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Construction Effects

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Acronyms/Abbreviations

DEIS ..... Draft Environmental Impact Statement
NFTA ..... Niagara Frontier Transportation Authority
UB ..... University at Buffalo

19 Construction Effects

This chapter summarizes anticipated construction impacts and mitigation measures for the Proposed Action. A qualitative analysis was performed to identify construction impacts in order to determine where preventive measures to minimize the adverse impacts of construction activities could be warranted. Because the No Action condition would not include construction activities, it also would not create any construction-related impacts.

Impacts to the natural and built environments would be anticipated during construction of the Proposed Action; however, these impacts would be temporary and intermittent. Mitigation techniques and adherence to applicable construction regulations will reduce the severity of impacts encountered during construction.

19.1 PROPOSED ACTION PHASES

The Metro Rail Expansion would involve a multi-year construction phase, which would be developed following completion of the environmental process and engineering phase. Before revenue service could begin, the following major steps would occur: preliminary and final design, pre-construction activities, construction, and testing. These major steps are described in the following sections:

1. Preliminary and Final Design – The conceptual engineering presented in this Draft Environmental Impact Statement (DEIS) (see Appendix B, "Conceptual Plan") would be further developed through preliminary design. Final design would follow the approval of the preliminary engineering design plans. The final design submission would include sealed construction plans; erosion and sediment control plans; traffic control plans; traffic signal plans; construction specifications/special provisions; quantity summary; and cost estimate.
2. Pre-Construction Activities – Pre-construction activities would occur before beginning construction activities, and typically include construction contracts development; construction community outreach and education programs; environmental permits and approvals; property acquisition; and light rail vehicle procurement.
3. Construction Activities – Construction activities include those items required to construct the light-rail track, overhead catenary system, signal and safety systems, ancillary facilities, and all proposed construction required for the light rail to be able to physically operate for revenue service.
4. Testing – Following construction, testing of completed light rail components would occur, and would involve the required testing of light-rail vehicles. Construction would be planned to be sufficiently complete from University Station to the planned light-rail vehicle maintenance and storage facility at the I-990 Station to facilitate testing of the light-rail vehicles prior to operation. Project-wide systems testing would also occur following construction activities. Systems to be tested include communication systems; fare collection systems; signal systems; traction power substations; and overhead catenary systems.

19.2 CONSTRUCTION EDUCATION AND OUTREACH PLAN

Construction of the Proposed Action would temporarily affect local businesses, residences, and traffic operations along the entire Proposed Action alignment. A Community Relations Program would provide general construction scheduling information, coordination of construction work with adjacent business activities, and assistance with the resolution of issues that could develop between local residents, motorists, the contractor, and the sponsoring agency. The details of the program would be included in a Construction Education and Outreach Plan, which would be executed before and during construction activities. Niagara Frontier Transportation Authority (NFTA) would implement the plan.

