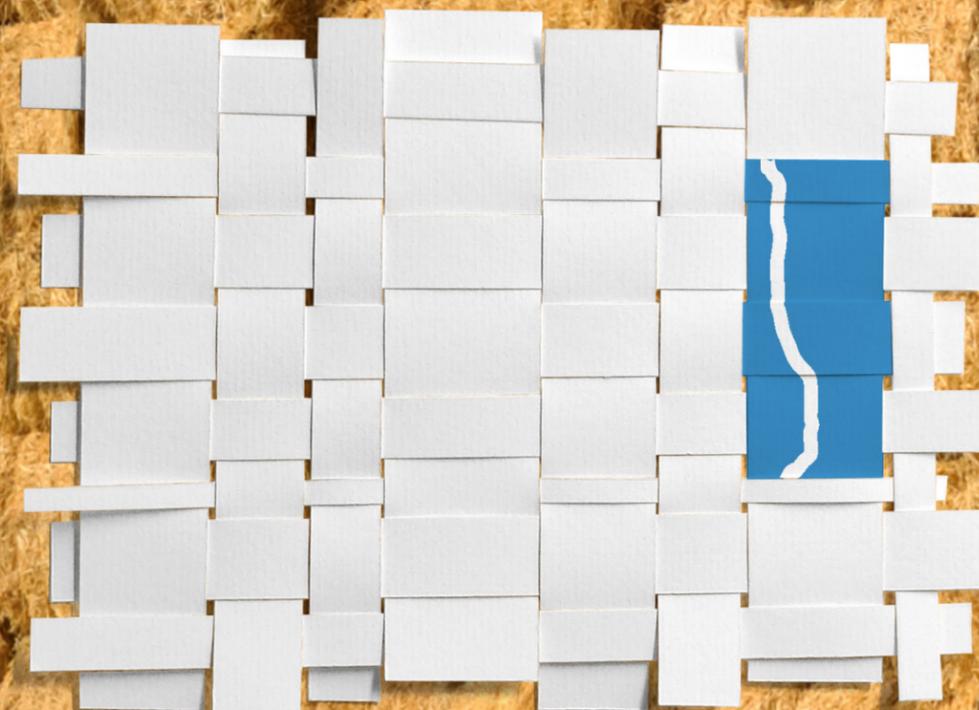


Wyoming Connects

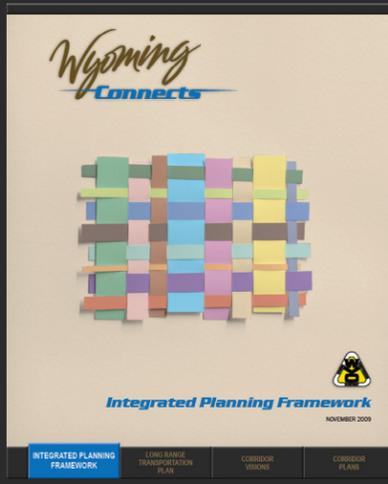


Corridor 14 Plan

DOUGLAS TO GILLETTE



MAY 2013



The Integrated Planning Framework describes the planning process in detail, including the linkage between strategic goals and project programming - and all the steps in between.



The Long Range Transportation Plan evaluates the state transportation needs from a systems level, describes the issues and problems facing the State including future revenue and programming, and presents options for future investments, all within the context of the Integrated Planning Framework.



Corridor Visions are created for each State Significant Corridor (SSC) as a supplement to the LRTP. These define long term goals and objectives for each corridor based on the strategic goals of the Department, the investment goals of the LRTP, and the specific context of each corridor. The SSC system represents high volume routes in the state that connect major activity centers to each other and to points external to Wyoming. Urban areas are also evaluated as a group.



Corridor Plans build on the Corridor Visions by providing a more detailed look at specific needs and location-based solutions. The plans identify a set of solutions and a recommended program of improvements to be implemented over time that address specific, documented needs.

CORRIDOR PLAN PURPOSE

This Corridor Plan is part of a set of documents created through a comprehensive planning process entitled Wyoming Connects. This set of documents captures consistent, transparent, and repeatable planning steps, analysis, and results designed to provide information to guide project selection and programming decision makers. Each document is designed to build upon prior documents and cascade the Strategic Goals of WYDOT forward from the overarching Strategic Plan to the system wide Long Range Transportation Plan, applied in the development of Corridor Visions, and the definition of Needs and potential Solutions to achieve the vision in Corridor Plans.

PERFORMANCE BASED NEEDS

The Corridor Plan utilizes a performance based approach to needs definition. A system of performance measures is used to evaluate the corridor. The architecture of this tiered system is focused on the three Investment Categories identified in the Long Range Transportation Plan: System Preservation, Safety, and Mobility. Performance measures include both absolute and comparative targets. Absolute measures gauge progress towards long term goals, while comparative measures between corridor and system performance provide information to assist in prioritization.

A need is defined as a deviation between these targets and measured performance. The first tier of the system allows for rapid identification of need in each of the Investment Categories through a Performance Indicator. The second tier provides additional information to qualify potential causes through a set of Performance Qualifiers. GIS based Mapping Analysis tools provide for a spatial analysis of these measurements to further investigate causes and identify overlapping needs.

TIERED APPROACH:

A method to evaluate performance goals at a general level and then advance through the system/hierarchy to filter data and define needs.

INVESTMENT CATEGORY

PERFORMANCE INDICATOR:

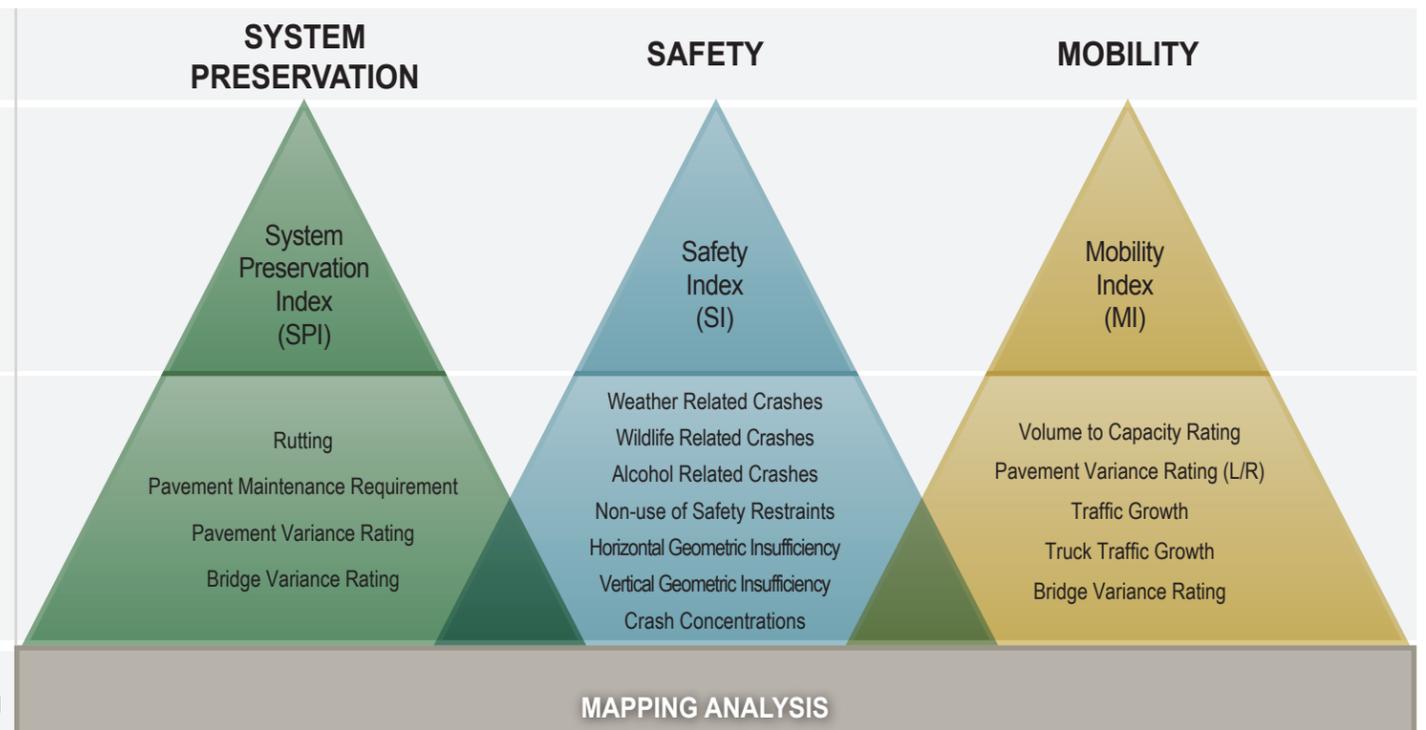
These are quantifiable and repeatable measurements that reflect the overall performance of the transportation corridor being analyzed. Targets for these indicators may be absolute and indicate a desired condition or comparative to current performance of the overall system to indicate relative priority.

PERFORMANCE QUALIFIER:

These measures include items that may contribute to the results of the indicator. These variables are measurable and actionable. They are used to qualify the need so that solution sets may be applied.

MAPPING ANALYSIS:

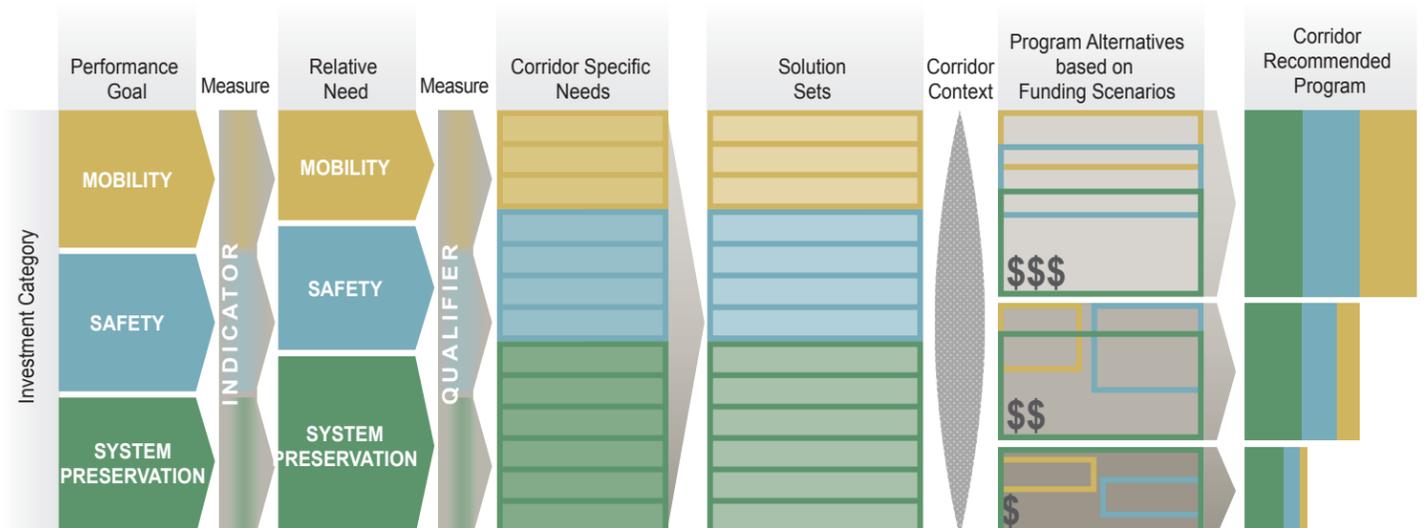
Mapping the deviated performance qualifiers against several factors to effectively prioritize, locate, and identify needs.



