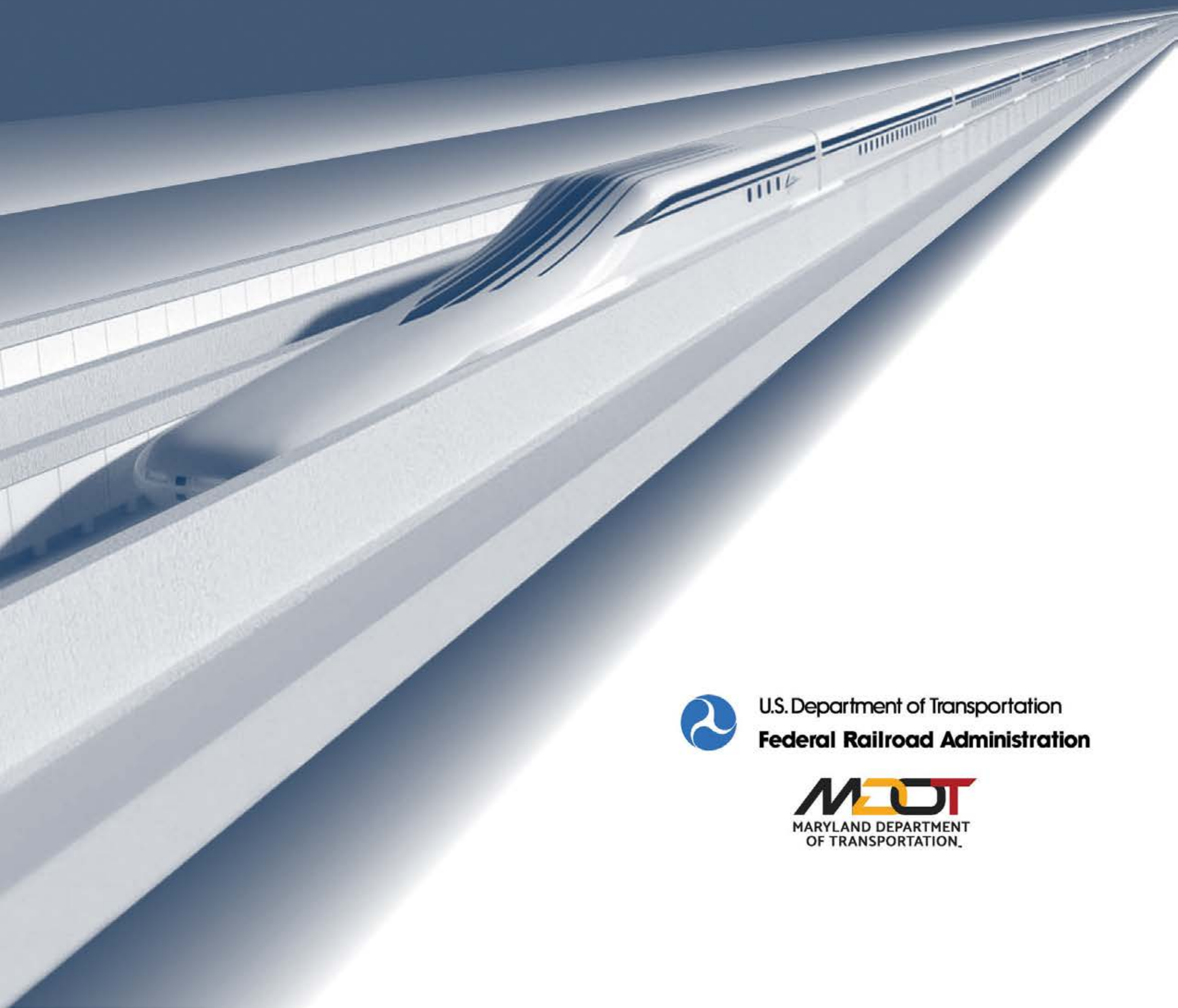
Section 4.1

Introduction

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

4.1 Introduction

Chapter 4 of this Draft Environmental Impact Statement (DEIS) presents the existing conditions and evaluates the potential effects of the Superconducting Magnetic Levitation Project (SCMAGLEV Project) on the human, natural, and physical environment. The Federal Railroad Administration (FRA) evaluated the 12 Build Alternatives and the No Build Alternative. Information presented in Chapter 4 supports the evaluation of alternatives and will support FRA's identification of the Preferred Alternative in the Final Environmental Impact Statement.

