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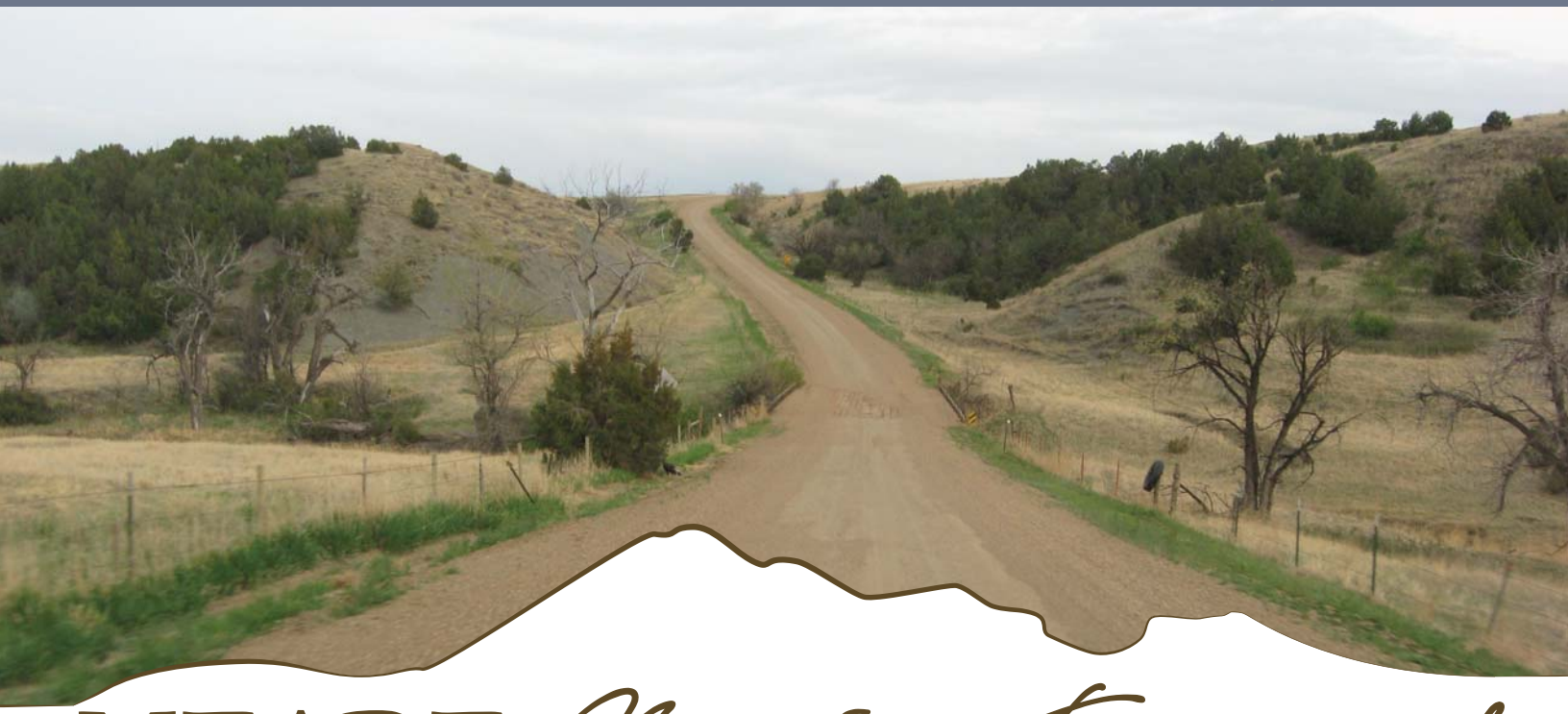

MEADE *Moving Forward*

2040 Transportation Plan

MEADE COUNTY
TRANSPORTATION PLAN

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Table of Contents

Page

Executive Summary ES-1

Introduction ES-1

Inventory of Existing Conditions ES-3

Future Needs Analysis ES-6

Standards ES-7

Projects ES-10

Implementation ES-15

I. Introduction 1

A. Purpose 1

B. Approach 1

C. Goals and Objectives 2

D. Public Involvement 3

E. Elements of the Transportation Plan 4

II. Inventory of Existing Conditions 5

A. Roadway Network 7

B. Traffic Volumes 10

C. Volume-to-Capacity Analysis 10

D. Traffic Safety 13

E. Culverts and Bridges 18

F. Transit 19

G. Non-motorized Facilities 19

H. Freight 19

I. Air 19

J. Areas of Concern 20

III. Future Needs Analysis 27

A. Future Growth Areas and Rates 27

B. Future Traffic Forecasts 29

C. Volume-to-Capacity Analysis 32

IV. Standards 33

A. Roadway Classification 33

B. Roadway Typical Sections 34

C. Roadway Surface Decisions 34
D. Access Management Guidelines 38
E. Transportation Impacts and Financing 39
F. Major Road Plan 42
G. Non-motorized Plan 47
V. Projects 47
A. Roadway Improvement Projects 48
B. Non-Motorized Projects 57
C. Bridge Projects 59
D. Special Planning Studies 61
E. Other Projects 63
VI. Implementation 65
A. Budgeting 65

List of Appendices

Appendix A. Methods and Assumptions Document
Appendix B. Initial Public Open House and Stakeholder Meetings Summary
Appendix C. Web Based Survey Results
Appendix D. Second Public Open House and Stakeholder Meetings Summary
Appendix E. Estimates of Probable Construction Cost (By Typical Section)

List of Figures

Page

Figure 1. Project Approach 2
Figure 2. Study Area 6
Figure 3. Roadway Surface Type and Paved Shoulder Width 8
Figure 4. Roadway Surface Type and Paved Shoulder Width, I-90 Corridor 9
Figure 5. Current Daily Traffic Volumes, 2012-2015 11
Figure 6. Current Daily Traffic Volumes, I-90 Corridor, 2012-2015 12
Figure 7. County Road Crashes by Month, 2009-2013 14
Figure 8. County Road Crashes by Type, 2009-2013 15
Figure 9. Areas of Concern 21
Figure 10. Future Growth Areas 28
Figure 11. Year 2040 Daily Traffic Volume Forecasts 30
Figure 12. Year 2040 Daily Traffic Volume Forecasts – I-90 Corridor 31
Figure 13. Arterial Typical Sections 35
Figure 14. Collector Typical Sections 36
Figure 15. Local Typical Sections 37
Figure 16. Major Road Plan (Countywide) 43
Figure 17. Major Road Plan (Sturgis Area Inset) 44
Figure 18. Major Road Plan (Mid I-90 Area Inset) 45
Figure 19. Major Road Plan (Piedmont-Summerset Area Inset) 46
Figure 20. Recommended Transportation Projects (All Projects) 50
Figure 21. Recommended Transportation Projects (Sturgis Area Inset) 51
Figure 22. Recommended Transportation Projects (Mid I-90 Area Inset) 52
Figure 23. Recommended Transportation Projects (Piedmont-Summerset Area Inset) 53
Figure 24. Bridge Prioritization 60
Figure 25. Annual County Transportation Budget and Projects 66

List of Tables

Page

Table 1. Planning Level Roadway Capacities 10
Table 2. Summary of Higher Crash Frequency County Road Corridors, 2009-2013 16
Table 3. Top Crash Intersections in Meade County, 2009–2013 (including State Highways) 18
Table 4. Traffic Volume Growth on County Roads 29
Table 5. Traffic Impact Study Requirements 40
Table 6. Roadway Improvement Projects 54
Table 7. Non-Motorized Projects 58
Table 8. Bridge Prioritization, Possible Funding from State Grant Program (BIG) 61
Table 9. Bridge Prioritization, Possible Funding from County or Sell to Landowner 62
Table 10. Proposed Special Planning Studies 62
Table 11. Roadways Identified for Maintenance and Repair 63
Table 12. Projects Identified in the STIP Impacting Meade County 64
Table 13. Funding Sources and Amounts – Meade Moving Forward Projects 66

Acronyms and Abbreviations

AFB	Air Force Base
FHWA	Federal Highway Administration
GIS	Geographic Information Systems
I-90	Interstate 90
LOS	level of service
mph	miles per hour
MPO	metropolitan planning organization
PHT	Prairie Hills Transit
ROW	right-of-way
SAT	Study Advisory Team
SD	South Dakota State Highway
SSDOT	South Dakota Department of Transportation
STIP	Statewide Transportation Improvement Program
US	United States
vpd	vehicles per day

Executive Summary

Introduction

Meade County is located in western South Dakota, primarily north and east of Rapid City. Meade County encompasses more than 2 million acres, making it the largest county in South Dakota in terms of land area. Although Meade County is 140 miles from its northeast corner to its southwest corner, it is sparsely populated. The total land area of Meade County is 3,482 square miles with an estimated population of 27,202 (2013). Sturgis is the largest city in the county with approximately 6,883 (2013) residents, with the remaining residents residing in smaller towns along Interstate 90 (I-90) and rural areas throughout the rest of the county.

Residents, employees, and tourists with varying travel demands use the transportation network in Meade County. The number one industry in the County is agriculture. Meade County is also home to Ellsworth Air Force Base (EAFB). In addition to the agriculture industry and military, the County hosts up to one-half million tourists each August for the world's largest motorcycle rally, the Sturgis Motorcycle Rally.

Purpose

In September 2014, the South Dakota Department of Transportation (SDDOT) and Meade County, initiated the Meade County Transportation Plan, *Meade Moving Forward*. Transportation is a critical component of community planning, and Meade County recognizes the need to be proactive about transportation as growth and development continue. This Transportation Plan provides guidance on how to strategically maintain and expand the transportation system to accommodate current and future needs. This plan serves as an update to and an expansion of the first Transportation Plan completed in 2008.

The plan studies all of Meade County, with an emphasis on the county transportation system. The plan addresses all modes of transportation and identifies improvements through the year 2040. This plan contains guidance to assist staff and policy makers in reviewing development proposals and implementing transportation improvements. The plan also lists projects that would be necessary to realize Meade County's transportation goals and is intended to be flexible enough to accommodate revisions and adjustments as future conditions dictate.

Approach

The development of the transportation plan involved five main tasks supported by continuous public involvement. The project began by establishing the project goals and objectives and confirming known issues. The previous transportation plan was used as a starting point to develop the goals and objectives and to establish the existing conditions. The next step provided a comprehensive review of existing conditions of the transportation system.

The next task, Standards Development, provided a policy framework for the transportation plan and a set of tools for addressing future development and roadway improvements. Task 4, Future Needs Analysis, addressed the anticipated influence of growth on the system, identifying projects needed to keep people moving into the future. The final task, Final Report, provided the completion of this report, including a list of prioritized projects and implementation strategies.

Goals and Objectives

The first step in the project process was to collaborate with the Study Advisory Team (SAT) to develop goals and objectives, with the public confirming them at the first set of public meetings.

Project goals included a plan that:

- Is well-coordinated with other plans and projects and addresses both immediate and long-term needs
- Addresses multimodal users, including transit services in the County
- Develops a prioritization and funding strategy to apply to project selection

Project objectives include:

- Update and expand the Meade County Transportation Plan initially completed in 2008
- Compile a list of transportation issues and needs facing Meade County
- Develop feasible solutions to address those issues and needs that meet current design standards and/or traffic level of service (LOS) expectations for both the current and predicted future traffic conditions while promoting a livable community that will enhance the economic and social well-being of Meade County residents
- Provide guidance to implement recommended improvements and to anticipate future development within the County

Public Involvement

Public participation is an essential part of the transportation planning process. The project team solicited input from the public throughout the project. The community was encouraged to provide comments on the project website and through the web-based project survey. The project team received 60 responses to the survey, which provided valuable information for the development of projects. The public was also encouraged to attend two series of public meetings, held in February and August 2015.

Elements of a Transportation Plan

Transportation plan elements include:

- Inventory of existing conditions
- Future needs analysis
- Long range transportation plan
- Standards
- Projects
- Implementation

Inventory of Existing Conditions

To characterize the County's transportation system and describe how residents, businesses, and visitors interact with the system, the project team conducted an inventory and analysis of transportation conditions in the county. The roadway inventory includes data associated with the existing system (such as road classification, surface type, bridge conditions, major freight corridors, safety, etc.) and traffic counts. This inventory considers both the physical condition of the roadways and the operations. The multimodal inventory includes bicycle and pedestrian facilities, transit service, air, and railroad conditions.

Roadway Network

Meade County's roadway network is the focal point for travel throughout the area, serving automobile, freight trucking, transit, bicycle, and pedestrian movement in concert with the network of state and local roads. All county highways provide two travel lanes (one in each direction). Approximately 149 of the 1870 miles are paved.

Traffic Volumes

The project team assembled this information from data recorded by Meade County staff and from data provided by SDDOT. The information reflects traffic counts recorded during the years between 2012 and 2015 as current traffic volumes.

Higher traffic levels surround the I-90 corridor in southwest Meade County, which connects the city of Sturgis and Buffalo Chip with the cities of Piedmont, Summerset, and Rapid City. No county highway currently carries more than 2,500 vehicles per day (vpd). Segments of Stage Stop Road, Erickson Ranch Road/Deadwood Avenue, and Elk Creek Road exceed 1,000 vpd. Current gravel-surfaced roads that exceed 500 vpd include segments of Alkali Road, Bear Butte Road, High Meadows Road, and Elk Creek Road.

Traffic information provided by the SDDOT and by County staff indicates that trucks represent a relatively high percentage of overall traffic in Meade County. According to traffic counts provided by County staff, truck percentages along Elk Creek, Ricard, and New Underwood roads exceed 20 percent. State highways, including SD 34, SD 79, and I-90, currently carry 10 to 15 percent trucks.

Volume-to-Capacity Analysis

The project team completed volume-to-capacity (v/c) comparisons to understand whether current roadway capacity in the county is sufficient to accommodate traffic demand and identify any locations that are in need of capacity improvements. A v/c ratio compares the existing traffic with the actual design of the roadway and the associated traffic carrying capacity. A v/c ratio of 1.0 means that there is roughly an equal balance between the roadway design and the vehicular traffic on it.

Traffic counts indicate no county roads exceeding 2,500 vpd, translating to a maximum v/c ratio of approximately 0.25 on county roads, well within available capacity. Current traffic levels on paved county roads reveal no traffic congestion concerns, as the available capacity exceeds the recorded traffic levels in all cases. Gravel-surfaced segments of Alkali Road, Bear Butte Road, High Meadows Road, and Elk Creek Road are carrying traffic levels at or nearing the threshold of 660 vpd. These roadways should be monitored as potential paving and improvement projects.

Traffic Safety

Reported crash data were compiled for a five-year period to identify the most hazardous intersections and roadway segments in the study area. A total of 877 crashes occurred on county roads, translating to an average of 175 crashes per year. Reported crashes include 11 fatal crashes, 265 injury crashes, and 601 property damage only (PDO) crashes. Approximately 10 percent of crashes involved alcohol use.

Several county road corridors were identified as demonstrating higher crash frequency, including Vanocker Canyon Road, New Underwood Road, and Elk Creek Road. Relatively frequent crash types included roadway departure crashes and animal collisions. Recommended actions to address these concerns include further study, increased enforcement, and improved traffic control signs and pavement markings.

The project team also analyzed crash records including state highways and roadways within city boundaries to identify top crash intersections based on accident frequency. All of the most frequent crash intersections are located along state highways and/or within city limits, rather than on the county road network. Therefore, *Meade Moving Forward* does not include any safety improvements as Meade County road projects.

Culverts and Bridges

Culverts and bridges are an important supporting component of a transportation system. Culverts allow a roadway to cross minor waterways and irrigation ditches, while bridges allow a roadway to cross more significant features such as other roads, railroads, and major waterways. Meade County manages more than 2,500 pipe culverts, 70 box culverts, and 203 bridges. Many of these bridge structures are in need of rehabilitation or replacement.

Transit

Prairie Hills Transit (PHT) currently provides transit service in portions of Meade County. PHT provides public transportation to anyone of any age and ability for any trip purpose. Meade County does not currently provide countywide transit services, nor do any county funds go toward providing a local match for federal transit funding such as PHT.

Non-motorized Facilities

An inventory of non-motorized travel conditions was compiled based on a physical review of current infrastructure, stakeholder discussions, and public input. The online survey included multiple questions related to non-motorized travel in Meade County. Non-motorized travel was also discussed at both public meetings. Most survey respondents rated travel by bicycling or walking as poor or unknown.

Because the county roadway system is primarily rural, non-motorized users are often forced to travel within the vehicular travel lanes, creating a safety hazard for all travel modes. Some roadways provide wide shoulders, but no continuous network of wide-shouldered roadways or detached paths are currently available in the county.

Non-motorized activity in Meade County is generally increasing. Mountain bike trails are becoming a greater attraction in the western portion of Meade County, particularly in the Black Hills National Forest. Road cycling is also increasing on county roads, such as on Vanocker Canyon Road. Bicyclists and

pedestrians can also be found commuting, for example, to school, on Sturgis Road through the more suburbanized communities of Summerset and Piedmont.

Freight

Most freight travel through Meade County occurs along I-90. I-90 is an interstate roadway serving longer, cross-country trips. Freight travel also occurs along state highways through Meade County including US 212, SD 34, SD 79, and SD 73. County highways play an important role in circulating freight traffic to and from destinations within the county which are mainly agricultural destinations. Many freight trips will use the entire transportation system by accessing a county highway and/or a state highway to access the interstate highway system.

Air

Meade County is home to two municipal airports. The Sturgis Municipal Airport is a city-owned, public-use airport located approximately 4 miles east of Sturgis off SD 34. The Faith Municipal Airport is a city-owned, public-use airport located approximately 1 mile northeast of Faith.

Meade County is also home to Ellsworth AFB, which is located just north of the city of Box Elder. Ellsworth AFB's population is approximately 9,500 and includes military members, family members, and civilian employees. No new air facilities are anticipated to develop in Meade County in the near term.

Areas of Concern

The public and stakeholder involvement process was designed to collect as much input as possible from the Meade County community about existing transportation issues within the study area. This process was valuable in identifying what community members view as the biggest concerns needing attention during the development of this transportation plan. The inventory of existing conditions culminates in a list of areas of concern, which include:

- North/south connectivity from I-90 to SD 79
- Traffic concerns on Tilford Road from I-90 to Ricard Road and on Ricard Road from Tilford Road to Elk Creek Road
- Traffic concerns on North Haines Avenue, Elk Creek Road, and Elk Vale Road
- Secondary access concerns on 224th Place
- Roadway concerns on New Underwood Road from the county line to SD 34
- Road curvature on Elm Springs Road
- Need for paved road connection north/south from Rapid City to SD 34
- Improved access for development east of I-90, near Exit 48 (possible connection of Eastridge Road to Sunshine Valley Road)
- Connection from Wonderland Homes to Sun Valley Estates subdivision
- Additional pedestrian/bicycle facilities along and crossing I-90 corridor
- Multimodal improvements along Vanocker Canyon Road
- Need for new I-90 Interchange northwest of Sturgis in Lawrence County
- Grading and pavement of Antelope Creek Road
- Provision of second access to Blucksberg Mountain Estates
- Eden/Avalanche Road deficiencies

Many of the areas of concerns result in specific roadway or non-motorized project recommendations, which are included in the project listing.

Future Needs Analysis

Future Growth Areas

Using county building permit data from the last 10 years and knowledge about anticipated development plans, the project team gained an understanding of the anticipated future growth areas. The rate of development was determined based on the number, location, and time of the applications. The highest growth expectations are near the I-90 corridor, particularly closer to the Rapid City area, and the area near Ellsworth AFB. This high growth area includes the Black Hawk area and the cities of Summerset, Piedmont, and Box Elder. Areas outside these are assumed to have less than 1 percent growth. **Table ES-1** shows the traffic volume growth on Meade County roads.

Future Traffic Forecasts

The high, medium, and low growth factors were applied to roadways within the growth areas to develop the Year 2040 traffic volume projections. Many county roads currently carry relatively low traffic volumes (less than 500 vpd) and are projected to remain below 500 vpd by the Year 2040. Every county road east of New Underwood Road fits this description, along with several roadways near the growth areas such as Middle Alkali Road, Elk Vale Road, Avalanch Road, Tilford Road, and Ricard Road. The following table lists county road segments anticipated to grow to a higher threshold volume. Any gravel surfaced roadways included in this list should be considered for paving by the Year 2040.

Table ES-1 Traffic Volume Growth on County Roads

Year 2040 Traffic Volume Range (vpd)	Roadway	Segment Description	
		Begin	End
501–1,000	Antelope Creek Road	Meade/Pennington County Line	Elk Creek Road
	Elk Vale Road	224th Street	Elk Creek Road
	Pleasant Valley Road	I-90, Exit 37	Fort Meade Way
	Quall Road/Norman Avenue	Stage Stop Road	Peaceful Pines Road
	Erickson Ranch Road	Elk Creek Road	Westridge Road
	Peaceful Pines Road	Timberline Road	Bluebird Lane
1,001–2,500	Alkali Road	Fort Meade Way	132nd Avenue
	Bear Butte Road	Sly Hill Road	Foothills Road
	High Meadows Road	Sturgis Road	North High Meadows Road
	Piedmont Meadows Road	Sturgis Road	Rotunda Court
	Elk Creek Road	Erickson Ranch Road	Haines Avenue
	Haines Avenue	Hale Road	Elk Creek Road

Year 2040 Traffic Volume Range (vpd)	Roadway	Segment Description	
		Begin	End
2,501–5,000	Erickson Ranch Road	Westridge Road	Peaceful Pines Road
	Elk Creek Road	I-90 Exit 46	Erickson Ranch Road
	Peaceful Pines Road	Sturgis Road	Timberline Road
>5,000	Deadwood Avenue	Meade/Pennington County Line	Norman Avenue

Volume to Capacity Analysis

Volume-to-Capacity comparisons were completed to understand whether current roadway capacity in the county is sufficient to accommodate projected Year 2040 traffic demand and to identify any locations that are in need of capacity improvements and/or paving. It was found that all county roads would continue to provide sufficient capacity to accommodate future growth without widening. Antelope Creek, Elk Vale, and Pleasant Valley Roads exceed 500 vpd by the Year 2040, implying the need to consider paving.

Standards

Standards provide a framework for how the transportation system should be maintained and expanded. Standards establish the County's baseline expectations so that future projects, such as reconstruction and paving, are completed consistently.

Roadway Classification

A roadway network includes a hierarchy of roads whose functional classification is defined by their usage. In general, streets serve two functions: mobility and access. Roadway classification is determined by the relative degree to which a road serves mobility versus access functions, as well as characteristics such as continuity, trip lengths served, travel speeds, and traffic volumes. *Meade Moving Forward* describes and identifies expectations for arterials, collectors, local roads, and I-90 service roads.

Roadway Typical Sections

Cross sections for arterial, collector, and local roads were established. These cross sections are intended to be used as a template for future roadway construction and improvements to existing roadways. Different typical sections are shown for roads in urban and rural areas.

Roadway Surface Decisions

The decision to pave a gravel roadway is complex and requires the consideration of multiple factors. The following considerations should be evaluated in making the decision to pave a gravel roadway:

- Daily traffic volumes and type of traffic along the roadway
- The continuity and functional classification of the roadway
- The tendency of drivers to divert away from gravel surfaces and onto paved surfaces
- Traffic safety

- Drainage and pavement condition
- Public opinion
- Accommodation of non-motorized modes

Access Management Guidelines

Access management techniques are recommended in *Meade Moving Forward*, with different spacing standards for roadways of varying classifications. The guidelines are consistent with those from the 2008 Plan. These guidelines should be applied to access requests to the extent possible.

Assessment of Development Impacts

New development in the County generates new vehicle trips and associated new demands on the County's road system. The impacts of different developments vary from a small number of trips for a single new home to a large number of trips for a major residential subdivision or commercial development. *Meade Moving Forward* recommends certain thresholds to determine whether a traffic impact study should be required.

Major Road Plan

The Major Road Plan provides a framework for how the road network should be maintained and expanded as development occurs within the County. The plan labels the classification of current roadways and identifies future roadway corridors designed to provide connectivity and access to existing and new developments in the study area. The SAT, stakeholders, and general public collaborated to develop the plan.

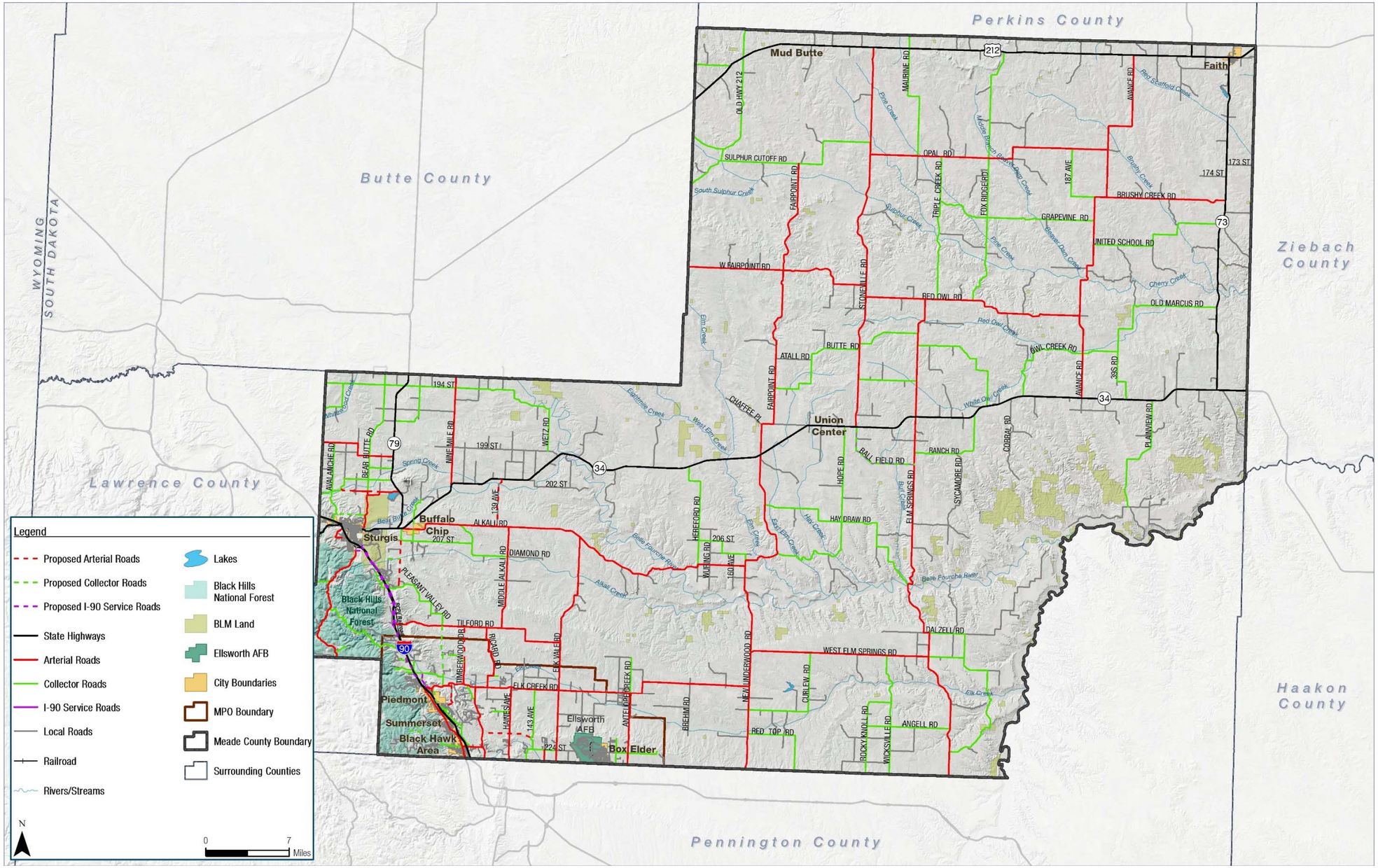
The Major Road Plan is high level, detailing the eventual roadway connections to be built over the next 20 to 50 years. This document does not suggest that development should and will begin immediately, nor does it detail the exact alignment that the roadway connections should follow. Instead, the plan serves as a basic roadway framework, with the eventual goal of constructing roadway segments that provide the continuity envisioned in this plan. **Figure ES-1** shows the countywide Major Road Plan.

