Winifred to Big Sandy Corridor Study

Final Report

Prepared for

Chouteau County

Fergus County

Prepared by

DKS Associates
TRANSPORTATION SOLUTIONS

May 2011

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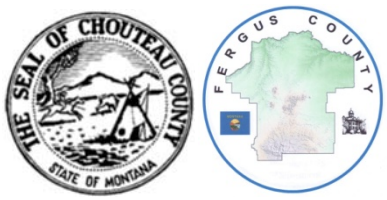

Prepared By:

DKS *Associates, Inc.*

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1.0 Executive Summary

1.1 Introduction

This report presents the findings and recommendations of the Winifred to Big Sandy Corridor Study conducted on behalf of Chouteau and Fergus Counties, with technical assistance from the Montana Department of Transportation (MDT).

The purpose of the study was to gather information from the public, counties, and other agencies about existing issues and to develop potential improvement options for the corridor.

The corridor planning study is a pre- National Environmental Policy Act/Montana Environmental Policy Act (NEPA/MEPA) process that allows for earlier planning level coordination with the public, stakeholders, resource and other agencies. The major elements of the study are:

- Analysis of transportation and environmental conditions
- Consultation and coordination with local officials, stakeholders, and the public
- Identification of corridor needs and improvement options
- Development of planning level cost estimates and investigation of potential funding sources.

The results of the study may be used to assist in determining the level of environmental documentation required if a project is forwarded into project development. The study does not determine a specific set of projects for the corridor, but instead defines improvement options that may be considered within three implementation scenarios.

1.2 Existing and Future Conditions

The study area includes the portion of S-236 between the towns of Winifred and Big Sandy and extends one-half mile to either side of the highway. S-236 is classified as a major collector on Montana's secondary highway system. Most of the 66-mile corridor within the study area from

reference post (RP) 24 to RP 74 is gravel. The 16-mile segment from RP 74 to RP 90 to the south of Big Sandy is paved.

Within the study area, S-236 is a two-lane roadway with no passing lanes or turn lanes. Traffic volumes are low, ranging from 200 – 300 vehicles per day. The primary trip types are trips by local residents, agricultural truck trips, and recreational trips by visitors to the Upper Missouri River Breaks National Monument.

The overall crash rate for the corridor of 0.8 crashes per million vehicle miles traveled (MVMT) is below the statewide average of 1.53 crashes per MVMT for rural state secondary roads. For the period 2004 – 2008, there were a total of 15 reported crashes; however, county officials and members of the public have pointed out that there are more crashes than the number reflected in the data.

MDT's roadway width standard of 24' is met throughout most of the corridor. MDT's stopping sight distance standard is not met over roughly 14% of the corridor and the passing sight distance standard is not met over 60% of corridor. This is due to the numerous hills and curves along the roadway located primarily south of the Missouri River. There are also many locations within this area where the roadside clear zone is limited or does not exist due to ditches, steep drop-offs, and roadside obstructions.

There are 30 county road intersections along the corridor. Ten intersections had approach angles that were too sharp. Sight distance standards are not met at three intersections near the 90-degree curves north of Winifred. Thirteen intersections were identified where the turning radius is too tight.

There were multiple comments from the public that the wider section of S-236 on the north end of the corridor has the poorest surface conditions because there is too much gravel. Wash boarding was also mentioned as an issue.

An environmental scan was conducted to determine the potential impacts or constraints within the corridor. There are several areas of potential concern that will require further analysis if a project is forwarded to the project development phase. These include Section 4(f) resources (the Judith Landing Historic District and Upper Missouri River Breaks National Monument), soil, geologic, water, biological, cultural and archaeological resources, and wetlands.

Traffic forecasts prepared for the study indicate that traffic volumes will remain low over the next 20 years; however, some roadway segment widths will not meet MDT standards due to the traffic growth.

1.3 Consultation and Coordination

Consultation and coordination activities occurred throughout the study to maximize the involvement and input from the public, project stakeholders, Chouteau and Fergus Counties, and MDT staff. The input from these groups was solicited through informational meetings in the towns of Winifred and Big Sandy, informational newsletters, a project website, local and regional press releases, and direct stakeholder contact.

Comments received from the public highlighted numerous safety issues including poor horizontal and vertical alignment, steep side slopes, the lack of warning signs, and conflicts between recreational and agricultural vehicles. The economic benefits of improving the corridor were also noted.

Comments received from stakeholders representing a cross-section of the local community mirrored many of the comments received at the informational meetings. High county maintenance costs and poor surface conditions were also mentioned.

Meetings were also held to solicit input on the concerns and comments from resource agencies and the MDT, Chouteau County, and Fergus County Road Maintenance Departments. The MDT and county maintenance staff had multiple concerns about safety, geometrics, or difficult/costly-to-maintain sections of road.

1.4 Corridor Needs

Analysis of existing and future transportation conditions, along with input received from all parties, were used to develop general needs for the corridor. Two main needs were identified:

- Improve roadway safety - to the extent practicable, improve overall geometry, public intersections, consistency of roadway width, and roadside clear zones.
- Improve roadway surface conditions - to the extent practicable, allow for all-weather travel, reduce roadway maintenance costs, and improve emergency response times.

1.5 Improvement Options

Improvement options were developed for specific locations based on the corridor needs. Two criteria were used in making this determination:

- Issues were either identified through the existing and future conditions analysis or it was reported as an area of concern; and
- A reasonable level of justification for an improvement could be established.

The general improvement types identified for issue areas included roadway widening, replacing the existing roadway base and surface, flattening hills, reducing sharp curves, removing roadside hazards, improving intersection sight distance and turning radii, and straightening skewed intersections. Improvement options were screened using a process that considered factors such as cost, constructability, environmental impacts, and how well the improvement would address the concerns.

Improvements adjacent to each other were grouped into logical packages called project bundles. Eight project bundles were created covering five to ten mile segments along the corridor. There is no bundle for the northernmost portion of the corridor (RP 83.5 to RP 90.0) because no improvements were identified for this area.

The project bundles could be applied within three different implementation scenarios:

- Spot Improvements Only
- Reconstruct/Rehabilitate to Gravel
- Reconstruct/Rehabilitate to Pavement

Within the Spot Improvements Only scenario, improvements would be made only at individual "spot" locations. Under the second and third scenarios, the spot improvements would be made, together with the reconstruction or rehabilitation of the entire roadway segment in which the spot improvements are located.

Project bundle rankings were developed for each of the implementation scenarios. The rankings were developed using the system developed for MDT's Secondary Roads Capital Construction Program. The actual order of implementation, however, will depend on future funding and county priorities.

1.6 Funding

There are three federal funding programs the corridor would be eligible for:

- Surface Transportation Program Secondary Highways (STPS) Program
- Highway Safety Improvement Program (HSIP)
- Federal Lands Highway Program (FLHP)

The only other source of federal funds for the corridor would be congressional earmarks.

At the local level, Chouteau and Fergus Counties would be able to contribute to the construction of improvements either through direct funding or by construction using county staff, with oversight by MDT. Alternative funding sources could include the donation of land for right-of-way, improvement districts, and the sale of general obligation bonds.

1.7 Conclusion

The results of the study suggest that there are no major impediments to developing the recommended improvement options using any of the three implementation scenarios defined in the study. At the current time there is no immediate funding identified to address any of the spot improvements or implementation scenario recommendations contained in this study. To continue with the development of a spot improvement or project bundle, the following steps are needed:

- Identify and secure a funding source (or sources);
- Initiate preliminary engineering activities including environmental documentation;
- Finalize design and prepare construction plans package; and
- Let construction contract.

2.0 Introduction

This report presents the findings and recommendations of the Winifred to Big Sandy Corridor Study conducted on behalf of Chouteau and Fergus Counties, with technical assistance from the Montana Department of Transportation (MDT). The study was conducted in response to a request from the counties to investigate potential improvements along the corridor. The study was performed according to MDT's *Montana Business Process to Link Planning Studies and National Environmental Policy Act/Montana Environmental Policy Act (NEPA/MEPA) Reviews.*[1]

2.1 Study Purpose

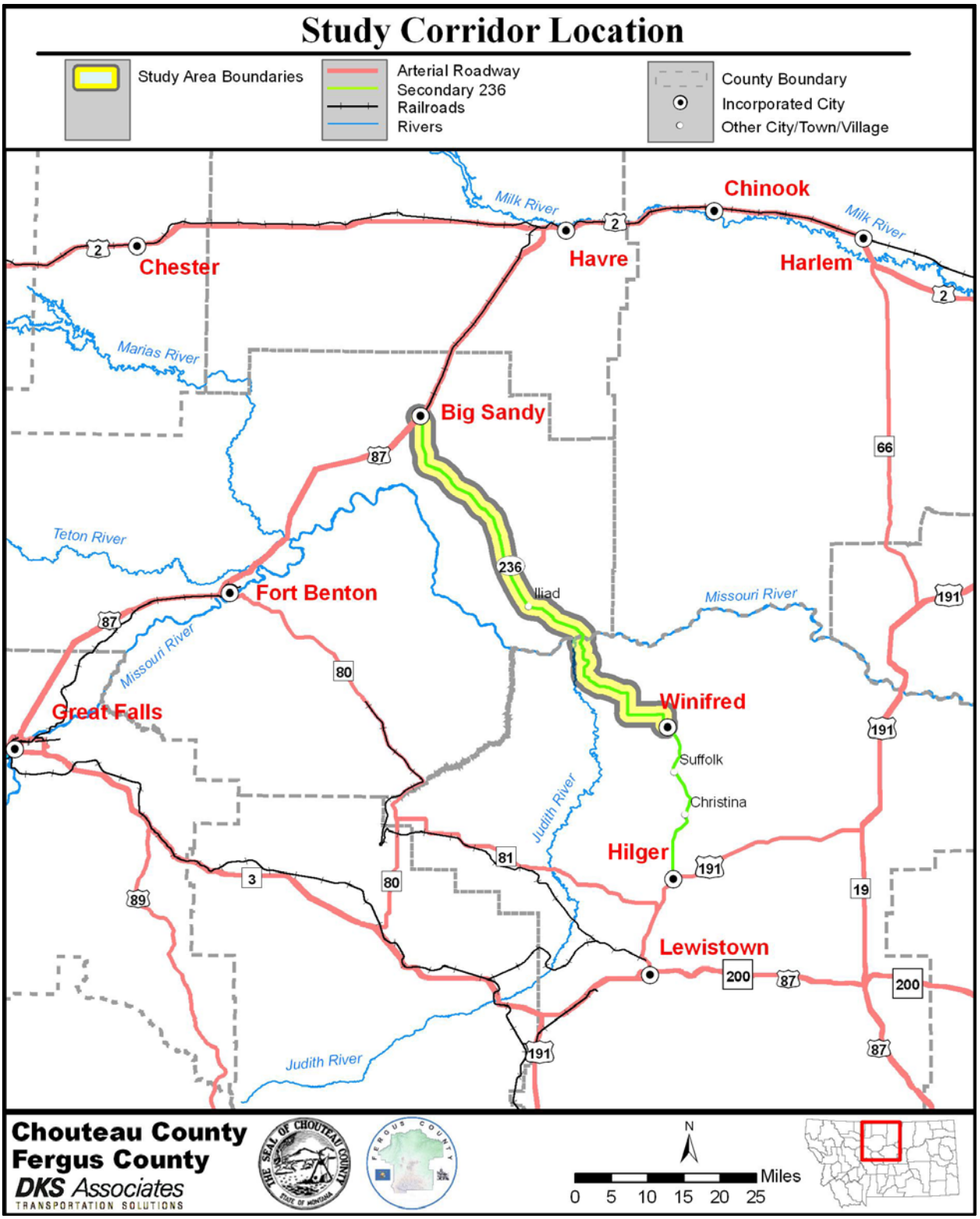
The purpose of the study was to gather information from the public, counties, and other agencies about existing issues and develop potential improvement options for improving the corridor. Through the consultation and coordination process, the study team was able to identify areas of concern for roadway users, local landowners, county and MDT road maintenance staff, and resource agencies. The results of the study may be used to assist in determining the level of environmental documentation required if a project is forwarded into project development. The study does not determine a specific set of projects for the corridor, but instead defines improvement options that may be considered within three implementation scenarios. This will provide the counties with flexibility in making future decisions about how to improve the corridor as funding and priorities allow.

2.2 Study Background

The Winifred to Big Sandy Corridor is located in central Montana within Chouteau and Fergus Counties (Figure 1). The study was conducted in response to a request from the two counties

[1] Cambridge Systematics, Inc., *Montana Business Process to Link Planning Studies and NEPA/MEPA Reviews*, prepared for Montana Department of Transportation, Helena, MT, May 2009.

Figure 1


Study Corridor Location
Study Area Boundaries
Arterial Roadway
Secondary 236
Railroads
Rivers
County Boundary
Incorporated City
Other City/Town/Village
Chinook
Milk River
Havre
Harlem
Chester
Marias River
Big Sandy
Teton River
Fort Benton
Missouri River
Great Falls
Iliad
Winifred
Suffolk
Christina
Judith River
Hilger
Lewistown
Chouteau County
Fergus County
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0 5 10 15 20 25
Miles

to investigate potential improvements along the corridor and to develop a plan. Several areas of concern expressed by the counties included:

- Poor roadway geometry, including 90-degree curves, restricted sight distance over hills and around corners, skewed intersections, and inconsistent road widths.
- Poor roadway surface conditions such as wash boarding, chuckholes, lack of gravel or too much gravel, and soft spots in the road.
- Maintenance and operational issues, including high maintenance costs, drifting snow, extended emergency response times, and conflicts between recreational and agricultural roadway users.

2.3 Study Process

The corridor planning study is a pre-NEPA/MEPA process that allows for earlier planning level coordination with the public, stakeholders, resource and other agencies. The study is developed strictly as a planning tool to identify a package of short and long term improvement options for the corridor and does not include project level design.

The major elements of the study are:

- Analysis of transportation and environmental conditions
- Consultation and coordination with local officials, stakeholders, and the public
- Identification of corridor needs and improvement options
- Investigation of potential funding sources
- Recommendations and next steps

3.0 Existing and Future Conditions

3.1 Roadways

The Winifred to Big Sandy Corridor is located in central Montana within Chouteau and Fergus Counties. The study area includes the portion of S-236 between the towns of Winifred and Big Sandy and extends one-half mile to either side of the highway. Most of the 66-mile corridor within the study area from reference post (RP) 24 to RP 74 is gravel and maintained by the two counties. The 16-mile paved portion of the roadway from RP 74 to RP 90 to the south of Big Sandy is maintained by MDT.

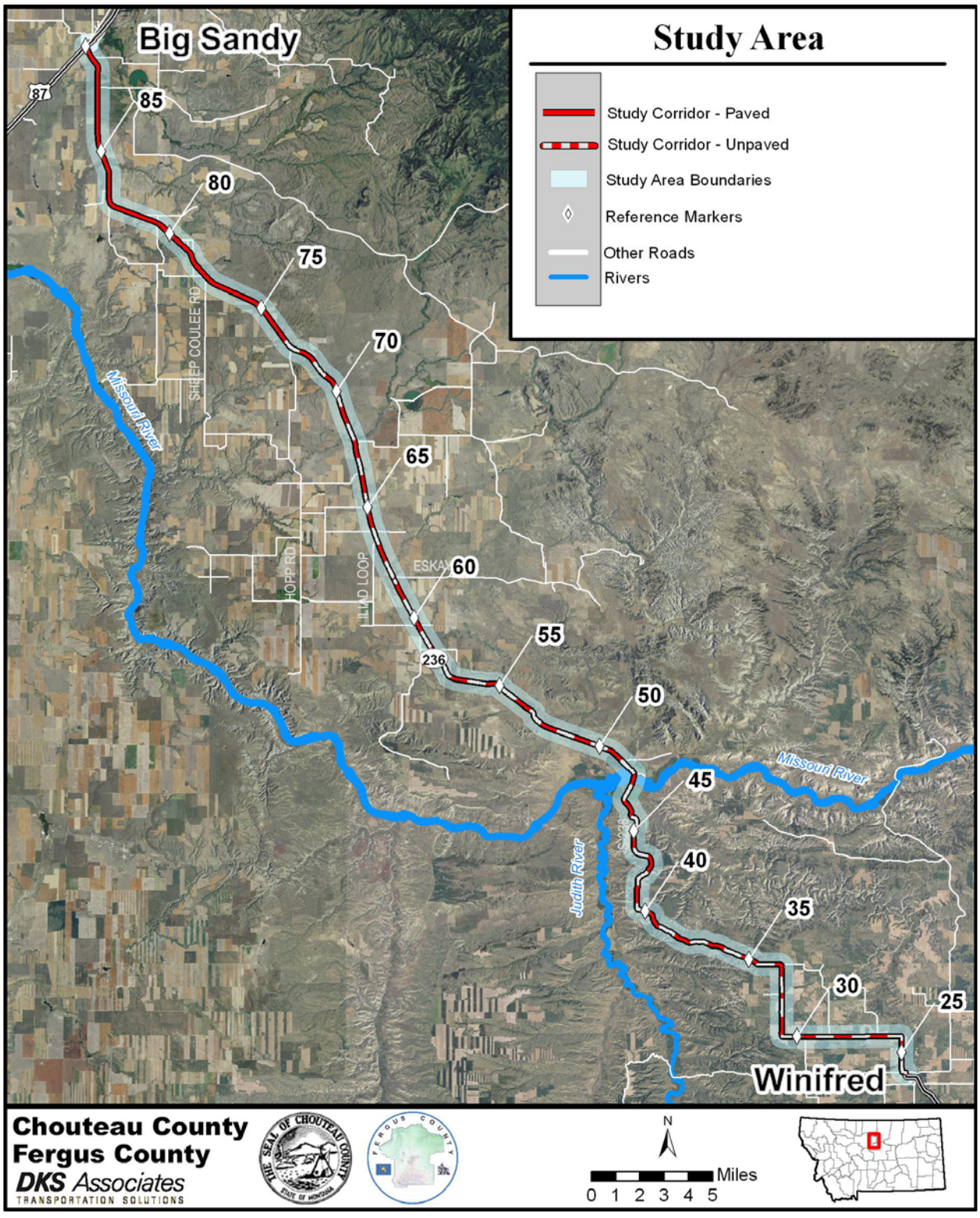
The corridor mainly has a northwest/southeast orientation, traversing through farmland and natural landscapes and bisecting the Upper Missouri River Breaks National Monument between RP 45 and RP 48. The terrain north of the Missouri River is relatively smooth and flat. South of the river the corridor winds through rugged terrain, resulting in tight turns and steep hills in many locations.

