6.0 OTHER TOPICS

6.1 Energy Consumption

During construction of any of the Build Alternatives, energy requirements (i.e., diesel and gasoline fuel consumption) would depend on several factors, such as the scope of construction activities (e.g., roadway widening versus new construction); length of the corridor; and number and length of any new bridges. Because these factors are variable among the Build Alternatives, energy consumption during construction would likely also vary. However, the Build Alternatives associated with the construction of the new Interchange Alternatives (i.e., Alternatives A, B, C, and D) are likely to have a greater quantity of energy consumed during construction when compared to the Upgrade Alternative (Alternative F). As noted in Table 3.7-1, the total length of roadway improvements varies from a low of 2.44 lane miles for Alternative F to a high of approximately 6.25 lane miles for Alternative C. Of the new Interchange Alternatives, Alternative A would have the least impact in terms of lane miles of new road and reconstructed road. The only alternative that would require construction of a new bridge would be Alternative B, which would cross Shields Brook on new roadway alignment. All other crossings for all the Build Alternatives are likely to only require improvements to existing structures, or installation of small drainage structures, primarily pipe culverts. Based on the total lane miles of new and reconstructed roadway, as well as the need for a new bridge crossing, Alternative C would have the greatest energy consumption impacts during construction. Other than the No Build Alternative, Alternative F would be expected to have the lowest energy consumption during construction.

Similar to energy use during construction, the greater the length of new roadway, the greater the expected maintenance requirements would be. Any new roadway facility requires expenditures of additional energy for maintenance, which includes plowing, sanding, mowing, bridge maintenance, and maintenance of drainage systems, and repairing roadway surfaces. Thus, it would be expected that the greatest energy consumption impacts would be associated with Alternative C, followed in order of decreasing energy use by Alternative B, Alternative D, Alternative A, and Alternative F.

Construction of any of the Build Alternatives would improve traffic flow between I-93 and the Towns, thus improving fuel efficiency. As discussed in Section 4.2, existing traffic conditions on NH 102 through downtown Derry result in substantial delays during the morning and evening peak hours. These conditions result in decreased fuel efficiency and an increase in fuel consumption. In contrast, the Build Alternatives address these traffic issues and the associated, anticipated delays at key intersections/roadways. By reducing delays and improving the flow of traffic, energy consumption per vehicle would decrease in future years for all Build Alternatives.

6.2 Construction Impacts

The No Build Alternative would not result in any construction impacts. Any of the Build Alternatives would include construction impacts related to air quality, soil erosion and water quality, noise, visual resources, and traffic.

6.2.1 Air Quality

Air pollutants emitted from diesel- and gasoline-powered construction equipment would include oxides of nitrogen, CO, hydrocarbons, and particulate matter. Emissions from construction equipment may result in elevated ambient concentrations within the immediate vicinity of construction operations for short periods of time but are not expected to have a substantial impact.

Particulate matter (i.e., fugitive dust) can result from movement of construction equipment and transport of materials to and from a construction site. Dust emissions can also occur during site preparation activities such as grading, curb laying, or grubbing and removal of vegetation to prepare a site for construction. Fugitive dust would generally be a problem during periods of intense construction activity and would be accentuated by windy and/or dry conditions.

Dust emitted during most construction activities would be controlled by wetting unpaved areas in the construction zone, covering loads on all open trucks, and seeding all unvegetated areas as soon as practicable.

Although New Hampshire has no specific laws regulating emission controls on construction equipment, NHDES recommends that construction contracts for all work to be conducted in the highly populated I-93 corridor include requirements for heavy-duty diesel construction equipment to be retrofitted with particulate filters and other appropriate controls (such as oxidation catalysts) to reduce the impacts of construction equipment emissions on residential neighborhoods adjacent to the Project corridor. Requiring “clean diesel” practices for construction equipment such as Tier 4 standard engines or best available retrofit technology would help mitigate any temporary impacts. In accordance with EPA’s Non-Road Diesel Rule, as ultra-low sulfur diesel fuel is phased in, diesel engines used for the construction equipment will be required to use the fuel to better enhance emission controls.

