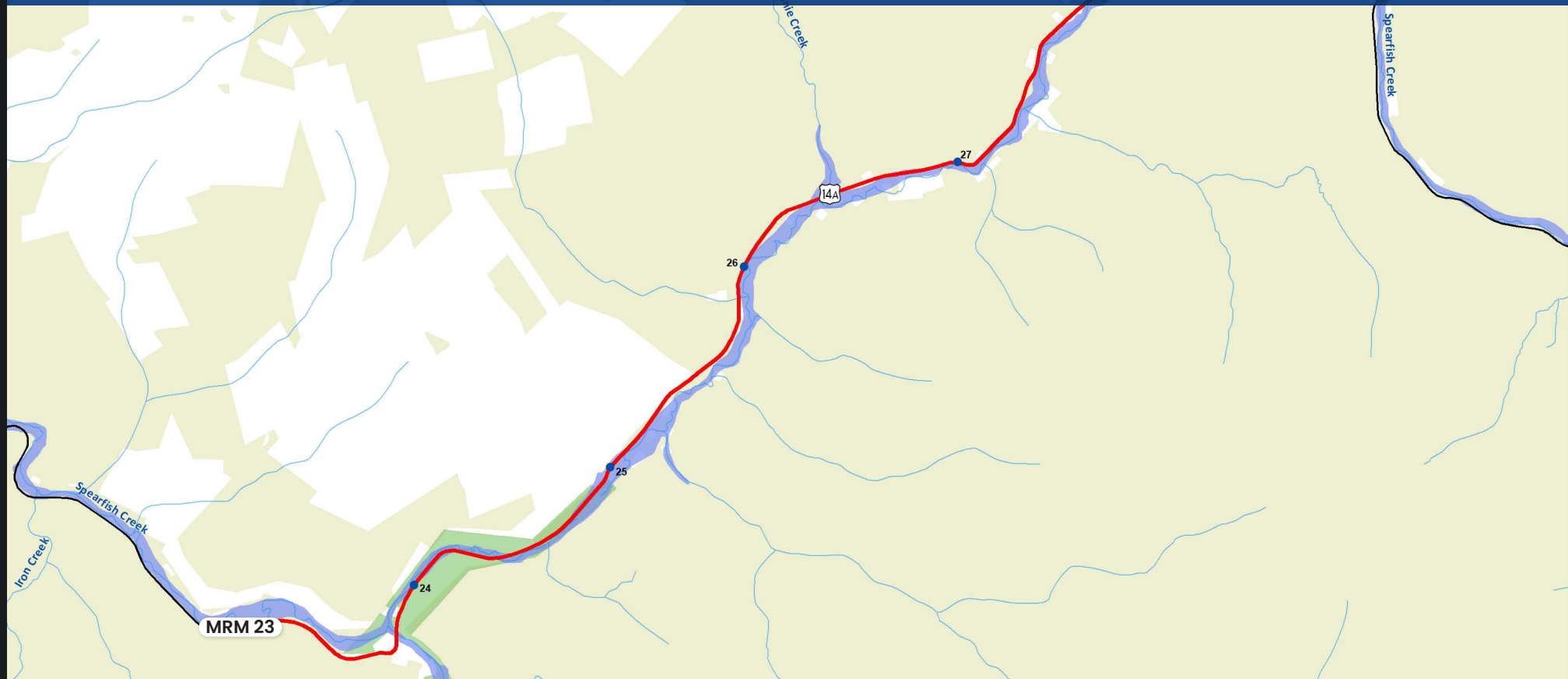
BLACK HILLS CONTEXT SENSITIVE CORRIDORS STUDY

PHASE 3 REPORT | CORRIDOR 2: US 14A - SPEARFISH CANYON SOUTH



Black Hills
CONTEXT SENSITIVE CORRIDORS STUDY

PHASE 3 REPORT
CORRIDOR 2 – US HIGHWAY 14A – SAVOY TO CHEYENNE CROSSING

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1. INTRODUCTION

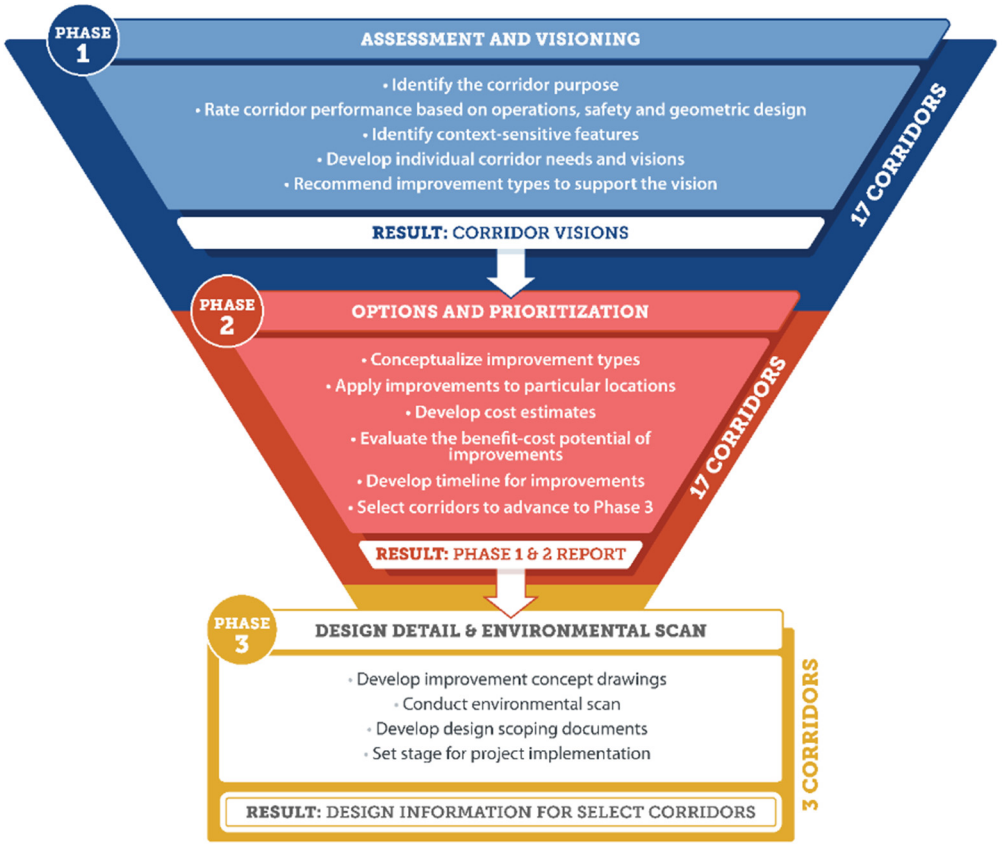
The Black Hills Context Sensitive Corridors Study team has crafted visions for improving 17 corridors in the scenic Black Hills of South Dakota. These corridors traverse topography substantially different from other areas in the state and serve functions that emphasize the drive/ride experience provided by the road, along with the ability to convey traffic.

While the environment surrounding the study corridors and the reasons some travelers are present on the routes is different from South Dakota Department of Transportation (SDDOT) routes in other parts of the state, the SDDOT has the same responsibility to maintain safe routes in a good state of repair. Fulfilling this responsibility incorporates applying the SDDOT design guidelines to address lane width, curve radius, shoulder and clear zone. Even when these standards are adjusted to account for mountainous conditions, a standard design configuration may impact adjacent terrain, geologic features, and/or streams and may bring a perceived negative impact to corridor user experience. Each impact is perceived as a challenge that has been addressed through the study by balancing engineering guidelines with the sensitive contextual conditions of the area.

The visions for improving these corridors were assembled through the application of Context Sensitive Solutions (CSS) principles. The visions recommend the types of transportation improvements to be applied to each corridor and provide preliminary locations and future prioritization of improvements.

The study has followed a program of three phases, as shown on **Figure 1**. Upon completion of corridor visioning through Phases 1 and 2, a subset of corridors was identified for further design detail and environmental evaluation in Phase 3. The vision for improving Corridor 2, US Highway 14A between Savoy and Cheyenne Crossing, was selected for further development in Phase 3 to provide information needed for the SDDOT to implement corridor projects.

Figure 1. Study Phases



1.1 Study Area

Corridor 2, along US 14A, of the context sensitive corridors is part of the initial northern group of five routes in Lawrence County. The corridor limits, displayed on **Figure 2**, are from Savoy to Cheyenne Crossing. The current section of Corridor 2 is a rural two-lane with minimal or no shoulders. **Appendix A** includes a composite figure displaying key travel and current conditions information for the corridor.

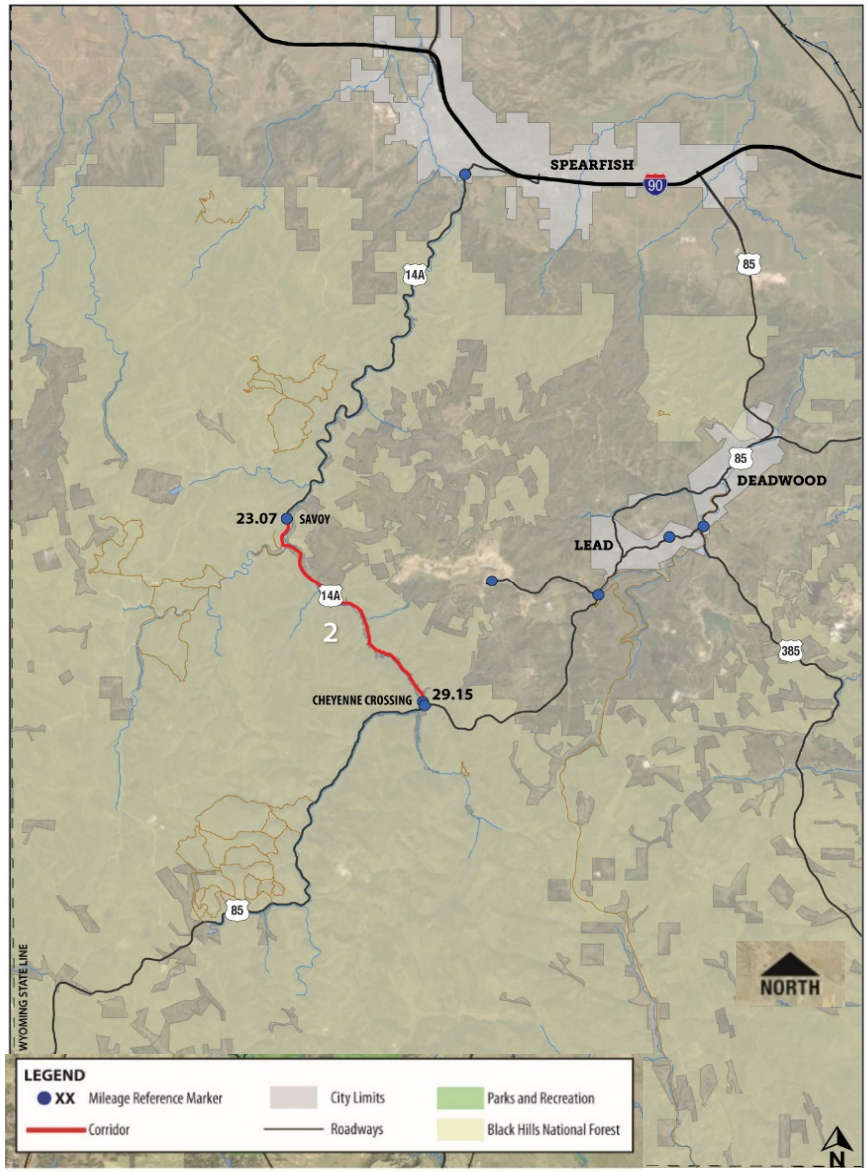
1.2 Phase 3 Report Content

The Phase 3 effort creates more detailed layouts, potential impacts documentation, and review with project participants and the public. Phase 3 of the overall project is the focus of this document, including:

- Review the CSS steps taken to develop, evaluate, screen, and recommend concepts.
- Restate the corridor vision to support this document being standalone separate from the Phase 1 and 2 document.
- Detail corridor enhancement design information to document the scope of potential improvement projects fitting within the defined corridor vision.
- Document corridor proposed concepts to be carried forward into conceptual and final design as improvements are advanced through project development when the need and funding are coordinated.

This report reviews the corridor vision developed in Phase 1, highlights the improvements recommended in Phase 2, and provides the additional Phase 3 design and environmental information for Corridor 2.

Figure 2. Study Corridor Location



2. CONTEXT-SENSITIVE PROCESS

CSS principles were used as a framework for developing the study. As applied in many transportation infrastructure projects, CSS provide a method for planning, designing, and constructing infrastructure improvements that are consistent with the purpose and role fulfilled by a corridor.

CSS operate with the following core principles (fhwa.dot/gov/planning/css):

- Strive toward a shared stakeholder vision to provide a basis for decisions
- Demonstrate a comprehensive understanding of contexts
- Foster continuing communication and collaboration to achieve consensus
- Exercise flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments

While the study represents a less formal implementation of CSS, these principles have guided the project team toward successful completion of Phases 1 and 2. Described as follows, stakeholder and public collaboration has supported the technical work, and the project team followed a series of steps to reach outcomes in line with CSS principles.

2.1 Study Oversight

Central to creating the context sensitive plan was discussion and information sharing with state/federal agency, county, and appropriate local jurisdictions throughout plan development. Before initiating the work, the SDDOT identified and invited representatives from the following agencies to participate on the Study Advisory Team (SAT):

- United States Forest Service (USFS), including representatives from each Ranger District in the region; districts invited to participate include Hell Canyon, Northern Hills, Mystic, and Black Hills National Forest
- United States National Park Service representatives from Jewel Cave and Mount Rushmore properties
- South Dakota Game Fish and Parks representatives from Custer State Park
- Spearfish Canyon Association
- Federal Highway Administration

SDDOT representatives from the following divisions participated on the SAT:

- Administration
- Bridge Design
- Custer Area Office
- Project Development
- Rapid City Area Office
- Rapid City Region Office
- Road Design
- Transportation Inventory Management

The SAT's role was to oversee the major project milestones, provide technical input, and monitor the progress of the planning process.

2.2 Stakeholder and Public Collaboration

In addition to ongoing guidance from the SAT, efforts were made to obtain feedback from other interested groups. A broad list of potential stakeholders was contacted and meetings occurred with numerous representatives.

2.2.1 Phase 1 and 2 In-Person Public Meeting

In Phase 1, stakeholder input was received through the following efforts:

- Small group meetings with adjacent landowners/stakeholders with an interest in individual or a range of corridors.
- Municipal representative meetings in which current issues and future development traffic impacts on the corridors were discussed. Entities included the cities of Custer, Hermosa, Spearfish, Lead, and Deadwood.
- Meetings with the Black Hills Council of Governments and Chambers of Commerce associated with the cities of Spearfish, Lead, and Deadwood, along with the School District encompassing the Lead and Deadwood area.
- Individual agency meetings with staff responsible for specific properties along one or more of the corridors, including Custer State Park.

General public meetings in support of Phases 1 and 2 were held in both the north and south regions of the study area in August 2018. Each meeting was broadcast live via YouTube. Participants had the opportunity to provide comments on issues they experience within one or more corridors and their perception of corridor desired functions. In-person and people participating remotely (live or delayed through watching the recorded meeting) were provided with the opportunity to send comments and/or questions via email.

A website was established to provide current information and serve as a tool for public feedback throughout the study.

2.2.2 Phase 3 Virtual/Remote Public Meeting

Due to restrictions associated with COVID-19, the opportunity to communicate with the public and opportunities for feedback were provided virtually through displays and recorded presentations available through the project website. Information provided through the website included:

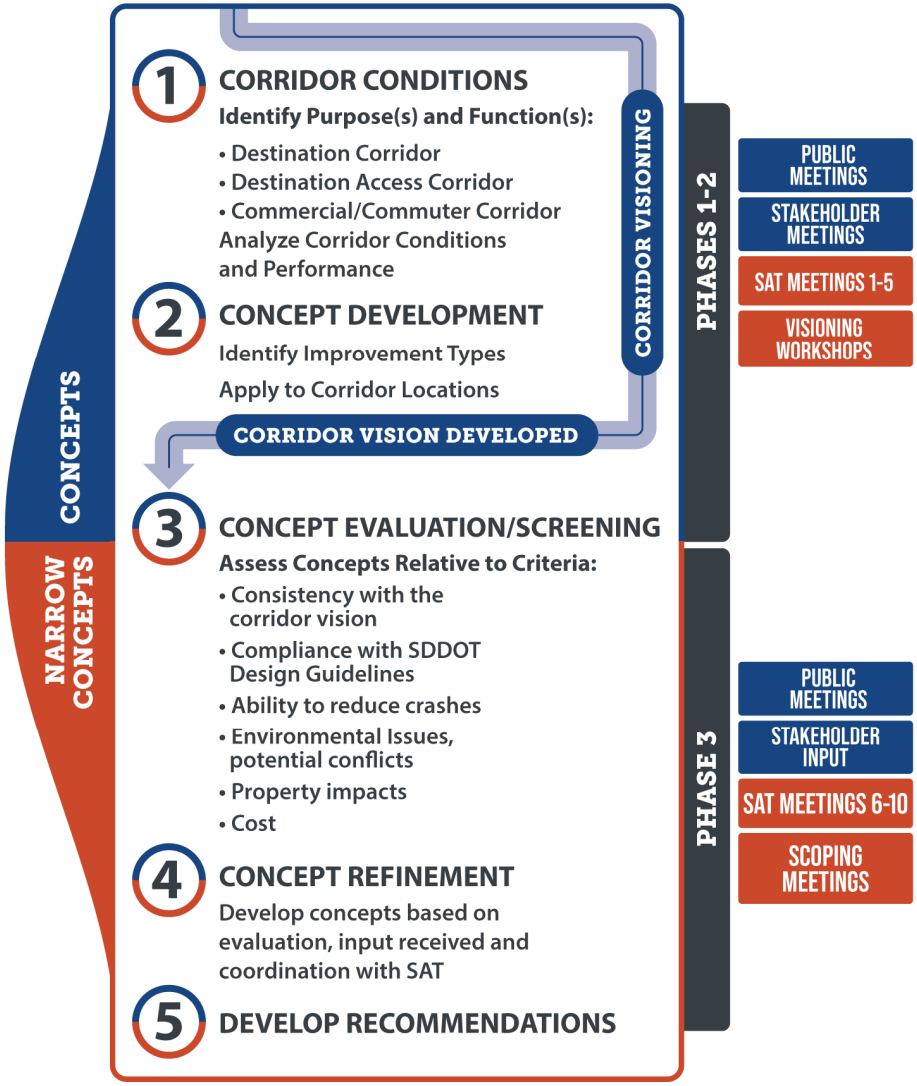
- Informational narrated recordings reintroducing the individual corridors, presenting concepts to address needs/gaps, and summarizing results of assessing the concepts relative to a consistent set of evaluation criteria.
- Detailed concept diagrams of the range of concepts being considered to address needs within the definition of context sensitivity, including potential impact areas and types of impacts.
- Contact information for residents, business representatives, and other stakeholders to provide feedback and/or discuss with consultant team members their questions/concerns about the study process, concepts or findings.

2.3 Context Sensitive Visioning and Analysis Steps

Figure 3 outlines the steps taken to reach a corridor vision and then develop, evaluate, screen, and recommend a design concept through the Context Sensitive Corridors Study. Phases 1 and 2 involved collecting pertinent information about each of the 17 corridors to understand their purpose and quantify their performance across a range of categories. Possessing this knowledge base, the study team identified improvement types that could be applied to further each corridor's purpose and meet the current and future needs. Improvement types include Design, Multimodal Operations, Safety, Intelligent Transportation Systems (ITS), and Aesthetics. The corridor vision includes locations for improvement types, assessments of costs and benefits, and timelines for implementing improvements to the corridors.

Criteria including purpose/design inconsistency, safety benefit/cost, crash frequency, and urgency of condition were used to advance a subset of corridors to Phase 3. In Phase 3 detail has been added to corridor improvements to better understand potential impacts associated with adding shoulder width, realigning segments, adding retaining walls and guardrail, and/or improving access into/out of the individual corridors to address safety and geometric deficiencies. Where stepping through Phases 1 and 2 resulted in expanding concept options and improvement types to address issues and vision throughout the corridors, the intent of Phase 3 is to narrow concepts and advance recommendations while increasing the detail provided. In addition to the concept layouts, a deliverable for Phase 3 is an environmental scan document.

Figure 3. Concept Development/ Screening Process



3. VISIONING

This section addresses the development of the context sensitive vision for US14A from Savoy to Cheyenne Crossing.

3.1 Purpose, Performance and Needs

The study team developed a numeric rating system to display key corridor conditions, including:

Purpose: The corridors are assigned ratings based on their tendency to serve as Destination, Destination Access, or Commuter/Commercial roadways. The rating system allows recognition of multiple purposes served within the same corridor.

In a Destination Corridor, driver/passenger experience of the road is the reason for the trip. Curves, narrower lanes, and slower speeds are not considered deficiencies, but rather are desirable characteristics of the adventure provided by the trip whether it is made by auto, motorcycle, or bicycle.

A Destination Access Corridor describes a hybrid corridor whose role is to carry travelers between their accommodation location (hotel/campground/ home) and the recreation venue to be visited. In addition, as the corridor provides direct access to a nature/park site, the environment next to the road traveled may also provide a complementary scenic view as part of the trip.

A Commuter/Commercial Corridor provides connectivity between residential areas and employment areas and/or is intended to carry goods from one point in the region to another or through the region. A Commuter/Commercial Corridor emphasizes vehicle throughput over access to adjacent property, reduced and reliable travel time, and lane and shoulder widths commensurate with commercial vehicles.

User Mix: Corridors were reviewed relative to the user type/vehicle mix observed in the corridor compared to the other 16 corridors in the study. The numeric rating allocated to a corridor reflects the deviation from the 17-corridor average for the particular user/vehicle type. Traffic in Corridor 2 reflects a higher percentage of motorcycles relative to many of the other 16 corridors.

Context: The nature and intensity of unique features "beyond the pavement" along the corridor are rated. The greater the number and/or quality of the features, the higher the score. Contextual features along Corridor 2 include Spearfish Canyon and Creek.

Traffic Operations: Traffic operations are rated based on Level of Service (LOS) findings for current and projected Year 2050 traffic levels compared with SDDOT LOS criteria. Existing and projected future LOS along Corridor 2 meets criteria.

Safety: Safety is rated based on the relative magnitude of crash history compared with expected norms for roadways of similar type. Total crash frequency along Corridor 2 (including severe and property damage only crashes) is consistent with established norms for similar facilities but demonstrates higher than expected severe crash frequency.

Road Design: Geometric features of the roadway are rated relative to conforming to established standards. Along Corridor 2, design deficiencies exist with respect to shoulder width, restricted clear zone, and access spacing.

Corridor 2 was documented relative to the items listed above, as were the remainder of the original 17 corridors.

Table 1 highlights the key characteristics of Corridor 2 relative to the context definitions.

Table 1. Corridor Characteristics Summary

Characteristic Category	Description
Purpose	Primary: Destination Access Secondary: Destination
User Mix	Prioritizes accommodation of recreational travel by car/RV, motorcycle, and/or bicycle
Context	Contains/provides access to unique geologic features and viewsheds. Emphasizes traveler enjoyment as they travel through the corridor.
Traffic/Safety Conditions	No traffic operations concerns. Crashes during Sturgis rally are elevated.
Road Design	Primary deficiencies are no/limited shoulder, restricted clear zone, and inconsistent access spacing.

The following summarize the assessment supporting the conclusion:

- The route is designated as part of the Spearfish Canyon State/National Forest Service Scenic Byway, supporting the scenic vista element of the corridor type definition.
- The corridor route provides access to key recreational venues of Bridal Veil Falls, Devil's Bathtub, and many designated picnic areas.
- The corridor route is highly influenced contextually by Spearfish Creek as it influences where the route curves and has tangent sections and the creek creates features such as rapids and waterfalls that create the desire to stop along the corridor.

3.2 Visioning Results

The corridor vision consists of two elements: 1) a statement describing the envisioned future of the corridor and 2) a list of improvement types and locations that demonstrate the potential to support the vision.

Vision: US14A is a recreation access oriented scenic corridor in need of improved condition. Urgent infrastructure work is needed to stabilize roadway, and improved shoulder widths and spot curve treatments are needed to enhance functionality and safety.

List of Improvements: The initial range of concepts developed for Corridor 2 consisted of 48 improvement types categorized as follows:

- **Design:** Improvements or changes to the current physical roadway conditions focused on lane width, shoulder width, vertical and horizontal curvature of the road, superelevation through a curve, ditch slopes, objects immediately outside the pavement area, and auxiliary lanes aiding entry or exit from the road.
- **Multimodal Operations:** Improvements reducing platooning behind slower moving vehicles, intersection control changes, better accommodating mixed traffic (bicycles, pedestrians and the range of motor vehicles) along and across a road.
- **Safety:** Actions/improvements that affect visibility, speed, traction in wet/snow/ice conditions, and feedback if vehicles stray from travel lanes.
- **Intelligent Transportation Systems (ITS)**: The range of vehicle detection and information feedback that influence driver behavior, such as speed management devices, advance warning devices, weather information systems, etc.
- **Aesthetics**: These improvements may not have an effect on driver behavior that can be measured in crash reduction. However, such improvements are complementary to safety motivated actions and consistent with the context sensitive nature of routes covered in the study.

Improvement types demonstrating the ability to support the vision were identified from this initial list over the course of the two visioning workshops, which in the context sensitive approach played a critical role in balancing the application of improvement types with the preservation of the corridor's unique surroundings. In the workshops, having an understanding of corridor purpose and performance, the project team, SDDOT, and agency staff set initial road design expectations for the design speed and typical section, applying judgment regarding context-sensitive implementation. The workshop attendees selected improvements to deliver safety benefits, improve consistency with SDDOT design standards, and bring corridor configuration more in line with its designated purpose.

Roadway stability and deficient design conditions are hampering the ability of US14A to effectively fulfill its purpose. The narrow paved section and horizontal curvature are contributing to safety concerns.

Effective improvement types would allow the corridor to better support the characterized purpose and function. A shortened list of improvement types was identified through a combination of evaluating the current conditions within the corridor relative to the vision, reviewing the findings from the operations, safety and design evaluations, and receiving input from the visioning workshops and the public meetings held in support of Phases 1 and 2. **Table 2** highlights the improvement types identified for US14A.

Table 2. Summary of Improvement Types to Support Vision

Improvement Type	Supports Vision by
Added shoulder width and center rumble strips	Improving roadway safety
Roadside embankment slope stability/drainage improvements	Maintaining state of good repair
Horizontal curve treatments to reduce crashes	Improving roadway safety
Additional pullouts and parking improvements	Improving corridor driving experience
Motorcycle safety treatments	Improving roadway safety

4. CONCEPT EVALUATION

Understanding the desired corridor travel functions, current and future operations, and needs to better support the vision, the project team undertook a series of actions to craft unique actions for each corridor. Workshops with the SAT were also used to identify and discuss appropriate ideas about the appropriate improvements to the corridors. The concepts developed and discussed through the workshops and corridor analysis represent the range of improvements reviewed through Phase 3.

Considerations informing the development of concepts include:

SDDOT road design standards: The guidance for road design characteristics contained within the Road Design Manual was used as the initial basis for refining the roadway typical sections, design speed and other parameters. In developing concepts, the study team implemented a context sensitive design approach balancing the meeting of standards with preservation of the unique context of the corridor.

With this approach, the following items were considered in addition to design standards:

Corridor purpose and function: Pursue concepts that assist in aligning the physical layout of the roadway corridor with its purpose and function in the transportation system as a Destination Access corridor.

Corridor characteristics: Effective concepts will address corridor conditions identified during visioning, including locations where crash frequency and/or severity is higher than expected, locations of contextual features to preserve/protect/avoid, public and stakeholder input, and information from the SAT regarding known concerns and objectives.

