

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

impacts to the resources located within the corridors will be done during the functional designs. Benefits and/or impacts for the Monetary Settlement Alternative are not addressed with regards to what Swain County would do with the money. The county could choose to spend the money in ways that result in environmental (human and natural) and cultural benefits and/or impacts within the study area; however, these potential benefits and/or impacts are not taken into account in the matrix, as they are unknown.

#### 4.2 Alternatives Eliminated from Further Study or Modified

Three of the nine preliminary study alternatives were suggested for elimination from further study based on the matrix. The suggestions were made by comparing the alternatives, and those that were likely to have higher impacts were suggested for elimination. In addition, those alternatives that appeared to offer little benefit to the study area were also suggested for elimination. The three alternatives suggested for elimination are the Buckeye Branch Bridge Corridor, the Interior Corridor, and the Flint Gap Corridor. Reasons for elimination are discussed below.

##### 4.2.1 Buckeye Branch Bridge Corridor

When compared with the other preliminary study alternatives, this corridor would have minimal benefits for local communities and GSMNP visitors. Benefits associated with this alternative would include a short segment of new vehicular access within GSMNP and a new connection between GSMNP and the Nantahala National Forest. These benefits are not expected to justify the cost and environmental impacts associated with the corridor and a major bridge crossing of Fontana Lake. This alternative was recommended for elimination because it would likely provide few enhancement opportunities to the GSMNP experience and likely would not satisfy the 1943 Agreement.

##### 4.2.2 Interior Corridor

When compared with the other corridors, the Interior Corridor would likely have a high potential to fragment habitat, impact wildlife, and alter the backcountry experience. While problematic rock formations are located throughout the study area, this corridor would involve construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. An alternative in this corridor may generate moderate increases in the number of visitors to the study area, and the new access in GSMNP may indirectly

provide moderate economic development opportunities in Bryson City and other study area communities. This corridor would have the potential to moderately impact the AT. Although this corridor complies with the original intent of the 1943 Agreement, the cumulative impact of the factors mentioned above are expected to be greater than those of the alternatives recommended for detailed study in the DEIS. Therefore, this corridor was recommended for elimination.

#### 4.2.3 Flint Gap Corridor

The Flint Gap Corridor, when compared with the other corridors, would likely have a high potential to fragment habitat, impact wildlife, and alter the backcountry experience. In addition, this corridor would likely impact a high number of potential cultural resource sites and streams. While problematic rock formations are located throughout the study area, this corridor would involve construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. This corridor may generate moderate increases in the number of visitors to the study area and may indirectly provide moderate economic development opportunities in Bryson City and other study area communities. This corridor would have the potential to moderately impact the AT. This corridor would avoid major bridge crossings at the Hazel Creek and Eagle Creek embayments by diverting north from the Northern Shore Corridor toward the interior of GSMNP. While this corridor complies with the original intent of the 1943 Agreement, the Flint Gap Corridor was recommended for elimination because of the impacts mentioned above. (Note: Based on public interest, this corridor was later modified to reduce impacts and go forward in the NEPA process for detailed study in the DEIS. The modification of the Flint Gap Corridor into what is later referred to as the Northern Shore Corridor [baseline] addressed public requests to avoid major bridge crossings and provide access to the former community area of Proctor. The modifications are explained in more detail in Section 7.3.)

#### 4.3 Alternatives Initially Suggested for Detailed Study in the DEIS

Six alternatives were initially suggested for detailed study in the DEIS and presented to the public and resource agencies for review and comment. Information on why these alternatives were suggested for detailed study is included below. Four of the six alternatives suggested for detailed study are partial-build or build corridors. The remaining two alternatives are the No-Action Alternative and the Monetary Settlement Alternative. Figure 8 shows the partial-build and build alternatives that were initially suggested for detailed study in the DEIS.

#### 4.3.1 No-Action

NEPA requires the No-Action alternative as a basis for comparing the potential benefits and impacts of other alternatives. This alternative would avoid study area disturbance and adverse impacts to cultural and natural resources; however, it would not meet the purpose of and need for the project.

#### 4.3.2 Monetary Settlement

Based on the Swain County Board of Commissioners Resolution, the Monetary Settlement may be a viable solution to settle the 1943 Agreement. It was suggested for detailed study in the DEIS because it would avoid disturbance and other adverse impacts to the existing natural environment, cultural resources, and recreational resources (including GSMNP, the AT, and the Nantahala National Forest). It would also provide Swain County with a monetary benefit. Swain County may choose to pursue economic development opportunities within the county's jurisdiction, which would potentially enhance public facilities, employment opportunities, and/or the local tourism industry. This alternative does not directly provide new opportunities to interpret local heritage within GSMNP, but Swain County may choose to pursue interpretive possibilities for local heritage within the county limits.

