



Great Smoky Mountains National Park

Environmental Assessment

Rehabilitate Newfound Gap Road and Reconstruct Stone Masonry Guardwalls
Milepost 0.0 to Milepost 14.5, Sevier County, Tennessee
Projects PRA-GRSM 1A25, 1A26 and 1A28

March 2010

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PROJECT SUMMARY

The Great Smoky Mountains National Park is located within the Appalachian Mountains of North Carolina and Tennessee. Within the Park is Newfound Gap Road, a 31-mile-long road, connecting Gatlinburg, Tennessee, with Cherokee, North Carolina. The road climbs from Sugarlands Valley in Tennessee to cross the crest of the Appalachian Mountains at Newfound Gap. From the gap it descends along the Thomas Ridge into the Oconaluftee River Valley.

This environmental assessment (EA) addresses the proposal by the National Park Service (NPS) to rehabilitate a 14.5-mile section of Newfound Gap Road from Gatlinburg, Tennessee, to the Newfound Gap Overlook Parking Area. The Park's goal is to provide a safe, long-lasting driving surface for visitors and Park staff. This document determines which aspects of the proposed action have potential for social, economic, or environmental impacts, and it identifies measures that may mitigate adverse environmental impacts. Also included are public involvement and coordination/consultation with other government agencies.

The purpose of the proposed project is to rehabilitate Newfound Gap Road in a manner that protects the resources and values of Great Smoky Mountains National Park and

- improves the overall safety of the road for both Park staff and visitors
- preserves the culturally significant features and contributing elements of the road and guardwalls
- enhances visitor use, enjoyment, and historic interpretation of the Park
- provides a long-lasting driving surface for visitors and Park staff and improves operational efficiency, reliability, and sustainability by decreasing maintenance required to keep both the road and guardwalls safe for public use

Rehabilitation of this 14.5-mile section of Newfound Gap Road is needed to improve the condition of the road and improve roadway safety. These improvements are needed to address the following:

- Deterioration of the road, such as signs of wear along the road edges and traveling surface, and deterioration of mortar joints and loose or missing stones in some guardwalls
- Safety concerns such as pavement edge drop-offs, guardwall heights in certain locations, and roadside hazards
- Circulation and parking problems resulting in traffic back-ups along Newfound Gap Road and informal parking at high-use areas
- Impacts on the historic character of Newfound Gap Road as a result of the continued deterioration of the road
- The increasing cost of routine maintenance and intermittent repairs due to the continuing deterioration of the road and guardwalls

This EA evaluates two alternatives: alternative A, no action, and alternative B, rehabilitation of Newfound Gap Road. Under the no action alternative, the Park would continue to implement select repairs to Newfound Gap Road as funding allows. However, the roadway and related features along Newfound Gap Road would continue to deteriorate. Should the no action alternative be selected, the NPS would respond to future needs and conditions without major actions or changes in the present course. Repair and/or maintenance to the roadway and related features would be conducted where there is specific need for critical and emergency repairs. Regular maintenance would be carried out as funding allows. Frequent patching of cracks and potholes in the paved surfaces of the roadway and repairs to the remaining historic stone guardwalls would continue as needed to maintain a safe condition for public use. The overall condition of the stone guardwalls would continue to degrade.

Alternative B would improve the safety of Newfound Gap Road, improve the condition of the road and its associated features, and maintain the integrity of the Park resources. Specific activities under the proposed action, described in greater detail in the “Alternatives” chapter, would include

- Rehabilitation of the road surface, including spot repair/reconstruction, pavement milling, and a new pavement overlay
- Rehabilitation of road shoulders, where needed, to restore shoulders to the proper height and grade
- Reconstruction of settled sections of roadway to restore stability of embankment
- Rehabilitation of existing stone masonry guardwalls, including minor repairs, replacement of wall elements in-kind, or rebuilding walls to their original design height
- Reconstruction of guardwall sections to meet current crashworthiness criteria in areas with a demonstrated safety risk
- The addition of new guardwalls and/or guardrail extensions or transitions in areas with a demonstrated safety risk

This EA has been prepared in accordance with the National Environmental Policy Act of 1969 as amended (NEPA); implementing regulations, 40 CFR 1500–1508; Department of the Interior (DOI) NEPA Regulations 43 CFR 46 (DOI 2008), and NPS Director’s Order 12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2001). Compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966 will occur simultaneously with the NEPA process.

Note to Reviewers and Respondents:

If you wish to comment on the EA, you may mail comments directly or submit them electronically. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Mailed comments can be sent to:

Superintendent
Great Smoky Mountains National Park
Rehabilitation of Newfound Gap Road – EA
107 Park Headquarters Road
Gatlinburg, TN 37738

Comments can also be submitted on-line by following the appropriate link at:

<http://parkplanning.nps.gov/GRSM>

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Acronyms and Abbreviations

BPR	Bureau of Public Roads
CCC	Civilian Conservation Corps
CEQ	U.S. Council on Environmental Quality
CLA	Cultural Landscape Assessment
DOI	Department of the Interior
DSC	Denver Service Center
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973, as amended
FHWA-EFLHD	Federal Highway Administration, Eastern Federal Lands Highway Division
GMP	general management plan
LOS	level of service
MM	mile marker
mph	miles per hour
MSA	Metropolitan Statistical Area
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPOMA	National Parks Omnibus Management Act of 1998
NPS	National Park Service
NRHP	National Register of Historic Places
SHPO	State Historic Preservation Officer
STARS	Service-wide Traffic Accident Reporting System
THPO	Tribal Historic Preservation Officers
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service

PURPOSE OF AND NEED FOR ACTION

The National Park Service (NPS), in cooperation with the Federal Highway Administration, Eastern Federal Lands Highway Division (FHWA-EFLHD), proposes to rehabilitate a 14.5-mile section of Newfound Gap Road within Great Smoky Mountains National Park from the Park boundary with Gatlinburg, Tennessee, to the Newfound Gap Overlook Parking Area. Newfound Gap Road is the principal north-south roadway within the Park and the only trans-mountain roadway that completely traverses the Park. It stretches approximately 31 miles from the Park boundary in Gatlinburg, Tennessee, to the Park boundary in Cherokee, North Carolina. The Park encompasses approximately 521,347 acres (over 800 square miles) and is the most-visited park in the national park system, attracting more than 9 million visitors each year. Figure 1 is a vicinity map and Figure 2 is a map of the project area.

This environmental assessment (EA) analyzes the impacts that would result from the implementation of the proposed action alternative and the no action alternative. The National Environmental Policy Act of 1969 as amended (NEPA) requires federal agencies to explore a range of reasonable alternatives and to analyze what impacts the alternatives could have on the human environment, which the act defines as the natural and physical environment and the relationship of people with that environment.

The alternatives under consideration include a “no action” alternative, as required by NEPA regulations. The no action alternative in this document is the continuation of the current maintenance practices. One action alternative was developed during the planning process. This alternative meets the management objectives for Great Smoky Mountains National Park and also the purpose of and need for the action.

This EA has been prepared in accordance with the NEPA of 1969 and implementing regulations, 40 CFR 1500–1508, and NPS Director’s Order 12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making* (NPS 2001). Compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA) is occurring separate from the NEPA process.

PURPOSE OF THE ACTION

The purpose of the proposed action is to rehabilitate Newfound Gap Road in a manner that protects the resources and values of Great Smoky Mountains National Park and

- Improves the overall safety of the road for both Park staff and visitors
- Preserves the culturally significant features and contributing elements of the road and its guardwalls
- Enhances visitor use, enjoyment, and historic interpretation of the Park
- Provides a long-lasting driving surface for visitors and Park staff and improves operational efficiency, reliability, and sustainability by decreasing maintenance required to keep both the road and guardwalls safe for public use

NEED FOR THE ACTION

Rehabilitation of this 14.5-mile section of Newfound Gap Road is needed to improve the condition of the road and improve roadway safety. These conditions include

- Deterioration of the road, such as signs of wear along the road edges and traveling surface, and deterioration of mortar joints and loose or missing stones in some guardwalls
- Safety concerns such as pavement edge drop-offs, guardwall heights in certain locations, and roadside hazards

- Circulation and parking problems resulting in traffic back-ups along Newfound Gap Road and informal parking at high-use areas
- Impacts on the historic character of Newfound Gap Road as a result of the continued deterioration of the road
- The increasing cost of routine maintenance and intermittent repairs due to the continuing deterioration of the road and guardwalls

The proposed road rehabilitation would bring Newfound Gap Road into good condition for its intended use, preserve the historic character of the road, enhance visitor enjoyment of the Park, and improve public safety.

PURPOSE AND SIGNIFICANCE OF THE PARK

Great Smoky Mountains National Park was established by an Act of Congress (16 USC 403) on May 22, 1926. The Park's purpose is to preserve exceptionally diverse resources and to provide for public benefit from and enjoyment of those resources in ways which will leave them basically unaltered by human influences.

Newfound Gap Road and other roads within the Park are important resources and are the primary means by which the majority of visitors experience the Park. Great Smoky Mountains National Park encompasses more than 800 square miles in the states of Tennessee and North Carolina. It is world renowned for the diversity of its plant and animal resources, the beauty of its ancient mountains, the quality of its remnants of American pioneer culture, and the depth and integrity of the wilderness sanctuary within its boundaries.

The Park's fundamental significance lies in its extraordinary quality as a sanctuary; the mountain ridges, valleys, and streams create unique ecosystems that provide refuges for hundreds of plants and animal species. Great Smoky Mountains National Park is the most biologically diverse area in the entire national park system.

The enabling legislation for the Park states, "The tract of land in the Great Smoky Mountains in the States of North Carolina and Tennessee, being approximately seven hundred and four thousand acres, recommended by the secretary of the interior in his report of April 14, 1926, which area . . . shall be known as the Great Smoky Mountains National Park: Provided, that the United States shall not purchase by appropriation of public moneys any land within the aforesaid areas, but that such lands shall be secured by the United States only by public or private donation. . ." That Act further defined the purpose by reference to the NPS Organic Act of August 25, 1916, which states "the fundamental purpose of the national parks is to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."

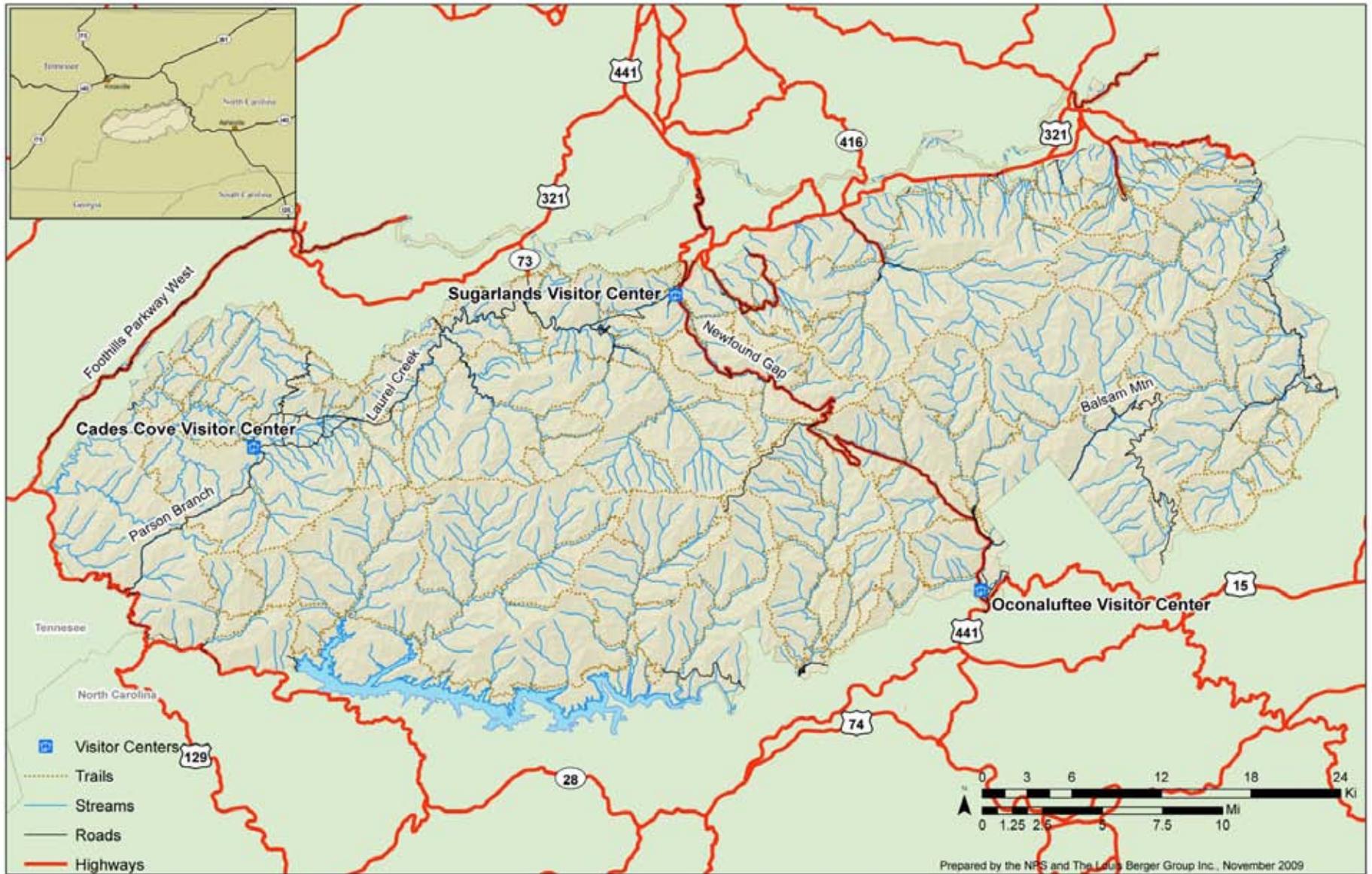


FIGURE 1: VICINITY MAP

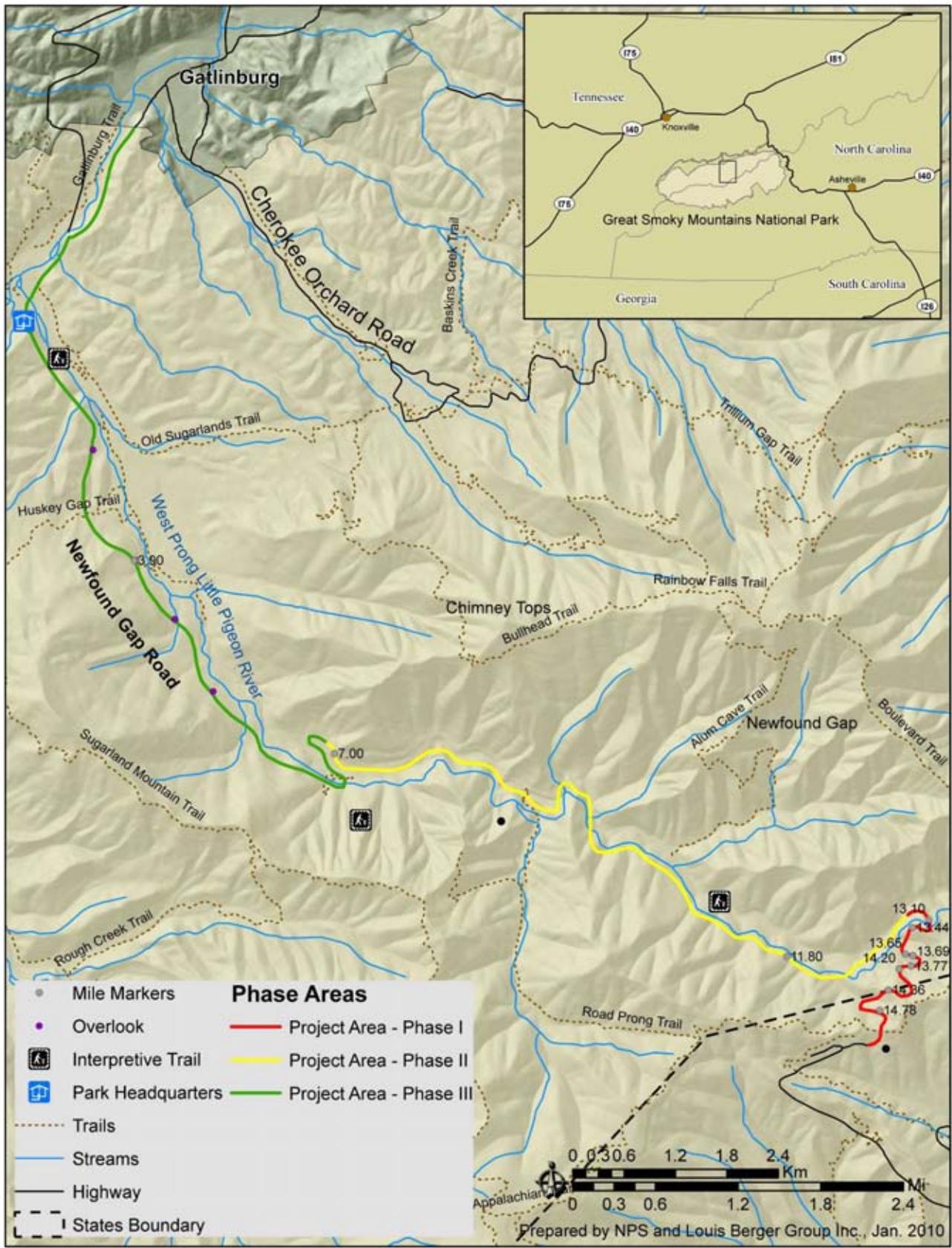


FIGURE 2: PARK/PROJECT AREA MAP

PARK PURPOSE

The purpose of Great Smoky Mountains National Park is to preserve its exceptionally diverse natural and cultural resources, and to provide for public benefit from and enjoyment of those resources in ways that will leave them basically unaltered by modern human influences.

PARK SIGNIFICANCE

The primary significance of Great Smoky Mountains National Park can be summarized as

- The extraordinary diversity and abundance of its plants and animals
- The beauty of its mountain terrain and waterways
- The quality of its remnants of pioneer culture
- The sanctuary it affords to those resources and for its modern human users

PROJECT BACKGROUND AND RELATED PLANS

The Park is a designated World Heritage Site and International Biosphere Reserve. It is distinguished by an extraordinary diversity of natural resources, an abundance of cultural resources, and the sanctuary it affords these resources. Some of the activities offered to visitors include birding, camping, hiking, fishing, and historic tours. Newfound Gap Road and other roads within the Park are important resources and, for the majority of Park visitors, these roads are the primary means by which they experience the Park.

Newfound Gap Road is a Class I Principal Park Road/Rural Parkway. The road is a significant cultural resource that embodies NPS landscape design principles of the 1930s. This road was originally constructed in 1930 by the North Carolina and Tennessee state highway departments; between 1932 and 1939, large portions of the road were reconstructed and a number of improvements were made under the direction of the NPS and the Bureau of Public Roads (BPR) (precursor to the Federal Highway Administration). These improvements included the construction of stone masonry bridges, culverts, guardwalls, and tunnel portals, as well as extensive landscape work on the road banks based on NPS park road design guidelines. Newfound Gap Road has been identified as a contributing resource to the proposed Park Development Historic District, which is documented and evaluated in a draft National Register of Historic Places (NRHP) Nomination/Historic Resource Study (NPS 1975).

The FHWA-EFLHD completed a comprehensive wall inspection report for Newfound Gap Road, dated January 2000, documenting wall conditions and providing recommendations for improvements. This report generally found the guardwalls in good condition; however, most do not meet current guardwall height standards. Guardwall height standards have been determined through crash testing performed in accordance with the National Cooperative Highway Research Program Report 350, *Recommended Procedures for the Safety Performance Evaluation of Highway Features* (NCHRP 1993). The height of a guardwall is primarily a function of the traveling speed of the vehicle. As the speed of traveling vehicles increases, the height of the guardwall required to be crashworthy also increases. Crashworthy barriers have more predictable outcomes designed to have an impacting vehicle be safely contained and redirected in a controlled manner.

In some locations, the guardwall is critical to the safety of the visitors, and the substandard height of the existing guardwall, ranging from 10 to 18 inches, is not sufficient. Since the January 2000 Wall Report, FHWA-EFLHD crash tested and approved a 22-inch-high stone-masonry-faced guardwall. This 22-inch height is the standard to which the guardwall sections would be reconstructed. Some guardwalls along Newfound Gap Road have been severely damaged due to vehicle impacts. The report noted approximately one-third of the guardwalls inspected have loose stones and/or need repointing.

The following laws, policies, and plans by the NPS, the state of Tennessee, or other agencies with neighboring land or relevant management authority are described in this section to show the constraints the proposed action must operate under and the goals and policies that it must meet.

NPS GUIDING LAWS, REGULATIONS, AND POLICIES

Three overarching environmental protection laws and policies guide the NPS in conducting NEPA analysis — NEPA and its implementing regulations, the National Parks Omnibus Management Act of 1998 (NPOMA), and the NPS Organic Act.

1. NEPA is implemented through regulations of the U.S. Council on Environmental Quality (CEQ) (40 CFR 1500–1508). The NPS has in turn adopted procedures to comply with the act and the CEQ regulations, as found in NPS Director’s Order 12, *Conservation Planning, Environmental Impact Analysis, and Decision-making* (2001), and its accompanying handbook, and the Department of the Interior (DOI) regulations implementing NEPA (Department Manual 12).
2. NPOMA (16 USC 5901 et seq.) underscores NEPA in that both are fundamental to NPS park management decisions. Both acts provide direction for articulating and connecting the ultimate resource management decision to the analysis of impacts, using appropriate technical and scientific information. Both also recognize that such data may not be readily available, and they provide options for resource impact analysis should this be the case.

NPOMA directs the NPS to obtain scientific and technical information for analysis. The NPS handbook for Director’s Order 12 states that if “such information cannot be obtained due to excessive cost or technical impossibility, the proposed alternative for decision will be modified to eliminate the action causing the unknown or uncertain impact or other alternatives will be selected” (sec. 4.4).

Section 4.5 of Director’s Order 12 adds to this guidance by stating, “when it is not possible to modify alternatives to eliminate an activity with unknown or uncertain potential impacts, and such information is essential to making a well-reasoned decision, the NPS will follow the provisions of the regulations of CEQ (40 CFR Part 1502.22).” In summary, the NPS must state in an EA or impact statement (1) whether such information is incomplete or unavailable; (2) the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific adverse impacts relevant to evaluating the reasonably foreseeable significant adverse impacts; and (4) an evaluation of such impacts based on theoretical approaches or research methods generally accepted in the scientific community.

3. The 1916 NPS Organic Act (16 USC 1) commits the NPS to making informed decisions that perpetuate the conservation and protection of park resources unimpaired for the benefit and enjoyment of future generations. In the Organic Act, Congress directed the DOI and the NPS to manage units of the national park system “to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such a means as will leave them unimpaired for the enjoyment of future generations” (16 USC 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that NPS must conduct its actions in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress” (16 USC 1a-1).

The Organic Act and its amendments afford the NPS latitude when making resource decisions about visitor recreation and resource preservation. Despite this discretion, courts consistently interpret the Organic Act and its amendments to elevate resource conservation above visitor recreation. See *Michigan United Conservation Clubs v. Lujan*, 949 F.2d 202, 206 (6th Cir. 1991), holding that in enacting the Organic Act “Congress placed specific emphasis on conservation”; *National Rifle Association of America v. Potter*, 628 F. Supp. 903, 909 (D.D.C. 1986), stating that “in the Organic Act Congress speaks of but a single purpose, namely, conservation.” By these acts, Congress “empowered [the NPS] with the authority to determine

what uses of park resources are proper and what proportion of the park's resources are available for each use" (Bicycle Trails Council of Marin v. Babbitt, 82 F.3d 1445, 1453 [9th Cir. 1996]). The NPS *Management Policies 2006* also recognize that resource conservation takes precedence over visitor recreation. The policy dictates "when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant" (NPS 2006, sec. 1.4.3).

Because conservation remains predominant, the NPS seeks to avoid or to minimize adverse impacts on Park resources and values. Yet, the NPS has discretion to allow negative impacts when necessary and appropriate to fulfill the purposes of the park, as long as the impact does not constitute impairment (NPS 2006, sec. 1.4.3).

While some actions and activities cause impacts, the NPS cannot allow an adverse impact that constitutes resource impairment (NPS 2006, sec. 1.4.3). The Organic Act prohibits actions that permanently impair park resources unless a law directly and specifically allows for the action (16 USC 1a-1). An action constitutes an impairment when its impacts "harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values" (NPS 2006, sec. 1.4.5). To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts" (NPS 2006, sec. 1.4.5). This EA, therefore, analyzes the effects of the management alternatives on park resources and values and determines if these effects would cause impairment.

NPS *Management Policies 2006* requires an analysis of potential effects to determine whether or not actions would impair park resources (NPS 2006). The fundamental purpose of the national park system is to conserve park resources and values for the use and enjoyment of future generations. NPS managers have the discretion to allow impacts on park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. That discretion to allow certain impacts within the Park is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible manager, would harm the integrity of park resources or values. An impairment is a subset of major adverse impacts that has an effect on a resource or value whose conservation is

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park,
- Key to the natural or cultural integrity of the park, or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Other applicable NPS guiding laws, regulations, and policies include the following.

Redwood National Park Act of 1978, as Amended

All national park system units are to be managed and protected as parks, whether established as a recreation area, historic site, or any other designation. This act states that the NPS must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

Wilderness Act of 1964

With the signing of the Wilderness Act by President Lyndon B. Johnson on September 3, 1964, the National Wilderness Preservation System was established to "...secure for the American people of present and future generations the benefits of an enduring resource of wilderness."

The Wilderness Act states that “In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.” Although there is great similarity between the NPS Organic Act and the Wilderness Act, Congress applied the Wilderness Act to NPS to strengthen its protective capabilities. No designated wilderness area is located in the proposed project area.

NPS Management Policies 2006

This is the basic NPS-wide policy document, adherence to which is mandatory unless specifically waived or modified by the NPS director or certain departmental officials, including the secretary. Section 9 of these policies direct how NPS addresses park facilities, such as roadways, and would be applicable to this action.

OTHER APPLICABLE FEDERAL LAWS, EXECUTIVE ORDERS, REGULATIONS, AND POLICIES

The NPS is also required to comply with the following laws, executive orders, regulations, and policies in developing this EA for the Newfound Gap Road rehabilitation.

Endangered Species Act of 1973, as Amended

This act requires all federal agencies to consult with the secretary of the interior on all projects and proposals with the potential to impact federally endangered or threatened plants and animals.

National Historic Preservation Act of 1966, as Amended

Section 106 of this act requires federal agencies to consider the effects of their undertakings on properties listed or potentially eligible for listing on the National Register. All actions affecting the Park’s cultural resources must comply with this law, which is implemented through 36 CFR 800.

Historic Sites Act of 1935

This act declares as national policy the preservation for public use of historic sites, buildings, objects, and properties of national significance. It authorizes the secretary of the interior and the NPS to restore, reconstruct, rehabilitate, preserve, and maintain historic or prehistoric sites, buildings, objects, and properties of national historical or archeological significance.

Federal Noxious Weed Act, 1975

The Federal Noxious Weed Act (7 USC 2801–2814, January 3, 1975, as amended 1988 and 1994) provides for the control and management of nonindigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.

Executive Order 13112 – Invasive Species (1999)

This executive order requires the NPS to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts invasive species cause.

Executive Order 11593 – Protection and Enhancement of the Cultural Environment (1971)

This executive order directs the NPS to support the preservation of cultural properties and to identify and nominate to the National Register cultural properties within the Park and to “exercise caution . . . to assure that any NPS-owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered.”

Director’s Order 28 – Cultural Resource Management (1998)

NPS Director’s Order 28 directs the NPS to protect and manage cultural resources in its custody through effective research, planning, and stewardship in accordance with the policies and principals contained in the

NPS *Management Policies 2006*. This director's order is carried out through the NPS 28 Cultural Resource Management Guideline that provides the fundamental concepts of cultural resource management for the NPS.

GREAT SMOKY NATIONAL PARK PLANNING DOCUMENTS

Great Smoky Mountains National Park General Management Plan

The 1982 general management plan (GMP) for the Great Smoky Mountains National Park serves as a guide for meeting the objectives established for the Park as a public statement of NPS management intentions. The GMP establishes long-range strategies for resource management, visitor use, and development of an integrated park system. The proposed action is compliant with the Park's stated primary purpose of providing "for visitor enjoyment compatible with preserving the rich assemblage of natural resources."

SCOPING

The NPS divides the scoping process into two parts: internal scoping and external or public scoping. Internal scoping involves discussions among NPS personnel regarding the purpose of and need for management actions, issues, management alternatives, mitigation measures, the analysis boundary, appropriate level of documentation, available references and guidance, and other related topics.

Public scoping is the early involvement of the interested and affected public in the environmental analysis process. The public scoping process helps ensure that people have an opportunity to comment and contribute early in the decision-making process. For this planning document, project information was distributed to individuals, agencies, and organizations early in the scoping process, and people were given opportunities to express concerns or views and to identify important issues or even suggest other alternatives.

Together, internal and public scoping are essential elements of the NEPA planning process. The following sections describe the various ways scoping was conducted for this assessment.

INTERNAL SCOPING

Multiple internal scoping meetings were held among the NPS interdisciplinary team and FHWA-EFLHD to define the project purpose, need, and objectives; determine impact topics to be carried forward; and define the alternatives.

An internal scoping meeting was held at the Park on October 24, 2007. The meeting was attended by personnel from the Park, the NPS – Denver Service Center (DSC), the FHWA-EFLHD, and contractor staff. Based on these meetings, the interdisciplinary team defined the purpose, need, and objectives of the plan, identified potential issues, discussed preliminary alternatives, and defined data needs. The results of the meetings were captured in a report now on file as part of the administration record for this EA.

Project alternatives were developed through numerous meetings with the NPS interdisciplinary team and FHWA-EFLHD. Through these meetings, Park staff and FHWA-EFLHD reviewed the various roadway rehabilitation options for Newfound Gap Road and considered alternatives, which were adapted as needed following the completion of the Cultural Landscape Assessment (NPS 2009a), Crash Report (NPS 2004), and traffic counts conducted in April 2008. Throughout this process, the NPS has worked closely with the FHWA-EFLHD in the development of alternatives.

PUBLIC SCOPING

Public scoping efforts for this planning process focused on the means or processes to be used to include the public, the major interest groups, and local public entities. Based on past experience, Park staff places a high priority on meeting the intent of public involvement in the NEPA process and giving the public an opportunity to comment on proposed actions.

To notify interested parties of public scoping meetings, the Park sent 180 public scoping letters to Park neighbors and organizations inviting people to attend the meetings, describing the proposed rehabilitation of Newfound Gap Road, and soliciting public comments on the proposed action. Press releases, providing the same information as the public scoping letter, were published in six local and regional newspapers including

- The Mountain Press (Sevierville)
- The Daily Times (Maryville)
- The Knoxville News Sentinel
- The Asheville Citizens Times
- The Cherokee One Feather
- The Smoky Mountain Times (Bryson City)

The public scoping letters were mailed two weeks prior to the meetings, and the press releases were published one week before the meetings. Information regarding these meetings was also posted on the NPS Planning, Environment and Public Comment (PEPC) website (www.parkplanning.nps.gov/grsm).

PUBLIC SCOPING MEETINGS

Two separate public scoping meetings were held to discuss the proposed project. The meetings were held on Tuesday, January 15, and Thursday, January 17, 2008, at the Garden Plaza Hotel in Gatlinburg, Tennessee, and at the Holiday Inn in Cherokee, North Carolina. Because the proposed action would directly affect travel between Gatlinburg and Cherokee, two meetings were held to ensure public representation from both potentially affected communities. These public scoping meetings were held to obtain community feedback and to initiate public involvement on this proposed project. The public scoping comment period was open January 15 through February 20, 2008.

At each meeting, participants were asked to sign in and were provided a comment sheet to complete during the course of the open house or at their leisure. Six participants signed in at the scoping meeting in Gatlinburg, and eight participants signed in at the meeting in Cherokee. Each public scoping meeting was held as an open-house format where meeting participants could look at display boards and interact with Park personnel one on one. The displays illustrated the purpose and significance of the Park, how roads are defined by NPS, the project area, the purpose and need, the NEPA process, and how to comment on the proposed action.

PUBLIC SCOPING COMMENTS

The public scoping period was between January 15, and February 20, 2008. The public meetings included numerous methods for the community to provide comments. A table was provided at the meetings with comment sheets that could be filled out and returned. If the attendee chose not to fill out the comment sheet at the meeting, a return address was provided on the sheet to mail back to the Park. Those attending the meeting were also informed about additional opportunities to comment on the project, including directing comments to the NPS PEPC website.

Three public comments were received during the public scoping comment period. Comments included new rehabilitation options and opposition to the proposed action.

ISSUES

Issues describe problems or concerns associated with current impacts from environmental conditions or current operations, as well as problems that may arise from the implementation of any of the alternatives. Potential issues associated with this rehabilitation project were identified by the public, Park staff, and other agencies.

The primary concern of the Park, as identified during the internal scoping meeting, is to ensure the long-term safety of Park visitors traveling along Newfound Gap Road. Other identified issues and concerns are listed below.

IMPACT TOPICS

The following impact topics are discussed in the “Affected Environment” chapter and are analyzed in the “Environmental Consequences” chapter. The topics include those resources of concern that could be beneficially or adversely affected by the actions proposed under each alternative. The impact topics were used to examine the extent to which a resource would be affected by the actions of a particular alternative. These impact topics were identified based on issues brought up during scoping, federal laws, regulations, executive orders, NPS *Management Policies 2006*, and NPS knowledge of limited or easily impacted resources. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

NATURAL RESOURCES

Wildlife, Vegetation, and Threatened and Endangered Species. Construction activities associated with the rehabilitation of the road would occur primarily in paved or graveled surface areas that support little to no vegetation and are of low habitat value to wildlife. However, the roadway area is adjacent to vegetated areas that provide potential wildlife habitat that could be impacted temporarily by construction noise. Unique or important fish or fish habitat could possibly be affected by construction, as there is the potential for construction within close proximity to the river. Cold water trout streams are within the vicinity of the proposed project area. However, in correspondence dated January 28, 2009, the U.S. Fish and Wildlife Service (USFWS) stated that they do not anticipate impacts to aquatic resources, wetlands, or migratory birds to occur as a result of the proposed project. Therefore, the EA will analyze impacts to terrestrial wildlife and wildlife habitat.

The Endangered Species Act of 1973 (ESA), as amended, requires all federal agencies to use their authority in the furtherance of the conservation of rare, threatened, and endangered species. Federal agencies are required to consult with the USFWS to ensure any action authorized, funded, and/or carried out by the agency does not jeopardize the continued existence of any listed species or critical habitat. NPS policy also requires examination of the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species. To facilitate compliance with these mandates, the Park sent a letter in December 2007 to the USFWS regarding the potential for any federally or state-listed species that could be affected by the proposed rehabilitation of Newfound Gap Road. The USFWS responded on January 25, 2008, stating their concerns about the presence of known federally endangered species occurring on sites within three miles of certain sections of the project area (USFWS 2008). These species include the Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*), spreading avens (*Geum radiatum*), and the spruce-fir moss spider. Because these species have the potential to be located within the project area, this topic was carried forward for further analysis.

Water Quality. The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, is a national policy to restore and maintain the chemical, physical, and biological integrity of the nation’s waters, to enhance the quality of water resources, and to prevent, control, and abate water pollution. The NPS *Management Policies 2006* provides direction for the preservation, use, and quality of water originating in, flowing through, or adjacent to Park boundaries. The NPS seeks to restore, maintain, and enhance the quality of all surface and groundwaters within the Park, consistent with the 1972 Federal Water Pollution Control Act, as amended, and other applicable federal, state, and local laws and regulations.

Newfound Gap Road runs parallel to West Prong Little Pigeon River, which, in places, is between approximately 40 to 475 yards away from the road. The road crosses the river at several points. Because of the proximity of the roadway to this water body, this topic was carried forward for further analysis.

Wetlands. Executive Order 11900 (Protection of Wetlands) requires federal agencies to minimize the loss, destruction, or degradation of wetlands and enhance their natural and beneficial values. NPS Director's Order 77-1, Wetlands Protection, was developed for use by the NPS in carrying out its responsibilities under Executive Order 11990 to protect wetlands. It contains two main elements: 1) the text of Director's Order #77-1:Wetland Protection (last issued in 2002) in Section 2.0; and 2) detailed procedures (in Sections 3–5) by which the NPS will implement Director's Order #77-1 (NPS 2008). The NPS *Management Policies 2006*, Director's Order 2 (Planning Process Guideline) and Director's Order 12 (NEPA Guideline) provide direction on developments proposed in floodplains and wetlands. Wetlands are located in the vicinity of Newfound Gap Road, and could be impacted by the replacement or modification of culverts. Therefore, this topic was carried forward for further analysis.

Air Quality. The 1963 Clean Air Act, as amended (42 U.S. C 7401 et seq.), requires federal land managers to protect Park air quality. The act also assigns the federal land manager (park superintendent) an affirmative responsibility to protect the Park's air quality related values – including visibility, plants, animals, soils, water quality, cultural and historic resources and objects, and visitors – from adverse air pollution impacts. Section 118 of the 1963 Clean Air Act requires the NPS to meet all federal, state, and local air pollution standards. Since Sevier County, Tennessee, the location of the proposed action, is in non-attainment for ozone, and since the proposed action would result in construction emissions that could impact ozone levels, this topic was carried forward for further analysis.

CULTURAL RESOURCES (CULTURAL LANDSCAPES AND ARCHEOLOGY)

Newfound Gap Road is eligible for the NRHP. The road is used not only as a transportation route between the two states, but also as a scenic road with carefully planned views of the landscape for motorists and hikers. Pull-offs along the road provide places of rest for visitors, access to trails, and views of the landscape. The road-related stone masonry structures located along Newfound Gap Road were primarily built by the Civilian Conservation Corps (CCC) and reflect the rustic design aesthetic practiced by the NPS during the New Deal era. These structures include bridges, tunnels, culverts, guardwalls, retaining walls, and tree wells. The stone-masonry structures are the most visible and prominent character-defining features of the Newfound Gap Road cultural landscape. Archeology resources occur throughout the Park, and also have the potential to be located in the Newfound Gap Road area.

As outlined in 36 CFR 800, regulations issued by the Advisory Council on Historic Preservation implementing section 106 of the NHPA of 1966, as amended (16 USC 470 et seq), the potential impacts on cultural resources must be addressed. Under the "Criteria of Effect" (36 CFR 800.9 [a]), federal undertakings are considered to have an effect when they alter the character, integrity or use of a cultural resource, or qualities that qualify a property for listing on the NRHP. In addition to the NHPA, NEPA, the 1916 Organic Act, NPS *Management Policies 2006*, and NPS Director's Order 28 further require the NPS to consider the effects of their proposed actions on cultural resources. Because the rehabilitation of Newfound Gap Road, a historic structure within a cultural landscape with the potential for archeological resources, has the potential to impact these cultural resources through altering the historic fabric of these resources, this topic was carried forward for analysis in the EA.

TRAFFIC AND TRANSPORTATION

Newfound Gap Road stretches approximately 31 miles from the Park boundary with Gatlinburg, Tennessee, to the Park boundary with Cherokee, North Carolina. Newfound Gap Road is a Class I Principal Park Road/Rural Parkway and is the only paved road that crosses the Park from the North Carolina side to the Tennessee side of the Park. Disruption resulting from construction and/or road conditions could impact traffic and Park visitors. Because of the potential delays and traffic impacts to visitors during construction activities, this topic was carried forward for analysis.

VISITOR USE AND EXPERIENCE

During peak seasons, Newfound Gap Road is traveled by approximately 9,000 people per day (NPS 2004). Newfound Gap Road provides the only access to several of the Park's recreational areas including the Sugarlands Visitor Center, the Oconaluftee Visitor Center, Clingmans Dome Observation Tower (elevation 6,643 feet), several picnic and self-guided hiking trails, the Smokemont Ranger Station and developed campground, horseback riding rental facilities, and the Newfound Gap (elevation 5,046 feet). Newfound Gap Road is a designated State Scenic Byway in North Carolina and Tennessee. Continued deterioration of the road and construction-related traffic delays are a concern; thus, the topic of visitor use and experience has been retained for analysis within this EA.

VISITOR AND EMPLOYEE SAFETY

Newfound Gap Road is a highly trafficked artery through Great Smoky Mountains National Park. The existing paved surfaces on Newfound Gap Road have areas of moderate to severe rutting, potholes, and wear along the pavement edges. The surface is cracked and spalling, and has become uneven and rough. Many of the stone masonry guardwalls, constructed in the 1930s and 1940s, are deteriorating. Mortar joints have deteriorated and stones occasionally fall off the walls or are jarred loose by crashes. The deteriorated mortar has compromised the strength of some guardwalls. The presence of pavement edge drop-offs is a concern along Newfound Gap Road. These areas, where the pavement edge is higher than the ground below, present a potential safety hazard. These edge drop-offs typically result in areas where a vehicle tire could drop off the edge of pavement and where shoulder heights prohibit positive drainage into ditches, forcing water to run along the edge of pavement. The insides of curves are areas of specific concern for pavement edge drop-offs. Because of the current road deficiencies and potential impacts to visitor and employee safety, this impact topic was retained for analysis in this EA.

SURROUNDING COMMUNITIES

Blount, Sevier, Cocke, and Monroe Counties in Tennessee are situated on the northern end, and Graham, Jackson, Swain, and Haywood Counties in North Carolina occupy the southern vicinity of the Park. The residents of the surrounding community use Newfound Gap Road for transportation between North Carolina and Tennessee, and any changes in the condition of this roadway would impact those in the surrounding communities; therefore, this topic was carried forward for analysis in this EA.

PARK MANAGEMENT AND OPERATIONS

As previously stated, Newfound Gap Road provides access to several of the Park's administrative and recreational areas. Repair and/or maintenance to the road and related features requires frequent patching of cracks and potholes in the paved surfaces of the road, and repairs to the remaining stone guardwalls would continue as needed to maintain them. The proposed actions would likely affect Park management and operations as well as roadway maintenance during construction of the road; therefore, this impact topic was retained.

IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS AND CONSIDERATION

The following impact topics were eliminated from further analysis in this EA. A brief description for dismissal is provided for each topic. With mitigation, potential impacts to these resources would be negligible and local.

SOUNDSCAPES

In accordance with the NPS *Management Policies 2006* and Director's Order 47, Sound Preservation and Noise Management (NPS 2000), an important part of the NPS mission is preservation of natural soundscapes associated with national park units. Natural soundscapes exist in the absence of human-caused sound. Natural ambient soundscapes are the aggregate of all the natural sounds that occur in park units,

together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive, and can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and duration of human-caused sound considered acceptable varies among NPS units, as well as throughout each park unit, being generally greater in developed areas and less in undeveloped areas. Under the action and no action alternatives, sound-generating activities would include the use of construction equipments. Impacts from these potential sources of noise are discussed in the “Visitor Use and Experience” section and not as a separate impact topic.

SOILS AND GEOLOGIC RESOURCES

Road rehabilitation would occur within, or slightly outside of (less than 30 feet), the existing road prism. Road rehabilitation would occur on already existing soil and geologic disturbance or closely within; therefore, this topic was dismissed from further analysis in this EA.

GEOHAZARDS

Limited geohazards exist in the area of Newfound Gap Road, including a history of rock slides in the area. It is not expected that these rock slides would be impacted by the rehabilitation activities of the road as construction and operation would not create conditions that would encourage rock-slide events; therefore, this topic was dismissed from further analysis in this EA.

LAND USE

The rehabilitation of Newfound Gap Road would not impact occupancy, property values, ownership, or any type of land use because all road rehabilitation would take place within Park boundaries. As a result, this impact topic was dismissed from further analysis in this EA.

PRIME AND UNIQUE FARMLAND

No prime or unique farmland is present within Great Smoky Mountains National Park. There would be no impact on this resource from any of the alternatives; therefore, this topic was dismissed from further analysis in this EA.

MARINE OR ESTUARINE RESOURCES

Due to the geographic location of Great Smoky Mountains National Park, no marine or estuarine resources exist within the Park. As a result, this topic was dismissed from further analysis in this EA.

HISTORIC STRUCTURES, ETHNOGRAPHIC RESOURCES, AND MUSEUM COLLECTIONS

Impacts to Newfound Gap Road and the historic road structures are addressed in the “Cultural Landscapes” section of the EA; therefore, the topic of historic structures was not carried forward for analysis. No known ethnographic resource or museum collections would be disturbed by the proposed action, therefore these topics were not carried forward for analysis in the EA.

