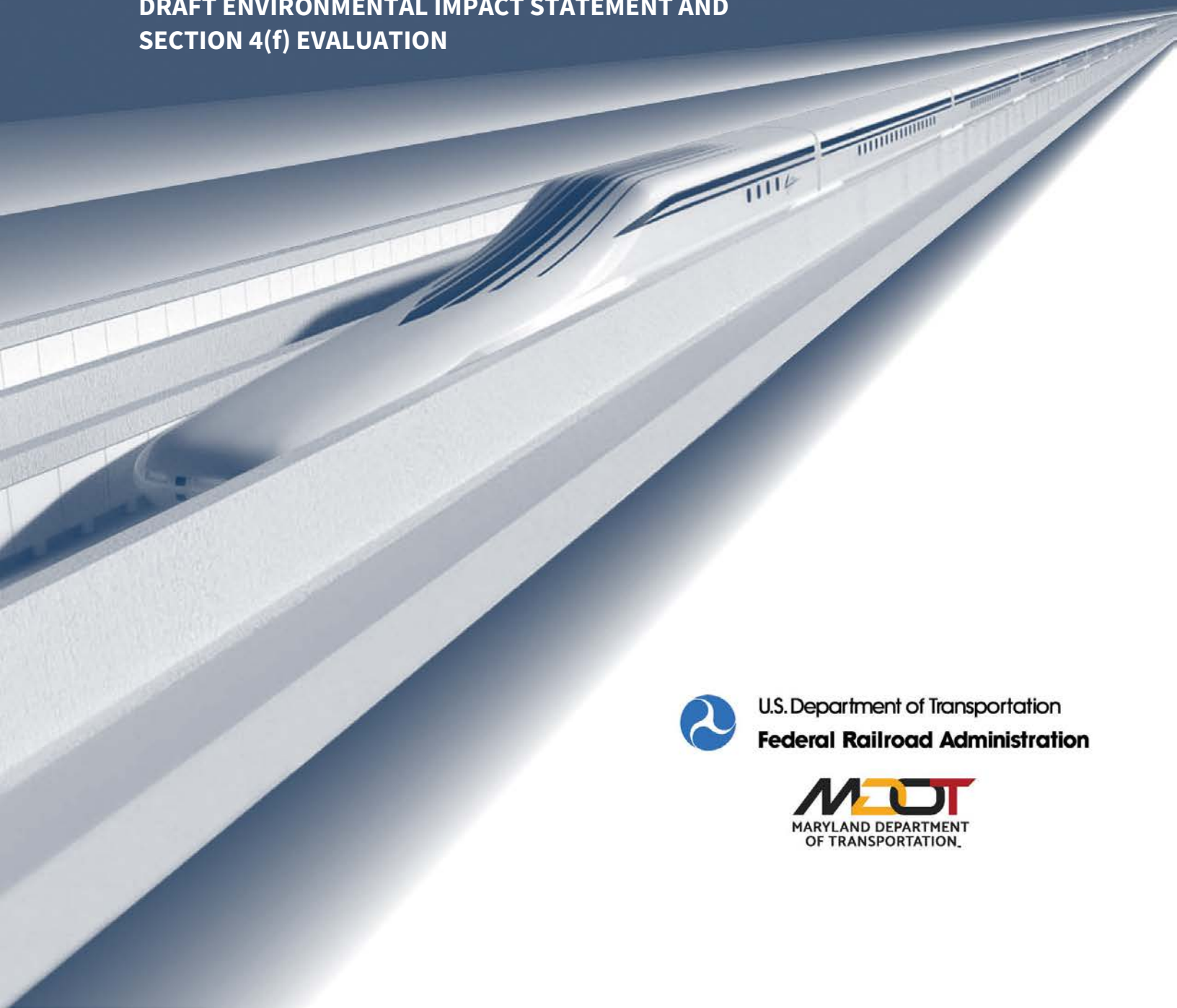
Section 4.2

Transportation

BALTIMORE-WASHINGTON SUPERCONDUCTING MAGLEV PROJECT

DRAFT ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(f) EVALUATION



U.S. Department of Transportation
Federal Railroad Administration

MARYLAND DEPARTMENT OF TRANSPORTATION

4.2 Transportation

4.2.1 Introduction

This section describes existing and planned transportation systems, services, and facilities within the vicinity of the Superconducting Magnetic Levitation Project (SCMAGLEV Project) Affected Environment of the SCMAGLEV Project and analyzes the potential effects of introducing SCMAGLEV Project as a new transportation mode.

This section is presented differently than other sections in Chapter 4. It is organized by transportation service type, i.e., SCMAGLEV Service and Operations, commuter rail, intercity passenger rail, etc. Within each subsection, discussion is provided for both existing and planned conditions because this discussion for each relevant transportation system is then followed by a discussion of effects under the future No Build and Build Alternatives (2030 and 2045). Potential mitigation is provided in each subsection where adverse effects are identified. Additional information is included in Appendix D.2 Transportation Technical Report.

4.2.2 Regulatory Context and Methodology

4.2.2.1 Regulatory Context

In accordance with the National Environmental Policy Act (NEPA), 42 U.S.C. § 4321 et seq., the Council on Environmental Quality (CEQ) regulations, 40 C.F.R. Parts 1500 - 1508, and the Federal Rail Administration's (FRA) Procedures for Considering Environmental Impacts, 64 Fed. Reg. 28545 (May 26, 1999) FRA assessed impacts to all modes of transportation, including passenger and freight rail, as well as potential impacts to roadway traffic congestion.

The Maryland Department of Transportation (MDOT) has regulatory authority over state roadways and transit systems in Maryland. Similarly, Baltimore City Department of Transportation (BCDOT) and District Department of Transportation (DDOT) have regulatory authority over local roadways and streets in the City of Baltimore and Washington, D.C., respectively. Any modifications to roadways in these jurisdictions would require review and approval by MDOT, BCDOT or DDOT.

Coordination with the Federal Aviation Administration (FAA) and the MDOT Maryland Aviation Administration (MAA) is required for any activities that might affect airport operation or safety.

4.2.2.2 Methodology

For the evaluation of transportation, the SCMAGLEV Project Affected Environment is the same as the Project Study Area defined in Section 4.1.

FRA evaluated the following transportation systems and networks:

- **SCMAGLEV Service and Operations** – New SCMAGLEV Service was added to the transportation network in the Build Alternatives.
- **Commuter Rail Network** – Maryland Area Regional Commuter (MARC) commuter rail service between the City of Baltimore, Baltimore-Washington International Thurgood Marshall (BWI Marshall Airport) Station, and Washington, D.C. (the Penn Line between Baltimore Penn Station, BWI Marshall Airport Station and Washington Union Station and the Camden Line between Baltimore Camden Yards Station and Washington Union Station).
- **Intercity Passenger Rail (Amtrak)** – Amtrak Intercity Passenger Rail service between Baltimore Penn Station, BWI Marshall Airport Station, New Carrollton, and Washington Union Station. Three Amtrak services operate along the corridor between Baltimore and Washington, D.C.: Acela high speed express service, Northeast Regional Service, which makes more stops within the corridor than Acela service, and long-distance intercity rail which operates within the corridor but is destined for cities outside the Northeast corridor.
- **Local Transit Systems** – In Baltimore this includes MDOT Maryland Transit Administration (MDOT MTA) Citylink local bus routes, commuter bus, Light RailLink (hereafter Light Rail) and Metro SubwayLink heavy rail (hereafter Metro). In Washington, D.C. this includes Washington Metro Area Transit Authority (WMATA) local bus and Metrorail, commuter bus run by multiple agencies, and the DC Streetcar and Washington, D.C. Circulator, both run by the District Department of Transportation. In Prince George's County local transit service includes the locally operated The Bus system, WMATA Metrorail and Metrobus service, and commuter bus service run by MDOT MTA; In Anne Arundel County, local transit service includes Baltimore Light Rail, local bus and commuter bus service run by MDOT MTA.
- **Intercity Bus** – Throughout the corridor, privately operated intercity bus service is provided by operators Greyhound, Peter Pan Trailways, and Mega Bus, each of whom provide service between Baltimore and Washington, D.C.
- **Regional Roadway Network** – Regional roadways that span the SCMAGLEV Project Affected Environment.
- **Station Area Street/Roadway Networks in Baltimore, MD, at BWI Marshall Airport, Washington**, **D.C., and around TMF Options** – The local street/roadway network around the proposed SCMAGLEV Project stations and the TMF options.
- **Airport Access** – BWI Marshall Airport access.
- **Station Area Parking** – Parking within the station area zones of each proposed station.
- **Station Area Urban Sidewalk, Bicycle and Pedestrian Networks** – Sidewalk, pedestrian and bicycle networks within the station area zone of each proposed station.

- **Station Area Pickup and Drop-Off Operations** – Vehicular drop-off and pick-up zones and pickup and drop-off operations at SCMAGLEV Project stations, including private auto, taxi, and transportation network companies such as Uber or Lyft.

FRA evaluated the overall transportation system and the individual transportation network elements listed above for the following conditions:

- Current conditions
- Future No Build Alternatives (Opening Year [2030] and Horizon Year [2045])
- Future Build Alternatives (Opening Year [2030] and Horizon Year [2045])
- Construction Related Impacts – impacts during construction for each affected transportation mode are summarized in Section 4.2.14.

The analysis also evaluates two different station alternatives in Baltimore at Camden Yards and Cherry Hill. In most aspects of the SCMAGLEV Project, there are no differences between the two station alternatives. Where there are differences, these are noted in the impact's evaluation throughout the chapter.

Appendix D.2 provides more detail on the characteristics and evaluation of each network element, for each condition. The analysis completed differed by mode/transportation network element but includes ridership impacts, travel time changes, Vehicle Miles Traveled changes, traffic impacts related to the Build Alternatives, trip diversions to SCMAGLEV station area impacts under the Build Alternatives, and traffic impacts associated with the construction period. Appendix D.2 also outlines the methodology for the different analyses that yielded the data that supported the evaluations in this chapter.

For this analysis, FRA considered a one-mile radius around the physical footprint of each passenger station. This one-mile radius was selected based on the anticipated geographic area that would be impacted by station activity and reflects access and egress to the station and associated traffic impacts and impacts to other modes such as pedestrians and public transportation modes. To support the evaluation of the different network elements within the SCMAGLEV Project Affected Environment, the Project Sponsor or FRA completed the following analyses.

SCMAGLEV Ridership Forecasts – Ridership forecasts were developed by the Project Sponsor (BWRR) to provide a range of inputs into the assessment of potential transportation impacts. Forecast-related data is provided for the years 2030 (opening year) and 2045 (horizon year), by Baltimore Station Scenario. Data outputs from the forecasts include:

- Forecasted daily and annual ridership.
- Forecasted travel times changes between the Build and No Build, aggregated for all daily trips made within the SCMAGLEV Project Affected Environment.

- Forecasted changes in annual Vehicle Miles Travelled (VMT) between the Build and No Build.
- Forecasted changes in Rail and Bus Passenger Miles Traveled (PMT) between the Build and No Build.
- Forecasted diversions of passengers/trips to SCMAGLEV Project from other modes operating within the SCMAGLEV Project Affected Environment.

The ridership forecasting methodology, approach, and assumptions are summarized in in the Transportation Technical Report, available on the SCMAGLEV Project website, utilizing documentation developed by the Project Sponsor.

SCMAGLEV Operations Report – The Operations Report[1], developed by the Project Sponsor, outlines the following elements related to SCMAGLEV operations:

- SCMAGLEV revenue hours of operation by day of week
- SCMAGLEV service by time of day and day of week
- SCMAGLEV train consist configuration and total capacity
- SCMAGLEV end-to-end travel times

More detail on SCMAGLEV operations is included in the Appendix D.2.