NEEDS DRIVEN SOLUTIONS:

Performance based needs are captured and documented. These needs remain until the performance is changed. This approach also separates the discussion of need from the discussion of projects, which enhances the transparency of prioritization.

From WYDOT's list of preferred remedies to specific problems, preliminary solutions sets are developed for the identified needs. These sets may be tailored by the specific context of the corridor. For each of the three funding scenarios of the long range plan, the solutions to be considered may vary and the size of the program change. A recommended program can be selected based on anticipated funding levels.





SSC 14 - DOUGLAS TO GILLETTE - WYO 59 CORRIDOR PLAN

CONTENTS

CORRIDOR PLAN PURPOSE	INSIDE FRONT COVER
I. STATE SIGNIFICANT CORRIDOR 14 - DESCRIPTION	1
Corridor Description	1
Corridor Segments	1
II. EVALUATION OF CORRIDOR PERFORMANCE	3
Step 1: Summary of Indicator and Qualifier Performance Measures	3
Step 2: System Preservation - Index Maps	4
Analysis of Investment Category Needs - System Preservation	5
Step 2: Safety - Index Maps	6
Analysis of Investment Category Needs - Safety	7
Step 2: Mobility - Index Maps	8
Analysis of Investment Category Needs - Mobility	9
Step 3: Analysis of Planning Segment Needs	10
Environmental Overview	11
Step 4: Summary of Corridor Needs	12
III. SOLUTION SETS	13
IV. RECOMMENDATIONS	14
Realizing the Corridor Vision	15
Corridor Performance	15

TABLES

TABLE 1	Segments for State Significant Corridor 14	2
TABLE 2	Indicator and Qualifier Performance of Planning Segments	3
TABLE 3	STIP by Year and Corridor Segment	5
TABLE 4	Horizontal Geometry Insufficiency	7
TABLE 5	Vertical Geometry Insufficiency	7
TABLE 6	Critical Crash Concentrations	7
TABLE 7	Major Traffic Generators	9
TABLE 8	Traffic Growth	9
TABLE 9	Truck Traffic Growth	9
TABLE 10	Local/Regional Routes with Poor PSR	9
TABLE 11	SSC 14 Structurally Deficient Bridges (L&R)	9
TABLE 12	Important Environmental Considerations	11
TABLE 13	Recommended Solution Sets to Improve Performance in Each Index	13
TABLE 14	SSC 14 Recommended Strategies for Long Range Plan Funding Scenarios	14
TABLE 15	Review of Corridor Vision Goals and Other Considerations	15
TABLE 16	Corridor Performance	15

APPENDIX

SYSTEM PRESERVATION MAPS	
Rutting	A-1
Pavement Maintenance Requirement	A-2
Pavement Variance Rating	A-3
Bridge Variance Rating	A-4
SAFETY MAPS	
Weather Related Crashes	A-5
Wildlife Related Crashes	A-6
Alcohol Related Crashes	A-7
Non-use of Safety Restraints per Crash Data	A-8
Horizontal Geometry Insufficiency	A-9
Vertical Geometry Insufficiency	A-10
Crash Concentrations	A-11
MOBILITY MAPS	
Volume to Capacity Rating	A-12
Pavement Variance Rating (L/R)	A-13
Traffic Growth	A-14
Truck Traffic Growth	A-15
Bridge Variance Rating (L/R)	A-16
ENVIRONMENTAL CHARACTERISTICS	
Environmental Data Summary	A-17



I. STATE SIGNIFICANT CORRIDOR 14 - DESCRIPTION

CORRIDOR DESCRIPTION

State Significant Corridor (SSC) 14 follows WYO 59 for 114 miles from Douglas to Gillette, passing through Converse and Campbell counties and is located in WYDOT Districts 2 and 4. A shared BNSF Railway and UPRR line runs along the corridor from just north of Douglas northward to Gillette. SSC 14 intercepts SSC 12 on the south end and SSC 13 on the north.

SSC 14 crosses through the Thunder Basin National Grasslands in the Powder River Basin between the Big Horn Mountains and the Black Hills. This semi-arid area supports dispersed recreation, hunting, and fishing on private ranch and BLM lands. It has extensive mineral resources including coal, oil, and coal bed methane gas. Several mines and power facilities are located along the corridor, including the North Rochelle Antelope Mine, Peabody Coal Mine, Black Thunder Mine, and several planned expansions or new mines. The energy industry is part of the State's

economic backbone and is the source of much of the truck, commuting, and service-related traffic.

Two urban areas, Douglas and Gillette, are regional agricultural and energy centers. Douglas is located on the south end of SSC 14 at the intersection of WYO 59 and I-25. Gillette is the fourth largest city in Wyoming, having undergone rapid growth in recent years.

Additional information including environmental context, key issues, and emerging trends is provided in the Corridor Visions and LRTP phases of Wyoming Connects. This Corridor Plan focuses on the identification of the corridor needs through the analysis of corridor performance.

CORRIDOR SEGMENTS

SSC 14 has been divided into 6 planning segments. Planning segments identify generally consistent sections of the corridor for planning level analysis. The planning segments vary in length depending on the context of the corridor. The corridor was segmented at all urban areas and at the intersection of other SSCs. Other context changes may include: roadway typical section (through lanes, shoulders, etc.), average daily traffic, intersecting routes, and terrain. Each segment break or endpoint was assigned as closely as possible to the nearest maintenance section endpoint; segments generally encompass multiple maintenance sections. The planning segments allow for an appropriate analysis and evaluation of corridor needs at a planning level while still providing geographic reference.

Table 1 and the accompanying map on the next page describe general characteristics of each corridor segment.



Douglas Bridge over the North Platte River

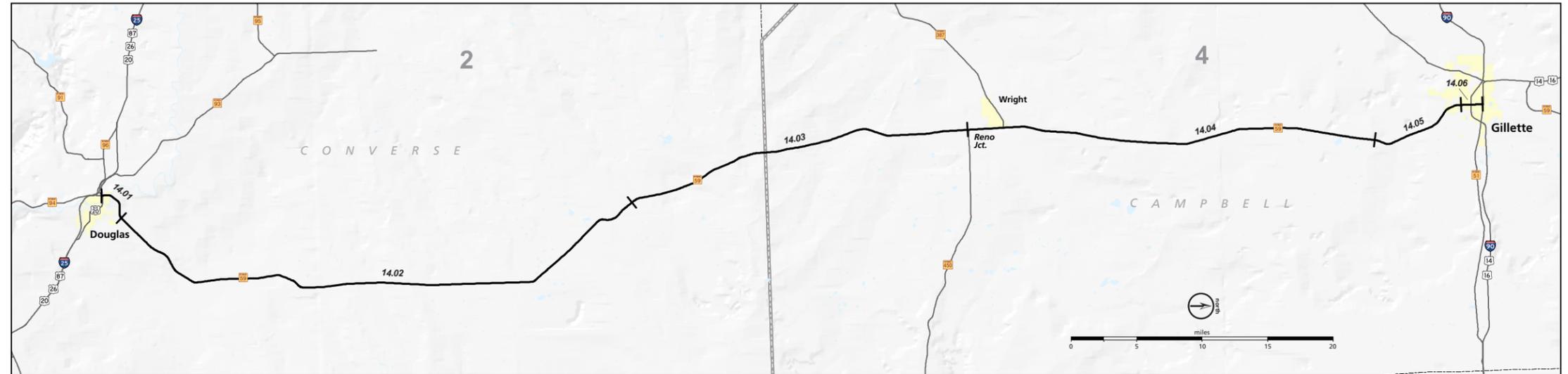
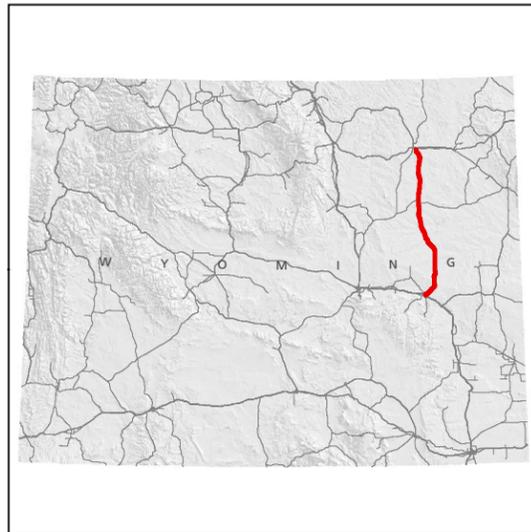


Table 1 - Segments for State Significant Corridor 14

Corridor 14	Segment	ML Route	Begin	End	Length	Description
	14.01	43	0.00	2.79	2.79	Douglas Urban Area (pop. 5,971). Features: urban cross section varies with curb, gutter, sidewalks, traffic signals, pedestrian crossings; segment begins at intersection with Local Route US 20/26/87 B, intersects Local Route WYO 93, WYO 59 Connector; road close gates; BNSF Railway grade separation; N. Platte River; ranch lands; energy production; urban terrain.
	14.02	43	2.79	46.00	43.21	North of Douglas. Features: 2 lane cross section; ranch lands; energy production; Thunder Basin National Grassland; flat terrain.
	14.03	43	46.00	72.52	26.52	South of Reno Jct. Features: 2 lane cross section varies with occasional passing lanes and turn lanes for local access; road close gates; BNSF Railway parallel to route with grade separations (2); Cheyenne River Rest Area; Antelope Creek, Lightning Creek, Box Creek, Mikes Draw, unnamed draw, S. Fork Cheyenne River; ranch lands; energy production; Thunder Basin National Grassland; rolling and flat terrain.
	14.04	43	72.52	103.65	31.13	Reno Jct. to South of Gillette. Features: 2 lane cross section varies with frequent passing lanes; intersects Regional Routes WYO 450, WYO 387; road close gates; Antelope Creek, Spring Creek, E. Fork Hay Creek, Hay Creek, Dry Creek, unnamed draw, Belle Fourche River, Caballo Creek, Bone Pile Creek, Tisdale Creek; BNSF Railway parallel to route; flat terrain.
	14.05	43	103.65	111.17	7.52	South of Gillette. Features: 2/4-lane cross section; road close gate; developed urban area with multiple accesses for commercial, industrial, and residential land uses; Antelope Creek, BNSF Railway parallel to route; flat terrain.
	14.06	43	111.17	112.29	1.12	Gillette Urban Area (pop. 29,087). Features: multilane urban cross section with curb, gutter, sidewalks, traffic signals, pedestrian crossings; segment terminates at SSC 13 (I-90); Donkey Creek; fully developed urban area with multiple accesses for commercial, industrial, and residential land uses; ranching and energy industry center; urban terrain.

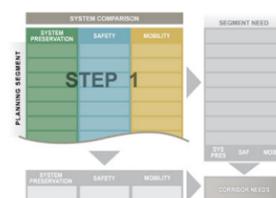
Source: URS Windshield Survey June 2012; Maintenance Section Reference Book 2012; Wyoming Connects: LRTP and Corridor Visions. Note: Descriptions of beginning and endpoints are approximate.



