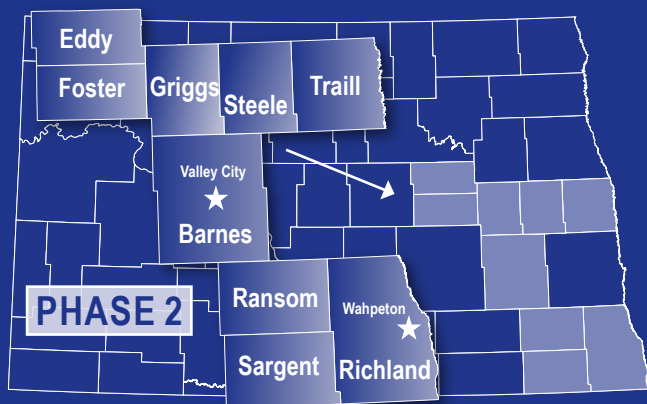




June 2014

North Dakota Local Road Safety Program



CODE FOR THE **ROAD**

PARTNERING TO SAVE LIVES.

North Dakota Local Road Safety Program

Prepared by

CH2M HILL

SRF Consulting Group, Inc.

On behalf of

North Dakota Department of Transportation

Grant Levi, P.E., Director

June 2014

23 USC 409

NDDOT Reserves All Objections

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Acronyms and Abbreviations

4Es	education, enforcement, engineering, and emergency medical services
100MVMT	100 million vehicle miles traveled
AASHTO	American Association of State Highway and Transportation Officials
ADT	average daily traffic
CMC	county major collector
CMF	crash modification factor
CRS	Crash Reporting System (North Dakota Department of Transportation)
DUI	driving under the influence
EMS	emergency medical services
ERA	edge risk assessment
FHWA	Federal Highway Administration
GDL	graduated driver's license
GHSA	Governors Highway Safety Association
HSIP	Highway Safety Improvement Program
LEAD	Listen, Educate, Ask, Discuss
LRSP	Local Road Safety Program
MUTCD	<i>Manual on Uniform Traffic Control Devices</i>
NCHRP	National Cooperative Highway Research Program
NDDOT	North Dakota Department of Transportation
NHTSA	National Highway Traffic Safety Administration
Plan	LRSP Safety Plan
PSA	public service announcement
SHSP	Strategic Highway Safety Plan
TSO	Traffic Safety Office

Executive Summary

This Local Road Safety Program (LRSP) was prepared for the nine counties (Barnes, Eddy, Foster, Griggs, Ransom, Richland, Sargent, Steele, and Traill) and two cities (Valley City and Wahpeton) in the eastern region. The LRSP was prepared as part of North Dakota's statewide highway safety planning process. The contents are the result of a data-driven process, with a goal to reduce serious crashes (defined as those crashes resulting in at least one fatality or incapacitating injury) by documenting at-risk locations, identifying effective low-cost safety improvement strategies, and better position the eastern region to compete for available safety funds. The LRSP includes a description of the connection to safety planning efforts at the national, state (through North Dakota's *Strategic Highway Safety Plan* and the Highway Safety Improvement Program), and regional levels.

This LRSP was commissioned by the North Dakota Department of Transportation (NDDOT) to provide a tool to assist counties in submitting proactive low-cost systemic safety projects for the NDDOT to fund as part of the Highway Safety Improvement Program (HSIP). The LRSP is not intended to be a complete safety plan for the eastern region, because there may be other safety improvement strategies that are considered high-cost or low-cost that are also effective, but cannot be systematically applied across a county or local road system. While this LRSP addresses many of the safety concerns at high-risk locations within the region, other equally important projects may be identified after this safety planning effort is complete.

Specifically, this LRSP includes the following:

- Description of the safety emphasis areas.
- Identification of a short list of high-priority, low-cost safety strategies.
- Documentation of at-risk locations along the county/local road systems that are considered candidates for safety investment. At-risk locations include roadway segments, horizontal curves, and intersections with multiple serious crashes or with roadway geometry and traffic characteristics similar to other locations in North Dakota where serious crashes have occurred.
- Development of approximately \$6.7 million of suggested safety projects across the eastern region (Table ES-1), including the filled out forms suitable for submittal to the NDDOT for their consideration for HSIP funding. These projects represent the application of high-priority safety strategies at the at-risk locations.
- Discussion of behavioral crash statistics, potential safety strategies, and current statewide resources available for implementation of behavioral safety strategies.

TABLE ES-1**Eastern Region Total Safety Project Costs**

Rural Projects	Roadway Segments	Intersections	Curves	Total
Barnes County	\$239,909	\$304,320	\$391,719	\$935,948
Eddy County	\$72,468	\$21,840	\$101,272	\$195,580
Foster County	\$144,240	\$104,400	\$72,246	\$320,886
Griggs County	\$36,762	\$160,320	\$53,640	\$250,722
Ransom County	\$150,936	\$141,240	\$29,520	\$321,696
Richland County	\$447,912	\$441,480	\$89,541	\$978,933
Sargent County	\$168,156	\$342,360	\$37,800	\$548,316
Steele County	\$134,683	\$54,000	\$65,172	\$253,855
Traill County	\$140,147	\$238,920	\$129,369	\$508,436
Urban Projects	Roadway Segments	Intersections – Right-Angle	Intersections – Pedestrians and Bicyclists	Total
Valley City	\$171,000	\$7,200	\$1,584,000	\$1,762,200
Wahpeton	\$175,850	\$374,400	\$84,000	\$634,250

The information in this LRSP is consistent with best practices in safety planning as presented in guidance prepared by the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), and the National Cooperative Highway Research Program (NCHRP). This information is provided to the eastern region in an effort to reduce the number of serious crashes on the county/local road systems. It is understood that the final decision to implement any of the suggested projects resides with the respective county or city officials.

It should also be noted that the rankings of county/local roadway facilities are based on a comparison with documented risk factors. There is no expectation or requirement that the eastern region pursue safety projects in the exact ranking order. The ranking suggests a general priority, and it is understood that actual project development decisions will be made by county or city staff based on consideration of economic, social, and political issues, as well as in coordination with other projects already in each agency's Capital Improvement Program.

It should also be noted that some of the at-risk locations and suggested safety projects involve the intersection of a county roadway and a state route. It is acknowledged that the county does not have the authority to implement projects on the state's right-of-way. The county is encouraged to coordinate with the NDDOT to pursue a partnership that identifies a path toward implementation. This LRSP (1) does **not** set requirements or mandates; (2) is **not** a standard; and (3) is neither intended to be nor does it establish a legal standard of care.

To help reduce the potential exposure to claims of negligence associated with motor vehicle crashes on the county/local road system, the following key point should be considered:

- Federal law (23 USC Section 409) established that information generated as part of the statewide safety planning process is considered privileged and unavailable to the public. The privileged status includes crash data where value/detail has been added by analysts during the safety planning process (for example, computation of crash rates, disaggregation of crashes by type or severity, and documentation of contributing factors), the lists of at-risk locations, and information supporting the development and evaluation of potential safety projects. The federal law and the privileged status of the safety information was upheld by the U.S. Supreme Court in the case of *Pierce County (Washington) v. Guillen*. North Dakota interprets Section 409 to mean that basic crash data are available to the public on request, but that the data cannot be used in legal proceedings associated with claims of negligence.

Regarding the expected life of this LRSP, the shelf life of this document is limited (as with any transportation plan). This is because the distribution of crashes can change over time, just as roadway and traffic conditions change, contributing to the occurrence of crashes. This LRSP contains \$6.7 million of potential safety projects, which could provide the eastern region with a sufficient backlog of projects for up to 5 years. As a result, the counties and cities are encouraged to periodically update this LRSP.

The counties and cities are encouraged to apply for these projects through the NDDOT's HSIP process. The anticipated annual HSIP process is shown in Table ES-2.

TABLE ES-2
HSIP Solicitation Schedule

Month	Task Description
October/November	Solicitation for HSIP is sent out to all counties, districts, MPOs, cities, and tribes. The counties, districts, MPOs, cities, and tribes will have about 6 weeks to respond .
January through March	NDDOT reviews the requests and conducts additional studies if required.
Following Fall	HSIP approval notices are sent after program concurrence from the FHWA. Funding for an approved project will be provided as funding is available.

1.0 Introduction

1.1 Background

To fulfill a commitment in the 2013 North Dakota Strategic Highway Safety Plan (SHSP), the North Dakota Department of Transportation (NDDOT) began the Local Road Safety Program (LRSP). The purpose of the LRSP is to better engage local roadway agencies in the statewide safety planning process. The NDDOT's commitment is based on two pieces of information:

- Based on 2007-to-2011 crash records, the SHSP identified that 56 percent of serious crashes (those crashes resulting in at least one fatality or incapacitating injury) in North Dakota occurred on roads operated by local agencies.
- The NDDOT had historically focused federal safety funds on interstates, U.S. highways, and state highways, even though approximately half of serious crashes occurred on those facilities.

The NDDOT set out to increase the level of participation of local agencies in safety planning and the amount of safety funds directed toward projects on local systems. To do this, the NDDOT first partnered with local agencies (including all 53 counties and 12 major cities in the state) to prepare safety plans for every region of North Dakota.

Representatives from the NDDOT, Barnes, Eddy, Foster, Griggs, Ransom, Richland, Sargent, Steele, and Traill counties; and the cities of Wahpeton and Valley City prepared this LRSP Safety Plan (Plan) as Phase 2 of a

comprehensive effort to reduce the number of fatal and incapacitating injury crashes (referred collectively as serious crashes) that occur on North Dakota's local road system in the eastern region. The area covered by the Plan includes portions of NDDOT District 2 – Valley City, District 3 – Devils Lake, District 6 – Grand Forks, and District 8 – Fargo (Figure 1-1). Additionally, Cass and Grand Forks counties and the cities of Fargo, West Fargo, and Grand Forks participated in Phase 2 of the study; however, their information is provided in separate reports.

The purpose of this LRSP is to identify and implement specific safety strategies at specific locations and to link these projects directly with the contributing factors associated with the majority of serious crashes on the local roads. These safety projects are intended to be comprehensive by addressing both infrastructure- and driver-behavior-related crashes by including proactive projects developed through a system-wide risk assessment process. These projects are intended to compliment reactive projects developed through a site analysis approach focused on high-crash locations.

The Strategic Highway Safety Plan (SHSP) development process was key in helping us identify the importance of local roads to achieve our long-term safety goals. This data-driven process helped us to transition to a systemic identification of crash types on all roads in addition to our traditional crash location (or hot spot) approach on the state system. As a result, the NDDOT has partnered with local stakeholder to prepare road safety plans that will identify potential safety projects consistent with the SHSP.

— Grant Levi, P.E., Director
North Dakota Department of Transportation

The traffic safety priorities identified in this Plan are the result of a data-driven analysis of nearly 88,450 crashes (including 2,231 serious crashes) on all roads in North Dakota. Of these crashes, 5,709 total crashes and 194 serious crashes occurred in the eastern region over the 5-year period from 2008 to 2012.

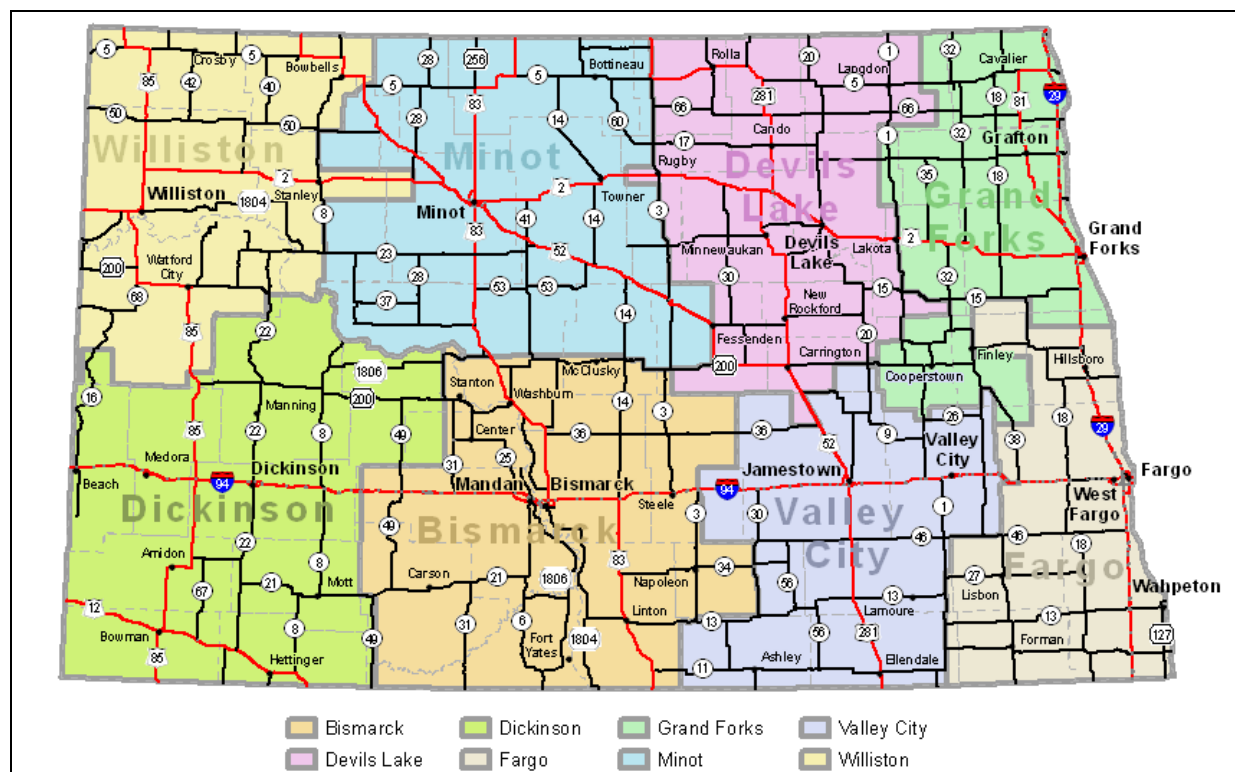


FIGURE 1-1
North Dakota Department of Transportation's Eight Districts

1.2 Traffic Safety – A National Perspective

According to the National Highway Traffic Safety Administration (NHTSA), 32,310 people were killed in traffic crashes in 2011 – an average of 89 people killed every day – and an additional 2.2 million people were injured. The number of fatalities nationally decreased significantly and steadily in the 1970s and 1980s. Beginning in the early 1990s and continuing through the early 2000s, traffic fatalities began to increase. However, since 2005, traffic fatalities have decreased dramatically to the lowest number of fatalities in recent history – 32,310 fatalities in 2011.

Like the national trend, the North Dakota traffic fatality rate also decreased in the 1970s and 1980s. Likewise, North Dakota's traffic fatalities slowly increased through the 1990s and early 2000s, and began to decrease again in 2005. However, unlike the national trend, North Dakota's traffic fatality rate has increased since 2008. The 2013 North Dakota Strategic Highway Safety Plan recognizes the following issues likely account for much of the increase:

- Shifts in the age of the driving population.
- Steady increase in the number of vehicle miles traveled in North Dakota, which is counter to the flat or decreasing national trend in travel.

