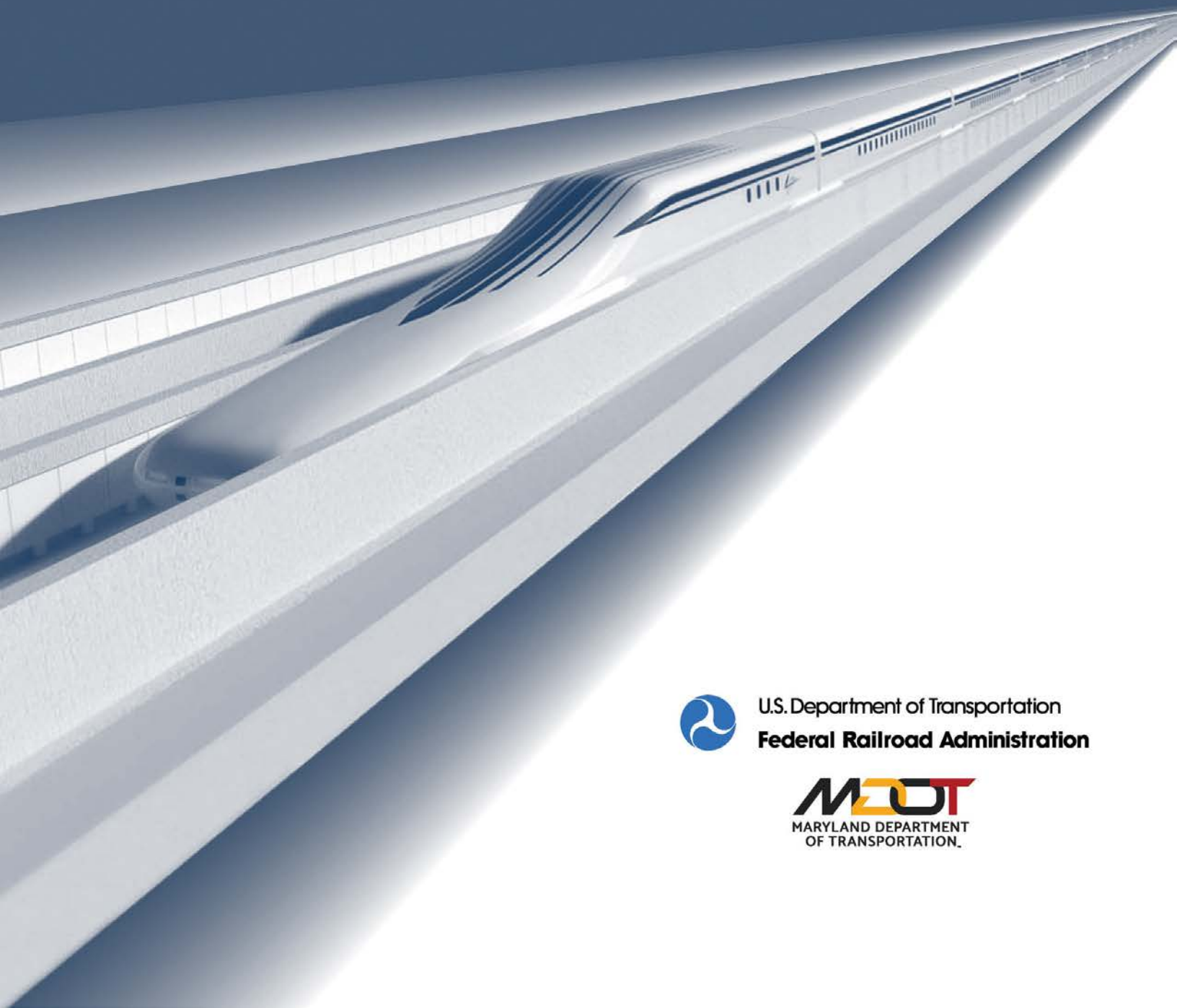
Section 4.14

Soils and Farmlands

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

4.14 Soils and Farmlands

4.14.1 Introduction

This section identifies soil types, potential soil hazards, and areas designated prime and unique or soils of statewide and local importance (farmland) that could either influence project design or be affected by the Superconducting Magnetic Levitation Project (SCMAGLEV Project). Additional details related to these resources can be found in Appendix D.7 Natural Environment Technical Report (NETR).