CLIMATE CHANGE

Climate change refers to any significant changes in average climatic conditions (such as mean temperature, precipitation, or wind) or variability (such as seasonality and storm frequency) lasting for an extended period (decades or longer). Recent reports by the U.S. Climate Change Science Program, the National Academy of Sciences, and the United Nations Intergovernmental Panel on Climate Change provide evidence that climate change is occurring and could accelerate in the coming decades.

While climate change is a global phenomenon, it manifests differently depending on regional and local factors. General changes that are expected to occur in the future as a result of climate change include hotter, drier summers, warmer winters, warmer water, and higher ocean levels, among other changes. Generally, worldwide, as temperatures are expected to rise, more water will evaporate from the oceans, causing more

downpours and increased snowfall. National Oceanic and Atmospheric Association data shows that in severe storms, the amount of rainfall per storm has increased by about 10% in recent decades. Changes in hydrology are expected to occur as a result of this change in precipitation patterns. Other examples of the potential impacts of climate change include rising temperatures that may also be the cause for changes in butterfly habitat ranges, which are shifting north in Europe and California. Alpine plants in Austria are moving to higher elevations as a possible result of rising temperatures. The Worldwide Fund for Nature has warned that a third of the world's habitat could disappear or change beyond recognition by 2100 (NPS 2009f).

Climate change is a far-reaching, long-term issue that could affect Great Smoky Mountain National Park, its resources, visitors, and management. Although some effects of climate change are considered known or likely to occur, many potential impacts are unknown. Much depends on the rate at which the temperature would continue to rise and whether global emissions of greenhouse gases can be reduced or mitigated. Climate change science is a rapidly evolving field with new information being developed continually.

Global air pollutants fall into two classes: ozone-depleting compounds (ODCs) and greenhouse gases, including carbon dioxide (CO₂), methane (CH₄), and nitrous oxides. These air pollutants tend to be long-lived in the atmosphere and have the ability to travel globally in both the troposphere and the stratosphere (upper layer of the atmosphere). The major pollutant gas contributing to global warming (85% of total) is CO₂, produced during the combustion of fossil fuels. CH₄ is the second largest contributor to greenhouse gas emissions and is emitted from agricultural lands, landfills, and natural wetlands. The Park has an extensive monitoring network and can evaluate trends over time and adapt as necessary.

The proposed activities would not likely result in substantial increases in global air pollutants from the proposed action(s) and would not alter climate locally. Implementation of the project, with limited construction equipment over a short time period, would cause a temporary increase in emissions from construction and cars idling in the area during construction, but would not measurably contribute to global climate change. The rehabilitation of Newfound Gap Road would not contribute cumulatively to the impacts on the Park's natural resources that may result from changes in climate that are expected over the next 50 years. Therefore, the topic of climate change was dismissed from further analysis in this EA.

SOCIOECONOMICS

Rehabilitation of Newfound Gap Road would involve the temporary employment of construction crews, potentially impacting the local economy. Under the proposed action, repairs would be done to the stone masonry guardwalls, where necessary. These repairs would include, but would not be limited to, repointing mortar joints, resetting loose stones, replacing missing stones or mortar, cleaning existing weep holes, and removing debris in front of the wall. The implementation of these repairs would require a small work crew, minimal traffic control, and a temporary work zone. It is assumed that the annual number of visitors to the Park and the associated visitor spending would continue as under current conditions. Therefore, impacts to the economic contribution of Park visitor spending from those outside the area would be long-term negligible adverse.

It is expected that Park spending on construction activities would increase under the action alternative. As a result, there would be short-term beneficial impacts to the businesses that support this construction activity. Additionally, this construction spending would benefit other downstream industries that support the construction sector such as trucking, wholesale trade, sand and gravel suppliers, and others. Construction workers would spend their income in the local and regional economies where they live and work, creating additional economic activity for the region. Since there would be only long-term negligible adverse and beneficial impacts from the proposed action, the topic of socioeconomics was not carried forward for further analysis.

ENVIRONMENTAL JUSTICE

On February 11, 1994, President Clinton issued Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” This order directs agencies to address environmental and human health conditions in minority and low-income communities to avoid the disproportionate placement of any adverse effects from federal policies and actions on these populations. Potential environmental justice populations were identified in Swain County, North Carolina, where approximately 27% of the residents were identified as “American Indian.” The Cherokee Indian Reservation is located within Swain County. However, these populations would not be particularly or disproportionately affected by the rehabilitation of Newfound Gap Road because they are outside the project area. Furthermore, impacts to these low-income and minority populations could be beneficial as a result of potential job creation and improved road conditions; therefore, this impact topic was dismissed from further analysis in this EA.

ALTERNATIVES

The alternatives analyzed in this document, in accordance with NEPA, are the result of design scoping, internal scoping, and public scoping.

The NPS explored and objectively evaluated a range of alternatives in this EA. Two alternatives were carried forward for analysis:

- Alternative A – No Action Alternative
- Alternative B – Rehabilitation of Newfound Gap Road

ALTERNATIVE A – NO ACTION ALTERNATIVE

The no action alternative serves as the baseline by which to compare all other alternatives. Under the no action alternative, the Park would continue to implement selected repairs to Newfound Gap Road as funding allows. However, the road and related features along Newfound Gap Road would continue to deteriorate. Should the no action alternative be selected, the NPS would respond to future needs and conditions without major actions or changes in the present course. Repair and/or maintenance to the road and related features would be conducted where there is specific need for critical and emergency repairs. Regular maintenance would be carried out as funding allows. Frequent patching of cracks and potholes in the paved surfaces of the road and repairs to the remaining stone guardwalls would continue as needed to maintain them in a safe condition for public use.

ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

This alternative describes actions that would be taken to improve the safety of Newfound Gap Road, improve the condition of the road and associated features, and maintain the integrity of the Park resources. Specific activities, described in detail later in this section, would include

- Rehabilitation of the road surface, including spot repair/reconstruction, milling pavement, and pavement overlay
- Rehabilitation of road shoulders, where needed, to restore shoulders to the proper height and grade
- Reconstruction of settled sections of roadway to restore stability of embankment
- Rehabilitation of existing stone masonry guardwalls, including minor repairs, replacement of wall elements in-kind, or rebuilding walls to their original design height
- Reconstruction of guardwall sections to meet current crashworthiness criteria in areas with a demonstrated safety risk¹
- Addition of new guardwall and/or guardrail extensions or transitions in areas with a demonstrated safety risk
- Rehabilitation, replacement, or cleaning of culverts to improve drainage

¹ The demonstrated safety risk was determined through analysis of several variables. First, the roadway corridor data was analyzed including crash data, weighted by severity, average daily traffic, and the posted speed limit. Then, a site-specific analysis was undertaken in February 2009 to look at the curve geometry, the severity of the hazard behind the guardwall, the length of the guardwall, the distance of the guardwall from the edge of the travel way, and the roadway and clear zone grades. The analysis was completed by highway engineers from the FHWA-EFLHD and Park resource specialists, and a list of the demonstrated safety risk areas was agreed upon, as stated in a letter dated March 10, 2009 (Appendix A).

- Removal and resetting of stone curbing

Implementation of alternative B would occur in three phases in order to better manage roadway closures and impacts to visitors (see Figure 2):

- Phase I: Rehabilitate approximately 2.0 miles of Newfound Gap Road from the Newfound Gap Overlook Parking Area (milepost 14.5) north to approximate milepost 12.5. Work items will contain all, or a combination, of the component items discussed above.
- Phase II: Rehabilitate approximately 6.0 miles of Newfound Gap Road from approximate milepost 12.5 north to the Chimneys Picnic Parking Area (approximate milepost 6.5). Work items will contain all, or a combination, of the component items discussed above.
- Phase III: Rehabilitate approximately 6.5 miles of Newfound Gap Road from approximate milepost 6.5 north to the Park boundary at Gatlinburg, Tennessee (milepost 0.0). Work items will contain all, or a combination, of the component items discussed above.

Rehabilitation of the entire road surface is expected under the proposed action as funding allows, as well as rehabilitation of road shoulders, as needed. In addition, the Park, in consultation with the FHWA-EFLHD, has identified several locations along the 14.5-mile section of Newfound Gap Road where specific repairs or improvements will be made, as funding allows. Specific actions known at this time, including their proposed location, are detailed below in Table 1.

Additional areas have been recognized along this section of road where similar repairs or improvements would be needed in the future. As these needs are identified, proposed repairs or improvements would undergo site-specific analysis prior to implementation to ensure the anticipated impacts are consistent with those described and analyzed in this EA.

Rehabilitation of the Road Surface

Road rehabilitation would result in restoring the road to a serviceable and maintainable condition, improving safety, and restoring positive drainage. Rehabilitation would consist of spot repair/reconstruction and asphalt pavement overlays. Spot repair/reconstruction would occur in areas where the surrounding expanse of pavement is currently adequate but where minor repairs such as filling and sealing cracks and potholes are needed. This work would be performed by a small work crew on an as-needed basis with very limited traffic controls required. Pavement overlay would be applied to large sections of the road, as funding permits. A pavement overlay would smooth the road surface and provide adequate road surface drainage, minimizing ponding. The process required for pavement overlays includes repairing areas of damaged or cracked pavement, milling the existing pavement to smooth the surface, and applying an asphalt overlay. A full road construction crew and associated heavy machinery would complete this work. In addition, rehabilitation of the road surface would require a temporary work zone and more extensive traffic controls to ensure worker and visitor safety.

Reconstruction of Settled Sections of Roadway

Several sections of the road corridor exhibit settlement of the roadway fill used to construct the road to grade. Geotechnical evaluation through design would be employed to evaluate these conditions and recommend corrective actions. Corrective actions would be selected from a range of repair methods, which could employ the use of retaining walls, reconstruction of the settled areas with geosynthetic reinforcement, the use of mechanically stabilized earth, or other methods. Due to the narrow width of the road, these processes would likely require single lane closures which could generate lengthy periods of traffic delay during which the work zones are in effect.

Rehabilitation of the Road Shoulder

Several options are proposed to address pavement edge drop-offs, including paving shoulders in areas prone to aggregate shoulder deterioration to create a more stable shoulder, and the installation of tapered pavement edges. Each site would be evaluated for implementation of the appropriate option. The addition of paved shoulders would be dependent upon the clearance areas that reach from the edge of pavement to an obstruction, such as a stone masonry guardwall or rock face. This process would be done by a full road construction crew and associated heavy machinery. In addition, rehabilitation of the road shoulder would require a temporary work zone and more extensive traffic controls to ensure worker safety.

Rehabilitation of Existing Guardwalls

Several options could be implemented to address the need for guardwall rehabilitation. Minor repairs would be done to the stone masonry guardwalls, where necessary. These repairs would include, but would not be limited to, repointing mortar joints, resetting loose stones, replacing missing stones or mortar, cleaning existing weep holes, and removing debris in front of the wall. The implementation of these repairs would require a small work crew, daily traffic control, and a temporary work zone.

Typically, rehabilitation would consist of repairing and/or rebuilding guardwalls to restore them to good condition based on their original design characteristics. This would include repairing or rebuilding sections of deteriorated guardwall and/or adding a concrete footer beneath guardwalls as needed to restore them to their original design height. Wall rehabilitation actions could require a small work crew and a semi-permanent work zone through one-lane closures, depending on the level of work required.

Construction of New Guardwalls and Reconstruction of Existing Guardwalls

In specific areas where a demonstrated safety hazard exists, the reconstruction of existing stone masonry guardwalls to meet current crashworthiness criteria would be considered and, in areas where there is no existing barrier, the addition of a new guardwall or guardrail would be considered to mitigate specific hazards. The new and reconstructed guardwalls would be constructed with a concrete core. Existing guardwall stones would be used to construct stone masonry faces to the extent practicable. Any new stone used would be similar in appearance to stones in existing guardwalls, and reconstructed guardwall/extensions/transitions (as appropriate) would be designed to be visually compatible (e.g., similar in scale, massing, materials, texture, and orientation) with the existing guardwalls. New and reconstructed guardwalls would be designed to meet current crashworthiness criteria. It is expected that reconstructed and new barriers would be constructed to a 22-inch height based on a recently crash-tested design for roads with posted speeds of 45 miles per hour (mph) or lower. Wall reconstruction actions could require multiple crews working concurrently along different sections of the road. Due to the narrow width of the road these work zones would likely require single lane closures which could generate lengthy periods of traffic delays. In areas where the existing stone masonry walls are removed, temporary barrier systems might be necessary to provide interim fall protection until new walls are constructed.

Stone Wall to Timber Railing Transitions and Stone Wall Transitions

In a limited number of areas, existing stone wall to timber railing transitions have either been impacted by vehicles or have deteriorated over time. Rehabilitation of these areas would include replacing missing stones within the masonry walls and/or minimally extending the masonry walls to provide an uninterrupted barrier between the timber railing and masonry walls. New timber railing would be constructed to current crash-worthy requirements. The timber railing would not physically connect to existing or extended stone masonry walls. These actions could require small work crews and a semi-permanent work zone through one-lane closures, depending on the level of work required.

Culvert Replacement, Rehabilitation, and/or Cleaning

To improve drainage, culvert cleaning, replacement, or rehabilitation would occur. Cleaning culverts would include removing debris from the pipe. Replacement would include replacing the old pipe with a new pipe,

typically reinforced concrete. Rehabilitation would typically involve adding a slip lining to the culvert with a polyethylene liner. The liner would be placed inside the pipe and inflated with steam to allow it to conform to the inside of the pipe, sealing any holes.

Parking Area Improvements

The following improvements would be made in the parking areas:

- Stone curb would be removed and reset as needed to remove settlement and/or misalignment.
- Existing gravel pull-offs may be paved on an as-needed basis to prevent further rutting, erosion, and deterioration of these areas. The size of these gravel pull-offs would not be expanded from their current size; once paved, the pull-offs would continue to accommodate two to three cars.
- Additional curbs may be installed in parking areas to delineate the area and to control water runoff.

FUNDING

Under the proposed action alternative, the preliminary design estimate for the first phase of rehabilitating Newfound Gap Road (from mile marker [MM] 12.5 to the Newfound Gap Overlook Parking Area) and related features is programmed to cost between \$5-10 million. The subsequent two phases of the project would be expected to incur similar level of costs, depending on engineering specifications of these future phases.

CONSTRUCTION STAGING

Under the action alternative, staging areas for construction equipment and vehicles would be located in several designated areas along the road, depending on where the construction was occurring. The staging areas would be sited in areas that would minimally impact the Park's natural, biological, and cultural resources. All staging areas would be located in previously disturbed areas with hardened surfaces where equipment could be parked without adversely affecting soils or vegetation, and where no impacts to any of the Park's significant natural, cultural, or historic features would occur. Existing features not scheduled for work within the staging areas would be protected from damage. These features could include walkways, curbing, walls, interpretive displays, drainage inlets, etc.

Site-specific actions proposed under alternative B would also occur, as shown in Table 1 and Figure 3 below.

TABLE 1. SITE SPECIFIC PROJECTS UNDER ALTERNATIVE B

Project Type	Project Location	Project Description
Rehabilitation of Existing Guardwalls	MP 3.9	Culvert headwall (collapsing). Design development to identify appropriate repair.
Reconstruction of Existing Guardwalls	MP 7.0	Reconstruct section (+/- 50 feet) with concrete core stone masonry guardwall design. Heights of reconstructed section would match existing wall heights. Add steel-backed timber guardrail between the two parking areas.
Addition of Extensions and/or Transitions	MP 11.80	Wall along the river. Extend wall south, beyond the existing culvert headwall to provide protection against fall hazard. Extension would be constructed with concrete core stone masonry design at a minimum height of 22 inches.
Reconstruction of Guardwall	MP 13.10	Southernmost bridge over Walker Prong. Some additional crash protection from the northbound lane bridge parapet may be added, such as additional barrier or construction of a masonry wall on top of the existing headwall to protect this particular hazard.
Reconstruction of Guardwall	MP 13.44	Settled wall sections. Reconstruct 75 feet in one area and about 50 feet in another area. Reconstructed sections would be constructed with concrete core stone masonry design at a minimum height of 22 inches.
Reconstruction of Guardwall	MP 13.65	The wall adjacent to this area (south) would be reconstructed. The reconstructed section would be a minimum height of 22 inches. This option includes the realignment of the roadway to create a shoulder area and direct traffic and maintenance operations away from the guardwall. This option would require minimal pavement widening and would lie mostly within the existing footprint of the roadway and parking area.
Rehabilitation of Existing Guardwalls	MP 13.69	Reset/repoint loose stones.
Addition of Extensions and/or Transitions	MP 13.77	Poor transition. Extension of the transition would be constructed and based on historic design (no concrete core).
Rehabilitation of the Road Shoulder	MP 14.20	Shoulder area between Morton Overlook and first pullout north would be widened to increase recovery area, or addition of steel-backed timber guardrail could be constructed.
Reconstruction of Guardwall	MP 14.36	+/- 1,100-foot section along outside of curve. Reconstruct 1,100 feet of wall from top of curve (break in wall) north to existing crenulated section. Reconstructed section would be constructed with concrete core stone masonry design at a minimum height of 22 inches.
Addition of Extensions and/or Transitions	MP 14.78	Transition between masonry wall and steel-backed timber guardrail. The transition will be reconstructed to include a crash-rated timber rail terminal section which will physically attach to the reconstructed section of stone wall.

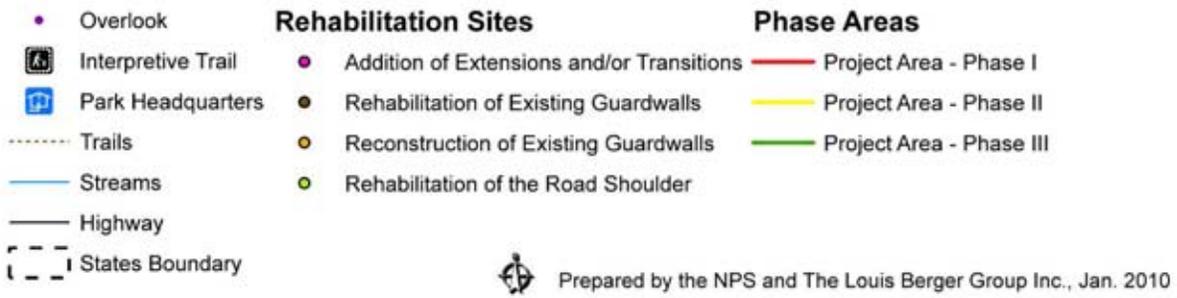
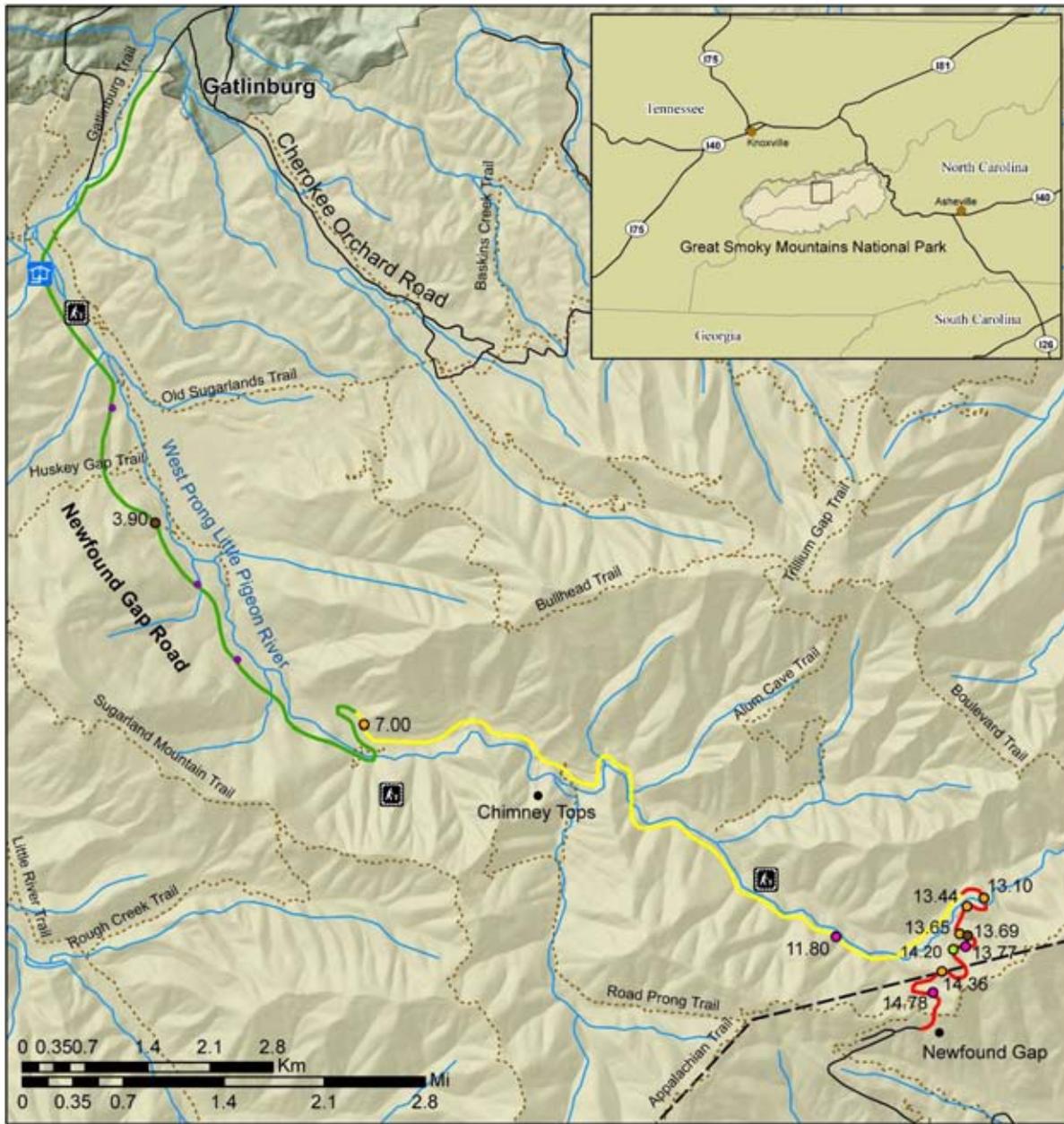


FIGURE 3: INDIVIDUAL PROJECT LOCATION MAP

ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Alternatives should be “reasonable.” According to the Director’s Order 12 Handbook, unreasonable alternatives may be those that are unreasonably expensive, that cannot be implemented for technical or logistic reasons, that do not meet Park mandates, that are inconsistent with carefully considered, up-to-date Park statements of purpose and significance or management objectives, or that have severe environmental impacts (NPS 2001).

Concrete Core Guardwall Reconstruction

During the initial scoping of this project, the FHWA-EFLHD proposed that any guardwalls in the “clear zone” should be reconstructed with a concrete core. The clear zone is a roadside border area available for the safe use by errant vehicles. Altering the original configuration of all the existing guardwalls in the clear zone could impact the historic integrity of the Newfound Gap Road cultural landscape. While use of this option would improve overall safety of certain sections of the road, the potential to impact the overall historic integrity of Newfound Gap Road by changing the original configuration of the guardwalls exists. Because of the potential impacts to cultural resources, the Park determined that this would need to be done on a case-by-case basis as opposed to being a programmatic action; accordingly, this option was dismissed from full consideration. The Park noted that all decisions regarding safety improvements and the treatment of the historic guardwalls would be based on a variety of factors, including improvements in motor vehicle safety and laws relating to motor vehicle operations, cultural resource impacts, impacts to views, cost, and construction impacts, among others. This approach would not fully meet the purpose and need of the project, and as a result, was not carried forward for further analysis.

Adding Additional Turn Lanes and Parking Areas

During development of the alternatives, the NPS considered adding turn lanes at the Chimneys Picnic Area and Alum Cave Trailhead Parking Area, as well as the expansion of parking areas at the Chimney Tops Trailhead and Alum Cave Trailhead. Public comment during scoping also suggested adding turn lanes to the Sugarlands Nature Trail and Huskey Gap Trail parking areas. The addition of turn lanes and the expansion of parking areas was dismissed from further consideration because the NPS determined that these actions would not meet the purpose and need of the action. Specifically, since these actions could impact the character-defining features of Newfound Gap Road, they did not meet the purpose of preserving culturally significant features and contributing elements of the road, nor did it address the safety needs, detailed on page 1 of this EA. Because these actions would not meet the purpose and need, they were not carried forward for further analysis.

Non-construction Measures

The use of traffic signals and lighting, speed reduction options, impact attenuators, and fencing were considered and evaluated, but were dismissed, due to their lack of feasibility and potential adverse impacts to the natural and cultural landscape along Newfound Gap Road. Non-structural techniques were not proposed because of potential safety hazards and maintenance costs. Additionally, raised rumble strips create obstructions for snowplows and tend to become maintenance burdens. Imbedded pavement reflectors or milled rumble strips can become ineffective when filled with debris.

THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is defined by the CEQ as the alternative that would promote the national environmental policy as expressed in NEPA Section 101. This includes:

1. Fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations

2. Assuring all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings
3. Attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences
4. Preserving important historic, cultural, and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice
5. Achieving a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities
6. Enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources

Simply put, this means choosing the alternative which causes the least amount of damage to the biological and physical environment; it also means choosing the alternative which best protects, preserves, and enhances historic, cultural, and natural resources (CEQ nd). After completing the EA, the NPS identified alternative B as the environmentally preferred alternative because it best meets the definition established by the CEQ. Alternative B would restore and preserve the historic character of Newfound Gap Road and its related features by removing non-historic elements and, where necessary, repairing or replacing important character-defining features such as stone curbing, walkways, and stone guardwalls. This alternative would also improve public safety by repairing and stabilizing the road and it would improve the efficiency of Park operations by reducing the need for future road and guardwall maintenance. In addition, the overall experience of Park visitors would be enhanced as road conditions are improved and as the historic character of the road and guardwalls are maintained.

Alternative A, no action, was not selected as the environmentally preferred alternative because it would not meet criteria 2 and criteria 3 because without the roadway improvements NPS would not provide for safe, healthful, productive, and aesthetically and culturally pleasing surroundings and health and safety would likely be impacted. Likewise, by not repairing and maintaining the characteristics of the road that make it historic, including guardwalls, NPS would not meet criteria 4 because the no action alternative would not maintain the cultural aspects of this Park. Further, as deteriorated roadway conditions would impact those traveling the road, the no action alternative would not meet criteria 5 because it would not permit high standards of living. For these reasons, alternative A was not chosen as the environmentally preferred alternative.

Table 2 describes how well each of the alternatives meets the purpose and need of the project. The "Environmental Consequences" chapter describes the effects on each impact topic under each of the alternatives. Impacts are summarized in Table 3.

MITIGATION MEASURES OF THE ACTION ALTERNATIVE

The NPS places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse environmental impacts. To help ensure the protection of natural and cultural resources and the quality of the visitor experience, the NPS would ensure the following protective measures are implemented as part of the action alternative. The NPS would implement an appropriate level of monitoring throughout the construction process to help ensure protective measures are properly executed and are achieving their intended results.

Additionally, although the EA addresses the entire project, the Park would be required to review the document at the commencement of each site-specific action to ensure all project information is up-to-date and in compliance with the necessary regulations (e.g., Endangered Species Act).

Water Quality and Quantity

- Use best management practices including temporary sediment control devices such as filter fabric fences, sediment traps, or check dams as needed during culvert replacement.
- Cover stockpiled soil and rock with semi-permeable matting or plastic or another type of erosion control material to prevent siltation of snow or rain runoff.
- Minimize soil disturbance, and reseed or revegetate disturbed areas as soon as possible.
- Retain silt fencing in disturbed areas until stabilization by reseeding or revegetation is complete.
- Use swales, trenches, or drains to divert stormwater runoff away from disturbed areas.
- Locate construction staging areas away from areas where water would run off to adjacent rivers and streams.
- Properly store, use, and dispose of chemicals, fuels, and other toxic materials using best management practices to prevent spills and pollution.

Vegetation Management and Exotic and Invasive Species Control

- Wash all construction equipment to be used at the site before entering the Park.
- Use the Park's standard seed mix for revegetation activities such as roadside stabilization.
- Ensure that all fill material brought into the Park is from a Park-approved source. This mitigation measure would help prevent the introduction of exotic and invasive species.
- Do not use straw for erosion control measures. Use artificial, biodegradable materials for erosion control measures (no plastic).
- Ensure that all quarry material is from a Park-approved source to prevent the introduction of exotic and invasive species.
- Minimize damage to existing trees. The road rehabilitation contract will restore any trees damaged by heavy equipment.
- Establish a designated construction staging area to prevent impacts to vegetated areas.

Rare, Threatened, or Endangered Species

Early consultation has occurred with the USFWS regarding the proposed action (see Appendix A). This EA will be a part of the continuation of this informal consultation with the USFWS regarding rare, threatened, and endangered species. In addition to this consultation, the following mitigation measures would occur related to the proposed action:

- The proposed action would occur in known habitat for northern flying squirrel. Although potential habitat exists, the proposed action would not remove trees above the 4,500-foot elevation line, which is where the known habitat occurs. The northern flying squirrel requires sizable trees for habitat; flying squirrels find habitat in large trees with hollow crevices, and bats live beneath peeling bark on trees. Although no impacts to this species are expected, to ensure that these habitats are not disturbed, no large trees would be removed.
- The rock gnome lichen (*Gymnoderma lineare*) is known to exist in the two areas adjacent to, but outside, the project location (Walker Camp Prong area). Although no work is scheduled to occur which would directly affect the rock gnome lichen, appropriate best management practices would be employed to ensure minimal, if any, effect on the rock gnome lichen. Silt

fencing and other appropriate methods of erosion control would be employed to mitigate any potential effect construction may have.

Cultural Landscapes and Archeological Resources

- Minimize impacts to the cultural landscape by ensuring that the contributing features of the road are rehabilitated/reconstructed in a manner consistent with the Secretary of Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.
- Emphasize preservation as the preferred treatment for significant landscape features; retain and repair original features and materials to the extent practical and replace materials in-kind, when necessary.
- Halt or redirect work to another area of the project in the event that potentially significant deposits or features are discovered during construction until finds can be documented, their significance assessed, and appropriate mitigation strategies developed in consultation with the Tennessee State Historic Preservation Office (SHPO) and the appropriate Tribal Historic Preservation Officer (THPO).
- The Park would approve the stone/stone source for the walls before the walls are repaired/reconstructed to ensure they are consistent with the cultural landscape.
- Although an attempt would be made to locate and evaluate archeological sites and/or components prior to construction activities, the potential exists that previously unidentified archeological sites, components, and/or human remains could be found during construction activities. In the event that construction activities inadvertently discover a previously unidentified archeological site, component, and/or human remains, all construction work would cease in the immediate area. Any willful destruction of the archeological site, component, and/or human remains can result in the prosecution of individuals under the Archeological Resource Protection Act of 1979, and other statutes that protect the Park's cultural resources. The project director, construction foreman, or designee would immediately notify the Park archeologist. No construction work would continue in this area until the archeological site, component, and/or human remains are evaluated by NPS to determine if it meets eligibility criteria of the NRHP. If the archeological site and/or component are considered eligible to the NRHP, NPS would develop a plan, in consultation with the SHPO/THPO, to protect it or undertake a program of data recovery to mitigate the loss of important archeological data. The inadvertent discovery of human remains is considered below.
- Treat the discovery of human remains, funerary objects, and objects of cultural patrimony in accordance with the Native American Graves and Repatriation Act (NAGPA) (25 USC 3001). These terms are defined in NAGPRA. In the event that human remains, likely funerary objects, or objects of cultural patrimony are discovered during the excavations, construction work at that location would stop immediately, the area would be secured, and the project director, construction foreman, or their designee would notify the Park archeologist immediately. Consultation with the appropriate SHPO and THPOs and other interested Native American groups would be initiated and a determination as to the disposition of these remains and/or associated funerary objects would be determined in consultation with the SHPO/THPOs.

Transportation and Traffic

Newfound Gap Road is the most heavily traveled road in the Park, and due to the narrow geometry of the road and the work required, impacts to traffic are not avoidable. Recent traffic counts and traffic

management analysis indicate that any lane closures under public traffic would generate delays, and it would be necessary to evaluate proposed traffic management for each site-specific action (such as road settlement and wall reconstruction areas) as the design for each construction phase proceeds.

Based on traffic volume, seasonal weather restrictions, narrow road alignment and other intangible variables, traffic impact during construction could vary from short-term minor adverse (5-minute delays) to short-term major adverse (several hours of delay) to pass through the work zones. For each engineered solution that requires site-specific actions which would interrupt public traffic, the duration of the temporary lane closure would be influenced by the level of traffic which needs to be accommodated through the work zone. This means that executing construction, while allowing for traffic, would in most cases, extend the construction period longer than if the work were performed without accommodating public traffic.

To mitigate this, evaluation/implementation of the following would be necessary during design:

- Evaluate all construction methods for site-specific design solutions to select the most cost-effective and functional solution which minimizes duration of impact into the roadway.
- Continue public involvement during the design phase to inform local stakeholders of proposed work and to gather local input to factor into proposed traffic management methods. Engage in extensive and ongoing dialogue with the neighboring communities, especially if full road closures occur during non-peak months.
- Evaluate local stakeholder and visitor use/experience impacts during construction while accommodating public traffic versus those impacts associated with closing the road to all traffic during construction.
- Evaluate cost and time impacts to local communities associated with partial road closure versus full road closure and duration of each.
- Evaluate construction during peak visitor use periods (e.g., weekends, holidays, and in the fall during peak colors) and how avoidance or acceptance could influence duration of construction. Avoid daytime lane closures during peak periods (approximately mid-July to mid-August).
- Use warning signs and/or flaggers to direct traffic through construction areas, as needed, during construction activities that could disrupt traffic. Develop a safety plan prior to initiation of construction to ensure the safety of Park visitors, workers, and Park personnel.
- Use stationary, semi-permanent temporary traffic signals to provide two-way single lane traffic through work zones.
- Use internet technology (such as websites) and local media to inform public of road conditions, closures, and anticipated delays.
- Ensure that any lighting, such as security lighting, would be directional and shielded to prevent intrusions into the night sky.
- Consider only daily work zones which are reopened to two-lane traffic at the end of each work day.
- Consider complete road closures during off-peak seasons to minimize duration of delays to the public.

TABLE 2. COMPARISON OF THE EXTENT TO WHICH EACH ALTERNATIVE MEETS THE PROJECT PURPOSE AND NEED

Purpose	Alternative A – No Action Alternative	Alternative B – Rehabilitation of Newfound Gap Road
Improves the overall safety of the road for both Park staff and visitors.	Meets the purpose and need. Road repairs and maintenance would be completed when funds are available or when safety deficiencies occur to ensure public safety.	Meets the purpose and need. Pavement deterioration would be addressed through rehabilitation of the road surface, rehabilitation of the road shoulder, rehabilitation of the existing guardwalls, and other repairs.
Preserves the culturally significant features and contributing elements of the road and guardwalls.	Does not fully meet the purpose and need. While Newfound Gap Road and its related features would be maintained with historical character in mind, and as funding allows, no active measures would be taken to fully rehabilitate the road and related features that have degraded.	Meets the purpose and need. The deteriorating historic stone guardwalls and road would be rehabilitated. This rehabilitation effort would be done in a manner that places emphasis on preserving the historic character of the road and its features.
Enhances visitor use, enjoyment, and historic interpretation of the Park.	Does not fully meet the purpose and need. While repairs and maintenance would be completed when funds are available or when safety deficiencies arise, deterioration of historic stone guardwalls, retaining walls, and the road itself would not be fully rehabilitated, which could negatively affect visitor enjoyment and historic interpretation of the Park.	Meets the purpose and need. The actions detailed under this alternative would enhance visitor use, enjoyment and historical interpretation through the rehabilitation of the historic stone guardwalls and Newfound Gap Road.
Provides a long-lasting driving surface for visitors and Park staff and improves operational efficiency, reliability, and sustainability by decreasing maintenance required to keep both the road and guardwalls safe for public use.	Does not fully meet the purpose and need. While repairs and maintenance would be completed when funds are available or when safety deficiencies arise, deterioration of Newfound Gap Road would continue, which could negatively affect operational efficiency, reliability, and sustainability by requiring continued maintenance measures along Newfound Gap Road well into the future.	Meets the purpose and need. The actions detailed under this alternative would enhance operational efficiency, reliability, and sustainability by decreasing maintenance actions required to keep both the road and guardwalls safe for public use.

TABLE 3. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A – No Action Alternative	Alternative B – Rehabilitation of Newfound Gap Road
Natural Resources – Wildlife, Vegetation, and Threatened and Endangered Species	<p>Impacts to wildlife and threatened and endangered species resulting from the no action alternative would be short-term negligible to minor adverse impacts, with no long-term impacts. There would be no short- or long-term impacts to vegetation under the no action alternative.</p> <p>Cumulative impacts to wildlife, vegetation, and threatened and endangered species under the no action alternative would be short-term negligible to minor adverse and long-term negligible adverse. Because there would be no major adverse or unacceptable impacts to the natural resources, there would be no impairment to wildlife, vegetation, and threatened and endangered species under the no action alternative.</p>	<p>Impacts on wildlife from the alternatives proposed under alternative B would be short-term negligible to minor adverse, but long-term negligible adverse impacts once construction activities are complete. Vegetation impacts would be short-term negligible to minor adverse during construction, and long-term negligible adverse. In the short-term, impacts to threatened and endangered species would be negligible adverse, due to the mitigation measures that would occur, with no long-term impacts to these species. Cumulative impacts under alternative B would be short- and long term negligible to minor adverse impacts. Because there would be no major adverse or unacceptable impacts to the natural resources, there would be no impairment to wildlife, vegetation, or threatened and endangered species under alternative B.</p>
Natural Resources – Wetlands and Water Quality	<p>Impacts to wetlands and water quality from the no action alternative would result in short-term negligible adverse impacts during spot repairs as these resources would be avoided and protected.</p> <p>Continued deterioration of the road and lack of drainage repairs would have long-term negligible to minor adverse impacts to these resources. Cumulative impacts to wetlands under the no action alternative would be short-term negligible impacts and long-term beneficial impacts. Because there would be no major adverse or unacceptable impacts to wetlands and water quality, there would be no impairment to the resource or values.</p>	<p>Impacts on wetlands and water quality from the various proposed activities under alternative B would be short-term negligible to minor adverse and long-term beneficial. Cumulative impacts under alternative B would be short-term negligible adverse and long-term beneficial. Because there would be no major adverse or unacceptable impacts to wetlands and water quality, there would be no impairment to water quality or wetlands under alternative B.</p>
Natural Resources – Air Quality	<p>The continuation of selected road rehabilitation on an as needed basis would result in localized, short-term, minor adverse impacts on air quality within the Knoxville airshed, as the impacts would be measurable, but localized and would not impact the attainment status of the county.</p> <p>Cumulative impacts under the no action alternative would be short-term minor adverse. There would be no impairment to air quality under the no action alternative as all impacts would be short-term and minor adverse.</p>	<p>The Newfound Gap Road rehabilitation efforts would result in localized, short-term, negligible to minor adverse impacts on air quality within the Knoxville airshed, as the impacts would be measurable, but localized and would not impact the attainment status of the county.</p> <p>Long-term beneficial impacts would result from the improved roadway conditions and the reduced need for spot repairs and associated emissions.</p> <p>Cumulative impacts under alternative B would be short-term minor adverse. There would be no impairment to air quality under alternative B as all impacts would be short-term and minor adverse.</p>

Impact Topic	Alternative A – No Action Alternative	Alternative B – Rehabilitation of Newfound Gap Road
Cultural Resources – Cultural Landscapes	Impacts to Newfound Gap Road’s cultural landscape resulting from the no action alternative are long-term moderate adverse impacts related to no substantial improvements to the road other than routine maintenance operations. Cumulative impacts would be long-term moderate adverse. Because there would be no major adverse or unacceptable impacts to the cultural landscapes, there would be no impairment of Park resources or values. For the purposes of Section 106 of the NHPA, the determination of effect would be no adverse effect.	Impacts to Newfound Gap’s cultural landscape, resulting from the various activities proposed under alternative B, would range from long-term beneficial impacts for the rehabilitation of existing guardwall, to long-term minor to moderate adverse impacts for the rehabilitation of road surface, rehabilitation of road shoulders, the reconstruction of guardwall sections, and the addition of new guardwall and/or guardwall extensions. Cumulative impacts would remain long-term minor to moderate adverse impacts. Because there would be no major adverse or unacceptable impacts to the cultural landscapes, there would be no impairment of Park resources or values. For the purposes of Section 106 of the NHPA, the determination of effect would be no adverse effect.
Cultural Resources – Archeology	Impacts to archeological resources within the Park, resulting from the no action alternative would be long-term and negligible and minor adverse since no major improvements would be made and routine maintenance operations are not expected to impact known resources. Cumulative impacts would be long-term, minor adverse. Because there would be no major adverse or unacceptable impacts to archeological resources, and sites would retain their present condition, there would be no impairment of Park resources or values. For the purposes of Section 106 of the NHPA, the determination of effect would be no adverse effect.	Impacts to archeological resources within the Park resulting from the proposed improvements to Newfound Gap Road under alternative B would be short -term minor adverse. Disturbance to previously unidentified site(s) discovered during the construction work would result in little effect on any of the characteristics that might qualify site(s) for the NHRP, including information potential and integrity. Cumulative impacts to archeological resources would be long-term minor adverse. Because there would be no major adverse or unacceptable impacts to archeological resources, and sites would retain their present conditions, there would be no impairment of Park resources or values. For the purposes of Section 106 of the NHPA, the determination of effect would be no adverse effect.
Traffic and Transportation	The no action alternative would result in long-term negligible adverse impacts on traffic operations, as the level of service is not expected to change to a noticeable level. Cumulative impacts to traffic under alternative A would be short-term negligible to minor adverse.	Impacts to Newfound Gap Road’s traffic network resulting from the various activities proposed under alternative B would be short-term minor to moderate adverse during rehabilitation of road surface, rehabilitation of road shoulders, the reconstruction of guardwall sections, and the addition of new guardwall and/or guardwall extensions. Mitigation measures such as extensive consultation and coordination with the community, limiting the length of the lane closures, and no daytime construction during peak periods would be implemented to ensure these short-term adverse impacts to not exceed a moderate level. Long-term beneficial impacts would be experienced from the improved roadway conditions and minimization of spot repairs on the road, and would be negligible, adverse. Cumulative impacts would be short-term negligible adverse with the potential for long-term beneficial impacts.

Impact Topic	Alternative A – No Action Alternative	Alternative B – Rehabilitation of Newfound Gap Road
Visitor Use and Experience	Impacts to visitor use and experience within the Park resulting from the no action alternative would be long-term, minor adverse impacts as only implementing routine maintenance operations as funding is available would lead to deterioration of the roadway that could impact the visitor experience in the Park, but is not expected to change visitation levels. Cumulative impacts would be short-term minor adverse to long-term beneficial.	Impacts to visitor use and experience within the Park resulting from the various activities proposed under alternative B would be short-term minor adverse due to temporary road closures and traffic delays, as well as noise from the heavy machinery, and long-term beneficial impacts from the improvements made to Newfound Gap Road and associated features that would improve visitor use facilities. Cumulative impacts would be short-term minor adverse and long-term beneficial.
Visitor and Employee Safety	Impacts to visitor and employee safety within the Park resulting from the no action alternative would be long-term, and minor adverse since no substantial improvements would be made to the road other than routine maintenance operations and safety concerns could occur. Cumulative impacts would be long-term, minor adverse.	Impacts to visitor and employee safety within the Park resulting from the proposed improvements to Newfound Gap Road under alternative B would be long-term negligible adverse and beneficial as current safety concerns would be addressed. Cumulative impacts to visitor and employee safety would be long-term negligible adverse.
Surrounding Communities	Impacts to surrounding communities resulting from the no action alternative would be long-term minor adverse impacts related to no substantial improvements to the road other than routine maintenance operations. Cumulative impacts to surrounding communities under the no action alternative would be long-term minor adverse.	Impacts on surrounding communities from the various activities proposed under alternative B would be short-term minor to moderate adverse due to delays from construction activities, but long-term beneficial once construction activities are complete. Cumulative impacts under alternative B would be short-term minor to moderate adverse and long-term beneficial.
Park Management and Operations	Impacts to Park management and operations resulting from the no action alternative would be long-term minor to moderate adverse impacts related to the continued, and possibly increasing, demands on Park staff time related to continued roadway deterioration. Cumulative impacts under alternative A would be long-term negligible to minor adverse.	Impacts to Park management and operations within the Park, resulting from the various activities proposed under alternative B, would result in short-term negligible to minor adverse impacts from the staff time required to plan and implement the roadway improvements. Once improvements are completed, long-term beneficial impacts would occur as staff time required for the continued roadway maintenance would decrease and other staff time savings would be realized. Cumulative impacts would be long-term, negligible to minor, and adverse.