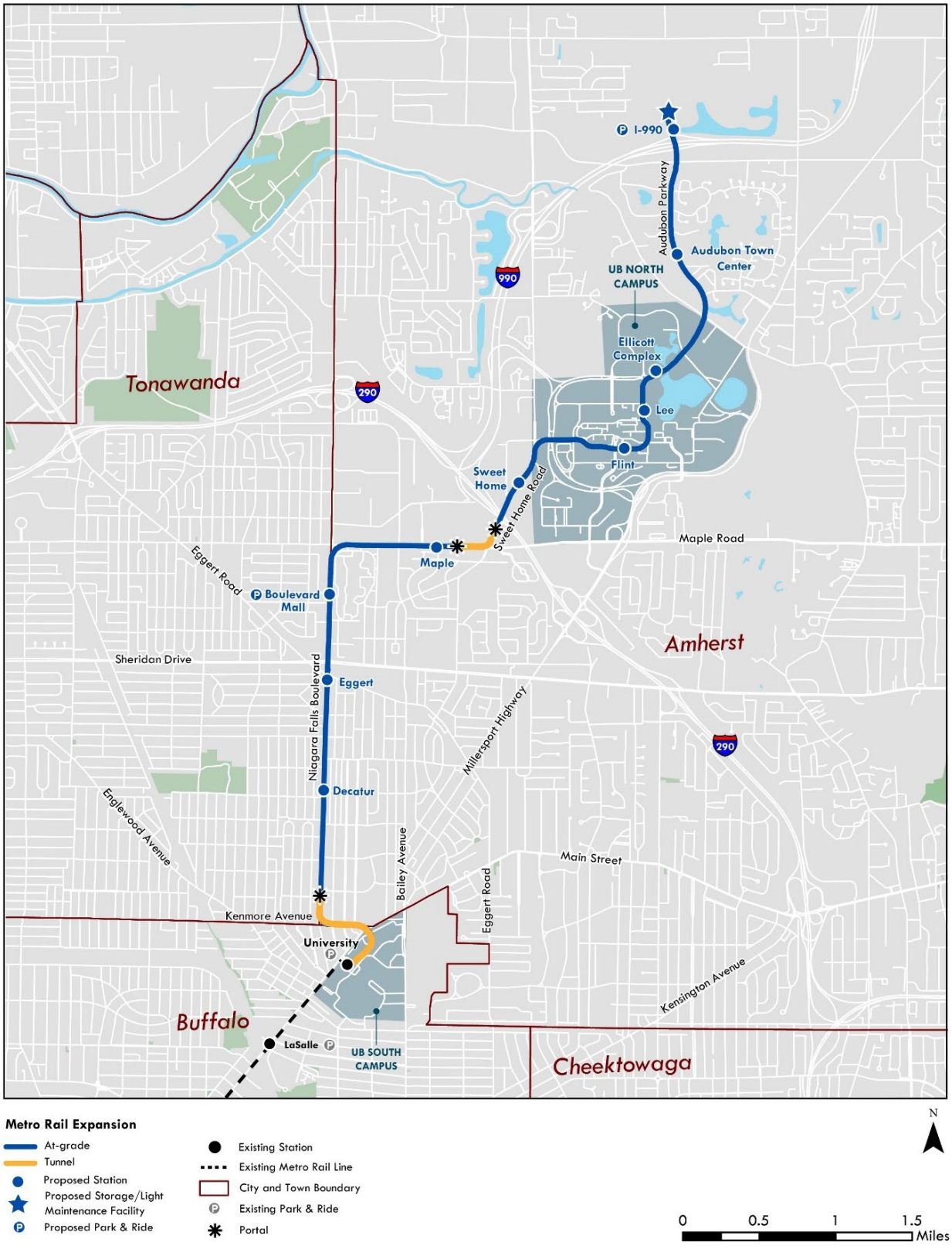
19.3 CONSTRUCTION METHODS

The Proposed Action would require the construction of basic elements not found in typical roadway projects, such as stations, park & ride facilities, tunnels and ventilation, vehicle storage yard, track bed, trackwork, and catenary poles and wires. Various methods would be used to construct the alignment of the Proposed Action, depending on the geographic and soil conditions and the design. The construction methods are described in the next sections. Chapter 1, "Project Description" provides a description of the Proposed Action alignment. Figure 19-1 presents the Proposed Action, including the tunnel and at-grade alignment, portal locations, ten stations, two park & ride facilities, and the light maintenance/storage facility.

19.3.1 At-Grade Configuration

An at-grade configuration would position the Proposed Action alignment at the same level as the ground surface. The actual construction for the at-grade configurations would take place within the street right-of-way and at intersection crossings, as is typically seen in city street construction projects in the surrounding area. Construction of the at-grade configurations would involve traffic detours and temporary lane closures. The equipment utilized during construction would be consistent with street construction. Pavement cutting machinery, rubber-tired excavators, and all-terrain cranes would be necessary for at-grade construction.

Figure 19-1. Metro Rail Proposed Action



19.3.2 Underground Configuration

For the underground portion of the Proposed Action, tunnel blasting would be used at University Station and continue eastbound, then loop westbound at the intersection of Main Street and Kenmore Avenue.

Tunnel blasting involves explosives and is typically performed in the following steps: drilling blast holes and loading them with explosives, detonating the blast, followed by ventilation to remove blast fumes, removal of the blasted rock (mucking), scaling crown and walls to remove loosened pieces of rock, installing initial ground support, and advancing rail, ventilation, and utilities.