Roadway surface widths vary between 21 feet near several culvert crossings to as wide as nearly 50 feet between RP 60 and RP 74. Many concerns have been raised by the public and counties with regard to roadway alignment, roadway surface, maintenance, and traffic operations.

Within the study area (Figure 2), S-236 is a two-lane roadway with no passing lanes or turn lanes. Along the narrower gravel segments of the corridor, the center of the roadway is used as a portion of the traveled area for both directions of traffic.

In these locations, drivers tend to “shy away” from the edge of the roadway where the gravel accumulates to greater depths or where there are roadside obstructions and steep drop-offs. There are no shoulders throughout the corridor.

Figure 2


Study Area
Study Corridor - Paved
Study Corridor - Unpaved
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
Winifred
Missouri River
Judith River
SHEEP COULEE RD
HOPP RD
ILLIAD LOOP
ESKAY
87
85
80
75
70
65
60
55
50
45
40
35
30
25
236
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
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In the portion of the corridor between the Missouri River and Big Sandy, the curvature of the roadway is minimal, with generally wide curves and gradual hills. There are a number of sharp curves and steep hills that result in limited sight distance at many locations in the southern end of the corridor. MDT's passing sight distance standard is not met along roughly 60% of the corridor.

The PN Bridge crosses the Missouri River at RP 48 and meets MDT's current design standards and has no issues or concerns. Culverts are located at various points along the corridor which may need to be addressed if improvement options are forwarded.

The speed limit is posted as 70 mph for passenger vehicles and 60 mph for trucks in the paved segment south of Big Sandy. In the gravel segment of the corridor to the north of Winifred the speed limit is posted at 45 mph, with several of the sharp curves in this area having 25 mph warning signs.

There are 30 county road intersections along the corridor. All of these are two-lane gravel roads, with stop sign control on the county road approaches. The primary function of these roads is to provide access to local residences and carry agricultural-related goods to/from the farm fields and ranches surrounding the corridor.

S-236 is classified as a major collector on Montana's Secondary Highway System. This function is reflected in the types of traffic that are carried along S-236 within the study area. The primary trip types served are:

- Trips by local residents
- Truck trips related to the agricultural industry in the area
- Recreational trips by visitors to the Upper Missouri River Breaks National Monument

The recreational component of travel has been growing over the past 20 years. Tourists use this corridor to access the Missouri River at the Judith Landing recreation area, a popular take-out point for float trips along the river. Although there is the potential for a large percentage of

through trips on the corridor, the existing percentage of these trips is likely low because of the gravel surface.

3.1.1 Traffic Volumes

Existing annual average daily traffic (AADT) volumes are low (Figure 4), ranging from 200 – 300 vehicles per day (vpd) to the north of Winifred and south of Big Sandy to less than 200 vpd between Heggem Ln. (RP 34) and Eskay Rd. (RP 62). AADT is defined as the annual total two-way traffic volume along a particular segment, divided by the number of days in the year. The AADT volumes were derived from traffic volume data obtained from MDT's Traffic Data Collection Section. Volumes are generally higher in the summer months due to increased agricultural and recreational traffic destined for the Missouri River.

3.1.2 Safety Conditions

Existing safety conditions were analyzed using crash data obtained from MDT's Traffic and Safety Bureau. For the period 2004 – 2008, there were a total of 15 reported crashes. Half of the crashes involved an injury, with one fatality (Figures 3 and 5). All but one of the crashes were single vehicle crashes with most of the vehicles leaving the road and overturning. Roughly half of the crashes were attributed to drivers going too fast for road conditions.

Figure 3
Crashes by Severity, Type, and Cause

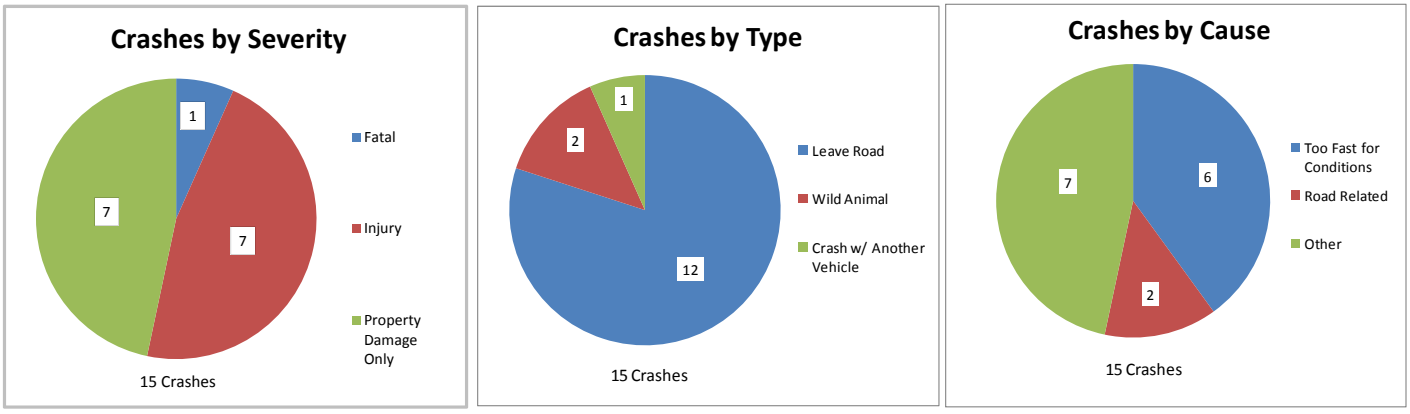


Figure 4

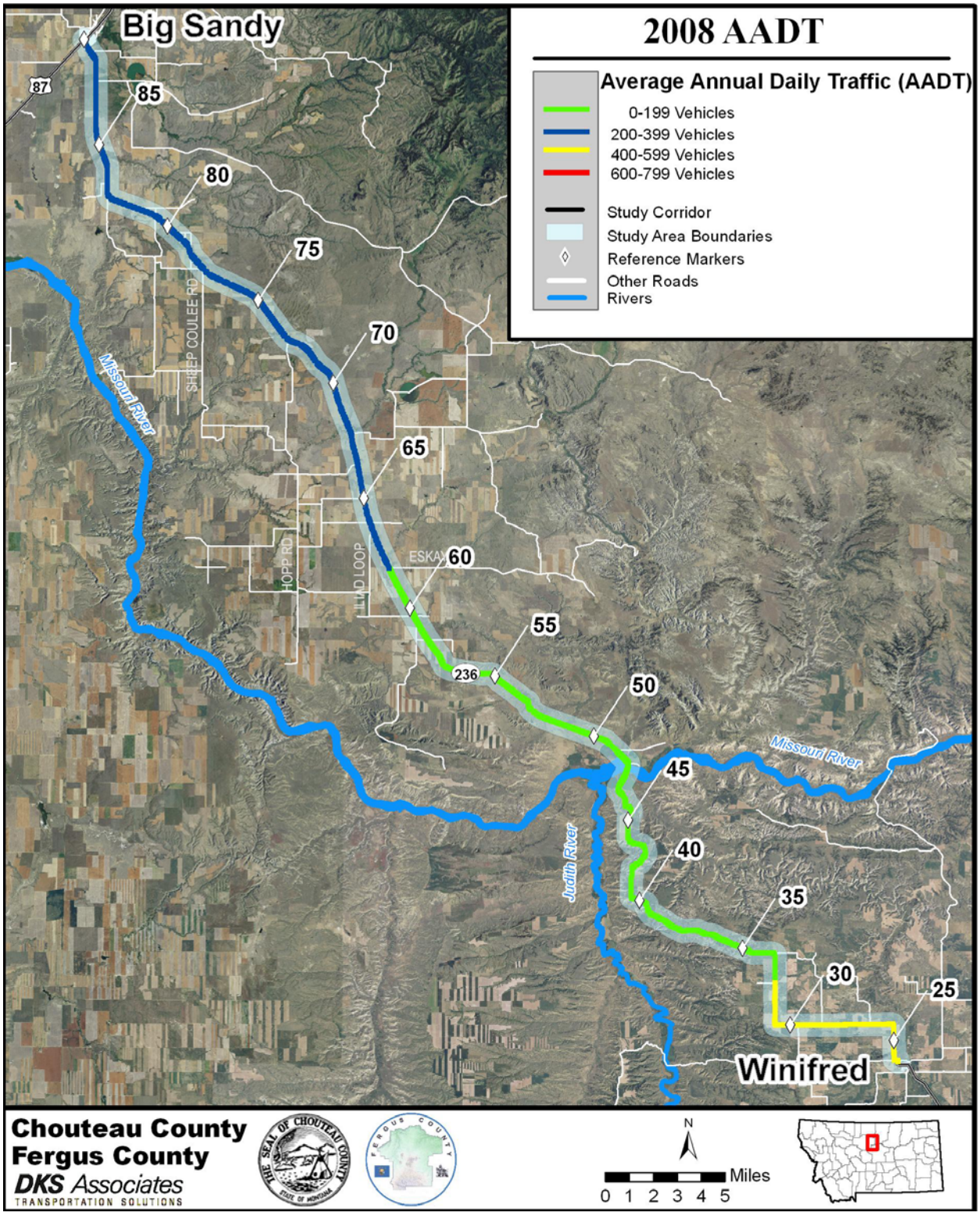
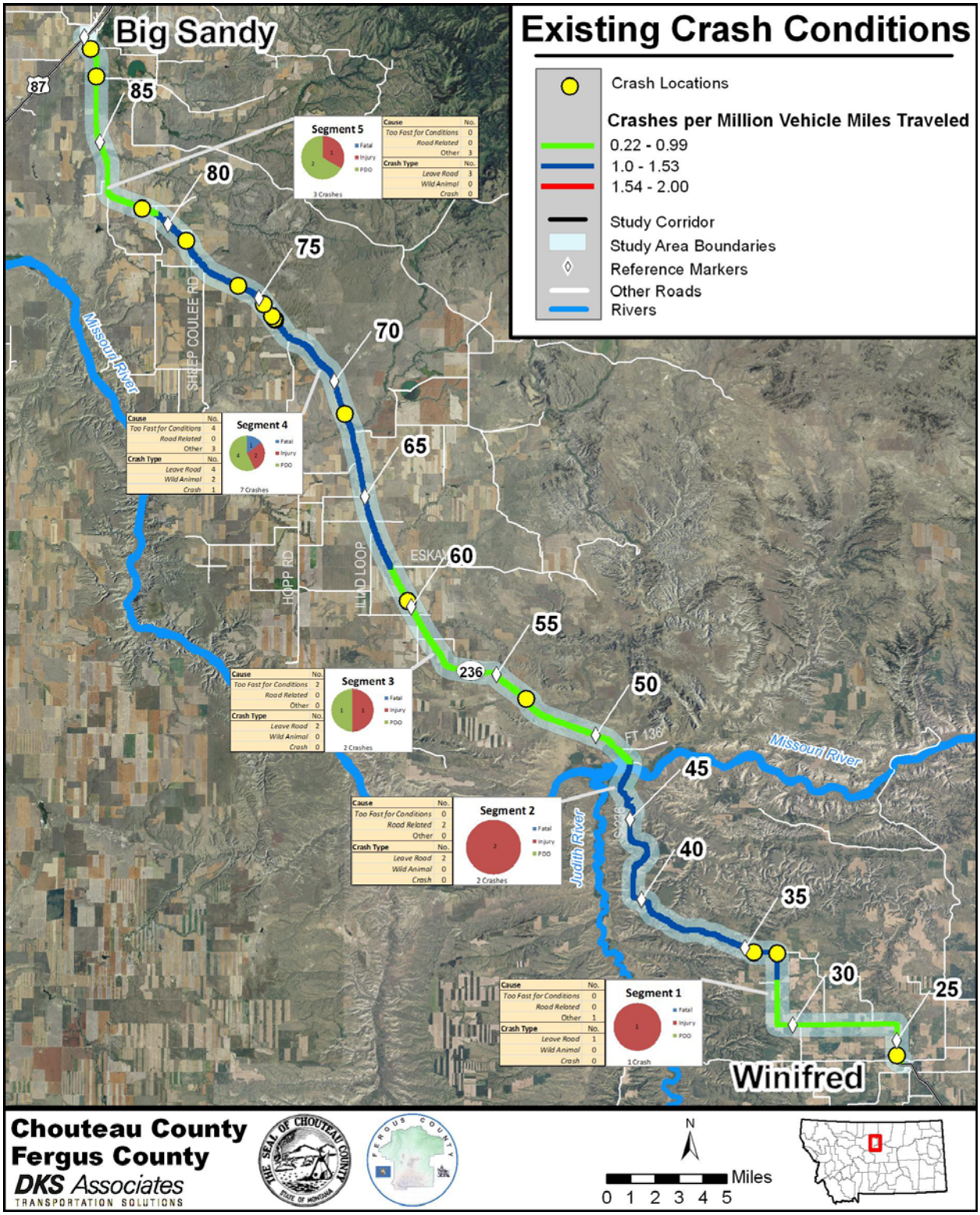

2008 AADT
Average Annual Daily Traffic (AADT)
0-199 Vehicles
200-399 Vehicles
400-599 Vehicles
600-799 Vehicles
Study Corridor
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
87
85
80
75
70
65
60
55
50
45
40
35
30
25
236
Winifred
Missouri River
Missouri River
Judith River
SHEEP COULEE RD
HOPP RD
ESKAY
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
N
Miles
0 1 2 3 4 5

Figure 5


Existing Crash Conditions
Crash Locations
Crashes per Million Vehicle Miles Traveled
0.22 - 0.99
1.0 - 1.53
1.54 - 2.00
Study Corridor
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
Winifred
Missouri River
Judith River
SHEEP COULEE RD
HOPP RD
ESKAY
FT 136
Segment 5
Segment 4
Segment 3
Segment 2
Segment 1
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
N
Miles
0 1 2 3 4 5

The overall crash rate for the corridor is 0.8 crashes per million vehicle miles traveled (MVMT) and is below the statewide average of 1.53 crashes per MVMT for rural state secondary roads.

Crash data includes reported crashes only; however, county officials and members of the public have pointed out that there are more crashes than the total number reflected in the crash data. Additional details regarding the crash analysis can be found in Appendix B.

Other safety related comments received from the counties and members of the public were that numerous geometric issues contribute to unsafe conditions, such as tight corners (90-degree curves) and sight distance restrictions (hills and corners along the roadway and roadside obstructions), and vehicle-generated dust causes reduced visibility.

It was also reported the road becomes difficult and dangerous to drive in wet or snowy conditions. Representatives from the school districts mentioned that they try to avoid the road when traveling to events out of the area due to concerns about safety.

3.1.3 Geometric Conditions

The current characteristics of roadway segments along the corridor were compared to MDT standards with regard to roadway width, stopping sight distance, passing sight distance, horizontal curve radius, vertical curvature, and maximum grade as discussed below.

Roadway Width

The top width of a roadway surface includes both travel lanes and shoulders. Within the paved portion of this corridor the travel lanes are delineated, but there are no shoulders. Within the gravel portion of the corridor, the roadway cross-section is a continuous surface with no delineation between travel lanes and shoulders. Drivers tend to follow the wheel path of other vehicles, resulting in rutting. In most of the wider sections of the roadway there are four ruts, two in each direction. In the narrower parts of the corridor, however, there are sometimes only three ruts, with the inside rut shared by drivers.

The roadway width standards for rural collector roads vary by traffic volume (see Appendix B). The applicable roadway width standard for this corridor is 24 feet as the current AADT is less than 300 vpd. Within the paved section on the north end of the corridor between RP 74 and RP 90, the roadway width is consistently 24 feet (Figure 6). The only locations not meeting the standard are very short segments near RP 31, RP 35, and RP 50, where the roadway narrows to cross culverts.