4.14.2 Regulatory Context and Methodology

4.14.2.1 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 soils and farmland. In addition, the Farmland Protection Policy Act (FPPA) of 1981 (7 U.S.C. § 4201 et seq.) was created "to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses" and is regulated by the Natural Resources Conservation Service (NRCS). All lands identified with soils that are prime, unique, or of statewide or local importance are subject to FPPA. For the purposes of this analysis, farmland includes soils designated as prime farmland (prime soil characteristics), unique farmland (high value specialty crops), and farmland of statewide or local importance. Although soils are not a regulated resource, as detailed in Section 4.10, Water Resources, Section 402 of the Clean Water Act (CWA) requires that an Erosion and Sediment Control (ESC) Plan, and/or Stormwater Pollution Prevention Plan (SWPPP), be prepared and approved, considering the potential loss of soils from the project site during construction activities and addressing the risk to pollution of waterways.

4.14.2.2 Methodology

FRA conducted an analysis of resources based on readily and publicly available desktop information such as published/online reports and maps from the NRCS, the U.S. Geological Survey (USGS), and the U.S. Census Bureau (USCB). These agencies provide information concerning soil types, characteristics and limitations, topography, and land use, including information on "urbanized area" that is generally excluded under the FPPA. FRA considered the geographic limit of the SCMAGLEV Project Affected Environment on a regional landscape level to complete a qualitative assessment of potential impacts that may result from the Build Alternatives and the implications or limitations that may be encountered as a result of the SCMAGLEV Project. FRA overlaid the proposed limit of disturbance (LOD) of the Build Alternatives for both permanent surface and subsurface elements as well as anticipated construction

laydown areas onto the existing soils and farmland mapping and identified areas of direct and indirect conversion of farmland soils. Through coordination with the NRCS, it was determined that the SCMAGLEV Project would result in a direct conversion from all activities within the LOD, whether temporary or permanent, and that an indirect conversion would occur outside of the LOD where access to land would be permanently restricted by SCMAGLEV Project features or other natural/physical features that prevent access. Parameters used in the quantitative analysis for direct and indirect conversion of farmland is included in Appendix D.7 NETR.

FRA reviewed existing data to document the presence or absence of soil hazards that may be encountered by the SCMAGLEV Project. Potential soil hazards evaluated include:

- ***Linear Extensibility (Shrink-Swell Potential)*** – the relative change in volume to be expected with changes in moisture content. The NRCS describes this potential for change as “low,” “moderate,” “high,” or “very high.”
- ***Erosion Hazard*** – based on soil erodibility (K factor), slope, and content of rock fragments. The hazard rating is described as "slight," "moderate," "severe," or “very severe.”
- ***Risk of Corrosion*** – indication of where soil-induced electrochemical or chemical action may weaken concrete or uncoated steel. The risk of corrosion is expressed as “low,” “moderate,” or “high.”

Land protected under the FPPA does not have to currently be in use (e.g., irrigated) for agriculture. As such, FRA considered mapped prime farmland and any area mapped as having prime farmland soils the same. Generally, land that is already in, or committed to, urban development or water storage is not considered protected under the FPPA. Using the published and available data, FRA prepared Parts I,II, III and VI of the NRCS-CPA-106 (*Farmland Conversion Impact Rating for Corridor Type Projects*) form, and the local NRCS field office completed Parts IV and V. The forms aid in identifying the relative value of farmland and rank it across a series of criteria that account for the site in a larger context such as whether there is farming support services or urban areas in the greater landscape. The ranked relative value of the farmland is added to the sitewide context and the overall value of the farmland is assigned a score by the NRCS on a scale of 0 to 260. For farmland that scores below 160, no additional action is required under the FPPA. If the farmland scores 160 or above, Federal agencies will give increasingly higher levels of consideration for protection. Forms prepared in coordination with the NRCS are also included in Appendix D.7 NETR.