II. EVALUATION OF CORRIDOR PERFORMANCE

This section describes the evaluation of specific corridor needs based on the performance based process defined in the IPF. The Performance Based Needs Process, shown below, illustrates the steps followed for this corridor plan. Indicative Performance measures based on existing or simply defined index measurements for each investment category of System Preservation, Safety, and Mobility were evaluated to preliminarily identify need relative to long term goals. Qualifying performance measures were evaluated to better assess contributing factors to the primary need indicators. The indicators and qualifiers were evaluated and analyzed relative to system averages and, when available, previously specified performance targets. This gap analysis identifies locations where needs exist, qualifies the nature of the need, and provides information on the priority relative to the system of SSCs and available funding.

Many of the measures were established as comparisons to the system average, therefore good performance indicates performance better than the system average. The reverse is also true, poor performance indicates that performance is below the average or rated as poor for a particular indicator or qualifier. As additional corridors are evaluated, specific performance targets may be set to measure absolute performance. The IPF process recommends a mix of absolute measures to evaluate true need relative to long term goals and comparative measures to assist in determining priority.



STEP 1: SUMMARY OF INDICATOR AND QUALIFIER PERFORMANCE MEASURES

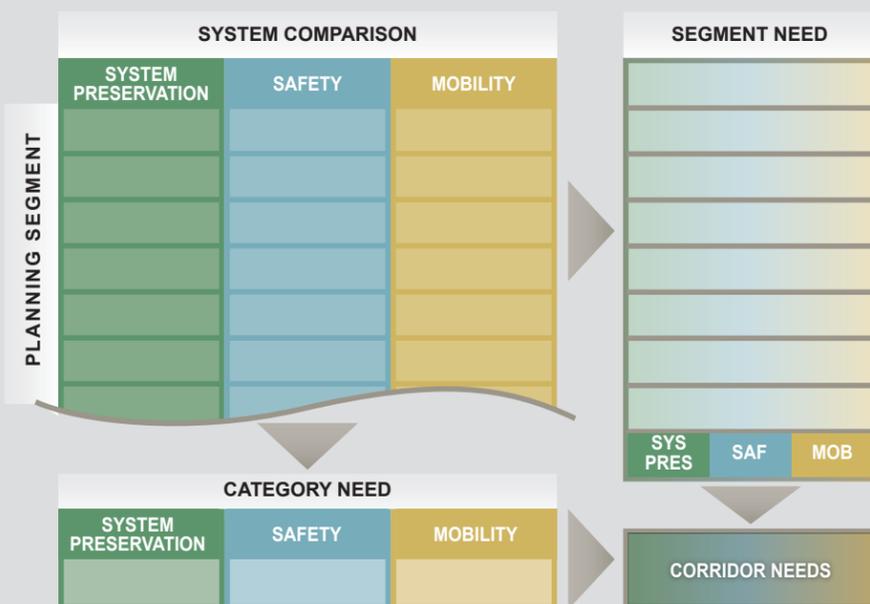
This corridor plan evaluates System Preservation, Safety, and Mobility performance using the process described in the Integrated Planning Framework, published separately. The plan analyzes the performance of planning segments described in Table 1 as compared to system averages. It identifies good, fair, poor or less, average, more performance for each segment in an overall index and for each contributing qualifier measurement.

Throughout this report, the color green is used to represent System Preservation, blue represents Safety, and yellow represents Mobility. Lighter shades represent better performance and darker shades represent worse performance compared to the system average.

Table 2 summarizes the results for each performance index and qualifier for each planning segment on the corridor.

Table 2 - Indicator and Qualifier Performance of SSC 14

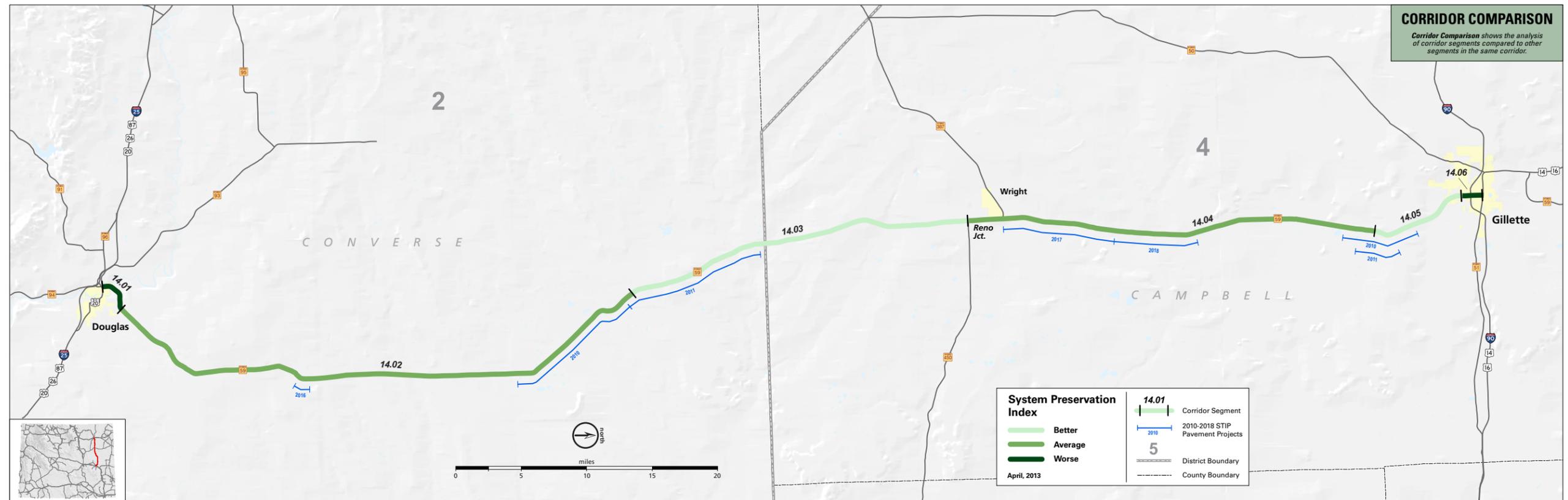
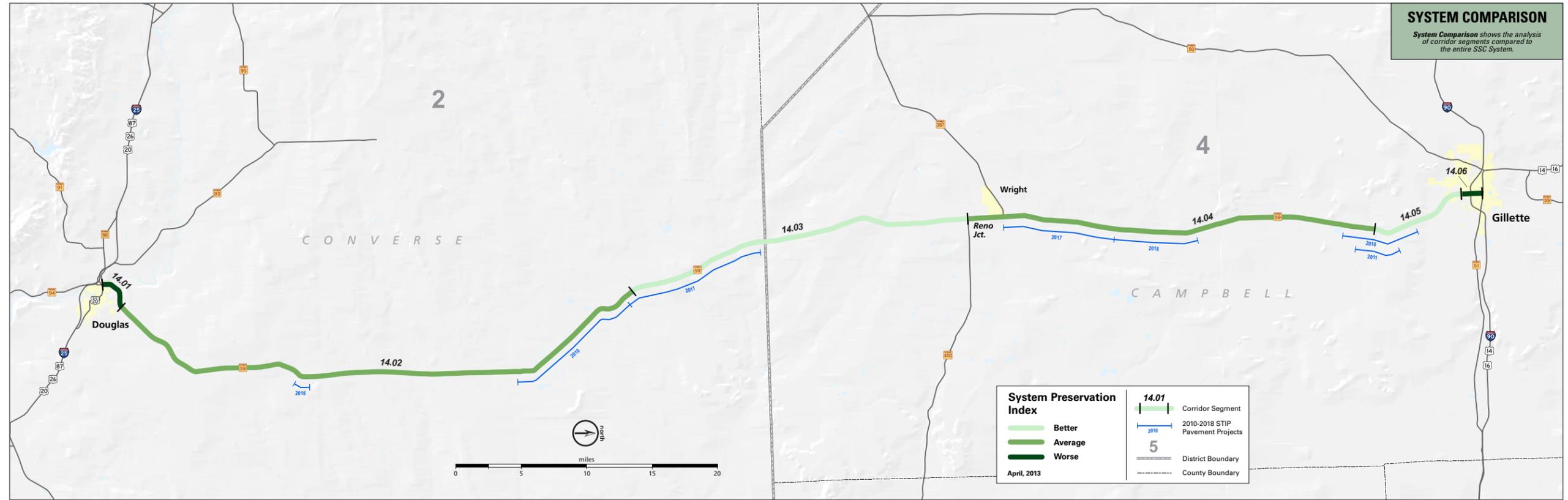
Segment	SYSTEM PRESERVATION					SAFETY								MOBILITY					
	System Preservation Index	Rutting	Pavement Maint. Requirement	Pavement Variance Rating	Bridge Variance Rating	Safety Index	Weather Related Crashes	Wildlife Related Crashes	Alcohol Related Crashes	Non-use of Safety Restraints	Horizontal Geometric Insufficiency	Vertical Geometric Insufficiency	Crash Concentrations	Mobility Index	Volume to Capacity Rating	Pavement Variance Rating (L/R)	Traffic Growth	Truck Traffic Growth	Bridge Variance (L/R)
14.01	Worse	Good	Average	Poor	Average	Fair	Average	Average	Average	Average	Less	More	Good	Worse	Good	Fair	Average	Average	Less
14.02	Average	Good	Average	Fair	Less	Good	Average	Average	Less	Average	Less	Less	Fair	Better	Good	Fair	Average	Average	Less
14.03	Better	Good	Less	Good	Less	Good	Average	More	Average	Average	Less	Less	Good	Better	Good	Fair	Average	Average	Less
14.04	Average	Fair	More	Fair	Average	Poor	Average	Average	More	Average	Less	Average	Poor	Average	Good	Fair	More	Average	Average
14.05	Better	Fair	Average	Good	Less	Poor	Average	Less	More	More	Less	Average	Good	Average	Good	Fair	More	Average	Less
14.06	Worse	Good	Less	Fair	More	Poor	Average	Less	Average	More	Less	Less	Good	Worse	Fair	Fair	More	Average	Less

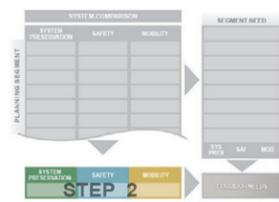




CORRIDOR 14

SYSTEM PRESERVATION – INDEX





Performance Index

The System Preservation Index is average or better, with the exception of segments 14.01 and 14.06, which is worse than average.

Performance qualifiers with a negative effect on the System Preservation Index:

- The Pavement Maintenance Requirement on segment 14.04 is more than average.
- The Pavement Variance Rating on segment 14.01 is poor.
- The Bridge Variance Rating on segment 14.06 is poor.

Refer to the sections below for more information.

SYSTEM PRESERVATION					
Segment	System Preservation Index	Rutting	Pavement Maint. Requirement	Pavement Variance Rating	Bridge Variance Rating
14.01	Worse	Good	Average	Poor	Average
14.02	Average	Good	Average	Fair	Less
14.03	Better	Good	Less	Good	Less
14.04	Average	Fair	More	Fair	Average
14.05	Better	Fair	Average	Good	Less
14.06	Worse	Good	Less	Fair	More

Performance Qualifiers

Rutting

There are no locations where the pavement falls within the poor category for rutting.

Pavement Maintenance Requirements

The pavement maintenance sections that were recommended by the Pavement Management System (Agile Assets) and not yet selected to receive funding within the STIP will continue to decline. If not treated fairly soon, the treatments will become more costly as conditions deteriorate.

Approximately 22% of Corridor 13 has been identified as having a 1S need. This represents 46 miles of pavement. Segments 13.02, 13.03, 13.05, and 13.08 have 1S treatments recommended by the Pavement Management System. Based upon current available funding, only four projects, representing 22 miles of pavement, have been selected to be completed within the next several years.