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AFFECTED ENVIRONMENT

NATURAL RESOURCES

VEGETATION

The vegetation within the project area of the Park consists of forest species. They include high-elevation and montane forests, low- and mid-elevation forest species, woodland, and human influence. The forest communities identified within the immediate area include montane alluvial forest, montane cove hardwoods, sub-mesic to mesic oak/hardwood, northern hardwoods, red spruce, hemlock, pine, shrubland, rhododendron mountain laurel, eastern hemlock, graminoid and herbaceous, and cove mixed hardwoods. Human influence within the project area includes maintained use areas such as grassy shoulders on existing roads and public use areas (Madden et al. 2004).

WILDLIFE

Amphibian species within the project area live on land as well as along the shores of the many streams and seepages that pass through the area. Salamanders that live within the area include the mountain dusky (*Desmognathus ochrophaeus*), blackbelly (*Desmognathus quadramaculatus*), Jordan's (*Plethodon jordani*), two-lines (*Eurycea bislineata*), and red (*Pseudotriton ruber*) as well as the eastern newt (*Notophthalmus viridescens*). These animals feed on terrestrial and aquatic insects, worms, crustaceans, and other organisms. The mountain dusky, Jordan's, and ravine salamander (*Plethodon richmondi*) live primarily within terrestrial habitats under leaves, rocks, and woody debris. Additional amphibians that are likely present in the area are the spring peepers (*Hyla crucifer*) and pickerel frogs (*Rana palustris*).

Reptiles within the project area may include snakes, lizards, and turtles. The rat snake (*Elaphe obsoleta*), brown snake (*Storeria dekayi*), timber rattlesnake (*Crotalus horridus*), and northern water snake (*Nerodia sipedon*) may be found within the project area. Lizards may include the broadhead skink (*Eumeces laticeps*) and the five-lined skink (*E. fasciatus*). One turtle species—the eastern box turtle (*Terrapene carolina*)—is likely to be found within the area.

There is a diverse range of mammal species likely to be found along Newfound Gap Road. Mammals likely to be found within the area include the Virginia opossum (*Didelphis virginiana*), eastern cottontail (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), eastern chipmunk (*Tamias striatus*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), coyote (*Canis latrans*), eastern harvest mouse (*Reithrodontomys humulis*), eastern spotted skunk (*Spilogale putorius*), American beaver (*Castor canadensis*), black bear (*Ursus americanus*), and the white-tailed deer (*Odocoileus virginianus*). Also, bats such as the silver-haired (*Lasiurus noctivagus*), the little brown myotis (*Myotis lucifugus*), eastern pipistrelle (*Pipistrellus subflavus*), and red (*Lasiurus borealis*) may be found within the project area.

There are several bird species that are found within the project area. They include the downy woodpecker (*Picoides pubescens*), hairy woodpecker (*P. villosus*), blue jay (*Cyanocitta cristata*), eastern wood-pewee (*Contopus virens*), tufted titmouse (*Parus bicolor*), Carolina chickadee (*Parus carolinensis*), American robin (*Turdus migratorius*), white-breasted nuthatch (*Sitta carolinensis*), northern cardinal (*Cardinalis cardinalis*), and yellow warbler (*Dendroica petechia*). Predator birds likely to be found within the project area include the red-tailed hawk (*Buteo jamaicensis*) and the eastern screech owl (*Otus asio*). Game bird species such as the ruffed grouse (*Bonasa umbellus*), woodcock (*Scolopax minor*), and wild turkey (*Meleagris gallopavo*) are likely present.

THREATENED AND ENDANGERED SPECIES

Federal law under the provisions of Section 7 of the ESA, as amended, requires that any action likely to adversely affect a federally protected species be subject to review by the USFWS. Other species may

warrant protection under separate state laws. The Park considers state-listed threatened and endangered species to have the same level of importance as federally listed threatened and endangered species.

Under the provisions of Section 7 and Section 9 of the ESA, plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected. "Critical habitat" as defined in the ESA, is a term for habitat given special protection for the benefit of a listed species. Critical habitat, defined by the USFWS, is designated for several species in Swain County, which include spruce-fir moss spider, and the Appalachian elktoe (*Alasmidonta raceneliana*); however, Sevier County contains most of the project area, and no critical habitat is present in the project area within Sevier County.

Although 25 federally listed species are known to occur within Sevier County, consultation with the USFWS indicates that the majority of these species are not known to occur within the proposed project area. In a letter dated January 25, 2008, the USFWS stated that the proposed project area is less than three miles from sites known to be occupied by federally endangered species: the Carolina northern flying squirrel, spreading avens, and the spruce-fir moss spider.

In consultation of USFWS, the presence of the federally listed Indiana bat (*Myotis sodalis*) was not raised as a concern for the proposed action. Park biologists have not observed the Indiana bat during visual surveys of the project area and it is not expected to occur. Although the species is not expected to occur in the project area, certain precautions would be met during construction activities such as when removing large trees (greater than 6 inches diameters at breast height) that have characteristics for Indiana bat summer roosts (i.e., dead trees with exfoliating bark, tree cavities, and crevices): (1) potential roost trees would only be removed between August 16 and May 14; or (2) a qualified individual would observe for bats existing in the trees for 20 minutes before and after sunset. If bats are observed, use mist netting to determine species or resurvey tree at a later date. Further construction activities would occur mainly during the winter months, when Indiana bats are not occupying trees in the area.

The northern flying squirrel is limited to the central and southern Appalachians. Within the Park, the squirrel's habitat consists of high-elevation ridges and peaks of limited size separated by deep valleys or small ridges of coniferous and mixed forests. They occupy tree cavities, leaf nests, underground burrows, and prefer cavities in mature trees as den sites. The female squirrel produces approximately one litter per year, in spring or summer. The young are weaned in about two months and are sexually mature within one year (NatureServe 2009). Locations where the northern flying squirrel has been captured are located near the southern extent of the project area, but not in the direct vicinity of the project area.

The spruce-fir moss spider is a rare invertebrate found only in the southern Appalachians. Its long-term viability is unknown. This small light-brown to reddish-brown spider ranges in size from 2.5 to 3.8 millimeters when fully grown. They live in high-elevation spruce-fir forest communities on moist but well-drained moss mats growing on rocks and boulders in well-shaded locations. There are only four known populations in western North Carolina and eastern Tennessee (NatureServe 2009). There are no maps depicting the spruce-fir moss spider's known habitat.

The spreading avens is found on exposed northwest-facing cliffs. These plants are exposed to a variety of threats including trampling, rock climbing, acid precipitation, and flower-pickers. The bright yellow flowers can grow up to 5 decimeters from a large basal rosette of leaves. At higher elevations, spreading avens are surrounded by either spruce-fir forests or northern-hardwood forests that contain some spruce (NatureServe 2009).

In addition to the federally listed species, the Park maintains a database of 320 plant and animal species listed by the states of North Carolina and Tennessee. Management of these plant and animal species will be according to the guidance established by the respective state.

WETLANDS

“Waters of the United States” or jurisdictional waters are defined in the Clean Water Act as water bodies including lakes, rivers and streams, and wetlands. Wetlands for the purposes of the Clean Water Act, are those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3). The USFWS views wetlands from a more ecological standpoint. For the purpose of implementing Executive Order 11990 *Protection of Wetlands*, any area that is classified as a wetland according to the USFWS’s “*Classification of Wetlands and Deepwater Habitats of the United States*” (Cowardin et al. 1979) is subject to *Director’s Order #77-1: Wetland Protection* (D.O. 77-1) and its implementation procedures as presented in *Procedural Manual #77-1: Wetland Protection* (NPS 2008). The Cowardin classification system forms the basis for the USFWS’s National Wetlands Inventory mapping program. Under the Cowardin definition, a wetland must have one or more of the following three attributes:

1. At least periodically, the land supports predominantly hydrophytes (wetland vegetation)
2. The substrate is predominantly undrained hydric soil
3. The substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year

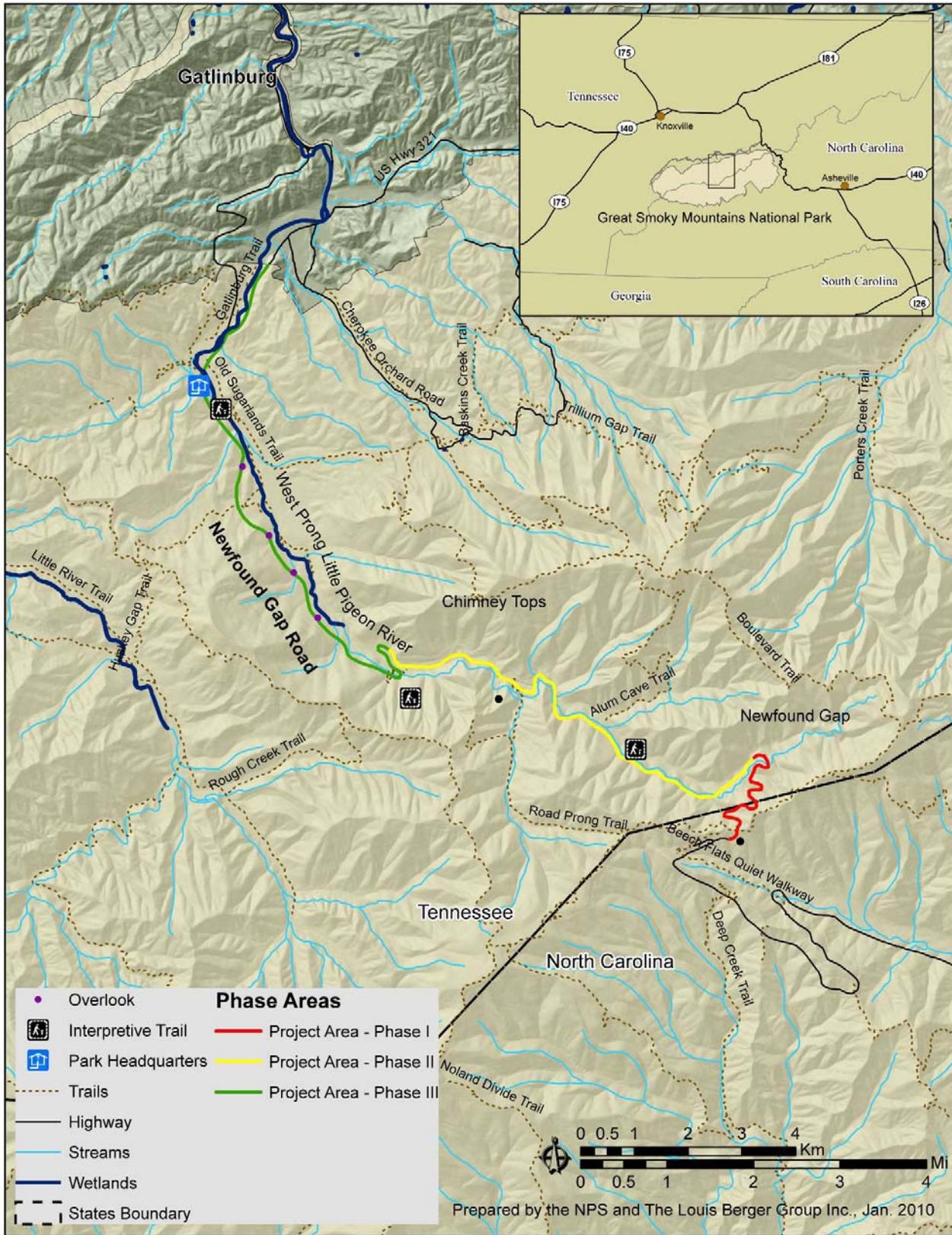
All of these definitions or classifications, along with corresponding regulations or guidelines, are applicable in the project study area.

The Newfound Gap Road is adjacent to the Little Pigeon River. The description of wetlands is taken from the USFWS classification system for wetlands and deepwater habitats (Cowardin et al. 1979). This classification system divides the wetlands into three broad categories: systems, subsystems, and classes. These categories are based on various characteristics including topographic location, physiographic location, proximity to various water bodies, soil and substrate composition, vegetation patterns, and flood frequency. An area of riverine wetland is located within the project area. This area is classified as R3UB1H and contains 67.308 acres. The riverine wetland is upper perennial, has an unconsolidated bottom, contains particles of cobble to gravel size, and is permanently flooded. These areas of wetland, in relation to the project area, are shown in Figure 4.

WATER QUALITY

Water quality is a major concern for the Great Smoky Mountains. Wildlife and vegetation rely on high water quality water to survive. The quality of aquatic habitat within the project area is due to the presence of riffles, pools, and runs. Streams in undeveloped areas generally exhibit excellent water quality (NCDWQ 1997). Potential threats to the Park’s aquatic ecosystem may be caused by effects from visitors, development, and nature. The Park receives a high total atmospheric deposition of sulfur and nitrogen. Also, there are large areas of shallow, poorly buffered soil. Over time, acidic rainfall and poorly buffered soil could eventually lead to increased acidity of the waters. Streams in developed areas often have elevated turbidity after storms due to increased erosion. The North Carolina Division of Water Quality found that most major streams are turbid after rain, and increased sediment levels have caused habitat degradation and stress to aquatic organisms. The Little Pigeon River West Prong is located within the project area. This also includes Trout Branch, Steep Branch, Hickory King Branch, Bullhead Branch, and Sugarland Branch. The Alum Cave Creek and Cole Creek are also within the project area. Within the project area, Newfound Gap Road travels directly over the river eight times via large bridge crossings and several more times via smaller culvert crossings.

FIGURE 4: WETLANDS AND WATER BODIES



AIR QUALITY

AIR QUALITY REGULATIONS

The U.S. Environmental Protection Agency (EPA) defines ambient air as “that portion of the atmosphere, external to buildings, to which the general public has access” (40 CFR 50) and requires federal land managers to follow policies that protect Park air quality. Section 118 of the Clean Air Act requires the Park to meet all federal, state, and local air pollution standards. In compliance with the 1970 Clean Air Act and the 1977 and 1990 Clean Air Act Amendments, the EPA has promulgated national ambient air quality standards and regulations. The standards were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety. To date, the agency has issued standards for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), particles with a diameter less than or equal to a nominal 10 micrometers (PM₁₀), particles with a diameter less than or equal to a nominal 2.5 micrometers (PM_{2.5}), ozone (O₃), nitrogen dioxide (NO₂), and lead (Pb). Each state and locality has the primary responsibility for air pollution prevention and control. Areas that do not meet national standards are called non-attainment areas.

The national ambient air quality standards are classified under two standards, which when exceeded have adverse effects on human health, and secondary standards, which can cause health and property damage if exceeded. Under the Clean Air Act and amendments, local air pollution control agencies have the authority to adopt and enforce ambient air quality standards that are more stringent than the national standards. Table 4 presents the national ambient air quality standards.

Newfound Gap Road is located within Sevier County, Tennessee, which is part of the Knoxville airshed. The airshed also includes Cocke County, which contains most of Great Smoky Mountains National Park.

TABLE 4. AMBIENT AIR QUALITY STANDARDS FOR CRITERIA POLLUTANTS

Pollutant	Federal Standard
Carbon Monoxide (CO) ¹ Maximum 8-Hour Concentration Maximum 1-Hour Concentration	9 ppm 35 ppm
Lead (Pb)* Maximum Arithmetic Mean Rolling 3 Consecutive Months 30-day	1.5 µg/m ³ 0.15 µg/m ³
Nitrogen Dioxide (NO ₂) ¹ Maximum 1-Hour Concentration Annual Arithmetic Mean	0.053 ppm
Ozone (O ₃)* 8-Hour Average ⁵ 1-Hour Average	0.075 ppm Revoked
Inhalable Particulate Matter (PM ₁₀) ² Maximum 24-Hour Concentration Annual	150 µg/m ³ Revoked
Inhalable Particulate Matter (PM _{2.5}) Annual Arithmetic Mean ³ Maximum 24-Hour Concentration ⁴	15 µg/m ³ 35 µg/m ³
Sulfur Dioxide (SO ₂) ¹ Annual Arithmetic Mean Maximum 24-Hour Concentration Maximum 1-Hour Concentration	80 µg/m ³ 365 µg/m ³

Source: EPA 2009b

ppm = parts per million; µg/m³=micrograms per cubic meter

1 Annual standards never to be exceeded; short-term standards not to be exceeded more than once per year

2 Not to be exceeded more than once per year on average over three years

3 To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

4 To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).

5 To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.

ATTAINMENT STATUS

Newfound Gap Road is located in an area classified by the EPA as basic non-attainment for ozone (EPA 2009a). Increased pollutant emissions resulting from the construction vehicles and equipment could impact local residents and Park visitors. When considering the affected environment for air quality under this EA, regional air quality conditions were considered.

Sevier County ambient air quality levels for 2008 for sulfur dioxide and ozone are shown in Table 5. No other monitors for criteria air pollutants are in operation within the county.

TABLE 5. AMBIENT AIR QUALITY MONITORING DATA

Pollutant	Sevier Monitoring Data (2008)		
	Monitoring Station	Period	1st/2nd Highest
Sulfur Dioxide (SO ₂)	Great Smoky Mountain National Park – Cove Mountain	1-hour	0.019/0.017 ppm
		3-hour	0.0130/0.011 ppm
		24-hour	0.007/0.005 ppm
		Annual	0.002 ppm
Ozone (O ₃)	Great Smoky Mountain National Park – Cove Mountain	8-hour	0.083/0.081 ppm
Ozone (O ₃)	Great Smoky Mountain National Park – Clingmans Dome	8-hour	0.086/0.086 ppm

ppm = parts per million; µg/m³ = micrograms per cubic meter

Source: EPA 2009c

CULTURAL RESOURCES

Archeological evidence of people utilizing the abundant natural resources of the Smokies begins 12,000 years ago and continues until the formation of the Great Smoky Mountains National Park in 1934. In the Smokies, archeological resources consist of prehistoric and aboriginal sites that represent several southeastern cultural periods, as well as historic sites related to mountain culture and the Park development period. While over 500 sites have been found within the Park boundary, the total remains unknown.

Prehistoric occupation of the Great Smoky Mountains probably occurred shortly after the arrival of humans to the New World more than 12,000 years ago. However, evidence for the Paleoindian Period (12,000–8,000 B.C.) is rare within the Park. Noted for the manufacture of large ovate projectile points, the Paleoindians are thought to have focused subsistence on the extinct large mammals present in the terminal Ice Age. It is generally believed these people followed the large mammals as they migrated in small highly mobile groups.

As the climate warmed to temperatures comparable to today, the fauna associated with the Ice Age began to disappear. Known to archeologists as the Archaic Period (8,000–1,000 B.C.), the people's subsistence focused on the gathering of wild plants and the hunting of modern game, such as whitetail deer. Evidence for this shift in the subsistence economy is noted by the appearance of tools related to the processing of wild plants and the occurrence of smaller more expedient types of weaponry. These groups of peoples were still highly mobile and some archeologists suggest that the Archaic people traveled seasonally to favored spots, where plants would ripen at differing times of the year or game would congregate.

The Woodland Period (1,000 BC–AD 1,000) was marked by the first appearance of intentional cultivation of wild plants. People began to settle in favored areas. The appearance of the bow and arrow, the occurrence of pottery, and mound-building all have their roots in the Woodland period. Ceremony and social

stratification became apparent. Mounds were utilized for the internment of a select few during this cultural period.

The Mississippian Period (AD 1,000– 1540) is marked by the appearance of full blown cultivation, the development of long-distance trade networks, the appearance of craft specialists, and social elites. People during this period built large mound complexes enclosed by palisade walls. Large open plazas around the mounds provided space for the traditional stick ball game. With the arrival of the Spanish in the New World in AD 1540, the Mississippian way of life was gradually eroded.

Among the first Europeans to encounter and document the Cherokee was the Spanish conquistador Hernando De Soto in 1540. The Cherokee were already well established in towns and villages along major waterways, and it is likely that the Cherokee Indians were residents of the area as early as the 15th century.

Known as the Qualla Phase, it is represented archeologically to some extent as a continuation of the Mississippian tradition. However, large declines in the population of the Cherokee from the introduction of European diseases and European expansionism, created major social changes. The large population centers and social elites of the preceding Mississippian period gradually declined and were supplanted with social structures focused at the familial and community level.

By the early 19th century, European expansionism culminated in the forced removal of Cherokees west to the Oklahoma territory. However, remnants of the Cherokee, their lands, and their culture remained in western North Carolina and today are represented as the Eastern Band of Cherokee Indians.

The first Europeans to settle in the Smokies arrived in the early 19th century. Following in the footsteps of the Cherokee, they established small farmsteads in the valleys and floodplains of the Smokies. They cleared the land and constructed many of the log cabins and associated outbuildings Park visitors enjoy today. Gradually flat arable agricultural land grew scarce as the population increased and people settled further up the mountains drainages.

At the end of the 19th century and beginning of the 20th century, large-scale industries began to recognize and exploit the geologic and natural resources of the Smokies. Places along Eagle Creek, Hazel Creek, Forney Creek, Big Creek, Little River, and the Oconaluftee and Raven's Fork Rivers, became hubs of industrial activity. Industrial activity was centered on the clear-cutting of timber, but mining and metallurgy played a significant role in the industry of the Park.

Processing mills were constructed to efficiently process the timber or ore. Networks of rail systems, roads, and trails were constructed to access the timber stands and to transport the processed goods to the national market. In some watersheds, company towns sprung up to support the workers. Vestiges of these towns and transportation networks are still visible today.

By the 1920s, as lumber company profit margins sank and the scars on the landscape from clear-cutting grew, a grassroots push for a National Park began in earnest. Beginning in 1923, the Great Smoky Mountains Conservation Association was formed with the support of prominent businessmen and naturalists. Their aim was to found a Park in the east that would prohibit logging, in contrast to the new system of national forests.

In 1926, President Calvin Coolidge signed into legislation a bill authorizing the establishment of the Great Smoky Mountains National Park. The lands were privately held at the time by roughly 400-500 residents, and only through the combined efforts of the States of North Carolina and Tennessee was it possible to purchase the lands. Through the fundraising efforts of both states, by the Great Smoky Mountains Conservation Association, and through a private donation by the Rockefellers, over 6,600 tracts were purchase and donated to the federal government for incorporation into a Park. By 1934, the acquisition of private lands had reached the acreage threshold denoted in the enabling legislation and the Park was officially born. Once the area became a National Park, the residents were removed from the area. There

were houses, cabins, schools, and churches up and down the hollows and narrow valleys of the steep and rocky sides of the mountains.

By 1933, Park management staff was in place and planning for needed visitor infrastructure was underway. A new program initiated in response to the Great Depression provided the manpower for the implementation of Park plans. Over 30 camps of 200 men and boys were dispatched to the Great Smoky Mountains National Park from 1933 to 1942. Known as the CCC, much of the work they completed remains in use today, while only remnants of their camps are found. Roads, bridges, trails, camp grounds, Park buildings, and fire towers are among some of their contributions to the Parks.

This legacy of human occupation and use of the land that now comprises Great Smoky Mountains National Park is evident in cultural resources managed by the Park. These include:

- Over 500 known archeological sites with more sites discovered each year. These sites have been identified in virtually all of the Park's biotic zones and geomorphic settings. A current registry of known sites is maintained in the Park service-wide Archeological Sites Management Systems.
- Over 197 historic structures are listed on the Park service-wide List of Classified Structures. These include historic buildings and early Park infrastructure including roads, bridges, and visitor centers.
- Currently listed are 42 landscapes and component landscapes on the Park service-wide Cultural Landscape Inventory. These include both those that have been certified as cultural landscapes as well as some that have been identified for further study as cultural landscapes.
- Ethnographic resources include over the over 150 known cemeteries located within the Park's boundaries as well as other sites that hold particular significance to traditionally associated peoples.
- Cultural museum objects have been described as the manifestations and records of behavior and ideas that span the breadth of human experience. The museum collection of the Park includes over 500,000 cultural objects and archival records.

For the purpose of compliance with Section 106 of the NHPA, as amended, cultural resources include prehistoric and historic archeological sites, buildings, structures, objects, districts, cultural landscapes, or museum objects that are eligible for or are listed in the NRHP. The consideration of these resources by NPS meets pertinent requirements of the NHPA, the NEPA, and related legislation and implementing regulations. For this project, analysis focuses on cultural landscapes (including road-related structures) and archeological resources. Historic structures (non-road related), ethnographic resources, and museum collections were dismissed because there is little, if any, likelihood these types of cultural resources are present in the study area.

CULTURAL LANDSCAPES

For this study, efforts to identify cultural resources included a review of information provided by the Park, supplemented by interviews with Park staff, and other published and unpublished sources. A Cultural Landscape Assessment (CLA) of Newfound Gap Road, completed in 2009, determined that the road is eligible for the NRHP as a cultural landscape (NPS 2009a). The CLA documented and evaluated the landscape features of Newfound Gap Road, including all structures associated with the road. The CLA contains a statement of significance, a historic context, and a physical description of the character-defining features of the Newfound Gap cultural landscape. A full inventory of surveyed structures is included in the CLA and lists location, construction date, and whether the structure is a contributing or non-contributing resource to the cultural landscape.

Cultural landscapes, as defined by *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (Birnbaum and Peters 1996), consist of “a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.” The proposed alternatives have the potential to affect the Newfound Gap cultural landscape.

Newfound Gap Road is a 31-mile-long linear landscape that transverses Great Smoky Mountains National Park, connecting the Park’s entrance in Gatlinburg, Tennessee, with the entrance in Cherokee, North Carolina. The road crosses the state boundary at Newfound Gap. The Tennessee section of the road was initially constructed by the State of Tennessee in 1926 and was realigned by the NPS and the BPR between 1933 and 1939, incorporating NPS road design standards. The reconstruction of the road was also a result of newly established New Deal programs, in particular the Emergency Conservation Work and the CCC.

Newfound Gap Road was constructed not only as a transportation route between the two states, but also as a scenic road with carefully planned views of the landscape for motorists and hikers. The 14.5-mile Tennessee section of Newfound Gap Road begins in the Sugarlands Valley, at the Gatlinburg entrance to the Park. The topography and natural landscape gradually changes as one ascends to Newfound Gap, affording a variety of views and vistas. Rustic bridges and tunnels, built by CCC, enhance the picturesque character of the road; their designs and materials help them blend compatibly with the surrounding natural landscape. Pull-offs at intervals along the road provide places of rest for visitors and access to trails, as well as more controlled views of the landscape. Thus, in its built form, the road is a testament to the NPS’s emphasis on road design, the preservation of the natural landscape, the harmonization of built structures with nature, and the overall experience of the visitor whose primary interaction within the Park would take place along the road. The collaborative road building effort among the NPS, BPR, and the CCC is still evident to those traveling along the road today.

The CLA found that Newfound Gap Road meets National Register significance as a representation of New Deal-era programs that involved the efforts of conservationists, state officials, Congress, and the Roosevelt administration. In addition, the construction and design of the road illustrate the importance placed on reviving the economy through public works, such as the CCC, while conserving natural resources and providing recreational opportunities for the



FIGURE 5: MASONRY ARCH UNDER CONSTRUCTION, 1935
(E.E. Exline, Photographer, Great Smoky Mountains National Park Archives)

American people. The CLA also determined that Newfound Gap Road is significant as an embodiment of the NPS naturalistic design philosophy and craftsmanship refined during the New Deal era. The CLA established the period of significance for Newfound Gap Road as 1933 to 1942, from the start of the NPS involvement in the reconstruction of the road until the onset of World War II when construction halted.

Cultural landscapes are composed of tangible and intangible aspects that individually and collectively “give a landscape its historic character and aid in the understanding of its cultural importance” (Page et al.

1998). A character-defining feature is defined as a “prominent or distinctive aspect, quality, or characteristic of a cultural landscape that contributes significantly to its physical character” (Birnbaum and Peters 1996). Character-defining features that contribute to the Newfound Gap cultural landscape include natural systems, topography and drainage, spatial organization and circulation, vegetation, views and vistas, and road-related structures.

The natural systems, topography, and drainage of the Newfound Gap cultural landscape are important as they played a large role in its 1930s reconstruction and are integral to visitors’ experience. The 14.5-mile Tennessee section of the road begins at the Park entrance to the proximity of Newfound Gap, which is the Tennessee-North Carolina border. Surface elevations along the road ascend from approximately 1,360 feet at the Park entrance to 5,046 feet at Newfound Gap. The dramatic rise in elevation over such a short distance of roadway brings significant changes in the physical landscape, ranging from an intimate, narrow stream valley to a broad, dissected upland with open views of ancient mountain ranges.

The natural vegetation of Great Smoky Mountains National Park and the Newfound Gap Road cultural landscape is diverse and widely varied, which adds to the depth and range of the visitor experience. Deciduous forests account for approximately 80% of Great Smoky Mountains National Park. Over 100 native tree species have been identified within Great Smoky Mountain National Park, with five major forest types within the Park boundaries: Cove Hardwood Forest, Spruce-Fir Forest, Northern Hardwood Forest, Hemlock Forest, and Pine-and-Oak Forest. During the reconstruction of Newfound Gap Road, great care was taken to preserve existing vegetation. Where it was necessary to remove trees, CCC crews often moved them to nurseries, one of which was located at the Sugarlands Valley; the trees were subsequently replanted. When new planting was required to disguise road construction scars, only appropriate species that were already found in the area were planted. While the vegetation has naturally evolved since the 1930s, the vegetation that visitors experience along the road is a significant character-defining feature to the Newfound Gap cultural landscape.

Newfound Gap Road is a vital component of the circulation system within Great Smoky Mountain National Park and is the only improved road that extends across the entire Park. In Tennessee, the road begins in the Sugarlands Valley and follows the path of the West Prong of the Little Pigeon River as it ascends to Newfound Gap. The 1930s’ reconstruction of Newfound Gap Road responded to the natural topography, landscape features, and views to enhance the motorist’s experience. This reconstruction transformed the roadway to follow the design philosophies of the NPS. Consequently, the road was realigned to avoid steep grades, road banks were restored to have a naturalistic appearance, and all road-related structures were built in a rustic aesthetic in order to harmonize with the surrounding landscape. Unlike the North Carolina section of Newfound Gap, of which a large portion was substantially realigned during the 1960s, the circulation pattern and spatial relationships of the Tennessee segment of the road have largely retained their original configuration from the 1933–1939 reconstruction of the road.

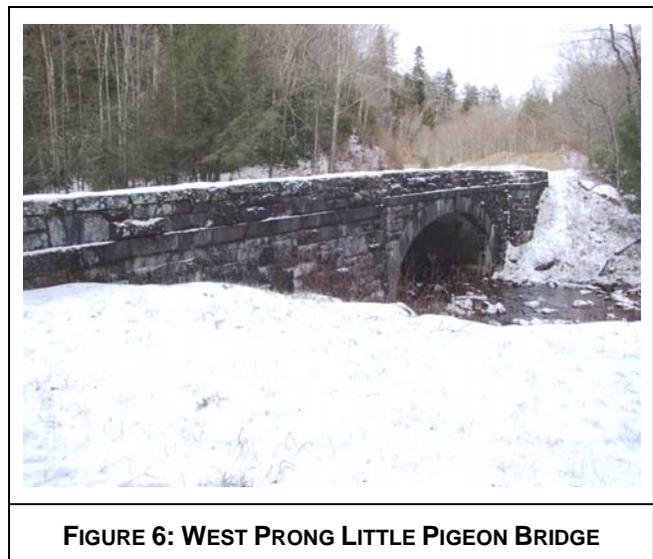


FIGURE 6: WEST PRONG LITTLE PIGEON BRIDGE

The views as vistas that are a part of the Newfound Gap Road cultural landscape were a significant design component of the road and were to be experienced from inside an automobile while traveling the road, or outside an automobile while stopped at a designated overlook. The winding nature of the road lends itself to a progression of more confined vistas, framed by the tree-lined, tunnel-like route of the lower elevations that

open to expansive mountain views in the upper elevations. Overlooks on the roadside guide visitors to specific locations of designed views and vistas and shape the overall experience of the visitor.

The road-related stone masonry structures located along Newfound Gap Road were primarily built by the CCC and reflect the rustic design aesthetic practiced by the NPS during the New Deal era. These structures include bridges, tunnels, culverts, guardwalls, retaining walls, and tree wells. The stone masonry structures are the most visible and prominent character-defining features of the Newfound Gap cultural landscape.

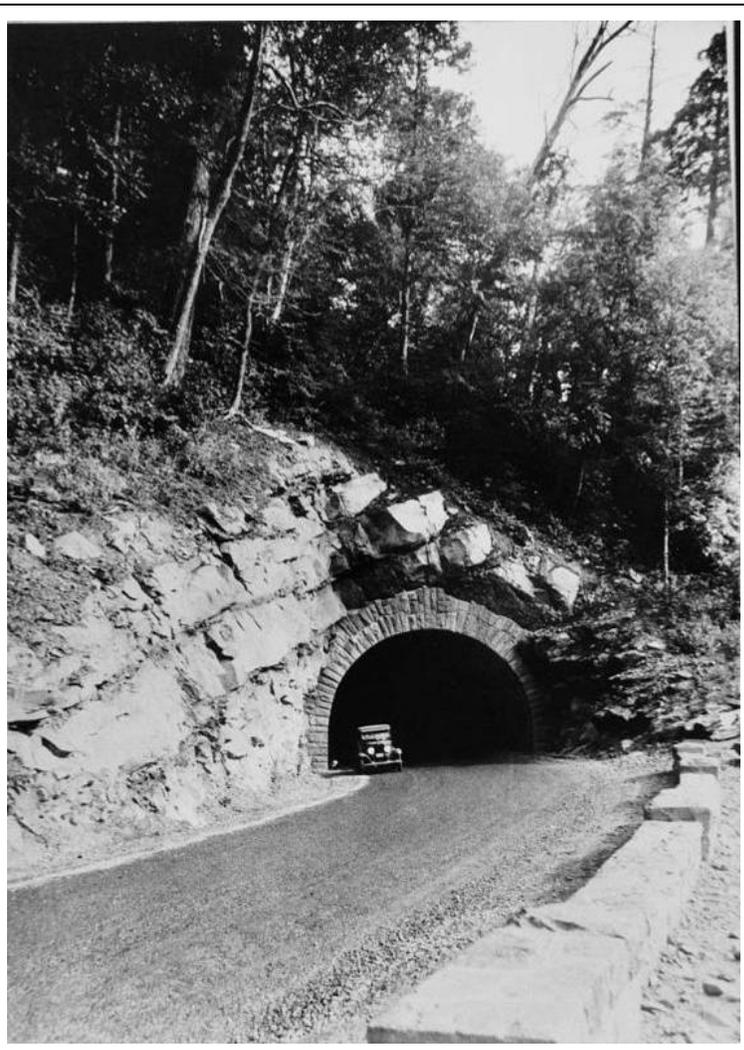


FIGURE 7: LOWER PORTAL OF THE CHIMNEYS TUNNEL, 1936

There are eight bridges on Newfound Gap Road, most of which carry the road over the West Prong of the Little Pigeon River. Constructed in the late 1930s, they are reinforced concrete structures with stone masonry facings. Each bridge is slightly different in design and is capped with stone masonry parapet walls. In most cases, a masonry guardwall extends from the bridge parapet along the roadway, creating a continuous line while protecting motorists. All of the bridge walls follow the same NPS standards for stone masonry and are finished with a subtly battered end or terminated with a single pier. The bridges are an integral component of both the circulation and the picturesque quality of Newfound Gap Road. They illustrate the refinement of the NPS design of Park structures during the 1930s and the emphasis placed on combining function with the rustic aesthetic.

The two tunnels built by the BPR on Newfound Gap Road in 1937, functionally speaking, permitted safe and continuous travel up to Newfound Gap. Aesthetically speaking, the tunnels allowed for the avoidance of major road scars and created picturesque focal points along the road. The tunnel portals exhibit weathered stone, laid in random,

irregular, and rough courses blended with the surrounding landscape. Although it is documented that the upper tunnel was relined with concrete in 1957 to 1958 and the road through both of the tunnels was lowered between 2001 and 2004, the tunnels generally retain their integrity of location, setting, design, materials, and workmanship from their original period of construction and continue to be exemplary of the NPS rustic aesthetic.

Culverts were integral structures in the design of Park roads, permitting the natural flow of water underneath roads and trails. The CLA identified over 130 culvert headwalls along Newfound Gap Road. The stone masonry headwalls associated with the culverts were intentionally built of naturally weathered stone. Variations of culvert headwalls included stepped parapets; jack, pointed, elliptical, and round arches; and

simple post and lintel construction. The culverts along Newfound Gap Road illustrate the desire of the NPS to preserve the natural landscape and harmonize all man-made structures with the landscape. The culverts are a significant structure type associated with the Newfound Gap Road cultural landscape. While additional culverts were added to the road after 1942, these more recent culverts feature the design and materials of the earlier culverts.

In particular, the stone masonry walls along Newfound Gap Road are among the most visible character-defining features of the cultural landscape. These walls, which include retaining walls and guardwalls, are integral structural elements and are distinctive of NPS road design. Stone masonry retaining walls and guardwalls are often freestanding; however, they are also used jointly. In addition, masonry guardwalls often cap or are extended from retaining walls, culvert headwalls, or bridges to create continuous lines of walls. Guardwalls and retaining walls often incorporate headwalls, or culverts, to facilitate drainage. Alone or in these combinations, masonry guardwalls protect motorists from steep edges along the mountainsides and the rivers and visually guide the visitor to pull-offs, bridges, and other roadside features. With their construction of locally quarried stone, the masonry walls express a naturalistic feeling that unifies the surrounding landscape. After World War II, additional masonry guardwalls and retaining walls were added along the road as needed to improve safety. Masonry guardwalls dating from 1933 to 1942 were an integral part of Newfound Gap Road's design and construction during the period of significance and are illustrative of the standardized designs executed by the NPS Landscape Division in the 1930s.

Less prominent, but still important, structures of the Newfound Gap cultural landscape are the formal overlooks and parking areas that line the road. The NPS incorporated formal overlooks and parking areas into the design of Newfound Gap Road to enhance the motorist's experience by providing resting points as well as spectacular panoramic views of the landscape. Overlooks, located in the higher elevations, provided views out into the landscape and had spots for parked cars, viewing terraces with sidewalks, stone curbing, and guardwalls in order for visitors to get out of their cars for a better view. While a number of these structures have been added to the road as needed, approximately nine contribute to the cultural landscape.

Unique and somewhat obscure structures of the Newfound Gap cultural landscape are the tree wells. During the NPS reconstruction of the road, the CCC installed tree wells around a number of notable specimens to protect them from damage by heavy machinery. The semicircular tree wells, lined with rough cut, uncoursed, and mortared local stone, separated the trees from the surrounding fill. Although construction plans called for the construction of tree wells along Newfound Gap Road—approximately 17 tree wells in the area of the Loop Over Bridge alone—only four tree wells are identified in the List of Classified Structures for Great Smoky Mountain National Park, three of which were surveyed in December 2007. Tree wells surveyed in December 2007 include one near MM 10 and two grouped after MM 12, near the West Prong Little Pigeon Bridge. These tree wells illustrate the emphasis placed on landscape and vegetation preservation by the NPS during the reconstruction of the road.

ARCHEOLOGICAL RESOURCES

Previous work within the general vicinity of the project area documented evidence of more than 8,000 years of human occupation in the general area. Archeological remains associated with the Early-to-Late Archaic, Early-to-Late Woodland, Historic Cherokee, and 19th century Euro-American and African American occupations are noted from previous archeological investigations.

Although small in scope, two archeological surveys were conducted within the road prism on September 11, 2008. No archeological sites were identified as a result of these surveys. However, Park acquisitions maps indicate that there are several known historic home sites that lie within 1,000 feet of the road. Table 6 below describes these sites. The Vance Newman Cemetery, located a short distance east of the road, has approximately 20 burial sites that are accessed by a quiet walkway. South of the Chimneys area, the land was once owned by the Champion Fiber Company, which once owned the most land within the Park.

TABLE 6. HISTORIC HOME SITES

Structure Name	Type of Site
Wiley Brownlee	House
Mark Ogle	House
Arthur Oakley	House
Elmer Trentham	House
Luther Parton	House, Barn
Luther Parton	House
Bruce Keener	House
H. Ray	House
Ben Robertson	House
J.C. Cole	House
Alec Cole	House, Barn
Sam King	Lunchroom, Garage

Source: NPS 2009e

TRAFFIC AND TRANSPORTATION

Newfound Gap Road is a significant cultural resource that embodies NPS landscape design principles of the 1930s, and was originally constructed in 1930 by the North Carolina and Tennessee State Highway Departments. Between 1932 and 1939, significant portions of the road were reconstructed and a number of improvements were made under the direction of the NPS and the BPR, which was a precursor to the FHWA-EFLHD. These improvements included the construction of stone masonry bridges, culverts, guardwalls, and tunnel portals, as well as extensive landscape work on the road banks based on NPS Park road design guidelines. Newfound Gap Road is identified as a contributing resource to the proposed Park Development Historic District, which is documented and evaluated in a draft NRHP Nomination/Historic Resource Study. The historic importance of this road is also illustrated by its designation as a State Scenic Byway by North Carolina and Tennessee in April 2009 (NPS 2009b). Newfound Gap Road's outstanding scenic, natural, historic, recreational, and cultural values are intrinsic features that contribute to the character of the area, providing visitors with a leisurely motoring experience through scenic mountainous environments. Newfound Gap Road stretches 31 miles between Gatlinburg, Tennessee, and Cherokee, North Carolina, and is the principal roadway that completely transverses the Park, leading to the highest elevations.

Newfound Gap Road is a two-lane road with additional left-turn lanes at some intersections. The posted speed limit along the entire road varies from 25 mph to 45 mph. Table 7 provides traffic counts taken by the NPS for Newfound Gap Road (NPS 2005).

TABLE 7. ANNUAL AVERAGE DAILY TRAFFIC ON THE PROPOSED SECTION OF NEWFOUND GAP ROAD TO BE REHABILITATED

Roadway Segment	Length (miles)	1988	1991	1994	2004
North Park Boundary to Gatlinburg Pass	1.1	3,057	6,162	6,717	6,463
Gatlinburg Pass to Sugarlands	0.37	7,263	7,449	8,119	8,089
Sugarlands to Chimneys Picnic Area	4.74	2,364	5,322	5,801	7,178
Chimneys Picnic Area to Newfound Gap	8.29	3,388	5,358	5,840	6,791
Total	14.5	16,072	24,291	26,477	28,521

Source: NPS 2005

Since Newfound Gap Road plays a critical role in providing access for Park visitors, maintaining a state of good repair is critical. The Park, in conjunction with the FHWA-EFLHD, has identified several locations along a 14.5-mile section of Newfound Gap Road where specific repairs or improvements are currently needed. Rehabilitation of the entire road surface is anticipated under the proposed action, as well as rehabilitation of road shoulders, as needed. In addition, Newfound Gap Road was last paved in the early 1980s, and the existing pavement has exceeded its serviceable condition. A detailed traffic analysis was conducted to aid in the overall planning and decision-making process for the rehabilitation of Newfound Gap Road.

Automatic traffic recorders were placed at six locations on Newfound Gap Road from Friday, August 1, 2008, at 1:00 p.m., to Thursday, August 7, 2008, at 12:00 p.m. This time period included important peak-hour periods. Previous data showed daily traffic volumes tended to peak on the weekends in the Park. Automatic traffic recorders were placed at the intersections of Newfound Gap Road with Little River Road, Chimneys Picnic Area Access Road, and Alum Cave Bluffs Trailhead Access Road. Automatic traffic recorders were also placed at the Chimney Tops Trail Head Area, the Quiet Walkway located one-quarter mile south of the Sugarlands Visitor Center, and the Huskey Gap Trail Head Area to determine vehicle usage volumes at these areas.

The collected traffic data was analyzed and sorted into 15-minute collection periods for each of the six study locations. This data was tallied into hour-long periods to determine the peak hour for the entire roadway. The traffic volumes at the six study locations were added together to create a snapshot of the usage of the roadway at all six collection points. The peak hour was determined to be 11:30 a.m. to 12:30 p.m. on Saturday, August 3, 2008, during the collection period. This peak hour was used as a baseline to develop peak, mid-peak, and off-peak analysis volumes.

