

Chapter 1. Purpose and Need

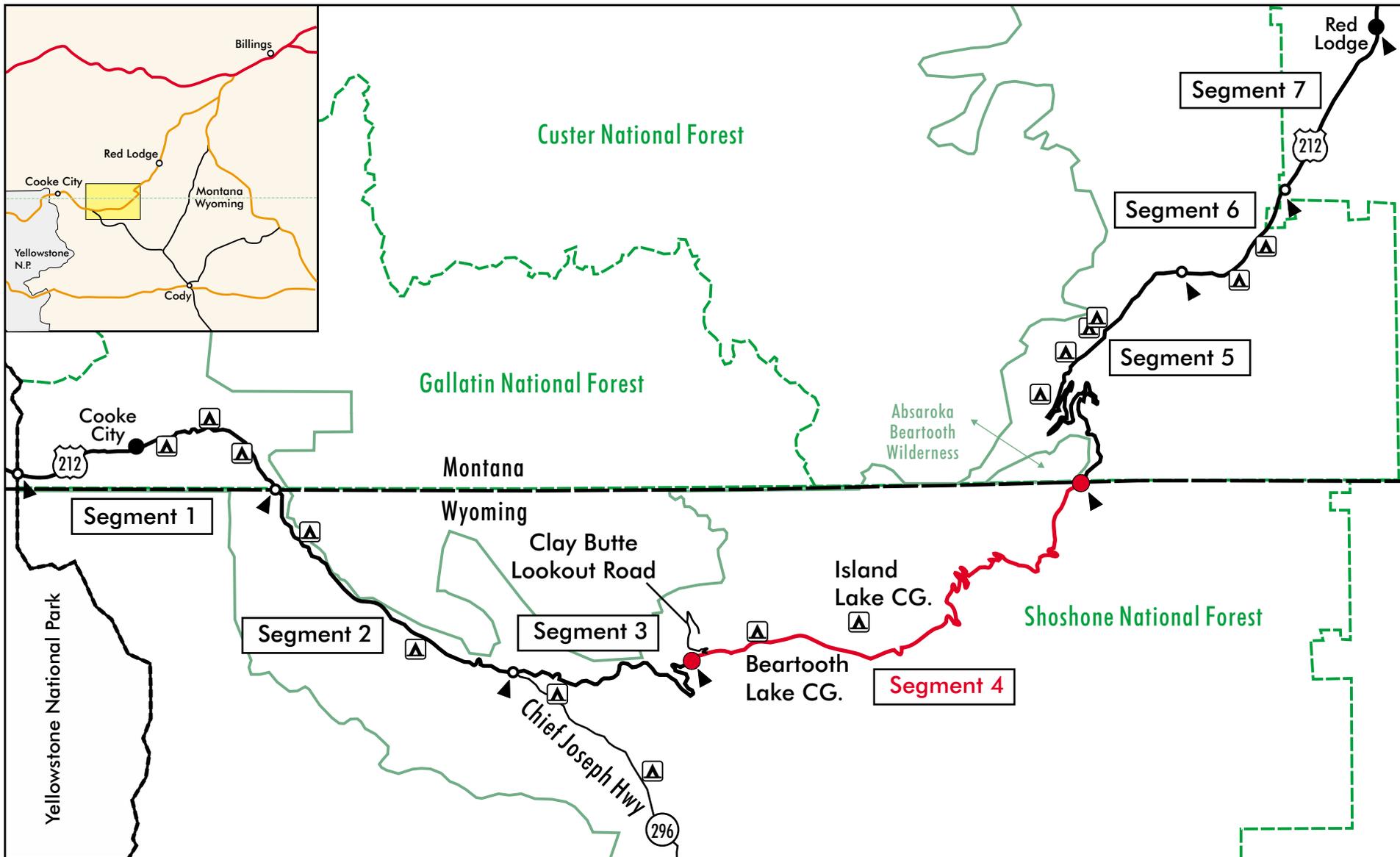
THIS Final Environmental Impact Statement (EIS) for the Beartooth Highway Reconstruction Project documents an analysis of the potential environmental consequences of a proposed road reconstruction project. In addition to the No Action Alternative, five build alternatives have been developed and analyzed (see Chapter 2). The Federal Highway Administration (FHWA) is the lead agency for the project and is responsible for project development, environmental evaluation, preparation of this EIS and a Record of Decision, and construction contract management.

The analysis in this EIS complies with the provisions of the National Environmental Policy Act (NEPA). Based on a review of the proposed project, the FHWA determined that the project may likely “significantly affect the quality of the human environment” and, therefore, an EIS should be prepared. This EIS also has been prepared in compliance with FHWA’s Environmental Impact and Related Procedures (23 CFR 771), the Forest Service Environmental Policy and Procedures Handbook (Forest Service Handbook, 1909.15), and the U.S. Army Corps of Engineers’ NEPA

implementation procedures for its regulatory program (Appendix B of 33 CFR 325).

1.1 THE PROPOSED PROJECT

In the proposed action, the FHWA, in cooperation with the U.S. Forest Service (USFS) and the National Park Service (NPS), proposes to reconstruct a 30-km (18-mi.) section of U.S. 212 in Park County, Wyoming. The proposed project would begin at kilometer post (KP) 39.5 (MP 24.5), just west of the Clay Butte Lookout turnoff, traverse east over Beartooth Pass, and end at the Montana/Wyoming state line at KP 69.4 (MP 43.1) (Figure 1). The majority of the reconstruction would be along the existing road corridor with an improved alignment, grade, and width to guidelines adopted by the FHWA and the Wyoming Department of Transportation (WYDOT), as required by FHWA’s regulations (23 CFR 625). These regulations require that federally-funded roads not on the National Highway System, such as the Beartooth Highway (U.S. 212), be designed, constructed, and maintained to the standards of the state in which they are located.



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- Segment 4 of the Beartooth Highway
- Project Start and End
- Other segments of the Beartooth Highway
- Forest Boundary
- ▲ Existing Forest Service campground

Source: 1:100,000 BLM topographic maps

Figure 1
Project Location

1 Inch = 4 Miles

521-PROJECT location 4-02.cdr

In 1994, the FHWA evaluated the condition and repair needs of the Beartooth Highway from Red Lodge to Yellowstone National Park (YNP) (FHWA 1994). The evaluation was completed at the request of NPS in response to the road's deteriorating condition and the NPS's lack of authority and funding to reconstruct a road outside the YNP boundaries. The road was divided into seven segments for study purposes. The segment between KP 39.5 (MP 24.5), just west of the Clay Butte Lookout turnoff and the Montana/Wyoming state line at KP 69.4 (MP 43.1) was designated as Segment 4. This EIS addresses Segment 4, the segment proposed for reconstruction. KP 39.5 (MP 24.5) and KP 69.4 (MP 43.1) are logical ends or termini for the project because the Beartooth Highway has been reconstructed up to both ends of the proposed project. Construction would begin in 2005 and last 6 years, until 2010.