This Section provides geographic context for the SCMAGLEV Project, the general approach used for effects assessment and provides a guide to the organization of Chapter 4.

Chapter 4 evaluates the short-term impacts related to construction of the Build Alternatives. The construction methods for the SCMAGLEV system would generally be the same across all Build Alternatives, with minor variations related to locations of facilities and the length of the viaduct section. The construction methods are described in this Section and evaluated by resource throughout Chapter 4. Appendix G.7 Construction Planning Memorandum describes the construction methods in greater detail.

4.1.1 Geographic Context

The SCMAGLEV Project generally extends between Washington, D.C., at its southern terminus, and Baltimore, MD at its northern terminus. The alignment starts as a deep tunnel (typically 80 feet to 260 feet deep) at Mount Vernon Square following US 50 (New York Avenue) and continues through portions of the northwest and northeast quadrants of Washington, D.C. The alignment crosses the Washington, D.C./Maryland state line in the vicinity of the Fort Lincoln Cemetery and continues into Prince George's County, MD. After passing under the Anacostia River at Coleman Manor Park, the Capital Beltway (I-95/I-495), and MD 193, the alignment splits into two possible routes: one east (Build Alternatives J) and one west (Build Alternatives J1) of the Baltimore-Washington Parkway (BWP). Both alignments transition from deep tunnel to a viaduct between the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center overpass and Beaver Dam Road in Greenbelt. Notable landmarks in this area include the Beltsville Agricultural Research Center (BARC), NASA Goddard Space Flight Center, the eastern end of the City of Greenbelt and the Patuxent Research Refuge (PRR). The alignments continue into Anne Arundel County, near Laurel, and runs adjacent to Fort George G. Meade on the east of the BWP and near Maryland City Park on the west side. The viaduct transitions back to a tunnel in the vicinity of Fort George G. Meade for the eastern Build Alternatives J and just east of Brock Bridge Elementary School for the western Build Alternatives J1. Both alignments, now in deep tunnel, become concurrent just north of MD 175 and pass under the Baltimore--Washington International Thurgood Marshall Airport (BWI Marshall Airport) as it continues north to Baltimore, MD where there two station choices, either above grade at the Cherry Hill Light Rail Station or in deep tunnel near Camden Yards.

Figure 4.1-1 shows the geographic context for the Build Alternatives, including the alignment (deep tunnel and viaduct), station locations options, and trainset maintenance facility (TMF) options. For more information on the definition of alternatives, refer to Chapter 3, Alternatives Considered.

4.1.2 Approach to Resource Analysis

This DEIS evaluates resource topics identified in FRA's Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545, May 26, 1999). For each resource topic, FRA evaluated both long -and-short-term effects on resources. Long--term effects are those that would be permanent, whereas short-term effects occur from temporary, often construction-related impacts and are not considered permanent. Effects on resources may result from operational (i.e., service frequencies, speed) or physical (i.e., infrastructure requirements, construction activities) characteristics of the SCMAGLEV Project. FRA assessed effects for each Build Alternative and the No Build Alternative for comparison.

For each resource topic, FRA defined geographic areas of study to assess where effects could occur (i.e., SCMAGLEV Project Affected Environment). The SCMAGLEV Project Affected Environment, varies in size according to the resource due to the unique and dynamic features associated with each resource. Impacts occur within the limits of operational/physical disturbance and can be permanent (Impact Area) or temporary (Construction-related Impact Area).