#### 4.3.3 Laurel Branch Picnic Area (Initial Concept)

Although the Laurel Branch Picnic Area (proposed to be located along or at the end of the existing section of Lake View Road) does not comply with the original intent of the 1943 Agreement, it may be a viable solution to settle the 1943 Agreement. It was suggested for detailed study in the DEIS because it would provide a new destination and additional opportunities to interpret local heritage with minor impacts to the natural environment and would have relatively no impacts to the GSMNP backcountry experience. This alternative would avoid disturbance and other adverse impacts to the AT and the Nantahala National Forest. The new facilities would likely attract visitors to the Bryson City entrance of GSMNP. The interpretive trail would provide an opportunity to explore stream ecology along Laurel Branch, while roadside signs would provide a tribute to local heritage. In addition, this alternative may indirectly provide minor economic development opportunities for Bryson City. Section 8.3 of this report details the refined concept for this alternative.

#### 4.3.4 Bushnell Area (Initial Concept)

Based on previous public comment, the Bushnell Area may be a viable solution to settle the 1943 Agreement. It was suggested for detailed study in the DEIS because it would provide the combination of a new destination and new vehicular access within GSMNP with relatively low potential impacts to the natural environment and the GSMNP backcountry experience as compared with the other preliminary study alternatives. This alternative would avoid disturbance and other adverse impacts to the AT and the Nantahala National Forest. It would likely attract visitors to the Bryson City entrance of GSMNP, which may indirectly provide moderate economic development opportunities for Bryson City. This alternative would avoid construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. In addition, this alternative has the potential to provide access to cultural resources for interpretive opportunities and heritage recognition. Furthermore, it would offer a new trailhead for access to the backcountry. Section 8.4 of this report details the refined concept for this alternative.

#### 4.3.5 Cable Cove Bridge Corridor

The Cable Cove Bridge Corridor was suggested for detailed study in the DEIS because it would likely have fewer impacts than the other build alternatives and appears to comply with the original intent of the 1943 Agreement by providing vehicular access along most of the northern shore of Fontana Lake. This new route and connection between GSMNP and the Cable Cove Recreation Area may generate moderate increases in the number of visitors to the study area. This alternative may also have the potential to indirectly provide economic development opportunities for Bryson City and other study area communities. As compared with the alternatives that terminate near Fontana Dam, this alternative's crossing over Fontana Lake would avoid two other major bridge crossings (one each at the Hazel Creek and Eagle Creek embayments). While problematic rock formations are located throughout the study area, the Cable Cove Corridor would avoid construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. In addition, this alternative would avoid impacts to the AT. Overall, environmental impacts associated with this alternative are expected to be generally moderate as compared with the other preliminary study alternatives.

#### 4.3.6 Northern Shore Corridor (Initial Concept)

This corridor was suggested for detailed study in the DEIS because it would likely have fewer impacts than the two build alternatives recommended for elimination and would comply with the original intent of the 1943 Agreement by providing vehicular access along the northern shore of Fontana Lake. This new vehicular access may have the potential to indirectly provide moderate economic development opportunities for Bryson City and other study area communities. In addition, this alternative may generate moderate increases in the number of visitors to the study area. While problematic rock formations are located throughout the study area, the Northern Shore Corridor would likely involve construction west of the confluence of Hazel Creek and Fontana Lake, where the underlying rocks are believed to have the highest potential for acid production and are likely to contain higher concentrations of metallic minerals than the surrounding rocks. Impacts through this area would be reduced through the use of major bridge crossings at the Hazel and Eagle Creek arms of Fontana Lake. As compared with corridors that are located farther north toward the interior of GSMNP, the proposed location of this corridor along the northern shore of Fontana Lake would involve topography with generally less drastic elevation changes and would reduce the potential for habitat fragmentation. The Northern Shore Corridor would moderately impact the GSMNP backcountry experience, and its terminus near Fontana Dam would have the potential to moderately impact the AT, as compared with the other alternatives. This study corridor, relative to the other corridors, would traverse the largest amount of the water supply watershed critical area, the most wetlands (per the National Wetland Inventory), and the largest area of floodplains (per the 100-year designations by the Federal Emergency Management Agency). Overall, environmental impacts associated with this alternative are expected to be generally moderate to high as compared with the other preliminary study alternatives.

## 5. Public Input

Five public meetings were held in February/March 2004 for the Alternatives Development Phase of the North Shore Road EIS. Participants were provided information on the preliminary study alternatives, and they suggested detailed study alternatives for review and comment. The Preliminary Study Alternatives were presented as suggestions that could be modified or combined based on public input and agency coordination. Appendix D includes the summaries of comments received related to the preliminary study alternatives, which were derived from individual input related to the North Shore Road EIS project. Public comments were obtained through transcripts and other written correspondence sent to the project post office box, the North Shore Road project website, the NPS, and the FHWA. The tone and content of