The project would include:

- Constructing a new road surface composed of crushed aggregate base and asphalt concrete pavement
- Installing adequate drainage structures
- Installing sub-surface drainage features and subgrade stabilization measures
- Widening the road to accommodate current and projected vehicular and recreational use and necessary maintenance activities
- Removing existing historic bridges where necessary and building new bridges
- Improving parking areas and pullouts adjacent to the road
- Upgrading signs, striping, guardrails, and other safety-related features
- Implementing environmental commitments to reduce or mitigate environmental impacts

The road would be reconstructed generally along the existing corridor. For the most part, the align-

ment of the reconstructed road would incorporate the footprint of the existing road. The new road would be wide enough to accommodate current and projected vehicular and recreational use, and necessary maintenance activities. Several sections may be realigned to minimize environmental effects, or to enhance safety. Major intersections, such as campground turnoffs, would be upgraded to improve sight distance where needed. The reconstructed road surface would have a design life of 20 years, and structural elements, such as retaining walls and bridges, would have a design life of 75 years. The project also would include:

- Developing material sources to be used in the reconstruction and possible future maintenance
- Using National Forest lands for storing materials, staging equipment (called staging areas), and batch plants
- Using roads outside the project area for transporting materials
- Using National Forest lands for work crew accommodations and offices near the project site

Purpose

The three reasons to reconstruct Segment 4 are to:

- Support management of National Forest lands adjacent to the road, including maintaining the Scenic Byway/All-American Road qualities
- Maintain an efficient transportation link between Red Lodge, MT and Yellowstone National Park that safely accommodates projected traffic in 2025
- Provide a roadway that could be reasonably maintained in a sustainable manner by a maintaining agency

Needs Associated With Land Management Goals

Segment 4 of the Beartooth Highway traverses National Forest lands managed by the SNF. The SNF's Land and Resource Management Plan (also called the Forest Plan) established a forest-wide goal of managing activities along travel routes to maintain and enhance recreation and scenic values (SNF 1986). The Forest Plan also established Management Areas to guide management of the Forest. The Beartooth Highway corridor is in a Management Area that emphasizes rural and roaded natural recreation opportunities. Motorized and non-motorized recreation activities such as driving for pleasure, viewing scenery, picnicking, fishing, camping, hiking, snowmobiling, and cross-country skiing are emphasized.

The designation of sections of the road including Segment 4 as an All-American Road under FHWA's Scenic Byway Program indicates the road has one-of-a-kind features that do not exist elsewhere. The All-American Road segment has two intrinsic qualities of national significance—natural and scenic. As an All-American Road, it provides an exceptional traveling experience so recognized by travelers that they would make a drive along the highway a primary reason for their trip. A Corridor Management Plan has been prepared for the All-American Road sections of the road (Beartooth All-American Road Steering Committee 2002). The plan describes management and protection strategies, and provides recommendations for interpretation. The proposed project was designed to be consistent with the plan.

Although the entire road corridor is in the same Management Area, the SNF manages Segment 4 for two distinct types of road use. Many travelers come to the Beartooth Highway to experience the drive and continue on to destination communities

or YNP. Other travelers come to the Beartooth Plateau as a recreation destination and either stay overnight or engage in day use of the area, with short trips to and from local roadside and off-road destinations. Winter use, from October through early June, is concentrated primarily on groomed snowmobile routes between Top of the World Store and Long Lake.

The SNF manages the section west of Long Lake as a recreation complex, with more intensive recreational activity, including pedestrian and bicycle use (SNF 2003). All of the developed recreation sites along the road are found west of Long Lake. The two campgrounds along Segment 4, Beartooth Lake and Island Lake, are popular camping locations and provide access to area lakes. Wilderness trails originate at both campgrounds. Because of their proximity to the road, Beartooth Lake and Long Lake are frequent stopping spots for tourists. Top of the World Store, the only location offering supplies, is between Island Lake and Beartooth Lake. Several jeep trails, such as the Morrison Jeep trail and the Sawtooth Lake trail, originate between Long Lake and Island Lake. The road provides motorized and non-motorized access to the wilderness and jeep trails.

In the western section, travelers are more likely to stop along the road shoulder for viewing or exploring informal recreational and game trails, use bicycles, motorcycles and all-terrain vehicles in family groups, and make opportunistic roadside stops to view wildlife, lakes, and streams. These activities involve frequent stops, slow-moving motorized and non-motorized vehicles and a variety of user ages. A shoulder 1.2-m (4-ft.) or wider is needed to accommodate these uses safely in combination with through traffic use of the roadway. Many of the comments on the Draft EIS focused on the roadway width, particularly shoulder widths. To minimize environmental

impact, the SNF, in cooperation with the FHWA and other SEE team members, agreed a 0.9-m (3-ft.) shoulder would meet the recreation use needs and adequately provide for safety from the Clay Butte Lookout turnoff to the road closure gate.

Winter recreational use also is important because the highway from Cooke City to Long Lake is a popular snowmobile destination. Low snow years and the “shoulder” seasons (early June and early October) of snowmobiling cause a mix of snow craft adjacent to the road and full-size vehicles on sections of the road. A wider shoulder width would address the potential safety hazards of this vehicle mix.

East of Long Lake, the road enters the alpine zone where the dominant recreational activity is scenic driving and viewing. No campgrounds are present east of Long Lake, and the Forest Plan either prohibits or discourages off-road motorized activity.

The incidence of family group activities, bicycles and road-side stops, and other day-use activities diminishes significantly east of Long Lake (SNF 2001a). The steep terrain, lack of trees for shelter, steep road grade, lack of camping facilities and frequent, severe and cold weather at all times of the year limit road use primarily to driving and viewing. The SNF management goal is to discourage over-snow recreation east of Long Lake due to frequent hazardous snowstorms. Because of the more limited roadside activities in the eastern section of the project, there is less need for a wider shoulder.