4.1 Concept Development

Initial design concepts for the US14A corridor from Savoy to Cheyenne Crossing, initially identified in Phase 2 of the study, reflect two scales:

- **Corridor-wide Concepts:** Improvements for the length of the corridor reflect widening the shoulder to a minimum of three feet and a design objective width of five feet. To reflect sensitivity to the importance of limiting impacts to the adjacent environment, the concept assumes reducing the travel lane width from the current 12-foot lane to 11 feet. Fully or partially paved shoulders would provide a wider travelway that currently exists, while reducing the overall footprint of the shoulder improvement. **Table 3** highlights the minimum and objective key cross section design elements.
- **Specific Higher Crash Experience Locations:** From approximately Elmore Road to Schoen Lane, there has been a higher-than-expected rate/number of crashes in the period from 2013 to 2017, the data analysis period used in the Phase 1 and 2 report. To address crashes in the segment from Mileage Reference Marker (MRM) 26.7 to MRM 27.3, concepts that included roadway realignment to address tight cures, were identified and evaluated.
- **Improving/Creating Pullouts:** Through the five plus miles of the corridor, several pullouts support a combination of opportunities to access nature areas, recreation venues or to allow faster moving traffic to pass. Most pullouts are not designed or constructed to support orderly deceleration to enter or acceleration to exit the pullout from/to the travel lane. Improvement concepts developed as part of the corridor study focus on identifying a typical pullout design, including deceleration area, vehicles storage area, and an acceleration lane to support safe entry back into the travel lane.

Table 3. Key Cross Section Components – Minimum and Objective (Reflecting Mountainous Terrain)

Design Element	Design Width/Length	
	Minimum (Feet)	Objective (Feet)
Lane Width	11	12
Shoulder (Paved)	3	5
Clear Zone	7	10
Inslope Grading Ratio	Varies: 4:1 to 2:1	
Backslope Grading Ratio	Varies: 4:1 to 1:2	
Pullout		
Deceleration Lane (from 35 MPH Speed Limit)	204 Feet	245 Feet
Vehicle Storage Length	100 Feet	
Acceleration Lane (to 35 MPH Speed Limit)	204 Feet	245 Feet
Vehicle Storage Width	12 Feet	

4.2 Cross Section Improvement Concepts

For rural highways carrying volumes similar to those of US14A at the posted speed in the study area, the SDDOT prefers a 10-foot buffer, or clear zone, outside the travel lane. The shoulder width is included within the clear zone. **Figure 4** displays the current and concept cross section to address needs in the corridor, while considering the context of a Destination Access corridor. The cross section includes a range of shoulder width between three and five feet, with the anticipated product of this study stage being a consistent shoulder width concept. Mixing widths between three and five feet along the corridor creates driver expectancy concerns that are to be avoided, as the SDDOT does not want drivers thinking there is five feet of shoulder available if constraints in a stretch of the corridor limit the width to three feet.

Providing the 10-foot clear zone drives the footprint for assessing the shoulder improvements as it extends outside the shoulder width concepts. Proximity of Spearfish Creek on the south side and severity of the terrain adjacent to the north result in substantial earthwork to meet the desired maximum slope design guideline in the SDDOT design guidelines.

With the sensitive nature of areas adjacent to US14A, there is a desire to limit the width of the roadway and clear zone area. A primary method of reducing the footprint of an improved corridor is to introduce retaining wall and guardrail concepts to replace enhanced grading areas and offset the need for clear zone.

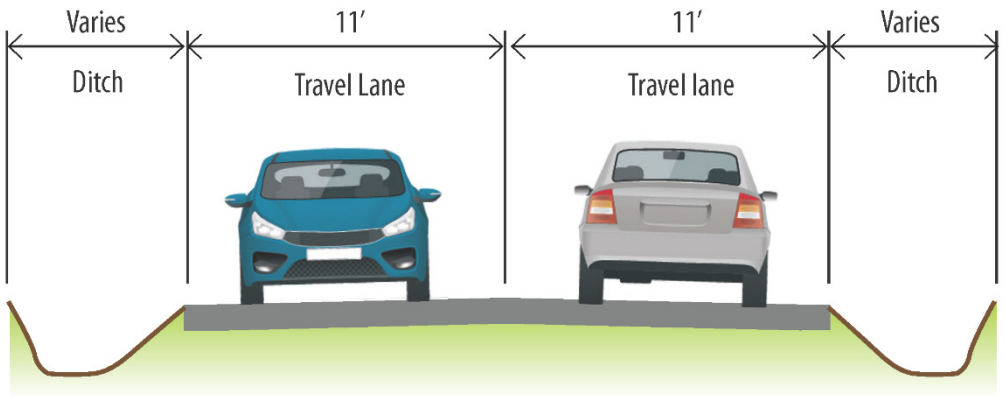
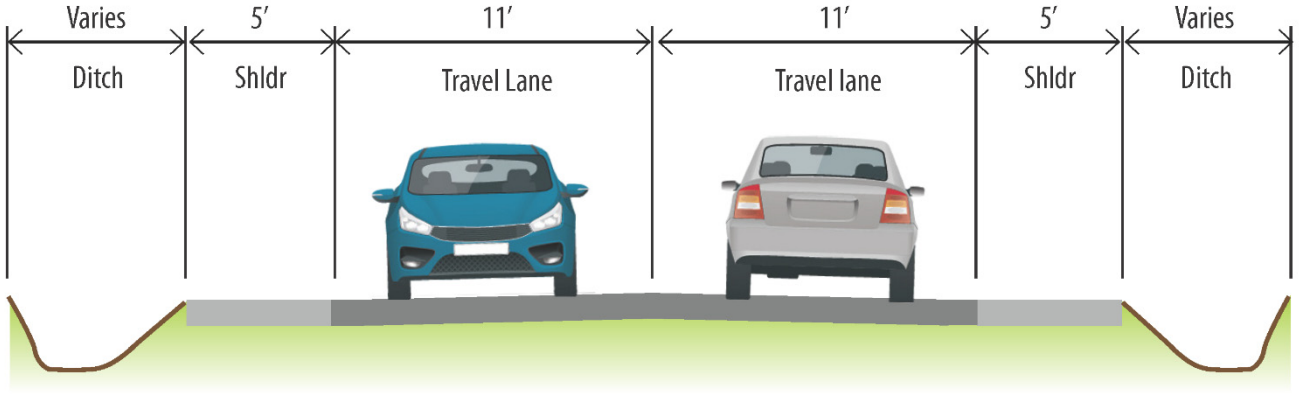
The environment surrounding the road, which includes features such as Spearfish Creek and steep terrain that limit right-of-way width, creates conflicts to providing the clear zone objective buffer and shoulder width. Thus, several concepts to narrow the overall roadway width, while retaining SDDOT design consistency where restrictions exist, can be incorporated:

- Adding guardrail or sections of retaining wall to the creek side to replace the clear zone buffer
- Providing a narrower three-foot shoulder
- Narrowing the clear zone to seven feet

Concepts considered in southern portions of US14A through Spearfish Canyon are consistent with those implemented several years ago in the segment to the north from Savoy to Spearfish.

Introducing the design criteria objective cross section throughout Corridor 2 would result in adjacent impacts extending outside the current right-of-way for approximately three-quarters of the corridor length. Additionally, the need to address roadway undercutting from Spearfish Creek by increasing the separation between the creek and US14A focuses widening to the east, which increases the required footprint width as the elevated areas require more width to accommodate the typical slope grading.

Figure 4. Current and Concept Typical Cross Section

Current – Typical Cross Section	
Concept – Typical Cross Section	

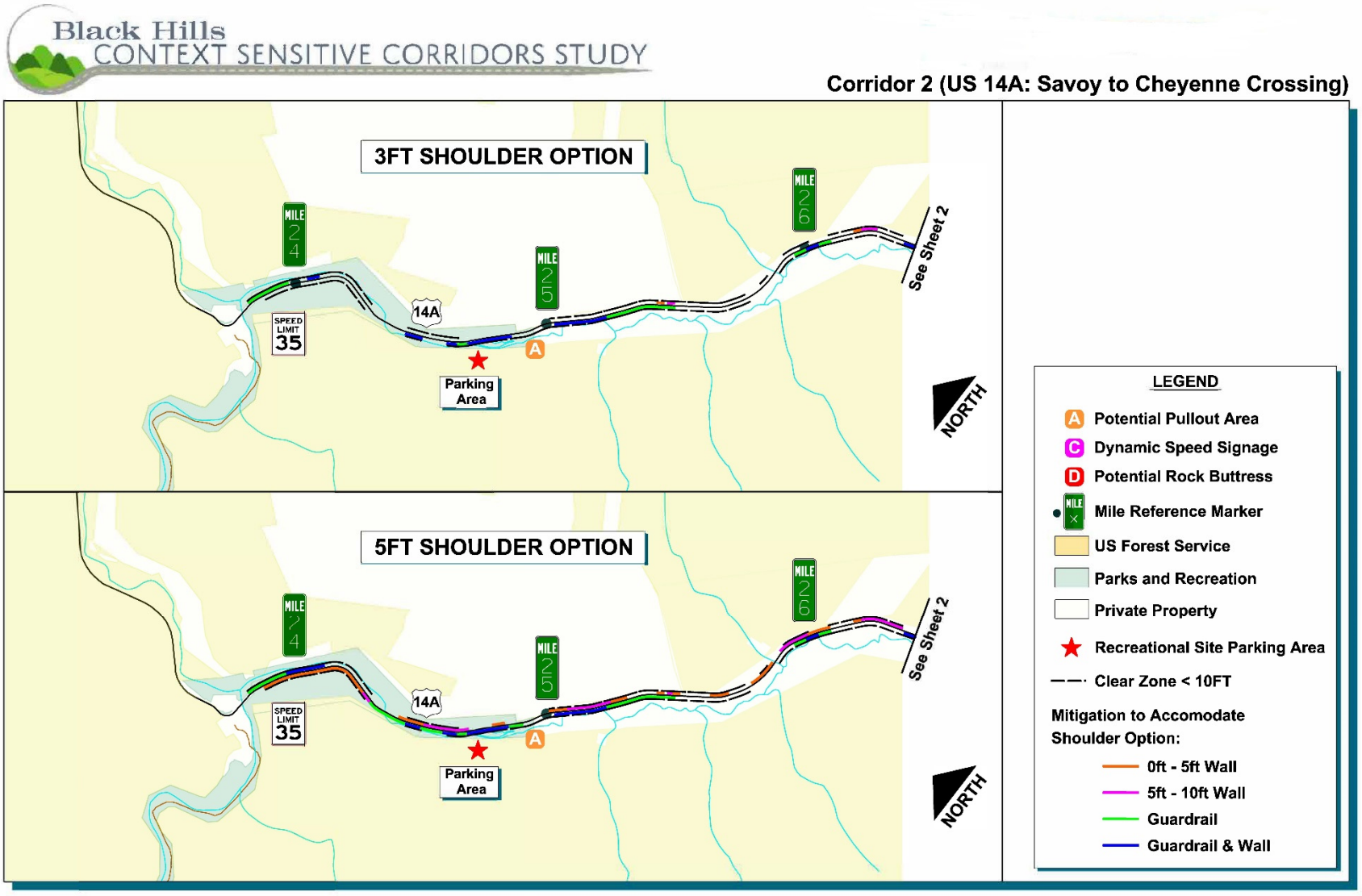
To reduce the corridor cross section width from right-of-way line to right-of-way line, the design team identified a series of design mitigation concepts to actively:

- Reduce the required width to accommodate backslopes to meet SDDOT design criteria.
- Correct erosion impacts to US14A from Spearfish Creek and reduce erosion potential in the future.

Figure 5 displays a concept for segments along the corridor where action is desirable to mitigate standard backslope grading width concerns to accommodate either a five-foot or a three-foot shoulder. Integrated into the cross section concept is a combination of retaining walls and guardrail to offset grading away from the clear zone. **Figure 6** displays the alternate cross section concepts for enhancing grading from the roadway, adding guardrail and/or retaining walls to the section. Each of the sections displayed reflect a variable width shoulder covering the range discussed throughout the study. Retaining walls are applicable on either side of the corridor to:

- Replace grading on the north side to narrow the width required to provide clear zone at an acceptable slope from the roadway. **Figure 6** displays how retaining wall is integrated into the north side of the corridor where terrain rises substantially from the roadway.
- Create a protective barrier between Spearfish Creek and the roadway. **Figure 6** displays the retaining wall and/or guardrail cross section concept for the Spearfish Creek side of the corridor.

Figure 5. Three- and Five-Foot Shoulder Impacts



Black Hills CONTEXT SENSITIVE CORRIDORS STUDY

Corridor 2 (US 14A: Savoy to Cheyenne Crossing)

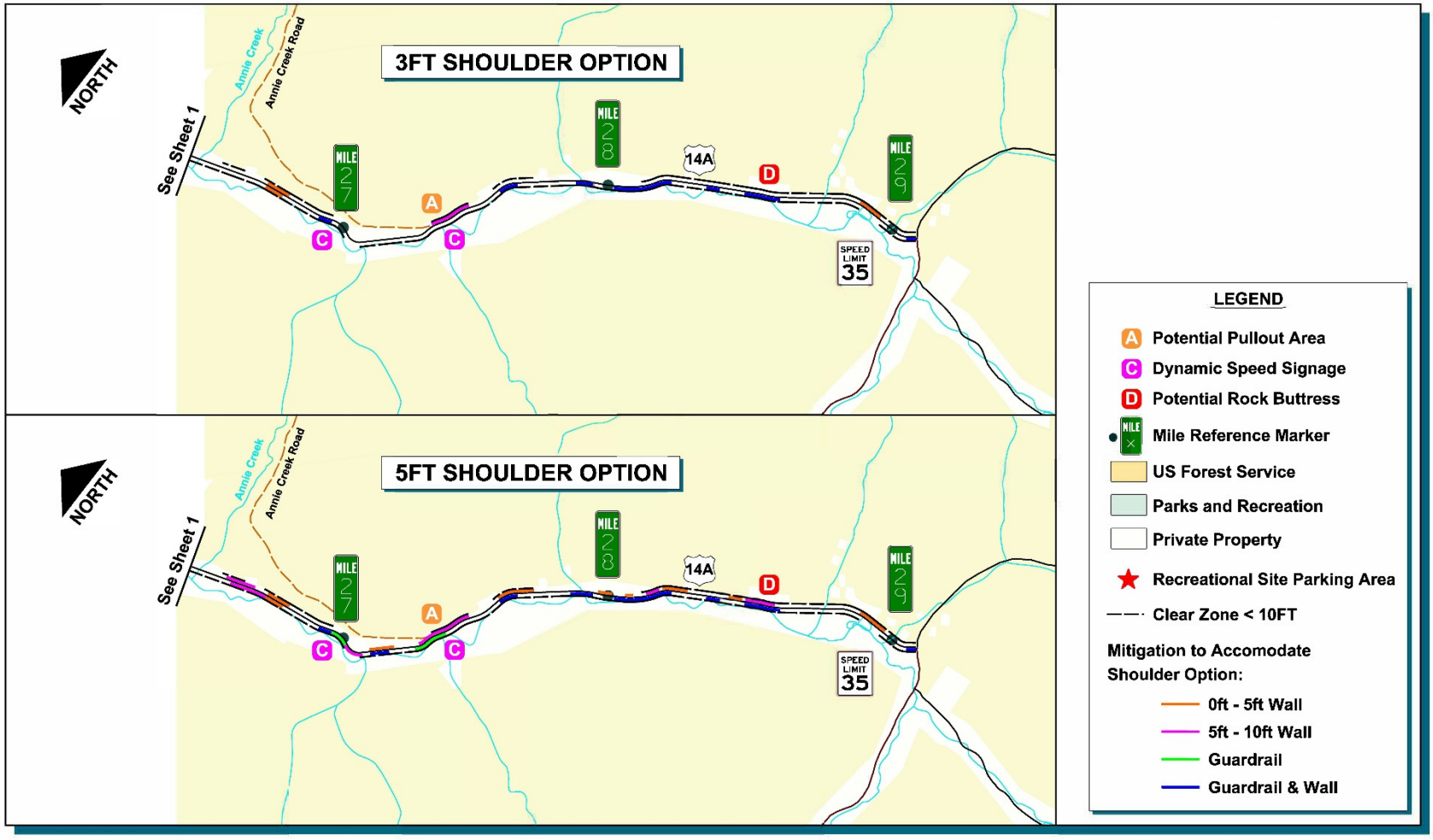
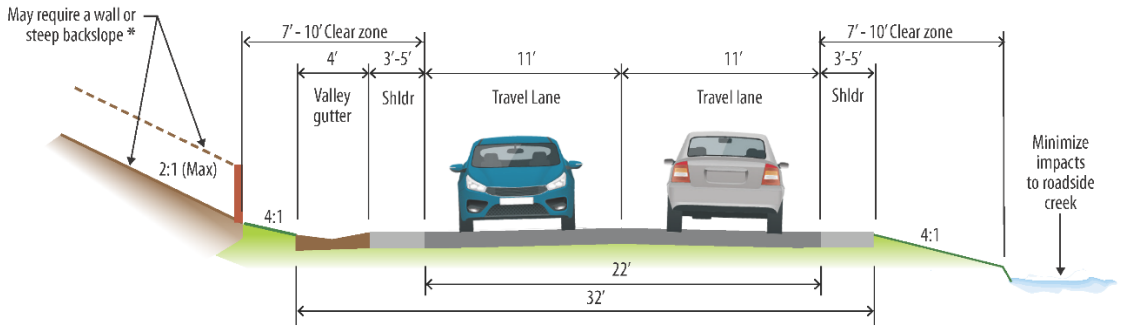
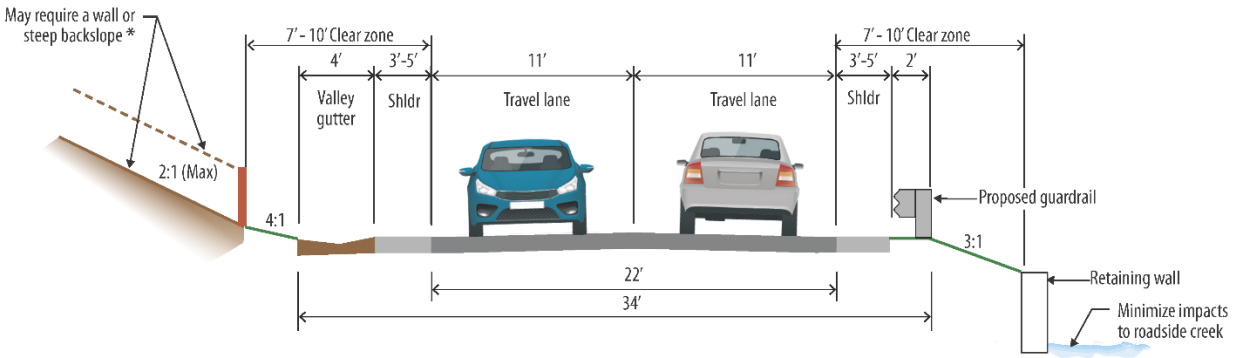


Figure 6 US14A Concepts to Reduce Improvement Impacts – Cross Sections

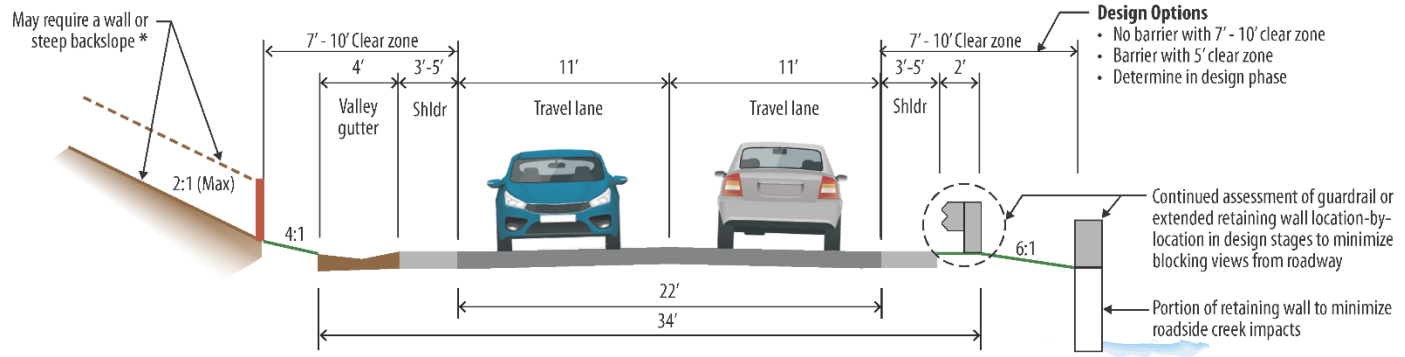
Variable Shoulder Section with Hillside Retaining Wall



Variable Shoulder Section with Hillside Retaining Wall and Creekside Guardrail



Vairable Shoulder Section with Hillside Retaining Wall and Creekside Guardrail/ Retaining Wall



*** HillsideSegments**
- A combination of modified backslope and/or a reinforced wall of variable height.
- Locations and heights determined in design phase

Review of the grading and added mitigation elements of combining retaining wall and guardrail across the three- and five-foot shoulder concepts provides key input information to develop the final corridor design concept. **Table 4** summarizes the anticipated corridor-wide combination of grading, retaining walls, and guardrail to reasonably accommodate a three-foot shoulder concept and a five-foot shoulder concept. Critical to the SDDOT decision process is the significance of the adjacent impact and cost differences among the concepts. Primary differences to the added cost elements relative to grading include:

- With a three-foot shoulder, approximately 3 miles of higher cost mitigation, such as retaining walls, could be addressed through lower cost enhanced grading and clearing for the clear zone.
- With the three-foot shoulder concept, many areas anticipated to require retaining walls would not need as high of walls, relative to the five-foot shoulder section. With a narrower shoulder section, approximately 1 mile of 5- to 10-foot high retaining wall could be lowered to 5 or less and approximately 1 mile of zero to 5-foot high walls could be eliminated.
- Narrowing the shoulder from five to three feet has the potential to reduce the amount of guardrail required to safely separate the highway from Spearfish Creek. The three-foot concepts require approximately two-tenths to a half-mile less guardrail and retaining wall combination or just guardrail, respectively.

4.3 Curve Geometric Deficiency and Higher Crash Area Concepts

Concepts considered to address the higher crash experience between MRM 26.8 and MRM 27.3 included:

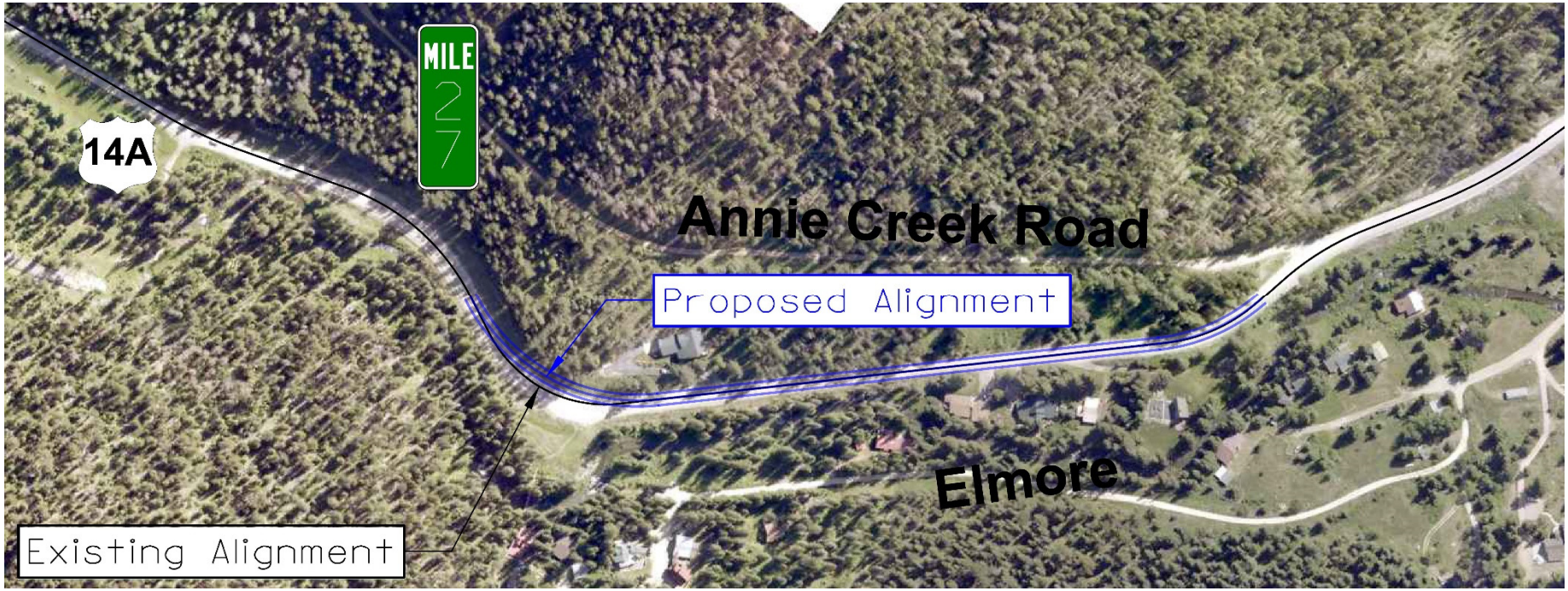
- Increasing the radius of the curves
- Adding shoulder

Table 4. Summary of Mitigation Required to Accommodate Shoulder Widening

Mitigation Measure	Lane Miles of Mitigation Shoulder Width 5 Feet	 3 Feet
Enhanced Grading and Tree/Shrub Clearing for Clear Zone	3.01	6.00
Retaining Wall (0 to 5 Feet)	1.54	0.25
Retaining Wall (5 to 10 Feet)	1.27	0.21
Retaining Wall Plus Guardrail	1.27	1.08
Guardrail	0.97	0.52
Totals	8.06	8.06
Percent of Corridor Needing Mitigation	**76.18%**	**76.18%**
Project Length	10.58	Lane Miles

Figure 7 displays an improvement concept anticipated to mitigate crashes observed in the segment. Realigning the curve results in shifting the road just over 20 feet north, which combined with grading requirements for clear zone adjacent to the realigned segment to support drainage, results in construction limits extending outside the current right-of-way. As most of the crashes observed in the segment involved vehicles running off the road, adding shoulder width is also a positive mitigation.