Non-motorized Plan

Meade County has an opportunity to develop and expand the network of non-motorized facilities, connect to community centers, and increase the overall regional network. The Non-motorized Plan provides a framework for how the non-motorized facilities should be established within the county as funds become available. The Non-motorized Plan identifies improvements to the bicycle and pedestrian network where the greatest deficiencies and needs exist. The future non-motorized improvements will provide safer and more efficient ways for people on foot or bicycle to reach their destinations.

New development and redevelopment of the transportation network should take advantage of opportunities to enhance the safety and efficiency of non-motorized travel. As roadway projects are identified, it is recommended that the County consider the existing and future non-motorized use to determine whether a non-motorized facility could be completed in conjunction with the roadway project.

Figure ES-1. Major Road Plan (Countywide)



Projects

Recommendations for improvements to the Meade County transportation system culminated in a list of projects. Projects were categorized as a roadway improvement project, a non-motorized project, or a bridge project.

Roadway Improvement Projects

Recommended improvements to Meade County roads have been compiled for the County to implement between 2015 and 2040. The list has been developed from the following sources: the 2008 Transportation Plan, the areas of concern, the future needs analysis, public and stakeholder input, and SAT coordination.

Recommended projects were prioritized into near, mid, and long term categories. The prioritization was based on criteria that were derived from the values and goals that are important to Meade County and its residents and businesses. Criteria include constructability, neighborhood connectivity, economic development, safety, regional connectivity, and cost.

Near-term projects are those anticipated to be funded and built within the next five years (2016–2020). These projects tend to be low-cost projects that make new neighborhood connections to the roadway network and address future capacity issues. Mid-term projects are those anticipated to be funded and built within the next five to 15 years (2020–2030). Long-term projects are those anticipated to be funded and built in the long term (beyond 2030).

Project costs have been developed for each recommended roadway project. The costs for 10 of the projects were adapted from previous documents, and new estimates were developed for the remainder of the projects based on the construction of the recommended typical section for Meade County arterial, collector, and local roadways. While not every roadway segment or improvement may be built to these specifications, the cost procedure provides the most conservative view of construction costs.

Figure ES-2 and **Table ES-2** identify the recommended roadway improvement projects.

Figure ES-2. Recommended Transportation Projects

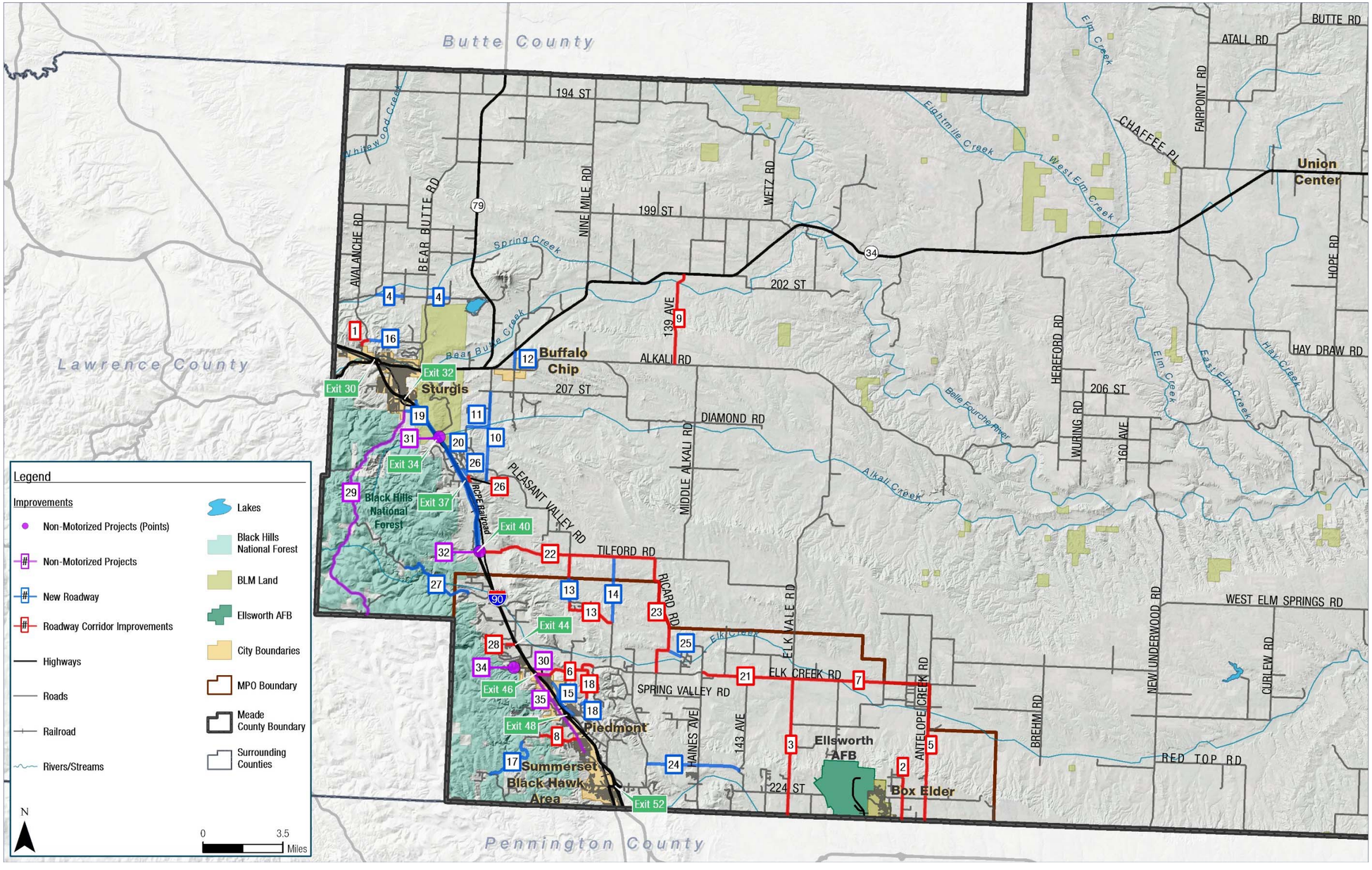


Table ES.2 Roadway Improvement Projects

ID #	Corridor	Location		Description	Lead Entity/ Coordinating Agencies	Priority	Estimated Conceptual Construction Costs	
		From	To				$M (Base Year)	$M (Yr. Of Expend.)
1	Avalanch Road	Sturgis City Limits	City Dump	Reconstruction and surfacing	Meade County/City of Sturgis	Mid-term	0.6	1.0
2	150th Avenue	Pennington County Line	North	Asphalt paving as minor arterial	Meade County/City of Box Elder	Near-term	1.3	1.6
3	Elk Vale Road	Pennington County Line	Elk Creek Road	Expand ROW to 100', pave roadway	Meade County	Near-term	7.0	8.0
4	North Loop Road	Highway 79	Eden Road at I-90	New roadway connection and reconstruction of existing alignment	Meade County	Mid-term	8.0	13.5
5	Antelope Creek Road	Pennington County Line	Elk Creek Road	Asphalt paving	Meade County	Mid-term	4.4	7.4
6	Elk Creek Road	Exit 46	Edgewood Place	Acquire ROW for Improvements	Meade County	Mid-term	7.0	11.8
				Realign roadway	Meade County			
7	Elk Creek Road	Elk Vale Road	Antelope Creek Road	Asphalt paving	Meade County	Mid-term	4.4	7.4
8	High Meadows Road Safety Improvements	Sturgis Road	North High Meadows Road	Safety Improvements	Meade County	Near-term	0.9	1.0
9	139th Avenue	Alkali Road	US 34	Paving arterial road	Meade County	Mid-term	6.1	10.3
10	Fort Meade Way	Pleasant Valley Road	207th Street	New arterial road	Meade County	Near-term	3.1	3.5

ID #	Corridor	Location		Description	Lead Entity/ Coordinating Agencies	Priority	Estimated Conceptual Construction Costs	
		From	To				$M (Base Year)	$M (Yr. Of Expend.)
11	Proposed Collector	Buffalo Road	Fort Meade Way	New collector road	Meade County	Long-term	1.8	4.7
12	132nd Avenue	Alkali Road	Highway 34	New collector road	Meade County	Long-term	1.5	3.9
13	Frontier Loop	Tilford Road	Local Access	Widening existing road to collector	Meade County	Mid-term	0.8	1.4
		Local Access	Frontier Loop	New collector road				
		Frontier Loop	Timberwood Drive	Use existing surface				
14	Timberwood Drive	Frontier Loop	Tilford Road	New arterial road	Meade County	Near-term	2.0	2.5
15	Glenwood Drive	Steamboat Road	Stage Stop Road	New collector road	Meade County/City of Summerset	Near-term	4.0	5.0
16	Foothills Road	Avalanch Road	N. Ox Yoke Road (approx.)	New collector road	Meade County	Near-term	1.3	1.6
17	High Meadows Area Secondary Access Route	Rolling Hills Road	High Meadows Road (current end)	New collector road	Meade County/Rapid City Area MPO	Mid-term	1.1	1.7
18	Sunshine Valley Road	Elk Creek Road	Private Drive	Paving existing gravel road	Meade County/City of Summerset	Near-term	3.7	4.6
		Private Drive	Truman Road	New arterial road				
19	South I-90 Service Road	Exit 40	Vanocker Canyon Road	New service road	SDDOT/Meade County	Mid-term	13.5	22.7
20	North I-90 Service Road	Exit 40	Old Stone Road	New service road	SDDOT/Meade County	Mid-term	13.5	22.7

ID #	Corridor	Location		Description	Lead Entity/ Coordinating Agencies	Priority	Estimated Conceptual Construction Costs	
		From	To				$M (Base Year)	$M (Yr. Of Expend.)
21	Elk Creek Road	Elk Vale Road	Haines Avenue	Asphalt paving to rural arterial	Meade County	Mid-term	6.1	10.3
22	Tilford Road	I-90 Exit 40	Ricard Road	Asphalt paving to rural arterial	Meade County	Long-term	11.4	29.6
23	Ricard Road	Tilford Road	Elk Creek Road	Asphalt paving to rural arterial	Meade County	Long-term	8.7	22.6
24	East-West Connection	Peaceful Pines and Deadwood Avenue	224th Street and Nike Road	New arterial road	Meade County/Rapid City Area MPO	Mid-term	7.7	13.0
25	Double Tree Drive Extension	Ricard Road	Double Tree Drive	New collector road	Meade County	Mid-term	0.9	1.5
26	Blucksberg Connection	Blucksberg Drive	Pleasant Valley Road	New local road Widening existing private road to local road	Meade County	Near-term	0.5	0.6
27	Bethlehem Road Connection	Alpine Acres Access	Runkle Road	Reconstruction as gravel road	Meade County/US Forest Service	Long-term	2.5	6.5
28	Chimney Canyon Road	I-90 Exit 44	Elk Horn Road	Asphalt paving	Local	Near-term	0.6	0.75

Non-motorized Projects

The project team, in collaboration with the SAT, determined that the most important non-motorized needs are concentrated around the I-90 corridor. The identified projects include a mix of projects to accommodate the various types of users and needs. Funding for non-motorized projects is limited, and the County will seek to implement roadway projects prior to exclusively non-motorized projects. In light of this, it is suggested that non-motorized improvements be integrated into roadway projects where possible. **Table ES-3** lists the recommended Non-Motorized Projects.

Bridge Projects

The County has identified and prioritized the structures shown on **Figure ES-4**. This prioritization is subject to change if traffic increases or further bridge deterioration occurs, or at the Commission's discretion.

Other Projects

Additional efforts are underway to preserve, renovate, and enhance the transportation system, including near-term projects already identified for maintenance by the County and projects initiated by other agencies such as SDDOT and local communities. *Meade Moving Forward* lists the roadways already identified for maintenance and repair and also lists the projects included in the 2016–2019 Statewide Transportation Improvement Program (STIP) that will have an impact on Meade County.

Implementation

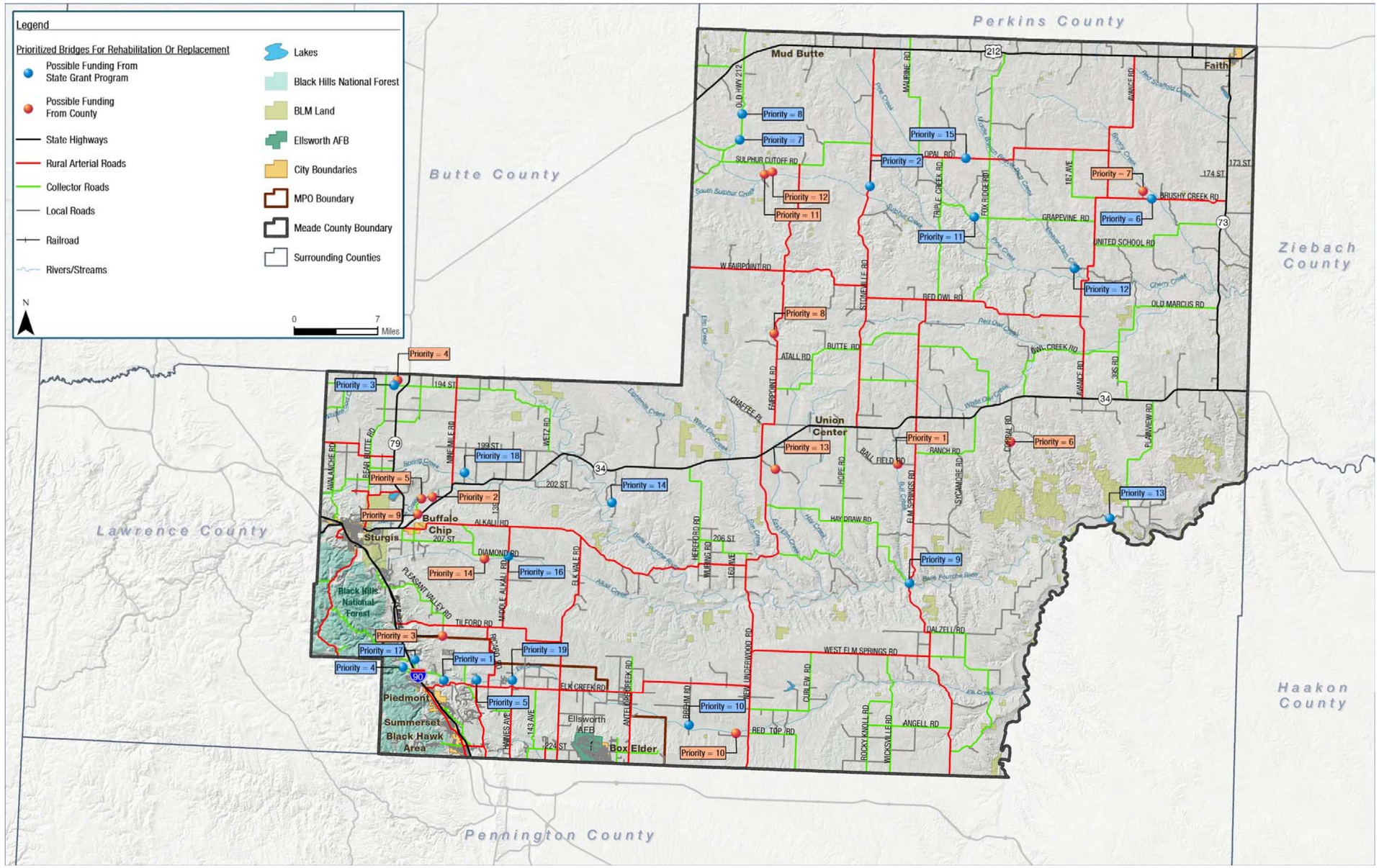
The intent of this Transportation Plan Update, *Meade Moving Forward*, is to help ensure that the County's transportation resources are well-positioned for future growth. This planning effort builds on the Meade County Transportation Plan developed in 2008 and includes recommendations to uphold the safety, efficiency, and maintenance of the transportation network for the County's residents, businesses, and visitors.

It is recommended that Meade County begin to plan and budget for completion of the 11 roadway improvements and 3 non-motorized improvements identified for the near term. It is recommended that Meade County Staff initiate planning now for these projects, refine the estimated costs, and complete preliminary studies to set the stage for implementation.

Table ES-3. Non-Motorized Projects

ID #	Relative Importance	Location/Corridor	From	To	Length (Miles)	Description	Source	Status	Lead Entity/ Coordinating Agencies
30	High	Vanocker Canyon Road	Pineview Drive	County Line	11.9	Bicycle wayfinding including bike route signing and pavement markings	SAT Discussion and Public Input	Not started	Meade County, Lawrence County
31	High	Elk Creek Road	Sturgis Road	Glenwood Drive	0.7	Sidewalk and intersection crossings along Elk Creek Road; coordinate with SDDOT on new overpass of I-90	SAT Discussion and Public Input	Not started	SDDOT, City of Summerset
32	Medium	Pleasant Valley Road and BLM Road (Exit 34)	N/A	N/A	N/A	Improve trailhead (parking, facilities, signage and wayfinding) for access to Fort Meade Recreation Area	SAT Discussion and Public Input	Not started	Bureau of Land Management
33	Low	Tilford Road (Exit 40)	N/A	N/A	N/A	Park-n-Ride facility for future use by Prairie Hills Transit	SAT Discussion and Public Input	Not started	SDDOT, Prairie Hills Transit
34	Medium	Meade County	N/A	N/A	N/A	Reach agreement with Prairie Hills Transit for transit service area expansion	SAT Discussion and Public Input	Not started	Prairie Hills Transit
35	Medium	Elk Mountain Road and Main Street Intersection	N/A	N/A	N/A	Provide improved trailhead and wayfinding/signing to trailhead (trail 144)	SAT Discussion and Public Input	Not started	Meade County, Piedmont, Forest Service
36	High	Piedmont Shared Use Path	Varies	Varies	Approx. 3 miles	Recommendations from the plan include: Path connections across I-90 at Elk Creek Road (Exit 46) and Stage Stop Road (Exit 48); Sturgis Road with initial phases including the portion of the road from the Elk Creek Road to near the intersection of Diamond T Circle and Kimberly Drive	SAT Discussion and Public Input	Planning stages	Piedmont, SDDOT

Figure ES-4. Bridge Prioritization



I. Introduction

Meade County is located in western South Dakota, primarily north and east of Rapid City. Meade County encompasses more than 2 million acres, making it the largest county in South Dakota in terms of land area. Although Meade County is 140 miles from its northeast corner to its southwest corner, it is sparsely populated. The total land area of Meade County is 3,482 square miles with an estimated population of 27,202 (2013). Sturgis is the largest city in the county with approximately 6,883 (2013) residents, with the remaining residents residing in smaller towns along Interstate 90 (I-90) and rural areas throughout the rest of the county.

Residents, employees, and tourists with varying travel demands use the transportation network in Meade County. The number one industry in the County is agriculture. Meade County is also home to Ellsworth Air Force Base (AFB). In addition to the agriculture industry and military, the County hosts up to one-half million tourists each August for the world's largest motorcycle rally, the Sturgis Motorcycle Rally.

A. Purpose

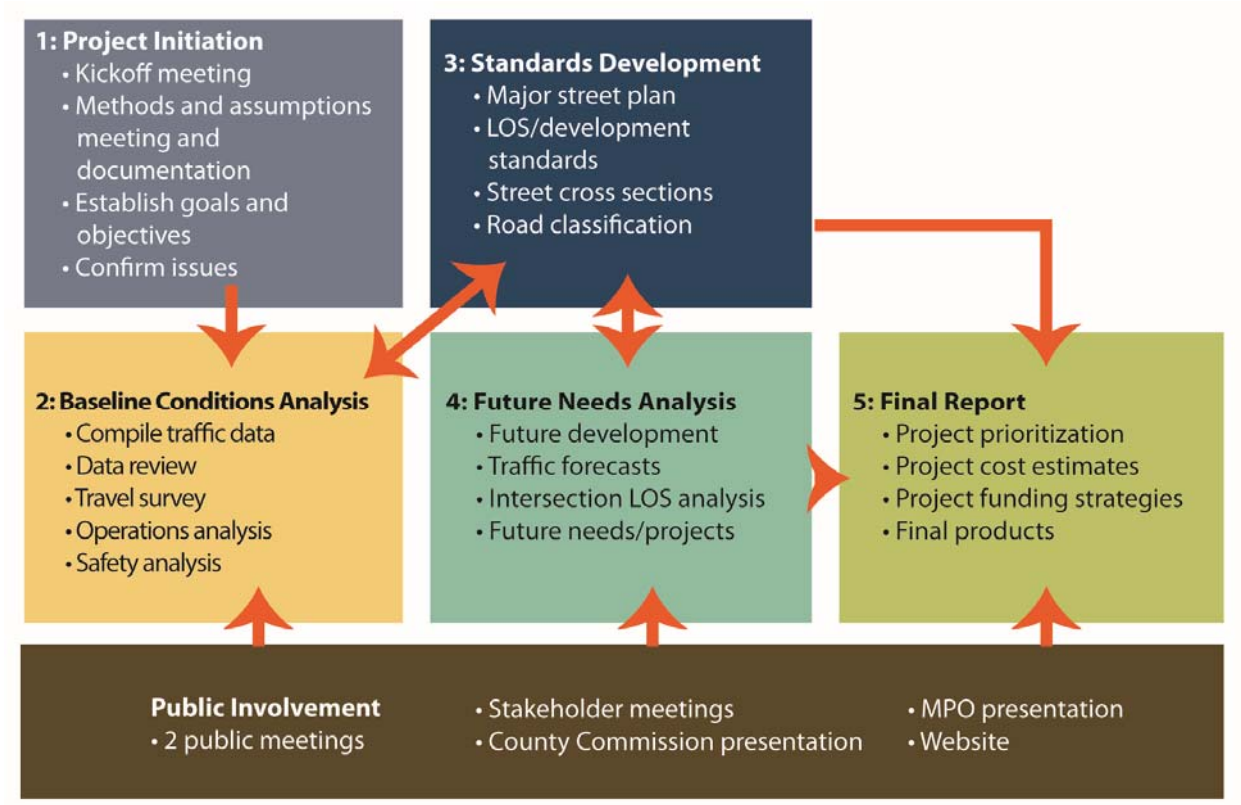
In September 2014, the South Dakota Department of Transportation (SDDOT) and Meade County initiated the Meade County Transportation Plan, *Meade Moving Forward*. Transportation is a critical component of community planning, and Meade County recognizes the need to be proactive about transportation as growth and development continue. This Transportation Plan provides guidance on how to strategically maintain and expand the transportation system to accommodate existing and future conditions. This plan serves as an update to and an expansion of the first Transportation Plan completed in 2008.

The plan studies all of Meade County, with an emphasis on the county transportation system. The plan addresses all transportation modes and identifies improvements through the year 2040. This plan contains guidance to assist staff and policy makers in reviewing development proposals and implementing transportation improvements. The plan also lists projects that would be necessary to realize Meade County's transportation goals and is intended to be flexible enough to accommodate revisions and adjustments as future conditions dictate.

B. Approach

The development of the transportation plan involved five main tasks supported by continuous public involvement. **Figure 1** shows the sequence and relationship of the major tasks included in the transportation planning process. Task 1, Project Initiation, began by establishing the project goals and objectives and confirming known issues. The previous transportation plan was used as a starting point to develop the goals and objectives and to establish the existing conditions. A Methods and Assumptions meeting and subsequent document established the techniques, tools and parameters that would govern the plan (see **Appendix A**). Task 2, Baseline Conditions Analysis, provided a comprehensive review of existing conditions of the transportation system.

Figure 1. Project Approach



LOS = Level of Service, MPO = Metropolitan Planning Organization

Task 3, Standards Development, provided a policy framework for the transportation plan and a set of tools for addressing future development and roadway improvements. Task 4 addressed the anticipated influence of growth on the system, identifying projects needed to keep people moving into the future. Task 5 provided the completion of this report, including a list of prioritized projects and implementation strategies.

C. Goals and Objectives

The first step in the project process was to collaborate with the Study Advisory Team (SAT) to develop goals and objectives, with the public confirming them at the first set of public meetings.

Project goals include a plan that:

- Is well-coordinated with other plans and projects and addresses both immediate and long-term needs
- Addresses multimodal users, including transit services in the County
- Develops a prioritization and funding strategy to apply to project selection

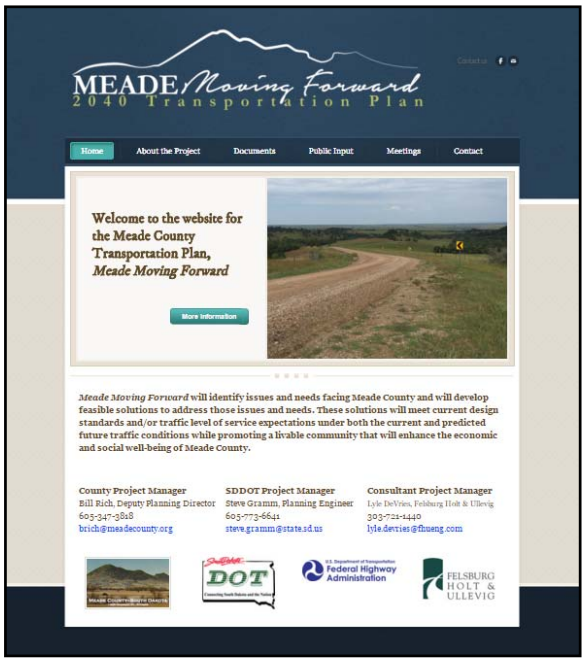
Project objectives include:

- Update and expand the Meade County Transportation Plan initially completed in 2008
- Compile a list of transportation issues and needs facing Meade County
- Develop feasible solutions to address those issues and needs that meet current design standards and/or traffic LOS expectations for both the current and predicted future traffic conditions while promoting a livable community that will enhance the economic and social well-being of Meade County residents
- Provide guidance to implement recommended improvements and to anticipate future development within the County

D. Public Involvement

Public participation is an essential part of the transportation planning process. The project team solicited input from the public throughout the project. The following provided the public ways to participate:

- **Project website** – The public was encouraged to provide comments on the project website, http://www.meademovingforward.com/. Using the project website, the public could access project information and updates, public meeting materials, and an online survey.
- **Initial Public Open House and Stakeholder Meetings** – The first public open house meetings and stakeholder meetings were held in February 2015. The project team provided an overview of the project goals and objectives, explained the existing transportation conditions, and identified areas of concern. Public input was gathered from individual conversations and from comment sheets. **Appendix B** summarizes the results of this outreach.
- **Web-based Project Survey** – The project team created a survey to gather information about the current transportation system. The survey was announced at the initial public meetings, through notices in four local newspapers, through the project website, and through the County's Facebook page in February 2015. The survey asked questions related to motorized and non-motorized travel. The project team received 60 responses, which provided valuable information. **Appendix C** summarizes the survey results.
- **Second Public Open House and Stakeholder Meetings** – In August 2015, the project team hosted a second round of public and stakeholder meetings. These meetings focused on the expected future growth, proposed major road plan, non-motorized plan, and draft projects. **Appendix D** provides a summary of the meetings.