- Other states have a longer history using a systemic investment approach to focus on locations with risk factors for serious crashes.
- The growing challenges of providing emergency medical response and quick access to advanced health care in rural areas.

1.2.1 AASHTO's *Strategic Highway Safety Plan* and Safety Emphasis Areas

In the late 1990s, the American Association of State Highway and Transportation Officials (AASHTO) and the Federal Highway Administration (FHWA) supported a comprehensive and data-driven approach to reduce the number of traffic-related fatalities. Both AASHTO and the FHWA concluded that up to that point, states' efforts had not been effective in lowering the number of serious crashes because: (1) efforts were not focused on serious crashes nor the primary factors resulting in serious crashes; and (2) safety project selection was not part of a data-driven process that implemented effective strategies at locations most at risk for a serious crash.

AASHTO and the FHWA recommended a safety program development process that included 22 categories (or safety emphasis areas) in the areas of drivers, special users, vehicles, highways, emergency services, and management. The objective of this first step is to help agencies consider the 4Es of safety – education, enforcement, engineering, and emergency medical services (EMS) – when identifying safety priorities for their roads. In addition, selecting safety emphasis areas focuses agencies on safety strategies linked to the issue.

In 2007, AASHTO set a goal to reduce the number of traffic fatalities nationally by 1,000 each year for the next 20 years, which is an integral first step in a national *Toward Zero Deaths* safety vision. FHWA has determined that this goal will be reached only by partnering with individual states. This partnering will lead to more successful project implementation and will result in programs that target the factors contributing to the greatest number of fatal and serious injury crashes.

1.3 North Dakota's Statewide Safety Planning Efforts

Through 2004, North Dakota had a fatality rate (1.34 fatalities per 100 million vehicle miles traveled [100MVMT] in 2004) that was less than the national average (1.44 fatalities per 100MVMT). However, in recent years, the North Dakota fatality rate (1.61 fatalities per 100MVMT in 2011) has risen to above the national average (1.10 fatalities per 100MVMT) and the overall number of traffic fatalities has crept upward (see Figure 1-2). In 2011, there were 148 fatalities on North Dakota roads: the most traffic fatalities reported in the state since 1982.

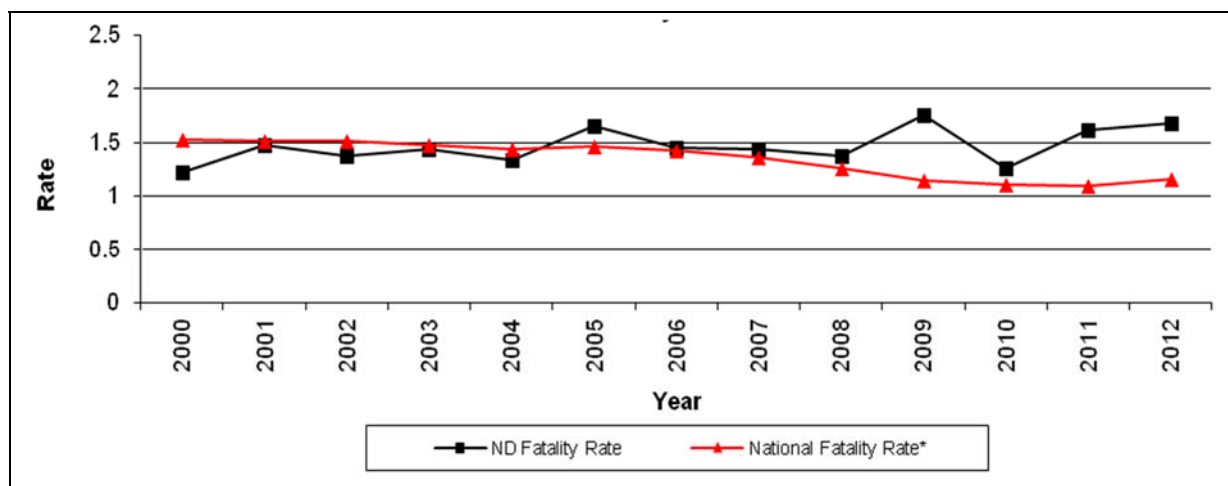


FIGURE 1-2
Fatality Rate – National and North Dakota (2000 to 2012)

In 2013, the NDDOT updated the state's SHSP. Based on serious crashes (Table 1-1), the 2013 SHSP identified the following safety emphasis areas, as well as priority safety strategies in each area:

- Young drivers (under age 21)
- Speeding or aggressive driving
- Alcohol-related
- Unbelted vehicle occupants
- Lane departure
- Intersections

North Dakota also adopted a long-term vision of zero fatalities on its roadways. Achieving this vision will require many years and dramatic shifts in the safety culture for North Dakota residents. An aggressive intermediate goal was set to reduce the 3-year average of traffic fatalities to 100 or fewer by 2020.

TABLE 1-1
North Dakota Fatal and Serious Injury Crashes by AASHTO Safety Emphasis Area

Safety Emphasis Area		Statewide Crashes (All Roads)	
		Percent	Number
Drivers	Involving Driver under Age 21	22%	501
	Involving drivers over the age of 64	13%	280
	Speeding or Aggressive Driving	26%	576
	Alcohol-Related	30%	667
	Distracted, asleep, or fatigued drivers	9%	206
	Unbelted Vehicle Occupants	48%	1,067

TABLE 1-1

North Dakota Fatal and Serious Injury Crashes by AASHTO Safety Emphasis Area

Safety Emphasis Area		Statewide Crashes (All Roads)	
		Percent	Number
Special Users	Pedestrians crashes	5%	117
	Bicycle crashes	2%	46
Vehicles	Motorcycles crashes	12%	265
	Heavy vehicle crashes	15%	342
Highways	Train-vehicle collisions	1%	13
	Lane-Departure Including both lane-departure (898 serious crashes) and head-on/ sideswipe-opposing crashes (150 serious crashes)	47%	1,048
	Intersections	23%	513
	Work zone crashes	2%	36
Total Serious (Fatal and Incapacitating Injury) Crashes		2,231	

Notes:

Information is from the 2008-to-2012 North Dakota crash data records, which is an update to the information in the 2013 North Dakota SHSP that used 2007-to-2011 crash records.

Numbers in this table do not add up to the statewide crash numbers because one crash may be categorized into multiple emphasis areas. For example, one crash may involve a young driver at an intersection and, therefore, be included in both of these emphasis areas.

1.4 Local Road Safety Program Overview

North Dakota's local road system encompasses more than 97,500 miles of roadway out of approximately 106,000 miles statewide. Although, historically, more than 50 percent of serious crashes in North Dakota occurred on local roads, the density of these crashes was very low (approximately 0.002 serious crash per mile per year). As a result, local agencies were unable to identify high-crash locations to nominate for funding through the Highway Safety Improvement Program (HSIP). Therefore, using stand-in data for the serious crashes, safety projects were identified using a systemic process to evaluate at-risk locations. The use of the systemic process was necessary due to the low crash density. Based on revised FHWA policy, the NDDOT expanded the HSIP to include projects identified through the systemic analysis of local roads.

The focus areas of the systemic risk assessment are rural, paved county and tribal highways,¹ and urban arterials and collectors in North Dakota's larger cities (cities with a population greater than 5,000). Paved, rural county highways were selected based on an analysis of statewide crash data that indicated that approximately 61 percent of serious local road crashes occurred on rural county roads. Of these crashes, approximately half occurred on paved roads, which account for less than 10 percent of county roads (approximately 6,200 miles). Further analysis indicated that on these rural highways, the most at-risk elements were roadway

¹ Does not include all paved roads outside municipal limits, but focuses on routes that serve regional travel. For example, a loop road that is paved and yet only provides access to a residential neighborhood was considered to be a local road given the type of traffic served by the facility.

segments (60 percent of serious crashes), horizontal curves (32 percent of serious crashes), and intersections (32 percent of serious crashes).

Major cities were selected as a focus because approximately 90 percent of the serious local-road crashes occurred within the city boundaries of the 12 cities in this category. Furthermore, 40 percent of the serious crashes occurred on urban arterials and collectors. In addition, because these 12 cities are responsible for operation and maintenance of U.S. highway and state highway routes within the municipal limits (not including fully access-managed facilities, such as freeways), the U.S. and state highways were included in the review.

Figure 1-3 shows the approach used to develop this Plan for the eastern counties. The process began with the crash analysis and concluded with this LRSP Safety Plan, the culmination of the NDDOT and concerned local agencies working together for nearly half a year.

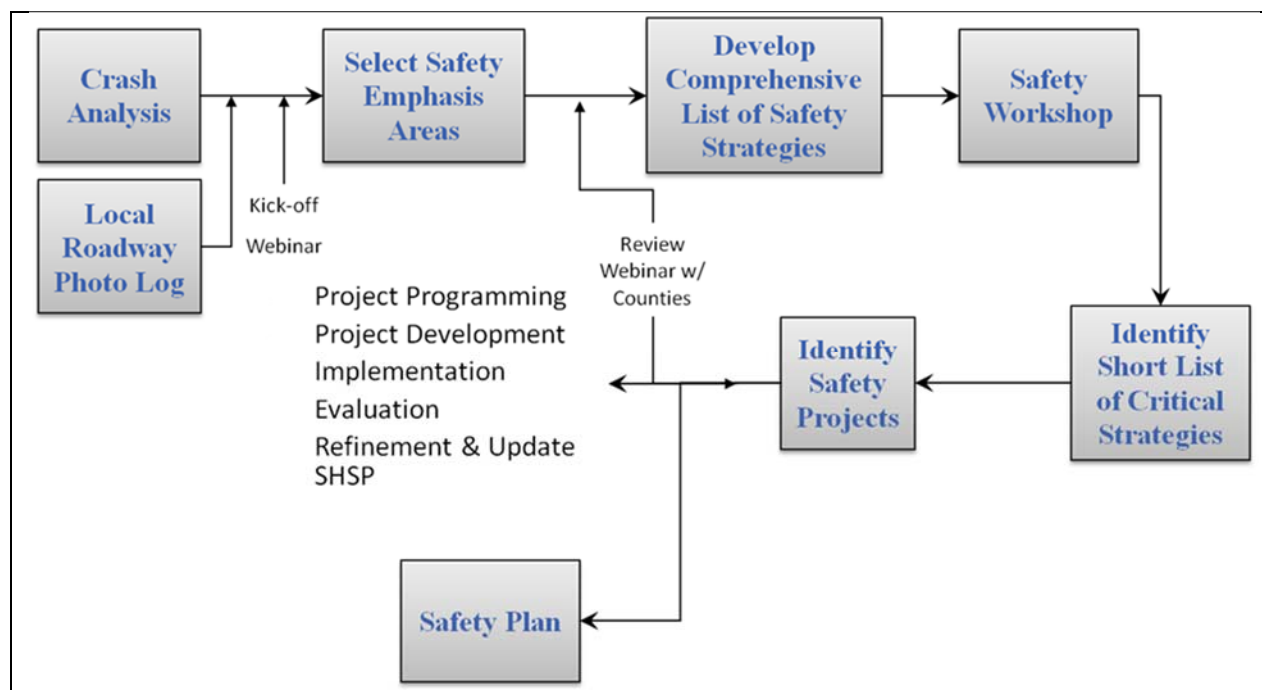


FIGURE 1-3
Local Road Safety Program Safety Plan Approach

2.0 Eastern Region Safety Emphasis Areas and Crash Overview

The first step in the process to prepare Safety Plans for the eastern region was to conduct a crash analysis overview statewide for North Dakota and then for the eastern region as a whole.

2.1 Eastern Region Crash Overview

2.1.1 North Dakota Crash Mapping

Crash data was taken from NDDOT Crash Reporting System (CRS) and placed into ArcGIS for data exportation based on specific locations relative to local roads. The most recent five-year period of crash data (from 2008 to 2012) was analyzed and used to determine risk factors specific to the local roads in the eastern region, which includes Barnes, Eddy, Foster, Griggs, Ransom, Richland, Sargent, Steele, and Traill counties, as well as the cities of Wahpeton and Valley City. Consistent with the NDDOT's SHSP, the analysis focused on serious (fatal and incapacitating injury) crashes.

2.1.2 Facilities Analyzed

The crash analysis was broken into three main facility types: roadway segments, curves, and intersections:

- Paved rural local roadway segments were analyzed and local county major collector (CMC) gravel roads were analyzed for multiple crash locations. Other local gravel roads were removed from the analysis because of the relatively low percentage of serious crashes and due to the lack of infrastructure-based strategies that can be applied to this roadway type.
- Local rural road intersections with state highways or other local roads were included in the analysis. Local non-CMC gravel roads intersecting with other local roads were removed from the analysis due to the very low number of crashes at these intersections.
- Horizontal curves on paved rural local roads were included in analysis.
- Urban roadway segments and intersections were analyzed in Valley City and Wahpeton. Urban roadway types analyzed within the city limits included:
 - State routes
 - Urban principal arterials
 - Urban minor arterials
 - Urban collector roads
- All other local roadway segments and intersections, including gravel roads, were reviewed for locations with multiple serious crashes or "hot spots."

2.1.3 Crash Data Sets

Crash data for the 5 years from 2008 to 2012 was used for the eastern region crash analysis. In safety analysis, it is recommended that more than 1 year of data be studied to reduce the possibility of examining an unusual year. It is also important to include as many years as necessary to produce a data set that will provide statistically reliable results but not too long so that changed conditions are a concern (for example, reconstructed roads, addition of STOP signs, and changed speed limits). For the eastern region, there were not enough crashes to be statistically reliable; therefore, decisions were based on the crashes for all Phase 1 and Phase 2 cities and counties combined (Figure 2-1), statewide data (Figure 2-2), or national research.

The eastern region data set includes 2,627 crashes on local roads; of these, 92 were fatal or incapacitating injury crashes. Disaggregating the serious crashes by road type (paved, gravel, or local), area (urban versus rural), and crash type category (intersection versus roadway segment crashes) resulted in the distribution shown in Table 2-1, Figure 2-1, and Figure 2-2.

TABLE 2-1
Crash Distribution (2008 to 2012)

Location	Eastern Region (Percent/Number)	Statewide (Percent/Number)
Rural Roads	87% (80 crashes)	71% (789 crashes)
Paved Rural Roads	49% (39 crashes)	50% (394 crashes)
CMC Gravel Roads	10% (8 crashes)	9% (73 crashes)
Paved Rural Road Segments	72% (26 crashes)	59% (225 crashes)
Single Vehicle, Lane-Departure Crashes on Paved Rural Road Segments	88% (23 crashes)	76% (170 crashes)
Paved Rural Road Intersections	28% (10 crashes)	36% (137 crashes)
Paved Rural Road Thru-STOP Intersections	60% (6 crashes)	44% (60 crashes)

This review shows that, on the local system, serious lane-departure crashes on paved roads and angle crashes at Thru-STOP intersections were overrepresented. Based on statewide traffic safety data, serious lane-departure crashes along curves are also overrepresented.