Agency and public comment on the Draft EIS expressed concern about maintaining the road’s All-American Scenic Byway qualities. The following attributes define these qualities:

- The curvilinear nature of the road, particularly the switchbacks in the alpine area
- The opportunity to stop and enjoy the spectacular scenery, pristine lakes and streams, and uncommon alpine vegetation and wildlife in a safe manner
- The proximity of the vegetation to the roadway, particularly in the alpine area

The proposed project needs to maintain the road’s qualities, and where possible, improve the visitor experience of the road. For example, over the years, informal pullouts have developed along the road throughout the corridor. At numerous locations, poorly located pullouts endanger pedestrians and traveling vehicles, reducing the recreational benefits of driving for pleasure and viewing scenery. In some locations, visitor use away from the pullouts, such as near wetlands, fens, lakes, or alpine vegetation, has led to environmental degradation. The proposed project needs to support SNF’s management of the corridor with better-designed and located pullouts to meet recreational demand while at the same time reducing current environmental degradation in environmentally sensitive areas. For example, pullouts that conflict with wildlife crossing areas may be eliminated during final design.



Segment 4 is a designated All-American Road under the Scenic Byway Program.

Needs Associated With Accommodating Projected Traffic

Segment 4 is an important transportation route between Red Lodge, Montana and YNP. The Beartooth Highway was initially constructed as a National Park Approach Road in the 1930s to provide access to YNP from Red Lodge (see following *History* section, p. 15). Since the road's opening in the 1930s, tourism associated with the Beartooth Highway has provided significant economic benefits to Red Lodge and Cooke City, Montana, as well as Cody, Wyoming. By safely accommodating projected traffic types and volumes, the tourism associated with the highway will continue to play a major role in sustaining these towns' economies.

Since Segment 4 was constructed in the 1930s, the type and amount of traffic on the road has changed substantially. Current vehicles are larger in size than those in the 1930s. As a result, the road no longer safely accommodates current vehicle types, such as recreational vehicles or pickup trucks with trailers that access National Forest and YNP. Projected future traffic volumes will also

exacerbate the current situation. In the 1994 Road Inventory and Needs Study, the FHWA concluded:

“Segment 4 clearly has the worst conditions of any portion of the route. The narrow width of the road is a major deficiency, but the conditions of the surface, inadequate subsurface drainage, lack of adequate roadside ditches and culverts, substandard signing and guardrail, lack of defined roadside pullouts, lack of snow storage area, and increasing bicycle use all indicate that serious consideration should be given to upgrading the road.” (FHWA 1994)

With existing deficiencies, the highway will not adequately accommodate projected traffic and the towns' economies will be at risk. Because tourism employs about a third of all Carbon County workers and the road accounts for most summer tourism in Carbon County and Red Lodge, it is expected that as the road continues to deteriorate, Red Lodge's economy would be at the greatest risk of decline. Services associated with food and lodging, which represent about 13 percent of earnings for Carbon County, would be reduced if tourism associated with scenic driving on the road decreased because of poor road conditions. This concern was the basis for the initial funding for improvements as part of the Crown Butte Mine settlement (the 1998 Department of the Interior and Related Agencies Appropriation Act) and for establishing the project as a High Priority Project in the Transportation Efficiency Act for the 21st Century (see Appendix B).

Reconstruction would address seven primary deteriorating or deficient elements that contribute to safety concerns of the existing road:

- Roadway surface
- Road vertical and horizontal alignment
- Travel lane width

- Shoulder width
- Bridges
- Drainage facilities
- Pullouts, parking areas, and access road intersections

Roadway Surface

The FHWA analyzed the pavement condition in 1994 (FHWA 1994). The road had a Pavement Condition Index of 40 in an index that ranges from a low of 0 to a high of 100. A Pavement Condition Index of 40 indicates pavement in need of major reconstruction.

A pavement preservation project that the FHWA completed in 2000 temporarily repaired the roadway surface. The project was designed to provide a driveable surface for about 5 to 10 years while the environmental review process for the reconstruction project progressed. Because of the resurfacing, some of the deficiencies in the roadway structure may not be readily apparent. For example, subsurface moisture and inadequate drainage have caused the pavement to crack and break-up in many locations. Many of these cracks were filled during the 1999-2000 pavement preservation project, but the underlying conditions that caused the cracks have not been corrected. Consequently, a distressed roadway surface will develop again under current and future traffic volumes, and maintenance costs will increase. Due to the road's narrow width, traffic driving on the edges of the road has caused the pavement edges to ravel (break away from the road). The resurfacing project did not widen the road or add shoulders. Consequently, future traffic will continue to cause the road edge to ravel. Permanent repair of the roadway surface and adequate structural capacity can only be accomplished by reconstruction of the roadbed and the entire base and pavement



The narrow travel lanes cause the edge of the pavement to break apart.

structure, and providing adequate drainage in roadside ditches. In improving the structural capacity and drainage of the roadway, future traffic volumes and vehicle types are used to determine design attributes such as pavement and base thickness, lane and shoulder widths, and horizontal and vertical alignment.

Road Vertical and Horizontal Alignment

The current alignment and gradient of the road is irregular and has numerous sharp curves and abrupt transitions, with sudden dips and crests. For example, the series of eight curves east of Frozen Lake (KP 53.4 to 54.6) has six different curve radii, ranging from 55 m (180 ft.) to 200 m (660 ft.). The inconsistent curve radii cause sudden reductions in speed and do not conform to driver expectations, which can adversely affect vehicle operation and safety. The superelevation (the cross-slope or bank of the road on curves) is excessive in many areas and insufficient in others, causing vehicles to veer into the oncoming lane or off the roadway. The sharp curves and sudden dips and crests restrict the sight distance and cause unsafe driving conditions. As traffic volumes increase, the alignment deficiencies will become more prominent, increasing the potential for erratic vehicular maneuvers and accidents. The alignment deficien-



The narrow travel lanes, lack of shoulders, and substandard guardrails present a safety hazard to motorists, pedestrians, and bicyclists.

cies can only be corrected through reconstruction of the road with a consistent alignment.

Travel Lane Width

Segment 4 currently consists of two 2.75-m (9-ft.) wide travel lanes for a total width of about 5.5 m (18 ft.). In most locations, there is little or no shoulder. About 5 percent of the vehicles (projected 100 vehicles per day in 2025) that use the road are over 6.1 m (20 ft.) long. Vehicles of this length typically are 2.6 m (8.5 ft.) wide without mirrors, and 3.2 m (10.5 ft.) wide with mirrors. The current roadway width does not accommodate these vehicles without encroachment into the oncoming lane or leaving the pavement, particularly on curves. The substandard alignment, coupled with the narrow travel lanes, makes this problem particularly hazardous at restricted sight distance curves. Vehicles leaving the pavement because of the narrow travel lane width also contribute to the pavement edge raveling. Future traffic volumes will exacerbate the width deficiencies.

