

National Park Service
US Department of the Interior

Badlands National Park
South Dakota



Badlands National Park Rehabilitation of Loop Road at Dillon Pass and Bigfoot Environmental Assessment

July 2018



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NOTE TO REVIEWERS AND RESPONDENTS

If you wish to comment on the environmental assessment, you may mail comments to the name and address below or post comments online at <http://parkplanning.nps.gov/badl> by August 13, 2018. This environmental assessment will be on public review for 30 days. 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. Although 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.

Please address written comments to:

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TABLE OF CONTENTS

Purpose and Need	1
Introduction.....	1
Purpose and Need	1
Environmental Issues and Impact Topics Retained for Detailed Analysis	5
Environmental Issues and Impact Topics Dismissed from Further Analysis.....	5
Alternatives.....	9
Alternative 1: No-Action.....	9
Alternative 2: Rehabilitaton of Loop Road at Dillon Pass and Bigfoot (Proposed Action and Preferred Alternative).....	10
Alternatives Dismissed from Further Consideration.....	18
Best Management Practices and Mitigation Measures.....	19
Affected Environment.....	21
Paleontological and Geological Resources	21
Wildlife Including Rare, Threatened, and Endangered Species	22
Visitor Use and Experience	24
Environmental Consequences.....	25
Cumulative Impacts Methodology	25
Paleontological and Geological Resources	26
Wildlife Including Rare, Threatened, and Endangered Species	28
Visitor Use and Experience	32
Consultation and Coordination.....	35
List of Preparers.....	37
References	39

LIST OF FIGURES

Figure 1. Project Location	3
Figure 2. Existing Conditions (left photo – temporary down drain at end of existing pipe, top right photo – eroding slope adjacent to road, and bottom right photo – bore hole in pavement from grout installation to fill void under roadway).....	4
Figure 3. Existing conditions at Bigfoot Picnic Area, consisting of potholes, cracks, uneven pavement, and settlement.....	4
Figure 4. Ponding caused by clogged culvert to north side of road on Dillon Pass section at MP 25	10
Figure 5a. Dillon Pass Section (Page 1 of 2)	11
Figure 5b. Dillon Pass Section (Page 2 of 2).....	12
Figure 6a. Bigfoot Section (Page 1 of 4).....	13
Figure 6b. Bigfoot Section (Page 2 of 4).....	14
Figure 6c. Bigfoot Section (Page 3 of 4).....	15
Figure 6d. Bigfoot Section (Page 4 of 4).....	16
Figure 7. Example of temporary down drain and metal pipe to be removed and replaced.....	18
Figure 8. Landforms and scenery along Loop Road as seen from Bigfoot Picnic Area.....	21

LIST OF TABLES

Table 1. Best Management Practices and Mitigation Measures	19
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PURPOSE AND NEED

INTRODUCTION

Badlands National Monument in South Dakota was recognized as a significant area when the United States Congress authorized its establishment in 1939. The monument encompassed approximately 110,000 acres of the South Dakota badlands. The monument was expanded by 133,000 acres in 1968, and it was re-designated as Badlands National Park (or “the park”) in 1978. The park is located 70 miles from Rapid City, South Dakota, and is split into two main units (North Unit and South Unit). The park’s significant features include outstanding scenic vistas and unique landforms of the White River Badlands, its importance to the science of paleontology, its natural resources, and preservation of archeological and cultural history. The primary park road, South Dakota Highway 240 Loop Road (or “Loop Road”), was developed from an informal local road system that was roughly in place by 1912. As part of the proclamation authorizing Badlands National Monument in 1929, the State of South Dakota agreed to formalize and consolidate this road system. The park was not officially designated until this work, primarily through the Works Progress Administration, was complete. Loop Road is listed in the NPS List of Classified Structures (LCS) database and may eventually be nominated for listing in the National Register of Historic Places, along with its associated developed areas (NPS 2017a).

The National Park Service (NPS), in cooperation with the Federal Highway Administration (FHWA), is proposing to rehabilitate two sections of Loop Road to address structural, drainage, and accessibility issues – the Dillon Pass section from mile post (MP) 24.9 to MP 25 and the Bigfoot section, starting west of Bigfoot Picnic Area at approximately MP 12.8 on Loop Road, for 1.19 miles to an area by Bigfoot Road (**Figure 1**). Together, the Dillon Pass and Bigfoot sections encompass 1.2 miles of the 32-mile Loop Road.

PURPOSE AND NEED

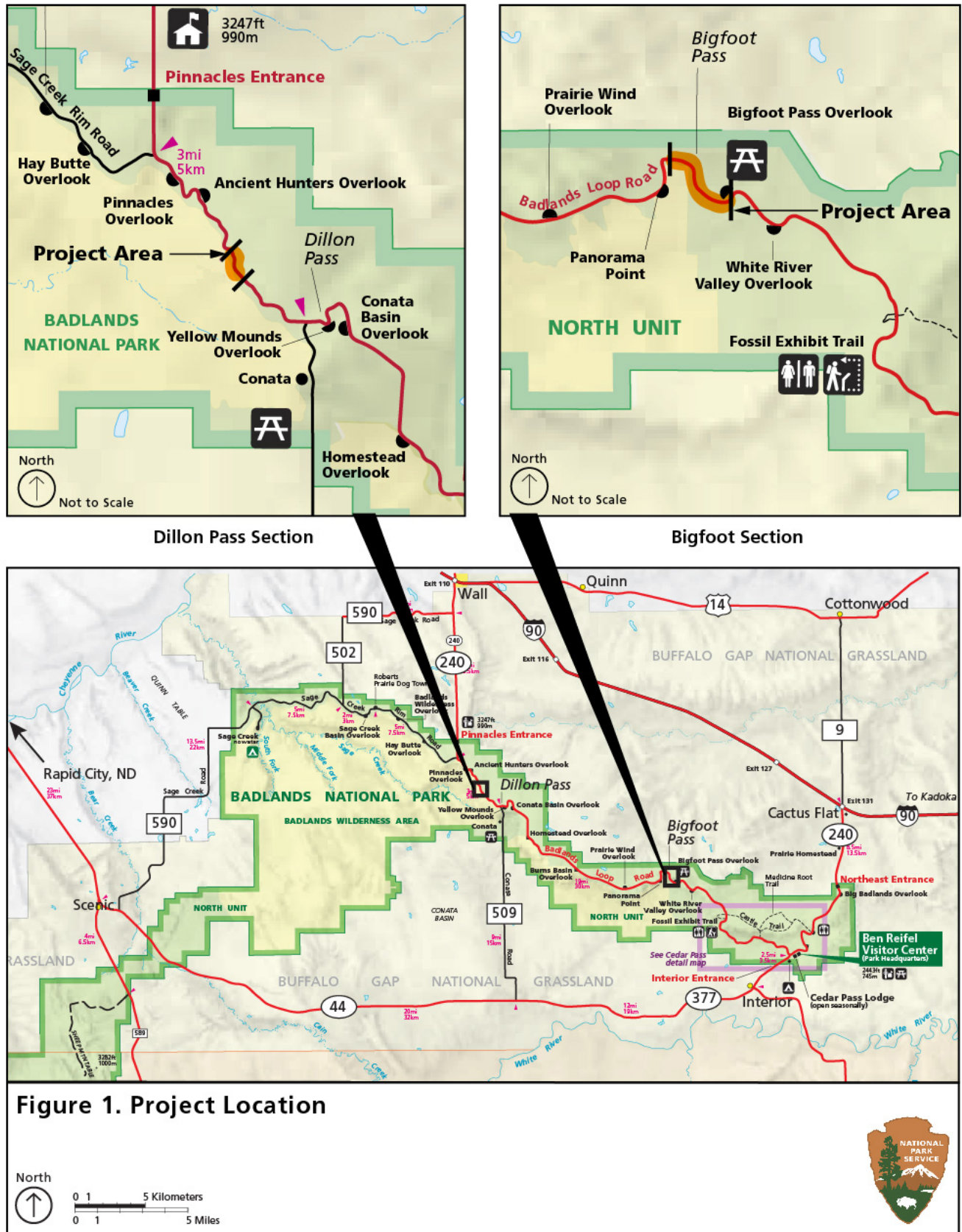
The purpose of this project is to provide a stable and more sustainable roadway to ensure the safety of visitors and to minimize impacts to park resources. Creating a more sustainable roadway would: 1) improve drainage and stabilize existing slopes; 2) ensure safe sight distances for turnouts for vehicles and bicycles; 3) improve accessibility and reduce tripping hazards on walkways; 4) maximize the use of the roadway prism to include paved ditches and/or pullouts; and 5) minimize the need for future park maintenance.

The following conditions have been identified and contribute to the need for rehabilitation in the project areas:

- The roadway currently does not comply with the NPS Park Road Standards (1984) specifically related to design elements (e.g., road alignment, sight distances), pavement conditions, and drainage infrastructure.

- The existing drainage system cannot drain the road surface effectively, which causes hazardous conditions due to stormwater ponding adjacent to the roadway (**Figure 2**). Additionally, a void exists beneath the road at the Dillon Pass section, which could cause future failure of the roadway.
- The pavement of the roadway and Bigfoot Picnic Area parking lot and walkways is uneven and contains potholes, cracks, and settlement making accessibility difficult (**Figure 3**).
- The park has limited resources for maintenance of the roadway. Rehabilitation would maximize park maintenance efficiency by eliminating the need for frequent spot repairs.

This plan fulfills a park priority for the types and general intensities of development at Badlands National Park and serves as a component of the park's planning portfolio. This plan also follows the NPS "Planning Portfolio" construct, consisting of a compilation of individual plans, studies, and inventories, which, together, guide park decision making. The planning portfolio enables the use of targeted planning products (such as this one) to meet a broad range of park planning needs, a change from the previous NPS focus on standalone general management plans. The general management plan remains a critical piece of the planning framework and will be revised in a timely manner through the park's planning portfolio.





Photographs courtesy of Stantec Consulting Services Inc.

Figure 2. Existing Conditions (left photo – temporary down drain at end of existing pipe, top right photo – eroding slope adjacent to road, and bottom right photo – bore hole in pavement from grout installation to fill void under roadway)



Photograph courtesy of Stantec Consulting Services Inc.