Project website homepage

E. Elements of the Transportation Plan

The transportation plan elements include:

- Inventory of existing conditions
- Future needs analysis
- Long range transportation plan
- Standards
- Projects
- Implementation

II. Inventory of Existing Conditions

To understand how transportation is provided to Meade County residents, employees, and visitors, the project team conducted an inventory of the existing transportation system within the county. The inventory is an important first step of the planning process because it helps identify areas that need improvement.

The roadway inventory includes data associated with the existing system (such as road classification, surface type, bridge conditions, major freight corridors, safety, etc.) and traffic counts. This inventory considers both the physical condition of the roadways and the operations. The multimodal inventory includes bicycle and pedestrian facilities, transit service, air, and railroad conditions.

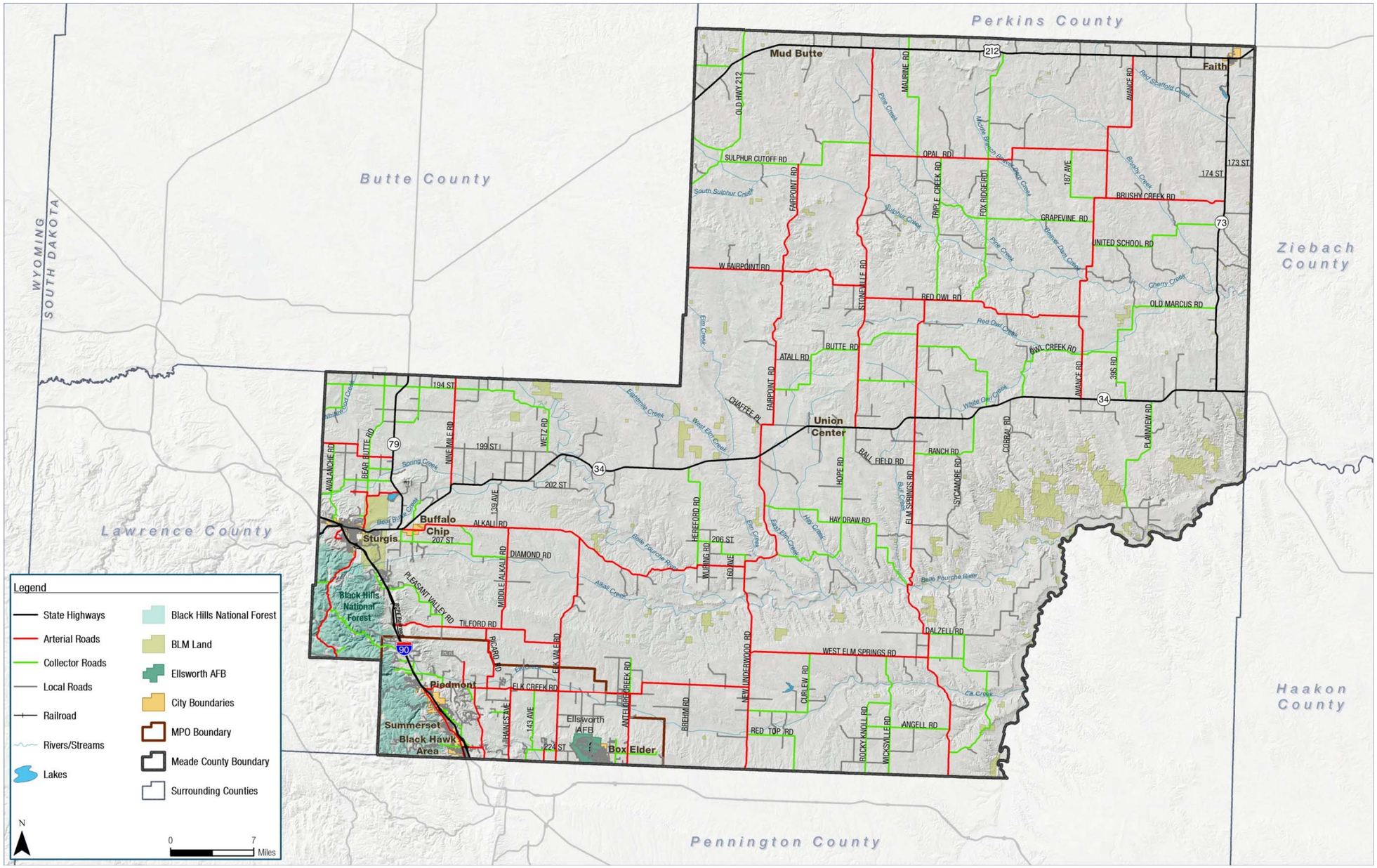
To characterize the County's transportation system and describe how residents, businesses, and visitors interact with the system, the project team conducted an inventory and analysis of transportation conditions in the county. The following topics were included:

- Traffic and safety conditions, describing the county roadway network, traffic volumes and capacity, and crash history
- Non-motorized facilities, identifying accommodations for bicycle and pedestrian travel
- Transit conditions, focusing on the existing operation of transit providers within Meade County, including Prairie Hills Transit (PHT) and school districts
- Air transportation, providing a review of current needs served by airports in Meade County
- Freight transportation, describing key patterns for freight movements through the study area
- Bridge conditions, identifying Meade County candidate structures for rehabilitation or replacement
- Areas of concern, describing locations identified for more detailed evaluation based on roadway design, traffic congestion, or safety concerns

Figure 2 depicts the *Meade Moving Forward* study area. The area covers all of Meade County, 3,482 square miles in size. The County includes the cities of Sturgis, Faith, Summerset, Buffalo Chip, and Piedmont, along with a portion of the City of Box Elder. Meade County is also home to 20 communities such as the Black Hawk area, Union Center, and Blucksberg.

The plan includes all roads under the jurisdiction of Meade County but excludes state highways and roadways within city limits. The County highway department is responsible for 1,870 centerline miles of roads and 142 bridges. Traversing the county are 239 additional miles of Interstate and state highways.

Figure 2. Study Area



A. Roadway Network

Meade County's roadway network is the focal point for travel throughout the area, serving automobile, freight trucking, transit, bicycle, and pedestrian movement in concert with the network of state and local roads. All county highways provide two travel lanes (one in each direction). Major County highways include:

- **Elk Creek Road (MC-4)** – Elk Creek Road extends east-west across the southwest portion of the county, connecting the I-90 corridor from the Exit 46 interchange east to primarily residential areas. Elk Creek Road is approximately 33 miles long, mostly gravel surfaced, and posted at 35 to 45 miles per hour (mph).
- **Tilford Road (MC-8a)** – Tilford Road extends east from the I-90 Exit 44 interchange. The road is gravel-surfaced and posted at 25 mph near Exit 44, which then increases to 55 mph.
- **Alkali Road (MC-12)** – Alkali Road extends approximately 31 miles east from the South Dakota State Highways (SD) 34/SD 79 intersection east of Sturgis. Alkali Road, posted at 55 mph and primarily gravel-surfaced, provides access to the city of Buffalo Chip and several major Sturgis Rally facilities.
- **215th Street (West Elm Springs Road)** – 215th Street, gravel-surfaced and posted at 55 mph, provides an east-west connection from New Underwood Road to Elm Springs Road
- **Elk Vale Road** – Elk Vale Road extends north-south from the Rapid City area north into Meade County, connecting to Alkali Road. It is posted at 55 mph and is gravel-surfaced.
- **New Underwood Road** (MC-21)– New Underwood Road extends north-south, providing a critical link from the I-90 corridor north to SD 34. New Underwood Road has recently been improved to provide a paved surface and mitigate erosion challenges. It is posted at 55 mph.
- **Haines Avenue** – Haines Avenue, paved and posted at 55 mph, extends north into Meade County from its interchange with I-90 in Rapid City (Exit 58).
- **Antelope Creek Road** (MC-17)– Antelope Creek Road is a gravel-surfaced north-south connection, posted at 55 mph.
- **Stoneville Road (MC-27)** – Stoneville Road, gravel-surfaced and posted at 55 mph, extends north from Union Center to US Highway 212 (US 212).
- **Elm Springs Road (MC-31)** – Similar to New Underwood Road, Elm Springs Road provides a north-south connection from I-90 to SD 34. It is mostly gravel-surfaced with several prominent horizontal curves.
- **State Highways** – The state highway network in Meade County includes a portion of I-90 and SD 79, 34, and 73. US 212 extends east-west along the north edge of the county, and US 14A extends west from Sturgis. The I-90 corridor extends generally north-south within the southwest portion of the county, between the city of Sturgis and community of Black Hawk. I-90 is a 4-lane freeway, and a 4-lane roadway exists along SD 34 east of Sturgis.

Figure 3 and **Figure 4** depict surface type and paved shoulder widths, respectively, along all Meade County roads. Approximately 149 of the 1,870 miles are paved.

All state highways in Meade County are paved and include shoulders at least 1-foot wide.

Figure 3. Roadway Surface Type and Paved Shoulder Width

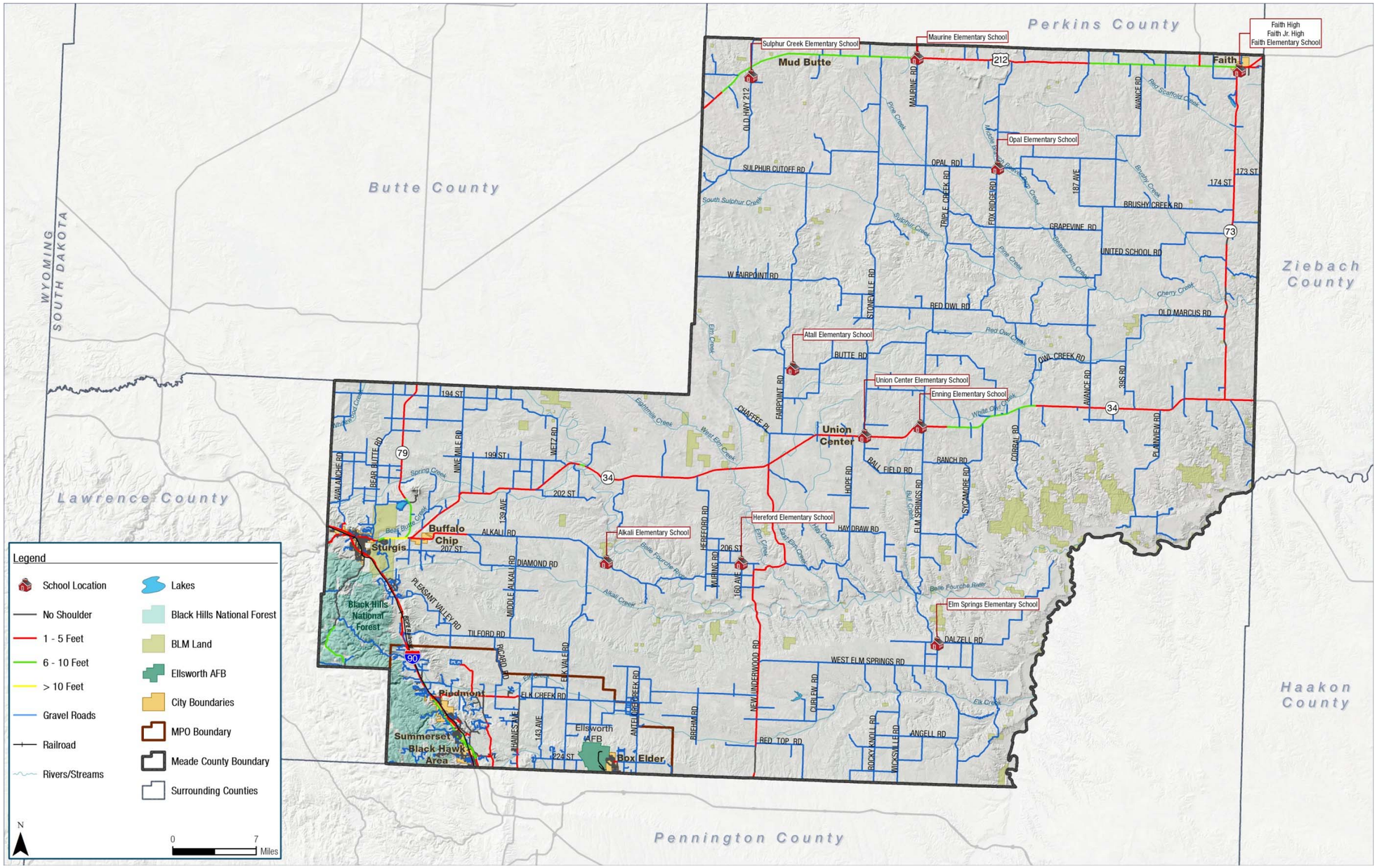
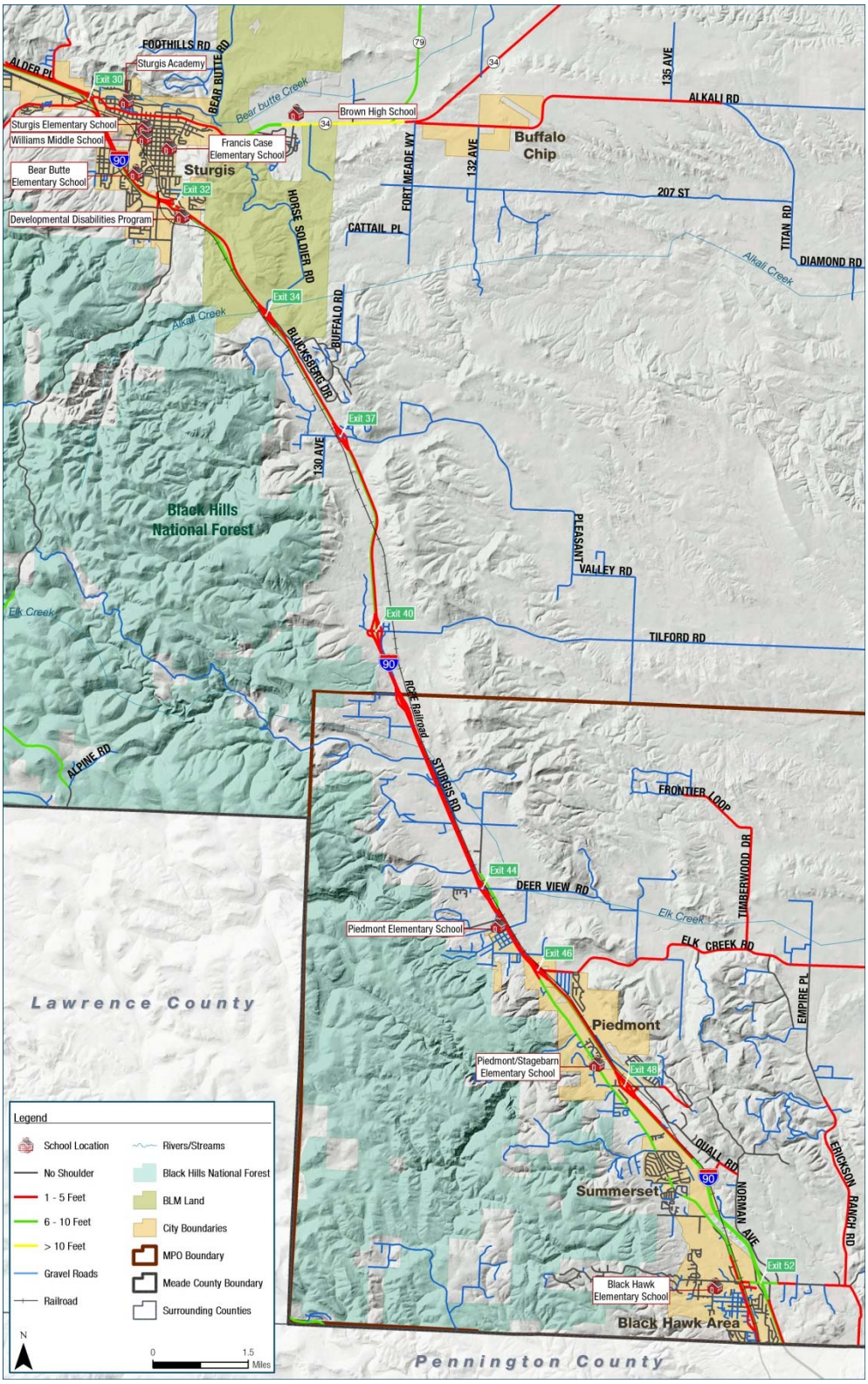


Figure 4. Roadway Surface Type and Paved Shoulder Width, I-90 Corridor



B. Traffic Volumes

Figure 5 and **Figure 6** illustrate the existing daily traffic volumes along county roadways. The project team assembled this information from data recorded by Meade County staff and from data provided by SDDOT. The information reflects traffic counts recorded during the years between 2012 and 2015 as current traffic volumes. Counts were completed during spring, fall, or summer months to appropriately represent typical conditions while avoiding the sharp tourist peak coincident with the annual Sturgis motorcycle rally in early August. The county-conducted traffic counts typically covered a full week, and the average weekday was identified as the representative count.

As shown, higher traffic levels surround the I-90 corridor in southwest Meade County, which connects the city of Sturgis with the cities of Piedmont, Summerset, and Rapid City. I-90 exceeds 5,000 vehicles per day (vpd). No county highway currently carries more than 2,500 vpd. Segments of Stage Stop Road, Erickson Ranch Road/Deadwood Avenue, and Elk Creek Road exceed 1,000 vpd. Current gravel-surfaced roads that exceed 500 vpd include segments of Alkali Road, Bear Butte Road, High Meadows Road, and Elk Creek Road.

Traffic information provided by the SDDOT and by County staff indicates that trucks represent a relatively high percentage of overall traffic in Meade County. According to traffic counts provided by County staff, truck percentages along Elk Creek, Ricard, and New Underwood Roads exceed 20 percent. State highways, including SD 34, SD 79, and I-90, currently carry 10 to 15 percent trucks.

C. Volume-to-Capacity Analysis

The project team completed volume-to-capacity (v/c) comparisons to understand whether current county roadway capacity is sufficient to accommodate traffic demand and to identify any locations that need capacity improvements. A v/c ratio compares the existing traffic with the actual design of the roadway and the associated traffic carrying capacity. A v/c ratio of 1.0 means that there is roughly an equal balance between the roadway design and the vehicular traffic on it.

The planning level daily capacity thresholds shown in **Table 1** provide a basis for this evaluation. These thresholds are the maximum planning level capacities in vpd for various roadway types and number of lanes.

Table 1. Planning Level Roadway Capacities

Roadway	Number of Lanes	Maximum Capacity (Vehicles Per Day)
Arterial	4-Lane[1]	32,000
Arterial	2-Lane	16,000
Collector	2-Lane	10,000
Gravel	N/A	660[2]

1 There are currently no 4-lane county roads, capacity provided for reference

2 Meade County identified 660 vpd as a threshold for reviewing a gravel surfaced roadway to determine whether an alternate roadway surface should be considered.

Figure 5. Current Daily Traffic Volumes, 2012-2015

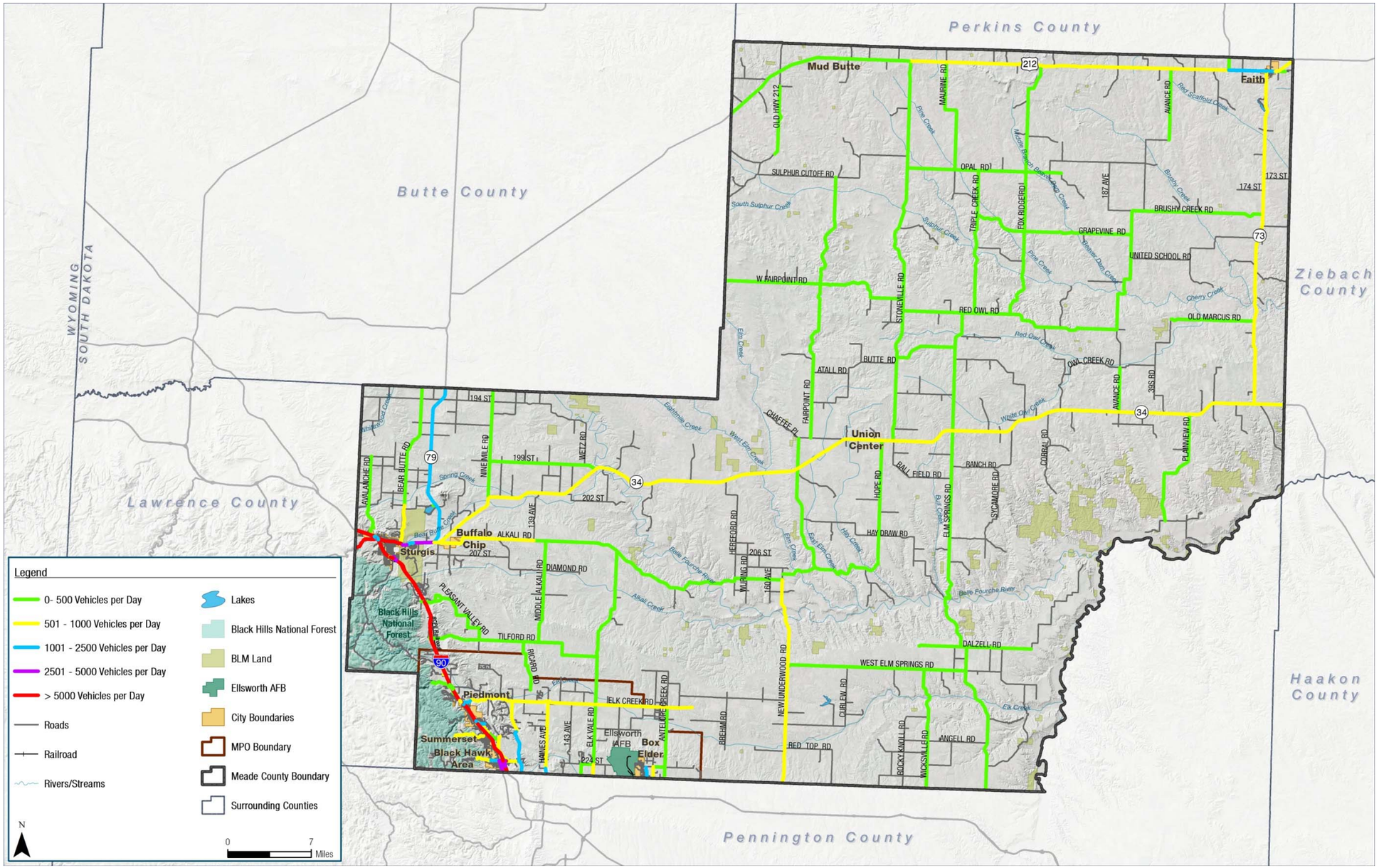
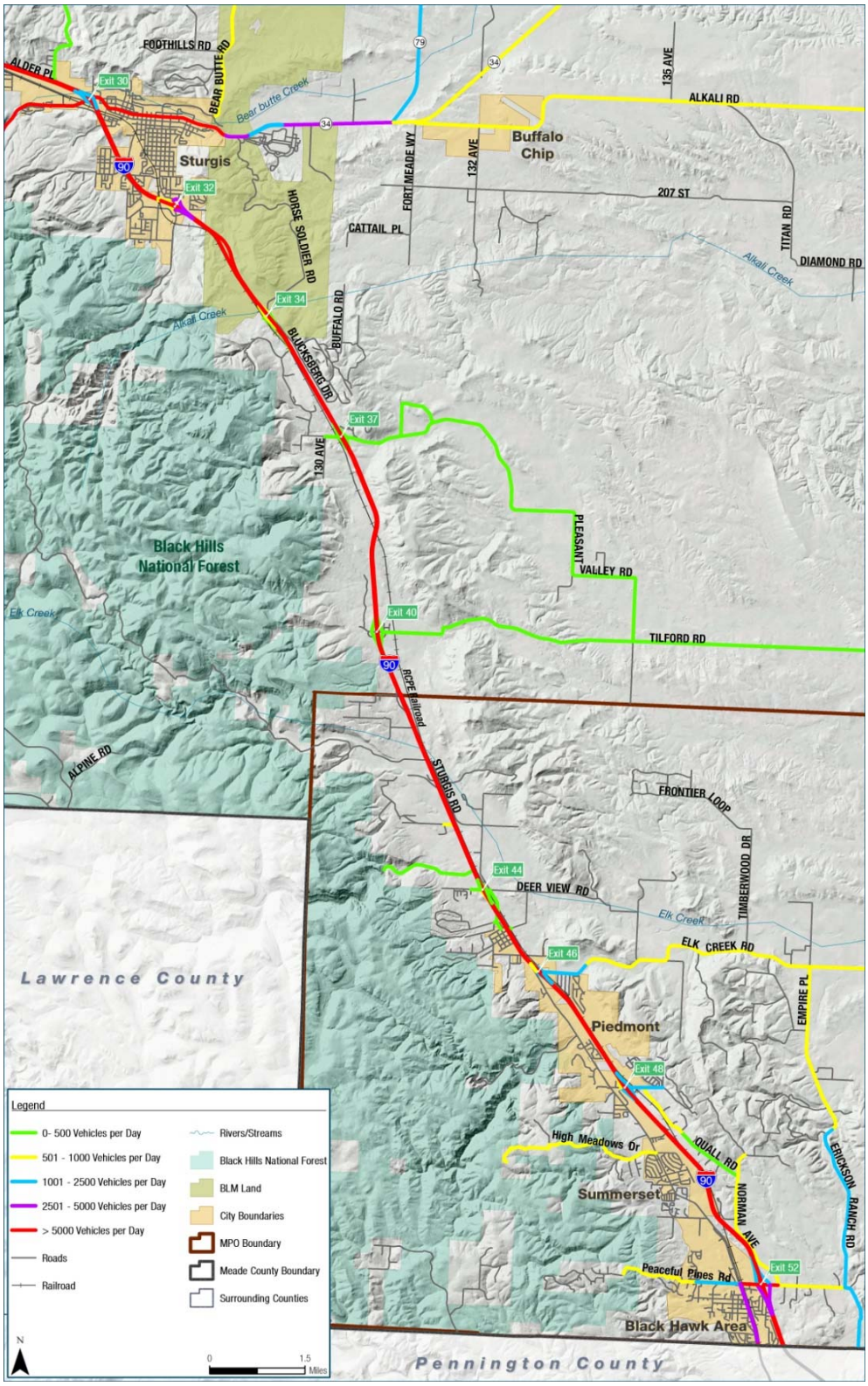


Figure 6. Current Daily Traffic Volumes, I-90 Corridor, 2012-2015



As shown in **Table 1**, capacity of 10,000 to 16,000 vpd is available along paved county roads. Traffic counts indicate no county roads exceed 2,500 vpd, translating to a maximum v/c ratio of approximately 0.25 on county roads, well within available capacity. Current traffic levels on paved county roads reveal no traffic congestion concerns, as the available capacity exceeds the recorded traffic levels in all cases.