SCMAGLEV Traffic Analysis – Traffic analysis was completed at both a regional and station-area level to understand the impacts to the SCMAGLEV Project Affected Environment roadway network of the addition of the SCMAGLEV Project to the Affected Environment Transportation Network. Deriving the data necessary to calculate impacts was a multi-step process that is outlined in detail in the Transportation Technical Report. This data development and analysis was completed by FRA based on Origin/Destination trip tables provided by the Project Sponsor.

This multi-step process yielded traffic volumes and turning movement counts that allowed for the calculation of Level of Service (LOS) and delay for station-area intersections under the No Build and Build Alternatives in order to assess the traffic operations impacts associated with the SCMAGLEV Project.

A sample of intersections impacted by SCMAGLEV construction activity was completed based on Maintenance of Traffic plans developed by the Project Sponsor for each construction phase. A summary of Maintenance of Traffic plans and associated temporary intersection modifications are provided in the Transportation Technical Report.

Review and Analysis of Public Documents – A significant amount of the data required to assess current and future network characteristics for both the Build and No Build Alternatives is available from public documents. These documents include public

[1] Baltimore-Washington SCMAGLEV Project; Operations Plan: BWRR – May 6, 2020 (see Appendix G.4 of this DEIS)

timetables for different transportation operators within the SCMAGLEV Project Affected Environment, long-range planning documents for different modes within the SCMAGLEV Project Affected Environment and the Constrained Long-Range Plans for the two Metropolitan Planning Councils within the SCMAGLEV Project Affected Environment; the Baltimore Metropolitan Council (BMC) and the Metropolitan Washington Council of Governments (MWCOG). These sources are cited throughout this chapter when data they provided was used in the impact evaluation.

4.2.3 SCMAGLEV Service and Operations

4.2.3.1 Current Conditions

The SCMAGLEV Project Affected Environment transportation network currently has no SCMAGLEV service or operation.

4.2.3.2 Future No Build

The SCMAGLEV service would not be part of the future No Build transportation network.

4.2.3.3 Future Build Network

FRA evaluated proposed SCMAGLEV service for opening year service in 2030 and horizon year 2045. Service would run between Baltimore, MD and Washington, D.C. and serve three stations; one in the City of Baltimore, one at BWI Marshall Airport and one in Washington, D.C. FRA evaluated two alternative station locations in Baltimore City (Cherry Hill and Camden Yards Stations). It should be noted that under the Cherry Hill Station alternative SCMAGLEV Project passengers would have to transfer to another transportation mode in order to access downtown Baltimore. Current options include Baltimore Light RailLink and local bus routes. Chapter 3 Alternatives Considered outlines the station zones and the SCMAGLEV Project alignments in greater detail. **Table 4.2-1** summarizes the SCMAGLEV Service Characteristics.

Table 4.2-1: Service Characteristics

Service Characteristic	Description
Number of Trains	16 car trains
Seated Capacity per train	762
Number of trains/hours	Weekday AM/PM Peak: 8 in each direction (train every 7.5 minutes/hour) Weekend: 4 in each direction (fewer trains occur during lower demand periods)
Service/service hours	7 days per week/ 5:00 AM to 11:00 PM
Travel time (between D.C. and Baltimore)	Approximately 15 minutes total. This total includes station dwell times

Source: BWRR, 2020

4.2.3.4 Impacts

The assessment focuses on the changes in how the transportation network will be used by trip-makers after the SCMAGLEV Project is added to the network. Key metrics to describe the impact of adding SCMAGLEV Project to the transportation network include total forecasted SCMAGLEV ridership (annual and daily), daily ridership by station, forecasted diversions of trips to SCMAGLEV Project from other modes, changes in Vehicle Miles Traveled (VMT), changes in Rail and Bus Person Miles Traveled (PMT), and aggregate travel time savings due to the addition of SCMAGLEV Project to the SCMAGLEV Project Affected Environment transportation network. Data for forecasted SCMAGLEV annual ridership and diversions of trips from other modes is outlined below. Data for the other metrics is provided in Appendix D.2A.2.

SCMAGLEV Annual Ridership

Table 4.2-2 depicts the forecasted SCMAGLEV annual ridership by year (2030 (opening year) and 2045 (horizon year)) and Baltimore Station Alternative. A forecasted range of 16.1 to 17.9 million riders would use the SCMAGLEV service in opening year 2030 depending on the Baltimore Station alternative, while a range of 18.9 to 20.6 million annual riders are forecasted in horizon year 2045. Further context for this ridership is provided in **Table 4.2-3**, which shows the source of these riders.

Table 4.2-2: Forecasted Annual Ridership on the SCMALEV: Years 2030 (Opening Year) and 2045 (Horizon Year)

	Cherry Hill		Camden Yards	
	2030	2045	2030	2045
Annual Ridership	17,056,911	18,657,769	18,960,622	20,578,553

Source: Project Sponsor: Baltimore-Washington SCMAGLEV Project

Source of SCMAGLEV Ridership and Diversions to SCMAGLEV Project from Other Modes

Introducing a new mode, like the SCMAGLEV Project, to the transportation network may divert ridership from one mode to another based on a change in perception of which mode will provide the most attractive trip based on factors such as trip cost and total trip time between origins and destinations. **Table 4.2-3** shows the forecasted annual diversions to SCMAGLEV Project from other modes for the years 2030 and 2045, by Baltimore Station Alternative. The impacts of these diversions are evaluated in detail for each mode affected within the section addressing that mode.

Generally, the large majority of forecasted trips on SCMAGLEV Project are diverted from other modes rather than induced new trips.

Table 4.2-3: Forecasted Source of SCMAGLEV Ridership and Forecasted Diversions to SCMAGLEV Project from other Modes for the Years 2030 and 2045, by Baltimore Station Alternative

Baltimore Station Alternative by Year	2030 Cherry Hill Station	2045 Cherry Hill Station	2027 Camden Yards Station	2045 Camden Yards Station
Diverted from Auto	11,380,467	14,877,281	12,609,501	16,480,393
Diverted from Rail	2,122,750	2,610,204	2,261,072	2,768,873
Diverted from Bus*	253,107	309,733	263,229	320,005
Diverted from Taxi/Rideshare	582,217	860,551	681,976	1,009,282
Total Diverted Trips	**14,338,541**	**18,657,769**	**15,815,778**	**20,578,553**
Total Forecasted Annual SCMAGLEV Trips	**17,056,911**	**22,367,238**	**18,960,622**	**24,938,652**
New Induced Trips	**2,718,370**	**3,709,269**	**3,144,844**	**4,360,099**

Source: Baltimore-Washington SCMAGLEV Project: Project Sponsor SCMAGLEV Daily Boardings and Alightings by SCMAGLEV Station

* This category covers diversions from all bus services in the SCMAGLEV Project Affected Environment, including local bus services, express services to Baltimore and Washington and privately operated inter-city bus services

Forecasted daily boardings by SCMAGLEV Project station for the horizon year 2045, by Baltimore Station Alternative, is shown in Appendix D.2A.2.1. The data in the Appendix table shows a range of 70,069 daily riders to 77,764 daily riders in the horizon year 2045. The highest ridership would occur at the Mount Vernon East Station in Washington, D.C., followed by Baltimore (either alternative) and then BWI Marshall Airport.

Changes in Annual Vehicle Miles Traveled (Build vs. No Build Alternatives)

The addition of SCMAGLEV Project to the transportation network will have an impact on how trips are made as well as the mode used (see discussion of trip diversions in previous section). This shift in how trips are made will, in turn, impact the aggregate number of Vehicle Miles Traveled within the SCMAGLEV Project Affected Environment as well as aggregate Rail and Bus Passenger Miles traveled. The forecasted changes in aggregate Annual Vehicle Miles Traveled between the No Build and Build Alternatives for the opening year and horizon year is outlined in detail in Appendix D.2A.2.2.The data in Appendix D.2A.2.2 shows a decrease in VMT compared to the No Build Alternative. This decrease reflects the diversion of trips from motorized modes such as single/low occupancy automobiles to SCMAGLEV Project. Decreases in VMT result in lower tail pipe emissions. Air quality impacts are evaluated in Section 4.16.

Changes in Rail Passenger Miles Traveled (Build vs. No Build Alternatives)

Forecasted changes in Rail Passenger Miles Traveled (RPMT) in the opening year and horizon year, as outlined in Appendix D.2A.2.3 is the companion data to the VMT data discussed in the previous section. The data in the Appendix table shows a decline in RPMT between the No Build and Build Alternatives, which reflects the forecasted diversion of trips from rail services in the SCMAGLEV Project Affected Environment to SCMAGLEV Project (see **Table 4.2-3** above). This forecasted decline in RPMT means rail services will be used less for trip making once SCMAGLEV Project is part of the transportation network.

Changes in Bus Passenger Miles Traveled (Build vs. No Build Alternatives)

Forecasted changes in Bus Passenger Miles Traveled (BPMT), as outlined in Appendix D.2A.2.4 is the companion data to the Rail Passenger Miles data discussed in the previous section. The data in the Appendix shows a decline in BPMT between the No Build and Build Alternatives, which reflects the forecasted diversion of trips from bus services to the SCMAGLEV Project (see **Table 4.2-3** above). As with rail service, this forecasted decline means bus services will be used less for trip making once SCMAGLEV Project is part of the transportation network. The decline in BPMT will result in benefits from lower tail pipe emissions based on fewer miles traveled.

Total Forecasted Aggregate Annual Travel Time Savings within SCMAGLEV Project Affected Environment (Build vs. No Build Alternatives)

As noted in previous sections, the addition of SCMAGLEV Project to the transportation network will change the way in which trips are made within the SCMAGLEV Project Affected Environment, with individual travelers making trip choices based on factors such as changes in cost and total trip time. One impact of the addition of SCMAGLEV Project to the network will be changes in forecasted Build Alternatives aggregate travel times within the SCMAGLEV Project Affected Environment when compared to the No Build Alternative, which are outlined in Appendix D.2A.2.5 for the years 2030 and 2045, by Baltimore Station scenario. The data shows that SCMAGLEV Project will result in forecasted travel times savings in both years, and for both Baltimore Station scenarios. This decline is a result of the forecasted diversion of trips from modes with longer travel times to SCMAGLEV Project and is a benefit for travelers within the SCMAGLEV Project Affected Environment. The economic impacts of these travel times savings are evaluated in Section 4.6 Economic Resources.

4.2.3.5 Mitigation Strategies

The evaluation of the impacts of adding to the SCMAGLEV Project Affected Environment transportation network show positive impacts associated with declines in Vehicle Miles Traveled and increases in aggregate travel time savings.

Changes in how trips are made within the SCMAGLEV Project Affected environment, however, will result in forecasted diversions from rail and bus service within the corridor to SCMAGLEV Project (see **Table 4.2-3** above). These forecasted diversions are significant and may require changes in how bus and rail service is provided after

SCMAGLEV Project implementation. More detail on the mitigation of the impacts of passenger diversions from corridor bus and rail services to SCMAGLEV Project are outlined in the sections below addressing each of the potentially impacted modes.

4.2.4 Commuter Rail Network

MARC commuter rail service operates on two different lines between downtown Baltimore, MD and Washington, D.C. Both lines run parallel to the Build Alternatives.

4.2.4.1 Current Conditions

Two MARC commuter rail service lines fall within the SCMAGLEV Project Affected Environment. The first line is the MARC Penn Line, with its alignment running on Amtrak's Northeast Corridor (NEC) between Penn Station in downtown Baltimore and Union Station in Washington, D.C. Penn Line service runs in both directions throughout the day and provides rail access to both downtown Baltimore and downtown Washington, D.C., as well as to activity centers along the line between the two cities.