In the middle portion of the corridor between RP 62 and RP 74, the roadway widths increase to greater than 28 feet. Within most of this section, widths range from 38 to 44 feet, with one location having a width of 50 feet. The width of the roadway varies over time as the gravel is redistributed by passing vehicles and road maintenance crews apply differing amounts of gravel from one maintenance cycle to the next.

Roadway Alignment

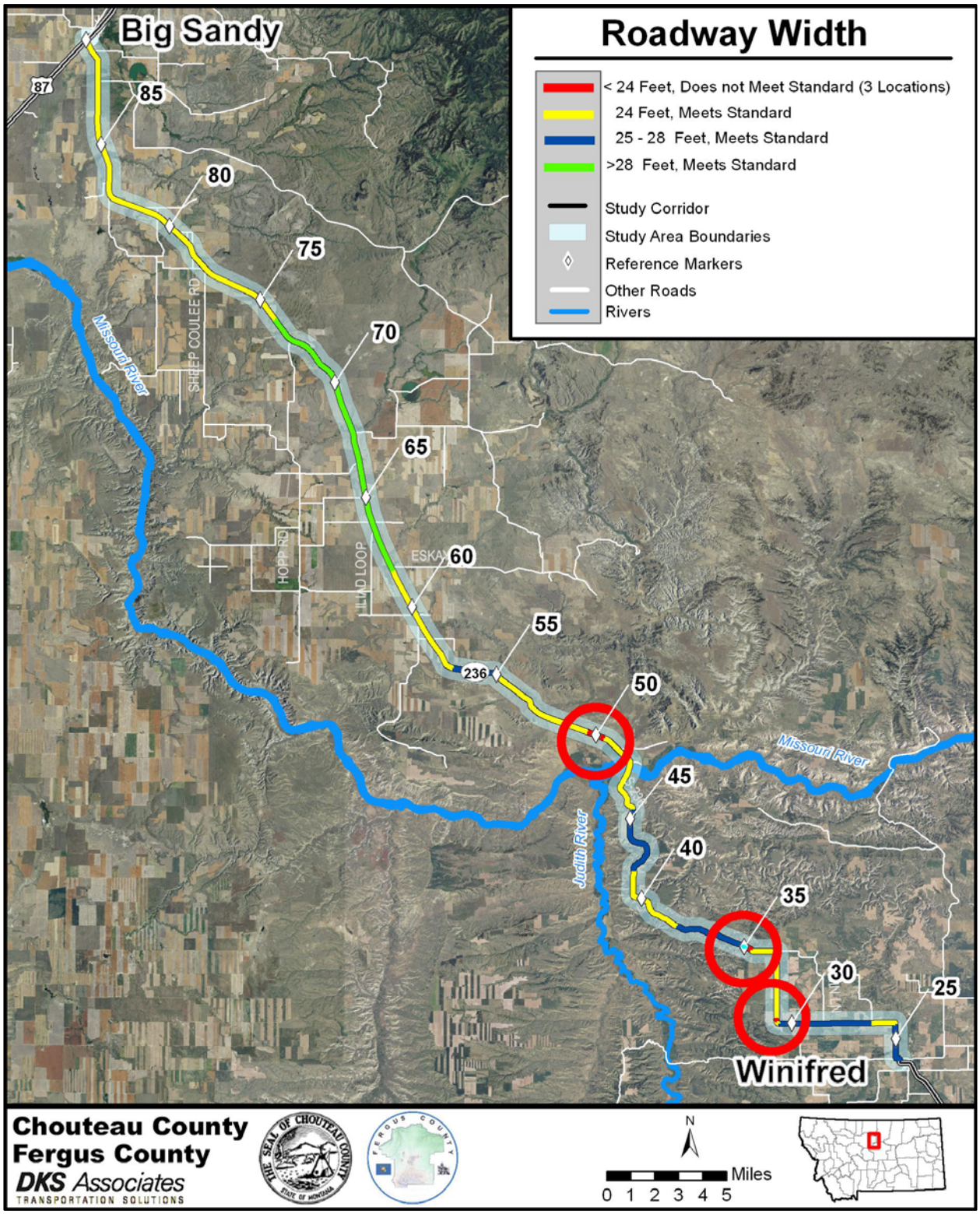
MDT's standards for stopping sight distance, passing sight distance, horizontal curve radius, vertical curvature, and maximum grade are based on the design speed of the roadway. These standards apply to both paved and gravel rural collector roads. For the majority of the corridor the terrain is relatively level and a design speed of 60-mph is used (Figure 7, shown in blue). On the south end of the corridor the terrain is rolling and the design speed is 50-mph.

Stopping Sight Distance

Stopping sight distance is the distance required for a driver to detect an object in the road, react, and bring the vehicle to a safe stop. The available stopping sight distance along a roadway can be affected by hills, curves, and roadside obstructions.

If a hill is too steep, the driver will not be able to see far enough ahead to come to a complete and safe stop to avoid an obstacle in the road. Limited sight distance along the corridor is primarily the result of the hilliness of the roadway. If a curve is too sharp, the sight distance will

Figure 6


Big Sandy
Winifred
Roadway Width
< 24 Feet, Does not Meet Standard (3 Locations)
24 Feet, Meets Standard
25 - 28 Feet, Meets Standard
>28 Feet, Meets Standard
Study Corridor
Study Area Boundaries
Reference Markers
Other Roads
Rivers
87
85
80
75
70
65
60
55
50
45
40
35
30
25
236
ESKAY
SHEEP COULEE RD
HOPP RD
LLD LOOP
Missouri River
Judith River
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
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Miles
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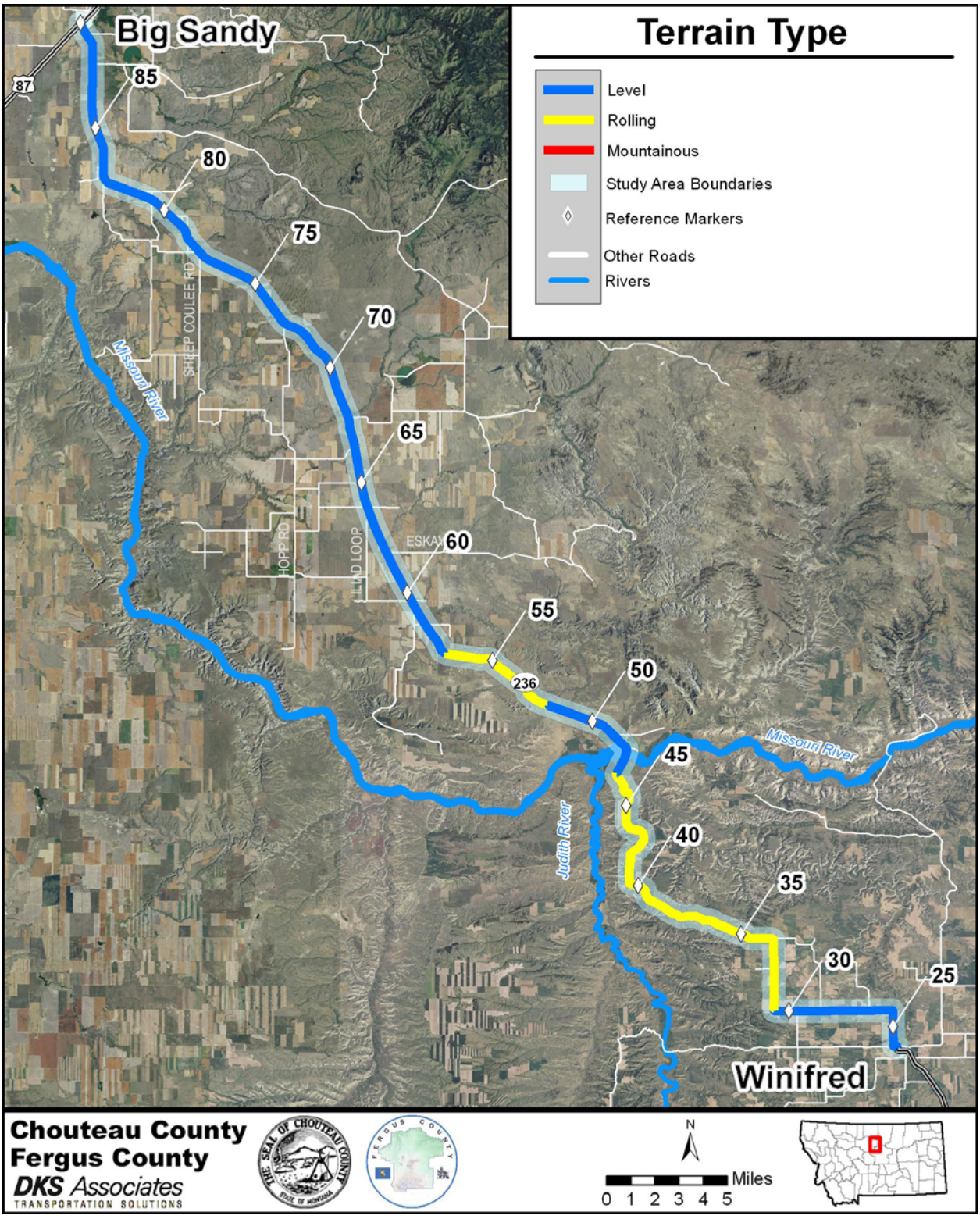
Figure 7


Terrain Type
Level
Rolling
Mountainous
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
Winifred
Missouri River
Judith River
SHEEP COULEE RD
HOPP RD
ESKAY
87
85
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Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
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Miles
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be inadequate, because the driver will not be able to see far enough around the curve. Roadside obstructions include such features as slopes, berms, vegetation, and man-made objects located adjacent to the road that block the driver's line-of-sight. The evaluation of stopping sight distance is covered in detail in Appendix B.

There are segments along the corridor where the stopping sight distance does not meet MDT's standard (Figure 8, shown in red). Most of these are located to the south of the Missouri River. Within this area, there are over 50 vertical curves that do not meet MDT's current design standard. Overall, MDT's standard for stopping sight distance is not met over roughly 14 % of the corridor.

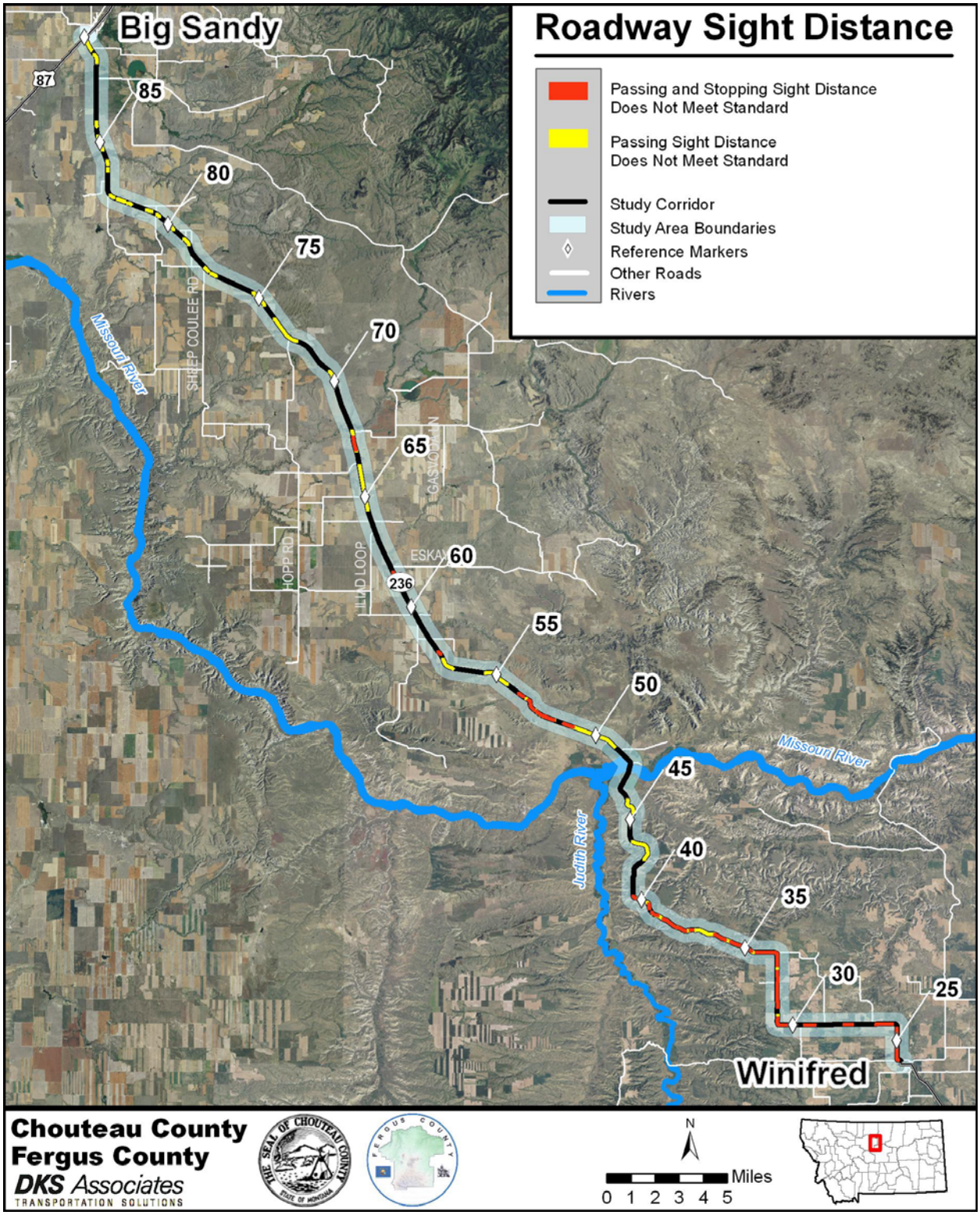
Passing Sight Distance

Passing sight distance is the distance required for a driver to detect an on-coming vehicle, decide whether there is adequate distance to pass, and then safely pass the slower-moving vehicle. The determining factors for passing sight distance include the speed of the vehicle to be passed, speed of the opposing vehicle, driving conditions, roadway surface conditions, driver characteristics, and vehicle condition. The requirements for passing sight distance are longer than those for stopping sight distance because the speed of the approaching vehicle must be accounted for.

Similar to stopping sight distance, the available passing sight distance along a roadway can be affected by hills, curves, and roadside obstructions. Details for the calculation of passing sight distance are covered in Appendix B. Additional segments where the passing sight distance standard only is not met are shown in yellow (Figure 8).

Overall, the percentage of estimated no-passing zones along the entire corridor is 60%. On the south end of the corridor between RP 24 and RP 40, there are almost no areas for passing. Other concentrations of no-passing zones exist between RP 49 and RP 55 and RP 65 and RP 67.

Figure 8


Roadway Sight Distance
Passing and Stopping Sight Distance Does Not Meet Standard
Passing Sight Distance Does Not Meet Standard
Study Corridor
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
Winifred
87
85
80
75
70
65
60
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236
Missouri River
Judith River
SHEEP COULEE RD
HOPP RD
ESKAY
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
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Curves

Curves are used to change the horizontal direction of the roadway. MDT's standard for curves is defined in terms of the curve radius. As vehicle speeds increase, the radius must be larger to allow vehicles to stay on the road while traveling around the curve.

As shown in Figure 9, there are 18 curves along the corridor that do not meet MDT's standards. Similar to the sight distance limitations, all of these are in the southern half of the corridor between RP 24 and RP 57. The highest concentration is in the area to the south of the Missouri River, where the roadway winds through hilly terrain. This includes three 90-degree curves just to the north of Winifred. Details for the curve standards and curve measurement and analysis are covered in Appendix B.

