

7 Environmental Review

This section surveys and summarizes the existing environmental resources within the study area and identifies any related future constraints. The findings of this screening will provide an environmental context to the alternatives for each corridor and will be integrated into the Alternatives Assessment process.

The screening consists of GIS-based analysis of key environmental resources in the study area and uses publicly available data and other mapping resources.

The resources studied include:

- Hazardous materials and brownfields
- Natural and ecological resources, such as threatened and endangered species and critical habitat; wetlands and waterways, water resources, and floodplains
- Historic and cultural properties listed on the National and RI State Registers
- Areas particularly sensitive to noise and vibration, such as schools and hospitals
- Public parks and recreation sites
- Air quality
- Environmental Justice

Hazardous Materials and Brownfields

An analysis of data from the EPA’s Cleanups in My Community mapping tool, the RIGIS “known underground storage tank locations” GIS layer, and the Rhode Island Geographic Information System (RIGIS) “leaking underground storage tank” layer indicates that the Study Area contains a variety of known contaminated and hazardous waste sites, including brownfields, superfund sites, and leaking underground storage tanks (see Figure 7-1).^{17, 18, 19} These sites are most concentrated in the denser and more developed portions of the study area and are largely correlated to current or former industrial and manufacturing land uses. Many of the contaminated sites within the study area are proximate to sections of the proposed high-capacity transit (HCT) corridors in and around Providence, Central Falls, and Pawtucket.

A future high-capacity transit project may not directly impact any contaminated sites if construction largely occurs within the existing road right-of-way (ROW). Nevertheless, appropriate screenings and other precautionary measures should be pursued according to state and local requirements prior to and during construction, especially if there are known contaminated sites near specific corridor segments.

¹⁷ [EPA - Cleanups in My Community](#)

¹⁸ [Underground Storage Tank Locations \(2018\) | Underground Storage Tank Locations \(2018\) | RIGIS](#)

¹⁹ [Leaking Underground Storage Tanks | Leaking Underground Storage Tanks | RIGIS](#)

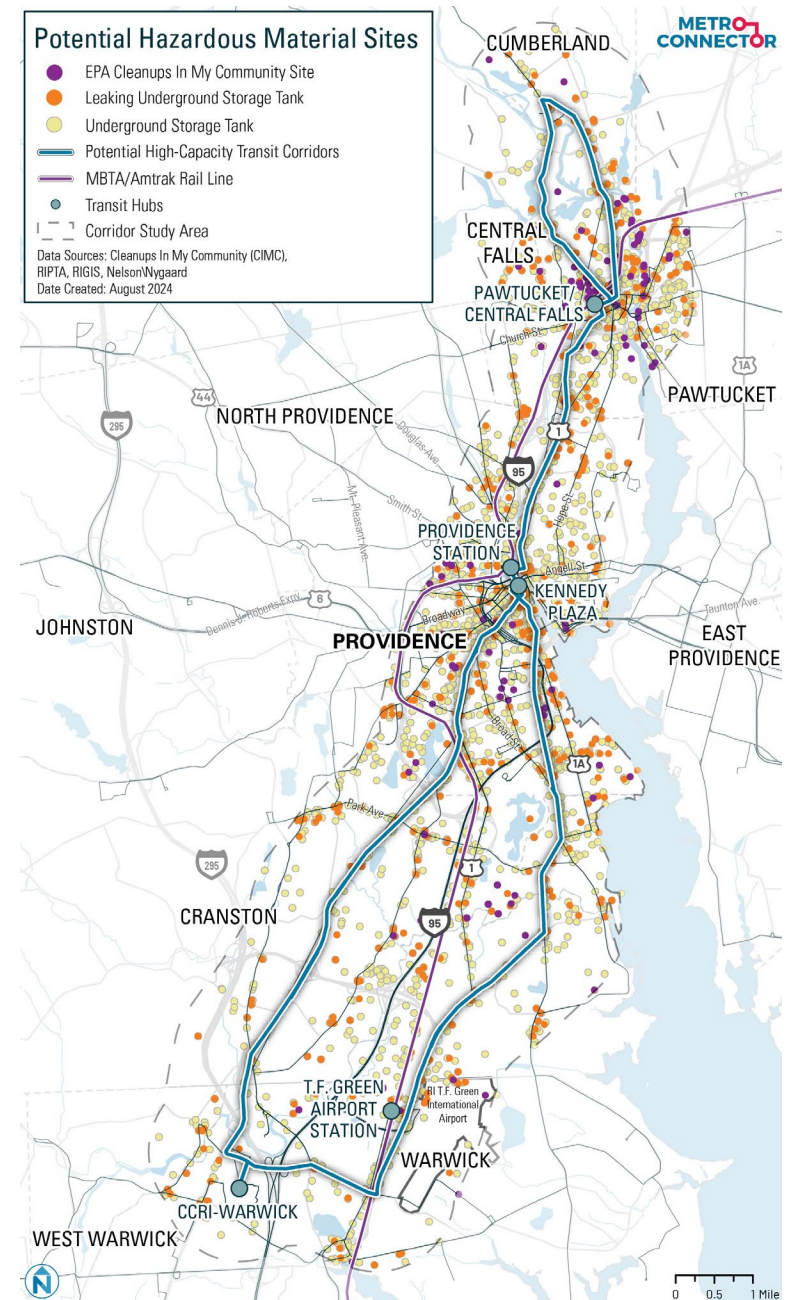


Figure 7-1 Potential Hazardous Materials Sites

Natural and Ecological Resources

Threatened and Endangered Species

Section 7 of the Endangered Species Act protects wildlife and plant species listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS). This section provides preliminary information on protected species with the potential to occur within the study area. Prior to construction, additional investigation and/or consultation with the USFWS would be required to confirm their likely absence within the limits of disturbance along any potential HCT corridor.

The USFWS Information, Planning, and Conservation (IPaC) online system was used to conduct a records search for the presence of threatened or endangered species and designated critical habitat within the study area.²⁰ The RIGIS “Natural Heritage Area (Figure 7-7)” GIS layer was also consulted to determine the presence of state listed species. The USFWS identified four threatened, endangered, proposed endangered, or candidate fish and wildlife species with the potential to occur within the planning area as shown in Table 7-1. No designated critical habitat was identified.

Mammals

The study area has been identified by the USFWS to potentially contain habitat for the endangered Northern Long-eared Bat and the proposed endangered Tricolored Bat.²¹ However, the study area is large and contains many different land use typologies. The areas immediately adjacent to the current proposed HCT corridors do not feature much suitable habitat for these species, as there is minimal tree coverage within the existing road ROW. However, further screening and analysis may be necessary to determine habitat potential prior to construction.