The proposed project needs to provide travel lanes adequate to accommodate existing and projected vehicle volumes and types in 2025. The year 2025 was used because it would be 20 years after the reconstruction project would be initiated, and 20 years is the approximate pavement lifespan and the practical limit of traffic projections. A 20-year traffic forecast period is most commonly used in the road construction industry. Because bridges and retaining walls are a major investment and failures of these structures can have significant consequences for motorists, they are designed to accommodate traffic farther in the future (75 years).

Shoulder Width

The roadway's lack of shoulders is a deficiency that restricts pedestrian and bicyclist use. In most locations, cyclists cannot use the road without causing vehicles to cross over into the adjacent, oncoming travel lane to avoid hitting the cyclists. Because of the road's narrow width, bicycle use of the road is limited and pedestrian use is unsafe in many locations. The FHWA and the Shoshone National Forest (SNF) anticipate the number of cyclists and pedestrians using the road would increase if the road has shoulders to accommodate such use. The Transportation Efficiency Act for the 21st Century and subsequent FHWA guidance requires "a presumption that bicyclists and pedestrians will be accommodated in new and improved transportation facilities" (FHWA 1999a).

At a minimum width of 0.6 m (2 ft.), shoulders provide protection of the travel lane pavement. On roads without shoulders, the edge of the pavement is prone to breaking off due to lack of lateral support that is provided by the shoulders when vehicles travel outside the travel lane. Shoulders reduce maintenance by preserving the travel lane pavement. The lack of shoulders would be



The existing road width does not safely accommodate bicyclists.

addressed by reconstructing the road with shoulders of an adequate width. The proposed project needs to provide shoulders adequate to accommodate projected vehicle volumes and types as well as recreational uses in 2025.

The lack of shoulders also is a safety concern for vehicular use. When shoulders are an adequate width, they provide a space to escape potential accidents or reduce their severity. Shoulders also provide a location for stopped vehicles, enforcement, or those involved in accidents or mishaps. As the *Needs Associated with Maintenance* section discusses, the road's narrow width and lack of shoulders does not provide room for snow removal or storage.

Bridges

The four bridges within the proposed project are too narrow for current as well as projected traffic volumes and vehicle types. In some cases, the bridges do not provide adequate load carrying capacity. The Beartooth Lake outlet bridge is 6.8 m (22.2 ft.) wide, the two bridges over Little Bear Creek are 6.2 m (20.2 ft.) wide, and the Long Lake outlet bridge, the widest bridge, is 6.9 m (22.6 ft.) wide (FHWA 1999b). Two large recreational

vehicles cannot pass each other on the bridges, and two full-size vehicles, such as two pickup trucks, can barely pass each other.

None of the bridges meet current acceptable safety standards. The bridge railing and guardrails are inadequate. The structural conditions of the bridges vary, with the Little Bear Creek bridge #1 (the western-most Little Bear Creek bridge, west of Top of the World Store) having a fair to poor condition rating, and the Beartooth Lake bridge having a good condition rating. The FHWA estimated the useful life of all bridges under current load limits and without major repairs to be 15 to 20 years (FHWA 1999b).

The Little Bear Creek bridge #1 is not long enough to handle the high runoff flows of the creek because of ice blockage. Often when the road first opens in May, water flows across the road and freezes, creating ice up to 15 cm (6 in.) thick. Ice has caused the abutment wing wall of this bridge to fail completely.

Bridge reconstruction needs to safely accommodate traffic volumes over their design life and meet current design standards. Bridges and retaining walls need to have a design life of 75 years.



The four bridges are structurally deteriorate and too narrow, and do not meet current safety standards or hydraulic requirements.

Drainage Facilities

Existing drainage facilities, such as ditches and culverts, throughout Segment 4 provide inadequate drainage. Snow drifts at higher elevations typically average from 3.7 to 6.1 m (12 to 20 ft.), and up to 11 m (36 ft.) in some locations. Much of the runoff from melting snow occurs over a 4- to 6-week period in June and July. During runoff periods, the narrow ditches and undersized culverts cannot convey the volume of runoff water, resulting in water flowing over the road. Consequently, ice can develop during cold weather after the road opens in June. Many locations along the road have poorly drained ditches and subgrades. Water seeps underneath the road, saturating the subgrade and base course and reducing the load carrying capacity of the roadway and eventually causes structural failure of the surface from traffic loads.

The road's vertical alignment was built in the 1930s, and its surface is too low to provide adequate drainage and protection from moisture and freezing and thawing. As a result, the road's subgrade and base have failed, leading to pavement cracking and deterioration. For example, the road is constructed in wetlands in the vicinity of Top of the World Store. Before the 1999-2000 pavement preservation project, the pavement had failed because the road's profile is too low and the pavement is subjected to freezing and thawing of subsurface moisture (FHWA 1994). Along the current alignment, the road's profile in the vicinity of Top of the World Store needs to be raised about 1 m (3 ft.) to provide proper ditch capacity and elevate it above the wet conditions, improving drainage and structural capacity. If not corrected, poor drainage will continue to affect the roadway surface and drainage-related maintenance costs will increase. Only reconstructing the road could improve all the drainage facilities and the road's vertical alignment.

Pullouts, Parking Areas, and Access Road Intersections

Most existing pullouts and parking areas are unpaved, undersized, poorly located, and cause traffic or safety problems. There are numerous locations along the road where poorly located pullouts endanger pedestrians and traveling vehicles (MK Centennial Engineering, Inc. 1998). For example, near Beartooth Falls, several pullouts, many of them informal, are located before and after the Falls, with one inadequately sized turnout that provides actual views of the Falls. As a consequence, vehicles stop in the roadway to view the Falls, which requires passing vehicles to encroach into the oncoming lane. In addition, pedestrians have no place to walk when looking at the Falls. Other locations where pullouts and parking areas lead to pedestrian-vehicular conflict are near Beartooth Lake, and the switchbacks on the East and West Summits. The conflicts will increase with future increased traffic volumes.

Several access roads to campgrounds and area lakes originate along the road. All of the access roads are unpaved. Sight distances associated with the intersection of some of these roads and the highway is poor.



Many pullouts are unpaved, undersized or poorly located.

Reconstructing the road with adequate sight distances would provide the opportunity to enhance the visitor's experience as well as motorist and pedestrian safety by properly locating and sizing pullouts and parking areas, and modifying access road intersections.