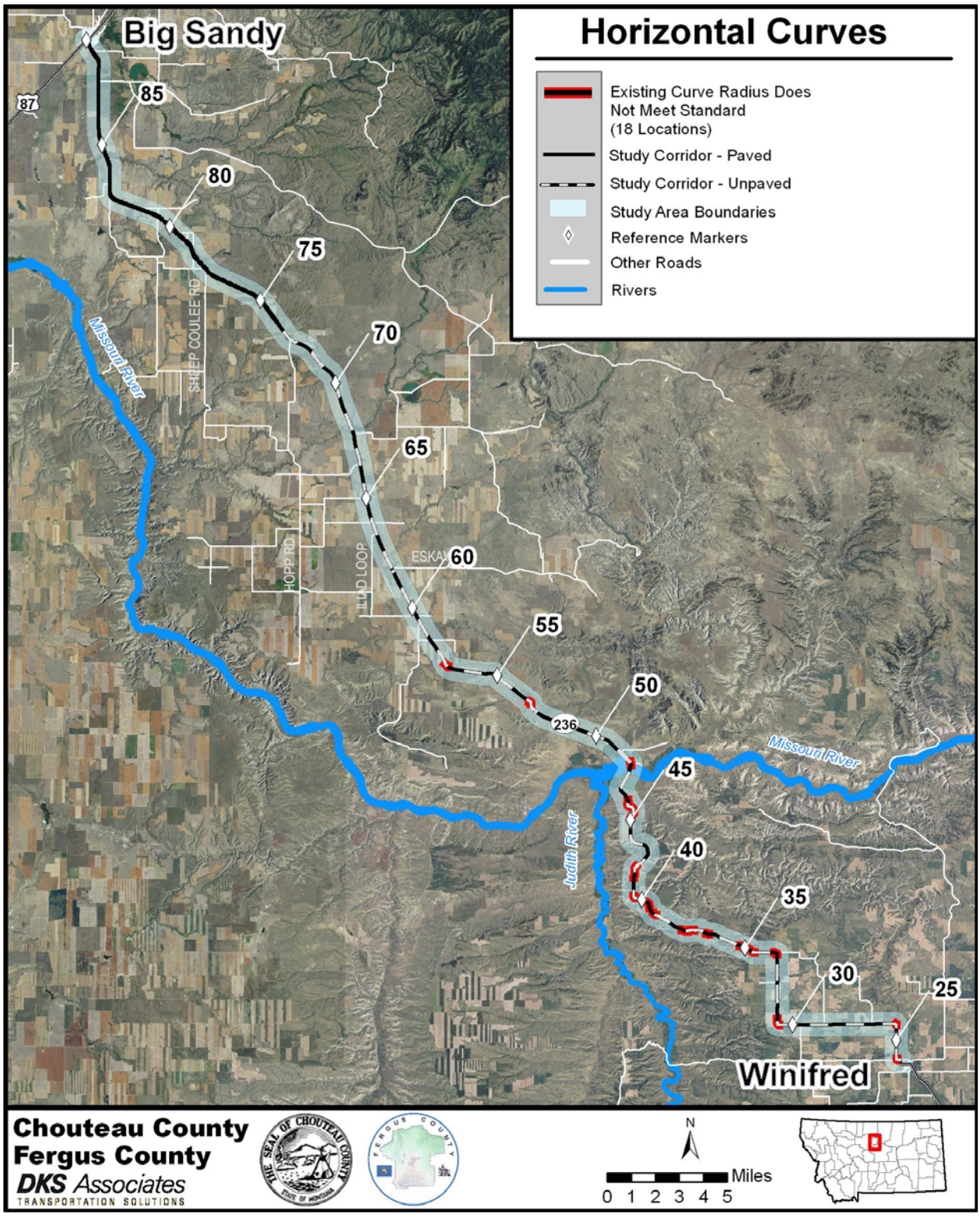
Grades

MDT's standards for maximum allowable grades are 5% in areas of level terrain, 7% in rolling terrain, and 10% in mountainous terrain. The standards attempt to balance roadway construction costs with roadway user costs. It is for this reason that the maximum allowable grades increase with the severity of the terrain.

Within the level segment between RP 24 and RP 30.5, the grades are $\leq$ 5%, so the standard is met. Within the rolling segment between RP 30.5 and RP 47, there are multiple locations where the grade exceeds the standard of 7% (Figure 10, shown in orange). The grade on the Claggett Hill portion of this section is 10%. Along the remainder of the corridor, there are only a few locations within the level segments (RP 47 to RP 52 and RP 57 to RP 90) and the rolling segment (RP 52 to 57) that do not meet the standard.

Details about MDT's standards for maximum allowable grades and the grade analysis are included in Appendix B.

Figure 9


Horizontal Curves
Existing Curve Radius Does Not Meet Standard (18 Locations)
Study Corridor - Paved
Study Corridor - Unpaved
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
Winifred
ESKAY
SHEEP COULEE RD
HOPP RD
ILLIAD LOOP
Missouri River
Judith River
87
85
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236
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
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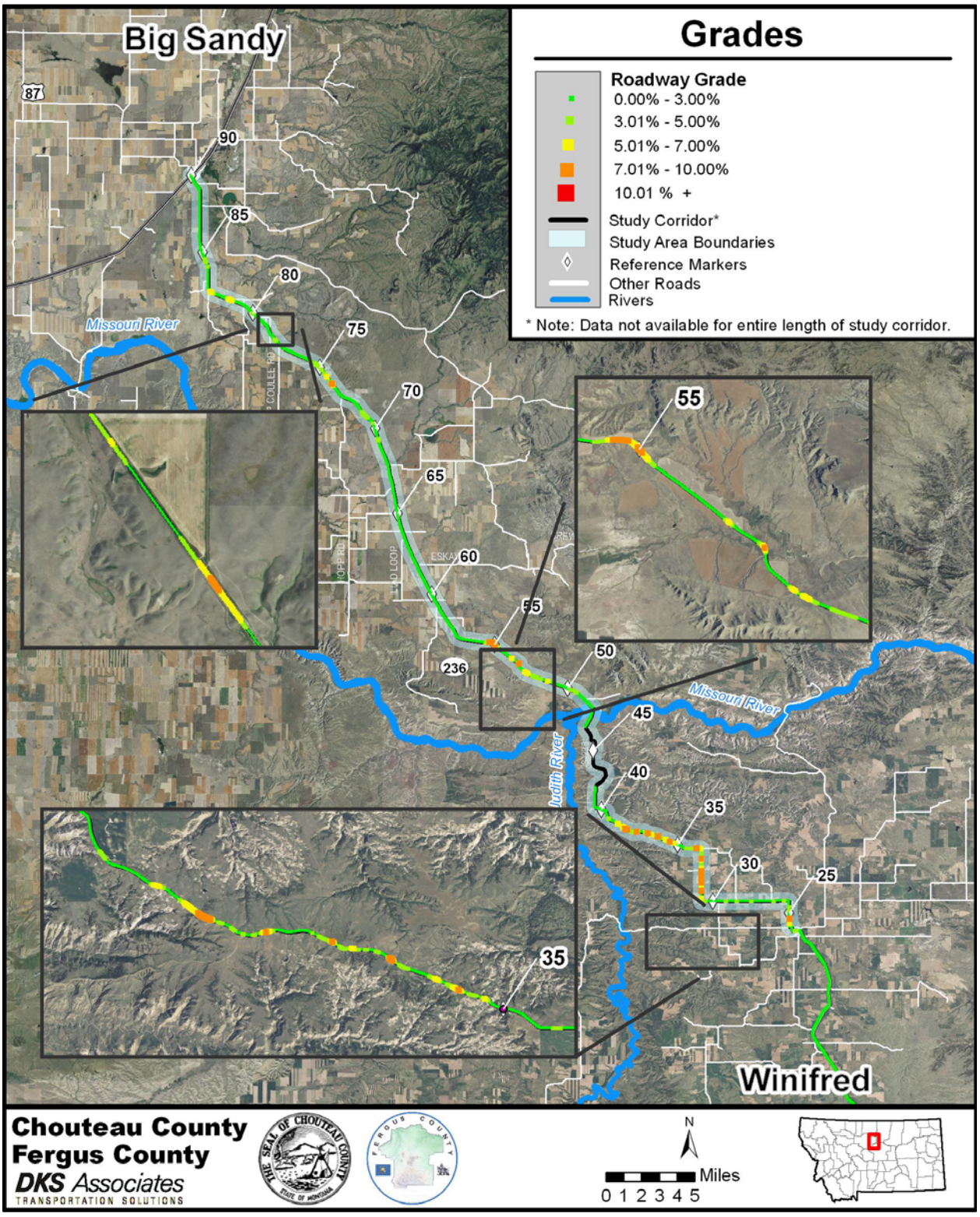
Figure 10


Big Sandy
Grades
Roadway Grade
0.00% - 3.00%
3.01% - 5.00%
5.01% - 7.00%
7.01% - 10.00%
10.01 % +
Study Corridor*
Study Area Boundaries
Reference Markers
Other Roads
Rivers
* Note: Data not available for entire length of study corridor.
Missouri River
Judith River
Winifred
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
N
Miles
0 1 2 3 4 5

Roadside Hazard Rating

The roadside clear zone is an important factor influencing the likelihood of errant vehicles being able to safely return to the roadway or come to a stop. The clear zone is defined as "The total roadside area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope and/or a recovery area."[2] Clear zones with stable, flattened slopes and relatively few fixed objects reduce the chance of serious consequences if a vehicle leaves the roadway.

There are many areas along the corridor where the clear zone is limited or does not exist. This is due to features such as ditches, steep drop-offs, irregular roadside surface conditions, and roadside obstructions.

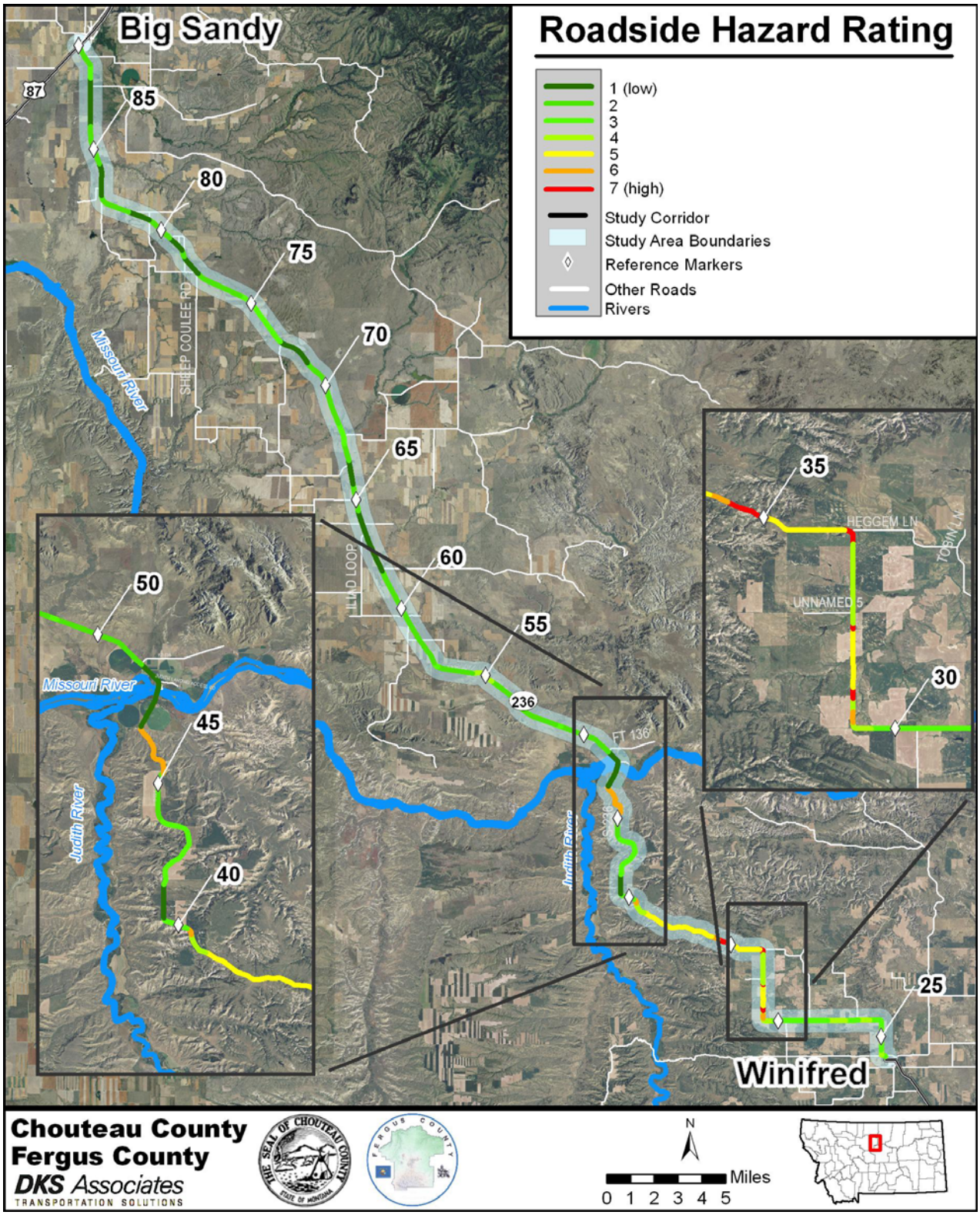
A roadside hazard rating system was used to assess the clear zone conditions along the corridor. The risk for crash frequency and/or severity increases as the roadside hazard rating increases from one to seven. The ratings are mostly "3" or better to the north of the Missouri River (Figure 11), meaning that vehicles running off the road generally can recover. To the south of the river, however, most of the corridor has a rating of "4" or worse. In this section, vehicles generally have little or no chance recovery. This includes several segments with ratings of "6" or "7". This condition is consistent with the findings for sight distance and horizontal curvature, reflecting the difficult terrain conditions in this portion of the corridor. Appendix B includes a detailed description of the roadside hazard ratings.

3.1.4 Intersections

In addition to roadway segments, existing roadway conditions were analyzed at all county road intersections along the corridor. It is important to consider intersection conditions because the

[2] Montana Department of Transportation, *Road Design Manual*, Helena, MT, December 2004.

Figure 11


Roadside Hazard Rating
1 (low)
2
3
4
5
6
7 (high)
Study Corridor
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
Winifred
87
85
80
75
70
65
60
55
50
45
40
35
30
25
236
FT 136
SHEEP COULEE RD
Missouri River
Judith River
HEGGEM LN
TOBIN LN
UNNAMED 5
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
N
Miles
0 1 2 3 4 5

configuration of intersections on the county road legs can affect traffic operations and safety conditions along the corridor.

Due to the sparse development within the study area, there are relatively few (30) county road intersections (Figure 12). These roads provide local access to the farms and ranches in the area. The traffic volumes are very low at all of the intersections.

The intersections were analyzed with regard to the following characteristics:

- Intersection angle
- Intersection sight distance
- Minor road approach grade
- Intersection turn radius

There are 10 study area intersections where the angle is too sharp. These are clustered near RP 24, RP 34, RP 60, and RP 80. Three intersections were identified between RP 24 and RP 32.5 that do not meet the standards (Figure 12). Two of these intersections are located on the 90-degree curves. The sight distance at these locations is limited due to roadside obstructions (hills), vertical curves, or skewed intersection alignment (see Appendix B for details). There are no intersections along the corridor with minor road approach grades greater than ± 3%. Thirteen intersections were identified where the turning radius is too tight.

3.1.5 Other Transportation Modes

Other transportation modes within the corridor study area are air, rail, and waterways. There are two public airports located just outside of Winifred and Big Sandy (Figure 13). The only rail line within the study area is the BNSF Big Sandy Subdivision, which runs between Havre and Big Sandy. There is no passenger rail service on this line. There is one gas pipeline that runs along the corridor. There are no major oil pipelines within the study area.

