over Fontana Dam may generate security concerns and would have the potential to increase the structure's maintenance costs.

3.4.1 Northern Shore Corridor (Initial Concept)

The Northern Shore Corridor continues west past the Lake View Road tunnel on a course that generally follows the northern shore of Fontana Lake to the vicinity of Fontana Dam, for a total of roughly 27 miles (43.5 km). This corridor utilizes remaining portions of NC 288 to the extent possible. Major bridge crossings of the Forney Creek, Hazel Creek, and Eagle Creek embayments would be necessary.

3.4.2 Interior Corridor

The Interior Corridor turns to the north from the Lake View Road tunnel to follow Bear Creek Valley as it continues into the interior of GSMNP. After its climb levels off, the corridor follows the mountainside. Just east of Hazel Creek, the corridor turns south to tie into the Northern Shore Corridor in the vicinity of the confluence of the Hazel Creek embayment and Fontana Lake. Major bridge crossings of the Hazel Creek and Eagle Creek embayments would be required. This route continues to follow the Northern Shore Corridor to the vicinity of Fontana Dam. A tunnel would be required where the topography transitions from valley to mountainside. This corridor is roughly 26 miles (41.8 km) in length.

3.4.3 Flint Gap Corridor

The Flint Gap Corridor would follow the Northern Shore Corridor from the Lake View Road tunnel for roughly 16 miles (25.7 km) to just east of Hazel Creek. From here, it would continue north to northwest toward the interior of GSMNP. Just west of Eagle Creek, the corridor would turn south to tie into the Northern Shore Corridor in the vicinity of the confluence of the Eagle Creek embayment and Fontana Lake. This route would continue to follow the Northern Shore Corridor to the vicinity of Fontana Dam. This corridor is the longest, with a total length of roughly 34 miles (54.7 km).

3.5 Potential for Major Bridges

The partial-build and build alternatives have the potential to cross one or more very deep and wide bodies of water. Fontana Dam created a reservoir that is in excess of 200 feet (61 m) deep. This area includes Fontana Lake as well as the impounded waters of major creeks, such as Forney, Hazel and Eagle creeks. It is anticipated that crossings of these water bodies would have spans ranging from 1,500 to 3,000 feet in

length. Bridge substructure height (water depth plus height above water) could range from 300 to 600 feet (91.4 to 182.9 m). Preliminary consideration of major bridge crossings indicates the need for non-conventional structures.

Non-conventional structures are able to accommodate the expected combination of relatively long spans and high substructure support columns related to the deep water levels and the height above water. These types of structures would allow potential roadway designs to follow the existing topography more closely at major creek and lake crossings. This ability to more closely follow the topography would minimize impacts by eliminating or reducing the need for steep cuts (reducing excavation) and would potentially reduce the quantity and area of retaining walls that may be required.

There are several options for designing non-conventional structures, including steel-arch bridges and cable-stayed bridges. These structures are typically large, which may impact visual resources within the existing environment. To minimize these impacts, special application and visualization techniques may be applied to create a more aesthetically sound structure that blends with the existing landscape. If a partial-build or build alternative requires a major bridge, the most appropriate and sensitive method would be utilized in the design. Opportunities to reduce bridge size may exist using a longer roadway, lower design speeds, or incorporating specialized engineering techniques that are appropriate for sensitive areas. Cost information and more detailed design will be evaluated in the impact phase for each alternative.

4. Framework for Decision Making – Summary of Potential Impacts

4.1 Comparison Matrix

The nine preliminary study alternatives were examined using the preliminary alternatives comparison matrix shown in Table 2. The matrix evaluates the preliminary study alternatives based on a list of variables that includes environmental, social, economic, and engineering constraints, as well as documented existing conditions data. Also shown in the matrix are the approximate lengths and corridor widths for each preliminary study alternative. The results of this initial review assisted in the decision to suggest six preliminary study alternatives for more detailed evaluation in the DEIS and eliminate (or modify) three from further study.

The quantities shown in the matrix are an approximation of known data within the 2,000-foot-wide (609.6-m-wide) study corridor and do not equate to impacts. The approximations are based on data obtained for the Existing Conditions Report and may change as more detailed studies are undertaken. Avoidance and minimization of