4.14.3 SCMAGLEV Project Affected Environment

4.14.3.1 Soils

Silt loam to sandy loam soils occur throughout the SCMAGLEV Project Affected Environment. Silt loams usually occur in lowland areas and sandy loams occur in

uplands. Hydric soils and occasional swamp areas occur within most of the lowland soils. In the Washington, D.C. and Baltimore, MD areas, soils are greatly disturbed and mostly categorized as urban land by the NRCS.

In evaluating soil hazards, FRA did not identify any soils with a shrink-swell potential described as "high" or "very high."[1] FRA identified seven soil map units described as "severe" (none as "very severe") for potential erodibility. FRA identified several soil map units described as "high" risk of corrosion throughout the length of the SCMAGLEV Project LOD, with almost every soil type having this risk present. Soil map units and detailed soil series descriptions are depicted in Appendix D.7 NETR.

4.14.3.2 Farmlands

Soils with farmland classifications for prime farmland soils and farmland of statewide importance, located outside of urbanized areas, are illustrated on natural resource mapping and listed in Appendix D.7 NETR. Most NRCS-mapped soil locations are ultimately excluded from consideration as farmland under FPPA, as much of the SCMAGLEV Project LOD occupy areas identified as "UA" on USCB mapping, denoting an urban area.[2]

Prime farmland or farmland of statewide importance occurs in the SCMAGLEV Project Affected Environment in Prince George's and Anne Arundel Counties. These mapped soils are predominantly located between Beaverdam Creek and the Little Patuxent River, including land within and surrounding the Patuxent Research Refuge (PRR) and the Beltsville Agricultural Research Center (BARC). Located in Prince George's County, BARC is owned and administered by the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS) and includes approximately 6,500 acres for agricultural research, approximately 3,037 of which are considered prime farmland soils. See Appendix B.3 Natural Resource Map Atlas for figures depicting the location of BARC and of farmland soils. The research experiments and studies conducted on the property are critical to the mission of USDA. The property supports a variety of agricultural research including approaches to remote sensing; sustainable agriculture; plant, animal, and insect research; and genetics and genomics studies.

4.14.4 Environmental Consequences

4.14.4.1 No Build Alternative

Under the No Build Alternative, the SCMAGLEV Project will not be built and therefore no impacts related to the construction or operation of a SCMAGLEV system will occur. However, other planned and funded transportation projects will continue to be

[1] Natural Resources Conservation Service, 2019. Web Soil Survey. United States Department of Agriculture. Available online at https://websoilsurvey.nrcs.usda.gov/. Accessed January 8, 2019.

[2] United States Census Bureau, 2017. Cartographic Boundary Shapefiles – Urban Areas, 2017 Urban Areas Boundary File. Available online at https://www.census.gov/geo/maps-data/data/cbf/cbf_ua.html. Accessed July 14, 2020.

implemented in the Project Study Area and could result in alterations to soil conditions and existing farmland.

4.14.4.2 Build Alternatives

Based on a qualitative assessment of soil impacts and a quantitative assessment of farmlands, impacts to soils are similar for each Build Alternative, as there are similar soil types throughout the SCMAGLEV Project Affected Environment. However, impacts do vary by alternatives due to the comparative length of viaduct and tunnel for the alignments, and for the different station and TMF locations. FRA does not expect that the SCMAGLEV Project would result in changes to, or increased risk to public safety or the built environment from soil resources or hazards. **Table 4.14-1** shows temporary and permanent impacts to farmland soil for each Build Alternative. Appendix D.7 NETR provides more detailed information on impacts for each Build Alternative.