Needs Associated with Maintenance

Because no agency has assumed ownership of the Wyoming segments of the Beartooth Highway, including Segment 4, and maintenance funding has been inconsistent, maintenance of the Beartooth Highway has been a problematic issue for several decades. In its deteriorated condition, Segment 4 has high maintenance requirements. The National Park Service has maintained the road historically, but has only been allocated funding for snowplowing from the Forest Service through 2006 or 2007. Although the Forest Service has short-term funding for snowplowing, it is not prepared to assume long-term maintenance. Currently, the average annual maintenance budget is about \$200,000 per year. Annual maintenance costs include about \$60,000 to open the road in the spring, and \$40,000 for snowplowing after the road is open, with the rest of the budget spent on other road maintenance needs such as materials, personnel, equipment, and maintenance facilities. The maintenance budget does not provide for all of the maintenance activities needed to adequately maintain the road each year.

The proposed project needs to provide a roadway with design features compatible with current maintenance equipment and techniques, affording safe and efficient maintenance practices, as required by law for the use of federal highway funds. Specifically, the proposed project needs to provide for easier and safer snowplowing, a more durable pavement surface, improved drainage features, and future sustainable maintenance that is

less expensive and will have little to no impacts from future maintenance needs on the surrounding environment.

Snowplowing Difficulties

Snowplowing the road in its present condition is difficult and unsafe. After the road is initially plowed open in late May, snowplowing operations continue through June due to frequent blowing and drifting conditions. Some snowplowing can occur every month of the year that the road is open. The road occasionally is closed for short periods when it becomes impassable due to severe drifting snow conditions. The existing travel lanes are 0.3 m (1 ft.) narrower than standard snowplow blades, which makes it difficult and unsafe to plow the road, especially while it is open to traffic. The road's narrow ditch width and lack of shoulders limit locations where plowed snow can be stored. Frequently in the spring and fall, snow stored in the narrow ditches melts at the pavement edge and causes substantial gullies along the pavement edge, further undermining and raveling the pavement. A reconstructed road would safely accommodate snowplowing equipment, and provide locations for snow storage and adequate drainage.

Continued Maintenance Requirements

The road's poor drainage and grade adversely affect the pavement condition, resulting in a continuing maintenance requirement. The raveling caused by vehicles driving on the road's edge adversely affects the travel lane pavement and increases maintenance requirements. The FHWA completed a 3R project (resurface, restore, and rehabilitate) on Segment 4 in 1968 and a pavement preservation project in 2000. Although both projects temporarily restored the pavement surface, the drainage problems and travel lane width were not addressed. In contrast to Segment 4, Segment

3, which is west of the Clay Butte Lookout turnoff to the intersection of WY 296, was reconstructed between 1968 and 1977. In 1994, Segment 3 had a Pavement Condition Index of 97 to 100, while Segment 4 had a Pavement Condition Index of 40. Until the road is reconstructed to an adequate width and drainage facilities are upgraded, the pavement will continue to deteriorate, and will require pavement repairs to maintain a driveable surface.

Future Sustainable Maintenance

Future sustainable maintenance refers to the ability to provide adequate maintenance, including complete pavement surface rehabilitation in 20 years, with minimal or no environmental impacts and at minimal cost. The proposed project would have a design life of 20 years, and drainage and structural elements, such as retaining walls and bridges would have a design life of 75 years. If the road is reconstructed, the FHWA anticipates the road surface would require a minimum 50-mm (2-in.) asphalt overlay in about 20 years to maintain a driveable surface. The proposed project needs to provide roadway elements that would accommodate this future surfacing overlay with minimal environmental impact and cost, while providing a safe roadway for future traffic volumes.

When an overlay is required in the future, the typical process is either to place the overlay on top of the existing pavement, or to grind up and recycle the existing pavement as aggregate base (gravel) and then place the overlay on the recycled former pavement. If the foreslope (the slope immediately adjacent to the roadway shoulders) and roadway width are at critical values already (maximum foreslope steepness and minimum shoulder width allowed by design guidelines), both overlay methods would raise the road profile. This would result in either foreslopes that are too steep to allow

recovery by run-off-the-road vehicles, or shoulders that are too narrow to function appropriately, or both. These actions would reduce safety for the people using the road corridor.

To preserve the safety characteristics of the road and provide adequate slope ratios and widths, the foreslopes could be reconstructed, disturbing the foreslope's vegetation, and in some cases, ditch bottoms and backslopes. To avoid these problems, the pavement could be ground down, hauled off and disposed of and then resurfacing applied. This method, however, would generate large volumes of asphalt pavement waste and pollution from trucks hauling material. It also costs almost twice as much as a simple overlay.

Therefore, future sustainable maintenance requires the ability to overlay the pavement while maintaining a safe foreslope and shoulder, and avoiding future additional environmental impacts from resurfacing. To meet these criteria, the design of the reconstructed road would need to: 1) allow for an overlay with minimal environmental impact; 2) provide a shoulder width that would either not be narrowed or could be narrowed to a minimum width; and 3) provide a foreslope ratio and width that would minimize or avoid disturbing the foreslope and avoid reconstructing ditches and cut/fill slopes during resurfacing; and maintain adequate foreslope ratios for recovery of errant run-off-the-road vehicles. A subsequent section, *Roadway Cross Sections* on p. 63, provides a more detailed discussion of this need.

Lack of Jurisdiction

Under the National Park Approaches Act of 1931, the Beartooth Highway was built as an approach road to provide roaded access to YNP from Red Lodge, Montana. (All legislation and other references in this section are in Appendix B). Under the Act, the approach roads had to cross

lands of 90 percent Government ownership and had to be a part of or tributary to a Federal Aid Primary road system.

The National Park Approaches Act allowed the Secretary of the Interior to:

“...construct, reconstruct, and improve national-park approach roads so designated, inclusive of necessary bridges, and to enter into agreements for the maintenance thereof by State or county authorities, or to maintain them when otherwise necessary...” (Public Law 592, Ch. 79, 46 Statute 1053, 1931)

In 1932, an Executive Order withdrew a 75-m (250-ft.) wide corridor on either side of Segment 4 from settlement, sale, mineral entry or other disposal, and reserved the lands as an approach road to YNP. No federal or state agency currently claims ownership of the road. Ownership of the land adjacent to Segment 4 remains with the Federal Government, and the SNF manages the National Forest land adjacent to the road.

Since the road was built, the Secretary of the Interior has been unable to interest either Montana or Wyoming in a maintenance agreement for the section of the road from YNP to the Montana/Wyoming state line at KP 69.4. The State of Montana has maintained the section from Red Lodge to Rock Creek since it was built. (Rock Creek is in Montana about 13.8 km [8.6 mi.] south of Red Lodge). Before 1945, the Bureau of Public Roads, FHWA’s predecessor, maintained the road to Rock Creek with funding from the NPS. After 1945, the NPS maintained the road from YNP to Rock Creek. In 1965, the Montana Department of Transportation (MDOT) began maintaining the segment between the Montana/Wyoming state line at KP 69.4 and Rock Creek.