Geographic Area Definitions in the DEIS

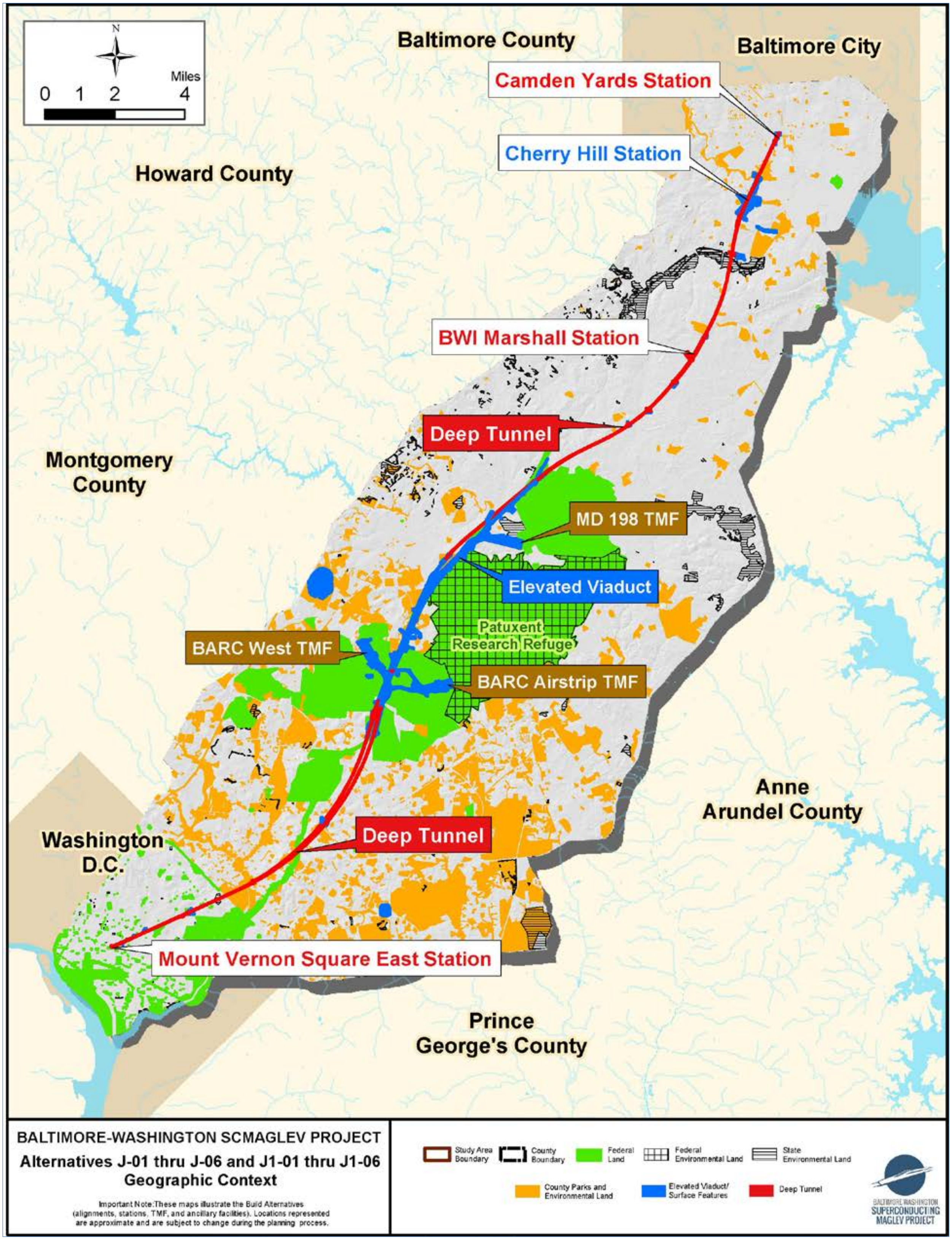
Project Study Area = The broadest geographic area that extends for approximately 40 miles from Washington, D.C. to Baltimore City.