The transition to a cut-and-cover tunnel method would occur at Kenmore Avenue near Capen Boulevard. The alignment would shift west and then make a quick turn north from Kenmore Avenue onto Niagara Falls Boulevard. The Proposed Action alignment would continue underground on Niagara Falls Boulevard until emerging from a portal near the intersection of Kenilworth Avenue. Cut-and-cover construction would also take place for the portion of the Proposed Action through the intersection of Maple Road and Sweet Home Road, where the light rail would traverse under the intersection

Cut-and-cover is a simple method of construction for shallow tunnels where a section is first excavated and then covered with an overhead support system strong enough to carry the load of what is to be built above the tunnel. Equipment for cut-and-cover would include large-diameter augers, large excavators, big cranes for installing and removing decking, medium-sized cranes for lifting materials, dump trucks for hauling cut and filled material, flatbed trucks for building materials, transit mixers for concrete, stake rack trucks for tools and equipment, and pickup trucks for personnel.

19.3.3 Trackwork Installation

Light-rail track construction would include the installation of the fixed-guideway elements, such as ballast, ties, rail, train signals and catenary system. The catenary system includes poles, underground conduit and messenger wire. These items would be placed in construction staging areas throughout the corridor to minimize haul distances and facilitate construction. The contractor would be responsible for the construction staging areas.

19.3.4 Stations

Ten stations would be constructed along the Proposed Action alignment. Construction of the stations would utilize equipment used in typical highway and building construction. The facility would require foundation construction by means of excavators, backhoes, concrete pumps, and vibrators.

19.3.5 Parking Facilities

Transit-only park & ride lots would be constructed at two station locations (Boulevard Mall and I-990 Stations), and construction would utilize grading equipment, asphalt pavers, and rollers.

19.3.6 Light Maintenance/Storage Facility

The Proposed Action would include a storage facility to store light-rail transit vehicles overnight and perform light maintenance and cleaning at the end of line, north of the I-990 and Audubon Parkway interchange. Construction of the light maintenance and storage facility would utilize equipment used in typical highway and building construction. Light-rail tracks would also be installed, which would include ballast, ties, and rail. The facility would require foundation construction by means of excavators, backhoes, concrete pumps, and vibrators.

19.4 CONSTRUCTION IMPACTS

Construction of the Proposed Action could cause temporary impacts to the surrounding environment. Some typical short-term construction-related impacts could include air quality, noise and vibration, and contaminated soils and hazardous materials. If properly planned, construction impacts to neighborhoods, businesses, and the natural environment would be minimized.

19.4.1 Land Use

Short-term land use changes are anticipated during the construction, resulting from easements needed for staging areas and construction access, and from temporary parking loss. Most construction staging areas would be obtained as temporary construction easements. Staging areas would also provide additional access points to the construction of the Proposed Action, where possible. Temporary construction easements could result in short-term change of access or closures of certain areas of the properties in the easement, or to adjacent properties; where this is the case, alternative access would be provided.

19.4.2 Socioeconomic Conditions

Local businesses would be affected by the construction of the Proposed Action due to access restrictions, loss of parking and landscape, business signage removal, traffic congestion, noise, dust, and aesthetic disruptions. NFTA would provide local business owners with notification of traffic interruptions and descriptions of alternative routes. Furthermore, attempts would be made to minimize the duration of parking disruptions.

19.4.3 Acquisitions and Displacements

Property acquisitions would be required for the Proposed Action. However, no additional displacements or relocations are anticipated due to construction activities outside the planned right-of-way. The contractor would be responsible for identifying potential staging areas and negotiating mutually agreeable terms with individual property owners in order to secure permission to utilize them. Property owners would be compensated; therefore, mitigation would not be required. Chapter 4, “Property Acquisitions and Displacements” provides a detailed list of the partial property acquisitions and displacements.

