



**NORTH-SOUTH CORRIDOR FEASIBILITY STUDY
FINAL REPORT
DECEMBER 2023**

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STUDY BACKGROUND

About this Study

Regional Transit Plan

Connecting Our Future: A Regional Transit Plan for Central Maryland (RTP) is a plan for improving public transportation in the region over the next 25 years. The Plan, published in September 2020, approaches regional mobility comprehensively, recognizing that people travel throughout Central Maryland in their daily activities. The Central Maryland region includes Anne Arundel County, Baltimore City, Baltimore County, Harford County, and Howard County. The RTP was developed in collaboration with a regional commission that included representatives from each jurisdiction.

A central focus of the RTP is increasing transit access for the region's residents, particularly those in historically underserved communities. Providing transit that connects residents to economic opportunities ensures the region's strength and vitality. In 2020, 40 percent of the region's 2.55 million residents and 50 percent of the region's 1.21 million jobs were accessible by bus or rail.¹ By 2045, the region is forecasted to grow by nearly 300,000 people and 440,000 jobs. The RTP recognizes that most growth in Central Maryland is not planned in areas accessible to existing transit stops and stations and recommends long-term expansion and enhancement of transit service to serve growing job and population centers, as well as coordinating transportation and land use goals and strategizing the fiscal sustainability of those decisions.

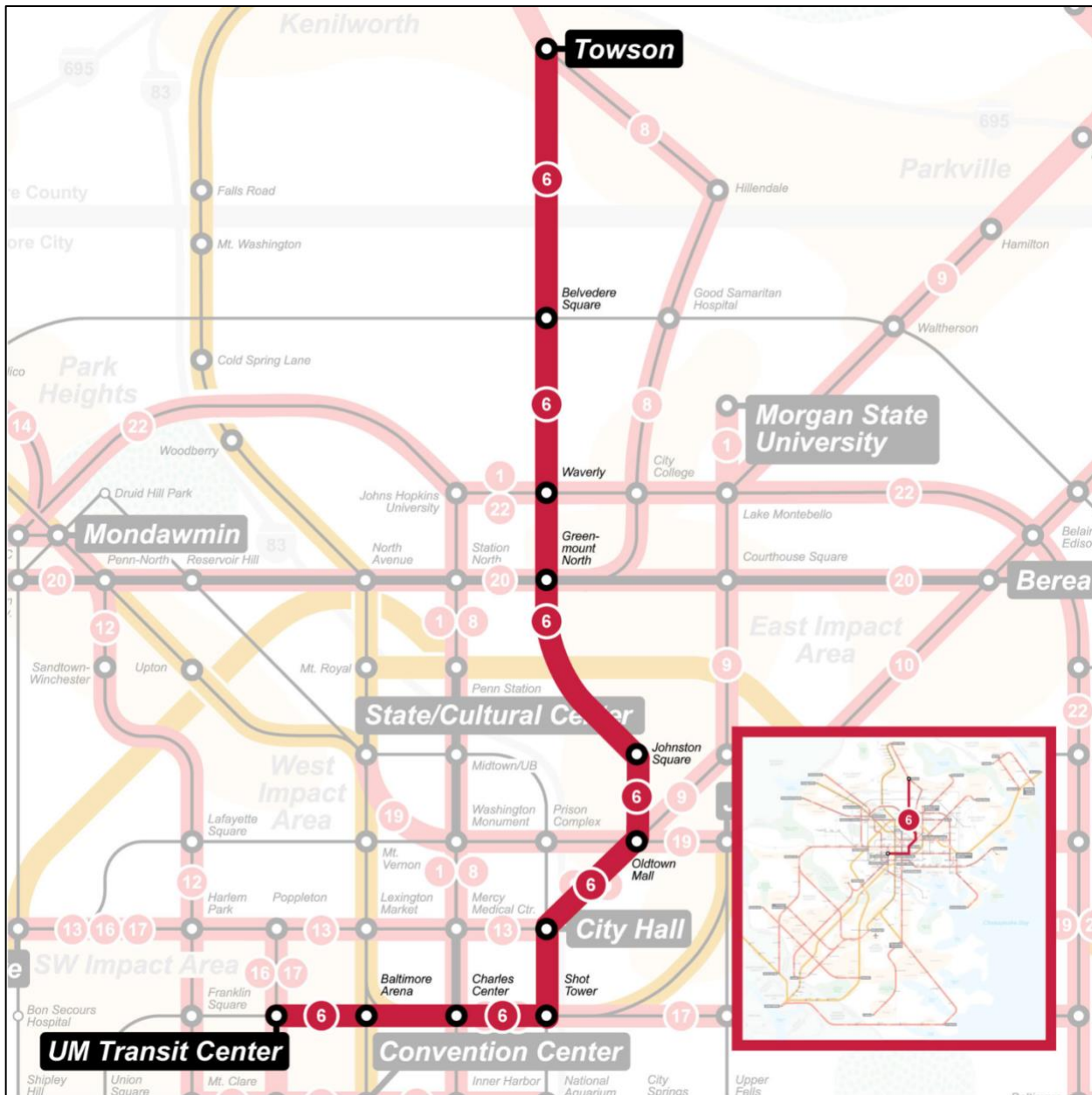
The RTP identifies 30 Regional Transit Corridors to plan and implement over the next 25 years, which are divided into short-, mid-, and long-term opportunity corridors. Areas identified as Regional Transit Corridors demonstrate transit demand that justifies infrastructure investment, expanded transit service, and/or technology improvements. All selected corridors are regionally significant, providing crucial connectivity within and between jurisdictions.

The RTP does not define specific routes, service patterns, alignments, stations, or levels of service; nor does it identify specific stations or modes to serve those corridors. Rather, the 30 corridors defined in the RTP were intended to remain flexible to accommodate the results of future feasibility studies and therefore present conceptual alignments without specifying a mode. The North-South Corridor Feasibility Study was the second corridor study conducted on behalf of the RTP Implementation Team.

As defined in the RTP, the North-South Regional Transit Corridor (Figure 1), connects dense Towson to Baltimore City's core neighborhoods and downtown (Corridor 6).

¹ This study used data from before the COVID-19 pandemic.

Figure 1: Corridor 6 (Towson to University of Maryland Medical Center)



Purpose of this Feasibility Study

This feasibility study advances this RTP corridor by exploring alignment and mode options that can be implemented to better connect Baltimore County and Baltimore City between Towson and downtown Baltimore. The Maryland Transit Administration (MTA) and its jurisdictional partners from Baltimore City and Baltimore County (referred to in this report as “the partners,”) iteratively developed seven conceptual alternatives to evaluate potential routes, modes, and service characteristics, including station locations and frequency. Following discussions with jurisdictional partners and an early project area review, some alternatives were extended further north to Lutherville, terminating at the Lutherville Light Rail station to promote connectivity to the existing transit network. Measures of effectiveness based on the project’s goals

and objectives provided data-based comparisons between the preliminary alternatives. This analysis was synthesized with public feedback, including insights from transit riders, advocates, and other stakeholders. Together, these quantitative and qualitative findings were used to compare options and develop recommendations for further study in the next phase of this project, the North-South Corridor Alternatives Analysis.

Previous Studies and Plans

Studies and Plans Reviewed

The project team reviewed studies and plans from the past dozen years to summarize the historical context for the North-South Corridor and contribute to the development of alternatives. Table 1 lists the previous studies and plans that were reviewed.

Table 1: Previous Studies and Plans Reviewed

Plan Type	Plan Name (Year Published)
Regional Transit Plans	Central Maryland Regional Transit Plan (2020)
Land Use & Redevelopment Plans	Greenmount West Area Master Plan (2010)
	Towson University Campus Master Plan (2015)
	York Road Corridor Vision and Action Plan (2015)
	Oldtown Redevelopment Plan (2016)
	Baltimore Penn Station Master Conceptual Plan (2020)
	Greenmount Avenue Leveraging Investments in Neighborhood Corridors (LINCS) Plan (2020)
	Johnston Square Vision Plan (2020)

The review of previous plans and studies coupled with an analysis of land use revealed several key areas of current or upcoming development, reinforced through input from the Baltimore City and Baltimore County district planners. In the northern section of the study area, Towson Circle and Towson Town Center are central to large-scale residential growth in recent years, as well as several more residential developments that are underway or planned. The York Road and Greenmount Avenue corridor from Towson into Baltimore City – which in the past has been an economic and racial dividing line – is a strong spine of plans and investment, referred to as a potential “zipper” that can connect its eastern and western flanking communities with retail, restaurant, services, and amenities.

Additionally, planned investment in upcoming development in and around Baltimore Penn Station, Johnston Square, and Oldtown suggests an opportunity for land use and transit decisions to be made in harmony. Further, transit-oriented development (TOD) potential was identified near Morgan State University and State Center. Together, these findings in the context of the reviewed plans and studies suggest strong opportunities to consider transit investment in concert with development, redevelopment, and community revitalization opportunities.

EXISTING CONDITIONS

The North-South Corridor has long been considered an important transportation spine, providing access to opportunities throughout Baltimore City and Baltimore County. In the existing and future conditions analysis, the project team analyzed need and demand for transit, travel flows, and land use and development in the corridor. The main takeaways are described below. Detailed findings of these analyses can be found in the Appendix A - Existing Conditions Technical Memorandum.

Population and Employment Density

MTA conducted a market analysis to assess the demographic makeup of residents and workers along the corridor and the distribution and density of locations where they live, work, shop, and play. This analysis helped to identify key anchors and attractors throughout the study area, travel to and from which transit could serve.

The market analysis found most of the study area had transit-supportive population and employment densities, with some sections supporting high-frequency, high-capacity services. Additionally, growth projections indicated potential future increases in density throughout the corridor, particularly in Towson Place, Hillendale, and Loch Raven.

Figure 2 shows the population and employment density in the study area in 2020, represented as the total number of people and jobs per acre. Typically, a density of at least five people and jobs per acre is supportive of fixed-route transit, while higher density may justify higher quality, more frequent transit. The highest density areas are in Mount Vernon, the Inner Harbor, downtown, around Johns Hopkins University, and Towson.

Regional Transit Connections

MTA conducted a travel flow analysis to assess current and future activity generations, travel patterns, and transit demand and capacity. Results from this analysis informed the development of preliminary alignment alternatives through building understanding of unique activity generators, trip patterns, and transit use in the study area.

