Eastern Connecticut Corridor Rail and Transit Feasibility Study (ECRTS)

Appendix K: Conceptual Station Site Locations

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1. Introduction and Selected Locations

As part of the Eastern Connecticut Corridor Rail and Transit Feasibility Study (ECRTS), this Conceptual Station Site Locations technical memorandum builds upon the findings from the previously completed Preliminary Feasibility Assessment. The Preliminary Feasibility Assessment identified a total of 18 potential station locations for evaluation and consideration as future sites for Shore Line East service expansion and/or implementation of rail service along the Thames River Corridor. The findings of the Preliminary Feasibility Assessment, informed by municipal and stakeholder feedback and general public input, led to the prioritization of service expansion options and the selection of six potential station locations for further analysis.

This analysis will expand on the high-level, qualitative existing conditions assessment that was conducted in the Preliminary Feasibility Assessment. This analysis does not identify or analyze potential station locations in Westerly, RI, or New London, CT, as it was assumed the existing stations in these communities would provide service for any future rail service expansion. Minor modifications were made to the precise siting of each of the locations based on feedback received, though the locations remain largely unchanged from the previous analysis.

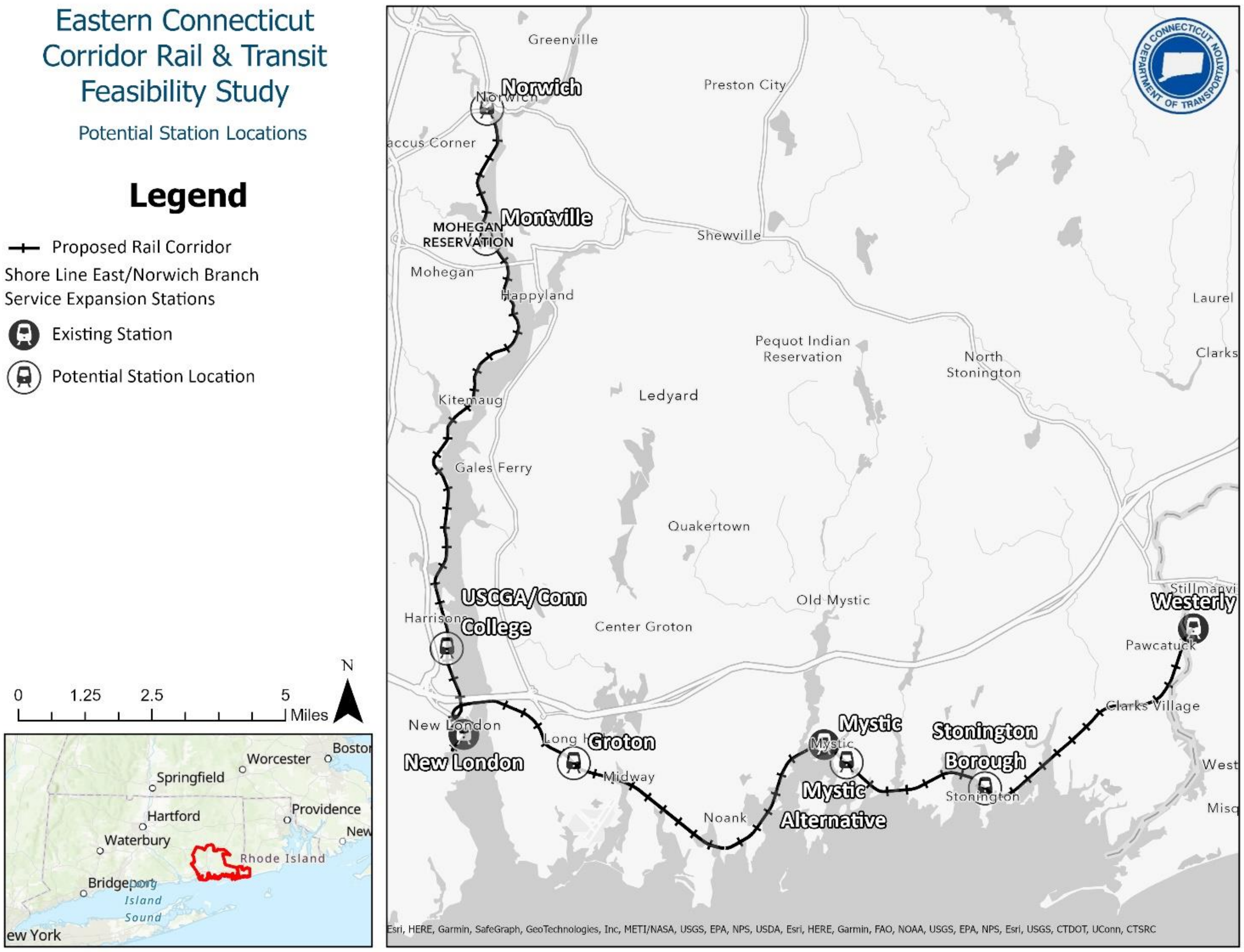
The locations for further analysis as possible station sites along the Thames River Corridor include the Norwich (Intermodal Center), Montville (Mohegan Sun), and U.S. Coast Guard Academy (USCGA)/Connecticut College locations (Figure 1). As part of the potential expansion of Shore Line East service between New London, CT and Westerly, RI, , the project team suggested the potential implementation of two new intermediate stops between these locations. Additionally, the project team identified a potential alternative location for the existing Mystic Station that accommodates the construction of high-level platforms, a necessary accessibility component of the new service. High level platforms cannot be installed at the existing station in Mystic due to track curvature that exceeds the maximum allowable curve. In the NEC corridor three station locations were advanced for further analysis: Groton West (henceforth referred to simply as “Groton”), Mystic Alternative, and Stonington Borough.

This technical memorandum includes the evaluation conducted for each of the six locations, focusing on a half-mile or one-mile radius around each in order to assess their viability as potential future stations. The analysis herein includes the following:

1) Rail Operations Feasibility and Physical Constraints
2) Access to Population and Activity Centers
3) Environmental Constraints
4) Traffic Access and Impacts
5) Pedestrian and Bicycle Access and Connectivity
6) Transit Connections

Working in tandem with other ongoing analyses, this evaluation seeks to identify any fatal flaws associated with these potential station locations, and identify the feasibility, viability, and potential benefits for further consideration of potential new stations associated with expanded passenger rail service in southeastern Connecticut.

Figure 1: Potential Station Locations Overview Map



2. Conceptual Station Location Evaluation

The results of this evaluation inform the next phases of the ECRTS by identifying any critical path items to address and improve feasibility and constructability of potential future stations.

2.1. Rail Operations Feasibility and Physical Constraints

2.1.1. Overview

Each station location was reviewed in terms of potential impacts to existing and future rail service and operations, including both passenger rail and freight rail activities, resulting from the addition of new stops in the existing schedule. This includes, but is not limited to, service levels and travel times associated with a range of propulsion technologies: diesel, dual-mode diesel-electric hybrid, or full electric alternatives. The project team also assessed the physical and geometric constraints of the potential station locations, including the need for tangent track of adequate length to accommodate a high-level, ADA-accessible rail platform; sufficient property available to provide ADA-accessible rail crossings; and station configuration to enable passenger safety and security. Further, the design of the station:

- Would assume a 500’ high-level station platform, similar to new stations on the CT*rail* Hartford Line, as the standard design for future stations to accommodate a 4-car train set and high-level boarding.
- Would include either ramps or elevators at each pedestrian access point to the high-level platform, to follow ADA Accessibility Guidelines.
- Would align with CTDOT’s commitment to a fully accessible railroad by ensuring the station platform length allows all doors of the train to be accessible at once.
- Would abide by National Fire Protection Association 130 standards for fixed guideway transit and passenger rail systems.
- Would account for CTDOT’s target of providing 200 dedicated parking spaces for any new station, on site or within ¼ mile
- Would follow design criteria for technical specifications such as track grades (preferred maximum grade of 0.50 percent) and curvature (maximum curvature degree of 1 degree 40 minutes).

All of the proposed river corridor stations assume a single platform at each station whereas all of the proposed Northeast Corridor (NEC) stations assume separate eastbound and westbound platforms.

2.1.2. Norwich

Access to the site and right-of-way are relatively constrained by existing infrastructure, primarily the railroad right-of-way (ROW) abutting the Yantic River to the east, North Thames Street to the west, West Side Boulevard to the north, and West Main Street to the south. Additionally, the site has topographic constraints that would need to be addressed in conjunction with future station design and construction, with elevation on the site ranging from 10-32 feet moving east to west away from the rail line.

A high-level analysis of the feasibility of rail operations of a terminus station at the potential location in Norwich yielded significant challenges that would likely need to be mitigated during the design and construction of any future station. ADA requirements allow for a maximum of one degree, forty-minute curvature for high-platform construction, with a maximum of three inches between the platform and train egress. Based on these requirements, the potential station location is bracketed by curves exceeding four degrees that would likely preclude installation of a full-length, high-level platform at this station. Opportunities for exemptions may need to be explored to allow for 1) hybrid high-level/low-level platform layout, or 2) a low-level platform for the entirety of the platform length, or 3) short, high-level platform. Any of these options would require an exemption issued by the Federal Railroad Administration for a station plan not in conformance with ADA requirements. Additional analysis would also be required to determine if there is sufficient space underneath the West Main Street and West Side Boulevard overpasses to allow for platform or access-way construction. At this location, there is approximately 250 feet of track between the two overpasses, which does not meet the assumed 500’ platform length standard. North of the conceptual station location there is an existing second track that could be used as train storage during turnover, allowing existing freight operations to be maintained through the area with limited impacts on freight operators.

2.1.3. Montville (Mohegan Sun)

The potential station location in Montville, situated on Mohegan Sun Resort and Casino property, is relatively constrained due to existing infrastructure at the location. Bounded by railroad ROW to the north and east, an existing RV parking lot and access road to the west, and a parking garage to the south, the platform design and location would likely be required to directly abut these existing structures. However, the proximity to these structures may present opportunities for shared parking and other joint operations/agreements through continued planning and coordination with Mohegan Sun leadership and state entities. Beyond ROW constraints, the site may have some minor topographic issues to address, as there is a slight slope approaching the rail line and the river to the east. Any potential future station design and construction would need to account for leveling of the area to ensure safe and efficient access.

The potential station location in Montville is located on a segment of track that presents as reasonably straight, although more precise measurements will be required to determine if there is any curvature present that exceeds the accepted maximum of 1°40”. Pending a more detailed analysis, it is anticipated that there is sufficient ROW available to accommodate a full 500’ high-level platform adjacent to the existing parking structure.

2.1.4. U.S. Coast Guard Academy/Connecticut College

The site is constrained by the railroad ROW to the east, a forested area to the west and south, and Farnsworth Street to the north The site is relatively flat, and it is expected that a potential future station could be implemented with very few topographic constraints. The primary challenge associated with a station on this site is its location within/proximate to the U.S. Coast Guard Academy and existing activity hubs. While often lightly utilized, an existing overflow parking lot is situated adjacent to, and potentially overlaps, the potential future station site. There are opportunities to work with the USCGA to supplement parking with a shared parking structure of some sort to accommodate their need for overflow parking alongside required minimum station parking capacity for future rail service. An opportunity to locate the platform north of Farnsworth St. adjacent to the US Coast Guard Child Development facility may prove better suited for the station. A more detailed analysis of both locations is required before a determination can be made.

The potential station site is situated between existing at-grade railroad crossings. It is primarily utilized by the USCGA to access their athletic fields and rowing center, as well as providing access to the Old Thames Shipyard. Expansion of passenger service along this corridor would necessitate implementation of general improvements to crossing infrastructure. The location of this potential station would necessitate additional design consideration for crossing infrastructure downtime while a passenger train is situated at the station during boarding. Predictive crossing technology can account for this type of operation to minimize gate down-times while still protecting train, vehicular and pedestrian movements. The USCGA also indicated during stakeholder interviews that there were concerns regarding the proximity of the tracks to their athletic fields. However, a potential future station is not expected to negatively impact the area proximate to the fields and could potentially improve access to and from the campus for public events. The USCGA did note, however, that they are frequently hosts to high-level military personnel and other “VIPs” that warrant additional security on campus. It is expected that during these visits, passenger train service may need to be reduced or suspended while VIPs are on-site to limit any potential security concerns. While primarily an operational constraint, this would likely include additional security at the station, possibly including full lockdown of platforms, parking, and other station facilities, as needed. Given these concerns, continued coordination with the Coast Guard Academy will be paramount for any planning of a future station at this location.

2.1.5. Groton

Any future station on the Northeast Corridor will need to include high-level platforms as part of its design, and a preliminary analysis did not yield any significant challenges that would preclude construction of a high-level platform at this location. The primary constraint to a future station at this location is the grade change between the railroad ROW and the proximate land parcel. Design will need to ensure that there are sufficient ramps and access points to platforms to provide equitable access to the platforms adjacent to the railroad ROW. The NEC corridor at this location includes three operational tracks, two of which are in good condition (Tracks 1 and 2), with the third (Track 4) requiring upgrades to be suitable for passenger rail travel. It is expected that the optimal platform layout would include an eastbound platform on Track 4 (on the south side), and a westbound platform on Track 1 (on the north side). An overhead pedestrian bridge to reach the platforms would be part of the design. This would allow freight activity and Amtrak trains to use Track 2 to overtake expanded Shore Line East trains as necessary. An island platform is not recommended at this location due to substantial alignment and property impacts, including the replacement of or major modification to the Poquonnock Road underpass at the eastern edge of the conceptual location. Design must consider opportunities for sufficient areas of refuge in the event of an emergency. Moderate upgrades are likely required under any circumstance for the railroad bridge over Poquonnock Road to facilitate construction of a potential station at this location.

2.1.6. Mystic Alternative

Relocating Mystic Station will better connect the population and activity centers in the region, as the current Mystic Station configuration precludes Shore Line East from running service due to the station's lack of high-level boarding platforms. While outside the half- to one-mile radius of the potential station site, several major tourist attractions, including Mystic Aquarium, Mystic Seaport Museum, and Olde Mistick Village, are located approximately two miles away. There is moderate employment density within the station radius, largely related to tourism, which is most intense in the warm weather months. The potential location, though it would relocate the existing station out of the downtown area, would still be close to several marinas and parks, offering access to significant recreational opportunities to residents and visitors. The new location would still be close to U.S. Route 1, the area's major economic corridor, offering regional connectivity for residents of this largely residential area to employment centers west towards New Haven, including Groton and New London, north towards Norwich and east to Westerly, Rhode Island.

2.1.7. Stonington Borough

The primary physical constraint at the potential station site in Stonington Borough is limited property availability on both sides of the railroad ROW. While some of the property appears to be publicly owned, much of the property on the west side of the ROW is privately owned and actively used. Virtually every potential site investigated in the Borough was limited by these constraints. This challenge will need to be investigated further and may require easements or other measures to acquire the necessary ROW. The track in this segment appears to be sufficiently straight for operational feasibility, although station design will need to include detailed curvature measurements to ensure that the maximum curvature threshold is not exceeded. A future platform would likely require some portion to extend under the existing Alpha Avenue overpass, which is expected to be reconstructed or repaired in the near future. Any proposed work or construction should allow for sufficient ROW between the railroad and bridge piers so as not to preclude a station platform. Generally, preliminary bridge designs do not suggest elements that would preclude a possible future station – there is sufficient space for a 500' platform to not interfere with the planned pier locations; a six-foot-wide sidewalk is feasible and adequate for ADA compliance; and there is sufficient ROW length to construct two new interlockings, one at either end of the station for each track.