In its current condition, Segment 4 is very difficult to maintain. Consequently, neither Montana nor

Wyoming has assumed ownership of this section of the road. Neither state has put the section of the road from YNP to KP 69.4 (MP 43.1) on its State Transportation Plan. When a road is on a State Transportation Plan, the state assumes responsibility for the road’s jurisdiction and maintenance. If the Wyoming section of the Beartooth Highway was on Wyoming’s State Transportation Plan, it would be maintained in a similar manner as other area roads, such as WY 296 or WY 120.

The NPS has maintained Segment 4 historically. In its current condition, road maintenance costs are high. Under 16 USC Section 17j-2(a), appropriations for the NPS are authorized for “maintenance of the roads in the national forests leading out of Yellowstone National Park.” Although Congress is authorized to appropriate funds for maintenance, the NPS is not allocated such funding. Because the NPS is not allocated regular funding for snowplowing or maintenance of the Beartooth Highway, the road occasionally is not adequately snowplowed or maintained. For example, in the mid-1990s, the NPS did not open the road by Memorial Day (as is usually done) because of a lack of funding. In the 1998 Department of the Interior and Related Agencies Appropriation Act, the USFS was given the responsibility and funding through 2006 or 2007 for snowplowing of the Beartooth Highway from KP 0 in YNP, into and through Wyoming, to KP 69.4 on the Wyoming/Montana state line. The USFS contracts with the NPS to meet this required snowplowing responsibility. The USFS also provided funding to the FHWA for the 1999-2000 pavement preservation project. While the USFS was provided funding for these recent activities, it is not prepared to assume long-term maintenance responsibility because of insufficient funding,

personnel, and equipment to plow and maintain a paved highway.

In 1997, a Steering Committee was established to provide oversight of funding, maintenance, and ownership issues of the Beartooth Highway. Steering Committee members consist of representatives from FHWA, NPS, USFS, WYDOT, MDOT, and Congressional staff. In 1999, the Steering Committee established long-term goals concerning ownership and responsibility for the improved roadway (see letter to Representative Rick Hill, Appendix D). The target date for achieving the goals is 2010, when Segments 1 and 4 are expected to be reconstructed. With these reconstructed segments, the entire Beartooth Highway will then be to appropriate standards and all ownership and responsibility issues resolved. The Steering Committee identified these long-term goals:

State Ownership: The Steering Committee's first preference is that the States of Wyoming and Montana will accept shared ownership and responsibility for the Beartooth Highway in the following manner:

- Segments 2, 3, 4 would be owned and maintained by the State of Wyoming.
- Segments 1, 5, 6, 7 would be owned and maintained by the State of Montana (Segments 5, 6, and 7 are currently maintained by the State of Montana) (Figure 1).

Federal Ownership: If Wyoming and Montana do not agree to assume responsibility for the highway, federal ownership, responsibility and funding need to be clarified. Currently, the NPS has the workforce but not the funds and the USFS has neither the funds nor the workforce to properly maintain the pavement and structures. In the meantime, the NPS would be left with the status

quo, a band-aid approach to maintenance and operation, sacrificing funds needed for road work in YNP.

Since the establishment of these goals, the Wyoming Transportation Commission discussed ownership of the Wyoming section of the Beartooth Highway on several occasions. In 1998, the Commission passed the following resolution:

“When the entire section within Wyoming is reconstructed to current standards, Wyoming will **consider** assuming ownership of U.S. 212 in northwestern Wyoming. Because of the time frame required to accomplish the reconstruction, Wyoming will not make a definite commitment that encumbers future transportation commissions and could possibly encumber a different Governor.” (Meeting minutes, Transportation Commission of Wyoming, October 14, 1998) [bolded emphasis in original].

1.2 LOCATION AND HISTORY

Location

The Beartooth Highway is a 108-km (67-mi.) route that begins at the northeast entrance to YNP and ends in Red Lodge, Montana (Figure 1). The first 13.5 km (8.4 mi.) and the last 38.1 km (23.7 mi.) of the route lie within Montana, and the remaining 55.8 km (34.7 mi.) of the route lie within Wyoming. The Beartooth Highway also is known as the Red Lodge-Cooke City Highway and is designated as U.S. 212 over its entire length. The section of the road in Wyoming is designated as Wyoming Forest Highway 4. In addition to being a Forest Highway, the road also is a National Park Approach Road (see the *History* section, p. 15).

History

In the late 1800s, a mining area developed around Cooke City, Montana, about 32 km (20 mi.) west of Segment 4. Cooke City was accessed through what is now YNP. In 1925, the USFS and the U.S. Bureau of Public Roads (FHWA's predecessor) investigated a route over the Beartooth Plateau that could provide access to the Cooke City mines from Red Lodge, Montana. A route suitable for mining purposes was not identified.

Local interest in a road between Red Lodge and YNP continued, and eventually lead to the enactment of the National Park Approaches Act of 1931. Under the Act, certain roads could be built to provide the public access to National Parks. Because of the Act's requirements, few roads other than the Beartooth Highway could qualify for appropriations. After the Act was passed and the location work was completed, it was discovered that the distance from the Park boundary to Red Lodge was 108 km (67 mi.), some 11.4 km (7.1 mi.) longer than the Act permitted. To address this limitation, the Bureau of Public Roads, Montana State Highway Department, and USFS put the section of road from Red Lodge southwest for 13.8 km (8.6 mi.) on the Federal-Aid Primary system and put the section inside the Forest boundary on the Forest Highway system. The Beartooth Highway was built between 1931 and 1936 under the Bureau of Public Roads, and opened on June 14, 1936 with a ceremony and caravan of supporters.

By the late 1950s, the road had significantly deteriorated. In 1968, Segment 4 was resurfaced, and many paved ditches were added. Segment 4 and Segment 1 near Cooke City are the two segments of the road that have not been completely reconstructed. All of the other segments were reconstructed between 1963 and 1984.

In 1998, the Department of the Interior and Related Agencies Appropriation Act authorized rehabilitation and minor widening of Segment 4. The FHWA held scoping meetings in 1998 on a project proposal to complete the work. With the passage of the Transportation Efficiency Act for the 21st Century later in 1998, the Beartooth Highway was identified as a High Priority Project and additional funding became available for the environmental review, planning, design, and reconstruction of Segment 4. This EIS is part of the environmental review process.