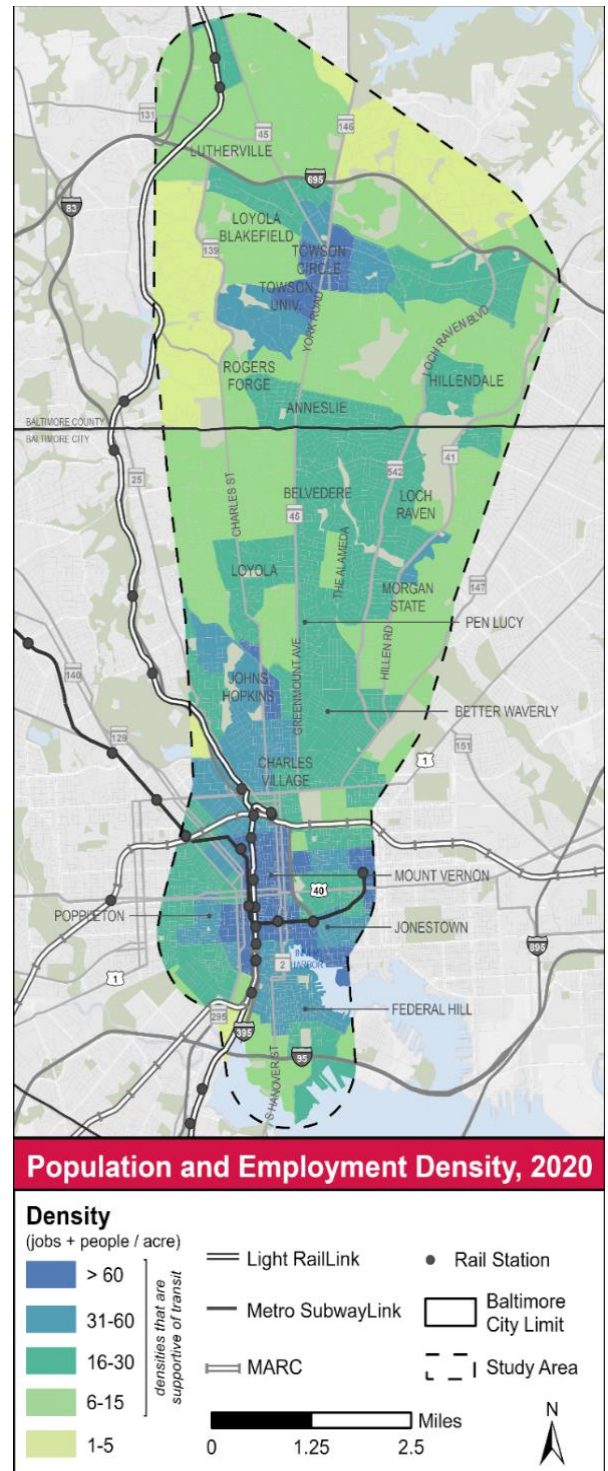
Major Generators and Points of Interest

Current major points of interest and trip generators in the study area include several university and college campuses, hospitals, and the Towson, Hampden, Charles Village, Penn Station, and Inner Harbor areas. Johns Hopkins University's Homewood Campus (Johns Hopkins University) is a major trip generator with significant projected growth, and Baltimore Peninsula (recently rebranded as Baltimore Peninsula) is projected to be a future major generator.

Travel Flows

High travel flow volumes are concentrated in three major areas: Towson (both the University and downtown area), Johns Hopkins University, and downtown Baltimore. It is anticipated that travelers will take more numerous and shorter trips throughout the entire corridor (as opposed to end-to-end trips), but projections show a significant increase in trips between Towson and Charles Village and between downtown Baltimore/Midtown/Charles Village and Baltimore Peninsula.

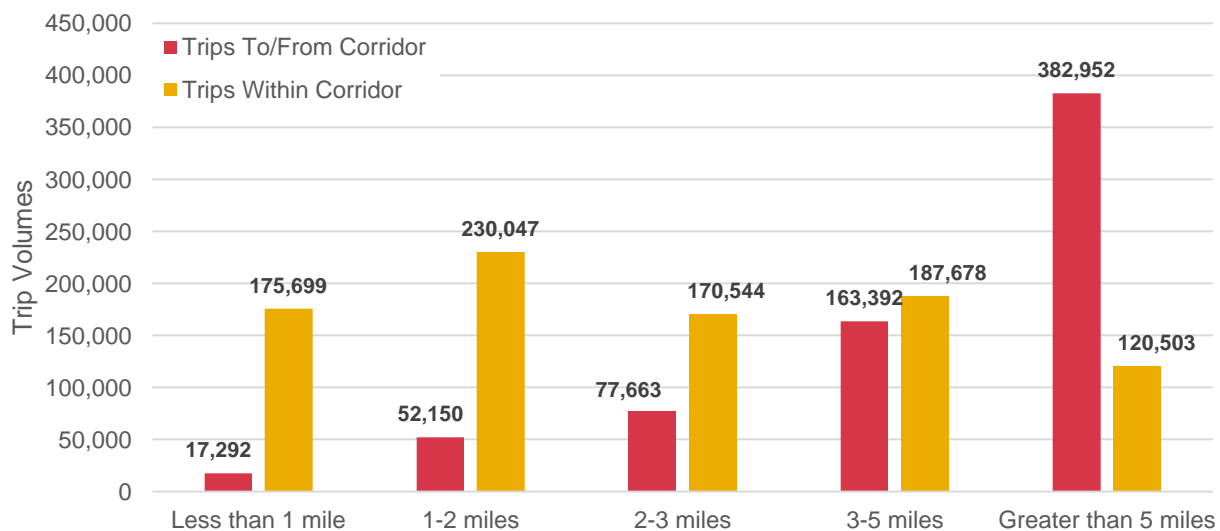
Figure 2: Current Population & Employment Density



Trip Patterns

While the feasibility study explored a variety of northern and southern termini, the northern-most option was the Lutherville Light Rail Station, and the southern-most option was Baltimore Peninsula. From Lutherville south to Baltimore Peninsula, the corridor is approximately 12 miles long. The length of trips made within the corridor and to/from the corridor is shown by distance in Figure 3. Trip distances are well distributed within the corridor, from short trips of less than a mile to longer trips greater than five miles. Nearly 46 percent of internal corridor trips are less than 2 miles. In contrast, the length of trips to and from the study area is typically longer, with 78 percent of trips reaching 3 miles or longer.

Figure 3: Daily Trip Volumes by Distance



Source: BMC Travel Demand Model

Transit Activity

The study area is served by MTA local bus routes, Charm City Circulator, and Towson Loop bus routes, as illustrated in Figure 4. Routes providing service include CityLinks Green, Red, and Silver, multiple LocalLink and Express Bus routes, the Purple Charm City Circulator, and the Towson Loop. The Towson Loop, launched in October 2021, connects riders to stops throughout Towson’s central business district including Goucher College, Greater Baltimore Medical Center, Towson University, and the University of Maryland St. Joseph Medical Center. In general, ridership activity and passenger movements or throughputs are greater in downtown Baltimore and Towson Town Center, and along Charles Street (south of North Avenue), Greenmount Avenue, and York Road. Peak direction transit travel on Loch Raven Boulevard is also notable, as shown in Figure 4. The region’s universities also offer shuttles that provide additional transit service to area students and staff, including the “Collegetown” shuttle, which serves over a dozen local higher education institutions.

Over 40 existing routes have some level of ridership activity at a bus stop within the study area. Figure 5 shows Fall 2019 bus stop-level ridership activity. Stops with major activity are located in downtown Baltimore, Greenmount Avenue/York Road, and Towson Town Center. Notable higher-ridership bus stops outside the downtown Baltimore cluster include Greenmount Avenue and North Avenue, the Alameda and 32nd Street, Loch Raven Boulevard and Goucher Boulevard, and Downtown Towson and Towson Town Center. It’s also notable that little ridership is generated by the Johns Hopkins University Homewood campus, which may be due in part to the presence of the Johns Hopkins private shuttle service between campuses and facilities throughout Baltimore which therefore is not taking place using MTA service. Note that the ridership in Figure 5 is for MTA service alone, resulting in a gap around the Homewood campus.

Figure 4: Existing Transit

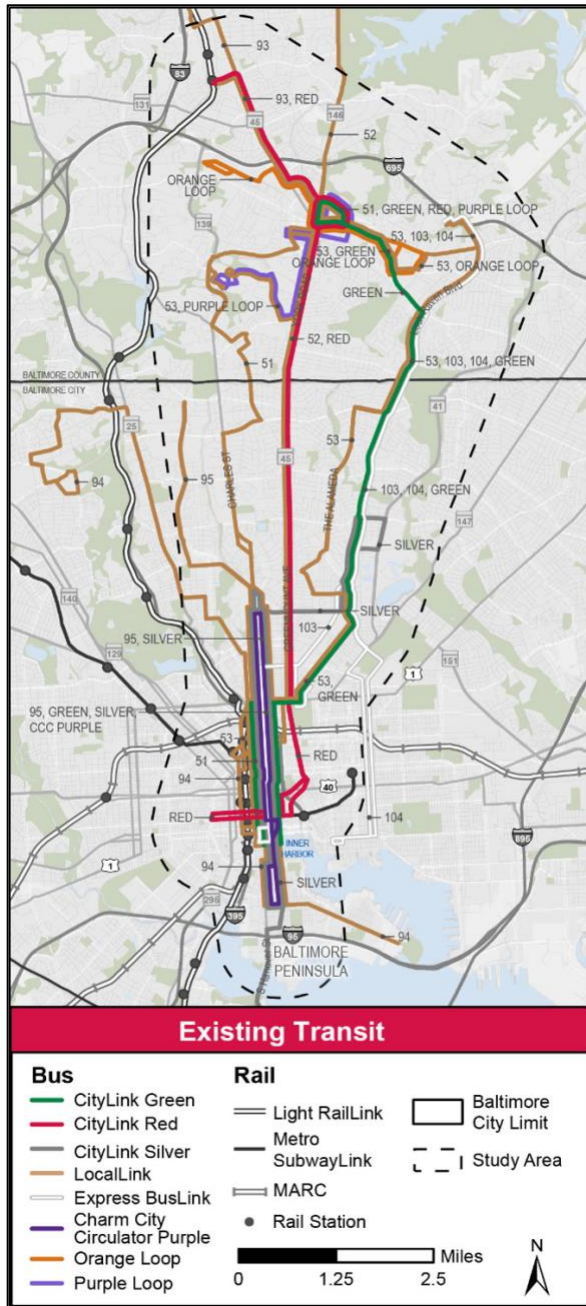
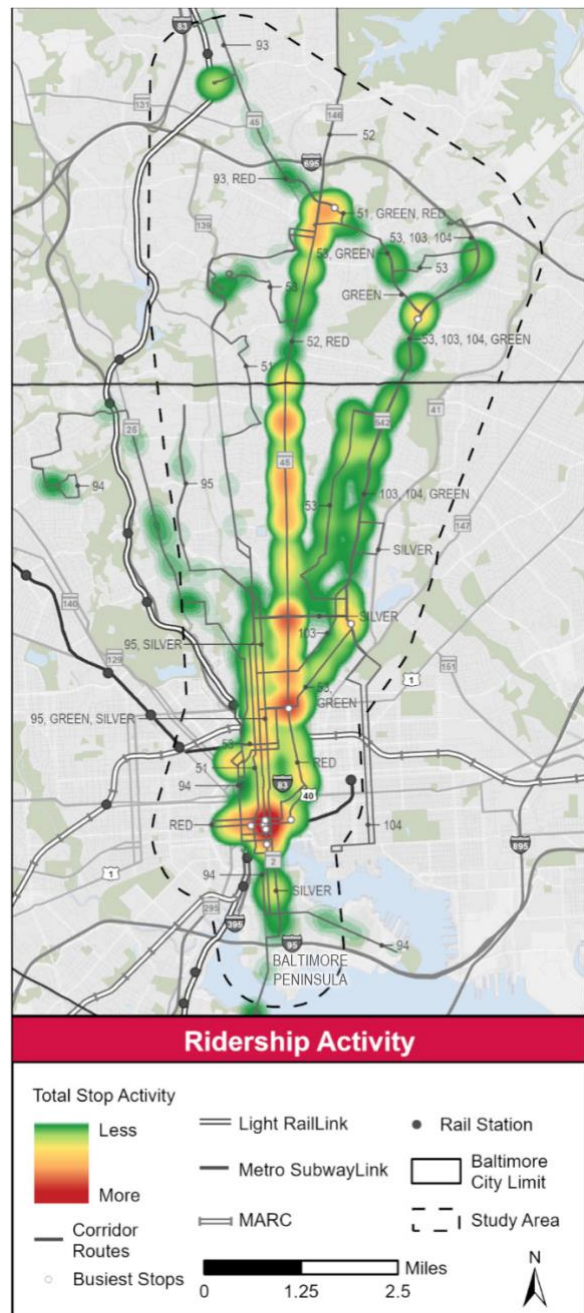