Table 4.14-1: Summary of Total Farmland Soil Impact

Alternative	Acres of Permanent Impact by Federal and State Recognition		
	Farmland of Statewide Importance	Prime Farmland	Total
J-01	50	160	210
J-02	44	114	158
J-03	59	167	226
J-04	50	160	210
J-05	44	114	158
J-06	59	167	226
J1-01	63	128	191
J1-02	51	79	130
J1-03	67	133	199
J1-04	63	128	191
J1-05	51	79	130
J1-06	67	133	199

Note: Numbers have been rounded to the nearest whole number.

A direct impact to soils would occur if the SCMAGLEV Project directly alters soil stability during construction, which could result in both long-and-short-term impacts, depending on the type of construction and stabilization procedures such as filling, grading, earthmoving, and/or permanent inundation that would result in the physical or chemical change of soils and/or preclude agricultural use. The conversion of farmland to a non-agricultural use, such as transportation,[3] directly impacts farmlands. An indirect impact would occur if the SCMAGLEV Project induces other changes that could affect soils,

[3] Impacts are considered with respect to mapped prime farmland, which do not have to currently be in use for agriculture (irrigated or otherwise).

such as creating a long-term potential for ongoing soil erosion or creating/ increasing the potential for future development that could impact soil stability or impact drainage.

FRA has prepared the NRCS-CPA-106 worksheet (*Farmland Conversion Impact Rating for Corridor Type Projects*), obtained NRCS input on Land Evaluation Information, and applied the corridor assessment criteria outlined in 7 CFR 658.5(c) for each of the proposed Build Alternatives. None of the Build Alternatives impact rating scores exceeds 160 points; therefore, no additional action is required under the FPPA. Table 4.14-2 shows the total impact rating score of each of the Build Alternatives. The score is presented by County for consistency with how NRCS tracks farmland impacts.

Table 4.14-2: Summary of Farmland Conversion Impact Rating Scores

Build Alternative	Anne Arundel County Rating Score	Prince George's County Rating Score
J-01	111	94
J-02	108	112
J-03	108	105
J-04	111	94
J-05	108	112
J-06	108	105
J1-01	113	114
J1-02	109	108
J1-03	105	103
J1-04	113	114
J1-05	109	108
J1-06	105	103

Alignments

FRA identified the following soil hazards along the both the Build Alternatives J and J1 alignments:

- Shrink-swell potential of soils is minimal, as existing soils are rated as "low" to "moderate" throughout the length of the alignments
- Severe erosion hazard potential in soils is located predominantly within Washington, DC, Prince George's County, and Baltimore City
- Risk of corrosion to concrete and steel occurs throughout both alignments

Both alignments result in impacts to farmland from the conversion of prime farmland soils or soils of statewide importance to transportation use. Alignments associated with Build Alternatives J have greater impacts to farmland soils (approximately 81 to 83 acres) compared to alignments associated with Build Alternatives J1 (approximately 50 to 57 acres).

Of these totals, alignment associated with Build Alternatives J impacts about two and a half acres of farmland soils within the BARC property and alignment associated with Build Alternatives J1 impact between approximately 11 and 13 acres. The use of tunnel for a large portion of the SCMAGLEV Project would minimize direct impacts to surface soils and would not preclude continuing or new agricultural use in those areas. The use of viaduct may however result in indirect effects to existing farmland soils, by fragmenting, or cutting off adjacent farmland uses.

Stations

The same soil conditions and risks described above exist in station areas. The potential for "severe" erosion hazards exists at the Cherry Hill Station, including the proposed parking garage at that station. No prime farmland soils or farmland soils of statewide importance would be impacted by any of the proposed stations.