SCMAGLEV Project Affected Environment = A geographic area of study that extends on either side of a Build Alternative alignment and associated facilities. The dimensions differ by resource.

Impact Area = The geographic area within the limits of operational/physical disturbance for each alternative.

Construction-related Impact Area = The geographic area defined by the temporary disturbance area that is required for construction activities.

Figure 4.1-1: Build Alternatives Geographic Context



4.1.2.1 No Build Alternative

FRA developed a No Build Alternative (see Chapter 3, Alternatives Considered) that considers planned and regionally significant transportation capacity improvements to existing modes between Washington, D.C. and Baltimore, MD. The analysis presented in Chapter 4 does not quantify the effects associated with the capacity improvements included in the No Build Alternative. The No Build Alternative assumes that the SCMAGLEV Project would not be built and, therefore, no impacts related to the construction or operation of the SCMAGLEV Project would occur.

4.1.2.2 Build Alternatives

As described above, impacts associated with the Build Alternatives could occur from either physical disturbance or from the operations of the SCMAGLEV Project and result in long-term, permanent impacts and short-term, temporary impacts.

Overall Construction Schedule and Planning

The Project Sponsor, BWRR, anticipates that construction of the entire SCMAGLEV Project will take approximately seven years. Construction will begin after completion of the final engineering design, and subject to Federal, state, and local permits. During this time, localized construction impacts, such as changes in traffic volume and circulation patterns, noise and vibration levels, visual effects have the potential to occur. As the engineering design advances, the Project Sponsor will develop a specific construction plan describing construction sequencing, equipment, methodologies, and safety practices. In addition, they will develop and implement a construction management plan that will govern how, where, and when construction activities will take place. The plan will incorporate, implement, and manage commitments made in the forthcoming Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) to avoid or minimize and mitigate natural and built environment impacts. Additional details related to construction are included in Appendix G.7.

As part of construction planning, the Project Sponsor will coordinate with affected property owners and stakeholders to ensure that the construction management plan accommodates their needs and concerns to the extent reasonably feasible. The construction management plan will address noise and vibration impacts, property access, fencing, safety and security, and restoration of disturbed land. The construction detail is conceptual, and the Project Sponsor will continue to refine construction planning during design in coordination with state and local jurisdictions.

Given that the length of the SCMAGLEV Project is 40 linear miles, construction activities occurring in any one location will not last for the entire construction period. The Project Sponsor will plan and undertake construction to maximize efficiency and minimize temporary impacts. They will also develop and implement a variety of mitigation and minimization measures to be applied corridor wide and specific to each site and the local construction activities. Examples of these measures include locating the elevated structure piers outside floodplains and wetlands when possible, locating the piers to avoid roads and prevent sight distance issues, installing cofferdams will be required for in-water pier construction, preparing and implementing a plan to dispose of excavated soils, preparing and implementing a noise and vibration control plan, protecting local building foundations during construction, and implementing traffic management and control plans.

The following discussion provides a general overview of the construction activities used to identify potential impacts in Chapter 4.

Construction Staging Areas

Staging and/or laydown areas are used to store construction-related vehicles, equipment, and materials. Where reasonably-feasible identified construction sites are within the limits of disturbance (LOD). The Project Sponsor located staging areas by identifying areas that were previously developed for non-residential use and are currently underutilized.