Figure 5: Ridership Activity



DOWNTOWN BALTIMORE GOALS AND OBJECTIVES

In the early stages of the feasibility study, MTA synthesized information from various sources to establish the North-South Corridor Study’s goals and objectives. These goals build on the community and stakeholder visions, values, and priorities defined in previous plans and studies and outreach activities in Winter/Spring 2021. In conjunction with a series of workshops with jurisdictional partners, MTA applied a funneling approach to iteratively identify, define, and refine specific goals and targeted objectives. The goals and objectives then provided a quantitative framework for measuring conceptual alternatives’ performance.

The goals were refined and finalized through public feedback via both a publicly available and a scientifically sampled survey, from which MTA also gathered a sense of stakeholder prioritization of those goals.

The North-South Corridor’s final goals, as well as corresponding objectives for each goal, are shown in Table 2.

Table 2: Corridor Goals and Objectives

Goal 1: Increase mobility and access to jobs, services, and other opportunities in the region
1. Prioritize service frequency and reliability along the corridor.
2. Improve existing and future system operability along the corridor.
3. Connect to transit, jobs, education hubs, and cultural destinations.
4. Minimize end-to-end travel time between the Towson area and downtown Baltimore.
5. Expand operating service hours to accommodate non-traditional work hours.
Goal 2: Center equity as a core consideration
1. Connect disadvantaged and low-income communities to educational, employment, and recreational opportunities in and around the corridor.
2. Maintain and enhance both real and perceived safety of all users within the corridor, regardless of modal choice.
3. Prioritize access for carless households and other transit-critical populations such as high school and university students.
4. Expand access to core and critical services, specifically social services, health care providers, groceries, and government services in and around the corridor.
5. Improve functionality and ease-of-use of fixed-route service for people with disabilities.
Goal 3: Create strategic connection to local and regional multi-modal transportation options
1. Provide connections to existing local and regional transit such as Light Rail, Metro Subway, MARC, and Amtrak.
2. Spur growth of transportation hubs and other supportive infrastructure throughout the corridor, including micromobility and first- and last-mile access.
3. Improve the connective pedestrian network around stops/stations.
4. Promote a unified transportation network between Baltimore City and Baltimore County through interjurisdictional coordination, including aligning schedules, stops/stations, wayfinding, and simplifying fare integration across providers.
5. Create deliberate connections to destinations along the East-West corridor and other key corridors within the region.

Goal 4: Support the region’s economic competitiveness and strategic growth

1. Minimize cost and time to implement proposed improvements while maintaining system flexibility and scalability.
2. Support community visions for maintaining historic main streets by ensuring long-term corridor goals and visions align with short-term plans.
3. Bolster transit investment to drive future transit-oriented development (TOD) within the corridor.
4. Increase the potential to attract federal and private support for major transit investment.

Goal 5: Support the region’s sustainability goals

1. Provide a service that enables and encourages mode shift to reduce greenhouse gas emissions and other pollution.
2. Improve public health outcomes by mitigating air quality-related health conditions.
3. Promote the use of climate-friendly transportation and infrastructure, such as electric buses and charging infrastructure.

ALTERNATIVES DEVELOPMENT

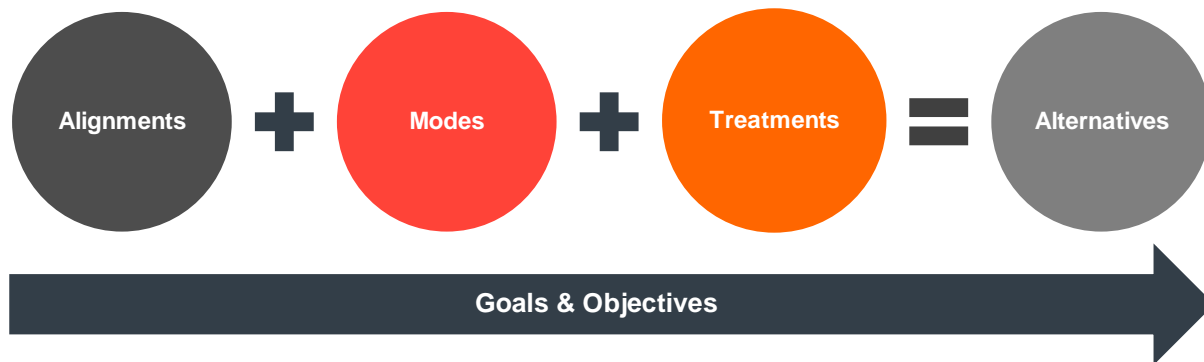
Development Process

The North-South Corridor encompasses a large and diverse study area; consequently, thoughtful, data-driven collaboration with partners and other stakeholders was critical to generating and refining a diverse set of options to test with appropriate alignments, modes, and associated treatments (e.g., dedicated lanes, mixed traffic, below-grade guideway).

Public input was vital to understanding the priorities and visions of success from community members and external stakeholders. Additionally, workshops and input from MTA, Baltimore City, and Baltimore County partners drove the alternatives development process. This core group brought the expertise, historical context, and comprehensive understanding of the study area needed to distill the full range of possible alternatives to a distinct set for MTA to test against the project’s goals, objectives, and measures of effectiveness (discussed further in the Evaluation of Preliminary Alternatives section).

MTA synthesized information from various sources to establish the North-South Corridor Study’s potential alignments and suitable modes, which were then used to create seven preliminary alternatives to advance through modeling. This process is depicted graphically in Figure 6.

Figure 6: Alternatives Formation Process



The process created three phases of alternatives development, using three workshop sessions with jurisdictional partners to review findings, gather input, and identify further analysis needed to continue the refinement process. Table 3 summarizes the purpose, content, and outcomes of each workshop.

Table 3: Alternatives Development Workshops Summary

Workshop	Purpose	Methods/Content	Outcomes
1	Provide information on potential modes and alignments.	Key attractors/anchors, population and employment density, segment, and modal analysis.	Affirmed project goals and narrowed down potential modes. Some alignments were extended to Lutherville following the workshop with Baltimore City and Baltimore County partners.
2	Finalize goals and objectives, review potential alternatives to advance, and gather input on potential stations/stops.	Modal comparison by key objectives, initial alignments, key connections, alignment comparison by key objectives.	Collaboratively developed five preliminary alternatives, using York Road, Loch Raven Boulevard, and Charles Street corridors; Charles Street north of 33 rd Street had overall low performance for key factors and alignment characteristics, so alternatives north of 33 rd Street were not developed. BRT, Light Rail, and Heavy Rail modes identified for further study. Two preliminary alternatives added to the five advanced in Workshop #2, following input from MTA and jurisdictional partners about alignments and neighborhood access.
3	Finalize seven preliminary alternatives (alignments, modes, stations) to advance to modeling with stakeholder approval.	Evaluation of preliminary alternatives	Concurrence on preliminary alternatives from Baltimore City and Baltimore County.

Modes Considered

To evaluate effective and viable corridor modes and alignments, MTA assessed projected density and throughput along five conceptual corridor alignments. With this information, MTA identified at the segment level which modes met the density and throughput thresholds. Shaped by findings from public and stakeholder surveys, MTA narrowed down a list of modal considerations to differentiate potential modes and identify the top five priorities (listed below in alphabetical order):

- Cost
- Support for Denser Land Use
- System Connectivity
- System Operability and Reliability
- Time to Build and Implement

Each mode was compared against the selected key objectives to better understand which modes most effectively met each goal. The analysis determined that Bus Rapid Transit (BRT), Light Rail Transit (LRT), and Heavy Rail Transit (HRT) were the most appropriate modes for consideration.

LRT is a common mode choice for new high-capacity transit in North America, often running on exclusive rights-of-way. As a high-capacity rail system, LRT provides one of the highest levels of passenger capacity, serving 60 to 175 passengers per vehicle. While LRT can operate in mixed traffic, the assumption throughout this study process has been that LRT would have exclusive right-of-way. Although there is not yet a prevalence of BRT in the Baltimore region, this mode is becoming an increasingly common choice for new high-capacity transit.

A form of rapid transit, BRT can provide the quality of rail transit with the flexibility of buses: through roadways that are dedicated to buses, BRT gives priority to buses at intersections where buses may interact with other traffic. While it is capable of operating in mixed traffic, this study has assumed that the BRT system would only be operating on dedicated lanes for buses. BRT also includes design features that reduce delays, such as off-board payment and all-door boarding. LRT and BRT stations are typically spaced one-half to two miles apart, consistent with the goals of increasing mobility and access and creating connections to other local and regional transportation options.

HRT provides high-capacity transit through exclusive rights-of-way and is ideal for serving high density metropolitan regions that have very high demand for transit. HRT lines are projected to provide between 70,000 and 200,000 trips per day, which is much higher than the corridor's expected ridership. Given the high capital costs associated with HRT, this mode has a much lower cost effectiveness compared to BRT and LRT. This is especially the case in lower density areas along the North-South Corridor.