19.4.4 Community Facilities and Utilities

Construction of the Proposed Action would cause temporary impacts to community facilities (i.e. police stations, fire stations, schools) due to access restrictions and temporary blocking of adjoining roadway intersections. The availability of alternative routes, in addition to the temporary duration of construction periods, would minimize the disruptions to the community facilities. Furthermore, alternative routes would ensure that access to the community facilities is maintained throughout all phases of construction.

The Proposed Action would conflict with existing utilities. The utilities affected include:

- electrical power utilities (both underground and above ground including poles)
- telecommunication, including telephone and cable (both above and below ground)
- water and sewer mains; natural gas utilities
- oil pipelines; University at Buffalo steam lines; and traffic signals and communications

The corridor was split into separate sections, with identifiable names, to communicate individual utility impacts within each segment of the corridor.

- The "UB South Campus section" affects the following utility as long as the tunnel is constructed without an open cut:
  - steam tunnel (depth is unknown)

- The "Kenmore Avenue section" affects the following utilities:
  - underground primary electrical and street lighting electrical
  - underground telecommunications; drainage
  - water and sewer
  - natural gas

- The "Niagara Falls Boulevard residential section" affects the following utilities:
  - underground street lighting and poles
  - telecommunication duct bank; water and sewer mains
  - natural gas and traffic signals at Kenilworth Avenue and Niagara Falls Boulevard and Decatur Road and Niagara Falls Boulevard

- The "Niagara Falls Boulevard commercial section" affects the following utilities:
  - electrical utility poles, telecommunication duct bank
  - water and sewer mains
  - natural gas and traffic signals at Longmeadow Road and Niagara Falls Boulevard, Eggert Road and Niagara Falls Boulevard, Sheridan Drive and Niagara Falls Boulevard, Treadwell Road and Niagara Falls Boulevard and the mall entrance and Niagara Falls Boulevard

  In this section the utilities are mostly affected at the intersections until the mall area.

- The "Maple Road section" affects the following utilities:
  - electrical utility poles
  - underground and above ground telecommunications; underground fiber (near the Bowmart Parkway intersection and between the School and Hillcrest Drive and Sweet Home Road)

  - water (Alberta Drive to North Baily Avenue) and Sewer (Niagara Falls Boulevard to North Baily Avenue)
  - natural gas and traffic signals at Maple Road and Alberta Drive, Maple Road and North Baily Avenue, Maple Road and Bowmart Parkway, Maple Road and Hillcrest Drive, and Maple Road and Sweet Home Road

- The "Sweet Home Road section" affects the following utilities:
  - underground fiber
  - sewer mains (near the intersection with Maple Road)
  - water (potentially)
  - natural gas

- The "UB North Campus section" affects the following utilities:
  - underground electrical (including light poles)
  - underground communications, water and sewer mains
  - UB steam lines
  - natural gas
  - oil pipelines
  - traffic signals at the Rensch Entrance and John James Audubon Parkway

- The "John James Audubon Parkway section to Ellicott Creek" affects the following utility:
  - underground electric.

- The "John James Audubon Parkway section north of Ellicott Creek" affects the following utilities:
  - underground electrical primary
  - underground communications
  - water and sewer mains, natural gas
  - traffic signals at John James Audubon Parkway and North Forest Road, John James Audubon Parkway and Gordon Yaeger Drive and John James Audubon Parkway and Dodge Road

  The impacts in this section could be minimized if the tracks followed the existing road alignment.

Mitigation techniques would include relocation, removal and protection (e.g., pipe casing). Utility conflicts would be addressed typically via in-kind replacement. In certain cases, overhead utilities could be relocated underground. Existing utilities in conflict with the Proposed Action could be relocated to "utility corridors," which could be located between the back-of-curb and the outside right-of-way. In addition, there could be an opportunity to collaborate with utility providers who have been considering utility upgrades or betterments to their systems

Construction equipment typically required for relocating utilities would include excavators/backhoes, trenchers, boring machines, trucks, cranes and generators/compressors. Utility relocations in existing streets would require the demolition of pavement, sidewalks and curbs where open trench construction would be employed. This work would require breaking operations consistent with sawing or jack hammering. To repair the damaged structures, concrete or asphalt construction methods would be utilized. Jack-and-bore and tunneling methods would reduce the amount of needed demolition needed and would typically be employed at sensitive locations, major

intersections, and perpendicular crossings. The design of utility adjustments and relocations would be developed as part of the final construction plans. Relocations would be addressed in the traffic control plans by using lane closures or temporary road closures.