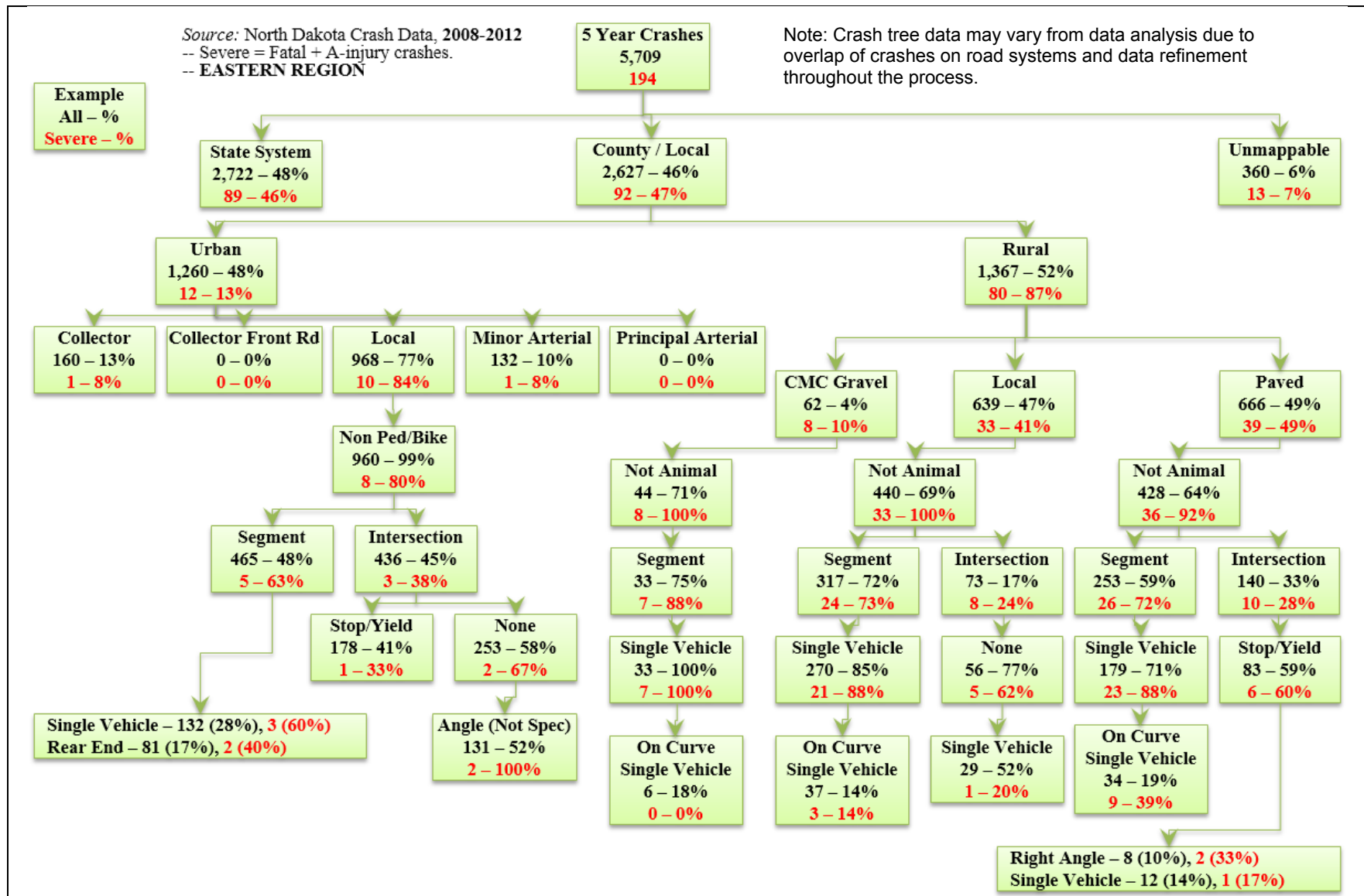


FIGURE 2-1
Eastern Region Crash Data Overview – Rural and Urban Local Road Systems (2008 to 2012)

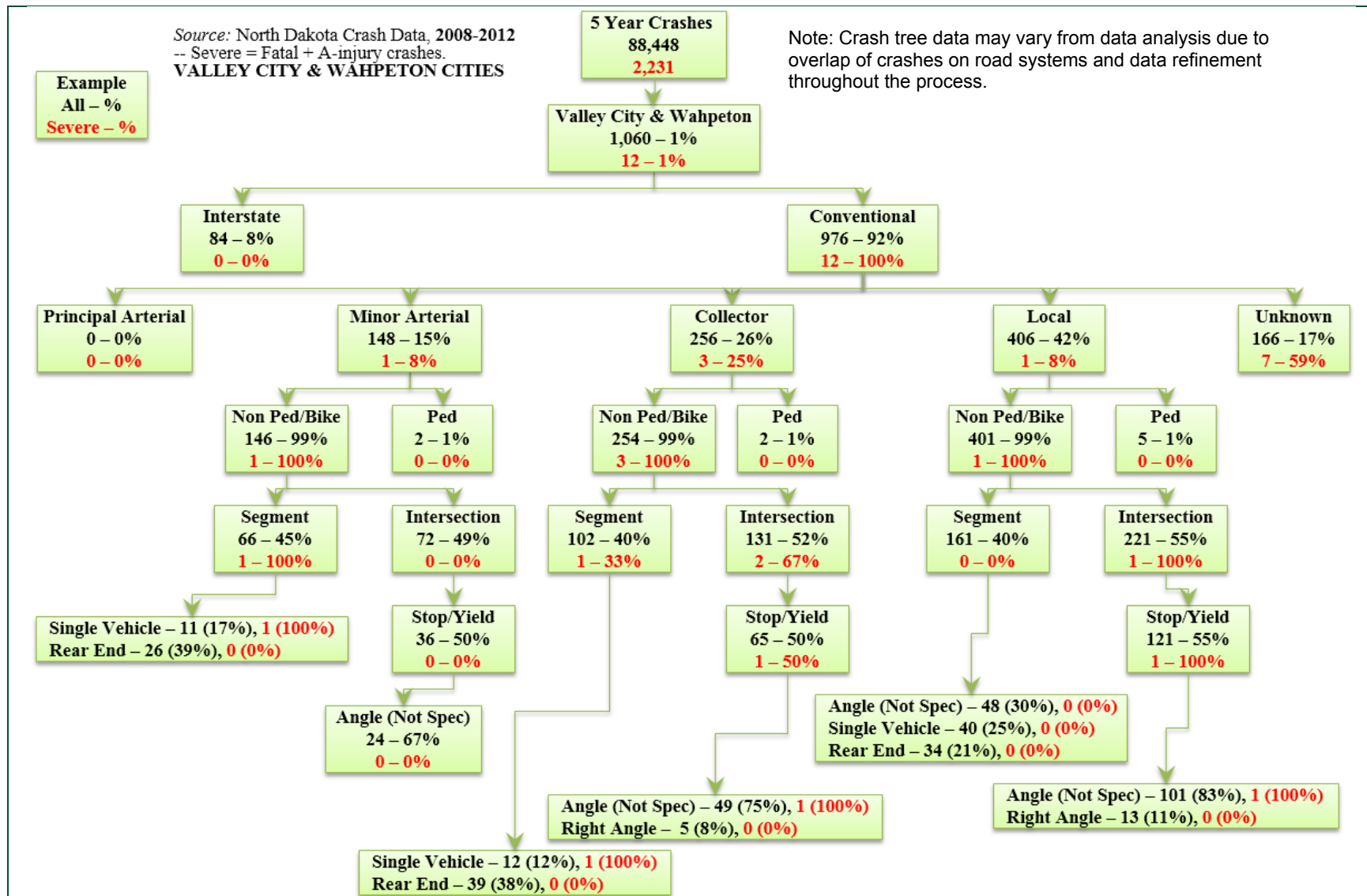


FIGURE 2-1 (Continued)
Eastern Region Crash Data Overview – Rural and Urban Local Road Systems (2008 to 2012)

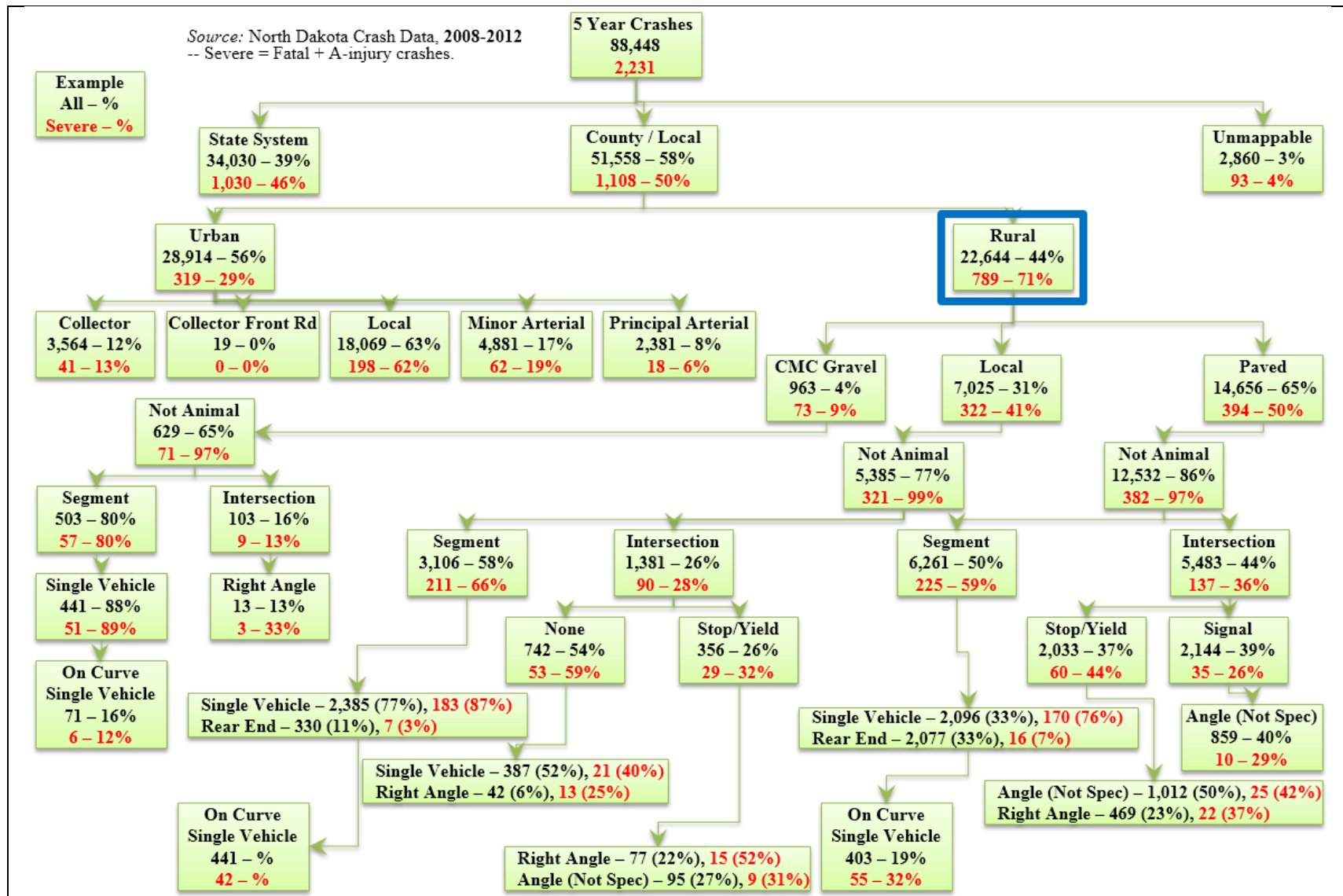


FIGURE 2-2
North Dakota Crash Data Overview – Rural and Urban Local Road Systems (2008 to 2012)

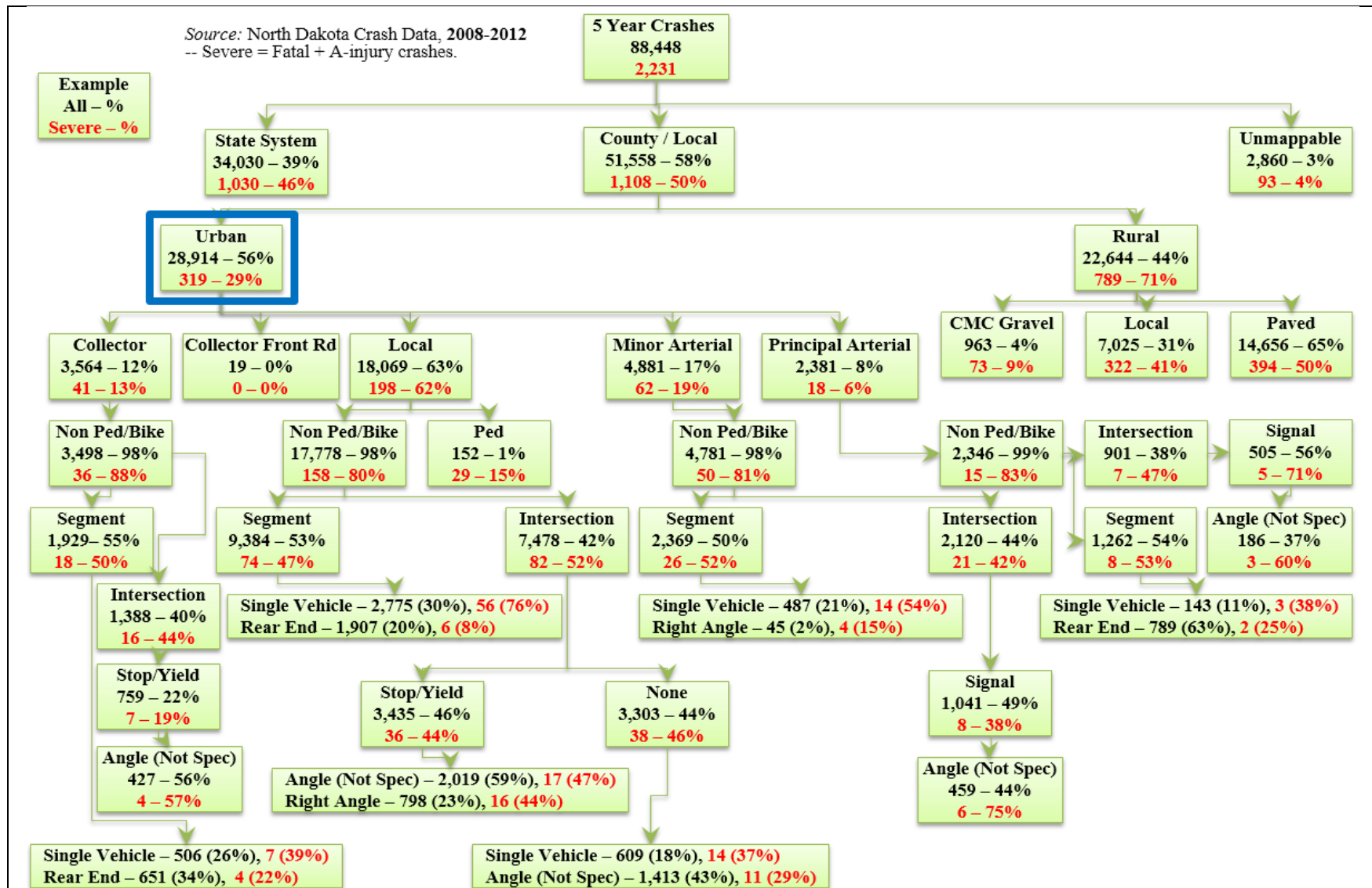


FIGURE 2-2 (Continued)
North Dakota Crash Data Overview – Rural and Urban Local Road Systems (2008 to 2012)

2.2 Eastern Region Safety Emphasis Areas

The total number of serious crashes (those crashes resulting in a fatality or incapacitating injury) in each county over the 5-year period from 2008 to 2012 was so few that the crash data was analyzed at regional, statewide, and national levels for various risk factors.