In addition to smaller construction sites along the respective alignments, ranging from two to ten acres, the Project Sponsor identified three larger staging areas to store precast superstructure segments before crews transport them to specific elevated guideway (viaduct) construction segments. These larger areas are :

- Site of former Suburban Airport – 50 acres
- Undeveloped commercial land near the I-95 & MD 200 (ICC) interchange – 160 acres
- Site of former Landover Mall – 40 acres

For the tunnel construction, activities within the construction staging areas include setup, insertion, operation, and extraction of tunnel boring machines (TBM). Construction contractors will typically organize the tunnel laydown areas into work zones to support tunnel excavation operations, including areas for processing and removing tunnel spoils, handling precast concrete tunnel-lining segments, and housing tunnel utilities (such as ventilation, water supply, wastewater removal, and power supply).

The Project Sponsor will erect fencing around staging areas and secure these areas with designated access points. In addition to providing a secure storage location, these measures will minimize the potential for impacts to surrounding properties and resources, and limit effects on the transportation network by preventing encroachment onto the adjacent property and/or resources and limiting access to the construction site.

Appendix B shows the locations of proposed construction staging areas. The construction staging areas are labeled as viaduct laydown, tunnel laydown, construction laydown area, miscellaneous construction LOD, or LOD for new electrical transmission.

Material Haul Routes

The Project Sponsor will designate haul routes for controlling vehicles carrying construction materials and debris use. Where possible, haul routes will use public roads in non-residential areas to minimize potential for traffic, noise, and vibration impacts from construction vehicles. No commercial or construction vehicles are allowed on the Baltimore Washington Parkway (BWP) south of MD 175 since this section of the road is maintained by the National Park Service (NPS).

The former Suburban Airport site is accessible to the mid-section of the viaduct for Build Alternative J1 directly from the Suburban Airport site and that of the Build Alternative J via Brock Bridge Road to MD 197. Crews will access the northern viaduct section via Brock Bridge Road to MD 198 and MD 32, and the southern section via Brock Bridge Road to MD 197 and local roads. The Brock Bridge Road Bridge over the Patuxent River has a posted weigh limit of five tons; the Project may require bridge reinforcement. To avoid local bridge replacement, construction workers could alternatively access Brock Bridge Road to MD Route 198; however, the route passes through the Maryland City residential neighborhood and may have time of use restrictions.

The undeveloped land owned by Konterra Associates LLC is accessible from I-95 and MD 200 (ICC) and can accommodate the stockpiling of spoils. The access to the project site from the Konterra storage location can be via Contee Road to MD 197 towards the mid-section of the viaduct, from I-95 to MD 32 and MD 198 to access the northern section and via MD 197 to local roads to access the southern section.

The former Landover Mall lot is accessible from I-95 and MD 202. Access to the project site can be via I-95 to MD 201 to Powder Mill Road and Beaver Dam Road to the south.

Construction crews will require temporary access roads and spoil routes along the viaduct for the delivery and transport of materials. In addition, the fresh air and emergency egress (FA/EE) facilities and substations will also require access. Appendix G.7 includes additional maps depicting the proposed haul routes between respective project elements (including the FA/EE facilities, substations, tunnel portals, and stations) and the nearest limited access highway or main artery.

Viaducts

The viaduct structures will be precast concrete superstructure elements supported on hammerhead piers of the same material and with drilled shaft foundations. The equipment to construct the foundation, footings, and piers for the guideway and viaducts will be typical of roadway and railroad construction activity: drill rigs, cranes, excavators, dump trucks, pay loaders, bulldozers, rock drills, sheet pile vibrators/hammers, flatbed delivery trucks, concrete trucks, concrete pump trucks, and general construction vehicles.

During construction, temporary access roads along the viaducts will facilitate materials movement and construction activities. The viaduct of Build Alternatives J will generally follow the BWP along the east side. In some cases, parallel local roads may serve as access points to the construction area. Powder Mill Road, MD 197, MD 198, and MD 32 are potential construction access points during viaduct construction. The viaduct of Build Alternatives J1will generally follow the BWP along the west side. Powder Mill Road, MD 197, and Brock Bridge Road are potential access points to the viaduct construction area.