Approximately 19% of Corridor 13 has been identified as having a 2S need. This represents 40 miles of pavement. Segments 13.05, 13.07, and 13.09 have 2S treatment recommended by the Pavement Management System. Based upon current available funding, only four projects, representing 23 miles of pavement, have been selected to be completed within the next several years.

Approximately 59% has been identified as having a 3S need. This represents 122 miles of pavement. Segments 13.01, 13.02, 13.03, 13.04, 13.05, 13.06, 13.07, and 13.08 have 3S treatment recommended by the Pavement Management System. Based upon current available funding, only one project, representing seven miles of pavement, has been selected to be completed within the next several years.

Pavement Variance Rating

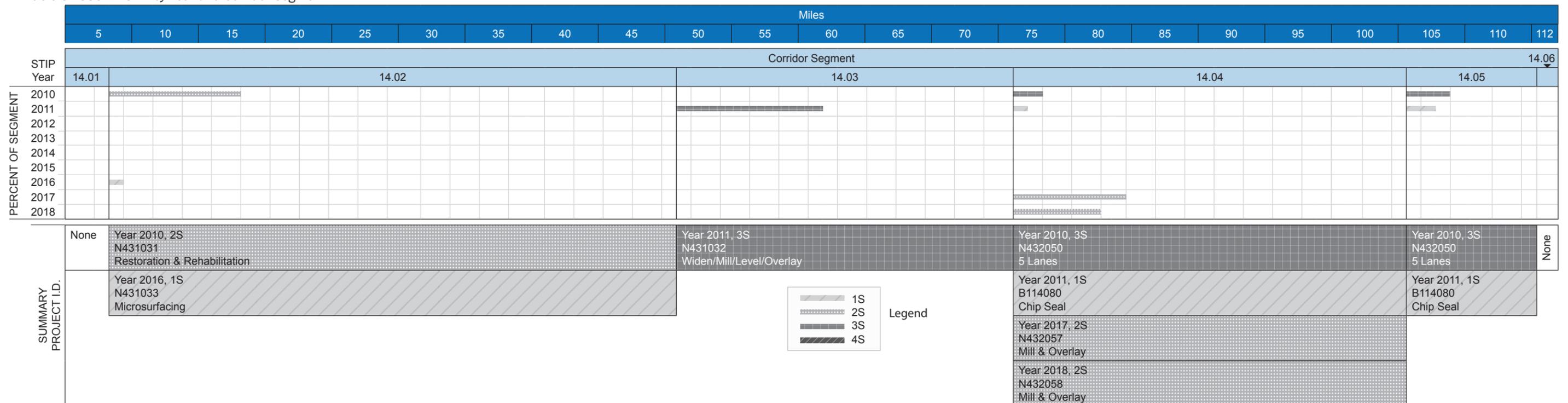
The Pavement Variance Rating is fair or better for the entire corridor with the exception of a poor rating on segment 14.01 (Douglas). Pavement hot spots, identified by length and severity, occur in Douglas, segment 14.01 (moderately severe), and one other location (least severe).

Bridge Variance Rating

The Bridge Variance Rating for most of the corridor is average or better than the system average. All segments have at least one bridge. There are three structurally deficient bridges along SSC 14, two with bridge decks under 15,000 ft² and one with a bridge deck under 30,000 ft². All bridges have the lowest WYDOT severity rating. The structurally deficient bridges are in segments 14.01 (1), 14.04 (1), and 14.05 (1), resulting in Bridge Variance Ratings of average or more when compared to the system average.

NOTE: See Appendix for maps documenting each performance qualifier.

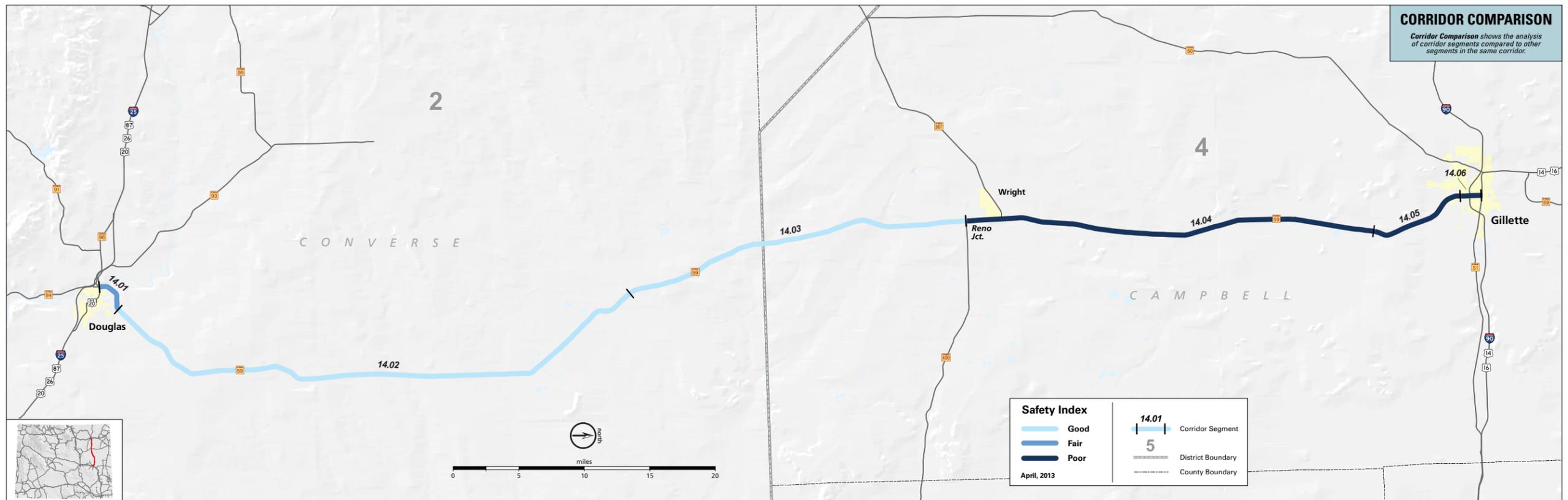
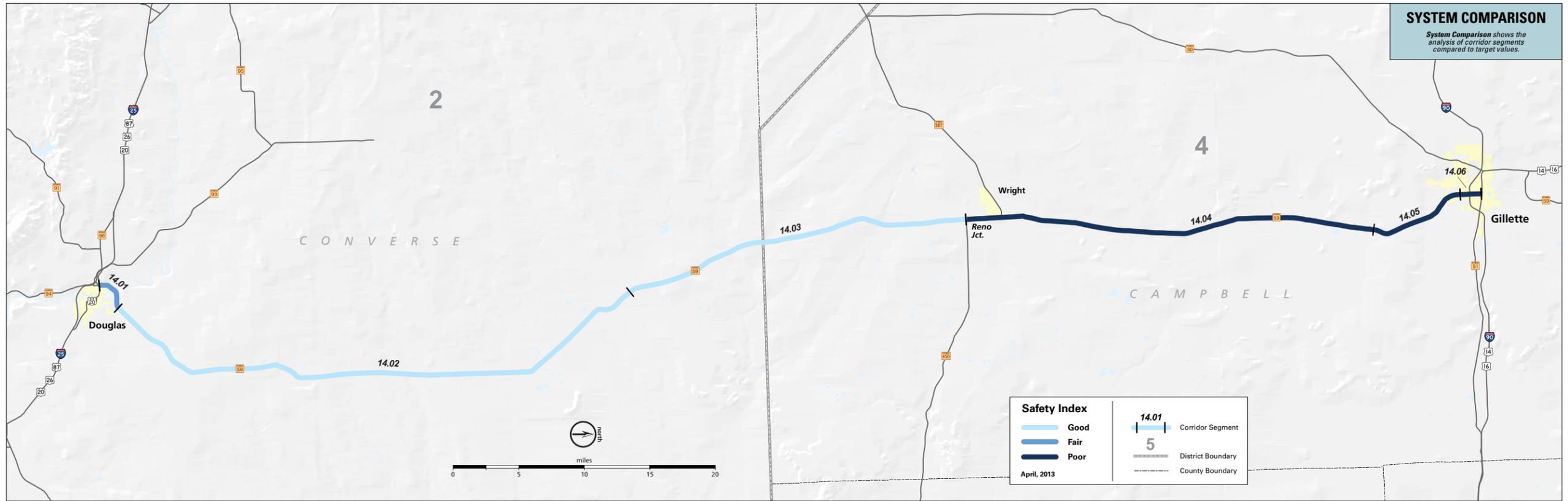
Table 3 - SSC 14 STIP by Year and Corridor Segment

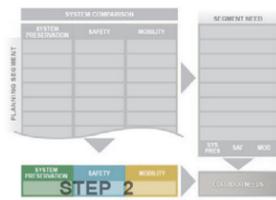




CORRIDOR 14

SAFETY - INDEX





Performance Index

The Safety Performance Index ranges from good to poor across the corridor. Segments rated poor include 14.04, 14.05, and 14.06.

Performance qualifiers with poor performance include:

- Wildlife Related Crashes are more than the average on segment 14.03.
- Alcohol Related Crashes are more than the average on segments 14.04 and 14.05.
- Non-Use of Safety Restraints is more than the average on segments 14.05 and 14.06.
- Crash Concentrations are rated poor on segment 14.04.

Refer to the sections below for more information.

Segment	SAFETY							
	Safety Index	Weather Related Crashes	Wildlife Related Crashes	Alcohol Related Crashes	Non-use of Safety Restraints	Horizontal Geometric Insufficiency	Vertical Geometric Insufficiency	Crash Concentrations
14.01	Fair	Average	Average	Average	Average	Less	More	Good
14.02	Good	Average	Average	Less	Average	Less	Less	Fair
14.03	Good	Average	More	Average	Average	Less	Less	Good
14.04	Poor	Average	Average	More	Average	Less	Average	Poor
14.05	Poor	Average	Less	More	More	Less	Average	Good
14.06	Poor	Average	Less	Average	More	Less	Less	Good

Performance Qualifiers

Weather Related Crashes

The ratio of weather related crashes to total crashes varied within SSC 14 from below the system average to slightly above the system average. The highest percentage of weather related crashes occurred in segments 14.01 (33%) and 14.04 (35%). Segment 14.01 is a 2.8-mile segment with a low number of weather related crashes. Segment 14.04 is a longer segment with a higher number of crashes; the adverse condition most reported was snowing with ice/frost on the road. In segments 14.02, 14.03, 14.05, and 14.06, the weather related crash rate ranged from 18.5% to 23.7%, which is below the system average.

Wildlife Related Crashes

Corridor 14 is varied in its wildlife related collisions. The stretch of highway between segment 14.02 and 14.03, from Douglas to Reno Junction, has the highest rating of wildlife related accidents. These segments have a rating of 50%, meaning half of the total accidents within these segments involve wildlife. The northern segment of 14.06, in Gillette, has the lowest rating of accident involving wildlife, with less than 1% of accidents in this segment involving wildlife.

Segment 14.03 is a rural highway surrounded by ranch lands, with flat and rolling terrain. Wildlife related collisions, primarily involving deer and occurring during darkness, are distributed evenly throughout this 26.5 mile segment. There is no

correlation with the migration routes documented by the Wyoming Game and Fish Department.

Alcohol Related Crashes

The percentage of alcohol related crashes is above the system average in four of the six corridor segments. Segments 14.04 and 14.05, between Reno Junction and Gillette, had the highest percentage of alcohol related crashes. Within segment 14.05, the crashes were concentrated near RM 110 and 111.