2.2. Access to Population and Activity Centers

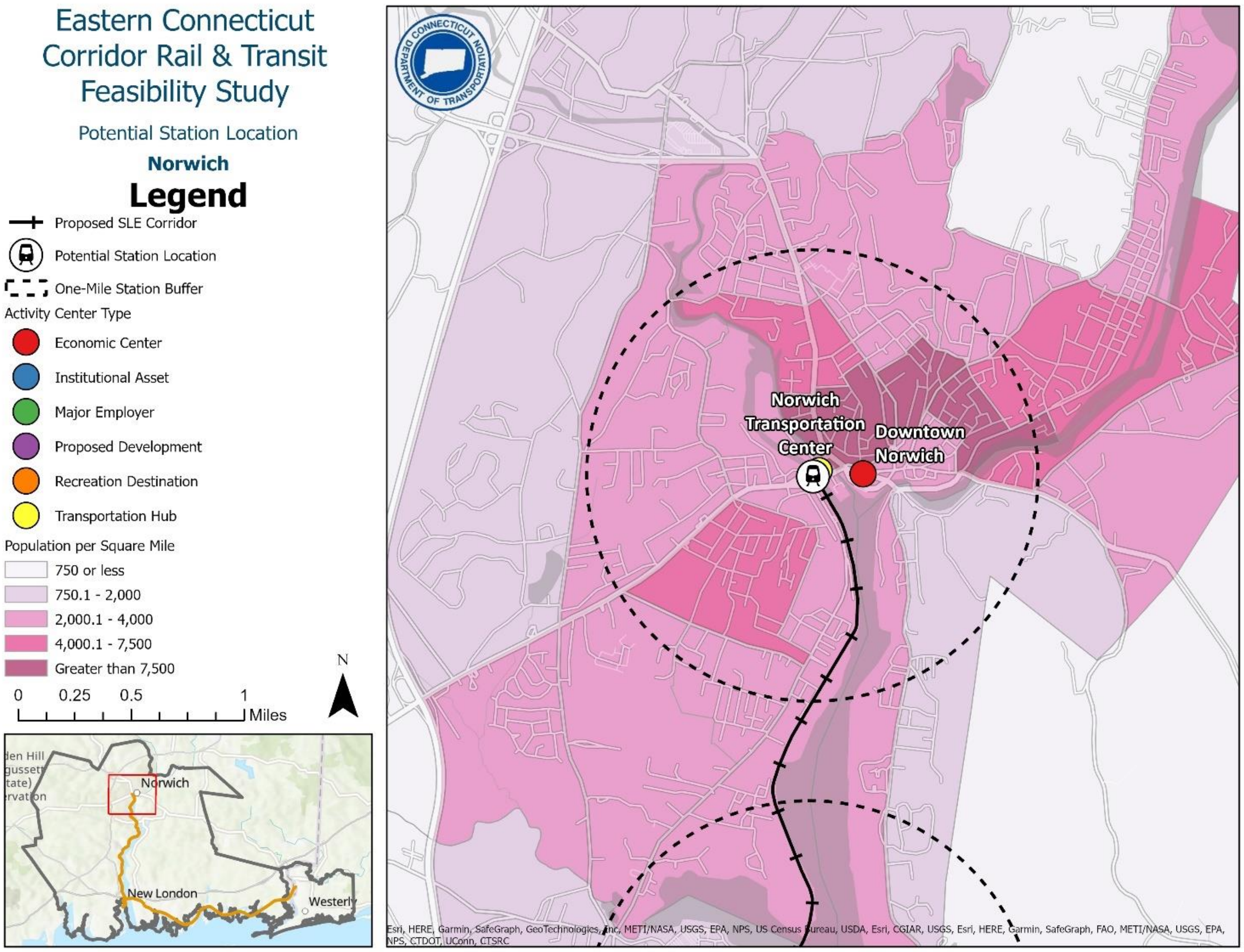
2.2.1. Overview

Following the refinement of the potential station locations, this analysis reexamined the findings of the existing conditions report and evaluated the population and activity centers within one-half to one mile of those sites. The potential for transit oriented development at these locations is addressed later in this document.

2.2.2. Norwich

The potential station location in Norwich is just outside the City's downtown and is one of the most densely developed station locations being considered in this study. Norwich, along with Groton, comprises the greatest proportion of the population in the study area. Additionally, Norwich ranks third in the region in employment density, which is primarily concentrated downtown, trailing only New London and Groton within the region, exceeding both the regional and statewide employment density averages. A station at this location would improve mobility options both for residents seeking to access employment centers elsewhere in the region, as well as expand employment opportunities for residents in nearby communities who may not otherwise be able to access the area.

Figure 2: Norwich Station Area Density and Activity Centers

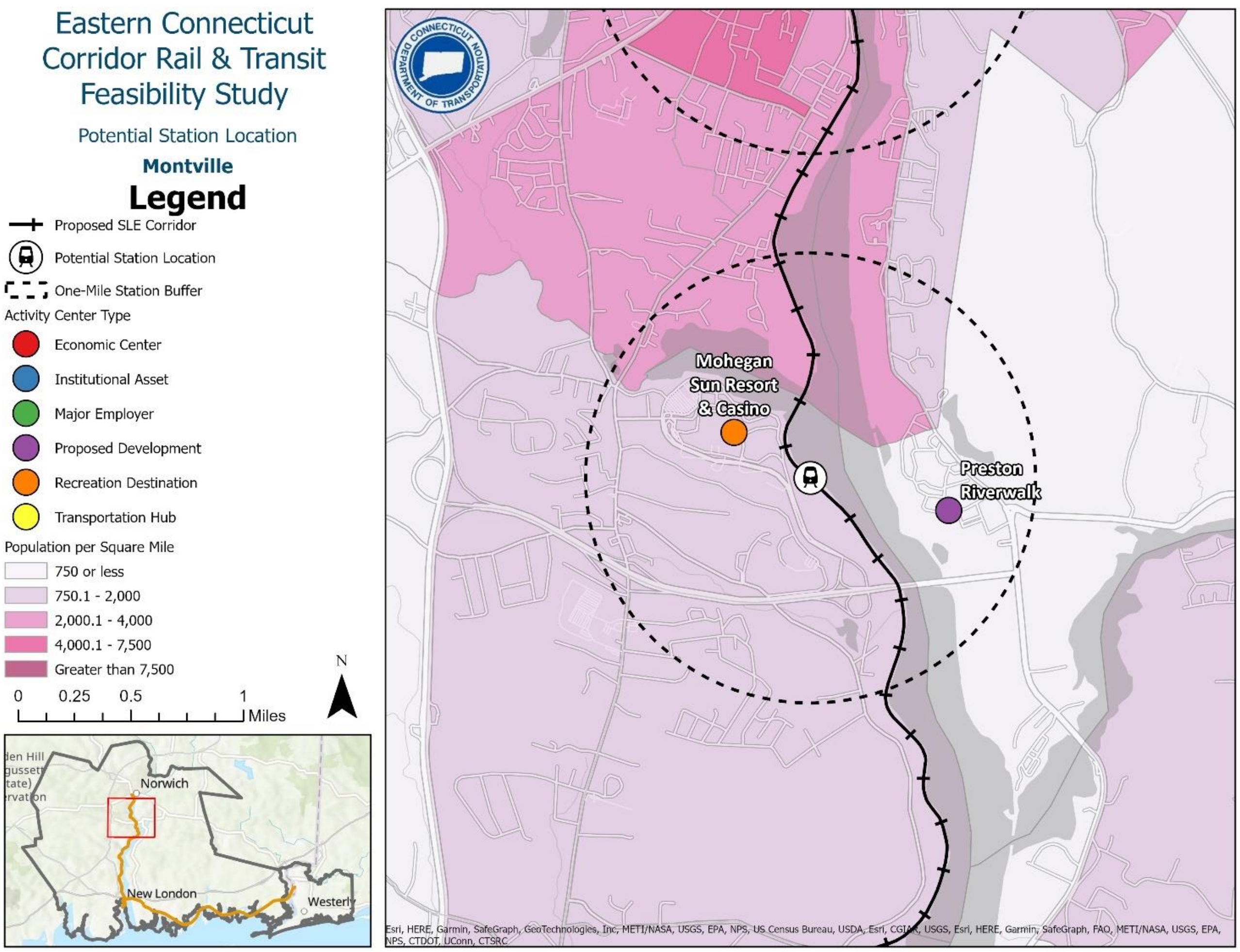


2.2.3. Montville (Mohegan Sun)

The potential station in Montville is located near one of the largest employment and recreation centers in the region, the Mohegan Sun Resort and Casino. Visitors and employees would be able to utilize the rail station and other transit options to access both employment and recreational opportunities. Rail service could also help alleviate casino-bound traffic during special events or popular times to visit such as holidays and weekends. Through continued coordination among Tribal representatives, the Town and other stakeholders, opportunities exist to implement corresponding improvements to facilitate movements between the station and the Mohegan Sun complex, such as improved pedestrian infrastructure or dedicated shuttles to and from a potential rail station.

Beyond the importance of access to and from Mohegan Sun, the potential station site is directly across the Thames River Bridge (Route 2A) from a proposed mixed-use development in Preston. The Preston Riverwalk proposal comprises six individual parcels totaling just under 400 acres for residential and commercial development. A future station at this location could serve as an important transportation asset for those living and working in the area, as well as provide public transportation access during construction for workers on site.

Figure 3: Montville Station Area Density and Activity Centers

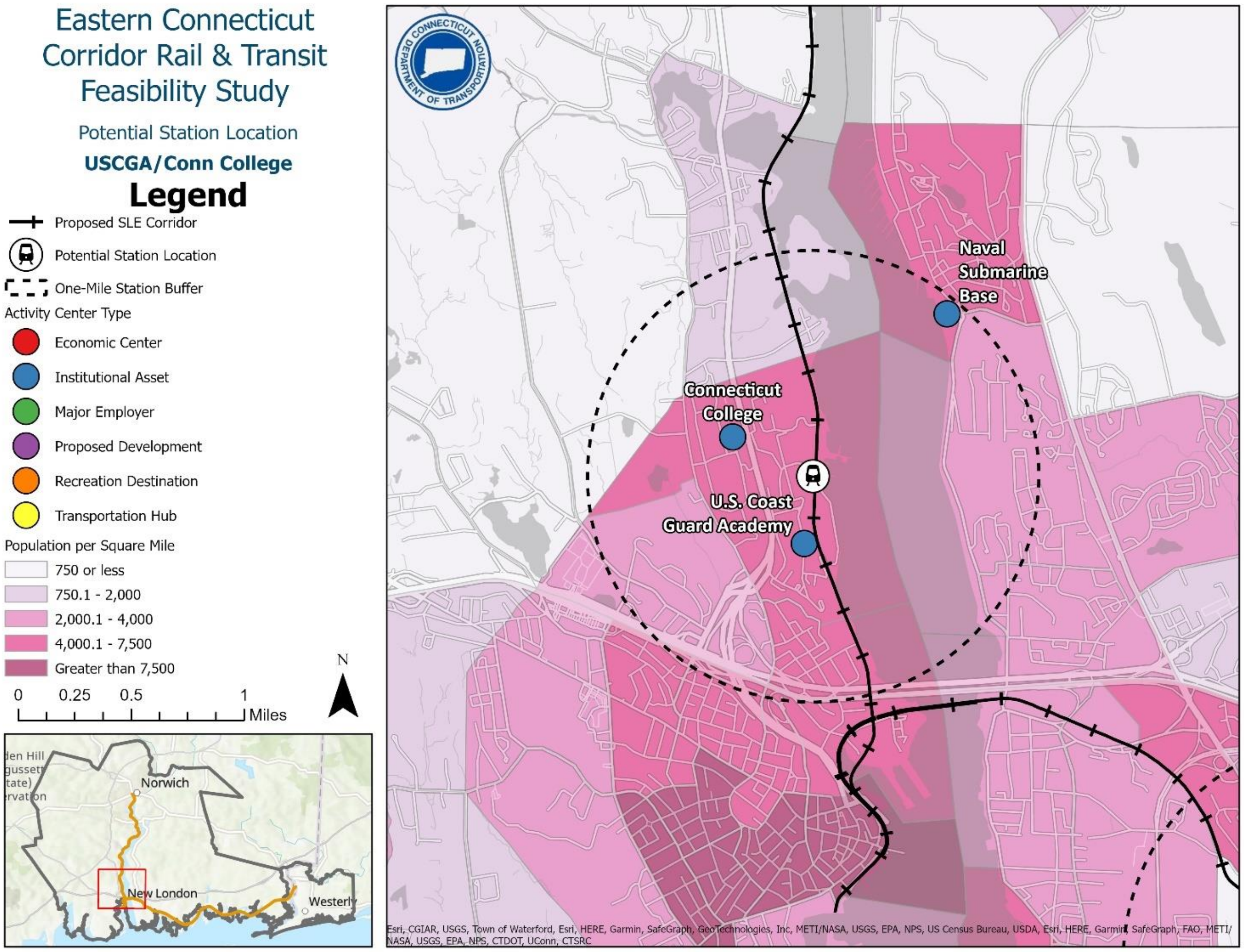


2.2.4. U.S. Coast Guard Academy/Connecticut College

Situated in the northern-most area of the City of New London, a potential station at this location could provide an alternative to the existing New London Station for residents and visitors in northern New London and Waterford, particularly the Quaker Hill community, possibly alleviating congestion and parking constraints at the existing location in downtown New London. New London and Waterford together contain approximately 22% of the region's population, and New London has the highest population density among all study area municipalities, more than five times that of the region and the state, with much of the population concentrated near the Thames River. New London also has the highest employment density in the region, over 2.5 times the density of the next closest municipality, much of which is attributable to the City's educational institutions and commercial activity in the downtown area.

A station at this location would provide direct access to both the United States Coast Guard Academy and Connecticut College campuses in the northern area of New London. It would also provide mobility options for faculty and current or prospective students who may not otherwise have a means to access the respective campuses. Similar to Mohegan Sun, continued coordination with nearby stakeholders could provide opportunities for additional complementary infrastructure improvements to enhance pedestrian access to and from the site, as well as provide opportunities for alternative access, such as a campus shuttle. Additionally, the site is nearly adjacent to the USCGA athletic fields, providing access to students and visitors during special events.