Figure 12

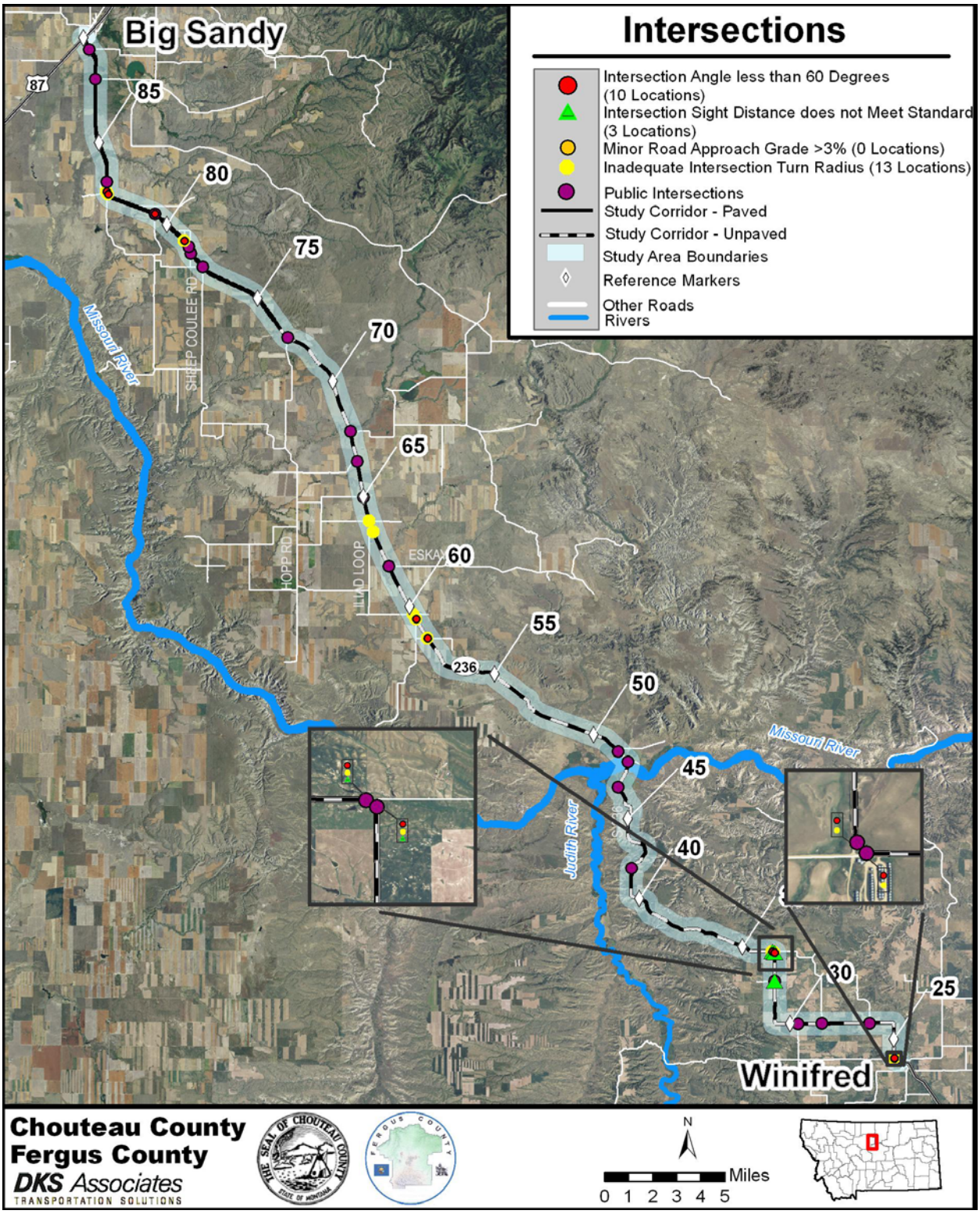
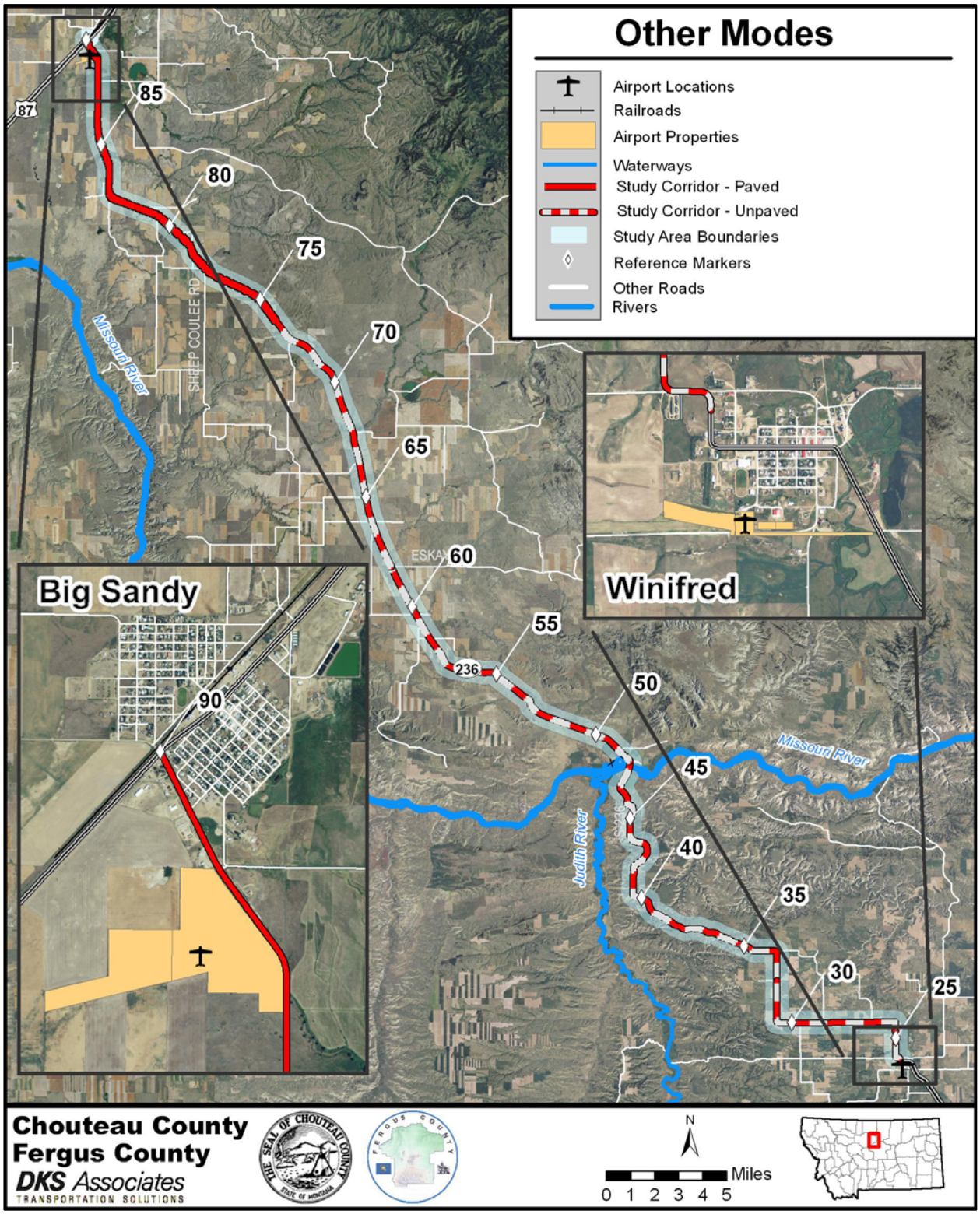

Big Sandy
Intersections
Intersection Angle less than 60 Degrees (10 Locations)
Intersection Sight Distance does not Meet Standard (3 Locations)
Minor Road Approach Grade >3% (0 Locations)
Inadequate Intersection Turn Radius (13 Locations)
Public Intersections
Study Corridor - Paved
Study Corridor - Unpaved
Study Area Boundaries
Reference Markers
Other Roads
Rivers
87
85
80
75
70
65
60
55
50
45
40
30
25
236
Missouri River
SHEEP COULEE RD
HOPP RD
ILLMO LOOP
ESKAY
Judith River
Winifred
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
N
Miles
0 1 2 3 4 5

Figure 13


Other Modes
Airport Locations
Railroads
Airport Properties
Waterways
Study Corridor - Paved
Study Corridor - Unpaved
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
Winifred
Missouri River
Judith River
SHEEP COULEE RD
ESKA
87
85
80
75
70
65
60
55
50
45
40
35
30
25
90
236
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
N
Miles
0 1 2 3 4 5

There are two rivers within the study area, the Missouri River and the Judith River. These are used for recreational activity.

3.2 Environmental Setting

An Environmental Scan Report was prepared for this corridor study to identify potential impacts, mitigation, and permitting requirements that may result if improvement options are forwarded from the study. In compliance with NEPA/MEPA regulations, state actions and federally-funded projects require a level of analysis to determine whether improvement options can be developed to avoid, minimize, or mitigate potential impacts to social, economic, and environmental resources. The following environmental elements may potentially be impacted (see Appendix C - Environmental Scan for more detail) and are summarized below.

Section 4(f)/Section 6(f)

Section 4(f) of the 1966 U.S. Department of Transportation Act (49 USC 303) applies if Federal transportation funds are used on a project and provide for the protection of publicly owned parks, recreation lands, historic sites, wildlife or waterfowl refuges, and any historic site of national, state, or local significance. If Section 4(f) properties are impacted, a Section 4(f) evaluation will be completed to demonstrate compliance. Under the requirements of Section 4(f), the Federal Highway Administration (FHWA) is required to consider avoidance alternatives to impacting Section 4(f) resources. If a feasible and prudent avoidance alternative to impacting a Section 4(f) resource exists, FHWA is obligated to select that alternative. If no feasible and prudent avoidance alternatives exist, FHWA is obligated to consider the alternative that results in the least harm to Section 4(f) resources. The Judith Landing Historic District and the Upper Missouri River Breaks National Monument are Section 4(f) resources located within the study area.

The National Land and Water Conservation Fund Act, Section 6(f), is intended to preserve, develop, and assure the quality and quantity of outdoor recreation resources. According to the

Montana Department of Fish, Wildlife and Parks Land and Water Conservation Fund list, Section 6(f) properties do not exist within the study area.

Soil Resources and Prime Farmland

The Farmland Protection Policy Act of 1981 was established to minimize the impact federal actions have on any unnecessary and irreversible conversion of farmland to nonagricultural uses and the compatibility with policies to protect farmland. Soil surveys are available (Chouteau and Fergus Counties) in the study area. Information regarding areas of prime farmland in the corridor area was compiled from the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS). The CPA-106 Farmland Conversion Impact Rating Form for Linear Projects is a way for the NRCS to keep inventory of the Prime and Important farmlands within the state. Soil map units found within the project area have been classified as Prime and Important farmlands. There is potential for farmlands to be impacted as improvement options develop. If a project is forwarded from this study, the environmental review process will likely require a CPA-106 Farmland Conversion Impact Rating Form for Linear Projects be completed. The process for completing this form requires mapping of the Prime and Important farmlands to be converted to non-farmable land, coordination with the NRCS, and final completion of the conversion form.

Geologic Resources

The study area is located within the Intermountain Seismic Belt, and several areas along the corridor are underlain by soils susceptible to liquefaction. In these areas, the roadway can sustain substantial damage during a large seismic event. As part of the project development process, seismic concerns will be considered, as necessary.

Surface Waters

The study corridor travels through the Middle Missouri Watershed. The Missouri River, Judith River, Eagle Creek, and Dog Creek are included in the 2008, 303(d) impaired water body list. As improvements options develop, the requirements of DEQ's Total Maximum Daily Loads (TMDL) standards and the Water Quality Restoration Plan will be considered.

Irrigation

If a project is forwarded from this study, impacts to irrigation facilities will be considered. If an impact is unavoidable, reconstruction or relocation of the existing facility would be a potential mitigation measure. Additionally, any potentially impacted irrigation facilities would be analyzed to determine if they are considered waters of the U.S. and subject to jurisdiction by the U.S. Army Corps of Engineers.

Wetlands

Portions of the Missouri River and several other drainages have wetlands associated with them. Wetland impacts should be avoided to the greatest extent practicable. If a project is forwarded from this study, field work including wetland delineations will be required. Unavoidable wetland impacts will be mitigated as required by the U.S. Army Corps of Engineers.

Wild and Scenic Rivers

The Wild and Scenic Rivers Act, created by Congress in 1968, provided for the protection of certain selected rivers, and their immediate environments, that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. The Missouri River is designated as a Wild and Scenic River within the study corridor area. If a project is forwarded from this study, coordination with the U.S. National Park Service will need to be conducted, as necessary, through the project development process.

Upper Missouri River Breaks National Monument

The Upper Missouri River Breaks National Monument is part of the Department of the Interior's National Landscape Monument System. Much of the land in this area is managed by the Bureau of Land Management (BLM). A portion of the study corridor is located within the monument. If a project is forwarded from this study, coordination with the BLM will be conducted as necessary.

Floodplains

Within the study corridor, there are no 100-year floodplains delineated by the Federal Emergency Management Agency (FEMA). There are no FEMA-issued flood maps for Chouteau County. If a project is forwarded from this study, coordination with Fergus and Chouteau Counties should be conducted during the project development process to verify no floodplain permits are necessary.

Hazardous Substances

Two petroleum release sites and several abandoned mines were identified in the general corridor area. If contaminated soils or groundwater are encountered during construction of a project forwarded from this study, handling and disposing of the contaminated material will be conducted in accordance with State, Federal, and local laws and rules.

Noise

A Preliminary Noise Screening Analyses may be necessary if a project is forwarded from this study. The likely locations for this type of study would be in or near Winifred, Big Sandy and near residences along the corridor.

Fish and Wildlife

If a project is forwarded from this study, recommendations for facilitation of wildlife movement and minimization of habitat disturbance through the study area will need to be considered during project development.

If a project is selected for construction, on-site surveys will need to be completed during the project development process.

Threatened and Endangered Species and Species of Concern

There are two threatened, endangered, proposed, or candidate animal species in the study area; the Black-footed Ferret and the Pallid Sturgeon. There are also several animal species of concern within the study area, including the Black-tailed Prairie Dog, Bald Eagle, and Sturgeon Chub. None of the vegetation found in the study area is currently listed as threatened, endangered, proposed, or candidate plant species. There are plant species within the study area listed as species of concern. If a project is forwarded from this study, an evaluation of potential impacts to threatened, endangered, proposed, or candidate species will need to be completed during the project development process.

Noxious Weeds

If improvements options are forwarded into project development the improvement options must adhere to the relevant federal, state, and local noxious weed laws and policies. Coordination with Chouteau and Fergus counties weed supervisors should commence during project development to establish specific guidance for noxious weed control relative to the improvement options.

Cultural and Archaeological Resources

The study corridor may contain a large number of cultural resources. Potential resources could include historic ranches and/or ranch buildings, tipi ring sites, lithic scatters, bison kill sites, and

pre-contact buried campsites. If a project is forwarded from this study, a cultural resource survey for unrecorded historic properties within the Area of Potential Effect will need to be completed during the project development process.

Environmental Justice

Title VI of the U.S. Civil Rights Act of 1964, as amended (USC 2000(d)) and Executive Order (EO) 12898 require that no minority, or, by extension, low-income person shall be disproportionately adversely impacted by any project receiving federal funds. This means no particular minority or low-income person may be disproportionately isolated, displaced, or otherwise subjected to adverse effects. If a project is forwarded from this study**,** Environmental Justice will need to be further evaluated during the project development process.

3.3 Future Transportation Conditions

3.3.1 Committed and Planned Improvements

There are no improvements for the corridor included in MDT's 2010-2014 State Transportation Improvement Program (STIP).[3] There are also no committed or planned improvements for county roads in either Fergus or Chouteau Counties.[4]

3.3.2 Traffic Projections

Based upon an assessment of potential future growth within the study area, a trendline forecasting method was used to estimate future volumes for the corridor. The trendline method used historic AADT traffic counts conducted by MDT at five locations along S-236 between 1980 and 2009. Traffic levels have fluctuated from year-to-year, but in general, they

[3] Montana Department of Transportation, *2010-2014 State Transportation Improvement Program*, Helena, MT, July 2010.
[4] Information received from Carl Seilstad, Fergus County Commissioner on October 4th, 2010 and Daren Schuster, Chouteau County Commissioner on July 10, 2010.

have increased by an average of 2.1 percent per year over the last 30 years (see Appendix B for details). This is equivalent to a growth of about 23 vehicles every 10 years. This growth increment was the basis for the 2030 AADT volumes (Figure 15).

Through the study's public involvement process, comments were received that if the corridor is improved, traffic from parallel routes may divert to S-236. This may be particularly true if the roadway is paved at some point in the future. The diverted traffic would be in addition to the growth in existing corridor traffic reflected in the trendline forecast.

The parallel routes to this corridor are MT 66 and MT 80. Both are paved routes that run in a primarily north-south direction. Current (2009) traffic levels are greater on these roadways than on this corridor. If this corridor were improved, the potential traffic volumes diverted from MT 66 and MT 80 to this corridor could increase. These increases were calculated for both a low (5%) and high (20%) scenario. Figure 14 shows the projected future volumes by segment for the trendline forecast and both diversion scenarios. Details about the traffic forecasts are included in Appendix B.