Section 1.2 described the development of AASHTO's emphasis areas, and how this process was applied to the State of North Dakota to identify statewide safety emphasis areas (Table 1-1). An identical process was followed for the eastern region, resulting in the distribution of serious crashes among AASHTO's 22 emphasis areas (Table 2-2). The safety emphasis areas for the eastern region are consistent with the state's emphasis areas. This process revealed where crashes were overrepresented based on a comparison to statewide averages or where a large enough number of crashes represented an opportunity to substantially reduce crashes. As a result, the following safety emphasis areas were identified as priorities for safety investments:

- Driver Behavior – Young drivers, aggressive drivers, alcohol-related, and unbelted vehicle occupants
- Highways – Lane departure and intersection crashes

TABLE 2-2
Eastern Region Serious Crashes by Safety Emphasis Areas (2008 to 2012)

Safety Emphasis Areas	Statewide (% of Total)	2008 to 2012 Serious Crashes					
		Eastern Region		State Roads		Local System	
		%	#	%	#	%	#
Total Serious Crashes	2,231	194		91		103	
Involving Drivers Under Age 21	22%	22%	43	18%	16	26%	27
Involving Drivers Over Age 64	13%	12%	24	15%	14	10%	10
Excessive Speed or Aggressive Driving	26%	35%	67	33%	30	36%	37
Alcohol-Related	30%	34%	66	23%	21	44%	45
Distracted, Asleep, or Fatigued Drivers	9%	11%	21	8%	7	14%	14
Unbelted Vehicle Occupants	48%	53%	102	45%	41	59%	61
Pedestrian Crashes	5%	2%	4	1%	1	3%	3
Bicycle Crashes	2%	1%	1	0%	0	1%	1
Motorcycle Crashes	12%	10%	20	10%	9	11%	11
Heavy Vehicle Crashes	15%	16%	31	25%	23	17%	18
Train-Vehicle Collisions	1%	0%	0	0%	0	0%	0
Lane-Departure (Run-Off-the-Road and Head-On) Crashes	47%	53%	102	47%	43	57%	59
<i>Head-On</i>	<i>7%</i>	<i>4%</i>	<i>8</i>	<i>4%</i>	<i>4</i>	<i>4%</i>	<i>4</i>
<i>Run-off-the-Road Crashes</i>	<i>40%</i>	<i>48%</i>	<i>94</i>	<i>43%</i>	<i>39</i>	<i>53%</i>	<i>55</i>
Intersection Crashes	23%	20%	39	14%	13	25%	26

TABLE 2-2

Eastern Region Serious Crashes by Safety Emphasis Areas (2008 to 2012)

Safety Emphasis Areas	Statewide (% of Total)	2008 to 2012 Serious Crashes					
		Eastern Region		State Roads		Local System	
		%	#	%	#	%	#
Work Zone Crashes	2%	2%	3	2%	2	1%	1
Deer Collisions	1%	2%	4	1%	1	3%	3
Adverse (Winter) Weather Related	16%	23%	44	36%	33	11%	11
Note: Serious crashes are those crashes that result in at least one fatality or incapacitating injury.							

Strategies to reduce crashes depend on whether a safety emphasis area is infrastructure-based or driver-behavior-based. Infrastructure-based emphasis areas refer to characteristics of the location (for example, a roadway segment, curve, or intersection) where crashes occurred. Driver-behavior-based emphasis areas refer to motorist characteristics or actions that contribute to crashes. Because driver behavior is tied to laws made at the national and state levels, roadway agencies generally have less ability to address driver-behavior-based emphasis areas. The most effective approach for road authorities to addressing driver-behavior-based emphasis areas is to focus on public education and law enforcement through cooperation and collaboration with other county departments, agencies, and schools. Generally, more opportunities exist for county and city road authorities to address infrastructure-based emphasis areas, because many of the associated strategies can be implemented as separate roadway improvement projects, or along with other planned improvements. Specific infrastructure- and driver-behavior-based strategies presented to the participants of the safety workshop held for the eastern region are provided in Section 3.2.

2.3 Crash Risk Factors

The objective of the analytical process is to identify candidates for safety investment based on two criteria: high-crash locations and at-risk locations. A more detailed crash analysis was performed for each priority crash type to identify (1) locations where these priority crash types occur at a rate of one or more serious crashes per year, and (2) basic roadway and traffic characteristics of locations with serious crashes. These characteristics are not considered to be the cause of crashes, but instead are used to determine the risk that a future serious crash would occur at a particular location. Information from historic crashes was used to evaluate the remainder of the region's local road system and prioritize locations for safety investment based on similar characteristics.

Three additional urban areas and two additional counties were studied as a part of Phase 2 in the LRSP: the cities of Fargo, West Fargo, Grand Forks, in addition to Cass County and Grand Forks County. Urban-rural counties are designated as those containing a city with a population greater than 5,000, while rural-rural counties are those without cities exceeding this population. Valley City and Wahpeton are the subjects of the urban portion of this Plan, but for analysis purposes, the data were combined for all of Phase 2 urban areas.

2.3.1 Rural Roadway Segments – Crashes on Paved Roads

Of the more than 97,500 miles of local road system in North Dakota, only 7 percent of the roads are paved. However, 52 percent of crashes occurred on paved roads. Therefore, the focus of the LRSP is on rural paved roadway segments.

There are 1,020 miles of rural paved county roads in the eastern region. From 2008 to 2012, 39 serious crashes were reported on these roads. The predominant crash type on these roads was single-vehicle lane-departure (Figure 2-3). The following five risk factors were identified for rural lane departure crashes on paved roads in the counties:

1. **Average Daily Traffic (ADT)** – Of the rural paved roads, 46 percent have an ADT greater than 225 vehicles per day. However, 72 percent of the serious lane departure crashes occurred above this ADT (Figure 2-4). Therefore, any segment with an ADT greater than 225 vehicles per day received a star.
2. **Access Density** – Nationally, research has shown that an access density of eight or more access points per mile (including field entrances, commercial entrances, roadway access, etc.) increased the likelihood of a serious crash occurring. North Dakota's review of serious crashes on their rural county roads (shown in Figure 2-5) demonstrates a similar relationship with a slightly lower threshold of six access points per mile. Therefore, any roadway segment with an access density greater than or equal to six access points per mile received a star.
3. **Lane-Departure Crash Density** – The average lane-departure crash density was 0.040 crash per mile. Due to limited number of crashes in each county, any roadway segment where the lane-departure crash density was greater than the average for the county received a star.
4. **Critical Radius Curve Crash Density** – Nationally, lane-departure crashes frequently occur within curves. Curves with radii between 500 and 1,200 feet (that is, critical radius curves) have a higher serious crash rate than other curves and roadway segments with more curves in this range are considered to have greater risk. The risk factor is determined by the number of critical radius curves divided by the length of the segment. The average critical curve radius crash density for these types of curves along roadway segments was 0.111 crash per mile. Any segment with a curve critical radius crash density greater than or equal to these respective values received a star.
5. **Edge Risk Assessment (ERA)** – A rating system was developed to categorize the risk level of vehicles leaving the travel lane. Roads with a usable shoulder and reasonable clear zone received a rating of 1. Roads with little or no usable shoulder but with a reasonable clear zone received a rating of 2, as did roads with a usable shoulder but with fixed objects in the clear zone. Roads with no usable shoulder and fixed objects in the clear zone received a rating of 3. Examples of these edge risks are shown in Figure 2-6. Roads were evaluated using photos taken in the autumn of 2013 to determine the rating. Roads with a rating of 2 or 3 received a star.

Detailed segment analyses and results for the counties are provided in Chapter 4. A prioritization process for each roadway segment was put into place using the five risk factors by giving stars to each risk factor present. The highest priority roadway segments received the most stars. In cases where roadway segments received the same number of stars, the ERA, and ADT were used to break the tie.

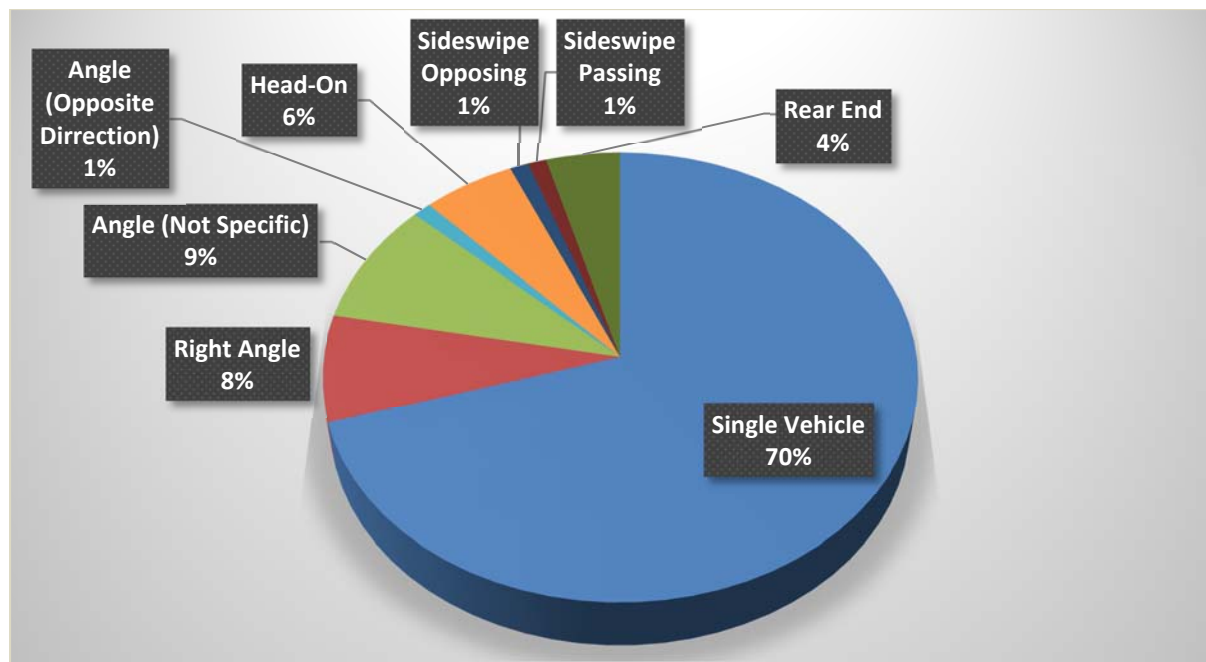


FIGURE 2-3
Serious Crash Types on Rural Paved Roads (2008 to 2012)

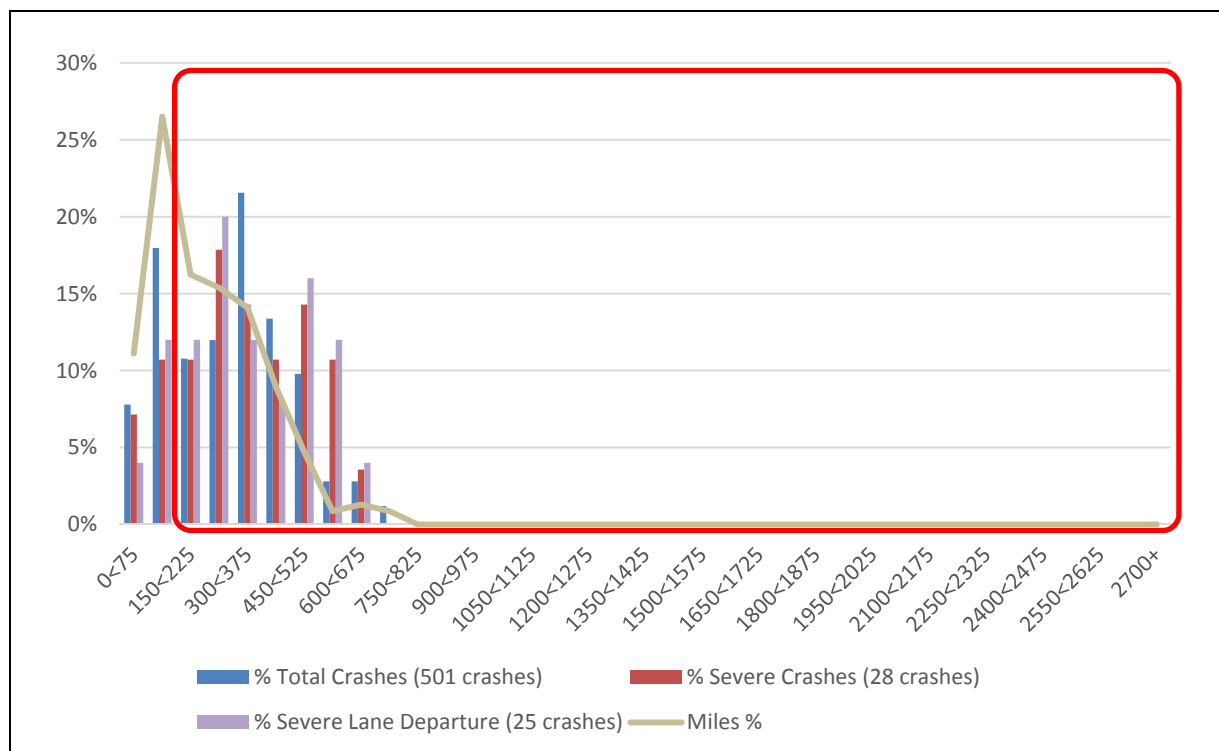


FIGURE 2-4
Rural Roadway Segment Average Daily Traffic (ADT) Crash Data (2008 to 2012)