Figure 7. US 14A Realignment to Address Reduced Speed Curve – MRM 26.7 to MRM 27.3

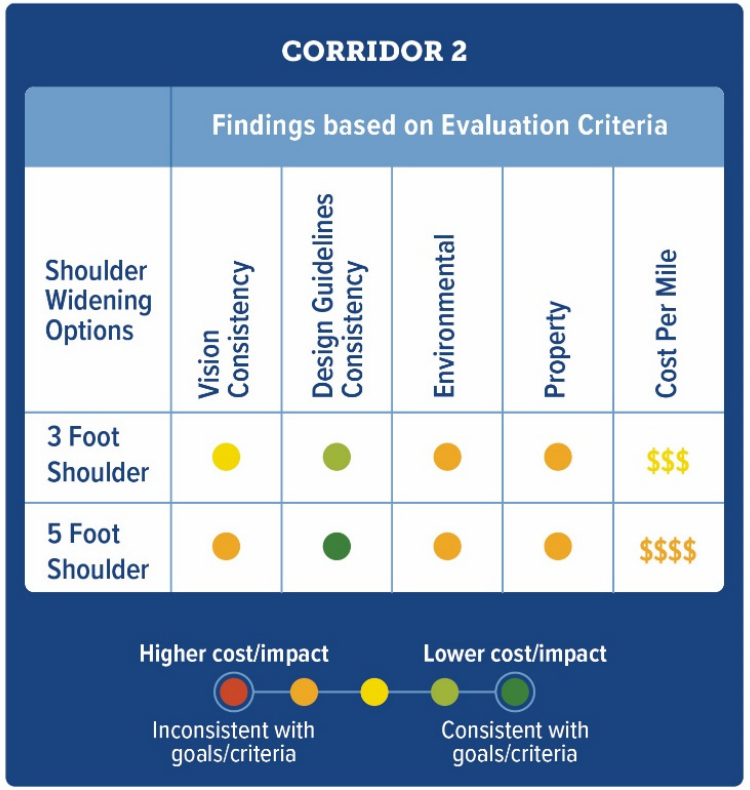


4.4 Concept Refinement

Figure 8 describes roadway improvements identified to address needs/gaps and the vision for Corridor 2. For each improvement concept, it documents potential positive and negative impacts associated with the concept, relative to:

- **Consistency with the corridor vision**, described in **Chapter 3**.
- **Consistency with SDDOT Design Manual guidelines** for the corridor setting and basic cross section: Through the corridor there is an expectation that concepts will not likely meet all design guidelines, while retaining the context of the corridor. As the corridor traverses a highly sensitive area, supporting the contextual vision is a higher priority than meeting every element outlined in the Design Manual, as long as a safe facility is provided.
- **Significance of environmental impacts:** Corridor 2 not only traverses a contextually sensitive area as it relates to the expectation of users, areas to the north and south are also environmentally sensitive. Directly north of much of the corridor is Spearfish Creek, which both impacts and is impacted by the roadway, depending on perspective. The hillside on the north side along much of the corridor is also sensitive to excavation associated with road construction. Potential impacts to the physical environment associated with roadway reconstruction/expansion that requires a wider cross section will result in impacts to one of the adjacent sensitive areas, or possibly both. **Appendix B** includes additional detail about environmental considerations associated with adding shoulder and improving the clear zone.
- **Impacts to adjacent property:** The corridor is lined with private property, with areas developed as residential, undeveloped forested land or small pockets of cultivated land. For those roadway improvement concepts requiring a wider cross section within or outside the current right-of-way, the general significance of the impact was quantified.
- **Cost per mile:** With the more severe terrain and abutting environmental features such as Spearfish Creek, improvement concepts to address operational or safety concerns will likely have a higher than typical cost per mile than projects on similar rural two-lane routes in other parts of the state. While SDDOT understands this situation and the importance of maintaining the state of good repair in the corridor, available funding to address needs is limited. Costs can be addressed through identifying and accepting lower cost concepts that may not meet all of the state's goals or phasing the project such that costs can be spread over multiple budget cycles.

Figure 8. Shoulder Concepts Summary



The uniqueness of the Context Sensitive Corridor purposes and functions, relative to others in the state, influences the application of improvements in the following ways:

- **Establishing a threshold for determining whether action is needed:** For most state routes, a lane width of less than 12 feet or a missing segment of paved shoulder would warrant review for improvement. In the context sensitive corridors, a higher level of deviation from the desired design as defined in the SDDOT Design Manual would be permitted to retain corridor character. Meeting the threshold of need for action in a context sensitive corridor requires an observed elevated crash rate combined with the narrower lane or missing shoulder included in this example.
- **Defining the improvement area:** As it is desirable in most of the study corridors to maintain the current design conditions, the defined extent of an improvement area was held to a minimum to address the issue. If through a corridor, for example, a disconnected series of curves was in need of improvement, the context sensitive improvements were limited to the curved segments, whereas in other parts of the state improving tangent segments connecting the identified curves may also be addressed.
- **Types of improvements:** Across the range of context sensitive corridors, there are few congested corridor segments or intersections. There are also very few segments where enhanced access management through consolidation is identified as a corridor need. The primary deficiencies for the corridors are tight curves, deficient superelevation, and/or a lack of sufficient paved shoulders, which contribute to higher crash rates and elevated severity. Thus, the predominant type of improvements are those focused on reducing run-off-the-road and head-on crashes, rather than those increasing throughput and reducing travel time.

4.5 Other Improvements

The study team conducted a parking demand evaluation to gauge current usage at the parking area located at the Old Spearfish Creek Dam site located at MRM 24.7 along the roadway and ensure that future modifications to parking provide an adequate number of spaces. **Table 5** outlines the results of the parking demand evaluation and provides concepts for parking lots. In current conditions, parking on the site generally forms around the perimeter of the lot as it is not paved, stalls are not delineated, and the narrow parcel does not support other parking configurations.

While current demand, at times, exceeds the estimated capacity of 12 parked vehicles, there is limited ability to reasonably expand the site to add more capacity. Additionally, paving the lot to allow stalls to be formalized is not likely warranted as the widest point is approximately 45 feet. The limited width would not allow creating spaces interior to the site, while retaining some level of circulation.

Table 5. Parking Demand Evaluation and Concept

Parking Location			Peak Parking Demand		Concept
MRM	Description	# of spaces	Wkdy	Wknd	
24.7	Old Spearfish Creek Dam Site	12	8	16	No/minimal improvements. Limited added expansion space due to proximity of Spearfish Creek.

5. RECOMMENDATIONS

Early in the study, discussion at SAT meetings regarding the desired concept for Corridor 2 was to extend the current typical section present along US14A within the north portion of Spearfish Canyon (two 11-foot through lanes and a five-foot shoulder on either side) through Corridor 2. Providing the five-foot shoulder would more effectively accommodate bicyclists, who make up an elevated percentage of vehicles, throughout the corridor. While the five-foot shoulder option would result in a greater level of cost and environmental resource impacts, it is recommended to accommodate nonmotorized presence along the corridor and provide consistency with the roadway typical section farther north along US14A. As more detailed topography, drainage, and creek interaction information is gathered through design stages, cost estimates will be refined and reassessed relative to recommended actions.

5.1 Environmental Scan

Appendix B contains the Environmental Scan Report. This document provides a "bridge" between the three-phase corridor planning studies and the subsequent National Environmental Policy Act (NEPA) process. The sections within the Environmental Scan Report include the corridor context within the Black Hills, transportation system context, and a preliminary corridor-wide purpose and need statement to be refined during the NEPA process. The preliminary purpose and need statement was provided for public review during the Phase 3 virtual public meetings. The Environmental Resources sections within the Environmental Scan Report document known and potential environmental resources within the environmental study area for Corridor 2.

5.2 Design Concept

Appendix C contains the recommended preliminary concept for the US14A corridor from Savoy to Cheyenne Crossing, including proposed mitigation of retaining wall, guardrail, and a combination of retaining wall and guardrail.

5.3 Cost Estimates

The project team developed planning level generalized cost estimates for the improvements envisioned for each corridor. The team reviewed the improvement types with respect to the limits and locations as presented to quantify the materials needed to implement these improvements. Unit costs were developed in collaboration with SDDOT staff, using the SDDOT pay items and representative unit costs. The costs of some improvements were estimated based on past projects such as ITS improvements.

Table 6 documents the unit cost assumption, units required and estimated construction costs for the shoulder concept of a five-foot shoulder. Estimate assumes a consistent 11-foot travel lane in each direction.

Table 6. Corridor Concept Opinion of Probable Cost

Five Foot Shoulder Option-Recommended

Black Hills CONTEXT SENSITIVE CORRIDORS STUDY

PCN 05UE

FHU PROJ NO. 117385-01

CONCEPTUAL LEVEL OPINION OF PROBABLE COST

FELSBURG HOLT & ULLEVIG

Alternative: Corridor 2 (US Highway 14A: Spearfish Canyon South - Savoy to Cheyenne

Prepared By: Troe/Johnson Date: 3/15/2022

ITEM	DESCRIPTION	UNIT	CONTINGENCY	UNIT COST	QUANTITY	COST
110	Earthwork and Removals (2' Depth)	SY		$ 22	89300	$ 1,964,600
110	Earthwork (Enhanced Grading)	CY		$ 12	17700	$ 212,400
380	Surfacing (Highway)	SY		$ 145	30792	$ 4,464,840
380	Surfacing (Access Road)	SY		$ 110	2600	$ 286,000
650	Curb and Gutter	LF		$ 50	21600	$ 1,080,000
	SUBTOTAL (A)					**$ 8,007,840**
530	Structures - Wall	SF		$ 190	158100	$ 30,039,000
450	Drainage - New	% of (A)	3%	$ -		$ 240,240
451	Utility Relocations	% of (A)	1%	$ -		$ 80,080
632/633	Traffic - Signing/Striping	% of (A)	1%	$ -		$ 80,080
634	Traffic Control	% of (A)	3%	$ -		$ 240,240
734	Erosion Control/Environmental	% of (A)	5%	$ -		$ 400,400
	SUBTOTAL (B)					**$ 31,080,040**
009	Mobilization	% of (A)+(B)	9%	$ -		$ 3,517,910
	Contingency	% of (A)+(B)	30%	$ -		$ 11,726,370
	SUBTOTAL (C)					**$ 15,244,280**
	CONSTRUCTION TOTAL (D)	**(A)+(B)+(C)**				**$ 54,332,160**
18	Design Engineering	% of (D)	5%	$ -		$ 2,716,610
900	Construction Engineering	% of (D)	10%	$ -		$ 5,433,220
						$ 62,481,990
	PROJECT TOTAL (E)					**$ 62,482,000**
	Construction + ROW Cost					**$ 54,400,000**

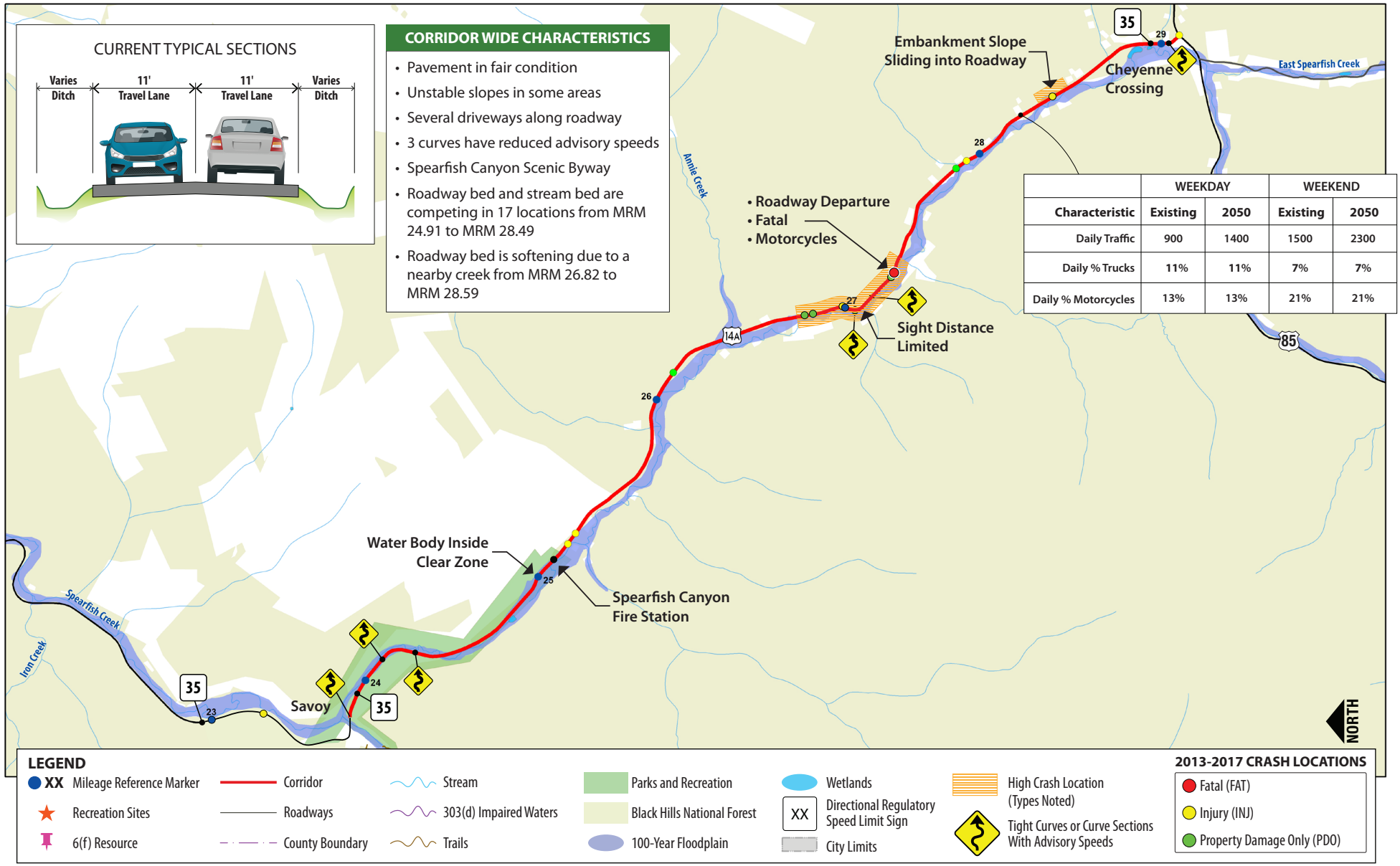
APPENDIX A. CORRIDOR 2 CHARACTERISTICS

CORRIDOR 2

US 14A: Spearfish Canyon South

Savoy to Cheyenne Crossing

Corridor Characteristics



	WEEKDAY		WEEKEND	
Characteristic	Existing	2050	Existing	2050
Daily Traffic	900	1400	1500	2300
Daily % Trucks	11%	11%	7%	7%
Daily % Motorcycles	13%	13%	21%	21%

SDDOT Black Hills CSC Study 17-385 2/3/20

APPENDIX B. ENVIRONMENTAL SCAN REPORT

Environmental Scan

Black Hills Context Sensitive Corridors Study – Corridor 2

US 14A: US 85 to Savoy

Environmental Review and Design

Lawrence County, South Dakota
P 014A(22)23 N PCN 05UE

View south toward US 14A one mile south of Savoy, adjacent to Old Spearfish Creek Dam.

Prepared for:
South Dakota Department of Transportation

Prepared by:
Felsburg Holt & Ullevig
6400 S Fiddlers Green Circle, Suite 1500
Greenwood Village, CO 80111
303.721.1440

October 2022

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Appendices

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List of Acronyms

ACS	American Community Survey
ADA	Americans with Disabilities Act
AEP	Area of Potential Effect
AMM	Avoidance and Minimization Measure
BGEPA	Bald and Golden Eagle Protection Act
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMR	Contaminated Materials Review
EDR	Environmental Data Resources
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHU	Felsburg Holt & Ullevig
FHWA	Federal Highway Administration
GLO	General Land Office
IPaC	Information, Planning and Conservation system
LEP	Limited English Proficiency
LOS	Level of Service
LWCF	Land and Water Conservation Fund
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NRHP	National Register of Historic Places
SDARC	South Dakota Archaeological Research Center
SDCL	South Dakota State Law
SDDANR	South Dakota Department of Agriculture and Natural Resources
SDDOT	South Dakota Department of Transportation
SDGFP	South Dakota Department of Game Fish and Parks
SDSHPO	South Dakota State Historic Preservation Office

TMDL	total maximum daily load
USC	United States Code
USCB	U.S. Census Bureau
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOUS	Waters of the United States

1. INTRODUCTION

South Dakota Department of Transportation (SDDOT) is conducting a context sensitive analysis of highway corridors in the Black Hills through a three-phase program, in conjunction with the Federal Highway Administration, US Forest Service, South Dakota Game, Fish & Parks Department, and the National Park Service. The study is being conducted to identify existing conditions, anticipated challenge areas, safety, and operational needs along these corridors and to determine its short-term and long-term transportation priorities.

The first phase encompassed an overall traffic and safety needs analysis of 17 corridors, and the second phase involved an assessment of opportunities for transportation-related improvements for each corridor. These initial corridor planning investigations are documented in the *Black Hills Context Sensitive Corridors Study, Phase 1 & 2 Report* (Study), May 2020.

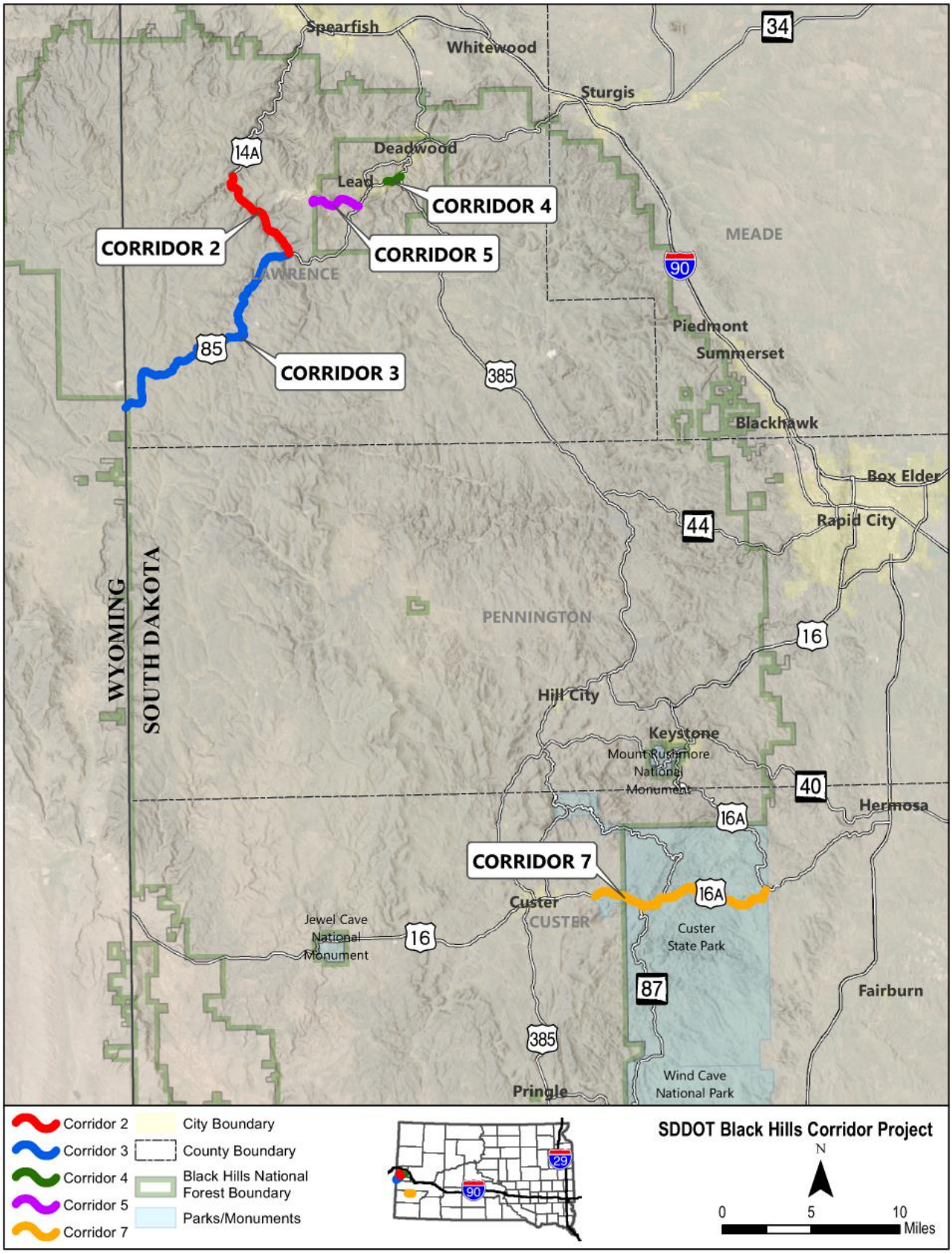
In the Phase 3 studies, these corridors were then prioritized for their ability to deliver safety benefits and address urgent infrastructure needs, based on current level of service, crash history, road purpose, and public review and comment. Five high priority corridors were selected for more detailed planning, conceptual design, and public review, including Corridors 2, 3, 4, 5, and 7 (see **Figure 1**).

This study is establishing a corridor-wide preliminary purpose and need statement as well as goals and objectives that will be later developed and refined as project-specific purpose and needs for use in the National Environmental Policy Act (NEPA) process. The results of analyses from the previous transportation planning process are being used to shape the corridor-wide preliminary purpose and need statement, and, thereby, the range of alternative concepts. The corridor-wide preliminary purpose and need statement and the goals and objectives will be used to comparatively measure the effectiveness of alternatives. This comparison could occur in the Environmental Scan document but could also occur in the NEPA process. The corridor-wide purpose and need addresses the primary transportation issue in the corridor. Subsequent NEPA projects may address portions of the corridor needs but could have a project-specific purpose and need.

This Environmental Scan addresses the portion of the Spearfish Canyon Scenic Byway along US 14A between Cheyenne Crossing and Savoy (Corridor 2). This corridor is just over six miles long and parallels Spearfish Creek**.** The regional location of Corridor 2 within the Black Hills is shown on **Figure 1**.

The purpose for this Environmental Scan Report is to create a “bridge” between the 3-phase corridor planning studies, and a subsequent NEPA process.

FIGURE 1. REGIONAL LOCATION MAP



The following sections include the *corridor context* within the Black Hills, *transportation system context,* and a preliminary corridor-wide *purpose and need statement* to be refined during the NEPA process. The *Environmental Resources* sections document known and potential environmental resources within the environmental study area for **Corridor 2**.

1.1 Corridor Context

The primary function of Corridor 2 is ***Destination Access***. Corridors supporting this purpose are hybrids in that they carry travelers between their accommodation location (hotel/campground/home) and the venue to be visited and they provide an effective level of adjacent access to key destinations. They are also routes that connect venues travelers may visit in a day trip.

The primary function of Corridor 2 is

Destination Access

Venues (destinations) accessed directly from Corridor 2 include as a connector into Corridor 1 (US 14A between Spearfish and Savoy), which contains Bridal Veil Falls, the Devil's Bathtub and numerous designated picnic areas.

Corridor 2 is along a National Forest Service Scenic Byway named Spearfish Canyon Scenic Byway. It is renowned for its natural beauty and history framed by towering limestone canyon walls. It has a rich vegetation with four distinct plant regions. This byway is a desirable place in the Black Hills to access waterfalls, such as Bridal Veil and Roughlock Falls. Creeks run through the canyon, and many hiking trails are available for those who want to stray from the road. The byway is a favorite fall color drive when the aspen changes in September (USDA Forest Service 2020).

Spearfish Canyon Scenic Byway follows an old railroad grade that was abandoned after massive flooding in 1933. Old rail stops and mining camps include Savoy and Elmore. Spearfish Creek supports trout brought to the Black Hills from Colorado in 1899 (USDA Forest Service 2020).

This corridor lies within a heavily forested canyon that contains unique geological features and unique viewsheds that provide user enjoyment. That is, there are numerous locations along the study corridor providing opportunities to stop and look at natural and built surroundings.

The Spearfish Canyon Scenic Byway parallels Spearfish Creek and is renowned for its natural beauty and history, framed by towering limestone canyon walls. The Byway follows an old railroad grade that was abandoned after massive flooding in 1933. Old rail stops and mining camps include Savoy and Elmore. Spearfish Creek supports trout brought to the Black Hills from Colorado in 1899. It has a rich vegetation with four distinct plant regions. The byway is a favorite fall color drive when the aspen changes in September (USDA Forest Service 2020).

Characteristics defining the context of this destination access corridor include:

- Serving as a scenic drive and access to key recreational venues in the region, including Roughlock Falls Natura Area, Bridal Veil Falls, the Devil's Bathtub, and numerous designated picnic areas
- Paralleling/crossing Spearfish Creek
- Balancing vehicle thru-put and access to local properties and use areas
- Reducing travel time in the corridor
- Providing lane widths and shoulders to better accommodate travelers is important.

1.2 Transportation System Context

For corridor transportation system context, **Figure 2** illustrates the current typical roadway section, high crash locations, daily traffic data, tight curves, and an overview of corridor-wide characteristics. The typical section of Corridor 2 provides two 11-foot travel lanes and stormwater drainage ditches on either side of the roadway, and there is little to no shoulder along the entire stretch of the corridor.

There are several areas with clear zone issues that could contribute to crashes. These could be substantial physical constraints as steep side slopes, rock walls, waterbodies, or drainage facilities. Overall, the pavement is in fair condition. One section of roadway at approximately mile marker 28.5 is in a slide area, which has shifted the roadway.

Much of this corridor lies within or near the 100-year floodplain and in an area proximate to Mileage Reference Marker (MRM) 25, Spearfish Creek is within the roadway clear zone.

There are several driveways along the roadway and three curves have reduced advisory speeds (MRM 24, MRM 27, and MRM 29).

As shown on **Figure 2**, the current daily traffic ranges from 900 to 1,500 vehicles and the forecasted Year 2050 levels range from 1,400 to 2,300 vehicles. The highest percentage non-passenger vehicle transportation user group in this corridor is motorcycles (13 to 21 percent). This is followed by bicycle and pedestrian activity. The pedestrian traffic primarily occurs at various pullouts and destination points along the corridor such as the Old Spearfish Creek Dam.

Figure 3 presents findings that compare the total and severe crashes reported along this corridor with what is expected for similar roadways, represented by the center line in the graph. The upper and lower limits (80 percent and 20 percent, respectively) lines delineate areas with a high potential for crash reduction and little potential for crash reduction. This type of graphic provides a demonstration of corridor safety performance.