Figure 14
Future Traffic Growth

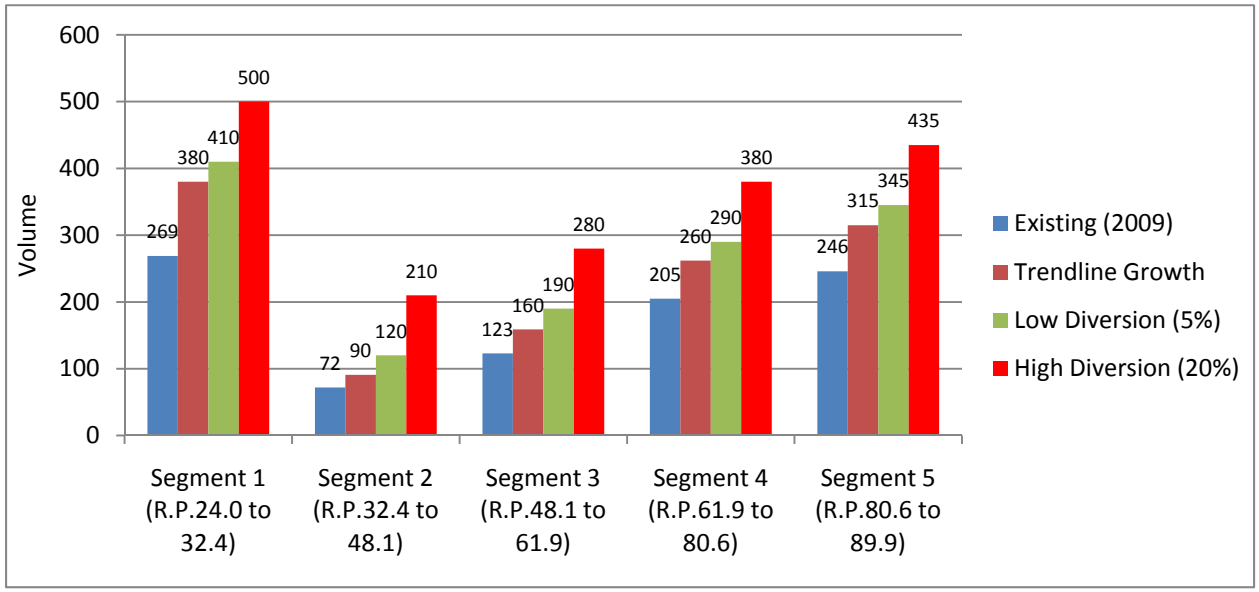
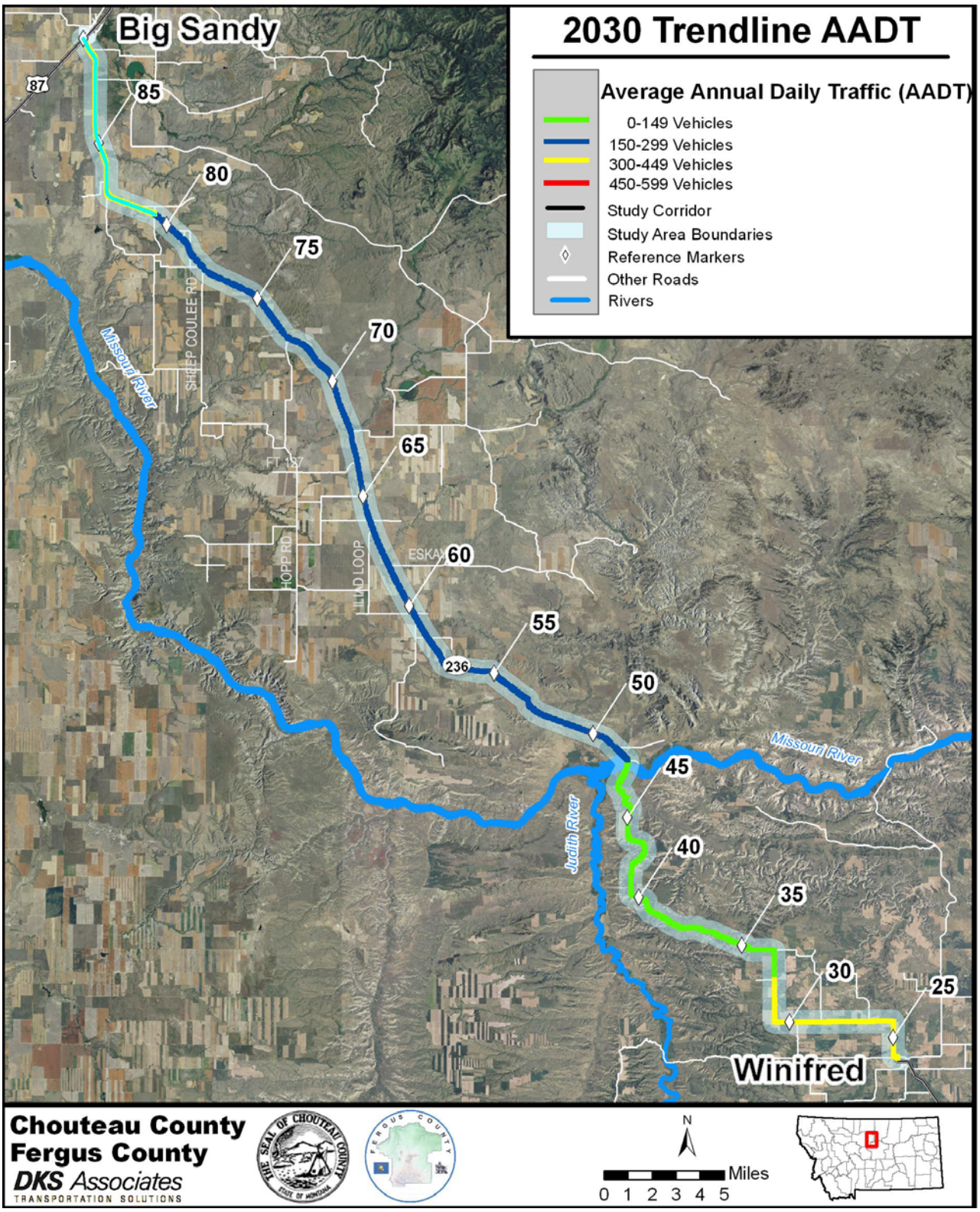


Figure 15


2030 Trendline AADT
Average Annual Daily Traffic (AADT)
0-149 Vehicles
150-299 Vehicles
300-449 Vehicles
450-599 Vehicles
Study Corridor
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
Winifred
87
85
80
75
70
65
60
55
50
45
40
35
30
25
236
Missouri River
Judith River
SHEEP COULEE RD
HOPP RD
ESKAY
FT 137
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
N
Miles
0 1 2 3 4 5

Of the MDT design standards used to assess existing transportation conditions in Section 3.1, the only one that varies by traffic volume level is the roadway width standard. Thus, for the trendline growth scenario, the roadway would need to be 28 feet wide for Segments 1 and 5 because the volumes exceed 300 vpd (Figure 15). The same width requirements would be true for the low diversion scenario, where traffic volumes for segment 1 and 5 continue to exceed 300 vpd. Under the high diversion scenario, Segment 4 would need to be 28 feet wide due to a traffic volume in excess of 300 vpd.

For the purpose of determining future roadway width requirements based on MDT's standards, a diversion rate of between 5% and 20% was considered to be a reasonable assumption. Within this range, the corridor would need to be 28 feet wide for Segments 1, 4, and 5. Because the current width of Segments 1 and 5 is less than 28 feet, these segments would not meet MDT's standard with the 2030 volumes. Segment 4 is greater than 28 feet in width between RP 61.9 and RP 74, so this portion of the segment would meet the standard. Between RP 74 and RP 80.6, however, the corridor is only 24 feet wide, so here the standard would not be met.

3.3.3 Other Transportation Modes

Based on the relatively low amount of future development expected within the corridor, no major changes are anticipated in future conditions for the other modes compared to existing conditions.

4.0 Consultation and Coordination

The study's consultation and coordination activities were designed to be inclusive, comprehensive, open, transparent, and continuous throughout the corridor planning process. The intent of these activities was to maximize the involvement and input from the public, project stakeholders, Chouteau and Fergus Counties, FHWA and MDT staff. The input from these groups was supported through public open house meetings in the towns of Winifred and Big Sandy, informational newsletters, a project website, local and regional press releases, and direct stakeholder contact.

4.1 Public Involvement Plan

The public involvement plan for the Winifred to Big Sandy Corridor Study established guidelines and procedures for encouraging public participation. The following list summarizes the communication strategies and techniques identified in the plan to distribute information to the community and seek a higher level of engagement.

- All approved, relevant deliverables and associated materials were posted on the study website at:

  http://www.mdt.mt.gov/pubinvolve/winifred/

- Informational meeting announcements and press releases for the newspaper were developed.
- Informational meetings were held with the public to receive input from the affected community.
- Study documents were provided to MDT for posting to the study's website and distributed to the Work Group to provide a better understanding of study issues and recommendations and provide study participants with feedback and an opportunity for continual comment. Hard copies of all materials were made available at the MDT Statewide and Urban Planning Section (2960 Prospect Avenue).

- Corridor property owners received mailings prior to the informational meetings
- Responses to questions and comments from the public concerning the public participation process and study deliverables were made via written response shown in Appendix A of this report. When warranted, the Consultant responded directly to an individual or group by letter or telephone call.

4.2 Informational Meetings

First Informational Meetings

Comments received from the public are summarized by the seven categories listed below.

General - There was substantial support for improving the road, particularly paving. The public indicated that they would like the study to culminate in roadway improvements. It was stated that the improvements should start to the south of the river.

Safety - Numerous safety issues were noted along the corridor. Poor horizontal and vertical alignment of the road and a lack of warning signs were identified as contributing factors. A safer roadway is needed for school bus trips and students driving to school who live along the corridor. School bus trips to locations out of the area avoid using the corridor altogether.

Traffic Operations - Several comments were received that there are frequent conflicts between agricultural and recreational traffic. This may be due to tourists traveling at speeds which are too fast for the roadway conditions. Poor road conditions also result in increased response time for emergency vehicles. There was also concern that increased traffic on the highway could pose a danger to cattle movements as the corridor is used to move cattle.

Geometrics - There were numerous comments about the issues and dangers presented by steep side slopes, 90-degree curves and blind hills and corners. There was consensus that these are areas of concern that should be addressed.

Road Surface Conditions - There were multiple comments from the public that the wider section of S-236 on the north end of the corridor has the poorest surface conditions because there is too much gravel. Wash boarding was also mentioned as an issue. Locations with little or no gravel were described as being dangerous in wet conditions and places with too much gravel were identified as a cause of vehicle damage. Between maintenance cycles the road condition often deteriorates. The poor condition of the road also increases the response time for first responders during emergency calls. The Claggett Hill section was noted as being shady and dangerous (icy) in the winter. Locations with little or no gravel were described as being dangerous in wet conditions and places with too much gravel were identified as a cause of vehicle damage.

Economic Benefits - Several economic benefits of improving the corridor were noted, including the increased potential for energy production, improved north-south connectivity, decreased cattle-hauling costs, and decreased vehicle wear-and-tear.

Other – A comment was received noting the state needs to reach an agreement to purchase land on the north side of the river at Judith Landing so that it can be improved and properly maintained/operated to serve tourist traffic accessing the river.

Second Informational Meetings

Most of the questions raised at the meetings concerned funding for improvements. There were several questions about potential funding sources and how the money would be spent once it is received. It was explained that there are several funding sources available and that project priorities would be determined by the counties. Other questions were raised about how the public could support the search for funding. The response was that members of the public should write letters to the congressional delegation in Washington D.C. expressing their support for improvements along the corridor.

There were several other questions about the phasing and timing of construction (i.e., specifically which section would be constructed first). It was explained that in the past, MDT

has worked with the counties to improve sections of the road as money became available. The counties selected the section to be improved and to what level of improvement with MDT administering the project. The same approach will be taken for this roadway.

A specific concern was raised about how the wide portion of the corridor between RP 60 and RP 74 would be addressed because maintenance of the gravel in this section is a significant cost to the county. The response was that new options are available for all-weather surface and soil stabilization. The new width will be substantially narrower than what is there now. The narrower surface will be easier to maintain.

4.3 Stakeholder Interviews

Stakeholder interviews were conducted between the months of June and August 2010. Fourteen participants answered six questions about their use of corridor and their concerns. The stakeholders were chosen to represent a cross-section of the local community, farms and businesses, environmental interests, and local government. The list of questions and transcribed responses are included in Appendix A. The responses are summarized below.

Interview Summary

Many of the responses mirrored the comments received at the first informational meetings about roadway geometrics, steep side slopes and the lack of warning signs. High county maintenance costs and poor surface conditions were also mentioned. Table 1 contains a list of the interviewees.

In general, residents, farms, and businesses use the corridor on a regular basis. Emergency responders, such as the sheriff, fire department, and medical services travel the corridor regularly to respond to emergency requests. The sheriff's office also routinely patrols the corridor. People who do not live, work, or have a business in or around the towns of Winifred or Big Sandy use the corridor with much less regularity, as little as once per year. Corridor users from outside the study area use it to access other destinations, such as Billings or Lewistown.

Table 1
Stakeholder Interviewees

Stakeholder	Association
Fire Chief	Big Sandy Fire Dept.
Representative	Town of Big Sandy
Sheriff	Chouteau County Sheriff
Mayor	City of Havre
Sheriff	Fergus County Sheriff
Commissioner	Hill County
Transportation Staff	Lewistown Schools
City Manager	City of Lewistown
Representative	Missouri River Company
Representative	Mountain View Co-op
Mayor	Town of Winifred
Safety Director	Triangle Telephone Co-op
Fire Chief	Winifred Fire Dept.
President	Friends of the Missouri Breaks

4.4 Resource and Other Agency Consultation

Meetings were also held to solicit input on the concerns and comments of resource agencies and the MDT, Chouteau County, and Fergus County Road Maintenance Departments.

Resource Agency Meeting

The resource agency meeting, held on July 7, 2010, was well-attended by representatives from seven different agencies. The meeting provided an opportunity for the study team to receive input from the agencies regarding issues and concerns within the study area.

The Consultant gave a presentation that included an overview of the study, a review of findings from the existing transportation and environmental conditions analysis, and a summary of comments received from the public at the Winifred informational meeting. A roundtable discussion of the issues and concerns pertinent to each agency's mission and responsibilities within the corridor was conducted. The minutes from this meeting are included in Appendix A. There were not major concerns identified by the agencies.

MDT and County Maintenance Departments Meeting

The project team met with representatives from the MDT and county road maintenance departments on April 28, 2010 to discuss locations of concern along the corridor from a maintenance perspective. Large roll-maps of the area were used to facilitate the identification of areas of concern. The maps were also used for recording comments. The maintenance staff had multiple concerns about safety, geometrics, or difficult/costly-to-maintain sections of road. Minutes from the meeting are included in Appendix A.

5.0 Needs and Objectives

The needs for the corridor were developed based on the assessment of existing and future conditions along the corridor. The needs describe the general areas of concern reported by the public, stakeholders, and resource/other agency staff and the issues identified in the existing and future conditions analysis.

Two main needs were identified – "Improve Roadway Safety" and "Improve Roadway Surface Conditions". Within each of the needs, the following objectives were defined:

I. Improve Roadway Safety

To the extent practicable, improve:

A. Overall geometry[5]
B. Public intersections
C. Consistency of roadway width
D. Roadside clear zone

II. Improve Roadway Surface Conditions

To the extent practicable:

A. Allow for all-weather travel
B. Reduce roadway maintenance costs
C. Improve emergency response times

The needs and objectives were used in the development of preliminary improvement options.

[5] Overall geometry includes geometric features such as stopping sight distance, passing sight distance, horizontal alignment, and vertical alignment.

6.0 Improvement Options

6.1 Issue Locations

Locations along the corridor were identified where issues existed. Two criteria were used in making this determination:

- An issue was identified through the existing and future conditions analysis or it was reported as an area of concern through the public involvement process; and
- A reasonable level of justification for an improvement could be established.

For example, if at a particular location a design standard was not met, and this location did not pose a significant safety or operational issue, the location was dropped from further consideration. If both criteria were met, improvement options were developed for the location.

6.2 General Improvement Types

A range of options was developed to ensure that all feasible improvement options could be considered. Factors considered were:

- Input received from the public, stakeholders, and resource/other agency staff
- Consistency with MDT standards and policies
- Existing and future roadway geometrics
- Feasibility of implementation

The feasibility of an improvement option was based on the magnitude of the cost, physical and/or environmental constraints, and potential impacts. The general improvement types considered for each type of issue are shown in Table 2.

Table 2
General Improvement Types

Issue	Improvement Types
Roadway Width	Widen roadway
Roadway Surface	1. Remove and replace existing road base and surface with alternative material. 2. Improve roadway drainage. 3. Use well-graded materials for road base and surface.
Vertical Curve	1. Flatten vertical curve. 2. Install advance warning signs.
Horizontal Curve	1. Increase curve radius. 2. Install advance warning signs.
Roadside Hazard	1. Remove embankment. 2. Remove vegetation. 3. Relocate utility poles. 4. Reduce steepness of side slope. 5. Install guardrail.
Intersection Sight Distance	1. Remove vegetation. 2. Flatten vertical curve.
Skewed Intersection	1. Realign intersection. 2. Widen minor road approaches.
Intersection Turn Radius	1. Realign intersection 2. Widen minor road approaches.

Descriptions of the general improvement types are provided below.

6.2.1 Roadway Width Improvements

Narrow roadway widths create potentially unsafe conditions between vehicles traveling in opposing directions and reduce the driver's margin of error. All of the sections with a narrow roadway width are located in the gravel portion of the corridor. For narrow sections, consistent width would be developed to meet MDT standards.

Figure 16: Narrow roadway near Murphy Lane (RP 30.8)

6.2.2 Roadway Surface Improvements

Figure 17: Poor roadway surface near Berlinger Rd. (RP 68.7)

Within the gravel portion of the corridor, there are areas with poor road surface conditions that can have adverse effects on driving safety, riding comfort, and vehicle condition. In addition, poor surface conditions can increase maintenance costs, reduce speeds, and increase emergency vehicle response times. In some cases, these issues can be addressed by improving the roadway drainage or replacing the existing materials with a better mixture of the rock, clay, sand, and silt materials comprising the road base and surface. In other cases, it may be necessary to remove and replace the existing road base and surface with an alternative type of material.

6.2.3 Vertical Curve Improvements

Figure 18: Vertical curve near RP 35.7

There are two general types of improvements that address sight distance issues caused by vertical curves. The first option is to flatten the curve. For crest vertical curves, this would involve "shaving" the top of hill to increase the driver's stopping sight distance. For sag curves, which occur at the bottom of a hill, this would be done by filling in the sag.

The second option for addressing sight distance issues is to post advance warning signs. This may be done when the cost or some other type of constraint eliminates the possibility of removing or reducing the vertical curve.

6.2.4 Horizontal Curve Improvements

Horizontal curves that are too sharp can result in limited sight distance as well as the potential loss of vehicle control. The first type of improvement to address these issues would be to increase the radius of the curve. This has the effect of lengthening the curve so that the change in direction is smoother and more gradual. Increasing the radius of a curve involves realignment of the roadway, which in rolling terrain may require the cutting of hillsides. If this option is not feasible due to cost or physical constraints, advance warning signs may be posted, similar to what is done for vertical curves. Typically, these signs indicate the direction of the upcoming curve with a curved arrow, with a placard below showing the recommended speed.