Figure 3. Existing conditions at Bigfoot Picnic Area, consisting of potholes, cracks, uneven pavement, and settlement

ENVIRONMENTAL ISSUES AND IMPACT TOPICS RETAINED FOR DETAILED ANALYSIS

The NPS, participating agencies and stakeholders, and members of the public identified specific environmental issues during scoping. As a result, the following issues and associated impact topics are being retained for detailed analysis in this EA.

Paleontological and Geological Resources: Drainage and Erosion Issues

Overall, the project would correct areas of poor drainage that are currently causing erosion and contributing to the deterioration of the road, which has direct effects on park resources such as paleontological and geological resources. In the short term, construction activities to repair the roadway have the potential to excavate soil and bedrock and change the topography, which could alter the park's landforms or displace or destroy fossils. These issues are evaluated under the *Paleontological and Geologic Resources* impact topic.

Wildlife: Disturbance from Construction Activities

Construction activities producing added noise from equipment, as well as increasing human disruption to the area during construction, could disturb wildlife. Some wildlife (i.e., bighorn sheep, bison) are often drawn to construction sites and interact with construction equipment or construction workers. Changes to the natural landscape could also alter wildlife breeding and habitat. Therefore, these issues are discussed under the *Wildlife* impact topic.

Visitor Use and Experience: Temporary Access and Visitor Use Restrictions

In general, the project would improve current accessibility, designated parking, and site visibility and safety in the long term. However, visitor use and accessibility to the Bigfoot Picnic Area would be limited during construction as this site may serve as a staging area during construction, which would detract from the opportunity for visitors to use park facilities. Because of winter weather conditions in South Dakota, some of the construction would occur during peak park visitation periods. In addition, emergency services and law enforcement access could be limited during temporary road closures. These issues are evaluated under the *Visitor Use and Experience* impact topic.

ENVIRONMENTAL ISSUES AND IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

The following issues are dismissed from further analysis in this EA for the reasons provided. Unless otherwise noted, no impacts are associated under the no-action alternative.

Vegetation: Vegetation Removal and Invasive Species Introduction

Construction activities would result in disturbances to native vegetation and the potential for the introduction of invasive species along the roadway. Fill materials that do not meet FHWA engineering requirements (i.e., fill materials that are not weed-free) could promote the establishment of noxious weeds and other invasive species.

Rationale for dismissal: Vegetation is currently being affected by unstable slopes and erosion. Revegetation of the disturbed areas conducted as part of the project would have a net benefit because native seed mix and planting would enhance the adjacent roadway shoulders and embankments resulting in added slope stabilization. Additionally, fill material used during the project would meet FHWA engineering requirements to further avoid the introduction of invasive species.

Threatened, Endangered, and Special Status Species: Special Concern Vegetation Species Impacts

Construction activities could result in disturbances to vegetation or streams that potentially serve as habitat to support federal- and state-listed plant species.

Rationale for dismissal: Consultation under Section 7(a)(c) of the Endangered Species Act (ESA; 87. Stat. 884, as amended: 16 *United States Code* [U.S.C.] 1531 et seq.) was initiated with the US Fish and Wildlife Service (USFWS) on December 1, 2017. Based on the consultation, the USFWS concurred with the NPS determination that no federally listed threatened and endangered species would be affected by the project as presently designed. Therefore, a discussion of disturbances to threatened, endangered, and other special status species and their habitat from construction activities has not been included in the analysis.

Water Resources: Surface Water and Wetlands

Information regarding water resources in the project area was obtained from a review of existing published sources, site-specific observations, and aerial mapping of the study area. In general, surface water features are limited in the North Unit of Badlands National Park. Small ephemeral or intermittent streams exist in the project area including two stream segments that flow under Loop Road through existing culverts in the Dillon Pass section. The proposed action could have impacts to wetlands (including streams) from the bank stabilization and culvert replacements under Loop Road.

Rationale for dismissal: The proposed action is considered an excepted action, as less than 0.1 acres of wetlands would be impacted, and with appropriate best management practices as listed in the NPS *Procedural Manual #77-1: Wetland Protection*, Appendix 2 (NPS 2016), impacts to wetlands and streams in the study area would be negligible.

Historic Structures: Changes to Historic Significance

The Loop Road is listed on the NPS LCS (052125 and 052126) and a determination of eligibility was prepared, entitled *National Register of Historic Places Multiple Property Listing for Historic Roads Resources, Badlands National Park*. The South Dakota State Historic Preservation Officer concurred with the eligibility determination on January 12, 2007. The NPS determined the road is historically significant under Criterion A for its association with the development of park road systems for public access to natural features; and under Criterion C for its design principles that clearly seek to enhance the viewshed for park visitors (LCS 52125). Loop Road has been on the LCS for years. However, the Dillon Pass section within the project area has been repaired multiple times since its construction. The Bigfoot section is the oldest section of road and is the last section with no drainage.

Rationale for dismissal: The proposed action would not adversely affect the aspects of integrity or character defining features that makes the Loop Road eligible for listing on the National Register of Historic Places. In addition, the proposed action would allow for the continued use of this historic property. Overall, Alternative B would have a long-term benefit by maintaining the criteria for which

Loop Road is historically significant. The NPS is also separately and concurrently preparing an assessment of effect to comply with the requirements of Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (54 U.S.C. 306108), and its implementing regulations (36 *Code of Federal Regulations* [CFR] 800).

Archeological Resources: Disturbance to Archeological Sites

Construction activities could result in disturbance to archeological resources.

Rationale for dismissal: Based on archeological surveys, no archeological sites have been identified within the area of potential effect (APE); thus, archeological resources have been dismissed from detailed analysis.

Ethnographic Resources: Limitations to Participation in Annual Events

The proposed project could potentially limit participant access to the annual Bigfoot Ride event conducted by several Tribes.

Rationale for dismissal: Timing restrictions of construction activities would be implemented as to avoid annual events within the park; therefore, the proposed project would not result in effects specific to these events.

Indian Trust Resources: Indian Trust Land and Sacred Site Impacts

Indian Trust resources are those natural resources reserved by or for Indian tribes through treaties, statutes, judicial decisions, and executive orders, which are protected by fiduciary obligation on the part of the United States (NPS 2006).

Rationale for dismissal: No lands held in trust for the benefit of Indians are located in the vicinity of the project area.

Environmental Justice: Impacts to Minority or Low-Income Populations

The proposed action could disproportionately impact minority or low-income populations.

Rationale for dismissal: Equal consideration was given to all public input from persons regardless of age, race, income status, or other socioeconomic or demographic factors; the proposed action would not result in any identifiable adverse human health effects; the proposed action would not disproportionately affect any minority or low-income population or community; and the proposed action would not result in any identified effects that would be specific to any minority or low-income community.

Socioeconomics: Impacts to Nearby Communities

The proposed action could impact the socioeconomic environment within nearby communities.

Rationale for dismissal: The park staff and planning team does not anticipate any impacts on the socioeconomic environment to alter the physical or social structure of nearby communities because the implementation of either alternative would neither change local or regional land use nor appreciably impact local business or other agencies.

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ALTERNATIVES

This EA analyzes a no-action alternative and one action alternative for each roadway section for the proposed rehabilitation along Loop Road. Several alternatives were considered then dismissed from additional evaluation, which are described in this chapter under the *Alternatives Dismissed from Further Consideration* section.

ALTERNATIVE 1: NO-ACTION

The no-action alternative describes the action of continuing the present management operations and conditions. This alternative does not imply or direct continuing the present action or removing existing uses, development, or facilities. The no-action alternative provides a basis for comparing the management direction and environmental consequences of the action alternative. The following is a description of the no-action alternative for the Dillon Pass and Bigfoot sections.

Dillon Pass Section

Under the no-action alternative, the NPS would continue management actions that would include general maintenance and spot repairs of the roadway to resolve drainage issues. The current drainage infrastructure and plastic netting products for slope stabilization would remain in place. The ponding along the roadside and the voids below the road surface would continue to exist.

However, erosion would continue to worsen the current conditions of the roadway, and structural and accessibility issues would remain. While this scenario would involve a continuance of current maintenance activities, it would not relieve the risk of potential eventual road failures that may occur in the project area as a result of the implementation of the no-action alternative.

Bigfoot Section

Under the no-action alternative, current management actions would include the same general elements as the Dillon Pass section. In addition, the current management actions of general maintenance and spot repairs at the Bigfoot Picnic Area would continue to occur. This area would continue to face drainage and erosional issues as well as visitor accessibility issues.

ALTERNATIVE 2: REHABILITATION OF LOOP ROAD AT DILLON PASS AND BIGFOOT (PROPOSED ACTION AND PREFERRED ALTERNATIVE)

Alternative 2 consists of proposed repair work along two sections of Loop Road: Dillon Pass and Bigfoot. In general, several elements are common between the rehabilitation activities proposed along the two sections, including 1) repaving of each section and in some areas, full reconstruction; 2) slope stabilization; 3) drainage infrastructure reconfiguration and/or replacement; 4) removal of abandoned and temporary pipes; 5) selective removal of curbs; 6) replacement of all plastic netting products with wildlife-friendly, plastic-free netting; and 7) revegetation of disturbed areas along Loop Road.

Dillon Pass Section

Proposed repair work along the Dillon Pass section at MP 24.9 to MP 25 would include the elements discussed below under *Elements Common to Dillon Pass and Bigfoot Sections*. Specific corrective actions to address drainage and roadway stabilization concerns at Dillon Pass include the removal of an abandoned culvert and backfilled concrete under the roadway as well as reestablishing a compacted buttress that covers any downspout culverts to termination points. A new culvert inlet headwall would be installed at MP 24.9, and the culvert at MP 25 would be cleaned out and drained (**Figure 4**). The project area (construction limits) for the Dillon Pass section is presented in **Figures 5a** and **5b**. Construction would include the use of heavy construction equipment such as excavators, bulldozers, and dump trucks for the earthwork needed to repair the banks and replace existing piping under the roadway.



Photograph courtesy of Stantec Consulting Services Inc.

Figure 4. Ponding caused by clogged culvert to north side of road on Dillon Pass section at MP 25

Bigfoot Section

Proposed repair work along the Bigfoot section starting west of Bigfoot Picnic Area at approximately MP 12.8 on Loop Road, for 1.19 miles to an area by Bigfoot Road, would include the same general elements as the Dillon Pass section, which are further described under *Elements Common to Dillon Pass and Bigfoot Sections*. In addition to these elements, this portion of the project would also address drainage and visitor accessibility issues at the Bigfoot Picnic Area, as well as remove timber curbing in the parking lot. Existing larger trees would be protected. The project area (construction limits) for the Bigfoot section is presented in **Figures 6a, 6b, 6c, and 6d**.