The traffic patterns of Newfound Gap Road are variable based on the season. The data collected in August 2008 does not represent the peak usage of the Park. A 2004 traffic report prepared for the Park contained data summarized for average daily traffic on a monthly basis. July was identified as the peak usage month, April as the mid-peak usage month, and January as the off-peak usage month, with these traffic volumes shown in Table 8.

TABLE 8. MONTHLY AVERAGE DAILY TRAFFIC

	Little River Road	Quiet Walkway	Huskey Gap Trailhead	Chimneys Picnic Area	Chimney Tops Trailhead	Alums Cave Bluffs
Average Daily Traffic	15,795	8,477	7,745	8,383	7,961	8,486
	Average Daily Traffic calculated from collected data.					
Month	Monthly Average Daily Traffic					
January	5,960	3,199	2,922	3,163	3,004	3,202
February	6,514	3,496	3,194	3,457	3,283	3,500
March	9,315	4,999	4,568	4,944	4,695	5,005
April	12,571	6,747	6,164	6,672	6,336	6,754
May	13,143	7,053	6,444	6,975	6,624	7,061
June	17,334	9,303	8,499	9,199	8,736	9,312
July	22,190	11,909	10,880	11,777	11,184	11,921
August	15,795	8,477	7,745	8,383	7,961	8,486
September	15,533	8,336	7,616	8,244	7,829	8,345
October	20,508	11,006	10,056	10,884	10,336	11,018
November	14,230	7,637	6,977	7,552	7,172	7,645
December	6,857	3,680	3,362	3,639	3,456	3,684

VISITOR USE AND EXPERIENCE

Great Smoky Mountains National Park provides a diverse range of easily accessible mountain recreation opportunities in close proximity to major eastern population centers. From Newfound Gap Road to wilderness trails, these facilities offer opportunities for outstanding scenic vistas and exposure to the diversity of the Great Smoky Mountains habitats and culture. Three main entrances are available for visitors to enter the Park: US-441 to the Gatlinburg, Tennessee, entrance through Sevierville and Pigeon Forge, Tennessee; TN-73 to the Townsend, Tennessee, entrance; and US-441 to the Cherokee, North Carolina, entrance. Newfound Gap and Newfound Gap Road are located in closest proximity to the Pigeon Forge entrance.

According to the NPS Public Use Statistics Database, annual visitation at the Park dropped considerably in 2000, but has since stayed steady. Approximately 10.3 million people visited the Park in 1999—the highest number since the establishment of the Park. Since then, the average annual number of visitors to the Park is approximately 9.3 million (NPS 2009c). Nevertheless, Great Smoky Mountains National Park remains the most-visited national park within the national park system. Park visitation is heaviest in June, July, and October. In 2008, total annual visitation was 9,044,010 people. Of this number, about 14% visited the Park during the month of July. The next highest monthly visitations occurred during October and June; this accounts for almost 24% of the total annual visits. These three months alone account for approximately 37.8% of total annual Park visitation (NPS 2009c).

The most recent visitor survey was conducted during June 22 – 28, 2008, by the University of Idaho Park Studies Unit (University of Idaho 2009). This survey profiled Great Smoky Mountains summer visitors and visitor activities and found that over 90% of visitors to the Park are non-residents. Visitor groups often visit multiple attractions while in the Park. The top five visited attractions within the Park are: (1) Cades Cove Loop Road—55% visited this attraction; (2) Sugarlands Visitor Center—45%; (3) Newfound Gap—37%; (4) Oconaluftee Visitor Center—36%; and (5) Clingmans Dome—33%. Both Newfound Gap and Sugarlands Visitor Center are near the area of Newfound Gap Road where the proposed action would occur.

When visiting Newfound Gap off of Newfound Gap Road, a survey of 293 visitors indicated that 85% of the visitors spent up to one hour at the site with only 1% staying up to 4 hours or more (University of Idaho 2009). This indicates that most visitors using Newfound Gap Road are passing through to Park attractions and are not staying long periods of time at those attractions.

When asked what specific activities the visitors participated in, 95% stated they took a scenic drive/viewed the scenery, such as Newfound Gap Road, while 69% stated they enjoyed wildlife viewing, and 62% enjoyed walking/hiking. Forty-six percent of the visitors surveyed stated that taking a scenic drive was the most important aspect of visiting the Park. Overall, 96% of the visitors surveyed rated the general quality of the facilities, services, and recreational opportunities as “very good” or “good” (University of Idaho 2009).

The Park contains ten developed campgrounds with a total of 1,000 campsites. In the area of Newfound Gap Road, visitor facilities include Elkmont Campground as well as a horse stable and picnic areas. Numerous trails are located off Newfound Gap Road including: Old Sugarlands Trail, Alum Cave Trail, Huskey Gap Trail, Chimney Tops Trail, and Road Prong Trail. A ranger station is located at the intersection of Newfound Gap Road and Little River Road to assist Park visitors recreating in this area.

VISITOR AND EMPLOYEE SAFETY

The NPS is committed to providing appropriate, high-quality opportunities for visitors and employees to enjoy the Parks in a safe and healthful environment. The NPS strives to protect human life and provide for injury-free visits. One of the core values of the NPS, as stated in the NPS *Management Policies 2006* and Director’s Order 50B, *Occupational Safety and Health Program* (NPS 1999), is the safety and health of its employees, contractors, volunteers, and the visiting public. It is the policy of the NPS to provide a safe and healthful place of employment to protect federal and private property from accidental damage or loss, and to meet or exceed all applicable statutory, regulatory, and policy requirements relating to safety, health, and the environment.

Newfound Gap Road was last paved in the early 1980s, and the existing pavement has since exceeded its serviceable condition. Rutting, cracking, and settling are apparent along the roadway, providing conditions for water to pond and resulting in a safety hazard.

As a means of quantifying the deficiencies identified, an analysis of the crash history for Newfound Gap Road has been completed. The crash analysis evaluates crash data on Newfound Gap Road within the study area. Crash data were compiled from Service-wide Traffic Accident Reporting System (STARS) reports from 1997 to 2007. A total of 517 records were sorted into six crash types for analysis. Various characteristics are gleaned from crash reports and entered into the STARS system. These crash characteristics include crash type, object struck, injury, fatality, property damage, weather, crash date and time, and contributing factors. The STARS system is based on a series of nodes as a means of geographic location. Segments of vehicle routes are given nodes to represent them in the STARS system. Figure 8 details the nodes for the Newfound Gap Road corridor. When crashes are entered into the system, an approximated distance from the nearest node to where the crash occurred is included.

Table 9 summarizes crash totals by STARS node, and is sorted from most occurrences to the least. The top five crash areas include the Chimneys Picnic Area entrance intersection with Newfound Gap Road, Alum Cave Bluffs Trail Head intersection with Newfound Gap Road, and the Upper Tunnel on Newfound Gap Road, shown on the Figure 1 site vicinity map. Table 10 provides a summary of crash type and injury occurrences. Based on the data, the first three crash types represent the bulk of the crashes occurring on Newfound Gap Road during the study period from 1997 to 2007. Similarly, most of the injuries and all of the fatalities of the study set were found in the collisions with other motor vehicles, collisions with a fixed object, and the non-collision crash types.

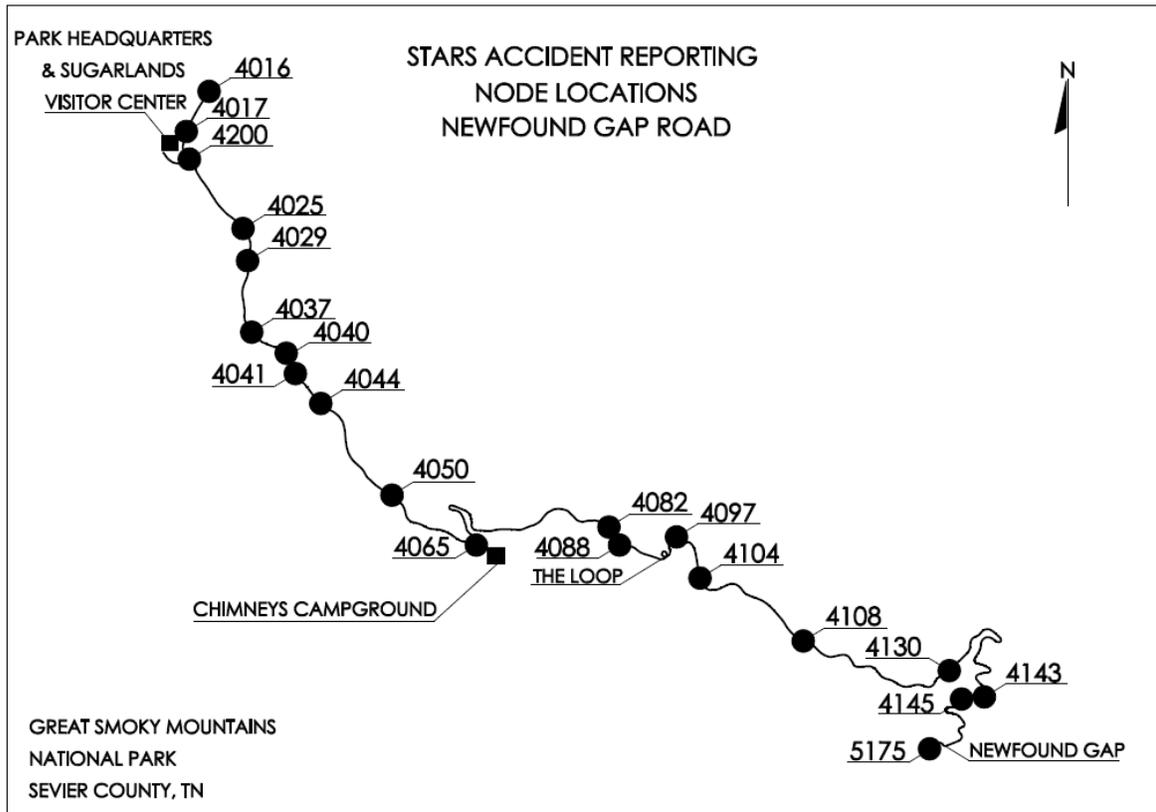


FIGURE 8: STARS ACCIDENT REPORTING NODE LOCATIONS

TABLE 9. CRASHES BY NODE

Node	Total Crashes	Fatalities	Injuries	Property Damage Only
4065	81	1	29	51
4108	70	1	18	51
4143	47		21	26
4200	35		11	24
4088	35		10	25
4145	32	1	15	16
4097	30		15	15
4000	28		6	22
4041	21		10	11
4017	19		3	16
4037	16		3	13
4130	14		5	9
4002	14		6	8
4016	12		2	10
4082	11		1	10
4005	10		1	9
4040	8		1	7
4029	6			6
4104	5		1	4
4025	5		1	4
4050	4		1	3
4100	2		1	1
4044	2		1	1
4033	2			2
4141	1		1	
4139	1			1
4128	1			1
4123	1			1
4112	1			1
4107	1		1	
4068	1			1
4032			1	

TABLE 10. FATALITY, INJURY, AND PROPERTY DAMAGE OCCURRENCES BY CRASH TYPE

Crash Type	Fatalities	Injuries	Property Damage Only	Total Crashes
Collision with other Motor Vehicle	1	56	171	228
Collision with Fixed Object	2	64	109	175
Non Collision		32	25	57
Collision with Animal		7	29	36
Collision with Other Object		5	12	17
Collision with Parked Motor Vehicle			2	2
Collision with Bicycle		1		1
Unknown			1	1
Total	3	165	349	517

Each of the crashes in the roadside environment was reviewed for the contributing factors to the crash as reported in the crash data. The contributing factors were classified as driver-based, environment-based, or vehicle-based. Driver-based crashes were caused by inattention of the driver, driving too fast for the prevailing conditions, driving under the influence of alcohol or drugs, or the physical impairment of the driver (falling asleep, fainting, etc.). Environment-based crashes were caused by weather conditions (snow, ice, slush, rain, etc.), debris in the roadway, or reduction in visibility due to fog or extreme sunlight. Vehicle-based crashes were caused by vehicle failure (most commonly due to brakes in the crashes studied). Driver-based contributing factors accounted for 70% of the crashes in the study group, followed by environment-based contributing factors as displayed in Table 11.

TABLE 11. GROUPED CONTRIBUTING FACTORS

Contributing Factor Group	Total Crashes	Percentage of Total
Driver	363	70%
Environment	128	25%
Vehicle	26	5%
Total	517	100%

SURROUNDING COMMUNITIES

Newfound Gap Road passes through the community of Gatlinburg in Sevier County, Tennessee, on the north side of the Park and through the community of Cherokee in Swain County, North Carolina, on the south side of the Park. Additionally, Knoxville, Tennessee (to the northwest), and Asheville, North Carolina (to the southeast), are both fairly large cities approximately 50 miles from the respective entrances to the Park via the Newfound Gap Road. Construction and improvements associated with the Newfound Gap Road are expected to be supported by businesses and workers located in these communities, and road closures or detours are likely to affect Park visitation by tourists staying in these communities and cities.

Therefore, the study area was determined to be Sevier County, Tennessee, Swain County, North Carolina, and the metropolitan areas of Knoxville (TN) and Asheville (NC). Socioeconomic data was collected for the Knoxville Metropolitan Statistical Area (MSA) and the Asheville MSA.² Knoxville MSA includes the City

² The Office of Management and Budget's (OMB) general concept of a metropolitan area is that of a geographic area consisting of a large population nucleus together with adjacent communities having a high degree of economic and social integration with the nucleus (BEA 2006).

of Knoxville and Anderson, Blount, Knox, Loudon, and Union Counties, and the Asheville MSA includes the City of Asheville and Buncombe, Haywood, Henderson, and Madison Counties. Additionally, socioeconomic data from the states of North Carolina, Tennessee, and the nation are also shown to provide a comparison with the study area data.

PARK ECONOMIC CONTRIBUTIONS TO LOCAL ECONOMIES

Great Smoky Mountains National Park contributes to the local economy in several ways. First, it provides jobs to Park employees, including seasonal, termed, and permanent full- or part-time positions (see the “Park Management and Operations” section of the “Affected Environment” chapter for more detail). Park employees spend their income and wages in the local economies, which support additional jobs and income. In 2007, Great Smoky Mountains National Park employed 346 employees, who supported an additional 157 jobs in the local economy, for a total of 503 jobs.³ This payroll spending contributes to the Value Added,⁴ or the region’s Gross Regional Product, by an estimated \$26.3 million. These Park payroll benefits are summarized in Table 12. The Park may also support the local economy if local vendors are utilized, through contracted construction services or purchases of supplies and materials, for example, although these figures are not assessed within this socioeconomic section.

TABLE 12. 2007 GREAT SMOKY MOUNTAINS NATIONAL PARK PAYROLL SPENDING IMPACTS

NPS Payroll and Impacts	NPS	Total (NPS and Supporting Jobs and Income)
Jobs	346	503
Labor Income (Payroll and Benefits)	\$18,421,000	\$23,134,000
Total Value Added		\$26,275,000

Source: Stynes 2008

Second, Great Smoky Mountains National Park attracts a large number of visitors from around the world. These visitors consume from local businesses such as restaurants, hotels, and retail outlets during their time in regions surrounding the Park, contributing to local economies. The economic contribution of visitor spending is a function of how many visitors arrive and how much money they spend while visiting. Visitor spending benefits for Great Smoky Mountains National Park have been estimated by Stynes (2008) and are summarized in Table 13.

During 2007, the Park experienced a total of 9,372,253 recreational visitor days, primarily from non-local visitors. Total spending associated with Park visitation was estimated to be \$718 million of which almost \$705 million (98%) was spent by non-local visitors. The total labor income generated by this spending was over \$327 million, and the Gross Regional Product was over \$509 million. This economic activity supports 13,236 jobs in the local economy (Stynes 2008).

³ The local economy or local regions are defined as a 50-mile radius around the Park, which is the primary impact region around most Parks. Economic multipliers are based on regions or areas defined as groupings of counties to approximate a 50-mile radius of the Park (Stynes 2008).

⁴ Value added is defined as gross output (sales or receipts and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported). Value added consists of compensation of employees, taxes on production and imports less subsidies (formerly indirect business taxes and nontax payments), and gross operating surplus.

**TABLE 13. NON-LOCAL VISITOR SPENDING AND IMPACTS
AT GREAT SMOKY MOUNTAINS NATIONAL PARK, 2007**

Type of Impact	Non-Local Spending and Associated Impacts
Visitor Spending	\$704,661,000
Total Labor Income	\$327,595,000
Value Added or Gross Regional Product	\$509,468,000
Jobs Supported	13,236

Source: Stynes 2008

Total economic contribution of Great Smoky Mountains National Park associated with payroll and visitor spending are summarized in Table 14. In 2007, employment in Sevier County, Tennessee, Swain County, North Carolina, and the metropolitan areas of Knoxville (TN) and Asheville (NC) was estimated to be 757,931 (BEA 2009). Great Smoky Mountains National Park non-local visitor spending and Park payroll contributes to 13,739 jobs within the region and over \$535 million in Gross Regional Product. Employment associated with the Park represents approximately 2% of the employment (757,931) within the study area.

TABLE 14. TOTAL ECONOMIC CONTRIBUTION ASSOCIATED WITH PAYROLL SPENDING AND PARK VISITATION

	NPS Payroll Spending	Total Non-Local Visitor Spending Impacts	Total
Spending	\$18,422,000	\$704,661,000	\$723,083,000
Jobs	503	13,236	13,739
Total Labor Income (includes benefits)	\$23,134,000	\$327,595,00	\$350,729,000
Total Value Added	\$26,275,000	\$509,468,000	\$535,743,000

Source: Stynes 2008

DEMOGRAPHIC COUNTY AND METROPOLITAN STATISTICAL AREA (MSA) DESCRIPTIONS

With an area of 598 square miles (1,548 km²), Sevier County is the largest county in Tennessee, supporting a population of 81,592 in 2007 (U.S. Census Bureau 2007a) which increased from 71,170 (U.S. Census Bureau 2000a) in 2000 or 15% over this time period. Sevier County has grown into a major tourist destination since the establishment of the Great Smoky Mountains National Park, which dominates the southern portion of the County. The City of Gatlinburg rests on the northern border of the Great Smoky Mountains National Park along Newfound Gap Road (U.S. Highway 441), which connects Gatlinburg to Cherokee, North Carolina, through the national park. Gatlinburg supports a population of approximately 5,433 in 2007 (U.S. Census Bureau 2007g) which increased from 3,828 (U.S. Census Bureau 2000a) in 2000, or 42% over this time period. In more recent years, tourism has become an increasing important economic activity in the county.

Swain County, North Carolina, has also grown into a major tourist destination since the establishment of the Great Smoky Mountains National Park. The County has a total area of 541 square miles (1,400 km²), and supports a population of 13,643 in 2007 (U.S. Census Bureau 2007g), which increased 5% since 2000 (U.S. Census Bureau 2000a). Swain County is quite rural in nature with 24.6 people per square mile. It also encompasses much of the Cherokee Indian Reservation. Cherokee rests on the southern border of the Great Smoky Mountains National Park along Newfound Gap Road (U.S. Highway 441).

Table 15 summarizes demographic information associated with Sevier and Swain Counties, as well as Knoxville, Asheville, Tennessee, North Carolina, and the U.S., for a comparison with reference populations. While population, education, and household income have little direct relation with Park operations and visitation, they do represent the economic stability and the underlying economic health of an area.

PARK MANAGEMENT AND OPERATIONS

Newfound Gap Road provides the primary access to several of the Park's administrative and recreational areas including the Sugarlands Visitor Center, the Oconaluftee Visitor Center, several picnic areas and self-guided hiking trails, Clingmans Dome, Clingmans Dome Road, the Smokemont Ranger Station and developed campground, horseback riding rental facilities, and the Newfound Gap (elevation 5,046 feet). Newfound Gap Road provides both eastbound and westbound access to these facilities.

With the designation of the Newfound Gap Road as a State Scenic Byway for both North Carolina and Tennessee, Newfound Gap Road became part of a distinctive collection of American roads eligible to compete for grants to fund different road projects. Designation as a State Scenic Byway makes the route eligible for grants through the FHWA-EFLHD for such projects as roadway enhancements, recreation facility improvements, road shoulder improvements, and vista clearing/maintenance projects. In addition, funding could be used for protection of historical, archeological, and cultural resources along the road and in areas adjacent to the road. In fiscal year 2008, \$40 million in grant money was available nationwide for this program. FHWA-EFLHD provides 80% funding for eligible projects and requires a minimum 20% match for approved projects (NPS 2009b).

The current maintenance schedule within the Park includes roadway and shoulder maintenance as needed, general roadway drainage maintenance, general bridge and tunnel maintenance, snow removal as needed, and removal of hazard trees and limbs. The service provider is expected to maintain, replace, or repair wooden guardrails at box culverts along roadside shoulders. In the North District, where this section of Newfound Gap Road is located, the following number of service calls occurs for maintenance activities, with each service call lasting approximately 32 person hours:

- Pot hole repair = 7 service calls
- Shoulder repair = 20 service calls
- Carsonite marker repair/installation = 10 service calls
- Slide removal = 11 service calls
- Gate repair = 15 service calls
- Unpaved surface repair – grading, 2 miles in length = 7 service calls
- Guardrail repair (30 linear feet) = 6 service calls
- Wall repair (30 linear feet) = 3 service calls
- Road delineator/reflector replacement (10 to 15 items) = 5 service calls

Storms, inclement weather, emergencies, or other extraordinary events are the only situations that may require periodic road closures, as directed by NPS management. Along Newfound Gap Road, mowing takes place once every four weeks during the growing season (approximately seven times per year). Litter pickup along Newfound Gap Road occurs weekly between June and October, and every two weeks between November and May (NPS 2005).

**TABLE 15. DEMOGRAPHIC CHARACTERISTICS
SEVIER COUNTY, SWAIN COUNTY*, KNOXVILLE MSA, ASHEVILLE MSA, TENNESSEE, NORTH CAROLINA, AND THE US
2007 (*2000)**

Estimate	Sevier County, TN	Swain County, NC*	Knoxville MSA	Asheville MSA	Tennessee	North Carolina	USA
Demographic, Education, and Poverty Status							
Total Population	83,527	12,968	682,527	402,601	6,156,719	9,061,032	301,621,159
*Area (square miles)	598	541	2,529	1,111	42,143	53,819	3,794,083
Population Density (population /square mile)	139.7	24.0	269.8	362.2	146.1	168.4	79.5
Median Age	39.4	38.8	38.7	41.2	37.5	36.8	36.7
High School Education or Higher	78.6%	70.5%	85.5%	86.5%	81.4%	82.9%	84.5%
Bachelor's Degree or Higher	16.0%	13.9%	27.5%	27.6%	21.8%	25.6%	27.5%
People Below Poverty	11.9%	18.3%	13.2%	12.9%	15.9%	14.3%	13.0%
Race							
White	97.9%	67.3%	90.8%	91.7%	80.3%	71.3%	75.8%
Black or African American	1.4%	2.2%	7.1%	5.8%	17.2%	22.1%	13.1%
American Indian or Alaskan Native	1.2%	27.0%	0.8%	0.9%	0.8%	1.7%	1.5%
Asian	0.6%	0.2%	1.7%	1.0%	1.5%	2.1%	5.0%
Native Hawai'ian or Pacific Islander	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.3%
Some Other Race	0.0%	3.4%	1.1%	2.0%	1.5%	4.5%	6.7%
Hispanic or Latino	0.0%	0.9%	2.2%	4.8%	3.4%	7.1%	15.1%
Housing and Families							
Total Housing Units	42,789	7,105	308,951	198,224	2,724,929	4,124,066	127,895,430
Average Family Size	3.11	2.91	2.91	2.81	3.05	3.04	3.2
Percent of Households With One or More People Under 18 Years	34.3%	33.9%	29.7%	29.0%	32.8%	33.9%	34.4%

Source: U.S. Census Bureau 2007a, 2007b, 2007c, 2007d, 2007e, 2007f, 2000a, 2000b.

* U.S. Census Bureau American Community Survey data was unavailable for Swain County, North Carolina. Thus, 2000 data was used from Summary Files 1 and 3.

ENVIRONMENTAL CONSEQUENCES

GENERAL METHODOLOGY FOR ESTABLISHING IMPACT THRESHOLDS AND MEASURING EFFECTS

The “Environmental Consequences” chapter addresses the potential impacts to each resource area (i.e., impact topics) for each of the alternatives. The action alternative is compared to the no action alternative, or baseline condition of the road before rehabilitation, to determine resource impacts. In the absence of quantitative data, best professional judgment was used. In general, impacts were determined through consultation and collaboration with a multidisciplinary team of NPS, FHWA-EFLHD, and professional staff. Regulatory agency consultation with the USFWS, and other existing data sources such as the North Carolina and Tennessee SHPOs, transportation volume and safety studies, and Park planning documents were also used to assess the potential impact of each alternative.

NPS policy requires that direct and indirect impacts be “considered.” However, directness is not to be specifically labeled or identified as “direct/indirect” in any of the impact topics in the “Environmental Consequences” chapter.

Potential impacts of all alternatives are described in terms of type (beneficial or adverse), context, duration (short- or long-term), and intensity (negligible, minor, moderate, or major). Definitions of these descriptors include:

- Beneficial:* A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
- Adverse:* A change that declines, degrades, and/or moves the resource away from a desired condition or detracts from its appearance or condition.
- Context:* The affected environment within which an impact would occur, such as local, Park-wide, regional, global, affected interests, society as a whole, or any combination of these. Context is variable and depends on the circumstances involved with each impact topic. As such, the impact analysis determines the context.
- Duration:* The duration of the effect is described as short-term or long-term. Duration is variable with each impact topic; therefore, definitions related to each impact topic are provided in the specific impact analysis narrative.
- Intensity:* Because definitions of impact intensity (negligible, minor, moderate, and major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed.

CUMULATIVE IMPACTS

NEPA regulations require an assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively moderate or major actions that take place over a period of time.

Cumulative impacts are considered for the action and no action alternatives. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects and plans in Great Smoky Mountains

National Park, and if applicable, the surrounding region. These actions are described in more detail below. In addition to these plans, cumulative impacts also took into account the impacts of past Park development and operations as part of past actions.

The analysis of cumulative effects follows four steps:

- Step 1—Resources Affected. Identify resources affected by any of the alternatives.
- Step 2—Boundaries. Identify an appropriate spatial boundary for each resource.
- Step 3—Cumulative Action Scenario. Determine which actions to include with each resource.
- Step 4—Cumulative Impact Analysis. Summarize the cumulative impact, which includes the effects of the proposed action plus other actions affecting the resource; defined context, intensity, duration and timing; defined thresholds, methodology, etc.

PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Rehabilitation of Morton Mountain and Chimney Top Tunnels

This project included rehabilitation work to lower the road through both tunnels. As part of this project, approximately 250 feet of existing stone wall (no core) was replaced with approximately 750 feet of new stone wall with concrete core. Work also included miscellaneous drainage work and paving the road through the tunnels. Project work was completed in October 2002.

Tow String Road and Bridge Improvement Project

This project, led by the Eastern Band of Cherokee Indians in cooperation with the NPS, included replacing the bridge that crosses the Oconaluftee River along Tow String Road. This project widened the bridge from 12-feet to 30-feet wide. Construction was completed in November 2005 (NPS 2009d).

Construction of Straight Fork Bridge along Straight Fork Road/Balsam Mountain Road

This project included the construction of a single-lane, single-span bridge which replaced a low water ford through the Straight Fork tributary of the Raven Fork River. NPS completed construction of the bridge in August 2006 (NPS 2009d).

Rehabilitation of 10.5 Miles of Newfound Gap Road from the Newfound Gap Overlook Parking Area to the Collins Creek Picnic Area

This project focused on roadway rehabilitation on the North Carolina side of Newfound Gap Road and included pavement and drainage rehabilitation along the 10.5 miles of road on the North Carolina side of the Park. This project also included replacement of approximately 10,000 feet of non-steel-backed timber guardrail with steel-backed-timber guardrail. Project work was completed in September 2007.

Smokemont Water and Sewer Project

This project included the construction of new water and sewer lines in order to provide municipal potable water to the Smokemont Campground and to provide sanitary sewer lines from the Smokemont Campground to the Cherokee utility system. The project negated the need to maintain and operate the deteriorating sewage treatment facility near the Smokemont Campground. NPS completed construction in 2009 (NPS 2009d).

Clingmans Dome Road—ARRA 54747

This project includes the rehabilitation of 7.2 miles of Clingmans Dome Road and its parking area and is scheduled to begin construction in spring 2010.

Rehabilitation of 6.5 Miles of Newfound Gap Road from the Collins Creek Picnic Area to the Southern Park Boundary

This is a road rehabilitation project in the Park which includes pavement and drainage rehabilitation along the lower 6.5 miles of Newfound Gap Road on the North Carolina side of the Park. No guardrail or guardwall work is included in the project, but it does include the reconfiguration of the Oconaluftee Visitor Center parking areas to accommodate a proposed new visitor facility. It also includes the widening of Newfound Gap Road in front of the Oconaluftee Visitor Center at the Tow String intersection and the Collins Creek Picnic Area with new turn lanes. This project is ongoing and is expected to be completed in January 2011.

Smokemont Campground—ARRA 90504

This future project is currently under design and would rehabilitate the Smokemont Campground.

UNACCEPTABLE IMPACTS ON PARK RESOURCES OR VALUES

The impact threshold at which impairment occurs is not always readily apparent. Therefore, the NPS will apply a standard that offers greater assurance that impairment will not occur. The NPS will do this by avoiding impacts that it determines to be unacceptable. These are impacts that fall short of impairment, but are still not acceptable within a particular park's environment. Park managers must not allow uses that would cause unacceptable impacts; they must evaluate existing or proposed uses and determine whether the associated impacts on park resources and values are acceptable.

For the purposes of these policies, unacceptable impacts are impacts that, individually or cumulatively, would

- Be inconsistent with a park's purposes or values
- Impede the attainment of a park's desired future conditions for natural and cultural resources as identified through the park's planning process
- Create an unsafe or unhealthful environment for visitors or employees
- Diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values
- Unreasonably interfere with park programs or activities, or an appropriate use, or the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park

IMPAIRMENT ANALYSIS

In addition to determining the environmental consequences of the alternatives under consideration, the NPS *Management Policies 2006* and Director's Order 12 require analysis of potential effects to determine if actions would impair park resources and values. The fundamental purpose of the national park system as established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. These laws give the NPS the management discretion to allow impacts to park resources and values (when necessary and appropriate) to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. NPS managers must always seek ways to avoid or minimize, to the greatest degree practicable, adversely impacting park resources and values.

The impairment prohibited by the Organic Act and the General Authorities Act is an impact, in the professional judgment of the responsible NPS manager, that harms the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be

affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. An impact to any park resource or value may constitute impairment, but an impact would more likely constitute impairment if it has a major or severe adverse effect upon a resource or value whose conservation is

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park
- Key to the natural or cultural integrity of the Park or to opportunities for enjoyment of the park
- Identified as a goal in the park's GMP or other relevant NPS planning documents

An impairment determination is included in the conclusion statement of the impact analysis of each alternative. Impairment determinations are not made for visitor use and enjoyment, health and safety, socioeconomics, or park operations and management because impairment findings relate to park resources and values; these impact areas are not generally considered to be park resources or values. Impairment determinations are not made for visitor use and experience because, according to the Organic Act, enjoyment cannot be impaired in the same way an action can impair park resources and values.

NATURAL RESOURCES

WILDLIFE, VEGETATION, AND THREATENED AND ENDANGERED SPECIES

METHODOLOGIES AND ASSUMPTIONS

Impacts to wildlife, vegetation, and threatened and endangered species were determined by considering the effect of the existing conditions and the proposed construction/rehabilitation impacts on these resources.

For threatened and endangered species, the ESA (16 USC 1531 et seq.) mandates that all federal agencies consider the potential effects of their actions on species listed as threatened or endangered. Section 7 of the ESA requires federal agencies that fund, authorize, or carry out an action to ensure that their action is not likely to jeopardize the continued existence of any threatened or endangered species (including plant species) or result in the destruction or adverse modification of designated critical habitats. If it is determined that an action may adversely affect a federally listed species, consultation with the USFWS is required to ensure minimization of potential adverse impacts to the species or its designated critical habitat. Two mosses, peak moss (*Brachydontium trichodes*) and translucent orthodontium (*Orthodontium pellucens*), and a liverwort (*Acrobolbus ciliates*) likely grow on the bridge spanning Walker Camp Prong at the switchback. However, since no work is anticipated on the bridge, no impacts would occur. If in the future it is determined that work on the bridge is required, a survey to confirm and mitigate would be done. In addition, the NPS *Management Policies 2006* state that the NPS will inventory, monitor, and manage all state and locally listed species in a manner similar to its treatment of federally listed species, to the greatest extent possible.

STUDY AREA

The study area for wildlife, vegetation, and threatened and endangered species includes the area along the Newfound Gap Road where road rehabilitation would occur.

IMPACT THRESHOLDS

The following thresholds were defined for wildlife and vegetation:

- Negligible:* There would be no observable or measurable impacts to native species (plant or animal), or the natural processes sustaining them. Impacts would be well within natural fluctuations.

- Minor:* A change in effects on wildlife would be localized within a small area. The change would be measurable or perceptible in terms of abundance, distribution, quantity, or quality of populations. While the mortality of individual animals might occur, the viability of wildlife populations would not be affected and the community, if left alone, would recover. Impacts would be detectable and are expected to be outside the natural range of variability.
- Moderate:* A change in effects on wildlife would occur over a relatively large area. The change would be readily measurable in terms of abundance, distribution, quantity, or quality of populations. Impacts on native species, or the natural processes sustaining them would be detectable, and could be outside the natural range of variability. Disruptions to key ecosystem processes that would be outside natural variation might occur, but the ecosystem would soon return to natural conditions. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.
- Major:* A change in effects on wildlife would be readily apparent, and would substantially change wildlife populations over a large area in and out of the Park. Impacts on native species, or the natural processes sustaining them would be detectable, and would be expected to be outside the natural range of variability or be permanent. Key ecosystem processes might be disrupted. Loss of habitat might affect the viability of at least some native species. Extensive mitigation would be needed to offset adverse effects, and its success would not be assured.

The following thresholds were defined for threatened and endangered species:

- Negligible:* There would be no observable or measurable impacts to federally listed species, their habitats, or the natural processes sustaining them in the proposed project area. This impact intensity would equate to a determination of “no effect” under Section 7 of the ESA.
- Minor:* Individuals may temporarily avoid areas. Impacts would not affect critical periods (e.g., breeding, nesting, denning, feeding, resting) or habitat. This impact intensity would equate to a determination of “not likely to adversely affect” under Section 7 of the ESA.
- Moderate:* Individuals may be impacted by disturbances that interfere with critical periods (e.g., breeding, nesting, denning, feeding, resting) or habitat; however, the level of impact would not result in a physical injury, mortality, or extirpation from the Park. This impact intensity would equate to a determination of “likely to adversely affect” under Section 7 of the ESA.
- Major:* Individuals may suffer physical injury or mortality or populations may be extirpated from the Park. This impact intensity would equate to a determination of “likely to adversely affect” under Section 7 of the ESA.

IMPACTS OF ALTERNATIVE A – NO ACTION ALTERNATIVE

Analysis

Under the no action alternative, the condition of Newfound Gap Road and its related features would remain the same, and would likely continue to deteriorate. The Park would continue to implement select repairs to

the guardwalls and roads as funding allowed. The repairs would be done whenever money was available and their occurrence would be at unpredictable times.

Wildlife living within the project area would be impacted under alternative A during times of spot repair due to disturbance from repair crews and equipment. These activities would be expected to be short-term (less than a week at a time) and would occur completely within the existing road area. Because of this, wildlife would experience short-term negligible to minor impacts during times of construction, but no long-term impacts would occur as no habitat would be lost and wildlife would continue to use the habitat around the roadway after spot repair activities are completed. Further, no vegetation would be lost, so there would be no short- or long-term impacts to vegetation. Spot repair activities would also not be expected to create long-term impacts for threatened and endangered species, but could have short-term negligible to minor adverse impacts during spot repairs, as described for general wildlife.

Cumulative Impacts

Several past, present, and future road rehabilitation/construction projects within Great Smoky Mountains National Park have the potential to impact wildlife, vegetation, and threatened and endangered species within and surrounding the Park. Other road rehabilitation and construction projects that have occurred, or will occur, in the area include the rehabilitated Morton Mountain and Chimney Top Tunnels, other rehabilitation efforts along Newfound Gap Road, the Tow String Road and Bridge improvement project, and the construction of Straight Fork Bridge along Straight Fork Road/Balsam Mountain Road. During construction activities, all of these projects would have short-term negligible to minor adverse impacts to these resources as habitat would be disturbed during construction. As these rehabilitation projects are not expected to remove large areas of habitat, wildlife would be able to return to the project area once construction activities are complete under all road rehabilitation projects, and would only experience short-term negligible to minor adverse impacts from the disruption during construction. As with construction projects, work activities of these projects would have short-term negligible to minor adverse impacts to wildlife, vegetation, and threatened and endangered species because, as discussed for road rehabilitation projects, the construction would cause short-term disruption; however, long-term loss of quality habitat for wildlife would not be expected. In addition, the Park's GMP has the potential to have cumulative impacts as this document guides future development in the Park. The directives and policies provided in the GMP would ensure that future development would occur in a way that limited impacts to wildlife, vegetation, and threatened and endangered species, and therefore would have beneficial impacts to these resources.

These cumulative actions are expected to have short-term negligible to minor impacts to wildlife, vegetation, and threatened and endangered species. These impacts, when combined with the long-term negligible adverse impacts of alternative A, would have short-term negligible to minor adverse and long-term negligible cumulative impacts.

Conclusion

Impacts to wildlife and threatened and endangered species resulting from the no action alternative would be short-term negligible to minor adverse impacts, with no long-term impacts. There would be no short- or long-term impacts to vegetation under the no action alternative. Cumulative impacts to wildlife, vegetation, and threatened and endangered species under the no action alternative would be short-term negligible to minor adverse and long-term negligible adverse. Because there would be no major adverse or unacceptable impacts to the natural resources, there would be no impairment to wildlife, vegetation, and threatened and endangered species under the no action alternative.

IMPACTS OF ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

Analysis

Under alternative B, rehabilitation of the road surface would occur and would include spot repair/reconstruction in areas where the road pavement is inadequate, including minor repairs such as filling

and sealing of cracks and potholes. Pavement overlay would be applied to large sections of the road which would smooth the existing road surface and provide adequate road surface drainage. This process would be performed by a full road construction crew and associated heavy machinery. Additional work would include culvert repair and addressing existing drainage issues along the road. All construction activities, including construction staging, are expected to occur within the existing road and would not result in the loss of any vegetation or habitat.

During construction activities, minor adverse short-term impacts to wildlife would occur due to increased noise levels associated with road rehabilitation activities. Affected wildlife would relocate to less disturbed areas during construction and would be expected to return to the area once construction is complete. As construction would not be expected to occur in undisturbed wildlife, no impact to wildlife would be expected. As no habitat would be lost, long-term impacts to wildlife would be expected to be negligible adverse.

Vegetation may experience minor disturbances as a result of the roadway improvements. A minimal amount of natural vegetation outside of the grassy road shoulders may be disturbed. Construction crew workers walking within the project area and possibly outside of the project area would cause disturbance to plants and their habitat. Heavy machinery associated with working on the road and guardwalls could possibly damage vegetation if driving outside the existing road. As all construction and staging is planned to occur on already disturbed areas, these short-term construction impacts are expected to be negligible to minor adverse for vegetation with negligible adverse long-term impacts as no vegetation is expected to be removed. Concerns related to the introduction of exotic and invasive species would be addressed as described in the “Alternatives” chapter under “Mitigation Measures of the Action Alternative.” Although these mitigation measures would be in place, the potential for the introduction of non-native and invasive species would still exist, resulting in the potential for long-term minor impacts to vegetation.

Therefore, the road rehabilitation/construction of Newfound Gap Road would result in short-term, negligible to minor impacts to existing vegetation within the project area from vegetation disturbance, with long-term minor impacts from the possible introduction of non-native species from construction activities.

To facilitate compliance the ESA, the Park sent a letter to the USFWS in December 2007 regarding the potential for any federally or state-listed species that could be affected by the proposed rehabilitation of Newfound Gap Road. The USFWS responded on January 25, 2008, stating their concerns about the presence of known federally endangered species occurring on sites within three miles of certain sections of the project area. These species include the northern flying squirrel, spreading avens, and the spruce-fir moss spider (USFWS 2008). As discussed for wildlife, the construction process brings with it inherent potential impacts to wildlife in the area. To minimize the potential for an adverse effect to threatened and endangered species, the mitigation discussed below would be implemented.

Flying squirrels and bats require sizeable trees for habitat. To ensure these habitats would not be disturbed, no large trees would be removed from the project area. To further ensure safe habitat for the species, construction activities would occur mainly during the winter months, when Indiana bats are not occupying the trees within the Park. In addition, all work would be done outside of the breeding season. However, if a situation occurred where a habitat tree needed removal, which is not expected, the Park would coordinate with the USFWS to determine the appropriate course of action.

Surveys conducted by the Park’s botanist for spreading avens concluded that the vascular plant only occurs on the summit of Mount LeConte and would not be located within the project area.

Impacts to the spruce-fir moss spider are not expected, due to the proposed road rehabilitation not extending outside the roadway corridor.

Rock gnome lichen is known to exist in two areas adjacent to the project location (within the Walker Camp Prong area), but silt fencing would be used to mitigate any potential effects. Impacts are expected to be negligible.

Prior to road rehabilitation construction, the Park would re-initiate consultation with the USFWS and re-survey the project area to ensure no federally listed species were present. As a result of road rehabilitation/construction on Newfound Gap Road, short-term negligible adverse impacts would occur to threatened and endangered species within the project area since sensitive habitat would be avoided, and there would be no long-term adverse impacts to these species as no habitat would be lost.

Cumulative Impacts

Past, present, and future actions that could affect natural resources are the same as described under alternative A, resulting in short-term negligible to minor impacts, and long-term negligible adverse impacts to wildlife, vegetation, and threatened and endangered species. These impacts, when combined with the short-term negligible to minor adverse impacts and long-term negligible to minor impacts of alternative B, would have short and long-term negligible to minor cumulative impacts to wildlife, vegetation, and threatened and endangered species.

Conclusion

Impacts on wildlife from the alternatives proposed under alternative B would be short-term negligible to minor adverse, but long-term negligible adverse impacts once construction activities are complete. Vegetation impacts would be short-term negligible to minor adverse during construction, and long-term negligible adverse. In the short term, impacts to threatened and endangered species would be negligible adverse, due to the mitigation measures that would occur, with no long-term impacts to these species. Cumulative impacts under alternative B would be short- and long-term negligible to minor adverse impacts. Because there would be no major adverse or unacceptable impacts to the natural resources, there would be no impairment to wildlife, vegetation, or threatened and endangered species under alternative B.

WETLANDS AND WATER QUALITY

METHODOLOGIES AND ASSUMPTIONS

Executive Order 11900 (Protection of Wetlands) requires federal agencies to minimize the loss, destruction, or degradation of wetlands and to enhance their natural and beneficial values. The NPS *Management Policies 2006*, Director's Order 2 (Planning Process Guideline) and Director's Order 12 (NEPA Guideline) provide direction on developments proposed in floodplains and wetlands. Wetlands are located in the vicinity of Newfound Gap Road, and could be impacted by the replacement or modification of culverts.

The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, is a national policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters and to enhance the quality of water resources and to prevent, control, and abate water pollution. The NPS *Management Policies 2006* provides direction for the preservation, use, and quality of water originating in, flowing through, or adjacent to Park boundaries. The NPS seeks to restore, maintain, and enhance the quality of all surface and groundwater within the Park, consistent with the 1972 Federal Water Pollution Control Act, as amended, and other applicable federal, state, and local laws and regulations.