Streetcar and Personal Rapid Transit (PRT) modes were not advanced for further study for this corridor. Both modes typically serve shorter trips of no greater than a few miles, making them unsuitable for the North-South Corridor. PRT vehicles typically have very little capacity (2 to 8 people) and would be unable to meet anticipated demand. Streetcar stops are typically one-quarter to one-half mile, requiring them to stop more frequently along a route. Additionally, they operate on a combination of mixed-traffic and exclusive rights-of-way, resulting in slower travel speeds and lower reliability. These characteristics make streetcars and PRT unsuitable modes for meeting the corridor's goals of frequent and reliable service.

Preliminary Alternatives

Seven preliminary alternatives were identified due to their intentional variability from one another, serving different locations, anchors, attractors, and demographic populations located in this diverse study area. Most notably, the preliminary alternatives tested different endpoints, going as far north as Lutherville to test the impact of connecting to the existing Light Rail system, and as far south as Baltimore Peninsula, where major redevelopment is underway. Figure 7 provides a summary of the preliminary alternatives.

Alternative 1

Light Rail Transit from Lutherville to University of Maryland Medical Center (UMMC) via York Road/Greenmount Avenue.

Alternative 2

Bus Rapid Transit from Lutherville to University of Maryland Medical Center (UMMC) via York Road/Greenmount Avenue.

Alternative 3

Bus Rapid Transit from Towson to Harbor East, via York Road/Greenmount Avenue.

Alternative 4

Heavy Rail Transit (Subway) from Towson to Baltimore Peninsula, via York Road/Greenmount Avenue.

Alternative 5

Bus Rapid Transit from Towson to Baltimore Peninsula, via York Road/Greenmount Avenue.

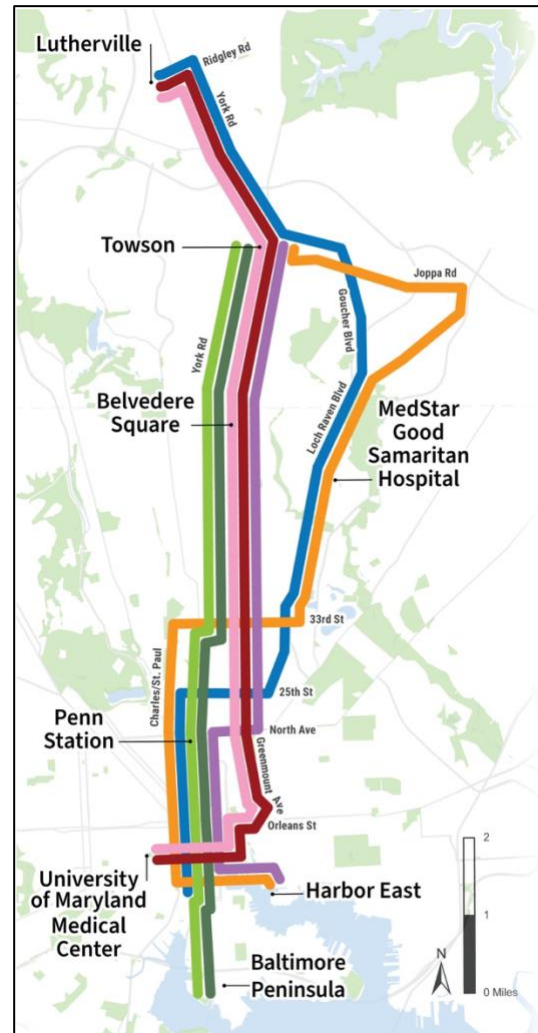
Alternative 6

Light Rail Transit from Lutherville to Otterbein, via Goucher Boulevard, Loch Raven Boulevard.

Alternative 7

Bus Rapid Transit from Towson to Harbor East, via Joppa Road, Loch Raven Boulevard.

Figure 7: Preliminary Alternatives



The following is a summary of each of the seven preliminary alternatives that were ultimately advanced in the study for public comment.

Preliminary Alternative 1: LRT from Lutherville to UMMC via York Road/Greenmount Avenue

Alternative 1 provides LRT service between Lutherville Rail Station and University of Maryland Medical Center (UMMC) in downtown Baltimore along York Road and Greenmount Avenue. The entire 11.6-mile, 21-station corridor is illustrated in Figure 8. Alternative 1 also creates connections to local MTA bus routes, specifically CityLink Red and LocalLink 93.

Alignment

The proposed route covers areas with a significant number of essential jobs, including in Lutherville and downtown Baltimore. The alignment also connects to areas of high-level vacancy, especially north and east of downtown Baltimore. The alignment begins at Lutherville Rail Station, travels south through Towson on York Road and Greenmount Avenue, and concludes at Fayette Street in downtown Baltimore. Alternative 1 closely follows the CityLink Red alignment, the highest ridership bus route in the network.

Characteristics and Features

Alternative 1 provides among the best average door-to-door transit travel between Towson and downtown Baltimore.

Figure 8: Alternative 1 Alignment & Stations

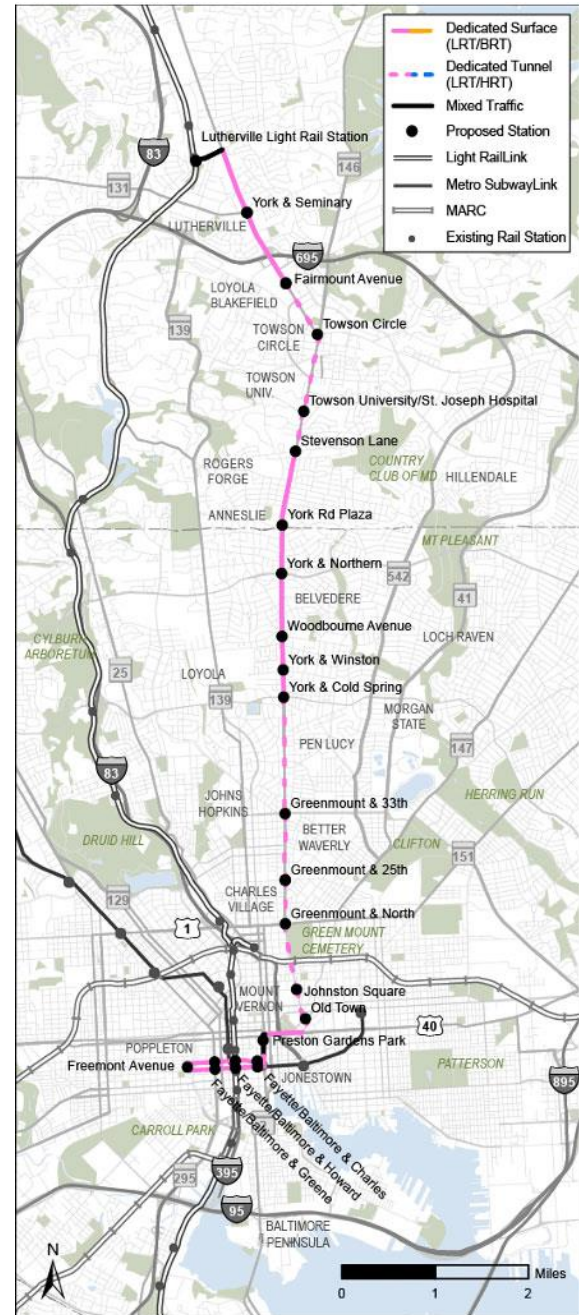


Table 4: Alternative 1 Service Information

Alternative 1 (LRT) Lutherville – UMMC		
Hours of Service		Weekdays 5:00 AM – 2:00 AM Saturday 5:00 AM – 2:00 AM Sunday 6:00 AM – 12:00 AM
Frequency	Peak	7 minutes
	Off Peak	10 minutes
One-Way Travel Time		33.8 minutes
One-Way Length		11.6 miles
Stations		21

Preliminary Alternative 2: BRT from Lutherville to UMMC via York Road/Greenmount Avenue

Alternative 2 provides BRT service between Lutherville Rail Station and University of Maryland Medical Center (UMMC) in downtown Baltimore along York Road and Greenmount Avenue. Alternative 2 closely mirrors Alternative 1, but tests how BRT would perform instead of LRT. A BRT system was chosen due to its lower capital and operational costs, as well as a shorter construction period. The entire 11.5-mile, 33-station corridor is illustrated in Figure 9. This alignment has the largest number of stations/stops of the seven preliminary alternatives. Alternative 2 also creates connections to local MTA bus routes, specifically CityLink Red and LocalLink 93.

Alignment

The alignment begins at the Lutherville Light Rail Station on mixed traffic lanes, travels south on York Road and Greenmount Avenue using a dedicated guideway and concludes at Fayette Street in downtown Baltimore. Alternative 2 precisely follows the CityLink Red alignment, the highest ridership bus route in the network.

Characteristics and Features

Alternative 2 provides the greatest number of connections to rail stations, frequent bus routes, and locally operated transit routes, although it does not connect to Baltimore Penn Station.

Figure 9: Alternative 2 Alignment & Stations

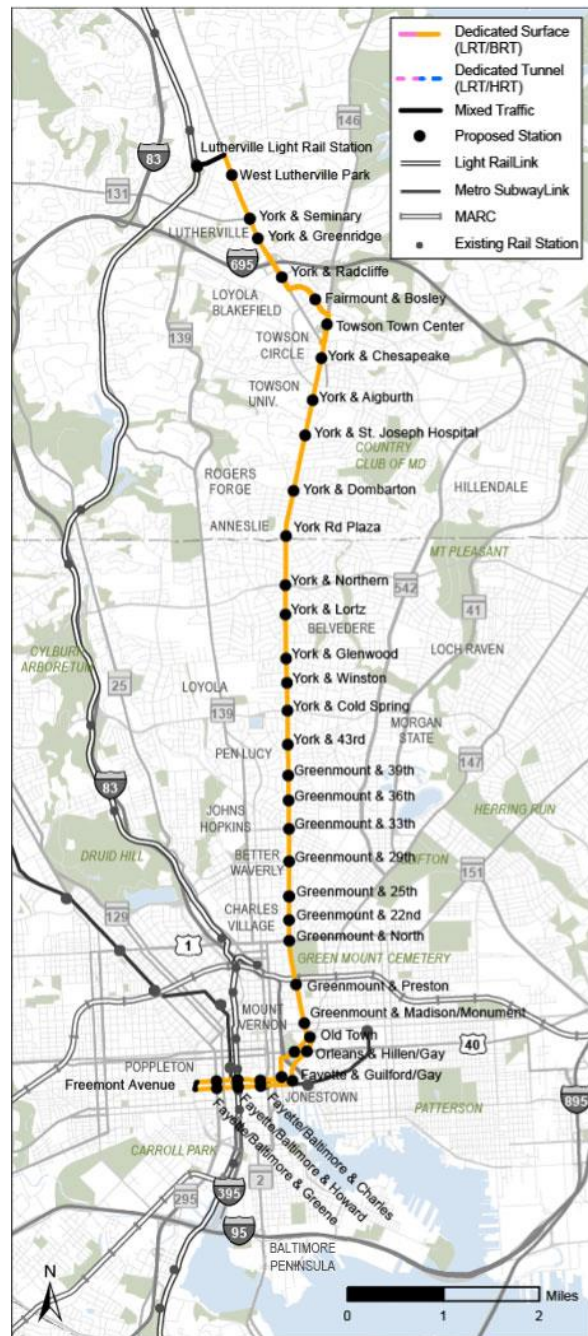


Table 5: Alternative 2 Service Information

Alternative 2 (BRT) Lutherville - UMMC		
Hours of Service		Weekdays 5:00 AM – 2:00 AM Saturday 5:00 AM – 2:00 AM Sunday 6:00 AM – 12:00 AM
Frequency	Peak	7 minutes
	Off Peak	10 minutes
One-Way Travel Time		42.2 minutes
One-Way Length		11.5 miles
Stations		33