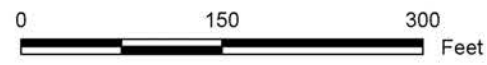
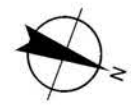
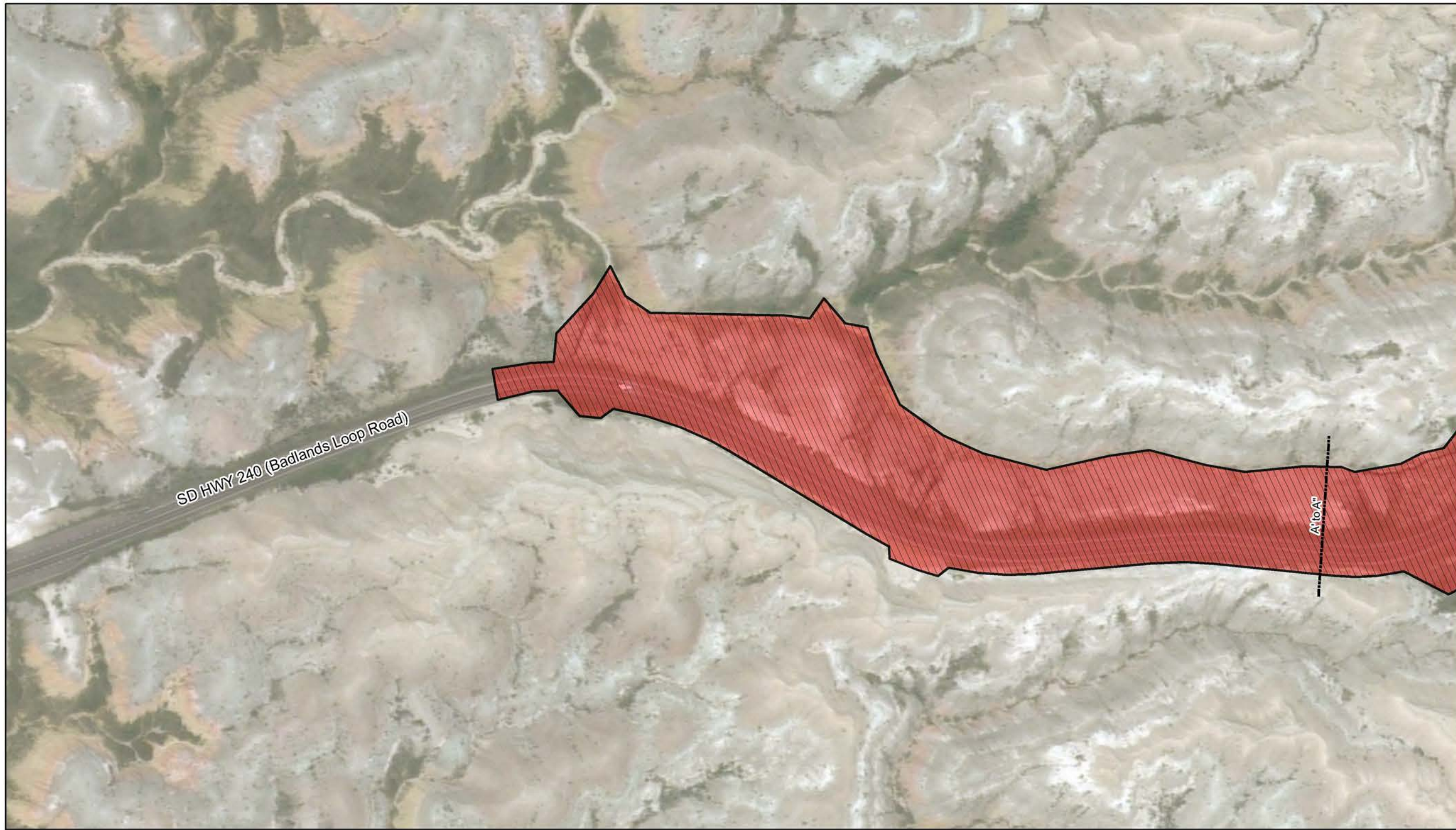



Figure 5a. Dillon Pass Section

----- Match Line

 Limits of Construction



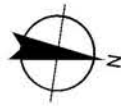
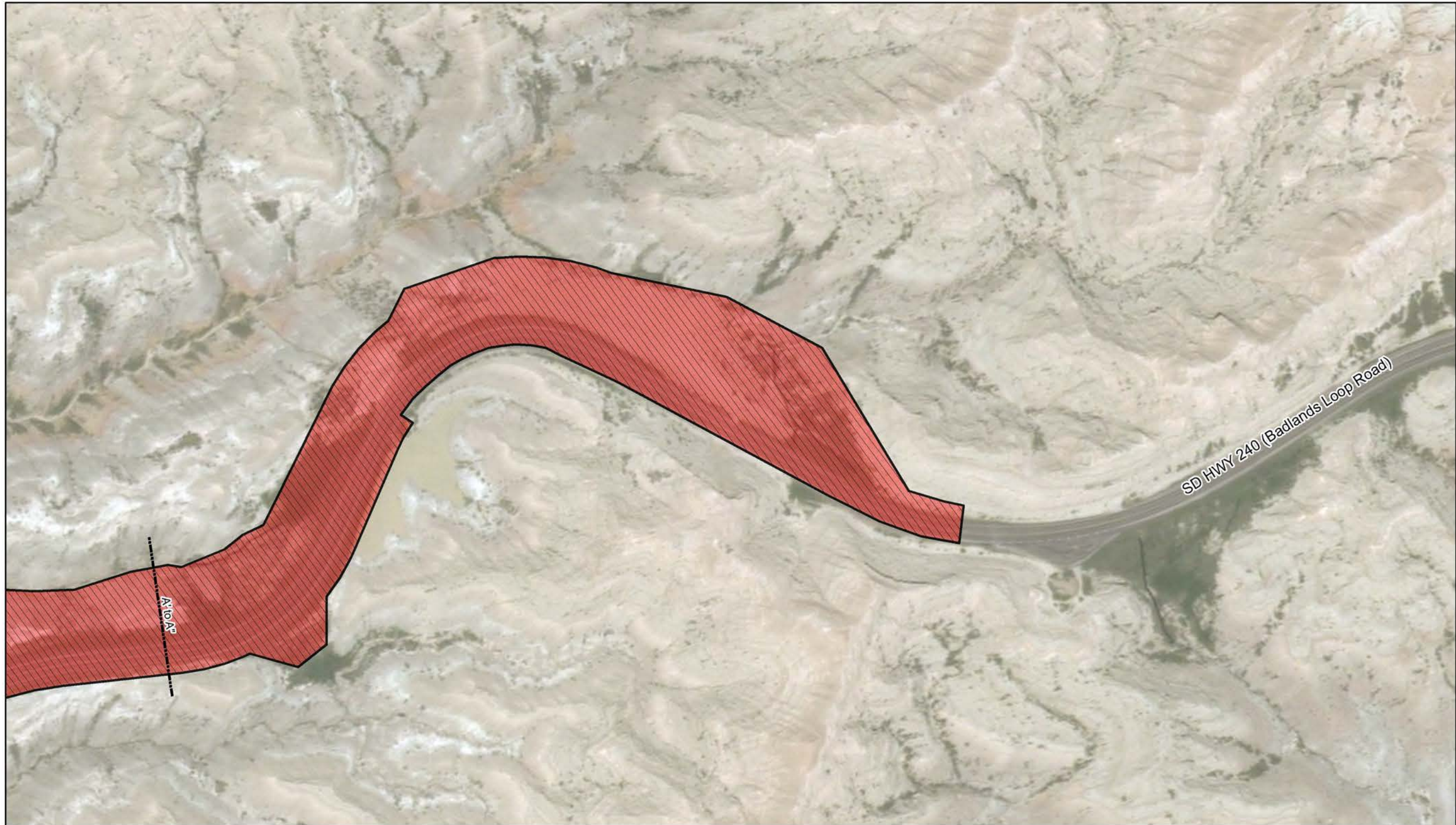