Tunnels

The Project Sponsor proposes two types of construction for the tunnels: boring and cut/cover. Construction crews may use Sequential Excavation Method (SEM) in some localized areas for tunnel construction entrances or other elements not easily addressed by TBM or cut/cover methods. The tunnel boring method will require a TBM that enters the ground and carves the tunnel from below ground. Tunnel boring requires TBM procurement and mobilization, preparation of the work area, assembly of the machine and its components, and tunnel excavation. The equipment required to support a TBM operation will include gantry/boom cranes, erectors for positioning lining segments, excavators, dump trucks and pay loaders.

In urbanized areas and where no space is available to set up a TBM staging area, the Project Sponsor will use cut/cover tunnel construction. The cut/cover construction method involves excavating the ground where the tunnel will be located, building the tunnel, and then covering the tunnel and re-establishing the ground surface. For example, the Project Sponsor will use cut/cover along New York Avenue in Washington, D.C. The Project Sponsor will excavate the roadway, build the tunnel below ground, and then restore the roadway to its original condition.

Portals and Fresh Air and Emergency Egress Facilities

In portal areas, the Project Sponsor will use short sections of cut/cover tunneling and open cut construction for the transitions between the viaduct and tunnel sections and for TBM launch locations located along the deep tunnel. The equipment anticipated to be used to construct the transition portals includes gantry or boom cranes, excavators, dump trucks, loaders, generators, grouting plant, rock drills, sheet pile vibrators/ hammers, concrete trucks, and concrete pump trucks. Fresh air and emergency egress facilities will require a combination of traditional above ground construction techniques and top-down construction of underground components such as the ventilation shafts connecting to the tunnels.

Stations

Each Build Alternative includes an underground station in Washington, D.C., an underground station at BWI Marshall Airport, and underground (Camden Yards) and above ground (Cherry Hill) station options in Baltimore, MD.

For underground stations, the preferred method of construction will be top-down. Similar to cut/cover for the tunnels, the Project Sponsor will excavate the surface area, build the underground station, and restore the ground surface on top of the station. Typically, slurry walls retain the perimeter of excavation and provide support in top-down excavation. Temporary cross braces and tie-back structures provide additional support. Temporary covers over the excavation area would be used during construction to maintain some degree of surface use, and phase top-down construction to minimize daytime travel lane closures.

The Mount Vernon Square East Station will be relatively straightforward to construct in a top-down method. The Camden Yards station is more challenging because the project orientation and alignment cannot match the existing Baltimore street grid. To access the station area, all buildings above the proposed station for a distance of 1,970 linear feet will have to be demolished to create open space for the top-down construction activity. It is not feasible to build a station in this location with the tunnel boring method because of the width required for a station, the presence of underground utilities and the presence of adjacent building and roadway support structures.

The Project Sponsor will construct the Cherry Hill Station above ground using conventional building materials and methods and a combination of cast-in-place concrete and structural steel. They will build a portion of the station and its approaches on elevated structures crossing over existing roadways and railway lines and above the existing light rail station platform. The Project Sponsor may use precast structural elements to minimize potential for disruptions of roadway and rail. The Cherry Hill Station will require modifications to local roadways and pose temporary traffic disruptions during construction. The bored tunnel will emerge from the ground south of the station via a cast in place concrete portal structure and become elevated on a rising concrete viaduct structure. The elevated station is expected to be constructed with precast and cast in place concrete. It will be connected to a new parking garage via an elevated pedestrian bridge and vertical transportation tower. Foundations will utilize deep-driven pile or drilled-shaft elements.

The equipment anticipated to perform the station construction will include cranes, excavators, dump trucks, payloaders, rock drills, sheet pile vibrators/hammers, concrete trucks, generators, and concrete pump trucks.

Substations and Standalone Maintenance of Way Facilities

The Project Sponsor will use traditional building techniques to construct above ground power substations and the maintenance of way (MOW) facilities. The equipment anticipated to construct the substations will include cranes, excavators, dump trucks, pay loaders, backhoes, bulldozers, trailers, concrete trucks mixers, concrete pumps, and vibrating rollers.