6.2.2 Soil Erosion and Water Quality

Activities associated with construction would require grading. Grading would involve the stripping of existing vegetation and topsoil removal, excavation, and placement of fill. These activities would result in disturbance of surficial soils and subsoils within the footprints of any of the Build Alternatives. Exposure of previously vegetated soils could lead to erosion and water quality impacts, if not properly controlled.

To mitigate potential sedimentation impacts during construction, the Project commitments (see Section 11.0) include the development and implementation of a sedimentation and erosion control program. This sedimentation and erosion control plan (as part of the Stormwater Pollution Prevention Plan) would also be consistent with the National Pollutant Discharge Elimination System and the NHDES’ AoT permitting requirements and the 2017 Construction General Permit (see Section 4.11). Proper maintenance of erosion control devices such as hay bales and silt fences would be an integral part of the Project so as to ensure their adequate installation and use. Erosion control measures and construction schedules would require that areas stripped of vegetation be stabilized as soon as practicable after exposure to prevent soil loss by wind and water. Where appropriate, upslope drainage would be diverted around work areas, and temporary erosion and sediment controls would be installed as necessary during construction. BMPs for fertilizer application during construction would also be followed. In addition, mechanisms to avoid and control chemical leaks and spills from the construction

equipment would be instituted. With proper implementation and maintenance of a well-planned erosion and sedimentation control plan, impacts during construction should be temporary.

Minor road adjustments to limit stream and wetland crossings would continue to be evaluated for the Project to further minimize impacts. Where practical, efforts would be made to maintain a buffer strip of vegetation near streams. In those areas where vegetation removal is required, revegetation with appropriate seed mixes or plantings would be completed as soon as possible.

6.2.3 Noise

Construction noise differs from traffic noise in length, type, and duration of noise events. Construction noise is of a fixed duration and ceases at the completion of the construction phase. Construction noise, usually limited to daylight hours, differs from normal vehicular traffic noise, which continues throughout the day- and night-time hours. Additionally, construction-related noise is responsible for a variety of impulsive, discontinuous noise sources, such as jack-hammer and/or vibratory rollers. Traffic noise, although varying in level, is more continuous as a noise source. Temporary increase in noise levels would occur during the time period that construction takes place. Noise levels from construction, although temporary, can impact areas adjacent to the Project.

Impacts from construction noise depend upon the following criteria:

- Time and duration of construction activities;
- Equipment types; and
- Equipment usage cycle.

Typical construction phases for the Project may involve the following construction activities:

- **Demolition**: Removal of structures within the ROW.
- **Clearing and Grubbing**: Existing landscaping, along with unwanted earth and rock.
- **General Earthwork**: Alteration of site topography to prepare the area for the roadway design. Earth-moving operations would be required to prepare the roadbed. Trenches would be excavated for drainage materials.
- **Foundations**: Preparation for, and construction of, foundation support systems for both bridge and other primary foundation structures.
- **Paving Operations**: Preparation of the base layer, such as roadbed compaction and the laying of substrata material as well as surface paving operations.
- **Finishing**: Cleanup and landscaping.

Equipment such as bulldozers, scrapers, pavers, backhoe, graders, loaders, cranes, trucks, compressors, vibratory compactors, generators, and pile driving operations are typically used during construction.

Mitigation measures will be incorporated into the contract documents to lessen potential construction noise impacts. The following mitigation strategies will be employed to the extent practicable to limit the potential impact of noise:

- Source Control
  - All exhaust systems in good working order, also using properly designed engine enclosures, and intake silencers.
  - Regular equipment maintenance.
- Site Control
  - Placement of stationary equipment as far away from sensitive receptors as possible (e.g., pumps, compressors, aggregate crushers, AC plants, operators).
  - Choice of disposal sites and haul routes thereto.
  - Employing shielding where possible.
- Time and Activity Constraints
  - Schedule of operations to coincide with periods when people would least likely be affected.
  - Limiting working hours and work days to least noise-sensitive times.
- Community Awareness
  - Public notification of construction operations.
  - Methods to handle complaints.

6.2.4 Visual Resources

Some short-term visual impacts would occur during construction as a result of land clearing and earth-moving. Additionally, some views would be disrupted by the presence of temporary construction or access roads. Construction equipment and materials would be aesthetically incompatible with the existing natural, built, and aesthetic environments because of their contrast in material, form, and color. Because the duration of the presence of equipment and materials is temporary, construction-related visual impacts are anticipated to be minor; therefore, no mitigation has been proposed.