To minimize scheduling conflicts and coordination issues during construction, the numerous utility relocations would occur before major construction activities begin. This advance utility relocation would facilitate the subsequent construction and minimize delays required to resolve utility conflicts.

19.4.5 Environmental Justice

As described in Chapter 6, "Environmental Justice, environmental justice communities are located along Niagara Falls Boulevard. Construction of the Proposed Action in this area would not isolate these communities, as access would be maintained throughout all phases of construction. Furthermore, NFTA and its contractors would continuously coordinate with community service providers (i.e. police, fire and ambulance service) to ensure emergency vehicles have access to all areas.

19.4.6 Visual Resources

The construction activities related to the Proposed Action would be highly visible but would only temporarily affect the visual environment, except trees that would be removed to accommodate construction activities. Temporary visual impacts would include the presence and movement of construction machinery, equipment, building materials, temporary roads and access ways, construction cranes, temporary construction fences and screens. Furthermore, staging areas would be dispersed along the Proposed Action alignment and would require temporary access for the storage of equipment and materials. Nighttime construction could occur subject to local regulations. Lights used for nighttime construction could affect residents within one or two blocks of the construction or staging areas. Impacts from lights used during nighttime operations would be minimized by aiming construction lights directly at the work area and/or shielding the lights to avoid disturbing nearby residences. Construction of the Proposed Action would also affect existing landscaping. Where the existing vegetation that buffers adjacent properties is altered or removed, vegetation or other screening would be restored.

19.4.7 Water Resources

During construction, adverse effects to wetlands and surface water quality within the study area would be minimized by implementing the following:

- Erosion and sediment controls in accordance with the 2016 New York State Standards and Specifications for Erosion and Sediment Control ("Blue Book")
- A Proposed Action -specific Stormwater Pollution Prevention Plan that would meet the requirements of State Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002)
- The requirements of the New York State Department of Transportation Highway Design Manual, Chapter 8 Highway Drainage.

Erosion and sediment controls to be implemented during construction would include the following:

- Inlet protection measures at existing stormwater inlets
- Sediment controls to prevent erosion and sediment from leaving the construction sites
- Dust control measures
- Spill prevention and containment measures
- Stabilized construction entrance/exits
- Vegetative measures to stabilize exposed soils

Construction activities conducted in surface waters—including the culvert extension, swale relocation, bridge construction, and the installation of new stormwater outfalls—would be completed from dry land to the maximum extent practicable. Best management measures such as turbidity curtains, cofferdams, and temporary piping or diversion of waterways would be implemented for any in-water construction activities, as necessary, to maintain stream flow and minimize increases in suspended sediment.

Post-construction stabilization of the stream banks would occur near the in-water activities. The disturbed areas would be stabilized with erosion control matting (to prevent sediment from entering the creek) and planted with native riparian and upland vegetation (to prevent invasive species from colonizing and to further stabilize the embankment).

Temporary construction impacts would occur in federal- and state-regulated wetlands. These temporary effects would be a result of temporary disturbances that would be required to access work areas, including the maintenance station proposed north of the I-990. As design advances, measures would be implemented to reduce and avoid temporary fill placement in wetlands. However, should temporary fill placement be unavoidable, these impacts would be included within the Section 401 and 404 permits and an Article 24 "Freshwater Wetlands" permit would be obtained from the U.S. Army Corps of Engineers and New York State Department of Environmental Conservation, respectively, for the Proposed Action as a whole. During construction, best management practices—including the erosion and sediment control practices described previously—would be implemented to protect wetlands within the Proposed Action study area.

Any wetlands that would be temporarily affected would be restored subsequent to construction following a soil and landscape restoration. Restoration measures would include restoring the grade to pre-construction conditions (or better) and seeding and/or planting native species, where applicable. With these measures in place, the construction of the Proposed Action would not result in an adverse effect on the study area wetlands.