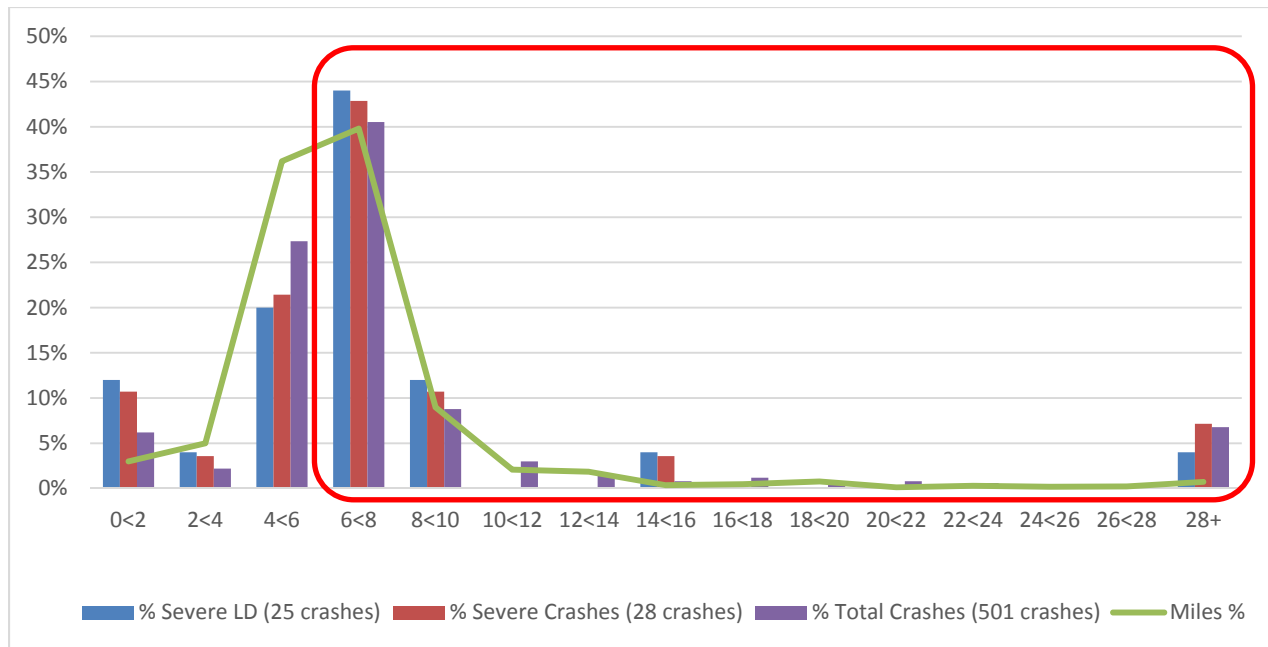


FIGURE 2-5
Serious Crashes by Access Density on North Dakota Rural County Roads (2008 to 2012)



FIGURE 2-6
Sample Edge Risk Assessment Ratings and Descriptions

2.3.2 Rural Curves – Crashes on Paved Roads in Curves

Detailed crash analysis included horizontal curves on rural paved local roads. Research indicates horizontal curves with certain characteristics contribute to the overall frequency of lane-departure crashes. The 1,020 miles of rural paved roads in the eastern region contain 281 curves totaling approximately 42 miles in length (4 percent of the road system mileage).

With only 10 serious crashes along curves reported from 2008 to 2012, too few crashes occurred on these curves to serve as a reliable indicator of the relative degree of risk. However, data for all counties show the importance of safety improvements on curves to reduce serious crashes since many serious lane-departure crashes occur in curves. As a result, the LRSP team used characteristics of curves in the county where crashes had occurred, as well as available information from similar analysis of national and statewide data. Results from *Cost-Benefit Analysis of In-Vehicle Technologies and Infrastructure Changes to Avoid Crashes Along Curves and Shoulders* (compiled by the University of Minnesota and CH2M HILL in June 2009) were also used in curve analysis and prioritization.

Based on a review of these sources, the following five risk factors were identified for crashes within curves in the county:

1. **Curve Radius** – The eastern region and all counties in Phase 1 and Phase 2 did not have enough serious curve crashes to provide insight into North Dakota's characteristics (Figure 2-7). National data shows that curves with mid-range radii had higher crash densities. An upper limit of 1,200 feet was used for at-risk curves, because 1,200 feet is a 60-mile-per-hour design speed based on AASHTO's *A Policy on Geometric Design of Highways and Streets* (commonly referred to as the "Green Book;" 6th edition, 2011). A lower limit of 500 feet was used to represent the serious lane-departure crashes that were reported in the county from 2008 to 2012. Any curve with a radius between 500 and 1,200 feet received a star.
2. **Average Daily Traffic (ADT)** – Traffic volumes over 300 vehicles per day represent a higher risk for crashes (Figure 2-8). Sixty-four percent of serious lane-departure crashes occurred along curves with this ADT, while only 31 percent of curves are represented in this range. Therefore, curves with an ADT over 300 vehicles per day received a star.
3. **Intersection within the Curve** – In the eastern region, the presence of an intersection within a curve increased the risk for a serious crash. Curves with at least one intersection within the curve received a star.
4. **Visual Trap** – A visual trap exists when the crest of a vertical curve is located before a horizontal curve or where a minor road, tree line, or line of utility poles continues on a tangent to the curve, thereby creating the illusion that the road continues straight ahead (Figure 2-9). The presence of a visual trap increased the risk of crashes in the eastern region and, therefore, received a star.
5. **Serious Crashes** – If a serious crash occurred on a curve between 2008 and 2012, the curve received a star.

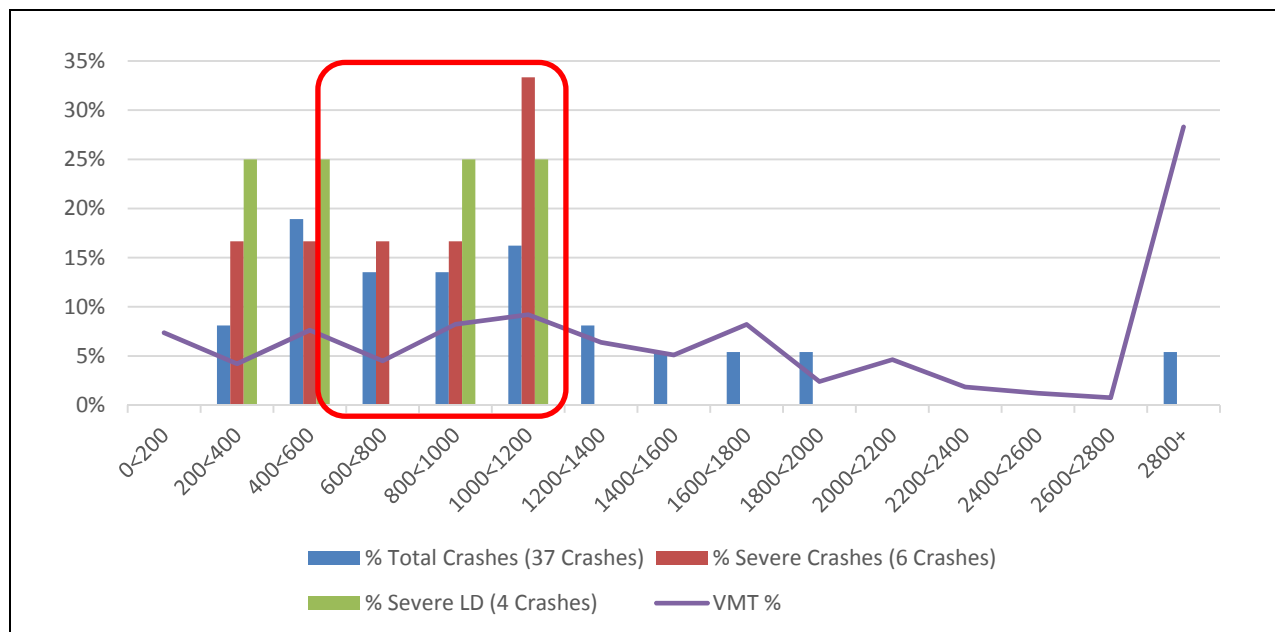


FIGURE 2-7
Phase 1 and Phase 2 Curve Crashes by Radii – 500 to 1,200 feet (2008 to 2012)

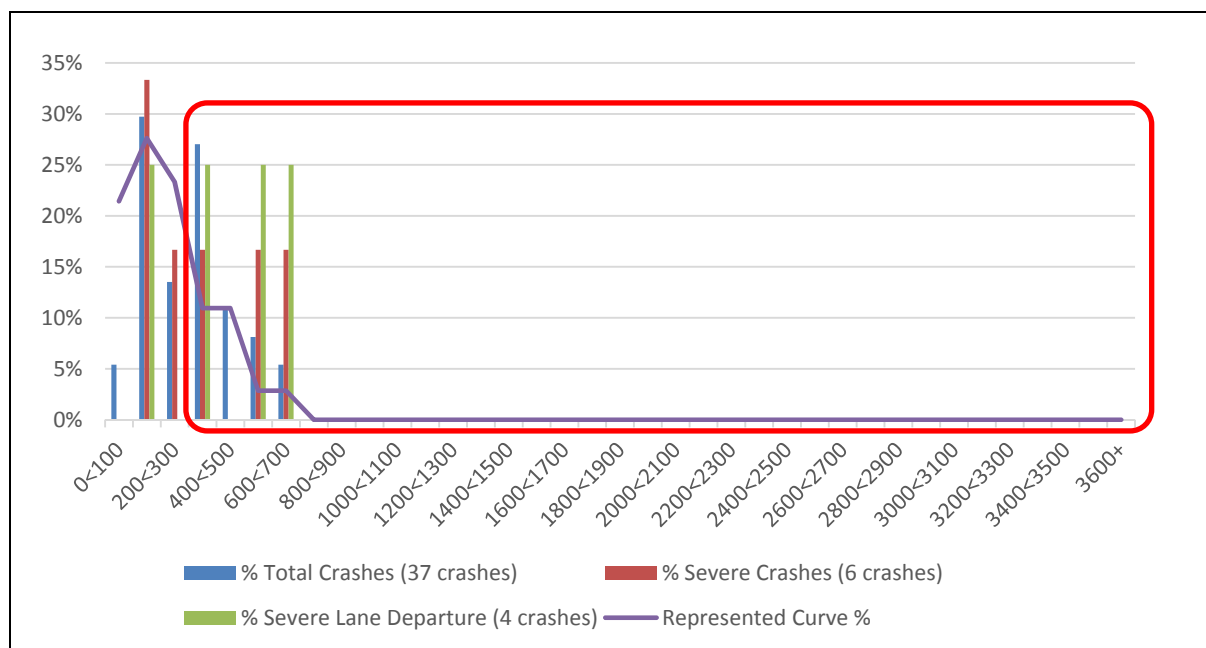


FIGURE 2-8
Rural Curve Crashes by Average Daily Traffic (ADT) – Greater than 300 Vehicles per Day (2008 to 2012)

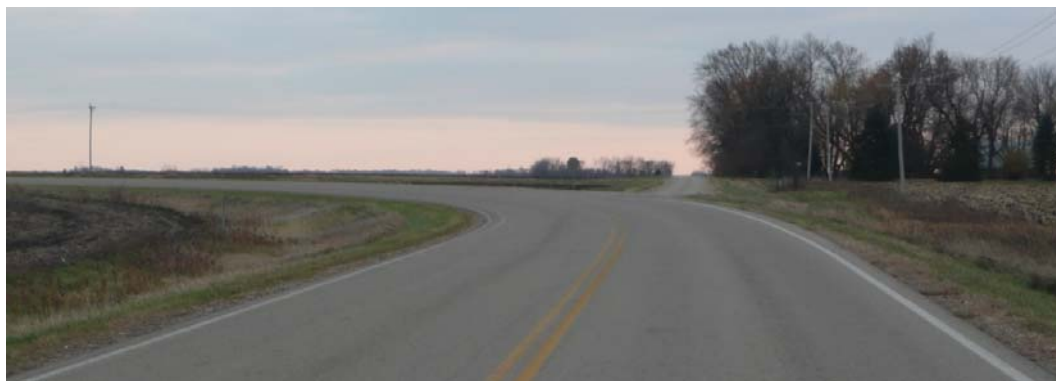


FIGURE 2-9
Example of a Visual Trap – Minor Road Intersects Roadway on a Curve

Based on 53 total crashes and 7 serious lane-departure crashes along the eastern region rural roads, those with intersections and visual traps have a higher crash density (are more at risk) than those without such features. These risk factors have also been observed nationally.

Detailed curve analyses and results for the counties are provided in Chapter 4. The five risk factors were used to prioritize curves in the county, with the highest-priority curves receiving the most stars. Curves were reviewed for proximity to high-priority curves and existing conditions as well.

Curves in the eastern region were screened for compliance with the *Manual on Uniform Traffic Control Devices* (MUTCD; 2009) requirement regarding traffic signs at horizontal curves. Under this requirement, a curve must have an advance horizontal alignment warning sign if the daily traffic is greater than 1,000 vehicles per day and if speed differentials (the difference between the speed limit and the advisory speed) meet certain thresholds. A horizontal alignment sign and advisory speed plaque are recommended when the speed differential is 5 mph, and they are required if the speed differential is 10 mph or greater. Curve radius was used to estimate whether individual curves meet the speed differential requirements for advance warning signs and advisory speed plaques. The estimated advisory speeds (assuming a 55-mph speed limit, 6-percent superelevation, and friction factor that are consistent with the AASHTO Green Book) based on the curve radius are as follows:

- 900 to 1,100 feet – 50 mph
- 700 to 900 feet – 45 mph
- 500 to 700 feet – 40 mph
- 300 to 500 feet – 35 mph
- Under 300 feet – 30 mph or slower

For this analysis, no suggested advisory speed is provided for curves with a radius under 300 feet; these curves should be investigated further by the county to determine the appropriate advisory speed. Additionally, it is recommended that the county complete its own ball-bank indicator assessment of all curves to determine whether the curves on their road system meet the MUTCD requirement and to verify suggested advisory speeds.

If a curve was not selected as a project candidate through the LRSP risk assessment process (although the curve has an ADT greater than 1,000 vehicles per day and a radius under 1,100 feet), the curve was flagged for the county to determine the need for additional signs based on MUTCD guidance.

2.3.3 Rural Intersections – Crashes at Thru-STOP Intersections

On the eastern region's rural local roads, a serious crash is most common at Thru-STOP intersections,¹ where 95 percent of serious intersection crashes (18 of 19 serious crashes) occurred from 2008 to 2012. Serious right-angle and angle crashes are the most common types of crashes at these intersections (Figure 2-10 and Figure 2-11).