The northern MOW facility for Build Alternatives J-04 thru J-06 and J1-04 thru J1-06 (alternatives with the underground Camden Yards Station) require an underground switch and tunnel portal to connect to the mainline guideway. The southern MOW facility under Build Alternatives J-01, J-04, J1-01, and J1-04 (alternatives with the

MD 198 TMF) will not be co-located adjacent to the MD 198 TMF but separately located along the respective mainline near Powder Mill Road. This requires additional MOW connector ramps as compared to the alternatives with either BARC TMF that utilize the TMF connector ramp for the respective co-located MOW facility.

Trainset Maintenance Facility (TMF)

The Project Sponsor will use traditional building techniques to construct the TMF. The equipment anticipated to construct the footings and piers for the TMF will include cranes, excavators, dump trucks, pay loaders, rock drills, caisson drill rigs, sheet pile vibrators/hammers, flatbed delivery trucks, bulldozers, concrete trucks, and general construction vehicles. Buildings and parking lots will require additional types of equipment, such as paving machines, rollers, and aerial lifts.

As compared to either of the BARC TMF sites, the MD 198 TMF site has a significant variation in existing ground elevation, dropping significantly from west to east across the proposed facility. The eastern half of the MD 198 facility will be constructed on retaining walls up to 100 feet tall, surmounted by 65-foot-high maintenance shop buildings. The northeast corner of the MD 198 TMF impacts the Little Patuxent River, which will have to be rerouted in a new channel to the east. The site conditions for the MD 198 TMF facility will add a year to the construction duration.

Roadway Relocations

The Project Sponsor will use traditional building techniques for the roadways that will be relocated or reprofiled as part of the SCMAGLEV Project. The equipment anticipated for this work will include cranes, excavators, dump trucks, pay loaders, backhoe, bulldozers, trailers, concrete trucks mixers, concrete pumps, and vibrating rollers.

The roadway relocations include the following: Explorer Road (Build Alternatives J-01 thru J-06); Springfield Road around the BARC Airfield TMF (Build Alternatives J-02, J-05, J1-02, and J1-05); Springfield Road around the southern MOW facility associated with the MD 198 TMF (Build Alternatives J1-01 and J1-04); River Road around the MD 198 TMF (Build Alternatives J-01, J-04, J1-01, and J1-04); and both West Patapsco Avenue and Annapolis Road for the Cherry Hill Station (Build Alternatives J-01 thru J-03 and J1-01 thru J1-03). Refer to Appendix G.7 for mapping illustrating the roadway relocations.

4.1.3 Chapter 4 Organization

This chapter provides individual sections for each resource topic, as shown in **Table 4.1-1**. Each section provides the following:

- **Introduction:** Defines the resource topic being discussed and provides an overview of what is covered in that section.

- **Regulatory Context and Methodology:** Provides an overview of the regulations and procedures used for effects assessment.
- **SCMAGLEV Project Affected Environment:** Describes the existing conditions relevant to each resource topic.
- **Environmental Consequences:** Describes the effects for the No Build Alternative and Build Alternatives, short-term construction effects, and mitigation strategies.

Chapter 4 provides an overview of the analysis. FRA organized each resource topic section depending on the type of impact (physical or operational). **Table 4.1-1** identifies the organization for each resource topic covered in Chapter 4.

- Physical (localized) Effects: For resource topics associated with physical impacts, FRA organized the effects assessment by the types of elements: alignment (both deep tunnel and viaduct), stations, and TMF sites. The long-term effects assessment generally presents a quantitative analysis. Short-term effects are generally discussed qualitatively.
- Service-related (corridor-wide) Effects: For resource topics associated with service, or operational, effects, FRA organized the effects to present a corridor-wide assessment that does not focus necessarily on a specific physical element. In some cases, the analysis presents both quantitative and qualitative data. Short-term effects are generally discussed qualitatively.
- Exceptions: Some resource topics are exceptions to the physical and corridor-wide assessment. These topics either require unique analysis or are more general in nature. Depending on the resource topic, the analysis presents a mix of quantitative and qualitative data.