Preliminary Alternative 3: BRT from Towson to Harbor East via York Road/Greenmount Avenue

Alternative 3 provides BRT service between Towson Town Center and Harbor East along York Road and Greenmount Avenue. The route differs from the previously noted BRT option (Alternative 2) by using St. Paul Street/Charles Street instead of Greenmount Avenue for part of the alignment and terminating in Harbor East. Moreover, this alternative travels entirely on surface-level, dedicated. The entire 9.2-mile, 28-station corridor is illustrated in Figure 10. Alternative 3 also creates connections to several bus routes and MARC and Amtrak at Penn Station.

Alignment

The alignment begins at Towson Town Center and travels south on York Road and Greenmount Avenue before turning west to merge with St. Paul Street and continue going south. At Pratt Street, the route turns southeast and concludes in Harbor East (see Figure 12). Heading north, this alignment would use portions of Charles Street running parallel with St. Paul Street. Alternative 3 combines segments of the CityLink Red and Green alignments.

Characteristics and Features

Alternative 3 provides the greatest access to transit-critical populations and has the highest number of projected daily boardings in 2045.

Table 6: Alternative 3 Service Information

Alternative 3 (BRT) Towson - Harbor East		
Hours of Service		Weekdays 5:00 AM – 2:00 AM Saturday 5:00 AM – 2:00 AM Sunday 6:00 AM – 12:00 AM
Frequency	Peak	7 minutes
	Off Peak	10 minutes
One-Way Travel Time		35.8 minutes
One-Way Length		9.2 miles
Stations		28

Figure 10: Alternative 3 Alignment & Stations



Preliminary Alternative 4: HRT from Towson to Baltimore Peninsula via York Road/St. Paul Street

Alternative 4 provides HRT service between Towson Town Center and Baltimore Peninsula along York Road and St. Paul Street. HRT is being considered due to its ability to attain high speeds and travel time savings. The entire 10.5-mile, 9-station corridor is illustrated in Figure 11. Alternative 4 also creates connections to several bus routes and to MARC and Amtrak at Penn Station.

Alignment

The proposed route utilizes an entirely tunneled right-of-way traveling below-grade, which drastically reduces the potential for service disruptions or delays attributable to shared surface-level infrastructure. The alignment starts at Towson Town Center and, heading south, travels underground on York Road before turning west at 33rd Street. From there, it leads to St. Paul Street, where it turns south again and ultimately ends in Baltimore Peninsula. Alternative 4 combines segments of the CityLink Red and Silver alignments.

Characteristics and Features

According to the MOE analysis, Alternative 4’s exclusive right-of-way saves the most travel time for riders among all seven preliminary alternatives.

Figure 11: Alternative 4 Alignment & Stations

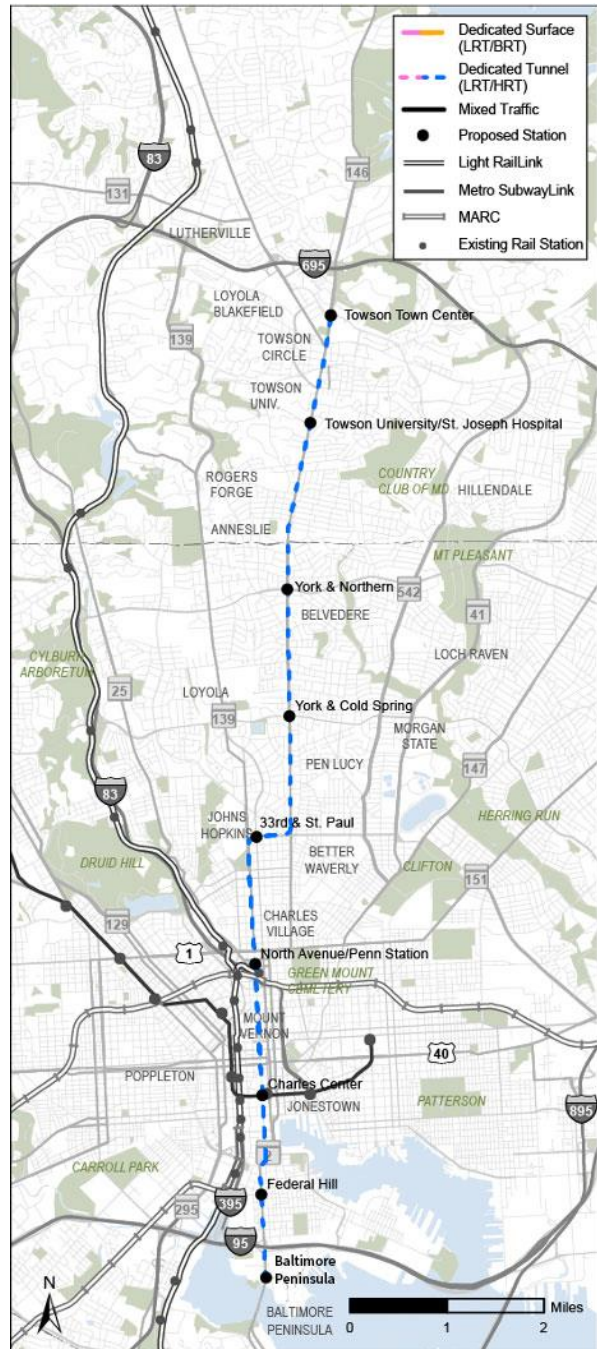


Table 7: Alternative 4 Service Information

Alternative 4 (HRT) Towson – Baltimore Peninsula		
Hours of Service		Weekdays 5:00 AM – 2:00 AM Saturday 5:00 AM – 2:00 AM Sunday 6:00 AM – 12:00 AM
Frequency	Peak	7 minutes
	Off Peak	10 minutes
One-Way Travel Time		23.3 minutes
One-Way Length		10.5 miles
Stations		9

Preliminary Alternative 5: BRT from Towson to Baltimore Peninsula via York Road/Greenmount Avenue

Alternative 5 provides BRT service between Towson Town Center and Baltimore Peninsula along York Road and Greenmount Avenue. It uses nearly the same route as Alternative 4 but tests how BRT would perform instead of HRT. A BRT system was chosen due to its lower capital and operational costs, and shorter construction period. The entire 10.4-mile, 30-station corridor is illustrated in Figure 12. Alternative 5 also creates connections with MTA’s CityLink Red, CityLink Green, CityLink Silver, and LocalLink 93 bus routes and to MARC and Amtrak at Penn Station.

Alignment

The alignment begins at Towson Town Center and, traveling south on dedicated guideways, moves along York Road and Greenmount Avenue before turning west on 33rd street. From there, it connects with St Paul Street and turns south towards its terminus in Baltimore Peninsula. Heading north, this alignment would utilize portions of Charles Street running parallel with St. Paul Street.

Characteristics and Features

Alternative 5 saves travel time compared to existing transit service, but not compared to Alternative 4. According to the MOE analysis, this option performs well in terms of increasing access to jobs, creating strategic connections to multimodal transportation, and improving equity.

Figure 12: Alternative 5 Alignment & Stations

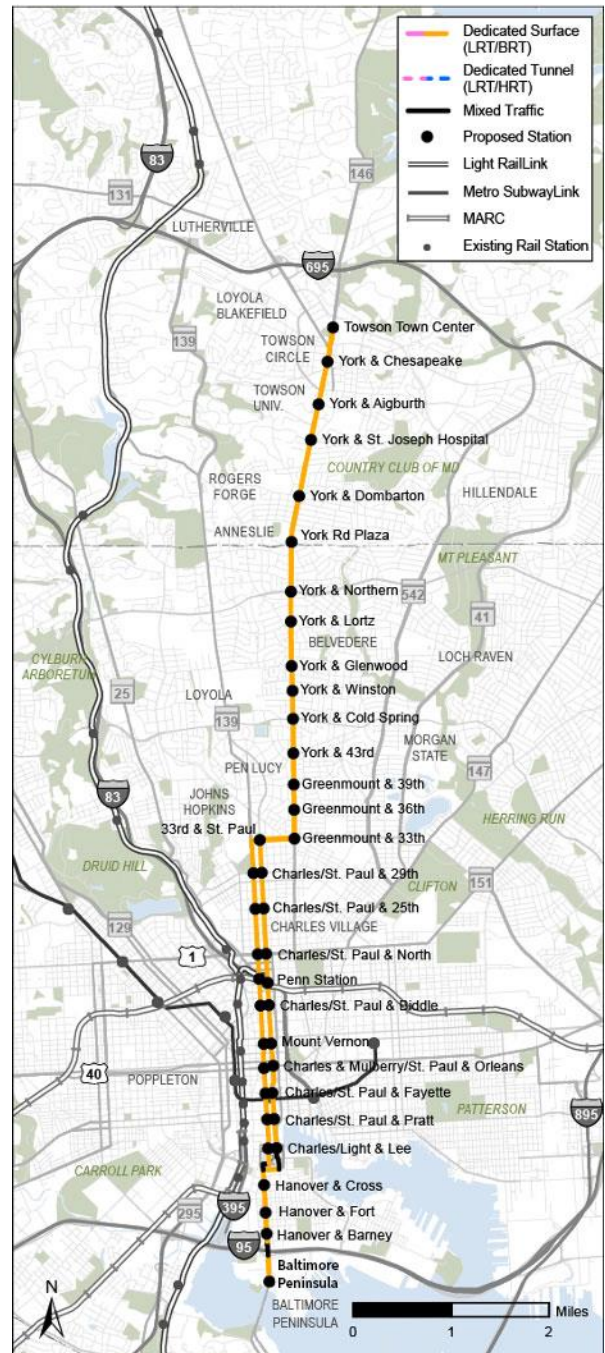


Table 8: Alternative 5 Service Information

Alternative 5 (BRT) Towson – Baltimore Peninsula		
Hours of Service		Weekdays 5:00 AM – 2:00 AM Saturday 5:00 AM – 2:00 AM Sunday 6:00 AM – 12:00 AM
Frequency	Peak	7 minutes
	Off Peak	10 minutes
One-Way Travel Time		39.8 minutes
One-Way Length		10.4 miles
Stations		30

Preliminary Alternative 6: LRT from Lutherville to Otterbein via Loch Raven Boulevard/St. Paul Street

Alternative 6 provides LRT service between Lutherville and Otterbein along Loch Raven Boulevard and St. Paul Street/Charles Street. This option tests the performance of LRT using Loch Raven Boulevard instead of York Road. This route uniquely serves riders from eastern Towson using dedicated surface-level guideways. The entire 12.5-mile, 25-station corridor is illustrated in Figure 13. Alternative 6 runs along several MTA bus route alignments including CityLink Red, CityLink Green, CityLink Silver, and LocalLink 93. Alternative 6 also connects to MARC and Amtrak at Penn Station.