The second line is the Camden Line**,** with its alignment running on CSX Transportation (CSXT) freight tracks between Camden Yards Station in downtown Baltimore, MD and Union Station in Washington, D.C. The Camden Line service runs in both directions during the AM and PM peak periods, and provides rail access to Baltimore, Washington, D.C. and local activity centers along the line. The two MARC rail lines are described in greater detail in the Appendix D.2A.3.

4.2.4.2 Future No Build Alternative

The MARC future No Build Alternative network consists of current conditions as well as improvements funded in the Baltimore Metropolitan Council (BMC) and Metropolitan Washington Council of Governments (MWCOG) Constrained Long Range Plans (CLRPs). These improvements are described in Chapter 3, Section 3.4.1.2.

The physical improvements to the MARC rail lines incorporated into the two CLRPs would allow for more frequent MARC service to accommodate increased forecasted demand by providing additional capacity as well as to provide a more attractive and convenient service to potential riders. The change in MARC service frequencies, as incorporated into the MWCOG regional forecasting model and reflecting the CLRPs, compared to current conditions, is summarized in **Table 4.2-4**.

The Maryland Department of Transportation, Maryland Transit Administration (MTA) also has developed the MARC Cornerstone Plan, which is a long-range plan that focuses on both prudent management of existing assets as well as system expansion through the year 2045. At this point the majority of the expansion initiatives outlined in the Cornerstone Plan are not funded through inclusion in the MWCOG or BMC Constrained Long-Range plans, but the intent is to fund the expansion projects over the life of the plan.

Table 4.2-4: Future MARC No Build Alternative Peak Period Service Frequencies

MARC Line/Direction	Current Peak Period Service Frequency	Future Peak Period Service Frequency
Penn Line – Baltimore to Washington	15-30 Minutes	15 – 20 minutes
Penn Line – Washington to Baltimore	30 minutes	20 minutes
Camden Line – Baltimore to Washington	30 minutes	20 minutes
Camden Line – Washington to Baltimore	30 minutes	20 minutes

Source: MWCOG Regional Forecasting Model – Future Network

4.2.4.3 Future Build Network Alternatives

At this time, there has been no indication that MDOT MTA is intending to scale back its expansion plans (funded in the CLRPs or in the Cornerstone Plan) to reflect SCMAGLEV Project's addition to the SCMAGLEV Project Affected Environment transportation network. Therefore, the MARC component of the future Build transportation network will be the same as its configuration in the Future No Build network.

4.2.4.4 Impacts

MARC carried 9,326,683 passengers in 2018, of which approximately 7,461,000 were carried on the Penn and Camden Lines (Federal Transit Administration: National Transit Database, MARC Cornerstone Plan:2019). The forecasted diversions from all rail to SCMAGLEV Project as outlined in **Table 4.2-3** are 2,768,873 in 2045 under the Camden Yards Baltimore Station Scenario. An estimated 88% (Project Sponsor Ridership Report dated November 2018) of the total will be diverted from MARC Penn Line and Camden Line service, resulting in a total forecasted diversion from MARC of 2,436,608 annual boardings. This means it is forecasted that approximately 32% of annual MARC ridership on the Penn and Camden Lines would divert to SCMAGLEV Project once implemented (based on current MARC ridership – future MARC ridership numbers are not available). While no plans to respond to these diversions have yet been developed, these significant forecasted trip diversions would likely require a lowering of MARC service levels to account for a decline in forecasted ridership demand as well as a likely decline in fare revenue.

Forecasted changes in ridership demand and lower levels of service would also likely require modifications to MARC's long-range expansion plans and other capital investments.

4.2.4.5 Mitigation Strategies

At this point, no changes to MARC service or long-range expansion plans and other capital investments have been identified by the Maryland Department of Transportation in response to the forecasted diversions of riders to SCMAGLEV. A specific mitigation

plan will need to be developed by the Project Sponsor in consultation with MDOT in order to address the impacts associated with the forecasted diversions. Specific strategies that might be included in this Mitigation Plan may include:

- **Development of New Operating Plans to Reflect New Ridership Demand** – This mitigation strategy would involve the development of new rail operating plans to reflect forecasted lower ridership demand on MARC. Service changes to reflect lower demand may include lower service frequencies, shorter hours of service, scaling back mid-day service on the Penn Line and scaling back of weekend service. MDOT will identify required assistance from the Project Sponsor in developing new operations plans.

- **Development of a Revised Financial Plan** – Changes in service levels in response to forecasted changes in ridership demand will require a new financial plan reflecting new operational levels. Service level changes will affect all aspects of operations including staffing levels for train crews, cleaning crews, vehicle maintenance crews, yard operations crews and station attendants. MDOT will identify required assistance from the Project Sponsor in developing a new financial plan.

- **Development of a New Six-Year Capital Plan** – Capital requirements will change across all elements of operations based on changes in service levels. This will include changes in vehicle-related capital requirements, passenger facility capital requirements, and operating support facilities. MDOT will identify required assistance from the Project Sponsor in developing a new six-year capital program as well as the required length of assistance in updating the plan on an annual basis.

- **Development of a New Long-Range Plan** – In addition to the six-year capital program, the existing Long-Range Plan (MARC Cornerstone Plan) will require updating to reflect changes in ridership demand. MDOT will identify required assistance from the Project Sponsor in developing a revised long-range plan.

- **Financial Support** – MDOT may require financial support during a transition period to the new operating configuration resulting from the forecasted diversion of trips to SCMAGLEV. This item will be part of the overall negotiations between the Project Sponsor and MDOT regarding the Project Sponsor's role in the transition to the new operating configuration resulting from forecasted rider diversions to SCMAGLEV.

4.2.5 Intercity Passenger Rail (Amtrak)

4.2.5.1 Current Conditions

Amtrak intercity rail service runs through the SCMAGLEV Project Affected Environment on the NEC, generally parallel to the proposed SCMAGLEV Project (Amtrak service runs on the same line as the MARC Penn Line service, as shown in Appendix D.2). The first of the three primary services in the corridor is the high-speed Acela Express, which

makes the fewest stops and has the fastest travel times within the SCMAGLEV Project Affected Environment. The second primary service is the Northeast Regional, which has longer travel times and provides more local stops within the SCMAGLEV Project Affected Environment. The Acela stops only at Baltimore Penn Station and Washington Union Station, while Northeast Regional trains stop at Baltimore Penn Station, the BWI Marshall Airport Station, the New Carrollton Rail Station, and Washington Union Station. The final services that run through the SCMAGLEV Project Affected Environment are long distance trains destined for locations beyond the NEC but which use NEC within the SCMAGLEV Project Affected Environment as part of their trip.

Amtrak trains run in both directions throughout the day, with service frequencies approximately every 15-20 minutes in the peak period and 30-40 minutes in the off-peak (these frequencies are based on the combined Acela/Northeast Regional services within the corridor).

4.2.5.2 Future No Build Alternative

A number of initiatives have been identified that are focused on improving intercity passenger rail service within the SCMAGLEV Project Affected Environment. These initiatives are identified in Chapter 3 Alternatives Considered and provide insight into the high level of planned capital investment in intercity passenger rail service within the SCMAGLEV Project Affected Environment. Of particular note are improvements identified by FRA in the NEC FUTURE ROD in order to meet service and performance objectives to improve and grow the role of passenger rail along the NEC. If projects identified in the NEC FUTURE Plan are implemented, the capacity and performance of intercity passenger rail within the SCMAGLEV Project Affected Environment would improve.

In addition to the initiatives outlined above, the new Acela 21 equipment is currently being manufactured and tested. This new equipment will allow for top operating speeds of 160 mph.

Amtrak is also evaluating the potential for low-cost intercity services within the NEC overall, including within the SCMAGLEV Project Affected Environment.

4.2.5.3 Future Build Alternatives

Currently, there are no planned changes to the capacity and service improvements as outlined in the NEC FUTURE ROD in response to the implementation of the SCMAGLEV Project. Based on these current plans, future intercity rail service would be the same as under the Future No Build Alternative.

4.2.5.4 Impacts

It is estimated that there were 354,800 Amtrak trips made between the Baltimore Penn Station, BWI Marshall Airport, and Washington Union Station stations in 2019 (Rail Passengers Association, Federal Railroad Administration). The forecasted diversions from Amtrak equal approximately 332,600 or 94% of annual Amtrak trips traveling between the three major Amtrak stations within the SCMAGLEV Project Affected

Environment. While no definitive plans to respond to these diversions have yet been developed, these trip diversions may require service changes to match train frequency and hours of service to new ridership demand as well as a scaling back of future planned expansion plans and new service initiatives within the SCMAGLEV Project Affected Environment.

4.2.5.5 Mitigation Strategies

At this point, no changes to Amtrak service or long-range expansion plans and other capital investments have been identified by Amtrak in response to the forecasted diversions of riders to SCMAGLEV. A specific mitigation plan will need to be developed by the Project Sponsor in consultation with Amtrak in order to address the impacts associated with the forecasted diversions.

It is important to consider in the mitigation plan development that Amtrak trips between stations within the SCMAGLEV Project Affected Environment are a small part of total boardings at these stations. Most SCMAGLEV Project Affected Environment station activity consists of trips destined for a destination outside the SCMAGLEV Project Affected Environment or trips coming from an origin outside the SCMAGLEV Project Affected Environment. Any mitigation plan, especially changes in service frequencies, must consider this origin/destination data.

Specific strategies that might be incorporated into an Amtrak Mitigation Plan may include:

- **Assessment of Whether Service Levels Should be Modified to Reflect Trip Diversions –** This analysis would evaluate whether the diversions occurring within the SCMAGLEV Project Affected Environment portion of the overall Northeast Corridor warrant changes to service levels that would cascade throughout the corridor. If it is determined that some modifications of service levels are warranted, this analysis would also consider financial and fare revenue impacts, capital improvement and future expansion impacts, and fleet and staffing impacts. Amtrak will identify required assistance from the Project Sponsor in developing this analysis.

4.2.6 Local Transit Systems

The Project Study Area consists of a highly developed transit network comprised of local bus, express bus, light rail and heavy rail. A brief description of the current local transit network is provided below, by geographic area within the Project Study Area, with a specific focus on interactions with potential SCMAGLEV Project stations. More detail is provided in Appendix D.2A.4.

4.2.6.1 Current Conditions – Baltimore

The City of Baltimore transit network is comprised of local bus routes known as LocalLink, commuter bus, Light Rail (known as Light RailLink) and Metro Heavy Rail (known as MetroLink). Each is described below. Service is operated by MDOT Maryland

Transit Administration (MDOT MTA) Maps of transit service in each SCMAGLEV Project station area is contained in Appendix D.2A.4.1.

Baltimore Local Bus (LocalLink)

MDOT MTA local bus network (known as LocalLink) in Baltimore consists of 56 LocalLink routes. The majority of these 56 LocalLink routes run through downtown Baltimore, thus providing access to the Camden Yards Station Area. A map showing the Camden Yard Station area transit network is provided in Appendix D.2A.4.1.

Four MTA LocalLink bus routes would provide service at the Cherry Hill Station alternative. Service characteristics for these routes as well as a map showing the routes are provided in Appendix D.2A.4.1.

Metro Heavy Rail (MetroLink)

The second transit mode serving Downtown Baltimore is MDOT MTA's Metro heavy rail line (known as MetroLink), with the closest stations to the SCMAGLEV Camden Yards Station being located at Lexington Market (five blocks north of the Camden Yards Station) and Charles Center (two blocks north of the Camden Yards Station). There is no Metro heavy rail service to the Cherry Hill Station option. More detail on MetroLink service characteristics is provided in Appendix D.2A.4.1.