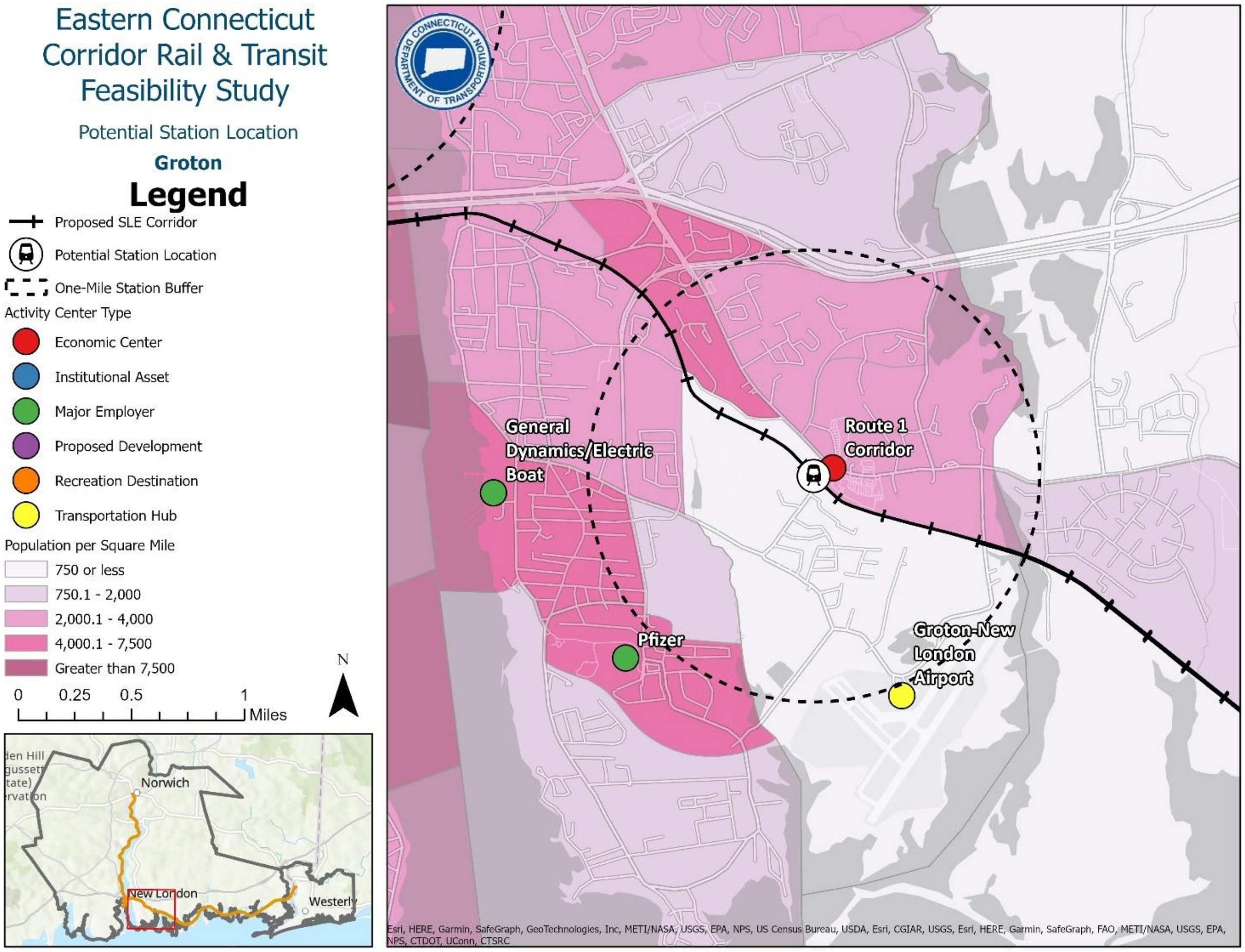
Figure 4: USCGA Station Area Density and Activity Centers



2.2.5. Groton

Similar to Norwich and New London, the Town of Groton (including the City of Groton, Groton Long Point, Noank, and other communities) is one of the major population and employment centers in the region. The potential station location, just off the Route 1 corridor, is one of the busiest areas in the region, with significant commercial and residential land-uses. Groton accounts for approximately 19% of the region's total population and is home to two of the biggest employers in the region – Electric Boat and Pfizer – as well as the Groton Naval Submarine Base. A future station at this location would expand access to not only the critical Route 1 commercial corridor, but also residential communities, major employers and other stakeholder institutions. Proposed transit improvements, discussed elsewhere in this report, could enhance connectivity between a future station and these activity centers, potentially including expanded shuttle and pedestrian access options.

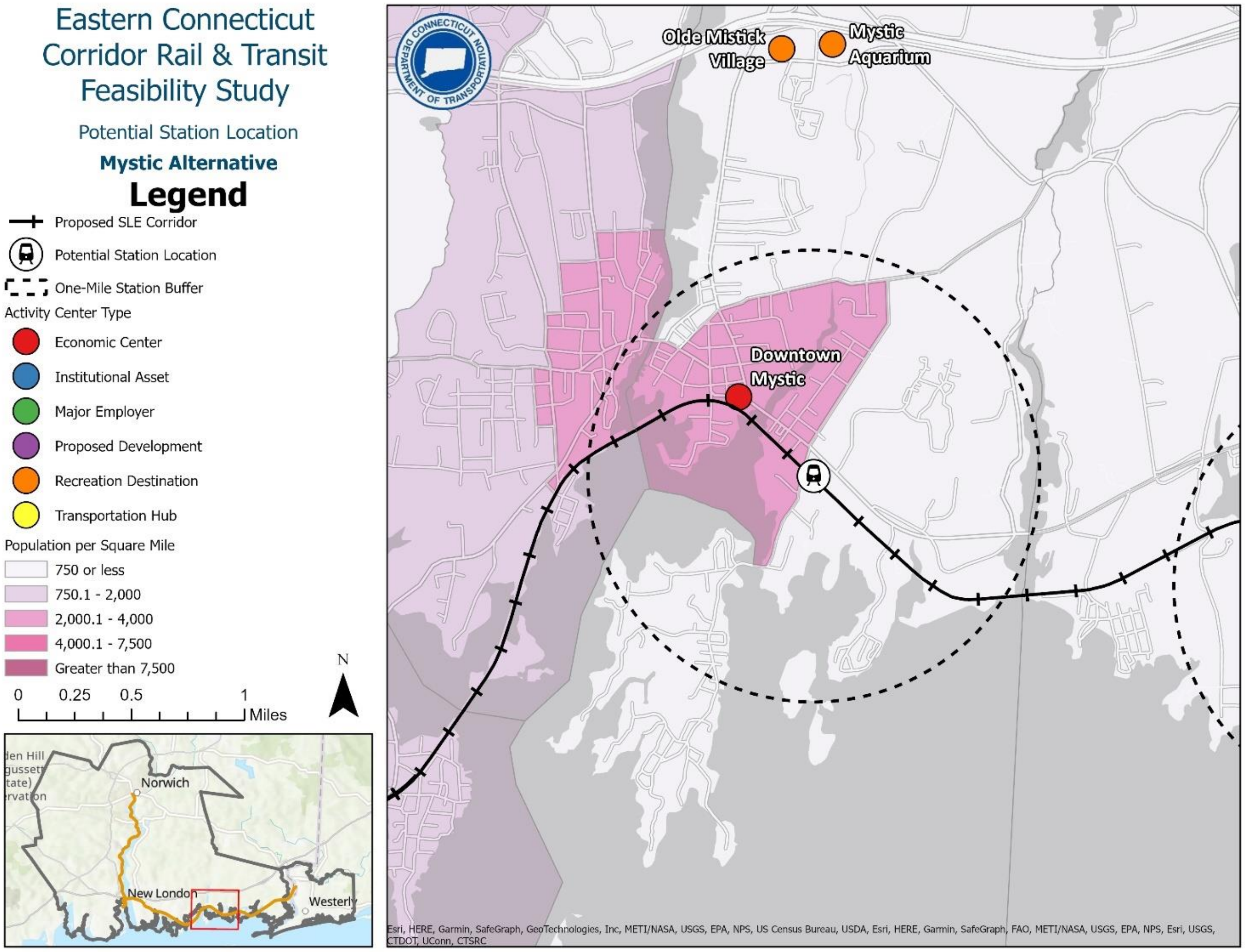
Figure 5: Groton Station Area Density and Activity Centers



2.2.6. Mystic

The potential site for relocating Mystic Station is proximal to both a population and activity center in the region, Mystic Village. While outside the half- to one-mile radius of the potential station site, one of the criteria for evaluation, several major tourist attractions, including Mystic Aquarium, Mystic Seaport Museum and Olde Mistick Village, are located approximately two miles away. The Village of Mystic extends into both the Town of Groton and Town of Stonington and is a moderately dense population center, although it also includes some of the densest residential communities in Stonington. There is moderate employment density, largely related to tourism, which is most active in the warm weather months. The potential location, though it would relocate the existing station out of the downtown area, would still be close to several marinas and parks, offering significant recreational opportunities to residents and visitors. The new location would still be close to U.S. Route 1, the area's major economic corridor, offering regional connectivity for residents of this largely residential area to employment centers in Groton, New London, Norwich, and Westerly, Rhode Island.

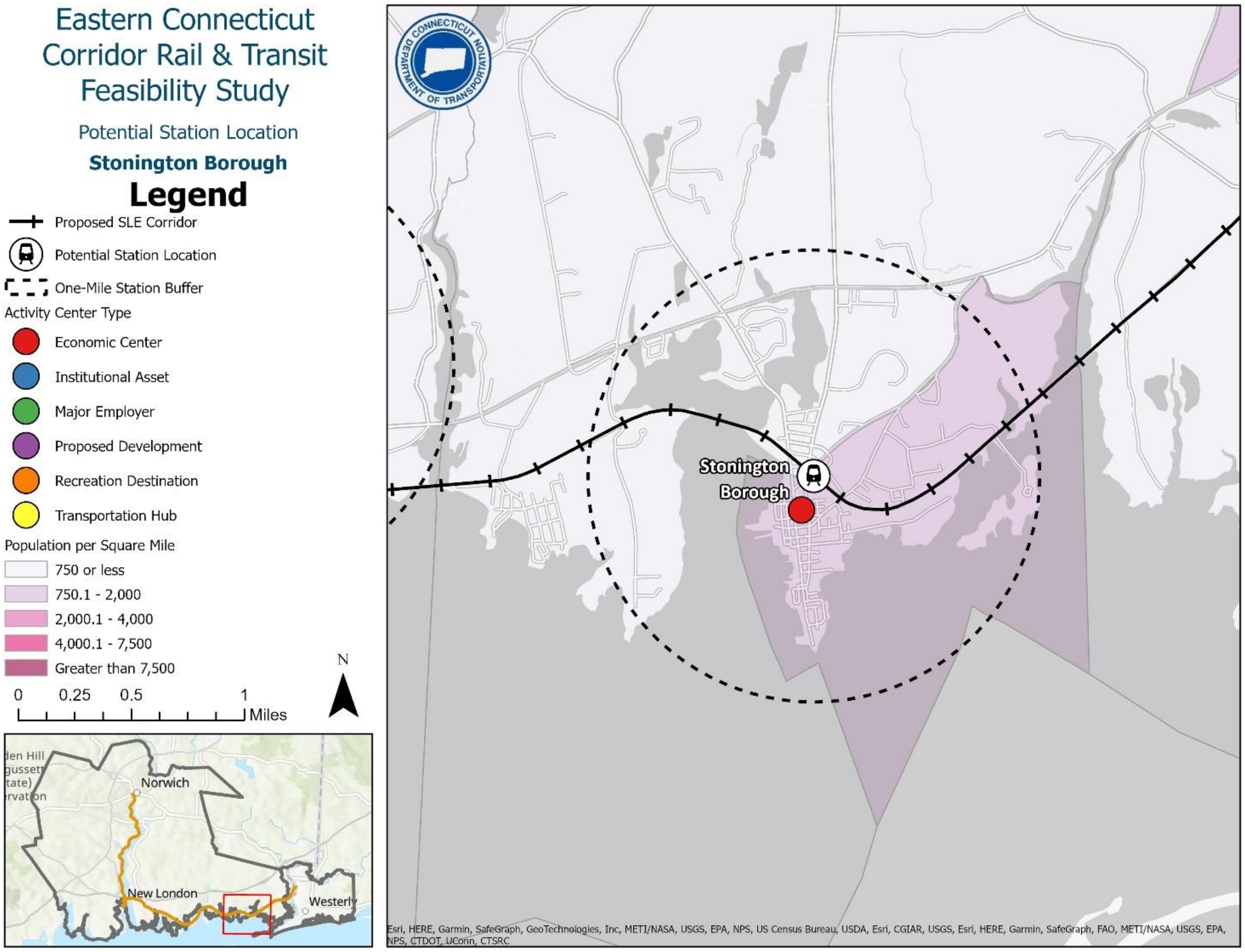
Figure 6: Mystic Alternative Station Area Density and Activity Centers



2.2.7. Stonington Borough

The Town of Stonington accounts for approximately 9% of the total study area population, and while the relative density is low compared to other communities in the study area, many of the densest communities are situated along the Route 1 corridor, proximate to the potential station location. Additionally, while not a major employment area, Stonington Borough is one of the most active areas in Stonington, and is a significant community center for the Town, offering access to recreational opportunities such as the Stonington Town Dock and Memorial, Stonington Boat Launch, Dubois Beach, and the Stonington Lighthouse Museum.

Figure 7: Stonington Borough Station Area Density and Activity Centers



2.3. Environmental Constraints

2.3.1. Overview

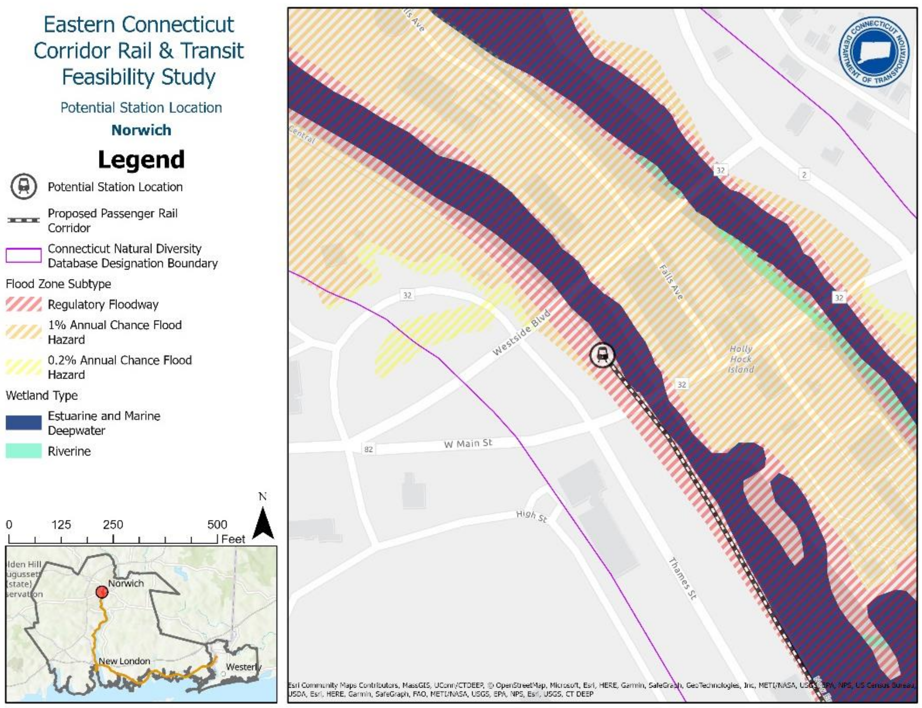
To understand any pressing environmental constraints, the project team reviewed several state and federal resources to determine any future risk or impacts associated with the implementation of a rail station at the identified locations. This included a review and expansion of previously conducted analyses. The project team conducted a natural and cultural resource screening process to assess proximate wetlands, buffer areas, areas of critical environmental concern, coastal habitats, and cultural and historic resources that would be subject to Section 106 review. Available resources were also reviewed to identify vulnerability to, and risks associated with, climate change impacts. This includes an analysis of potential flood risks from sea level rise and storm surge, extreme heat, and other impacts. The project team also conducted an analysis of proximate environmental justice (EJ) communities and equity indicators, including state designated EJ communities, distressed municipalities, and various demographic indices.[1]

[1] In the context of EJ communities, this study largely considers rail service as another option available for use, not necessarily an option used by these communities today.