Trainset Maintenance Facilities (TMFs)

The same soil conditions and risks described above exist at TMF locations with the potential for "severe" erosion hazards for soils at all three TMF options. Prime farmland soil exists at all three TMF locations. The BARC Airstrip TMF would impact the least amount of prime farmland soil (approximately 73-75 acres), BARC West TMF the most (approximately 142-147 acres), and MD 198 TMF impacts approximately 129-140 acres. Due to the significance of prime farmland soils located on BARC property, FRA considered an additional breakdown of BARC impacts from the TMFs.

The BARC Airstrip TMF would directly convert approximately two percent of the BARC lands overall classified prime farmland soils, with 58 to 60 acres for TMF associated with Build Alternatives J1 and J respectively, identified on BARC. The BARC West TMF would directly convert approximately four percent of BARC's overall prime farmland soils, with 115 acres identified on BARC. The MD 198 TMF would directly convert less than 0.2 percent of BARC's overall prime farmland soils, due to necessary supporting viaduct ramps connecting the alignment to the TMF, equating to approximately six acres on BARC due to necessary supporting viaduct ramps associated with Build Alternatives J1 only.

4.14.4.3 Short-term Construction Effects

During construction, land would be disturbed, and soil removed. Construction activities would include cut/cover, excavation, filling, cutting, pile driving, vegetation clearing, and the development of temporary impervious surfaces and physical elements. Short-term construction activities, including vegetation clearing, would also impact soils and farmland. However, these areas have the potential to be re-vegetated and restore the soil's ability to absorb and retain water, stabilize the soil, and retain potential environmental benefits to adjacent farmland.

Construction of the Build Alternatives would result in the disposal of excavated soils. Soils removed will require testing prior to disposal. During construction, contractors would follow United States Environmental Protection Agency (USEPA) guidelines to

remove, test, and dispose of soils, including those that may be suspected of contamination. Testing ensures that spoils can be safely placed into the environment at approved locations. Section 4.1 and Section 4.15 Hazardous Materials and Solid Waste discuss soil contamination and disposal in more detail.

4.14.5 Potential Minimization and Mitigation Strategies

4.14.5.1 Minimization

The Project Sponsor will prepare and implement an SCMAGLEV Project-specific ESC Plan and ensure that appropriate best management practices (BMP) are in place during construction. An ESC Plan will be prepared during final design in accordance with the guidelines provided by Maryland Department of the Environment (MDE) and the DC Department of Energy and the Environment (DOEE). Successful implementation of appropriate BMPs would ensure that the SCMAGLEV Project complies with state and Federal requirements, and that the resulting short-term and long-term soil impacts are maintained at acceptable levels. These measures could include the following:

- Install and monitor erosion-prevention measures, such as silt fences and water breaks, sedimentation basins, filter fences, sediment berms, interceptor ditches, straw bales, rip-rap, swales, and/or other sediment control structures; and re-spreading stockpiled topsoil.
- Seed and revegetate areas temporarily cleared of vegetation, and use native seed mixes and plants, whenever possible.
- Retain vegetation to the extent reasonably feasible.
- Install and maintain soil-stabilizing vegetation, mulch, or man-made materials to provide soil stabilization on disturbed areas.
- Minimize soil compaction by restricting vehicle travel, avoiding working on wet soils, and restoring soil conditions when necessary.

Indirect conversions of farmland to be minimized in areas of proposed fencing under the elevated viaduct with the use of gates, to allow farming equipment to access land that has been split by the alignment or other proposed SCMAGLEV systems. With more detailed design, the Project Sponsor will continue coordination with the USDA and other landowners where farmland may be impacted to enable use of these lands if desired, while maintaining safety and security to the SCMAGLEV systems and users of the property.

Mitigation

Once a preferred Build Alternative is selected, the appropriate NRCS-CPA-106 worksheet would be finalized and submitted to the local NRCS field office. Because none of the Build Alternatives exceeds 160 points on the conversion impact rating, mitigation for prime farmland soils is not anticipated.