Gravel-surfaced segments of Alkali Road, Bear Butte Road, High Meadows Road, and Elk Creek Road are carrying traffic levels at or nearing the threshold of 660 vpd. These roadways should be monitored as potential paving and improvement projects.

D. Traffic Safety

SDDOT currently maintains a geographic information system (GIS) crash database designed to monitor crash trends. As part of *Meade Moving Forward*, the reported crash data were compiled for a five-year period to identify the most hazardous intersections and roadway segments in the study area. The analysis was conducted for all crashes between January 2009 and December 2013, a five-year time period.

Safety sign outside the County facility

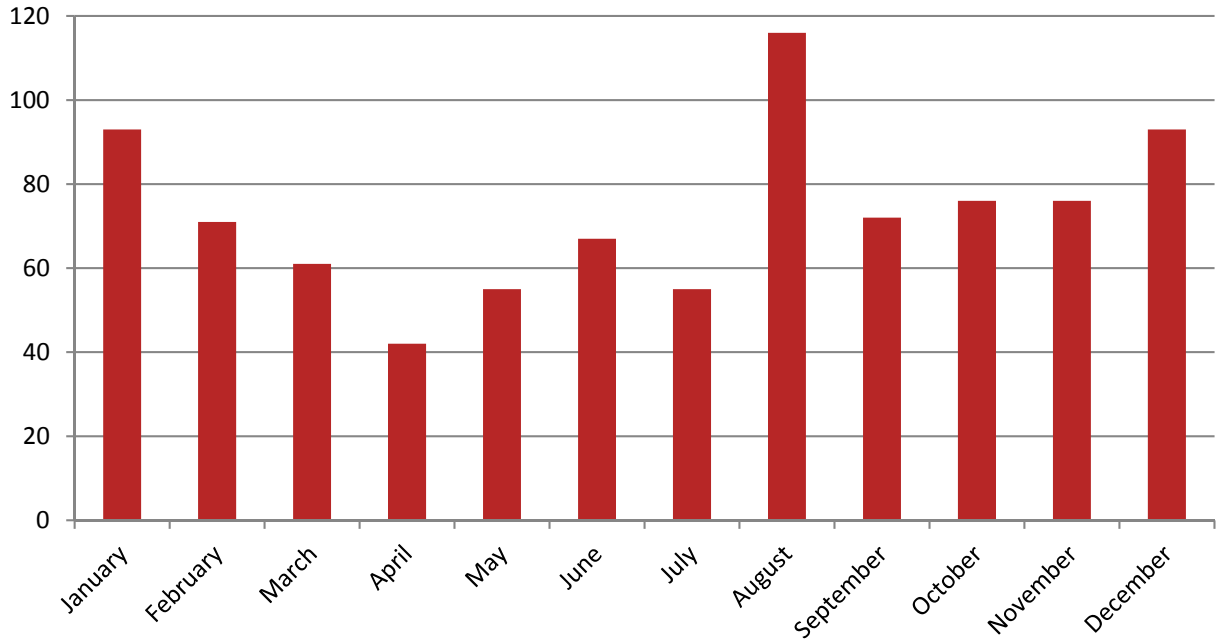
A total of 877 crashes occurred on county roads, translating to an average of 175 crashes per year. This represents an increase over the annual rate of 133 crashes per year reported in the 2008 Meade County Transportation Plan based on 2006–2008 data.

A number of countywide safety trends are noted as follows:

- Approximately 10 percent of crashes involved alcohol use
- Reported crashes included:
  - 11 fatal crashes (1.55 percent)
  - 265 injury crashes (30 percent)
  - 601 property damage only (PDO) crashes (68.5 percent)
- Reported roadway conditions during crashes included:
  - 62 percent dry
  - 38 percent other (ice, snow, wet, slush, sand, mud, dirt, gravel, etc.)
- Reported lighting included:
  - 62 percent daylight
  - 5 percent dawn or dusk
  - 26 percent dark unlighted
  - 6 percent dark lighted
  - 1 percent unknown

Figure 7 summarizes county road crashes by month.

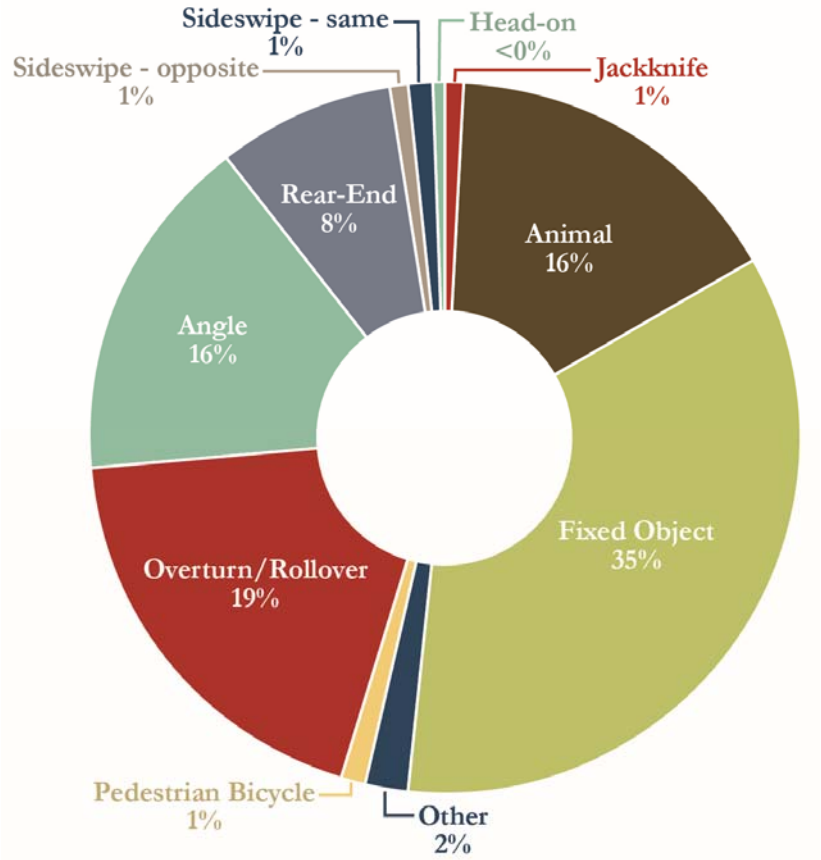
Figure 7. County Road Crashes by Month, 2009-2013



As shown, the most crashes were reported in the months of August and January. Greater traffic exposure due to the annual rally and tourist visits likely contributed to the elevated August rate, while winter road conditions contributed to higher December, January, and February results. Non-dry road conditions were noted in roughly 70 percent of crashes, double the overall frequency of non-dry conditions.

Figure 8 summarizes county road crashes by type.

Figure 8. County Road Crashes by Type, 2009-2013



As shown, the most prevalent crash types are fixed object collisions and overturning crashes. Together, these represent 54 percent of all reported crashes. These types of accidents typically involve a departure from the roadway. Roadway geometric design factors can play a role in causing these types of crashes, including narrow shoulders, tight horizontal or vertical curves, steep sideslopes, limited visibility and faded or no pavement markings. Further, more detailed investigation should be conducted to understand contributing factors and identify counter measures with a potential to reduce crashes.

A map-based review of crash locations revealed a higher concentration of crashes along some county roads. **Table 2** provides a summary of these roads, including the number of crashes reported and observations regarding the nature of the crashes.

Table 2. Summary of Higher Crash Frequency County Road Corridors, 2009-2013

Corridor	Number of Crashes	Observations	Recommendations
Vanocker Canyon Road between I-90 and the county line	32	▪ 24 severe crashes (2 fatal and 22 injury/potential injury) ▪ 28 accidents occurred on a curve ▪ 12 overturn/rollover accidents ▪ 13 crashes in early August	▪ Provide more signage and pavement marking indicating entry into the canyon and the need for caution on curves ▪ Increase enforcement presence during rally peaks ▪ Consider side rumble strips and/or widened shoulders, though side rumble strips can inhibit bicycling
New Underwood Road between Meade/Pennington county line and SD 34	31	▪ 1 fatal crash ▪ 17 accidents occurred under dark/unlighted roadway conditions ▪ 10 overturn/rollover accidents ▪ 10 accidents involving animals, public expressed concern over animal collisions between Pioneer and Curlew Roads, where 36 percent of crashes involved animals	▪ Conduct further study to identify mitigation measures ▪ Consider wildlife fencing installation, particularly for section between Pioneer and Curlew Roads ▪ Consider side rumble strips and/or widened shoulders
Elk Creek Road between I-90 and Elk Vale Road	21	▪ 2 fatal crashes ▪ 11 fixed object accidents ▪ 10 accidents occurred under dark/unlighted roadway conditions	▪ Implement Elk Creek Road study recommended alternative(s) to address roadway curvature
Haines Avenue between Elk Creek Road and the county line	17	▪ 8 accidents occurred under dark/unlighted roadway conditions ▪ 6 accidents occurred under snowy or icy road conditions	▪ Provide heightened maintenance attention/activity during winter conditions

Corridor	Number of Crashes	Observations	Recommendations
Erickson Ranch Road between Elk Creek Road and the county line	16	▪ 8 accidents occurred under snowy or icy road conditions ▪ Higher concentration of crashes along curved segments ▪ 8 fixed object accidents	▪ Consider side rumble strips and/or widened shoulders ▪ Provide heightened maintenance attention/activity during winter conditions
Antelope Creek Road between Elk Creek Road and the county line	11	▪ 5 accidents occurred under dark/unlighted roadway conditions ▪ 5 overturn/rollover accidents	▪ Implement paving of gravel surface and provide standard shoulders
Avalanch Road between I-90 and 201st Street	8	▪ 5 accidents occurred under snowy or icy road conditions ▪ 3 accidents occurred on a curve	▪ Provide heightened maintenance attention/activity during winter conditions

As shown, the higher percentage of crashes involving roadway departures are reflected on these particular corridors, and crashes often involved poor surface and/or lighting conditions. Some techniques used to mitigate roadway departure crashes include curve warning signage, curve reconstruction, rumble strips, guard rail, high-visibility pavement markings, lighting, and wildlife fencing. **Table 2** provides initial recommendations for each location. In addition to these recommendations, it is recommended that a countywide data-driven safety study be conducted to provide a detailed assessment of roadway departure crashes reported in Meade County and prioritize safety improvements shown to provide the greatest return on capital invested.

Intersection Crashes

The project team analyzed crash records throughout the county to identify top crash intersections based on accident frequency, including county, city, and state roadways. **Table 3** summarizes the results.

Table 3. Top Crash Intersections in Meade County, 2009-2013 (including State Highways)

Intersection		Number of Crashes	Observations	Recommendations
1	Peaceful Pines Road/ SD 231	21	17 of 21 crashes are angle and rear-end, typical signalized intersection pattern	Monitor intersection for left turning conflicts
2	Chimney Canyon Road / Exit 44 EB Ramps	14	Most crashes single-vehicle, less related to intersection	Consider measures to improve visibility, upcoming interchange reconstruction
3	Elk Creek Road/I-90 Service Road (Sturgis Road)	13	7 angle crashes	Close intersection spacing is a concern with many conflict points; future interchange reconstruction has potential to reduce crashes
4	US 14A/Moose Drive	11	Angle and rear-end accounted for 7 crashes	Tight access spacing likely contributes to crash frequency
5	SD 34/131 Avenue	8	6 of 8 crashes occurred during rally, most angle crashes	131 Avenue serves a major point of access to busy rally area, monitor in future
6	US 14A/Exit 30 EB Ramps	7	Relatively low crash frequency; no pattern noted	None
7	US 14A/SD 34	7	Relatively low crash frequency; no pattern noted	None
8	SD 34/Glencoe Drive	6	Relatively low overall crash frequency, 5 of 6 crashes during rally	Monitor location during rally
9	Peaceful Pines Road/ I-90 Service Road	4	Relatively low crash frequency	None

All of the most frequent crash intersections are located along state highways and/or within city limits, rather than on the county road network. Therefore, *Meade Moving Forward* does not include any safety improvements as Meade County road projects.

E. Culverts and Bridges

Culverts and bridges are important supporting components of a transportation system. Culverts allow a roadway to cross minor waterways and irrigation ditches, whereas bridges allow a roadway to cross more significant features such as other roads, railroads, and major waterways. Meade County manages more than 2,500 pipe culverts, 70 box culverts, and 203 bridges. Many of these bridge structures are in need of rehabilitation or replacement.

F. Transit

Prairie Hills Transit (PHT) currently provides transit service in portions of Meade County. PHT provides public transportation to anyone of any age and ability for any trip purpose. PHT provides in-town service in Sturgis, as well as to Fort Meade and to Rapid City. PHT also provides service from Piedmont to Rapid City. PHT fares range from $2 to $10 based on starting point and final destination. Meade County does not currently provide countywide transit services, nor do any county funds go toward providing a local match for federal transit funding such as PHT.

G. Non-motorized Facilities

The project team compiled an inventory of non-motorized travel conditions based on a physical review of current infrastructure, stakeholder discussions, and public input. The online survey included multiple questions related to non-motorized travel in Meade County. Non-motorized travel was also discussed at both public meetings. Most survey respondents rated travel by bicycling or walking as poor or unknown.

Because the county roadway system is primarily rural, non-motorized users are often forced to travel within the vehicular travel lanes, creating a safety hazard for all travel modes. Some roadways provide wide shoulders, but no continuous network of wide-shouldered roadways or detached paths are currently available in the County.

Non-motorized activity in Meade County is generally increasing. Mountain bike trails are becoming a greater attraction in the western portion of Meade County, particularly in the Black Hills National Forest. Road cycling is also increasing on county roads, such as on Vanocker Canyon Road. Bicyclists and pedestrians can also be found commuting, for example, to school, on Sturgis Road through the more suburbanized communities of Summerset and Piedmont.

H. Freight

Most freight travel through Meade County occurs along I-90. I-90 is an interstate roadway serving longer, cross-country trips. Freight travel also occurs along state highways through Meade County including US 212, SD 34, SD 79, and SD 73. County highways play an important role in circulating freight traffic to and from destinations within the county which are mainly agricultural destinations. Many freight trips will use the entire transportation system by accessing a county highway and/or a state highway to access the interstate highway system.

I. Air

Meade County is home to two municipal airports. The Sturgis Municipal Airport is a city-owned, public-use airport located approximately 4 miles east of Sturgis off SD 34. The Faith Municipal Airport is a city-owned, public-use airport located approximately 1 mile northeast of Faith.

Meade County is also home to Ellsworth AFB, which is located just north of the city of Box Elder. Ellsworth AFB's population is approximately 8,300 and includes military members, family members, and civilian employees. No new air facilities are anticipated to develop in Meade County in the near term.

J. Areas of Concern

The public and stakeholder involvement process was designed to collect as much input as possible from the Meade County community about existing transportation issues within the study area. This process was valuable in identifying what members of the community view as the biggest concerns needing attention during the development of this transportation plan.

Figure 9 depicts areas of concern resulting from the inventory of existing conditions.

1. North/south connectivity from I-90 to SD 79

Providing a connection between I-90 and SD 79 has been contemplated for several years, dating back beyond the first Meade County Transportation Plan. Adding a direct north/south connection would save approximately 7 miles of travel. The current County Commission has identified construction of such a connection as a high priority for near term future implementation. A final design has been completed for the new roadway connection, titled Fort Meade Way. *Meade Moving Forward* acknowledges the ongoing effort to construct this project.

2. Traffic concerns on Tilford Road from I-90 to Ricard Road and on Ricard Road from Tilford Road to Elk Creek Road

Tilford and Ricard Roads are currently gravel-surfaced roadways that serve approximately 50 vpd. These roadways include some horizontal curvature. Accident records indicate two reported crashes on the 14 miles of roadway, not indicative of a pattern of crashes susceptible to correction.

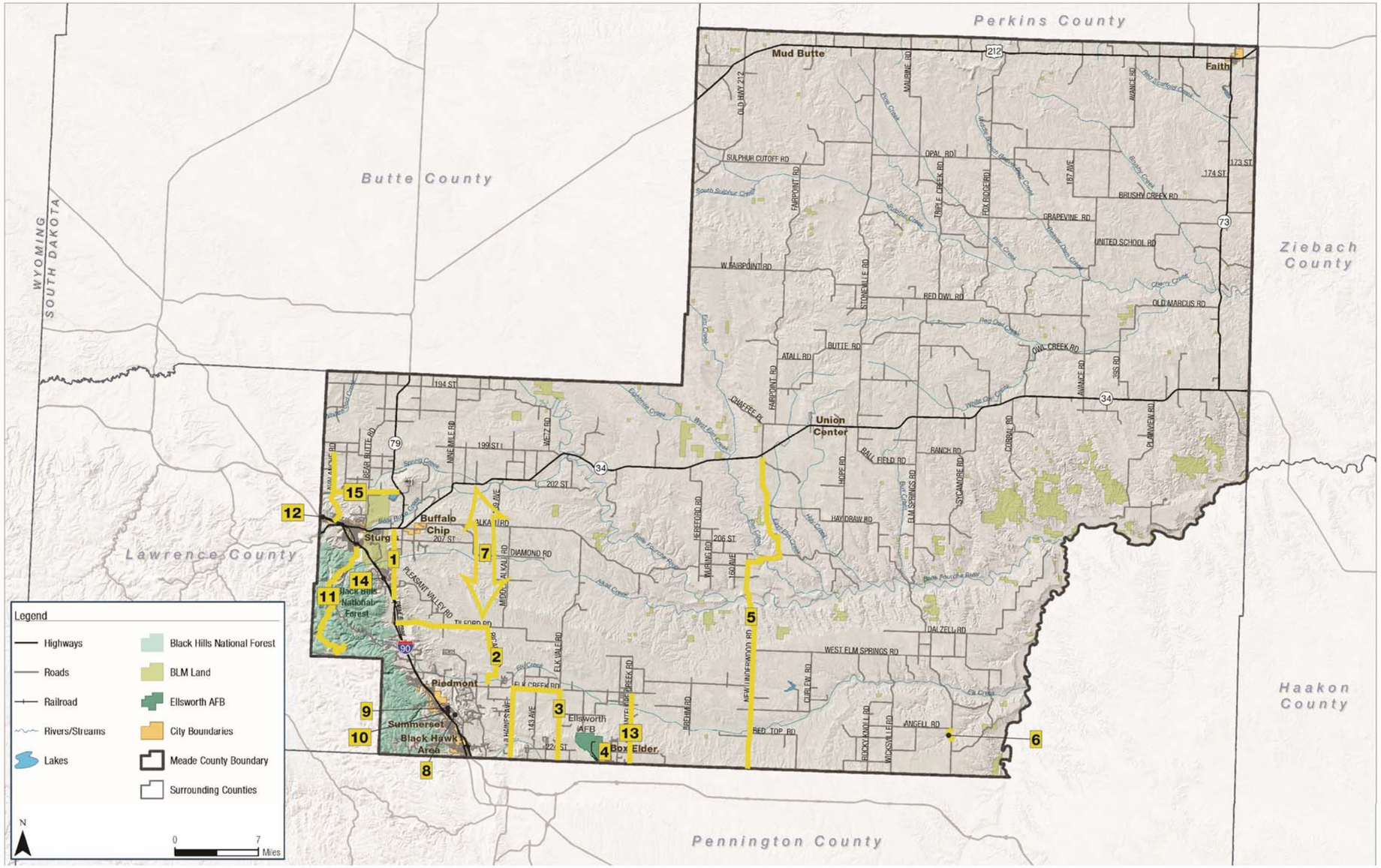
Ricard Road currently carries fewer than 50 vpd, and Tilford Road also carries a relatively low traffic volume. Year 2040 traffic forecasts indicate growth to approximately 70 vpd to 115 vpd. The roadway corridor does carry a substantial percentage of truck traffic, primarily due to the surrounding farming and ranching land uses.

The need for improvements to these roadways is not imminent, but long-term future resurfacing efforts should consider paving these gravel roads and making improvements to horizontal curvature.

Tilford Road looking west near I-90

Ricard Road looking east

Figure 9. Areas of Concern



3. Traffic concerns on North Haines Avenue, Elk Creek Road, and Elk Vale Road

Concerns have been expressed about the ability of these roadways as currently configured to accommodate increased general traffic and truck travel. Elk Creek Road and Haines Avenue carry approximately 750 trips per day, with the south portion of Haines Avenue reaching approximately 1,750 vpd near the Meade/Pennington county line. Elk Vale Road carries approximately 650 vpd. Truck percentages reach 20 to 40 percent. Approximately 30 accidents were reported on these three segments of road, totaling 21 miles in length, with most accidents occurring on Haines Avenue, especially on the southern portion near the county line.

The segments of Elk Vale Road and Elk Creek Road within this area of concern are scheduled to be paved by 2018 and Haines Avenue is already paved. This project will help to alleviate concerns about higher traffic levels. As possible, the paving projects should provide paved shoulder width and address any roadway geometry issues present (horizontal and vertical curves, etc.).

4. Secondary access concerns on 224th Place

Approximately 800 residential units off 224th Place to the northeast of Ellsworth AFB currently have only a single point of access to the surrounding public roadway network. This concern presents a safety issue, as evacuation would be hampered if the single point of access were compromised.

A second access to these homes should be planned in conjunction with the city of Box Elder. One potential second access alignment could be constructed by extending farther east a road located north of 224th Place and connecting it with one of the neighborhood roads. Antelope Flats Road presents one such opportunity.

5. Roadway concerns on New Underwood Road from the county line to SD 34

The paving of New Underwood Road was identified as a project in the 2008 Transportation Plan and paving has been completed in the years since, including a major grading and paving project. A review of crash history of the six years between 2008 and 2013 shows 45 crashes along the 30-mile length of New Underwood Road.

Recently paved section of New Underwood Road

According to vehicle counts, the road carries approximately 275 to 300 vpd.

It is anticipated that traffic levels will increase along New Underwood Road with completion of the paving effort, and conditions should be monitored to ensure that the new paved surface is performing adequately with respect to safety and durability. It is recommended that the County conduct routine traffic counts to accomplish this.

6. Road curvature on Elm Springs Road

Elm Springs Road north of Alkali Creek

Elm Springs Road winds through hilly territory in the southeast portion of Meade County. The roadway surface is gravel, approximately 28 feet wide. The county has highlighted a section of Elm Springs Road south of Angell Road that includes horizontal and vertical curvature through the Alkali Creek drainage. The roadway is estimated to carry fewer than 500 vpd. The alignment diverts from the section line and introduces curvature to negotiate the contours of the drainage. North of the creek, the roadway section parallels the edge of the drainageway, creating a steep roadside with limited recovery space for southbound vehicles departing the roadway. There is currently no protective barrier along this edge. A review of the reported crash history (2009-2013) indicates that a single vehicle crash occurred in 2010.

Though the crash history does not indicate a pattern of repeated roadway departure crashes in this area, the potential for severe accidents is present. Two possible courses of action may be followed to address this concern. Option 1 is to redesign and reconstruct the roadway to improve roadside conditions. Such a reconstruction would be costly, likely requiring a rebuild of the existing bridge over Alkali Creek, which appears to have some life left before requiring attention (greater than 50 years old, 50 percent plus sufficiency rating), significant earthwork, and property impacts. Option 2 is to install approximately 350 feet of protective guardrail or cable restraint along the west edge of Elm Springs Road beginning approximately 880 feet north of the Alkali Creek bridge.

To maximize cost-effectiveness and to address the potential for severe roadway departure crashes at this location, the County should consider installing a protective roadside system consisting of guardrail or cable restraint before considering any roadway reconstruction. The decision to install a roadside restraint system should not be made without proper consideration. Such consideration should include a reviewing other potential locations for guardrail installation along county roads, updating count and speed information at the location, analyzing the roadside condition to rate the severity of the hazard, and analyzing benefits and costs associated with the potential installation. Guidance on how to assess the need for guardrail and how to design a system may be found at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_638.pdf.

7. Need for paved road connection north/south from Rapid City to SD 34

Input received at the first public meeting included an interest in a new direct roadway connection north from Rapid City to SD 34. Current direct connections include New Underwood Road and I-90, and drivers can indirectly make a connection via Elk Vale Road/Alkali Road. Based on the presence of current options for connecting and the limited traffic that would use a direct connection, it was determined that no new roadway should be planned at this time.

Should the need for a connection become more apparent, one option for creating a more direct paved link between Rapid City and SD 34 would be to pave Elk Vale Road from the Meade/Pennington county line all the way to Alkali Road and then continue north through the hills to connect with SD 34.

8. Improved access for development east of I-90, near Exit 48 (possible connection of Eastridge Road to Sunshine Valley Road)

This concern was raised in conversations with project stakeholders. Connecting Eastridge Road to Sunshine Valley Road would improve access within developed areas east of I-90 between Exit 48 (Stage Stop Road) and Exit 46 (Elk Creek Road). Current residents seeking to travel north-south must use I-90 or Sturgis Road. A new connection would enhance convenience, encourage more local development, and improve safety east of I-90.

The distance to connect these two roads is only about a mile but may be difficult because of the change in elevation. Elevation change could vary between 200 and 400 feet from Eastridge Road to meet Sunshine Valley Road through the fairly steep grades. Further local access enhancements could also be realized via a connection to Crooked Canyon Road.

9. Connection from Wonderland Homes to Sun Valley Estates subdivision

Similar to #8, this connection would run approximately parallel with I-90 and serve to connect two subdivisions. A connection could facilitate trips made between the two areas and would be especially helpful for school bus and carpooling routes, emergency vehicle access, multimodal transportation options and convenience should I-90 be closed. The distance for a road between the two developments is a little over a mile, but about half of this is already in place as a gravel road.

10. Need for additional pedestrian/bicycle facilities along and crossing I-90 corridor

Project stakeholders and the general public expressed strong interest in improved I-90 crossing conditions for bicyclists and pedestrians. For some areas in the I-90 corridor, crossings of I-90 can be far away from each other, even as much as a few miles. For the existing crossings, many would reasonably feel unsafe for a pedestrian or bicyclist to use because of the narrow roadways. For example, the interchange (Exit 46) just south of Piedmont is signed as being off-limits to pedestrians because there is no space for pedestrians on the narrow bridge.