Non-use of Safety Restraint

The ratio of crashes in which a restraint device was not worn to total crashes varies within SSC 14 from below the system average to higher than the system average. The highest percentage of crashes in which seat belts were not worn occurred in segment 14.06. In this segment, 93% of crashes had at least one occupant who was not wearing a safety restraint.

Horizontal Geometry Insufficiency

Corridor 14 has one horizontal alignment found to be insufficient based on the associated posted speed and an assumed emax of 8%. The horizontal alignment insufficiency was calculated along ML 43 at RM 44.7. No crashes were recorded at this location. Because of the low number of crashes, it is suggested funding be spent in other locations where there are more crashes that can be attributed to poor roadway geometry.

Table 4 - Horizontal Geometry Insufficiency

Segment	ML Route	Route Marker	# of Crashes
N/A			

Vertical Geometry Insufficiency

Several vertical alignments were found to be insufficient based on the associated posted speed and the length of the curve for stopping sight distance. Segment 14.01 has the most insufficient vertical alignments within the corridor. Further study will need to take place to determine specific needs of each alignment and the constraints to which it was designed and built.

Table 5 summarizes locations where a vertical profile corresponded to a crash. The data is not clear if the crash was directly related to the geometry. However, locations with several crashes should be further studied. The table summarizes locations of insufficient profiles with more than one crash in the near vicinity within the 5 year crash analysis.

Table 5 - Vertical Geometry Insufficiency

Segment	ML Route	Route Marker	Curve Type	# of Crashes
14.01	ML43	1.97	SAG	2
14.04	ML43	79.98	SAG	3
14.04	ML43	83.27	SAG	2
14.05	ML43	105.98	CREST	6

Crash Concentrations

Crash concentrations are identified by locating spatially significant clusters of individual crash events that are of the similar severity level. The concentrations fall into one of two severity types: Critical, which consists of only “Critical” level crashes; and Other, which consists of “Severe” and “Damage” level crashes.

There are three Critical concentrations on Corridor 14, which are listed in Table 6. Additionally, there is one Other type concentration. Segment 14.04 between Gillette and Wright exhibits the most crash concentrations with 2 Critical concentrations, which occur between RM 84.5 and 85 and RM 100.6 and 101.3. Segment 14.05 has the only Other type concentration, resulting primarily from Damage level crashes.

Table 6 - Critical Crash Concentrations

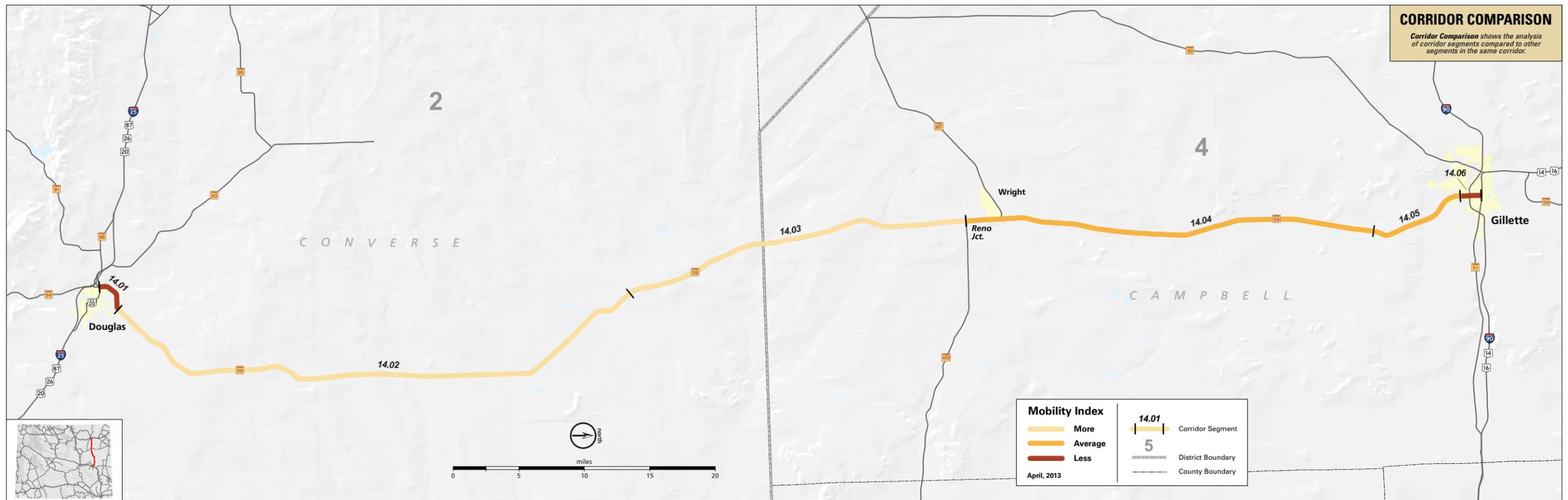
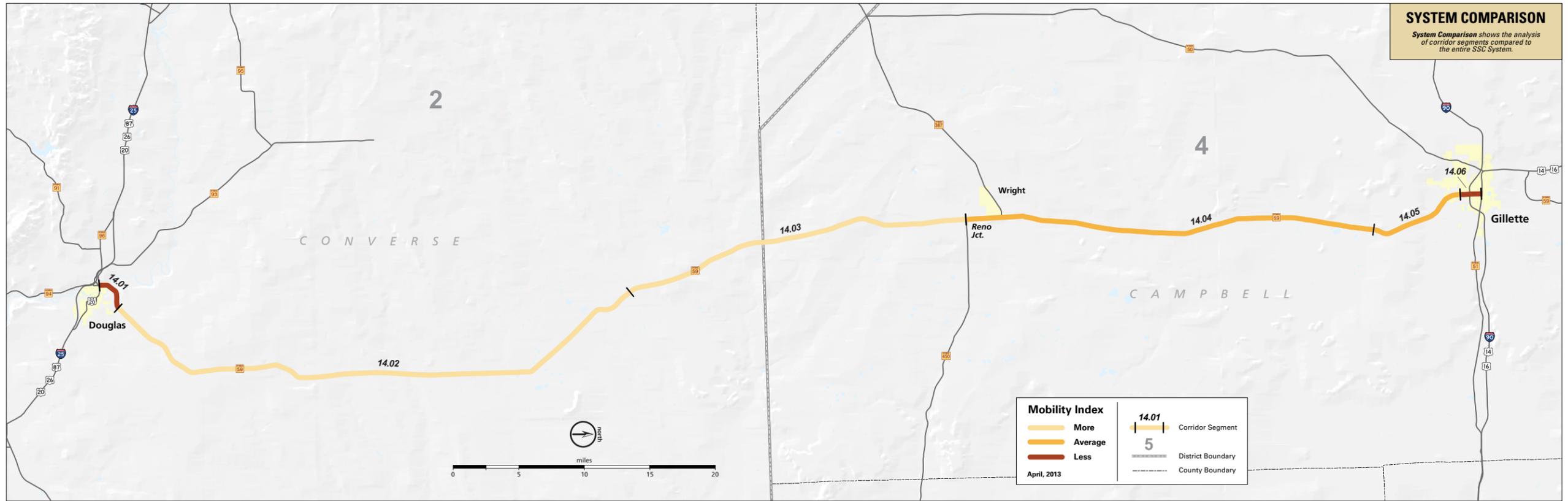
Segment	ML Route	Route Marker	
		From	To
14.02	ML43	35.4	36.4
14.04	ML43	84.5	85
14.04	ML43	100.6	101.3

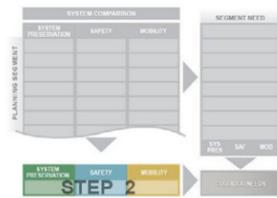
NOTE: See Appendix for maps documenting each performance qualifier.



CORRIDOR 14

MOBILITY - INDEX





Performance Index

The Mobility Performance Index for SSC 14 ranges from better than average to worse than average. Segments rated worse than average include 14.01 and 14.06.

Segment	MOBILITY					
	Mobility Index	Volume to Capacity Rating	Pavement Variance Rating (L/R)	Traffic Growth	Truck Traffic Growth	Bridge Variance (L/R)
14.01	Worse	Good	Fair	Average	Average	Less
14.02	Better	Good	Fair	Average	Average	Less
14.03	Better	Good	Fair	Average	Average	Less
14.04	Average	Good	Fair	More	Average	Average
14.05	Average	Good	Fair	More	Average	Less
14.06	Worse	Fair	Fair	More	Average	Less

Two regional routes connect to SSC 14. The condition of each local and regional route is associated with a planning segment and directly influences the mobility of that segment. The condition of several connecting local and regional routes is poor. There is currently one structurally deficient bridge on the local and regional routes.

SSC 14 supports an increasing amount of traffic due to the growing mining and power industries, especially the traffic and heavy loads associated with construction and service of these facilities. Shoulder widths are typically 10' with some rumble strips. Most of this corridor has moderate to high volumes.

Table 7 - Major Traffic Generators

Major Traffic Generators
Employment center - Gillette
Energy industry truck traffic - gas/oil/coal - Powder River Basin
Energy industry center - Gillette
Dispersed local/regional recreation on public lands (Thunder Basin National Grassland)

Performance Qualifiers

Volume to Capacity Rating

Volume to Capacity Ratio (V/C) is a measure that reflects mobility and quality of travel of a corridor or section of a corridor. It compares roadway demand (vehicle volumes) with roadway supply (carrying capacity). The volume to capacity rating for the entire SSC 14 is good.

Traffic Growth

The average traffic growth within the SSC System is 1.42%. All but one segment in Corridor 14 is above this average. Segment 14.04 has the highest average annual traffic growth rate. This segment connects Reno Junction to Gillette on ML43.

Table 8 - Traffic Growth

Segment	AADT 2010	Average 20 Year Growth
14.01	2,975	1.35%
14.02	1,992	1.79%
14.03	1,949	1.67%
14.04	3,763	2.30%
14.05	11,035	1.89%
14.06	28,541	2.13%

Truck Traffic Growth

The average truck traffic growth within the SSC System is 1.34%. The majority of SSC 14 segments are below this average. All but segment 14.06 has a roadway classification of 2-lane rural. Segment 14.03 has the highest average annual truck growth rate. This segment is north of Douglas to Reno Junction via ML43.

Table 9 - Truck Traffic Growth

Segment	AADTT 2010	% Trucks 2010	Truck Traffic Growth
14.01	457	16.39%	1.21%
14.02	351	17.67%	1.27%
14.03	356	17.90%	1.49%
14.04	644	14.13%	1.45%
14.05	775	9.29%	1.00%
14.06	785	2.58%	1.05%

Local and Regional Roads

Local and Regional Routes that connect to the SSC affect the Mobility Performance Indicator. These routes serve the important function of connecting rural areas to the primary routes. While traffic volumes are typically low on these secondary routes, maintaining them in acceptable condition is important to general mobility for the state. This analysis includes pavement and bridge condition as qualifiers.

Local and Regional Roads Impacting Pavement Variance Rating (L/R)

The Mobility Index may be affected by local and regional routes that have poor pavement condition as reflected by the Pavement Variance Rating (PVR). The PVR is the product of Pavement Sufficiency Rating (PSR) calculated as the deviation from the system average. Poor PSR is reported on local/regional routes associated with segments 14.01 and 14.04. Table 10 lists the local/regional routes with poor PSR.