Birds

The study area has been identified by the USFWS to potentially contain habitat for the endangered Roseate Tern. The Roseate Tern is a shore bird, with habitats primarily featuring islands, sandy beaches, open bare ground, and grassy areas. Most of the study area is not likely to serve as a habitat for this species due to its distance from the coastline and lack of preferred habitat features.

Table 7-1 Federally Listed fish and Wildlife Species with Potential to Occur in the Study Area

Species	Listing Status	Habitat	Potential to Occur in Study Area
Tricolored Bat (<i>Perimyotis subflavis</i>)	Proposed Endangered	Found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures.	Potential to occur within study area but would likely only be found in trees or similar habitat and not within existing developed areas or the road ROW.
Northern Long-eared Bat (<i>Myotis Septentrionalis</i>)	Endangered	Found in caves, mines, and in cavities or under bark within dead or live trees. May also be found in structures such as barns or sheds.	Potential to occur within study area but would likely not be found within existing developed areas or the road ROW.
Roseate Tern (<i>Sterna dougallii dougallii</i>)	Endangered	Found along seacoasts, on bay and estuaries. Nests on islands on sandy beaches, open bare ground, and grassy areas.	Unlikely to occur within the majority of the study area except for coastal portions.
Monarch Butterfly	Candidate	During migration monarchs may be found anywhere there are flowering plants, but they lay eggs on a variety of Milkweed (<i>Asclepias</i> spp.) in both upland and lowlands. Can often be found along woodland edges where milkweeds are prevalent.	Potential to occur within study area but would likely only be found near milkweed.

²⁰ [IPaC: Home \(fws.gov\)](https://www.fws.gov/ipac)

²¹ Note: The Tri Color Bat is slated to be listed as endangered

Insects

The USFWS has identified potential habitat for the Monarch Butterfly within the study area. There may be Monarch butterflies found along the proposed HCT corridors, specifically in conjunction with the presence of milkweed plants. Further screening and analysis may be necessary to determine habitat potential prior to construction.

Wetlands and Waterbodies

An analysis of mapped state designated wetlands, USFWS National Wetland Inventory (NWI) wetlands, and various RIGIS hydrological layers, indicates that the study area contains a variety of wetlands, streams, rivers, ponds, lakes, and other waterbodies (see Figure 7-2 and Figure 7-3). Many of these wetlands and waterbodies are proximate to the proposed HCT corridors, while some are located underneath existing roadways that make up segments of the corridors.^{22, 23, 24, 25}

This section provides preliminary information on wetlands and waterbodies with the potential to occur within the study area. Prior to construction, additional investigation and/or official surveys likely would be required to confirm their presence along any potential HCT corridor.

All currently proposed HCT corridors are composed of existing and paved roadways that would limit the potential for wetland impacts unless major widening or other large-scale construction occurs. However, wetland protection measures that comply with state and federal guidelines should be followed during any construction activities. Additionally, permitting may be needed for any work done within the regulatory buffer areas surrounding wetlands or waterbodies within the study area.²⁶

²² [Wetlands \(1993\) | Wetlands \(1993\) | RIGIS](#)

²³ [National Wetlands Inventory \(usgs.gov\)](#)

²⁴ [Freshwater Rivers and Streams \(1:5,000\) | Freshwater Rivers and Streams \(1:5,000\) | RIGIS](#)

²⁵ [Lakes and Ponds \(24K\) | Lakes and Ponds \(24K\) | RIGIS](#)

²⁶ 250-RICR-150-15-3 (Rhode Island Code of Regulations)