FIGURE 2. CORRIDOR 2 CHARACTERISTICS

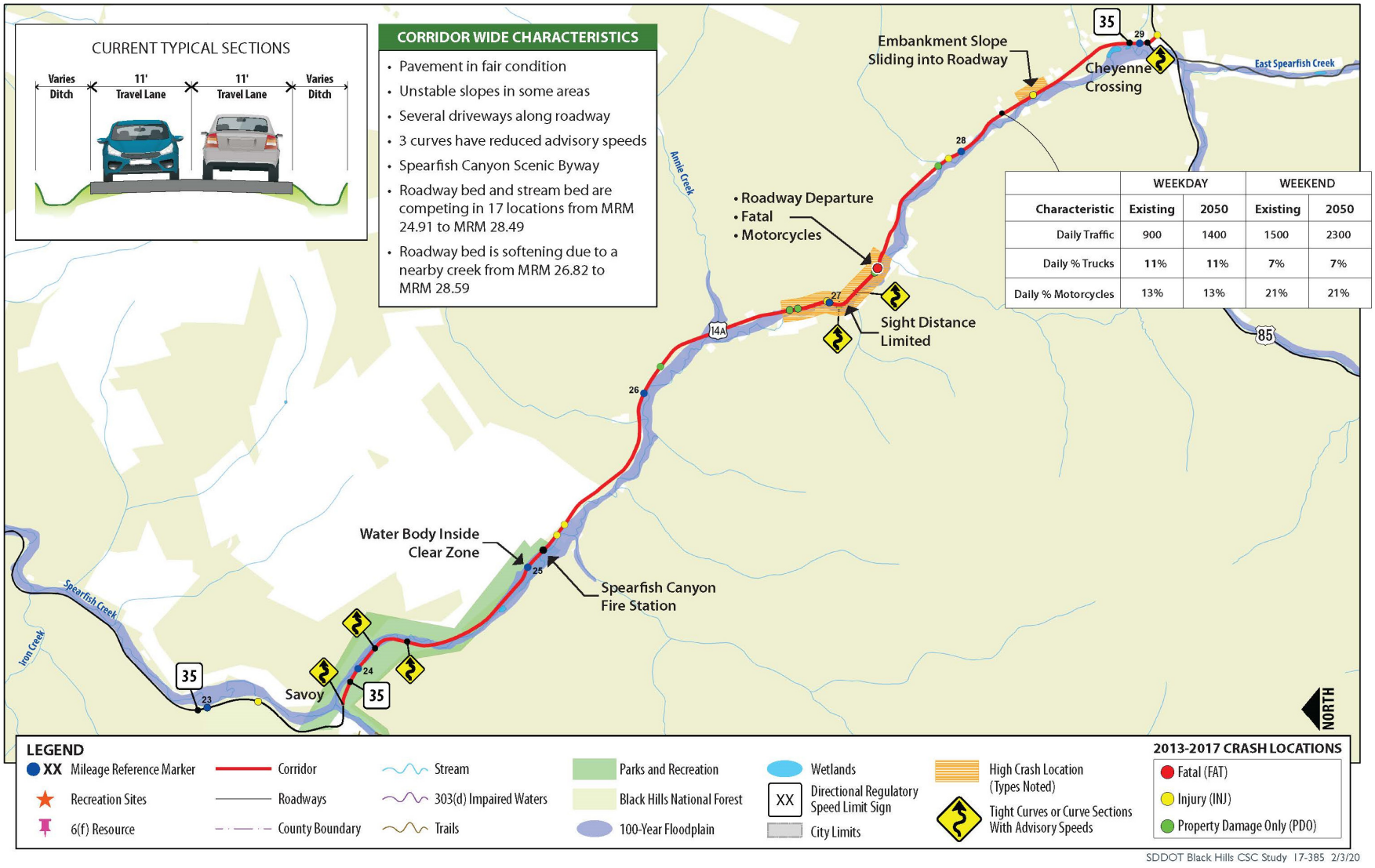
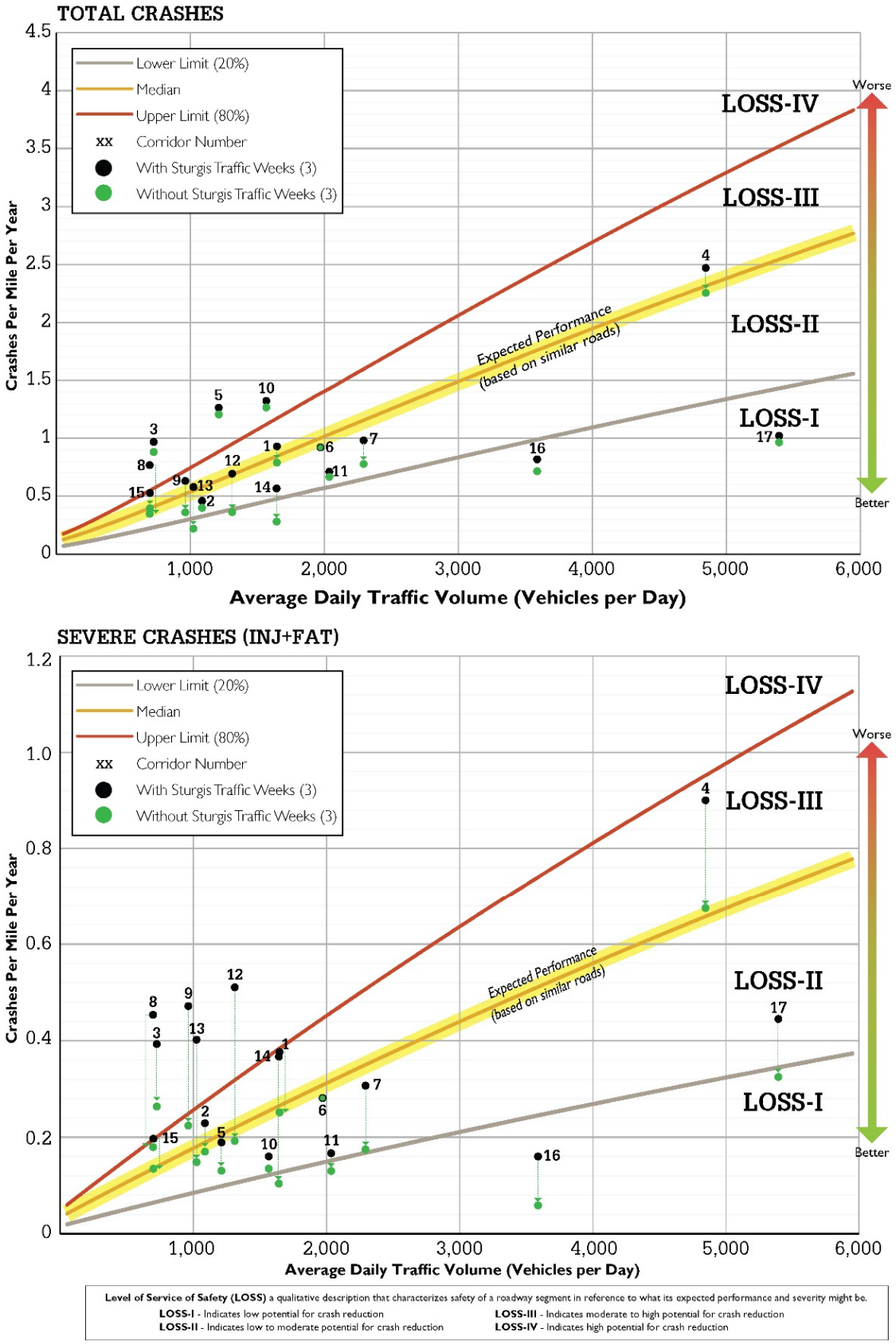


FIGURE 3. CORRIDOR SAFETY PERFORMANCE, 2013-2017



Level of Service of Safety (LOSS) a qualitative description that characterizes safety of a roadway segment in reference to what its expected performance and severity might be.

LOSS-I - Indicates low potential for crash reduction
LOSS-II - Indicates low to moderate potential for crash reduction
LOSS-III - Indicates moderate to high potential for crash reduction
LOSS-IV - Indicates high potential for crash reduction

This entire corridor results in a total crash Level of Service of Safety (LOSS) of II both during and without Sturgis Rally traffic weeks (**Figure 3**). This means that the corridor experiences slightly less total crashes than expected and has a lower potential for crash reduction. Severe (injury and fatal) crashes have occurred at a greater than expected frequency along this corridor, particularly with the inclusion of the annual Sturgis Motorcycle Rally weeks in the crash data. At LOSS III based on severe crashes, the corridor shows a moderate to high potential for severe crash reduction based on this analysis.

There is an elevated crash location around MRM 27 (highlighted in orange on **Figure 2**) that includes a horizontal curve with advisory speed. Crash records show roadway departure and motorcycle crash patterns in the area. The increased presence of motorcycles during the Annual Sturgis Motorcycle Rally may contribute to this occurrence. Sight distance limitations associated with this section may contribute to the higher crashes.

1.3 Purpose and Need

The following purpose and need sections included descriptions of the *preliminary corridor-wide purpose and need* for the proposed Action, and project goals, to be refined during the NEPA process.

1.3.1 Preliminary Corridor-wide Purpose for the Proposed Action

Spearfish Canyon Scenic Byway transportation improvements are intended to address inadequate roadway design and stability issues and enhance the user experience along the corridor. The improvements should be resilient and support the underlying context that adds to the corridor being categorized as a Scenic Byway.

1.3.2 Preliminary Corridor-wide Need for the Proposed Action

This section summarizes the transportation needs for the US 14A Spearfish Scenic Byway Corridor. The transportation improvements are needed to address:

- **Roadway Deficiencies:** The efficient movement of people, goods, and services along the corridor is critical and the roadway has several deficiencies that need to be brought to appropriate engineering standards that are appropriate for a designated National Scenic Byway. These include:
    - **Inadequate shoulders —** There is currently little to no shoulders throughout the corridor. Maximizing shoulder width as much as physically practicable, when considering substantial constraints (up to five feet) would allow for an appropriate accommodation of engineering standards.
    - **Roadside Embankment Stabilization** — Improvements along the corridor near MRM 28.5, where the road base is unstable and has shown propensity to shifting, is essential to help stabilize the roadside embankment. If left unaddressed, this issue will continue

to be exacerbated and could result in the ultimate failure of the roadway. However, achieving a permanent solution to the shifting road base may not be attainable due to the systemic nature of erosion issues at this location.

1.3.3 Project Goals

This section addresses goals of the project that each improvement type is intended to address. These goals are important to the character of the corridor, but do not rise to actual transportation need for the corridor. These goals may result in the selection of alternatives when other needs are equal, and one alternative addresses the goals better than other alternatives.

- **Safety:** The corridor has experienced severe crash frequency that indicates a moderate to high potential for crash reduction, as shown on **Figure 3**
  - ***Passenger Vehicles, Trucks, and Motorcycles —*** Address the incidences of higher-than-expected severe crashes along the corridor and surrounding MRM 27. Improvements will be formulated to work toward a result of LOSS II for the entire year, including Sturgis Rally weeks.
  - ***Bicycle/Pedestrian —*** Address the inadequate to zero shoulders along the corridor. Create shoulders that are three to five feet to enhance safety for bicycle traffic in the corridor. Pedestrian usage in the corridor occurs based upon visitors accessing the area for recreational purposes and consideration of these uses should be addressed.
- **User Experience:** The context of the corridor serving as a destination for travelers requires consideration of transportation improvements that further enhances this use. Users experience this corridor via passenger vehicles, heavy vehicles, motorcycles, bicycles, and as pedestrians. These uses should all be considered when infrastructure improvements are implemented.
- **Clear Zone:** A design consideration advanced by project stakeholders is the provision of a 7-to-10-foot clear zone along the roadway, meeting the applicable minimum as documented in the AASHTO Roadside Design Guide. Some improvement locations may not be fully able to achieve this width through improvements. This is due to substantial physical constraints such as substantial steep grades, rock ridges, and the presence of waterbodies. Achieving standard clear zone widths may not be practical when balancing reasonableness and context sensitivity.

1.4 Proposed Project

1.4.1 Project Termini

The project termini are described as follows:

- **Northern Terminus: MRM 23.7:** This location lies at the small, populated place of Savoy and the intersection with Roughlock Falls Road. Beginning at this location, the roadway alignment shifts from the more winding portion of US 14A to more moderate curvature.
- **Southern Terminus: MRM 29.15:** This location lies at the populated place of Cheyenne Crossing and the intersection with US Highway 85.

1.4.2 Proposed Improvements

A corridor visioning exercise was completed during the Black Hills Context Sensitive Corridors Study. The visioning exercise included technical analyses and intensive consultation with the SDDOT, partner agencies, stakeholders and the general public. The vision includes a list of appropriate improvement types to support the vision, summarized below:

Vision Statement: US 85 is a National Highway System (NHS) route serving high speed commuter/commercial traffic. A corridor reconstruction effort increasing lane and shoulder widths and addressing horizontal curvature is needed to provide improved mobility and safety.	
Improvement Type:	**Supports Vision by:**
Additional pullouts alongside the roadway	Improving operations and safety
Widened roadway section including lane and shoulder width	reducing crashes and improve heavy vehicle travel conditions
Horizontal curve treatments	reducing crashes and create more consistent travel speed
Speed management signage/devices	Helping to smoothly transition vehicles from higher-speed western portion to tighter, lower speed western portion
Motorcycle safety treatments	Reducing motorcycle crash frequency
Roadside embankment slope stability/drainage improvements	Maximizing safety of roadside design while addressing infrastructure needs

Upon reaching and confirming the vision, the study team compiled and evaluated concepts to improve the corridor. Concepts were developed to address SDDOT road design standards, advance the corridor's purpose and function, and address corridor safety and operational needs. Design concepts were presented during public meetings to gather feedback and discussed with the Study Advisory Team to review impacts to the corridor context and adjust the concept to more effectively balance such impacts. A recommended concept emerged from the refinement, including the following components:

- Adaptive/variable width (3–5 ft) paved shoulders to minimize roadside vegetation removal and cut slopes,
- 11-ft travel lanes,
- 7-10 ft clear zones

- Combination of enhanced grading and retaining walls on creek side to minimize creek encroachment, retain views, and reduce guard rails
- Retaining current alignment

The scope of the environment scan data and mapping would cover future considerations of other corridor improvements.

1.5 Stakeholder and Public Involvement

General public meetings in support of Phases 1 and 2 were held in August of 2018 and both meetings were broadcast live via YouTube. Participants had the opportunity to provide comments on issues they have experienced within one or more of the corridors and their perception of corridor desired functions. A website was established to provide information and serve as a tool for public feedback throughout Phases 1 and 2. Meetings with various stakeholders were also held, which included:

- Small group meetings with adjacent landowners/stakeholders.
- Municipal representative meetings with the cities of Custer, Hermosa, Spearfish, Lead, and Deadwood.
- Black Hills Council of Governments and Chambers of Commerce associated with the cities of Spearfish, Lead, and Deadwood, along with the School District encompassing the Lead and Deadwood area.
- Individual agency meetings, including Custer State Park.

Two Visioning Workshops were held in Phases 1 and 2. These workshops helped to facilitate proper identification of corridor purposes, needs and improvement types.

Public engagement tasks for Phase 3 included presenting previous findings of the corridor studies, improvement options, and engagement tools for receiving public input. A project website was created, and it served as the primary portal of information for members of the public wanting to learn more about the study and to provide feedback.

A virtual public meeting was hosted instead of an in-person meeting due to the recommendations by the Centers for Disease Control. Information about participating in the public meeting was posted on the project website, as well as through different channels of communication. The project website included general project information, access to the interactive public meeting platform, and information on how to subscribe and access documentation form previous public meetings.

The meeting website and public comment period was launched on June 23, 2021, and closed at noon on August 20, 2021. Press releases, flyers, and mailing lists were all used to notify the public of the start of the comment period. Agency stakeholders included in the notifications included:

- City of Custer
- Black Hills Council of Governments
- Town of Hermosa
- Custer County
- Lawrence County
- City of Keystone
- City of Lead
- City of Deadwood
- City of Spearfish

Social Pinpoint, a community engagement platform, was used for the virtual public meeting. The virtual public meeting had almost two thousand visits to all corridors from 420 unique users. Corridor 2 had a total of nine responses and four emails. In general, of the responses, there is more support for widening the shoulders than no widening; however, there are concerns about the impact on the landscape and increasing speeds. People support slower speeds and maintaining the scenic views of the canyon.

Agency involvement included coordination and correspondence with agencies for identifying issues and understanding needs and concerns in the corridors. The Study Advisory Team (SAT) was comprised of the following members:

- U.S. Forest Service (USFS)
- U.S. National Park Service (USNPS)
- South Dakota Game, Fish, and Parks
- Spearfish Canyon Association
- Federal Highway Administration
- SDDOT

The SAT's role was to oversee the major project milestones, provide technical input, and to monitor the progress of the planning process. A total of nine SAT meetings have been held to date, four of which has been during Phase 3 of the study.

2. Environmental Resources

This chapter provides a review of known and potential environmental resources within the environmental study area that may be important considerations for construction of the potential improvements. The environmental study area consists of a 500-ft buffer of the existing US 14A roadway between MRM 23.7 in Savoy at the intersection with Roughlock Falls Road and MRM 29.15 in Cheyenne Crossing at the intersection with US 85. **Figure 4** provides an overview of the study area.

Included are sections documenting *regulatory requirements*, study *methodology*, descriptions of *existing conditions*, and *next steps* in the NEPA evaluation process for implementing improvements identified for Corridor 2. Evaluated resources are as follows:

- Soils/Geology
- Air Quality
- Water Quality
- Floodplains
- Wetlands and Waterways
- Vegetation and Wildlife
- Threatened and Endangered Species
- Environmental Justice
- Historic and Cultural Resources
- Federal and Tribal Lands
- Traffic Noise
- Section 4(f) and 6(f)
- Visual Resources
- Hazardous Materials

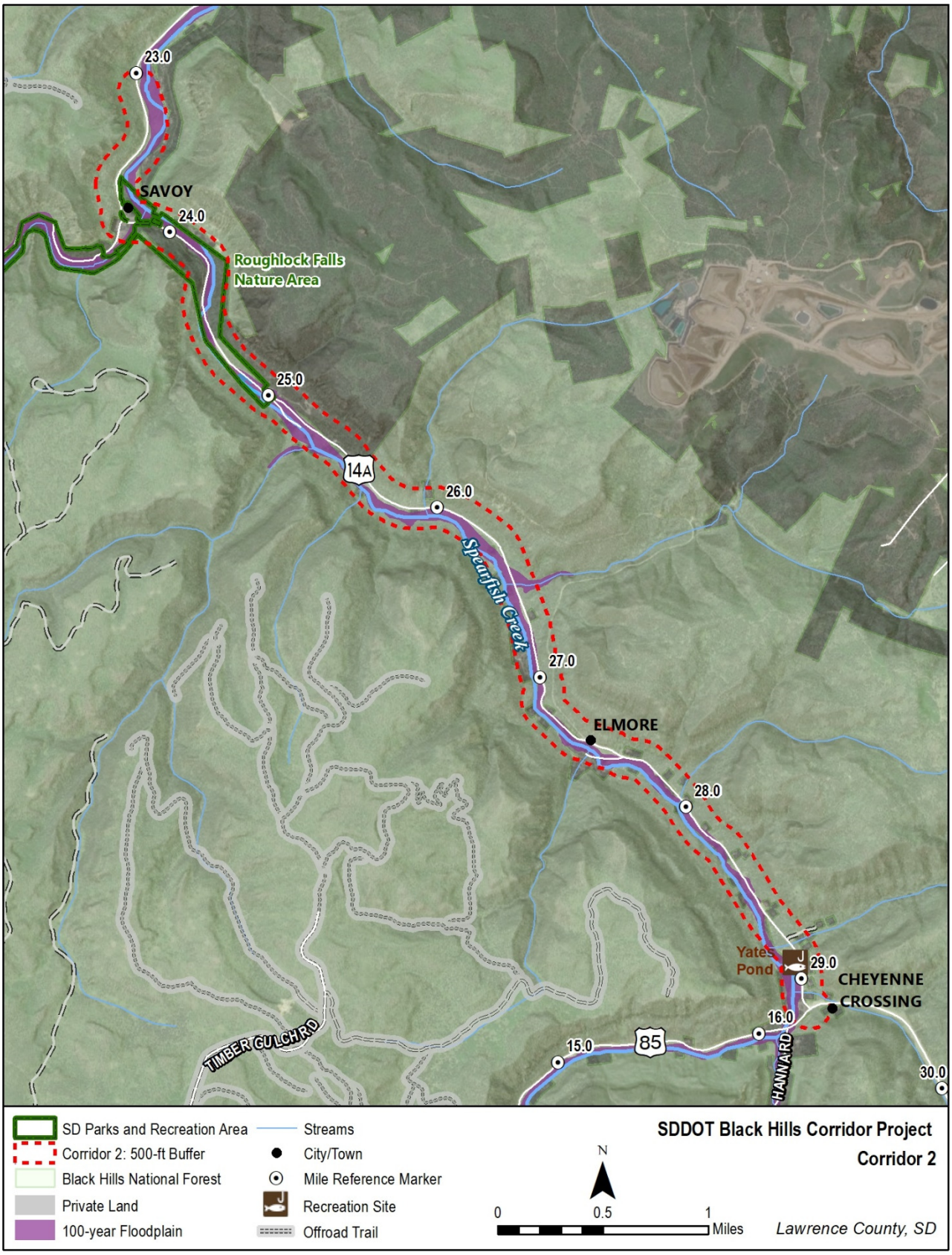
Several environmental resources with regulatory drivers but without applicability to the environmental study area for Corridor 2 were excluded from further review, including contaminated materials, farmlands, invasive species, wild and scenic rivers, and socioeconomic resources.

The following subsections provide an overview of the environmental resources, findings of this evaluation and, where appropriate, additional considerations for the proposed project.

2.1 Soils / Geology

This section highlights the soil and rock outcrop constraints associated with the Black Hills adjacent to US 14A. Soil constraints associated with roadway widening or realignments into the moderate to very steep side slopes include erosion, instability, rock outcrops, and revegetation challenges. The focus of this section is on selected soils on steep to very steep slopes with rock outcrops. The primary source of information is from the Soil Survey of Lawrence County, South Dakota (USDA, 1976).

FIGURE 4. ENVIRONMENTAL STUDY AREA



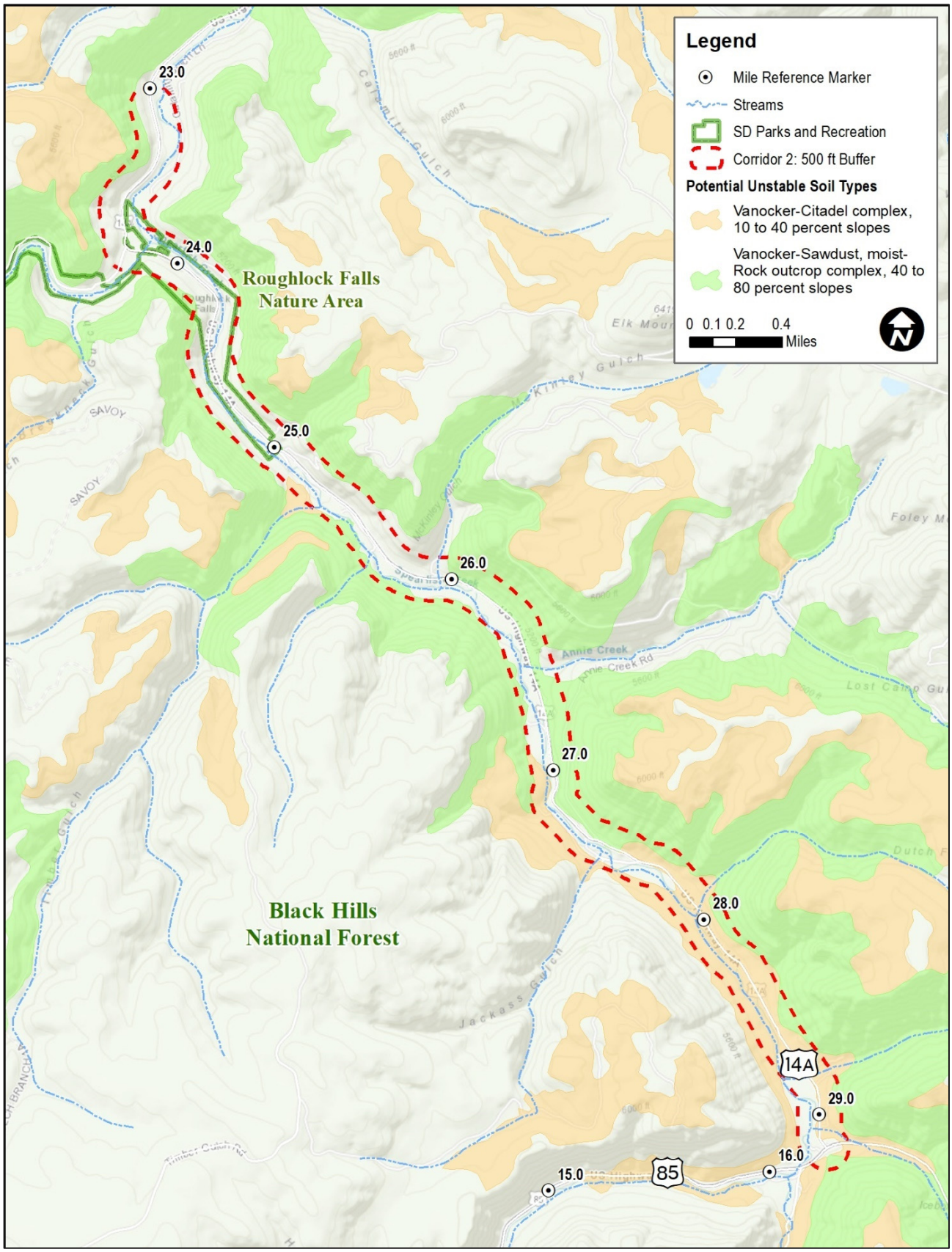
2.1.1 Existing Conditions

There are visible areas of erosion on uphill side slopes within the corridor, and an unstable slope and slide located at MRM 28.6. The following is a profile of constraints associated with soil types adjacent to Corridor 2 side slopes that could contain potentially unstable slopes:

- **Q0584E- Vanocker-Citadel Complex (10 – 40% slopes)**
  - **General Characteristics:** Deep, well drained, steep, and very steep soils in the Black Hills. It is on breaks along the edge of ridges and on the sides of mountain valleys. In some places bedrock is less than 40 inches deep.
  - **Revegetation**: Low fertility. Dominantly Ponderosa Pine forest with some native grasses and shrubs.
  - **Hazards**: Generally too steep for building sites, local roads and streets.
  - **Erosion:** moderate
  - **Depth to Bedrock**: greater than 15”
- **Q0589G - Vanocker-Sawdust, moist-Rock outcrop complex (40 – 80% slopes)**
  - **General Characteristics:** Deep, well drained, very steep Vanocker and Sawdust soils intermingled with areas of Rock outcrop. It is on the sides of mountains and canyons at the lower elevations of Limestone Plateau. The Vanocker and Sawdust soils are formed in material from weathered limestone and clacareous sandstone. Vanocker is typically on north-facing slopes and Sawdust on south-facing slopes. In some areas bedrock is 20-40 inches deep.
  - **Revegetation**: Dominantly Ponderosa Pine. There is also some bluestem, sedges, sideoats grama, common juniper, snowberry, Saskatoon snowberry, and yucca.
  - **Hazards**: Water erosion in disturbed areas. This soil type is severely limited as a site for swellings, hard surfaced roads and streets because of large stones on the Sawdust soil, the slope, and the Rock outcrop.
  - **Erosion:** Severe
  - **Depth to Bedrock**: greater than 15”

Figure 5 provides an overview of the corridor and areas of potential unstable soil types.

FIGURE 5. POTENTIAL UNSTABLE SOIL TYPES



2.1.2 Next Steps

Certain soil types along the corridor could pose a risk to the roadway. These soils will need to be further evaluated during the preliminary design phase and NEPA process.

2.2 Air Quality

Air quality is primarily regulated under the federal 1970 Clean Air Act (CAA) and amendments from 1977 and 1990. The purpose of the CAA is to protect and enhance air quality to promote public health, welfare, and the productive capacity of the nation.

2.2.1 Regulatory

Through the CAA, National Ambient Air Quality Standards (NAAQS) were established for six criteria air pollutants: carbon monoxide, particulate matter, lead, sulfur dioxide, nitrogen dioxide and ozone. Each of the states have evaluated their air quality with respect to the NAAQS. Any areas that exceeded the NAAQS were designated as nonattainment areas and are subject to more rigorous air pollution control measures. Over time and with air quality improvements, nonattainment areas may transition into NAAQS maintenance areas or NAAQS attainment areas. Transportation sources are most closely associated with carbon monoxide, particulate matter, nitrogen dioxide and chemical precursors of ozone.

A group of hazardous air pollutants are regulated under the CAA; a subset of which are called mobile source air toxics (MSAT). Greenhouse gases (GHG) are also covered by the CAA.

The CAA established mandatory Class I federal areas, which receive extra protection and consideration from impairment from man-made air pollution. This primarily focuses on visibility/haze and aerosols from large industrial sources and includes prevention of significant deterioration to the air quality.

For reasons described in the following section, the CAA transportation conformity regulations do not apply in South Dakota. However, the SDDOT Environmental Procedures Manual (2019) states:

> "Air quality is an environmental concern within the broad purview of NEPA and the thresholds/screening criteria included in the transportation conformity regulations and guidance can be helpful in deciding whether an air quality analysis of a proposed transportation project is warranted for NEPA purposes."

SDDOT has the option to consider transportation conformity concepts voluntarily. Such voluntary analyses are determined case by case.

Construction may temporarily affect air quality (e.g., fugitive dust). Permits are likely to be needed when construction begins.

2.2.2 Existing Conditions

South Dakota currently has no air quality nonattainment or maintenance areas designated by the U.S. Environmental Protection Agency for NAAQS pollutants under the CAA. This is indicative of good overall air quality across the state, including the Black Hills. Consequently, the federal CAA transportation conformity regulations do not apply in South Dakota and transportation projects, in general, would be expected not to be concerns regarding the NAAQS.