Table 10 - Local/Regional Routes with Poor PSR

Segment	Average PVR	ML Route	Route Marker		Average PSR
			Begin	End	
14.01	1.29	ML94	0.00	16.61	1.96
14.04	0.92	ML42	131.79	151.26	2.33

Bridge Variance Rating (L/R)

The bridge variance rating for local and regional routes on SSC 14 shows 1 structurally deficient bridge. The location of the bridge is shown in the table below.

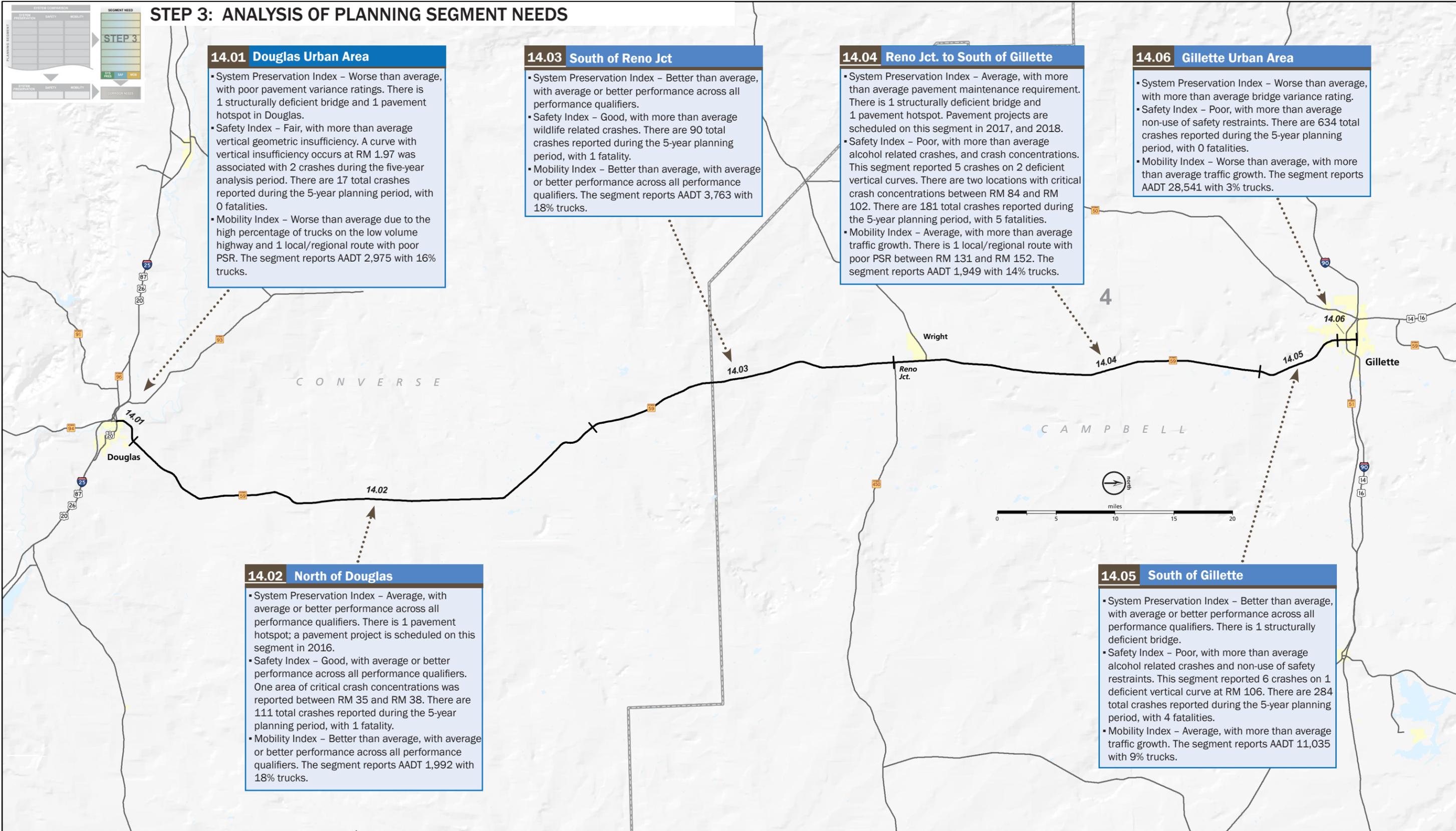
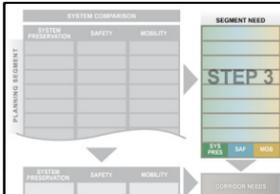
Table 11 - SSC 14 Structurally Deficient Bridges on Local/Regional Routes

Segment	ML Route	Route Marker
14.04	ML2300	36.31

NOTE: See Appendix for maps documenting each performance qualifier.



STEP 3: ANALYSIS OF PLANNING SEGMENT NEEDS



14.01 Douglas Urban Area

- System Preservation Index – Worse than average, with poor pavement variance ratings. There is 1 structurally deficient bridge and 1 pavement hotspot in Douglas.
- Safety Index – Fair, with more than average vertical geometric insufficiency. A curve with vertical insufficiency occurs at RM 1.97 was associated with 2 crashes during the five-year analysis period. There are 17 total crashes reported during the 5-year planning period, with 0 fatalities.
- Mobility Index – Worse than average due to the high percentage of trucks on the low volume highway and 1 local/regional route with poor PSR. The segment reports AADT 2,975 with 16% trucks.

14.03 South of Reno Jct

- System Preservation Index – Better than average, with average or better performance across all performance qualifiers.
- Safety Index – Good, with more than average wildlife related crashes. There are 90 total crashes reported during the 5-year planning period, with 1 fatality.
- Mobility Index – Better than average, with average or better performance across all performance qualifiers. The segment reports AADT 3,763 with 18% trucks.

14.04 Reno Jct. to South of Gillette

- System Preservation Index – Average, with more than average pavement maintenance requirement. There is 1 structurally deficient bridge and 1 pavement hotspot. Pavement projects are scheduled on this segment in 2017, and 2018.
- Safety Index – Poor, with more than average alcohol related crashes, and crash concentrations. This segment reported 5 crashes on 2 deficient vertical curves. There are two locations with critical crash concentrations between RM 84 and RM 102. There are 181 total crashes reported during the 5-year planning period, with 5 fatalities.
- Mobility Index – Average, with more than average traffic growth. There is 1 local/regional route with poor PSR between RM 131 and RM 152. The segment reports AADT 1,949 with 14% trucks.

14.06 Gillette Urban Area

- System Preservation Index – Worse than average, with more than average bridge variance rating.
- Safety Index – Poor, with more than average non-use of safety restraints. There are 634 total crashes reported during the 5-year planning period, with 0 fatalities.
- Mobility Index – Worse than average, with more than average traffic growth. The segment reports AADT 28,541 with 3% trucks.

14.02 North of Douglas

- System Preservation Index – Average, with average or better performance across all performance qualifiers. There is 1 pavement hotspot; a pavement project is scheduled on this segment in 2016.
- Safety Index – Good, with average or better performance across all performance qualifiers. One area of critical crash concentrations was reported between RM 35 and RM 38. There are 111 total crashes reported during the 5-year planning period, with 1 fatality.
- Mobility Index – Better than average, with average or better performance across all performance qualifiers. The segment reports AADT 1,992 with 18% trucks.

14.05 South of Gillette

- System Preservation Index – Better than average, with average or better performance across all performance qualifiers. There is 1 structurally deficient bridge.
- Safety Index – Poor, with more than average alcohol related crashes and non-use of safety restraints. This segment reported 6 crashes on 1 deficient vertical curve at RM 106. There are 284 total crashes reported during the 5-year planning period, with 4 fatalities.
- Mobility Index – Average, with more than average traffic growth. The segment reports AADT 11,035 with 9% trucks.



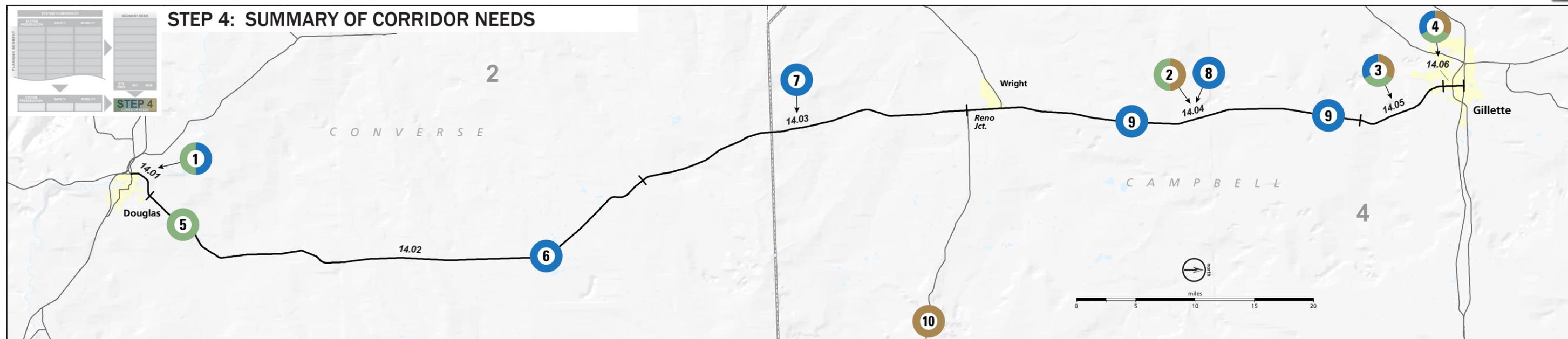
Environmental Overview

The Wyoming Interagency Spatial Database and Online Management System (WISDOM) was queried to identify natural resources that could be impacted by transportation projects. The following summary lists the general type of potentially impacted resources. The project development phase should investigate these resources in more detail to determine if mitigation activities are required. Please see Appendix and <http://wisdom.wygisc.org/> for detailed information.

There are five different terrestrial habitat types located throughout the three special management areas within SSC 14. Three federally listed species within the corridor fall into one of three categories, candidate, endangered, and threatened. Eleven raptor species are found in SSC 14. There are three different categories that fall under the aquatic habitat. There are twelve watersheds, two aquatic crucial priority areas, and one aquatic enhancement priority area. See Table 12 for general locations.

Table 12 - Environmental Considerations

Category	SOUTH (Douglas - South of Reno Junction)	CENTRAL (South of Reno Junction - Reno Junction)	NORTH (Reno Junction - Gillette)
Big Game Crucial Range	na	na	na
Big Game Migration Route	na	na	na
WGFD Aquatic Crucial Priority Areas SHP	Middle North Platte-Glendo Prairie Stream & Riparian Corridors	Prairie Stream & Riparian Corridors	na
WGFD Terrestrial Crucial Priority Areas SHP	Thunder Basin	Thunder Basin	na
WGFD Combined Crucial Priority Areas SHP	na	na	na
Occurrence & Distribution (Federally Listed Species)	Gray Wolf Greater Sage Grouse	Black-footed Ferret Greater Sage Grouse	Black-footed Ferret Gray Wolf Greater Sage Grouse



Summary of Needs

This section summarizes needs by planning segment for each of the three performance indicators and the supporting performance qualifiers. The summary identifies overlapping needs, which provides guidance in the efficient prioritization of projects to best address deficiencies. The practice of completing projects that simultaneously address multiple needs may present cost savings as well as being most effective in improving performance indexes across the system. The summary also lists other needs in each of the three performance measurement areas. For more information about needs at the corridor level, see the maps in the appendix which compare both system level and corridor level needs.