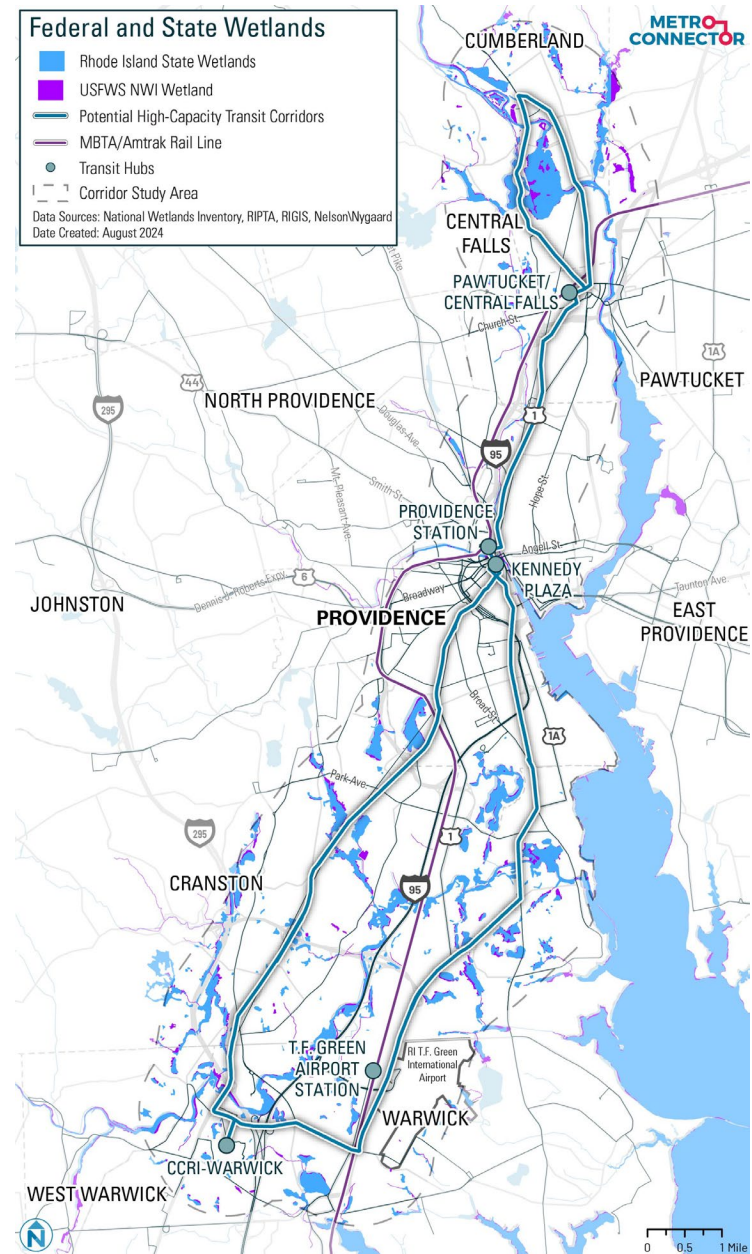


Figure 7-2 Federal and State Wetlands

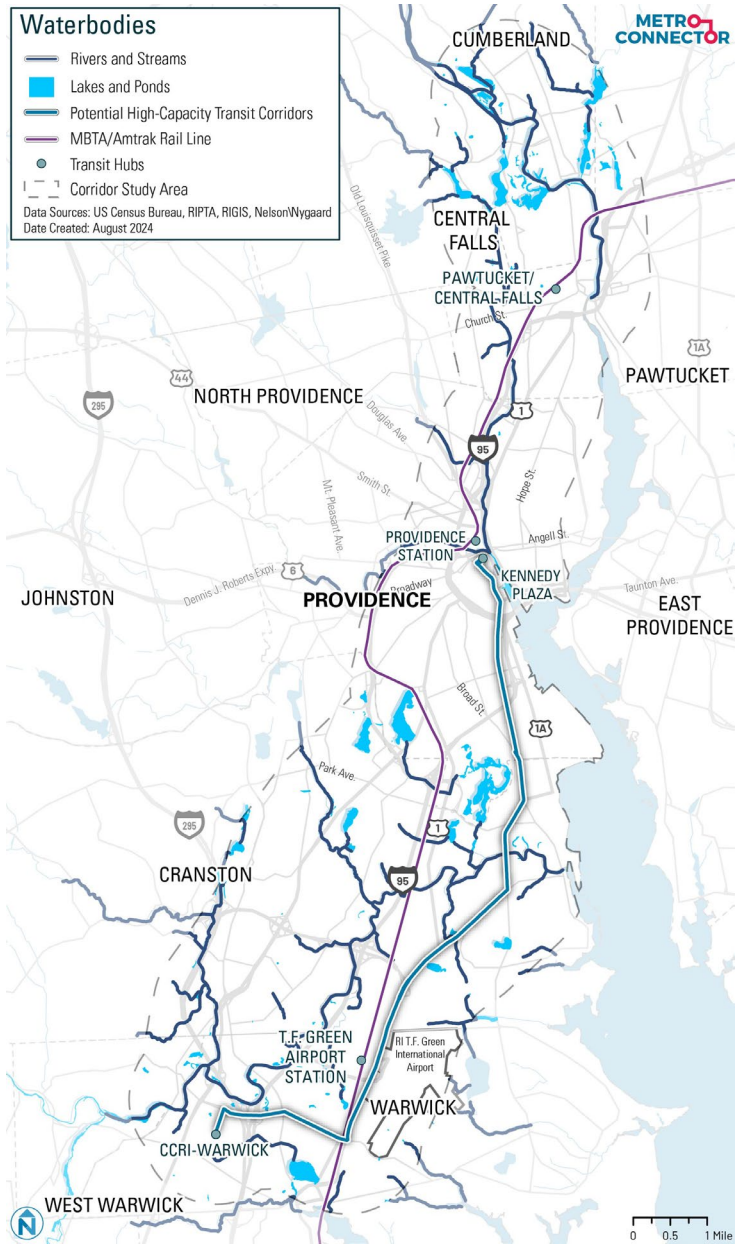


Figure 7-3 Waterbodies

Floodplains

An analysis of mapped FEMA floodplains from the National Flood Hazard Layer (NFHL) indicates that study area contains FEMA 100-year floodplains (see Figure 7-4), which require certain state and federal regulatory protections during a project's construction and other related activities.²⁷ The presence of floodplains correlates to the locations of streams, rivers and other waterbodies throughout the study area. The portions of the proposed HCT corridors within these floodplains are largely located in Warwick to the south and in Cumberland to the north.

All proposed HCT corridors comprise existing and paved roadways that would require minimal impervious coverage increases unless additional widening or major construction occurs. Unless widening occurs, the potential for increased stormwater runoff and related floodplain impacts may be fairly limited. However, floodplain protection measures that comply with state and federal guidelines should be followed during any construction-related activities. Additionally, permitting may be needed for any work done within the regulatory buffer areas surrounding floodplains within the study area.²⁸

²⁷ [Flood Data Viewers and Geospatial Data | FEMA.gov](#)

²⁸ 250-RICR-150-15-3 (Rhode Island Code of Regulations)