Impacts on wetlands are addressed under Executive Order 11990, Protection of Wetlands. NPS Director's Order 77-1 establishes policies, requirements, and standards for implementing Executive Order 11990 for wetlands. According to Director's Order 77-1 and the accompanying Procedural Manual 77-1, direct or indirect adverse impacts on wetlands should be avoided, or where impacts cannot be avoided, degradation or loss must be minimized by every practicable effort. The order adopts a "no net loss of wetlands" policy and states that the NPS will use the Cowardin classification system as the standard for defining wetlands for purposes of compliance with Executive Order 11990, which means that non-vegetated shorelines and mudflats are included in the wetlands classification. Any NPS activities that involve the discharge of dredged or fill materials into wetlands or "other waters of the United States" must also comply with the Clean Water Act and Section 404 regulations (33 CFR 1344) and Section 10 of the Rivers and Harbors

Act (33 CFR 403), which prohibits the unauthorized obstruction or alteration of navigable waters of the United States.

If adverse impacts to wetlands would occur from a proposed project, a Statement of Findings is prepared, unless the actions are exempted for the various reasons provided in Procedural Manual 77-1, Section 4.2(A). Exceptions may include actions designed for restoring wetlands and water-dependent actions that have minor impacts. One such exception can be found in Section 4.2.1(h) of Procedural Manual 77-1 that provides exceptions for:

“Actions designed specifically for the purpose of restoring degraded (or completely lost) natural wetland, stream, riparian, or other aquatic habitats or ecological processes. For purposes of this exception, ‘restoration’ refers to reestablishing environments in which natural ecological processes can, to the extent practicable, function at the site as they did prior to disturbance. Temporary wetland disturbances that are directly associated with and necessary for implementing the restoration are allowed under this exception (see ‘conditions’ in Section 4.2.2). Actions causing a cumulative total of up to 0.25 acres of new long-term adverse impacts on natural wetlands may be allowed under this exception if they are directly associated with and necessary for the restoration (e.g., small structures or berms). Note: Some ‘artificial wetlands’ (see definitions in Section 4.2.3) may have been constructed on sites which were originally 100% upland habitat (e.g., wetlands sustained via water pumps or other means). Restoration of such sites to upland habitat may also be considered under this exception.”

STUDY AREA

The study area for wetlands and water quality includes those areas along the Newfound Gap Road where road rehabilitation would occur in the vicinity of wetlands and streams, as shown in Figure 4.

IMPACT THRESHOLDS

The following thresholds were defined:

- Negligible:* No measurable or perceptible effects on size, integrity, or connectivity of wetlands would occur. A U.S. Army Corps of Engineers 404 permit would not be necessary. Chemical, physical, or biological effects to water quality would not be detectable, and parameters would be well below water quality standards or criteria for the designated use of the water and within historical or desired water quality conditions.
- Minor:* The effect on wetlands would be measurable or perceptible, but small in terms of area and the nature of the impact. A small effect on size, integrity, or connectivity would occur; however, the overall viability would not be affected. If left alone, an adversely affected wetland would recover, and the impact would be reversed. A U.S. Army Corps of Engineers 404 permit would not be required. Chemical, physical, or biological effects to water quality would be detectable, but parameters would be well below water quality standards or criteria and within historical or desired water quality conditions.
- Moderate:* The impact would be sufficient to cause a measurable effect on one of the three parameters (size, integrity, connectivity) or would result in a permanent loss or gain in wetland acreage, but not to large areas. Wetland functions would not be affected in the long term. A U.S. Army Corps of Engineers 404 permit could be required. Chemical, physical, or biological effects to water quality would be detectable, but parameters would be at or below water quality standards or criteria; however, historical baseline or desired water quality conditions may be altered on a limited time and space basis.

Major: The impact would result in a measurable effect on all three parameters (size, integrity, connectivity) or a permanent loss or gain of large wetland areas. The impact would be substantial and highly noticeable. The character of the wetland would be changed so that the functions typically provided by the wetland would be substantially altered. A U.S. Army Corps of Engineers 404 permit would be required. Chemical, physical, or biological effects to water quality would be detectable and would be frequently altered from the historical baseline or desired water quality conditions; and/or chemical, physical, or biological water quality standards or criteria may be exceeded.

IMPACTS OF ALTERNATIVE A – NO ACTION ALTERNATIVE

Analysis

Under the no action alternative, the condition of Newfound Gap Road and its related features would remain the same, and would likely continue to deteriorate. The Park would continue to implement select repairs to the guardwalls and roads as funding allowed. The repairs would be done whenever money was available or safety concerns needed to be addressed, and their occurrence would be at unpredictable times. The West Prong Little Pigeon River flows adjacent to Newfound Gap Road, as shown in Figure 4. If spot repairs were implemented, the wetlands would not be affected from this as these repairs would avoid wetland areas. During Phase I of the proposed action, rehabilitation from the Overlook Parking Area to the Park boundary at Gatlinburg would result in a short-term negligible adverse impact to the Newfound Gap wetlands, due to its proximity to wetland and surface water features. In the long term, lack of road maintenance could result in further roadside erosion and poor drainage, which could have adverse impacts to water quality in this area from the runoff. The runoff could create changes in the chemical composition of these water bodies as well as alter the integrity of wetland areas. However, these changes would be expected to be minimal. The potential changes to these features from runoff would result in negligible to minor adverse impacts on these resources.

Spot repair activities would be expected to include standard procedures that protect Park water quality, with short-term negligible impacts expected. These procedures are described in the “Alternatives” chapter under “Mitigation Measures of the Action Alternative.” Lack of road maintenance could result in further roadside erosion and poor drainage, which would impact the water quality of surrounding water features resulting in long-term minor adverse impacts to water quality under the no action alternative.

Cumulative Impacts

Several past, present, and future road rehabilitation/construction projects within Great Smoky Mountains National Park have the potential to impact wetlands within and surrounding the Park. Other road rehabilitation and construction projects that have occurred, or will occur, in the area include the rehabilitated Morton Mountain and Chimney Top Tunnels, other rehabilitation efforts along Newfound Gap Road, the Tow String Road and Bridge Improvement project, and the construction of Straight Fork Bridge along Straight Fork Road/Balsam Mountain Road. During construction activities, these projects would have short-term negligible adverse impacts on wetlands and water quality as these resources would be avoided and mitigation measures likely implemented. Once complete, these projects may provide long-term beneficial impacts as improved roadway conditions may improve water drainage through incorporation of best management practices and improvement of the condition in the surrounding road network, potentially improving wetlands and water quality along the road.

Other construction activities include the Smokemont water and sewage project, which would also have short-term negligible adverse impacts on wetlands and water quality as these resources would be avoided and mitigation measures likely implemented.

Once complete, these projects could provide long-term beneficial impacts as improvements would help the wetlands. In addition, the Park's GMP also has the potential to have cumulative impacts as this document will guide future development in the Park. The directives and policies provided in the GMP would ensure that future development would occur in a way that limits impacts to wetlands and water quality, and therefore would have beneficial impacts to these resources.

These cumulative actions are expected to have short-term negligible adverse impacts, and long-term beneficial impacts from drainage and roadway improvements on water quality and wetlands. These impacts, when combined with the short-term negligible adverse and long-term negligible to minor adverse impacts of alternative A, would have long-term negligible adverse impacts cumulative impacts to wetlands and water quality.

Conclusion

Impacts to wetlands and water quality from the no action alternative would result in short-term negligible adverse impacts during spot repairs as these resources would be avoided and protected. Continued deterioration of the road and lack of drainage repairs would have long-term negligible to minor adverse impacts to these resources. Cumulative impacts to wetlands under the no action alternative would be short-term negligible impacts and long-term beneficial impacts. Because there would be no major adverse or unacceptable impacts to wetlands and water quality, there would be no impairment to the resource or values.

IMPACTS OF ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

Analysis

Under alternative B, rehabilitation of the road surface would occur and would include spot repair/reconstruction in areas where the road pavement is inadequate, including minor repairs such as filling and sealing of cracks and potholes. Pavement overlay would be applied to large sections of the road, in a phased process as shown in Figure 2, which would smooth the existing road surface and provide adequate road surface drainage. Drainage deficiencies would be addressed through repairs, and culverts would be improved. This process would be performed by a full road construction crew and associated heavy machinery.

These rehabilitation efforts would not affect wetlands in the project area. While the riverine wetland does occur close to the road at times, the construction would never directly come in contact with the West Prong Little Pigeon River, and during construction, mitigation would occur to ensure that runoff and other construction activities do not impact wetlands adversely (refer to the "Alternatives" chapter). While mitigation measures would be implemented, some contaminants could still potentially enter the water flow. The correction of drainage deficiencies would reduce contaminants from running off into adjacent wetland areas. As a result, the rehabilitation from the Newfound Gap Road Overlook Parking Area to the Park boundary at Gatlinburg would result in short-term negligible adverse impacts. A stream armoring component of this project would occur in the Upper Walker Prong tributary, involving the placement of large rocks or sandbags to armor the stream banks and reduce erosion of the stream banks in this area. The total anticipated area of disturbance for stream armoring would be an area of approximately 50 feet long by 20 feet wide (1,000 square feet), or 0.02 acres. This project can be classified as a restoration project under 0.25 acres and as such, would be exempt from the requirement for a Statement of Findings, as required under Director's Order 77-1, under section 4.2.1(h).

For water quality, the West Prong Little Pigeon River flows through the project area; mitigation measures to avoid potential adverse environmental impacts to the river have been defined. Before construction would begin, construction staging areas would be located in several designated areas throughout the Park, and would be sited in areas that would minimally impact the Park's natural, biological, and cultural resources. Construction crews would use best management practices including temporary sediment control devices such as filter fabric fences, sediment traps, or check dams, as needed during culvert replacement, as described in the "Alternatives" chapter under "Mitigation Measures of the Action Alternative." Under the

road rehabilitation/construction of Newfound Gap Road, water quality is likely to result in short-term negligible to minor adverse effects and long-term benefits as drainage issues would be corrected.

Cumulative Impacts

Past, present, and future actions that could affect wetlands and water quality are the same as described under alternative A, resulting in short-term negligible adverse impacts and long-term beneficial impacts to wetlands. These cumulative actions, when combined with the short-term negligible to minor adverse impacts from construction activities and long-term beneficial impacts from reduction of erosion and runoff from the roadway improvements under alternative B, would have short-term negligible and long-term beneficial impacts to wetlands and water quality.

Conclusion

Impacts on wetlands and water quality from the various proposed activities under alternative B would be short-term negligible to minor adverse and long-term beneficial. Cumulative impacts under alternative B would be short-term negligible adverse and long-term beneficial. Because there would be no major adverse or unacceptable impacts to wetlands and water quality, there would be no impairment to water quality or wetlands under alternative B.

AIR QUALITY

GENERAL METHODOLOGIES FOR ANALYZING IMPACTS

Impacts to air quality were qualitatively assessed using current air quality information obtained through a review of the literature and pertinent laws, guidance and regulations, professional judgment, and experience with comparable actions.

Thresholds of impact are defined below:

- Negligible:* Changes in air quality would not be measurable.
- Minor:* Effects would result in a measurable change in air quality, although the changes would be small and the impacts would be localized.
- Moderate:* Effects on air quality would be readily measurable and widespread.
- Major:* Effects would be readily measurable on a regional scale, and air quality standards would be exceeded.

STUDY AREA

The area of analysis for air quality is the expanded area of analysis, including the Knoxville airshed, which includes Anderson, Blount, Cocke, Jefferson, Knox, Loudon, and Sevier Counties.

IMPACTS OF ALTERNATIVE A: NO ACTION ALTERNATIVE

Analysis

Under alternative A, the no action alternative, the NPS would continue to implement selected repairs; however, Newfound Gap Road would continue to deteriorate. This alternative includes road work on an as-needed basis in order to keep the road in safe conditions for public use. Ongoing repairs would include frequent patching of cracks and potholes and repairs to the remaining stone guardwalls.

The impact on air quality under the no action alternative would vary based on the frequency and severity of repair work on the road. Increase in emissions would occur during times when spot repairs are being

conducted, due to idling traffic in the area of the repair. Repairs would be expected to be more frequent, and incidences of cars idling would be expected to increase as more repairs are needed. Impacts to air quality would be short-term adverse minor, as there would be a measurable effect on air quality, but these effects would be small and the impacts localized.

Cumulative Impacts

Several past, present, and future construction-related projects within Great Smoky Mountains National Park have the potential to impact air quality within the Park. Other road rehabilitation and construction projects that have occurred, or will occur, in the area include the rehabilitated Morton Mountain and Chimney Top Tunnels, other rehabilitation efforts along Newfound Gap Road, the Tow String Road and Bridge Improvement project, the Smokemont Water and Sewer project, and the Construction of Straight Fork Bridge along Straight Fork Road/Balsam Mountain Road. During construction activities, all of these projects would have short-term, minor adverse impacts on air quality due to emissions from construction equipment. Once complete, these projects would result in no impact to air quality, as there are no operational emissions associated with the project.

These cumulative actions are expected to have short-term minor adverse impacts to air quality. These impacts, when combined with the short-term minor adverse impacts of alternative A, would have short-term minor adverse impacts to air quality.

Conclusion

The continuation of selected road rehabilitation on an as-needed basis would result in localized short-term minor adverse impacts on air quality within the Knoxville airshed, as the impacts would be measurable but localized and would not impact the attainment status of the county.

Cumulative impacts under the no action alternative would be short-term minor adverse. There would be no impairment to air quality under the no action alternative as all impacts would be short-term and minor adverse.

IMPACTS OF ALTERNATIVE B: ACTION ALTERNATIVE

Analysis

Under alternative B, local air quality could be temporarily affected by construction-related dust and emissions resulting from idling vehicles. Similarly, passenger vehicles that are idling while waiting in a traffic delay caused by construction-related activities could also affect local air quality. Hauling material and operating equipment would result in increased vehicle exhaust and emissions during the construction period. Hydrocarbons, nitrogen oxide, and sulfur dioxide emissions would rapidly dissipate. Dust plumes from construction equipment would occasionally increase airborne particles in the area near the project site.

Based on projects of similar scale and nature, it is expected that these temporary sources of emissions from construction vehicles and increased dust would not change regional air quality and would fall well below the minimum pollutant levels for basic non-attainment (subject to 40 CFR 93, "Determining Conformity of Federal Actions to State or Federal Implementation Plans"). This would result in negligible impacts to air quality during the construction phase or from idling cars. With alternative B, temporary increases in air pollution would occur during construction, primarily from operation of construction equipment. After construction (operational phase), there would be no further adverse impacts to air quality associated with the road improvements, with long-term beneficial impacts to air quality as the need for spot repair, and associated idling during repairs, would be reduced. Impacts to air quality under this alternative would be localized short-term negligible to minor and adverse, with long-term beneficial impacts.

Cumulative Impacts

Impacts related to past, present, and future actions at Great Smoky Mountains National Park that could affect air quality are the same as described under alternative A. There would be short-term minor adverse

impacts on air quality from these projects. These short-term minor localized impacts, when combined with the short-term negligible to minor adverse impacts of alternative B, would have short-term minor adverse cumulative impacts to air quality.

Conclusion

The Newfound Gap Road rehabilitation efforts would result in localized short-term negligible to minor adverse impacts on air quality within the Knoxville airshed, as the impacts would be measurable but localized and would not impact the attainment status of the county. Long-term beneficial impacts would result from the improved roadway conditions and the reduced need for spot repairs and associated emissions.

Cumulative impacts under alternative B would be short-term minor adverse. There would be no impairment to air quality under alternative B as all impacts would be short-term and minor adverse.

CULTURAL RESOURCES

METHODOLOGIES AND ASSUMPTIONS

Federal actions that have the potential to affect cultural resources are subject to a variety of laws and regulations. The NHPA of 1966, as amended, is the principal legislative authority for managing cultural resources associated with NPS projects. Generally, Section 106 of the NHPA requires all federal agencies to consider the effects of their actions on cultural resources listed and/or determined eligible for listing in the NRHP. Such resources are termed “historic properties.” Agreement on mitigation of adverse effects to historic properties is reached through consultation with the SHPO; the THPO, if applicable; and, as required, the Advisory Council on Historic Preservation (Advisory Council). In addition, the NHPA requires that federal agencies take actions to minimize harm to historic properties that would be adversely affected by a federal undertaking. Among other things, Section 110 of the NHPA also charges federal agencies with the responsibility of establishing preservation programs for the identification, evaluation, and nomination of historic properties to the NRHP.

Other important laws and regulations designed to protect cultural resources are:

- Native American Graves Protection and Repatriation Act, 1990
- American Indian Religious Freedom Act, 1978
- National Environmental Policy Act, 1969
- Archeological Resources Protection Act, 1979
- Executive Order 11593 Protection and Enhancement of the Cultural Environment, 1971

In addition, the NPS is charged with the protection and management of cultural resources in its custody. This is furthered through the implementation of *Director’s Order 28: Cultural Resources Management Guidelines* (NPS 1998), *NPS Management Policies 2006*, and the 2008 Servicewide Programmatic Agreement with the Advisory Council and the National Conference of State Historic Preservation Officers. These documents charge NPS managers with avoiding, or minimizing to the greatest degree practicable, adverse impacts on park resources and values. Although the NPS has the discretion to allow certain impacts in parks, that discretion is limited by the statutory requirement that Park resources and values remain unimpaired, unless a specific law directly provides otherwise.

The NPS categorizes cultural resources by the following categories: archeological resources, cultural landscapes, historic districts and structures, museum objects, and ethnographic resources. As noted in the “Issues and Impact Topics” section of the “Purpose and Need” chapter, only impacts to cultural landscapes are of potential concern for this project. Analysis of potential impacts to historic districts and structures,

ethnographic resources, and museum objects has been dismissed, as discussed under the “Purpose and Need” section.

The analyses of effects on cultural resources that are presented in this section respond to the requirements of both NEPA and Section 106 of the NHPA. In accordance with the Advisory Council’s regulations implementing Section 106 (36 CFR 800, *Protection of Historic Properties*), impacts on cultural resources were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or are eligible to be listed in the NRHP (e.g., historic properties); (3) applying the criteria of adverse effect to affected historic properties; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under the implementing regulations for Section 106, a determination of either *adverse effect* or *no adverse effect* must also be made for affected historic properties. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the NRHP (for example, diminishing the integrity of the resource’s location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects caused by the proposal that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5). A determination of *no adverse effect* means there is either no effect or that the effect would not diminish, in any way, the characteristics of the cultural resource that qualify it for inclusion in the NRHP.

CEQ regulations and Director’s Order 12 also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g., reducing the intensity of an impact from major to moderate or minor). Any resulting reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. Cultural resources are non-renewable resources and adverse effects generally consume, diminish, or destroy the original historic materials or form, resulting in a loss in the integrity of the resource that can never be recovered. Therefore, although actions determined to have an adverse effect under Section 106 may be mitigated, the effect remains adverse.

Director’s Order 12, the NPS guidance for evaluating impacts (NPS 2001), requires that impact assessment be scientific, accurate, and quantified to the extent possible. For cultural resources, it is seldom possible to measure impacts in quantifiable terms; therefore, impact thresholds must rely heavily on the professional judgment of resource experts.

The NPS gave an early notice to the Tennessee SHPO of this pending project in 2005, but the NPS began formal Section 106 consultation with the Tennessee SHPO in December 2007. The SHPO responded on January 2, 2008, and stated that the proposed project has the potential to affect historic properties that are eligible for listing in the NRHP. The SHPO recommended continued consultation. Based on this initial finding, the Park continued corresponding with the SHPO on this issue (see Appendix A, January 2009 correspondence). On October 20, 2009, the NPS submitted additional information to the SHPO regarding the proposed roadway rehabilitation. In this correspondence, the NPS states that, due to the finding of “*may affect properties that are eligible for listing on the National Register of Historic Places,*” the Park and FHWA-EFLHD spent considerable time reevaluating project issues, the resources associated with the roadway, and the potential solutions to the issues faced. Based on information provided in this correspondence, the Park recommended that the SHPO consider a finding of “*no adverse effect*” for this project. On November 4, 2009, the Tennessee SHPO responded to the NPS with correspondence stating that, “the project as currently proposed will not adversely affect any property that is eligible for listing on the NRHP.” These series of correspondence between the NPS and the SHPO fulfill the requirement set forth by the Advisory Council’s regulations for initiating the Section 106 process (36 CFR 800.3) and are found in Appendix A.

STUDY AREA

The area of potential effects for this project includes all areas where road rehabilitation and repair would occur and where any of the proposed alternatives could impact character-defining features of the Newfound Gap Road cultural landscape or archeological resources.

CULTURAL LANDSCAPES

IMPACT THRESHOLDS

In order for a cultural landscape to be listed on the NRHP, it must possess significance (the meaning or value ascribed to the landscape) and have integrity of those features necessary to convey its significance. Character-defining features of a cultural landscape may include spatial organization and land patterns, topography, vegetation, circulation patterns, water features, and structures/buildings, site furnishings, and objects (Birnbaum and Peters 1996). For purposes of analyzing potential impacts to cultural landscapes, the thresholds of change for the intensity of an impact are defined as follows:

- Negligible:* The impact is at the lowest level of detection with neither adverse nor beneficial consequences.
- Minor:* Adverse impact – Alteration of a pattern(s) or feature(s) of the cultural landscape listed on or eligible for the NRHP would not diminish the integrity of a character-defining feature(s) or the overall integrity of the landscape.
Beneficial impact – Preservation of landscape patterns and features would be in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*, therefore maintaining the integrity of the cultural landscape.
- Moderate:* Adverse impact – The impact would alter a character-defining feature(s) of the cultural landscape and diminish the integrity of that feature(s) of the landscape.
Beneficial impact – The landscape or its features would be rehabilitated in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*, to make possible a compatible use of the landscape while preserving its character-defining features.
- Major:* Adverse impact – The impact would alter a character-defining feature(s) of the cultural landscape and severely diminish the integrity of that feature(s) and the overall integrity of the historic property.
Beneficial impact – The cultural landscape would be restored in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* to accurately depict the features and character of a landscape as it appeared during its period of significance.
- Duration:* Short-term impacts would last for the duration of construction activities associated with the proposed alternative; long-term impacts would last beyond the construction activities.

IMPACTS OF ALTERNATIVE A – NO ACTION ALTERNATIVE

Analysis

Under the no action alternative, routine maintenance operations would continue but there would be no substantial improvements to Newfound Gap Road, resulting in adverse impacts to the Newfound Gap

cultural landscape that could range from long-term negligible to moderate adverse in intensity. Among the character-defining elements of the Newfound Gap Road cultural landscape, the stone masonry guardwalls would be most vulnerable to adverse impacts from a lack of repair. A number of the walls have experienced deterioration due to age, weather, and vehicular damage, and this deterioration could potentially worsen if major repairs are not made. Thus, without proper repairs to the stone masonry walls, the Newfound Gap cultural landscape faces long-term moderate adverse impacts.

Cumulative Impacts

Other past, present, and future projects within or adjacent to Great Smoky Mountains National Park have the potential to impact the Newfound Gap Road cultural landscape. In 2000, the Tennessee SHPO determined that the rehabilitation of Morton Mountain and Chimney Tops Tunnels, which included the lowering of the road and the replacement of approximately 250 feet of stone wall, would adversely affect Newfound Gap Road. Thus, impacts were long-term and moderate adverse. Impacts were minimized through the implementation of mitigation measures outlined in the Memorandum of Agreement with the Tennessee SHPO.

The moderate adverse impacts on the cultural landscape from cumulative actions in combination with the long-term moderate adverse impacts of the no action alternative on the cultural landscape would continue to result in long-term moderate adverse cumulative impacts.

Conclusion

Impacts to Newfound Gap Road's cultural landscape resulting from the no action alternative are long-term moderate adverse impacts related to no substantial improvements to the road other than routine maintenance operations. Cumulative impacts would be long-term moderate adverse. Because there would be no major adverse or unacceptable impacts to the cultural landscapes, there would be no impairment of Park resources or values.

IMPACTS OF ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

Analysis

Each of the individual actions included in alternative B are considered separately in order to consider the overall impact to the Newfound Gap Road cultural landscape.

Rehabilitation of the road surface of Newfound Gap Road would have an impact on the Newfound Gap cultural landscape that would be long-term negligible adverse. The rehabilitation of the road surface would minimally impact the integrity of character-defining features of the Newfound Gap cultural landscape. Newfound Gap Road has been repaved several times since its construction in 1933–1938; therefore, none of the original road surface is extant. However, due to the multiple layers of asphalt, the original curbing and many of the original weep holes in the stone masonry guardwalls have been completely or partially covered (curbing covered with debris would be removed and reset to allow for a 6-inch reveal). Consequently, the height from the road surface to the top of the guardwalls has been reduced, diminishing the integrity of the design of the guardwalls, a character-defining feature of the Newfound Gap cultural landscape. The addition of new layers of asphalt would continue this impact on the stone guardwalls. However, since this action would not alter the overall appearance of the road and the guardwalls, it would have a long-term minor adverse impact on the Newfound Gap cultural landscape.

Rehabilitation of road shoulders would have a minor impact on the Newfound Gap cultural landscape. The introduction of paved shoulders would impact several character-defining features of the Newfound Gap cultural landscape. The addition of paved shoulders would add elements to the road not part of the original design. Depending on width, construction of shoulders could also result in a loss of the associated vegetation, existing topography, as well as structures that are set back from the road such as culvert headwalls, all of which are character-defining features of the Newfound Gap Road cultural landscape. However, since the proposed rehabilitation of road shoulders would only take place along one section of the

road, the action would not impact the integrity of these character-defining features as a whole. Thus, the impact would be a long-term minor adverse impact following the shoulder rehabilitation.

Rehabilitation of existing guardwall would have a long-term beneficial impact on the Newfound Gap cultural landscape if the rehabilitation uses the existing stone, the historic mortar patterns, and follows the *Secretary of Interior Standards for Rehabilitation*. A number of sections of the historic masonry guardwall have experienced damage and deterioration due to age, weather, and vehicular contact. The rehabilitation of these sections of guardwall with the original stone and mortar techniques would improve the condition and the integrity of the guardwalls. The addition of a concrete footer that could stabilize the walls and bring the walls to their original height would also improve the integrity of the guardwalls and allow visitors to experience the circulation pattern, views, and structures as they were originally intended. The impact would be long-term beneficial following the guardwall rehabilitation.

Reconstruction of guardwall sections would have long-term moderate adverse impact on the Newfound Gap cultural landscape. Reconstruction of guardwall sections would impact the integrity of character-defining features of the Newfound Gap cultural landscape. Raising the height and width of the existing guardwalls would introduce new material to the wall and essentially alter the original design, materials, and workmanship of the guardwalls, which are a character-defining feature of Newfound Gap Road. Because the walls would have to be completely disassembled and reconstructed with a concrete core, some of the historic fabric would be lost. In addition, views into the surrounding landscape, as intended by the original NPS design of the road and a character-defining feature, would be slightly obstructed by the increased height of the guardwalls, although 22 inches would be at the height of the original wall design. The effect of the reconstruction of the guardwalls would be a long-term moderate adverse impact.

The addition of new guardwall and/or guardwall extensions would have a minor adverse impact on the Newfound Gap cultural landscape. Adding new guardwall and/or guardwall extensions would impact character-defining features of the Newfound Gap cultural landscape. A small number of guardwalls and steel-backed timber guardrails have been added to Newfound Gap Road since the road was constructed between 1933 and 1938, and have already had a slight impact on the integrity of the cultural landscape. Additional guardwalls and guardrails would continue to diminish the integrity of the Newfound Gap cultural landscape. Extensions or transitions constructed on the ends of stone masonry walls would impact the integrity of the historic guardwalls, which are character-defining features of the cultural landscape, as it would change the design, materials, and workmanship of the guardwalls. Extensions or transitions add an element to the walls that was not part of the original conception of the walls when they were built. The addition of new guardwall and/or guardwall extensions would introduce obtrusive visual elements into the landscape and could potentially obstruct views from the road, which are character-defining features of the cultural landscape. Additional guardwalls and/or guardwall extensions would also introduce non-historic materials to the cultural landscape. However, new guardwalls and/or guardwall extensions would only be added in three locations along the roadway, thus the impact would be minor. The impact would be a long-term minor adverse impact.

In summary, the package of rehabilitation, reconstruction, and new construction would have adverse impacts to the Newfound Gap Road cultural landscape that would range in intensity from beneficial to moderate adverse. These impacts would be long term. Adverse impacts would be mitigated by a program of context-sensitive design that would include the use of material similar in appearance to the existing historical features for any reconstruction and repair activities and by minimizing new design elements such as transitions and extensions from the existing guardwalls.

Based on the above analysis, for the purposes of Section 106 of the NHPA, the determination of effect for alternative B would be no adverse effect.

Cumulative Impacts

Impacts related to past, present, and future actions at Great Smoky Mountains National Park that could affect the cultural landscape are the same as described in alternative A. The long-term minor and moderate adverse impacts of past actions on the cultural landscape, in combination with the long-term minor to moderate adverse to beneficial impacts of the road improvement projects on the cultural landscape, would continue to result in long-term minor to moderate adverse cumulative impacts.

Conclusion

Impacts to Newfound Gap's cultural landscape, resulting from the various activities proposed under alternative B, would range from long-term beneficial impacts for the rehabilitation of existing guardwall, to long-term minor to moderate adverse impacts for the rehabilitation of road surface, rehabilitation of road shoulders, the reconstruction of guardwall sections, and the addition of new guardwalls and/or guardwall extensions. Cumulative impacts would remain long-term minor to moderate adverse. For the purposes of Section 106 of the NHPA, the determination of effect would be no adverse effect. Because there would be no major adverse or unacceptable impacts to the cultural landscapes, there would be no impairment of Park resources or values.

ARCHEOLOGY

METHODOLOGIES AND ASSUMPTIONS

Impacts to archeological resources were determined by considering the effect of the existing conditions and proposed construction/rehabilitation activities on archeological resources.

STUDY AREA

The area of potential effects for this project includes all areas where road rehabilitation and repair would occur and where any of the proposed alternatives could impact archeological resources found in the vicinity of Newfound Gap Road.

IMPACT THRESHOLDS

The following thresholds were defined:

- Negligible:* Impact would be at the lowest levels of detection – barely measurable with no perceptible consequences, either adverse or beneficial – to archeological resources. For purposes of Section 106, the determination of effect would be no adverse effect.
- Minor:* Adverse impact – Disturbance of a site(s) would result in little, if any, loss of significance or integrity and the NRHP-eligibility of the site(s) is unaffected. For purposes of Section 106, the determination of effect would be no adverse effect.
Beneficial impact – Action would result in protection, maintenance, and preservation of a site(s). For purposes of Section 106, the determination of effect would be no adverse effect.
- Moderate:* Adverse impact – There would be disturbance of a site(s) that does not diminish the significance or integrity of the site(s) to the extent that its data potential is compromised. For purposes of Section 106, the determination of effect would be adverse effect.
Beneficial impact – Stabilization, limited data recovery, or increased protection of a site(s) would occur. For purposes of Section 106, the determination of effect would be no adverse effect.
- Major:* Adverse impact – Disturbance of a site(s) would occur that diminishes or destroys the

significance and integrity of the site(s) to the extent that it is no longer eligible to be listed in the NRHP. For purposes of Section 106, the determination of effect would be adverse effect.

Beneficial impact – Active intervention to preserve a site(s) would occur. For purposes of Section 106, the determination of effect would be no adverse effect.

IMPACTS OF ALTERNATIVE A – NO ACTION ALTERNATIVE

Analysis

Under the no action alternative, the condition of Newfound Gap Road and its related features would remain the same, and would likely continue to deteriorate in the future. The Park would continue to implement select repairs to the guardwalls and roads as funding allowed. While the road and guardwalls continue to deteriorate without rehabilitation, the repairs would be done whenever money was available, and their occurrence would be at unpredictable times. Within the project area, two previous archeological surveys have been conducted. No archeological sites were identified in the surveys, thus no impacts would be expected to occur related to archeological resources during spot repair activities or after spot repair activities are completed. Previously unknown sites would be retained in their present condition, resulting in short-term beneficial impacts.

Cumulative Impacts

Several past, present, and future construction-related projects within Great Smoky Mountains National Park have the potential to impact archeological resources within the Park. There are several other road rehabilitation and construction projects that have occurred or will occur in the area. They include the rehabilitated Morton Mountain and Chimney Tops Tunnel, the rehabilitation of Newfound Gap Road from the Newfound Gap Overlook Parking Area to the Collins Creek Picnic Area, and the rehabilitation of Newfound Gap Road from Collins Creek Picnic Area to the southern Park boundary. The construction and operation of these projects would be expected to avoid all archeological resources, resulting in short- and long-term negligible adverse impacts. These long-term minor adverse impacts, when combined with the long-term negligible impacts of alternative A, would result in long-term minor adverse cumulative impacts to archeological resources.

Conclusion

Impacts to archeological resources within the Park resulting from the no action alternative would be long-term and negligible and minor adverse since no major improvements would be made and routine maintenance operations are not expected to impact known resources. Cumulative impacts would be long-term minor adverse. Because there would be no major adverse or unacceptable impacts to archeological resources, and sites would retain their present conditions, there would be no impairment of Park resources or values.

IMPACTS OF ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

Analysis

Under alternative B, rehabilitation of the road surface would occur and would include spot repair/reconstruction in areas where the road pavement is inadequate, including minor repairs such as filling and sealing of cracks and potholes. Pavement overlay would be applied to large sections of the road, as funding permits, which would smooth the existing road surface and provide adequate road surface drainage. Culvert repair and correction of road drainage deficiencies would also occur. This process would be performed by a full road construction crew and associated heavy machinery. Based on surveys performed (as described under the “Affected Environment” section), no archeological resources are known to exist in

this area. However, as with any construction project, the possibility of an inadvertent discovery exists. If archeological resources are encountered during construction, the mitigation measures outlined in the “Alternatives” chapter under “Mitigation Measures for the Action Alternative” would be implemented.

Since there are no identified archeological resources present and mitigation measures would be established for any unexpected discoveries, alternative B would result in short- and long-term minor adverse impacts to the project area. Based on the above analysis, for the purposes of Section 106 of the NHPA, the determination of effect for alternative B would be no adverse effect.

Cumulative Impacts

Impacts related to past, present, and future actions at Great Smoky Mountain National Park that could affect archeological resources are the same as described under alternative A. These impacts would be long-term minor adverse. These long-term minor adverse impacts, when combined with the short- and long-term minor impacts of alternative B, would result in long-term minor adverse cumulative impacts to archeological resources.

Conclusion

Impacts to archeological resources within the Park resulting from the proposed improvements to Newfound Gap Road under alternative B would be short and long-term minor adverse impacts as there are no known resources in this area, and mitigation measures would be established for unexpected discoveries. Cumulative impacts to archeological resources would be long-term minor adverse. Based on the above analysis, for the purposes of Section 106 of the NHPA, the determination of effect for alternative B would be no adverse effect. Because there would be no major adverse or unacceptable impacts to archeological resources, and sites would retain their present conditions, there would be no impairment of Park resources or values.

TRAFFIC AND TRANSPORTATION

METHODOLOGY AND ASSUMPTIONS

Several possible construction scenarios were modeled to quantify potential impacts for roadway users. To simulate an alternating one-way lane closure, a synchronized traffic signal was coded into Synchro with appropriate phasing and all red times to allow for traffic to clear the work zone. This scenario was modeled using closure distances of 500 feet and 1,500 feet.

This analysis uses the concept of level of service (LOS) to analyze operations on Newfound Gap Road. Level of service is defined by the amount of delay incurred by vehicles on the minor movements through an intersection. An LOS of “A” indicates the movement is operating well and that those driving on the road experience delays equal to or less than 10 seconds (or 0.17 minutes); an “F” LOS indicates the movement is failing, with those driving on Newfound Gap Road experiencing delays of over 80 seconds (or 1.33 minutes). Table 16 details each LOS according to the Highway Capacity Manual (Transportation Research Board 2000), and what type of delay drivers would experience under each level of service category.

TABLE 16. LEVEL OF SERVICE CRITERIA

Level of Service	Average Control Delay (seconds/vehicle)	Average Control Delay (minutes/vehicle)
A	≤ 10	≤ 0.17
B	> 10 to 20	> 0.17 to 0.33
C	> 20 to 35	> 0.33 to 0.58
D	> 35 to 55	> 0.58 to .92
E	> 55 to 80	> .92 to 1.33
F	> 80	> 1.33

Basically, there are two areas where vehicles would be delayed due to construction: within the queue up to the signal and beyond the signal in the work zone. The LOS of a signalized intersection is defined in terms of control delay per vehicle (seconds per vehicle). Control delay is the portion of total delay experienced by a motorist that is attributable to the traffic signal. It is composed of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The delays identified in Tables 17, 18, and 19 represent all of the additional time experienced by each vehicle (average time per vehicle) traveling in and through the queue to the signal. Beyond the signal, the travel speed within the construction zone would most likely be slower than current conditions, translating into longer travel times within the construction zone. However, these conditions would vary by location depending upon the type of construction being performed and length of the work zone compared with the prevailing speed on the same segment of road during non-construction conditions. In most cases, the additional travel time in the work zone would be negligible. Therefore, most of the additional delay to vehicles due to construction would be attributable to the signal and have been identified in Tables 17, 18, and 19 as average delay per vehicle.

The periods of peak usage (July), mid-peak usage (April), and off-peak usage (January) were selected for analysis to effectively gauge and represent traffic operations, including the potential impact to these operations, year round. The traffic on Newfound Gap Road varies greatly on an annual basis. Therefore, choosing only the peak usage period (as is traditional in traffic analyses) would give the impression that traffic is high year round, when in reality, high traffic is limited to a few peak periods and would not accurately capture potential impacts.

STUDY AREA

The FHWA-EFLHD has identified several locations along a 14.5-mile section of Newfound Gap Road where specific repairs or improvements are currently needed. However, to analyze the roadway network during the construction condition, the upper 2.5 miles from MM 12 to MM 14.5 was used to model representative conditions.

IMPACT THRESHOLDS

The following thresholds were used to determine the magnitude of impacts on traffic:

- Negligible:* The impact would be an imperceptible or barely perceptible change by roadway users during construction.
- Minor:* The impact would be noticeable, but would result in little inconvenience or benefit to roadway users during construction.
- Moderate:* The impact would impact the travel time of a large number of roadway users during construction and would result in a noticeable change in travel time.
- Major:* There would be a substantial impact on the travel time of a large number of roadway users during construction and would result in a highly noticeable change in travel time.
- Duration:* Short-term impacts would be those experienced during implementation of the alternative. Long-term impacts would be those impacts which persist or result from implementing the alternative.

IMPACTS OF ALTERNATIVE A – NO ACTION ALTERNATIVE

Analysis

The no action alternative serves as the baseline by which to compare all other alternatives. Under the no action alternative, no substantial improvements would be performed other than routine maintenance

operations. Although no improvements would be performed, traffic conditions would be expected to remain the same as routine maintenance occurs. As funding allows for roadway maintenance, the LOS on the road would not change. Therefore, there would be no material effect on traffic operations along Newfound Gap Road, resulting in long-term negligible adverse impacts.

Cumulative Impacts

Several past, present, and future construction-related projects within Great Smoky Mountains National Park have the potential to impact traffic operations within the Park. Other road rehabilitation and construction projects that have occurred, or will occur, in the area include the rehabilitated Morton Mountain and Chimney Top Tunnels, other rehabilitation efforts along Newfound Gap Road, the Tow String Road and Bridge Improvement project, and the Construction of Straight Fork Bridge along Straight Fork Road/Balsam Mountain Road. During construction activities, all of these projects would have short-term minor to moderate adverse impacts to traffic operations within the Park, depending on the duration and extent of construction, the associated road closures, and how that impacts traffic flow within the Park. Once complete, these projects would provide long-term beneficial impacts as improved roadway conditions would ease traffic congestion within the Park.

Other construction includes the Smokemont Water and Sewer project, which has provided negligible long-term impacts to traffic and transportation within the Park. The Park's GMP also has the potential to have cumulative impacts as this document guides future development in the Park. As with construction projects, this development would have short-term minor to moderate adverse impacts to traffic and transportation, depending on the duration and extent of construction, the associated road closures, and how that impacts the ability of visitors to reach their destinations within, and outside of, the Park. Once complete, these projects would provide long-term beneficial impacts to traffic and transportation as any improvements to the Park would be available for use by surrounding communities.

These cumulative actions are expected to have short-term minor to moderate adverse impacts, and long-term beneficial impacts to traffic and transportation. These impacts, when combined with the long-term negligible adverse impacts of alternative A, would have long-term minor adverse cumulative impacts to traffic and transportation.

Conclusion

The no action alternative would result in long-term negligible adverse impacts on traffic operations, as the LOS is not expected to change noticeably. Cumulative impacts to traffic under alternative A would be short-term negligible to minor adverse.

IMPACTS OF ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

Analysis

Under alternative B, once roadway upgrades have occurred and construction is complete, the LOS along Newfound Gap Road would not be expected to change from its current condition, resulting in long-term negligible adverse impacts to traffic along the roadway. Although an LOS change would not be expected, Park users would be expected to experience long-term beneficial impacts as the level of spot repairs would be reduced and the roadway condition would be improved. Short-term impacts associated with road repair and rehabilitation would occur to the LOS during construction. Several construction scenarios were analyzed in detail to represent the range of impacts that would occur during construction activities.

Construction: One-Way Traffic

Construction staging scenarios modeling an alternating one-way traffic pattern with a one-lane closure along Newfound Gap Road were modeled in the peak, mid-peak, and off-peak periods. Closure lengths of 500 feet and 1,500 feet were used. The simulation was developed to model the construction condition for an 8-hour period between 10:00 AM and 6:00 PM. These scenarios were modeled using one controller for the two

intersections at either end of the construction zone to allow only one direction of traffic to progress through the construction zone at a time. It is assumed that the traffic signal is always green for vehicles leaving the construction zone. The time required for traffic to clear the construction zone was projected for both the 500-foot and 1,500-foot closures. During this clearance period, traffic is not permitted to enter at either end of the construction zone. This period allows vehicles within the construction zone to exit before the signal changes to green to allow opposing traffic to enter the construction zone. It is estimated that a clearance time of 35 seconds would be needed for the 500-foot closure and 85 seconds would be needed for the 1,500-foot closure.

Construction: Peak Traffic Levels

The average delay per vehicle in minutes for the 500-foot and 1,500-foot closures under the Peak Usage Construction condition is provided in Table 17. For the 500-foot closure, it is projected that the average delay would be approximately 32 minutes in the northbound direction and 24 minutes in the southbound direction over the 8-hour period analyzed. The longest delay in the northbound direction would be 47 minutes between 2:00 p.m. and 3:00 p.m., and the longest delay in the southbound direction would be 50 minutes between 4:00 p.m. and 5:00 p.m. For the 1,500-foot closure, it is projected that the average delay would be approximately 114 minutes in the northbound direction and 120 minutes in the southbound direction over the 8-hour period analyzed. The longest delay would occur between 4:00 p.m. and 5:00 p.m. with a 168-minute delay in the northbound direction and a 250-minute delay in the southbound direction. Based upon the results, traffic would operate at LOS F in both directions throughout the 8-hour period analyzed for both the 500-foot and 1,500-foot closures during the Peak Usage Construction condition. For these reasons, no day lane closures would occur from approximately mid-June to mid-August to avoid these wait times. Some night work may occur during this time, but is not expected to have more than a minor impact to traffic. Since, based on the analysis of wait times, no day lane closures would occur during peak usage times, there would be short-term minor impacts as the impact would be noticeable, but would result in little inconvenience or benefit to the roadway user during this time.

TABLE 17. PEAK USAGE CONSTRUCTION CONDITION

Start Time	Vehicles Per Hour		500-Foot Closure			1,500-Foot Closure		
			Average Delay Per Vehicle Minutes(LOS)			Average Delay Per Vehicle Minutes(LOS)		
	NB	SB	NB	SB	NB & SB	NB	SB	NB & SB
10:00 a.m.	202	829	2.5 (F)	1.5 (F)	2.3	6.4 (F)	8.1 (F)	8.7
11:00 a.m.	350	942	10.0 (F)	7.5 (F)	8.6	25.6 (F)	37.9 (F)	34.6
12:00 p.m.	447	865	43.3 (F)	17.4 (F)	24.6	111.2 (F)	70.8 (F)	80.9
1:00 p.m.	514	603	43.9 (F)	29.7 (F)	36.5	97.4 (F)	136.7 (F)	119.9
2:00 p.m.	510	578	46.8 (F)	33.9 (F)	40.3	123.9 (F)	168.5 (F)	149.7
3:00 p.m.	582	495	34.4 (F)	48.7 (F)	40.9	127.0 (F)	217.5 (F)	168.6
4:00 p.m.	607	394	31.2 (F)	50.1 (F)	39.3	150.5 (F)	236.4 (F)	191.5
5:00 p.m.	558	324	23.9 (F)	41.8 (F)	31.5	168.1 (F)	249.6 (F)	206.3
Average	459	672	31.7 (F)	24.3 (F)	28.1	113.7 (F)	118.9 (F)	118.3

NB – Northbound; SB – Southbound

Construction: Mid-Peak

The average delay per vehicle in minutes for the 500-foot and 1,500-foot closures under the mid-peak condition are provided in Table 18. For the 500-foot closure, it is projected that the average delay would be approximately two minutes in the northbound direction and one minute in the southbound direction over the 8-hour period analyzed. The longest delay in the northbound direction would be less than 6 minutes between 12:00 p.m. and 1:00 p.m. and the delay in the southbound direction would be approximately one minute over the 8-hour period analyzed. For the 500-foot closure, traffic would operate on average at LOS F throughout the 8-hour period analyzed in the northbound direction. It would also operate at LOS F until about 2:00 p.m. and LOS E until the end of the 8-hour period analyzed during the mid-peak usage construction condition. In the southbound direction, traffic would operate on average at LOS E throughout the 8-hour period analyzed. Before 1:00 p.m., traffic would operate at LOS D but would operate at either LOS E or F until the end of the 8-hour period analyzed.