Alignment

The alignment starts in Lutherville and, heading south, travels through Towson along York Road before turning southeast on Goucher Boulevard until it connects with Loch Raven Boulevard. It then travels south towards 25th Street, where the route turns west toward St. Paul Street and travels south until its terminus in Otterbein. Heading north, this alignment would utilize portions of Charles Street running parallel with St. Paul Street.

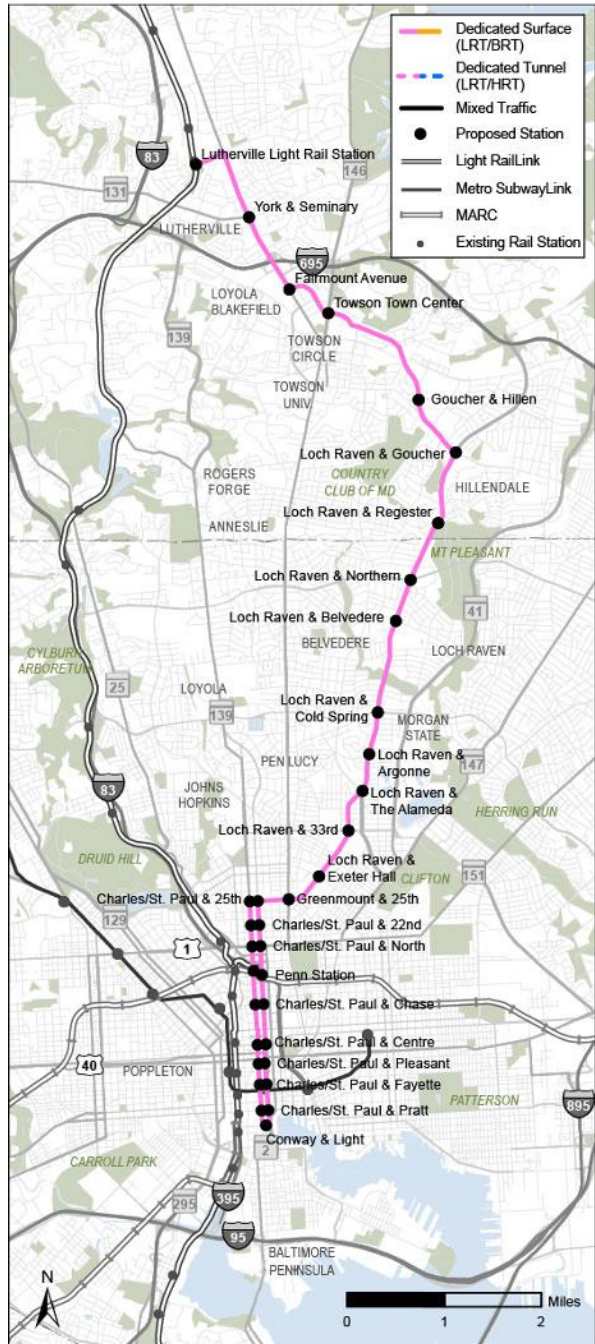
Characteristics and Features

According to the MOE analysis, this option performs well in terms of increasing access to jobs and creating strategic connections to multimodal transportation.

Table 9: Alternative 6 Service Information

Alternative 6 (LRT) Lutherville – Otterbein		
Hours of Service		Weekdays 5:00 AM – 2:00 AM Saturday 5:00 AM – 2:00 AM Sunday 6:00 AM – 12:00 AM
Frequency	Peak	7 minutes
	Off Peak	10 minutes
One-Way Travel Time		41.7 minutes
One-Way Length		12.5 miles
Stations		25

Figure 13: Alternative 6 Alignment & Stations



Preliminary Alternative 7: BRT from Towson to Harbor East via Joppa Road/Loch Raven Boulevard

Alternative 7 provides BRT service between Towson and Harbor East along Joppa Road and Loch Raven Boulevard. This alignment is the longest proposed alternative and has the second largest number of stations/stops. It tests the performance of a long transit street connecting essential job clusters in Towson, JHU-Homewood, and downtown Baltimore. It is the only proposed alternative that serves the neighborhoods immediately east of Towson. The entire 12.6-mile, 32-station corridor is illustrated in Figure 14. Alternative 7 also runs along MTA’s CityLink Silver and LocalLink 93 bus route alignments and connects to MARC and Amtrak at Penn Station.

Alignment

The alignment starts at Towson Town Center and, heading south, runs east on Joppa Road before connecting to Loch Raven Boulevard. The route then travels southwest and south towards East 33rd Street. The route then turns west until it reaches St. Paul Street, after which it heads south to the Inner Harbor and, ultimately, east towards Harbor East. Heading north, this alignment would utilize portions of Charles Street running parallel with St. Paul Street.

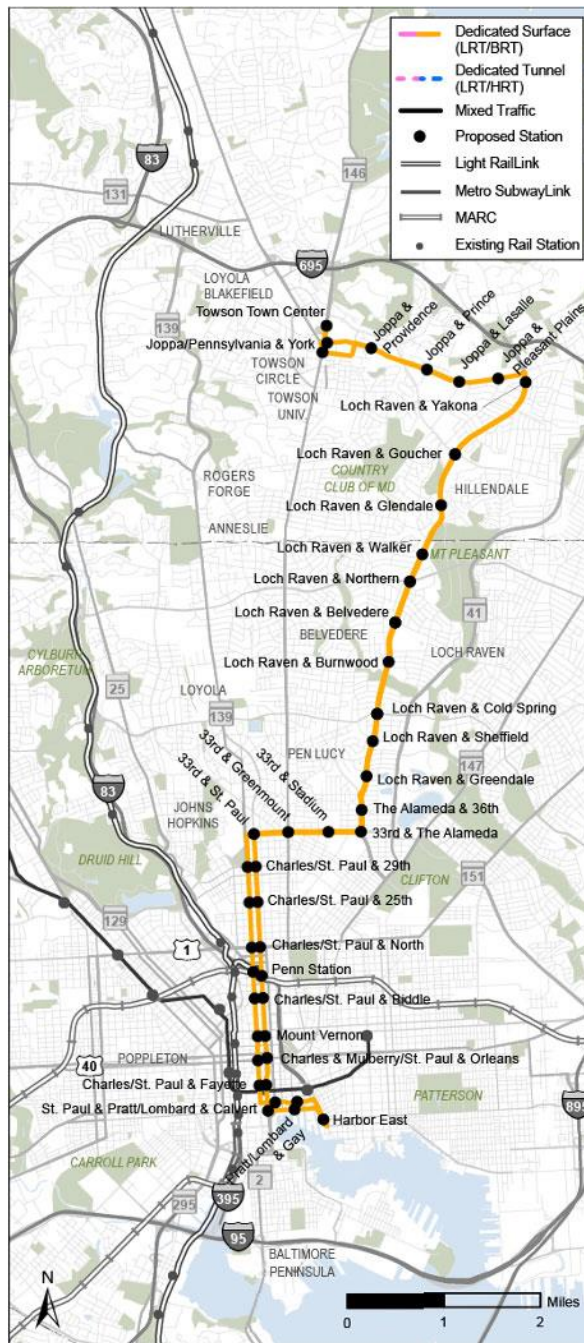
Characteristics and Features

Alternative 7 improves equity and access for households within a half-mile of a station when compared with existing transit service. According to the MOE analysis, this option performs well in terms of increasing access to jobs and creating strategic connections to multimodal transportation.

Table 10: Alternative 7 Service Information

Alternative 7 (BRT) Towson - Harbor East		
Hours of Service	Weekdays 5:00 AM – 2:00 AM, Saturday 5:00 AM – 2:00 AM, Sunday 6:00 AM – 12:00 AM	
Frequency	Peak	7 minutes
	Off Peak	10 minutes
One-Way Travel Time	44.5 minutes	
One-Way Length	12.6 miles	
Stations	32	

Figure 14: Alternative 7 Alignment & Stations



EVALUATION OF PRELIMINARY ALTERNATIVES

Measures of Effectiveness Results

Upon developing project goals, MTA worked with jurisdictional partners and the East-West Corridor Project Team (another corridor study identified through the RTP) to identify measures of effectiveness (MOEs) with which to evaluate the preliminary alternatives. These MOEs are shown in Tables 11 and 12. The goals, objectives, and MOEs played an integral role in analyzing and comparing the seven preliminary alternatives. Additional information regarding the transportation modeling and measures of effectiveness methodology is described in Appendix B.