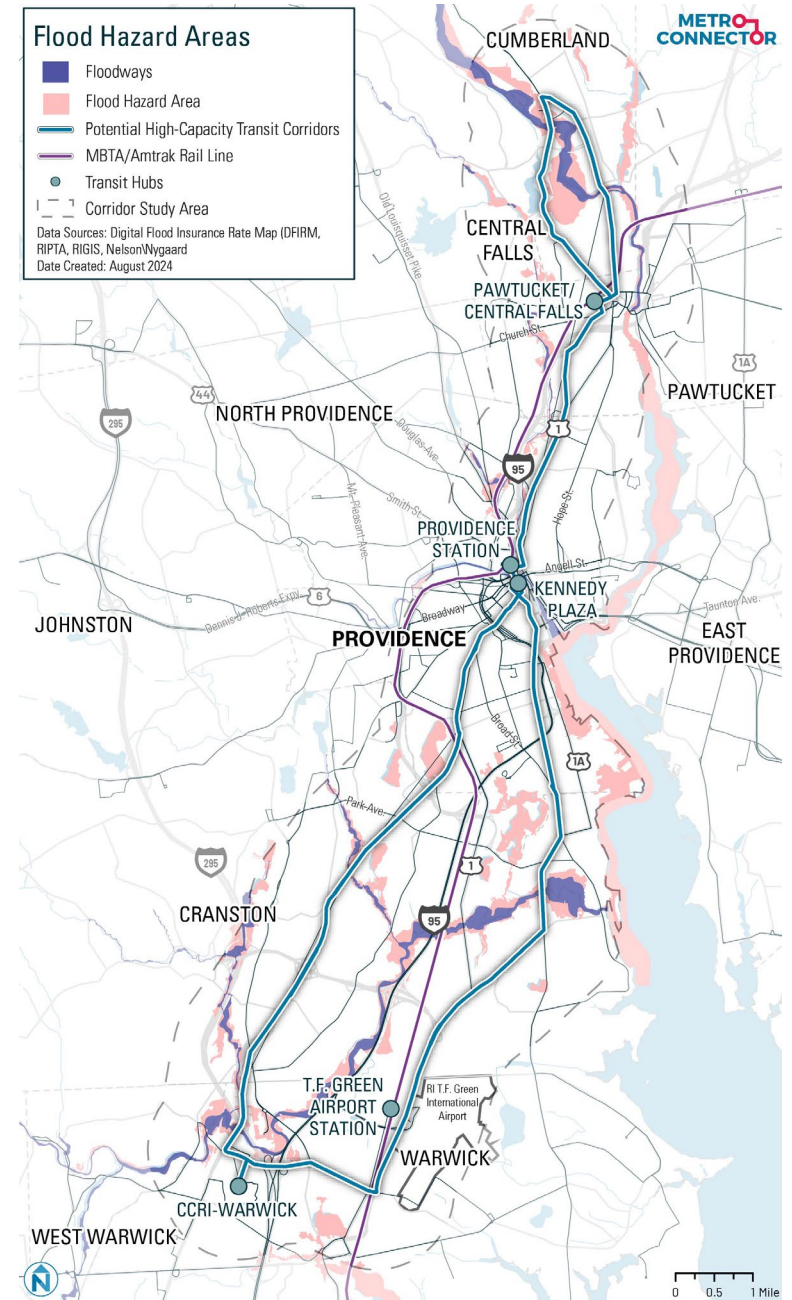


Figure 7-4 Flood Hazard Areas

Historic and Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) and the Rhode Island Historic Preservation Act (RIHPA) require consideration of impacts to historic and archaeological resources. Additionally, the United States Department of Transportation (U.S. DOT) Act of 1966 requires further consideration of historic sites during the development of transportation related projects under Section 4(f).

An analysis of state historic resource GIS layers and federal National Register of Historic Places (NRHP) GIS layers indicates that there are a wide variety of historic resources present throughout the study area.^{29, 30, 31, 32} Additionally, buildings within the study area that are older than 50 years of age (at the time of construction) may be eligible for listing on the NRHP, and would need to be assessed for their potential eligibility prior to a project's implementation.³³

The highest concentration of these resources occurs within the denser and central portions of Providence and Pawtucket, which feature multiple state and federally listed historic buildings and districts. There are also state listed historic cemeteries dotted throughout the study area, with some located on properties adjacent to sections of the proposed HCT corridors.

Although unlikely, potential temporary impacts to these resources include vibration and visual disturbances. The development of HCT in place of auto-oriented traffic may even reduce the overall level of vibration generated along the corridors. Implementation of a HCT project would likely require additional work such as a cultural resources survey and consultation with the Rhode Island Historical Preservation and Heritage Commission (RIHPHC).

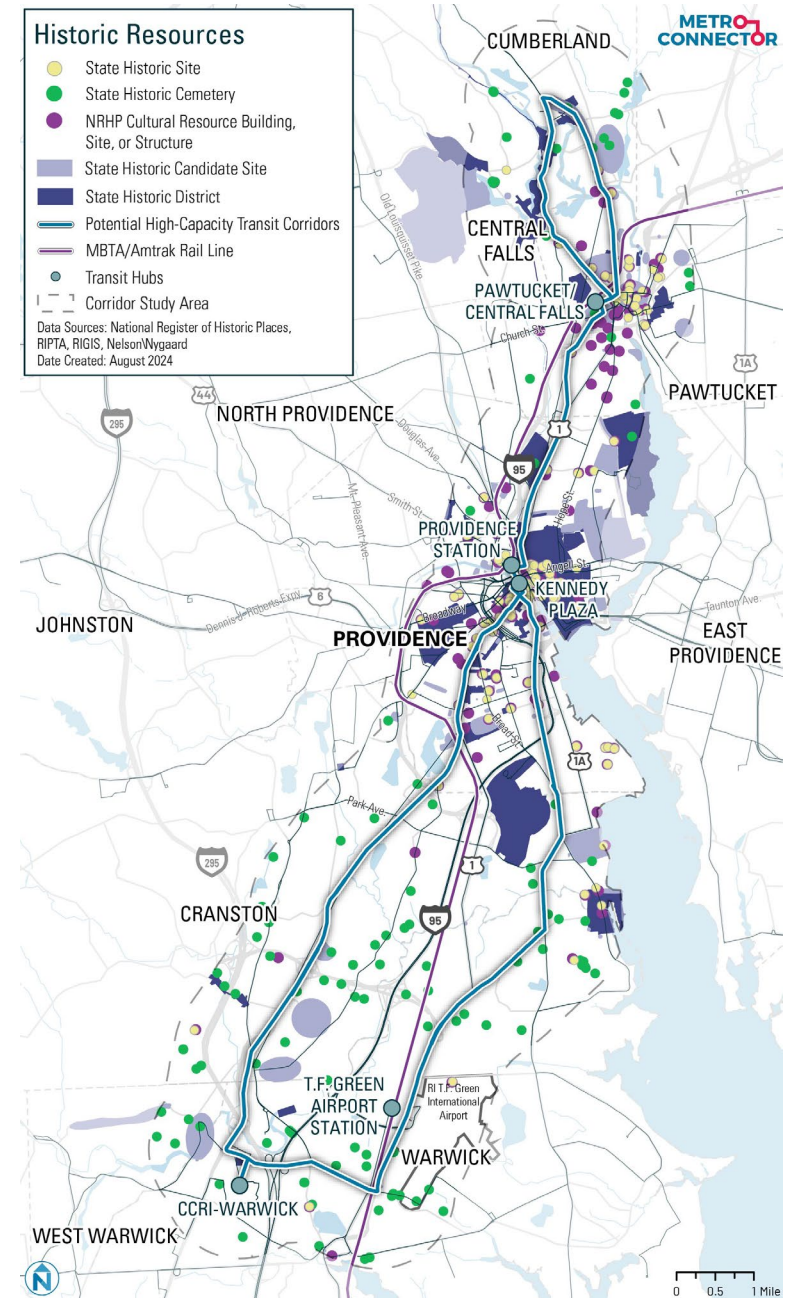


Figure 7-5 Historic Resources

²⁹ [Historic Candidate Sites | Historic Candidate Sites | RIGIS \(arcgis.com\)](#)

³⁰ [Historic Sites | Historic Sites | RIGIS \(arcgis.com\)](#)

³¹ [Historic Districts | Historic Districts | RIGIS \(arcgis.com\)](#)

³² [DataStore - National Register of Historic Places \(nps.gov\)](#)