6.2.5 Traffic

Construction would create increase truck traffic on secondary roads, and unavoidable temporary delays would be experienced on I-93 during construction of the new ramps as the overpass bridge is constructed, traffic is shifted temporarily from one side to the other, equipment is moved around, and materials are delivered. Coordination would occur between local and state emergency response personnel to develop efficient incident management procedures and protocols. Intelligent Transportation System (ITS) technologies would be deployed to more efficiently manage traffic, enhance incident management during construction, and provide real-time traveler information. A detailed Traffic Control Plan, to include incident management procedures, would be instituted to reduce traffic-related, short-term impacts and minimize construction zone delays. Additional temporary delays would be experienced along secondary roads in the Town of Derry during widening activities. Businesses and their customers may experience some inconvenience due primarily to construction activities along their frontage. Construction activities would be coordinated with property owners to ensure that reasonable access to properties is maintained. Temporary signing and other issues related to temporary relocation of access points, caused by construction activities, would be appropriately addressed on an individual basis.

6.3 Relationship between Short-term Use of the Environment and the Maintenance and Enhancement of Long-term Productivity

Improving traffic flow between I-93 and the Derry-Londonderry area is perceived as a solution to current and forecasted traffic delays and safety issues. It is also viewed as an important factor in facilitating future economic growth in the communities. The proposed roadway improvements address these needs as identified by the communities, and are based on comprehensive planning studies that go back more than 20 years, and were undertaken in cooperation with NHDOT and FHWA. These planning studies have taken into consideration the need for transportation improvements using predicted regional future area growth and land use patterns, and information derived from traffic modeling. In more general terms, transportation improvements in NH are subject to a comprehensive planning process by the state. Approval of a highway project is contingent upon the fact that local short-term impacts and use of resources by the Project are determined to be consistent with the maintenance and enhancement of long-term productivity for the state.

Each Build Alternative would have similar short-term impacts upon environmental resources in the study area. Short-term impacts associated with construction within the study area would include increased noise, temporary reduction in air quality, potential water quality impacts resulting from soil erosion, removal of vegetation, traffic delays/increases, disturbance of wildlife habitat, and visual impacts. Most of these short-term impacts would be mitigated and would stop after completion of the Project. Short-term benefits would include additional employment opportunities and revenues for the local economy realized during the construction period.

Socioeconomic impacts associated with the Build Alternatives would include loss of residences, businesses, and/or open space or agricultural land; changes to the character of neighborhoods; possible devaluation of properties near any proposed roadway; and loss of associated tax revenue for the communities. Some businesses could also experience a decrease in revenue due to loss of parking and diminished customer accessibility while construction is underway. The Build Alternative alignments could also impact planned future development, both residential and commercial in some areas. However, these economic impacts would be compensated for in the long-term by improving access to other developable parcels. The total annual property tax losses to the Towns would be small, particularly in relation to the potential additional tax revenues from future development and/or redevelopment. In addition, loss of residences and businesses would have a minimal impact on the community due to an adequate supply of available properties for sale or lease within the study area as a whole. Therefore, the financial impacts on the Towns and the economic impacts caused by direct displacements are expected to be minor.

Natural resource impacts associated with roadway projects can include impacted surface water quality, increased stormwater runoff, and changes in noise levels and traffic patterns. The degradation, loss, and fragmentation of wetlands and wildlife habitat could result in long-term impacts on animal populations within the study area. These negative impacts would likely be partially offset by the permanent habitat protection and enhancement provided in the wetland mitigation areas. Impacts on archaeological resources are not anticipated.

6.4 Irreversible and Irretrievable Commitment of Resources

Implementation of the Project would involve a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for a highway interchange and connector road. If a greater need arises in the future for use of the land or if the highway facility is no longer needed, the land can be converted to another use; however, there is no reason to believe such a conversion will ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material would be expended. Additionally, labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply, and their use would not have an adverse effect upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of local, state, and federal funds which are not retrievable.

The commitment of these resources is based on the concept that residents in Derry and Londonderry would benefit by the improved quality of transportation services which are anticipated to outweigh the commitment of these resources.