SSC 14 needs occur in all performance indexes. Within System Preservation, two pavement hotspots are documented along with three structurally deficient bridges and one segment with poor pavement maintenance requirement. Within Safety, wildlife and alcohol related crashes, as well as crashes related to the non-use of safety restraints and deficient vertical curves are documented. Three areas of critical crash concentrations occur on the corridor. Within Mobility, traffic growth is high on the north end near Gillette and one structurally deficient bridge on a local/regional route is reported.

The Wyoming Game and Fish Department classifies Thunder Basin basin as a Terrestrial Crucial Priority Areas and the Middle North Platte-Glendo Prairie Stream and Riparian Corridors as Aquatic Crucial Priority Areas. Several federally listed endangered species are found in the corridor and should be considered in all project planning.

Based on the needs identified in this analysis and the recommended strategies and solution sets, this plan does not identify specific needs to preserve or acquire additional rights of way to accommodate improvements. Heavier traffic in the Gillette urban area presents challenges for pavement management, traffic management, and safety and should be evaluated for additional improvements. Local and specific ROW requirements based on urban area needs should be evaluated in the Urban Areas Corridor Plan in cooperation with local governments and planning organizations.

Overlapping Needs

Overlapping needs are identified on four segments:

- 1 14.01 - SYSTEM PRESERVATION/SAFETY: Pavement Hotspot, Structurally Deficient Bridge, Crashes on Curves with a Vertical Deficiency
- 2 14.04 - SYSTEM PRESERVATION/MOBILITY: Pavement Maintenance Requirement, Structurally Deficient Bridge, Traffic Growth
- 3 14.05 - SYSTEM PRESERVATION/SAFETY/MOBILITY: Structurally Deficient Bridge, Alcohol Related Crashes, Non-use of Safety Restraints, Traffic Growth
- 4 14.06 - SYSTEM PRESERVATION/SAFETY/MOBILITY: Bridge Variance Rating, Non-use of Safety Restraints, Traffic Growth



Other Performance Index Needs

System Preservation

- 5 14.02 - SYSTEM PRESERVATION: Pavement Hotspot

Safety

- 6 14.02 - SAFETY: Crash Concentrations
- 7 14.03 - SAFETY: Wildlife Related Crashes
- 8 14.04 - SAFETY: Alcohol Related Crashes
- 9 14.04 - SAFETY: Crash Concentrations

Mobility

- 10 14.02 - MOBILITY: Structurally Deficient Bridge



III. SOLUTION SETS

A solutions menu was created to address the needs identified in the previous sections. This menu identifies potential solution strategies grouped by performance measure categories. The strategies are a preliminary list based on industry accepted approaches and the efforts to date of WYDOT programs to document preferred approaches. This list is not intended to be all-inclusive, but represents types of improvements that may be employed to address documented needs.

Section IV recommends how the solution sets may be efficiently grouped depending on funding availability.

Table 13 - Recommended Solution Sets to Improve Performance in Each Index

System Preservation	Safety		Mobility	
<p><i>Pavement Maintenance Requirement & Pavement Variance Rating</i></p> <p><i>Rutting</i> Mill Mill and overlay</p> <p><i>1S Treatments</i> Mill and overlay Seal Coat Cleaning and sealing joints Patching pavement Micro surfacing</p> <p><i>2S Treatments</i> Roadway Restoration</p> <p><i>3S Treatments</i> Reconstruct Roadway Roadway widening Upgrade geometric design</p> <p><i>Bridge Variance Rating</i> Bridge Replacement Channel reconstruction Cleaning and sealing bridge members Lower weight limits Restore drainage systems Scour countermeasures</p>	<p><i>Weather Related</i> Signage Automated anti-icing systems Grooved pavement ITS Larger signs Snow berms/grading Snow fencing Warning beacons</p> <p><i>Wildlife Related</i> Animal detection systems Animal jump-out or one-way gates ITS Remove brush from ROW Signage Warning beacons Wildlife bridge/underpass Wildlife fencing</p> <p><i>Alcohol Related</i> Centerline rumble strips ITS Law Enforcement Media campaign Shoulder rumble strips</p>	<p><i>Horizontal Geometry</i> Centerline rumble strips Dynamic curve warning system Guardrail Improve/restore superelevation Lighting Oversize/length restrictions Reconstruction/realignment Reduce posted speed Reflectors Shoulder rumble strips Signage Warning beacons</p> <p><i>Vertical Geometry</i> Larger signs Reconstruction/realignment Reduce posted speed Reflectors Signage Warning beacons</p> <p><i>Safety Restraints</i> ITS Law Enforcement Media campaign</p>	<p><i>Volume to Capacity Rating & Traffic Growth / Truck Traffic Growth</i> Acceleration lane Capacity improvements Deceleration lane Increase lane width Intersection/interchange improvements Multimodal improvements Passing lanes Shoulder widening Through lanes Turn lane</p> <p><i>Bridge Variance (L/R)</i> Bridge Replacement Channel reconstruction Cleaning and sealing bridge members Lower allowable weight limits on bridge Restore drainage systems Scour countermeasures</p>	<p><i>Pavement Variance Rating (L/R)</i></p> <p><i>Rutting</i> Mill Mill and overlay</p> <p><i>1S Treatments</i> Cleaning and sealing joints Micro surfacing Mill and overlay Patching pavement Seal Coat</p> <p><i>2S Treatments</i> Roadway Restoration</p> <p><i>3S Treatments</i> Reconstruct Roadway Roadway widening Upgrade geometric design</p>



IV. RECOMMENDATIONS

This section describes recommendations for strategies and priorities to address corridor needs. The selected strategies address the needs described in previous sections and are organized by the three strategic performance areas: System Preservation, Safety, and Mobility. These recommendations provide information and guidance consistent with the Strategic and Long Range Plans to help WYDOT select projects in coordination with the STIP process.

The recommended strategies have been packaged into solution sets that recognize the inherent overlap that investments may have across performance areas. For example, an intersection improvement may simultaneously improve traffic flow (Mobility) and reduce crashes (Safety).

The solution sets are tiered to the three Funding Scenarios identified in the Long Range Transportation Plan. The funding scenarios describe a progressively increasing budget, with generally defined allocations to System Preservation, Safety, and Mobility. With each succeeding level of investment, additional funding is allocated to address shortfalls in performance-based goals.

- Funding Scenario 1 – The continuation of program funding at current levels. Most funding is directed to System Preservation needs. System characteristics are expected to decline with inflation and increasing construction costs over time. Few major projects to address Safety, other than with specially restricted and allocated funds, or Mobility would be implemented.
- Funding Scenario 2 – Funding over and above the base level would allow additional investments in pavement and bridge projects to meet WYDOT goals.
- Funding Scenario 3 – Additional funding over and above Scenario 2 would allow WYDOT to maintain and improve existing conditions, achieve pavement and bridge condition goals, plus invest in major projects to improve Mobility.

Funding Scenario 1

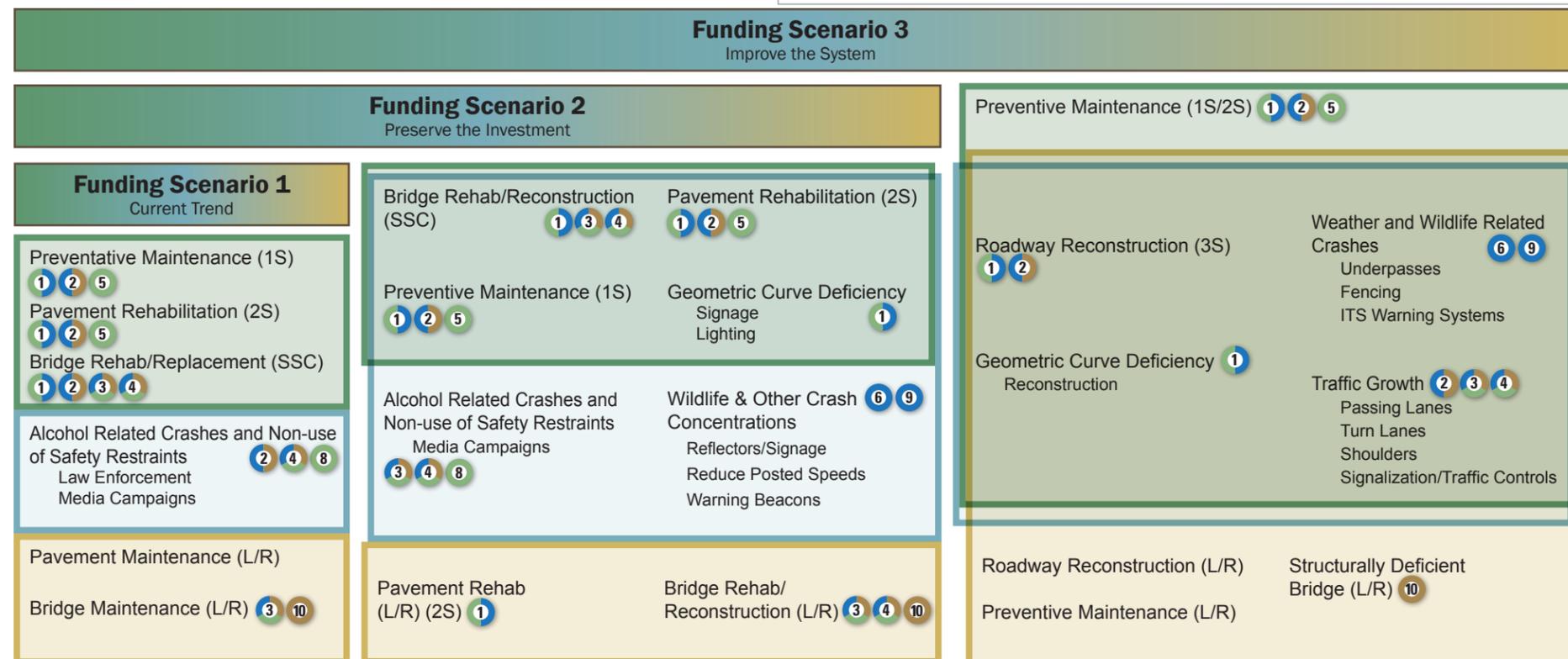
Funding Scenario 1, defined as the continuation of current program funding, is focused primarily on addressing System Preservation needs through preventive maintenance efforts. For this corridor, the plan recommends that these funds remain allocated to preventive maintenance, along with reserving a portion to address identified safety needs. The growing traffic and truck traffic volumes, while not generally requiring capacity improvements, do require systematic pavement treatments in order to stay ahead of the pavement lifecycle curve. Less expensive treatments on a regular schedule, delay the need indefinitely for more expensive reconstruction. The corridor also has needs in the bridge area. Bridge maintenance or rehabilitation should be timed to coincide with pavement treatments, to the extent possible.

Safety needs are most apparent in the category of wildlife and alcohol related crashes. The non-use of safety restraints is also a frequent factor. Three specific areas of crash concentrations are also observed. Mobility needs are most apparent in traffic growth in the Gillette area. One bridge on a local/regional route is structurally deficient.

These needs may be only partially met under current funding. Additional needs that cannot be met under Scenario 1 may be delayed pending additional funds under Scenarios 2 or 3.

- Surface treatments on the SSC mainline, including mill and overlay.
- Bridge rehabilitation and replacement of structurally deficient bridges on the SSC mainline.
- Safety campaign to reduce number of alcohol related crashes and to increase the use of safety restraints.
- Strategies to address wildlife related crashes that do not involve major construction such as signage and lighting.
- Projects to reduce the number of crashes at curves with a geometric deficiency, not involving major construction.