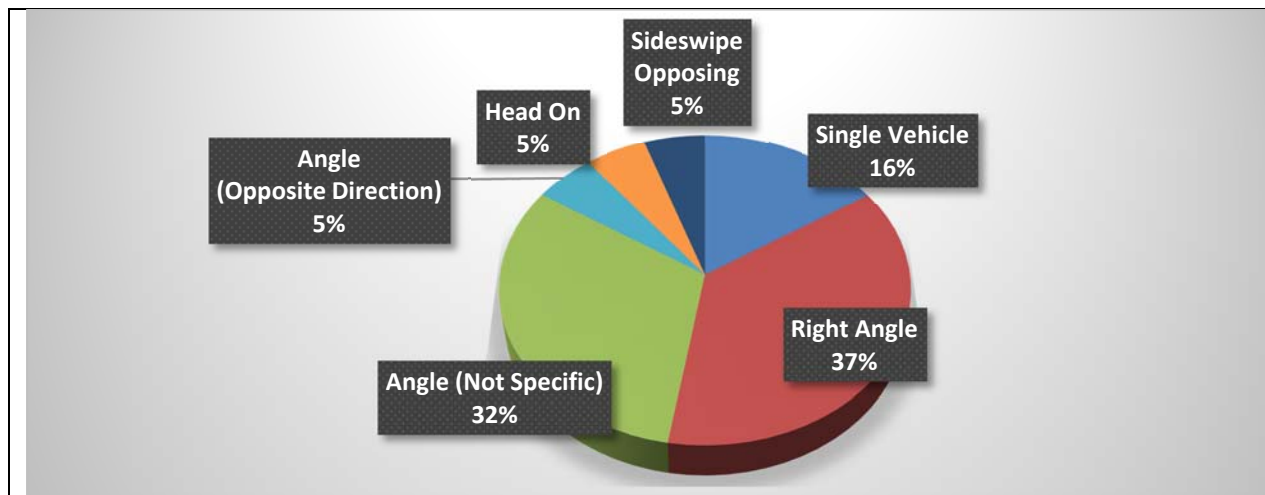


FIGURE 2-10
Phase 2 Rural Serious Crashes by Crash Type (2008 to 2012)

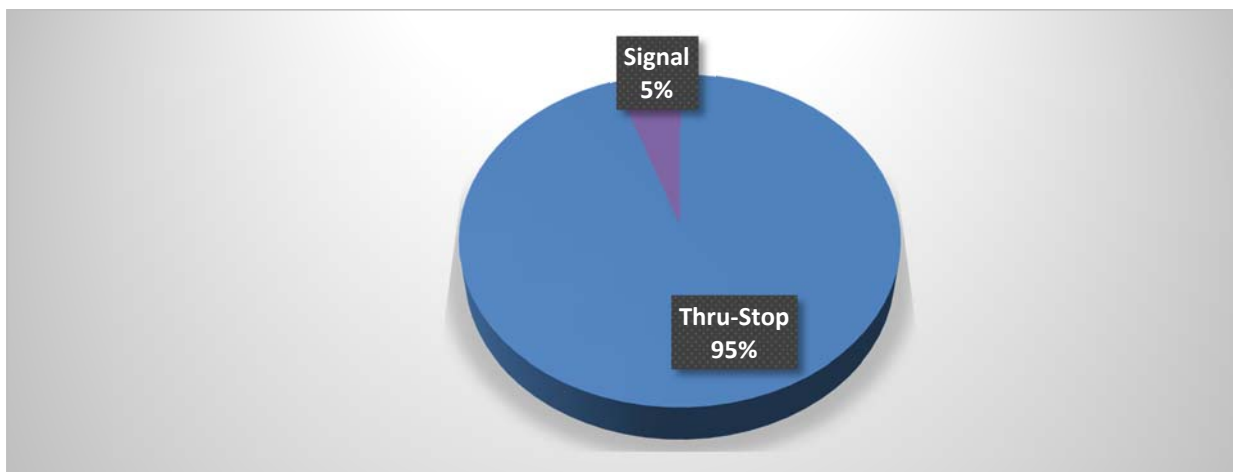


FIGURE 2-11
Phase II Rural Serious Crashes by Traffic Control Device (2008 to 2012)

¹ Those intersections where traffic on the more heavily used road may proceed through the intersection without stopping, while traffic on the less-used crossroad must stop at the STOP sign before proceeding through the intersection.

In the eastern region, 369 rural intersections with 284 Thru-STOP locations were reviewed. The average serious crash density at rural Thru-STOP locations is 0.01 serious crash per intersection per year. This low density supports assessing an intersection risk based on the characteristics of the locations where serious crashes occurred. The following seven rural Thru-STOP risk factors were identified for serious right-angle crashes in the counties:

1. **ADT Cross Product** – 94 percent of the serious right angle crashes at rural Thru-STOP intersections occurred at intersections with an ADT Cross Product² of major and minor entering vehicles greater than 60,000 (Figure 2-12). An intersection was considered to have a higher risk of serious right angle crashes if the ADT Cross Product was greater than 60,000. These intersections received a star.
2. **Skew** – As the intersection skew (the angle at which one road intersects another) increases, the crash risk also increases (Figure 2-13). At a 20-degree skew, the crash risk compared to that of a 90-degree intersection is increased by approximately 10 percent. While the region's serious right-angle crash data set was too small to determine if skew plays a role in crashes, it has been proven nationally that the greater the skew, the greater the likelihood for a crash (Figure 2-14). Intersections with a skew greater than 20 degrees received a star.
3. **Within or Near a Curve** – Research has shown that intersections located within or near a horizontal curve are subject to a higher level of risk. This risk factor was supported by the analysis (Figure 2-14). In this analysis, intersections located within or near a horizontal curve received a star.
4. **Development Present** – Research has shown that intersections with commercial development in one or more quadrants have a higher level of risk, possibly due to vehicles entering or exiting the development. Private residences or farms were not included as development. Intersections with development present had more serious crash rates (Figure 2-14) and therefore received a star.
5. **Railroad Crossing** – Intersections on or near a railroad crossing are subject to increased risk because drivers must navigate the railroad tracks while approaching the intersection. The rural analysis supported this risk factor (Figure 2-14). An intersection with a railroad crossing on one of the approaches received a star.
6. **Previous STOP More than 5 Miles Before the Intersection** – When traveling longer distances without encountering a STOP sign, drivers lose attention, and research has shown those intersections to be at higher risk (Figure 2-14). National data were used to confirm this risk factor. Intersections at which either of the stopped approaches do not encounter a STOP sign within 5 miles received a star.
7. **Total Crashes** – If an intersection had any type of crash from 2008 to 2012, the intersection received a star.

² The ADT Cross Product is the major-street entering volume multiplied by the minor-street entering volume.

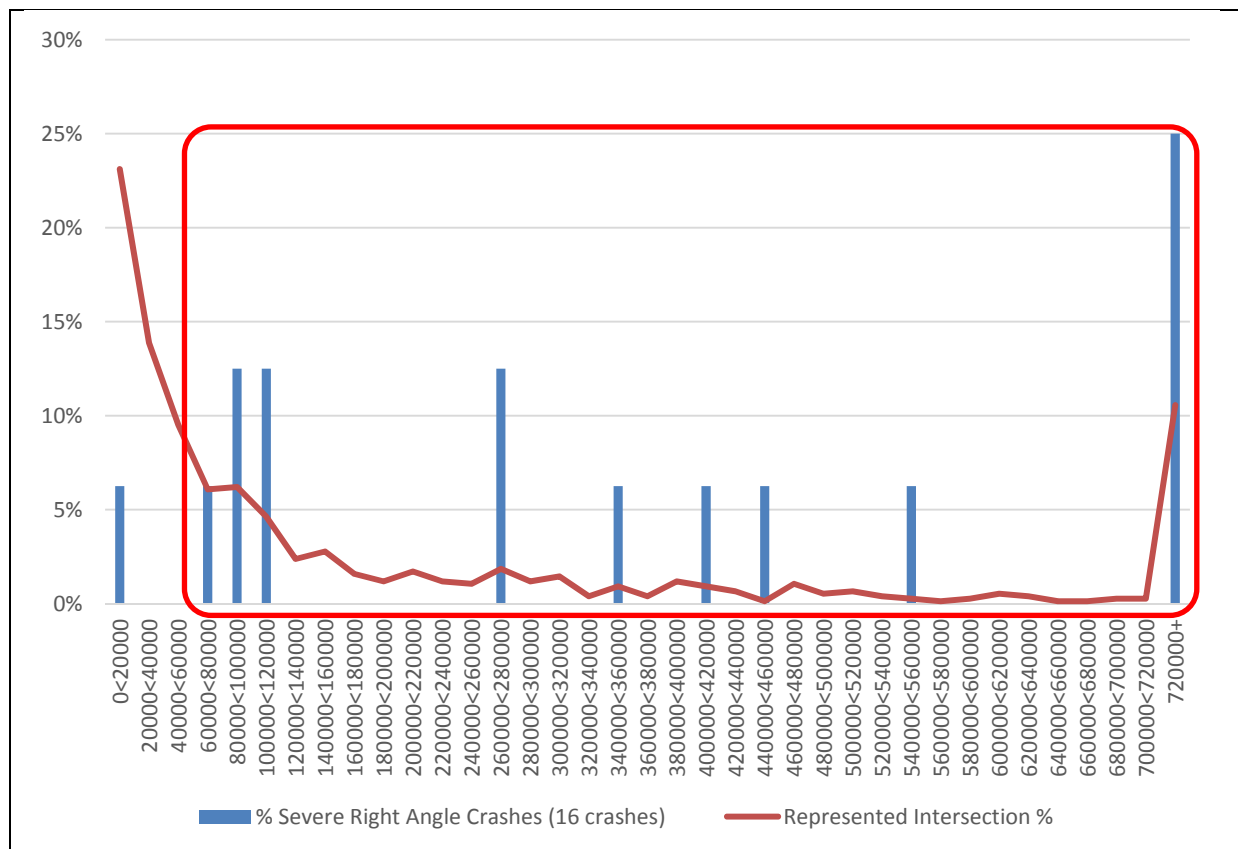
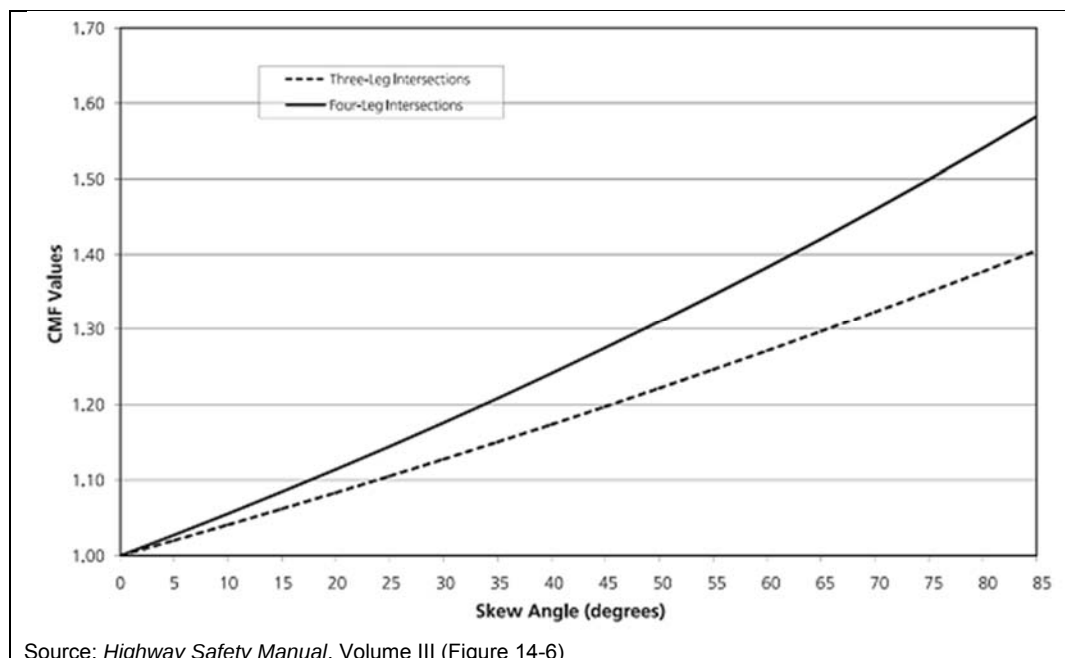


FIGURE 2-12
Phase 1 and Phase 2 Rural ADT Cross Product (2008 to 2012)



Source: *Highway Safety Manual*, Volume III (Figure 14-6)

FIGURE 2-13
Intersection Skew Risk

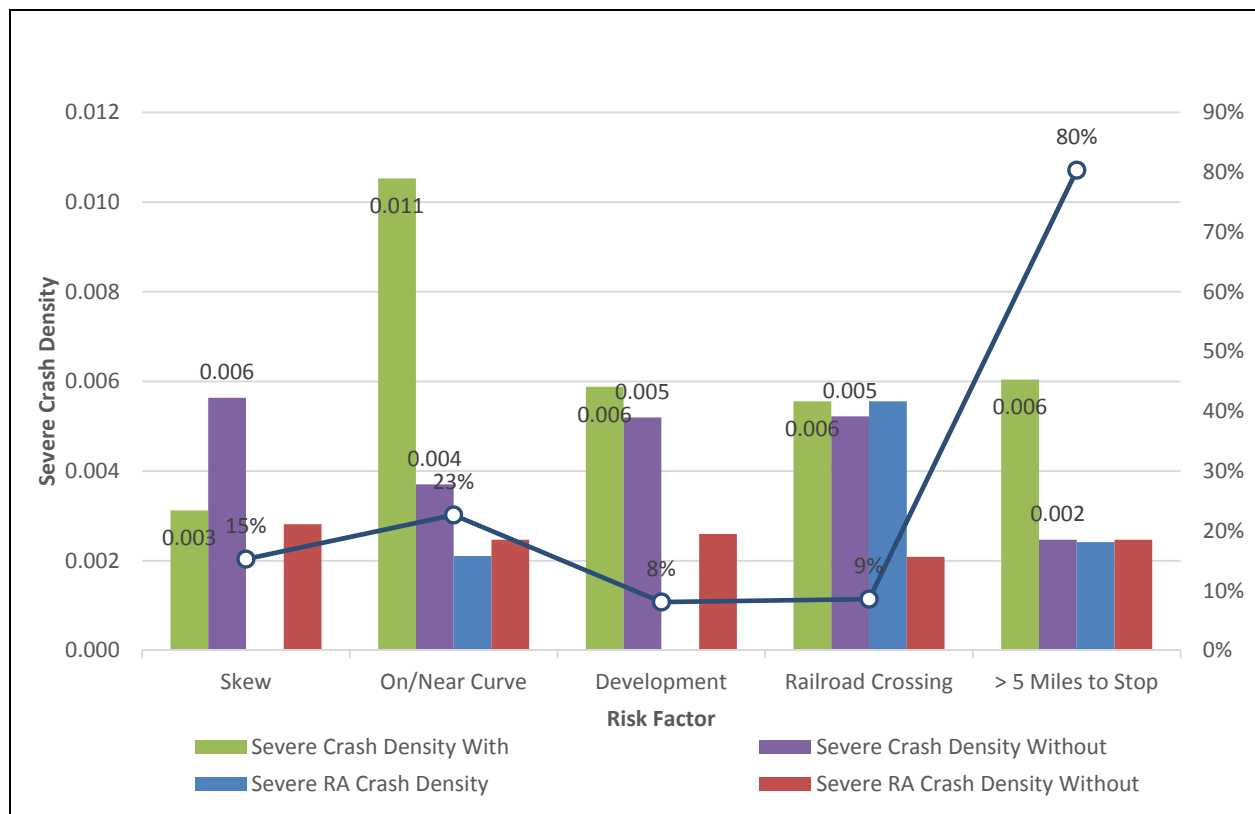


FIGURE 2-14
Rural Intersection Risk Factors for the Phase I & Phase II (2008 to 2012)

The eastern region had 87 total rural intersection crashes from 2008 to 2012, and only 10 of those crashes are serious. Due to the small number of serious crashes, some of the data and risk factors may be misleading based on the county data alone. National data were used to confirm intersection risk factors.