In 2000, the FHWA completed a pavement preservation project on Segment 4. The purpose of the project was to provide a driveable surface for 5 to 10 years until a decision was made on the reconstruction project. The preservation project consisted of sealing cracks and applying a thin layer of micro-surfacing (asphalt-based surfacing material) to the road. The project also included cleaning plugged ditches and culverts, replacing destroyed guardrails, and performing minor repairs. The road's existing substandard alignment, grade, and width, as well as its underlying structural and drainage deficiencies, were not addressed due to the limited scope of the project.

1.3 EXISTING AND FUTURE ROAD USE AND TRAFFIC CONDITIONS

Existing Uses

The Beartooth Highway is primarily a recreational road that connects the northeast entrance of YNP to Red Lodge, Montana and Cody, Wyoming. The road provides access to campgrounds, trailheads, vista points, pullouts, and recreation facilities along the corridor in the SNF, the Custer National Forest (CNF), and the Gallatin National Forest (GNF).

The Beartooth Highway itself is a major recreational attraction. It is designated a Forest Service Scenic Byway and a Wyoming State Scenic Byway. Sections of the road are designated an All-American Road under FHWA's National Scenic Byways Program. Many travelers take the road to enjoy the lakes and scenery along the route. The road has many undeveloped roadside pullouts to view alpine scenery, as well as informal recreational opportunities along the corridor. Two USFS campgrounds and a visitor contact station (a former fire lookout at Clay Butte) are located along Segment 4. Several hiking and jeep trails originate from the road, but no pedestrian trails parallel the road. The *Recreation Resources* section of Chapter 3 provides additional information about the recreation uses along the road.

In 1999, the FHWA completed an origin and destination study of Segment 4 users (MK Centennial 1999a). East-bound motorists (towards Red Lodge) were stopped at the western end of the

project near the Clay Butte Lookout turnoff and west-bound motorists (towards YNP) were stopped at the eastern end of the project near the Montana/Wyoming state line. YNP, Cody, and Cooke City were the primary originating locations for east-bound motorists. The Beartooth Mountains, Red Lodge, and Billings were the dominant destinations. Most west-bound motorists started at Billings or Red Lodge and were going to YNP, the Beartooth Mountains, or Cooke City. Over 90 percent of the motorists were recreational travelers, with about 70 percent of them making one or more trips to the project area per year (MK Centennial 1999a). The origin and destination study confirmed that the road is used for destination-related travel to the Beartooth Mountains and as an arterial for traffic between Red Lodge and Billings and Cooke City and YNP.

Segment 4 typically opens by Memorial Day and closes by Columbus Day (about October 15). The road sometimes is accessible by car up to the road closure gate east of Long Lake before Memorial Day and after Columbus Day, depending on snow conditions. Harsh winter conditions preclude keeping Segment 4 open during the winter, and there are no plans to do so in the future. West of Segment 4, the Beartooth Highway connects with the Chief Joseph Highway (WY 296), which provides a link to Cody, Wyoming. The Beartooth Highway provides access between the communities of Silver Gate, Cooke City, and Red Lodge. Only one business, the Top of the World Store, is located along Segment 4. This store supplies gasoline, motel facilities, and miscellaneous supplies. It usually stays open from Memorial Day until the road closes in mid-October.

Commercial tour buses and bicyclists use the road. Bicyclists use the travel lanes because the road has little or no shoulders and no adjacent bike trails. Logging trucks and other commercial trucks are



The Beartooth Highway was constructed between 1931 and 1936.

allowed on Segment 4. All commercial traffic is prohibited through YNP, except by permit. Supplies to Cooke City in the winter come through YNP.

Traffic Volumes, Speeds and Accidents

Segment 4 typically is open between June and mid-October, or about 145 days. Seasonal Average Daily Traffic (SADT) is the average number of vehicles that travel the road each day over a set period of time or season. Traffic counts completed annually between 1998 and 2000 indicate the SADT averages 942 vehicles (Table 1). About 95 percent of the traffic was a mix of cars, motorcycles, and small trucks less than 6.1 m (20 ft.) in length. The remaining 5 percent of traffic was composed of medium-sized trucks, motor homes, buses, campers, or tractor-trailers greater than 6.1 m (20 ft.) in length. The steep, winding, and narrow nature of the road may discourage use by large vehicles.

Highway reconstruction projects typically are designed to carry traffic volumes for 20 years before substantial repairs, such as pavement overlay or widening, are required. For this reason, future traffic volumes are used for design purposes. Future traffic volumes are estimated by applying an annual growth rate of the project area to current

Table 1. Seasonal Average Daily Traffic for Segment 4.

Month	1998-2000 Average SADT	2025 Projected SADT
June	822	1,721
July	1,111	2,326
August	1,151	2,410
September	682	1,428
Average	942	1,972

Construction would begin in 2005; 2025 would be the end of the 20-year design life of the proposed project. *Source:* MK Centennial Engineering, Inc. 2001a.

traffic volumes, and making adjustments for changes in traffic patterns that can be reasonably foreseen. Future increases in traffic volumes depend on a variety of factors, such as the economy, fuel prices, vacationing trends, road conditions, and federal regulations and policies.

To estimate the annual growth factor, the FHWA completed traffic studies that examined growth on area roads, changes in YNP visitation, and area population growth. (MK Centennial Engineering, Inc. 1998). The WYDOT provided the FHWA with projected traffic volumes on U.S. 212, WY 296, and WY 120. WYDOT’s estimated annual growth rate on U.S. 212 and WY 120 was 2.6 percent and 4.5 percent on WY 296. The FHWA also used trends in recreational visitors to YNP, particularly the northeast entrance, at the west end of the Beartooth Highway. Between 1985 and 2001, the number of visitors using the northeast entrance increased by 3.8 percent per year. The FHWA examined population growth in Carbon County, Montana and Park County, Wyoming using 1990 census data. The population growth rate in both counties was 1.0 percent per year. Based on the various growth rates, the FHWA used 3 percent as a reasonable estimate of the future annual growth rate for traffic on Segment 4 (Table 1). Future traffic volumes based on a growth rate of 2 to 4 percent would require the same design standards as those selected for the project. Design standards are discussed in detail in Chapter 2 and Appendix C.

The FHWA measured existing operating speeds at several locations along the road. Speeds were measured for both east- and west-bound traffic in the morning and afternoon. Operating speeds are shown in Table 2.

From 1990 to 1999, 19 accidents were reported on Segment 4—nine accidents were property damage

Table 2. Operating speeds along the road.