Along with measures identified previously, the contractor would implement standard environmental protection practices for water quality. NFTA would incorporate the practices into the construction contracts for the proposed alternative that include the following:

- The contractor would schedule and conduct their work to minimize soil erosion, not cause or contribute to a violation of water quality standards, and prevent sedimentation on lands adjacent to or affected by the work.

- The construction of temporary soil erosion and sedimentation control measures, temporary and permanent soil stabilization, drainage facilities, and the performance of other contract work would contribute to the control of erosion and sedimentation control measures.

19.4.8 Natural Resources

Wildlife would be affected by construction activities in the short- and long terms. In the short term, habitats could be displaced or fragmented during construction as vegetation is removed. In the long term, habitats could be eliminated entirely because corridors trafficked by wildlife are typically destroyed or fragmented, and therefore more dangerous. Nonetheless, most habitats are expected to return once vegetation returns to the construction area. The more vegetation that is permanently removed, the more habitats are likely to be destroyed. The contractor will perform pest control and extermination work prior to earth work activities.

19.4.9 Transportation

Construction activities would result in temporary interruptions to vehicular, pedestrian, and bicycle traffic patterns. Careful planning would be required to reduce disruptions to traffic. Some access to residences and businesses could be limited temporarily, though access would be maintained to the extent possible. Additional traffic could be generated by the hauling of construction materials and equipment, debris, and building materials. Work plans and schedules for hauling mass amounts of equipment and construction materials to and from the construction site should be staggered and planned for times when local traffic is off peak or limited.

19.4.10 Noise

Noise impacts from construction activities are generally caused by construction equipment being located near sensitive land uses and noise receptors for long durations of time. Different phases of construction would create different levels of noise based on the equipment being used. Some primary noise generators include diesel engines, impact pile driving, pavement breaking, cranes, generators, bulldozers, blasting, and back-up alarms.

A general construction noise analysis, according to FTA analysis guidance, was conducted and is presented in Chapter 14, “Noise”. Based on this analysis, the potential for adverse construction noise impacts was identified at receptors within 40 feet of substation or station construction along the proposed alignment. The construction noise analysis found that at other receptors, noise resulting from construction of the Proposed Action may result in noticeable levels of noise, but the noise would not exceed FTA construction noise impact criteria, would occur over only a limited period of time, and/or would occur infrequently such that it would not rise to the level of an adverse impact.

Construction of the Proposed Action would not occur during night-time hours (i.e., 10 p.m. to 7 a.m.) on a regular basis. This would include the movement of construction trucks on roadways passing residences. In general, trucks would be routed to avoid passing by noise-sensitive land uses (e.g., residences, schools, religious uses, open space, etc.) wherever possible. Additionally, auger drill rigs, rock drills, and cranes used in construction of the Proposed Action would be required to produce noise levels not greater than 80 dBA at a distance of 50 feet.

19.4.11 Vibration

Vibration impacts from construction activities are generally caused by construction equipment being located near sensitive land uses and noise receptors for long durations of time. Varying degrees of ground vibrations can result from construction activities. Pile driving and blasting typically create the strongest vibrations. The movement of heavy equipment—such as dump trucks and bulldozers—can also contribute to vibrations. Vibrations vary in strength and tend to diminish over a certain distance. One primary concern over vibrations is damage to the structural integrity of surrounding buildings.

An analysis of vibration impacts during construction is presented in Chapter 15, “Vibration”.

Construction of the Proposed Action is anticipated to generate perceptible vibration in some receptor areas closest to caisson drilling and loaded trucking routes, but is not anticipated to result in vibration that could cause damage to any buildings. Construction-related vibration would be perceptible at each receptor only for a limited period of time and consequently would not constitute an adverse impact.

19.4.12 Air Quality

In general, construction-related effects related to air quality would be limited to short-term increased fugitive dust and mobile-source emissions during construction. State and local regulations regarding dust control and other air quality emission reduction controls should be followed.