Table 14 - SSC 14 Recommended Strategies for Long Range Plan Funding Scenarios



Funding Scenario 2

If sufficient funds to preserve the system in at least its current operational form are made available, WYDOT will direct funding to strengthen pavement and bridge conditions across the system, including on local and regional routes. The corridor has some pavement and bridge rehabilitation needs on local and regional routes. This scenario would allow investments to fully achieve WYDOT goals in the System Preservation investment category. Expansion of safety programs to reduce the number and severity of crashes related to alcohol and the non-use of safety restraints should be considered, especially in areas of crash concentrations as identified in this corridor plan.

- Preventive maintenance could be deferred and/or advanced, depending on life cycle, as recommended by the Pavement Management System.
- Reconstruction (2S) to address geometric insufficiencies on the SSC mainline.
- Improvement of pavement condition of Local and Regional Routes, to include preventive maintenance or mill and overlay.
- Bridge rehabilitation on local and regional routes.
- Safety program expansion to address alcohol related crashes and non-use of safety restraints.
- Projects to reduce the number of crashes at curves with a geometric deficiency, not involving major construction.

Funding Scenario 3

If additional funds are made available to WYDOT under Funding Scenario 3, opportunities would be created to address all three investment categories, thus preserving the investment and improving the overall “health” of the system. Additional funds allow project selection to address overlapping needs, therefore investing funds most effectively. The additional funds would expand to include other items to improve performance in the Mobility Index.

- Roadway reconstruction (3S) to meet long term goals, including correction of geometric deficiencies.
- Traffic operations and intersection improvements to improve safety and traffic flow in high volume areas (Gillette).
- Improvement of pavement condition of Local and Regional Routes, to include reconstruction (3S), as necessary.

Performance Measurement over Time

As these performance measures are continually monitored over time it will become evident how the recommended solution strategies and the selected projects address the needs of the corridor and the overall system. Addressing deficiencies documented in the corridor plan will effectively improve the System Preservation, Safety, and Mobility indexes at both the corridor and system level.

Ongoing performance measure documentation is critical to identify trends, capture the existing health of the system, and allowing an accurate forecast of the future health of Wyoming’s Transportation system. The need for additional funding and/or more aggressive solutions will become evident if performance measures fail to meet WYDOT goals.

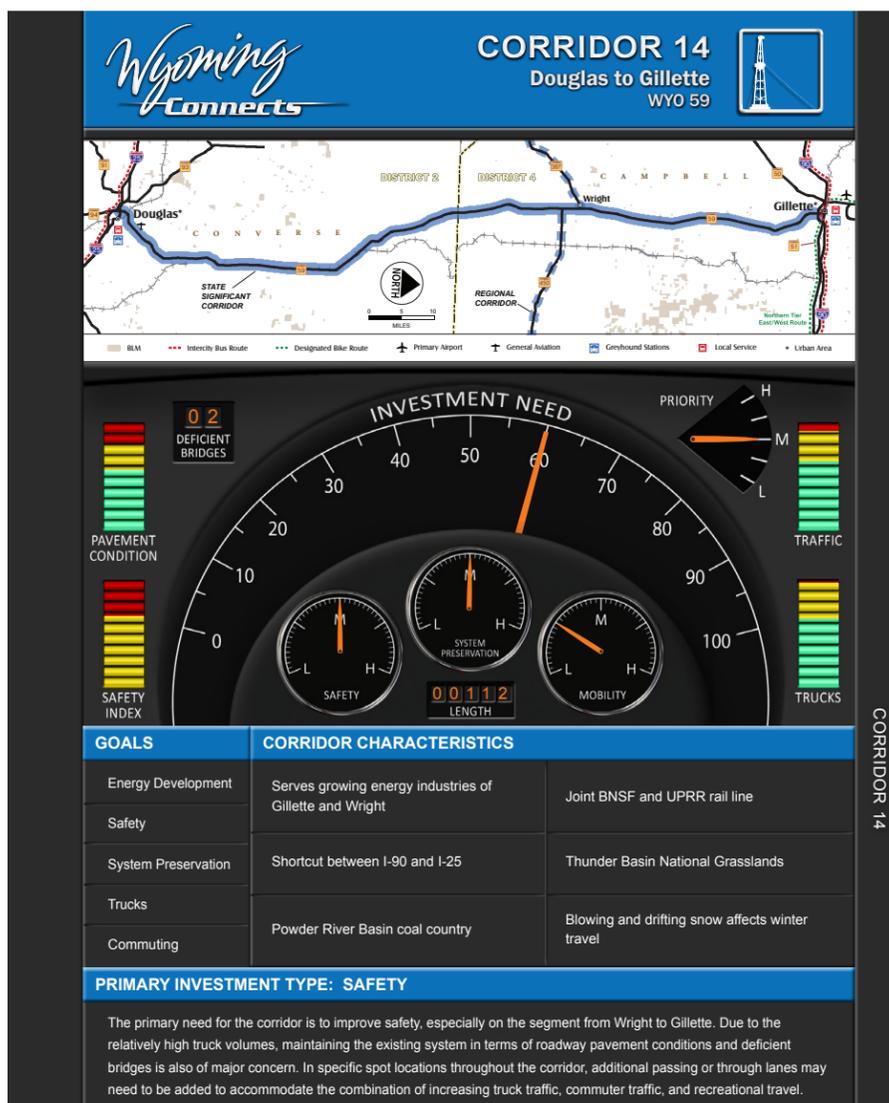


REALIZING THE CORRIDOR VISION

As part of the statewide Wyoming Connects and Long Range Transportation Plan, the Corridor Vision for SSC 14 - and all SSCs - focuses on the identification of overall system performance aggregated from the evaluations of each individual corridor's "health" relative to WYDOT's long-term Strategic Goals. The identified types of investment needs (system preservation, safety, and mobility) expressed in the Corridor Vision are reflected in the three primary need indicators of this Corridor Plan. The analysis of each investment type generated goals representing corridor health issues as communicated by the planning and public process used in development of the Vision. See *Wyoming Connects: Corridor Visions* for more information.

Corridor Vision Goals

The Douglas to Gillette Corridor Vision captured Key Issues and Emerging Trends of critical importance and how SSC 14 could best serve the communities it connects over the long term. While issues were identified relative to each investment type, the Primary Investment Type is Safety:



The primary need for the corridor is to improve safety, especially on the segment from Wright to Gillette. Due to the relatively high truck volumes, maintaining the existing system in terms of roadway pavement conditions and deficient bridges is also of major concern. In specific spot locations throughout the corridor, additional passing or through lanes may need to be added to accommodate the combination of increasing truck traffic, commuter traffic, and recreational travel.

Additional goals which reflect the full context, character, and issues of SSC 14 were set as high priority goals as indicated in Table 15. A review of these Vision Goals compared to the findings of this Corridor Plan provides for a conformance check and identifies additional issues to be considered when evaluating potential projects and implementation plans.

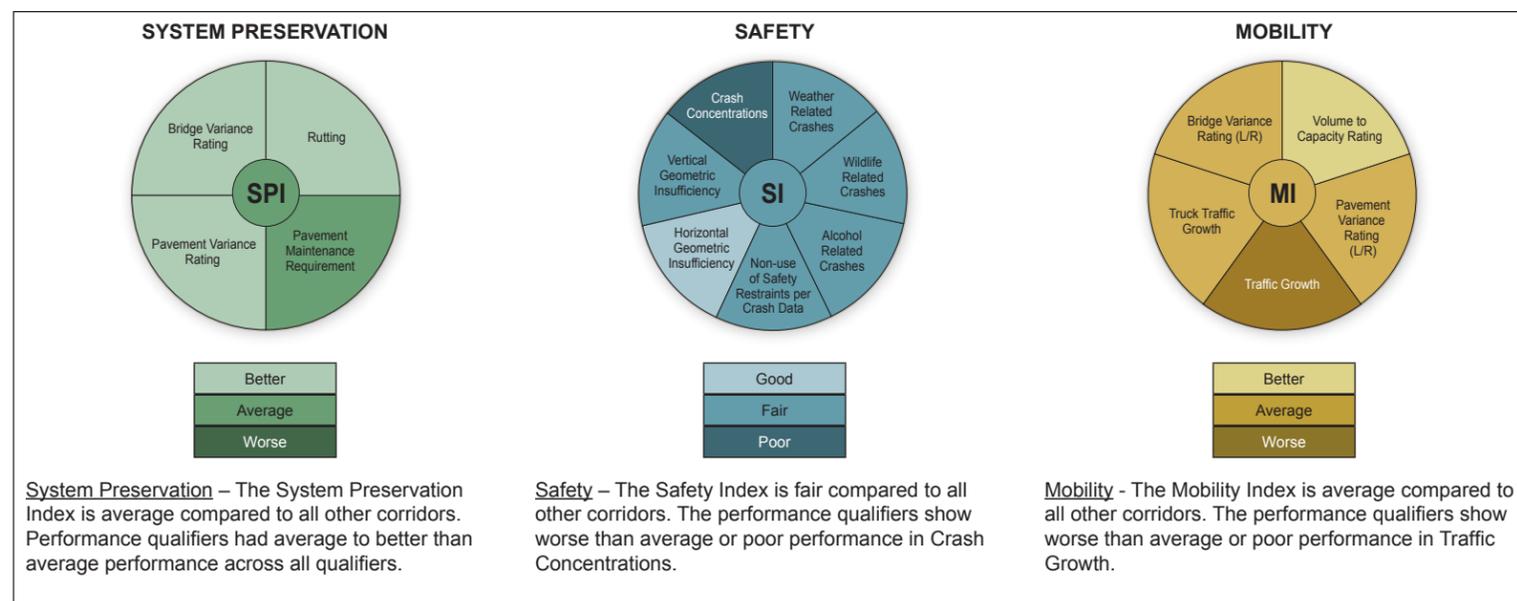
Table 15 - Review of Corridor Vision Goals and Other Considerations

Corridor Visions		High Priority	Other Considerations
Investment Category	Goal		
System Preservation	Preserve the existing transportation system		The Corridor Plan identifies several pavement hotspots and structurally deficient bridges for rehabilitation.
	Plan for continuing energy industry impacts to road system		Truck volumes contribute to the need for continuing maintenance.
	Accommodate growth in truck freight transport	✓	Future passing lanes and turn lanes may be required to address growing total traffic volumes, especially in the Gillette area.
Safety	Reduce fatalities, injuries, and property damage crash rates	✓	Wildlife and alcohol related crashes, along with failure to use safety restraints contribute to the severity of crashes in the corridor.
Mobility	Support commuter travel		The two-lane roadway is sufficient for commuter volumes for the near term, except with Gillette, where major improvements are either completed or underway. Additional traffic controls may be necessary to increase safety and improve traffic flow.

CORRIDOR PERFORMANCE

Table 16 shows SSC 14 corridor performance compared to the system. The center of each chart indicates the value of the performance index, with each section indicating the performance qualifier for each measure.

Table 16 - Corridor Performance



Coordination with System Priorities

The corridor comparison can be used to help assign a priority level to entire corridors, if conditions warrant. The Corridor Plans – Executive Summary is published under separate cover and provides an overview of corridor comparisons. The summary identifies areas of greatest need within all performance indexes and for performance qualifiers across the state system. By addressing these areas of greatest need, whether by program, corridor, or corridor segment WYDOT will ensure positive changes in reported conditions throughout Wyoming.