Detailed intersection analyses and results for the counties and cities are provided in Chapter 4. Due to the large number of intersections, each intersection was prioritized using the seven risk factors by giving stars to each risk factor present. The highest-priority intersections received the most stars. In cases where two or more intersections received the same number of stars, crash costs were used to break the tie and determine priority.

2.3.4 Urban Roadway Segments – Cities with Populations Greater than 5,000 (Cities of Valley City and Wahpeton)

Approximately 500 miles of urban local roads were reviewed, where 23,603 total and 281 serious crashes occurred from 2008 to 2012. Nationally, research has shown that rear-end and head-on crashes are most common on urban local roads. In the cities of Valley City and Wahpeton, 143 rear-end crashes and 26 head-on and sideswipe-opposing crashes occurred from 2008 to 2012.

Although a variety of data was collected for each local roadway segment, only the following four risk factors were identified for the cities of Valley City and Wahpeton:

1. **Average Daily Traffic (ADT)** – Both rear-end and head-on crashes were overrepresented in road corridors with ADT volumes greater than 6,000 vehicles per day (Figure 2-15). (Note: This ADT volume includes data from the cities of Fargo, West Fargo, Grand Forks, Devils Lake, Bismarck, and Minot.) Corridors with an ADT greater than 6,000 vehicles per day received a star.
2. **Access Density** – Rear-end and head-on crashes are overrepresented along corridors with access densities greater than or equal to 30 access points per mile (Figure 2-16), and therefore received a star.
3. **Road Geometry** – Crashes are overrepresented per corridor mile on roadways with three or more lanes (Figure 2-17), and therefore multilane roadways were given a star.
4. **Speed Limit** – Serious rear-end and head-on crashes were overrepresented in low-speed corridors (40 mph or less) (Figure 2-18), and therefore received a star.

Detailed urban segment analyses and results for Valley City and Wahpeton are provided in Chapter 4. The four risk factors were used to prioritize roadway segments, with the highest priority segments receiving the most stars. High-priority roadway segments were also reviewed from a corridor perspective so that suggested safety improvement projects create a consistent corridor throughout the urban area.

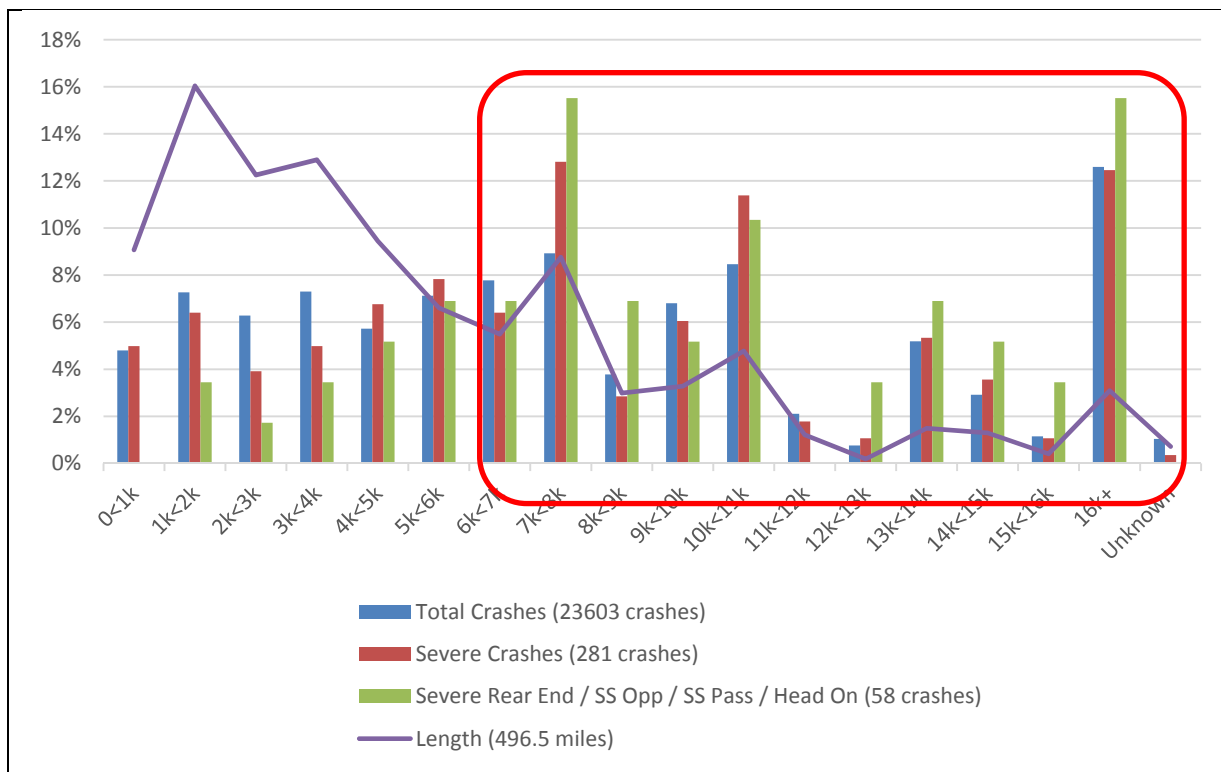


FIGURE 2-15
Phase 1 and Phase 2 Urban Roadway Segment Average Daily Traffic (ADT) (2008 to 2012)



FIGURE 2-16
Phase 1 and Phase 2 Urban Roadway Segment Access Density (2008 to 2012)

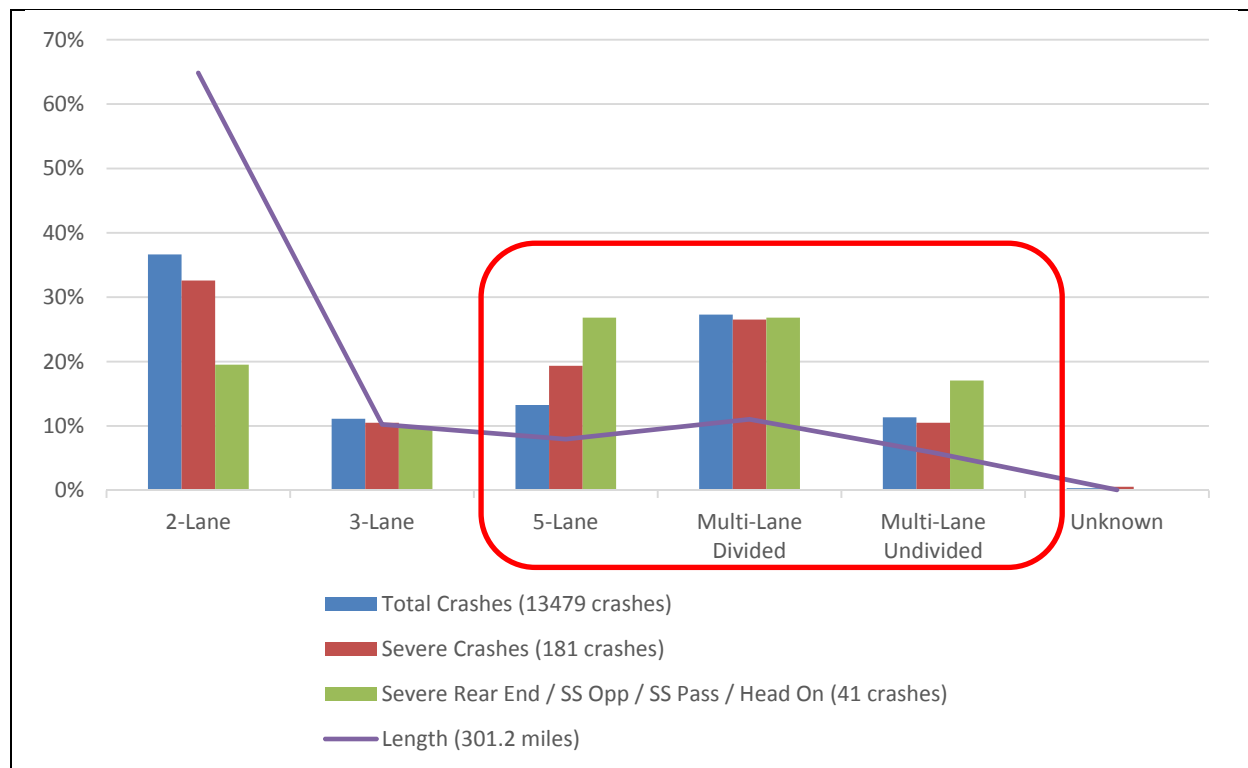


FIGURE 2-17
Phase 1 and Phase 2 Urban Road Geometry (2008 to 2012)

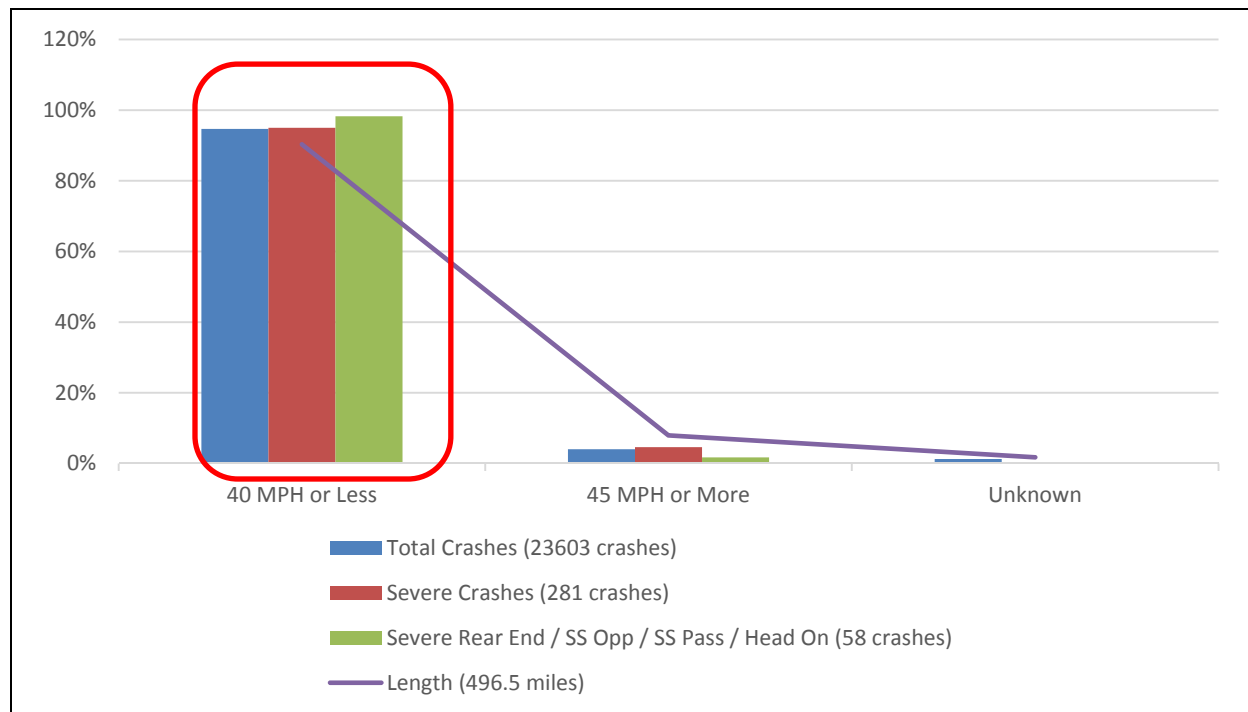


FIGURE 2-18
Phase 1 and Phase 2 Urban Roadway Segment Crashes by Speed (2008 to 2012)

2.3.5 Urban Intersections – Right-Angle Crashes, Cities with Populations Greater than 5,000 (Cities of Valley City and Wahpeton)

In the cities of Valley City and Wahpeton, 94 intersections including 12 signalized intersections were analyzed. Of the over 319 total crashes, only 4 serious crashes occurred at the Valley City and Wahpeton urban intersections analyzed. These data support assessing an intersection's risk based on the characteristics of locations with serious crashes. A variety of information was collected on each intersection and from that, the following six risk factors for right angle crashes were chosen:

1. **Traffic Control Device** – Serious crashes are overrepresented at signalized intersections versus other intersection control types in urban areas (Figure 2-19). Therefore, signalized intersections received a star.
2. **Entering ADT** – Higher volumes of vehicles entering intersections was considered a risk factor. Approximately 40 percent of right angle crashes at signalized intersections in Phase 1 and Phase 2 urban areas occurred at intersections with an entering vehicles ADT greater than 18,000 vehicles per day (Figure 2-20). Therefore, any intersection with an entering vehicles ADT greater than 18,000 vehicles per day received a star.
3. **Road Geometry** – Serious and right-angle crashes were overrepresented on divided roadways with signalized intersections (Figure 2-17). Therefore, intersections on divided roadways received a star.
4. **Major Corridor Speeds** – Low-speed corridors were found to act as a surrogate for serious angle crashes (Figure 2-21). Therefore, intersections with low speed limits (40 mph or less) received a star.
5. **Serious Crashes** – Any intersection where one or more serious crashes had occurred received a star.
6. **Total Lanes on Major Approach** -- Serious and serious angle crashes were overrepresented at intersections containing six or more approach lanes (Figure 2-22). Therefore, intersections with six or more approach lanes received a star.

Detailed urban intersection right angle analyses and results for the Valley City and Wahpeton are in Chapter 4. The risk factors previously listed were used to help prioritize intersections with the highest priority intersections receiving the most stars. Right angle crash intersections were reviewed as urban corridors to create a consistent corridor throughout the urban area and to discourage implementing strategies at just one or two high priority intersections along a corridor if the remaining intersections have the same characteristics.