It is projected that the average delay for the 1,500-foot closure would be approximately 29 minutes in the northbound direction and approximately 18 minutes in the southbound direction over the 8-hour period analyzed. The longest delay in the northbound direction would be approximately 45 minutes between 1:00 p.m. and 3:00 p.m. and approximately 33 minutes between 4:00 p.m. and 5:00 p.m. in the southbound direction. Based upon the results, traffic would operate at LOS F in both directions throughout the 8-hour period analyzed for 1,500-foot closure during the mid-peak usage construction condition.

The impacts from construction activities under alternative B during the mid-peak period would vary depending on the length of the lane closure. All construction during this time is expected to occur using a one-lane closure, with signals. A 500-foot lane closure would be used where possible to reduce the delay times experienced by those using Newfound Gap Road during this time. The LOS of F experienced during certain times of the day would result in short-term moderate adverse impacts as the travel delays would be noticeable, but on average, since they are below five minutes with a 500-foot closure, would not be classified as highly noticeable.

TABLE 18. MID-PEAK USAGE CONSTRUCTION CONDITION

Start Time	Vehicles Per Hour		500-Foot Closure			1,500-Foot Closure		
			Average Delay Per Vehicle Minutes(LOS)			Average Delay Per Vehicle Minutes(LOS)		
	NB	SB	NB	SB	NB & SB	NB	SB	NB & SB
10:00 a.m.	120	490	1.6 (F)	0.8 (D)	1.6	2.4 (F)	2.1 (F)	2.9
11:00 a.m.	208	558	1.8 (F)	0.9 (D)	1.7	11.1 (F)	8.0 (F)	9.4
12:00 p.m.	264	513	5.7 (F)	0.9 (D)	3.1	31.4 (F)	15.7 (F)	21.1
1:00 p.m.	305	357	2.7 (F)	1.2 (E)	2.5	45.1 (F)	21.0 (F)	31.8
2:00 p.m.	302	343	1.2 (E)	1.2 (E)	1.7	44.6 (F)	28.3 (F)	36.6
3:00 p.m.	344	293	1.2 (E)	1.4 (F)	1.8	32.5 (F)	30.6 (F)	32.5
4:00 p.m.	360	232	1.0 (E)	1.4 (F)	1.7	27.1 (F)	32.9 (F)	30.1
5:00 p.m.	330	192	1.1 (E)	1.3 (E)	1.7	19.3 (F)	28.9 (F)	23.6
Average	272	398	2.0 (F)	1.1 (E)	2.0	29.3 (F)	18.2 (F)	23.7

NB – Northbound; SB – Southbound

Construction: Off-Peak

The average delay per vehicle in minutes for the 500-foot and 1,500-foot closures under the off-peak condition are provided in Table 19. For the 500-foot closure, it is projected that the average delay would be approximately one minute or less in both directions for the 8-hour period analyzed. Traffic would operate on average at LOS E throughout the 8-hour period analyzed in the northbound direction. It would also operate at LOS E or F until about 3:00 p.m. and LOS D until the end of the 8-hour period analyzed during the off-peak usage construction condition. In the southbound direction, traffic would operate on average at LOS D throughout the 8-hour period analyzed. Before 1:00 p.m., traffic would operate at LOS D but would mostly operate at LOS E until the end of the 8-hour period analyzed.

For the 1,500-foot closure, it is projected that the average delay would be approximately four minutes in the northbound direction and approximately two minutes in the southbound direction for the 8-hour period analyzed. The longest delay in the northbound direction would be less than 14 minutes between 12:00 p.m. and 1:00 p.m. and the delay in the southbound direction would be two minutes or less for the 8-hour analyzed period. Based upon the results, traffic would operate at LOS F in both directions throughout the 8-hour period analyzed for the 1,500-foot closure during the off-peak usage construction condition.

Given this analysis, delays would be the shortest during the off-peak period. For part of this period, one-lane road closures with traffic signals would occur. Although the roadway would operate at an LOS of between E and F during the day, average closures of below five minutes would be expected to have short-term minor to moderate impacts during these few months of construction as they would be noticeable and would result in a change of travel time; however, this change would not be highly noticeable.

Also during this time period, the NPS may implement a full road closure for up to two months in order to accommodate the required construction equipment, as well as to expedite the construction and decrease the amount of construction that needs to occur in the peak and mid-peak periods. This option would divert those from the surrounding communities who use Newfound Gap Road as a preferred access route, resulting in short-term impacts that would be noticeable. However, a full closure that is planned would be less impacting to the community than an unplanned impact, as the NPS will be able to communicate the closure well in advance of the action, and planned road closures are generally shorter than unplanned closures. If the NPS allows the roadway conditions to continue deteriorating, and Newfound Gap Road is forced to be closed due to embankment collapse or some other catastrophic event or due to safety reasons (an unplanned closure), this permanent or extended closure could result in substantially longer impacts to the surrounding

communities. In addition, any unplanned or catastrophic failure of the road could result in an immediate and unplanned closure. Since planning of alternate routes cannot be provided in advance of unplanned closures, the impacts from planned closures tend to be less than those of unplanned ones.

Additional mitigation for these closures would include meetings with leadership in the local communities to convey the project details to the affected stakeholders and participants from both sides of the mountain communities. The impact on the local communities, bus tours, detour routes, and various construction scenarios would be discussed. Potential impacts of a full road closure during non-peak months would likely be similar to those for a related project, Rehabilitation of the Tunnels through Chimney Tops and Morton Mountain (GRSM 1A23, B16), which was completed from fall 2001 until spring 2003. This project consisted of two parts: lowering the roadbed within the tunnels to gain clearance for large vehicles, and rehabilitating the associated guardwalls. Total closure for this project was 42 days over two different periods, one before and one after the Christmas and New Year holiday period. Outside of the full road closures, stationary single-lane closures were utilized to complete required tunnel wall work and guardwall rehabilitation. A stone masonry guardwall similar to the design used in this project was part of the tunnel project.

These full road closures during off-peak periods would present an inconvenience to those in neighboring communities who utilize the roadway on a regular basis. These impacts would be noticeable, with a noticeable change in travel time, resulting in short-term moderate adverse impacts as the NPS would mitigate impacts through extensive consultation and coordination with the local communities.

TABLE 19. OFF-PEAK USAGE CONSTRUCTION CONDITION

Start Time	Vehicles Per Hour		500-Foot Closure			1,500-Foot Closure		
			Average Delay Per Vehicle Minutes(LOS)			Average Delay Per Vehicle Minutes(LOS)		
	NB	SB	NB	SB	NB & SB	NB	SB	NB & SB
10:00 a.m.	54	222	1.2 (E)	0.7 (D)	1.3	2.0 (F)	1.6 (F)	2.2
11:00 a.m.	93	253	1.5 (F)	0.8 (D)	1.3	3.1 (F)	1.9 (F)	2.8
12:00 p.m.	120	232	1.4 (F)	0.7 (D)	1.4	13.6 (F)	1.7 (F)	6.2
1:00 p.m.	138	161	1.0 (E)	1.1 (E)	1.5	6.8 (F)	1.8 (F)	4.7
2:00 p.m.	137	155	1.2 (E)	0.9 (D)	1.4	2.0 (F)	2.0 (F)	2.6
3:00 p.m.	156	133	0.8 (D)	1.1 (E)	1.4	1.7 (F)	2.0 (F)	2.4
4:00 p.m.	162	105	0.8 (D)	1.0 (E)	1.2	1.6 (F)	1.7 (F)	2.2
5:00 p.m.	150	87	0.8 (D)	1.1 (E)	1.3	1.7 (F)	2.0 (F)	2.4
Average	123	180	1.0 (E)	0.9 (D)	1.4	4.0 (F)	1.8 (F)	3.3

NB – Northbound; SB – Southbound

Construction: Two-Way Traffic

Traffic was modeled using a reduced-width, two-way, two-lane setup with the same lengths as the one-way traffic. No decrease in service or delays were introduced with the reduction in lane width, resulting in long-term negligible to minor adverse impacts as the impact could be noticeable, but the level of inconvenience to the visitor would be kept to a minimum.

Analysis Summary

Of all the construction scenarios evaluated, two usage periods are feasible for construction in terms of traffic delays. The peak usage period produces the longest delays, and construction during this time would have the

greatest level of impact to Park visitors and staff. The off-peak usage period has the least delay associated with any of the closure lengths. However, the low temperatures and winter weather conditions associated with this period may not be conducive to construction. Any construction that is not temperature dependent should be carried out during the off-peak usage period, using the closure length most convenient to facilitating the construction work.

The mid-peak usage season represents a compromise of traffic and weather conditions. The closure lengths of 500 feet and 1,500 feet produce feasible delays and queues in the mid-peak usage period. It is recommended that temperature-dependent construction operations be implemented using the 500-foot and 1,500-foot closure lengths.

Where physically feasible, two-way, two-lane, reduced-width construction staging is recommended due to its lack of traffic delay. These construction recommendations apply to the section of roadway between MM 12 to MM 14.5; however, they are not exclusive to that section. MM 12 to MM 14.5 represents the most geometrically constrained portion of the roadway with tight radii and large positive grades, and is considered the worst-case scenario for construction. These recommendations could be implemented on any section of Newfound Gap Road in the study area where physically feasible.

Based on these results, under alternative B, potential impacts to traffic would be mitigated by maximizing the amount of construction that takes place at off-peak travel times, including night-time construction. Further mitigation would occur by maximizing the amount of work that can occur while keeping two lanes of traffic open, even at a reduced width. Implementation of these mitigation measures would ensure that impacts remain short-term negligible to minor adverse.

Cumulative Impacts

Impacts related to past, present, and future actions at Great Smoky Mountains National Park that could affect traffic are the same as described under alternative A. These short-term minor to moderate adverse impacts, when combined with the short-term minor to moderate adverse impacts of alternative B, would have short-term minor adverse cumulative impacts.

The overall beneficial long-term impacts to the local area transportation network from area projects would not materially affect traffic flow on Newfound Gap Road. The effect of construction on Newfound Gap Road would be temporary in nature and would vary in terms of the affect on motorists, depending upon the time period in which the construction activity would occur. The combination of the cumulative projects and the construction activities associated with alternative B would not result in any adverse long-term impacts, with the potential for long-term benefits.

Conclusion

Impacts to Newfound Gap Road's traffic network resulting from the various activities proposed under alternative B would be short-term minor to moderate adverse during rehabilitation of road surface, rehabilitation of road shoulders, the reconstruction of guardwall sections, and the addition of new guardwalls and/or guardwall extensions. Mitigation measures such as extensive consultation and coordination with the community, limiting the length of the lane closures, and no daytime construction during peak periods would be implemented to ensure these short-term adverse impacts do not exceed a moderate level. Long-term beneficial impacts would be experienced from the improved roadway conditions and from minimization of spot repairs on the road, and would be negligible adverse. Cumulative impacts would be short-term negligible adverse with the potential for long-term beneficial impacts.

VISITOR USE AND EXPERIENCE

METHODOLOGY AND ASSUMPTIONS

Impacts to visitor use and experience were determined by considering the effect of the existing conditions and proposed construction/rehabilitation activities on the experience of Park visitors.

STUDY AREA

The study area for visitor use and experience includes Newfound Gap Road and sites accessed by the road, focusing on those areas where road work would take place.

IMPACT THRESHOLDS

The following thresholds were defined:

- Negligible:* Visitors would likely be unaware of impacts associated with implementation of the alternative. There would be no noticeable change in visitor use and experience or in any defined indicators of visitor satisfaction or behavior.
- Minor:* Changes in visitor use and/or experience would be slight and detectable, but would not appreciably limit or enhance critical characteristics of the visitor experience. Visitor satisfaction would remain stable.
- Moderate:* Few critical characteristics of the desired visitor use and experience would change. The number of participants engaging in a specified activity would be altered. Some visitors who desire their continued use and enjoyment of the activity/visitor experience might be required to pursue their choices in other available local or regional areas. Visitor satisfaction would begin to either decline or increase.
- Major:* Multiple critical characteristics of the desired visitor use and experience would change and/or the number of participants engaging in an activity would be greatly reduced or increased. Visitors who desire their continued use and enjoyment of the activity/visitor experience would be required to pursue their choices in other available local or regional areas. Visitor satisfaction would markedly decline or increase.
- Duration:* Short-term impacts occur during all or part of alternative implementation; long-term impacts extend beyond implementation of the alternative.

IMPACTS OF ALTERNATIVE A – NO ACTION ALTERNATIVE

Analysis

Under the no action alternative, the condition of Newfound Gap Road and its related features would remain the same and would likely continue to deteriorate over time. The Park would continue to implement select repairs to the road and guardwalls as funding allows. The repairs would be done on an opportunistic basis and their occurrence would not be predictable. Park visitors would not be able to easily plan around these disturbances, and their experience could be impacted by any delays that these repairs could cause from temporary closures. While visitors would notice this disturbance, it is not expected to appreciably limit or enhance critical characteristics of the visitor experience and would result in long-term minor adverse impacts. With repairs occurring as funding allows, the road and guardwalls would continue to deteriorate. As the road and related features deteriorate, visitor experience would be impacted as the overall aesthetic quality would degrade and visitors would be able to feel the deteriorated road conditions driving in their cars (i.e., bouncing around driving over a pothole). Because of these potential impacts, the lack of scheduled maintenance and the continued degradation of Newfound Gap Road would result in long-term minor

adverse impacts to visitor use and experience under the no action alternative, as impacts would be noticeable, but visitor use levels would not be expected to change.

Cumulative Impacts

Several past, present, and future construction-related projects within Great Smoky Mountains National Park have the potential to impact visitor use and experience within the Park. Other road rehabilitation and construction projects that have occurred, or will occur, in the area include the rehabilitated Morton Mountain and Chimney Top Tunnels, other rehabilitation efforts along Newfound Gap Road, the Tow String Road and Bridge Improvement project, and the Construction of Straight Fork Bridge along Straight Fork Road/Balsam Mountain Road. During construction activities, all of these projects would have short-term, minor to moderate adverse impacts on visitor use and experience due to various closures (campgrounds, roads, etc.), and traffic delays within the Park. Once complete, these projects would provide long-term beneficial impacts on visitor use and experience due to the improvements made within the Park, such as improved roadways and campground facilities.

Other construction includes the Smokemont Water and Sewer project, which has provided beneficial impacts to visitor use and experience by providing new infrastructure systems. In addition, the Park's GMP also has the potential to have cumulative impacts as this document guides future development in the Park. As with construction projects, this development would have short-term minor to moderate adverse impacts to visitor use and experience, depending on the duration and extent of construction and how that impacts the ability of the visitors to access and enjoy the Park. Once complete, these projects would provide long-term beneficial impacts to visitor use and experience as any improvements to the Park would be made available to all visitors.

These cumulative actions are expected to have short-term minor to moderate adverse impacts, and long-term beneficial impacts to visitor use and experience. These impacts, when combined with the long-term minor adverse impacts of alternative A, would have short-term minor adverse and long-term beneficial cumulative impacts to visitor use and experience.

Conclusion

Impacts to visitor use and experience within the Park resulting from the no action alternative would be long-term minor adverse impacts as only implementing routine maintenance operations as funding is available would lead to deterioration of the roadway that could impact the visitor experience in the Park, but is not expected to change visitation levels. Cumulative impacts would be short-term minor adverse to long-term beneficial.

IMPACTS OF ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

Analysis

Under alternative B, rehabilitation of the road surface would occur and would include spot repair/reconstruction in areas where the road pavement is adequate, including minor repairs such as filling and sealing of cracks and potholes. This action would require very limited traffic controls. Pavement overlay would be applied to large sections of the road, as funding permits. A pavement overlay would smooth the road surface and provide adequate road surface drainage. This process would be performed by a full road construction crew and associated heavy machinery. This process would require a temporary work zone and more extensive traffic controls that would have short-term minor adverse impacts to visitor use and experience due to temporary road closures and delays, as well as noise from the heavy machinery. Long-term beneficial impacts to visitor use and experience would result from the improvements made to Newfound Gap Road due to smoother travel along the roadway and safer roadway conditions and improved visual condition of the roadway.

The presence of pavement edge drop-offs is a concern along Newfound Gap Road. These areas, where the pavement edge is higher than the ground below, present a potential safety hazard. Under this alternative,

each site would be evaluated for implementation of the appropriate option. A road construction crew with associated heavy machinery and temporary work zone would be required for construction of either option. Short-term minor adverse impacts to visitor use and experience would result from temporary traffic controls and from increased noise from the heavy machinery that could distract the visitor from the natural, quiet surroundings of the Park or could cause a delay in allowing visitors to get to their destination. Long-term beneficial impacts to visitor use and experience would result from the improvements made to Newfound Gap Road that would improve the visual experience for the visitor.

The construction process for these activities under alternative B would require a temporary work zone and more extensive traffic controls that would have short-term minor adverse impacts to visitors' quality of life due to temporary road closures and delays, as well as noise from the use of heavy machinery. These impacts to visitor experience are likely to be most affected if construction occurs during summer peak seasons when travel and traffic levels are already high. Long-term beneficial impacts to the quality of visitors' experiences may result from the improvements made to Newfound Gap Road.

Under alternative B, minor repairs would be done to the stone masonry guardwalls, where necessary. These repairs would include, but would not be limited to, repointing mortar joints, resetting loose stones, replacing missing stones or mortar, cleaning existing weep holes, and removing debris in front of the wall. The implementation of these repairs would require a small work crew, minimal traffic control, and a semi-permanent work zone. Impacts to visitor use and experience would be short-term minor and adverse due to temporary road closures and/or traffic delays resulting from repairs. Long-term beneficial impacts to visitor use and experience would result from the improvements made to Newfound Gap Road guardwalls. These improvements to guardwalls would create a sense of increased safety for travelers and would restore the historic nature of the roadway that visitors come to the Park to enjoy.

Alternative B would call for the rehabilitation of Newfound Gap Road, road shoulders, and stone masonry guardwalls. Activities associated with the rehabilitation of the roadway and related features that could potentially impact visitor use and experience include the temporary closure of those areas requiring total or partial reconstruction and rehabilitation, as well as disturbance and noise associated with all rehabilitation activities. To assure visitor safety, Newfound Gap Road could be closed to the public in certain areas while construction activities are taking place. During construction and rehabilitation activities related to the implementation of alternative B, impacts to visitor use and experience would be short-term minor and adverse due to temporary and semi-permanent road closures and traffic delays, as well as noise from the heavy machinery that could distract the visitor from the natural, quiet surroundings of the Park. After construction and rehabilitation activities are complete, impacts to visitor use and experience would be long-term and beneficial as a result of the improvements made to Newfound Gap Road and its associated features that would return the roadway to its historic appearance and provide smoother travel along the roadway, as well as a sense of increased safety for those traveling along the road.

Cumulative Impacts

Impacts related to past, present, and future actions at Great Smoky Mountains National Park that could affect visitor use and experience are the same as described under alternative A. There would be short-term minor to moderate adverse impacts on visitor use and experience from these projects, in combination with long-term beneficial impacts from the improvement of roadway and recreational facilities in the area. These short-term minor to moderate impacts and long-term beneficial impacts, when combined with the short-term minor adverse and long-term beneficial impacts of alternative B, would have short-term minor adverse and long-term beneficial cumulative impacts to visitor use and experience.

Conclusion

Impacts to visitor use and experience within the Park resulting from the various activities proposed under alternative B would be short-term minor adverse due to temporary road closures and traffic delays, as well as noise from the heavy machinery, and long-term beneficial impacts from the improvements made to

Newfound Gap Road and associated features that would improve visitor use facilities. Cumulative impacts would be short-term minor adverse and long-term beneficial.

VISITOR AND EMPLOYEE SAFETY

METHODOLOGY AND ASSUMPTIONS

Impacts to visitor and employee safety were determined qualitatively based on the existing conditions of the site and the safety concerns.

STUDY AREA

The study area for visitor and employee safety includes the area along Newfound Gap Road where roadway rehabilitation would occur.

IMPACT THRESHOLDS

The following thresholds were defined:

- Negligible:* The impact to visitor and employee safety would not be measurable or perceptible. Emergency response capabilities would not be affected.
- Minor:* The impact to visitor and employee safety would be measurable or perceptible, but it would be limited to a relatively small number of visitors at localized areas. Impacts to visitor and employee safety might be realized through a small increase in the potential for visitor conflicts in current accident areas. Emergency response capabilities would be affected; however, impacts would be small and easily mitigated.
- Moderate:* The impact to visitor and employee safety would be sufficient to cause a change in accident rates at existing low accident locations or to create the potential for additional visitor conflicts in areas that currently do not exhibit noticeable accident trends. Emergency response capabilities would be impacted and mitigation to offset adverse effects would be extensive, but likely successful.
- Major:* The impact to visitor and employee safety would be substantial. Accident rates in areas usually limited to low accident potential are expected to substantially increase in the short and long term. Emergency response capabilities would be changed substantially and mitigation measures would be extensive.
- Duration:* Short-term impacts occur during all or part of alternative implementation; long-term impacts extend beyond implementation of the alternative.

IMPACTS OF ALTERNATIVE A – NO ACTION ALTERNATIVE

Analysis

Under the no action alternative, the condition of Newfound Gap Road and its related features would remain the same, and would likely continue to deteriorate. The Park would continue to implement selected repairs to the road and guardwalls as funding allows. However, the road and guardwalls would continue to deteriorate. As the roadway and related features deteriorate, their overall level of safety could become a concern, adversely affecting visitor and employee safety along the road. As described in the “Affected Environment” chapter, the top crash areas within the study area include the Chimneys Picnic Area entrance intersection with Newfound Gap Road, Alum Cave Bluffs Trail Head intersection with Newfound Gap Road, and the Upper Tunnel on Newfound Gap Road. Although Newfound Gap Road has been identified as

an area of high accident rates, factors other than the road condition, such as environmental concerns (fog) or driver error have been the cited reasons for the accidents. Even though it has not been identified as a contributing factor, a deteriorated road surface could contribute to safety concerns. Under alternative A, these ongoing safety concerns would result in long-term minor adverse impacts as it may be measurable to staff and visitors but there would be a relatively small number of incidents based on past Park data.

Cumulative Impacts

Several past, present, and future construction-related projects within Great Smoky Mountains National Park have the potential to impact visitor and employee safety within the Park. Other road rehabilitation and construction projects that have occurred, or will occur, in the area include the rehabilitated Morton Mountain and Chimney Top Tunnels, other rehabilitation efforts along Newfound Gap Road, the Tow String Road and Bridge Improvement project, and the Construction of Straight Fork Bridge along Straight Fork Road/Balsam Mountain Road. These projects would improve visitor and employee safety.

Other construction includes the Smokemont water and sewer project, which has provided new infrastructure systems that support improved sanitary conditions and access to potable water. Once complete, these projects would enhance visitor and employee safety, providing access to potable water, improved sanitary conditions, and other improvements made within the Park. In addition, the Park's GMP also has the potential to have cumulative impacts as this document guides future development in the Park. The directives and policies provided in the GMP would ensure that future development would occur in a way that protects visitor and Park employee safety, and would have long-term beneficial impacts.

These cumulative actions are expected to have long-term beneficial impacts to visitor and employee safety. These impacts, when combined with the long-term minor adverse impacts of alternative A, would have long-term minor adverse impacts cumulative impacts to visitor and employee safety.

Conclusion

Impacts to visitor and employee safety within the Park resulting from the no action alternative would be long-term and minor adverse since no substantial improvements would be made to the road other than routine maintenance operations, and safety concerns could occur. Cumulative impacts would be long-term minor adverse.

IMPACTS OF ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

Analysis

Under alternative B, the existing safety concerns within the Park would be addressed through activities such as rehabilitation of road surfaces which require spot repair/reconstruction in areas where the pavement is adequate, but where minor repairs such as filling and sealing of cracks and potholes are needed; and pavement overlay that would be applied to large sections of the road, as funding permits, that would smooth the road surface and provide adequate road surface drainage. These actions would result in long-term beneficial impacts to visitor and employee safety from improvements made to the road surface that create a safer traveling experience.

As discussed in the "Affected Environment" chapter under the "Visitor and Employee Safety" section, contributing factors to vehicular accidents on Newfound Gap Road were classified as driver-based, environment-based, or vehicle-based. Environment-based crashes were caused by weather conditions, debris on the roadway, or reduction in visibility due to fog or extreme sunlight. While the condition of the road surface was not identified as a contributing factor to environment-based accidents, improvements to the road surface under alternative B would likely create a safer driving environment once construction activities are complete. As current safety concerns would be addressed under alternative B, impacts to safety would be expected to be long-term negligible to negligible adverse, as there would not be a measurable impact to visitor or employee safety. However, overlaying the existing pavement would necessitate the creation of temporary work zones as a means to conduct the work. In some cases, the work zones would need to

accommodate one-way traffic and would necessitate the use of traffic control devices. Implementation of these devices could increase the number of rear-end accidents as vehicles queue while stopped to allow traffic to flow in the opposite direction. This situation could create a small increase in the potential for visitor conflicts in current accident areas and would result in short-term minor adverse impacts to visitor or employee safety.

Rehabilitation of road shoulders would have a minor impact on the Newfound Gap Road in terms of visitor or employee safety. Most of this work could take place while maintaining two-way traffic. Since the proposed rehabilitation of road shoulders would only take place along one section of the road, the action would not affect most of the Newfound Gap Road corridor. The beneficial impact from implementing this measure to improve safety would result in long-term negligible adverse impacts as the current safety concerns on the road would be addressed.

Under alternative B, multiple safety hazards would be addressed. The presence of pavement edge drop-offs is a concern along Newfound Gap Road. These areas present a potential safety hazard for motorists. Under this alternative, each site would be evaluated for implementation of the appropriate option, and hazardous conditions would be addressed. A road construction crew with associated heavy machinery and temporary work zone would be required for construction of either option. Short-term minor adverse impacts to visitor or employee safety use and experience would result from temporary traffic controls as the number of rear-end accidents would increase as vehicles queue while stopped to allow traffic to flow in the opposite direction. Long-term beneficial impacts to visitor or employee safety would result from the improvements made to Newfound Gap Road as the current safety concerns on the road would be addressed.

The stone masonry guardwalls would undergo minor repairs, where necessary. These repairs would include, but would not be limited to, repointing mortar joints, resetting loose stones, replacing missing stones or mortar, cleaning existing weep holes, and removing debris in front of the wall. The implementation of these repairs would require a small work crew, minimal traffic control, and a semi-permanent work zone. Impacts to visitor or employee safety would be short-term minor and adverse due to temporary road closures and/or traffic delays resulting from repairs. The beneficial impact from implementing these measures to improve safety would result in long-term negligible adverse impacts as the current safety concerns on the road would be addressed. These improvements to guardwalls would also create a sense of increased safety for travelers.

Cumulative Impacts

Impacts related to past, present, and future actions at Great Smoky Mountains National Park that could affect visitor and employee safety are the same as described under alternative A. These impacts would be long-term beneficial as improvements to Park roadways and facilities would improve visitor and employee safety. These long-term beneficial impacts, combined with the long-term negligible adverse impacts of alternative B, would have long-term negligible cumulative impacts to visitor and employee safety.

Conclusion

Impacts to visitor and employee safety within the Park resulting from the proposed improvements to Newfound Gap Road under alternative B would be long-term negligible adverse and beneficial as current safety concerns would be addressed. Cumulative impacts to visitor and employee safety would be long-term negligible adverse.

SURROUNDING COMMUNITIES

METHODOLOGIES AND ASSUMPTIONS

Impacts to surrounding communities were determined by considering the existing conditions and proposed construction/rehabilitation activities in terms of the effects on visitors and how those residing in local communities would be able to access the Park or other desired destination, as well as impacts to quality of life.

STUDY AREA

As described in the “Affected Environment” chapter, the socioeconomic study area was determined to be Sevier County, Tennessee, Swain County, North Carolina, and the metropolitan areas of Knoxville, Tennessee, and Asheville, North Carolina. Construction and improvements associated with the Newfound Gap Road are expected to be supported by businesses and workers located in these communities, and road closures or detours are likely to affect Park visitation by tourists staying in these communities and cities.

IMPACT THRESHOLDS

The following thresholds were defined:

- Negligible:* The effects to surrounding communities would be barely detectable.
- Minor:* The impact on surrounding communities would be small and would be more localized than widespread in the region.
- Moderate:* The impact on surrounding communities would be detectable, readily apparent, and widespread at the regional level.
- Major:* The impact on surrounding communities would be readily apparent and so large as to substantially change the regional economy or social services within the region.
- Duration:* Short-term impacts occur during all or part of alternative implementation; long-term impacts extend beyond implementation of the alternative.

IMPACTS OF ALTERNATIVE A – NO ACTION ALTERNATIVE

Analysis

Under the no action alternative, the condition of Newfound Gap Road and its related features would not undergo any additional improvements. The Park would continue to implement selected repairs to the road and guardwalls to ensure safety for public use, as funding allows. However, continued deterioration of the road and guardwalls would be expected.

Deteriorated roadway conditions would lead to inconveniences for surrounding communities that use Newfound Gap Road as part of their transportation network. Poor roadway conditions may reduce speeds and increase travel times, as well as discourage surrounding residents from using Newfound Gap Road as a transportation option, possibly resulting in residents needing to take a longer, and more inconvenient routing. Spot repairs would also be ongoing, and their scheduling unpredictable, creating potential delays for those in surrounding communities. The lack of action under alternative A would result in continued poor pavement conditions and other roadway deficiencies along Newfound Gap Road, resulting in a long-term minor adverse impact as it would be localized to those who used the roadway frequently, and would not be widespread on a regional level.

Cumulative Impacts

Several past, present, and future construction-related projects within Great Smoky Mountains National Park have the potential to impact surrounding communities within and surrounding the Park. Other road rehabilitation and construction projects that have occurred, or will occur, in the area include the rehabilitated Mountain and Chimney Top Tunnels, other rehabilitation efforts along Newfound Gap Road, the Tow String Road and Bridge Improvement project, and the Construction of Straight Fork Bridge along Straight Fork Road/Balsam Mountain Road. During construction activities, all of these projects would have short-term minor to moderate adverse impacts to surrounding communities, depending on the duration and extent

of construction and how that impacts the ability of those in surrounding communities to access the Park and other destinations. Once complete, these projects would provide long-term beneficial impacts as improved roadway conditions would make travel easier and would increase quality of life aspects for those in surrounding communities.

Other construction includes the Smokemont water and sewer project, which has provided beneficial impacts to the surrounding communities by providing new infrastructure systems. In addition, the Park's GMP also has the potential to have cumulative impacts as this document guides future development in the Park. As with construction projects, this development would have short-term minor to moderate adverse impacts to surrounding communities, depending on the duration and extent of construction and how that impacts the ability of those in surrounding communities to access the Park and other destinations. Once complete, these projects would provide long-term beneficial impacts as any improvements to the Park would be available for use by surrounding communities.

These cumulative actions are expected to have short-term minor to moderate adverse impacts, and long-term beneficial impacts to surrounding communities. These impacts, when combined with the long-term minor adverse impacts of alternative A, would have long-term minor adverse impacts cumulative impacts to surrounding communities.

Conclusion

Impacts to surrounding communities resulting from the no action alternative would be long-term minor adverse impacts related to no substantial improvements to the road other than routine maintenance operations. Cumulative impacts to surrounding communities under the no action alternative would be long-term minor adverse.

IMPACTS OF ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

Analysis

Under alternative B, rehabilitation of the road surface would require spot repair/reconstruction in areas where the road pavement is adequate, but where minor repairs such as filling and sealing of cracks and potholes are needed. This action would require very limited traffic controls. Pavement overlay would be applied to large sections of the road, as funding permits. Pavement overlay would smooth the road surface and provide adequate road surface drainage. This process would be performed by a full road construction crew and associated heavy machinery. Once completed, the necessity for spot repairs would be expected to decline along Newfound Gap Road as the roadway conditions improve.

While road rehabilitation and associated projects are occurring, residents of surrounding communities would experience short-term minor to moderate adverse impacts from construction activities as their travel patterns could be impacted by these activities as they may require more time to reach desired destinations or be required to take an alternate route. Once construction is complete, these residents would experience long-term beneficial impacts as the level of spot repairs would decrease, and the condition of the roadway would improve. Also, the accessibility of the roadway would improve as residents would not be delayed by ongoing spot repairs.

Cumulative Impacts

Past, present, and future actions that could affect surrounding communities are the same as described under alternative A, resulting in short-term minor to moderate adverse impacts, and long-term beneficial impacts to surrounding communities. These impacts, when combined with the short-term minor to moderate adverse and short- and long-term beneficial impacts of alternative B, would have short-term minor to moderate and long-term beneficial cumulative impacts to surrounding communities.

Conclusion

Impacts on surrounding communities from the various activities proposed under alternative B would be short-term minor to moderate adverse due to delays from construction activities, but long-term beneficial once construction activities are complete. Cumulative impacts under alternative B would be short-term minor to moderate adverse and long-term beneficial.

PARK MANAGEMENT AND OPERATIONS

METHODOLOGY AND ASSUMPTIONS

Great Smoky Mountains National Park is responsible for providing staff to perform all of the day-to-day operations and maintenance required to manage and maintain Park facilities, roadways, and amenities that serve Park visitors.

STUDY AREA

The study area for Park management and operations includes the entire Park.

IMPACT THRESHOLDS

The following thresholds were defined:

- Negligible:* The effects would be at low levels of detection and would not have an appreciable effect on Park operations.
- Minor:* Impacts would be noticeable, but would be of a magnitude that would not result in an appreciable or measurable change to Park or agency operations.
- Moderate:* Impacts would be readily apparent and would result in a substantial change in Park or agency operations that would be noticeable to staff and the public. Mitigation could be required and may be effective.
- Major:* Impacts would be readily apparent and would result in a substantial change in Park operations that would be noticeable to staff and the public, and would require the Park to readdress its ability to sustain current Park operations.
- Duration:* Short-term impacts occur during all or part of alternative implementation; long-term impacts extend beyond implementation of the alternative.

IMPACTS OF ALTERNATIVE A – NO ACTION ALTERNATIVE

Analysis

Under the no action alternative Newfound Gap Road and its related features would continue to deteriorate. The Park would continue to implement selected repairs to the roadway and guardwalls as funding allows. However, the roadway and guardwalls would continue to deteriorate, degrading their overall level of service, which would adversely affect Park management as the amount of time needed for roadway maintenance would continue, and possibly increase. As Park vehicles would be driving on the roadways, this could also result in increased maintenance to these vehicles from driving on poor road conditions (damage caused by potholes, shoulder drop-offs, etc.). Overall, performing road maintenance as funds allow under the no action alternative would lead to the continued degradation of Newfound Gap Road. More staff time would be dedicated to maintenance of both the road and Park vehicles, resulting in long-term minor to moderate adverse impacts to Park management and operations as impacts would be noticeable, but could

result in a measureable change in Park operations due to needed funding and staffing effort to continue the spot repairs.

Cumulative Impacts

Several past, present, and future construction-related projects within Great Smoky Mountains National Park have the potential to impact Park operations and management. Other road rehabilitation and construction projects that have occurred, or will occur, in the area include the rehabilitated Morton Mountain and Chimney Top Tunnels, other rehabilitation efforts along Newfound Gap Road, the Tow String Road and Bridge Improvement project, and the Construction of Straight Fork Bridge along Straight Fork Road/Balsam Mountain Road. During construction activities, all of these projects would have short-term minor to moderate adverse impacts to Park operations as staff hours would be dedicated to the planning of these projects, as well as delays to Park staff accessing various areas of the Park during construction. Once complete, these projects would provide long-term beneficial impacts as improved roadway conditions would make travel easier for Park staff and would likely also decrease Park costs for maintenance of these various facilities.

In addition, the Park's GMP also has the potential to have cumulative impacts as this document guides future development in the Park. The directives in this document ensure that the future development in the Park is done in a manner that protects the Park's natural and cultural resource values, and would have long-term beneficial impacts.

These short-term minor to moderate adverse impacts and long-term beneficial impacts, combined with the long-term negligible to minor adverse impacts of alternative A, would result in long-term negligible to minor adverse cumulative impacts.

Conclusion

Impacts to Park management and operations resulting from the no action alternative would be long-term minor to moderate adverse impacts related to the continued, and possibly increasing, demands on Park staff time related to continued roadway deterioration. Cumulative impacts under alternative A would be long-term negligible to minor adverse.

IMPACTS OF ALTERNATIVE B – REHABILITATION OF NEWFOUND GAP ROAD

Analysis

Under alternative B, in areas where the road pavement is adequate but minor repairs are needed, spot repairs and minimal reconstruction would be completed. Pavement overlay would be applied to large sections of the road, as funding permits. Pavement overlay would smooth the road surface and provide adequate road surface drainage. Other improvements such as addressing the pavement edge drop-offs and conducting minor repairs to the stone masonry guardwalls would be made.

Short-term negligible to minor adverse impacts to Park management and operations would result during the rehabilitation/construction phase of the plan due to the staff time required to execute and manage the rehabilitation efforts. Long-term beneficial impacts to Park management and operations would result from improvements made to the road surface as the deteriorated conditions would be addressed, and fewer maintenance activities would be required, saving both staff time and Park budget. Further benefits could be realized as improvements made along the roadway and to the road surface would enable more efficient (faster) travel throughout the Park for staff, decreasing the need for NPS vehicle maintenance.

Cumulative Impacts

Past, present, and future actions that could affect surrounding communities are the same as described under alternative A, resulting in short-term minor to moderate adverse and long-term beneficial impacts. These short-term negligible to minor adverse impacts and beneficial impacts, combined with the short-term

negligible to minor adverse impacts and beneficial impacts of alternative A, would result in long-term negligible to minor adverse cumulative impacts.

Conclusion

Impacts to Park management and operations within the Park, resulting from the various activities proposed under alternative B, would result in short-term negligible to minor adverse impacts from the staff time required to plan and implement the roadway improvements. Once improvements are completed, long-term beneficial impacts would occur as staff time required for the continued roadway maintenance would decrease and other staff time savings would be realized. Cumulative impacts would be long-term negligible to minor and adverse.

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COORDINATION AND CONSULTATION

The intent of the NEPA is to encourage the participation of federal- and state-involved agencies and affected citizens in the assessment procedure, as appropriate. This section describes the consultation that occurred during development of this EA, including consultation with scientific experts and other agencies. This chapter also includes a description of the public involvement process and a list of the recipients of the document.

AGENCY CONSULTATION

In accordance with Section 5.5 of Director's Order 12, coordination and public involvement in the planning and preliminary design of the proposed action was initiated early in the process. As required by NPS policies and planning documents, it is the Park's objective to work with state, federal, and local governments and private organizations to ensure that the Park and its programs are coordinated with theirs, are supportive of their objectives, and that their programs are similarly supportive of Park programs. The following agencies were consulted when preparing this EA:

- Tennessee Department of Environment and Conservation
- Tennessee Wildlife Resources Agency
- Tennessee Division of Archaeology (SHPO)
- Tennessee Department of Transportation
- Eastern Band of Cherokee Indians
- USFWS
- Tennessee Valley Authority
- U.S. Army Corps of Engineers
- Blue Ridge Parkway

On April 13, 2009, the NPS-DSC received correspondence from Jeffrey Slater from the FHWA-EFLHD regarding meetings between these two agencies. Mr. Slater concurred with Mike Tomkosky of the NPS-DSC with how the two agencies proposed to proceed with the guardwall and guardrail rehabilitations along Newfound Gap Road, MM 0.0 to MM 14.5. Mr. Slater stated that representatives of the Park are welcome to participate as informational resources at a subsequent meeting between the FHWA-EFLHD and their consultant, Kimley-Horn.

On January 2, 2008, the Park received correspondence from the Tennessee SHPO regarding the proposed rehabilitation of Newfound Gap Road, specifically related to Section 106 of the NHPA. The SHPO indicated through this correspondence that the proposed project may affect properties eligible for listing on the NRHP. Based on this initial finding, the Park continued corresponding with the SHPO on this issue (see Appendix A, January 2009 correspondence). On October 20, 2009, the NPS submitted additional information to the SHPO regarding the proposed roadway rehabilitation. In this correspondence, the NPS states that, due to the finding of "*may affect properties that are eligible for listing on the National Register of Historic Places,*" the Park and FHWA-EFLHD spent considerable time reevaluating project issues, the resources associated with the roadway, and the potential solutions to the issues faced. Based on information provided in this correspondence, the Park recommended that the SHPO consider a finding of "*no adverse effect*" for this project. On November 4, 2009, the Tennessee SHPO responded to the NPS with correspondence stating that, "the project as currently proposed will not adversely affect any property that is eligible for listing on the National Register of Historic Places."

Consultation was also conducted with the USFWS, under Section 7 of the ESA. On January 25, 2008, the Park received correspondence from the USFWS regarding the proposed rehabilitation of Newfound Gap Road and other associated rehabilitation activities. The USFWS stated that the proposed project area is less than three miles from sites known to be occupied by federally endangered species: the Carolina northern flying squirrel, spreading avens, and the spruce-fir moss spider. This EA evaluates potential impacts to these species from the proposed action and will be used to continue informal consultation with the USFWS pursuant to Section 7 of the ESA. Early correspondence with the USFWS indicated that they do not anticipate impacts to aquatic resources, wetlands, or migratory birds to occur as a result of the proposed project (see Appendix A).

LIST OF RECIPIENTS OF THE ENVIRONMENTAL ASSESSMENT

This EA will be sent to the following agencies, organizations, and businesses, as well as to other entities and individuals who requested a copy.

Federal Departments and Agencies

- U.S. Department of Transportation (USDOT), FHWA-EFLHD
- USDOT, FHWA, North Carolina Division
- USDO, NPS, Great Smoky Mountain National Park Unit
- USDO, NPS, Blue Ridge Parkway
- U.S. Army Corps of Engineers
- USFWS
- United States Senate
 - Senator Kay Hagan, North Carolina
 - Senator Richard Burr, North Carolina
 - Senator Lamar Alexander, Tennessee
 - Senator Bob Corker, Tennessee
- United States House of Representatives
 - Representative Heath Shuler, District 11, North Carolina
 - Representative Phil Roe, District 1, Tennessee
 - Representative John Duncan, District 2, Tennessee

State, County, and Local Agencies

- Eastern Band of Cherokee Indians
- Honorable Bruce Medford, Mayor of Waynesville
- Honorable Henry Foy, Mayor of Waynesville
- Honorable Jerry Hayes, Mayor of Gatlinburg
- Honorable Beverly Perdue, Governor of North Carolina
- Honorable Ralph Wallace, Mayor of Maggie Valley
- Mr. Glenn Jones, Chairman, Swain County Commission

- Mr. Jack Horton, Haywood County Manager
- Mr. Kevin King, County Manager, Swain County
- Mr. Larry Callicutt, City Manager, Town of Bryson City
- Mr. Larry Walters, Sevier County, Sevierville, Tennessee
- Mr. Lee Galloway, City Manager, Town of Waynesville
- Mr. Scott Buffkin, City Manager, Town of Maggie Valley
- Ms. Cindy Cameron Ogle, City Manager, Gatlinburg, Tennessee
- NCDCCR, SHPO
- North Carolina Department of Environmental and Natural Resources
- North Carolina Wildlife Resource Commission
- Tennessee Valley Authority
- Cherokee Tribal Travel and Promotion
- Cocke County Chamber of Commerce
- Gatlinburg Chamber of Commerce
- Gatlinburg Department of Tourism
- Haywood County Chamber of Commerce
- Maggie Valley Chamber of Commerce
- North Carolina Park Parkway and Development Council
- Pigeon Forge Department of Tourism
- Smoky Mountain Convention & Visitor's Bureau
- Swain County Chamber of Commerce
- Ms. Earlene Teaster, City Manager, Pigeon Forge, Tennessee
- Mr. Steve Hicks, city Manager, Sevierville, Tennessee
-

Organizations and Businesses

- A Walk in the Woods
- Audubon Society
- Blue Ridge Trail Riders
- Carolina Mountain Club
- Cherokee Forest Voices
- Citizens for the Economic Future of Swain County
- Foothills of Land Conservancy
- Foundation for Global Sustainability

- Friends of the Smokies
- Gatlinburg Gateway Foundation
- Great Smoky Mountains Conservation Association
- Ijams Nature Center
- Izaak Walton League
- League of Women Voters
- National Parks Conservation Association
- Sierra Club
- Smoky Mountains Hiking Club
- Southern Alliance for Clean Energy
- Southern Appalachian Biodiversity Project
- Southern Appalachian Forest Coalition
- Southern Environmental Law Center
- Southwings
- Tennessee Citizens for Wilderness Planning
- Tennessee Clean Water Network
- Tennessee Eastman Hiking and Canoeing Club
- Tennessee Environmental Council
- Tennessee Park Commission
- The Wilderness Society
- Trout Unlimited
- Western North Carolina Alliance
- WildLaw
- World Wildlife Fund

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REFERENCES

Birnbaum, Charles A. and Peters, Capella

- 1996 The Secretary of the Interior's Standards for Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes. U.S. Department of the Interior, National Park Service, Washington, D.C.