Figure 5b. Dillon Pass Section

----- Match Line



 Limits of Construction





Figure 6a. Bigfoot Section

- Match Line
 -  Limits of Construction
- Page 1 of 4



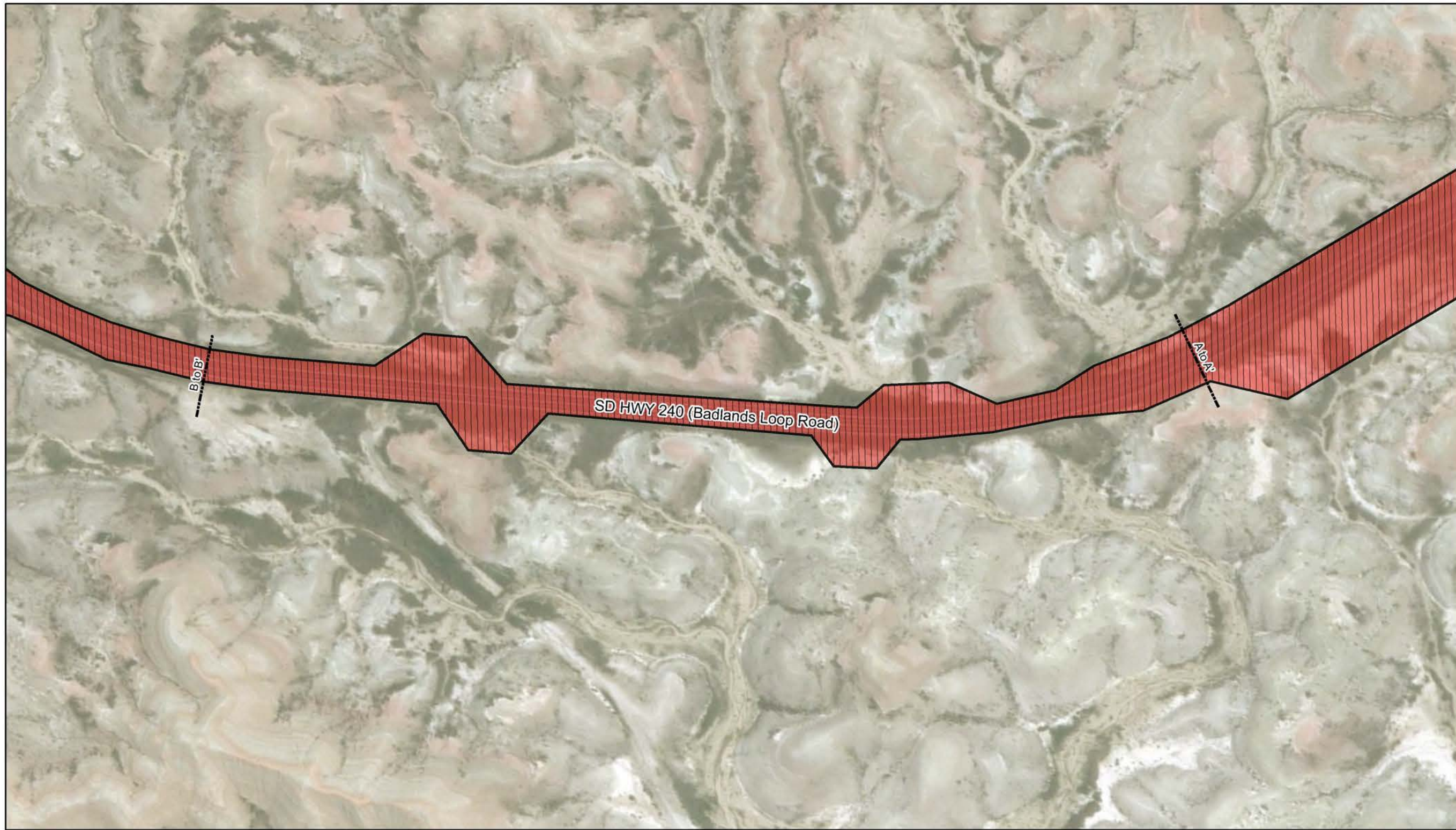



Figure 6b. Bigfoot Section

----- Match Line

 Limits of Construction



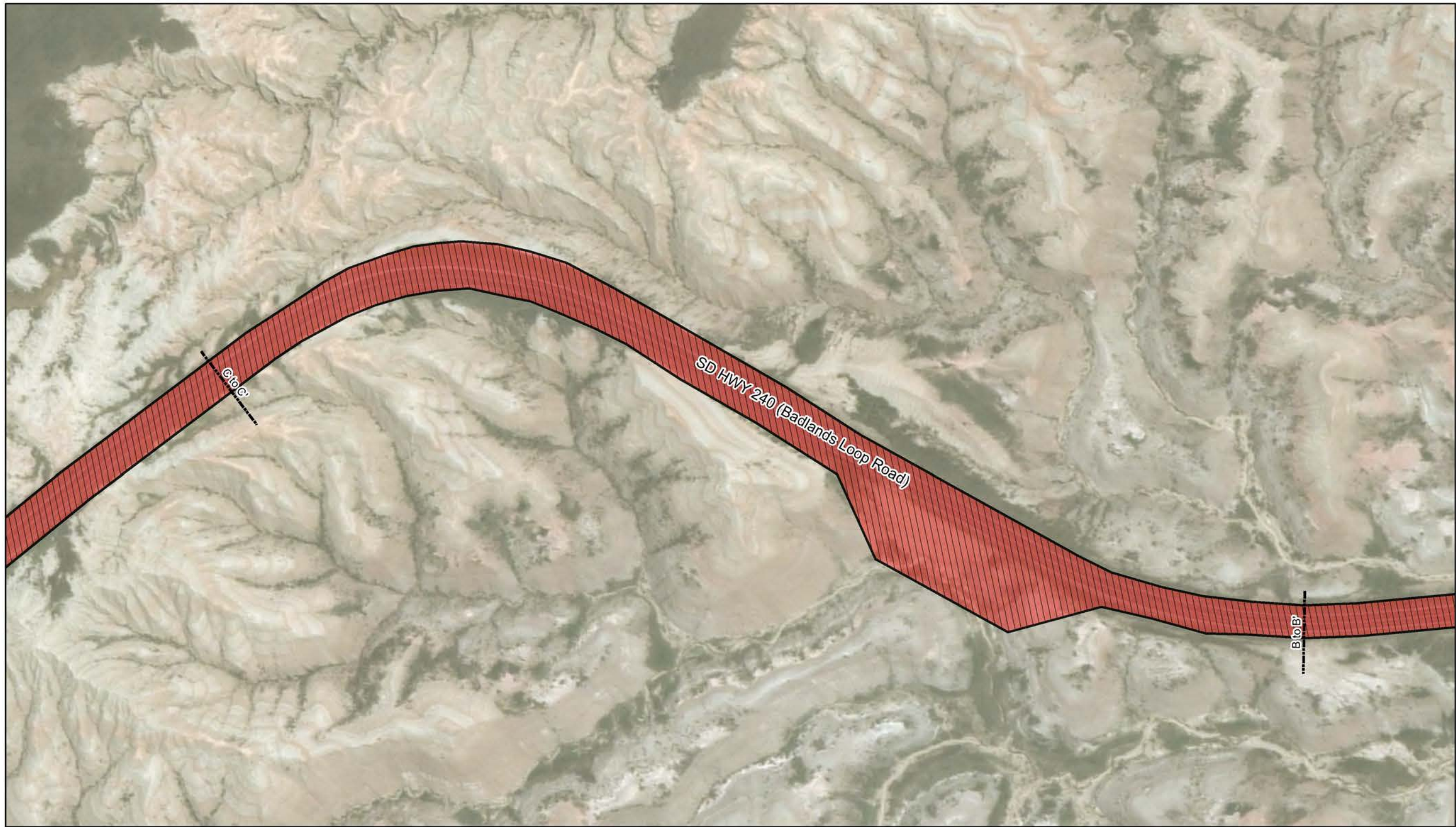



Figure 6c. Bigfoot Section

- Match Line
 -  Limits of Construction
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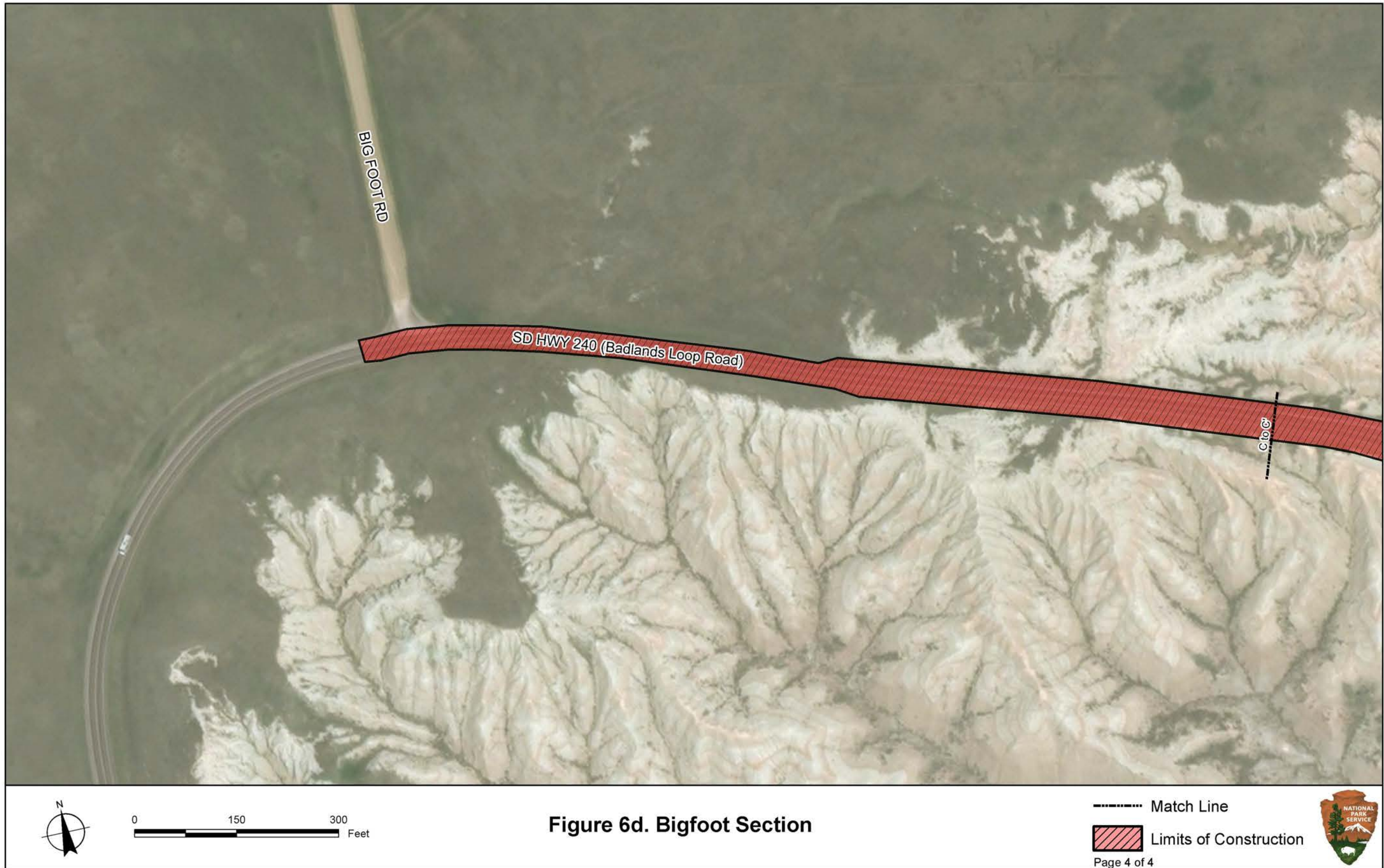


Figure 6d. Bigfoot Section

----- Match Line
Limits of Construction
Page 4 of 4

Elements Common to Dillon Pass and Bigfoot Sections

Construction Activities including Equipment, Timing, and Road Detours

Construction activities under alternative 2 would require the use of the following equipment: excavators, dozers, compactors, wheel loaders, dump trucks, graders, and paving equipment (e.g., laydown, rollers).