Light Rail (Light RailLink)

The MDOT MTA Light Rail system (known as Light RailLink) runs north/south through Baltimore City, Baltimore County and Anne Arundel County and would interact with the SCMAGLEV system at multiple points, including direct connections to each of the Baltimore SCMAGLEV Project station alternatives and at BWI Marshall Airport. More detail on Light Rail service characteristics, alignment, and connections with different SCMAGLEV Project stations is provided in Appendix D.2A.4.1.

MTA Express Bus Service

There are nine express bus services directly run by the MDOT MTA and seven contractor operated commuter services that serve downtown Baltimore from throughout the Baltimore region. Each of these services provide access to downtown Baltimore and therefore would also provide access to the SCMAGLEV Camden Yards Station. No express service currently serves the Cherry Hill Station.

Privately Operated Inter-City Bus Services

Four private operators run bus service between Baltimore and Washington, D.C. Greyhound runs nine trips per day in each direction between the two cities. Megabus, Bolt Bus and Peter Pan Trailways each run two trips per day in each direction between the two cities.

4.2.6.2 Current Conditions – Anne Arundel County and Prince George's County

The middle portion of the SCMAGLEV Project alignment between Baltimore City and Washington, D.C. would be located in Anne Arundel County and Prince George's County Maryland. The transit network in this set of counties includes local bus, express bus, WMATA bus and Metrorail, and MDOT MTA Light Rail. More detail on each of these transit network elements is provided in Appendix D.2A.4.2.

4.2.6.3 Current Conditions – Washington, D.C.

Washington, D.C. and the area around the proposed SCMAGLEV Project station at Mount Vernon Square is served by a dense transit network that comprises WMATA Metrobus service, DC Circulator service, and WMATA Metrorail service. In addition, VRE commuter rail service provides connections from Northern Virginia and Washington, D.C. at Union Station and Commuter buses from both Virginia and Maryland also provide connections to the District. Finally, inter-city Amtrak rail service serves Washington Union Station (also the terminal for project area commuter rail service). Each of these network elements is outlined below, with greater detail provided in Appendix D.2A.4.3.

WMATA Metrobus

The Metrobus system is a region-wide bus system that is also the prime service provider in Washington, D.C. Multiple WMATA Metrobus routes run in the vicinity of the proposed Mount Vernon East Station. More detail on each of these local bus routes in the station area is provided in Appendix D.2A.4.3.

DC Circulator

The DC Circulator is a smaller bus system managed by the District Department of Transportation that supplements bus service provided by WMATA Metrobus. The Georgetown – Union Station Circulator route runs directly by the proposed Mount Vernon East Station on K Street. The Circulator runs every 10 minutes throughout the day.

Metrorail

Metrorail is a regional heavy rail system consisting of six lines and serving Virginia, Maryland and Washington, D.C. More detail on the Metrorail system overall as well as in the vicinity of the SCMAGLEV Mount Vernon Station is provided in Appendix D.2A.4.3.

Privately Operated Inter-City Bus Services

Four private operators run bus service between Baltimore and Washington, D.C. Greyhound runs nine trips per day in each direction between the two cities. Megabus, Bolt Bus and Peter Pan Trailways each run two trips per day in each direction between the two cities.

4.2.6.4 Future No Build Alternative

FRA identified transit improvements within the Project Study Area included in the two regional CLRPs. They are:

- MDOT MTA Bus Expansion Program;
- Bus Rapid Transit to BWI Marshall Airport - from Dorsey MARC Station to BWI Marshall Light Rail Station;
- U.S. 29 Bus Rapid Transit service;
- DC Streetcar Expansion; and
- MDOT MTA Purple Line.

The future No Build transit network will consist of the current network as well as these additional improvements.

4.2.6.5 Future Build Alternatives

No planned changes to local transit systems have been identified in response to the addition of the SCMAGLEV Project Affected Environment transportation network.

4.2.6.6 Impacts

Impacts to ridership demand and required service levels on local transit systems within the SCMAGLEV Project Affected Environment are expected to occur on two different sets of local transit routes.

The first set of routes are those serving the three SCMAGLEV Project stations. The SCMAGLEV ridership forecasting process identified daily mode of access and mode of egress for each trip made on SCMAGLEV, by SCMAGLEV Project station, by Baltimore Station Alternative. This data provides an understanding of transit modes from which SCMAGLEV Project riders are transferring from at the beginning of their trip or transferring to at the end of their trip.

These daily forecasted numbers have been further disaggregated into peak hour data using common factors regarding percent of ridership occurring in the AM and PM peak periods and further the percent of peak period ridership occurring in the peak hour of the peak period. The peak hour transit mode access and egress for each SCMAGLEV Project trip arriving or leaving via transit for each SCMAGLEV Project station is summarized in **Table 4.2-5**.

The data in the table shows that there will be increased demand on bus and rail routes serving the three SCMAGLEV Project stations, especially in Baltimore and Washington, D.C. This increased demand may require increased service frequencies on bus and rail, or longer trains on the rail services, serving the SCMAGLEV Project stations (Metrorail in Washington, D.C. and Baltimore Metro and Light Rail in Baltimore).

Table 4.2-5: Year 2045 Peak Hour Access and Egress Mode for SCMAGLEV Trips, by SCMAGLEV Project Station, by Station Alternative

Trips Arriving at Each SCMAGLEV Station by Transit (Access Trips by Transit Mode)				
SCMAGLEV Station	Cherry Hill Baltimore Station Alternative		Camden Yards Baltimore Station Alternative	
	Station Access by Bus	Station Access by Rail	Station Access by Bus	Station Access by Rail
Baltimore	255	1,139	301	1,214
BWI Marshall Airport	47	193	55	218
Washington, D.C.	371	1,456	408	1,611
Trips Leaving Each SCMAGLEV Station by Transit (Egress Trips by Transit Mode)				
	Station Egress to Bus	Station Egress to Rail	Station Egress to Bus	Station Egress to Rail
Baltimore	242	964	265	942
BWI Marshall Airport	31	120	36	133
Washington, D.C.	437	1,137	479	1,251

Source: Baltimore-Washington SCMAGLEV Project: BWRR

The second set of local transit routes that would be impacted by the addition of SCMAGLEV Project to the transportation network are those affected by diversions of trips to SCMAGLEV service. **Table 4.2-2** (Forecasted Source of SCMAGLEV Ridership and Forecasted Diversions to SCMAGLEV Project from other Modes for the Years 2030 and 2045, by Baltimore Station Alternative) shows that a range of 240,000 to 320,000 trips would be diverted from bus to SCMAGLEV Project depending on the year of analysis and the Baltimore Station Alternative. The large majority of these diversions would occur on publicly operated express bus services (predominantly MDOT MTA service) or privately-operated inter-city bus that currently run between the Baltimore and Washington, D.C. suburbs and the two downtowns anchoring the SCMAGLEV service, or between the two downtowns. These services are direct competitors to SCMAGLEV Project and therefore would stand to lose riders if SCMAGLEV Project would provide a more attractive trip, as shown by the forecasted diversions.

4.2.6.7 Mitigation Strategies

At this point no mitigation plans have been developed by the Project Sponsor and local transit operators or privately-operated intercity bus operators to respond to forecasted changes in demand (either an increase in demand for some routes or a decrease in demand for other routes) resulting from the addition of the SCMAGLEV Project to the Affected Environment transportation network. As a first step the Project Sponsor will assist, Local transit operators and private operators in developing these mitigation plans. Mitigation strategies may include:

- **Development of New Operating Plans to Reflect New Ridership Demand** – This mitigation strategy would involve the development of new operating plans for local transit service impacted by additional demand from SCMAGLEV

passengers transferring to local bus and rail services, or conversely routes impacted by a decline in demand due to diversions to SCMAGLEV. Local transit operators and the private operators in the SCMAGLEV Project Affected Environment will identify required assistance from the Project Sponsor in developing new operations plans.

- **Development of a Revised Financial Plan** – Changes in service levels in response to forecasted changes in ridership demand will require a new financial plan reflecting new operational levels for each local operator and the private operators. Service level changes will affect all aspects of operations, which will impact operations and maintenance costs and fare revenues. Local operators and the private operators will identify required assistance from the Project Sponsor in developing new financial plans reflecting changes in forecasted ridership.

- **Development of a New Six-Year Capital Plan** – Capital requirements for local operators will change due to forecasted changes in ridership on local services. Based on the forecasted ridership changes, increased frequency on local buses serving the SCMAGLEV stations could require fleet additions. This would also be true of increased frequencies or longer trains on the Baltimore Metro and the Washington Metrorail heavy rail systems. The local operators will identify required assistance from the Project Sponsor in developing new six-year capital programs as well as the required length of assistance in updating the plan on an annual basis.

- **Financial Support** – The local operators may require financial support during a transition period to the new operating configurations resulting from the forecasted changes in ridership. This support may include capital support for fleet additions or operating support to offset the potential need to increase service frequencies to accommodate increased demand. This item will be part of the overall negotiations between the Project Sponsor and local operators regarding the Project Sponsor's role in the transition to the new operating configurations resulting from changes in forecasted riders.

4.2.7 Regional Roadway Network

The Project Study Area has a densely developed regional roadway network (ranging from local roads to major highways) that experiences moderate to severe congestion during peak travel periods of the day. FRA evaluated the current and future regional roadway network in order to determine impacts to this network associated with the addition of the SCMAGLEV Project to the regional transportation network. A comparable analysis is outlined in Section 4.2.8 for the local roadway network around each SCMAGLEV Project station.

4.2.7.1 Current Conditions

The SCMAGLEV Project corridor has a dense roadway network reflecting the highly developed nature of the SCMAGLEV Project Affected Environment. The regional roadway network is summarized below, with greater detail provided in Appendix D.2A.5.

North/South Roadways

FRA identified six major north/south roadways in the Project Study Area that run parallel to the SCMAGLEV Project. These roadways are I-95, the Baltimore-Washington Parkway (BWP), I-97, U.S. 29, U.S. 1, and MD Route 170. More detail on each of these roadways is provided in Appendix D.2A.5.1.

East/West Roadways

FRA identified ten major east/west roadways that run perpendicular to the proposed SCMAGLEV Project alignment. These roadways are I-195, MD Route 100, MD Route 175, MD Route 32, MD Route 198, MD 197, MD Route 200, MD Route 193, MD Route 450 and U.S. 50. Appendix D.2A.5.2 provides more detailed descriptions of each.

Circumferential Beltways

Both major cities within the SCMAGLEV Project Affected Environment, City of Baltimore (I-695) and Washington, D.C. (I-495), are encircled by a circumferential beltway. These are described in greater detail in Appendix D.2A.5.3.

4.2.7.2 Future No Build Alternative

FRA identified the future No Build Regional Roadway network as consisting of the current conditions network plus roadway improvements that are funded and programmed in the CLRPs of either MWCOG or BMC. Roadway projects that are funded or included in one of the CLRPs are primarily focused on improvements to enhance operations or in some instances add additional capacity. FRA has included relevant regional roadway projects within the SCMAGLEV Project Affected Environment in Chapter 3, Section 3.4.1.1.

4.2.7.3 Future Build Alternatives

The future Build Network consists of the Future No Build network plus the addition of the SCMAGLEV Project physical improvements and train operations to the network. The Project Sponsor is coordinating with MDOT Maryland Aviation Administration (MAA) to determine if additional roadway improvements need to be added to the current BWI Marshall Airport – Airport Master Plan. Currently, the Master Plan shows improvements to MD 170 (Aviation Boulevard), Interstate 195 and Friendship Boulevard.