³³ [FAQs - National Register of Historic Places \(U.S. National Park Service\) \(nps.gov\)](#)

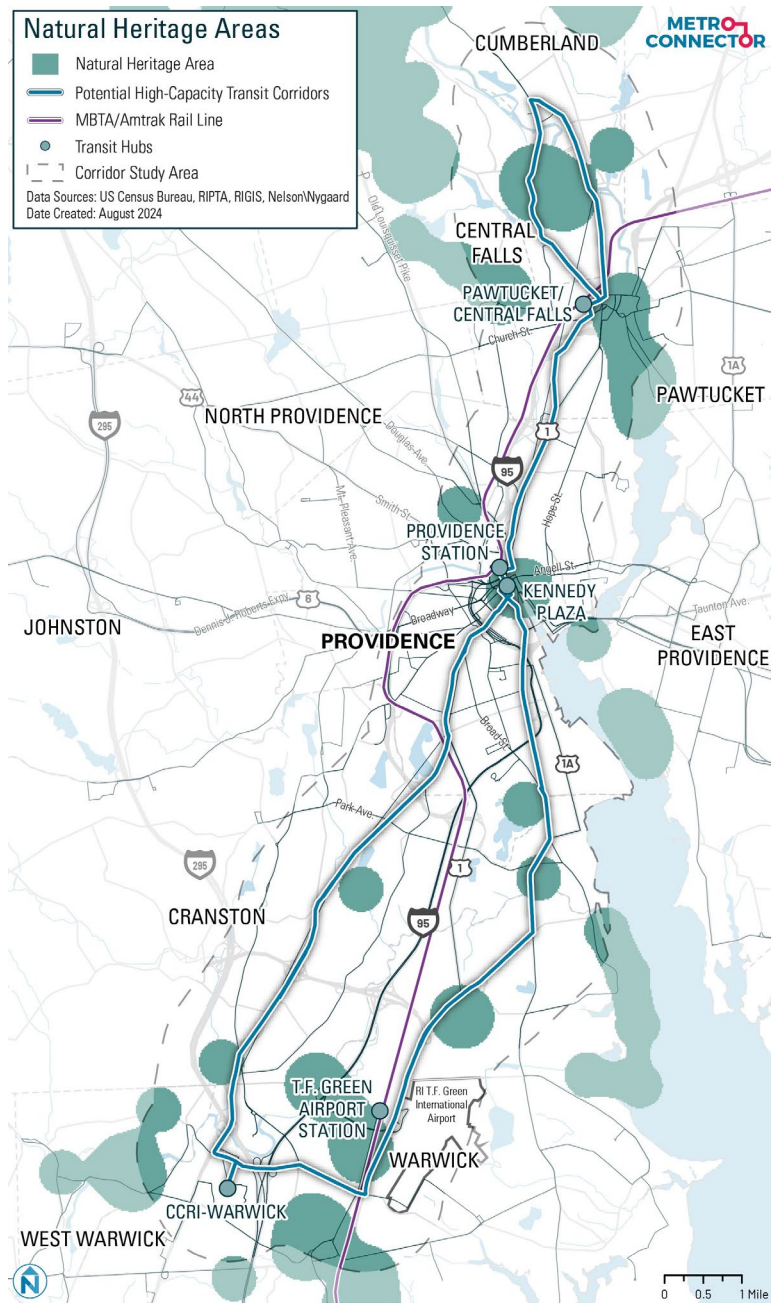


Figure 7-6 Natural Heritage Areas

Parks, Recreation Sites, and Conserved Lands

Section 4(f) of the U.S. DOT Act of 1966 protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites. An analysis of various RIGIS GIS layers including bike paths, major parks and open space, hiking trails, and local and state conservation lands indicates that there are multiple bicycle paths that are intersected by some of the proposed HCT corridors, most notably, the Blackstone River Bikeway located at the northern end of the study area. There are also various parks and other state and locally designated conservation lands that are located immediately adjacent to segments of the proposed HCT corridors (see Figure 7-7).

High-capacity transit may result in the disruption of bicycle traffic along designated separated bike paths by HCT service along the proposed corridor. Measures should be taken to ensure uninterrupted bicyclist traffic flow during and after project implementation. A HCT project may also require minimal use of existing park property and conservation lands along the proposed HCT corridors. Although major impacts are unlikely, permitting, mitigation efforts, and other regulatory actions may be required in some areas.