The majority of construction would be completed without closing the road to traffic. However, as construction proceeds, one lane of Loop Road would be closed for up to four weeks, and it is possible that both lanes of the road may be closed for one to two weeks for grading and surfacing work, although the NPS's goal is to maintain one lane open at all times as the route is important for farm to market purposes (NPS 2017a). In the case of a full temporary roadway closure, a viable detour route would use other portions of Loop Road. Construction would be conducted during daytime hours.

Staging Areas

Construction staging areas would be sited in previously disturbed or developed areas during detailed design to minimize impact on park resources, park operations, and visitor experience. As an example, the Bigfoot Picnic Area would be used as a staging area for equipment, etc., during construction. Additional staging areas could occur in available pullouts and other parking areas.

Road Surface Alterations

The park would repave areas of Loop Road along the Dillon Pass and Bigfoot sections to repair the uneven or rough surface. The pavement work would consist of milling the old roadway asphalt, re-utilizing the asphalt millings by compacting the material into a solid base layer, then overlaying the surface with a fresh asphalt hot mix. In other areas, full reconstruction of Loop Road would be necessary to correct the roadway subsurface. Full reconstruction entails removal of the existing pavement and subbase material and rebuilding the road subbase and pavement, whereas, milling and overlay includes scraping the top of the pavement surface and laying down new surface on top of the existing roadway. In concert with road surface alterations, the park would redesign pull-offs along the two sections of Loop Road. In some areas, the road striping and shoulder widths would be changed to allow for better sight distances and to discourage visitors from pulling off along the roadway shoulder on curves or unsafe areas.

Slope Stabilization

In areas of erosion or construction disturbance, the existing roadway embankments would be graded to more gradual slopes that would support revegetation. FHWA-approved engineered fill materials would be used during construction, and spoil would be removed offsite to avoid introduction of foreign materials into the sensitive soils and to use more suitable materials for construction. As part of the slope stabilization that would occur, the NPS would grade the adjacent shoulders (more gradual slope) to the roadway in such a manner as to allow the park maintenance staff to more easily perform roadside mowing and snow removal.

Drainage Improvements

The road surface is drained by a combination of small drop inlets and temporary pipes (**Figure 7**) that feed into ephemeral or intermittent stream channels within the park, which then drain into Sage Creek (and ultimately White River). The park would remove temporary and abandoned pipes and replace or reconfigure drainage features with a more permanent drainage system to include new piping in suitable structural fill materials and revegetation to minimize future erosion. Based on the highly erodible soils that exist at the park, pipes would be removed in lieu of abandonment.



Photograph courtesy of Stantec Consulting Services Inc.

Figure 7. Example of temporary down drain and metal pipe to be removed and replaced

Curb Removal

Select asphalt and timber curbing along the Dillon Pass and Bigfoot sections would be removed and replaced with concrete curbing to prevent future erosion and stabilize the roadway shoulders.

Plastic Netting Replacement

During past projects along Loop Road, plastic netting products have been used for slope stabilization; however, these products have resulted in fatalities to wildlife within the park (e.g., snakes). Therefore, the plastic netting products along the Dillon Pass and Bigfoot sections would be replaced with wildlife-friendly, plastic-free netting (i.e., jute, sisal, and coir) for slope stabilization.

Revegetation

In addition to slope stabilization activities, revegetation efforts on all new construction and disturbed areas on both north and south sides of Loop Road would occur. Revegetation would consist of NPS-approved weed-free seed mixes that would help to stabilize the banks.

ALTERNATIVES DISMISSED FROM FURTHER CONSIDERATION

2006 North Unit General Management Plan Alternatives

The North Unit General Management Plan (GMP; NPS 2006) was reviewed to identify potential alternatives for rehabilitation of Loop Road. However, the Loop Road realignment alternatives discussed in the GMP do not apply to the project area as the realignments were not proposed to occur along the Dillon Pass nor Bigfoot sections. Additionally, an alternative was dismissed in the GMP discussing the construction of a bicycle lane along Loop Road. After preliminary review, it was determined that widening parts of the road to accommodate bicycles would require extensive excavation, which would lead to concerns about adverse effects to resources (e.g., fossils) as well as cost. Therefore, these alternatives were dismissed from detailed analysis.

Bigfoot Realignment

An alternative was considered to realign a section of the current roadway along the Bigfoot section. The realignment would provide increased roadway stability by reducing erosion in the near term; however, the realignment would pose a risk to the potential for future landslide movements impacting this realigned section of the roadway.

Elevated or Benched Roadway

This alternative would consist of raising or benching the roadway to provide for better long-term structural support. This alternative would require a much larger construction footprint and extensive fill materials be brought into the park resulting in unacceptable impacts and higher costs.

Loop Road Closure

Permanent closure of Loop Road was an alternative considered during the planning process. However, this alternative would not meet the purpose and need of the project as a closure would prevent visitor access to park sites and experiences. The rehabilitation of the roadway at the Dillon Pass and Bigfoot sections is needed to help preserve the historic Loop Road for future generations, improve visitor experience, facilitate safe driving conditions, increase operational efficiency, and address erosion concerns.

BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

To prevent and minimize potential adverse impacts associated with the action alternative, best management practices and mitigation measures would be implemented during construction and post-construction phases of the project. Best management practices and mitigation measures associated with this project are included in **Table 1**.

Table 1. Best Management Practices and Mitigation Measures

Resource Area	Best Management Practice/Mitigation Measure
Paleontological and Geological Resources	A qualified paleontologist would be on site to monitor for paleontological resources before and during construction. Dependent upon NPS resources, paleontological monitoring either will be contracted or conducted by park personnel.
	If paleontological resources are found on site during construction, all work would stop in the immediate area until the paleontologist can fully document and mitigate the discovery. Efforts would be made to avoid fossil resources during the construction process.
	Fill used as a part of this project will meet FHWA engineering specifications to include an off-site borrow area free of paleontological resources.
	Project engineers would seek to minimize impacts to existing landforms to the extent feasible during more detailed design by further delineating landforms on the project plans and requiring contractors to avoid these areas.

Resource Area	Best Management Practice/Mitigation Measure
Wildlife	Ongoing monitoring activities as well as pre- and post-construction monitoring for bighorn sheep would be required. Efforts would be made to schedule construction and maintenance activities outside of sensitive times of the year for bighorn sheep, such as the breeding season (November and December) and lambing season (May and June).
	Wildlife-friendly, plastic-free netting (i.e., jute, sisal, and coir) must be used in erosion and sediment control products. Existing netting would be removed as part of the construction in the project area.
	The contractor will set a perimeter with plastic netting around heavy equipment in the event of oil/antifreeze leaks from this equipment at staging areas during construction.
Visitor Use and Experience	A traffic control plan would be developed in conjunction with the construction documents for use during the construction period(s) associated with roadway, entrance station, overlooks, and parking area improvements. The plan would be provided to the park for review and approval before implementation. Considerations for emergency vehicle access would be incorporated into the plan.
	Timing restrictions would be observed so that construction activities will not interfere with the Bigfoot Ride event and Sturgis motorcycle rally.
Archeological Resources	Although there is no surface evidence of archeological resources, if concealed archeological resources are encountered during project activities, all necessary steps will be taken to protect them, and NPS Midwest Region Archeological Center cultural resources specialists will be notified immediately.
	Project staging/laydown shall be located in areas free and clear of archeological concerns.
Vegetation	Revegetation and recontouring of disturbed areas would take place following construction and would be designed to minimize impacts on native vegetation, geological formations, and deter the possible spread of invasive species. Revegetation efforts would strive to use park approved species that contribute to the slope stabilization and ease of maintenance on roadway shoulders.
	A revegetation plan would be developed in coordination with the park's vegetation program manager and registered landscape architect. Any revegetation efforts would use site-adapted native species and/or site-adapted native seed, and park policies regarding revegetation and site restoration would be incorporated. The plan would consider, among other things, the use of native species, nonnative vegetation management, and pedestrian barriers. Policies related to revegetation would be referenced from the NPS <i>Management Policies</i> (2006).
Water Quality	If required, a stormwater pollution prevention plan, or equivalent best management practices, would be prepared by the contractor during the construction contract and would meet all statutory NPS standards. All National Pollutant Discharge Elimination System requirements would also be met.

AFFECTED ENVIRONMENT

This chapter describes the affected environment, which is intended to document the existing conditions of the park. These descriptions serve as a baseline for understanding the resources that could be impacted by implementation of the proposed action.

PALEONTOLOGICAL AND GEOLOGICAL RESOURCES

Badlands National Park is world renowned for its paleontological resources. A report that accompanied the 1929 Act creating the park described the Badlands as containing “vast beds of vertebrate remains” Dr. Hiram Prout, a St. Louis physician, described the first vertebrate fossil in 1846 (Prout 1846). Numerous important paleontological finds in the Badlands have served to define the geologic period. Oligocene fossil remains include camels, three-toed horses, oreodonts (small sheep-like animals), antelope-like animals, rhinoceroses, false deer, rabbits, subterranean beavers, creodonts (predatory animals), land turtles, rodents, and birds.

In the western part of the North Unit of the park, marine fossils are found in deposits of an ancient sea that existed in the region some 67 to 75 million years ago during the Cretaceous period. Within the park, fossils found in the Pierre Shale Formation include ammonites, nautiloids, fish, marine turtles, and mosasaurs.

In October 2017, park staff conducted a paleontological survey for both the Dillon Pass and Bigfoot APE, which for archeological and paleontological resources is equivalent to the limits of construction. Fossils were identified within the Dillon Pass APE. While no fossils were identified within the Bigfoot APE, the bedrock is known to be highly fossiliferous within both the Dillon Pass APE and the Bigfoot APE.

The park also is significant for its geologic formations, unique landforms, and scenery. The erosion of sediments at the park provides an array of dramatically changing vistas. The spectacular shapes and colors of the landscape range from low rolling hills to tall walls and spires. As a result, Loop Road is also known as the Badlands Scenic Byway (NPS 2017a). **Figure 8** shows the types of landforms and colors representative in the Bigfoot section study area.

The different types of geologic formations (i.e., light colored Sharps Formation, thick layer of Rockyford Ash, tannish brown Brule Formations, and greyish Chadron Formation) can be seen as one drives Loop Road in the North Unit (NPS 2018a). These formations are highly erodible. In the study area, small grey mounds of the greyish Chadron Formation and the grey and red banded Brule Formation exist along the sides of the roadway.