2.3.2. Norwich

The natural and cultural resources screening yielded findings that may pose challenges to a station sited at this location. The site falls within the Connecticut Coastal Area, as designated by Connecticut General Statute, and as such, activities conducted within the area must be consistent with the Connecticut Coastal Management Act. Given the proximity to the Yantic River (designated under Connecticut Wetland designation as Estuarine and Marine Deepwater), a portion of the site falls under the Regulatory Floodway designation of the National Flood Hazard Layer (NFHL), with a smaller portion falling under the 1% Annual Chance of Flooding designation. The site also falls within the boundaries of the Connecticut-designated Natural Diversity Database, highlighting the potential risk for impacts to protected species. An analysis of the National Register of Historic Places did not yield a finding of any cultural resources at the station site.

Figure 8: Norwich Station Area Environmental Constraints Map



With the growing impacts of climate change, worsening storms, and expected sea level rise, an analysis of potential future risk associated with climate change was conducted. Utilizing the National Oceanic and Atmospheric Administration's (NOAA) Sea Leveling Affecting Marshes Model (SLAMM), the project team identified expected roadway flooding risk in the study area at varying year thresholds.[2] Proximate roadways to the potential station location are expected to experience low to moderate flood risks by the year 2085, with some sections anticipated to experience flooding every 90 days to every 10 years, and other roadway segments every 10 to 100 years. However, at a small roadway segment close to West Main Street, at the south end of the potential station location, flooding is expected to occur as frequently as every 30 days. Additionally, based on NOAA's Sea Level Rise Viewer, sea level rise of as little as four feet would result in adverse effects to a future station at this location. Given the expectations outlined by NOAA, some flood mitigation factors will likely be necessary at this location.

As noted in the preliminary feasibility report, a potential station location in Norwich is expected to provide public transportation benefits to vulnerable populations, including Environmental Justice communities. Since 2010, the

[2] NOAA Office for Coastal Management. SLAMM is "a mathematical model that uses digital elevation data and other information to simulate potential impacts of long-term sea level rise on wetlands and shorelines."

Connecticut Department of Economic and Community Development has issued an annual list of "Distressed Municipalities,"[3] identifying Connecticut municipalities that exhibit "high unemployment and poverty rates, low or declining job growth, an aging housing stock, low educational attainment rates, and low per capita incomes". Between 2010 and 2022, Norwich was a designated Distressed Municipality ten out of thirteen years, and in 2022 was the fourth-most Distressed Municipality in the state. Additionally, as noted in the Preliminary Feasibility Study, this location is within a designated Medium Social Vulnerability zone, and is proximate to zones of High Social Vulnerability, based on the Environmental Protection Agency's (EPA) Environmental Justice Screening Tool's (EJScreen) Demographic Vulnerability Index[4]. The tool uses a combination of demographic and environmental indicators to calculate EJ areas (Census block groups) that are vulnerable to change. While proximate to vulnerable communities as identified by the EJScreen tool, the station is not proximate to any state designated Environmental Justice communities under Connecticut State statute 22a-20a.

2.3.3. Montville (Mohegan Sun)

The natural and cultural resources screening yielded findings that may pose moderate challenges to a station at this location. The site falls within the Connecticut Coastal Area, as designated by Connecticut General Statute, and as such, activities conducted within the area must be consistent with the Connecticut Coastal Management Act. Given the proximity to the Thames River (designated under Connecticut Wetland designation as Estuarine and Marine Deepwater), a portion of the site falls under the 1% Annual Chance Flood Hazard designation of the National Flood Hazard Layer. A designated Freshwater Pond is located southwest of the existing parking structure and is not expected to pose any challenges to implementation of a potential station at this location. The site also falls within the boundaries of the state's Natural Diversity Database, highlighting the potential risk for impacts to protected species. An analysis of the National Register of Historic Places did not yield a finding of any cultural resources at the station site. Fort Shantok Indian Burial Ground, a known Native American archeological site, is located in proximity to the station area, although the Burial Ground is not expected to be directly affected by station development. However, given that the site could extend beyond the existing designated boundary and possibly impact the Burial Ground, it is anticipated that archaeological considerations would need to be addressed during the design of a future station.

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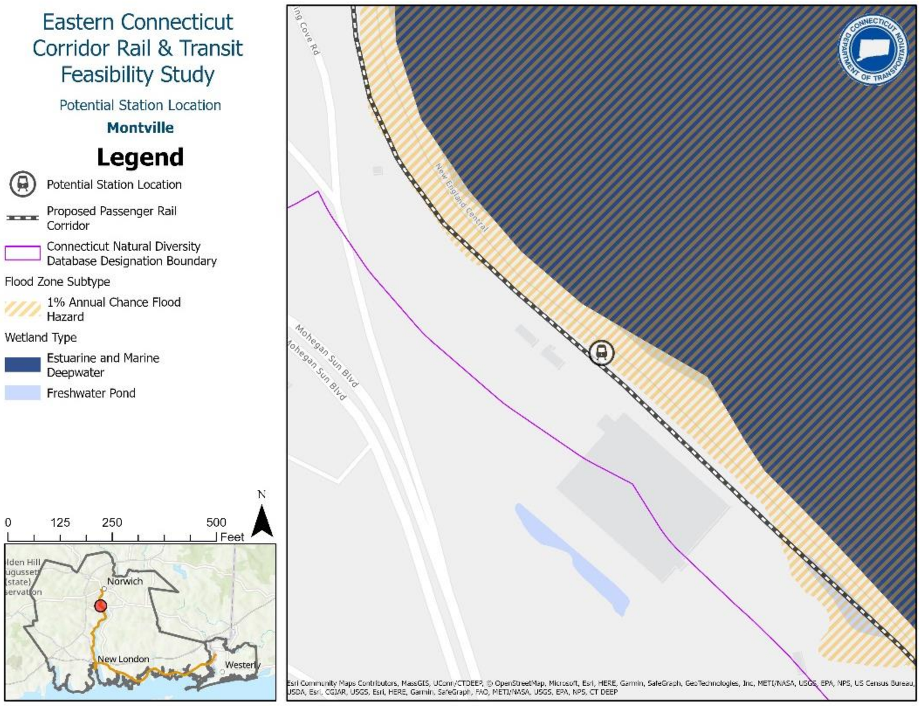
[3] Distressed Municipalities. (2021). Retrieved June 17, 2022, from CT.gov - Connecticut's Official State Website: https://portal.ct.gov/DECD/Content/About_DECD/Research-and-Publications/02_Review_Publications/Distressed-Municipalities
[4] EJScreen: Environmental Justice Screening and Mapping Tool | US EPA. (2014, September 3). Retrieved June 17, 2022, from US EPA website: https://www.epa.gov/ejscreen

Figure 9: Montville Station Area Environmental Constraints Map



With the growing impacts of climate change, worsening storms, and expected sea level rise, an analysis of potential future risk associated with climate change was conducted. Utilizing NOAA's SLAMM Model, the project team identified expected roadway flooding risk in the study area at varying year thresholds. An analysis of proximate roadways that would serve the potential station yielded minimal flood risks by the year 2085. However, the Route 2A bridge over the Thames River, offering connections between Montville and Preston, is expected to experience varying levels of flooding by the year 2085 at varying levels of severity and frequency. Additionally, based upon NOAA's Sea Level Rise Viewer, a minimum sea level rise of approximately ten feet would be required for expected adverse effects to a potential future station at this location. Given the expectations outlined by NOAA, minimal flood mitigation factors will likely be necessary for a future station at this location.

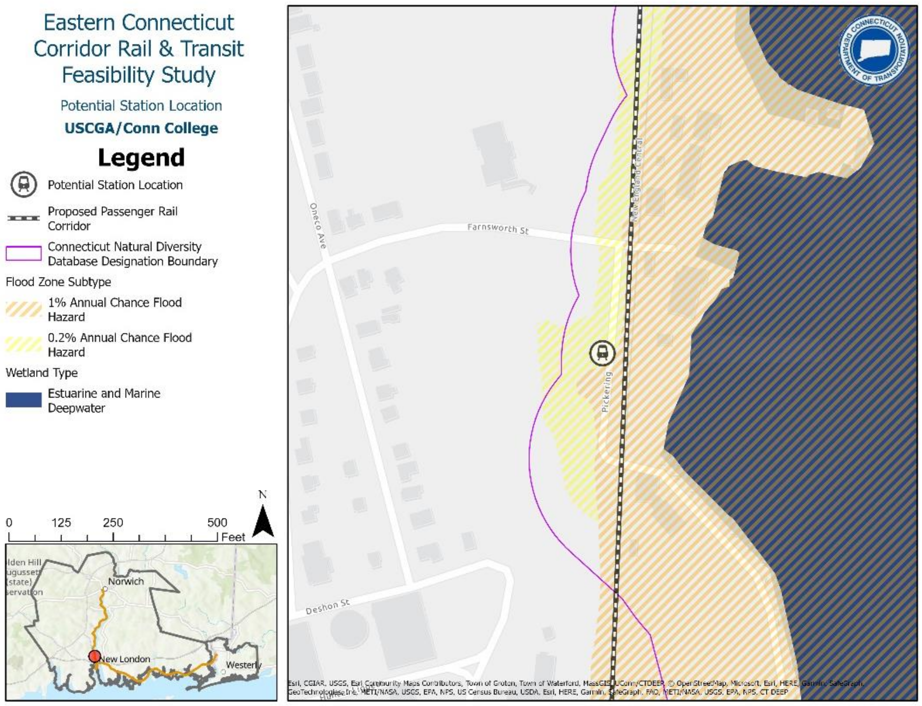
The potential station location in Montville is expected to provide rail transit benefits to vulnerable populations and EJ communities, including across the Thames River in Preston, where an EJ community is located. Other public transportation options could provide connections to EJ populations in Ledyard, offering north-south rail connections. As noted previously, the DECD has issued an annual list of "Distressed Municipalities" since 2010, as defined in the previous section. Between 2010 and 2022, Montville was a designated Distressed Municipality a total of nine times in thirteen years, and in 2022 was ranked 15th among Distressed Municipalities in the state. Based on the EPA's EJScreen Demographic Vulnerability Index, the potential station location is located within a Low Vulnerability Zone, although Census block groups directly north of the site are in the 62nd percentile, qualifying as having moderate social vulnerability.

2.3.4. U.S. Coast Guard Academy/Connecticut College

The natural and cultural resources screening yielded findings that may pose moderate challenges to a station at this location. The site falls within the Connecticut Coastal Area, and as such, activities conducted within the area must be consistent with the Connecticut Coastal Management Act. Given the proximity to the Thames River (designated under Connecticut Wetland designation as Estuarine and Marine Deepwater), a portion of the site falls under the Regulatory Floodway designation of the National Flood Hazard Layer, with a smaller portion falling under the 1% Annual Chance of Flooding designation. The site also falls within the boundaries of the state's

Natural Diversity Database, highlighting the potential risk for impacts to protected species. There are no anticipated impacts to historic structures; however, the Old Thames Shipyard, a state-designated historic location, is within a half-mile of the potential station site, and necessary safety infrastructure, e.g., gates, may impact the site.

Figure 10: USCGA Station Area Environmental Constraints Map



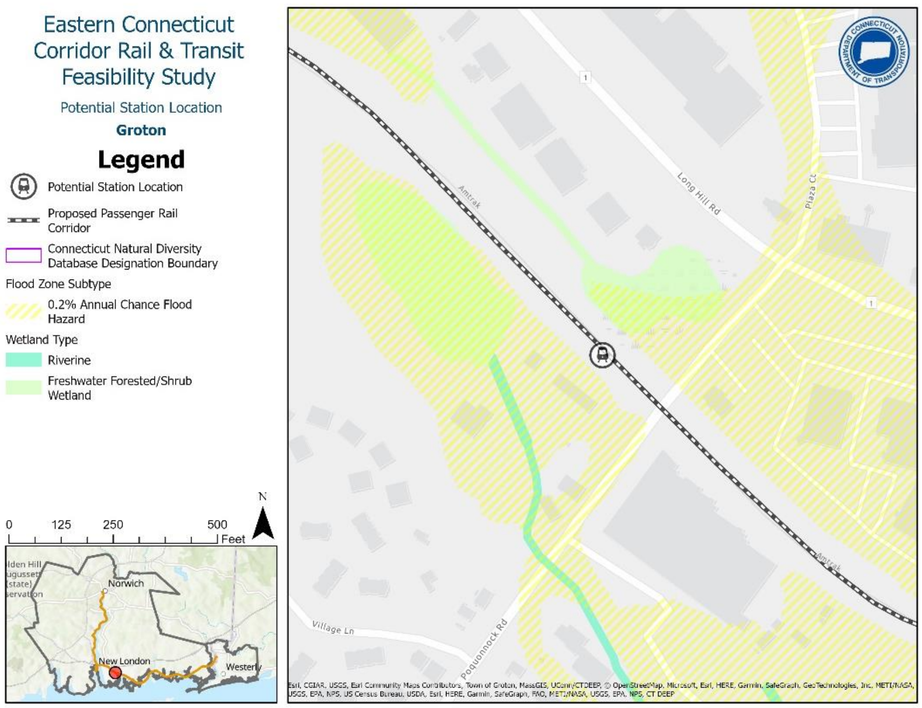
With the growing impacts of climate change, worsening storms, and expected sea level rise, an analysis of potential future risk associated with climate change was conducted. Using NOAA's SLAMM Model, the project team identified expected roadway flooding risk in the study area at varying year thresholds. An analysis of proximate roadways that would serve the potential station yielded findings that the potential station location is expected to experience low to moderate flood risks by the year 2085. The roadway segment expected to provide primary access to the potential station site, and adjacent to the railroad ROW, is expected to experience relatively low flood risk (10 – 100 years). This warrants consideration for flood mitigation measures during design of a future station due to the road's proximity to the railroad ROW. However, roadway segments further south and adjacent to the Thames River are expected to experience flooding at varying frequencies, including every 30 – 60 days, 90 days – 10 years, and even as frequently as every 30 days. These roadway segments, while not providing primary access potential station location, include segments proximate to the USCGA athletic fields, which could provide secondary access to the potential station site. Additionally, based on NOAA's Sea Level Rise Viewer, a minimum sea level rise of approximately eight feet would be required for expected adverse effects to a potential future station at this location. Given the expectations outlined by NOAA, some flood mitigation factors will likely be necessary for a future station at this location.

The potential station location at USCGA/Connecticut College in New London is expected to provide rail transit benefits to vulnerable populations and EJ communities, including several block groups in New London that rank among the highest in the region (some as high as the 98th percentile). In fact, between 2010 and 2022, New London has been a designated Distressed Municipality every year, and in 2022 was the third-most Distressed Municipality in the state, trailing only Windham and Ansonia. While these communities are proximate to the existing SLE station in New London, a new station outside of the downtown core could enhance public transportation options for those communities.

2.3.5. Groton

The natural and cultural resources screening yielded findings that indicate minimal challenges to a station sited at this location. The site falls within the Connecticut Coastal Area, and as such, activities conducted within the area must be consistent with the Connecticut Coastal Management Act. The location is proximate to Freshwater Forested/Shrub Wetland and Riverine designated wetlands, although no direct impacts to these wetland features are expected. Given the proximity to these wetlands, however, a portion of the potential station site falls within the 0.2% Annual Chance Flood Hazard designation of the NFHL. The site also falls within the boundaries of the state's Natural Diversity Database, highlighting the potential risk for impacts to protected species. An analysis of the National Register of Historic Places did not yield a finding of any cultural resources proximate to the station site.