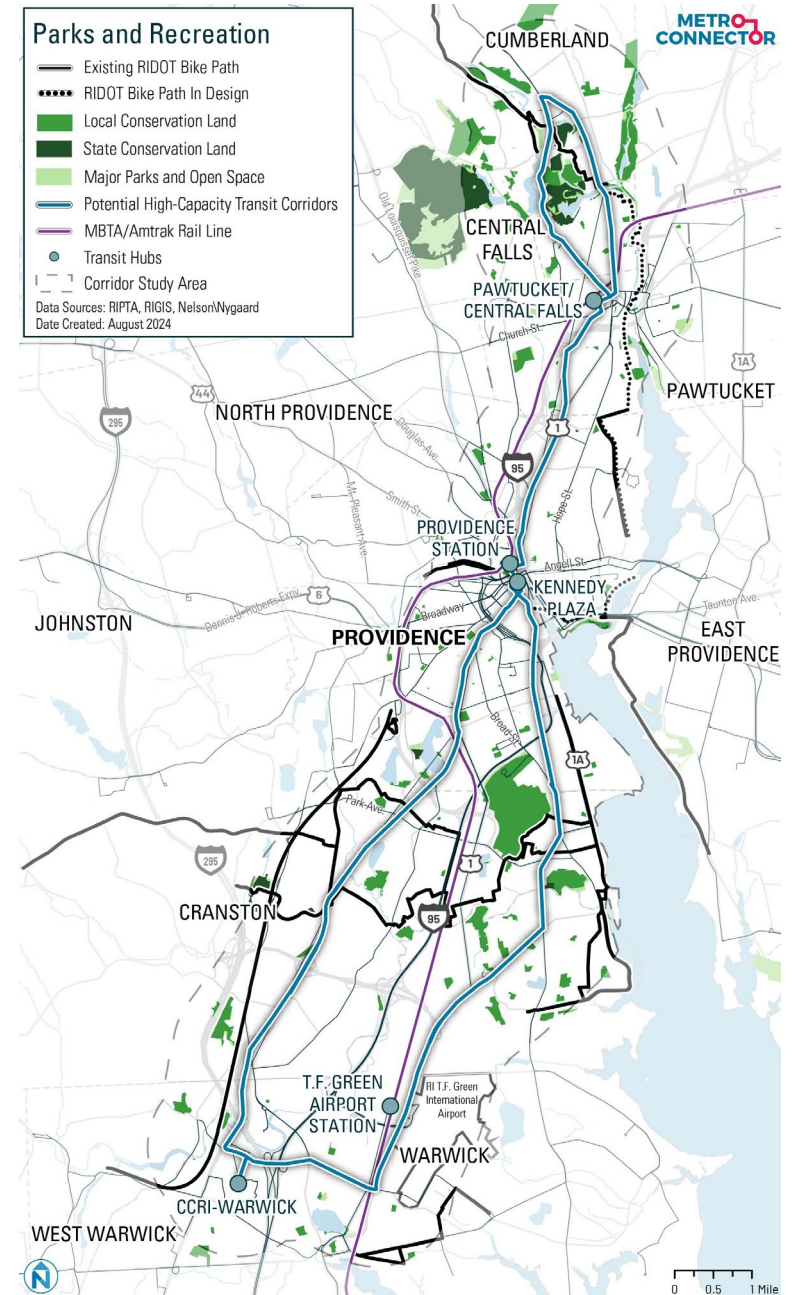


Figure 7-7 Parks and Recreation

Air Quality

The Federal Clean Air Act (CAA) requires the United States Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for six commonly found pollutants, otherwise known as criteria air pollutants. These criteria pollutants are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO_x), and particulate matter pollution with a diameter of 10 microns or less (PM₁₀), and 2.5 microns or less (PM_{2.5}).

In accordance with the CAA and based on air quality monitoring, all areas within the study area are currently designated as in attainment for all criteria pollutants. A future high-capacity transit project likely would lower air emissions and improve local air quality by decreasing the number of vehicle miles travelled (VMT) from single occupancy vehicles within the study area. It should be noted that electric vehicles still pose an asthma risk due to particulate emissions from tires and brakes. Short-term construction emissions would likely be negligible and would not exceed the NAAQS. An emissions analysis would be required to confirm that the construction emissions are minimal.

Asthma

According to the 2021-2024 Rhode Island Asthma Strategic Plan, there are significant racial/ethnic and socioeconomic disparities in pediatric asthma outcomes throughout the state.³⁴ The Plan identifies Providence, Pawtucket, Central Falls, and Woonsocket as the four “core cities” that, when combined, contain the majority of children living in poverty in the state. The study area includes three of the four aforementioned cities, with Woonsocket as the only city outside of the buffer. Currently, childhood asthma rates are higher in these cities than the state average. Emergency department (ED) visits for asthma related health concerns are also higher in the core cities, with rates at 11.1 per 1,000 children as opposed to 6.2 per 1,000 children statewide.³⁵ The majority of childhood asthma related ED visits were minority with 67% minority and 26% white, respectively.³⁶

While unlikely to meet its 2025 deadline, a HCT project would be in line with Objective 4.2 listed in the Rhode Island Asthma Strategic Plan to “Improve

transportation infrastructure and reduce traffic congestion in and around low income and communities of color by 2025.”³⁷ The transportation infrastructure improvements resulting from a HCT project likely would reduce the overall VMT in the communities within and surrounding the study area by increasing transit ridership. This reduction in VMT likely would lead to air quality improvements and improved asthma rates and outcomes.

³⁴ [2021-2024 Rhode Island Department of Health Asthma Strategic Plan \(ri.gov\)](#)

³⁵ [2021-2024 Rhode Island Department of Health Asthma Strategic Plan \(ri.gov\)](#)

³⁶ [2021-2024 Rhode Island Department of Health Asthma Strategic Plan \(ri.gov\)](#)

³⁷ [2021-2024 Rhode Island Department of Health Asthma Strategic Plan \(ri.gov\)](#)(pg.36)

Environmental Justice and Public Health

Environmental Justice (EJ) is defined as the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, policies, and activities and with respect to the distribution of environmental benefits. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, or local programs and policies or receive an inequitably low share of resources and environmental benefits.

Presence of Environmental Justice Populations

Pursuant to federal regulations, and for the purposes of this project, EJ communities are defined as census tracts where the percentage of the population is greater than 50% minority and/or where the proportion of individuals living below 200% of the poverty line exceeds the state average of 25.16%.

According to data pulled from the 2017-2021 American Community Survey (ACS) 5-year Estimates, the study area exhibits significant disparities in the level of poverty as compared to the state. The study area presents a higher level of poverty relative to its size, with approximately 33% of residents falling into this category (see Table 7-2).

Table 7-2 Poverty Status of Population

Rhode Island			Study Area			
Total Population	Population Living Below 200% of the Poverty Line	Percent of Rhode Island Population Living Below 200% of the Poverty Line	Total Population	Population Living Below 200% of the Poverty Line	Number of residents living in Census Tracts where total percent of residents living below 200% of the poverty line is greater than 25.16%	Percent of Study Area Population Living Below 200% of the Poverty Line
1,050,314	264,326	25.16%	375,891	125,269	107,348	33.32%