There are two Class I areas in South Dakota and both are in the vicinity of the corridor. Wind Cave National Park is approximately 50 miles south of the corridor. Badlands National Park (Badlands/Sage Creek Wilderness Area) is approximately 80 miles southeast of the corridor. Road improvement projects typically would not be a concern for Class I areas, particularly at these distances.

2.2.3 Next Steps

If a NEPA clearance is required for the corridor improvements, an appropriate air quality analysis will be scoped and completed. Transportation conformity analysis under the CAA will not be required, but SDDOT has the option to choose voluntary conformity-based analyses—that decision will be made at that time in response to the circumstances and concerns in place.

The need for and extent of MSAT or GHG analyses generally depends on the NEPA class of action. These analyses may be either qualitative or quantitative. An EA or EIS generally requires progressively greater consideration of MSAT and GHG. The level of analysis needed for these will be determined when the NEPA decision for the corridor is made.

The corridor improvements are unlikely to be a concern for either of the two Class I areas nearby and no associated air quality analysis is expected, but the two areas should be acknowledged.

Analysis of construction emissions is not needed for most projects. Permits are likely to be needed for construction and typical best practices should be required to minimize construction emissions and address air quality issues.

2.3 Water Quality

2.3.1 Regulatory

Water Quality is regulated under the Federal Water Pollution Control Act Amendments of 1972 (CWA). The objective is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and non-point pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. Each state has jurisdiction for managing water quality in its respective state.
Section 303(d) of the CWA requires each state to evaluate water quality conditions in designated waterbodies and list as impaired any waterbodies not meeting water quality standards; this is to be reported every other year.

2.3.2 Methodology

The 2020 South Dakota Integrated Report lists five categories to present information on the Section 303(d) finding in a descriptive and comprehensive manner (SDDANR, 2020). Category 5 waterbodies where one or more beneficial uses are determined to be impaired by one or more pollutants and a total maximum daily load (TMDL) has not been developed. States must develop and implement TMDLs (i.e., pollutant management plans) for waterbodies identified as having a Category 5 impairment.

2.3.3 Existing Conditions

The *2020 South Dakota Integrated Report for Surface Water Quality Assessment* (SDDANR, 2020) does not list any waterbody within or near the study area as impaired.

2.3.4 Next Steps

During the NEPA process, mitigation measures to reduce impacts to water quality would be incorporated and includes developing a Storm Water Pollution Prevention Plan (SWPPP) and a National Pollutant Discharge Elimination System (NPDES) Construction Storm Water Permit would be required from the South Dakota Department of Agriculture and Natural Resources (SDDANR). Furthermore, best management practices (BMPs) from the South Dakota DOT Erosion Control Guide would be implemented to minimize pollutants entering waterbodies.

2.4 Floodplains

2.4.1 Regulatory

Floodplains are the lands on either side of a waterway that are inundated when a channel exceeds its capacity. The following regulatory requirements apply to floodplains:

- **Executive Order (EO) 11988, Floodplain Management (1977),** directs federal agencies to "provide leadership and take action to reduce the risk of flood loss, to minimize the impacts of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains." This EO assists in furthering the NEPA, the National Flood Insurance Act of 1968 (amended), and the Flood Disaster Protection Act of 1973.
- **Code of Federal Regulations (CFR), Title 23 – Highways,** prescribes the policies and procedures that FHWA is directed to implement in the location and hydraulic design of highway encroachments on floodplains.
- **CFR, Title 44 – Emergency Management and Assistance**, contains the basic Federal Emergency Management Agency (FEMA) policies and procedures to regulate floodplain management and to analyze, identify, and map floodplains for flood insurance purposes.

2.4.2 Methodology

The 100-year floodplains and floodways were identified using FEMA digital GIS data. For projects within the floodplains, local jurisdictions typically require floodplain development permits.

2.4.3 Existing Conditions

The main floodways and floodplains within the study area are those associated with Spearfish Creek and its tributaries. All floodplains within the environmental study area have been classified as "Flood Zone A," the area covered by a 100-year flood (see **Figure 6**) on Flood Insurance Rate Map (FIRM) Panel 4600940050B and FIRM Panel 4600940125B.

2.4.4 Next Steps

This project requires that a floodplain analysis be completed to determine whether potential floodway impacts are associated with the project elements. If impacts are found, the level of these impacts will be identified, as well as measures to mitigate or eliminate these impacts. The floodplain analysis uses modeling to assess significant changes. These areas would require a Conditional Letter of Map Revision (CLOMR) from FEMA. For projects within the floodplains, local jurisdictions typically require floodplain development permits.

2.5 Wetlands and Waterways

2.5.1 Regulatory

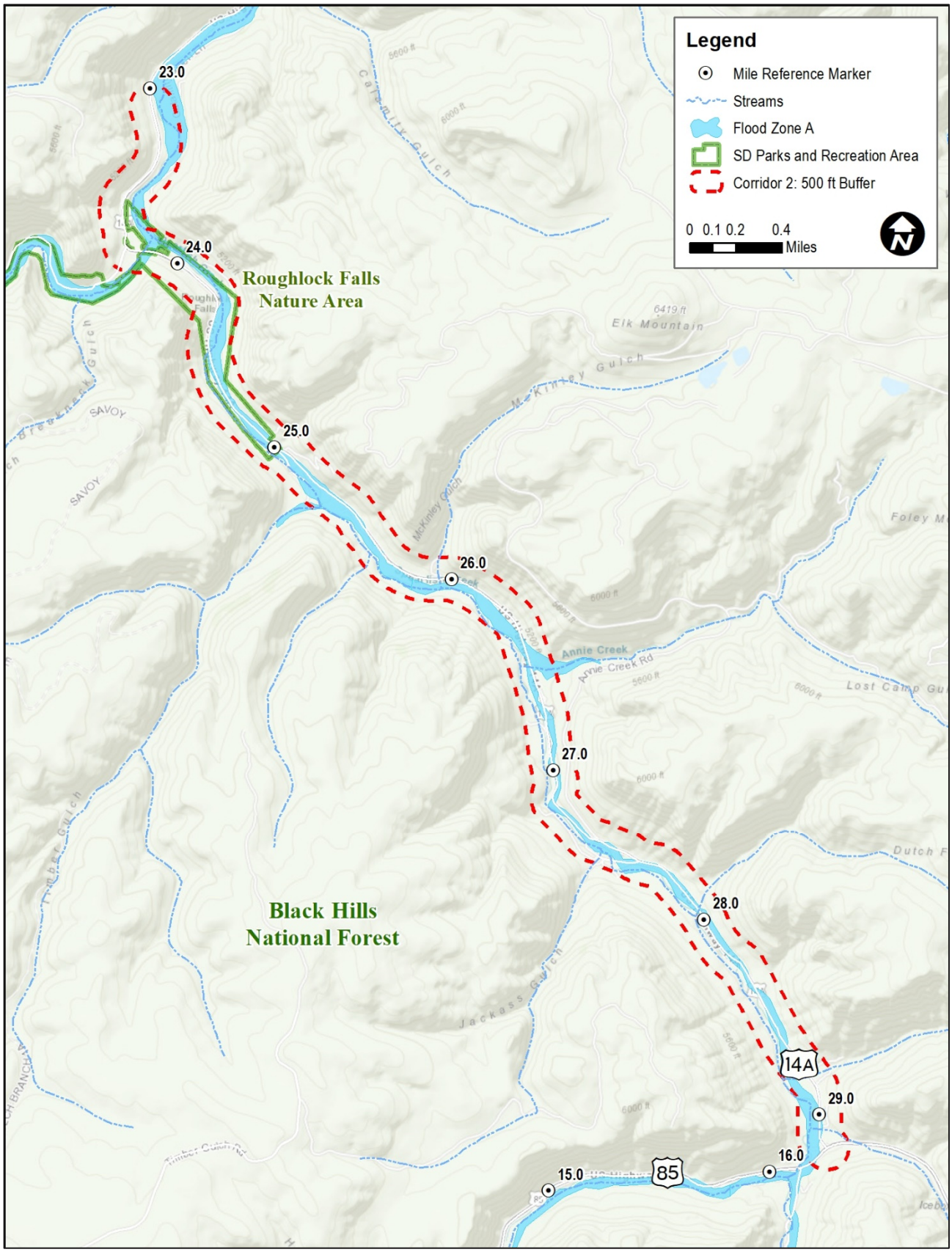
Wetlands and Waters of the United States (WOUS) are protected under Section 404 of the CWA, as amended (33 USC 1344), and EO 11990 of 1977 (Protection of Wetlands). Discharge of fill into wetlands and WOUS requires a Section 404 permit from the United States Army Corps of Engineers (USACE). Additionally, SDDANR reviews and issues certification for Section 401 of the CWA, which requires states to review federal projects for water quality certification.

2.5.2 Methodology

Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328). Wetlands and riparian areas are important because they provide habitat for various plant, fish, and wildlife species; serve as groundwater recharge areas; provide storage areas for storm and flood waters; serve as natural water filtration areas; and provide protection from wave action, erosion, and storm damage.

Potential wetlands were mapped within the study area, based on field observations and aerial photography.

FIGURE 6. FLOODPLAINS



2.5.3 Existing Conditions

Initial inventories of streams and wetlands adjacent to or crossing along US 14A between Cheyenne Crossing and Savoy within the Corridor 2 study area are summarized by MRM in **Table** 1, and shown on **Figure 7** and on the Environmental Resources Map Book in **Appendix A**.

TABLE 1. CORRIDOR 2 INVENTORY OF STREAMS AND POTENTIAL WETLANDS

Streams and Wetlands	Location (MRM or MRM Range)
Stream Crossings / Adjacent Stream Spearfish Creek and tributaries	28.87
	27.1–27.0
	26.53
	26.1
	25.0–23.83
Potential Wetlands	28.45
	28.2–28.0
	27.42–27.57
	26.85
	26.0–25.96
	25.0–24.0

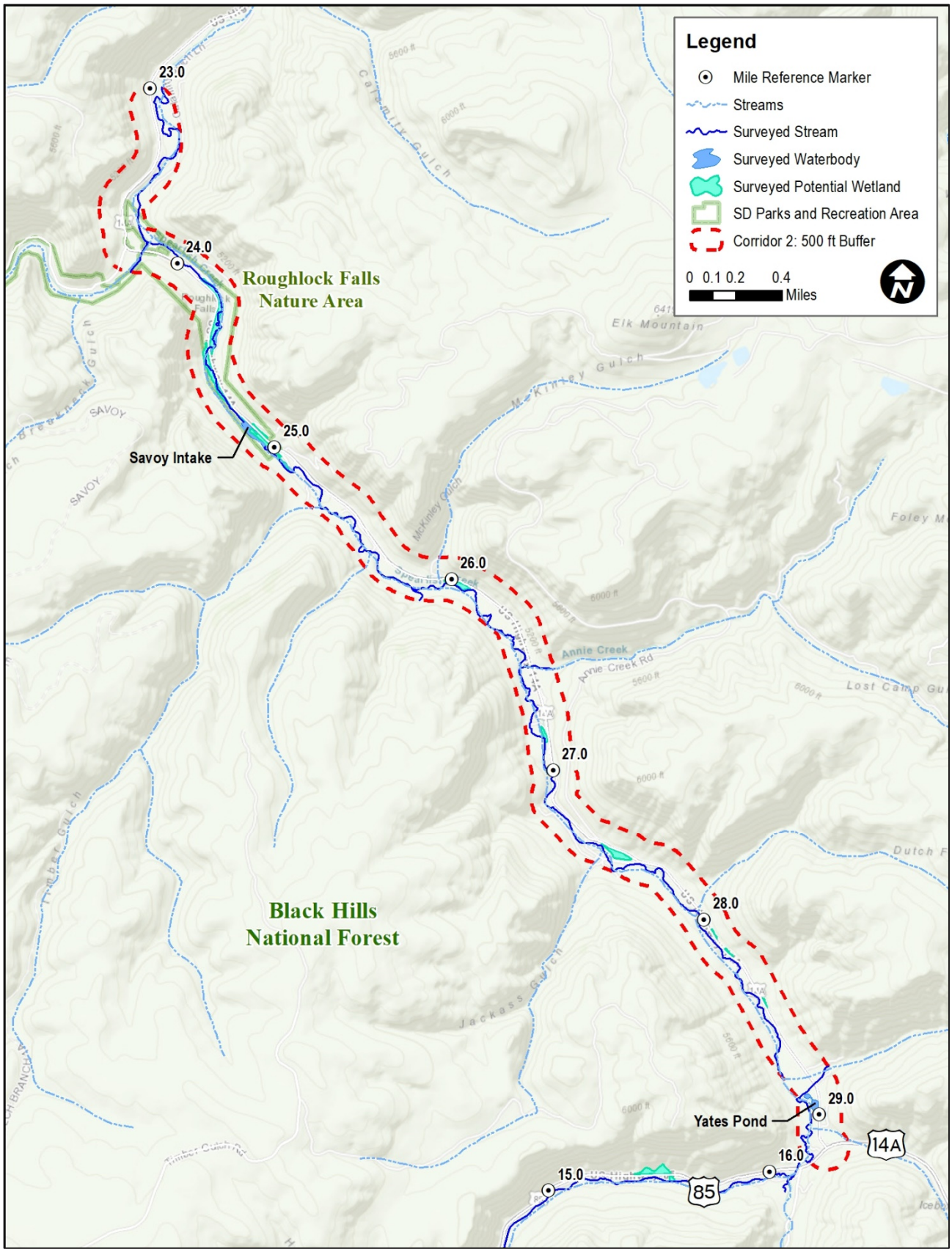
A total of 12.97 acres of potential wetlands were identified within the environmental study area. The wetlands consisted of palustrine emergent (PEM) and palustrine scrub-shrub (PSS) wetlands. PEM wetland vegetation included species such as baltic rush (*Juncus balticus*), cattail (*Typha* sp.), common threesquare (*Schoenoplectus pungens*), Nebraska sedge (*Carex nebrascensis*), prairie cordgrass (*Spartina pectinate*), reed canarygrass (*Phalaris arundinacea*), sedge (*Carex* sp.), smartweed (*Polygonum* sp.), and softstem bulrush (*Schoenoplectus tabernaemontani*). Vegetation in the PSS wetlands included Arroyo willow (*Salix lasiolepis*), Bebb willow (*Salix bebbiana*), peachleaf willow (*Salix amygdaloides*), and sandbar willow (*Salix interior*).

Spearfish Creek runs adjacent to the roadway for most of the corridor. Little Spearfish Creek, Annie Creek, and several unnamed tributaries were also found within the environmental study area. The project has a potential to impact Waters of the U.S., including wetlands.

2.5.4 Next Steps

A wetland delineation would be required during the NEPA phase of the project to ensure that the areas preliminarily identified within the study area contain all three requirements of a wetland. When wetland impacts cannot be avoided through design, adequate time must be built into the project schedule to allow for wetland permitting and mitigation.

FIGURE 7. WATERS OF THE U.S., INCLUDING WETLANDS



2.6 Vegetation and Wildlife

This section describes the existing vegetation and wildlife that occurs within the environmental study area for Corridor 2.

2.6.1 Existing Conditions

Vegetation

The environmental study area is located in the Black Hills Core Highlands sub-ecoregion within the Middle Rockies Ecoregion (USEPA, 2006). The Middle Rockies ecoregion consists of individual mountain ranges of mixed geology intermingled with high elevation, grassy parkland. The Black Hills are an outlier of the Middle Rockies and share with them a montane climate, hydrography, and land use pattern. Land uses such as ranching and woodland grazing, logging, recreation, and mining are commonly found throughout this ecoregion. The Black Hills Core Highlands sub-ecoregion consists of higher elevations and cooler temperatures. Increased rainfall in this area fosters boreal species such as white spruce, aspen, and birch trees.

Table 2 provides a list of species observed within the Black Hills corridors.

TABLE 2. OBSERVED BLACK HILLS VEGETATION LIST

Common Name	Scientific Name
Tree	
Aspen	*Populus tremuloides*
Bur oak	*Quercus macrocarpa*
Paper birch	*Betula papyrifera*
Ponderosa pine	*Pinus ponderosa*
Rocky Mountain juniper	*Juniperus scopulorum*
White spruce	*Picea glauca*
Shrub	
Arroyo willow	*Salix lasiolepis*
Bebb willow	*Salix bebbiana*
Buffaloberry	*Shepherdio canadensis*
Chokecherry	*Prunus virginiana*
Common bearberry	*Arctostaphylos uva-ursi*
Common hackberry	*Celtis occidentalis*
Common snowberry	*Symphoricarpos albus*
Creeping Oregon grape	*Mahonia repens*

Common Name	Scientific Name
Ground juniper	*Juniperus communis*
Mountain ninebark	*Physocarpus monogynus*
Peachleaf willow	*Salix amygdaloides*
Prickly wild rose	*Rosa acicularis*
Sandbar willow	*Salix interior*
Saskatoon serviceberry	*Amelanchier alnifolia*
Wood's rose	*Rosa woodsii*
Herb	
Baltic rush	*Juncus balticus*
Bearded wheatgrass	*Elymus caninus*
Canada goldenrod	*Solidago canadensis*
Cattail	*Typha* sp.
Common cowparsnip	*Heracleum sphondylium*
Common dandelion	*Taraxacum officinale*
Common threesquare	*Schoenoplectus pungens*
Common Yarrow	*Achillea millefolium*
Curly dock	*Rumex crispus*
Indian ricegrass	*Oryzopsis hymenoides*
Kentucky bluegrass	*Poa pratensis*
Little bluestem	*Schizachyrium scoparium*
Nebraska sedge	*Carex nebrascensis*
Oxeye daisy	*Leucanthemum vulgare*
Prairie cordgrass	*Spartina pectinata*
Reed canarygrass	*Phalaris arundinacea*
Roughleaf ricegrass	*Oryzopsis asperifolia*
Sedge	*Carex* spp.
Smartweed	*Polygonum* sp.
Smooth brome	*Bromus inermis*
Softstem bulrush	*Schoenoplectus tabernaemontani*
True forget-me-not	*Myosotis scorpioides*

There are a few scattered homes, vacation rentals, and commercial properties found within the study area. However, much of the environmental study area is comprised of undeveloped forested land within the Black Hills National Forest. In the forested area on the south side of US 14A, between MRM 25 and MRM 26 there is a blowdown area where an expansive area of trees was felled by a windstorm (see **Appendix A, Sheet 7** and **Sheet 8**).

At the time of September 2020 field visit, no noxious weeds were observed within the study area, but they are still possible through the environmental study area. State-listed noxious weed species from the SDDANR (2021) include:

- Absinth wormwood (*Artemisia absinthium*)
- Leafy spurge (*Euphorbia esula*)
- Canada thistle (*Cirsium arvense*)
- Perennial sow thistle (*Sonchus arvensis*)
- Hoary cress (*Cardaria draba*)
- Purple loosestrife (*Lythrum salicaria*)
- Salt cedar (*Tamarix sp.*)

No purple loosestrife has been reported in Lawrence County, but the other six species have documented populations. Locally listed noxious weed species in Lawrence County include Canada thistle, common Tansy (*Tanacetum vulgare*), and common mullein (*Verbascum thapsus*) (Lawrence County, 2021).

Wildlife

The Fish and Wildlife Coordination Act of 1958, as amended, recognizes the vital contribution of wildlife resources to the Nation and requires equal consideration and coordination of wildlife conservation with water resources development programs.

This area is home to a variety of species due to the presence of streams, lakes, varied topography, and vegetation in the Black Hills National Forest. Ungulate species known to occur in or near the environmental study area include mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), elk (*Cervus canadensis*), and pronghorn (*Antilocapra americana*).

Many carnivore species occur in the environmental study area, including raccoon (*Procyon lotor*), coyote (*Canus latrans*), red fox (*Vulpes vulpes*), and mountain lion (*Puma concolor*). Individuals of these species may use this area as a movement corridor, for hunting purposes, or for denning purposes.

Many rodent species may occur in the environmental study area. This group is very large, and species likely to be found in or near the environmental study area include the beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), yellow-bellied marmot (*Marmota flaviventris*), porcupine (*Erethizon dorsatum*), mountain cottontail (*Sylvilagus nuttallii*), least chipmunk (*Tamias minimus*), pine squirrel (*Tamiasciurus hudsonicus*). Various mice, voles, and woodrats (*Neotoma* sp.) could also use the environmental study area.

Several bat species have the potential to occur in the environmental study area. These species include the Long-eared Myotis (*Myotis evotis*), Northern Long-eared Bat (*Myotis septentrionalis*), and the Silver-haired Bat (*Lasionycteris noctivagans*).

Several reptile and amphibian species can be present in the environmental study area due to the presence of suitable habitat within the riparian area surrounding Spearfish Creek and other streams crossing the environmental study area. Species such as: bull frogs (*Lithobates catesbeianus*), snapping turtles (*Chelydra serpentina*), common garter snakes (*Thanmophis sirtalis*), bull snakes (*Pituophis catenifer sayi*), and prairie rattlesnakes (*Crotalus viridis*).

Migratory Birds and Raptors

The Migratory Bird Treaty Act (MBTA) of 1918 provides protection of birds classified as migratory birds by the U.S. Fish and Wildlife Service (USFWS). The Migratory Bird Permit memorandum issued in April 2003 stipulates there is no prohibition against destruction of inactive nests. Additionally, any disturbance to these nesting areas must follow the stipulations outlined in the MBTA. Specific protection for Bald and Golden Eagles is authorized under the Eagle Protection Act (16 United States Code 668), which provides additional protection to these species from intentional or unintentional harmful conduct.

Most birds found in South Dakota and their nests are protected under the MBTA. Species not included in the MBTA are nonnative species whose occurrences in the United States are solely the result of intentional or unintentional human-assisted introduction. Disturbance of active migratory bird nests is prohibited (USFWS, 2020a).

Bald eagles (*Haliaeetus leucocephalus*) require mature trees near large, open bodies of water for nesting and winter roosting. Golden eagles (*Aquila chrysaetos*) generally nest on cliffs or escarpments. The study area contains suitable habitat that may provide opportunities for forage, roosts, and nesting to migrating birds, such as raptors and passerines.

2.6.2 Next Steps

A field survey would be required to establish the presence or absence of noxious weeds, migratory bird and raptor nests, and species-specific wildlife habitat during the NEPA phase of the project.

Disturbance of soil due to project activities would have the potential to introduce or spread noxious weeds and other invasive plant species. Mitigation measures should include seeding disturbed areas with mixtures that comply with South Dakota Seed Laws in order to reduce the potential for invasive plant infestations and to comply with South Dakota laws regarding weed and pest control (South Dakota Code, 2005).

2.7 Threatened and Endangered Species

2.7.1 Regulatory

The Endangered Species Act (ESA), administered by the United States Fish and Wildlife Service (USFWS), provides protection to imperiled species and their habitats. Section 7 of the ESA requires federal agencies to consult with USFWS for federally funded or federally permitted projects that may affect a species listed under the ESA. South Dakota State Law (SDCL 34A-8), administered by South Dakota Department of Game Fish and Parks (SDGFP), protects state listed threatened and endangered species.

2.7.2 Methodology

Felsburg Holt & Ullevig (FHU) used the USFWS Information, Planning, and Conservation System (IPaC) website to identify the latest information on threatened and endangered species that may occur in the study area (USFWS, 2021). SDGFP county lists were also reviewed for threatened, endangered, proposed, and candidate species (SDGFP, 2021). Habitat was evaluated in the project area for species listed as potentially present in the Black Hills National Forest.

2.7.3 Existing Conditions

Table 3 identifies federal and state listed species potentially located in the Corridor 2 area.

TABLE 3. THREATENED AND ENDANGERED SPECIES LIST

Common Name	Status	Habitat	Comments
Mammals			
Northern long-eared bat (*Myotis septentrionalis*)	FT	Northern long-eared bats are typically found near water and dense forest conditions. Roost sites consist of shedding bark and tree cavities, open buildings, and caves or mines. Winter hibernacula are caves and mines.	Potential summer roosting habitat for the northern long-eared bat exists along streams and other drainages that cross the environmental study area within dense forest conditions.
Birds			
Osprey (*Pandion haliaetus*)	ST	Lakes, rivers, and coastal bays are primary habitat. Builds nests at the tops of large living or dead trees, utility poles, cellphone towers, and other tall structures.	Suitable nesting habitat is present within the study area; however, no nest sites have been identified.
Red Knot (*Calidris canutus rufa*)	FT	Red knots breed in dry tundra areas and winter at intertidal marine habitats near coastal inlets, estuaries, and bays.	Project lacks dry tundra areas and suitable intertidal marine habitats.
American Dipper (*Cinclus mexicanus*)	ST	Rocky, unpolluted streams. Streams with cliffs, ledges, or bridges nearby are important nesting habitats.	Suitable nesting habitat is present near Spearfish Creek, Annie's Creek

Common Name	Status	Habitat	Comments
			and other streams; however, no nest sites have been identified.
Peregrine Falcon (*Falco peregrinus*)	SE	Habitat consists of tall cliffs for nesting with open landscapes for foraging. Nests are often established on cliffs at heights ranging from 50 to 200 meters.	Currently the peregrine is a rare summer resident of the Black Hills.
Whooping Crane (*Grus americana*)	FE/SE	Whooping Cranes migration habitat includes freshwater marshes, wet prairies, shallow portions of rivers and reservoirs, grain stubble fields and submerged sandbars in rivers with good horizontal visibility for feeding and resting.	Although individuals can be found during migration anywhere in South Dakota, they are most commonly found along and adjacent to the Missouri River.
Fish			
Finescale dace (*Chrosomus neogaeus*)	SE	Cool spring-fed bogs, lakes and creeks; small, weedy, sluggish streams and small lakes. Sometimes associated with beaver ponds.	Potential habitat is located within the environmental study area. They have been reported in a large population from Cox and Mud lakes near Spearfish.
Longnose sucker (*Catostomus catostomus*)	ST	Habitat for longnose sucker may be lentic or lotic. They prefer cool, clear, spring-fed streams and lakes.	The species is known to exist in very few locations. No recent populations are found on National Forest System lands.

FE = Federally Endangered ST = State Threatened

FT = Federally Threatened SE = State Endangered

References: SDGFP – Accessed July 2021 USFWS Species Profiles – ECOS, IPaC July 2021

In Lawrence County, three federally listed species were identified through the USFWS IPaC. Potential northern long-eared bat summer foraging habitat is present at wooded habitats along Spearfish Creek, East Spearfish Creek, and other drainages, which also includes adjacent non-forested habitats such as wetlands and open fields. There are also several bridges within the study area that could also be considered potential summer habitat.

The SDGFP identified six state listed species as having potential to occur in Lawrence County, South Dakota, including one species that is also federally listed. In general, habitat is lacking for state listed species within the environmental study area. While some species use stream habitat, channels present within the study area lack suitable habitat. There is potentially suitable habitat along Spearfish Creek for the osprey and the finescale dace.

2.7.4 Next Steps

A field survey would be required to establish the presence or absence of federal or state listed threatened and endangered species habitat during the NEPA phase of the project.

The following measures should be implemented during planning and construction of the project:

- Disturbance to riparian and wetland areas should be kept to an absolute minimum.
- If riparian vegetation is lost it should be quantified and replaced onsite. Seeding of indigenous species should be accomplished immediately after construction to reduce sediment and erosion.
- A site-specific sediment and erosion control plan should be part of the project.
- A post construction erosion control plan should be implemented to provide interim control before reestablishing permanent vegetative cover on the disturbed site.

As the project moves into the NEPA phase, USFWS and SDGFP should be coordinated with for concurrence on effects to the listed species and to identify necessary mitigation commitments.

2.8 Environmental Justice

2.8.1 Regulatory

Under Executive Order 12898 (1994), Federal Actions to Address Environmental Justice in Minority Populations, projects are required to identify and address disproportionately high and adverse human health or environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority populations and low-income populations in the United States. In accordance with Council on Environmental Quality (CEQ) guidance, EJ populations occur where either:

- The minority or low-income population of the affected area exceeds 50%.
- The population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.