4.2.7.4 Impacts

FRA compared estimated daily traffic volumes on regional roadways between the Horizon Year 2045 No Build SCMAGLEV Project Affected Environment transportation

network and the 2045 Build Transportation Network. To assess impacts to the regional roadway network associated with the addition of SCMAGLEV Project to the transportation network, FRA selected major roadway links within the SCMAGLEV Project Affected Environment roadway network to determine changes in vehicular traffic volumes between the future No Build and Build Alternatives. The 2045 No Build and Build Alternatives volumes are summarized in Appendix D.2 for both the Cherry Hill and Camden Yards Baltimore Station scenarios. Results showed small changes in volumes between the No Build and Build Alternatives, which reflects the fact that although there will be annual diversions to the SCMAGLEV Project from automobiles (see **Table 4.2-2**) these diversions are a small percentage of the total annual automobile trips made within the SCMAGLEV Project Affected Environment and are for a small set of distinct origin/destination (O/D) pairs that are part of a much larger set of O/D pairs that are not conveniently served by the SCMAGLEV Project.

To provide context, the highest annual forecasted diverted trips from auto to SCMAGLEV Project, as shown in **Table 4.2-2**, is 16,480,000 annual trips (year 2045, Camden Yards Baltimore Station Alternative), or an average of approximately 57,000 diverted trips per day over a seven-day week. These 57,000 daily diverted trips represent approximately 1.3 percent of the total projected 4,401,899 daily auto trips made under the No Build Alternative within the SCMAGLEV Project Affected Environment in 2045.

4.2.7.5 Mitigation

The change in daily traffic volumes at key links within the regional roadway network show small changes on a daily basis, with even smaller changes during the peak periods when roads are most congested. Given that these changes in roadway volumes between the 2045 No Build and Build Alternatives will have minimal impacts on the operation of the regional roadway network, no mitigation is proposed.

4.2.8 Station Area and Train Maintenance Facility Street Network Impacts

Section 4.2.7 evaluated the impacts of the addition of SCMAGLEV Project to the SCMAGLEV Project Affected Environment on the regional roadway network. Section 4.2.8 evaluates the impact of the addition of the SCMAGLEV Project Affected Environment transportation network on the local street network around each proposed SCMAGLEV Project station. Also included in Section 4.2.10 is an analysis of parking at each proposed station under the Build Alternatives, including an assessment of forecasted parking demand versus anticipated parking capacity

The first sub-section, 4.2.8.1, evaluates the urban street network around the Camden Yards Baltimore Station Alternative.

4.2.8.1 Camden Yards Baltimore Station Current Conditions

Current conditions for the local street network around the Camden Yards SCMAGLEV Project station are summarized in Appendix D.2A.6.

4.2.8.2 Future No Build Alternative

FRA identified no funded capital improvements in the BMC CLRP that would change the street network surrounding the Camden Yards Station in the No Build transportation network.

4.2.8.3 Future Build Alternatives

The future Build Network consists of the Future No Build network plus the addition of the SCMAGLEV Project physical improvements and train operations to the network. The Project Sponsor's station design for the Camden Yards Station includes:

- drop-off areas serving taxi, Transportation Network Companies, and privately-owned vehicles near station entrances;
- a new seven-story 5,000 space parking facility constructed north of Pratt Street between Sharp and Charles Streets; and
- improvements to the Camden Yards Transportation Center to integrate with the SCMAGLEV Project station.
- The Project Sponsor did not include improvements to the street network for the Camden Yards Station.

4.2.8.4 Impacts

In order to assess the impacts of SCMAGLEV Project on local street operations, FRA analyzed LOS and delay for the future (2045) No Build and Build Alternatives at key analysis intersections within the Camden Yard Station area, with a key focus on the changes between No Build and Build Alternatives. Detailed results are provided in Appendix D.2A.6 with a results summary provided below.

Analysis of the change in LOS and delay between the No Build and Build Alternatives show marginal changes in LOS and delay between the Build and No Build Alternatives, meaning the addition of the SCMAGLEV Project Affected Environment transportation network would have minimal impacts to the local street network around the Camden Yards Station. Detailed results are included in Appendix D.2A.6.

4.2.8.5 Mitigation Strategies

Given the forecasted LOS and delay for the Build Alternatives show minimal changes in local roadway operations when compared to the No Build Alternative, no detailed mitigation plans are proposed.

4.2.9 Station Area Street Network – Baltimore Cherry Hill Station Alternative

This sub-section evaluates the urban street network around the Cherry Hill Baltimore Station Alternative.

4.2.9.1 Current Conditions

Current conditions for the local street network around the SCMAGLEV Project Cherry Hill Station are summarized in Appendix D.2A.7.

4.2.9.2 Future No Build Alternative

FRA identified one funded capital improvement in the BMC CLRP within the Cherry Hill Station area. The BMC CLRP proposes expansion of the BWP to four lanes in each direction. However, the improvement would not change the local street network surrounding the Cherry Hill Station Alternative and thus would not impact the future No Build transportation network.

4.2.9.3 Future Build Alternatives

The future Build Network consists of the Future No Build network plus the addition of the SCMAGLEV physical improvements and train operations to the network. The Project Sponsor is including a bus drop-off area and an auto drop off/pick-up area (including a taxi staging area) on the east side of the station and a new 4-level parking structure connected to the station through a skywalk opposite the drop off/pick-up area. The Project Sponsor is also including changes to the profile of Annapolis Road at Patapsco Avenue to accommodate the SCMAGLEV tunnel portal; a network of local roadways to allow for ample circulation in and around the station; signal upgrades and roadway changes at Waterview Avenue intersections with Cherry Hill Road, Sidney Avenue and Annapolis Road; and a fully integrated roadway with a direct connection to the MDOT MTA LRT Station that is located directly below the Cherry Hill Station.

4.2.9.4 Impacts

Analysis of the change in LOS and delay between the No Build and Build Alternatives show marginal changes in LOS and delay between the Build and No Build Alternatives in the Cherry Hill Station area. This means the addition of the SCMAGLEV Project Affected Environment transportation network will have minimal impacts to the local street network around the Cherry Hill Station. Detailed results are provided in Appendix D.2A.7.

4.2.9.5 Mitigation Strategies

Given that the minimal forecasted changes in roadway operations between the 2045 No Build and Build Alternatives, no specific mitigation strategies are proposed. The Project Sponsor has identified overall signal and striping improvements that would be implemented as part of the roadway upgrade completed as part of the station construction. These proposed improvements include:

- Annapolis Road and Manokin Street: Upgrade the traffic signal to a fully actuated system; stripe a 100-foot left-turn lane along the Annapolis Road northbound approach

- Annapolis Road and Russell Street: Install a new fully actuated traffic signal; stripe a 175-foot right-turn lane along the Russell Street eastbound approach; stripe a 350-foot left turn lane along the Annapolis Road northbound approach
- Annapolis Road and Waterview Avenue EB side of MD 295: Stripe a 375-foot four-lane cross section (two lanes in each direction) along the Annapolis Road southbound approach (ending near Maisel Street); upgrade signal to a fully actuated signal (this may be covered by the current proposed improvements)
- Annapolis Road and Waterview Avenue WB side of MD 295: Add a new 150-foot left turn lane along the Annapolis Road northbound approach; upgrade the traffic signal to a fully actuated signal (this may be covered by the current proposed improvements); note a 350-foot second northbound lane along the Annapolis Road northbound approach is proposed as part of the city project
- Annapolis Road and MD 295 SB ramps: Add a 120-foot second left-turn lane along the MD 295 SB off-ramp approach; add a right-turn lane along the Annapolis Road northbound approach extended back to the previous intersection; upgrade the traffic signal to a fully actuated signal (this may be covered by the current proposed improvements); note a 250-foot left-turn lane along the Annapolis Road southbound approach is proposed as part of the current city project.
- Annapolis Road and West Side Access North Driveway: Add a second southbound travel lane along the Annapolis Road southbound approach extended to the previous intersection; add a 250-foot right-turn lane along the Annapolis Road northbound approach; create a double-right and single left-turn lane along the site access exit roadway; install a new fully actuated traffic signal
- Waterview Avenue and MD 295 NB off-ramp/ Church Street: Add a left-turn lane along the MD 295 off-ramp approach; install a new fully actuated traffic signal
- Waterview Avenue and East Side Access West entrance: Upgrade traffic signal to a new fully actuated traffic signal to allow westbound traffic to make a left into the station site
- Waterview Avenue and East Side Access East entrance: Add a 150-foot left-turn lane along the Waterview Avenue westbound approach; add a 150-foot right-turn lane along the Waterview Avenue eastbound approach; create a double-left and single right-turn lane along the site access exit roadway; install a new fully actuated traffic signal
- The two Waterview Avenue intersections/signal should be designed as dynamic lane control to allow the lane use to be changed by reprogramming the signal and approach signs because the peak hour volumes might not reflect the off-peak and weekend volume demands by lane

4.2.10 Station Area Street Network – Washington, D.C. Mount Vernon East Station

This section evaluates the urban street network around the proposed Mount Vernon East Station in Washington, D.C.

4.2.10.1 Current Conditions

The Project Sponsor located the Mount Vernon East Station in the Mount Vernon neighborhood of downtown Washington, D.C. More detail on street network around the Mount Vernon East Station is provided in Appendix D.2A.8.

4.2.10.2 Future No Build Alternative

For this analysis, no future year capital improvements were included for the street network surrounding the Mount Vernon East Station. However, the MWCOG CLRP includes a major project nearby the station area known as the “Return to L'Enfant” project. The “Return to L'Enfant” project is a planned unit development that will cover I-395 with an at-grade platform above the highway that will be used to support new building.

4.2.10.3 Future Build Alternatives

The future Build Network consists of the Future No Build network plus the addition of the SCMAGLEV physical improvements and train operations to the network. The Project Sponsor is including an underground parking facility with 1,000 spaces and a drop off/pick-up area, including taxi staging, on the first below-ground floor of the proposed underground garage, between 5th and 6th Streets NW.

4.2.10.4 Impacts

Degradation in traffic operations between the No Build and Build Alternatives was found at the following intersections in the Mount Vernon East Station area. (**Figures 4.2-6 and 4.2-7)**

Table 4.2-6: Changes in LOS and Delay Between the No Build and Build Alternatives in Mount Vernon East Station Area (Camden Yards Station Alternative)

Intersection	No Build LOS	Build LOS	Increase in Delay (seconds)
AM Peak – No intersections			
PM Peak			
New York Avenue @ 10th Street NW	B	F	84.3
New York Avenue @ 9th Street NW	C	F	68.0
L Street NW @ 6th Street NW	B	F	280.0
New York Avenue @ 6th Street NW	C	F	84.7
Massachusetts Ave @ 6th St. NW	E	F	24.1

Note: Level of Service defined as: LOS A – free flow; LOS B – Stable flow – slight delay; LOS C – stable flow – acceptable delays; LOD D – approaching unstable flow; LOS E – unstable flows – intolerable delays; LOS F – forced flow (significantly degraded traffic operations)

Table 4.2-7: Changes in LOS and Delay Between the No Build and Build Alternatives in Mount Vernon East Station Area (Cherry Hill Station Alternative)

Intersection	No Build LOS	Build LOS	Increase in Delay (seconds)
AM Peak – No Intersections			
PM Peak			
New York Avenue @ 10th Street NW	B	F	84.3
New York Avenue @ 9th Street NW	C	F	67.6
L Street NW @ 6th Street NW	B	F	280.0
New York Avenue @ 6th Street NW	C	F	83.3
Massachusetts @ 6th Street NW	E	F	39.9

4.2.10.5 Mitigation Strategies

The Project Sponsor will coordinate with the District Department of Transportation to develop detailed mitigation measures, as appropriate. Potential mitigation strategies may include:

- Optimize all traffic signals in the station area to ensure the heaviest traffic movements are receiving optimum green time.