Figure 11: Groton Station Area Environmental Constraints Map



With the growing impacts of climate change, worsening storms, and expected sea level rise, an analysis of potential future risk associated with climate change was conducted. Utilizing NOAA's SLAMM Model, the project team identified expected roadway flooding risk in the study area at varying year thresholds. An analysis of proximate roadways that would serve the potential station yielded findings that the potential station location is expected to experience no flood risks by the year 2085. However, feeder roadways to the station site including segments of U.S. Route 1, High Rock Road, and Poquonnock Road are expected to experience moderate to severe flooding by the year 2085. Additionally, based on NOAA's Sea Level Rise Viewer, there are no expected adverse effects from sea level rise based upon projections of up to ten feet. The potential impacts of climate change and sea level rise outlined by NOAA are not expected to directly affect the potential station location, and as such, no flood mitigation factors will likely be necessary for a potential future station at this location, however mitigation for proximate roadways may be required regardless of station construction.

The potential station location within the Town of Groton is expected to provide rail transit benefits to vulnerable populations. While there are no EJ populations, several block groups in Groton rank among the 60-70th percentiles, according to the EPA's EJScreen demographic index, with some as high as the 87th percentile within two miles of the potential station location. Between 2010 and 2022, Groton has been a designated Distressed

Municipality four times, including 2022, when it was ranked the 21st-most Distressed Municipality in the state, after falling from the list for a seven-year span prior to 2021.

2.3.6. Mystic

The natural and cultural resources screening yielded findings that may pose moderate challenges to a station sited at this location. The site falls within the Connecticut Coastal Area, and as such, activities conducted within the area must be consistent with the Connecticut Coastal Management Act. The station site is proximate to a Freshwater Emergent Wetland, and due to this it falls under the 0.2% Annual Chance of Flooding designation of the NFHL. Dependent upon design and placement of a future station, a smaller portion may fall under the 1% Annual Chance of Flooding designation. The site also falls within the boundaries of the state's Natural Diversity Database, highlighting the potential risk for impacts to protected species. An analysis of the National Register of Historic Places did not yield any cultural resources at the station site.

Figure 12: Mystic Station Area Environmental Constraints Map

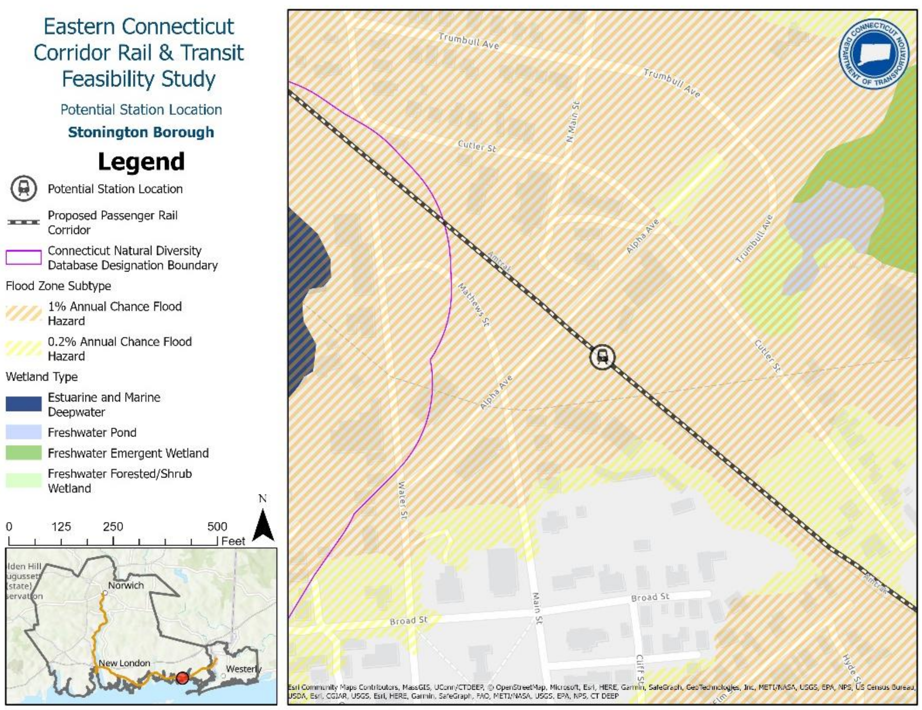
A SLAMM analysis identified expected roadway flooding risk in the study area at varying year thresholds. An analysis of proximate roadways that would serve the potential station yielded findings that the location is expected to experience severe flood risks by the year 2085. The roadway segments that are expected to provide primary access to the potential station site are expected to experience high flood risk (at least every 30 days), and most other roads in this location are expected to experience moderate to severe flooding. While flood risk is prominent in the areas surrounding the potential station location, a minimum of ten feet of sea level rise would be necessary to start seeing impacts to this location. However, given the projections for flooding and sea level rise outlined by NOAA, robust flood mitigation factors will likely be necessary for a future station at this location, particularly for roadways providing primary access to it.

The potential station location at the alternative Mystic location is expected to provide primarily indirect public transportation benefits to EJ and other vulnerable communities. An analysis determined that there are few designated EJ populations within close proximity to the potential station site; however, improved service in areas with higher EJ populations such as Norwich or New London would benefit from the improved Mystic station by improving access for vulnerable users. The primary benefit of the new location is the ability to install high level platforms to ensure ADA accessibility and equity for all riders in a largely recreational and residential hub. The improvements would benefit riders by expanding equitable access for those visiting the station, particularly those who may have not enjoyed full equitable access at the existing station due to difficult low-level platforms.

2.3.7. Stonington Borough

The natural and cultural resources screening yielded findings that may pose moderate challenges to a station sited at this location. The site falls within the Connecticut Coastal Area, and as such, activities conducted within the area must be consistent with the Connecticut Coastal Management Act. The station site is within a half mile of designated wetland areas, but no direct impacts to these wetlands are anticipated. However, due to the proximity to Stonington Harbor, this location falls within the 1% Annual Change Flood Hazard NFHL designation. An analysis of the National Register of Historic Places indicated that this site would also fall within the designated Stonington Borough Historic District, and as such, potential impacts would need to be mitigated in the event of station construction.

Figure 13: Stonington Borough Station Area Environmental Constraints Map



A SLAMM analysis performed by the project team identified expected roadway flooding risk in the study area at varying year thresholds. Roadways that would serve the potential station are expected to experience severe flood risks by the year 2085. The roadway segments that are expected to provide primary access to the potential station site, including Alpha Avenue and Cutler Street, among others, are expected to experience high flood risk (at least every 30 days), and most roadways proximate to the potential station location are expected to experience moderate to severe flood risk. Additionally, based on NOAA's Sea Level Rise Viewer, future sea level rise of as little as four feet would be enough to result in significant impacts to a future station at this location. Given the expectations outlined by NOAA, robust flood mitigation efforts will likely be necessary at this location.

The potential station location in Stonington Borough is expected to provide mostly indirect rail transit benefits to EJ and other vulnerable populations. An analysis determined that there are few designated EJ populations within close proximity to the potential station site, however, improved service in areas with higher EJ populations such as Norwich or New London would benefit from the improved station by increasing access to the Borough and its economic benefits for vulnerable users, who otherwise may not have regional access to the community due to limited fixed route transit.

2.4. Traffic Analysis and Impacts

2.4.1. Overview

This analysis also evaluated both the existing traffic conditions as well as potential impacts that could be expected with the implementation of a potential station at each location. The evaluation investigated the capacity for efficient traffic access for station pick-up and drop-off, as well as parking opportunities proximate to the station location. The study team analyzed potential access routes and roadway connectivity to the conceptual station locations and examined potential constraints associated with at-grade railroad crossings, multimodal connectivity, and potential congestion or safety impacts.

Based on the selected station locations, critical roadway segments and intersections in the vicinity of the station were reviewed. Specifically, available information such as Average Daily Traffic Volume (ADT), peak hour directional traffic volume, and 85th percentile speed was obtained from CTDOT Traffic Monitoring Count Data.

2.4.2. Norwich

Route 82 (West Main Street) / West Side Boulevard at North High Street Route 32 S.B./S.R. 646 (North Thames Street) is a four-way, signalized intersection with each approach having a posted speed limit of 25 miles per hour. Both Route 32 S.B./S.R. 646 (North Thames Street) and North High Street have a single-lane approach. Route 82 (West Main Street) eastbound approach has two lanes, a through lane, and a through/right turn lane. Route 82 westbound approach (West Side Boulevard) is comprised of a left turn lane, two through lanes, and a right turn lane. There are crosswalks at four legs of the intersection. The traffic signal provides an advance phase for the Route 82 westbound approach and an exclusive pedestrian phase. Over the course of the last three years, there were 10 accidents reported at this intersection. Three of those accidents were sideswipe collisions, while the majority, six, were rear-ends. There was also one head-on collision that resulted in a fatality at the intersection. There are currently accessible ramps and crosswalks spanning each leg of the intersection for pedestrian travel.

Route 82 (West Main Street) at S.R. 646 (N. Thames Street) and Route 32 (Thames Street) is a signalized intersection with a posted speed limit of 25 miles per hour for each approach. Route 82 (West Main Street) is a one-way street and travels in the eastbound direction. The eastbound approach to the intersection is comprised of three lanes, two through lanes, and a right turn lane. S.R. 646 (North Thames Street) has a left turn and a through lane, while Route 32 (Thames Street) has a through lane and right turn lane. There are crosswalks at each leg of the intersection. The traffic signal provides simple two-phase operation with an exclusive pedestrian phase. There have been 11 accidents at this intersection within the past three years. Of those, there were three angular and rear-end collisions each and two sideswipes. The remaining three accidents were single-vehicle collisions, two with fixed objects, and one with a pedestrian in the crosswalk. Each leg of this intersection has a pedestrian crosswalk and accessible ramps to facilitate crossing the street.

Route 32 & 2 (Washington Street) at Route 2 (Water Street) and Route 82 & 32 (West Main Street) and Church Street and Main Street #1 is a five-leg, signalized intersection with 25-mile-per-hour approaches. The Church Street leg is a one-way road heading eastbound from the intersection. Route 82 & 32 (West Main Street) has a left turn lane, a through/right turn lane, and a right turn lane in the eastbound direction. The southbound approach of Water Street is made up of a left turn/through lane and a through lane. Water Street in the northbound direction has three lanes, two through lanes, and a through/right turn lane. Main Street, the westbound approach, has a left turn/right turn and a right turn lane. There are crosswalks crossing each leg of the intersection. The traffic signal has a protected/permitted phase for Route 32 & 2 (Washington Street) and

Route 2 (Water Street), an exclusive pedestrian phase, and a separate phase for Route 82 & 32 (West Main Street) and Route 2 (Water Street). This intersection has had 81 accidents over the last three years with the majority (67) being rear-end collisions, as well as six angled and sideswipe accidents each. The remaining two accidents involved pedestrians.

Table 1: Norwich Station Area Traffic Analysis

Roadway Segment	Roadway Classification	2020 ADT	Directional Peak Hour Volumes	85th Percentile Speed (mph)
Rt 82, W. Main St	Minor Arterial	15,200	EB 570 (3 pm) WB 590 (4 pm)	46.7
West Side Blvd	Minor Arterial	9,200	WB 690 (8 am)	44.4
N. Thames St	Minor Arterial	2,350	210 (4 pm)	33.6
Rt 82, W. Main St- (between N. High St and N. Thames St)	Minor Arterial	8,000	EB 620 (3 pm)	43.1
Rt 82, W. Main St- (between N. Thames St and Washington St)	Minor Arterial	9,800	EB 740 (4 pm)	38.3
Route 32 & 2 Washington St	Principal Arterial	15,100	1,320 (4 pm)	40.5
Route 2 Water St NB	Principal Arterial	4,900	EB 370 (4 pm)	40.6

2.4.3. Montville (Mohegan Sun)

Mohegan Sun Boulevard / Route 2A Exit 6 On & Off Ramps / Private Driveway is a four-legged, signalized intersection with the north/southbound approaches having two lanes and the east/westbound approaches being four lanes. Mohegan Sun Boulevard in the eastbound direction is designated as a 40-mile-per-hour speed limit, comprised of two left turn lanes, one through lane, and a right turn lane. The Route 2A East, Exit 6 off-ramp, the westbound approach, consists of a single left turn lane, two through lanes, and a through/right turn lane with a 25-mile per hour speed limit posted. The southbound approach is a two-lane private boulevard for Mohegan Sun which includes a left turn/through lane as well as a through/right turn lane. The Route 2A West, Exit 6 off-ramp in the northbound direction is posted as a 30-mile per hour speed limit with a left turn lane and a left/through/right turn lane. There are no sidewalks or pedestrian crossings at this intersection. The traffic signal runs a quad-protected/permitted phase for Route 2A eastbound off-ramp and Mohegan Sun Boulevard, followed by split phases of Route 2A westbound off-ramp and Thames Garage Drive. Within the past three years, there were 23 accidents that occurred at this intersection. The accidents were primarily sideswipes and rear-end, nine and seven respectively, but also includes four angular crashes and three single-vehicle collisions with guide rails.

Route 32 (Norwich-New London Tpke) at New London Tpke and Trading Cove Road is a signalized, four-legged intersection. The Route 32 (Norwich-New London Tpke) eastbound approach provides an exclusive left turn lane and a through/right turn lane, while the Route 32 (W. Thames St) southbound approach has an exclusive left turn lane, a through lane, and a through/right turn lane. Both New London Turnpike and Trading Cove Road have an exclusive right-turn lane and a through/left-turn lane. There is a sidewalk along the east side of the Norwich-New London Turnpike and along the south side of Trading Cove Road. In addition, there is a crosswalk crossing the southern leg of the intersection. The traffic signal runs a quad-protected/permitted phase for Route 32, followed by an exclusive pedestrian phase, and split phases of New London Turnpike and Trading Cove Road. It should be noted that the City of Norwich is currently in the design process to add a sidewalk along the New London Turnpike through the Local Transportation Capital Improvement Program (LOTCIP) and this intersection is scheduled to be improved in 2025. Within the past three years, there were 31 accidents that occurred at this intersection. The accidents were primarily rear-ended and angled, 11 and eight respectively, but also includes nine single vehicles that hit fixed objects.

Table 2: Montville Station Area Traffic Analysis

Roadway Segment	Roadway Classification	2020 ADT	Directional Peak Hour Volumes	85th Percentile Speed (mph)
Rt 2A, Exit 6 Eastbound Off-Ramp	Freeway Ramp	3,800	290 (12 Pm)	48.9
Rt 2A, Exit 6 Westbound Off-Ramp	Freeway Ramp	1,250	100 (12 Pm)	41.9
Rt 32, Norwich-New London Tpke	Minor Arterial	8,000	NB 350 (3 pm) SB 350 (4 pm)	44.0
Rt 32, W. Thames St	Minor Arterial	10,200	NB 380 (8 am) SB 420 (4 pm)	47.3
New London Tpke	Minor Arterial	3,600	NB 160 (3 pm) SB 150 (2 pm)	43.4

2.4.4. U.S. Coast Guard Academy/Connecticut College

Route 32 (Mohegan Avenue Parkway) at Deshon Street is a three-legged, signalized intersection. Route 32 (Mohegan Avenue Parkway) southbound has two through lanes and a left-turn lane while the northbound is comprised of a through lane and a through/right-turn lane. The posted speed limit for Route 32 is 45 miles per hour. Deshon Street intersects Route 32 from the east and has a single-lane approach with a posted speed limit of 25 miles per hour. There is a pedestrian crosswalk across the southern leg of the intersection. The traffic signal provides an advance phase for the Route 32 southbound approach and an exclusive pedestrian phase.