Bureau of Economic Analysis (BEA)

- 2009 Table CA04. Employment Summary. Accessed November 11, 2009. Accessed online: <http://www.bea.gov/regional/reis/default.cfm?selTable=CA04>.

Columbia Encyclopedia

- 2003 6th Edition, Accessed online on June 26, 2009. Available:
<http://www.encyclopedia.com/topic/Knoxville.aspx> ;
<http://www.encyclopedia.com/topic/Asheville.aspx>

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe

- 1979 Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service Pub. FWS/OBS79/31, Washington, D.C., 103 pp.

Madden, M., R. Welch, T. Jordan, P. Jackson, R. Seavey, and J. Seavey

- 2004 Digital Vegetation Maps for the Great Smoky Mountains National Park. Center for Remote Sensing and Mapping Science, Department of Geography, The University of Georgia. July 2004.

National Cooperative Highway Research Program (NCHRP)

- 1993 Report 350: Recommended Procedures for the Safety Performance Evaluation of Highway Features. National Academy Press, Washington, D.C. 1993.

National Park Service (NPS)

- 1916 National Park Service Organic Act.
- 1975 National Register of Historic Places Inventory-Nomination Form. Cole, Alex—Cabin. <http://pdfhost.focus.nps.gov/docs/NRHP/Text/76000165.pdf>. Accessed October 5, 2009.
- 1998 Director's Order 28, Cultural Resources Management Guidelines.
- 1999 Director's Order 50B, Occupational Safety and Health Program.
- 2000 Director's Order 47, Sound Preservation and Noise Management.
- 2001 Director's Order 12, Conservation Planning, Environmental Impact Analysis, and Decision-making and Handbook. Washington, D.C.
- 2004 Great Smoky Mountains National Park Traffic Package. 2004 Traffic Data Report.
- 2005 Preliminary Planning Effort, Great Smoky Mountains National Park. March 2005.

- 2006 Management Policies 2006. U.S. Department of the Interior, National Park Service. Washington, DC. August 31, 2006.
- 2008 National Park Service Procedural Manual #77-1: Wetland Protection.
- 2009a Cultural Landscape Assessment Newfound Gap Road, Milepost 0.0 to Milepost 14.5, Great Smoky Mountains National Park Sevier County, Tennessee. Prepared by the Louis Berger Group, Inc. Washington, D.C.
- 2009b Great Smoky Mountains National Park Official Website. Found at: <http://www.nps.gov/grsm/> Accessed on June 19, 2009.
- 2009c Public Use Statistics Database. Found at: <http://www.nature.nps.gov/stats/park.cfm> Accessed on June 17, 2009.
- 2009d Personal communication via telephone between Jeff Gutierrez (The Louis Berger Group, Inc.) and Mike Tomkosky (NPS-DSC) regarding cumulative impact projects within the park. September 30, 2009.
- 2009 e Personal communication through email between Megan Blue-Sky (The Louis Berger Group, Inc.) and Erik Kreuzsch (NPS). Sent October 5, 2009.
- 2009f Climate Friendly Parks.
<http://www.nps.gov/climatefriendlyparks/resource/science/impacts.html>. Last updated on November 5, 2009. Accessed on March 2, 2010.

NatureServe

- 2009 NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available at: <http://www.natureserve.org/explorer>. Accessed September 28, 2009.

North Carolina Division of Water Quality (NCDWQ)

- 1997 Little Tennessee River Basinwide Water Quality Management Plan. North Carolina Department of Environment, Health, and Natural Resources. Raleigh, NC.

North Carolina Natural Heritage Program

- 2009 <http://www.ncnhp.org/>. Last accessed September 23, 2009.

Page, Robert, Cathy A. Gilbert and Susan A. Dolan

- 1998 *Guide to Cultural Landscape Reports: Contents, Process, and Techniques*. Cultural Resources Stewardship and Partnerships, Park Historic Structures and Cultural Landscapes Program. U.S. Department of the Interior, National Park Service, Washington, D.C.

Stynes, Daniel J.

- 2008 National Park Visitor Spending and Payroll Impacts, 2007. National Park Service, Social Science Program and Michigan State University, Department of Community, Agriculture, Recreation and Resource Studies, September.

Transportation Research Board

- 2000 Highway Capacity Manual. Accessed on August 27, 2009. Located at:
http://144.171.11.107/Main/Public/Blurbs/Highway_Capacity_Manual_2000_152169.aspx

University of Idaho

- 2009 Great Smoky Mountains National Park Visitor Study – Summer 2008. Park Studies Unit, Visitor Services Project. Report 205.

U.S. Census Bureau

- 2000a Detailed Tables, Census 2000 Summary File 1 (SF 1), P1, P3, P4, P13, P15, P17, P19, P31, P33, H1, H3 for the United States, for the Sevier County, Swain County, and the United States. Accessed online, June 24, 2009. Available:
http://factfinder.census.gov/home/saff/main.html?_lang=en&_ts=
- 2000b Detailed Tables, Census 2000 Summary File 3 (SF 3), P6, P7, P37, P53, P87, H1 for Sevier County, Swain County, and the United States. Accessed online, May 26, 2009. Available:
http://factfinder.census.gov/home/saff/main.html?_lang=en&_ts=
- 2000c State and county Quickfacts, Accessed online, June 10, 2009.
<http://quickfacts.census.gov/qfd/states/15/15003.html>.
- 2007a 2007 American Community Survey 1-year Estimates. Sevier County, Tennessee. Accessed online. June 24, 2009. Available: http://factfinder.census.gov/servlet/ADPTable?_bm=y&-context=adp&-ds_name=ACS_2007_1YR_G00_&-tree_id=307&-redoLog=true&-_caller=geoselect&-geo_id=05000US47155&-format=&-_lang=en
- 2007b 2007 American Community Survey 1-year Estimates. Knoxville, TN Metropolitan Statistical Area. Accessed online. June 24, 2009. Available:
http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=31000US28940&-context=adp&-ds_name=ACS_2007_1YR_G00_&-tree_id=307&-_lang=en&-_caller=geoselect&-format=
- 2007c 2007 American Community Survey 1-year Estimates. Asheville, NC Metropolitan Statistical Area. Accessed online. June 24, 2009. Available:
http://factfinder.census.gov/servlet/ADPTable?_bm=y&-context=adp&-qr_name=ACS_2007_1YR_G00_DP2&-ds_name=ACS_2007_1YR_G00_&-tree_id=307&-redoLog=false&-_caller=geoselect&-geo_id=31000US11700&-format=&-_lang=en
- 2007d 2007 American Community Survey 1-year Estimates. Tennessee. Accessed online. June 24, 2009. Available: http://factfinder.census.gov/servlet/ADPTable?_bm=y&-context=adp&-qr_name=ACS_2007_1YR_G00_DP2&-ds_name=ACS_2007_1YR_G00_&-tree_id=307&-redoLog=false&-_caller=geoselect&-geo_id=04000US47&-format=&-_lang=en
- 2007e 2007 American Community Survey 1-year Estimates. North Carolina. Accessed online. June 24, 2009. Available: http://factfinder.census.gov/servlet/ADPTable?_bm=y&-context=adp&-qr_name=ACS_2007_1YR_G00_DP2&-ds_name=ACS_2007_1YR_G00_&-tree_id=307&-redoLog=false&-_caller=geoselect&-geo_id=04000US37&-format=&-_lang=en

2007f 2007 American Community Survey 1-year Estimates. United States. Accessed online, June 24, 2009. Available:
http://factfinder.census.gov/servlet/DatasetMainPageServlet?_lang=en&_ts=261937186680&_ds_name=ACS_2007_1YR_G00_&_program=

2007g Annual Estimates of the Resident Population for City of Gatlinburg, Swain County, City of Knoxville, Anderson County, Blount County, Knox County, Loudon County, Union County, City of Asheville, Buncombe County, and Haywood County: July 1, 2007. Accessed online, June 24, 2009. Available:
http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=PEP.

U.S. Council of Environmental Quality (CEQ)

nd NEPA's 40 Most Asked Questions. Accessed on August 28, 2009. Located at:
<http://www.nepa.gov/nepa/regs/40/40p3.htm>

U.S. Department of the Interior (DOI)

2008 43 CFR 46. Implementation of the National Environmental Policy Act (NEPA) of 1969; Final Rule.

U.S. Environmental Protection Agency (EPA)

2009a Green Book "The Green Book Nonattainment Areas for Criteria Pollutants." Sevier County. November 17, 2009.

2009b National Ambient Air Quality Standards. <http://www.epa.gov/ttn/naaqs/>

2009c AirData "Reports: Monitoring data for Sevier County." January 10, 2009.

U.S. Federal Highway Administration

2000 *Rehabilitation of Tunnels Through Morton Mountain and Chimney Tops Mountain on Newfound Gap Road*. Prepared by Federal Highway Administration Eastern Federal Lands Highway Division for National Park Service.

U.S. Fish and Wildlife Service (USFWS)

2008 Great Smoky Mountain Public Meeting Summary

2009a Endangered Species: Indiana Bat (*Myotis sodalis*). U.S. Fish and Wildlife Service. <http://www.fws.gov/midwest/Endangered/mammals/inba/index.html>. Last accessed September 28, 2009. Last updated July, 29, 2009.

2009b U.S. Fish and Wildlife Service Endangered Species Program. <http://www.fws.gov/endangered/wildlife.html>. Last accessed September 23, 2009.

APPENDIX A
AGENCY CONSULTATION LETTERS

H 30

October 20, 2009

Dr. Joe Garrison, Historic Preservation Specialist
Review and Compliance, Section 106
Tennessee Historical Commission
Department of Environment and Conservation
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. Garrison:

In compliance with Section 106 of the National Historic Preservation Act of 1966 and its implementing regulations, we are enclosing documentation concerning the rehabilitation of the 14.5 mile section of Newfound Gap Road in Sevier County, Great Smoky Mountains National Park (Park, GRSM). This project has been assigned the Planning, Environment and Public Comment (PEPC) number of 20471.

This project was brought to the attention of your office in December 2007. As a result of that communication, your office indicated (January 2008) that this project *may affect properties that are eligible for listing on the National Register of Historic Places*. Since that time, the Park and representatives of Eastern Federal Lands Highway Division (EFLHD) have spent considerable time re-evaluating project issues, the resources associated with the roadway, and potential solutions to the issues faced. The purpose of this letter is to discuss the preferred alternative that has been developed as a result of this work.

Section 106 review and National Environmental Policy Act review of this project have *not* been managed as a consolidated review process as allowed under 36 CFR 800.8 c. While they are being managed as separate review processes, the Park believes that it is appropriate to utilize public comment relative to historic resources received as a part of the Environmental Assessment (EA) process review as also public comment for Section 106 review. Public meetings were held in January 2008, and as a result of that meeting no comments or issues relative to historic properties were raised by the general public. No additional public outreach specific to Section 106 review is anticipated for this project. Project alternatives including the preferred alternative will also be fully discussed in the EA document, which will be available for public review and comment later this year.

One report of particular interest to your office is enclosed for your information. A *Cultural Landscape Assessment of Newfound Gap Road in Sevier County, Tennessee* was completed in February 2009. It includes a list of landscape features (Appendix A) along this 14.5 mile

segment of Newfound Gap Road and an assessment of whether or not these should be considered to be contributing. These features are also located on maps found in Appendix B.

Project Need and Description

Rehabilitation of this 14.5-mile section of Newfound Gap Road is needed to improve the condition of the road and improve roadway safety. These improvements are needed to address:

- Deterioration of the road, such as signs of wear along the road edges and traveling surface, and deterioration of mortar joints and loose or missing stones in some guardwalls.
- Safety concerns, such as pavement edge drop-offs, poor drainage, delaminating asphalt and guardwall heights in certain locations.
- Circulation and parking problems, resulting in traffic back-ups along Newfound Gap Road and informal parking at high use areas.
- The increasing cost of routine maintenance and intermittent repairs due to the continuing deterioration of the road and guardwalls.

The proposed road rehabilitation would bring Newfound Gap Road into good condition for its intended use, preserve the historic character of the road, enhance visitor enjoyment of the Park, and improve public safety.

Work elements of the proposed rehabilitation includes milling and/overlaying Newfound Gap Road and roadside pullouts and parking areas using full depth pavement reconstruction in deteriorated and/or settled areas; placing asphalt leveling and binder courses as required; removing and resetting existing stone curb; replacement or repair of existing drainage structures; replacement of steel backed timber guardrail (SBTG); placement of additional SBTG at select locations; creating road shoulders where none currently exist (one location); stabilizing and reestablishing roadside turf ditches; overlaying and/or reconstructing asphalt and stone paved ditches; stabilizing shoulders and reseeded; installing pavement markings; and placing roadway signage.

Many of these stone masonry guardwalls were constructed in the 1930s and 1940s and are currently in fair to poor condition. Mortar joints have deteriorated and stones occasionally fall off the walls or are jarred loose by crashes or vandalism. As a result of these conditions, the reconstruction of stone masonry guardwalls along Newfound Gap Road was evaluated. At the start of project development, it was anticipated that approximately 7,500 feet of these walls could require reconstruction. The preferred alternative developed would impact approximately 1,600 feet of guardwall built in the 1930s and 1940s and another 100 feet of more recently constructed guardwall. Other sections of guardwall are to be repaired. In addition, any wall being reconstructed with a concrete core will be constructed as a 22 inch high wall as opposed to the 27 inch high wall previously considered by EPLHD as appropriate for crash-worthiness. This 22 inch height is consistent with 1935 General Construction notes for the construction of walls in GRSM. At 24 inches wide, the concrete core walls with the stone veneer will be slightly thicker than the 1935 walls (21 inches wide).

Also, originally considered but being dropped from consideration under the preferred alternative is the addition of turn lanes at Chimneys Picnic Area and Alum Cave Bluffs Trailhead and providing additional parking areas at Alum Cave Bluffs and Chimney Tops Trailheads.

Discussion

A review of Appendix A in *Cultural Landscape Assessment of Newfound Gap Road* indicates that there are many structures along this segment of Newfound Gap Road that are considered to contribute to this potentially eligible cultural landscape. These structures include bridges, guardwalls, retaining walls, culvert headwalls, and pull-outs. However, the vast majority of the work proposed under the preferred alternative is consistent with Streamlined Review Process #3 – Repair/Resurfacing/Removal of Existing Roads, Trails and Parking Areas. Project actions under the preferred alternative that might be considered to fall outside of this Streamlined Review are discussed below.

As part of initial project scoping, limited archeological testing was done in areas where parking or road alignment changes were anticipated. No archeological resources (field notes on file in park archeologist office) were discovered as a result of that testing; however, those project elements have since been eliminated from the preferred alternative. With the preferred alternative project work confined to the existing road prism, it is anticipated that no additional archeological testing is needed. However, there is a potential that previously unidentified archeological sites, components, and/or human remains will be identified during construction activities. In the event that construction activities inadvertently discover a previously unidentified archeological site, component, and/or human remains all construction work will cease in the immediate area. Any willful destruction of the archeological site, component, and/or human remains can result in the prosecution of individuals under the Archeological Resource Protection Act of 1979 (ARPA), and other statutes that protect the Park's cultural resources.

Several sections of guardwall are slated for rehabilitation or reconstruction using a concrete core wall under the preferred alternative. These were selected for this treatment to address noteworthy structural or safety issues. Concrete core walls will be covered with a stone veneer and unless noted below will be 22 inches in height. Existing stone will be reused to the extent possible both in repairs and in reconstruction. However, because of the waste inherent in cutting the existing stone into veneer, it is anticipated that the existing stone supply will not be sufficient and new stone will also have to be used. This new stone will be selected to be as consistent as possible with the remaining, existing stone. For those guardwalls being repaired, that repair includes repointing, grouting voids and resetting loose capstones with the replacement of missing capstones.

There are approximately 150 culverts found along this segment of Newfound Gap Road in varying condition and most of these are considered to be contributing features. Some are in good condition and will receive little to no attention as a part of project. Most will require cleaning and others a slip lining or other relatively minor repair. A very few will require major repair or reconstruction due to settlement or displacement of the pipe sections. Repairs to culvert headwalls will reset and reuse existing stone to retain the original character. Replacement stone, if necessary, would be selected to be as consistent as possible with the remaining, existing stone.

Mulepost (MP) 3.9 - One culvert headwall of particular interest is found at MP 3.9 and north of a popular pull-out area. This headwall is larger than typical and because of its proximity to the road is very visible to drivers. This wall is collapsing and will be reconstructed reusing existing stone.

MP 7.0 – The guardwall found at this location is *not* considered to be a contributing structure (see *Cultural Landscape Assessment*, Appendix A). As a result of the road bed subsiding, it has failed and under this project it would be replaced with a concrete core wall covered with a stone

masonry veneer. The height of this reconstructed wall would match adjacent wall heights. Also at this location, STBG would be added between two parking areas.

MP 11.80 – At this location, the project proposal includes extending an existing, contributing wall southward approximately 50 feet. The extension would be constructed using a concrete core wall with a stone masonry veneer. This extension would address two safety issues found at this location. Extension would address a fall hazard presented by an adjacent culvert crossing, extending the wall beyond a culvert headwall located within three feet of the road would eliminate a blunt end obstruction hazard.

MP 13.10 – The southern most bridge over Walker Prong presents a blunt end hazard to northbound traffic that is of particular concern to EPLHD. Various options were discussed with the preferred approach being the addition of approximately 300 feet of SBTG. This would extend southward along the northbound lane, from the end of the current stone work of the bridge. The SBTG would not actually attach to the stonework and precautions would be taken during construction of the SBTG to prevent damage to the bridge stonework.

MP 13.44 – Short sections of guardwall between sections of retaining wall have settled and it was determined that those sections of guardwall (approximately 70 feet and 40 feet of 2,200 feet of guard and retaining wall) should be removed and the stone reset to match the remaining sections of wall (no concrete core).

MP 13.65 – This point of the road is a sharp curve and is noted for a number of safety issues. Under icy conditions the super-elevation of the roadway causes vehicles, including snowplows, to slide down slope. In addition, particularly long vehicles, such as campers towing additional vehicles, must swing into the opposing traffic lane to round this curve or strike the wall. After years of being struck, the upper courses of stone from the stone guardwall at this location had become dislodged and were lost down slope. To address the immediate safety issue, w-beam guardrail was added as an interim solution. The guardrail continues to exhibit signs of being struck.

The preferred solution to these safety issues is to add a retaining wall/system outside the current location of the w-beam guardrail. While the paved roadway footprint would not change, a road shoulder would be created where none currently exists. A concrete core wall with stone veneer would replace the w-beam guardrail.

MP 13.69 – An existing stone guardwall (250 feet in length) immediately to the south of the w-beam guardrail is also failing and under the preferred alternative this wall would be reconstructed using a concrete core wall with stone veneer. Approximately 500 feet of guardwall between this point and MP 13.77 will be repaired and not reconstructed.

MP 13.77 – In 2001, the Morton Mountain Tunnel was rehabilitated and at that time the guardwall leading up to the tunnel façade was rehabilitated ending at MP 13.77. At that time, the only approved crashworthy wall was 27 inches high and guardwalls were being rehabilitated using these 27 inch high walls. It was anticipated that rehabilitation of this guardwall would be continued in the future using these same design standards. As a result the transition from 2001 concrete core guardwall to the 1935 guardwall is extremely abrupt. Under the preferred alternative, 25 feet of additional 1935 guardwall would be reconstructed to improve the transition but this section will not include a concrete core wall.

MP 14.20 – This area is considered by FFIHD to be a fall hazard area and as a solution approximately 135 feet of SBTG wall would be added to this section of roadway.

MP 14.36 – This section of historic guardwall has settled and this section of roadway is known as the site of numerous motor vehicle crashes including those where the vehicle has gone over the wall. Under the preferred alternative, approximately 1,100 feet of guardwall would be reconstructed using a concrete core wall. Approximately 300 feet at the north end and 400 feet at the south end of stone guardwall will not be reconstructed.

MP 14.78 At this point there is an existing SBTG transitioning to an existing stone guardwall which is missing several stones. Under the preferred alternative, the stone guardwall would be repaired and a drainage and erosion issue at the north end of the wall addressed. Stones from the wall that have fallen down slope will be retrieved for use in repairing the wall and if any additional stone is needed it will be selected to blend with the existing stone. The SBTG would be slightly shorter in length because of the wall repair and the end of the SBTG would be altered to improve its crashworthiness. The SBTG also would not be attached to the stonework and precautions would be taken during construction of the SBTG to prevent damage to the stone guardwall.

Photographs of each of the sites discussed above are included along with a project location map and a copy of the *Cultural Landscape Assessment of Newfound Gap Road* (Sevier County). In addition 70% draft specification plans for the section of Newfound Gap Road from MP 12.4 to MP 14.5 are included with the sections of the guardwall reconstruction highlighted. Specification plans for MP 0.0 to 12.4 have not been drafted.

Conclusion

To summarize, GRSM believes that the preferred alternative has carefully weighed safety considerations and the importance of the many historic features associated with Newfound Gap Road. A comparatively small fraction the stone guardwall along Newfound Gap Road will be reconstructed as a result of this project and this work is being done in a manner (22 inch high walls, reuse of stone) that is sensitive to the overall road resource. The condition of other contributing features including sections of guardwall will be improved through their repair. In addition, the Park also believes that the enclosed *Cultural Landscape Assessment of Newfound Gap Road* (Sevier County) provides good documentation of these historic features. Given these considerations, the Park is recommending that the Tennessee State Historic Preservation Office (SHPO) consider that the preferred alternative to have *no adverse affect* on the overall historic property of Newfound Gap Road.

We thank you for your interest in the programs of the National Park Service. If you have any questions, feel free to contact Dianne Flaugh, Landscape Architect, at (865) 436-1239.

Sincerely,

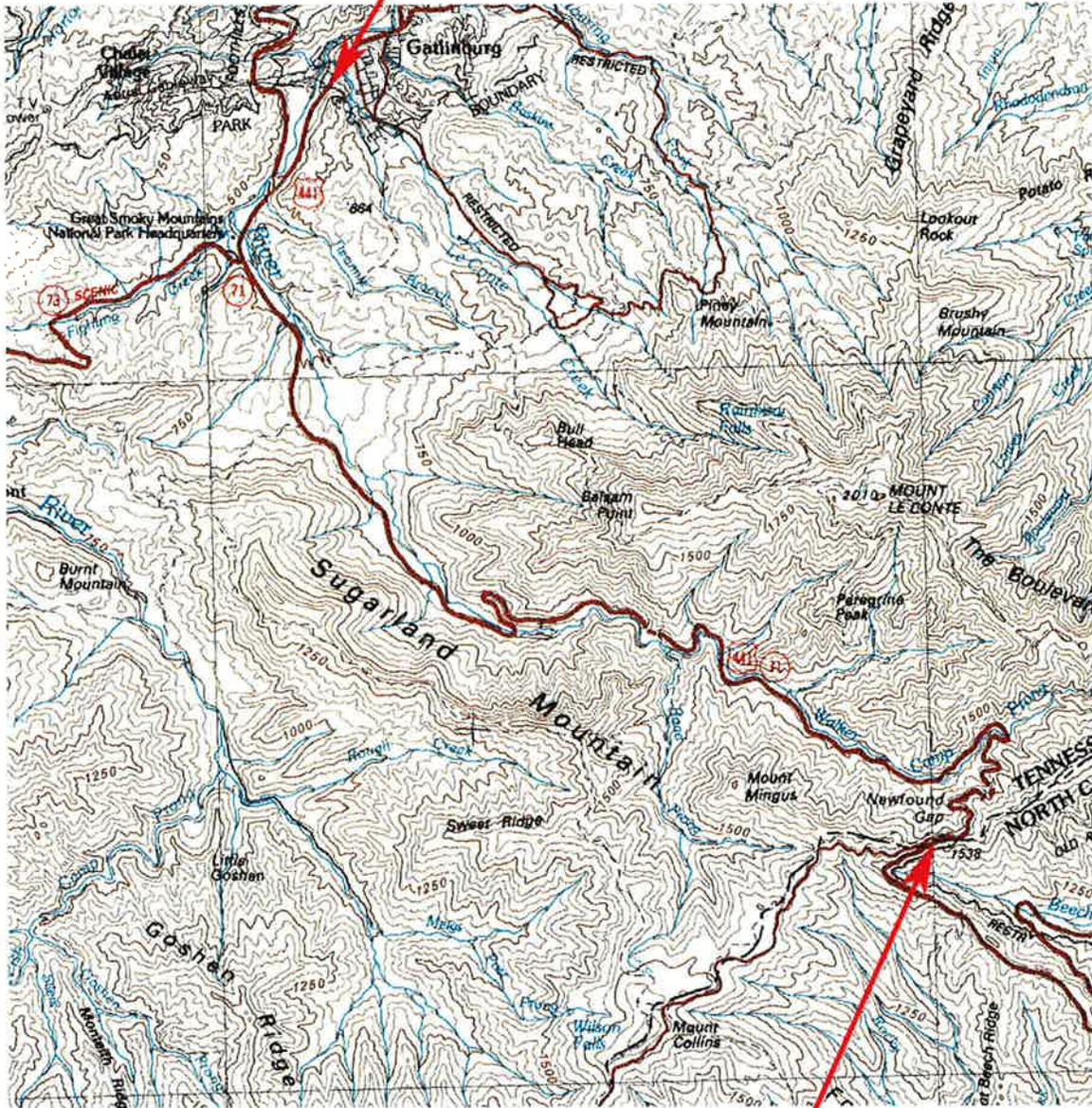
10/21/09
DATE

SIGNED: K. Fitzgerald

Dale A. Ditmanson
Superintendent

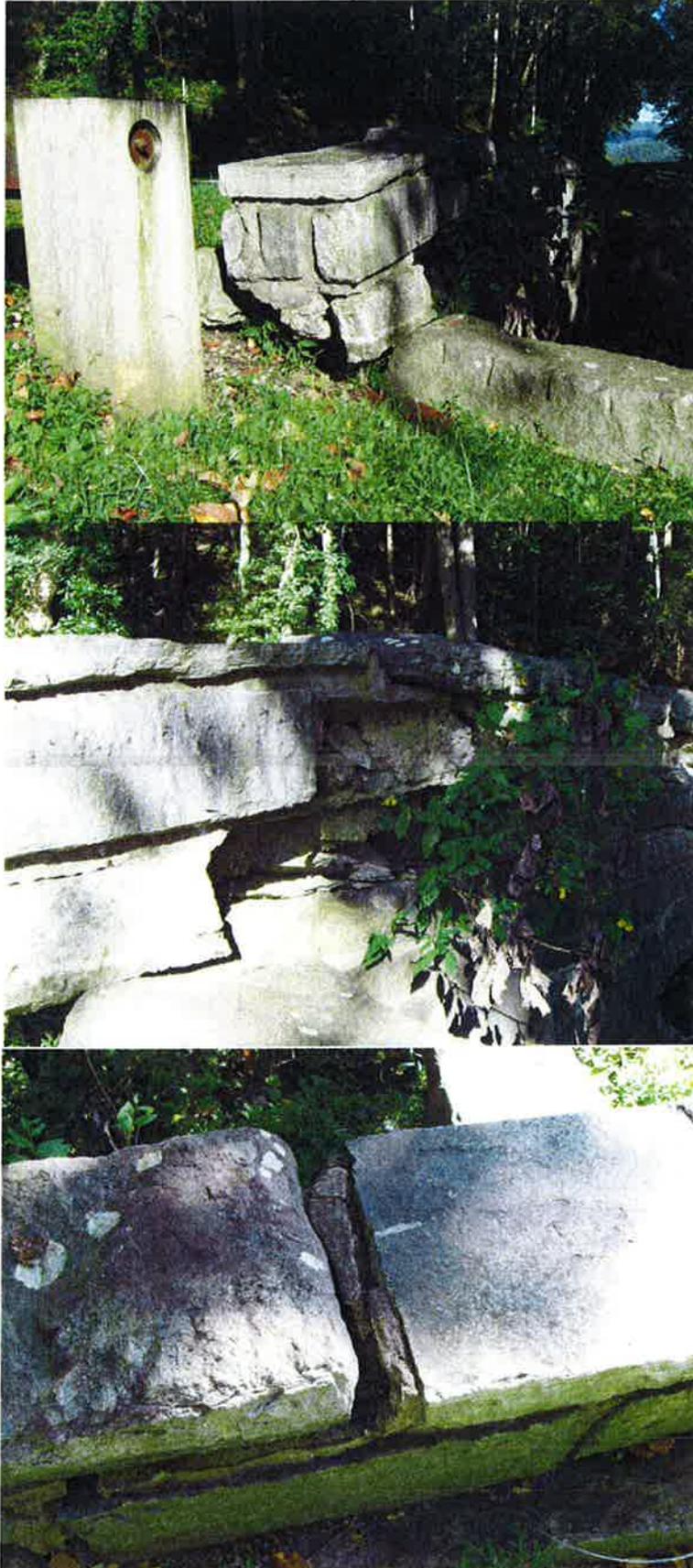
Enclosures

North end of project work (MP 0.0)



Rehabilitation of Newfound Gap Road from
Milepost 0.0 to 14.5

South end of project work (MP 14.5)



MP 3.9 Culvert Headwal
needing repair - erosion,
missing stones, cracks.



MP 7.0 Non-contributing wall requiring repair - to be reconstructed as a concrete core wall.





MP 11.80 - wall to be extended 50 feet past existing culvert headwall. Extension to be a concrete core wall.

Current end of wall

Culvert headwall



MP 13.10 Bridge Parapet



Culvert Headwall

Approximate Location of
Steel Backed Timber
Guardrail



MP 13.44 - Example of segment of wall that has settled. Two segments are to be removed and the stone reset.

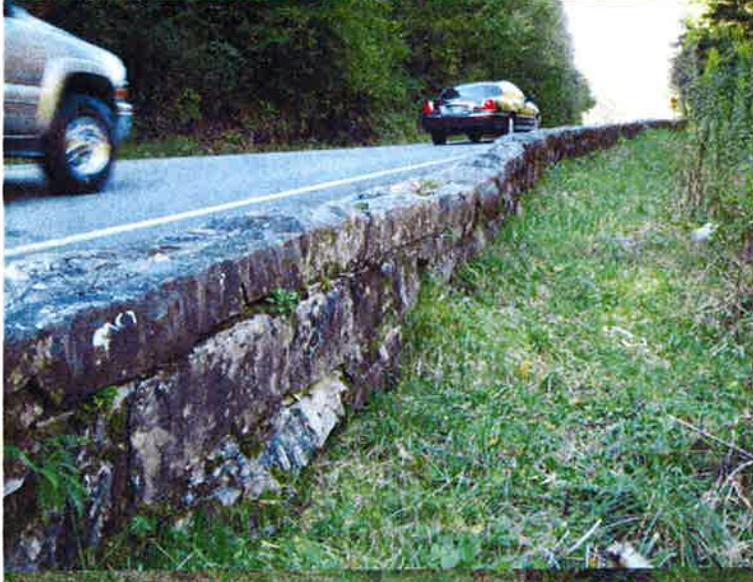




MP 13.65 - Damaged stone guardwall and interim W Beam guardrail in area where road shoulder is proposed to be extended and new concrete core wall built.



MP 13.69 - Section of guardwall to be reconstructed looking north



Looking south



Example of damage



MP 13.77 - Segment of wall to be reconstructed to improve transition





MP 14.20 - Section of road way where additional Steel Backed Timber Guardrail will be added.



Approximate location of SBTG



MP 14.36 South end of 1100 foot section of guardwall to be reconstructed, looking north.

Approximate south end of work



North end of work looking south (toward North Carolina)



Low segment of wall



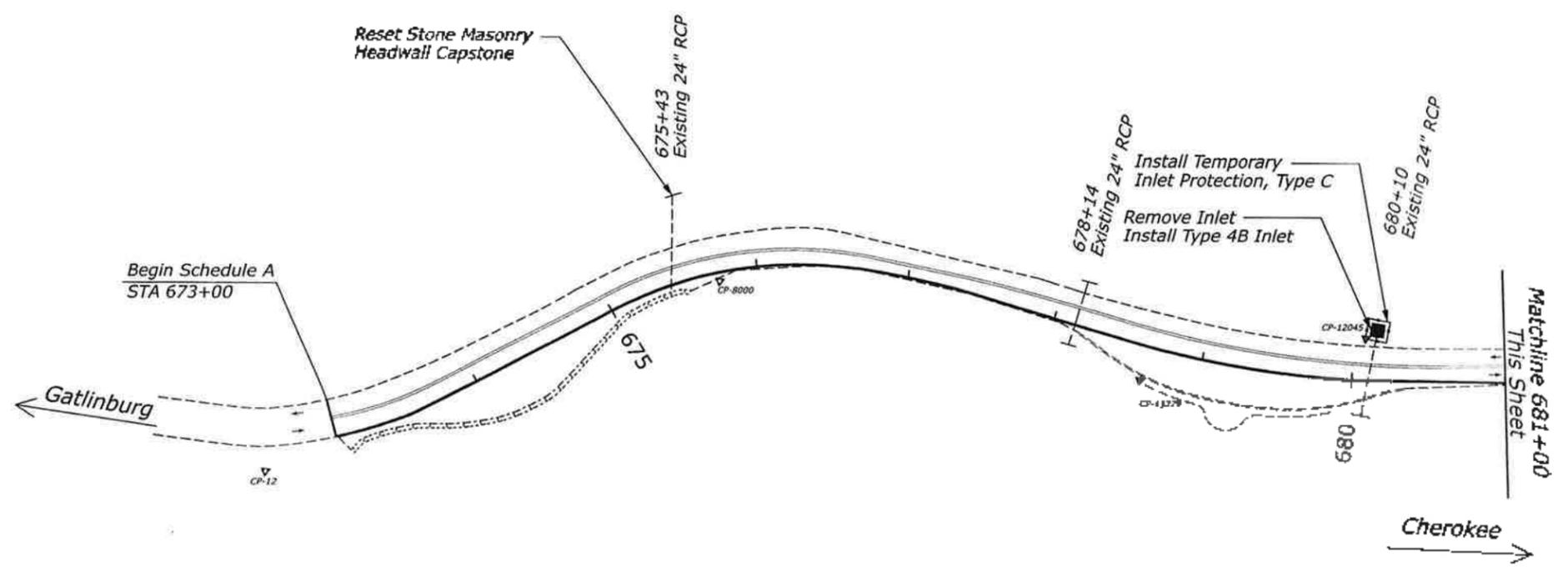
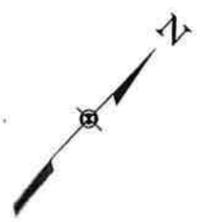
MP 14.78 Transition area between masonry wall and SBTG to be improved



Missing stone to be replaced



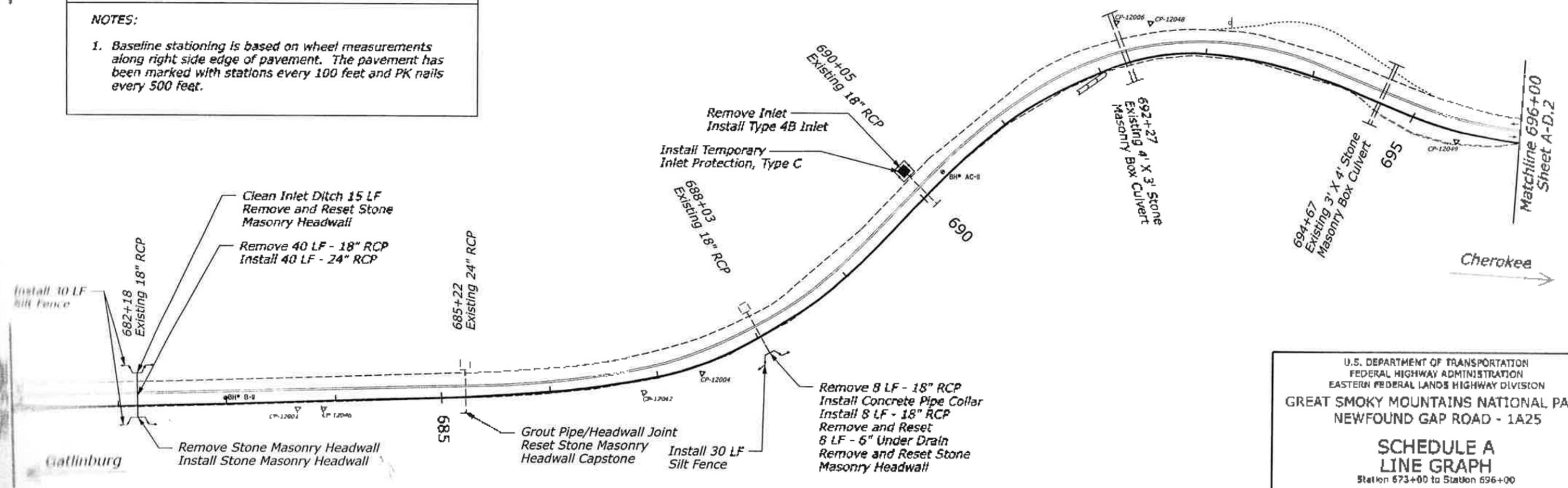
REG	STATE	PROJECT	SHEET NO.
SE	TN	PRA-GRSM 1A25	A-D.1



LEGEND

NOTES:

- Baseline stationing is based on wheel measurements along right side edge of pavement. The pavement has been marked with stations every 100 feet and PK nails every 500 feet.



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

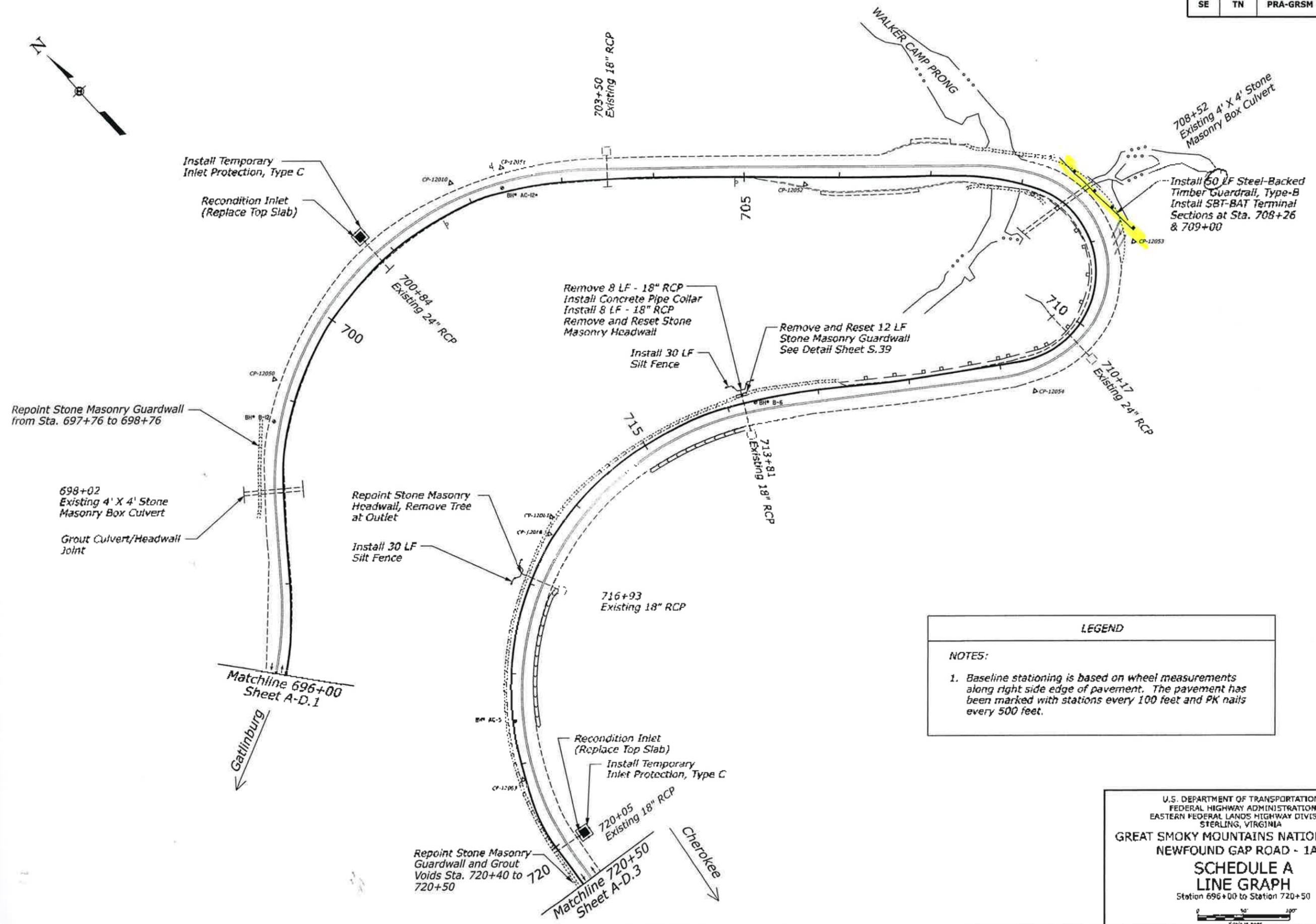
**GREAT SMOKY MOUNTAINS NATIONAL PARK
NEWFOUND GAP ROAD - 1A25**

**SCHEDULE A
LINE GRAPH**

Station 673+00 to Station 696+00

Scale in Feet
0 50 100

REG	STATE	PROJECT	SHEET NO.
SE	TN	PRA-GRSM 1A25	A-D.2



708+52
Existing 4' X 4' Stone
Masonry Box Culvert

Install 50 LF Steel-Backed
Timber Guardrail, Type-B
Install SBT-BAT Terminal
Sections at Sta. 708+26
& 709+00

Remove 8 LF - 18" RCP
Install Concrete Pipe Collar
Install 8 LF - 18" RCP
Remove and Reset Stone
Masonry Headwall

Remove and Reset 12 LF
Stone Masonry Guardwall
See Detail Sheet S.39

Install 30 LF
Silt Fence

Repoint Stone Masonry Guardwall
from Sta. 697+76 to 698+76

698+02
Existing 4' X 4' Stone
Masonry Box Culvert

Grout Culvert/Headwall
Joint

Repoint Stone Masonry
Headwall, Remove Tree
at Outlet

Install 30 LF
Silt Fence

716+93
Existing 18" RCP

Recondition Inlet
(Replace Top Slab)
Install Temporary
Inlet Protection, Type C

Repoint Stone Masonry
Guardwall and Grout
Voids Sta. 720+40 to
720+50

LEGEND

NOTES:

- Baseline stationing is based on wheel measurements along right side edge of pavement. The pavement has been marked with stations every 100 feet and PK nails every 500 feet.