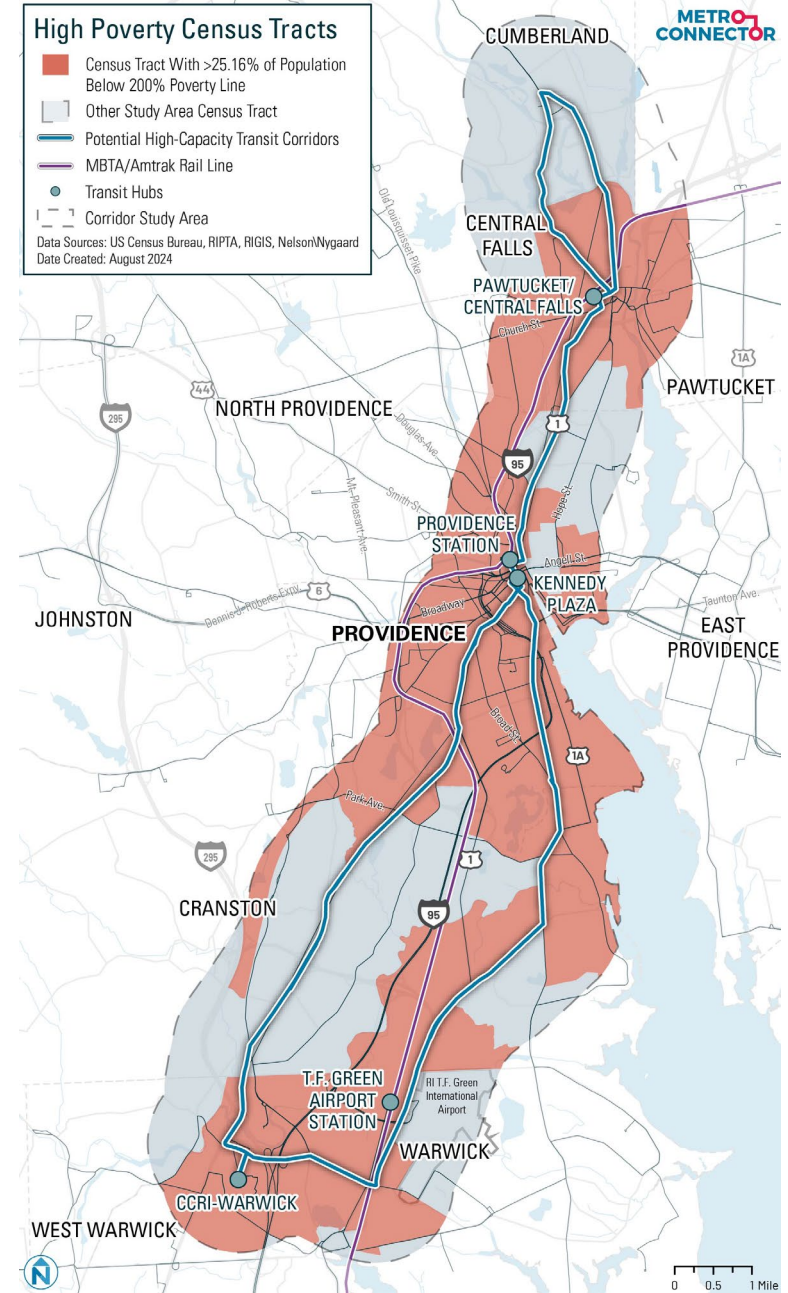


Figure 7-8 Areas with High Rates of Poverty

Demographic data also reveals a significant contrast in minority status between the state and the study area. Approximately 29% of Rhode Island residents have minority status, compared to 48% of residents in the study area (see Table 7-3).

Overall, approximately 67% (66 out of 90) of the census tracts located within the study area are considered EJ communities through poverty and/or minority status. These communities face heightened environmental justice challenges that necessitate focused interventions and policies to promote equitable living conditions. A HCT project would improve access to transportation within these traditionally underserved communities, which may allow for an improvement in economic and social wellbeing.

Table 7-3 Minority Status of Population

Rhode Island			Study Area			
Total Population	Minority Population (Total minus White Only)	Percent of Rhode Island Population that is Minority	Total Population	Minority Population	Number of residents living in EJ Census Tracts where the minority population is greater than 50% of the total	Percent of Study Area Population that is Minority
1,091,949	321,249	29.41%	391,512	186,483	181,848	47.63%

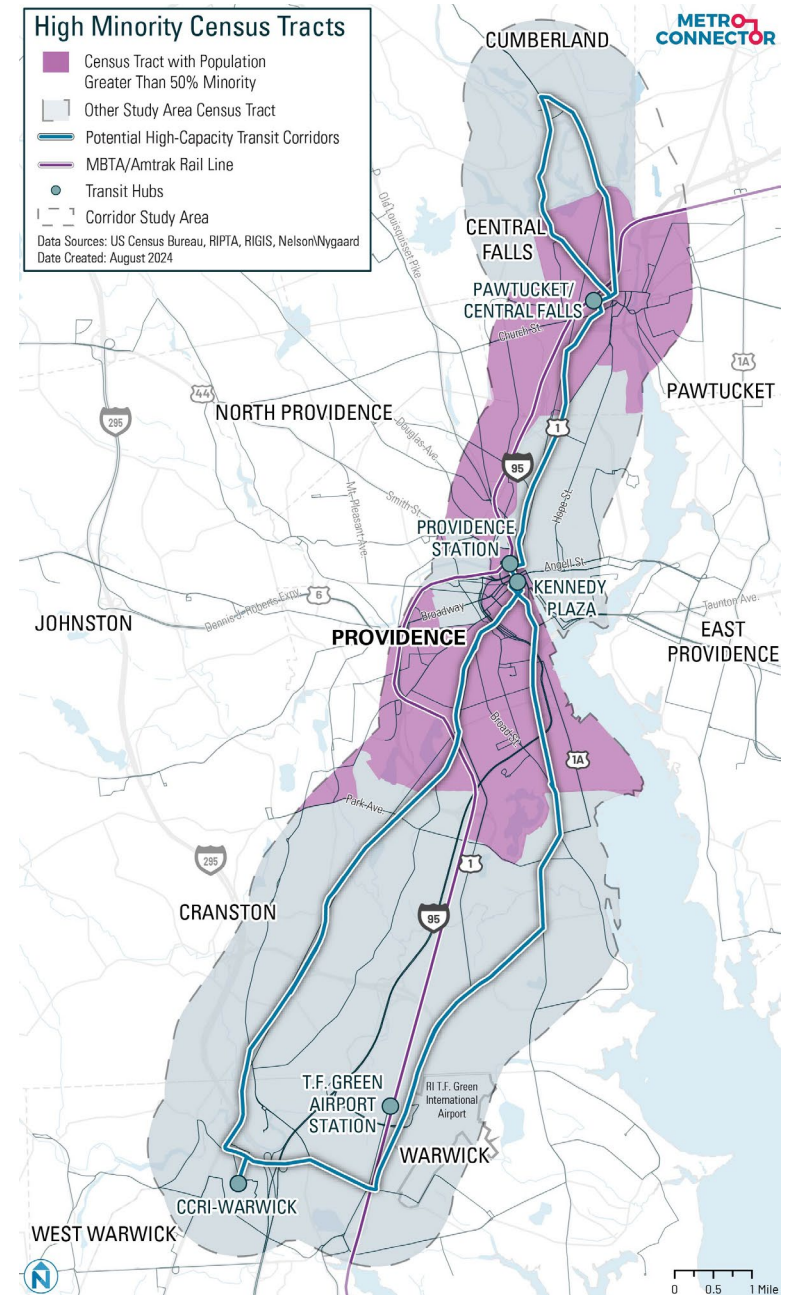


Figure 7-9 Areas with High Minority Population

Noise and Vibration

An analysis of RIGS GIS layers featuring libraries, schools and hospitals, which are sites that are particularly sensitive to noise and vibration, indicates that there are many sensitive sites within the study area.^{38, 39, 40} The largest concentrations of these sites are located within the municipal centers of Providence and Central Falls, but some are located on properties adjacent to various segments of the proposed HCT corridors.