Title VI of the Civil Rights Act of 1964 (Title VI) ensures that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance based on race, color, or national origin (42 United States Code [USC] 2000d et seq.). Executive Order 12898 on environmental justice directs that programs, policies, and activities not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations (59 FR 7629).

When federal funding or a federal action is involved, the lead federal agency procedures for identifying EJ populations should be followed. The potential for disproportionately high or adverse impacts to be borne by EJ populations when compared to the non-EJ populations will need to be determined. Additionally, the opportunity for EJ populations to participate fully in the decision-making process must be provided. The denial, reduction, or delay of receipt of benefits by minority and low-income populations cannot occur.

2.8.2 Methodology

To be consistent with the requirements of Title VI and Executive Order 12898, demographic characteristics of the environmental study area were examined to determine whether a low-income and/or minority population occurs within the study area. The demographic and economic character of the environmental study area was compared with that of the State of South Dakota using data from EJSCREEN, USEPA's Environmental Justice Screening and Mapping Tool (Version 2020) (USEPA, 2020).

2.8.3 Existing Conditions

The study area lies within Census Tract 9666, Block Group 1. A block group is an area defined by the U.S. Census Bureau that usually has in the range of 600-3,000 people living in it. Low-income populations are defined by USEPA as: "*The percent of a block group's population in households where the household income is less than or equal to twice the federal poverty level*." Minority populations are defined by the U.S. Census Bureau as: "*A population of people who are not single-race white and not Hispanic. Populations of individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic*."

EPA's EJSCREEN tool was used and reports approximately 40 habitants within one mile of the proposed project corridor. The minority population is approximately 1 percent, while that of the State of South Dakota is 18 percent. The low-income population is approximately 14 percent, while that of the State of South Dakota 31 percent. The demographic index is 7 percent, while that of the State of South Dakota is 24 percent. The demographic index in EJSCREEN is a combination of percent low-income and percent minority. State Percentiles are a way to see how local residents compare to the rest of the State of South Dakota. Instead of just showing numbers out of context, EJSCREEN compares a community to the rest of the state, by using percentiles. The State percentile tells you what percent of the State population an equal or lower value has, meaning less potential for exposure/ risk/ proximity to certain facilities, or a lower percent minority (USEPA, 2020).

Based on the EJSCREEN the project does not lie within a minority or low-income EJ population.

2.8.4 Next Steps

A more detailed EJ analysis should be completed during the NEPA process to verify the proposed project does not have a potential for disproportionately high or adverse impacts on EJ populations and identify ways to avoid and mitigate for any impacts.

2.9 Historic and Cultural Resources

2.9.1 Regulatory

Historic resources are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible to the National Register of Historic Places (NRHP). Cultural resources are defined as man-made features and physical remains of past human activity, generally at least 45 years old (properties constructed in 1975 or earlier). Cultural resources include historic buildings, bridges, railroads, roads, other structures, and archeological sites. Section 106 of the National Historic Preservation Act of 1966 requires evaluation of project effects on historic properties that are on, or eligible for, the National Register of Historic Places (NRHP). Criteria for determinations of eligibility are set forth in 36 Code of Federal Regulations (CFR) Part 60.4 (70) and are described in National Register Bulletin How to Apply the National Register Criteria for Evaluation (NPS 1995).

2.9.2 Methodology

An initial inventory and analysis of historic and cultural resources was conducted for Corridor 2 by a historian with FHU. This process involved the following steps:

- Initiating a record search request to the South Dakota Archaeological Research Center (SDARC), for previously recorded historic and archaeological resources within a 1-mile buffer of US 14A, within the study limits of Corridor 2 (see Section 1.4.1 Logical Termini),
- Mapping of previously recorded resources within 500 ft of US 14A.
- Reviewing all previously recorded sites within the 500 ft buffer and identifying NRHP Listed NRHP Eligible sites that may potentially be affected by Corridor 2 improvements.

Results of the Corridor 2 historic and cultural resources inventory and analysis are documented in **Table 4**.

2.9.3 Existing Conditions

A total of 34 previously recorded resources listed in **Table 4** were identified within the 500 ft buffer for Corridor 2, including 3-NRHP eligible properties.

TABLE 4. CORRIDOR 2 – PREVIOUSLY RECORDED RESOURCES ADJACENT TO US HWY 14A

Resource ID / Site ID	Resource Type	Location	Description	Most Recent National Register Eligibility Determination
N/A	Misc.	T4N, R2E Sect(s) 9, 15 & 16	Wagon Road	*N/A*
N/A	Misc.	T4N, R2E Section(s) 9 & 16	B & M Railroad	*N/A*
97	Para.	T5N, R1E Section(s) 25 & 36	PSP-0031	*N/A*

Resource ID / Site ID	Resource Type	Location	Description	Most Recent National Register Eligibility Determination
36	Para.	T4N, R2E NW ¼ of NW ¼ of Section 9	PSP-0076	*N/A*
7702 / **LA00000648**	Structure	T5N, R1E SE ¼ of NE ¼ of Section 36	Latchstring Inn (b.1892)	*Unevaluated*
13742 / **LA00000918**	Structure	T4N, R2E NE ¼ of NW ¼ of Section 22	Cheyenne Crossing (b.1877)	*Unevaluated*
14177 / **LA00000992**	Structure	T4N, R2E NE ¼ of NE ¼ of Section 6	Hydro No. 2 (b.1914)	*Unevaluated*
55920 / **LA00001054**	Structure	T4N, R2E NW ¼ of NW ¼ of Section 9	Isolated Cabin has wrap-around porch and shed roof screen porch (b.1912)	*Recommended Not Eligible*
2341 / **LA00001889**	Bridge	T4N, R2E SE ¼ of SW ¼ of Section 9	Bridge 41-079-199 (b.1950's)	*Recommended Not Eligible*
3501 / **LA00002048**	Bridge	T5N, R2E SW ¼ of NW ¼ of Section 31	Savoy Foot Bridge (b.1997)	*Recommended Not Eligible*
12190 / **39LA0443**	Site	T4N, R2E NE ¼ of NW ¼ of Section 22	cabin; native american artifact scatter	*Recommended Not Eligible*
12415 / **39LA0444**	Site	T4N, R2E NW ¼ of NW ¼ of Section 9	cabin; euroamerican artifact scatter; native american artifact scatter	*Recommended Not Eligible*
13544 / **39LA0781**	Site	T5N, R1E SE ¼ of NE ¼ of Section 36	nonfarm ruins; native american artifact scatter; townsite	***NRHP Eligible***
13545 / **39LA0784**	Site	T5N, R1E SE ¼ of NE ¼ of Section 36	dump; prehistoric artifact scatter	***NRHP Eligible***
12662 / **39LA1206**	Site	T4N, R2E SE ¼ of SW ¼ of Section 9	nonfarm ruins; euroamerican artifact scatter	*NRHP Not Eligible (SHPO Concurrence)*
12660 / **39LA1207**	Site	T4N, R2E NW ¼ of SW ¼ of Section 9	foundation	*Unevaluated*
13586 / **39LA1249**	Site	T4N, R2E NW ¼ of SW ¼ of Section 9	foundation; dump	*NRHP Not Eligible (SHPO Concurrence)*
13588 / **39LA1250**	Site	T4N, R2E NW ¼ of SW ¼ of Section 9	Dump	*NRHP Not Eligible (SHPO Concurrence)*
13589 / **39LA1251**	Site	T4N, R2E NE ¼ of SW ¼ of Section 9	dump	*NRHP Not Eligible (SHPO Concurrence)*
13591 / **39LA1253**	Site	T4N, R2E SW ¼ of SE ¼ of Section 9	dump	*NRHP Not Eligible (SHPO Concurrence)*

Resource ID / Site ID	Resource Type	Location	Description	Most Recent National Register Eligibility Determination
12703 / **39LA1254**	Site	T4N, R2E NE ¼ of NE ¼ of Section 16	foundation; dump; euroamerican artifact scatter	*NRHP Not Eligible (SHPO Concurrence)*
12705 / **39LA1255**	Site	T4N, R2E SW ¼ of NW ¼ of Section 15	industrial	*NRHP Not Eligible (SHPO Concurrence)*
12704 / **39LA1257**	Site	T4N, R2E SW ¼ of NW ¼ of Section 15	foundation; euroamerican artifact scatter	*NRHP Not Eligible (SHPO Concurrence)*
24044 / **39LA1324**	Site	T4N, R2E NE ¼ of NW ¼ of Section 22	nonfarm ruins; well/cistern; dump; euroamerican artifact scatter	***NRHP Eligible***
12773 / **39LA1326**	Site	T4N, R2E SE ¼ of SW ¼ of Section 15 & NE ¼ of NW ¼ of Sec. 22	mine; dump; well/cistern	*NRHP Not Eligible (SHPO Concurrence)*
13016 / **39LA1435**	Site	T4N, R2E SW ¼ of NW ¼ of Section 9	euroamerican artifact scatter; euroamerican earthwork	*NRHP Not Eligible (SHPO Concurrence)*
12995 / **39LA1436**	Site	T4N, R2E SW ¼ of NW ¼ of Section 9	nonfarm ruins; euroamerican artifact scatter	*NRHP Not Eligible (SHPO Concurrence)*
12997 / **39LA1438**	Site	T4N, R2E SE ¼ of SW ¼ of Section 9	mine	*NRHP Not Eligible (SHPO Concurrence)*
13018 / **39LA1444**	Site	T4N, R2E NW ¼ of NW ¼ of Section 9	euroamerican artifact scatter	*NRHP Not Eligible (SHPO Concurrence)*
13511 / **39LA1531**	Site	T4N, R2E NW ¼ of SW ¼ of Section 15	euroamerican artifact scatter; nonfarm ruins; well/cistern	*NRHP Not Eligible (SHPO Concurrence)*
12969 / **39LA2029**	Site	T4N, R2E NW ¼ of SW ¼ of Section 15	Euroamerican dam; industrial	*NRHP Not Eligible (SHPO Concurrence)*
12969 / **39LA2044**	Site	T5N, R1E Section 36 & T5N, R2E Section 31	industrial	*NRHP Not Eligible (SHPO Concurrence)*
12661 / **39LA2142**	Site	T4N, R2E NW ¼ of SW ¼ of Section 9	road	*Unevaluated*
13020 / **39LA2218**	Site	T4N, R2E NW ¼ of NW ¼ of Section 9	road	*NRHP Not Eligible (SHPO Concurrence)*
	Previously recorded National Register listed or eligible resources			
	Eligibility determination: not eligible/SHPO concurrence, unevaluated, or *unknown*			

2.9.4 Next Steps

Next steps would be for the responsible agency to initiate a cultural resources survey to determine whether the undertaking (project) could affect these previously recoded historic and cultural

resources that are National Register listed or eligible. If so, the agency proceeds to define the Area of Potential Effects (APE), which is the area that an undertaking may directly or indirectly cause changes in the character of use of historic resources. Once the APE has been defined, a cultural resources survey would be conducted, and the agency would consult with the appropriate State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO) on effects to historic or potentially historic resources located within the APE.

2.10 Federal and Tribal Lands

2.10.1 Regulatory

Tribal consultation is conducted for all transportation projects that may be of interest to a Tribe in South Dakota and with Tribes with aboriginal ties to lands in in South Dakota, particular the Black Hills. For projects involving federal funding, SDDOT coordinates with FHWA to conduct regular and meaningful consultation with Tribes, in accordance with Executive Order 13175 on Tribal Consultation.

2.10.2 Methodology

Tribes with interests in lands within Lawrence County were identified based on FHWA's list of *Counties of Interest for Tribes in and near South Dakota* (Environmental Procedures Manual, Table 2.5-1, SDDOT. 2019)

2.10.3 Tribal Consultation

Tribal consultation through coordination with FHWA, the Bureau of Indian Affairs and Lawrence County would involve the following tribes in South Dakota: Cheyenne River Sioux Tribe, Lower Brule Sioux Tribe, Oglala Sioux Tribe, Sisseton-Wahpeton Oyate, Standing Rock Sioux Tribe, Yankton Sioux Tribe, Three Affiliated Tribes (Mandan Hidatsa Arikara Nation), Ponca Tribe of Nebraska, Northern Arapaho Tribe, and the Chippewa Cree Tribe.

2.10.4 Next Steps

An initial step in the NEPA scoping process will be to prepare a letter to each designated tribal representative, including a description of the proposed project, a map, and an invitation to become a consulting party. Under Section 106 regulations, tribes are offered the opportunity to identify concerns about cultural resources, and comment on how the project might affect them. Tribes that that elect to become consulting parties for the undertaking will be notified of the results of any necessary historic property surveys, and they will be asked to comment on eligibility and effects determinations.

2.11 Traffic Noise

Traffic noise can be an important and contentious environmental consideration for highway projects. The locations most often of concern for traffic noise are exterior areas of frequent human use.

2.11.1 Regulatory

At the federal level, highway traffic noise is addressed under 23 CFR 772. The *Noise Analysis and Abatement Guidance* is South Dakota DOT's compliance with 23 CFR 772 and guides highway noise analyses in South Dakota. These regulations apply to projects that receive federal funding or are otherwise subject to FHWA approval. State-only actions do not require a noise analysis.

Some, but not all, federal-aid or federal-approval highway improvement projects will require a traffic noise analysis. Type I projects require a noise analysis; South Dakota does not participate in Type II projects; Type III projects are exempt. No new through lanes are currently planned, so the most likely reasons an improvement may be Type I is from a substantial vertical shift in the road surface near a receptor or a shift in the road alignment that halves the distance between the road and a receptor. In most other cases, the project is likely to be Type III.

If the project is determined to be Type I, a traffic noise impact analysis will be undertaken through computer modeling using prescribed software. The analysis will focus on the presence or absence of noise impacts in the study corridor. Noise abatement, typically in the form of noise barriers, will be evaluated for any noise impacts identified. Noise abatement actions found to be feasible and reasonable, if any, must be included in the final project.

2.11.2 Existing Conditions

US 14A in this corridor is an existing two-lane highway through a rural, mountainous setting. There are dispersed residences and other developed sites within 300 feet of the highway, so nominally there will be noise receptors to consider. Substantial changes to the elevation and alignment of the road are not expected due to the cost and difficulty that would entail but some changes are expected (e.g., curve flattening). There are no existing SDDOT noise abatement measures present.

2.11.3 Next Steps

The specific improvements proposed at the NEPA phase will need to be reviewed to determine the noise type status and what noise analysis may be required. As envisioned by the recommendations from Phases 1 and 2, the conceptual improvements for the corridor suggest a Type III noise project is likely, which will not require a traffic noise analysis. If future decisions on corridor improvements result in a Type I project, a noise analysis may be needed during the NEPA phase where noise impacts and abatement actions are evaluated in accordance with *Noise Analysis and Abatement Guidance*.

2.12 Section 4(f) and Section 6(f) Resources

Section 4(f) properties include publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites as defined in the US Department of Transportation (DOT) Act of 1966. FHWA and other DOT agencies cannot approve use of these properties for transportation projects unless certain conditions apply.

Section 6(f) properties include recreational resources developed with federal funding through the Land and Water Conservation Fund (LWCF). Section 6(f) of the LWCF Act prohibits the conversion of these properties to anything other than public outdoor recreation uses.

2.12.1 Regulatory

Section 4(f) stipulates that FHWA and other United States Department of Transportation (DOT) agencies cannot approve the use of land from publicly owned parks, recreational facilities, wildlife and waterfowl refuges, or historic sites unless there is no feasible and prudent alternative to the use of the land and unless the action includes all possible planning to minimize harm to the property resulting from use. Historic sites that are on or eligible for the NRHP qualify for protection under Section 4(f).

Section 6(f) of the Land and Water Conservation Act requires that the conversion of lands or facilities acquired with LWCF Act funds be coordinated with the Department of Interior. Usually, replacement in kind is required. Evaluation of Section 6(f) properties is completed for the following reasons:

- To preserve the intended use of public funds for land and water conservation
- To comply with several legal mandates that pertain to the LWCF and Section 6(f)

Section 6(f) of the Act assures that once an area has been funded with LWCF assistance, it is continually maintained for public recreation use unless the NPS approves a substitute property of reasonably equivalent usefulness and location and of at least equal fair market value.

2.12.2 Methodology

Section 4(f): Preliminary inventory included a review of available GIS data for parks, recreational facilities, wildlife and waterfowl refuges for non-historic Section 4(f) resources. For historic Section 4(f) resources, the information provided in Section 2.9 was used to determine the presence of historic Section 4(f) resources.

Section 6(f): Information from The Land and Water Conservation Fund (LWCF) was referenced to identify Section 6(f) properties potentially located near the study area.

2.12.3 Existing Conditions

Section 4(f): Non-historic Section 4(f) properties located within the within the 500 ft study area for Corridor 2 in the Black Hills National Forest, include Roughlock Falls Nature Area.

Historic Section 4(f) properties include 3-NRHP eligible historic properties within the 500 ft study area for Corridor 2, including:

- Property # 3544 / 39LA0781: nonfarm ruins; native american artifact scatter; townsite— NRHP eligible
- Property # 3545 / 39LA0784: dump; prehistoric artifact scatter—NRHP eligible
- Property # 24044 / 39LA1324: nonfarm ruins; well/cistern; dump; euroamerican artifact scatter— NRHP eligible

Section 6(f): The Black Hills National Forest - Spring Creek Watershed is located just five miles south of Custer, South Dakota. The 350-acre Spring Creek Watershed property was added to the Black Hills National Forest in 2020 using an investment of $1.719 million from the LWCF in 2019. The acquisition will preserve wildlife habitat, protect watersheds and streams, and provide recreational opportunities for the public, including new access to hunting areas (LWCF, 2021). Information available from the LWCF indicates the boundary of the Black Hills National Forest is included in the Section 6(f) resource boundary.

2.12.4 Next Steps

Section 4(f): If, during the project development processes, parks, trails, or open space are impacted, the next steps of the Section 4(f) process require evaluations of publicly owned parks, trails, and open space lands to be conducted to determine if there are any properties that qualify for protection under Section 4(f). The law says that FHWA (and other DOT agencies) cannot approve the use of land from publicly owned parks, recreation areas, wildlife refuges, or historic sites unless there is no feasible and prudent alternative to the use and the action includes all possible planning to minimize harm to the property. The substantive provisions of Section 4(f) apply only to agencies within the USDOT. A Section 4(f) evaluation would be required for the conversion of any publicly owned parks, trails, or open space lands for transportation improvements.

Section 6(f): During the NEPA process, the boundary for the Black Hills National Forest Section 6(f) resource will be verified and determine if there will be any impacts to Section 6(f) properties. For Section 6(f) properties located in the areas of the improvements, alternatives should be designed to avoid a conversion of these properties and/or determine if improvements would be a benefit to the property. If a conversion of land cannot be avoided, efforts will be made to mitigate effects to these properties. SDDOT, in cooperation with the local government landowner, must identify replacement land of equal value, location, and usefulness before a transfer of property under Section 6(f) can occur.

2.13 Visual Resources

2.13.1 Regulatory

The VIA scoping process applied to Corridor 2 follows guidance from FHWA's Guidelines for the Visual Impact Assessment of Highway Projects (FHWA, 2015) for assessing impacts on visual resources in context to NEPA (See **Appendix B**, Visual Resource Scoping - Corridor 2).

2.13.2 VIA Scoping

A visual resource scoping process was conducted for Corridor 2, to identify issues related to the transportation improvement concepts planned for **US 14A: US 85 to Savoy/Spearfish Canyon Scenic Byway** (Scenic Byway), and to establish Visual Impact Assessment (VIA) requirements for the NEPA phase.

Context and Landscape Character

The US 14A Scenic Byway is a recreation-oriented roadway within the Black Hills National Forest, paralleling Spearfish Creek through Spearfish Canyon, between Savoy and Cheyenne Crossing. The narrow forested Scenic Byway foreground landscape character is defined by Spearfish Creek within a dense riparian forest parallel to the western edge of the roadway. Intermittent views of the creek with white birch trees and grey limestone outcropping along adjacent roadside slopes create local visual interest. The densely forested Spearfish Canyon skyline defines the outer limits of corridor viewsheds. The backdrop of expansive limestone cliffs and rimrocks provides focal points that establish a unique sense of place. The overall combination of foreground and background landscape elements within the Scenic Byway corridor viewshed creates an "enclosed" landscape composition with nationally significant focal points.

Scenic Byway Management Standards and Guidelines

The *Black Hills National Forest Land and Resource Management Plan* (Forest Plan) sets Goals and Standards for the Scenic Byway, under Area 4.2A. These include Desired Future Condition, Management Area Goals and Objectives, and Management Area Standards and Guidelines for the corridor (See **Appendix B** for additional details).

Black Hills NF Scenery Management

Goals in the Forest Plan include providing for the scenic quality and recreational opportunities, and protection of heritage resources in response to the needs of the Black Hills National Forest visitors and local communities. The Forest Plan also includes Scenic Integrity Objective (SOI) Guidelines. The High SOI for Corridor 2 encompasses the Immediate Foreground (within 300 feet) and Foreground (within one-half mile), creating a mile-wide protected viewshed centered on US 85. A high SOI indicates that human activities are not visually evident, and planned activities may only repeat attributes of form, line, color, and texture found in the existing landscape character.

The Forest Plan includes applicable guidelines for managing the scenic integrity level for site-specific projects and documentation in decision documents. The "foreground" of high public use areas has the highest priority, along with the length of time for natural processes and rehabilitation measures will take to meet the scenic integrity objective. Site-specific mitigation for impacts resulting from lane and shoulder widening and curve realignments through undisturbed forested areas would require context-sensitive design approaches. The visual impact assessment and mitigation strategies will need to be responsive to the Scenic Byway designation, recreation travel stakeholders, and Black Hills National Forest Scenery Management goals and objectives. Site-specific mitigation for impacts, and design guidelines would be developed during the project specific NEPA process.

2.13.3 VIA Scoping Issues and Next Steps

The proposed improvements for Corridor 2, including shoulder widening and curve realignments, would result in noticeable changes to landscape character within the immediate foreground (within 300 feet) of the Spearfish Canyon Scenic Byway, which would require context-sensitive design and visual impact mitigation to meet Goals and Objectives of the *Black Hills National Forest Land and Resource Management Plan*, and Scenery Management Objectives.

The VIA Scoping process resulted in a score ranging from 22 to 24 points, indicating that a *Standard VIA* would be appropriate for NEPA documentation. Assumptions are that the proposed project elements could potentially result in adverse visual impacts, and the VIA would receive extensive local, perhaps statewide, public review. The VIA would typically include several visual simulations and involve a thorough examination of Forest planning and policy documents supplemented with a direct agency and public engagement processes to determine visual preferences, and mitigation.

Additional information regarding VIA scoping findings for Corridor 2 is provided in Appendix B. Corridor 2 Visual Impact Assessment Scoping.

2.14 Hazardous Materials

2.14.1 Regulatory

Hazardous materials are regulated by various state and federal regulations. NEPA, as amended (42 US Code (USC) 4321 et seq., Public Law 91-190, 83 Stat. 852), mandates that decisions involving federal funds and approvals consider environmental effects from hazardous materials. Other applicable regulations include the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC 9601 et seq.), which provides federal authority for the identification, investigation, and cleanup of sites throughout the US that are contaminated with hazardous substances (as specifically designated in the CERCLA) and the Resource Conservation and Recovery Act of 1976 (RCRA) (42 USC 321 et seq.), which establishes a framework for the management of both solid and hazardous waste. The federal Hazardous and Solid Waste Amendments of 1984 established a new comprehensive regulatory program for underground storage tanks containing petroleum products and hazardous chemicals regulated under CERCLA. In 2016, the EPA retired the CERCLA

Information System database, and replaced it with a more modern system called the Superfund Enterprise Management System.

2.14.2 Existing Conditions

A desktop review of the study area revealed facilities that may utilize hazardous materials daily such as the following:

- Spearfish Canyon Lodge (10619 Roughlock Falls Road)

In addition to the facility listed above, there may other properties that were previously located within the study area that may have affected groundwater and subsurface soils but have since been occupied by another business. Finally, there could be facilities located near the study area that may be undergoing active groundwater remediation.

2.14.3 Next Steps

Prior to final design, an environmental database records search of federal and state environmental resources should be obtained and reviewed for the study area. The environmental database records would be evaluated with respect to the status of the facility listing and its location within the study area boundaries. The facilities identified in the environmental database would be ranked as having either a high, medium, or low potential to impact based on the location of these facilities and known releases.

In addition to the environmental database review, an on-site visual inspection of the study area and surrounding areas should be completed. The site visit should be completed by a qualified environmental professional, skilled and experienced in identifying hazardous materials and waste issues, to identify and evaluate present conditions.

Finally, a review of historical site information such as Sanborn fire insurance maps, US Geological Survey topographic maps, and readily available historical aerial photographs should be completed. This review of historical sources should include all obvious uses from the study area's first obvious developed use or 1940, whichever is earlier, to the present time.

If findings from the historical and/or database reviews indicate that subsurface contamination may be present, a limited subsurface investigation to collect soil and/or groundwater samples may be warranted. Based on the information gathered during the subsurface investigation, a Materials Management Plan (MMP) may be recommended to detail the Standard Operating Procedures for handling potentially contaminated media, specifically soil and/or groundwater. The MMP will be designed to minimize worker exposure to potentially contaminated material, prevent releases to the environment, and ensure proper disposal.

2.15 Summary

This environmental review was prepared to evaluate issues and the potential for conflicts with human and natural environment from highlighted key resources within each corridor with a likelihood of potential effects depending on the proposed action and project design development.

Next steps would follow SDDOT NEPA process in coordination with FHWA. The scan report is intended to provide a starting point for the NEPA process.