Figure 19: Horizontal curve near Heggem Ln. (RP 33.6)

6.2.5 Roadside Hazard Improvements

Roadside hazards reduce the ability of the driver to make a safe recovery if the vehicle leaves the road. Along the corridor there are several types of roadside hazards, including steep side slopes and embankments, trees, and utility poles. These are a particular issue in areas with sharp horizontal curves that may result in run-off-the-road crashes. MDT's general strategy for dealing with roadside hazards is to first try to remove the hazard. Examples of this would be the removal of an embankment, cutting of trees, relocation of utility poles, and reducing the steepness of a side slope. If these measures are not feasible, the second approach would be to consider the installation of guardrail to reduce the likelihood of vehicles entering the roadside clear zone.

Figure 20: Severe side slope near Murphy Ln. (RP 30.8)

6.2.6 Intersection Sight Distance Improvements

There are several locations along the corridor where the sight distance for drivers on the county road intersection approach is restricted due to vegetation or vertical curves near the intersection. This creates a potentially unsafe situation in which drivers may inadvertently pull into oncoming traffic. The two general improvement options would be to flatten the vertical curves or remove the vegetation.

Figure 21: Restricted intersection sight distance at Stulc Ln. (RP 32.4)

6.2.7 Skewed Intersection/Intersection Turn Radius Improvements

Skewed intersections occur where the intersecting roads meet at an angle that is too sharp. This can result in limited sight distance for stopped vehicles on the approach road. Tight turns can occur if the lanes on the approach road are too narrow or the angle is too severe, requiring larger vehicles to use the opposing travel lane. For skewed intersections, realignment may be necessary to correct the issue. If the issue is tight turns, the issue can generally be resolved by widening the lanes on the approach road.

Figure 22: Skewed intersection at Eight Mile Bench Road (RP 59.4)

6.3 Evaluation of Improvement Options

A set of screening criteria was developed that were consistent with the needs and objectives. The screening criteria are summarized in Table 3.

Table 3
Improvement Option Screening Criteria

Criteria	Description
1. Cost	Planning level cost estimate for the improvement option.
2. Constructability	Estimated feasibility of construction.
3. Minimization of environmental impacts	Estimated amount of environmental impacts, including encroachment on private property.
4. Satisfies need	Degree to which the identified issue is addressed by the improvement option.
5. Implementation time frame	Time required to complete the project programming and environmental documentation phases of the project implementation process.
6. Potential for project bundling	Possibility of combining the improvement option with a similar, nearby improvement.
7. Additional benefits	Additional benefits of the improvement option beyond those of addressing the identified issue.
8. Consistency with ultimate corridor configuration	Degree to which the improvement option would match the features of a fully-developed corridor.

For each improvement option, scores were developed for the criteria. The option with the highest total score was identified as the recommended option. More detailed information on the screening criteria and procedure can be found in Appendix D – Improvement Options.

6.4 Project Bundles

Projects that are similar and have close proximity are more efficient to implement as a group or bundle. The proposed project bundles are only preliminary groupings of the improvement options. The bundles may also serve as a starting point for future project development. How the improvement options would be implemented will depend on the amount and timing of future funding and the implementation strategy decided upon by the counties, in coordination with MDT.

The following two examples show how the project bundles may be modified:

- Example 1: In addition to constructing the spot improvement options, the segment of road within the bundle will be paved at the same time. If available funding is $2 million and the estimated cost of the improvements, including the paving, is $2.5 million, an adjustment could be made to shorten the length of original segment to fit the available funding.
- Example 2: If instead of improving the corridor segment-by-segment, it is more important to address high priorities throughout the corridor, the bundles could be broken into smaller project subgroups comprising the high priorities.

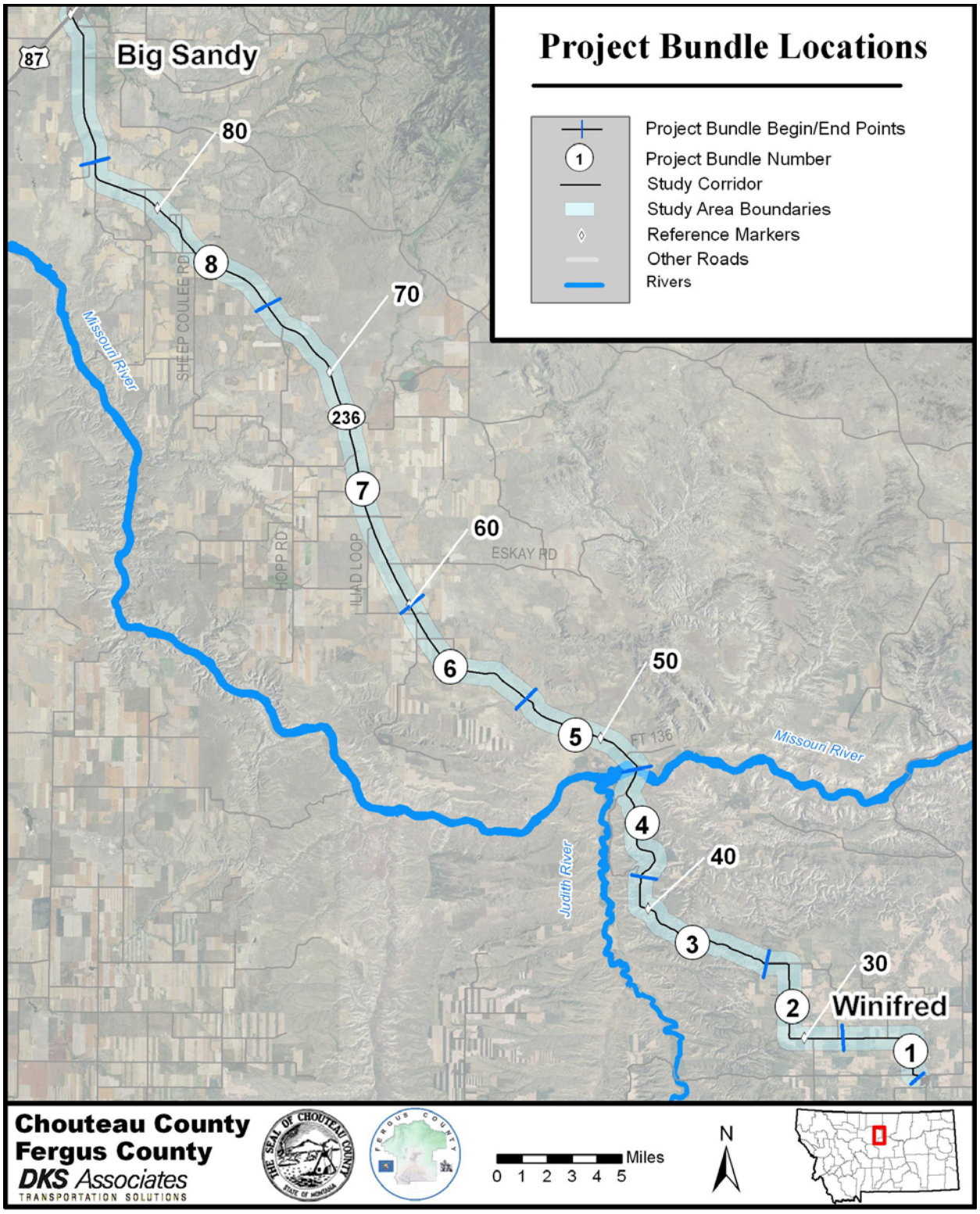
The locations of the proposed project bundles are shown in Table 4 and Figure 23.

Table 4
Proposed Project Bundle Locations

Project Bundle	Location	From RP	To RP
1	North of Winifred	24.0	29.5
2	Murphy Ln. to Heggem Ln.	29.5	34.5
3	Badd's Place	34.5	41.8
4	Claggett Hill	41.8	48.0
5	North of Missouri River	48.0	53.5
6	Near Jappe Trail	53.5	60.0
7	The "Wide Spot"	60.0	74.0
8	Hopp Rd. to Lone Tree Trail	74.0	83.5

The proposed project bundles extend from north of Winfred (RP 24.0) to south of Big Sandy (RP 83.5). There is no bundle for the northernmost portion of the corridor between RP 83.5 and RP 90 because no improvements were identified for this area. Brief summaries of the project bundles are provided below. Detailed information on the specific recommended improvements at each location can be found in Appendix D – Improvement Options.

Figure 23


Project Bundle Locations
Project Bundle Begin/End Points
1
Project Bundle Number
Study Corridor
Study Area Boundaries
Reference Markers
Other Roads
Rivers
Big Sandy
87
80
8
70
236
7
60
6
50
5
4
40
3
30
2
Winifred
1
Missouri River
SHEEP COULEE RD
HOPP RD
ILIAD LOOP
ESKAY RD
FT 136
Judith River
Chouteau County
Fergus County
DKS Associates
TRANSPORTATION SOLUTIONS
Miles
0 1 2 3 4 5
N

Project Bundle 1 – North of Winifred (RP 24.0 – 29.5)

Project Bundle 1 begins on the northern outskirts of Winifred where the roadway surface type transitions from pavement to gravel. Along this segment of the corridor, there are a number of vertical curves and cut slopes where the roadway passes through hilly terrain. There are also two 90-degree curves where vehicles must slow from the posted 45-mph speed limit. Access to the corridor consists of several low-volume county road intersections, as well as widely-spaced rural residential driveways and farm field accesses.

Figure 24: Vertical curves near Tobin Ln. (RP 28.6)

The recommended improvement types within Bundle 1 are:

- Flatten the vertical curves.
- Increase the radius of the 90-degree curves.

Project Bundle 2 – Murphy Lane – Heggem Lane (RP 29.5 – 34.5)

Between Murphy Lane and Heggem Lane, the roadway has several abrupt changes in elevation as it traverses coulees. There are two major 90-degree curves and two smaller horizontal curves along the alignment. As with Bundle 1, access to the road is limited to a few county roads, rural residential driveways, and farm field accesses.

Figure 25: Combined horizontal/vertical curve and roadside obstruction south of Stulc Ln. (RP 31.5)

The recommended improvement types within

Bundle 2 are:

- Flatten the vertical curves.
- Increase the radius of the 90-degree curves.
- Reduce roadside hazards.
- Decrease the amount of blowing and drifting snow.

Project Bundle 3 – Badd's Place (RP 34.5 – 41.8)

Project Bundle 3 starts to the west of Heggem Lane and continues north and west to the junction with the old S-236 alignment. This segment is significantly hillier than the other project bundles, with many tight horizontal and vertical curves and various roadside obstructions. There are places along the alignment where there are steep drop-offs on one or both sides of the road and other locations where horizontal curves wrap around cut slopes on steep hills. In addition to the poor geometric features of the road, there are several locations where there are trees or other roadside obstructions within the roadside clear zone. Access to the road is limited to a few rural residential driveways and farm field accesses.

Figure 26: Combined horizontal/vertical curves. (RP 36.9)

The recommended improvement types within Bundle 3 are:

- Flatten the vertical curves.
- Increase the radius of the tight horizontal curves.
- Reduce the roadside hazards through the removal of obstructions or installation of guardrail.

Project Bundle 4 – Claggett Hill (RP 41.8 – 48.0)

Figure 27: Claggett Hill (RP 46.1)

Project Bundle 4 starts at the junction with the old S-236 alignment and ends at the Missouri River. The roadway and surrounding land are on the top of a mostly level plateau that drops into canyons converging north to the Missouri River. To accommodate this, there are a handful of horizontal curves that follow the edge of the plateau for much of its distance. MDT constructed this new roadway alignment in 2009, which includes the section known as Claggett Hill. This is the steepest section of the corridor, with a slope of nearly 10 percent. In addition to the steepness of the slope, this section is also prone to icing during the winter when the road is shaded for the entire day by the hill above. Access to the road is from the old S-236 alignment and a few rural residential driveways and farm field accesses.

There is no simple solution that directly addresses the issue of icing on the roadway. Instead, chain-up areas are recommended at the top and bottom of the hill that would provide drivers with a safe place to put on and take off chains. There are no other recommended improvements within this segment.

Project Bundle 5 – North of Missouri River (RP 48.0 – 53.5)

Figure 28: S-curve near Chip Creek. (RP 53.2)

Project Bundle 5 starts at the Missouri River and continues northwest to an S-curve near Chip Creek. Poor road surface conditions and a handful of horizontal and vertical curves characterize this segment of the corridor. The S-curve has been identified by the public and MDT/county staff as an area of concern because of the horizontal and

vertical curves and a roadside obstruction that limit sight distance through the curves. Access to the road is from two county roads and a few rural residential driveways and farm field accesses.

The recommended improvement types within Bundle 5 are:

- Flatten the vertical curves.
- Increase the radius of the tight horizontal curves.
- Install advance warning signs at the S-curve.

Project Bundle 6 – Near Jappe Trail (RP 53.5 – 60.0)

Project Bundle 6 starts to the north of the S-curve near Chip Creek and continues northwest to the area known as the "Wide Spot." The gravel surface within this segment has been reported to have wash board issues in certain areas as a result of the grades and heavy vehicle traffic. While much of the alignment is straight, there are a handful of tight horizontal curves that could cause the loss of vehicle control. There is also a steep section near Jappe trail and several isolated vertical curves that limit sight distance along the roadway. Due to the alignment of the road and the location of property boundaries, there are several intersections with skew angles of 60-degrees or less, which can limit intersection sight distance and cause larger vehicles to turn into the opposing travel lane.

Figure 29: Hill near Jappe Trail (RP 55.1)

The recommended improvement types within Bundle 6 are:

- Flatten the vertical curves.
- Increase the radius of the tight horizontal curves.

- Realign the minor roads at skewed intersections to create a 90-degree angle with S-236.

Project Bundle 7 – The "Wide Spot" (RP 60.0 – 74.0)

Project Bundle 7 starts to the north of Iliad Loop and continues north by northwest to the beginning of pavement. Nearly all of this segment comprises an area known as the "Wide Spot", where the gravel cross-section is 50 feet wide in some locations. Soft spots with poor drainage and maintenance issues have been identified by the public and MDT/county staff. Within part of the segment, the combination of a steep grade and relatively high truck volumes result in wash boarding. The alignment is mostly straight, with a few large-radius horizontal curves. The vertical curves are relatively gentle compared to the rest of the corridor and are flat enough so that sight distance is not restricted. Similar to Project Bundle 6, the alignment of the road and the location of property boundaries result in several county road intersections with skew angles of 60-degrees or less.

Figure 30: The "Wide Spot" near Hopp Rd. (RP 73.0)

The recommended improvement types within Bundle 7 are:

- Widen the minor road approaches at skewed intersections to improve access/egress.
- Remove and replace the existing road surface with an alternative material to address wash boarding.

Project Bundle 8 – Hopp Rd. – Lone Tree Trail (RP 74.0 – 83.5)

Project Bundle 8 starts at the beginning of pavement north of Hopp Road and continues northwest to the intersection of S-236 and Lone Tree Trail. The entire segment is paved and allows for adequate stopping sight distance. The grade changes are mostly gradual and where

passing sight distance is available, the roadway is appropriately marked with passing zones. Access to the road is available from several county roads and a few rural residential driveways and farm field accesses. Three of the county road intersections have skew angles of less than 60-degrees. Because of this, some of the turning movements are restricted for large vehicles.

Figure 31: Curve at Lone Tree Trail (RP 82.8)

The recommended improvement types within Bundle 8 are:

- Realign the minor roads at skewed intersections to create a 90-degree angle with S-236.
- Widen the minor road approaches at skewed intersections to improve access/egress.

6.5 Planning Level Cost Estimates

Planning level cost estimates were developed for the purpose of identifying the funding requirements for the project bundles under each implementation scenario. They are order-of-magnitude estimates and should not be confused with the more refined estimates produced as a part of project development. None of the estimates include the cost of right-of-way acquisition. The cost estimates are shown in Tables 6 - 8 in Section 6.6.

The methodology for the Spot Improvements Scenario was based on the amounts of material that would be required to construct the improvements and the costs of the material. The methodology for the Reconstruct/Rehabilitate to Gravel and Reconstruct/Rehabilitate to Pavement Scenarios was based on the spot improvement costs plus the cost of reconstructing or rehabilitating the remaining portions of the bundle segments. The methodologies used for

estimating the project bundle costs under each implementation scenario are described in detail in Appendix D – Improvement Options.

6.6 Implementation Scenarios

The project bundles can be implemented using three different scenarios for the improvement of the corridor.

Implementation Scenario 1 – Spot Improvements Only

Under the first scenario, only the recommended improvements for specific locations or spot improvements contained within the project bundles would be implemented. Construction would involve the complete removal and replacement of the road base and surface. This would be done for all of the improvement types except the intersection improvements, where any construction would be done primarily on the minor road legs of the intersection. Spot improvements would be designed and constructed to be consistent with the long range corridor improvement plan. This would ensure that construction activities would only need to occur once for each spot improvement area, thus maximizing the return on investment in the corridor.

Implementation Scenario 2 – Reconstruct/Rehabilitate to Gravel

This scenario represents a higher level of corridor improvement that would not only include the construction of the spot improvements, but also reconstruction of the roadway to a gravel surface in the remainder of the segment. Reconstruction to gravel would not apply to Bundles 4, 7, and 8. Bundle 4 has already been reconstructed, Bundle 7 only requires rehabilitation, and Bundle 8 only requires spot improvements because this segment is already paved.