Improved interchange facilities would offer some assistance to crossing of I-90. Interchange replacements are coming at Exits 44 and 46 in the next 5 to 10 years, and improved pedestrian provisions will be part of these projects. At this time, it is recommended that no exclusive bicycle or pedestrian grade separations be constructed.

11. Need for multimodal improvements along Vanocker Canyon Road

Vanocker Canyon Road is a two-lane road that winds through the Black Hills south of Sturgis. It has relatively narrow shoulders (1 to 2 feet) along most of its length and no infrastructure to accommodate pedestrians. Given the nature of the road as winding through a large undeveloped area, the lack of pedestrian infrastructure does not seem out of place or to be a problem. Therefore, the need for multimodal improvement should focus on making the road more comfortable and safe for bicycling. This could be accomplished by adding bike lanes or a larger shoulder, which would also benefit the occasional pedestrian. Because not all of the road has room to expand the shoulder, enhancing the signing and striping to communicate the presence of bicyclists may be a good interim solution. Improvements could include designation of Vanocker Canyon Road as a scenic byway by the Federal Highway Administration (FHWA). The FHWA has established a series of criteria for designation, including safety for large and small vehicles, provision for bicycle and pedestrian travel, and development of a scenic byways corridor management plan.

Limited shoulder width along Vanocker Canyon Road

12. Need for new I-90 Interchange northwest of Sturgis

I-90 Exit 30 is located in the northwest part of Sturgis, with the next interchange to the west (Exit 23) located approximately 6 to 7 miles away along I-90 in Whitewood. A new interchange would likely be located in Lawrence County, slightly west of the county line. Meade County staff has contemplated the need for a new interchange, and preliminary discussions with Lawrence County have been held. According to information provided by Meade County staff, the presence of a new interchange could:

- Provide additional interstate access to existing subdivisions and residents in Meade County, Lawrence County, and the city of Whitewood
- Provide access to planned future residential development between the cities of Sturgis and Whitewood
- Provide quicker access of emergency services to those residents north and west of Sturgis in Meade and Lawrence Counties
- Provide access for a future truck route between Highway No. 79 and I-90

More study and coordination with adjacent agencies is required to better define the need and to identify steps toward implementation. It is recommended that Meade County participate in conducting a study of a new interchange.

13. Grading and paving of Antelope Creek Road

Antelope Creek Road is paved in Pennington County up to Meade County, where it turns to gravel. Antelope Creek Road currently carries less than 500 vpd and is anticipated to increase to above 500 vpd by the Year 2040. The closest paved roads serving similar routes are New Underwood Road to the east and Haines Avenue to the west, each of these is approximately 10 miles away from Antelope Creek Road. Paving Antelope Creek Road is likely to attract some vehicle-trips away from these two other paved roads, especially for trips going to or from Box Elder and Ellsworth AFB. Also, Elk Vale Road, which is parallel to Antelope Creek Road and located 6 miles to the west, is planned to be paved by 2018. This change may make the paving of Antelope Creek Road less of a priority, but traffic demand and future growth do support the need for paving. *Meade Moving Forward* includes the paving of Antelope Creek Road as a Mid-term project, slated for implementation between Year 2020 and 2030. This prioritization could be adjusted as future events warrant.

14. Provision of 2nd access to Blucksberg Mountain Estates

The Blucksberg Mountain area currently accesses the surrounding roadway network via only a single connection to I-90 Exit 34. Additional access is needed to enhance the safety of Blucksberg residents and network connectivity.

Several options for additional access are worthy of further consideration. The best option is developing a connection south to Pleasant Valley Road. The existing roadway south is privately owned and part of a small campground complex, which may complicate putting a public road through the area. If the Blucksberg access cannot be made to the south, another option is building a road north from the Blucksberg area to Buffalo Road to the east through the hills to Cattail Place. The *Meade Moving Forward* project list includes a south connection.

15. Eden/Avalanch Road deficiencies

Several stakeholders and members of the public expressed concern about Eden and Avalanch Roads, which carry an increasing traffic load and are currently surfaced in gravel. Future growth will increase pressure on these roadways. On the basis of input received and technical review, *Meade Moving Forward* includes a project to address this need.

III. Future Needs Analysis

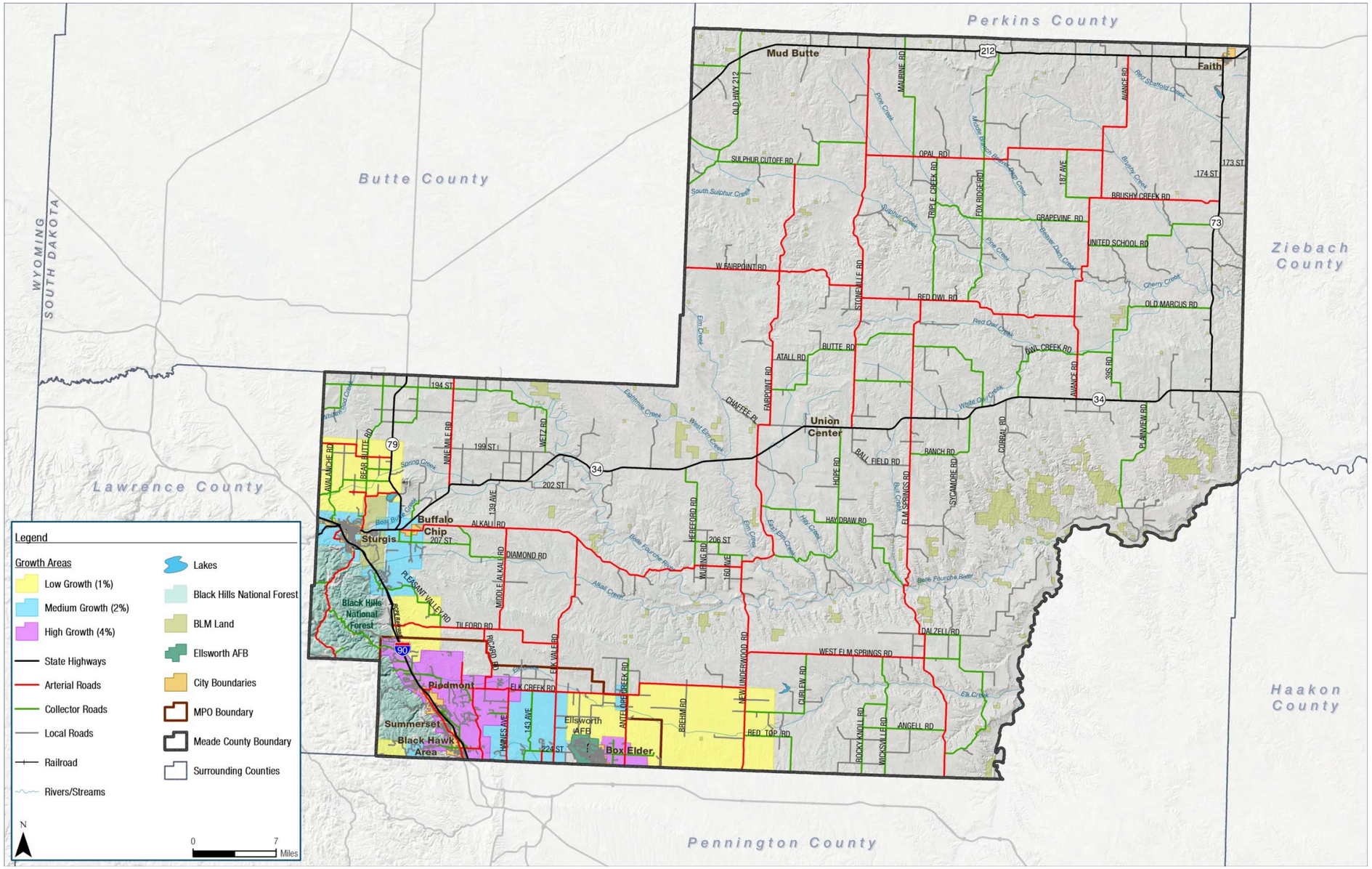
To properly identify potential improvement projects for Meade County's transportation system, it is important to first understand the anticipated future conditions.

A. Future Growth Areas and Rates

Meade County's population in 2013 was estimated at 27,202, a nearly 7 percent increase from 2010 (25,434) (US Census). While population growth can be one indicator of future conditions, it is equally important to understand the location and nature of the growth.

Using county building permit data from the last 10 years and knowledge about anticipated development plans, the project team created a map of the anticipated future growth areas. The rate of development was determined based on the number, location, and time of the applications. **Figure 10** shows the areas of high, medium, and low growth within Meade County. Areas outside these are assumed to have less than 1 percent growth. The highest growth expectations are near the I-90 corridor, particularly closer to the Rapid City area, and the area near Ellsworth AFB. This high growth area includes the Black Hawk Area, the city of Summerset, the city of Piedmont, and the city of Box Elder.

Figure 10. Future Growth Areas



B. Future Traffic Forecasts

The high, medium, and low growth factors were applied to roadways within the growth areas shown on **Figure 10** to develop the Year 2040 traffic volume projections shown on **Figure 11** and **Figure 12**.

Many county roads currently carry relatively low traffic volumes (less than 500 vpd) and are projected to remain below 500 vpd by the Year 2040. Every county road east of New Underwood Road fits this description, along with several roadways near the growth areas such as Middle Alkali Road, Elk Vale Road, Avalanch Road, Tilford Road, and Ricard Road. **Table 4** lists county road segments anticipated to grow to a higher threshold volume, by category, corresponding to the traffic volume graphics.

Table 4. Traffic Volume Growth on County Roads

Year 2040 Traffic Volume Range (vpd)	Roadway	Segment Description	
		Begin	End
501–1,000	Antelope Creek Road	Meade/Pennington County Line	Elk Creek Road
	Elk Vale Road	224th Street	Elk Creek Road
	Pleasant Valley Road	I-90 Exit 37	Cardinal Place
1,001–2,500	Quall Road/Norman Avenue	Stage Stop Road	Peaceful Pines Road
	Erickson Ranch Road	Elk Creek Road	Westridge Road
	Peaceful Pines Road	Timberline Road	Bluebird Lane
	Alkali Road	Fort Meade Way	132nd Avenue
	Bear Butte Road	Sly Hill Road	Foothills Road
	High Meadows Road	Sturgis Road	North High Meadows Road
	Piedmont Meadows Road	Sturgis Road	Rotunda Court
	Elk Creek Road	Erickson Ranch Road	Haines Avenue
	Haines Avenue	Hale Road	Elk Creek Road
2,501–5,000	Erickson Ranch Road	Westridge Road	Peaceful Pines Road
	Elk Creek Road	I-90 Exit 46	Erickson Ranch Road
	Peaceful Pines Road	Sturgis Road	Timberline Road
>5,000	Deadwood Avenue	Meade/Pennington County Line	Norman Avenue

As shown, roadways carrying traffic volumes in the 1,001 to 2,500 vpd range are expected to increase by the Year 2040. Any gravel surfaced roadways included in this list should be considered for paving by the Year 2040.

Figure 11. Year 2040 Daily Traffic Volume Forecasts

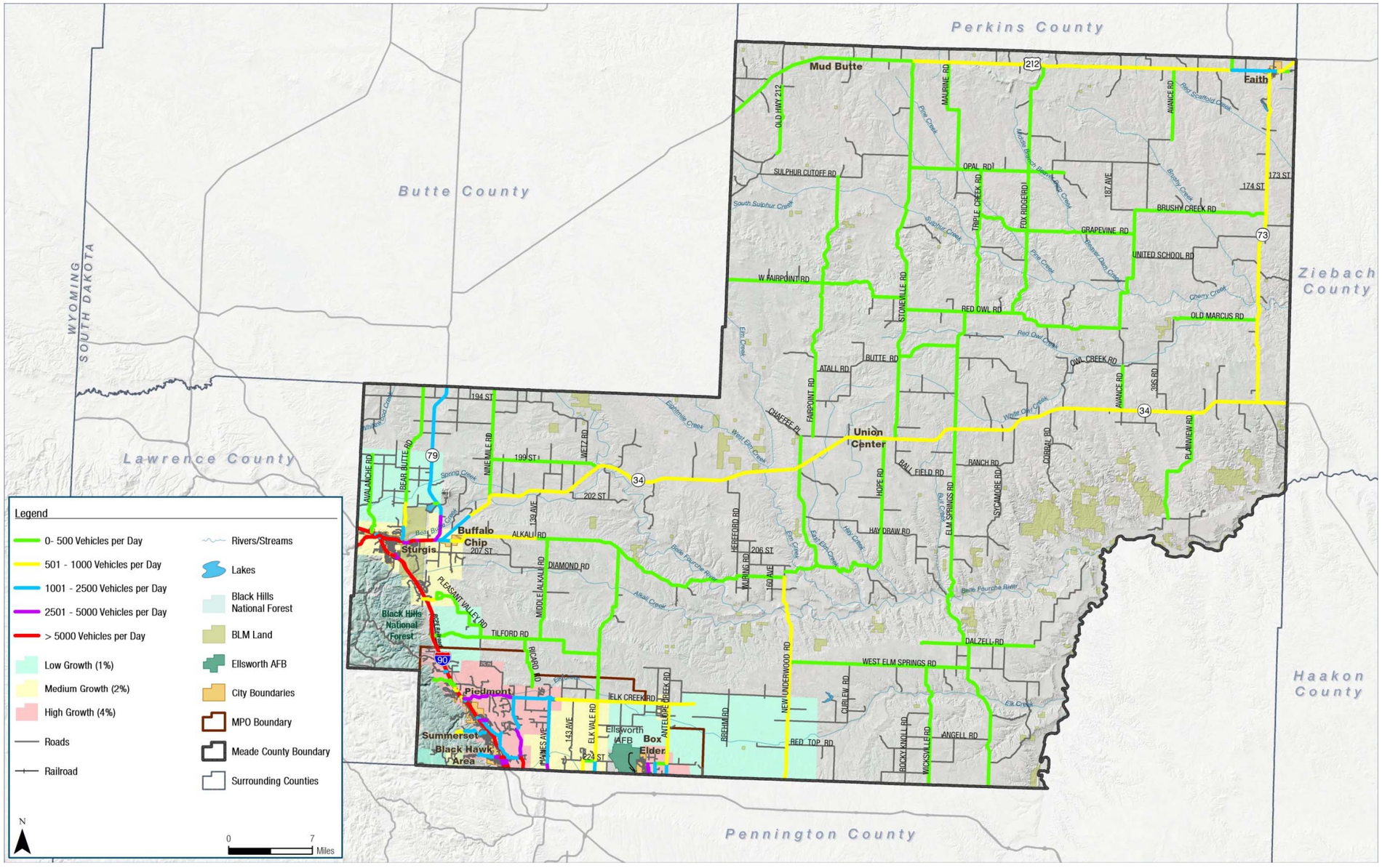
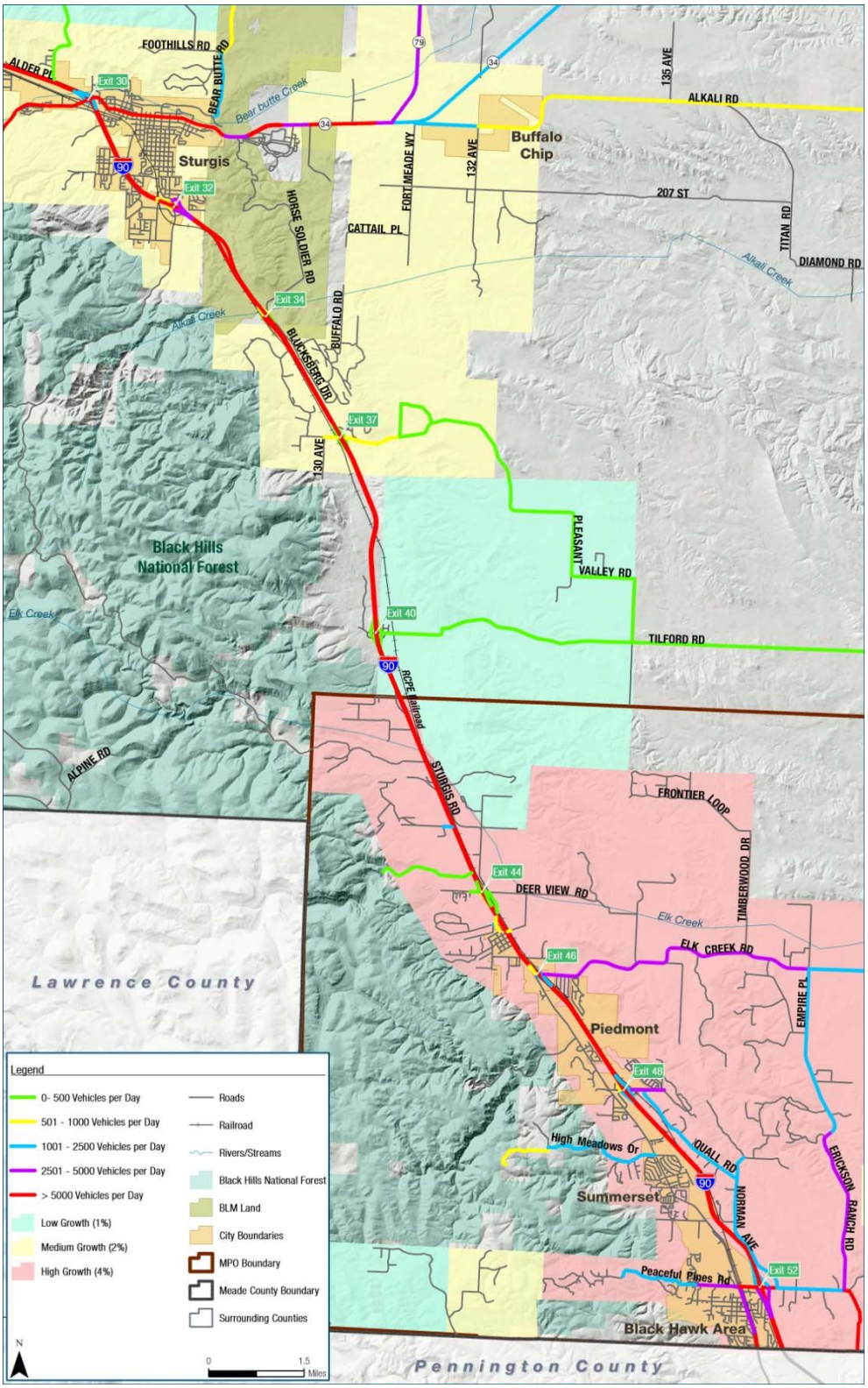


Figure 12. Year 2040 Daily Traffic Volume Forecasts – I-90 Corridor



C. Volume-to-Capacity Analysis

Volume-to-Capacity comparisons were completed to understand whether current roadway capacity in the county is sufficient to accommodate projected Year 2040 traffic demand and to identify any locations that are in need of capacity improvements and/or paving. It was found that all county roads would continue to provide sufficient capacity to accommodate future growth without widening.

Antelope Creek, Elk Vale, and Pleasant Valley Roads exceed 500 vpd by the Year 2040, implying the need to consider paving.

IV. Standards

An important element of the Plan is standards. Standards provide a framework for how the transportation system should be maintained and expanded. Standards establish the County's baseline expectations so that future projects, such as reconstruction and paving, are completed in a consistent manner. Standards also allow the County to clearly communicate expectations to developers to ensure a consistent transportation network.

A. Roadway Classification

A roadway network includes a hierarchy of roads whose functional classification is defined by their usage. In general, streets serve two functions: they provide mobility and access. Roadway classification is determined by the relative degree to which a road serves mobility versus access functions, as well as characteristics such as continuity, trip lengths served, travel speeds, and traffic volumes.

Arterials

Arterial roadways are mobility roads that carry longer-distance trips for regional, inter-community, and major commuting purposes. Arterials have a limited number of at-grade intersections and provide only direct property access when lower classification street access does not exist. Arterials can carry significant traffic volumes at higher speeds for longer distances and are seldom spaced at closer than one-mile intervals. It is typical for arterials to connect to I-90 interchanges, as in the cases of Elk Creek Road and Tilford Road.

Rural Arterials have shoulders on the edges and drainage ditches. Arterial roads in the more developed areas of Meade County could be constructed with curbs, gutters, and sidewalks on each side.

Collectors

Collector roadways are Meade County maintained roads that serve a combination of mobility and access functions. They typically distribute traffic between arterial roads and local streets. Collectors provide for moderate trip lengths and moderate to high travel speeds. Access is provided via moderately spaced stop controlled intersections, with rare signalized intersections.

Local Roads

The primary function of local roads is to provide access to adjacent land uses. Local streets generally are internal to or serve an access function for a single neighborhood or development. Local roads are limited in length and continuity, and traffic using them should have a close-by origin or destination.

I-90 Service Roads

I-90 service roads provide for local access and circulation between freeway interchanges, relieving some local traffic demand along I-90. It is important to note that current responsibility for maintaining the service roads varies between Meade County and the SDDOT by roadway section.

B. Roadway Typical Sections

Figure 13, **Figure 14**, and **Figure 15** depict typical cross sections for arterial, collector, and local roads. These cross sections are intended to be used as a template for future roadway construction and improvements to existing roadways. Different typical sections are shown for roads in urban and rural areas. Urban cross sections include curbs, gutters, and sidewalks adjacent to the travel lanes, while the more rural cross sections may have paved shoulders but no curb, gutter, or sidewalk. These are typical cross sections; however, particular road segment cross sections may vary depending on specific intersection improvements, topographical and environmental features, or roadside constraints.

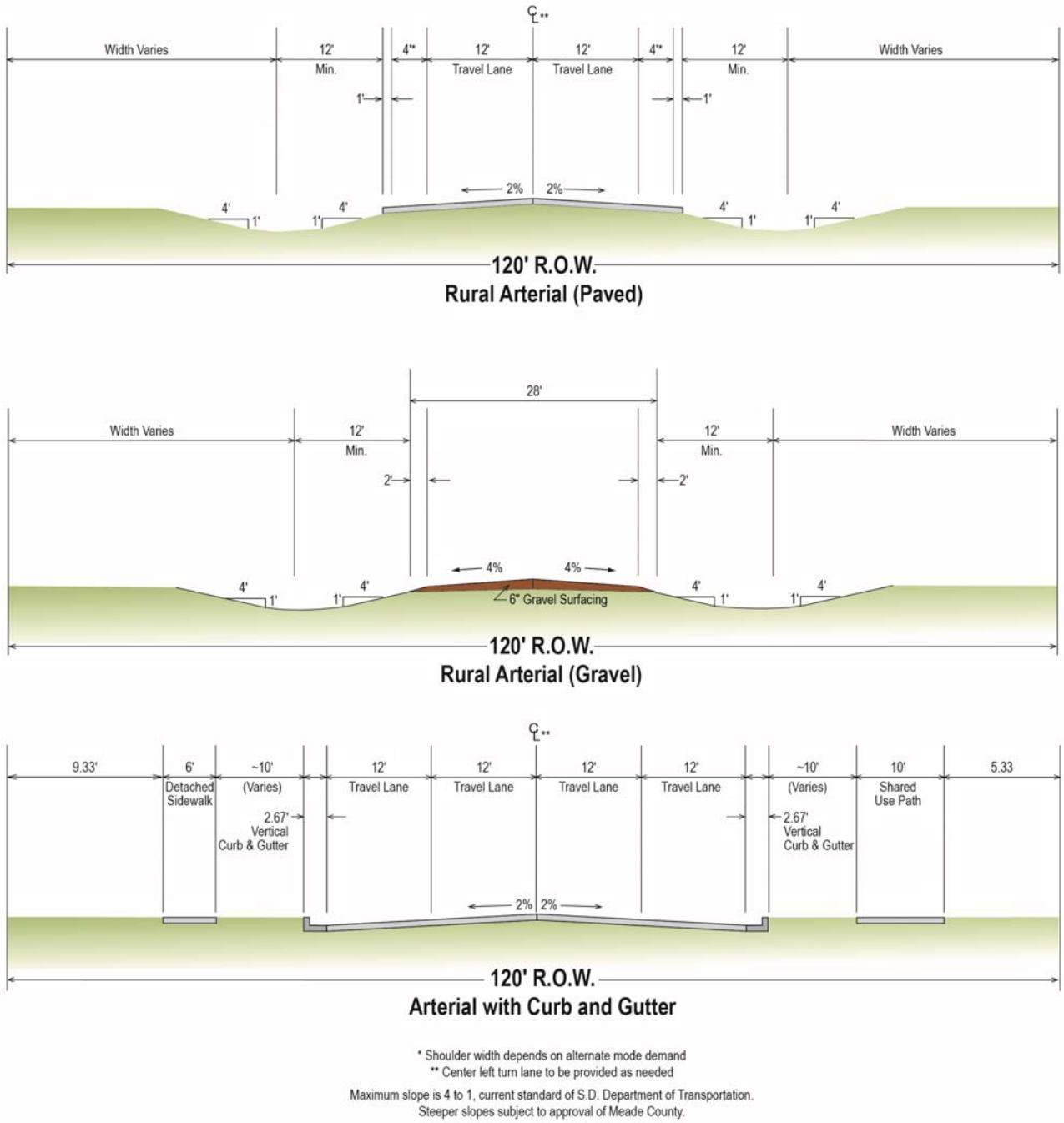
C. Roadway Surface Decisions

The decision to pave a gravel roadway is complex and requires the consideration of multiple factors. In recent years, tire pressures have increased to accommodate commercial trucks and agricultural equipment increasing in size, weight, and horsepower. The damaging effect of larger and heavier vehicles on paved roads is well understood and requires the construction of stronger bases and pavements. The effect of these vehicles on gravel roads is as serious and often not recognized.

Based on federal guidance and discussion with the SAT, the decision-making considerations developed in the 2008 Transportation Plan are still applicable and, therefore, will be carried forward for this plan. Therefore, the following considerations should be evaluated in making the decision to pave a gravel roadway:

- **Daily traffic volumes and type of traffic** along the roadway – SDDOT data indicates that it is economically viable to provide surface treatment to gravel roads carrying in excess of 250 to 300 vpd. Roads carrying in excess of 660 vpd are typically reviewed to determine whether an alternate roadway surface should be considered.
- The **continuity** and **functional classification** of the roadway – Arterial roads should generally be paved before collector or local roads. As another consideration, a local street may be economically sealed or paved while a road with heavy truck usage may best be surfaced with gravel and left unpaved until sufficient funds are available to place a thick load-bearing pavement on the road.
- The tendency of drivers to divert away from gravel surfaces and onto paved surfaces to make their trip – If the new paved roadway would provide the first paved surface serving a particular **demand pattern** within Meade County, it should be designed to accommodate higher levels of traffic. Routes leading to it may require some improvement to provide adequate traffic safety. An example of this is how travel patterns changed once New Underwood Road was paved.
- **Traffic safety** – Paved roads encourage higher travel speeds. Sight distance, curvature, lane width, surface friction, and super-elevation should be tailored to the anticipated travel speed.
- It is important to build up the road base and **improve drainage** before paving. If water is not drained away from the road, the pavement will fail.
- **Public opinion** – Public opinion should be weighed in the decision process, and leaders should inform the public about the factors considered in the decision process.