19.4.12.1 Fugitive Dust Emissions

Fugitive dust is airborne particulate matter, generally of a relatively large particulate size. Construction-related fugitive dust would be generated by haul trucks, concrete trucks, delivery trucks, and earth-moving vehicles operating around the construction sites. This fugitive dust would be caused by particulate matter that is re-suspended ("kicked up") by vehicle movement over paved and unpaved roads, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from uncovered haul trucks.

Generally, the distance that particles drift from their source depends on their size, the emission height, and the wind speed. Small particles (30 to 100 micron range) can travel several hundred feet before settling to the ground. Most fugitive dust, however, is comprised of relatively large particles (that is, particles greater than 100 microns in diameter). These particles are responsible for the reduced visibility often associated with this type of construction. Given their relatively large size, these particles tend to settle within 20 to 30 feet of their source.

To minimize the amount of construction dust generated, the mitigation measures below are recommended:

- Site Preparation
  - Minimize land disturbance
  - Use watering trucks to minimize dust
  - Cover trucks when hauling dirt
  - Stabilize the surface of dirt piles if they are not removed immediately
  - Use windbreaks to prevent accidental dust pollution
  - Limit vehicular paths and stabilize temporary roads
  - Pave all unpaved construction roads and parking areas to road grade for a length no less than 50 feet from where such roads and parking areas exit the construction site to prevent dirt from washing onto paved roadways
- Construction
  - Cover trucks when transferring materials
  - Use dust suppressants on unpaved traveled paths
  - Minimize unnecessary vehicular and machinery activities
  - Minimize dirt track-out by washing or cleaning trucks before leaving the construction site. An alternative to this strategy is to pave a few hundred feet of the exit road just before entering the public road
- Post-Construction
  - Re-vegetate any disturbed land not used
  - Remove unused material
  - Remove dirt piles
  - Re-vegetate all vehicular paths created during construction to avoid future off-road vehicular activities

19.4.12.2 Mobile Source Emissions

Since CO emissions from motor vehicles generally increase with decreasing vehicle speed, disruption of traffic during construction (such as a temporary reduction of roadway capacity and increased queue lengths) could result in short-term, elevated concentrations of CO. To minimize the amount of emissions generated, every effort should be made during construction to limit disruption to traffic, especially during peak travel hours.

19.4.13 Hazardous Materials

Hazardous and contaminated material impacts during construction would typically result from the removal and transportation of material on the site or the discovery of previously unidentified materials during construction. To mitigate potential impacts, contract requirements would be consistent with federal, state, or local law or agency regulations.

Materials necessary for construction that would be transported to the site would typically consist of native or manufactured materials. Manufactured materials would typically include concrete, metal components, reinforcing steel, fencing or similar elements that would not contain hazardous or contaminated materials. Native materials incorporated into the construction would typically consist of borrow material or select material for use in embankments and mechanically stabilized earth retaining wall type applications. As a precautionary measure, the contractor would be required to submit the sources and the appropriate testing for approval, which would prevent hazardous or contaminated materials from being incorporated into construction operations.

Based on preliminary site investigations, several locations could contain contaminated and/or hazardous materials requiring removal and/or remediation as noted in Chapter 18, "Hazardous and Contaminated Materials." For these operations, the contractor would be required to properly remove, contain, and transport the materials in accordance with the applicable regulations. Additionally, the contractor would be required to clean its vehicles to prevent off-site contamination.

Construction operations that could discharge hazardous or contaminated materials would require on-site remediation so that contamination would not occur. These construction operations would include demolishing existing buildings that could contain materials such as lead or asbestos. The contractor would be responsible for removing, remediating, and disposing of any contaminated materials encountered during construction activities.

Accidental spills from equipment would be another source of potentially hazardous or contaminated materials during construction. These types of spills typically occur as a result of mechanical failure of the equipment or during maintenance or repair of the equipment. The contractor would be responsible for removing, remediating, and disposing of any accidental spills during construction.

The excavation of previously unidentified hazardous or contaminated materials during construction would be another potential source of impacts. Procedures for safely handling this potential circumstance would be included in the contract specifications, which would require conformance to the appropriate safety and environmental controls, including the containment and remediation of any potential contaminated materials. Environmental investigations could minimize the potential for encountering previously unknown contaminated materials.