Implementation Scenario 3 – Reconstruct/Rehabilitate to Pavement

The highest level of corridor improvement would be realized under the third implementation scenario. Under this scenario, spot improvements would be constructed together with the reconstruction or rehabilitation of the roadway to a paved surface along the entire length of the segment. Rehabilitation would be done for those bundles (4 and 7) that do not require full reconstruction. Bundle 8 only requires spot improvements because this segment is already paved.

Table 5 shows the planning level cost estimate for the corridor for each implementation scenario.

Table 5
Cost Estimates

Implementation Scenario	Corridor Cost	Cost per Mile
Spot Improvements Only	$16.95 million	N/A
Reconstruct/Rehabilitate to Gravel Including Spot Improvements	$29.83 million	$404,000 per mile*
Reconstruct/Rehabilitate to Pavement Including Spot Improvements	$53.31 million	$808,000 per mile*

* Cost per mile for reconstruction only. Does not include cost of spot improvements.

6.7 Prioritization of Project Bundles

Rankings were developed for project bundles under each of the implementation scenarios; however, the actual order of implementation will depend on the amount and timing of future funding and the implementation strategy decided by the counties, in coordination with MDT. An example of how the order may differ from the proposed rankings is the existing Memorandum of Understanding between Chouteau and Fergus Counties (see Appendix E) that describes the agreed upon order of paving improvements for the gravel portion of the corridor.

6.7.1 Ranking Criteria

The proposed rankings were developed using the system developed for MDT's Secondary Roads Capital Construction Program. In 2005, MDT and Montana's counties agreed upon the Secondary Roads Capital Construction Priority Process for establishing the priority of improvement projects for MDT's secondary road system. A subset of these criteria takes into account the characteristics of the proposed project along with the safety and traffic conditions of the segment. These are:

1. Safety - Compares the frequency and severity of crashes along the segment to statewide averages for secondary roads. Segments with greater safety issues receive a higher score. Maximum points: 100

2. Scope – Reflects the general size and character of the project Categories of improvement are:

    - Reconstruct to Gravel (90 points)
    - Rehabilitate to Pavement (60 points)
    - Reconstruct to Pavement (30 points)
    - Safety (90 points)

    All spot improvements fall within the safety category.

3. Geometrics – Number of locations with geometric issues that would be addressed by the project:

    - 0 locations (0 points)
    - 1 –2 locations (25 points)
    - 3 – 5 locations (55 points)
    - > 5 locations (80 points)

    Geometric issues include horizontal and vertical curves and intersection issues.

4. Traffic – Comparison of the segment's AADT volume with the 85th percentile AADT volume for all secondary roads in the Great Falls and Billings Districts. Segments with higher volumes receive a higher score. Maximum points: 70

5. Maintenance – Reflects the level of maintenance cost associated with the general improvement type. General improvement types are:

    - Gravel to Gravel (60 points)
    - Pavement Overlay (40 points)
    - Gravel to Paved (20 points)

    Paved roads are more expensive to maintain than gravel roads, so the Gravel to Paved improvement type receives a lower number of points than the Gravel to Gravel improvement type.

Based on the points available for each criterion, the maximum total points that could be received by a project bundle would be 400. Additional information about MDT's Secondary Roads Capital Construction Priority Process is included in Appendix D – Improvement Options.

6.7.2 Project Bundle Rankings

The ranking system was applied to the proposed project bundles for each of the implementation scenarios. The results are shown in Tables 6 - 8 and Figure 32. Tables 6 - 8 also include the estimated improvement costs for the bundles discussed in Section 6.3. The project bundles with higher scores would have a higher priority for implementation than the bundles with lower scores.

Table 6
Implementation Scenario 1 – Spot Improvements Only
Proposed Project Bundle Rankings

Project Bundle	County	From RP	To RP	Scope	Estimated Cost	Score	Rank
1	Fergus	24.0	29.5	Spot Improvements	$2,240,000	228.1	4
2	Fergus	29.5	34.5	Spot Improvements	$3,400,000	254.7	1
3	Fergus	34.5	41.8	Spot Improvements	$5,710,000	250.1	2
4	Fergus	41.8	48.0	Spot Improvements	$60,000	159.4	8
5	Chouteau	48.0	53.5	Spot Improvements	$2,170,000	223.0	5
6	Chouteau	53.5	60.0	Spot Improvements	$950,000	216.6	6
7	Chouteau	60.0	74.0	Spot Improvements	$2,280,000	199.4	7
8	Chouteau	74.0	83.5	Spot Improvements	$140,000	230.2	3
Total Estimated Cost					$16,950,000		

The highest-ranked bundles for Scenario 1 are Bundles 2 and 3. The primary reason is the high scores received for the geometrics criterion. Within each of these segments, there are more than 10 locations with geometric issues that would be addressed. Conversely, Bundles 4 and 7 are ranked lower because there are very few locations with geometric issues (zero locations for Bundle 4 and two for Bundle 8). Bundle 4 is also ranked lower because there were zero reported crashes within this segment for the 2004 - 2008 period.

Table 7
Implementation Scenario 2 – Reconstruct/Rehabilitate to Gravel
Proposed Project Bundle Rankings

Project Bundle	County	From RP	To RP	Scope	Estimated Cost	Score	Rank
1	Fergus	24.0	29.5	Reconst. to Gravel	$4,470,000	228.1	3
2	Fergus	29.5	34.5	Reconst. to Gravel	$5,430,000	254.7	1
3	Fergus	34.5	41.8	Reconst. to Gravel	$8,670,000	250.1	2
4	Fergus	41.8	48.0	Spot Improvements	$60,000	N/A	N/A
5	Chouteau	48.0	53.5	Reconst. to Gravel	$4,400,000	223.0	4
6	Chouteau	53.5	60.0	Reconst. to Gravel	$3,580,000	216.6	5

Table 7 (cont.)
Implementation Scenario 2 – Reconstruct/Rehabilitate to Gravel
Proposed Project Bundle Rankings

Project Bundle	County	From RP	To RP	Scope	Estimated Cost	Score	Rank
7	Chouteau	60.0	74.0	Rehab. to Gravel	$3,080,000	199.4	6
8	Chouteau	74.0	83.5	Spot Improvements	$140,000	N/A	N/A
Total Estimated Cost					$29,830,000		

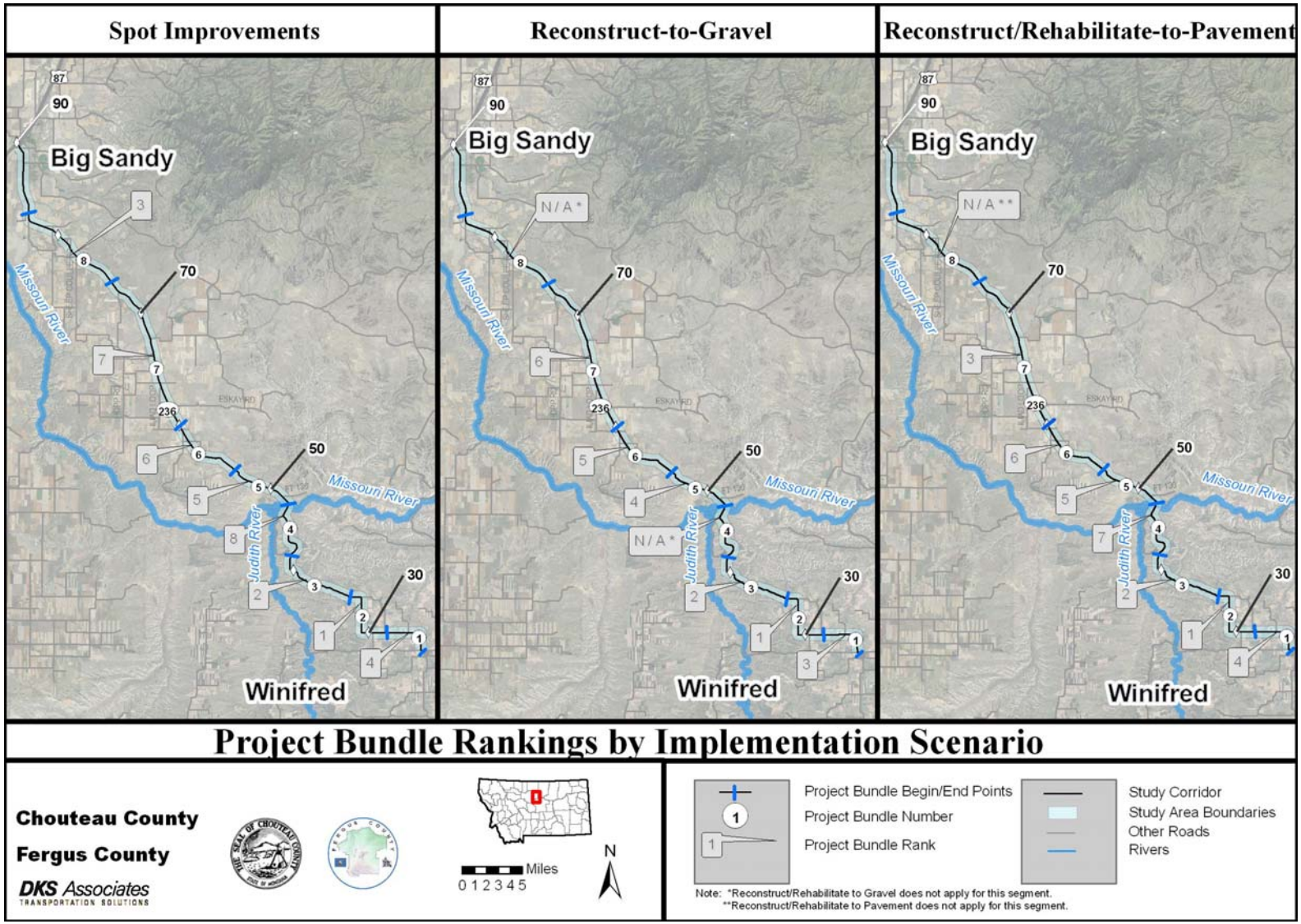
The bundle ranking for Scenario 2 is nearly the same as it is for Scenario 1. Bundles 2 and 3 are the highest-ranked bundles and Bundle 7 is the lowest-ranked bundle for the same reasons as described for Scenario 1. Under this scenario, the scores and ranks for Project Bundles 4 and 8 are shown as "N/A" because reconstruction or rehabilitation would not be required for these segments.

Table 8
Implementation Scenario 3 – Reconstruct/Rehabilitate to Pavement
Proposed Project Bundle Rankings

Project Bundle	County	From RP	To RP	Scope	Estimated Cost	Score	Rank
1	Fergus	24.0	29.5	Reconst. to Pvmt.	$6,690,000	128.1	4
2	Fergus	29.5	34.5	Reconst. to Pvmt.	$7,450,000	154.7	1
3	Fergus	34.5	41.8	Reconst. to Pvmt.	$11,620,000	150.1	2
4	Fergus	41.8	48.0	Rehab. to Pvmt.	$4,660,000	89.4	7
5	Chouteau	48.0	53.5	Reconst. to Pvmt.	$6,620,000	123.0	5
6	Chouteau	53.5	60.0	Reconst. to Pvmt.	$6,210,000	116.6	6
7	Chouteau	60.0	74.0	Rehab. to Pvmt.	$9,920,000	129.4	3
8	Chouteau	74.0	83.5	Spot Improvements	$140,000	N/A	N/A
Total Estimated Cost					$53,310,000		

The rankings for Scenario 3 are different from Scenarios 1 and 2 due to a lower score for the "Rehabilitate to Pavement" category than the score for the "Reconstruct to Pavement" category. The main difference in the Scenario 3 ranking is for Bundle 7, which received a rank of 3 compared to ranks of 7 and 6 in Scenarios 1 and 2 respectively.

Figure 32 – Proposed Project Bundle Rankings



7.0 Funding

Federal Funding Sources

There are three federal funding programs the corridor would be eligible for:

- Surface Transportation Program Secondary Highways (STPS) Program
- Highway Safety Improvement Program (HSIP)
- Federal Lands Highway Program (FLHP)

The only other source of federal funds for the corridor would be congressional earmarks.

Secondary Highway System Program

Federal and state funds available under this program are used to finance transportation projects on the state-designated Secondary Highway System. The Secondary Highway System includes highways that have been functionally classified by MDT as either rural minor arterials or rural major collectors and that have been selected by the Montana Transportation Commission in cooperation with the boards of county commissioners, to be placed on the secondary highway system.

Secondary road funds are distributed statewide to each of the five MDT districts based on a formula which takes into account the land area, population, road mileage and bridge square footage. Federal funds for secondary roads must be matched by non-federal funds. Of the total received, 86.58% is Federal and 13.42 % is non-federal match paid by the State.

Eligible activities for the use of secondary road funds fall under three major types of improvements: reconstruction, rehabilitation, and pavement preservation. The reconstruction and rehabilitation categories are allocated a minimum of 65% of the program funds, with the remaining 35% dedicated to pavement preservation.

Highway Safety Improvement Program

HSIP funds are federally apportioned to Montana and allocated to safety improvement projects identified in the Strategic Highway Safety Improvement Plan by the Commission. Projects described in the plan must correct or improve a hazardous road location or feature or address a highway safety issue.

One of the programs receiving HSIP funds is the High Risk Rural Roads Program (HRRRP). These funds are allocated to by the Commission for the construction of operational improvements along high-risk rural roads, including guardrail, signing, intersections, and the reconstruction of curves. Projects are ranked statewide by the level of need and then implemented as funding allows. If the State certifies that it has met all of the needs on high-risk rural roads, the funds may be used on any safety improvement project under the HSIP. Montana's set aside requirement for HRRRP is approximately $700,000 per year.

Federal Lands Highway Program

The Federal Lands Highway Program is a coordinated federal program comprising several funding categories. One of the categories, the Public Lands Discretionary Program, provides funding for projects on highways that are within, adjacent to, or provide access to federal public lands. The corridor would be eligible for these funds because it passes through the Upper Missouri River Breaks National Monument. As a discretionary program, the project selection authority rests with the Secretary of Transportation. There are no matching fund requirements.

Congressionally Directed Funds

Congressionally Directed funds may be received through either highway program authorization or annual appropriations processes. These funds are generally described as "demonstration" or "earmark" funds. Receiving Congressionally Directed funds has been a viable mechanism for local governments to secure federal funding for projects. If a local sponsored project receives

these types of funds, MDT will administer the funds in accordance with the Montana Transportation Commission Policy # 5 – "*Policy resolution regarding Congressionally directed funding: including Demonstration Projects, High Priority Projects, and Project Earmarks."*

State, Local, and Private Funding Sources

There is no dedicated State Funded Construction Program at this time. State funds are utilized to match Federal funds.

At the local level, Chouteau and Fergus Counties would be able to contribute to the construction of improvements either through direct funding or by construction using county staff. In the first case, the counties would provide funding to MDT, who would be responsible for the design and construction of the improvements. Potential sources of county funding would be the counties' general funds or road funds. In the second case, the counties, rather than MDT, would be responsible for the design and construction of a portion of the improvements, with oversight by MDT. This approach has been used in other areas in Montana. It would require the approval of the Montana Transportation Commission.

The primary alternative funding sources would be at the local level. One potential source is donation of land for right-of-way. Several property owners in Fergus County have indicated that they may be willing to do this. Another example of private funding is the use of improvement districts. These include road districts, multi-jurisdictional service districts, and local improvement districts. These improvement district mechanisms would result in the assessment of property owners within a defined area along the corridor.

The sale of general obligation bonds to finance a specific set of improvements is another alternative funding source. The use of this mechanism requires the approval of county voters.

8.0 Conclusion

The section of S-236 between Winifred and Big Sandy was evaluated at a planning level to understand corridor issues and develop relevant improvement options that would meet the transportation and safety needs of the traveling public. The study was conducted at the request of Chouteau and Fergus Counties seeking a mechanism to make improvements to reduce safety and maintenance issues along this mostly gravel roadway.

After a focused outreach with the public and resource agencies, and a comprehensive review of publically available information relative to environmental resources and existing infrastructure, a set of three (3) implementation scenarios were developed. Each implementation scenario addressed the fifty four (54) spot improvements identified along the corridor. These improvement options were grouped into project bundles to reduce cost through consolidation of labor resources and equipment.

The results of the study suggest that there are no major impediments to developing the project bundles using any of the three implementation scenarios defined in the study. This study provides a diverse list of improvement options and strategies that may be considered as funding becomes available.

Next Steps

At the current time there is no immediate funding identified to address any of the spot improvements or implementation scenario recommendations contained in this study. To continue with the development of a spot improvement or project bundle, the following steps are needed:

- Identify and secure a funding source (or sources);
- Initiate preliminary engineering activities;
- Finalize design and prepare construction plans package; and
- Let construction contract.

Appendices

Appendix A Consultation and Coordination

Appendix B Existing and Future Conditions Report (on CD)

Appendix C Environmental Scan (on CD)

Appendix D Improvement Options (on CD)

Appendix E Memorandum of Understanding (on CD)