Photograph courtesy of Stantec Consulting Services Inc.

Figure 8. Landforms and scenery along Loop Road as seen from Bigfoot Picnic Area

WILDLIFE INCLUDING RARE, THREATENED, AND ENDANGERED SPECIES

Badlands National Park is at the western edge of what was once a mixed-grass prairie ecosystem, a transition zone between the arid short-grass prairie to the west, and the moist tall-grass prairie to the east. In conjunction with the adjacent Buffalo Gap National Grassland, today the park supports one of the largest remaining mixed-grass prairies in North America (NPS 2012, 2006).

Information regarding wildlife species and habitat in the project area was obtained from a review of existing published sources, site-specific surveys, South Dakota Game, Fish & Parks Department (SDGFP), and USFWS file information. Baseline descriptions of both resident and migratory wildlife include species that have either been documented within the project area, or those that may occur within the project area, based on habitat associations. The project area contains two habitat types, including grassland and sparsely vegetated areas.

Big Game Species

Big game species that occur in the project region include white-tailed deer, mule deer, pronghorn, bison, and Rocky Mountain bighorn sheep (NPS 2012). Population numbers for these species fluctuate slightly from year-to-year based on habitat conditions and winter severity. Forage quality, cover, and weather patterns typically determine the level of use and movement of big game species within the project area, particularly during the winter months. Rocky Mountain bighorn sheep were restored to the park in 1964 and the population now numbers approximately 200 animals (NPS 2017b). They are found primarily near the Pinnacles and Cedar Pass in the North Unit. A key migratory route for the species (and other wildlife) is the narrow corridor at the southwest end of the North Unit (approximately 15 miles southwest of the Dillion Pass section of the project area), which is bisected by State Highway 44 (NPS 2017b, 2006). This species may be present in the project area during various times of the year.

Small Game Species

Upland game birds that potentially occur or have been documented within the project area include sharp-tailed grouse, wild turkey, and mourning dove (NPS 2012). The sharp-tailed grouse is a representative of the native prairie ecosystem and has been documented in the park; however, only one lek has been identified in the South Unit of the park outside of the project area (NPS 2012). Small game mammals likely to occur within the project area include eastern and desert cottontail (NPS 2012). These species occur in a variety of habitat types but are most common in brushy areas such as drainages and shrublands.

Nongame Species

A diversity of nongame species (e.g., small mammals, raptors, passerines, amphibians, and reptiles) occupies a variety of trophic levels and habitat types within the project area. Common nongame wildlife species include small mammals, such as bats, voles, gophers, woodrats, and mice. These small mammals provide a substantial prey base for predators in the project area, including larger mammals (coyote, badger, and fox), raptors (eagles, hawks, accipiters, and owls), and reptiles (snakes).

Raptors and Other Migratory Birds. Nongame birds encompass a variety of passerine and raptor species, including migratory bird species that are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-711) and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). Raptor species that occur within the project area as residents or migrants include golden eagle; buteos (e.g., red-tailed hawk, Swainson's hawk, rough-legged hawk, and ferruginous hawk); falcons (e.g., prairie falcon and American kestrel); owls (e.g., great-horned owl, short-eared owl, burrowing owl); northern harrier, and turkey vulture (NPS 2012; Stoke and Stokes 1996). No known nests occur in or near the project area.

Migratory birds are considered integral to natural communities and act as environmental indicators based on their sensitivity to environmental changes caused by human activities. A variety of passerines occur within the project area throughout the year; however, they are most abundant during the spring/fall migration, as well as during the breeding season (generally February 1 through July 15). Representative bird species that occur within the project area include killdeer, eastern kingbird, Bell's vireo, black-billed magpie, bank swallow, cliff swallow, mountain bluebird, field sparrow, and dickcissel (NPS 2012; Stokes and Stokes 1996).

Reptiles and Amphibians. Common amphibians found within the park include the Plains spadefoot toad, Great Plains toad, and the chorus frog. Common reptiles found within the park include the red-sided garter snake, Western Plains garter, western hognose snake, bullsnake, and prairie rattlesnake (NPS 2012, 2006).

Rare, Threatened, and Endangered, and Other Special Species

Special status species are plant or wildlife species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed species that are protected under the ESA. There are no special status plant species identified as potentially occurring within the project area. A total of six special status terrestrial wildlife species were identified as potentially occurring within the project area (SDGFP 2017; USFWS 2017). The potential for occurrence of special status wildlife species within the project area was based on range, known distribution, and the presence of suitable habitat within the project area. Based on these evaluations, four wildlife species (whooping crane, interior least tern, rufa red knot, and northern long-eared bat) have been eliminated from detailed analysis. The remaining two species analyzed (black-footed ferret and swift fox) have the potential to occur within the project area.

Black-footed Ferret (State Endangered). This species inhabits prairie dog colonies within semi-arid grasslands and mountain basins. The park's reintroduction of black-footed ferret population is designated a nonessential experimental population under the ESA. This designation allows federal, state, and tribal resource managers more flexibility in managing the population. It provides for experimental designs in releasing animals and allows for incidental take of individuals (such as the death of an individual during anesthesia). The black-footed ferret population now is concentrated in the Kocher Flats and Roberts areas in the North Unit of the park. The park's black-footed ferret population reached a high in late summer 2000 with a minimum of 33 individuals, and then declined to an estimated 14 individuals in the autumn of 2001 (NPS 2006). In 2011, there were an estimated 33 individuals, with an average of 28 breeding adults (USFWS 2013).

Black-tailed prairie dog colonies do not occur in the project area; although the nearest known colonies are approximately 0.5 mile west of the Bigfoot section of the project area and one mile northwest of the Dillon Pass section of the project area. The nearest black-tailed prairie dog colony with black-footed ferrets present is approximately 1.5 miles southwest of the Bigfoot section of the project area in the Prairie Wind black-tailed prairie dog town (Childers 2017a).

Swift Fox (State Threatened). The swift fox is classified as a state threatened species in South Dakota. Swift fox habitat is composed of level to gently sloping topography containing an open view of the surrounding landscape, abundant prey, and lack of predators and competitors (SDGFP 2008). Swift fox habitat in the park is concentrated in the Sage Creek area and along the northern edge of the North Unit (NPS 2006). While suitable habitat for the species occurs near the project area, particularly immediately north of the Bigfoot section of the project area, the nearest documented trap location for swift fox is approximately 1.25 miles north of the Bigfoot section of the project area (Childers 2017b).

VISITOR USE AND EXPERIENCE

From 2005 to 2013, Badlands National Park averaged 893,318 visitors per year. Loop Road provides primary access to the park for visitors and serves an important function for farm-to-market and emergency services purposes. The park's scenic landscape of the Badlands provides visitors with a unique experience. The park also provides visitors with educational opportunities regarding the parks' geological and paleontological wonders, as the Badlands geologic formation contains one of the world's richest fossil beds (NPS 2017a). In addition to scenic driving, the park provides visitors with recreational opportunities in the form of hiking and picnicking.

Currently, portions of Loop Road within the project area are rough for park visitor vehicular traffic, which detracts from the overall visitor experience. Visitors also face safety concerns with improper site distances along portions of Loop Road at the Dillon Pass and Bigfoot sections. In addition, the Bigfoot Picnic Area consisting of potholes, cracks, uneven pavement, and settlement presents accessibility issues to visitors wishing to use this area.

ENVIRONMENTAL CONSEQUENCES

This chapter includes an analysis of the environmental consequences or “impacts” of the no-action alternative and action alternative. The impact topics presented in this chapter correspond to the environmental issues and concerns described in the *Purpose and Need* chapter of this EA.

In accordance with CEQ regulations, the environmental consequences analysis includes the direct, indirect, and cumulative impacts (40 CFR 1502.16). The intensity of the impacts is assessed in the context of the park’s purpose and significance and any resource-specific context that may be applicable (40 CFR 1508.27). The methods used to assess impacts vary depending on the resource being considered, but generally are based on a review of pertinent literature and park studies, information provided by on-site experts and other agencies, professional judgment, and park staff knowledge and insight.

CUMULATIVE IMPACTS METHODOLOGY

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). To determine the cumulative impacts, the team examined past, present, and reasonably foreseeable future actions at Badlands National Park. The study area for this cumulative impact assessment is generally delineated as the North Unit of Badlands National Park. Cumulative impacts are considered for the no-action and the preferred alternative. The following projects were identified for the purpose of conducting the cumulative impact analysis:

Past Actions

- Loop Road Cedar Pass Roadway Rehabilitation (2000) – This project consisted of stabilizing the deteriorating Loop Road section that crosses over the active Cedar Pass Landslide area. An EA was completed that evaluated project alternatives, including the preferred alternative, involving the construction of a stability buttress.
- Loop Road Cliff Shelf Roadway Rehabilitation (2014) – This project consisted of stabilizing the deteriorating Loop Road section that crosses over the active Cliff Shelf landslide area. An EA was completed to evaluate project alternatives, including the preferred alternative, involving the construction of a deep patch and buttress.
- Emergency Relief for Federally Owned Roads Program (ERFO) Event Repairs (2015) – The ERFO project included repairs to Loop Road (including along the Dillon Pass section) and Conata Road to address damage from a 2015 storm event.

Present Actions

- North Unit Bison Resource Stewardship Plan/EA (2016) – This plan/EA evaluated alternatives, including the preferred alternative, to expand the current geographic bison range within the North Unit of the park to conserve the herd’s genetic integrity, while enhancing the mixed-grass prairie ecosystem and increasing visitor opportunities to view the bison herd.

Reasonably Foreseeable Future Actions

- Loop Road and Conata Road Engineering Study – An engineering study is being conducted concurrently with this EA that evaluates conditions along the entirety of Loop Road and Conata Road within the park to develop a five to 15-year road work plan. This engineering study could result in the future development of a programmatic NEPA compliance document evaluating the proposed repair work.

PALEONTOLOGICAL AND GEOLOGICAL RESOURCES

About the Analysis

The study area for the analysis is the limits of construction for both the Dillon Pass and Bigfoot sections of Loop Road. In October 2017, park staff conducted a paleontological survey that identified fossils within the Dillon Pass limits of construction. While no fossils were identified within the Bigfoot limits of construction, the bedrock is known to be highly fossiliferous throughout the study areas. The analysis also considered potential changes and impacts to existing geological landforms resulting from grading and excavation to conduct the roadway reconstruction, pipe replacement, and slope stabilization.