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Appendix A. Environmental Resources Map Book

Black Hills Phase III Corridors

Corridor 2: Sheet 1 of 12

HANNA RD

US HWY 85

US HWY 14A

Spearfish Creek

Spearfish Creek

Yates Pond

29.0

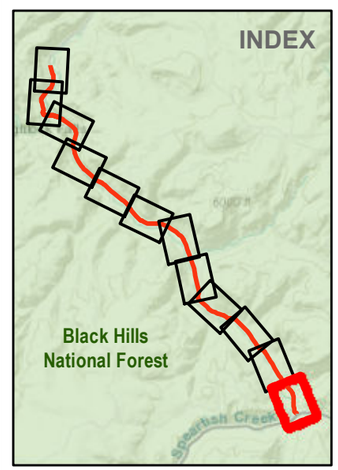
Black Hills
National Forest

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

0 100 200 300 Feet

INDEX



Black Hills Phase III Corridors
Corridor 2: Sheet 2 of 12

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

0 100 200 300
Feet

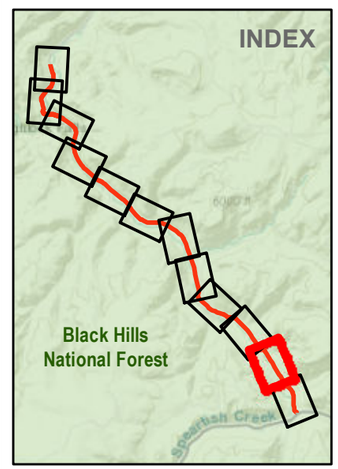
Spearfish Creek

US HWY 14A

Slide Area

Black Hills
National Forest

INDEX



Black Hills Phase III Corridors

Corridor 2: Sheet 3 of 12

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

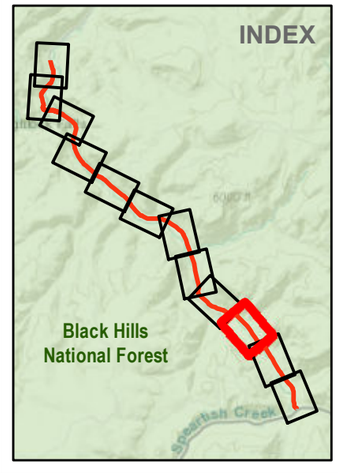
0 100 200 300 Feet

Black Hills
National Forest

Spearfish Creek

28.0

US HWY 14A



Black Hills Phase III Corridors
Corridor 2: Sheet 4 of 12

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

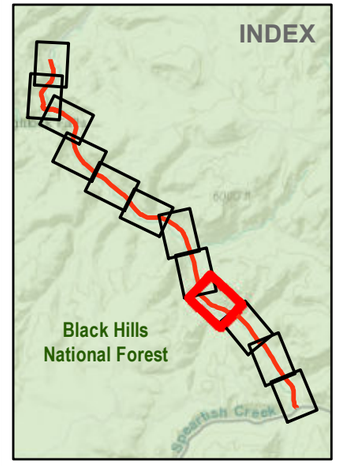
0 100 200 300
Feet

ELMORE MAIN RD

US HWY 14A

Spearfish Creek

Black Hills
National Forest



Black Hills Phase III Corridors

Corridor 2: Sheet 5 of 12

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

0 100 200 300 Feet

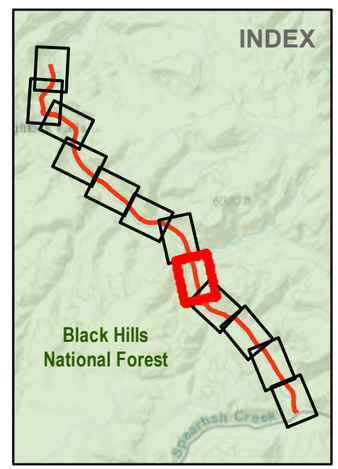
Black Hills
National Forest

Spearfish Creek

27.0

US HWY 14A

INDEX



Black Hills Phase III Corridors
Corridor 2: Sheet 6 of 12

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

0 100 200 300
Feet

Black Hills
National Forest

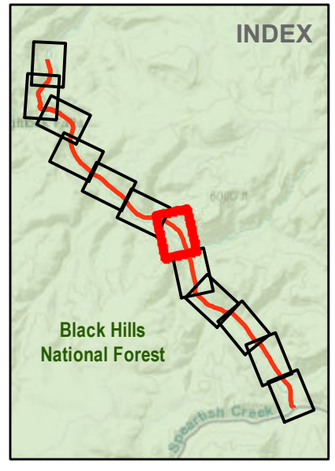
Spearfish Creek

26.0

US HWY 14A

Annie Creek

INDEX



Spearfish Creek

26.0

Blowdown Area: Trees felled by Windstorm

US HWY 14A

Black Hills
National Forest

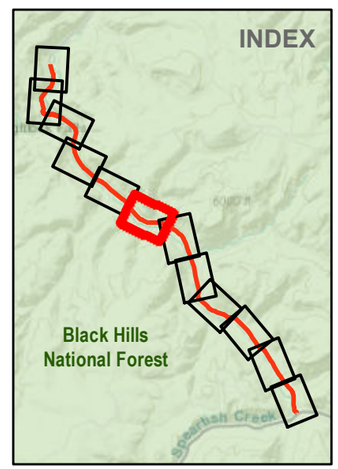
Black Hills Phase III Corridors
Corridor 2: Sheet 7 of 12

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

0 100 200 300
Feet

INDEX



Black Hills Phase III Corridors
Corridor 2: Sheet 8 of 12

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

0 100 200 300 Feet

Spearfish Creek

US HWY 14A

COYOTE LN

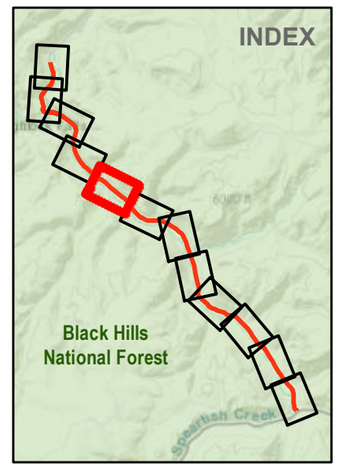
Savoy Intake

25.0

Blowdown Area: Trees felled by Windstorm

Black Hills
National Forest

INDEX



Savoy Intake

US HWY 14A

Roughlock Falls
Nature Area

Spearfish Creek

Black Hills
National Forest

Black Hills Phase III Corridors
Corridor 2: Sheet 9 of 12

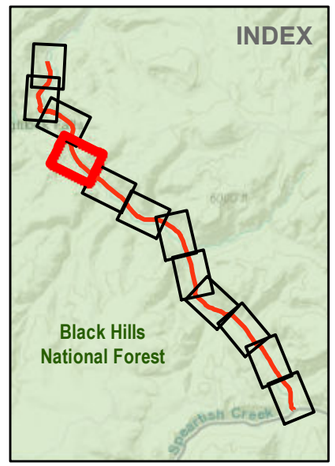
Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

N

0 100 200 300
Feet

INDEX



Black Hills Phase III Corridors
Corridor 2: Sheet 10 of 12

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

N

0 100 200 300
Feet

US HWY 14A

Roughlock Falls
Nature Area

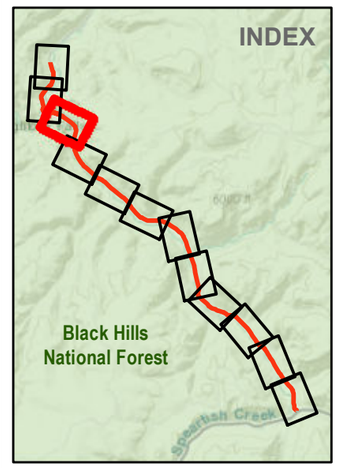
Little Spearfish Creek

24.0

Spearfish Creek

Black Hills
National Forest

INDEX



Black Hills Phase III Corridors
Corridor 2: Sheet 11 of 12

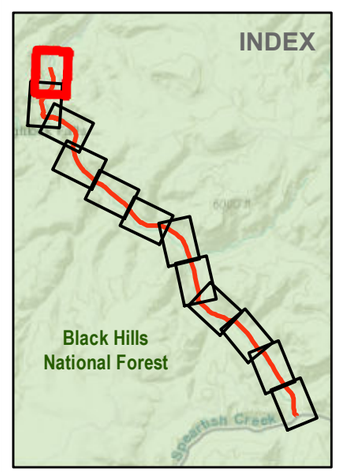
ROUGHLOCK FALLS RD
US HWY 14A
Roughlock Falls Nature Area
Spearfish Creek
Little Spearfish Creek
Black Hills National Forest
Legend
Other Environmental Resource
Tenth Mile Marker
Mile Reference Marker
Snowmobile Trail
Streams
Corridor 2: Existing Alignment
Potential Wetland
Waterbodies
Corridor 2: 500 ft Buffer
SD Parks and Recreation Area
N
0
100
200
300
Feet
INDEX
Black Hills National Forest

Black Hills Phase III Corridors
Corridor 2: Sheet 12 of 12

Legend

- Other Environmental Resource
- Tenth Mile Marker
- Mile Reference Marker
- Snowmobile Trail
- Streams
- Corridor 2: Existing Alignment
- Potential Wetland
- Waterbodies
- Corridor 2: 500 ft Buffer
- SD Parks and Recreation Area

0 100 200 300
Feet



Appendix B. Visual Impact Analysis Scoping

Appendix B. Corridor 2 Visual Impact Assessment Scoping

2.15.1 Introduction

This visual impact assessment (VIA) scoping for Corridor 2 identifies issues related to the transportation improvement concepts planned for US 14A: Spearfish Canyon Scenic Byway / Savoy to Cheyenne Crossing and anticipates the visual resource requirements for the National Environmental Policy Act (NEPA) phase. The VIA scoping process applied to Corridor 2 follows guidance from FHWA's *Guidelines for the Visual Impact Assessment of Highway Projects* (FHWA, 2015) for assessing impacts on visual resources in context to NEPA.

These FHWA Guidelines include a scoping questionnaire, to be applied early in project planning, as a tool to determine the appropriate level of effort for assessing the visual impacts that may result from a proposed highway project. The questionnaire consists of 10 questions, including 5 questions covering *environmental compatibility* and 5 questions covering *viewer sensitivity, with a* scoring system to help determine if a VIA would be required, and if so, the appropriate level of VIA for NEPA documentation: Expanded, Standard, Abbreviated, or Memorandum.

This initial scoping process was based primarily on the Corridor 2 concept planning and design; corridor videos; criteria from the *Black Hills National Forest Land and Resource Management Plan, 1997 Revision, Phase II Amendment;* and guidance from the Black Hills National Forest Landscape Architect regarding applicable Scenic Integrity Objectives and guidelines. Feedback related to visual resources from the Phase 3 public meetings has also been incorporated.

The following sections include the initial Corridor 2 VIA Scoping Questionnaire responses, with assumptions, supporting information, and next steps to consider for NEPA.

2.15.2 VIA Scoping

Corridor 2 Scoping Questionnaire

Environmental Compatibility

The five questions about *environmental compatibility* in the VIA Scoping Questionnaire are:

1. ***Will the project result in a noticeable change in the physical characteristics of the existing environment?***

   Consider all project components and construction impacts, both permanent and temporary, including landform changes, structures, noise barriers, vegetation removal, railing, signage, and contractor activities.

   - **High level of permanent change (3)**
   - **Moderate level of permanent change (2)**
   - Low level of permanent or temporary change (1)
   - No Noticeable Change (0)

   Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-1, following the questionnaire.

2. ***Will the project complement or contrast with the visual character desired by the community?***

   Evaluate the scale and extent of the project features compared to the surrounding scale of the community. Is the project likely to give an urban appearance to an existing rural or suburban community? Do you anticipate that the change will be viewed by the public as positive or negative? Research planning documents or talk with local planners and community representatives to understand the type of visual environment local residents envision for their community.

- Low Compatibility (3)
- **Moderate Compatibility (2)**
- High compatibility (1)

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-2, following the questionnaire.

3. ***What types of project features and construction impacts are proposed? Are there particular concerns related to bridge structures, large excavations, sound barriers, vegetation removal, or other features of the proposed project that will raise concerns?***

Certain project improvements can be of special interest to local citizens, causing a heightened level of public concern, and requiring a more focused visual analysis.

- High concern (3)
- **Moderate concern (2)**
- Low concern (1)
- Negligible Project Features (0)

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-3, following the questionnaire

4. ***Will the project changes likely be mitigated by normal means such as landscaping and architectural enhancements, or will avoidance or more extensive compensation measures be necessary to minimize adverse change?***

- **Extensive Non-Conventional Mitigation Likely (3)**
- **Some non-conventional Mitigation Likely (2)**
- Only Conventional Mitigation Likely (1)
- No Mitigation Likely (0)

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-4, following the questionnaire

5. ***Will this project, when seen collectively with other projects, result in cumulative adverse impacts to visual resources or their visual character?***

Identify any projects [both state and local] in the area that have been constructed in recent years and those currently planned for future construction. The window of time and the extent of area applicable to possible cumulative impacts should be based on a reasonable anticipation of the viewing public's perception.

- Cumulative Impacts likely: 0-5 years (3)
- Cumulative Impacts likely: 6-10 years (2)
- **Cumulative Impacts unlikely (1)**

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question EC-5, following the questionnaire.

Viewer Sensitivity

The five questions about *viewer sensitivity* in the VIA Scoping Questionnaire are:

1. ***What is the potential that the project proposal may be controversial within the community, or opposed by any organized group?***

This can be researched initially by talking with the state DOT and local agency management and staff familiar with the affected community's sentiments as evidenced by past projects and/or current information

- High Potential (3)
- **Moderate Potential (2)**

- **Low Potential (1)**
- No Potential (0)

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-1, following the questionnaire.

2. ***How sensitive are potential viewer-groups likely to be regarding visible changes proposed by the project?***

   Consider among other factors the number of viewers within the group, probable viewer expectations, activities, viewing duration, and orientation. The expected viewer sensitivity level may be scoped by applying professional judgment, and by soliciting information from other DOT staff, local agencies, and community representatives familiar with the affected community's sentiments and demonstrated concerns.

   - **High Sensitivity (3)**
   - Moderate Sensitivity (2)
   - Low Sensitivity (1)

   Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-2, following the questionnaire.

3. ***To what degree does the project appear to be consistent with applicable laws, ordinances, regulations, policies, or standards regarding visual preferences?***

   - Low Compatibility (3)
   - **Moderate Compatibility (2)**
   - High compatibility (1)

   Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-3, following the questionnaire.

4. ***Are any permits going to be required by outside regulatory agencies (i.e., Federal, State, or local) that will necessitate a particular level of Visual Impact Assessment?***

   Permit requirements can have an unintended consequence on the visual environment. Anticipated permits, as well as specific permit requirements – which are defined by the permitter, may be determined by talking with the project environmental planner and project engineer. Note: Coordinate with the state DOT representative responsible for obtaining the permit prior to communicating directly with any permitting agency. Permits that may benefit from additional analysis include permits that may result in visible built features, such as infiltration basins or devices under a stormwater permit or a retaining wall for wetland avoidance or permits for work in sensitive areas such as coastal development permits or on Federal lands, such as impacts to Wild and Scenic Rivers.

   - Yes (3)
   - **Maybe (2)**
   - No (1)

   Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-4, following the questionnaire.

5. ***Will decision-makers (including the project designers) or the public benefit from a more detailed visual analysis in order to help reach consensus on a course of action?***

   Consider the proposed project features, possible visual impacts, and probable mitigation recommendations.

   - **Yes (3)**
   - Maybe (2)
   - No (1)

Assumptions: See **Section 2.15.3**, **Supporting Information and Assumptions**, for Question VS-5, following the questionnaire.

Summary of VIA Scoping Results

This represents an initial VIA scoping effort to get the process started based on a preliminary review of the US 14A: Spearfish Canyon Scenic Byway context-sensitive planning and design documentation and the Black Hills National Forest Plan. **With a score ranging from 22 to 24 points, a Standard VIA would be appropriate for NEPA documentation (see below).**

Determining the Level of Visual Impact Assessment

Total scores of the answers to all 10 questions on the Visual Impact Assessment Scoping Questionnaire indicate the appropriate level of VIA to perform for the project. If there remains doubt about whether a VIA needs to be completed, it may be prudent to conduct an Abbreviated VIA. If there remains doubt about the level of the VIA, begin with the simpler VIA process. If visual impacts emerge as a more substantial concern than anticipated, the level of VIA documentation can always be increased.

The level of the VIA can initially be based on the following ranges of total scores:

☐ ***Score 25–30*** An *Expanded VIA* is probably necessary. It is recommended that it should be proceeded by a formal visual scoping study prior to beginning the VIA to alert the project team to potential highly adverse impacts and to develop new project alternatives to avoid those impacts. These technical studies will likely receive statewide, even national, public review. Extensive use of visual simulations and a comprehensive public involvement program would be typical.

x ***Score 20–24*** A *Standard VIA* is recommended. This technical study will likely receive extensive local, perhaps statewide, public review. It would typically include several visual simulations. It would also include a thorough examination of public planning and policy documents supplemented with a direct public engagement processes to determine visual preferences.

☐ ***Score 15–19*** An *Abbreviated VIA* would briefly describe project features, impacts and mitigation requirements. Visual simulations would be optional. An Abbreviated VIA would receive little direct public interest beyond a summary of its findings in the project's environmental documents. Visual preferences would be based on observation and review of planning and policy documents by local jurisdictions.

☐ ***Score 10–14*** A *VIA Memorandum* addressing minor visual issues that indicates the nature of the limited impacts and any necessary mitigation strategies that should be implemented would likely be sufficient along with an explanation of why no formal analysis is required.

☐ ***Score 6–9*** No noticeable physical changes to the environment are proposed and no further analysis is required. Print out a copy of this completed questionnaire for your project file to document that there is no effect. A *VIA Memorandum* may be used to document that there is no effect and to explain the approach used for the determination.

2.15.3 Supporting Information and Assumptions

Environmental Compatibility

The following provides supporting documentation and assumptions related to scores assigned to Environmental Compatibility (EC) Questions 1–5.

Question EC-1: Assumptions

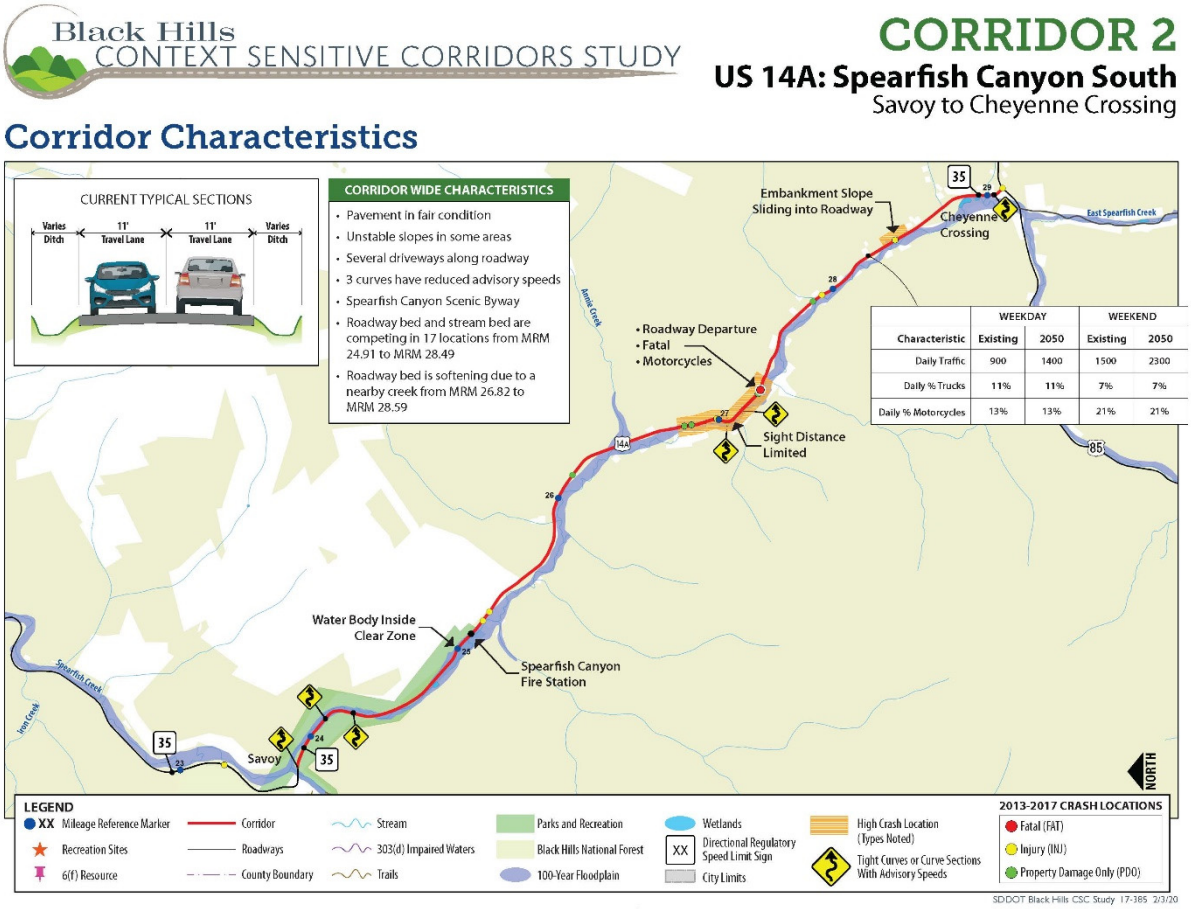
Context and Landscape Character

The Spearfish Canyon Scenic Byway is a recreation-oriented roadway within the Black Hills National Forest, paralleling Spearfish Creek through Spearfish Canyon, between Savoy and Cheyenne Crossing. The narrow forested Scenic Byway foreground landscape character is defined by Spearfish Creek within a dense riparian forest parallel to the western edge of the roadway. Intermittent views of the creek with white birch trees and grey limestone outcropping along adjacent roadside slopes create local visual interest. The densely forested Spearfish Canyon skyline defines the outer limits of corridor viewsheds. The backdrop of expansive limestone cliffs and rimrocks provides focal points that establish a unique sense of place. The overall combination of foreground and background landscape elements within the Spearfish Canyon Scenic Byway corridor viewshed creates an "enclosed" landscape composition with nationally significant focal points.

Roadway Characteristics and Deficiencies (see **Attachment A**)

- **Current Typical Roadway Section**: US 14A is a 2-lane roadway with two 11-ft travel lanes, with minimal unpaved shoulders and stormwater drainage ditches on either side of the roadway. The curvilinear horizontal alignment is adjacent to Spearfish Creek, with a 35-mph posted speed limit.
- **Roadway Deficiencies:** Corridor 2 has several roadway deficiencies, including:
  - Inadequate shoulders—Currently little to no shoulders throughout the corridor, resulting in conflicts with Spearfish Creek. Shoulders ranging from 3 to 5 feet in width would allow an appropriate accommodation of engineering standards. Fitting widened shoulders into the would likely result in widening into the uphill embankment along the north & northeast side of the corridor, where roadcuts would modify the landscape character and viewer experience within the immediate foreground (within 300 feet) of the Spearfish Canyon Scenic Byway viewshed.
  - Unstable Roadside Embankment—Improvements along the corridor where the road base is unstable and has shown propensity to shift. This issue could result in the ultimate failure of the roadway.
  - Limited sight distance—Curves with reduced advisory speeds near Miles 24, 27 and 29.

Attachment A. Corridor 2 Corridor Characteristics



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Transportation Improvements and Visual Change (see **Attachment B**)

The following potential improvements included in concept options for Corridor 2 could result in moderate to strong levels of visual contrast and noticeable permanent visual change:

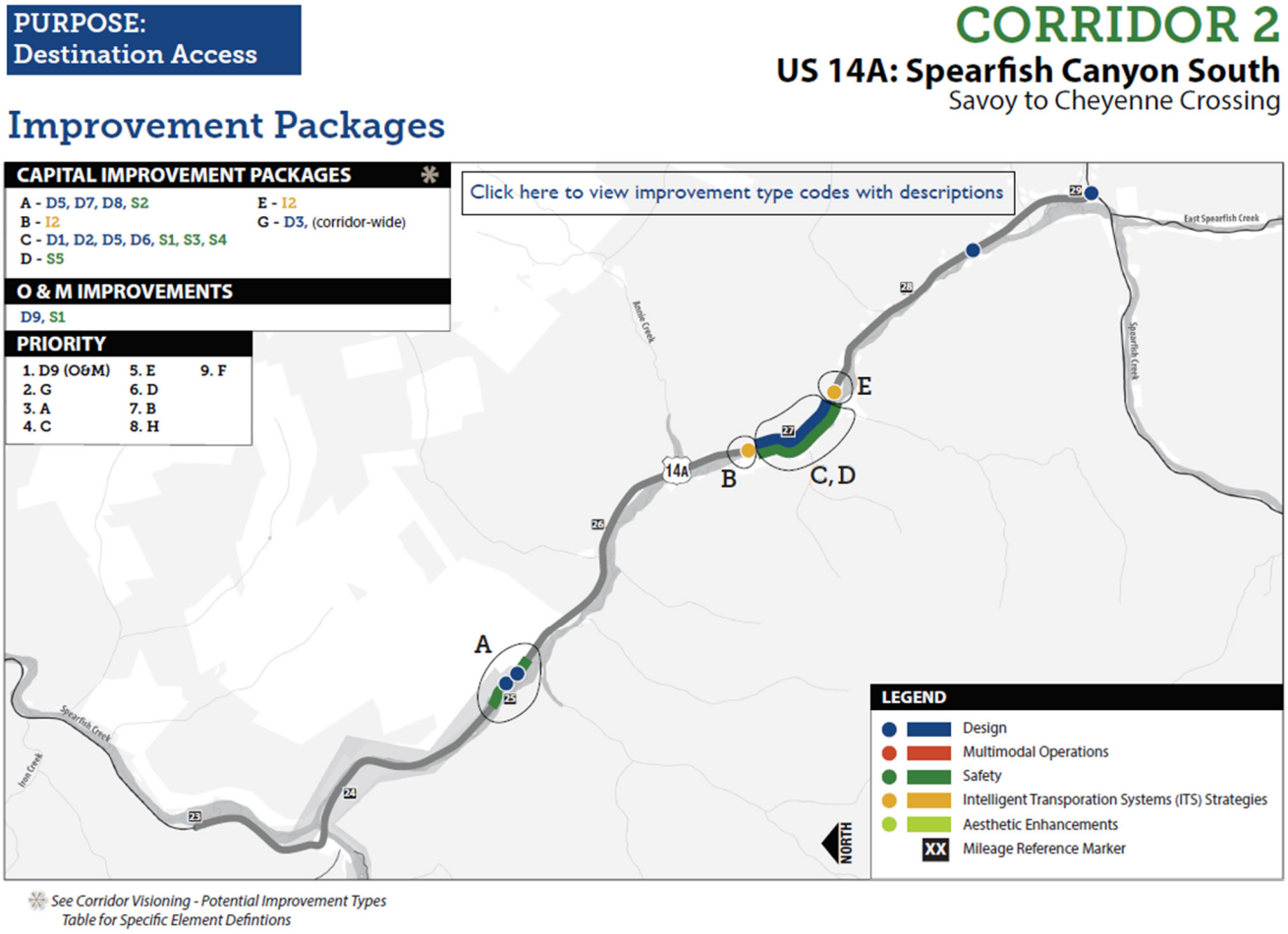
- Shoulder widening: Adaptive/variable width (3–5 ft) paved shoulders to minimize roadside vegetation removal and cut slopes, while maintaining the current US 14 A alignment. **Attachment C** illustrates variable shoulder widening alternatives, and depicts an aerial overview of the setting for shoulder widening near MRM 24.
- Roadside drainage improvements adjacent to Spearfish Creek
- Curve smoothing and/or vegetation removal: between MRM 27 to 27.5; and Spearfish Canyon Fire Station. **Attachment D** presents an aerial overview of the setting for the curve smoothing at MRM 27.
- Roadside erosion control and slope stability wall at Raspberry Gulch
- Creek edge walls or cantilever
- Sign improvements

Other potential improvements that are less likely to attract attention and noticeable visual change include:

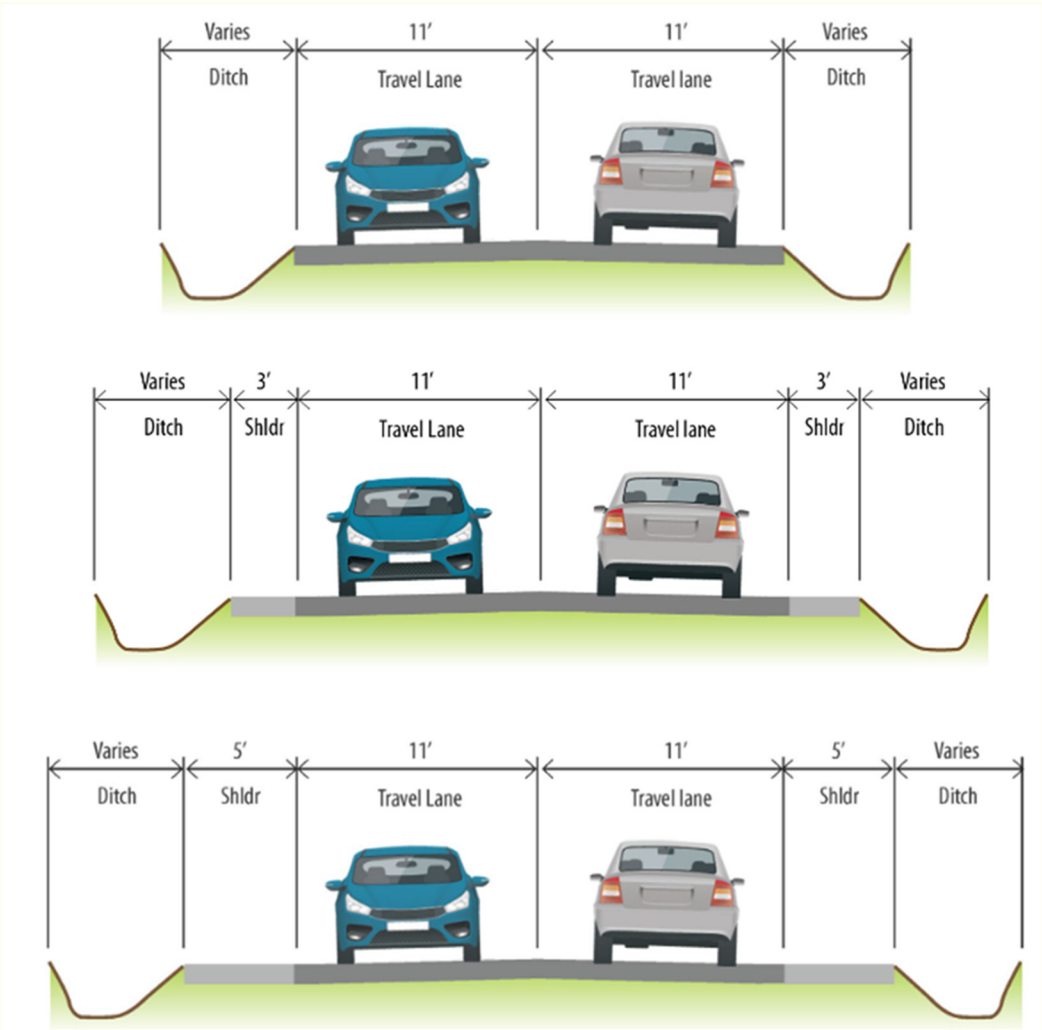
- Truck pull-offs and parking improvements near Spearfish Canyon Fire Station

- Guardrail improvements near Spearfish Canyon Fire Station

Attachment B. Corridor 2 Improvements to Support Vision



Attachment C. Corridor 2 Improvement Alternatives



Aerial view of MRM 24 – Shoulder Widening Area

Attachment D. Curve Smoothing

Curve smoothing between MRM 27 to MRM 28

View north MRM 27.1

Question EC-2: Assumptions

The Spearfish Canyon Scenic Byway is a nationally valued scenic/recreation-oriented corridor. The generally low to moderate levels of visual contrast of planned improvements to the visual character of roadside landforms, vegetation, and Spearfish Creek are considered moderately compatible with community values.