- Encourage drivers through public outreach efforts to choose alternative routes in order to avoid the station area to the degree possible. This would include avoidance of 7th NW to the degree possible by using other north/south streets and automobiles avoiding New York Avenue by using other routes such as Rhode Island Avenue to the degree possible, understanding that New York Avenue is a major freight route into the city.
- Channel SCMAGLEV traffic via specific routes to separate from general traffic to the greatest degree possible in order to mitigate impacts to general traffic.
- Evaluate the potential for adding roadway capacity in the station area including additional left turn capacity. Focus would be on separating station traffic from general traffic to the greatest degree possible.
- Evaluate potential for removing on-street parking during times of heaviest vehicle arrivals and departures from the SCMAGLEV Project station.
- Develop a variable message sign system to highlight potential delays in the station area and provide alternative routes for drivers traveling through the station area.

4.2.11 Road Network Around Train Maintenance Facility Alternatives

This section evaluates the roadway network around the three project Train Maintenance Facility (TMF) alternatives:

- The first alternative TMF site is located directly north of MD Route 198 and just to the east of the BW Parkway, in the Anne Arundel County portion of the SCMAGLEV Project Affected Environment (known as the MD 198 alternative).
- The second alternative site is to the north of Powder Mill Road on Beltsville Agricultural Research Center (BARC) property west of the Baltimore Washington Parkway (BWP) in the Prince George's County portion of the SCMAGLEV Project Affected Environment (known as the BARC West site).
- The third alternative site is on Springfield Road on Beltsville Agricultural Research Center property east of the BWP in the Prince George's County portion of the SCMAGLEV Project Affected Environment (known as the BARC Air Strip site).

4.2.11.1 Current Conditions

Current conditions for the roadway network around each of the Train Maintenance Facility (TMF) site alternatives are outlined in Appendix D.2A.9.

4.2.11.2 Future No Build Alternative

Future No Build conditions for the roadway network around each of the TMF site alternatives are outlined in Appendix D.2A.9.2.

4.2.11.3 Future Build Alternatives

Future Build Alternatives for the roadway network around each of the TMF site alternatives are outlined in Appendix D.2A.9.3.

4.2.11.4 Impacts

Impacts to the roadway network around each TMF alternative resulting from the addition of the respective alternatives to the SCMAGLEV Project Affected environment are outlined in Appendix D.2A.9.4.

4.2.11.5 Mitigation Strategies

Coordination efforts between the Project Sponsor and MDOT SHA, Anne Arundel County or Prince George's County, the National Park Service (NPS), and other key stakeholders will be required to develop specific mitigation requirements for traffic impacts associated with the different TMF options (this will build on the extensive inter-agency coordination carried out during the development of this document). Development of these mitigation strategies will rely on more precise information on anticipated trip generation by the TMF facility as well as the distribution of those trips over the full day. Based on preliminary engineering design, potential mitigation strategies by TMF site may include:

MD 198 TMF Alternative – Mitigation strategies for the MD 198 TMF alternative may include the following:

- Install a left turn stacking lane for eastbound vehicles turning into the storage facility driveway from MD 198. Currently eastbound vehicles on MD 198 would make the turn into the driveway from the center median turn lane but only a single vehicle can do this at a time based on the current roadway configuration. Without the left turn stacking lane, additional vehicles waiting to turn left would have to queue in the left general traffic lane, thus disrupting traffic.
- Widen the right turn radius for vehicles entering the driveway to the TMF entrance from westbound 198. The entrance to the driveway is currently improved and channelized but a wider turning radius for right turning vehicles could allow these vehicles to exit the 198 westbound general traffic lane more quickly, thus minimizing disruptions to westbound through traffic.
- Channelizing improvements in the existing median to separate eastbound traffic making left turns into the driveway from vehicles making the left turn out of the driveway and into the median and eastbound lanes. This improvement should also include storage in the median for left turning vehicles from the driveway to avoid queues intruding on westbound traffic lanes.
- Complete warrant analysis to determine if a signal is warranted at this intersection.

BARC West TMF Alternative – Mitigation strategies for the BARC West TMF alternative may include the following:

- Install a left turn stacking lane for vehicles traveling westbound on Odell Road and making the left turn into the TMF facility. This lane would accommodate queues entering the facility from the east in order to avoid disruptions to westbound general traffic.
- Install a right turn lane on Odell Road separate from the general traffic lane for eastbound vehicles entering the facility. This would allow for vehicles entering the facility to separate from general traffic, thus avoiding disruptions to eastbound through traffic.
- Complete a warrant analysis to determine if a signal is warranted at this new entrance.

BARC Air Strip Alternative – Mitigation strategies for the BARC Air Strip TMF Alternative may include:

- Install a left turn stacking lane for vehicles traveling southbound on Springfield Road and making the left turn into the TMF facility. This lane would accommodate queues entering the facility from the north in order to avoid disruptions to southbound through traffic.
- Install a right turn lane on Springfield Road separate from the general traffic lane for northbound vehicles entering the facility. This would allow for vehicles entering the facility to separate from general traffic, thus avoiding disruptions to northbound through traffic.
- Complete a warrant analysis to determine if a signal is warranted at this new entrance.

4.2.12 Roadway Realignments (Horizontal and Vertical) Resulting from SCMAGLEV Alignment and Facilities

This section evaluates required horizontal and vertical roadway realignments resulting from the SCMAGLEV alignment and facilities. Required roadway realignments are outlined in Appendix D.2A.10

4.2.12.1 Current Conditions

Current conditions for each of the impacted roadways is outlined in Appendix D.2A.10.1.

4.2.12.2 Future No Build

Future No Build conditions for each of the impacted roadways is outlined in Appendix D.2A.10.1.

4.2.12.3 Future Build Alternatives

Future Build conditions for each of the impacted roadways is outlined in Appendix D.2A.10.1.

4.2.12.4 Impacts

Impacts to each roadway requiring realignment due to the SCMAGLEV alignment and facilities are outlined in Appendix D.2A.10.1.

4.2.12.5 Mitigation Strategies

None of the vertical or horizontal realignments outlined in Appendix D.2A.10.1 will lead to a change in roadway cross section or functionality, so no mitigation is proposed.

Ongoing coordination efforts between the Project Sponsor and MDOT-SHA, and either Prince George's County, Anne Arundel County, or Baltimore City should be carried out through the final design process to ensure more detailed design does not result in impacts.

4.2.13 BWI Marshall Airport Access

This section evaluates the transportation network around the proposed SCMAGLEV BWI Marshall Airport Station.

4.2.13.1 Current Conditions

The BWI Marshall Airport is a major U.S. airport located approximately nine miles south of the SCMAGLEV Camden Yards alternative and approximately 32 miles northeast of Washington, D.C. Appendix D.2A.11.1 provides more detail on auto and transit access to the Airport.

4.2.13.2 Future No Build Alternative

FRA and MDOT MTA completed environmental documentation and conceptual engineering for the BWI Marshall Airport Rail Station Improvements and Fourth Track Project in January 2016. The Rail Station and Fourth Track Project includes construction of a new platform, improvements to the current station with possible multi-level transit-oriented development and the addition of nine miles of fourth track along the Northeast Corridor Line. The Rail Station Improvements and Fourth Track Project is not funded for advancement to design and construction phases at this time. However, MDOT MTA includes the MARC BWI Marshall Airport Rail Station Upgrades and Repairs project in the MDOT FY 2019-2024 Consolidated Transportation Program (CTP). This project includes structural improvements to parking garages and station improvements for a more passenger-friendly experience.

The MDOT MAA's Capital Improvement Program also includes widening the terminal access road as it transitions from I-195 to Friendship Road at the airport entrance.

No other transit or road network improvements are programmed in the vicinity of the BWI Marshall Airport Station.

4.2.13.3 Future Build Alternatives

FRA determined that no additional transit or roadway network changes are proposed as a result of the addition of the SCMAGLEV Project to the SCMAGLEV Project Affected Environment transportation network.

The construction of the BWI Marshall Airport Station would result in the demolition of the current hourly garage, but current plans are for MDOT Maryland Aviation Administration to reconstruct the garage in the same vicinity once the station is completed. Ongoing coordination between the Project Sponsor and MDOT MAA will be undertaken in order to communicate any changes in current plans. Specific garage replacement plans would be prepared in the final engineering design.

4.2.13.4 Impacts

Tables D.2-25 and D.2-26 in Appendix D.2A.11.2 contain LOS and delay information for key analysis intersections in the vicinity of BWI Marshall Airport for the 2045 Build and No Build Alternatives. Table D.2-25 contains information for the Camden Yards Station Alternative while Table D.2-26 contains information for the Cherry Hill Station Alternative.

Intersections that show degradation in traffic operations under the Camden Yards Scenario include:

- MD 170 @ MD 176 - This intersection operates at LOS F in both the Build and No Build Alternatives in the AM peak, but delay increases by approximately 58 seconds. In the PM peak, LOS remains at F, but delay increases by 85 seconds.
- MD 170 @ Terminal Road – This intersection remains at LOS F during the AM peak, but delay increases by approximately 148 seconds.
- MD 162 @ Cromwell Park Drive – This intersection degrades from LOS D to LOS F in the PM peak, with an increase in delay of approximately 70 seconds.
- MD 170 @ EB Ramps to I-195 – This intersection degrades from LOS A to LOS F, with an increase in delay of approximately 136 seconds. In the AM peak and 129 seconds in the PM peak.

Intersections that show degradation in traffic operations under the Cherry Hill Scenario include:

- MD 170 @ MD 176 - This intersection operates at LOS F in both the Build and No Build Alternatives in the AM peak, but delay increases by approximately 61 seconds. In the PM peak, LOS remains at F, but delay increases by 97seconds.
- MD 170 @ Terminal Road – This intersection remains at LOS F during the AM peak, but delay increases by approximately 158 seconds.
- MD 162 @ Cromwell Park Drive – This intersection degrades from LOS D to LOS F in the PM peak, with an increase in delay of approximately 95 seconds.

- MD 170 @ EB Ramps to I-195 – This intersection degrades from LOS A to LOS F, with an increase in delay of approximately 129 seconds in the AM peak and 139 seconds in the PM peak.

4.2.13.5 Mitigation Strategies

FRA has identified the following mitigation strategies to be addressed by the Project Sponsor for the degradation of LOS and delay at the intersections noted above. Coordination between the Project Sponsor and MDOT SHA, which has not yet taken place, is an essential first step to confirm these strategies. Note: These mitigation strategies apply to both the Camden Yards and Cherry Hill station alternatives.

MD 170 @ MD 176

- Optimize signal timing to maximize green times for the highest movement volumes through the intersection.
- Add a third through lane on northbound MD 170 at the intersection to increase intersection capacity. Make any required geometry improvements to support this added capacity.

MD 170 @ Terminal Road

- Optimize signal timing to maximize green time times for highest movement volumes through the intersection.
- Extend left turn pocket on southbound MD 170 to accommodate the increase in left turns into the Terminal Road entrance into the Airport;
- Add a second left turn pocket on southbound MD 170 to facilitate higher turning movements within the same signal cycle. Make any required geometry improvements to support this added capacity.

MD 162 @ Cromwell Park Drive

- Optimize signal timing to maximize green times for the highest movement volumes through the intersection.
- Extend length of free right turn lanes from northbound MD 170 onto Cromwell Park Drive and from Cromwell Park Drive onto northbound MD 170 to provide more distance for merges.
- Extend length of left turn stacking lane for turns from southbound MD 170 onto Cromwell Park Drive.

MD 170 @ Eastbound Ramps to MD Interstate 195

- Optimize signal timing to maximize green times for the highest movement volumes through the intersection.

- Add a second left turn lane for cars exiting eastbound I-195 and turning left onto eastbound MD 170 to allow more vehicles to make the left turn during a single signal cycle.