Location	Km/h	Mph
West end of project	67	42
Beartooth Campground	60	37
Top of the World Store	75	47
Near Long Lake	74	46
Switchbacks	33	20
Near Twin Lakes pullout	64	40
East end of project	66	41

Operating speeds are based on the cumulative 85th percentile speed averaged between east- and west-bound.

Source: MK Centennial Engineering, Inc. 2001a.

only, nine accidents involved injuries, and one accident resulted in a fatality. Of the 19 accidents, 5 or about 25 percent of them occurred in the Beartooth Ravine area, more than at any other location along Segment 4. Unsafe speed was cited as the cause of three of the five accidents in the ravine area (MK Centennial Engineering Inc. 1999b).

The accident rate for Segment 4 was 0.95 accidents per million vehicle miles traveled. During the same period, the segment of U.S. 212 west of the project area had an accident rate of 0.72, the lowest rate on all of U.S. 212. The segment with the highest accident rate was near Cooke City, with an accident rate of 1.24. This segment is proposed for reconstruction beginning in 2004. Accident rates for Segment 4 were lower than statewide accident rates for rural roads in Wyoming and Montana (MK Centennial Engineering, Inc. 2001a). Accident rates on Segment 4 may be lower than statewide rates because minor accidents may go unreported, and because the road is closed during the winter. The lack of regular and cell phone service and distance to nearby towns makes accident reporting more difficult.

1.4 SEE TEAM AND COOPERATING AGENCIES

When the FHWA starts an environmental review process for a major road project, it convenes a Social, Economic and Environmental (SEE) study team consisting of federal, state and local agencies with project involvement. The SEE team assists in identifying major issues associated with the proposed project, developing alternatives for the project, assessing environmental impacts, guiding the project through the environmental process and project development, and recommending a Preferred Alternative.

The SEE team for this project is comprised of representatives from the following six agencies:

- FHWA
- U.S. Forest Service
(Shoshone National Forest)
- National Park Service
(Yellowstone National Park)
- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- Wyoming Department of Transportation

Under NEPA, the FHWA can request assistance from other federal and state agencies in preparing the EIS. The USFS, NPS, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service (USFWS) have agreed to become cooperating agencies for the project. Copies of agency correspondence are included in Appendix D.

1.5 PERMITS OR APPROVALS

The FHWA, in cooperation with the USFS and the NPS, has issued this Final EIS, identifying Alternative 6–Blended Emphasis as the preferred alternative. No sooner than 30 days after the Final EIS is issued, the FHWA, in cooperation with the USFS and the NPS, will select one or a

combination of the build alternatives studied in detail in the Final EIS, or the No Action Alternative. The FHWA will document the final selection in a Record of Decision.

The FHWA would need to obtain permits or approvals from federal or state agencies before implementing an action alternative (Table 3). Additional permits associated with refinements in final design and construction techniques also may be needed.

The FHWA will continue coordination with the SEE team agencies throughout final design to get their input on refinements to the design to minimize impacts further, if possible.

1.6 REFERENCES

- Beartooth All-American Road Steering Committee. 2002. Beartooth All-American Road Corridor Management Plan. January.
- Federal Highway Administration. 1994. Beartooth Highway road inventory and needs study. October.
- Federal Highway Administration. 1999b. Structure inspection reports-Beartooth Creek bridge, Little Bear Creek bridge #1, Little Bear Creek bridge #2, and Long Lake bridge. Prepared for Yellowstone National Park.
- MK Centennial Engineering Inc. 1998. Traffic Study-United States Highway 212, Beartooth Highway. Prepared for the Federal Highway Administration, Central Federal Lands Highway Division, Lakewood, CO. December.
- MK Centennial Engineering Inc. 1999a. Origin and Destination Study-United States Highway 212, Beartooth Highway. Prepared for the Federal Highway Administration, Central Federal Lands Highway Division, Lakewood, CO. December.
- MK Centennial Engineering Inc. 1999b. Traffic Study Addendum A-United States Highway 212, Beartooth Highway. Prepared for the Federal Highway Administration, Central Federal Lands Highway Division, Lakewood, CO. December.
- MK Centennial Engineering, Inc. 2001a. Traffic Study Addendum B. United States Highway 212, Beartooth Highway. Prepared for Federal Highway Administration, Central Federal Lands Highway Division, Lakewood, CO. June.
- Shoshone National Forest. 1986. Land and Resource Management Plan. Cody, Wyoming.
- Shoshone National Forest. 2001a. Letter from Rebecca Aus, SNF, to Richard Cushing, FHWA. November 29.
- Shoshone National Forest. 2003. Letter from Rebecca Aus, SNF, to Richard Cushing, FHWA. July 3.

Table 3. Permits, stipulations, or approvals required for the Beartooth Highway Reconstruction Project.

Permits, Stipulations, or Approvals	Purpose
U.S. Forest Service	
Letter of Consent (Interstate and Defense Highway System Act 23 CFR 710)	To allow the FHWA to use National Forest lands for road purposes.
Special Use Permit	To allow activities, such as a workcamp, on National Forest lands outside an approved corridor.
Mineral Material Permit	To allow the FHWA to take construction material, such as gravel, from National Forest lands.
Timber Settlement Agreement	To allow the FHWA to harvest commercial timber on National Forest lands before disturbance. Harvesting would be conducted only to clear the area necessary for road construction or materials sources.
U.S. Fish and Wildlife Service	
Section 7 Consultation (Endangered Species Act 50 CFR 402)	To ensure that the proposed project would not jeopardize the continued existence of threatened or endangered species, or result in the destruction or modification of critical habitat.
U.S. Army Corps of Engineers	
404 Permit (Clean Water Act 33 CFR 320)	To allow the FHWA to discharge dredged or fill material into waters of the U.S., including wetlands.
Wyoming Department of Environmental Quality	
401 Certification (Clean Water Act 40 CFR 121)	To certify that any activity requiring a federal license or permit that may result in any discharge into waters of the U.S. would not cause or contribute to a violation of state surface water quality standards.
National Pollutant Discharge Elimination System Permit	To allow FHWA to discharge pollutants from a point source into waters of the U.S., such as storm water or construction dewatering.
Authorization for temporary increase in turbidity levels	To allow FHWA to temporarily increase surface water turbidity due to road work, including road and bridge construction.
Wyoming State Engineer’s Office	
Permit to temporarily divert water for construction	To allow FHWA to temporarily reduce stream flow for road construction, including dust suppression activities and cofferdam installations.
Advisory Council on Historic Preservation	
Section 106 Review (National Historic Preservation Act 36 CFR 800)	To consult with the Wyoming State Historic Preservation Office, Native American tribes, and the Advisory Council on Historic Preservation.