Question EC-3: Assumptions

Shoulder widening, curve smoothing, and tree clearing to improve safety may result in roadcuts, stream and wetland impacts, and roadside vegetation removal. Wall or cantilever structures may be used for Spearfish Creek wetland protection and retaining walls may be used for slope stabilization. These local road-edge landscape changes would contrast with the natural appearance of the foreground scenic byway image and may distract from the overall Spearfish Canyon viewshed and landscape composition (particularly adjacent to Miles 24, 25, and 27.

Question EC-4: Assumptions

Site-specific mitigation for impacts resulting from shoulder widening, curve smoothing, protective structures for wetlands, or slope stabilization would require context-sensitive design approaches. The level of non-conventional visual resource-related mitigation development will depend on the extent of tree removal, road cuts, walls, or structural requirements to accommodate safety and functional improvements.

Mitigation strategies may include detailed site surveys and applying design techniques to reduce visual contrast to the form, line, color, texture, and scale of landform, vegetation, or structural changes, such as:

- Slope rounding and warping to blend cut slopes into adjacent terrain
- View opening opportunities and layered revegetation at tree removal sites
- Aesthetic treatment to retaining walls or structural elements
- Context-sensitive design concepts to support corridor-wide improvements:
  - Matching the 11-ft travel lanes, with 3-ft shoulders to accommodate bicyclists
  - Retaining trees, even in the clear zone

Question EC-5: Assumptions

The existing corridor is visually intact, and the USFS Black Hills National Forest Visual Management classification of High Scenic Integrity rating would retain the landscape character.

Viewer Sensitivity

The following provides supporting documentation and assumptions related to scores assigned to Viewer Sensitivity (VS) Questions 1–5.

Question VS-1: Assumptions

Ongoing public, agency, and stakeholder involvement in the planning and design process will create a positive collaborative approach.

Question VS-2: Assumptions

The Scenic Byway designation and the recreation orientation of travelers will make the proposed changes to US 14 A highly sensitive to recreation travelers.

Summary of community comments from the public outreach on proposed improvements (July-August 2021):

- **Shoulder widening** (road MRM 23 to MRM 26.5):
  - *Shoulder widening would take away from the beauty of the Canyon*
  - *3-shoulder option would eliminate the use of walls on most portions of the roadway*
- **Corridor-wide Purpose and Need:**
  - *A scenic highway that provides access to recreation in the Black Hills*
- **Environmental** – elements most important to the character of Corridor 2:
  - *Maintaining the Rock Walls - Removing a few trees along the highway would help open viewing of the Canyon walls*
  - Most dominant natural aspects of the Corridor: *Rock walls and Spearfish Creek*

Question VS-3: Assumptions

The *Black Hills National Forest Land and Resource Management Plan* (USFS, Phase II Amendment 2006):

Chapter One: Goals and Objectives—*Goal 4*

- **402:** Provide for scenic quality, a range of recreational opportunities, and protection of heritage resources in response to the needs of the Black Hills National Forest visitors and local communities:

Chapter Two: Standards and Guidelines–*Scenery Management*

- ***High Scenic Integrity Objective*:** In the *Immediate Foreground* (within 300 feet) & *Foreground* (within one-half mile) of Corridor 2 = a mile-wide viewshed corridor.
- **High SIO:** A scenic integrity level meaning human activities are not visually evident. In high scenic integrity areas, activities may only repeat attributes of form, line, color, and texture found in the existing landscape character.
- **Applicable Guidelines**: the following ***SIO Guidelines*** from the *Black Hills National Forest Land & Resource Management Plan* apply: 5602, 5603, 5604, 5606, 5607, 5608, 5609, 5610:
  - **5602**. Management activities which are inconsistent with the scenic integrity objectives will be prohibited unless a decision is made to change the scenic integrity objective. Such decisions will be documented in a site-specific decision document.
  - **5603**. Use the following priorities for rehabilitating areas that do not meet scenic integrity objectives (SIO):

a. Relative importance of the area and the amount of deviation from the scenic integrity objectives. "Foreground" of high public use areas has highest priority;
b. Length of time it will take natural processes to reduce the visual impacts so that they meet the scenic integrity objective(s);
c. Length of time it will take for rehabilitation measures to meet the scenic integrity objective; and
d. Benefits to other resource management objectives to accomplish rehabilitation.

- **5604.** Achieve enhancement of landscapes where determined appropriate.
- **5606.** Where the scenic integrity objectives (SIO) criterion is high or moderate, meet the criterion within 1 full growing season after completion of a project. In the wildland-urban interface (WUI) areas,
- **5607**. Choose facility and structure design, color of materials, location and orientation to meet the scenic integrity for the management area.
- **5608**. Integrate the protection of aesthetic values with all resource planning.
- **5609.** Highest priority for protection of scenic quality are those areas of heavy public use, such as scenic byways, major roads or trails, developed recreation sites, administrative sites, and backdrops for cities and towns.
- **5610**. Within the immediate foreground of primary travel ways/use areas, manage tree stands to enhance the scenic quality and recreational opportunities. Manage for a variety of scenic quality and recreation opportunities. Manage for a variety of scenic conditions including areas of large, yellow-barked ponderosa pine, areas of hiding cover for wildlife, and areas with open park-like conditions, except as needed to meet Objective 10-02.

Chapter 3: Management Area Direction

Spearfish Canyon Scenic Byway is managed under Black Hills National Forest Management Area 4.2A. The following sections document the *Setting, Desired Future Condition*, *Management Area Goals and Objectives*, and *Management Area Standards and Guidelines*/*Scenery Management*, and *Transportation and Travel*:

***Setting*:** Spearfish Canyon Scenic Byway is a 20-mile drive popular with the traveling public. It provides spectacular scenery, historical mining remnants, and an all-season paved highway. This Byway, approved by the Chief of the Forest Service in 1989, allows public access to numerous outdoor recreational activities.

This section of U.S. Highway 14A, from the city of Spearfish to Cheyenne Crossing, receives very high recreational use throughout the year, but especially during the summer and fall.

Desired Future Condition: Landscapes adjacent to the road corridors appear natural. Existing facilities, such as powerlines and roads, may be obvious to the casual observer. Management activities are likely to be less evident, be of short duration and be more natural in appearance than in many other areas of the forest.

Management Area Goals and Objectives: Social Elements/Scenery Management

4.2A-401. Emphasize visually appealing landscapes such as vista openings, rock outcroppings, and diversity of vegetation. ***GOAL***

Scenery Management (*4.2A-5601)*: The adopted scenic integrity objective (SOI) for U.S. Highway 14A Near foreground and foreground is *high* for the *Immediate Foreground* (within 300 feet) & *Foreground* (within one-half mile)**.**

Transportation and Travel*:** 4.2A-9101. In areas where there are special features, design roads and trails to blend with the landscape and provide opportunities for viewing enjoyment. ***STANDARD

Question VS-4: Assumptions

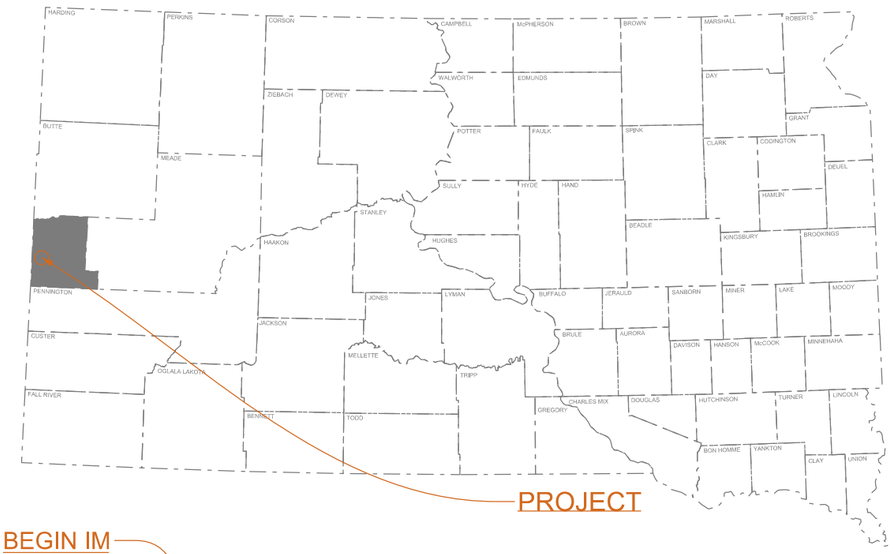
The project is not subject to visual resource-related permits within the Black Hills National Forest and will require agency consultation.

Question VS-5: Assumptions

The VIA evaluation process will provide opportunities for project-specific mitigation strategies for the proposed improvements to the US 14A corridor:

- The VIA and mitigation strategies will require compliance with the Scenic Byway designation; Black Hills National Forest Scenery Management goals, objectives, standards and guidelines; and responsiveness to recreation travel stakeholders.

APPENDIX C. CORRIDOR DESIGN INFORMATION



BEGIN IM
US 14A
Station 514+91

END IM
US 14A
Station 791+78

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT NH 014A (105) 0, PCN 05UE
US HIGHWAY 14A
LAWRENCE COUNTY

TYPICAL SECTIONS AND CONCEPTUAL PLAN SHEETS

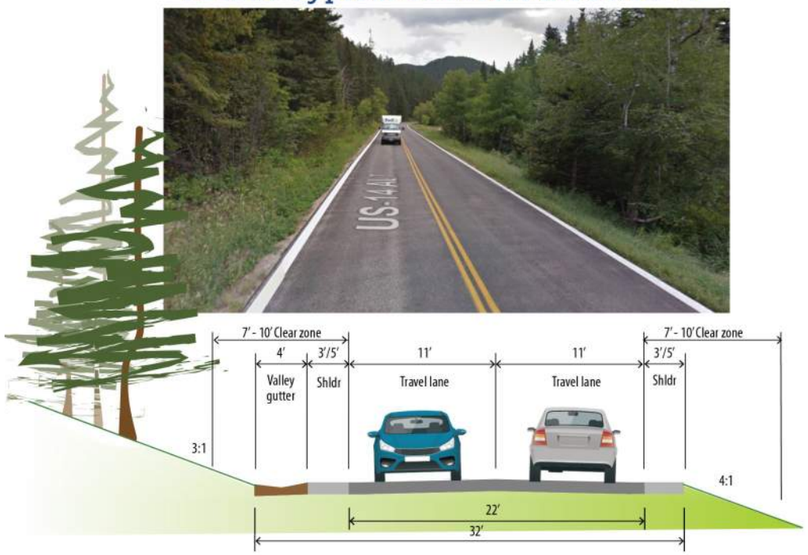
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 014A(105) 0 N, PCN 05UE	1	26

Plotting Date: 01-28-2021

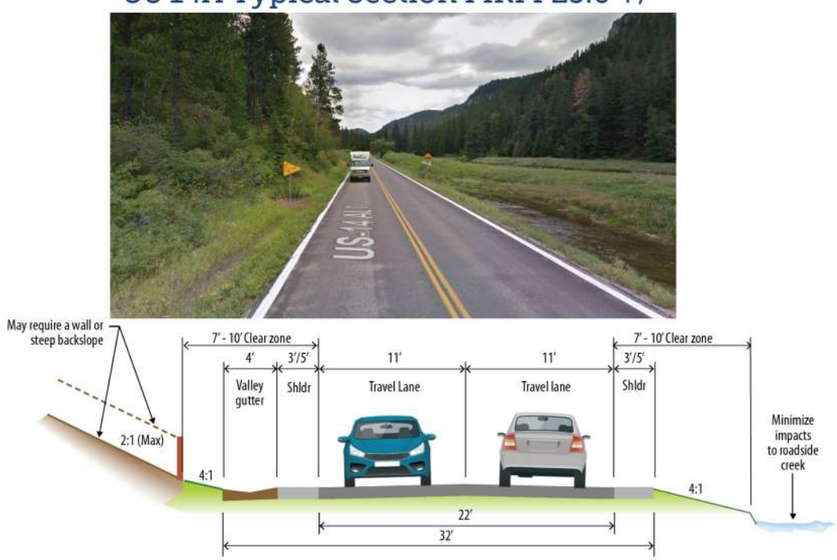
INDEX OF SHEETS

US 14A (MRM 25-29) **Improvement: Widen Shoulders**

US 14A Typical Section MRM 26.1 +/-



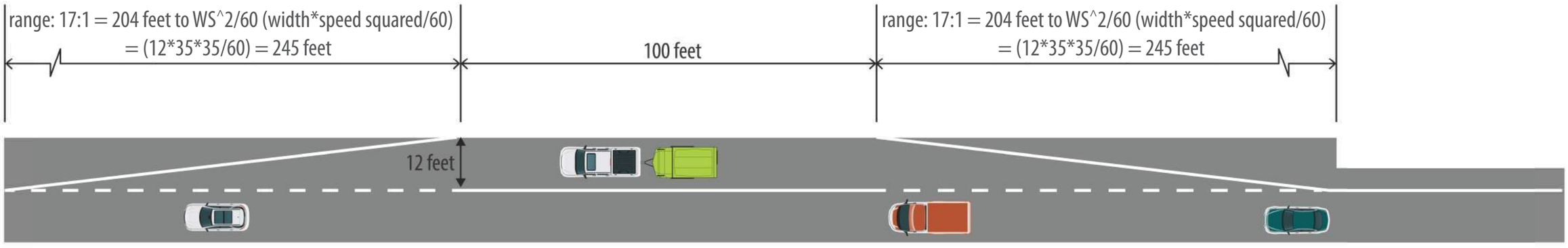
US 14A Typical Section MRM 25.0 +/-



US 14A (MRM 25-29) **Improvement: Widen Shoulders**

US 14A Typical Section MRM 27.7 +/-

Posted 35 mph Pull-off



Corridor 2 (US 14A: Spearfish Canyon South)

Black Hills
CONTEXT SENSITIVE CORRIDORS STUDY

SRF JACOBS FELSBURG HOLT & ULLEVIG

Corridor 2 (US 14A: Spearfish Canyon South)

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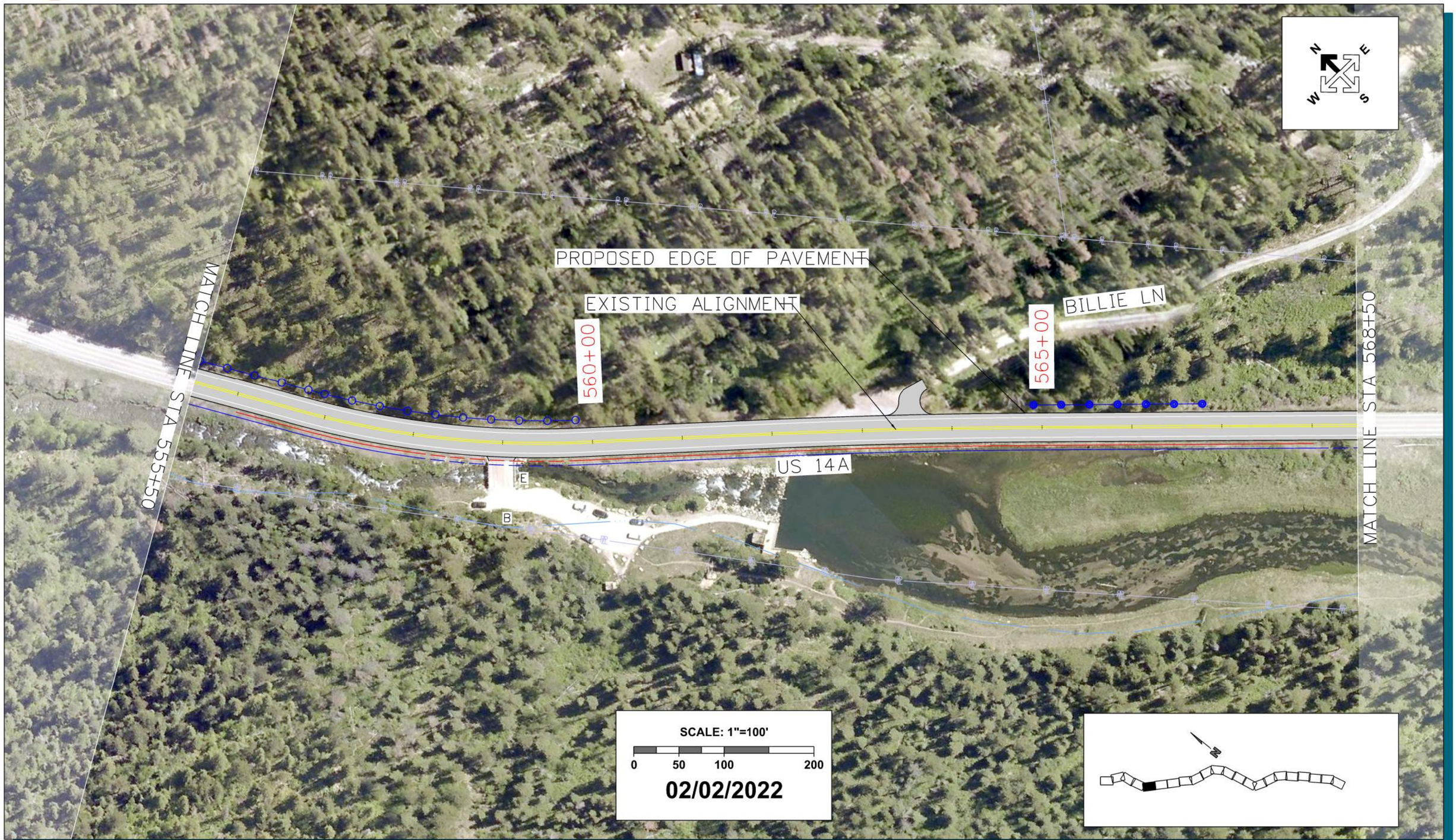

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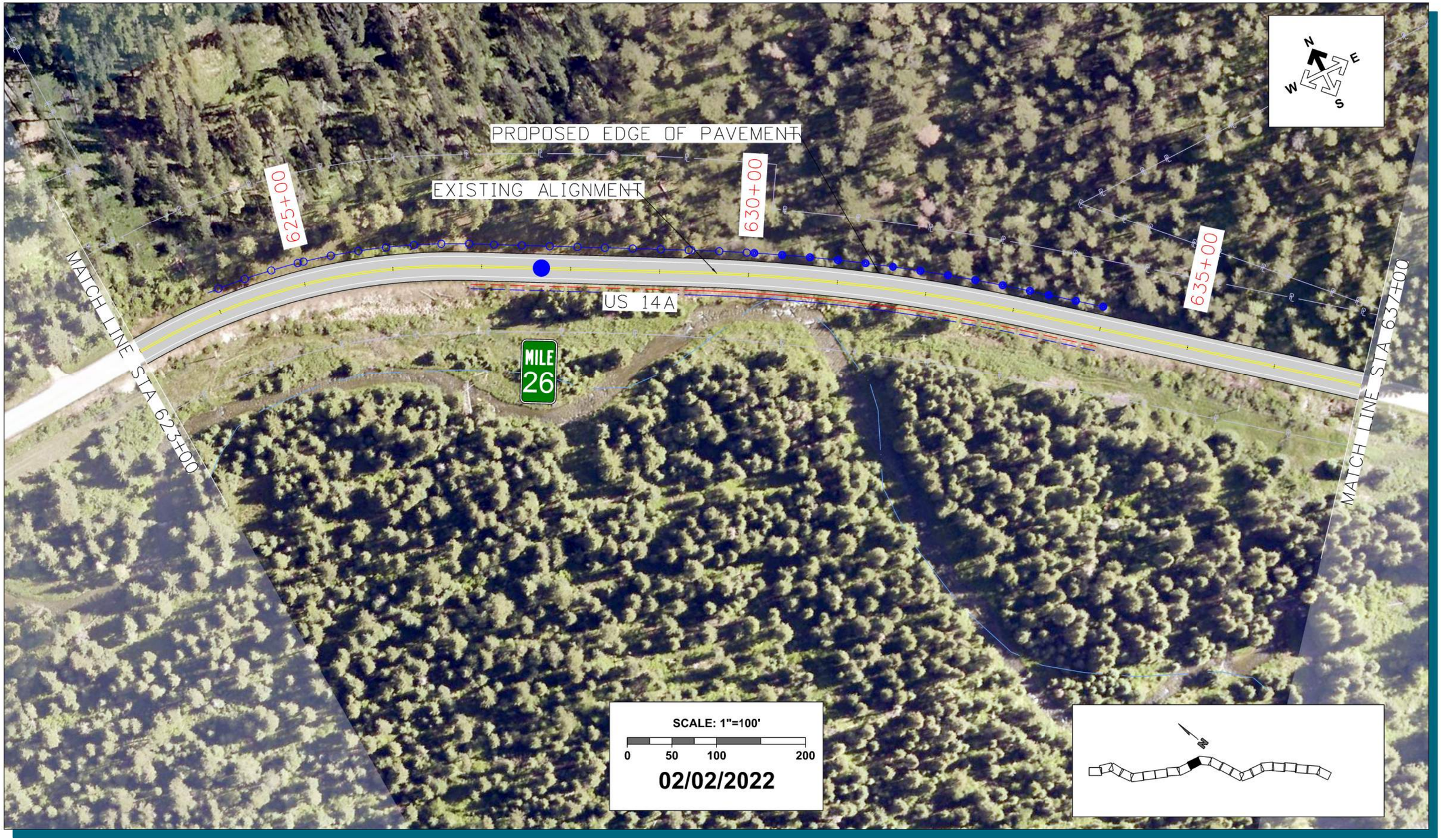

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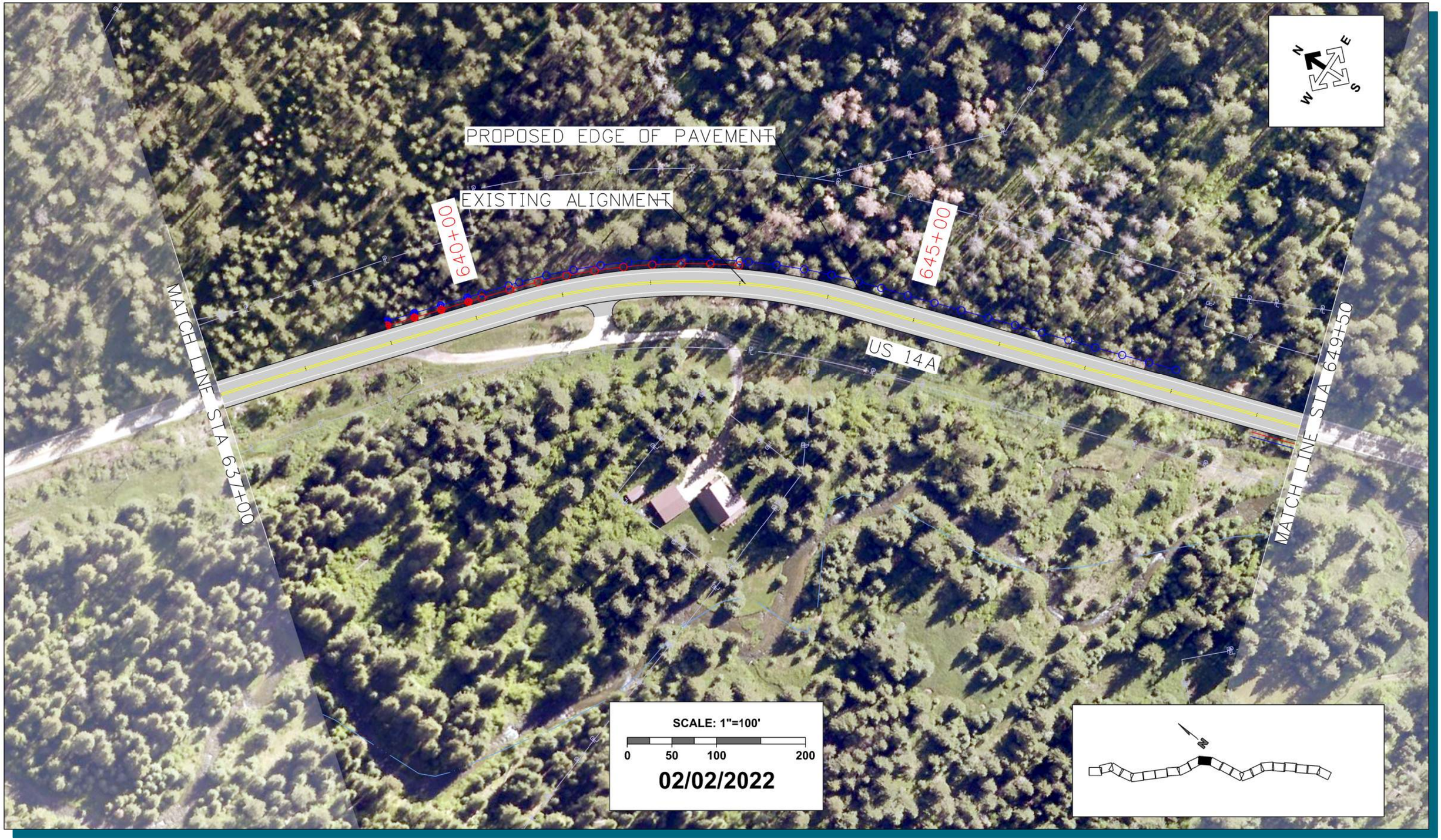

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