There have been 12 accidents at this intersection within the past three years. Of those, there were two angular and a single sideswipe. There were also five rear-end accidents as well as a head-on collision. The remaining three accidents involved single-vehicle collisions, each with various fixed objects (utility pole/concrete barrier).

Table 3: USCGA/Conn. College Station Area Traffic Analysis

Roadway Segment	Roadway Classification	2020 ADT	Directional Peak Hour Volumes	85th Percentile Speed (mph)
Rt. 32 (Mohegan Avenue Parkway)	Principal Arterial	15,200	NB 750 (4 pm) SB 1,080 (6am)	60.2

2.4.5. Groton

Plaza Court / Poquonnock Road at Route 1 (Long Hill Road / Poquonnock Road) is a four-way signalized intersection. Both the eastbound and westbound approach of Route 1 has 3 lanes, a left turn lane, a through lane, and a through/right turn lane with a posted speed limit of 30 miles per hour. The northbound approach of Poquonnock Road has a posted speed of 30 miles per hour and consists of a left turn lane as well as a through/right turn lane. The southbound approach, Plaza Court, has a left turn lane and a through/right turn lane with no speed limit posted. Each approach, except for the eastbound leg, has a pedestrian crosswalk with accessible ramps. The traffic signal runs a dual quad-protected/permitted phase with an exclusive pedestrian phase.

There have been 17 reported accidents that occurred at this intersection over the last 3 years. Of those accidents, 1 was a sideswipe, there were 5 rear-ends, and the majority (11) were angular collisions primarily due to turning vehicles.

Table 4: Groton Station Area Traffic Analysis

Roadway Segment	Roadway Classification	2020 ADT	Directional Peak Hour Volumes	85th Percentile Speed (mph)
Rt 1 (Poquonnock Rd)	Minor Arterial	14,000	NB 540 (12 pm) SB 590 (4 pm)	38.3
Rt 1 (Long Hill Rd)	Minor Arterial	14,900	NB 600 (12 pm) SB 640 (4 pm)	31.8
Poquonnock Rd	Major Collector	6,900	NB 320 (2 pm) SB 290 (2 pm)	43.2

2.4.6. Mystic

Route 1 (Williams Avenue / Stonington-Westerly Road) at Masons Island Road / Hewitt Road is a four-way, signalized intersection. Route 1 (Williams Avenue/Stonington-Westerly Road) has a 35-mile-per-hour speed limit and includes a crosswalk for the eastbound approach of Route 1. Masons Island Road and Hewitt Road each have a 25-mile-per-hour speed limit leading up to the intersection. The traffic signal provides Route 1 eastbound advance left turn phasing and is in a closed loop system. Over the last 3 years, there were 4 accidents that occurred at this intersection. Of those accidents, one was an angled collision caused by a left-turn maneuver, while the other 3 were rear-ended.

Table 5: Mystic Station Area Traffic Analysis

Roadway Segment	Roadway Classification	2020 ADT	Directional Peak Hour Volumes	85th Percentile Speed (mph)
Rt 1 (Stonington-Westerly Rd)	Minor Arterial	8,000	NB 429 (12 pm) SB 380 (4 pm)	44.9

2.4.7. Stonington Borough

Trumbull Avenue at Alpha Avenue is a four-way, stop-controlled intersection. Each approach is a single lane with a 25-mile-per-hour speed limit. There is a crosswalk spanning the southwest approach of Alpha Avenue. There was one single accident at this intersection over the last 3 years. The accident was an angled collision between 2 vehicles.

Table 6: Stonington Borough Station Area Traffic Analysis

Roadway Segment	Roadway Classification	2020 ADT	Directional Peak Hour Volumes	85th Percentile Speed (mph)
Rt 1A (Trumbull Ave.)	Major Collector	3,500	EB 140 (4 pm) WB 160 (12 pm)	23.21
Alpha avenue	Major Collector	815	NB 200 (2 pm) SB 220 (4 pm)	30.8

2.4.8. Methodology and Conclusions

The analyses used in the report were based on the level of service (LOS) methodology described in the Highway Capacity Manual (HCM), published by the Transportation Research Board.

The operational performance of highways and intersections is evaluated in terms of the quality of service, which describes how well a transportation facility operates from the traveler's perspective. Quality of Service is usually measured with "Level of Service" (LOS), a letter grade like those used in school. "A" means the best operation condition and "F" the worst. A summary of LOS measures for different roadway facilities pertinent to this study is provided below.

Roadway Segments

According to the HCM, the LOS roadway segment is based on the density of vehicles, expressed in passenger cars per mile per lane. The LOS can also be evaluated with volume-to-capacity (V/C) ratios, average travel speeds, and maximum service flow rates. For this study, a simplified calculation method based on V/C was selected. To be conservative, the capacity was estimated based on the saturated flow rate of 1,900 vehicles per lane and the assumption that all studied roadways would receive only 50 percent of the green time. The reduction in capacity due to intersecting streets has been accounted for in this method. Volumes on each roadway segment in each direction are divided by the capacity, estimated to be 950 vehicles per hour per lane. The V/C for the roadway is correlated to LOS based on the information in Table 7 below. Table 8 presents a summary of the existing Level of Services for the studied roadway segment in the vicinity of the selected stations.

Table 7: Level of Service Criteria for Roadway Segments

LOS	Roadway Segments	Volume-to-Capacity ratio (V/C)
A	Free-flow conditions with unimpeded maneuverability. Stopped delay at signalized intersections is minimal.	0.00 to 0.60
B	Reasonably unimpeded operations with slightly restricted maneuverability. Stopped delays are not bothersome.	0.61 to 0.70
C	Stable operations with somewhat more restrictions in making mid-block lane changes than LOS B. Motorists will experience appreciable tension while driving.	0.71 to 0.80
D	Approaching unstable operations where small increases in volume produce substantial increases in delay and decrease in speed.	0.81 to 0.90
E	Operations with significant intersection approach delays and low average speeds.	0.91 to 1.00
F	Operations with extremely low speeds caused by intersection congestion, high delay, and adverse signal progression.	>1.00

Table 8: Existing Level of Service for the Studied Roadway Segments

Roadway Segment	Roadway Classification	Number of Lanes	Volume-to Capacity Ratios	LOS
Norwich Station				
Rt 82, W. Main St	Minor Arterial	2	0.61	B
West Side Blvd	Minor Arterial	2	0.36	A
N. Thames St	Minor Arterial	2	0.11	A
Rt 82, W. Main St- (between N. High St and N. Thames St)	Minor Arterial	2	0.33	A

Roadway Segment	Roadway Classification	Number of Lanes	Volume-to Capacity Ratios	LOS
Rt 82, W. Main St- (between N. Thames St and Washington St)	Minor Arterial	3	0.26	A
Route 32 & 2 Washington St	Principal Arterial	5	0.28	A
Route 2 Water St NB	Principal Arterial	2	0.19	A
Montville Station				
Rt 2A, Exit 6 Eastbound Off-Ramp	Freeway Ramp	2	0.15	A
Rt 2A, Exit 6 Westbound Off-Ramp	Freeway Ramp	1	0.11	A
Rt 32, Norwich-New London Tpke	Minor Arterial	3	0.37	A
Rt 32, W. Thames St	Minor Arterial	5	0.42	A
New London Tpke	Minor Arterial	2	0.16	A
Groton Station				
Rt 1 (Poquonnock Rd)	Minor Arterial	4	0.3	A
Rt 1 (Long Hill Rd)	Minor Arterial	4	0.33	A
Poquonnock Rd	Major Collector	2	0.32	A
Rt 1 (Stonington-Westerly Rd)	Minor Arterial	2	0.15	A
Mystic Station				
Rt 1 (Stonington-Westerly Rd)	Minor Arterial	2	0.43	A
Stonington Station				
Rt 1A (Trumbull Ave.)	Major Collector	2	0.16	A
Alpha Avenue	Major Collector	2	0.22	A

Intersections

According to the HCM, the LOS for intersections is defined in terms of control delay. Unsignalized intersections are generally evaluated in terms of average side street delay, as well as the capacity of the roadway approach. Signalized intersections are analyzed in terms of vehicle capacity and motorist delay. Control delay measures the increase in delay a motorist experiences while encountering a traffic control signal. These factors include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Table 9 below shows the relationship between levels of Service and average delay for the intersection.

Table 9: Level of Service Criteria for Intersections

LOS	Unsignalized Intersection	Signalized Intersection
A	Queue is rare **Intersection Control Delay: < 10s/Veh**	Very minimal queuing; excellent corridor progression and/or short cycle length **Intersection Control Delay: < 10s/Veh**
B	Occasional queuing **Intersection Control Delay: < 10-15s/Veh**	Some queuing; good corridor progression and/or short cycle length **Intersection Control Delay: 10-20s/Veh**
C	Regular queuing **Intersection Control Delay: < 15-25s/Veh**	Regular queuing; not all demand may be serviced on some cycles **Intersection Control Delay: 20-35s/Veh**
D	Queue lengths increased **Intersection Control Delay: < 25-35s/Veh**	Queue lengths increased; routine cycle failures. **Intersection Control Delay: 35-55s/Veh**
E	Significant queuing **Intersection Control Delay: < 35-50s/Veh**	Long queues, congested conditions; majority of cycles fail **Intersection Control Delay: 55-80s/Veh**
F	Volume to capacity ratio approaches 1.0; very long queues **Intersection Control Delay: > 50s/Veh**	Volume to capacity ratio approaches 1.0; very long queues; almost all cycles fail **Intersection Control Delay: >80s/Veh**

Please note that intersection levels of service were not performed at this time. A proper traffic study that includes peak hour turning movement counts at the studied intersections, a traffic model using Synchro or other approved software, and a detailed traffic forecast model for the stations would be required to perform the task.

Conclusion

This preliminary review investigates the existing conditions on the adjacent roadway network. Based on the available information, there is reserved capacity available for the adjacent roadway system. It is recommended that a traffic study be conducted later when the project moves forward for a more detailed analysis of future traffic increases. Given the magnitude of accident occurrence at some locations, a safety assessment is also recommended.

2.5. Pedestrian and Bicycle Access and Connectivity

2.5.1. Overview

Purpose

The Pedestrian & Bicycle Connectivity Evaluation's purpose was to identify conditions within the existing roadway and sidewalk networks that affect bicycle and pedestrian modes of transportation. The focus was primarily within the context areas described below.

Context Areas

This evaluation focused on the existing street networks as it pertains to current bicycle and pedestrian amenities that may support access to the six proposed station locations. There were two primary focuses of review, based on distances considered efficient for cycling or walking. It should be noted the radial distance is not based on the path of travel, which could be greater than the distance parameters set forth:

Bicycle: One-mile radius: This distance is measured horizontally from the station location to an outer limit of 1-mile. The primary purpose of this selected distance was to focus upon a distance that is known to readily capture cyclists willing to access a station location and reviewed existing roads and, if present, existing bike, or multi-use paths.

Pedestrian: Half-mile radius: This selected distance is generally accepted as a comfortable walking distance to and from a destination. The focus of the evaluation within this distance includes bicycle access but included a review of pedestrian amenities (sidewalks, crosswalk, pedestrian phase signals and Americans with Disabilities Act (ADA) accessibility/routes) leading to the station location.

Evaluation Considerations

It should be noted that it is not feasible to review each individual street, especially within communities with dense roadway and walkway patterns. To that end, the review included a “drive-thru” to ascertain the general conditions and common theme. The focus was primarily on major routes and those streets from dense areas of population and employment connecting to the station locations.

To that end, this evaluation considered the following aspects influencing “bikability” and “walkability”’. These include but are not limited to the following:

- Street and shoulder width,
- Number of lanes of traffic (including at intersections),
- Street access to population density,
- Major employers/destinations,
- Observed traffic speeds,
- Observed traffic volumes,
- Land topography– ease/comfort of mobility,
- ADA accessibility (i.e., topography, curb ramps),
- Sidewalk conditions,
- Presence and continuity of sidewalks,
- Width of intersection impacting crossing, and
- Pedestrian phases at signalized intersection.

Existing Documentation Reviews

Complementing field investigations was the review of published data, reports, local regulations, and planning documents, including:

- *Connecticut Crash Data Repository*; https://www.ctcrash.uconn.edu/
  Provided reported vehicular, bike and pedestrian incidents within the study area of each station location inclusive of the past 3 years.
- *Southeast CT Regional Bike and Pedestrian Plan*; https://bikewalksect.com/
  Utilized to understand prior findings from analysis, public outreach, and associate future opportunities within the study area.
- *Route 32 Corridor Study*, New London CT; https://www.route32study.com/
  Considered recommendations of the Route 32 corridor that may improve bike and pedestrian connectivity within the Study Area.
- Zoning Regulations from the municipalities the stations are situated.

ADA Accessibility and Bicycle Parking/Storage

Accessibility of street networks was considered; however, an exhaustive inventory is beyond the scope of this effort. Generally, each half-mile Context Area varied because of differing topographic challenges and overall maintenance. A more exhaustive inventory may be appropriate for areas that can reasonably accommodate accessible routes to and from various destinations. Unless otherwise noted within each station's discussion in the following pages, the conditions of accessibility vary.

Bike parking facilities primarily focused upon a review of the Zoning Regulations and, if included, a summary has been provided. With new stations, all towns may benefit from regulatory controls for uses within the Context Area to require enhanced and indoor bike parking/storage. Offering lockers and shower facilities for comfort may also encourage the use of alternative transportation modes. Linking access to these amenities to train fare media may reduce the risk that these facilities are misappropriately used by non-passengers.

Community: Sense of Place

A rail station has the potential to be an important part of community structure and identity. Discussion with local stakeholders and a review of current conditions indicates that each station location lacks an identity and should be considered within the context of its overall neighborhood. To reinforce this potential, and successfully link it to nearby residential and commercial uses, and employment centers, it is essential to integrate the new stations into the fabric of the community, creating a focal point and sense of place through surrounding land use and development. While this may be a challenge because of the remote locations of the Montville and New London stations, creating strong streetscapes immediately adjacent to each station should be further studied. Placemaking elements will enhance, strengthen, and promote walking and cycling to and from the stations.

Regional Initiatives

Based on a conversation with the Southeastern Connecticut Council of Governments (SECCOG), various projects are proposed for funding along differing timelines. These include, but are not limited to, improvements along Route 32 in Montville, Route 32 in New London, and a multimodal path to be incorporated into the Pequot Bridge reconstruction. It is our understanding that no single comprehensive document is available that lists each project, timeline, and funding amount. A summary of these proposed improvements may be appropriate as a complement to the existing conditions review included herein, as well as further next steps.

2.5.2. Norwich

Existing Conditions: Access Network

The access network within the Context Areas has the highest density of residential and employment populations of the six stations reviewed. It is characterized by three land use patterns that correlate with varying bike/ped opportunities within a diverse and dense network of streets:

- Northwest and northeast of the station is the historic Norwich Downtown and residential hillside neighborhoods. This area contains patterns of 3-5 story historic buildings, with moderate to steeply sloping roadways. Local streets are primarily narrow with wide multi-lane streets at the intersection of Route 82 and Route 2 and corridors approaching the station location.
- South of the station, along Route 32 is primarily a two-lane, residential road with limited commercial uses. Most residential is situated on local hillside neighborhood streets (i.e., Mechanic Street) and feed into Route 32. Shoulder widths and conditions vary from wide, narrow, and steeply sloping to vertical landscape.