Table 4.1-1: Resource Topic Organization

Section Number	Resource	Evaluated Effects	Technical Appendix	Additional Information
4.1	Introduction	Exception	D.1 Permits and Authorizations	G.7 Construction Planning Memorandum
4.2	Transportation	Exception	D.2 Transportation Technical Report	G.8 Traffic Control Plans Memorandum
4.3	Land Use and Zoning	Physical Effects	D.3 Socioeconomic Environment Technical Report	
4.4	Neighborhoods and Community Resources	Physical Effects	D.3 Socioeconomic Environment Technical Report	

Section Number	Resource	Evaluated Effects	Technical Appendix	Additional Information
4.5	Environmental Justice	Physical Effects	D.3 Socioeconomic Environment Technical Report	
4.6	Economic Resources	Exception	D.4 Economic Impact Analysis Technical Report	G.9 Capital and Construction Costs Memorandum
4.7	Recreation Facilities and Parklands	Physical Effects	NA	
4.8	Cultural Resources	Physical Effects	D.5 Cultural Resources Appendix	
4.9	Aesthetics and Visual Quality	Physical Effects	D.6 Aesthetics, Visual Quality and Light Emissions Appendix	
4.10	Water Resources	Physical Effects	D.7 Natural Environment Technical Report	
4.11	Waters of the U.S., Including Wetlands	Physical Effects	D.7 Natural Environment Technical Report	
4.12	Ecological Resources	Physical Effects	D.7 Natural Environment Technical Report	
4.13	Geology	Physical Effects	D.7 Natural Environment Technical Report	G.13 Geotechnical Report
4.14	Soils and Farmlands	Physical Effects	D.7 Natural Environment Technical Report	
4.15	Hazardous Materials and Solid Waste	Physical Effects	D.8 Hazardous Material Sites and Solid Waste Appendix	
4.16	Air Quality	Corridor-wide Effects	D.9 Air Quality Technical Report	
4.17	Noise and Vibration	Corridor-wide Effects	D.10 Noise and Vibration Appendix	
4.18	Electromagnetic Fields and Interference	Corridor-wide Effects	D.11 Electromagnetic Fields and Interference Appendix	G.3 Electromagnetic Fields (EMF) Memorandum
4.19	Energy	Corridor-wide Effects	NA	
4.20	Utilities	Corridor-wide Effects	NA	

Section Number	Resource	Evaluated Effects	Technical Appendix	Additional Information
4.21	Public Health and Safety	Exception	NA	
4.22	Safety and Security	Corridor-wide effects	NA	G.6 Safety and Security Technical Memorandum
4.23	Indirect and Cumulative Effects	Corridor-wide Effects	NA	
4.24	Irreversible and Irretrievable Use of Resources	Exception	NA	

Additional information, such as mapping, agency correspondence and more detailed data is provided in the following Technical Appendices:

- **Appendix A** provides a list of acronyms, glossary of terms, references, and list of preparers
- **Appendix B Mapping Atlas** - provides a mapping atlas that illustrates the relationship of physical resources to the Build Alternatives
- **Appendix C Supporting Alternative Development** - provides supporting document for the alternatives' development process
- **Appendix D Chapter 4 Supporting Technical Documents** - provides supporting documentation to resource topics analyzed in Chapter 4
- **Appendix E Public Involvement Agency Coordination** - provides documentation of public and agency coordination
- **Appendix F Section 4(f)** - provides the Draft Section 4(f) Evaluation
- **Appendix G Preliminary Engineering and Design Specifications of the Build Alternatives** - provides preliminary engineering associated with the Build Alternatives