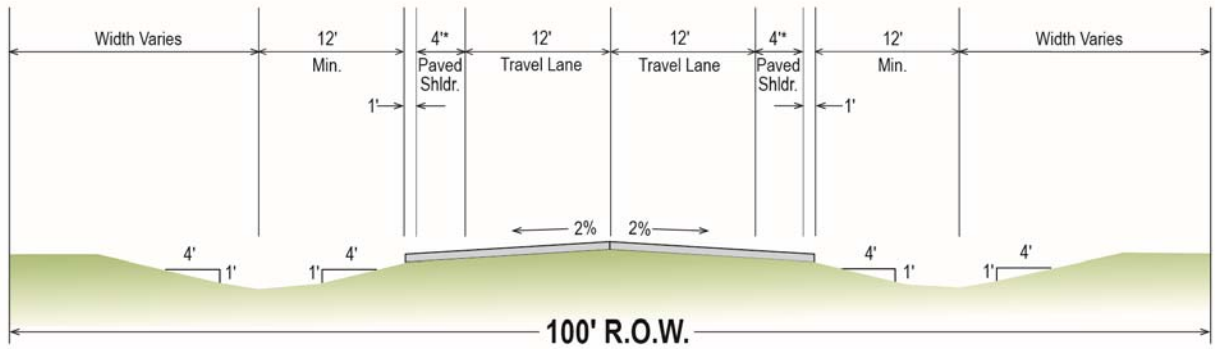
Figure 13. Arterial Typical Sections



* Shoulder width depends on alternate mode demand
** Center left turn lane to be provided as needed

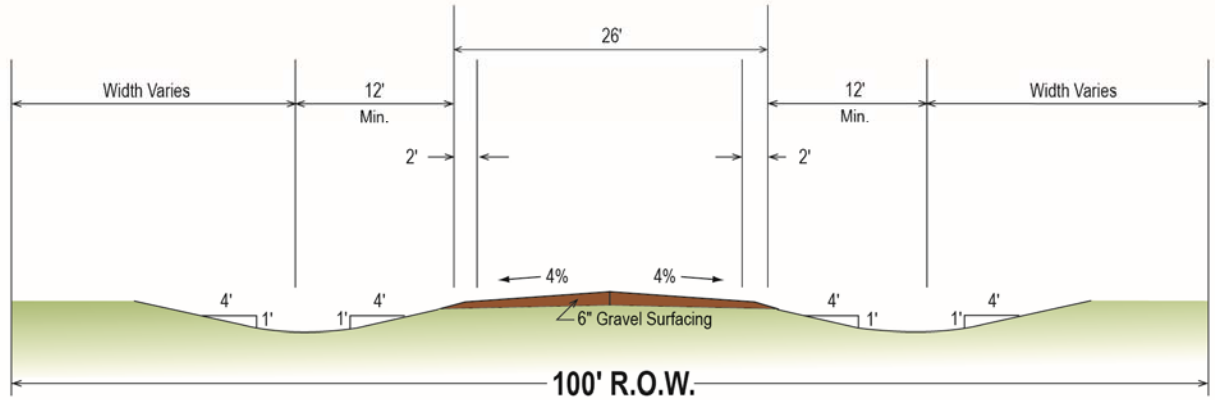
Maximum slope is 4 to 1, current standard of S.D. Department of Transportation.
Steeper slopes subject to approval of Meade County.

Figure 14. Collector Typical Sections

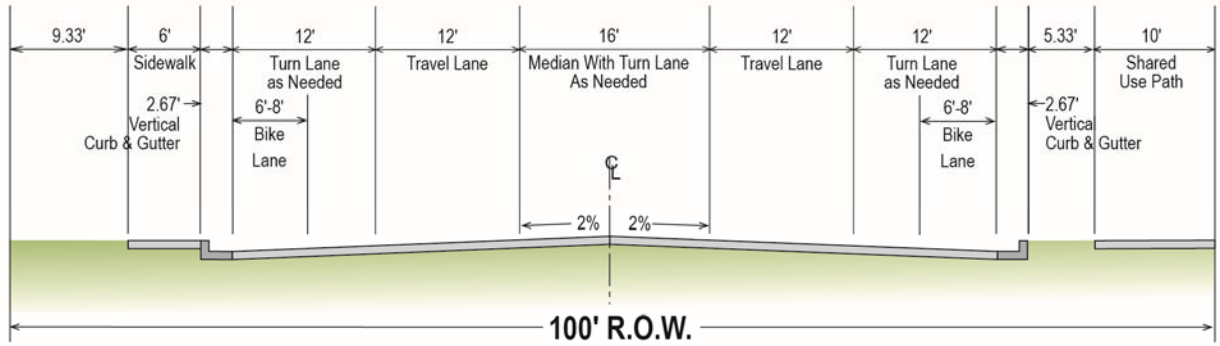


Rural Collector (Paved)

Right-of-way may be increased to accommodate ancillary lanes (i.e. ATV / bike)



Rural Collector (Gravel)

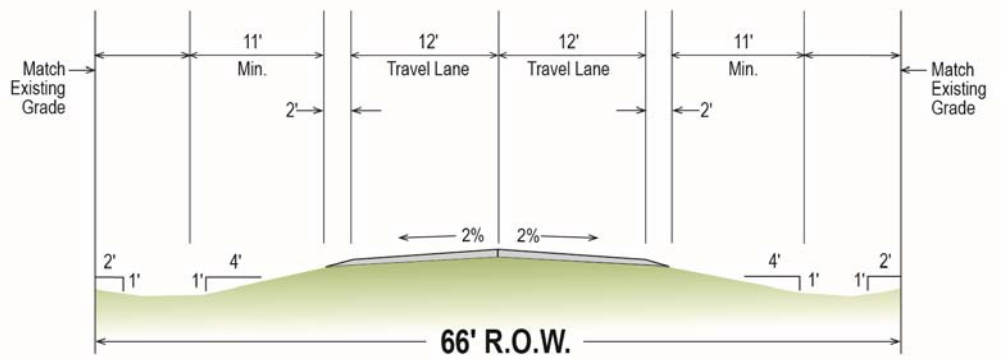


Collector with Curb and Gutter

*Shoulder width depends on alternate mode demand

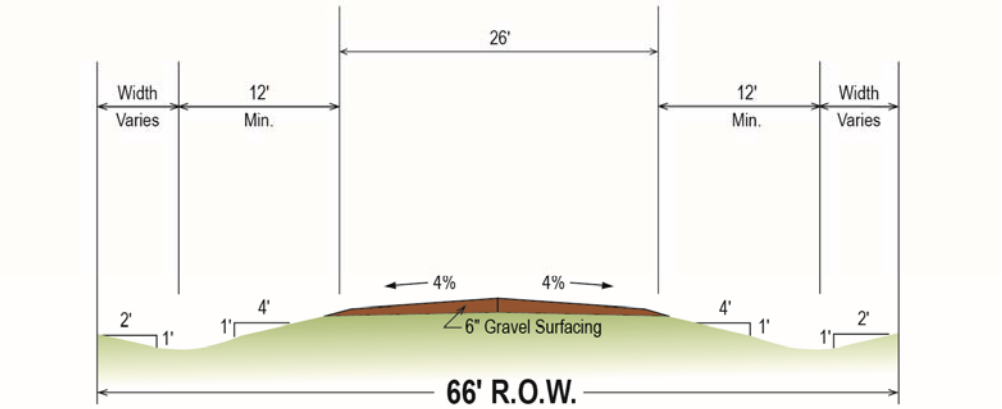
Maximum slope is 4 to 1, current standard of S.D. Department of Transportation.
Steeper slopes subject to approval of Meade County.

Figure 15. Local Typical Sections

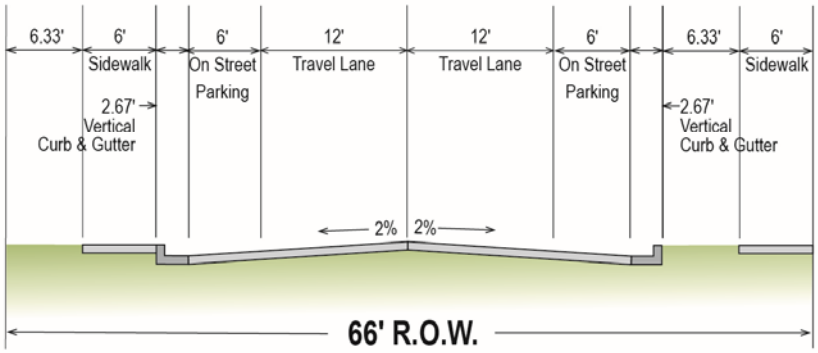


Rural Local (Paved)

Right-of-way may be increased to accommodate ancillary lanes (i.e. ATV / bike)



Rural Local (Gravel)



Local with Curb and Gutter

Maximum slope is 4 to 1, current standard of S.D. Department of Transportation.
Steeper slopes subject to approval of Meade County.

In addition to the previous guidance, the County should consider **accommodation of non-motorized modes**. The County should determine whether non-motorized users, such as bicyclists and pedestrians, would be inclined to use the paved route, and if so, what type of accommodation is appropriate. Such considerations could include the signing and striping of a route to increase driver awareness of the presence of cyclists and walkers, as well as the width of the shoulders.

D. Access Management Guidelines

The following guidelines included in the 2008 Plan remain applicable. These guidelines should be applied to access requests to the extent possible.

Arterial Roads

Direct access to abutting land is subordinate to providing service to the through traffic movements. Access will normally not be granted to individual property that has a reasonable alternative means of access to a lower classification of roadway. Consideration of reasonable alternative access will take into consideration the function of the alternative roadway, its purpose, capacity, operation, safety, and means of improving the alternative roadway.

Ideally, accesses should be limited to only arterial and collector cross-streets. Intersections with the potential for eventual signalization should be spaced at one-quarter-mile intervals based on section lines, where feasible and subject to the roadway's grade and to the driver's entering sight distance. Allowed accesses or intersections spaced at intervals other than one-quarter mile will be restricted to right-in/right out only unless an engineering study clearly demonstrates that there are benefits to allowing additional movements and that the access location would not be a significant detriment to the integrity of the arterial roadway.

A full movement access, with the potential for signalization, may be allowed at a location that does not meet the preferred one-half mile spacing provided that an engineering study shows that half-mile spacing is not practical <u>and</u> that good signal progression (at least 35 percent) can be achieved. The location of any access should maintain a minimum spacing of 500 feet with any other access or intersection subject to allowance for proper vehicular turn lane storage requirements.

All necessary means shall be pursued to ensure that any access granted to an arterial roadway serves as many properties as possible; this may require the stipulation of cross access through the subject property to serve neighboring properties. Additional access will not be provided to parcels along the arterial that are subdivided or are under a common ownership. Single family homes will not be allowed to front onto an arterial.

Collector Roads

Direct access onto a collector roadway is reasonably balanced with the roadway's mobility function. One access will be allowed to serve each property provided that it does not create a hazard or a detriment to the roadway's integrity and is at least 500 feet from another existing or future eminent access or intersection (500 feet in rural setting). Access will normally be full movement, unsignalized unless such access creates an operation or safety problem. In such a case, a restriction of movements may be required. A second access to individual properties may be granted if this access is not detrimental to existing or future access serving the adjacent property or to the operation of an existing or planned cross-street intersection. Single family homes will not be allowed to front onto a collector.

Any access or cross-street intersection with the potential for signalization will need to be located to ensure adequate (30 percent) progression, if appropriate. An engineering study will be required to show proper signal progression. Any access with the potential for signalization should be located so that it serves as many properties as possible with the potential stipulation of cross access to the adjacent properties.

Local Roads – Developing Areas

The intent of local roads within developing areas is to provide direct access to abutting properties. Minimum spacing between access/intersections should be 150 feet; greater spacing may be required in unique circumstances subject to specific traffic conditions. Meade County Ordinance #10 (Roads, Streets and Highway Systems) lists this requirement and provides additional context.

Local Roads – Rural Areas

Local roads within rural areas have a dual function of providing adequate access to the abutting properties within an environment that experiences relatively high speeds. One access to adjacent properties will be allowed, provided that it does not create a hazard or a significant detriment to the roadway's mobility function and it is at least 500 feet from any other existing or future eminent access or intersection. A second access to individual properties may be allowed pending specific circumstances and appropriate spacing.

It is recognized that some access drives will be used very little such as those serving agricultural purposes or oil and gas purposes. If the access is to experience very little use (no more than twice a month), the policy stated above may be waived barring any other unusual circumstances.

E. Transportation Impacts and Financing

Assessment of Development Impacts

New development in the County generates new vehicle trips and associated new demands on the County's road system. The impacts of different developments vary from a small number of trips for a single new home to a large number of trips for a major residential subdivision or commercial development. Many counties and municipalities require applicants for major developments to submit a traffic impact study, estimating the number of trips expected to be generated, the expected distribution of those trips onto the surrounding road network, and identifying major road improvements needed to accommodate the traffic.

Jurisdictions typically establish a threshold for the size of development that would trigger the requirement to do a traffic impact study (TIS). The traffic volume thresholds shown in **Table 5** are recommended in consideration of the need for a traffic impact study.

Table 5. Traffic Impact Study Requirements

Daily Traffic Volume Generated by Proposed Development (Vehicle-trips per day)[1]	Study Requirement
1,000 or more	Traffic Impact Study Required
500–1,000	Traffic Impact Study may be required at the discretion of Meade County
Less than 500	Traffic Impact Study Not Required

[1] Daily Traffic Volume generated by development may be calculated based on proposed land uses using Trip Generation, Ninth Edition (Institute of Transportation Engineers, 2012). Using these rates, 1,000 vehicles per day corresponds to approximately 23,000 square feet of shopping center retail or approximately 105 single-family detached homes.

Financing Tools

Different county roadway improvement types can be financed through a variety of mechanisms. This section provides a brief overview of existing or potential funding mechanisms and their applicability to different improvement types.

Local Roads

Construction of local streets accessing single developments is generally the responsibility of private developers who create the need for those streets and driveways.

Major Roads Adjacent to New Developments

New developments are generally required to construct or improve arterial and collector roads that are adjacent to the development. Roads would be constructed to the applicable road classification type and typical cross-section documented in this plan.

Tax-Increment Financing (TIF) Districts

Tax-Increment Financing Districts have been an increasingly common mechanism used in South Dakota to fund public improvements. During the development of *Meade Moving Forward*, Meade County residents voted on a potential TIF district to fund construction of Fort Meade Way. Through the use of a TIF district, the county could fund a road project from future earmarked tax revenue received from parties and areas anticipated to use the project.

Other Major Road System Improvements

Because new development does not necessarily occur contiguous to existing development, development-provided improvements often leave gaps in the road system. Counties or municipalities can consider several approaches to fund new roads or improvements to the major road system that are not immediately adjacent to a particular development. Meade County can consider the following financing options, individually or in combination, to fund improvements to the major road system.

- **County Capital Improvement Program** – Funding for new roads or improvements to existing roads can use general County funds through a capital improvement program. Meade County allows the development of capital reserve accounts that can be used to set aside incoming monies for specific capital improvement projects.

- **Development Contributions** – The County can negotiate with a developer to fund or construct improvements to fill gaps in the system that help provide desirable access to that development. Rather than negotiating case by case for off-site improvements, the County can enact regulations, often referred to as "adequate public facilities" regulations, to enable the County to require such off-site improvements as a condition to development approval. The TIS filed by the developer would serve as a guide to identifying needed roadway improvements.
- **Road Impact Fees** – Many local governments throughout the country use impact fees or development exactions to impose charges on new development to generate revenues for funding off-site road expansion necessitated by new development. Impact fees enable the local government to target this funding to the highest priority improvements for the County. Based on the traffic volume thresholds, many development filings within Meade County would not be sizeable enough to require a TIS. Such developments could be required to pay a road impact fee based on the number of residential units or commercial building size.
- **Bond Programs** – Local governments can use long-term financing programs to allow capital improvements to proceed sooner than would be possible with a "pay-as-you-go" approach. This approach is most common for capital improvements in entities with an expanding tax base.
- **Platting Fees** – A fee may be charged to developers for the platting of land within Meade County outside the 3-mile platting jurisdictions of cities and towns that have developed Major Street Plans.
- **Building Permit Fee** – A fee charged to acquire a building permit through the County may be used to fund transportation improvements.
- **Sales Tax** – At the time of plan development, state law in South Dakota prohibits counties from collecting sales tax. With legislative action, sales tax could become a transportation funding option available to Meade County.
- **Property Tax** – Senate Bill (SB) 1 specifies that the County may levy an annual tax as a reserve fund to be accumulated and used for roads and bridges, up to 60 cents per $1,000 of property value for a county of Meade County's taxable valuation.

Wheel Tax

Meade County Ordinance No. 51 became effective July 1, 2015. The funds collected from the wheel tax are dedicated to highway and bridge maintenance and construction projects within the County. The tax applies to all motor vehicles registered in the County on a per vehicle wheel basis.

Bridge Improvement Grants (BIG)

The South Dakota State Legislature created the Bridge Improvement Grant (BIG) program in 2015. The program will provide $7 million for local government bridges derived from an increase in license plate fees in addition to the $8 million available annually. To participate in the program, Meade County must conform to the procedures identified by the SDDOT.

F. Major Road Plan

The centerpiece of *the Meade Moving Forward* as it relates to the road network is the Major Road Plan, which provides a framework for how the road network should be established as development occurs within the study area. The plan labels the classification of current roadways and identifies future roadway corridors designed to provide connectivity and access to existing and new developments in the study area. The SAT, stakeholders, and general public collaborated to develop the plan.

The Major Road Plan, a high-level planning document, details the eventual roadway connections to be built over the next 20 to 50 years. This plan does not suggest that development should and will begin immediately. It does not detail the exact alignment that the roadway connections should follow. Instead, the plan serves as a basic roadway framework, with the eventual goal of constructing roadway segments that provide the continuity envisioned in the plan. It is recognized that as this plan has been developed, existing land uses may conflict with the roadway connections, but the plan does not intend to require immediate action. Instead, the Major Road Plan recognizes that over time, development patterns within the study area will evolve and certain areas will be more desirable for development. As development is pursued in these areas, the Major Road Plan should be consulted and appropriate right-of-way (ROW) allocations and preservations made to facilitate this vision can be fulfilled.

Figure 16 provides the Major Road Plan (countywide), and **Figure 17** through **19** show inset views of the Major Road Plan. This plan distinguishes existing roadways (solid line) from proposed roadways (dashed line) and identifies the roadway as an arterial or a collector road. Many of the proposed new road alignments would offer benefit to land developers and governmental agencies within and surrounding Meade County. Cost sharing is anticipated. However, the Major Road Plan does not address ultimate responsibility for construction cost.

Figure 16. Major Road Plan (Countywide)

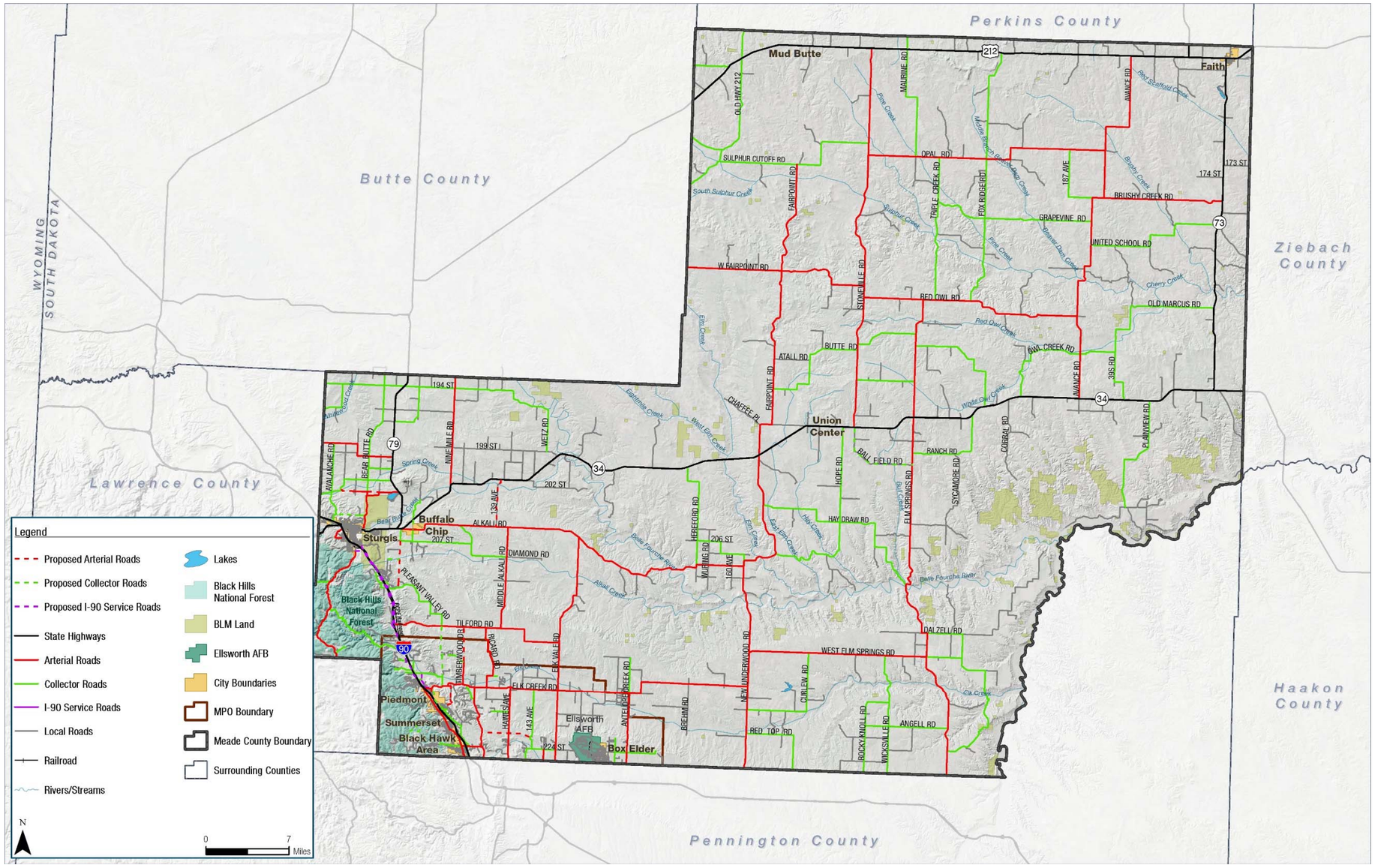


Figure 17. Major Road Plan (Sturgis Area Inset)

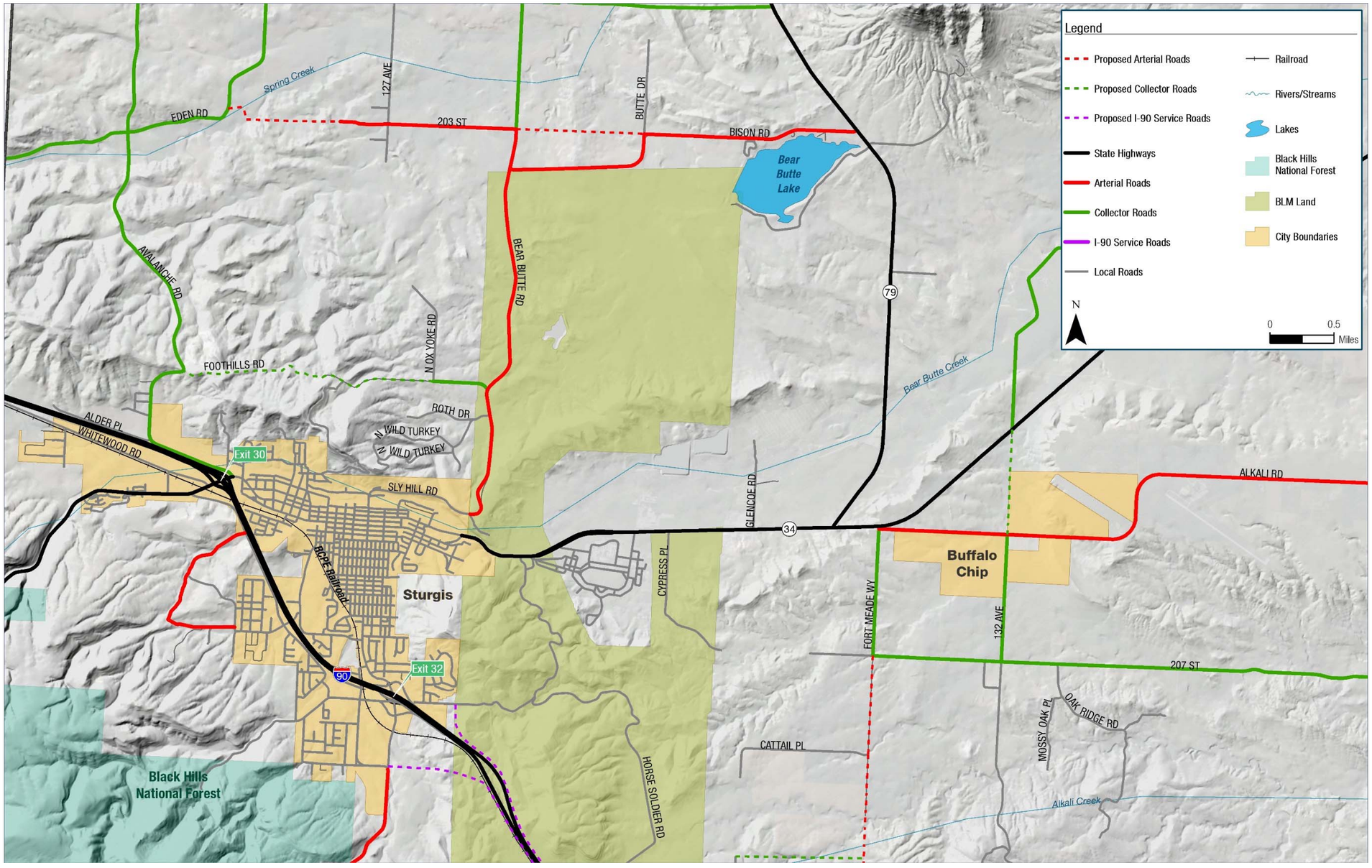


Figure 18. Major Road Plan (Mid I-90 Area Inset)