4.2.14 SCMAGLEV Project Station Area Parking

This section evaluates station area parking capacity and assesses whether there will be sufficient parking capacity to meet demand at each SCMAGLEV Project station.

4.2.14.1 Current Conditions

Current parking infrastructure in each of the SCMAGLEV Project station areas is summarized in Appendix D.2A.12.1.

4.2.14.2 Future No Build Alternative

The area around the Washington, D.C. Mount Vernon East Station is undergoing extensive redevelopment, but the District of Columbia is discouraging and limiting parking in new development. Therefore, parking capacity beyond what already exists will likely remain unchanged, or perhaps even experience some decline. In downtown Baltimore, ongoing development and redevelopment will likely result in the addition of parking capacity beyond what currently exists, though given the dense urban nature of downtown, these additions will likely be constrained.

No source was found that indicated there would be parking expansion in the vicinity of the Baltimore Cherry Hill Station.

The Airport Layout Plan for BWI Marshall Airport shows planned expansions of both the hourly and daily garages.

4.2.14.3 Future Build Alternatives

The Project Sponsor has proposed parking at each of the proposed SCMAGLEV Project stations to accommodate at least some of the forecasted demand for people who would drive and park at each station (this mode of access data comes from the Project Sponsor ridership forecasting effort). The additional parking proposed at each station is summarized in **Table 4.2-8**. Also included in the table is a summary of the daily SCMAGLEV Project riders who would arrive at the station via automobile and park at the station, by Baltimore Station Scenario. The final column in the table represents the excess number of daily riders who would have to find parking at a parking facility other than the parking facility at the station. The data in the final column show that there would be excess demand for parking in downtown Baltimore, at BWI Marshall Airport and in Washington, D.C.

Table 4.2-8: Proposed Parking Capacity Added at Each Station Area and Daily Excess Demand for Parking

Station	Proposed Added Parking Spaces	Forecasted Daily SCMAGLEV Riders Arriving at Station and Parking	Excess Demand - SCMAGLEV Daily Riders Required to Find Parking at Facility Other Than at Station
Camden Yards Station Alternatives			
Baltimore Camden Yards	5,000	6,190	1,190
BWI Marshall Airport	5,000	5,868	868
Mount Vernon East	1,000	3,769	2,769
Cherry Hill Station Alternatives			
Cherry Hill	5,000	4,919	0
BWI Marshall Airport	5,000	5,952	952
Mount Vernon East	1,000	3,360	2,360

Source: SCMAGLEV Ridership Forecast, BWRR, Impacts

4.2.14.4 Impacts

Impacts associated with the change in cars accessing/exiting each SCMAGLEV Project station areas between the No Build and Build Alternatives are addressed in the LOS/delay analysis contained in Section 4.2.9.

Excess daily demand for parking at each SCMAGLEV Project station will require a portion of riders accessing SCMAGLEV Project stations to find parking at other facilities in the station area. This requirement may result in shortages of parking at other parking facilities in the station area, though a precise assessment is difficult to complete at this time due to lack of comprehensive data on current parking utilization in facilities around each station, especially in Washington, D.C. and Baltimore.

4.2.14.5 Mitigation Strategies

At this point no plans have been developed by local jurisdictions to respond to potential parking shortages at parking facilities around each SCMAGLEV Project station. The Project Sponsor will coordinate with the appropriate local jurisdictions to evaluate potential impacts prior to the publication of the FEIS and ROD and develop mitigation measures, as appropriate. The first step in this evaluation will be the completion of a parking capacity and utilization study by the Project Sponsor for both downtowns in order to gain a more precise understanding of total parking capacity and available excess parking to accommodate increased SCMAGLEV-related demand. The Project Sponsor may then be required to develop additional mitigation strategies based on the result of the analysis.

4.2.15 Station Area Urban Sidewalk and Pedestrian Networks

This section evaluates the sidewalk network around each station area.

4.2.15.1 Current Conditions

Detail on the sidewalk networks around each of the proposed SCMAGLEV Project stations is provided in Appendix D.2A.13.1.

4.2.15.2 Future No Build Alternative

FRA has not identified specific plans for sidewalk enhancements in the station areas. As development and redevelopment occur, the pedestrian network in each station area will change but FRA cannot assess those changes at this stage.

4.2.15.3 Future Build Alternatives

The Project Sponsor has designed, at a conceptual level, pedestrian improvements in the immediate station area as part of its overall station designs in Baltimore (both station alternatives) and Washington, D.C., but improvements/upgrades for the broader station area sidewalk network have not yet been identified or developed.

At the BWI Marshall Airport SCMAGLEV Project station, coordination between the Project Sponsor and the MDOT MAA regarding pedestrian movements at BWI Marshall Airport has already begun and would continue through the development process.

4.2.15.4 Impacts

To assess the impacts of additional pedestrians accessing, or leaving, each SCMAGLEV station on each station area's sidewalk network under the future Build Alternatives, an estimate of how these pedestrians would be distributed onto the different links within the station area sidewalk network during the AM peak was completed. The estimated results are contained in Appendix D.2A.13.2 for the two station alternatives in Baltimore and the Mount Vernon East station in Washington, D.C. (results under both Baltimore Station scenarios is provided for the Mount Vernon East station).

A summary of the results and impacts for each station are outlined below.

Baltimore Camden Yards Station – The Camden Yards Station will have two entrances, one located on Conway Street and one located along Sharp Street just south of Pratt Street. The heaviest loading of SCMAGLEV Project passengers onto the sidewalk network in the AM peak will occur on the leg of Pratt Street east of Sharp Street (estimated loading of an additional 599 pedestrians in the AM peak hour compared to the future No Build Alternative) and the leg of Conway Street west of Sharp Street (estimated loading of an additional 523 pedestrians in the AM peak hour compared to the future No Build Alternative). A total of an additional 2,217 pedestrians will be added to the Camden Yards Station area sidewalk network in the AM peak hour compared to the No Build Alternative (see Appendix D.2A.13.2).

Baltimore Cherry Hill Station – The Cherry Hill Station has a single entrance on Cherry Hill Road, so all pedestrian loading onto the station area network would occur at this station entrance. It is estimated that a total of 2,636 pedestrians would be loaded onto the Cherry Station area sidewalk network during the AM peak hour beyond the No Build. It is estimated that 1,977 of these passengers would load onto the east leg of Cherry Hill Road while the remainder (659) would load onto the west leg of Cherry Hill Road.

Mount Vernon East Station (Cherry Hill Baltimore Station Alternative) – The Mount Vernon East Station in Washington, D.C. has three entrances; 3rd Street NW at New York Avenue, New York Avenue between 5th and 6th Streets, and New York Avenue at 7th Street. The heaviest pedestrian activity associated with the addition of the SCMAGLEV Project to the SCMAGLEV Project Affected Environment Transportation network is estimated to occur at the 7th Street NW/N.Y. Avenue entrance, which is closest to office, residential, and other activity centers in the station vicinity, as well as to the entrances to the two Metro stations and bus services in the vicinity of the SCMGALEV Project station.

The heaviest estimated AM peak hour loadings onto the Station area sidewalk network from the SCMAGLEV Project station would be on the north leg of the 7th Street/New York Avenue intersection, with an additional 1,710 pedestrians loaded onto this sidewalk network link beyond future No Build volumes in the AM peak hour.

The next highest estimated pedestrian loadings will occur at the north and west legs of the intersection of 6th Street NW and New York Avenue, based on this intersection's proximity to the station entrance between 5th and 6th Streets at New York Avenue. An estimated additional 419 pedestrians would be loaded onto each of these intersection legs in the AM peak hour under the Build Alternatives, when compared to the No Build Alternative.

Mount Vernon East Station (Camden Yards Baltimore Station Alternatives) – The pedestrian loading patterns at the Mount Vernon East Station under the Camden Yards Station Alternatives would be the same as under the Cherry Hill Station Alternative, though with higher absolute pedestrian volumes based on higher ridership under the Camden Yards Station Alternative.

As with the Cherry Hill Station alternatives, the sidewalk link with the highest AM peak hour additional pedestrian loading under the Build Alternatives would be the north leg of the 7th Street/New York Avenue intersection. Total additional AM peak hour loadings on this sidewalk network link would be 1,888 under the Camden Yards Station Alternative. Estimated additional loadings on the north and west legs of the intersection of 6th Street and New York Avenue would be 463 additional pedestrians in the Build Alternatives when compared to the No Build Alternative.

Pedestrian network upgrades in the immediate station area of the Washington, D.C. Station would be constrained due the dense urban nature of the station area and therefore some sidewalk crowding is to be anticipated during the AM peak hour.

4.2.15.5 Mitigation Strategies

Mitigation strategies would depend on the characteristics of the sidewalk network at the time of the start of revenue service.

In the short-term, the Project Sponsor, in coordination with the appropriate agencies within each local jurisdiction, would increase sidewalk capacity where feasible based on available space. Assessment of opportunities for short-term capacity expansion would be completed through coordination with the appropriate agencies in each city, with the Project Sponsor completing the design for capacity expansion.

In support of long-term capacity expansion, the cities may ask the Project Sponsor to set aside funding to be used as redevelopment opens up opportunities to increase sidewalk capacity.

In the short-term, the Project Sponsor has also identified other mitigation strategies to be applied, including detailed wayfinding signage that would support spreading of pedestrians to different station entrances and hand-held device applications and street-level real-time signage identifying congested pedestrian areas and walk paths to less crowded entrances.

4.2.16 Passenger Pickup and Drop-Off Operations at SCMAGLEV Project Stations

4.2.16.1 Current Conditions

The current conditions for the designated pick-up and drop-off areas at the proposed SCMAGEV stations are outlined in detail in Appendix D.2A.14.1.

4.2.16.2 Future No Build Alternative

There will be no designated pickup and drop-off areas for SCMAGLEV Project passengers in the Future No Build Alternative transportation network at any of the four station areas being evaluated.

4.2.16.3 Future Build Alternatives

Designated pickup and drop off areas would be added to the transportation network at the four SCMAGLEV Project station areas. Locations and required sidewalk frontage length is outlined in detail in Appendix D.2A.14.2.

4.2.16.4 Impacts

Impacts associated with curb pick-up and drop-off operations by station and location are outlined below.

Camden Yards Station – Approximately 240 feet of curb space will be required for pick-up and drop-off operations on both Pratt Street and Conway Street (both pick up and drop off operations will occur on each street). There is sufficient curb side distance

on both streets to meet this need. Additional considerations associated with these operations include:

- Westbound Conway Street – Conway Street is a busy feeder from downtown Baltimore to I-395, with average daily traffic equaling approximately 37,000 cars per day. Detailed design of the pickup and drop-off facility has not yet been developed by the Project Sponsor, but two general options exist, each with different impacts.

  In the first instance, the pickup and drop-off facility could be built into the wide sidewalks east and west of Sharp Street, thus allowing cars to completely pull out of traffic, thus avoiding impacts to general traffic operations. However, this operation would impact sidewalk widths, which in turn would impact pedestrian operations, including the additional pedestrians added to the sidewalk network after the SCMAGLEV Project is in operations. One additional impact related to a full pull-out is the potential difficulty for vehicles to quickly exit the pull out once the pickup or drop-off is completed due to trouble transitioning to a general traffic lane (this is especially true during high traffic times of the day). Delayed exit from the pull out could lead to queues in the general traffic lane waiting to enter the pull-out, which would disrupt general traffic operations.

  The second pickup and drop-off operational option is to take the rightmost general traffic lane and complete pickup and drop-off operations from this lane. Currently this rightmost general traffic lane is a right-turn only lane at Howard Street while the other two lanes in the three-lane cross-section are left-turn only lanes to I-395. Operating pickups and drop-offs out of the rightmost Conway Street general traffic lane will impact general traffic operations, especially during the PM peak hours when there are heavy traffic volumes, though this impact is hard to specify without the Project Sponsors detailed design for the pickup/drop-off facility.
- Eastbound Pratt Street – The same options for pick-up/drop-off operations identified for Conway Street, with the same potential impacts, are also applicable for Pratt Street. One additional impact from having operations in the curb lane is that this lane is a dedicated bus only lane and therefore curb operations would impact bus operations.