Table 11: Measures of Effectiveness by Goal²

		ALTERNATIVES	1	2	3	4	5	6	7
		Mode	LRT	BRT	BRT	HRT	BRT	LRT	BRT
		Endpoints	Lutherville UMMC -	Lutherville UMMC -	Towson Harbor East -	Towson Baltimore Peninsula -	Towson Baltimore Peninsula -	Lutherville Otterbein -	Towson Harbor East -
		Length (miles)	11.6	11.5	9.2	10.5	10.4	12.5	12.6
		Number of Stations	21	33	28	9	30	25	32
		Average Station Spacing (miles)	0.6	0.3	0.3	1.2	0.3	0.5	0.4
Goal	Theme	Measure of Effectiveness	Comparison	Comparison	Comparison	Comparison	Comparison	Comparison	Comparison
1. Increase mobility and access to jobs, services, and other opportunities in the region	Reliability	Percent of dedicated or separated guideway	GOOD	BETTER	BETTER	BEST	BETTER	BETTER	BEST
		Fixed or Flexible Guideway	FIXED	FLEXIBLE	FLEXIBLE	FIXED	FLEXIBLE	FIXED	FLEXIBLE
	Access	Transit travel time savings between Towson and downtown Baltimore (minutes)	BEST	BETTER	BETTER	BEST	BETTER	GOOD	GOOD
		Households within 1/2 mile of a station, per mile	BETTER	BETTER	BEST	GOOD	BEST	BETTER	BETTER
		Student population within 1/2 mile of a station per mile	BETTER	BETTER	BEST	GOOD	BEST	GOOD	BETTER
		Future jobs within 1/2 mile of a station per mile	BETTER	BEST	BEST	GOOD	BETTER	BETTER	BETTER
2. Create strategic connection to multi-modal transportation options locally and regionally	Connections	Connections to rail stations, frequent bus routes, and locally operated transit routes	BETTER	BEST	BETTER	GOOD	GOOD	BETTER	GOOD
		Additional future jobs accessible by transit within 45 minutes	BEST	BETTER	BETTER	GOOD	GOOD	GOOD	BETTER
3. Center equity as a core consideration	Equity	All transit-critical populations within 1/2 mile of a station, per mile	BETTER	BETTER	BEST	GOOD	BETTER	BETTER	BETTER
4. Support the region's economic competitiveness and strategic growth	Cost	Capital cost	\$\$\$	\$	\$	\$\$\$	\$	\$\$	\$
	Development	Transit-Oriented Development and Opportunity Zones within 1/2 mile of station	BETTER	GOOD	GOOD	GOOD	BEST	BETTER	BETTER
		Implementation time	MIDDLE	SHORTEST	SHORTEST	LONGEST	SHORTEST	MIDDLE	SHORTEST
	Implementation	Bridge and Tunnel Complexity	MEDIUM	N/A	N/A	HIGH	N/A	MEDIUM	N/A
Ridership		Projected daily boardings in 2045, per mile	BETTER	BETTER	BEST	GOOD	BEST	BETTER	BETTER
	Sustainability	Zero-car households within 1/2 mile of a station, per mile	BETTER	BETTER	BETTER	GOOD	BETTER	BETTER	BEST

² Cost estimates were developed between 2021 and 2022. The costs are expected to be higher given recent inflation and current trends.

Table 12: Measures of Effectiveness by Theme³

Theme	Measure of Effectiveness	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
Reliability	Percent of dedicated or separated guideway	96%	97%	98%	100%	97%	98%	100%
	Fixed or Flexible Guideway	FIXED	FLEXIBLE	FLEXIBLE	FIXED	FLEXIBLE	FIXED	FLEXIBLE
Travel Time Savings	Transit travel time savings between Towson and downtown Baltimore (minutes)	11	7	7	14	7	3	0
Access	Households within 1/2 mile of a station, per mile	3,700	3,800	4,700	2,800	4,500	3,800	4,300
	Student population within 1/2 mile of a station per mile	1,100	1,100	1,200	500	1,000	900	1,000
	Future jobs within 1/2 mile of a station per mile	20,200	20,900	26,200	19,400	24,500	18,200	21,000
Connections	Connections to rail stations, frequent bus routes, and locally operated transit routes	23	24	23	19	21	23	22
	Additional future jobs accessible by transit within 45 minutes	38,000	26,000	19,000	6,000	8,000	11,000	22,000
Equity	All transit-critical populations within 1/2 mile of a station, per mile	11,400	11,800	13,600	6,700	11,900	11,600	13,000
	Low-income population within 1/2 mile of a station, per mile	2,500	2,500	2,800	1,300	2,400	2,000	2,300
	Minority population within 1/2 mile of a station, per mile	5,400	5,600	6,400	3,100	5,500	6,000	6,700
	Zero-car households within 1/2 mile of a station, per mile	1,200	1,200	1,500	700	1,300	1,100	1,200
	Limited English proficiency population within 1/2 mile of a station, per mile	300	300	400	200	300	300	300
	Adult population over age 65 within 1/2 mile of a station, per mile	1,100	1,200	1,400	700	1,200	1,200	1,300
	Population with disabilities within 1/2 mile of a station, per mile	1,000	1,000	1,200	600	1,100	1,000	1,100
Cost	Capital cost (\$ millions)	4,000	600	500	6,200	600	1,300	600
Development	Transit-Oriented Development and Opportunity Zones within 1/2 mile of station	1,200	1,100	1,000	1,100	1,400	1,200	1,200
Implementation	Implementation time (years)	7-9	6-8	6-8	10-12	6-8	7-9	6-8
	Bridge and Tunnel Complexity	MEDIUM	N/A	N/A	HIGH	N/A	MEDIUM	N/A
Ridership	Projected daily boardings in 2045, per mile	1,700	1,800	2,100	1,100	2,200	1,400	1,400
Sustainability	Zero-car households within 1/2 mile of a station, per mile	1,200	1,200	1,500	700	1,300	1,100	1,200

³ Cost estimates were developed between 2021 and 2022. The costs are expected to be higher given recent inflation and current trends.

Measures of Effectiveness Takeaways

The measures of effectiveness (MOEs) were identified both quantitatively by theme and categorically as good, better, and best options by goal. After the MOEs were analyzed and compared for each of the seven preliminary alternatives, MTA learned the following about the preliminary alternatives and specific geographic segments within the corridor:

Overall Takeaways

- The preliminary alternatives are not equal in their ability to attract ridership. Specific alignment tests show greater ridership potential in some areas compared to others.
- **BRT** preliminary alternatives have **less travel time savings** because their stations are spaced more closely, but a higher number of stations also **increases access**.
- **Cost varies dramatically** across preliminary alternatives and is **driven by mode and length of tunneling**. Costs to build and operate rail preliminary alternatives are two to ten times higher than BRT.
- **Implementation time** is directly related to cost and risk across the preliminary alternatives. **Rail** preliminary alternatives will take longer to implement than **BRT**.
- The North-South Corridor is an **investment to improve existing transit** versus create new service to fill a gap; **ridership** is therefore high for all tested alternatives and **not a major differentiator** between preliminary alternatives.
- **York Road** preliminary alternatives produce **more ridership**; extending to Lutherville increases ridership by approximately 4,000 riders, of which over 1,000 riders walking to stations and almost 3,000 are riders driving to a park-and-ride facility at the Lutherville light rail station.
- Preliminary alternatives that use the **Charles/St. Paul** segment and serve Penn Station/Mt. Vernon have **higher overall access** than those that stay on Greenmount Avenue.
- Looking at access for **transit critical populations**, Alternative 3 (BRT from Towson to Harbor East), and Alternative 7 (BRT from Towson to Harbor East) are clear top performers, while Alternative 4 (HRT from Towson to Baltimore Peninsula) is the bottom performer.
- Overall, **York Road** preliminary alternatives **perform better** than those on Loch Raven Boulevard. However, York Road preliminary alternatives have the **most constrained right-of-way**.
- **LRT** provides **significant travel time savings**; BRT provides greater flexibility and **faster, lower-cost implementation**.
- The number of short trips in the corridor emphasizes the **need for connectivity** with underlying local transit service, shorter stop spacing, and **improved bicycle and pedestrian facilities** in the corridor.

Takeaways by Geographic Segment

- Lutherville
 - Low density of land uses means that connection to rail station to accommodate park and ride constitutes most of the ridership contributed to the alternatives by the addition of this almost 2-mile segment. Identifying a park and ride location closer to denser land uses may be another way to capture some of this ridership without the Capital cost associated with additional facility mileage through low-density areas.
 - Additional distance adds cost and the connection from Towson to Hunt Valley is part of another RTP Corridor.

- Towson
 - York Road has more consistent density.
 - Loch Raven has a higher percentage and absolute number of low-income population, minority population, and zero-car households compared to York Road.
 - York Road is more direct, but the roadway right-of-way is more constrained.
- Central Baltimore
 - Connecting to Penn Station provides key access to regional transit, including MARC and Amtrak service, and reaches greater density of jobs than Greenmount Avenue.
- Downtown
 - All options generate strong ridership in the downtown Baltimore area, including Harbor East.
 - All options connect to Metro Subway at Charles Center.
 - Baltimore Peninsula generates more ridership for BRT (Alternative 5) and not much for HRT (Alternative 4).

Takeaways by Alternative

- **Alternative 1** (LRT from Lutherville to UMMC via York Road/Greenmount Avenue)
 - Among the best transit travel time savings between Towson and downtown Baltimore.
 - Highest amount of additional future jobs accessible by transit within 45 minutes.
- **Alternative 2** (BRT from Lutherville to UMMC via York Road/Greenmount Avenue)
 - Among the best access to future jobs within a half mile of a station.
 - Most connections to rail stations, frequent bus routes, and locally operated transit routes.
- **Alternative 3** (BRT from Towson to Harbor East, via York Road/Greenmount Avenue)
 - Highest number of transit-critical populations within a half mile of a station.
 - Among the best access to households, student populations, and future jobs within a half mile of a station.
 - Highest number of projected daily boardings in 2045.
- **Alternative 4** (HRT from Towson to Baltimore Peninsula, via York Road/Greenmount Avenue)
 - Among the highest percent of dedicated or separated guideway.
 - Among the best transit travel time savings between Towson and downtown Baltimore.
- **Alternative 5** (BRT from Towson to Baltimore Peninsula, via York Road/Greenmount Avenue)
 - Among the best access to households and student populations within a half mile of a station.
 - Most Transit-Oriented Development and Opportunity Zones within a half mile of a station.
- **Alternative 6** (LRT from Lutherville to Otterbein, via Goucher Boulevard, Loch Raven Boulevard)
 - Uniquely serves riders from eastern Towson.
- **Alternative 7** (BRT from Towson to Harbor East, via Joppa Road, Loch Raven Boulevard)
 - Among the highest percent of dedicated or separated guideway.
 - Most zero-car households within a half mile of a station.

PUBLIC OUTREACH SUMMARY

MTA public outreach activities commenced in mid-2021 and finished in late 2022. As outlined in the Outreach Summary chart below, MTA conducted a combination of web and in-person surveys, a sequence of virtual public meetings, and informal pop-ups. Early in the project, a public web-based survey was conducted to develop project goals and objectives, which were then refined through virtual public meetings. MTA solicited public comment between September and December 2022 on the seven preliminary alternatives through in-person pop-up events throughout the project area as well as public meetings and community events. Public outreach and engagement efforts are further detailed in Appendix C.