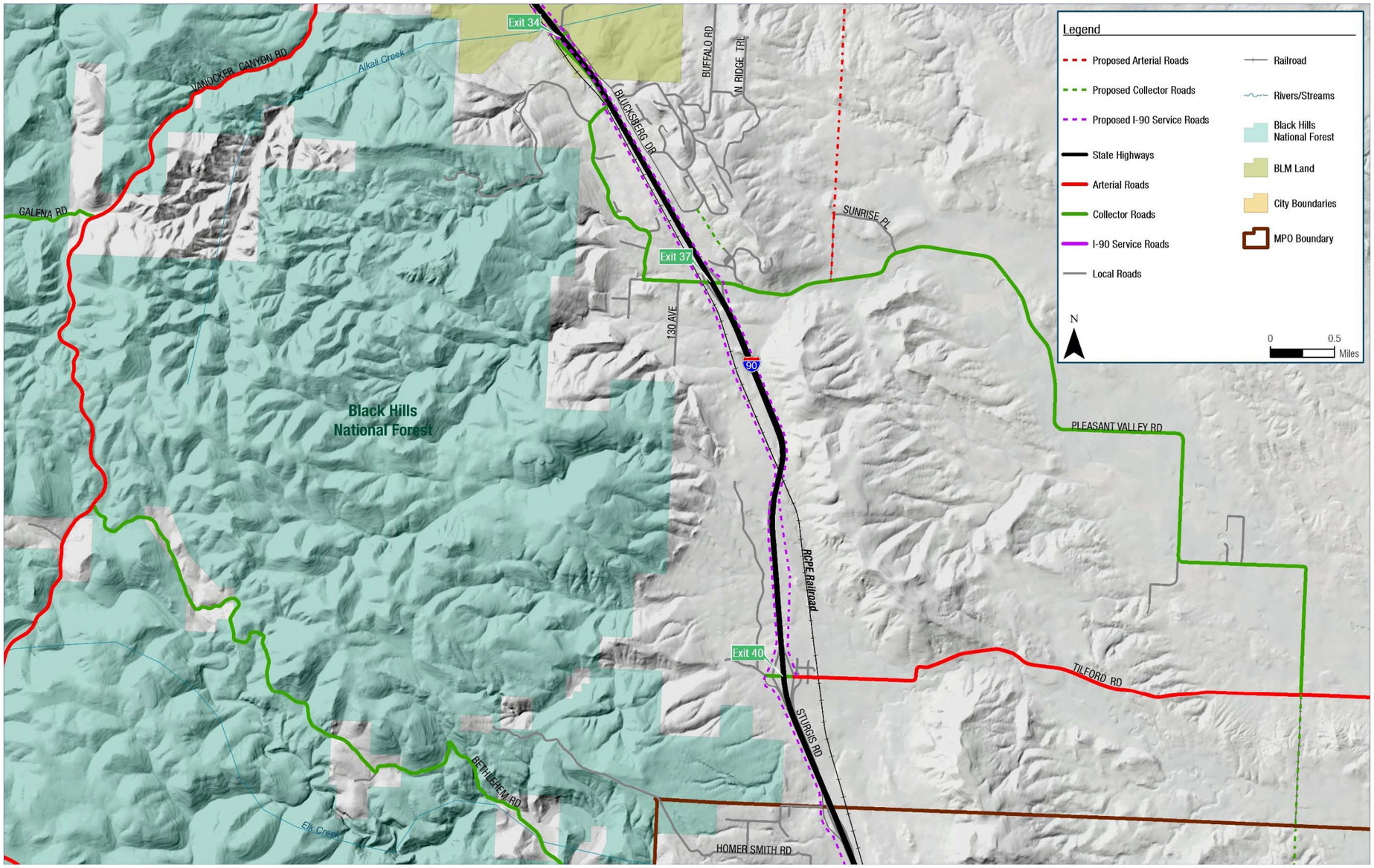
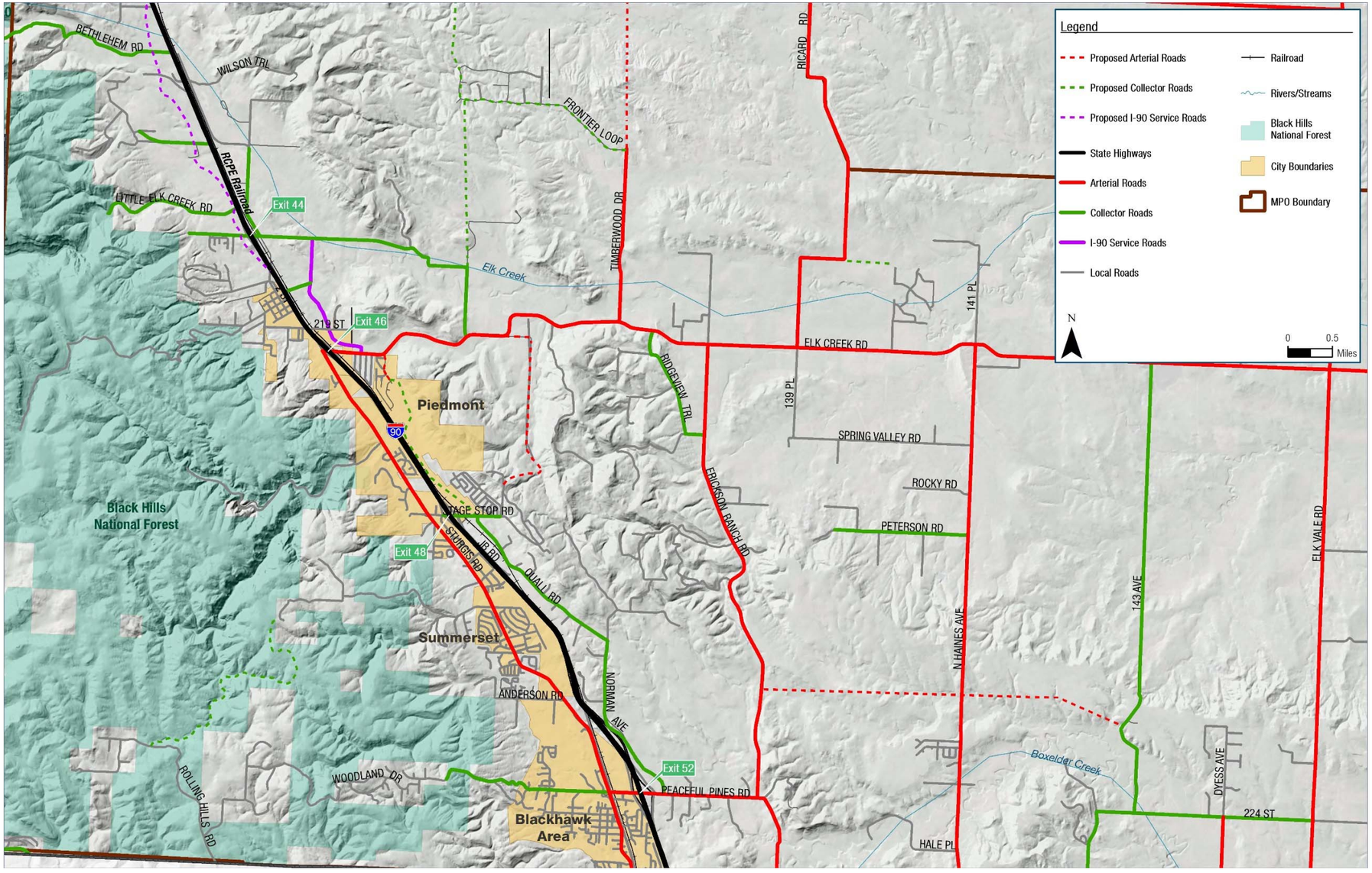


Figure 19. Major Road Plan (Piedmont-Summerset Area Inset)



G. Non-motorized Plan

Meade County has an opportunity to develop and expand the network of non-motorized facilities, connect to community centers, and increase the overall regional network. The Non-motorized Plan provides a framework for how the non-motorized facilities should be established within the county as funds become available. The Non-motorized Plan identifies improvements to the bicycle and pedestrian network where the greatest deficiencies and needs exist. The future non-motorized improvements will provide safer and more efficient ways for people on foot or bicycle to reach their destinations.

The Non-motorized Plan recognizes that bicyclists and pedestrians can vary greatly in their abilities and their level of comfort in using various types of facilities. Ideally, the transportation system should accommodate these various types of users. Bicyclists can generally be categorized as the following:

- **"Strong & Fearless" Bicyclists** are bicycle enthusiasts who will ride their bicycle for any trip type, with bicycling being their primary mode for commuting. Bicycling is part of their identity, and they will ride on nearly any roadway in any conditions.
- **"Enthused & Confident" Bicyclists** are encouraged to bicycle by the availability of bicycle facilities. They will occasionally ride in traffic when bicycle facilities are not present but prefer to ride within their own facility. These riders may not always choose to bicycle but are comfortable doing so in many cases. Investment in additional bicycling infrastructure to improve safety and connectivity will lead to these riders making more bike trips.
- **"Interested but Concerned" Bicyclists** are typically the largest group of a population. They are interested in biking but are concerned about their safety. They do not like using routes without bicycle facilities, as they are nervous about mixing with motorized vehicles. They primarily ride their bicycle for short trips and for recreational reasons. The addition of bicycle facilities that remove them from interacting with motorized vehicles would increase their likelihood of riding.
- **"No Way, No How"** are people who have no interest in bicycling due to immense safety concerns, weather, topography, and/or a simple lack of interest.

Based on conversations with the public and the SAT, most residents in the community can be categorized as the "no way, no how." However, all types of bicyclists currently exist in Meade County.

Pedestrians can range in a multitude of characteristics including age (children, adults, and elderly), speed, ability (ambulatory or visual impairments), and purpose (recreational walking, running, commuting). These characteristics often dictate the type of facility a pedestrian is comfortable using. Wider, detached sidewalks generally serve the greatest number of pedestrians by providing a buffer between the pedestrian and vehicular traffic and adequate space to accommodate passing and wheelchair use. Shared-use trails primarily serve recreational pedestrians.

New development and redevelopment of the transportation network should take advantage of opportunities to enhance the safety and efficiency of non-motorized travel. As roadway projects are identified, it is recommended that the County consider the existing and future non-motorized use to determine whether a non-motorized facility could be completed in conjunction with the roadway project.

V. Projects

Recommendations for improvements to the Meade County transportation system culminate in a list of projects. Projects are categorized as either a roadway improvement project, a non-motorized project, or a bridge project. This section also identifies other efforts that will have an impact on the Meade County transportation system.

A. Roadway Improvement Projects

Recommended improvements to Meade County roads have been compiled for the County to implement between 2015 and 2040. The list has been developed from the following sources:

- **Meade County Transportation Plan (2008)** – The Meade County Transportation Plan included 11 capital roadway improvement projects targeted for implementation between 2008 and 2030. Three of these projects have been completed since 2008 (for example, paving of New Underwood Road), with several others in progress (for example, Fort Meade Way).
- **Areas of Concern** – The 15 areas of concern identified in Section II were evaluated in detail to determine whether any roadway projects could address concerns. Evaluation included a qualitative assessment of need and quantitative measures where relevant.
- **Future Needs Analysis** – The future needs analysis identified opportunities to support future growth with roadway improvements, including improvements to existing county roads and construction of new road alignments.
- **Public and Stakeholder Input** – Members of the public and project stakeholders expressed interest in particular roadway projects via the online survey, public open houses, and individual meetings. This input is reflected in the project list.
- **SAT Coordination** – The SAT was closely involved in selecting projects for inclusion in the plan.

Project Prioritization

Recommended projects were prioritized into near, mid, and long term categories. The prioritization was based on criteria that were derived from the values and goals that are important to Meade County and its residents and businesses. The criteria are as follows:

- **Constructability** – Measures the relative ease or difficulty associated with building a given project. Includes potential land use, institutional or physical challenges.
- **Neighborhood Connectivity** – Grades the ability of a roadway linkage to provide a second point of access for isolated neighborhoods and/or connecting existing neighborhoods to each other.
- **Economic Development** – Measures the potential of projects to be a catalyst to new development opportunities. For example, new roadways connecting existing major roadways that provide access to largely undeveloped land are likely to encourage new development in undeveloped areas.
- **Safety** – Measures projects on their potential to improve safety at intersections and along roadways for all modes of travel, or safety for residents and visitors to Meade County by assisting with evacuation during emergencies or providing an alternate travel route.

- **Regional Connectivity** – This involves projects that connect Meade County to surrounding communities.
- **Cost** – This involves the estimated total cost based on the county's ability to implement the project using its annual STP (surface transportation planning) funding.

Based on these criteria, projects were defined as either near, mid, or long term in their delivery as a complete project. Near-term projects are those anticipated to be funded and built within the next five years (2016–2020). These projects tend to be low-cost projects that make new neighborhood connections to the roadway network and address future capacity issues. Mid-term projects are those anticipated to be funded and built within the next five to 15 years (2020–2030). Long-term projects are those anticipated to be funded and built in the long term (beyond 2030).

Project Costs

Project construction costs have been estimated for each of 29 recommended roadway projects using the following sources of information:

- Construction costs associated with six of the projects (1, 2, 4-7) were carried forward from the 2008 Transportation Plan to a 2013 base year, assuming steady construction costs between 2008 and 2013.
- The cost for project 3 (Elk Vale Road paving) was adapted from the current SDDOT STIP, assuming a base year of 2015.
- Costs for projects associated with High Meadows Road were adapted from the High Meadows Road Corridor Study document, assuming a base year of 2015.
- Costs for Fort Meade Way were adapted from an engineering cost estimate associated with the final design plans, provided for a base year of 2015.
- New construction cost estimates were developed for new recommended *Meade Moving Forward* projects. These costs were based on the construction of the recommended typical section for Meade County arterial, collector, and local roadways. While ultimately not every roadway segment or improvement may be built to these specifications, this cost procedure provides the most conservative view of construction costs. Cost opinions included construction related items based on Year 2013 unit costs (most recent available), a 25 percent contingency factor applied to these items and smaller percentages to account for other costs such as ROW, utilities, design, mobilization and construction engineering.

A 4.43 percent per year inflation factor from 2013 into the future was applied to project costs to adjust to the anticipated year of expenditure (YOE). **Appendix E** includes more detailed explanations of cost opinions by project.

Project List

Figure 20 through **23** show recommended projects. A total of 28 roadway projects have been identified as needed roadway network improvements for Meade County. These projects are listed in **Table 6**, which provides the estimated cost for each project, a general description of each project, and the prioritization of the project. As shown, construction of the full set of identified projects would require an investment of approximately $224.7 million. Alone, the near-term priority projects would require $33 million to complete.

Figure 20. Recommended Transportation Projects (All Projects)

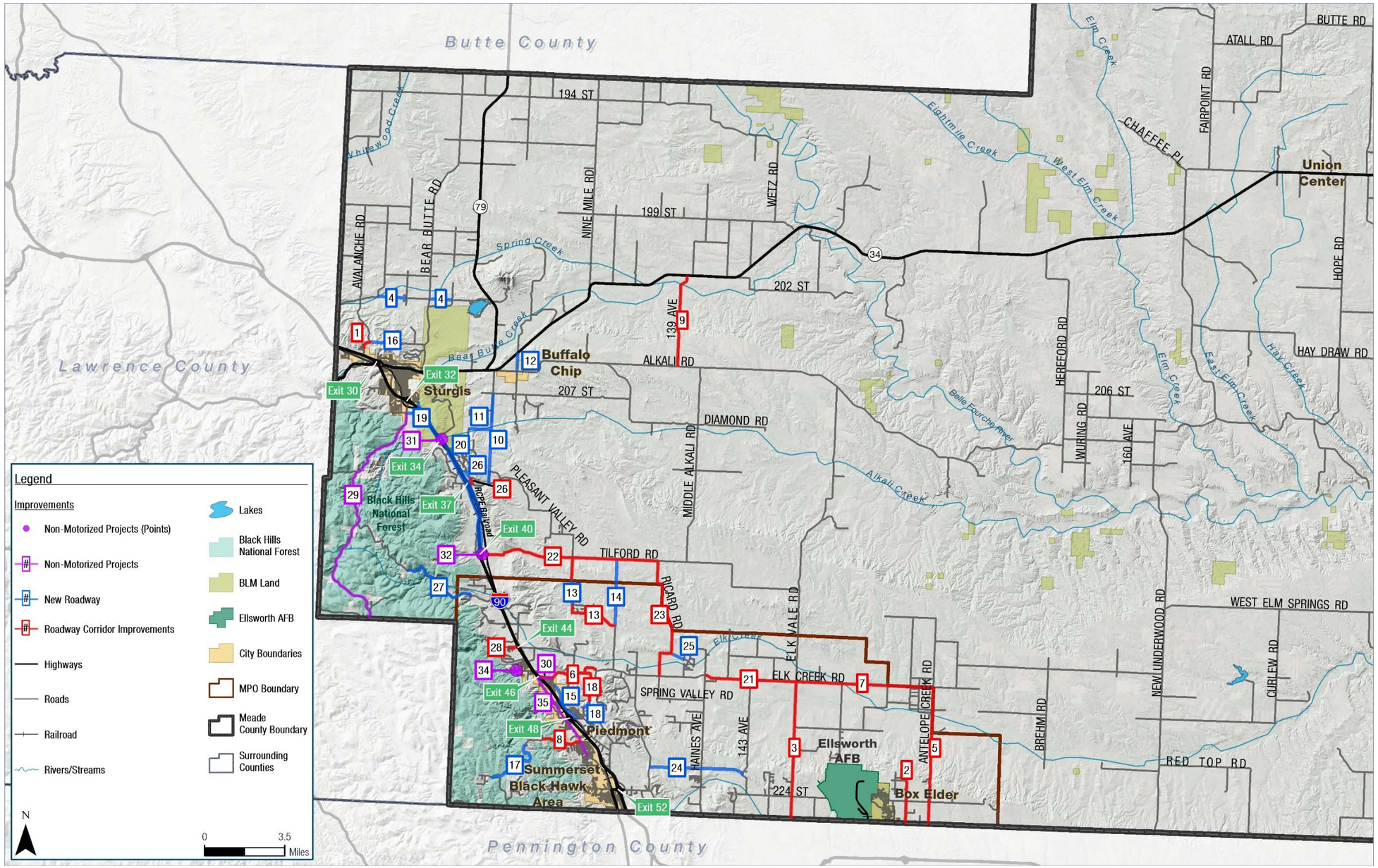


Figure 21. Recommended Transportation Projects (Sturgis Area Inset)

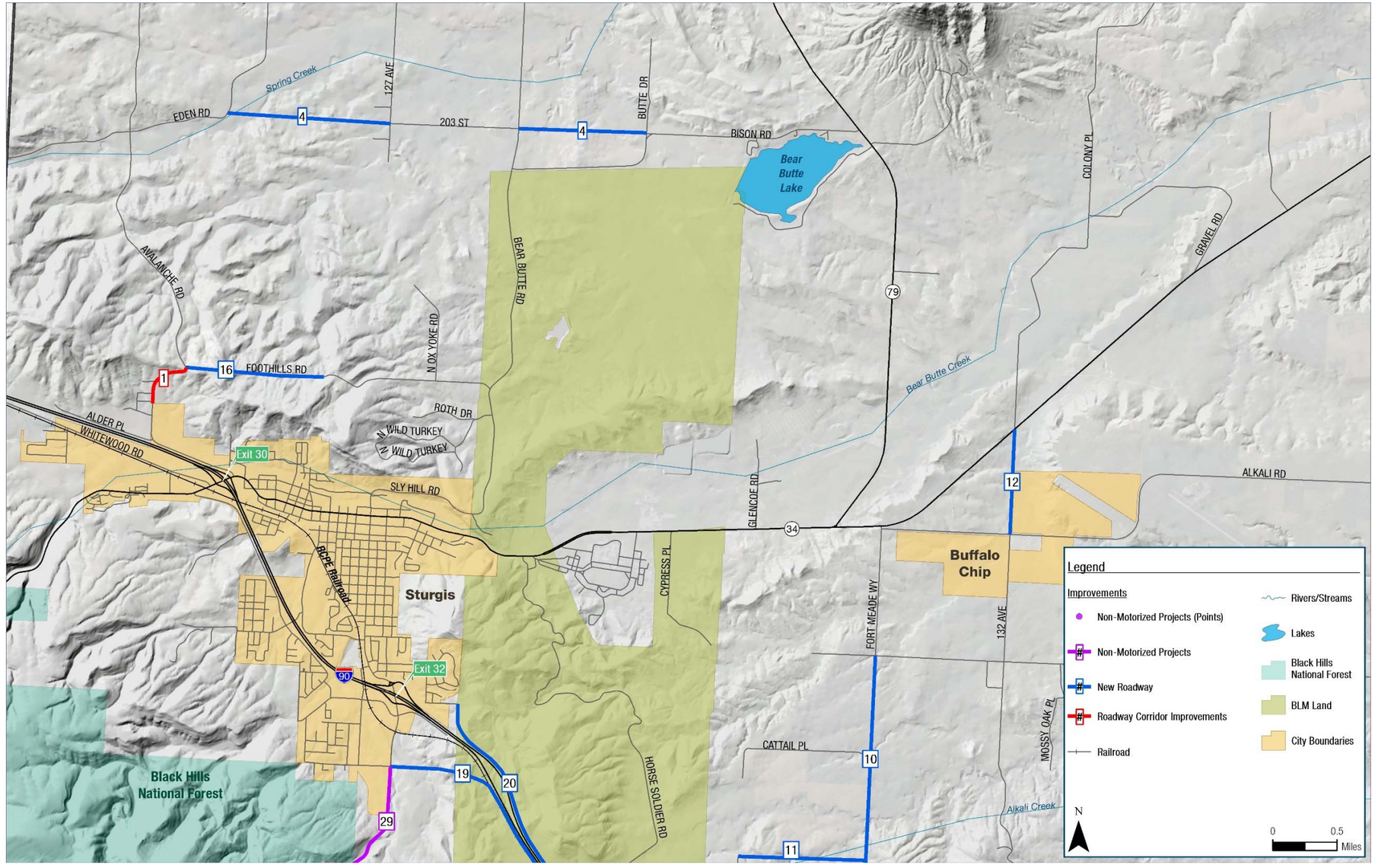


Figure 22. Recommended Transportation Projects (Mid I-90 Area Inset)

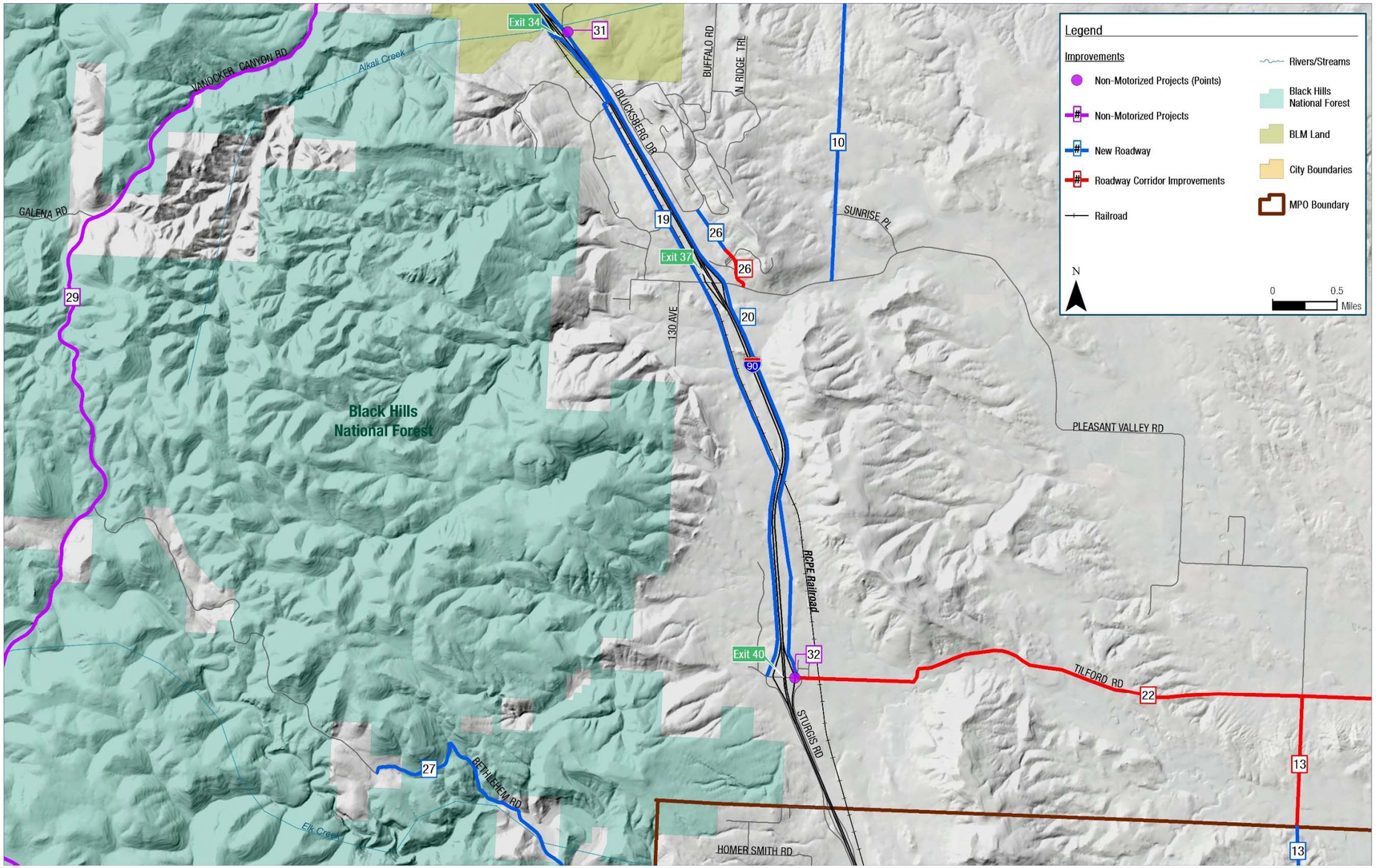


Figure 23. Recommended Transportation Projects (Piedmont-Summerset Area Inset)