- West of the station is the dense, commercial Route 82 corridor from which residential neighborhoods connect. This stretch of highway consists of a wide ROW and high traffic volumes.

Within the Context Area, bike amenities are limited to a multi-use path along the Yantic River east of the station location. No other amenities were observed such as designated bike lanes, sharrows, or share-the-road signage within the Context Area. The network of sidewalks throughout are in fair to good condition and most residential and commercial locations include sidewalk networks. Most major roadways are wide and lane reduction appears possible to incorporate bike amenities and/or to widen sidewalks for a more comfortable pedestrian experience, particularly in the immediate vicinity of the proposed station location.

The close proximity between the proposed rail station and existing intermodal station offers a unique opportunity to strengthen and provide multimodal transportation options for the region. To make this a success, the streetscapes connecting the two stations, Downtown and Route 82 Corridor should be enhanced, visually and physically, to promote the use of alternative means of transportation. CTDOT is currently engaging in an effort to redesign the Route 82 Corridor towards this aim, with proposed roadway work anticipated to begin in 2025 based on the availability of funding, permit approval, and ROW securement.[5]

Planning Documents

Norwich is in the process of updating its Plan of Conservation and Development. A draft has not been reviewed. Considering the Plan's purpose, reference to this rail study may benefit the implementation of various improvements. This includes roadway and other public infrastructure investments that will address and strengthen bicycle and pedestrian amenities throughout the Context Area.

The *SCCOG - Norwich Bike and Pedestrian Improvements Toolkit includes the following:*

- Bike-Oriented Recommendations:
  - Incorporate a bicycle boulevard connecting N Main St to Franklin Ave.,
  - Add bike lanes Dunham St along Rt 82 to Rt 32,
  - Talman St.: Explore two-way advisory bike lanes or bicycle boulevard (half of Talman is one-way),
  - Route 12 from Water St (Rt 2) to Town of Preston town line: Widen roadway for bike-safe shoulders and at intersections with turn lanes to provide a continuous shoulder,
  - Within Downtown streets, provide bike lanes, sharrows and "Bikes May Use Full Lane" signs where feasible, and
  - Add both short-term and long-term bicycle parking at the existing transportation center, with additional short term bicycle parking in the downtown business district.
- Pedestrian-Oriented Recommendations:
  - Implement safety improvements on Rt 82 from Old Salem Plaza to Fairmont St. including improved sidewalks, crossings, lighting, and landscaping.
  - Greenville district: Repair, replace or construct sidewalks and/or accessory improvements where needed as indicated by the Plan's ADA mapping.

Crash Data Review: 2015 – 2022 (Within 1 mile)

There were 60 recorded pedestrian collisions within one mile of the proposed station location. Pedestrian-involved crashes were concentrated in the vicinity of the five-way intersection of Route 2, 32, Main, and Church Street as well as the intersection with Route 2, 12, and Main Street to the east. One fatality occurred during the time period at the five-way intersection and within 1,000 feet from the proposed rail station location. Anecdotally, the steep road topography and six-lane crosswalks without pedestrian refuge may contribute to this data. Seventeen (17) crashes involved bicyclists, and 12 of the 17 recorded crashes were intersection related.

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[5] https://portal.ct.gov/DOT/CTDOT-Press-Releases/2022/Public-Information-Meeting-Route-82-Norwich

Bicycle Parking/Storage

Norwich has incorporated requirements for bicycle parking within their Zoning Regulations. This includes requiring off-street bicycle parking for:

- new construction,
- changes of use,
- substantial improvements or new multi-family developments of four dwelling units or more
- new retail,
- office and institutional developments greater than 5,000 square feet, and
- all transit transfer stations and park-and-ride lots.

The regulations provide design criteria for bicycle parking and require it at the main building entrance. The regulations do not specify the number of short-term spaces required. Long-term or covered bicycle parking spaces are only required where vehicular parking is covered or partly covered. In that scenario, the bicycle parking shall be covered at the same ratio as the vehicular parking spaces.

Although there are currently limited options for bicycle parking, the number of available bicycle parking spaces will increase with the growth of the area. Since there is no calculation for the number of parking spaces at each new development, only a single bicycle rack seems to be required unless a request is made for additional bike parking.

2.5.3. Montville (Mohegan Sun)

Existing Conditions: Access Network

Located on the Mohegan Tribal Reservation (Mohegan Sun Casino), access is via an existing roadway network designed solely for efficiently moving vehicles into, out of, and around the Mohegan Sun facility. The property is accessed via Route 32 to the west and Route 2A from the South. Route 32 is primarily a two-lane commercial corridor in the vicinity of the reservation with two signalized intersections consisting of multiple thru and turn lanes. Route 2A is a limited access highway and serves as access to the site from Route 12 in Ledyard via the Pequot Bridge and I-395, also a non-access highway. No roadway networks exist directly from the residential neighborhoods to the south.

Internal to Tribal lands is a multi-lane ’freeway” with turn lanes and on/off ramps exists immediately west of the Casino building and a narrow drive along the east side. Both offer primarily one-way loop circulation; no sidewalks, crosswalks or bike facilities are provided. Limited sidewalks are provided from Route 32 but terminate within 1,000 feet of entering the Reservation. Access from the south is restricted due to topography and non-access lines along Route 2A.

The following provides a summary of bicycle and pedestrian amenities within the Context Areas.

- Route 32 - There are no bicycle amenities on Route 32. In the vicinity of the western entrance, the roadway is steep and presents a challenge to the average cyclist and may be appropriate for a veteran rider.
- Route 2A/Pequot Bridge - This is a non-access highway; therefore, bicyclists are not permitted. No bicycle amenities from Route 12 to local streets in Montville exist.
- Route 12 - No bicycle amenities exist. The roadway primarily has a wide ROW and wide vehicular traffic lanes. and a bike lane may be accommodated, and multi-use path may be possible in select stretches.
- New London Turnpike - Serving points west and north, this is a two-lane roadway with narrow segments, lanes, and ROW. High traffic volumes and observed travel speeds are prevalent.

Planning Documents

The 2021 *Montville Plan of Conservation and Development* references and recommends strategies to address bicycle and pedestrian amenities. The POCD references the 2016 CTDOT road safety audit along Route 32. It found that the entire Route 32 corridor pedestrian accommodations, which include accessible ramps, signal timing, pedestrian signals, signing etc., did not meet the latest CTDOT safety requirements. The CTDOT recommended that:

- The town and DOT jointly work to provide additional crosswalks, pedestrian signals, accessible ramps, and detectable warning strips to the Fitch Hill Road/Trading Cove intersection.
- Town to install crosswalks and ADA compliant landings on the north, south, and west sides of crosswalks of the Fitch Hill Road and Holly Hill Road intersection and to consider the option of a raised crosswalk to slow down vehicles.
- Town to require developers along Route 32 to include pedestrian accommodations including sidewalks, crosswalks, accessible ramps, etc., as they purchase and develop properties that are currently residential properties.

The above recommendations should be incorporated within the Context Areas to support the necessary amenities.

The SECCOG - Montville Bike and Pedestrian Improvements Toolkit outlines recommendations that influence enhancing accommodations within the Context Areas:

- Bike-Oriented Recommendations:
  - Create a signed north/south bike route on Massapeag Side Rd./Fort Shantok Rd. (Rt 433).
  - Provide a shared use path on proposed second span of Mohegan-Pequot Bridge (Rt 2A) and pathway bridge access from adjacent roads to the north (Mohegan Sun) and south.
- Pedestrian-Oriented Recommendations:
  - Uncasville district: Repair, replace or construct sidewalks and/or accessory improvements where needed as indicated by the regional Plan's ADA Mapping.
  - Route 32 north of Route 2A district: Repair, replace or construct sidewalks and/or accessory improvements where needed as indicated by the Plan's ADA Mapping.

Crash Data Review: 2015 – 2022 (Within 1 mile)

There were five (5) recorded pedestrian incidents within one mile of the proposed station location. These incidents were concentrated around the intersection of Route 32 and New London Tpke – a main access point to the Reservation leading to the rail station - and Norwich New London Tpke. and Leo Road.

Bicycle Parking/Storage

No bicycle parking requirements are included within the current zoning regulations dated May 2023.

2.5.4. U.S. Coast Guard Academy/Connecticut College

Existing Conditions: Access Network

The proposed station is accessed solely via Deshon Street to Nameaug Avenue, adjacent to the U.S. Coast Guard Academy and within one-quarter mile of Connecticut College's campus. Access is a local neighborhood street providing access to the north portions of the US Coast Guard Academy and nearby residential uses. A daycare center and Connecticut College Early Childhood Center are also along this access route. No bike or pedestrian amenities are provided, and the roadway network is steeply sloping from Route 32 to the west.

The topographic conditions are a major hurdle with respect to both comfort of walking, biking, and ADA accessibility - the latter not possible to overcome other than shuttle/transit options. A second significant challenge with accessing the station is the divide created by Route 32, a major four-lane highway. While signalized intersections exist to allow for pedestrian phase crossings, the comfort of walking or biking this corridor is challenging or non-existent because of a lack of walkways and the high speed of vehicular traffic. For pedestrians and cyclists other than Connecticut College staff, students and visitors, the College campus and Route 32 create a barrier to comfortable and efficient access between the potential station site and residential neighborhoods west of Conn. College.

In summary, no convenient and comfortable bike and pedestrian facilities are offered. Without substantial infrastructure investment such as those being reviewed by the Route 32 Corridor Study and Williams Street streetscape, safe and efficient routes for cyclists and pedestrian will not exist.

Planning Documents

The SECCOG - New London Bike and Pedestrian Improvements Toolkit outlines recommendations that influence enhancing accommodations with the Context Areas:

- Bike-Oriented Recommendations
    - Add bike lanes or protected bidirectional bike lane at Huntington Street (Rt 641) from Williams Street to Federal Street.
    - Add protected bike lanes at Williams Street (Rt 635 partial) from Broad St. to Waterford border.
    - Add both short-term and long-term bicycle parking at the existing train station, with additional short-term bicycle parking in the surrounding business district (not within Context Area but notable to mention).
    - Provide “Eastern Shoreline Path Bikeway” (ESP) and wayfinding signs at appropriate intervals.
    - Proved kiosk/wayfinding points at beginning of Gold Star Bridge Bike/Pedestrian Path. The existing bridge path has sub-standard width with hazardous conditions for pedestrians and bicyclists, especially at sign foundation choke points. This path is commonly used by motorized scooters causing safety concerns.
    - Recommended is to construct a new protected Shared Use Path on Gold Star Bridge northbound as part of a bridge renovation project. This would connect to Huntington Street bike lanes and sidewalks.
    - Connect Eastern Shoreline Path route from either Williams Street or Huntington Street (depending on Gold Star Bridge Path outcome).
    - Create Bicycle Boulevard on Highland Avenue (requires cross-jurisdictional cooperation with Waterford).
- Pedestrian-Oriented Recommendations:
    - Rt 32 from Williams St. to Benham Ave.: Implement traffic calming measures including improved sidewalks, crossings, lighting, and landscaping.
    - Repair, replace or construct sidewalks and/or accessory improvements where needed as indicated by the Plan’s ADA Mapping.

A targeted planning effort by the City of New London and CTDOT is the Route 32 Corridor Study. This study is evaluating the potential for recreating a stretch of Route 32 and from which the potential station could benefit. If implemented, it will greatly enhance connectivity to populations that may utilize a new station, including Connecticut College staff, faculty, students, and visitors. Also being considered are new walkways and a multi-use path along the north- and south-bound lanes from Williams Street to approximately the Connecticut College Athletic Center. Furthermore, a streetscape project along Williams Street is being explored which will enhance connections to neighborhoods, including the pedestrian path along the I-95 Gold Star Bridge. The latter is being further studied to ascertain the feasibility of upgrading the substandard route essential in providing pedestrian and bike connections between Groton and New London.

Crash Data Review: 2015 – 2022 (Within 1 mile)

There were fifteen (15) recorded pedestrian incidents within one mile of the proposed station location. Eight (8) pedestrian-involved crashes resulted in injuries and concentrated around the intersection of Hawthorne Dr., Colman St., and Bayonet St. near the Nutmeg Woods apartment complex, and within the parking lots of New London Mall, which is located along N Frontage Rd and Bayonet St. Three (3) pedestrian collisions occurred around the intersection of State Pier Rd., Cole St., and Rosemary St. There was one (1) pedestrian fatality within .25 mi of the proposed station which occurred at the crosswalk on Route 32 (Mohegan Ave. Parkway) connecting to Connecticut College gatehouse entrance.

Seven (7) bicycle collisions occurred - all involving injury. Locations include the intersection of Briggs St. and the North Frontage Rd (Rt 1) on-and-off ramps and the four-way intersection of Williams St. and Route 32 (Mohegan Ave. Parkway).

Bicycle Parking/Storage

The Zoning Regulations (Dated April 2023) do not specifically address bicycle parking. However, Section 614 (2) Van/Carpools address possible reduction of parking for joint commuters and transit use programs. Incorporation of parking and other related bike amenities such as lockers and shower facilities for commuters can be beneficial for future development around the proposed station.

2.5.5. Groton

Existing Conditions: Access Network

The proposed station site is accessed from Poquonnock Road, which connects Route 1 to Route 649 (Poquonnock Rd and South Road). Route 1 is a densely developed, primarily commercial retail corridor with some service uses, office and multifamily homes. Route 1 has high traffic volumes, 4+ lanes of travel with turning lanes. Sidewalks are present, however the development patterns and auto dominated area make this corridor uninviting and uncomfortable for pedestrians. There are no bicycle amenities present. Road diets and intersection enhancements appear viable in many locations to make this a more pedestrian oriented area.

Poquonnock Road from Route 1 passes by the station location and leads to Rainville Ave. Poquonnock Road is a two-lane roadway with wide travel lanes. Bituminous sidewalks are located adjacent to the station site, leading to concrete walks further south and all in poor condition. With a road diet and capitalizing upon the wide easterly landscaped shoulder, a multi-use trail appears feasible from Route 1 to Rainville Ave. A new multiuse path would connect to the existing multiuse path along South Road, linking the existing bike lanes along Thomas Road and providing access to the Groton/New London Airport. Furthermore, Electric Boat owns an employee parking area near the intersection with Rainville Avenue. This location offers shuttle service for employees to the Groton and New London campuses and the parking area is easily within biking distance from the station.

Connecting points north of Route 1 is Buddington Road and Drozdyk Drive. Both serve multifamily and single-family homes and lead to points north of I-95. Bike amenities are possible through lane reductions and could include a multi-use trail along Drozdyk Drive, capitalizing on a wide shoulder. At minimum, bike lanes appear feasible.