Mount Vernon East Station – Impacts by each designated pick-up drop off area include:

- Southbound 9th Street NW, n/o Massachusetts Avenue NW – This location would be used for taxi pickup operations. It is estimated that 160 feet of curbside is required to accommodate this. An existing taxi stand of sufficient length is currently located here so no impacts are anticipated.
- Southbound 7th Street NW between M Street NW and Mount Vernon Place NW – This location would be used for TNCs pickups. An estimated 240 feet of curbside is required to support the operation. There is sufficient space in this section of 7th Street NW to accommodate this operation. Other impacts would occur for

Metrobus service, which runs through this area on 7th Street. One bus stop is located in this section, at L Street NW.

Curbside operations would also impact general traffic operations. Parking, which is currently allowed in the mid-day, would also have to be removed to accommodate this operation.

- 6th Street NW between New York Avenue and K Street – This location would be used for Taxi, TNC, and Kiss-and-Ride drop-offs. An estimated 640 feet of curbside would be required to support this operation. There is not sufficient space in this section of 6th Street NW to accommodate this operation so the operation may need to be expanded north to L Street or south toward Massachusetts Avenue to handle all operations. Other potential effects include impacts of general traffic operations from curbside operations, including from queues in general traffic lanes waiting to enter the drop-off area. Mid-day parking would also have to be removed to accommodate this operation.

4.2.16.5 Mitigation Strategies

Mitigation would be required to accommodate conflicts between the SCMAGLEV Project's required curb space for drop-off and pickup operations and other uses such as bus stops along the same curb side. Specific mitigation strategies would be identified as engineering design progresses. This would require close coordination between the Project Sponsor and the appropriate local jurisdictions.

4.2.16.6 Construction Period Impacts

The SCMAGLEV Project Affected Environment transportation network will be temporarily impacted during SCMAGLEV construction in three predominant areas. These are:

- Impacts related to truck and auto arrivals and departures at work sites along the SCMAGLEV Project alignment.
- Impacts to traffic operations due to closed or modified intersections during construction.
- Impacts to transit services operating in areas of construction activity.

Current conditions, impact assessment and mitigation strategies related to each of these impact areas are outlined below.

4.2.17 Transportation Network Impacts Related to Truck and Auto Arrivals at Work Sites

There will be multiple work sites along the SCMAGLEV Project alignment where trucks would deliver equipment and work materials while also carrying away construction debris and tunnel construction spoils. Vehicles carrying workers to and from work sites would also add traffic to the roadway network in the vicinity of each work site.

The impacts of this construction-related vehicle traffic on the roadway network is the subject of this document section.

4.2.17.1 Current Conditions

Current conditions for the roadway network around each of the proposed work sites are outlined in detail in Appendix D.2A.15.1.

4.2.17.2 Future No Build Alternative

In most instances the future No Build Alternative roadway network will be the same as under current conditions. Where there are changes, they are noted in Appendix D.2A.15.1 in the Current Conditions section.

4.2.17.3 Future Build Alternatives

In most instances the future Build Alternatives roadway network will be the same as under the future No Build Alternative. Where there are changes, they are noted in Appendix D.2A.15.1 in the Current Conditions section. There will be changes on Odell Road and Springfield Road to accommodate the BARC West and BARC Airstrip TMF options respectively, but these changes include a modification to roadway alignment but not to roadway capacity or functionality.

4.2.17.4 Impacts

The impacts of truck and auto arrivals and departures at each work site along the alignment will differ at each site based on the number of truck arrivals/departures and the roadway configuration surrounding the site. Detailed impacts for each work site are outlined in Appendix D.2A.15.2 but a summary of potential impacts is summarized here.

- Overall degradation of general traffic operations on roadways leading to the work site based on slow moving traffic impacting roadway operations and traffic throughput.
- Traffic operations degradation occurring because of fewer general traffic vehicles clearing a signalized intersection during each green phase due to trucks operating more slowly than automobiles.
- Degradation of general traffic operations related to trucks entering and exiting the construction sites, including truck queues spilling over into general traffic lanes as they wait to make turns into a work site. This is especially relevant for trucks making left turns across traffic to access a work site.
  - Flag operations at many work sites will be required to allow trucks to enter and exit the site. This type of operation will lead to traffic delays and degraded traffic operations, especially on heavily traveled roadways.
- In some instances, temporary traffic signals will be required at the entrances/exits of work sites. These signals will change roadway capacity and traffic operations, leading to degradation in overall traffic operations.

4.2.17.5 Mitigation Strategies

Mitigation of the impacts of truck and auto arrivals and departures at work sites along the alignment will differ at each site based on the number of truck arrivals/departures and the roadway configuration surrounding the site. Detailed mitigation strategies are outlined in Appendix D.2A.15.2, but a summary of potential mitigation strategies is summarized here.

- Completion of a detailed traffic impact study by the Project Sponsor at each site in order to fully understand the implications of truck arrivals and departures on traffic operations during each phase of construction and during different times of the day. Data used to complete the analysis presented in the DEIS is not yet at this level of detail. Develop detailed mitigation plans based on analysis results.

Potential mitigation strategies may include:

- Staging of truck arrivals and departures to avoid the highest traffic times of the day.
  - Add temporary signals at the entrance/exits of work sites that are located on a heavily traveled road and which are not currently signalized.
  - Construct temporary truck turning lanes and truck only queue jumps where physically possible in order to separate truck traffic from general traffic to the greatest degree possible. This may include temporary left turn stacking lanes or the extension of existing left turn stacking lanes, truck only lanes, and general traffic lane bypasses around work site entrances.
  - Optimize signal timing at intersections through which heavy truck traffic will travel to accommodate truck movements to the greatest degree possible without creating an undue burden for other traffic movements through the network.
  - Assign traffic control flaggers at work site entrances/exits to control truck movements into and out of work sites. Concurrently, provide sufficient space on each construction site to handle long queues of trucks waiting to exit the site and enter the regional roadway network.
  - Maintain access roadways in a state of good repair to ensure vehicle movements are as efficient as possible. This may include increasing the pavement vertical section on access roadways to accommodate increased truck movements and heavier vehicle weights associated with fully loaded trucks.

4.2.18 Transit Service Impacts During Construction

Transit services throughout the SCMAGLEV Project Affected Environment will be impacted by construction activities, with different levels of impacts anticipated depending on the service's interaction with the work site and the level of the activity at the work site.

4.2.18.1 Current Conditions

Outlined in Appendix D.2A.16.1 are transit services operating in the vicinity of each work site.

4.2.18.2 Future No Build Alternative

No changes to the routes described in Appendix D.2A.16.1 have been identified by their respective operators.

4.2.18.3 Future Build Alternatives

No planned changes have been identified in response to the SCMAGLEV Project.

4.2.18.4 Impacts

One route identified in Appendix D.2A.16.1 will have to be rerouted because of construction activity. This is the Metrobus Route 96 which travels across the Mount Vernon Station work site on New Jersey Avenue. New Jersey Avenue will be closed during one stage of the Mount Vernon Station construction, thus necessitating the re-route.

One Metrobus route, the F4, will not have to be rerouted route but reliability and schedule adherence will potentially be impacted by the heavy truck traffic entering and exiting the work site at the intersection of Riverdale Road and MD 410 in Prince George's County. The F4 passes directly by this work site.

Significant issues with schedule adherence and reliability may also be of concern regarding the MDOT MTA routes that pass through the Camden Yards Station work site as well as those that pass-through Cherry Hill on Cherry Hill Road and Waterview Avenue (MDOT MTA Route 26 and MDOT MTA Route 71).

There is a possibility of impacts to each of the other services identified in Appendix D.2A.16.1 based on their passing by a work site that will generate truck traffic. Truck trip generation at these work sites is lower than at sites noted above and therefore it is anticipated impacts will be lower.

4.2.18.5 Mitigation Strategies

The Project Sponsor will coordinate with the appropriate transit operators within the SCMAGLEV Project Affected Environment regarding the anticipated impacts to transit services and develop mitigation measures.

Specific mitigation strategies may include:

- The Project Sponsor will coordinate with WMATA to design a reroute for the 96 that will be impacted by a closed New Jersey Avenue
- The Project Sponsor will coordinate with WMATA to evaluate the routing of the F4 to determine if a rerouting is required. There will likely be a need to make

schedule adjustments to account for slowdowns associated with truck arrivals and departures on Riverdale Road.

- In Baltimore, for the services affected by the Camden Yards Station construction, schedule adjustments to account for slowdowns would be developed by the Project Sponsor through coordination with MDOT MTA. Reroutes of the Green and Silver routes, which run on Charles and Conway Street may be considered.
- Routes that enter BWI Marshall Airport (MDOT MTA 75, RTA 201, Anne Arundel County Connector, and Metrobus B30) may be candidates for re-routes based on final Maintenance of Traffic Plans in the Airport. The Operators will also likely consider schedule adjustments.
- For each of the other identified routes, schedule adjustments will be evaluated in response to potential slowdowns associated with truck traffic.

4.2.19 General Traffic Operations Impacted by Street Closures and Modifications

This section focuses on a quantitative understanding of the impacts of construction activity on general traffic operations in the Baltimore City and Washington, D.C. station areas, where the greatest impacts would occur due to lane and full street closures. Smaller impacts would occur at select locations along the alignment. These are also addressed in Appendix D.2A.17 on a qualitative basis.

4.2.19.1 Current Conditions

Current conditions for the roadway network around each work site is provided in Appendix D.2A.17.

4.2.19.2 Future No Build Alternative

Those roadways that will change from Current Conditions are noted in Appendix D.2A.17.

4.2.19.3 Future Build Alternatives

The Project Sponsor has not identified permanent changes to roadways to accommodate construction activity. Specific temporary roadway changes are included in Appendix D.2A.17.1.

4.2.19.4 Impacts

To understand impacts related to construction period activity, a select group of intersections in station areas in Baltimore and Washington were selected for analysis. Impacts were assessed by comparing the No Build Alternative in 2027 (approximately mid-way through construction) to the 2027 Build Alternatives.

Impacts by station area are outlined in detail in Appendix D.2A.17.1 in Table D.2.34. Intersections during different construction stages with significant degradation in traffic operations are highlighted in yellow in the table. The data in the Table shows significant

degradation in traffic operations during construction, especially for the Camden Yards Station.

4.2.19.5 Mitigation Strategies

The Project Sponsor, in coordination with Baltimore City Department of Transportation or the District Department of Transportation will develop detailed mitigation plans to address traffic impacts during construction. Potential mitigation strategies may include:

- Completion of a detailed traffic impact study by the Project Sponsor that will build on the analysis presented in the document. This additional analysis would allow the Project Sponsor and the two Departments of Transportation to fully understand the implications of construction activities on traffic operations.
- Staging of construction work and road closures to avoid the highest traffic times of the day to the greatest degree possible.
- In Baltimore, optimize signal timing at intersections of Howard Street and Conway Street, Howard Street and Pratt Street, Conway Street and Sharp Street, Conway Street and Charles Street, and Pratt Street and Sharp Street to accommodate new traffic patterns associated with construction-related closures and street modifications.
- Assign traffic control flagger at key work site intersections to control vehicle movements through the construction area.
- Provide temporary roadway capacity where feasible, with a focus on additional left turn lane capacity and additional through roadway capacity.
- Maintain all roadways in the work area in a state of good repair to ensure vehicle movements are as efficient as possible.