While there may be temporary construction-related noise and vibration impacts to various sites throughout the study area, the project could also result in an overall net decrease to the noise and vibration generated from existing traffic conditions. Additional screening and analysis would be needed to confirm the difference between the proposed and existing conditions. There may also be noise and vibration attenuation measures required during construction in areas proximate to particularly sensitive locations.

³⁸ [Libraries \(2014\) | Libraries \(2014\) | RIGIS](#)

³⁹ [Schools \(2023\) | Schools \(2023\) | RIGIS](#)

⁴⁰ [Hospitals \(2023\) | Hospitals \(2023\) | RIGIS](#)

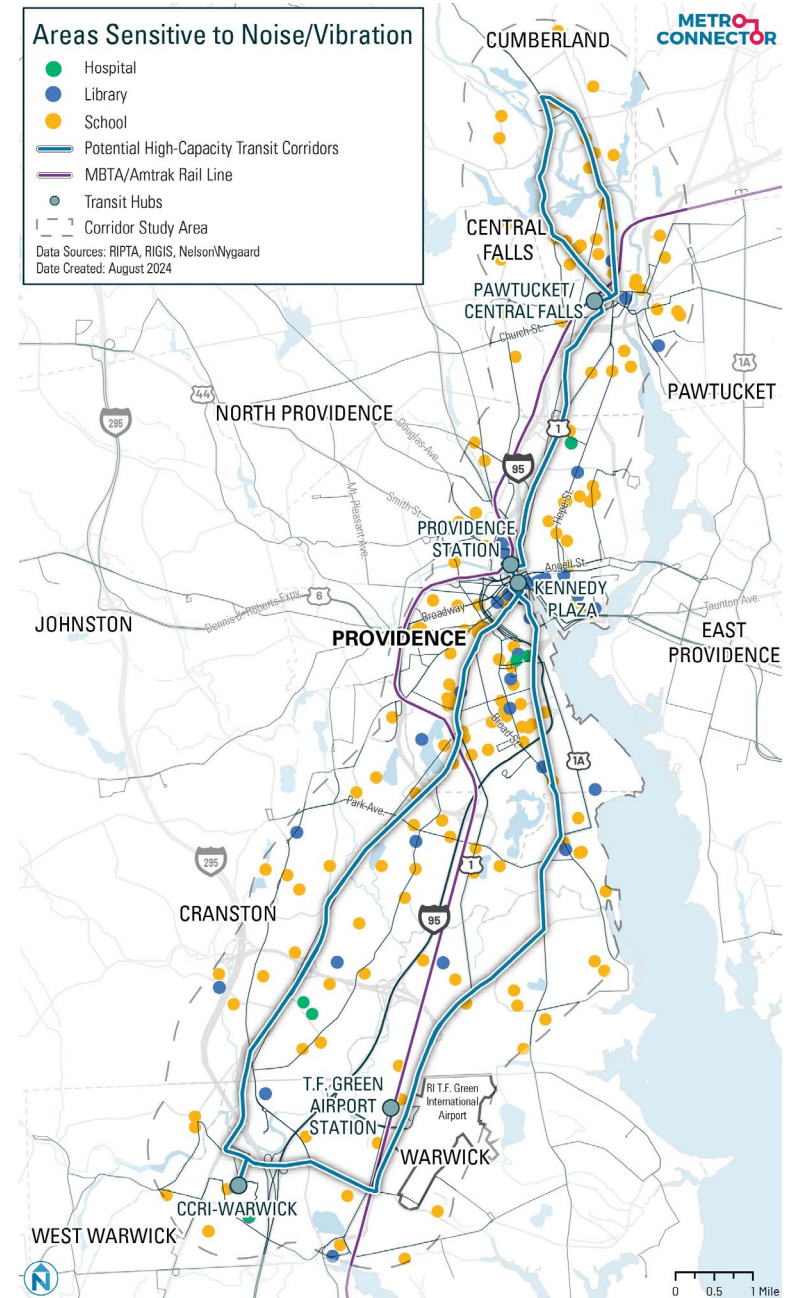


Figure 7-10 Areas Sensitive to Noise and Vibration

Summary and Opportunities

The Environmental Review chapter considers environmental factors that may impact or may be impacted by the implementation of a high-capacity transit project in the study area. The analysis found several environmental advantages in the study area that would be supportive of a HCT project:

- There is no designated critical habitat along the proposed HCT corridors.
- All proposed HCT corridors comprise existing and paved roadways that would limit potential for wetland and stormwater impacts.
- The proposed HCT corridors would serve several cities that have socioeconomic disparities compared to the rest of Rhode Island, including higher rates of childhood asthma than the rest of the state. A HCT project would likely facilitate mode shift, leading to improved air quality, asthma and health outcomes in these cities and across the study area.
- Of the 90 census tracts in the study area, 66 meet federal environmental justice criteria, as they have higher concentrations of people of color or people below 200% of the poverty line than the state average. A HCT project would improve access to transportation within these traditionally underserved communities, which may allow for an increase in economic and social wellbeing.
- The project may result in an overall net decrease to noise and vibration due to reduced VMT.

While a HCT project is likely to have a positive environmental impact overall, the analysis identified the following environmental sensitivities that need to be managed through the project's construction and operation:

- Protection of communities in the study area from contamination during HCT construction and operation
- Protection of the four threatened, endangered, proposed endangered, or candidate species along the study corridors.
- Proactive planning measures to avoid disruption of bicycle traffic on separated bike paths near the proposed HCT corridor.
- Project construction may result in temporary impacts to parks, areas sensitive to noise and vibration, EJ communities, and ecological resources.

Building on the findings of this chapter, the following considerations and steps can be explored further as the HCT corridors become refined:

- Potential for real property acquisitions and site assessments
- Potential traffic impacts and roadway capacity
- Provisions of the Americans with Disabilities Act (ADA) to ensure services, vehicles, and facilities are accessible to and usable by individuals with disabilities
- Additional screening to identify critical wildlife habitats, waterbodies, and floodplains near proposed corridors
- Execution of a cultural resources survey and consultation with the Rhode Island Historical Preservation and Heritage Commission (RIHPHC)