Planning Documents

Pedestrian activity is not substantial at the Poquonnock Road and Mitchell Street/Benham Road/Chicago Avenue areas with an average 18 pedestrians per hour. This measure was conducted within the half-mile Context Area during the *SCCOG Bike and Pedestrian Plan - Bike, Pedestrian and Traffic Counts*. Furthermore, the *SCCOG - City of Groton Bike and Pedestrian Improvements Toolkit* provides the following recommendations:

- Bike-Oriented Recommendations
    - Provide bike lanes along High Rock Rd. and Rainville Rd. to Eastern Point Rd. (serving access to Electric Boat).
    - Extend Thomas Rd. bike lanes south into Groton City turning south along Shennecossett Rd. (Rt 349) continuing onto Eastern Point Rd. Provide sharrows and "Bikes May Use Full Lane" signs where roadways cannot be widened.
    - Improve the Gold Star Bridge shared use access pathway: widen pavement, lessen steep grades, add lighting and wayfinding signs (kiosk/wayfinding point).
    - Construct a new protected shared use path on Gold Star Bridge northbound span as part of bridge renovation project. Bridge path accessway would connect to Bridge Street.
- Pedestrian-Oriented Recommendations:
    - Repair, replace or construct sidewalks and/or accessory improvements where needed as indicated by the Plan's ADA mapping.

Crash Data Review: 2015 – 2022 (Within 1 mile)

Eight (8) total pedestrian incidents were concentrated in shopping center parking lots connecting to Long Hill Road, three (3) of these were suspected serious injuries. Of twelve (12) reported bicycle crashes, two (2) occurred on Poquonnock Rd. leading north to the proposed station. One of these was within one-tenth of a mile of the site. Two bicycle incidents at an intersection of Meridian St. Ext. and Long Hill Rd. (Rt 1), leading into a shopping center parking lot one-third of a mile from the proposed station.

Bicycle Parking/Storage

Requirements for bicycle infrastructure and sidewalks are included in the Town of Groton's Zoning regulations and required in mixed use and commercial zoning districts. New development or major renovations within the Neighborhood Commercial Districts and Mixed-Use Town Center Districts with greater than 10 parking spaces are required to provide a minimum of two bicycle parking spaces and or 5% of the total vehicle parking spaces. The regulations allow for bicycle parking to be located in the interior of a building for residential and professional uses, but otherwise, there is no separate requirement for long-term bicycle parking.

2.5.6. Mystic

Existing Conditions: Access Network

Located within the Town of Stonington and 1-mile east of the Downtown Mystic Village tourist destination and existing rail station, east-west bicycle and pedestrian access to the station is primarily via Route 1. Population density, employment centers and attractions are predominantly west of the proposed station location. Route 1 is a two-lane state highway that experiences high volumes of traffic during summer months.

Access from the north in the direct vicinity of the station is via Hewitt Road, providing access to a densely populated single family residential neighborhood and points further north. The street network connects to various points of interest to the north. Traffic volumes appear low and may present an opportunity for a comfortable bike route to the station, rather than via Route 27 to Route 1.

Overall, this context area is flat to moderately sloping and offers comfortable walking and biking opportunities, however no bike amenities are provided throughout, and walkways are limited. Within the half-mile walking distance, some visitor destinations and employers are present at a lower density than the Downtown Mystic

Village core. Route 1 does pose some potential for bike lanes west; however, the greater potential is to the east and complementing possible bike improvements associated with the Stonington station. Within and leading away from Mystic Village, bike amenities are restricted by narrow roadways with on street parking within neighborhoods and along Route 1. To this extent, signage and sharrows may be the only possible infrastructure improvements that support safe bike travel in the community.

Planning Documents

The 2015 *Plan of Conservation and Development* highlights various aspects of bike and pedestrian amenities, with 89% of those responding to the plan's questionnaire desiring bicycle and walking trails. Furthermore, Section 8.1 encourages "increased foot and bicycle traffic in villages and maintaining a safe pedestrian and cycling environment." A complementing policy identified on p. 69, Item 8.2.2 states "Maintain and improve pedestrian and bicycle access, safety and comfort within village areas and points of interest."

Within the Context Area and complementing the Town's POCD, the *SECCOG - Stonington Bike and Pedestrian Improvements Toolkit* recommends the following:

- Bike-Oriented Recommendations:
    - Provide bi-directional protected bike lanes on south side of Rt 1 from Greenhaven Rd. to intersection with Mason Island Rd., Mystic.
    - Add both short-term and long-term bicycle parking at the existing Mystic train station, with additional short-term bicycle parking in the surrounding business district.
    - Narrow travel lanes to 10' and provide buffered bike lanes both sides of Williams Ave. (Rt 1) from Mason Island Rd. to intersection with Washington St.; provide sharrows and R4-11 "Bikes May Use Full Lane" signs on Rt 1 to Mystic River drawbridge/Groton town line.
- Pedestrian-Oriented Recommendations:
    - Route 1 from Broadway to Big-Y grocery store: Infill sidewalk gaps.

Crash Data Review: 2015 – 2022 (Within 1 mile)

Six (6) Pedestrian incidents, one (1) suspected to be a serious injury, occurred within the Context Area. Pedestrian crashes were concentrated along East Main St. and West Main St. leading to Steamboat Wharf along Mystic River (> 0.7 mi from proposed station).

Six (6) bicycle incidents were concentrated around the intersection of Williams Ave. with Avery St., Hatch St., and Hewitt Rd. (immediately adjacent to the station location). Five (5) of the six (6) collisions were within one-quarter mile of the proposed station.

Bicycle Parking/Storage

The *Town of Stonington's Zoning Regulations- 27th Edition* requires bike parking. The provision states "Bicycle parking facilities shall be provided as part of new multifamily developments of four units or more, new retail, office and institutional developments, and all transit transfer stations and park and ride lots."

2.5.7. Stonington Borough

Existing Conditions: Access Network

Access to the station is via the looped Route 1A which connects to Route 1, the latter providing access east and west. Route 1 is a wide two-lane roadway, with minimal land development within the Context Area. Possibilities for bike lanes and a multi-use path appear feasible in certain locations, including widening of a causeway. Route

1A as noted below, has some possibilities to offer bike amenities as well. Access points north of Route 1 are primarily North Main Street and Flanders Road. Both routes are popular cycling routes for their scenic and rural character, but the narrow roads can be daunting for the less experienced cyclist.

The streets within the Borough are narrow with on-street parking throughout the network. Sidewalks are prevalent and in varying conditions and materials, with historic stone and curbs common to maintain the charm of the village setting. Accessible ramps along sidewalks are limited.

Route 1A from Alpha Avenue and south of the station location consist of a vast network of walkways, however as one ventures away from the station along Route 1A, sidewalks do not exist. No walkways exist along Cutler Street, where the station may be located. The Alpha bridge does pose a slight challenge provide a direct access to the Borough, but an existing stair system, albeit not very inviting, accommodates vertical circulation. Alternatively, the walkway along the Trumbull Street jughandle can be utilized.

East of Trumbull along Cutler Street sidewalks are present, continuing along Elm Street and terminate at the Town Hall, approximately ½ mile walking distance from the station.

Overall, existing bike amenities are limited throughout the Context Area.

Planning Documents

The 2015 *Plan of Conservation and Development* highlights various aspects of bike and pedestrian amenities, with 89% of those responding to the plan's questionnaire desiring Bicycle and walking trails. Furthermore, Section 8.1 encourages "increased foot and bicycle traffic in villages and maintaining a safe pedestrian and cycling environment." A complementing policy identified on p. 69, Item 8.2.2 states to "Maintain and improve pedestrian and bicycle access, safety and comfort within village areas and points of interest."

Within the Context Area and complementing the Town's POCD, the *SECCOG - Stonington Bike and Pedestrian Improvements Toolkit* recommends the following:

- Bike-Oriented Recommendations:
    - Create a signed bike route on Route 184 from Groton border to N. Stonington border; widen roadway where shoulder is too narrow and at intersections w/ turn lanes to provide continuous shoulder.
    - Along Route 1A side loop leading into Stonington Borough designate an Alternate Bike Route w/ signage, widen roadway where shoulder is too narrow. Add sharrows and R4-11 "Bikes May Use Full Lane" signs to Cutler St. and Elm St. sections where roadway width is constrained.

Crash Data Review: 2015 – 2022 (Within one-mile)

There have been a total of five (5) bicycle or pedestrian incidents with the Context Area. Two (2) incidents involved pedestrians and three (3) involved bicycles on Water Street.

Bicycle Parking/Storage

The *Town of Stonington's Zoning Regulations - 27th Edition* requires bike parking. The provision states "Bicycle parking facilities shall be provided as part of new multifamily developments of four units or more, new retail, office and institutional developments, and all transit transfer stations and park and ride lots."

2.6. Transit Connections

2.6.1. Overview

The study team presented potential service improvements, as recommended in the **Transit Service Plan (Appendix I)** and the **Rail Service Plan (Appendix J)**. These improvements included improved opportunities for connecting or complementary service to potential passenger rail stations at the conceptual station locations, and also considered the opportunity or feasibility of each to function as a ground transportation hub. This analysis considered both existing bus and microtransit service as well as the proposed service modifications to determine level of connectivity that can be achieved through the conceptual station locations. Given that construction of these stations is dependent upon implementation of new or expanded passenger rail service, this analysis will consider the recommendations presented under the long term rail service alternatives, by which bus service would be designed to complement, rather than complete with, expanded rail service.

2.6.2. Norwich

Several Southeast Area Transit District (SEAT) bus routes make stops within a half-mile of the potential station location including Routes 1, 2, 4, 5, 6, 7, and 9, offering robust connections to local and regional bus destinations. The potential station location is located directly across the Yantic River from the Norwich Transportation Center and Parking Garage and provides an opportunity to support a multimodal connectivity as a hub for passenger rail traffic and commuting between Norwich, New London, and beyond. **Transit Service Plan (Appendix I)** outlined potential improvements for SEAT Route 1 service, including the expansion of weekend service spans and the addition of a weekday express service (Route 1E). Ultimately, rail service would replace the proposed Route 1 Express service, offering similar headways and service patterns, but via rail. Proposed Route 1 service would culminate at the Norwich Transportation Center, which could act as a multimodal transportation hub, connecting rail, bus, personal vehicle, pedestrian, and bicycle travelers at a single location. Similar to Route 1 service, bus connections to the potential future station location in Norwich would be facilitated through the Norwich Transportation Center. Route 2 operates on the east side of the Thames River and could expand the opportunities for connections via the east side of the river, filling a gap for potential riders. The recommendations include a moderate span expansion on Saturdays, highlighting the capacity to align with rail riders. As noted in the analysis, rail service did not directly affect the recommendations set forth for Route 2 service, but the improved service could benefit rail riders in the future.

2.6.3. Montville (Mohegan Sun)

Existing SEAT Routes 1 and 7 make stops within a half-mile of the potential station despite not providing direct service to the site. SEAT provides service to and from the Mohegan Sun Winter Garage, situated on the north end of the campus. While not directly adjacent to the potential station site, this service could compliment rail service, which would provide service at the south end of the campus, to the Thames Garage and could offer potential local and regional connections for a possible station at this location. While not a primary parking structure for the resort, primarily utilized as overflow/supplemental parking, coordination with Mohegan Sun could spur future increased utilization, including expansion of the shuttle that operates between the resort/casino and the Thames Garage. Alternatively, coordination with SEAT could be considered for future route modification to serve the potential station location, but existing service to Mohegan Sun, in theory, could provide supplemental transit options for the foreseeable future.

2.6.4. U.S. Coast Guard Academy/Connecticut College

While it does not provide direct service to the potential station site, SEAT Route 1 makes stops within a half-mile of the potential station location and could provide potential local and regional bus connections for a station at this location. As discussed in Section 3.5, there is limited pedestrian and bicycle infrastructure to and from the potential station site at this location. Future connectivity and infrastructure improvements could be implemented to bridge the connectivity gaps, offering more robust transit and active transportation options for students, faculty, residents, and visitors in proximity to the station.

2.6.5. Groton

As part of the bus service recommendations set forth in **Transit Service Plan (Appendix I)**, alongside expansion of passenger rail service on SLE, existing SEAT Route 11 would be eliminated and replaced with two new Routes – 76 and 85, as well as the proposed Grot-On-Demand microtransit service to fill remaining gaps. In this scenario, new Route 85 would provide direct bus service to the station site and would provide immediate connections to both the Groton US Navy Submarine Base and Electric Boat. This service would fill a major gap, identified by both stakeholders and prospective travelers, and would provide connecting service not only to these major employment hubs, but also UConn – Avery Point and the Groton Square Shopping Center. The new Route is envisioned to provide half-hour weekday and hour weekend frequency, with service operating on a 14-hour span between 6AM and 8PM on weekdays and an 11-hour span between 7:30AM and 6:30PM on weekends, offering flexibility for both commuters and visitors to the region. As presented in **Transit Service Plan (Appendix I)**, Grot-On-Demand would be a new microtransit service that would operate between 6AM and 11PM on weekdays and Saturdays, and 8AM to 11PM on Sundays, in order to connect destinations in Mystic and Groton with future rail service options. The proposed microtransit service would fill a microtransit gap between New London Smart Ride, which operates in New London, west of the Thames River, and Stonington HOP service which operates in Mystic/Stonington, east of the Mystic River. Grot-on-Demand would offer similar services in the greater Groton area and would provide robust on-demand service to and from the proposed station location in Groton.

2.6.6. Mystic

While bus service in the Mystic Village area is primarily provided by on-demand HOP microtransit service run by SEAT, this study recommends the implementation of new Route 32 Service – Seasonal Mystic to complement existing and expanded microtransit service. Following the implementation of passenger rail service along the NEC, the proposed Route 32 service would operate from Memorial Day through Labor Day and operate on 20-minute frequency from 9AM to 6PM seven days per week, with 40-minute headways from 8 to 9AM and 6 to 7PM. As outlined in **Transit Service Plan (Appendix I)**, the seasonal service would satisfy public and stakeholder interest in fixed route service to destinations such as Mystic Aquarium, Olde Mistick Village, the central business district, and other local destinations from the existing rail station in Mystic, and ultimately a new station at the conceptual location discussed in this report. Beyond satisfying demand, providing multimodal service to major tourist destinations can help reduce congestion on Interstate 95 during the busiest season of the year. It will also alleviate concerns with relocation of the Mystic SLE station, given the potential location is outside of the central business district, by providing frequent bus connections to the old (existing) station location.

2.6.7. Stonington Borough

The potential future station in Stonington Borough is, and would continue to be, served by a SEAT-operated on-demand microtransit service in the Stonington area, called Stonington HOP. As such, the potential station would not align with fixed-route service or be proximate to any designated bus stations or stops; however, on-demand microtransit would provide multimodal connectivity to the station and the surrounding community. As part of its proposed improvement package, the project team identified Stonington HOP service as a candidate for expanded span of service as a near term mobility solution; a solution that would both accommodate and benefit both the community as it exists today, as well as potential future rail passengers should a rail station be constructed. The existing span of service runs from 6:30 AM to 7:45 PM on weekdays – however the project team recommends expansion of service span to run from 6:00 AM to 11:00 PM on weekdays. HOP service does not currently run on weekends. To provide microtransit options to weekend travelers, it is recommended that HOP provide weekend service between the hours of 8:00 AM and 11:00 PM during the peak travel season in the region: Memorial Day through Labor Day, to accommodate the expected and observed influx of seasonal travelers. Expanded microtransit service would allow rail passengers to make last mile connections to and from their destinations, expanding access to the potential future rail station without the need for use of personal automobiles, and for those who are unable to walk or ride a bicycle to and from the station due to ability or geographic distance.

3. Conclusion

The project team recommends that these six sites be advanced further as potential station locations for expanded SLE service and service to Norwich via the Palmer Line. At this time, while challenges exist, there do not appear to be any immediate fatal flaws that would preclude future stations at these locations. Continued stakeholder coordination is of paramount importance for these sites, and any future design must adequately address the constraints and challenges outlined in this analysis.