Alternative A: No-Action

Under the no-action alternative, the NPS would continue management actions that would include general maintenance and spot repairs of the roadway to resolve drainage issues, and erosion would continue along the road. Paleontological resources (fossils) and geological resources (landforms) have the potential to be impacted by both general maintenance activities and continued erosion; however, impacts would be minimal as general maintenance would occur within the previously disturbed roadway and would be unlikely to impact undisturbed bedrock. Continued erosion due to standing water, poor drainage, and sink holes has the potential to impact known and unknown paleontological resources. The impacts would be expected to be minor in the context of the resources in the study area because the impact area is very small given the amount of land at the park supporting paleontological resources.

Cumulative Impacts. Past, present, and reasonably foreseeable projects, such as past roadway rehabilitation projects, have had a minor adverse cumulative impact on paleontological and geological resources in the North Unit of Badlands National Park. Reasonably foreseeable future actions, such as the corrective actions resulting from the engineering study of Loop Road and Conata Road, could also have impacts to fossils and geologic formations. Impacts would result from grading necessary to implement roadway repair and slope stabilization. As previously described, the no-action alternative

would have a minor adverse impact to paleontological and geological resources due to general roadway maintenance and continued erosion. The no-action alternative would contribute a small increment to the overall long-term minor cumulative impact.

Conclusion. Under the no-action alternative, there would be long-term minor adverse impacts to existing fossils and landforms caused by general roadway maintenance and continued erosion. Cumulative impacts would be adverse and minor.

Alternative B (Proposed Action and NPS Preferred Alternative)

Full road reconstruction, slope stabilization, and drainage improvements have the potential to disturb paleontological resources within both the Dillon Pass and Bigfoot limits of construction. Excavation activities could lead to the disturbance or loss of resources, such as fossils within the project areas. If this occurs, there would be a long-term adverse impact. Monitoring performed by a qualified paleontologist during construction would reduce the potential that impacts would occur. To help protect the context of paleontological resources in the North Unit, FHWA-approved engineering fill used for slope stabilization and roadway reconstruction would be obtained from an off-site source that has been determined to be free of fossils to prevent fossils from being introduced that are not in context with Badlands National Park.

To stabilize the banks along Loop Road where continual erosion has been problematic, the roadway embankment would be graded to more gradual slopes that support vegetation. Structural engineering fill would be used and spoils discarded offsite. This grading and changes to the slope could impact existing Chadron and Brule geologic formations (mounds) that exist between the toe of slope and roadway. These landforms contribute to the park feeling and visual setting as one drives Loop Road. Project engineers would seek to minimize impacts during detailed design by delineating landforms on the project plans and requiring contractors to avoid these areas. In the context of the vast nature of the landforms in the larger park setting of the North Unit, impacts to existing geological landforms are expected to be minor.

Cumulative Impacts. As described previously, alternative B would have long-term minor adverse impacts to paleontological resources and geological landforms resulting from earth disturbance and excavation activities for drainage improvements and slope stabilization. Past projects such as Cedar Pass, Cliff Shelf, and ERFO event repairs to Loop Road have had adverse impacts on paleontological resources as well as geological landforms from construction activities similar to the proposed action. Collectively, these impacts have not diminished the resources to the point that impacts were noticeable. Near-term future roadway rehabilitation could also add to the cumulative impacts to these resources for similar reasons. Collectively, these cumulative impacts are minor because the impacts would not result in a noticeable change to the vast area of existing paleontological resources and significant geological landforms in the North Unit of Badlands National Park. The actions of alternative B would add a small increment to the overall cumulative impact.

Conclusion. As the park is abundant with paleontological resources, only minor impacts to paleontological resources and geological landforms would occur from soil and bedrock excavation and disturbance to complete the pavement reconstruction, drainage improvements, including pipe replacements, and slope stabilization. Impacts would be minor, adverse, and long-term. On-site

monitoring by a qualified paleontologist and additional protection to landforms during more detailed design would be implemented to minimize impacts. Alternative B would add a small increment to the overall minor cumulative impact.

WILDLIFE INCLUDING RARE, THREATENED, AND ENDANGERED SPECIES

About the Analysis

The study area for the analysis includes the wildlife habitats located within and abutting the project area, since wildlife species are transient. The project area includes the limits of construction for areas proposed for road surface alterations, slope stabilization, drainage improvements, curb removal, plastic netting replacement, revegetation activities, and other construction activities (including staging and road detours). Potential impacts to wildlife were identified by reviewing existing data sources and literature, quantifying the extent to which the project could impact habitat, individuals, or populations, and identifying any conflicts with applicable land use plans and/or regulations.

Alternative A: No-Action

Under the no-action alternative, the NPS would continue management actions that would include general maintenance and repairs of the roadway to resolve drainage issues and erosion. However, erosion would continue to worsen the current conditions of the roadway, and structural and accessibility issues would remain. Potential disturbance to wildlife and their habitat would not be likely to occur from general maintenance activities and spot repairs to the roadway. However, fatalities to snakes that get trapped in the plastic netting used for erosion control during past rehabilitation projects would continue to occur resulting in long-term minor adverse impacts.

Cumulative Impacts. Past, present, and reasonably foreseeable projects, such as past roadway rehabilitation projects, have had a minor adverse cumulative impact on wildlife in the North Unit of Badlands National Park. Reasonably foreseeable future actions, such as the corrective actions resulting from the engineering study of Loop Road and Conata Road, could also have impacts to wildlife (e.g., habitat displacement). Through best management practices such as minimizing construction activities during breeding or lambing season in the case of bighorn sheep, the NPS has minimized impacts to wildlife to the point that impacts have been minor relative to habitat displacement and affected fecundity at a population level in the North Unit. Past installation of plastic netting has resulted in impacts to wildlife, such as snakes, that get trapped in the netting and cannot escape resulting in fatalities. The no-action alternative would have a minor adverse impact to wildlife as described previously. The no-action alternative would contribute a small increment to the overall minor cumulative impact.

Conclusion. The no-action alternative is not likely to result in impacts to wildlife from routine repairs to Loop Road. Fatalities to snakes that get trapped in the existing plastic netting would result in long-term minor adverse impacts as the number of snakes trapped is small relative to the populations as a whole within the North Unit. The no-action alternative would contribute a small increment to the overall long term adverse cumulative impact.

Alternative B (Proposed Action and NPS Preferred Alternative)

Impacts to wildlife and habitat under alternative B would include surface disturbance or alteration of native and reclaimed habitats, animal displacement, changes in plant species composition, and potentially direct loss of wildlife. The severity of these impacts on terrestrial wildlife species would depend on factors such as the sensitivity of the species, current population trends, seasonal use patterns, type and timing of project activity, and physical parameters (e.g., topography, cover, forage, climate). The revegetation of the roadway shoulders and stabilization of the roadway banks would have a slight change in the plant composition. These plants would be indigenous or appropriate to the North Unit of the park.

Big Game Species

Under alternative B, adverse impacts to big game species and habitat would occur from construction activities associated with the project, specifically slope stabilization, removal of the slurry fill, temporary traffic detours, and embankment construction. Impacts to big game would consist of temporary displacement of animals due to noise and disturbance from construction activities, transportation of materials, and general human activity in the project area. In addition, vehicle and equipment emissions and fugitive dust may disperse wildlife, which would cause more disturbance than the general traffic that exists today. Impacts are expected to be minor because there is suitable nearby habitat for the species to utilize during the period of construction, and land would be reclaimed minimizing the loss of habitat.

The North Unit of the park would experience indirect impacts of human noise and disturbances that would likely disperse wildlife outside of the construction areas and into the immediate project vicinity. Indirect impacts may result in temporary, localized reduction in relative abundance of some big game species due to construction disturbance and human activity but would not likely reduce species populations or abundance on a landscape level. The displacement of few individuals may result in additional stress placed on these individuals; however, it would not likely cause mortality or lowering of species viability.

In addition, as described in **Table 1**, ongoing monitoring activities for Rocky Mountain bighorn sheep would be required. Efforts would be made to schedule construction and maintenance activities outside of sensitive times of the year for Rocky Mountain bighorn sheep, such as the breeding season (November and December) and lambing season (May and June).

Small Game Species and Nongame Species

Direct and indirect impacts to small game and nongame species would include wildlife displacement related to construction; habitat loss, habitat alteration, and fragmentation; and increased levels of noise, activity, and human presence. Project construction would result in the potential loss of habitat until completion of reclamation and re-establishment of vegetation. However, in most instances, suitable habitat adjacent to the project area would be available for small game and nongame species until grasses and other vegetation become re-established within the disturbance areas.

Raptors and Other Migratory Birds

A number of raptor species (e.g., golden eagle, ferruginous hawk, prairie falcon, red-tailed hawk, short-eared owl) seasonally occupy the habitats in the project vicinity. Impacts to raptor species can result from the loss or alteration in habitat, reduction in prey base, and increased human disturbance. Furthermore, raptors have a high potential of being disturbed from nests and roosts, thereby leading to displacement and reduced nesting success (Holmes et al. 1993; Postovit and Postovit 1987; Stalmaster and Newman 1978). Noise levels and human activity also can preclude otherwise acceptable raptor habitat from use. To minimize the potential impact to nesting raptors and their habitat, raptor nest sites identified within the areas of disturbance would be avoided to prevent their removal. Since several variables (e.g., nest location, species' sensitivity, breeding, phenology, topographical shielding) determine the level of impact to a breeding pair, appropriate protection measures, such as seasonal constraints and establishment of buffer areas, would be implemented at active nest sites on a species-specific and site-specific basis. As a result of these protection measures, construction-related impacts to raptor species would be anticipated to be low, and no take is expected as a result of project activity.

Other avian species that may be behaviorally impacted by construction and operation activities include nesting passerines or songbirds that use the various habitats within the project area. Direct and indirect impacts to other avian species include displacement related to project construction and operation; habitat loss, alteration, and fragmentation; and increased levels of noise, activity, and human presence. Project construction could result in the incremental loss or alteration of potential habitat. However, appropriate protection measures, such as seasonal constraints and establishment of buffer areas, would be implemented at active nest sites on a species-specific and site-specific basis. As a result of these protection measures, construction-related impacts to other avian species would be anticipated to be low in relation to the total population within the North Unit, and no take is expected as a result of project activity.