Geographical Distribution of Respondents

Findings from comments gathered during fall 2022 showed:

- Over 80 percent of commenters who provided their neighborhood of residence live within the study area.
- Slightly more than half of those, 637 commenters, live in Baltimore County.
- Lutherville/Timonium commenters represent 12 percent of the commenters who provided their neighborhood of residence.
- Towson as a whole and neighborhoods within it, including Rodgers Forge and Anneslie, are highly represented in the comments
- Communities along the Loch Raven Boulevard preliminary alternatives, along York Road south of Northern Parkway and north of Charles Village, and in the southern portion of the study area are represented at much lower rates than those in Rodgers Forge and Anneslie.

Support for Individual Alternatives

Public feedback on the preliminary alternatives was received via the project website, 12 pop-ups at transit stops throughout the study area, 12 open house events, and additional neighborhood events and virtual public meetings.

- Input gathered via website comments and in-person events was not consistent with one another, indicative of the different characteristics of commenters; for example, while those who provided in-person feedback (often at transit stops and stations) ranked Alternative 2 highest, website participants ranked it lowest.
- Approval is greater than disapproval for all preliminary alternatives.
- Alternative 4 has the highest approval and lowest disapproval rates
- Alternatives 3, 4, 5, and 6 show greater approval than neutrality or disapproval

Modes

- Online respondents preferred HRT and LRT over BRT.
- Between the two rail modes, HRT was slightly more favored overall.
- While support for LRT was generally high, respondents expressed concerns about increased congestion and pedestrian safety along at-grade segments and sought justification for operating two north-south light rail systems in the region.

Locations Served

As part of the feedback process, comment cards and the website provided pairs of locations and asked respondents to indicate which destination they would rather have served by the alternative. Each tradeoff consisted of a set of parallel locations that could not both be served by the same service. Results included:

OUTREACH SUMMARY

Between September and December 2022, the project team conducted or distributed:

- **1,300+** postcards and flyers
- **1,185** comments from website
- **408** comment cards
- **12** pop-ups at **transit stops**
- **11 neighborhood** events
- **12 community association meetings/open houses**
- **6 in-reach events** at bus divisions to reach current MTA bus operators
- **2 virtual public meetings** with 257 unique participants between them

- Serving York Road was preferred over Loch Raven Boulevard.
- Respondents showed a preference for Charles/St. Paul Street than Greenmount Avenue south of North Avenue.
- Preferences between Harbor East, Inner Harbor, Baltimore Peninsula, and UMMC were roughly split, with the least amount of support for Baltimore Peninsula.
- Commenters consider Penn Station a very important destination along the North-South Corridor.

Treatment Preference

- Significantly more respondents expressed approval for underground alignments than disapproval.
- Most mentions of alignments running above ground were statements of disapproval; many commenters expressed concern about transit vehicles getting stuck in traffic.

Additional Information

- Open house participants requested specific information about cost, congestion, and connectivity to transit routes.
- Respondents also expressed interest in the following topics, which each had a similar number of mentions: on-time performance/reliability, the impact of construction, implementation approach and timeline, and perceived increase potential for crime.

Alignment Segments

The segment through York Road in Baltimore County (south of Towson) and northern Baltimore City demonstrated greater public support than Loch Raven Boulevard. Community groups organized and submitted a petition in opposition to alignments that would serve the Timonium-Lutherville neighborhoods and Stoneleigh/Anneslie neighborhoods. There was a clear preference for the section of York Road south of Towson among the public and jurisdictional partners overall. Of the two preliminary alternatives that run on Loch Raven Boulevard, it is worth noting that there was more support for serving destinations along Joppa Road rather than Goucher Boulevard. There was public support for Charles/St. Paul Street over Greenmount Avenue both between 33rd Street and North Avenue and south of North Avenue. Notably, this segment serves Penn Station, which was cited as one of the most critical destinations for any north-south alternative.

Baltimore Peninsula generated the least public support among the southern termini options. Among North-South southern termini, public outreach found that Harbor East is the overall preferred destination, followed by the Inner Harbor.

NORTH-SOUTH FEASIBILITY STUDY CONCLUSIONS

Figure 15. Strongest Performing Segments



The findings and conclusions presented in this report are based on the measures of effectiveness results and public feedback. This information will be used to guide the development of alternatives for further study during the next phase of the project, the North-South Corridor Alternatives Analysis.

Alignment Segments Demonstrating Good Performance

The segment on York Road in Baltimore County and northern Baltimore City performed better than the Loch Raven Boulevard alignment in terms of projected ridership and travel time savings. York Road provides transit access to a larger population and service to many preferred destinations of interest. It is worth noting that although the York Road preliminary alternatives produce more ridership than the Loch Raven preliminary alternatives, daily transit ridership was not a major driver of performance. As an investment, the North-South Corridor seeks to *improve* existing transit as opposed to creating new service to fill a gap.

In addition to serving key destinations such as Penn Station, the Charles/St. Paul Street segment performed well and provides higher ridership and jobs access than the other options. Figure 15 shows the segments that demonstrated good performance in the Measures of Effectiveness and support from jurisdictional partners.

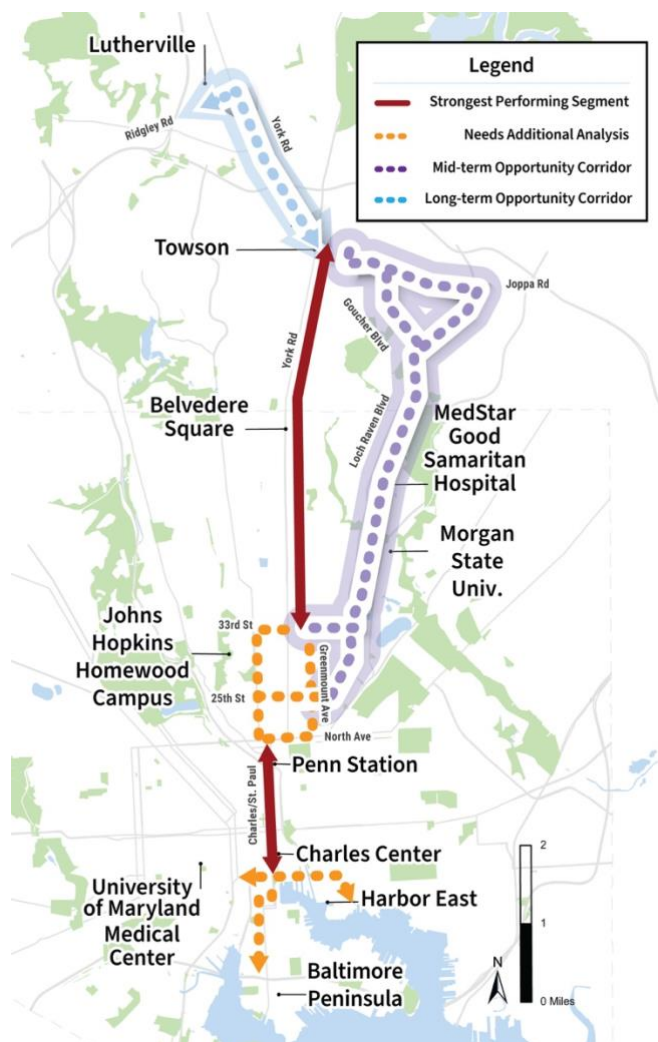
Additional Analysis and Input Needs to Inform Decisions

MTA’s analysis found that all preliminary alternatives generate strong ridership in Central Baltimore City. Segments needing further analysis are presented in Figure 16 as dotted lines.

While ridership analysis projects that connecting to the Lutherville area and Light Rail Station could add approximately 4,000 riders, public respondents did not express confidence in the potential for additional ridership in this segment, and expressed additional concerns about traffic and quality of life impacts.

Analysis findings and public feedback showed that York Road south of Towson outperformed Loch Raven Boulevard, though respondents expressed concern about right-of-way limitations. Further study of these constraints for feasibility, cost, and risk on this segment of York Road is recommended.

Figure 16. Options Needing Additional Analysis and Input



potential performance and input from stakeholders is needed to make a decision about how to serve one or both locations with this project.

Mode Conclusions

BRT captured the highest ridership and connections to transit compared to the rail modes. Due to having the greatest number of stations, BRT performed the best on equity and access for households and students. From a constructability perspective, BRT had the shortest implementation time and the lowest bridge and tunneling complexity, making it the most cost-effective mode. BRT is recommended to advance for further study and alternatives development.

HRT demonstrated the best travel time savings between Towson and downtown Baltimore compared to other modes. These time savings are attributed to having significantly fewer stations – less than half of all other modes – and fully separated guideway. While beneficial for time savings, having fewer stations negatively impacted ridership, equity, accessibility and connections to other transit and jobs. HRT will undergo additional analysis to determine if this mode merits inclusion in the next phase of study.

Alignment Conclusions

The Feasibility Study analysis results and public feedback drive the conclusion that the York Road north of Towson and Loch Raven Boulevard/Joppa Road/Goucher Boulevard segments will not move forward into the Alternatives Analysis phase. These results confirm the transit readiness classifications identified in the RTP, with Loch Raven Boulevard identified as a mid-term opportunity corridor and York Road north of Towson identified as a long-term opportunity corridor. Despite these segments not performing highly enough to warrant a near-term premium transit investment, there may be opportunities to further study corridor improvements in these areas as the RTP corridor network advances in the future

Further analysis is needed to compare Greenmount Avenue to Charles/St. Paul between 33rd Street and North Avenue. Between 33rd Street and North Avenue, Greenmount Avenue did not perform as well as the Charles Street/St. Paul Street couplet, with analysis findings showing lower projected ridership and jobs access. However, despite population and employment densities being marginally higher west of Greenmount Avenue, the distribution of transit-oriented population east of Greenmount Avenue calls for further analysis of the alignments between 33rd Street and North Avenue.

Further analysis is needed south of Downtown. Both Harbor East and Baltimore Peninsula showed strong demand, and further analysis of

LRT demonstrated better travel time savings compared to BRT on similar alignments, which is due in part to LRT having fewer stations. On the other hand, fewer stations mean less access to households, students, and future jobs within a half mile of stations compared to BRT; reevaluating stop spacing in future phases could reduce this tradeoff. While more expensive than BRT, LRT has better travel times than BRT and costs less than HRT and has a shorter construction time. LRT is recommended to advance for further study and alternatives development.

NEXT STEPS

MTA and its regional partners will continue to work together to identify alternatives to be studied in the AA phase. The conclusions of the feasibility study presented above will serve as the basis of the alternatives that will be studied in detail during the AA phase.

In 2024, the Project Team will conduct public engagement to share the findings from this work, present the alternatives that will continue into the AA phase, and seek feedback to inform the technical analysis. It is anticipated that refined alignments and modes will be shared at that time. An outreach and engagement plan will guide the project team's public and stakeholder engagement activities during the AA to support equitable opportunity to provide feedback at key decision points of the process. The AA phase is expected to take two years to complete, depending on the number and complexity of alternatives included for study.