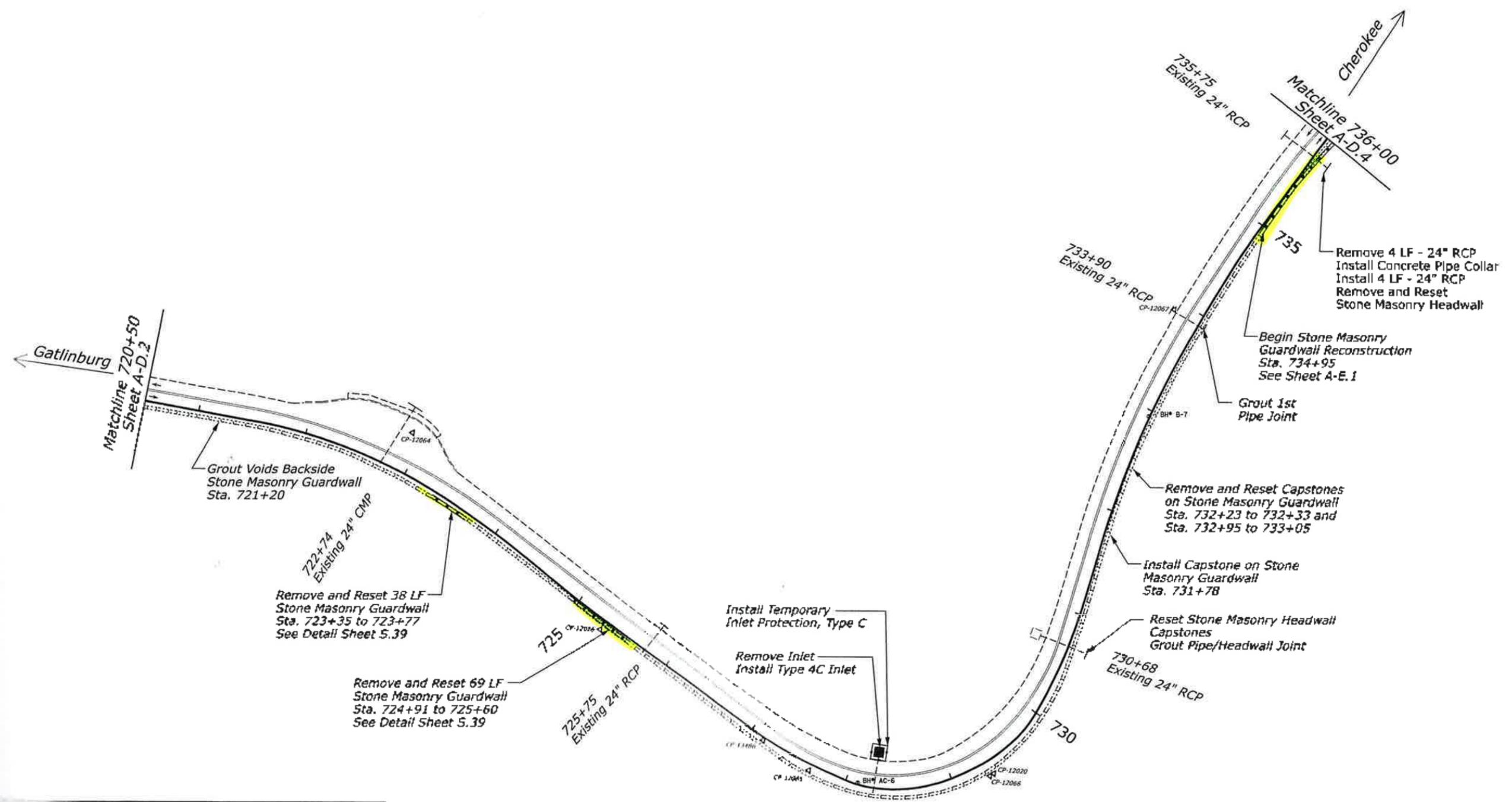
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

**GREAT SMOKY MOUNTAINS NATIONAL PARK
NEWFOUND GAP ROAD - 1A25**

**SCHEDULE A
LINE GRAPH**
Station 696+00 to Station 720+50

0 50 100
Scale in feet

REG	STATE	PROJECT	SHEET NO.
SE	TN	PRA-GRSM 1A25	A-D.3



LEGEND

NOTES:

1. Baseline stationing is based on wheel measurements along right side edge of pavement. The pavement has been marked with stations every 100 feet and PK nails every 500 feet.

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 FEDERAL HIGHWAY ADMINISTRATION
 EASTERN FEDERAL LANDS HIGHWAY DIVISION
 STERLING, VIRGINIA

**GREAT SMOKY MOUNTAINS NATIONAL PARK
 NEWFOUND GAP ROAD - 1A25**

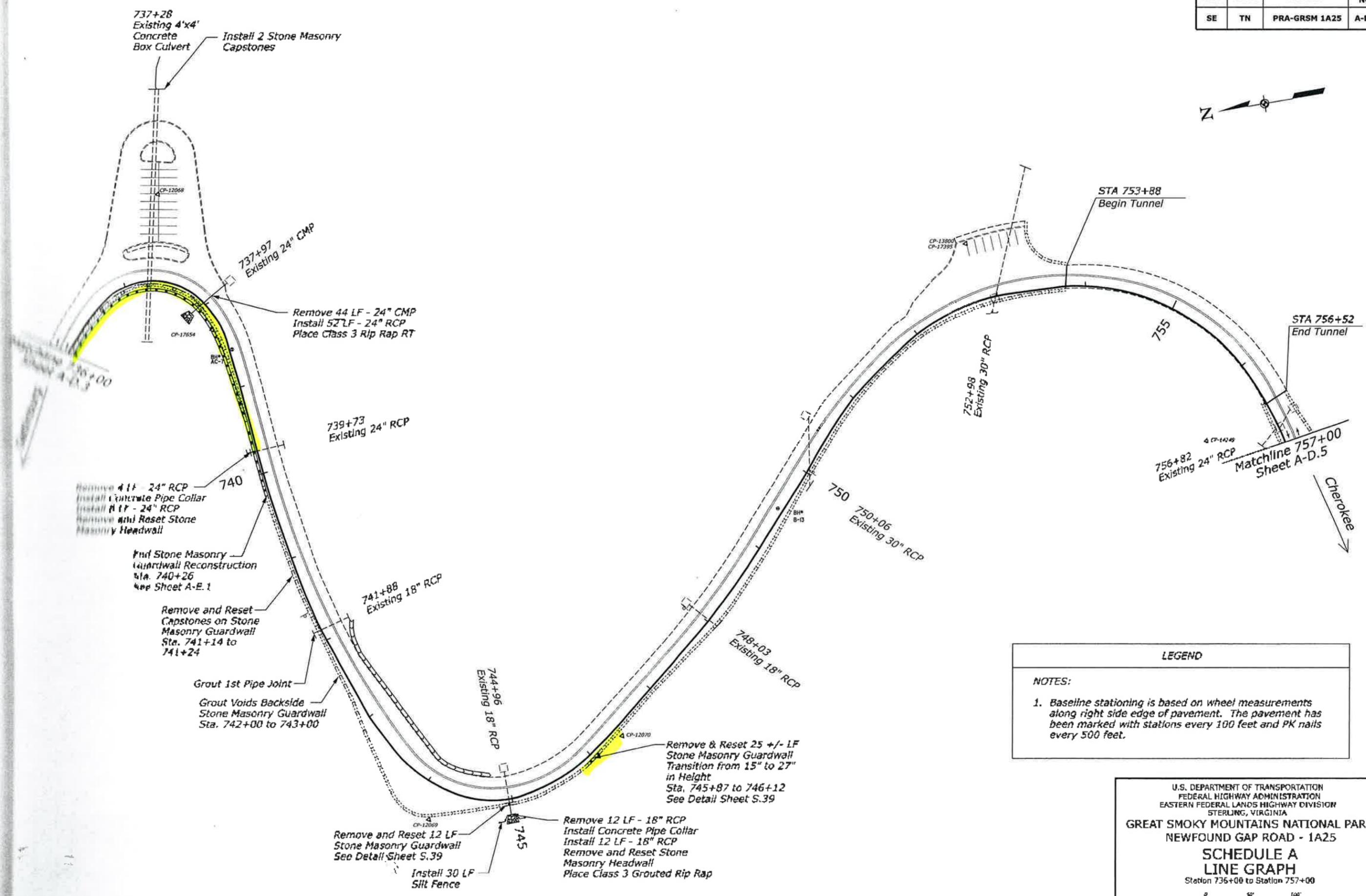
**SCHEDULE A
 LINE GRAPH**

Station 720+50 to Station 736+00

Scale in Feet

728+26
Existing 18" RCP

REG	STATE	PROJECT	SHEET NO.
SE	TN	PRA-GRSM 1A25	A-D.4



737+28
Existing 4'x4'
Concrete
Box Culvert

Install 2 Stone Masonry
Capstones

737+97
Existing 24" CMP

Remove 44 LF - 24" CMP
Install 52 LF - 24" RCP
Place Class 3 Rip Rap RT

739+73
Existing 24" RCP

740

Remove 4 LF - 24" RCP
Install Concrete Pipe Collar
Install 1 LF - 24" RCP
Remove and Reset Stone
Masonry Headwall

End Stone Masonry
Guardwall Reconstruction
Sta. 740+26
See Sheet A-E.1

Remove and Reset
Capstones on Stone
Masonry Guardwall
Sta. 741+14 to
741+24

Grout 1st Pipe Joint

Grout Voids Backside
Stone Masonry Guardwall
Sta. 742+00 to 743+00

741+88
Existing 18" RCP

744+96
Existing 18" RCP

745

Remove and Reset 12 LF
Stone Masonry Guardwall
See Detail Sheet S.39

Install 30 LF
Silt Fence

748+03
Existing 18" RCP

750

750+06
Existing 30" RCP

752+89
Existing 30" RCP

755

756+82
Existing 24" RCP

Matchline 757+00
Sheet A-D.5

Cherokee

LEGEND

NOTES:

1. Baseline stationing is based on wheel measurements along right side edge of pavement. The pavement has been marked with stations every 100 feet and PK nails every 500 feet.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

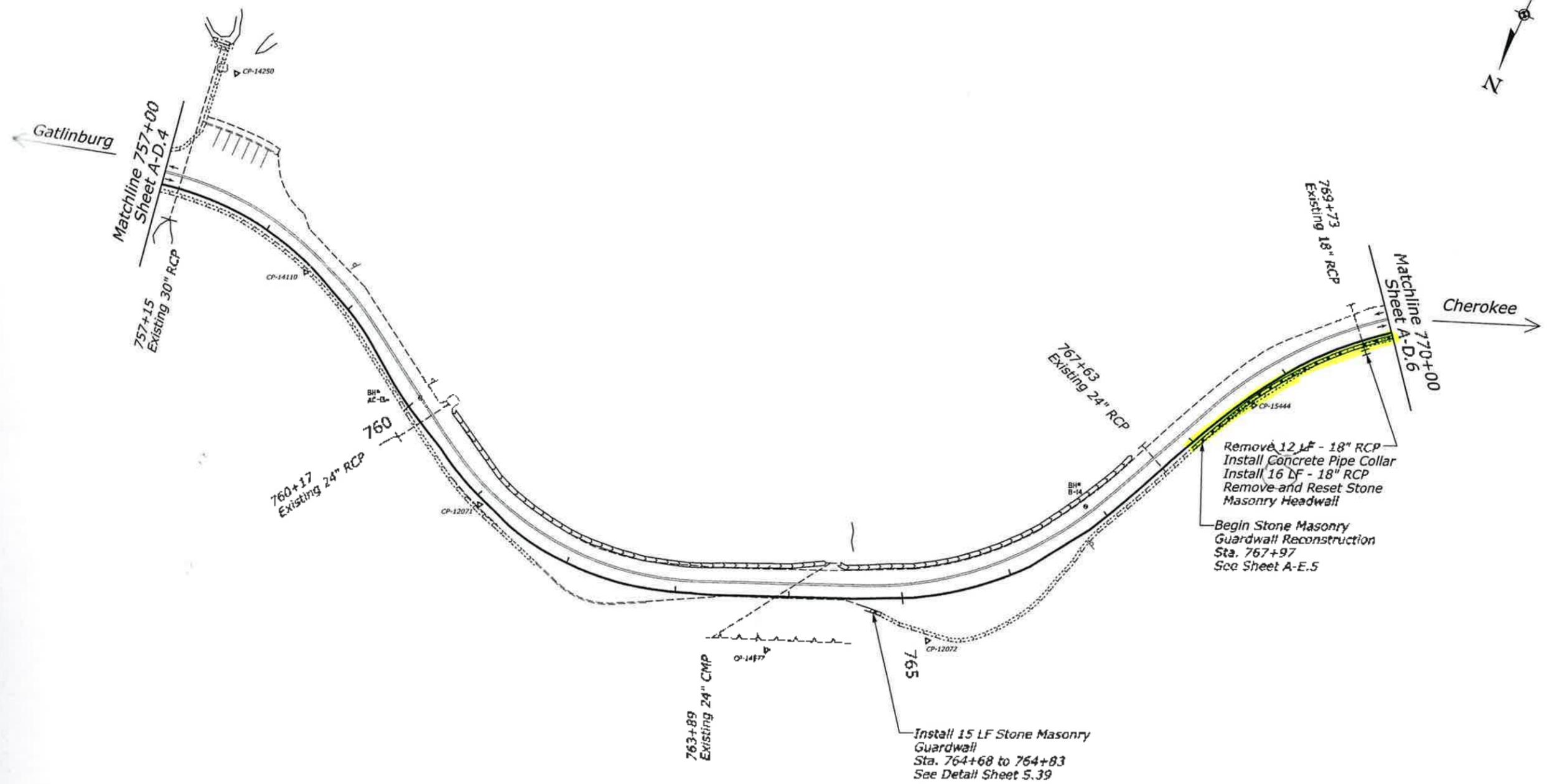
GREAT SMOKY MOUNTAINS NATIONAL PARK
NEWFOUND GAP ROAD - 1A25

SCHEDULE A
LINE GRAPH
Station 736+00 to Station 757+00

Scale in Feet

NPS PMIS NO.: 54903

REG	STATE	PROJECT	SHEET NO.
SE	TN	PRA-GRSM 1A25	A-D.5

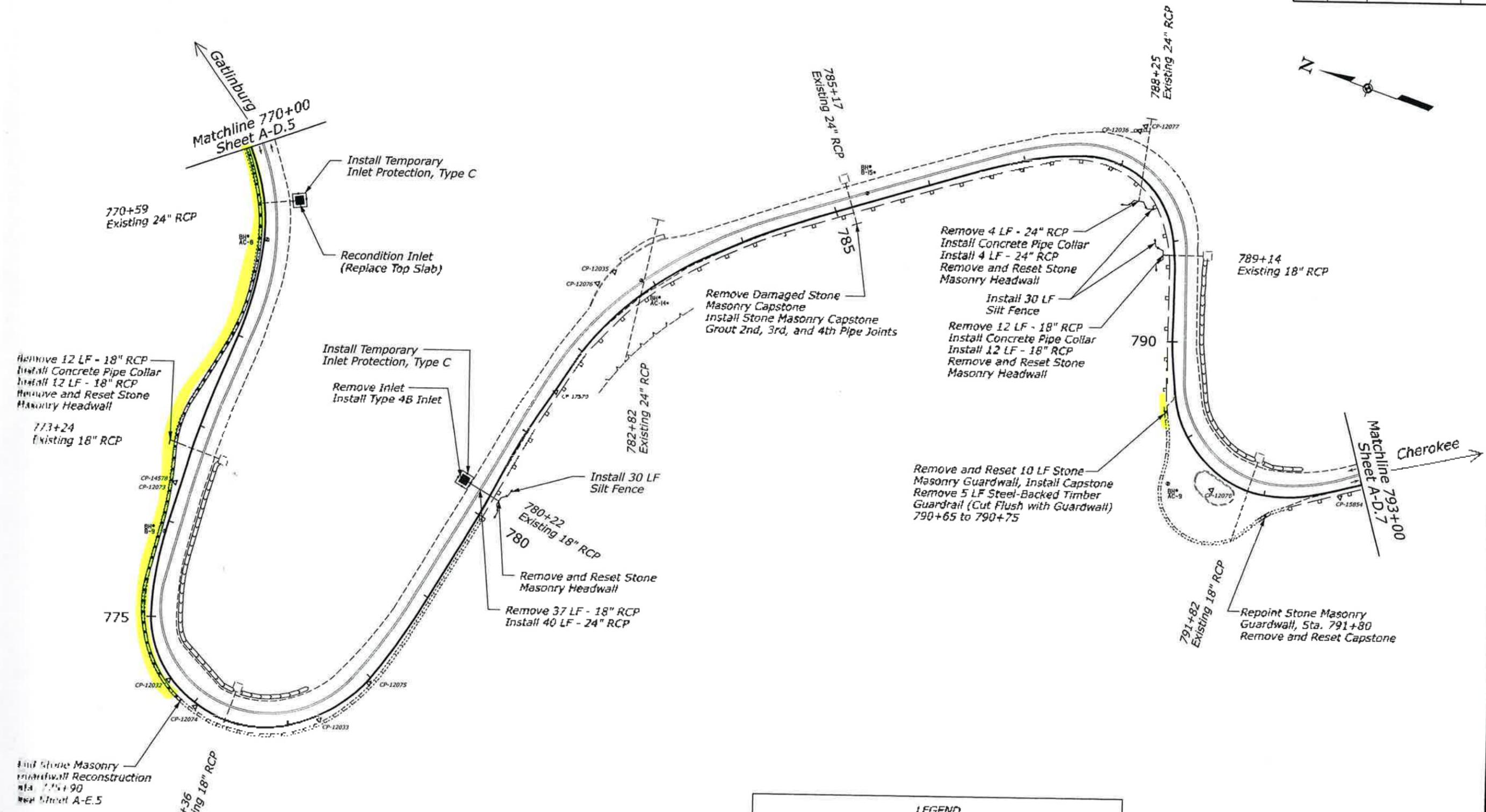


LEGEND

Stationing is based on wheel measurements along right side edge of pavement. The pavement has been marked with stations every 100 feet and PK nails every 500 feet.

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 EASTERN FEDERAL LANDS HIGHWAY DIVISION
 STERLING, VIRGINIA
GREAT SMOKY MOUNTAINS NATIONAL PARK
NEWFOUND GAP ROAD - 1A25
SCHEDULE A
LINE GRAPH
 Station 757+00 to Station 770+00
 Scale in Feet

REG	STATE	PROJECT	SHEET NO.
SE	TN	PRA-GRSM 1A25	A-D.6



LEGEND

NOTES:

- Baseline stationing is based on wheel measurements along right side edge of pavement. The pavement has been marked with stations every 100 feet and PK nails every 500 feet.

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 EASTERN FEDERAL LANDS HIGHWAY DIVISION
 STERLING, VIRGINIA

**GREAT SMOKY MOUNTAINS NATIONAL PARK
 NEWFOUND GAP ROAD - 1A25**

**SCHEDULE A
 LINE GRAPH**
 Station 770+00 to Station 793+00

Remove 12 LF - 18" RCP
 Install Concrete Pipe Collar
 Install 12 LF - 18" RCP
 Remove and Reset Stone
 Masonry Headwall

773+24
 Existing 18" RCP

770+59
 Existing 24" RCP

Matchline 770+00
 Sheet A-D.5

Install Temporary
 Inlet Protection, Type C

Recondition Inlet
 (Replace Top Slab)

Install Temporary
 Inlet Protection, Type C

Remove Inlet
 Install Type 4B Inlet

Remove Damaged Stone
 Masonry Capstone
 Install Stone Masonry Capstone
 Grout 2nd, 3rd, and 4th Pipe Joints

Remove 4 LF - 24" RCP
 Install Concrete Pipe Collar
 Install 4 LF - 24" RCP
 Remove and Reset Stone
 Masonry Headwall

Install 30 LF
 Silt Fence

Remove 12 LF - 18" RCP
 Install Concrete Pipe Collar
 Install 12 LF - 18" RCP
 Remove and Reset Stone
 Masonry Headwall

Remove and Reset 10 LF Stone
 Masonry Guardwall, Install Capstone
 Remove 5 LF Steel-Backed Timber
 Guardrail (Cut Flush with Guardwall)
 790+65 to 790+75

Repoint Stone Masonry
 Guardwall, Sta. 791+80
 Remove and Reset Capstone

End Stone Masonry
 Guardwall Reconstruction
 Sta. 776+36
 See Sheet A-E.5

776+36
 Existing 18" RCP

Remove 37 LF - 18" RCP
 Install 40 LF - 24" RCP

780+22
 Existing 18" RCP

Install 30 LF
 Silt Fence

Remove Inlet
 Install Type 4B Inlet

Install Temporary
 Inlet Protection, Type C

Recondition Inlet
 (Replace Top Slab)

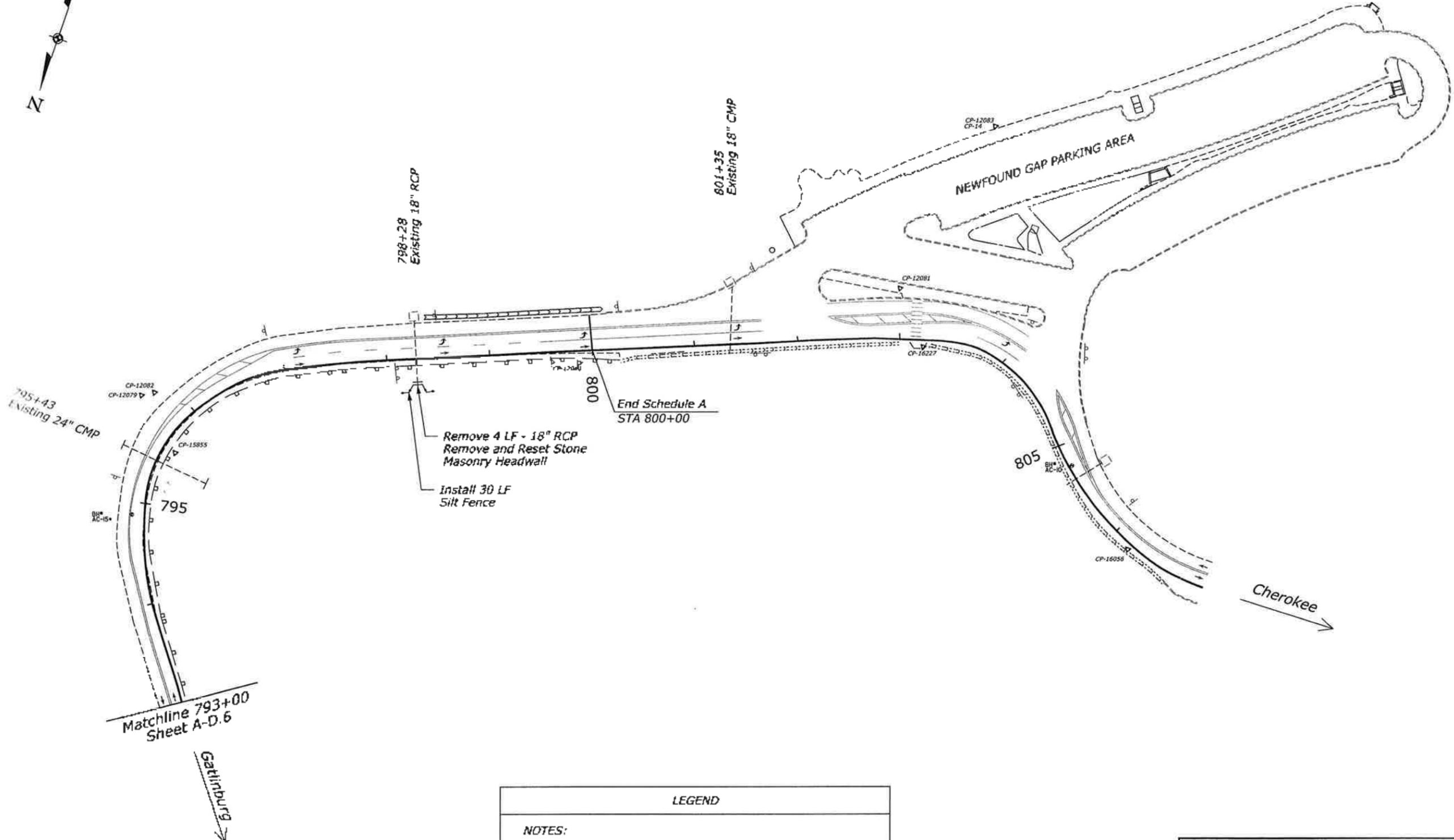
Install Temporary
 Inlet Protection, Type C

Matchline 793+00
 Sheet A-D.7

Cherokee

Gatlinburg

REG	STATE	PROJECT	SHEET NO.
SE	TN	PRA-GRSM 1A25	A-D.7



Matchline 793+00
Sheet A-D.6

Gatlinburg

Cherokee

LEGEND

NOTES:

- Baseline stationing is based on wheel measurements along right side edge of pavement. The pavement has been marked with stations every 100 feet and PK nails every 500 feet.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

**GREAT SMOKY MOUNTAINS NATIONAL PARK
NEWFOUND GAP ROAD - 1A25**

**SCHEDULE A
LINE GRAPH**
Station 793+00 to Station 807+00

Scale in Feet
0 50 100



TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

November 4, 2009

Mr. Dale A. Ditmanson
Great Smoky Mountains National Park
107 Park Headquarters Road
Gatlinburg, Tennessee, 37738

RE: RPS, NEWFOUND GAP ROAD REHABILITATION, UNINCORPORATED, SEVIER COUNTY

Dear Mr. Ditmanson:

In response to your request, received on Friday, October 23, 2009, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicant for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800. You may wish to familiarize yourself with these procedures (Federal Register, December 12, 2000, pages 77698-77739) if you are unsure about the Section 106 process. You may find additional information concerning the Section 106 process and the Tennessee SHPO's documentation requirements at <http://www.tennessee.gov/environment/hist/federal/sect106.shtml>

Considering available information, we find that the project as currently proposed will NOT ADVERSELY AFFECT ANY PROPERTY THAT IS ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER OF HISTORIC PLACES. Therefore, this office has no objection to the implementation of this project. Please direct questions and comments to Joe Garrison (615) 532-1550-103.

We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jyg



IN REPLY REFER TO:

D30
PMIS 054903
Project GRSM 1A25

United States Department of the Interior

NATIONAL PARK SERVICE
DENVER SERVICE CENTER
12705 W. ALAMEDA PARKWAY
P.O. BOX 25287
DENVER, COLORADO 80225-0287



March 10, 2009

Mr. Jeffrey Slater, Project Manager
Eastern Federal Lands Highway Division
Federal Highway Administration
21400 Ridgetop Circle
Sterling, Virginia 20166-6511

Dear Mr. Sanders:

Reference: Great Smoky Mountains National Park, PMIS Nos. 54903, 90562 and 54745; Projects GRSM 1A25, 1A26 and 1A28, Rehabilitate Newfound Gap Road from Gatlinburg to the Newfound Gap Parking Area, Milepost 0.0 to 14.5; Sevier County, Tennessee; Project Design

Subject: Revised Project Scope, Newfound Gap Road, Tennessee Milepost 0.0 to 14.5
Follow up to February 11th and 12th, 2009 Meeting

On February 11th and 12th, 2009, staff from Great Smoky Mountains National Park (GRSM) and myself met with representatives of the Federal Highway Administration, Eastern Federal Lands Highway Division (EFLHD) to discuss the October 23, 2008 letter that GRSM sent to EFLHD requesting that the scope of the referenced project be refined.

On February 11th, 2009, the group met from 12:45pm until 5:00pm in the Park Headquarters conference room. The meeting attendees included Alan Sumeriski, Imelda Wegwerth, Mike Tomkosky, Jeffrey Slater and Alan Teikari.

On February 12th, 2009, the meeting convened at 9:00am in the Park Headquarters conference room. The meeting attendees included Kevin Fitzgerald, Alan Sumeriski, Imelda Wegwerth, Mike Tomkosky, Jeffrey Slater and Alan Teikari. From approximately 9:30am until 1:30pm, the six of us drove the Tennessee section of the road to field evaluate the existing conditions of the walls and to discuss actions to correct the most apparent deficiencies. At approximately 2pm, the group reconvened in the Park Headquarters conference room and had a closeout meeting with Superintendent Dale Ditmanson.

The following is the recollection of the National Park Service representatives as to the actions that GRSM and EFLHD have agreed to implement to address the condition of the masonry structures and associated safety concerns.

Notes:

1. All milepost (MP) locations are approximate. MP 0.0 assigned at Park boundary with Gatlinburg.
2. The purpose of the meeting was not to "design" solutions for the identified problems and it is understood that the design development process will detail the actual work. The purpose of the meeting was to identify the areas that do need work and the "type" of work which might be done (such as rehab or reconstruction).

3. It is understood that the design process may reveal additional structural weaknesses and if so, additional discussion may be required.

- MP 3.9 Culvert headwall (collapsing). The Park agrees to correct this headwall. Design development to identify appropriate repair.
- MP 6.5 Chimneys Picnic Area intersection. The Park agrees to not add a turn lane for north bound traffic turning into the picnic area. The Park will consider using rumble strips and signage as mitigation of conditions.
- MP 7.0 "Levitating Wall". The Park agreed to reconstruct this section of wall. Old drawings indicate that the wall should have included a concrete core but it was not constructed with one. Reconstruction section (+/- 75-100 feet) will include a core. Heights of reconstruction to match adjacent wall heights. The Park also agrees to add steel backed timber guardrail (SBTG) between the two parking areas.
- MP 9.82 Stone work in parking area. The Park agrees to not rehabilitate the stone masonry in this parking area as part of this project.
- MP 10.25 Stone work in parking area. The Park agrees to not rehabilitate the stone masonry in this parking area as part of this project.
- MP 10.65 Wall along the river. The Park agrees to not include any work along this wall.
- MP 11.55 Wall along the river. The Park agrees to not include any work along this wall.
- MP 11.80 Wall along the river. The Park agrees to consider extending this wall south, beyond the existing culvert head wall to provide protection against the fall hazard. Extension would include a concrete core, constructed to minimal crash worthy height (22" wall in development).
- MP 12.43 Stone work in parking area. The Park agrees to not rehabilitate the stone masonry in this parking area as part of this project.
- MP 13.10 Southernmost bridge over Walker Prong. During the meeting, EFLHD made arguments to provide crash protection from the northbound lane bridge parapet south about 250-300 feet past passed (south of) the gravel parking area. The Park prefers no additional barriers be installed. Prior to agreeing on how to proceed in this area, the Park requests that several options be considered for this area, including but not limited to; raising the height of the headwall to provide fall protection, localize any new barriers around the headwall only.
- MP 13.44 Settled wall sections. The Park agrees to reconstruct 75' in one area and about 50' in another area. Reconstruction would include a concrete core, constructed to minimal crash worthy height (22" wall in development).
- MP 13.65 Sharp curve with w-beam guardrail. The Park agrees that this area needs work. The Park does not want to realign the road into the parking area. One option includes adding a retaining system outside the roadway with embankment and relocating the parapet wall off the edge of pavement. Also, the Park agrees that there are structural issues with the wall adjacent (south of) this area and agreed to reconstruct the wall up to the next pullout (about 250 feet). Reconstruction would include a concrete core, constructed to minimal crash worthy height (22" wall in development).
- MP 13.69 Reset/repoint loose stones. The Park agrees to reconstruct this area as part of the work at MP 13.65 (described above).
- MP 13.77 Poor Transition. The Park would like to address this transition by extending it out about 25 feet and to slowly transition to the height of the old masonry work. It was agreed that the section to be transitioned will not include a concrete core.
- MP 14.20 Shoulder area between Morton Overlook and first pullout north. The Parks agrees to address the fall hazard. First, the Park wants to consider shoulder widening to increase recovery area but will consider adding SBTG.

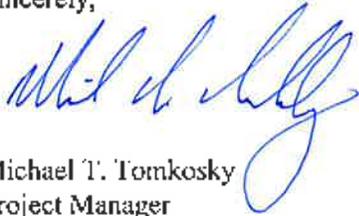
- MP 14.36 +/- 1100' section along outside of curve. The Park agrees to reconstruct +/- 1100' feet of wall from the top of the curve (break in wall) north to the existing crenulated section. The reconstructed portion will include a concrete core, constructed to the minimal crash worthy height (22" wall in development).
- MP 14.78 Transition between masonry wall and SBTG. All agreed to improve the transition and to address the drainage issue (scour/erosion at downhill end of wall).

The above represents our recollection of the discussions had during our meeting. Please advise me if I have overlooked anything and please let me know if your office concurs with the above.

The Park has asked me to pass along their appreciation to you and Mr. Teikari for joining us to discuss this important project. As always, they welcome the support that EFLHD offers.

If you have questions regarding the above, please feel free to contact me at (865) 430-0344.

Sincerely,



Michael T. Tomkosky
Project Manager

cc:

GRSM, Superintendent, D. Ditmanson

GRSM, Chief-FMD, A. Sumeriski

GRSM, Chief-RM&S, N. Finley

SERO Transportation Program Manager, K. Cochran

DSC-T, Chief, G. Tait, Project Manager, P. Walsh



U.S. Department
of Transportation
**Federal Highway
Administration**

Eastern Federal Lands
Highway Division

21400 Ridgetop Circle
Sterling, VA 20166-6511

SENT VIA ELECTRONIC CORRESPONDENCE

APR 13 2009

In Reply Refer To: HFHD-15

Mr. Michael Tomkosky
Project Manager
National Park Service
Denver Service Center
12795 W. Alameda Parkway
PO Box 25287
Denver, CO 80225-0287

Subject: GRSM 1A25, 1A26, 1A28, PMIS 54903, 90562, 54745

Dear Mr. Tomkosky:

This letter is a follow up to our February 11 and 12, 2009 meetings. We have reviewed your letter of March 10, 2009 and concur with your recollections of how we shall proceed with the guardwall and guardrail rehabilitations along Newfound Gap Road, MP 0.0 to 14.5. We will instruct our consultant accordingly.

I am planning to hold my next progress review with our consultant, Kimley-Horn, onsite in the Park, prior to their Phase II submittal. I wish to schedule this for the same week as, but after, our 70% Plan In Hand review for GRSM 26(1) in May 2009.

This is not a design review and full attendance by the Park is not necessary, however, a Park representative, such as Ms. Wegwerth or Mr. Tomkosky would be welcome as an informational resource to coordinate with and assist me.

If you require further information or assistance, please contact me at 703-404-6327.

Sincerely yours,

Jeffrey M. Slater, MSCE, PE, PMP®
Project Manager

cc:

Mr. Dale Ditmanson, Superintendent, GRSM, NPS, Gatlinburg, TN

Mr. Alan Sumeriski, Chief-Facility Management Division, GRSM, NPS, Gatlinburg, TN

Ms. Nancy Finley, Chief-Resource Management & Science, GRSM, NPS, Gatlinburg, TN

Mr. Kent Cochran, Transportation Program Manager-Southeast Region, NPS, Atlanta, GA

Mr. George Tait, Branch Chief of Roads, DSC-T, NPS, Denver, CO

Mr. Don Miller, Director, Project Delivery, FHWA, Sterling, VA

U.S. Fish and Wildlife Service
Cookeville Field Office
446 Neal Street
Cookeville, Tennessee 38501

Dear Jim Widlak:

The National Park Service (NPS), in cooperation with the Federal Highway Administration, Eastern Federal Lands Highway Division, is preparing an environmental assessment (EA) to assess the potential effects of rehabilitating Newfound Gap Road and reconstructing approximately 6,900 linear feet of stone masonry guardwalls from milepost 0.0 to milepost 14.5, in Sevier County, Tennessee. The project area is depicted on the 7.5-Minute Series Clingmans Dome and Gatlinburg quadrangles topographic maps for Sevier County, Tennessee (see attached – Newfound Gap Road project area is highlighted in red). This EA is being prepared in accordance with the NEPA of 1969 and implementing regulations, 40 CFR 1500-1508, and NPS Director's Order 12 and Handbook, *Conservation Planning, Environmental Impact Analysis, and Decision-making*. The purpose of this initial correspondence is to request a list of any federally listed species or habitats that may occur within the proposed project area and to solicit any early input or concerns that you may have regarding this proposed action.

The purpose of this project is to rehabilitate Newfound Gap Road and reconstruct stone masonry guardwalls in a way that protects the resources and values of Great Smoky Mountains National Park and that improves the overall safety of the road for both park staff and visitors. This proposed action is needed because of the overall deterioration of the road and stone guardwalls and other safety concerns created by specific design elements of several of the walls. The road is showing signs of wear along the edges and deterioration of the pavement is also occurring. Mortar joints have deteriorated and stones intermittently fall off the walls, or are jarred loose by crashes or by vandalism, compromising the strength of some guardwalls. The heights of many of the walls within the project area are too low and may not stop a vehicle from dropping down a steep slope. The blunt ends of several walls would not deflect head-on collisions and pose crash hazards to motorists.

Since we are just starting the initial planning stages of this project, specific action alternatives have not yet been developed, however, it is assumed that the actions associated with the proposed rehabilitation/reconstruction would occur entirely within, or slightly outside (less than 30 feet), of the existing road prism.

If you have any questions or require additional information, please contact Mike Tomkosky by phone at (865) 430-0344, by facsimile at (865) 436-1712, or by e-mail at Mike_Tomkosky@nps.gov. Thank you in advance for your assistance.

Sincerely,

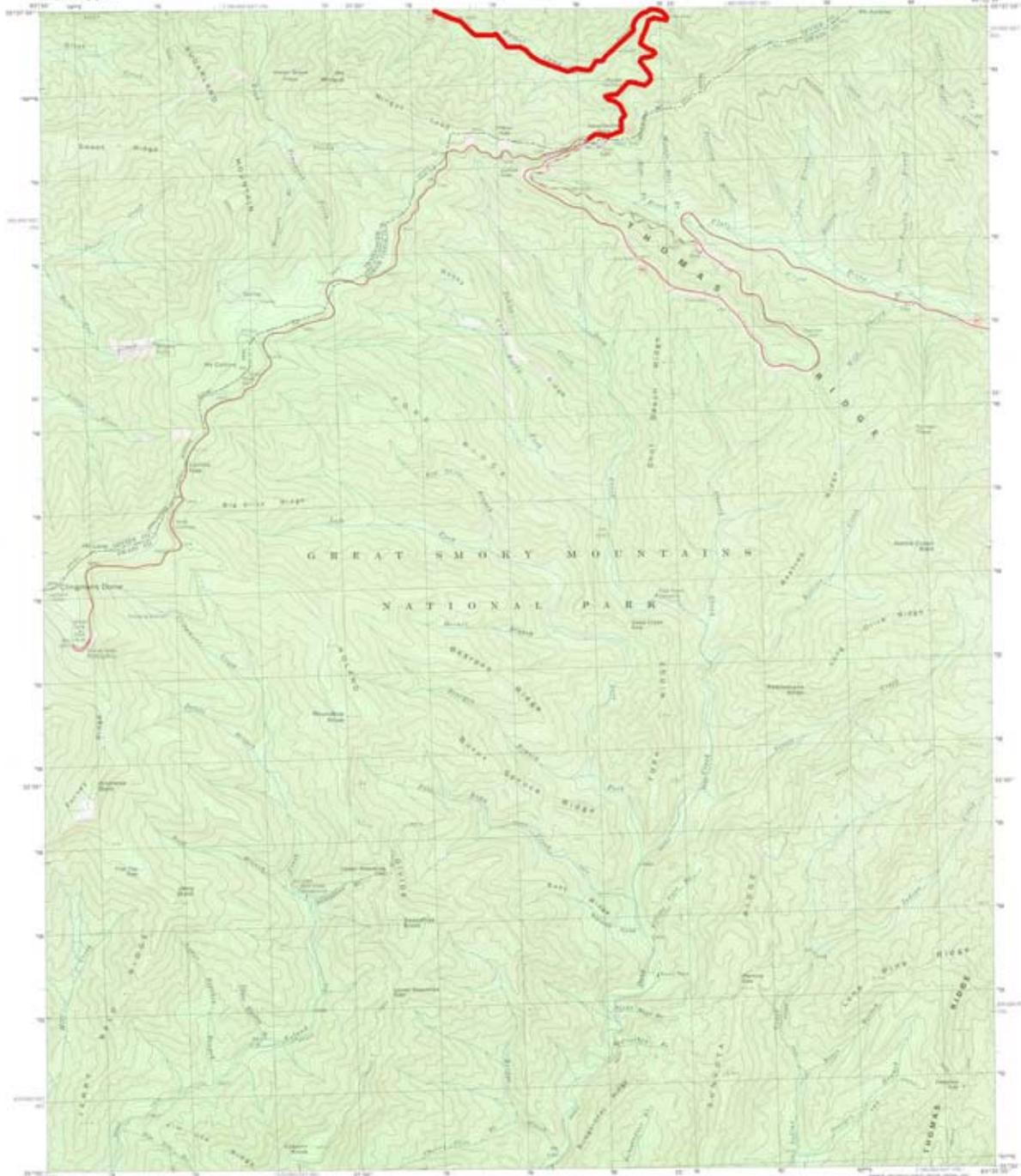
Mike Tomkosky

Enclosures: Maps



U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

CLINGMANS DOME QUADRANGLE
NORTH CAROLINA-TENNESSEE
1:50,000 SCALE SERIES (TOPOGRAPHIC) 445-900

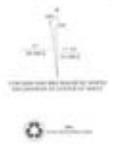


Produced by the United States Geological Survey
Revised from maps issued 1963 and other sources. Photorevised
using imagery taken 2005; no major changes in drainage changes
observed. North arrow correct as of 1984.
Revised edition 2007

North American Datum of 1983 (NAD 83)
Projection: North Carolina coordinate system
Datum: North Carolina datum
Scale: 1:50,000. North Carolina coordinate system and
datum coordinate system
1983 and 1984. Tennessee Plateau and
June 21

North American Datum of 1983 (NAD 83) is shown by default
except where noted. The values of the grid between 445 27 and 445 28
to 7' in some elevations are obtained from National Standard
Form 150000-100-0000.

Users may be given latitude within the boundaries of
the National or State coordinate system on the map.



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1	2	3	4
5	6	7	8
9	10	11	12

Shaded Relief: Light gray and brown
Contour Lines: Brown
Roads: Red, Yellow, Orange, Green, Blue
Water: Blue
Setbacks: Blue

CLINGMANS DOME, NC-TN
2007





United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

January 25, 2008

Mr. Dale Ditmanson
Superintendent
Great Smoky Mountains National Park
107 Park Headquarters Road
Gatlinburg, Tennessee 37738

Subject: Preparation of an Environmental Assessment (EA), Rehabilitation of Newfound Gap Road, Great Smoky Mountains National Park, Sevier County, Tennessee.

Dear Mr. Ditmanson:

U.S. Fish and Wildlife Service biologists have reviewed your description of the subject project plans. The project would involve rehabilitation of a 14.5-mile section of Newfound Gap Road from the park entrance near Gatlinburg to the Newfound Gap Overlook parking area. Proposed activities include milling and/or overlaying existing asphalt on this road, roadside pullouts, and parking areas; rehabilitation or reconstruction of stone masonry guardwalls; removal and re-setting of stone curbs; and replacement or repair of existing drainage structures. We understand that you are also considering the addition of turn lanes at the Chimneys picnic area and Alum Cave Bluffs Trailhead parking area. Additional parking area may also be constructed at the Alum Cave Bluffs Trailhead and Chimney Tops Trailhead parking areas. Please consider the following comments during preparation of the EA.

The proposed project area is less than three miles from sites known to be occupied by federally endangered species. These are the Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*), spreading avens (*Geum radiatum*), and the spruce-fir moss spider (*Microhexura northruga*). The potential for adverse effects to these species should be addressed in the EA. If potentially suitable habitat for these species exists in the project impact area, sites should be surveyed for the species during the appropriate time of the year by a qualified biologist. Survey plans and results should be coordinated with this office. Further, any specific actions that are proposed to address potential impacts to the Carolina northern flying squirrel, spreading avens, or spruce-fir moss spider should be included in the EA, and informal consultation initiated pursuant to section 7 of the Endangered Species Act. Based on the nature and location of the proposed action, we do not anticipate impacts to aquatic resources, wetlands, or migratory birds to occur as a result of the project.

Thank you for this opportunity to provide input for the EA scoping process. We look forward to further coordination regarding endangered species at the park. Please contact David Pelren of my staff at 931/528-6481 (ext. 204) if you have questions about these comments.

Sincerely,



Lee A. Barclay, Ph.D.
Field Supervisor



As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

National Park Service 133/101454

March 2010

United States Department of the Interior ✧ National Park Service