Reptiles and Amphibians

Similar to small game and nongame species discussed previously, impacts to reptiles and amphibians as a result of the project would include temporary displacement related to construction and operation and habitat loss, alteration, and fragmentation. Construction activities could result in direct mortalities as a result of crushing of burrows from vehicles and equipment. However, due to suitable habitat adjacent to the project area and reclamation and revegetation of areas disturbed by construction but not required for project operation, impacts, such as small-scale mortality relative to the populations of these common species, to reptiles and amphibians would be limited primarily to disturbed areas. In addition, as described in **Table 1**, wildlife-friendly, plastic-free netting (i.e., jute, sisal, and coir) would be used in erosion and sediment control products to prevent reptiles, particularly snakes, from becoming entangled or entrapped.

Rare, Threatened, and Endangered, and Other Special Species

Black-footed Ferret

No black-tailed prairie dog colonies or black-footed ferret known occurrences have been documented in the project area as presented in chapter 3. Therefore, due to the lack of suitable habitat (i.e., black-tailed prairie dog colonies) in the project area, no impacts to black-footed ferrets are expected to occur.

Swift Fox

Impacts to breeding swift fox, if present, would result from abandonment of den sites and the potential loss of adults and young from the compaction of dens during the project construction. If swift fox are present, impacts could include the loss of suitable breeding habitat in the project area. Additional impacts, such as displacement and avoidance, would also result from increased noise and human presence associated with construction activities. However, impacts are unlikely to occur to swift fox given the small area of impact, which is restricted to areas adjacent to the roadway; in addition, no known dens are known to exist in the study area.

Cumulative Impacts. Past, present, and reasonably foreseeable future actions have cumulatively resulted in impacts to wildlife from surface disturbance that has incrementally added to habitat loss, habitat fragmentation, animal displacement, and direct mortalities. In areas where development has occurred, habitat fragmentation may have resulted in the disruption of seasonal patterns or migration routes. Past projects such as the Cedar Pass, Cliff Shelf, and ERFO event repairs to Loop Road have resulted in small areas of habitat disturbance adjacent to Loop Road resulting in a slight loss of available cover, forage, and breeding areas for wildlife species. Overall, cumulative impacts associated with these projects are minor in the context of the available habitat that exists in the North Unit and species populations in the park.

Other reasonably foreseeable future actions, such as expanding the park's bison range and recreational activities associated with bison viewing, also contribute to cumulative impacts to wildlife and their habitats. Wildlife species would be susceptible to these cumulative impacts since encroaching human activities in the North Unit resulted or would result in habitat loss and fragmentation and animal displacement in areas that may be at their relative carrying capacity for these resident species. However, many of the local wildlife populations (e.g., small game, migratory birds, raptors, reptiles) that occur likely would continue to occupy their respective ranges and would continue to breed successfully. In the context of the North Unit, alternative B would contribute a small increment to the overall cumulative impact on wildlife.

Conclusion. Wildlife impacts associated with the project would be minor in the context of the study area and North Unit of the park because: 1) only a small portion of the potentially suitable, available habitat would be impacted by the project construction activities; 2) established soil handling techniques, maintaining current contours, and subsequent reseeding of disturbed areas would aid in the re-establishment of habitats; 3) old erosion control netting would be replaced with new wildlife-friendly, plastic-free netting; 4) the committed environmental protection measures would minimize potential impacts to species (such as bighorn sheep) during the sensitive times of the year; and 5) the short-term nature of the project (approximately 6 months) would minimize the length of time that wildlife would potentially avoid habitats in the project. Overall, adverse impacts to wildlife would be minor. Alternative B would contribute a small increment to the overall minor cumulative impacts on wildlife.

VISITOR USE AND EXPERIENCE

About the Analysis

To identify the potential impacts of each alternative on visitor use and experience at the park, current driving conditions on Loop Road and surface conditions in the Bigfoot Picnic Area were considered. In addition, opportunities to access and experience scenic vistas and interpretational and cultural resources were considered, as well as visitor services and emergency response, within the North Unit.

Alternative A: No-Action

Under alternative A, the NPS would continue to perform spot repairs and conduct maintenance to the roadway and adjacent features. Visitors would continue to encounter rough driving conditions and improper sight distances, as well as potholes, cracks, uneven pavement, and settlement on Loop Road and within the Bigfoot Picnic Area. Additionally, the road would remain prone to landslide movements that could result in failure and subject visitors to more long-term closures of the road. Failure of the roadway would require park visitors to seek other roads to access portions of the park, thereby reducing the quality of the visitor experience because of longer travel times.

Cumulative Impacts. Under the no-action alternative, a long-term adverse impact to visitor use and experience would occur, as discussed previously. Past, present, and reasonably foreseeable future actions have improved (or would improve) the roadway conditions and fixed (or would fix) drainage and erosion issues. These projects have had short-term impacts to visitor experience but resulted in a long-term beneficial impact. Overall, the no-action alternative would not add to the long-term beneficial cumulative impacts to visitor use and experience of other past, present, and reasonably foreseeable projects.

Conclusion. The no-action alternative would result in adverse impacts to visitor use and experience. The NPS would maintain the existing conditions within the project area and would continue to perform spot repairs and maintenance, as necessary. Visitors would continue to face rough driving conditions and improper sight distances along Loop Road, as well as potholes, cracks, uneven pavement, and settlement within the Bigfoot Picnic Area. The no-action alternative would not add to the long-term beneficial cumulative impacts to visitor use and experience of other past, present, and reasonably foreseeable projects.

Alternative B (Proposed Action and NPS Preferred Alternative)

Under alternative B, short-term adverse impacts would occur during construction, including limitations to visitor access and use of the Bigfoot Picnic Area, as well as dust and noise from construction. There would be a potential for increased traffic due to lane closures, as well as temporary access limitations for park staff, law enforcement, emergency services, and local agricultural traffic. However, in addition to detour routes being posted, seasonal timing also would be considered for construction schedules; this would enable construction to occur during months of lower visitation or to be scheduled to avoid special events like the Bigfoot Ride event or Sturgis motorcycle rally, thereby mitigating some impact to visitors.

Alternative B would result in long-term beneficial impacts to visitor use and experience through improved functionality and conditions of the roadway and Bigfoot Picnic Area. Improved sight distances along the roadway would also increase visitor safety.

Cumulative Impacts. Alternative B would result in beneficial impacts to visitor use and experience through improved roadway conditions and modification made to the roadway to increase safety. Past, present, and reasonably foreseeable future actions have improved (or would improve) the roadway conditions and fixed (or would fix) drainage and erosion issues. These projects have had short-term adverse impacts to visitor experience but resulted in a long-term beneficial impact. Overall, alternative B would add a small increment to the overall beneficial cumulative impact to visitor use and experience.

Conclusion. Under alternative B, short-term adverse impacts would occur during construction, including limits to accessibility, increased traffic, as well as dust and noise from construction. However, construction would occur during months of lower visitation or scheduled to avoid special events, thereby mitigating some impact to visitors. The project would result in long-term beneficial impacts as well as contribute to a net cumulative beneficial impact in combination with other past, present, or reasonably foreseeable future actions.

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CONSULTATION AND COORDINATION

The NPS places a high priority on public involvement in the NEPA process and on giving the public an opportunity to comment on the proposed action. Consultation and coordination with federal, state, and local agencies, as well as American Indian tribes, were also conducted to identify issues and concerns related to natural and cultural resources within the park. This chapter provides a summary of the public and stakeholder involvement and agency and tribal consultation that occurred in the preparation of this EA.

A public scoping period was held from December 4, 2017 to January 4, 2018 for the EA. The NPS issued a news release and posted project information to the NPS Planning, Environment and Public Comment website to provide a project overview and to invite the public to participate in the planning process. Scoping letters were also sent to interested parties and agency representatives on December 4, 2017. No comments were received from members of the public during the public scoping period.

The NPS also submitted a letter to the USFWS on December 4, 2017 to initiate informal ESA Section 7(c) consultation including a list of federally-listed species identified as being found in Pennington County, South Dakota, including black-footed ferret (experimental non-essential population), northern long-eared bat (threatened), least tern (endangered), red knot (threatened), whooping crane (endangered), and Leedy's roseroot (threatened). The letter further stated that, based upon staff knowledge and on-site investigations, no federally listed species were identified within the vicinity of the proposed project. However, an experimental non-essential population of black-footed ferrets occurs in the park, so the USFWS may conduct an additional on-site visit, if desired. The NPS received a response on December 18, 2017 stating that the USFWS determined that no federally listed threatened and endangered species would be affected by the project as presently designed. The USFWS requested that, if changes are made to project plans or operating criteria, or additional information becomes available, the USFWS should be informed.

The NPS separately and concurrently prepared an assessment of effect to comply with the requirements of Section 106 of the NHPA, as amended (54 U.S.C. 306108), and its implementing regulations (36 CFR 800). Consultation was initiated on December 4, 2017 with letters to the South Dakota State Historical Society and the following tribes: Arapaho Tribe of the Wind River Reservation, Fort Peck Assiniboine and Sioux Tribes, Blackfeet Nation, Cheyenne River Sioux Tribe of the Cheyenne River Reservation, Cheyenne and Arapaho Tribes of Oklahoma, Crow Creek Sioux Tribe of the Crow Creek Reservation, Crow Nation of Montana (Apsáalooke), Lower Brule Sioux Tribe of the Lower Brule Reservation, Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation, Oglala Sioux Tribe, Omaha Tribe, Ponca Tribe, Rosebud Sioux Tribe of the Rosebud Indian Reservation, Santee Sioux Nation, Sisseton-Wahpeton Oyate of the Lake Traverse Reservation, Spirit Lake Dakota Nation, Standing Rock Sioux Tribe of North & South Dakota, Three Affiliated Tribes of the Fort Berthold Reservation, Turtle Mountain Band of Chippewa Indians of North Dakota, and Winnebago Tribe. To date, a response letter was sent to the NPS on December 13, 2017 from the Tribal Historic Preservation Officer (THPO) of the Cheyenne and Arapaho Tribes stating their determination that no traditional cultural properties are known to be within the project area. However, the THPO requested that the tribes be notified if inadvertent discoveries are made in accordance with 36 CFR 800.13, as amended.

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As the nation's principal conservation agency, the Department of the Interior has 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 historical 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 US administration.

Document # 137 / 141635 July 2018

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