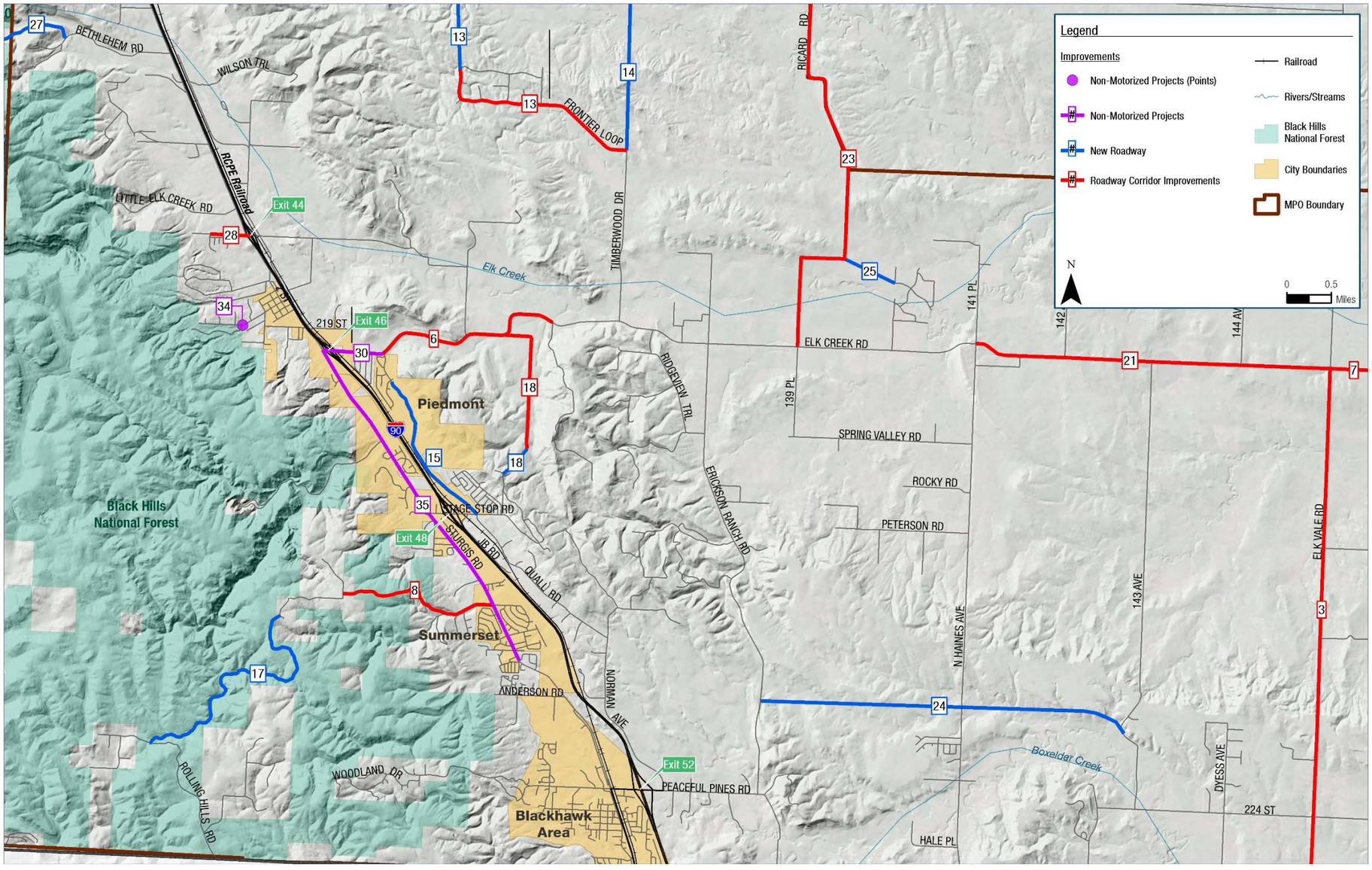


Table 6. Roadway Improvement Projects

ID #	Corridor	Location		Description	Lead Entity/ Coordinating Agencies	Priority	Estimated Conceptual Construction Costs	
		From	To				$M (Base Year)	$M (Yr. Of Expend.)
1	Avalanch Road	Sturgis City Limits	City Dump	Reconstruction and surfacing	Meade County/City of Sturgis	Mid-term	0.6	1.0
2	150th Avenue	Pennington County Line	North	Asphalt paving as minor arterial	Meade County/City of Box Elder	Near-term	1.3	1.6
3	Elk Vale Road	Pennington County Line	Elk Creek Road	Expand ROW to 100', pave roadway	Meade County	Near-term	7.0	8.0
4	North Loop Road	Highway 79	Eden Road at I-90	New roadway connection and reconstruction of existing alignment	Meade County	Mid-term	8.0	13.5
5	Antelope Creek Road	Pennington County Line	Elk Creek Road	Asphalt paving	Meade County	Mid-term	4.4	7.4
6	Elk Creek Road	Exit 46	Edgewood Place	Acquire ROW for Improvements	Meade County	Mid-term	7.0	11.8
				Realign roadway	Meade County			
7	Elk Creek Road	Elk Vale Road	Antelope Creek Road	Asphalt paving	Meade County	Mid-term	4.4	7.4
8	High Meadows Road Safety Improvements	Sturgis Road	North High Meadows Road	Safety Improvements	Meade County	Near-term	0.9	1.0
9	139th Avenue	Alkali Road	US 34	Paving arterial road	Meade County	Mid-term	6.1	10.3
10	Fort Meade Way	Pleasant Valley Road	207th Street	New arterial road	Meade County	Near-term	3.1	3.5

ID #	Corridor	Location		Description	Lead Entity/ Coordinating Agencies	Priority	Estimated Conceptual Construction Costs	
		From	To				$M (Base Year)	$M (Yr. Of Expend.)
11	Proposed Collector	Buffalo Road	Fort Meade Way	New collector road	Meade County	Long-term	1.8	4.7
12	132nd Avenue	Alkali Road	Highway 34	New collector road	Meade County	Long-term	1.5	3.9
13	Frontier Loop	Tilford Road	Local Access	Widening existing road to collector	Meade County	Mid-term	0.8	1.4
		Local Access	Frontier Loop	New collector road				
		Frontier Loop	Timberwood Drive	Use existing surface				
14	Timberwood Drive	Frontier Loop	Tilford Road	New arterial road	Meade County	Near-term	2.0	2.5
15	Glenwood Drive	Steamboat Road	Stage Stop Road	New collector road	Meade County/City of Summerset	Near-term	4.0	5.0
16	Foothills Road	Avalanch Road	N. Ox Yoke Road (approx.)	New collector road	Meade County	Near-term	1.3	1.6
17	High Meadows Area Secondary Access Route	Rolling Hills Road	High Meadows Road (current end)	New collector road	Meade County/Rapid City Area MPO	Mid-term	1.1	1.7
18	Sunshine Valley Road	Elk Creek Road	Private Drive	Paving existing gravel road	Meade County/City of Summerset	Near-term	3.7	4.6
		Private Drive	Truman Road	New arterial road				
19	South I-90 Service Road	Exit 40	Vanocker Canyon Road	New service road	SDDOT/Meade County	Mid-term	13.5	22.7
20	North I-90 Service Road	Exit 40	Old Stone Road	New service road	SDDOT/Meade County	Mid-term	13.5	22.7

ID #	Corridor	Location		Description	Lead Entity/ Coordinating Agencies	Priority	Estimated Conceptual Construction Costs	
		From	To				$M (Base Year)	$M (Yr. Of Expend.)
21	Elk Creek Road	Elk Vale Road	Haines Avenue	Asphalt paving to rural arterial	Meade County	Mid-term	6.1	10.3
22	Tilford Road	I-90 Exit 40	Ricard Road	Asphalt paving to rural arterial	Meade County	Long-term	11.4	29.6
23	Ricard Road	Tilford Road	Elk Creek Road	Asphalt paving to rural arterial	Meade County	Long-term	8.7	22.6
24	East-West Connection	Peaceful Pines and Deadwood Avenue	224th Street and Nike Road	New arterial road	Meade County/Rapid City Area MPO	Mid-term	7.7	13.0
25	Double Tree Drive Extension	Ricard Road	Double Tree Drive	New collector road	Meade County	Mid-term	0.9	1.5
26	Blucksberg Connection	Blucksberg Drive	Pleasant Valley Road	New local road Widening existing private road to local road	Meade County	Near-term	0.5	0.6
27	Bethlehem Road Connection	Alpine Acres Access	Runkle Road	Reconstruction as gravel road	Meade County/US Forest Service	Long-term	2.5	6.5
28	Chimney Canyon Road	I-90 Exit 44	Elk Horn Road	Asphalt paving	Local	Near-term	0.6	0.75

B. Non-Motorized Projects

The project team, in collaboration with the SAT, determined that the most important non-motorized needs are concentrated around the I-90 corridor. The identified projects include a mix of projects to accommodate the various types of users and needs. **Table 7** lists the projects, relative importance, and probable costs of each project. A relative importance rating is assigned to each project based on public input and anticipated non-motorized demand for each project. **Figures 20** through **23** depict project locations.

Funding for non-motorized projects is limited, and the County will seek to implement roadway projects prior to exclusively non-motorized projects. In light of this, it is suggested that non-motorized improvements be integrated into roadway projects where possible.

Table 7. Non-Motorized Projects

ID #	Relative Importance	Location/Corridor	From	To	Length (Miles)	Description	Source	Status	Lead Entity/ Coordinating Agencies
29	High	Vanocker Canyon Road	Pineview Drive	County Line	11.9	Bicycle wayfinding including bike route signing and pavement markings	SAT Discussion and Public Input	Not started	Meade County, Lawrence County
30	High	Elk Creek Road	Sturgis Road	Glenwood Drive	0.7	Sidewalk and intersection crossings along Elk Creek Road; coordinate with SDDOT on new overpass of I-90	SAT Discussion and Public Input	Not started	SDDOT, City of Summerset
31	Medium	Pleasant Valley Road and BLM Road (Exit 34)	N/A	N/A	N/A	Improve trailhead (parking, facilities, signage and wayfinding) for access to Fort Meade Recreation Area	SAT Discussion and Public Input	Not started	Bureau of Land Management
32	Low	Tilford Road (Exit 40)	N/A	N/A	N/A	Park-n-Ride facility for future use by Prairie Hills Transit	SAT Discussion and Public Input	Not started	SDDOT, Prairie Hills Transit
33	Medium	Meade County	N/A	N/A	N/A	Reach agreement with Prairie Hills Transit for transit service area expansion	SAT Discussion and Public Input	Not started	Prairie Hills Transit
34	Medium	Elk Mountain Road and Main Street Intersection	N/A	N/A	N/A	Provide improved trailhead and wayfinding/signing to trailhead (trail 144)	SAT Discussion and Public Input	Not started	Meade County, Piedmont, Forest Service
35	High	Piedmont Shared Use Path	Varies	Varies	Approx. 3 miles	Recommendations from the plan include: Path connections across I-90 at Elk Creek Road (Exit 46) and Stage Stop Road (Exit 48); Sturgis Road with initial phases including the portion of the road from the Elk Creek Road to near the intersection of Diamond T Circle and Kimberly Drive	SAT Discussion and Public Input	Planning stages	Piedmont, SDDOT

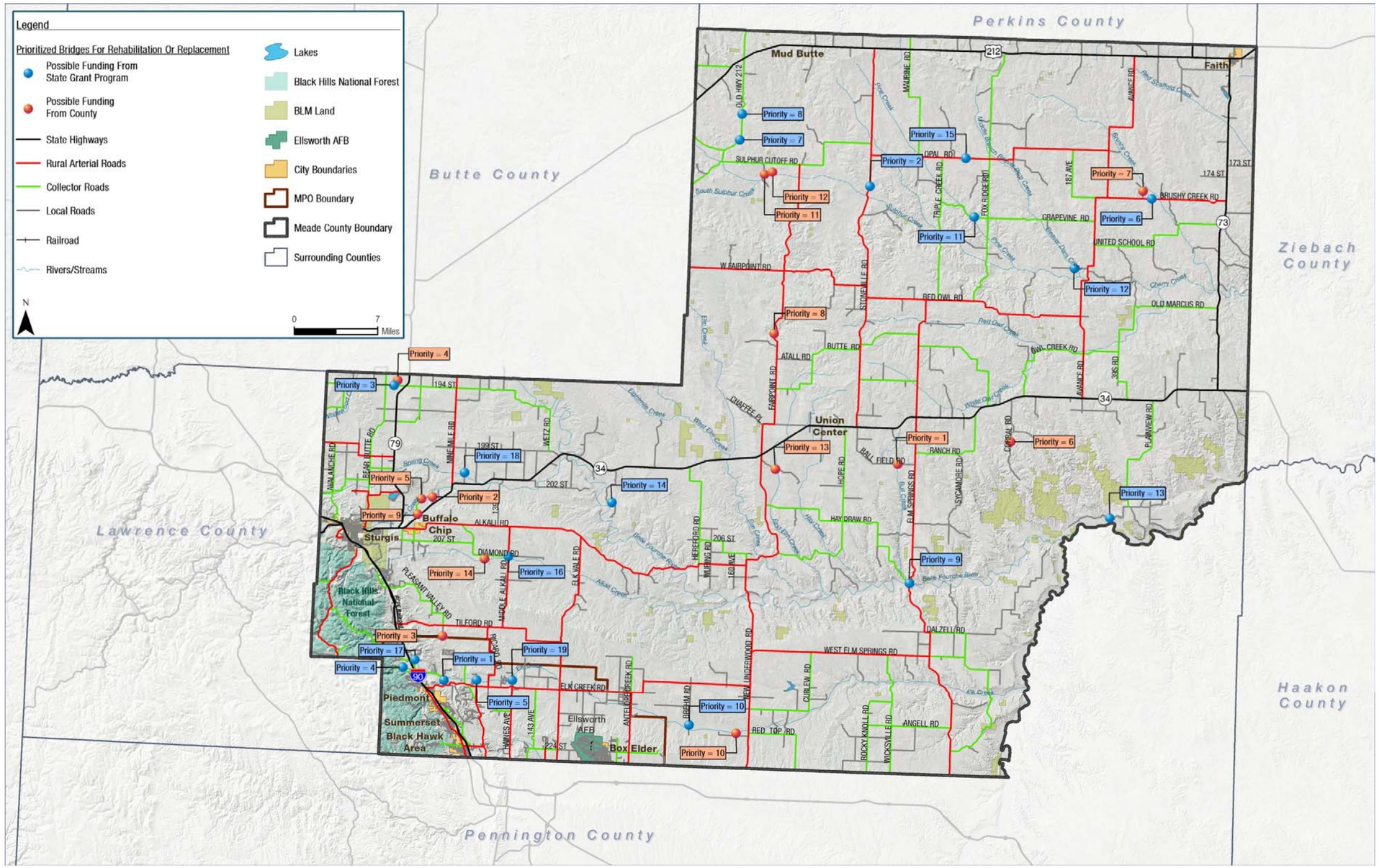
C. Bridge Projects

As discussed earlier, culverts and bridges are important supporting components of a transportation system. Many of these structures were built before 1970 and are in need of rehabilitation or replacement due to their age and/or condition and current traffic volumes. The County has identified and prioritized the structures shown on **Figure 24**. This prioritization is subject to change if traffic increases or further bridge deterioration occurs, or at the Commission's discretion.

It is important to note that bridge-related expenditures represent a significant and increasing allocation of County funds, and Meade County is continually seeking methods by which the costs of maintaining a functional network of bridges can be managed. In light of this challenge, the following methods are offered for County consideration:

1. Bridges that provide property access may be deeded over to property owners to handle maintenance moving forward.
2. Where possible, bridges due for replacement may be redesigned to minimize structure size, including adjustments to alignment or width. An example of this is noted where bridges cross rivers or creeks on a skew angle and could be adjusted to intersect at a right angle.
3. Conversion of some bridges to "Texas crossings" may be considered in low drainage areas.
4. Tax Increment Financing may be applied to bridge projects.

Figure 24. Bridge Prioritization



Meade County is currently in position to apply for the SDDOT's BIG program, having implemented a wheel tax and outlined county highway and bridge improvement projects planned for the next five years. It is recommended that the County proceed with pursuit of BIG funds. **Table 8** and **Table 9** identify prioritization of bridges via two possible funding scenarios.

Table 8. Bridge Prioritization, Possible Funding from State Grant Program (BIG)

Priority	Structure Number	Location
1	47114553	8.4E & 12.3S (Deerview Road)
2	47460128	11.8S of 212 on Stoneville Road
3	47057310	12N & 2.7E (20-T)
4	47079547	11.7S & 4.9E (L-E-L)
5	47140555	11E &12.5S (Empire Place)
6	47698130	12S & 6.1W of Faith (Brushy Creek Rd)
7	47348093	7S & 0.2W of Mud Butte (Killdeer Rd)
8	47350070	5S of Mud Butte
9	47499460	1.8W & 4N of Elm Springs
10	47320585	29E &15.5S (Brehm Road)
11	47549149	21.1W & 13.9S of Faith
12	47635190	6E & 12N of White Owl (Whitetail Dr)
13	47666400	10S & 11.3
14	47243401	2.9N & 21.3E (Impala Place)
15	47541100	9S & 5E of Maurine
16	47160451	13E & 2.1S (7-L)
17	47088539	0.3W & 1.7N of Piedmont
18	47120381	9E & 4.9N (136th Pl.)
19	47170554	141st (TIFD)

This is subject to change if traffic or further bridge deterioration occurs.

Table 9. Bridge Prioritization, Possible Funding from County or Sell to Landowner

Rank	Structure Number	Location
1	47484360	3S & 3.4E of Union Ct (Ballfield Rd)
2	47093404	2.6N & 6.3E (6-L-H)
3	47110518	8E & 8.8S South of 8T
4	47060305	3E & 12.5N (194th St.)
5	47085404	5.5E & 2.4N (Hanks Bridge)
6	47580338	13E & 0.8S of Union Ct.
7	47689123	7.1W & 11.3S of Faith
8	47375253	34.5E & 17.7N (Fairpoint Rd)
9	47082417	1.3N & 5.2E (East of 6-L-H)
10	47359589	32.7 & 15.9S (North of Pioneer Rd)
11	47371119	9.8S & 2.1E of Mud Butte
12	47377117	9.7S & 2.8E of Mud Butte
13	47382368	6.2N & 35.2E (Wilcox Rd.)
14	47140453	11E & 2.3S

D. Special Planning Studies

It is recommended that Meade County conduct and/or participate in a number of special planning studies to accurately assess particular issues and needs along county roads. **Table 10** lists these studies, the particular need(s) for the study, and the champion agency.

Table 10. Proposed Special Planning Studies

Plan/Study	Need/Description	Champion(s)
Safety Analysis of Roadway Departure Crashes	Roadway departure crashes have been noted as a recurring pattern along a number of county roads. Study is needed to examine causes, develop and prioritize recommended improvements based on cost-effectiveness	Meade County
Study of potential new I-90 Interchange west of Sturgis	Meade County and others have preliminarily identified a new interchange as a need. Study is needed to support the need and to outline appropriate next steps.	Lawrence County

E. Other Projects

Additional efforts are underway to preserve, renovate, and enhance the transportation system, including near-term projects already identified for maintenance by the County and projects initiated by other agencies such as SDDOT and local communities. **Table 11** lists the roadways that the County has identified for gravel maintenance and repair.

Table 11. Roadways Identified for Maintenance and Repair

Corridor	Length (Miles)	Year
Ricard Road	2.0	2015
Piedmont Meadows	2.0	
Chimney Canyon	0.5	
Elk Creek Road	9.0	2016
Pleasant Valley Road	5.0	
Bend Road	1.0	
Red Top Road	5.0	
Tilford Road	8.0	
Brehm Road	4.0	
West Elm Springs Road	4.0	
Red Owl Road	8.0	

The 2016–2019 Statewide Transportation Improvement Program (STIP) is a four-year program that shows how anticipated funding will be used to serve the state's transportation needs. The STIP identifies highway and intermodal improvements to preserve, renovate, and enhance South Dakota's transportation system. **Table 12** identifies the projects included in the STIP that will have an impact on Meade County.

Table 12. Projects Identified in the STIP Impacting Meade County

Corridor		Location		Length (Miles)	Description	Estimated Conceptual Construction Cost ($M) in 2015 Dollars	Time Frame	Lead Entity/ Coordinating Agencies
		From	To					
I-90 Mainline/ Exit 44	EB	MRM 40.31	MRM 45.00	5	Reconstruct Mainline I-90 and Exit 44	$38.23	2017	SDDOT
	WB	MRM 40.29	MRM 45.00	5				
SD 34		MRM 38.83	MRM 46.00	7	Shoulder widening and spot grading	$6.12	2017	SDDOT
I-90 Exit 46		MRM 46.14	MRM 46.14	<1 mile	Reconstruct interchange	$9.69	2020–2025	SDDOT
I-90 Exit 48		MRM 48.15	MRM 48.69	<1 mile	Reconstruct interchange	$12.68	2026–2030	SDDOT
I-90 Exit 40		MRM 40.00	MRM 40.00	<1 mile	Reconstruct interchange	$8.84	2026–2030	SDDOT
I-90 Exit 34		MRM 34.57	MRM 35.06	<1 mile	Reconstruct interchange	$13.03	2031–2035	SDDOT
Main Street in Sturgis		Middle Street	4th Street	0.4	Reconstruct road	$3.80	2016	City of Sturgis
Elk Vale Road		225th Street	Elk Creek Road	6	Grade and interim surfacing	$4.80	2016	Meade County
Elk Creek Road		Elk Vale Road	Haines Avenue	4.1				Meade County
Elk Vale Road		225th Street	Elk Creek Road	6	Asphalt paving	$2.20	2017	Meade County
Elk Creek Road		Elk Vale Road	Haines Avenue	4.1				Meade County
Nemo Road		Pennington / Meade County Line		<1 mile	Reconstruct horizontal curve	$3.48	2020–2025	Meade County and Pennington County

VI. Implementation

The intent of this Master Transportation Plan Update, *Meade Moving Forward*, is to help ensure that the County's transportation resources are well-positioned for future growth. This planning effort builds on the Meade County Transportation Plan developed in 2008 and includes recommendations to uphold the safety, efficiency, and maintenance of the transportation network for the County's residents, businesses, and visitors.

The prioritized project summary listing includes roadway improvements that are designed to be implemented over the next 25 years. The Pedestrian & Bicycle Mater Plan includes guidance for future improvements to the multimodal transportation system over the same timeline. The projects discussed in detail in **Section V** focus on a variety of multimodal projects, which will be the responsibility of public agencies and will require coordination among Meade County, local cities, and SDDOT.

The following section describes budgeting efforts that Meade County should consider to ensure that the needed roadway improvements are funded.

A. Budgeting

Project Cost Summary

It is recommended that Meade County begin to plan and budget for completion of the 11 roadway improvements and 3 non-motorized improvements identified for the near term. The total estimated construction cost of the near-term projects is $29.2 million. The mid-term projects total $124.5 million and long-term projects reach a total estimated construction cost of $67.2 million. It is recommended that Meade County Staff initiate planning now for these projects, to refine the estimated costs and complete preliminary studies to set the stage for implementation.

A total of approximately $220.9 million in transportation improvement projects is identified in *Meade Moving Forward,* approximately $10.1 million of which represents projects already identified in the County's current Transportation Improvement Plan (TIP).

Funding

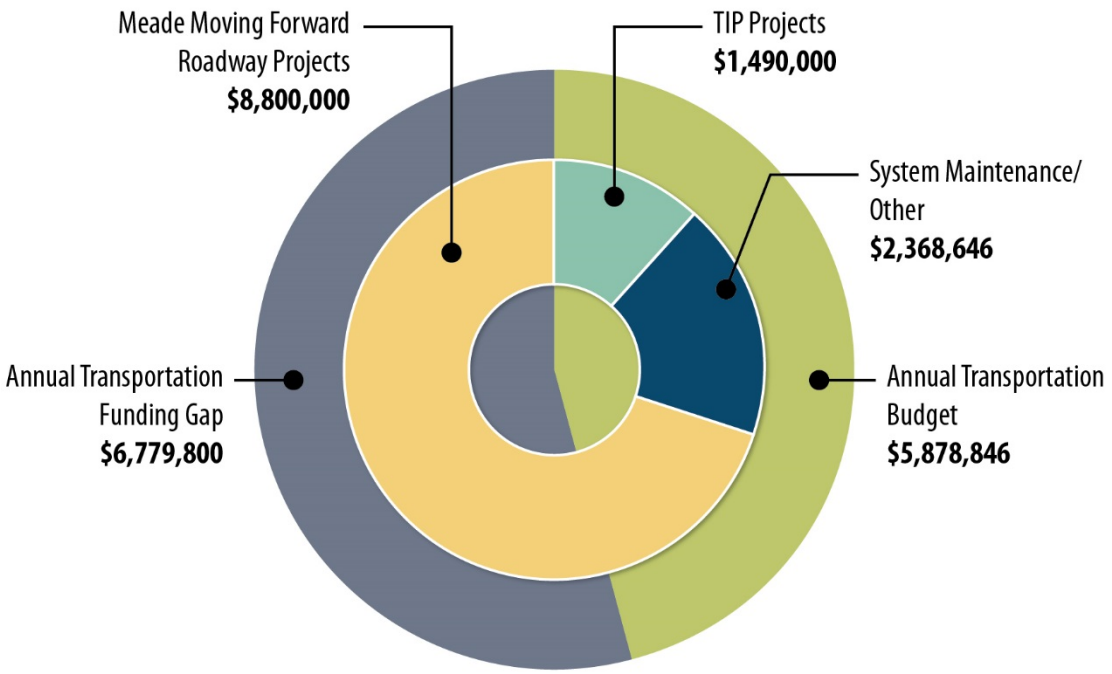
Figure 25 summarizes the annual Meade County budget and projects. The estimated annual transportation budget is approximately $5.9 million, composed of County Road and Bridge funds, Surface Transportation Planning (STP) funding, and Federal Bridge funds. Transportation needs include TIP projects, system maintenance/other, and *Meade Moving Forward* roadway projects.

In the TIP, Meade County has identified a capital program of approximately $17.55 million to be spent on road projects (not including bridge projects) over the 5 years between 2016 and 2020, which averages to approximately $3.5 million per year. Funding for this capital program comes from a blend of County and Federal monies. Though subject to change, the TIP currently indicates that $3.3 million of the total would come from STP funds.

The remaining $14.25 million is shown in the TIP to come from County monies, including the following specific sources:

- Road and Bridge ($13.6 million)
- Federal Bridge Funds ($650,000)

Figure 25. Annual County Transportation Budget and Projects



Looking beyond the projects already budgeted for in the County TIP, constructing the projects identified in *Meade Moving Forward* would require $210.8 million between 2016 and 2040, a capital program averaging approximately $8.8 million annually. A number of sources may be tapped to provide this funding. **Table 13** summarizes available sources and amounts.

Table 13. Funding Sources and Amounts – Meade Moving Forward Projects

Funding Source	Proposed Amount
Surface Transportation Program (STP)	$660,000[1]
County Funds	$1.36 million[2]
Other Sources	$6.78 million[3]
Total	**$8.8 million**

1 Typical STP annual amount based on current County TIP, assumed to continue at same level into the future
2 Amount budgeted per year in current County TIP available for Meade Moving Forward roadway projects, assumed to continue at same level into the future.
3 Estimated amount from other sources needed to reach annual $8.8 million goal, including potential sources cited in Section IV.E.

As shown, Meade County would need to increase funding from its internal budget or identify approximately $6.78 million in funding from other sources to help fund the *Meade Moving Forward* projects. For the purposes of *Meade Moving Forward*, it is assumed that annual transportation funding will remain steady into the future with no increases or decreases. Meade County may explore a number of potential external funding sources, enumerated in **Section IV.E**.

Appendix A. Methods and Assumptions Document

Provided electronically

Appendix B. Initial Public Open House and Stakeholder Meetings Summary

Provided electronically

Appendix C. Web Based Survey Results

Provided electronically

Appendix D. Second Public Open House and Stakeholder Meetings Summary

Provided electronically

Appendix E. Estimates of Probable Construction Cost (By Typical Section)

Provided electronically

MEADE *Moving Forward*

2040 Transportation Plan

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