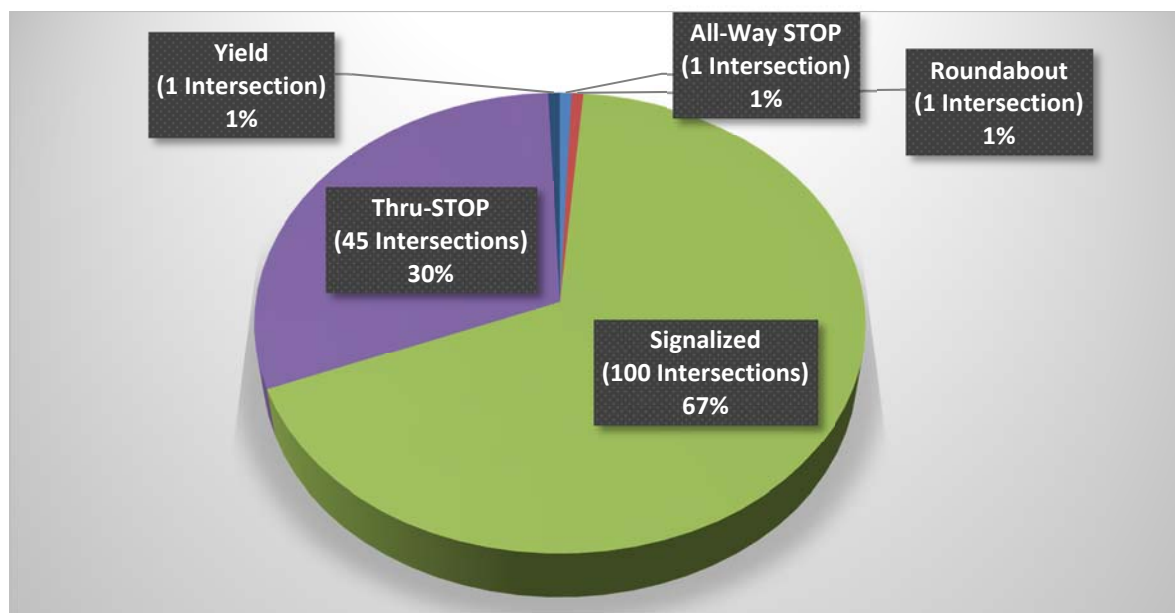


FIGURE 2-19
Phase 1 and Phase 2 Urban Serious Crashes by Intersection Traffic Control Device (2008 to 2012)

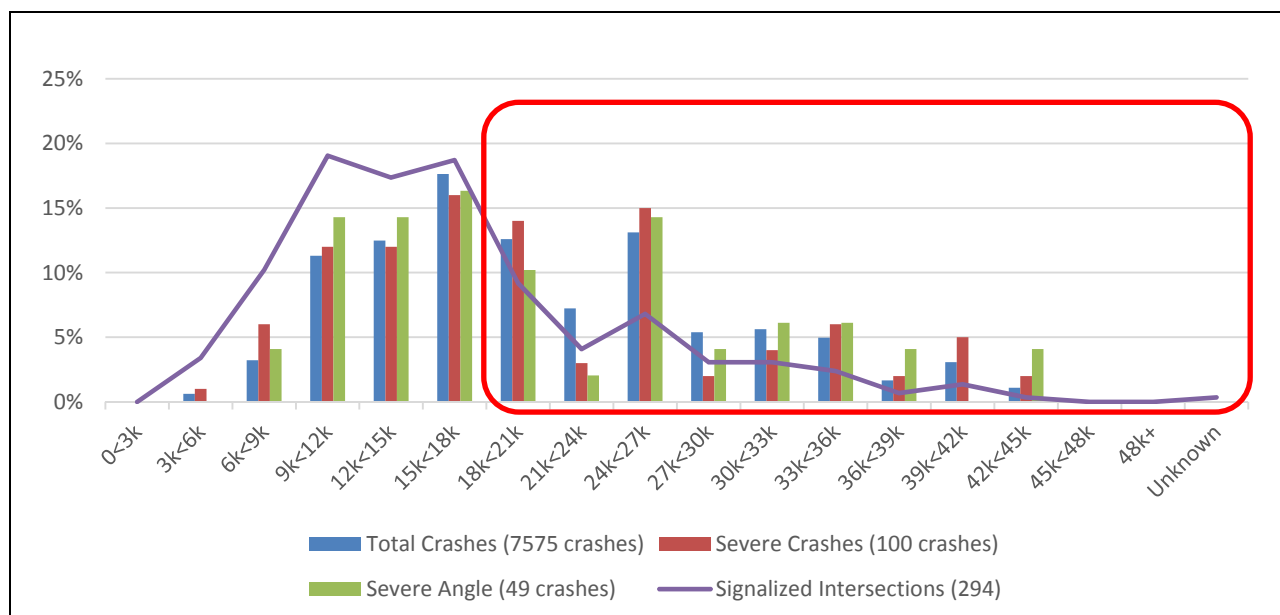


FIGURE 2-20
Phase 1 and Phase 2 Urban Crashes by Intersection Entering Vehicles Average Daily Traffic (ADT)

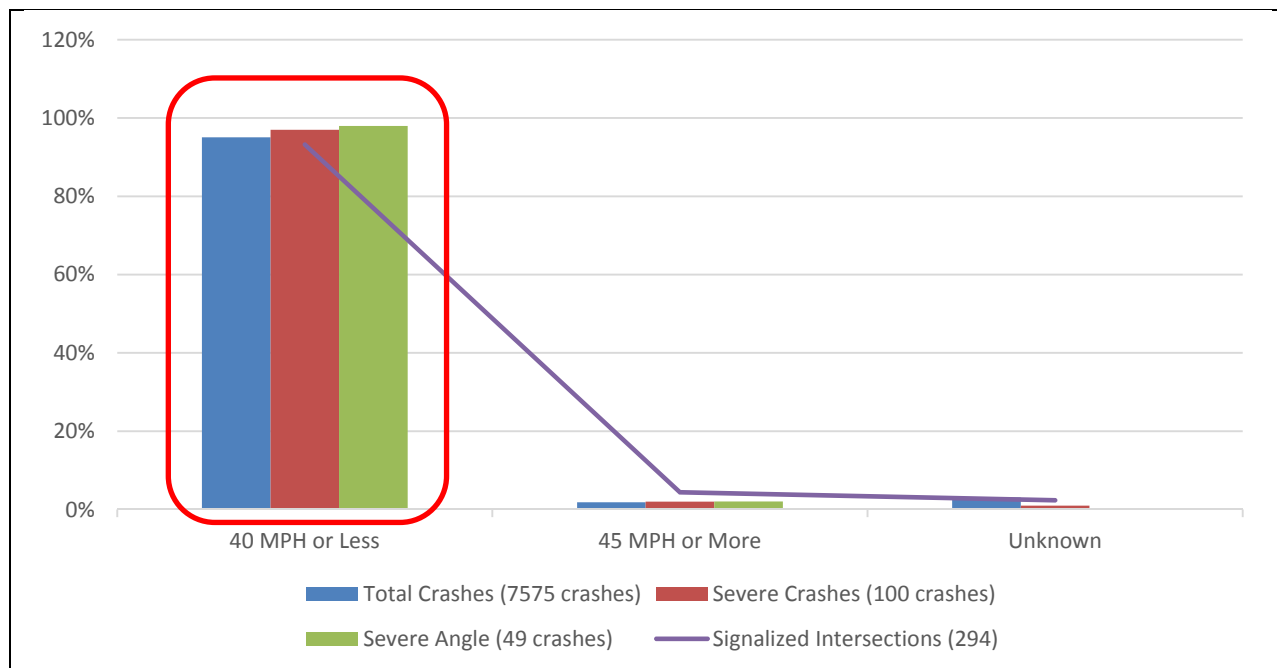


FIGURE 2-21
Phase 1 and Phase 2 Urban Crashes by Intersection Configuration

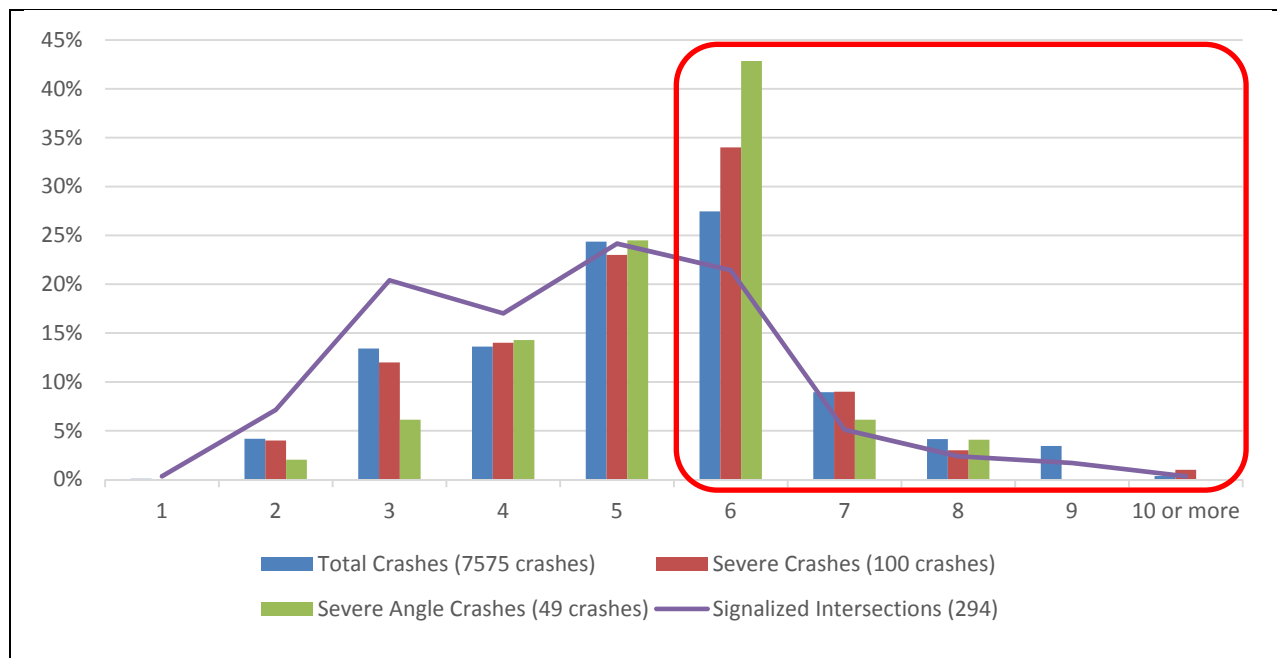


FIGURE 2-22
Phase 1 and Phase 2 Urban Signalized Intersection Crashes by Major Lanes Distribution (ADT)

2.3.6 Urban Intersections – Pedestrian/Bicycle Crashes, Cities with Populations Greater than 5,000 (Cities of Valley City and Wahpeton)

Similar analysis was completed for pedestrian and bicycle crashes at intersections. No serious pedestrian and bicycle crashes occurred at Valley City and Wahpeton intersections from 2008 to 2012, therefore the data were combined with all of the Phase 1 and Phase 2 urban intersection analysis. The following seven risk factors were identified based on the analysis:

1. **Traffic Control Device** - Serious pedestrian and bicycle crashes are overrepresented at signalized intersections versus other intersection control types in urban areas (Figure 2-23). Therefore, signalized intersections received a star.
2. **Entering Vehicles ADT** - A high volume of vehicles entering an intersection was considered a risk factor. A majority of the serious pedestrian and bicycle crashes occurred at intersections with an entering vehicles ADT greater than 18,000 vehicles per day (Figure 2-24). Therefore, any intersection with an entering vehicles ADT greater than 18,000 vehicles per day or greater received a star.
3. **Pedestrian Generator** - Intersections with adjacent land uses likely to generate pedestrian traffic (such as a school, playground, bar or gas station) had a higher pedestrian and bicycle crash risk than other intersections (Figure 2-25). Therefore, an intersection with a pedestrian generator present received a star.
4. **Major Corridor Speeds** - Low-speed corridors were found to act as a surrogate for serious pedestrian and bicyclist crashes (Figure 2-26). Therefore, intersections with low speed limits (40 mph or less) received a star.
5. **Marked Crosswalk** - The presence of marked crosswalks was found to be a surrogate for serious pedestrian and bicyclist crashes (Figure 2-27). Therefore, intersections with a marked crosswalk received a star.
6. **Bus Stop** - The presence of a bus stop was associated with increased rate of pedestrian and bicyclist crashes (Figure 2-28). Therefore, intersections with a bus stop received a star.
7. **Pedestrian and Bicycle Crashes** - Any intersections that had any bicycle or pedestrian crash from 2008 to 2012 received a star.

Detailed urban intersection pedestrian and bicycle analysis and results for the cities of Valley City and Wahpeton are provided in Chapter 4. The seven risk factors were used to prioritize intersections with the highest-priority intersections receiving the most stars. Pedestrian and bicycle crash intersections were reviewed as urban corridors to create a consistent corridor throughout the urban area.

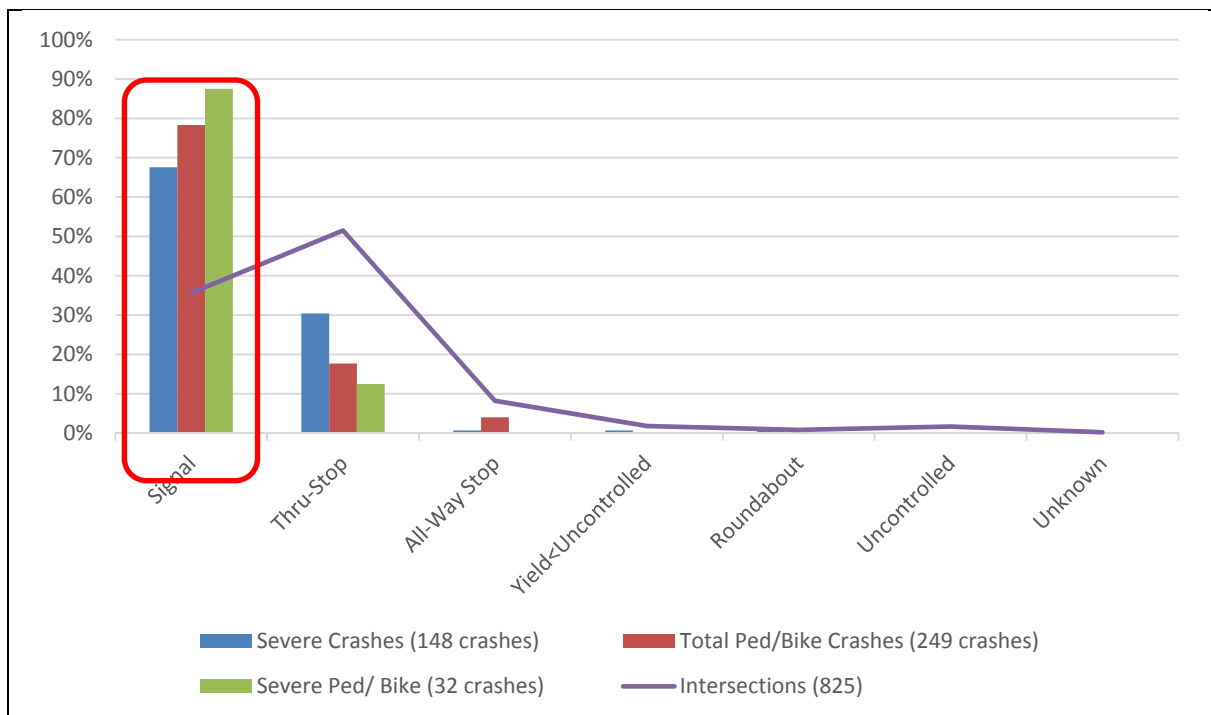


FIGURE 2-23
Phase 1 and Phase 2 Urban Pedestrian/Bicycle Crashes by Intersection Traffic Control Devices

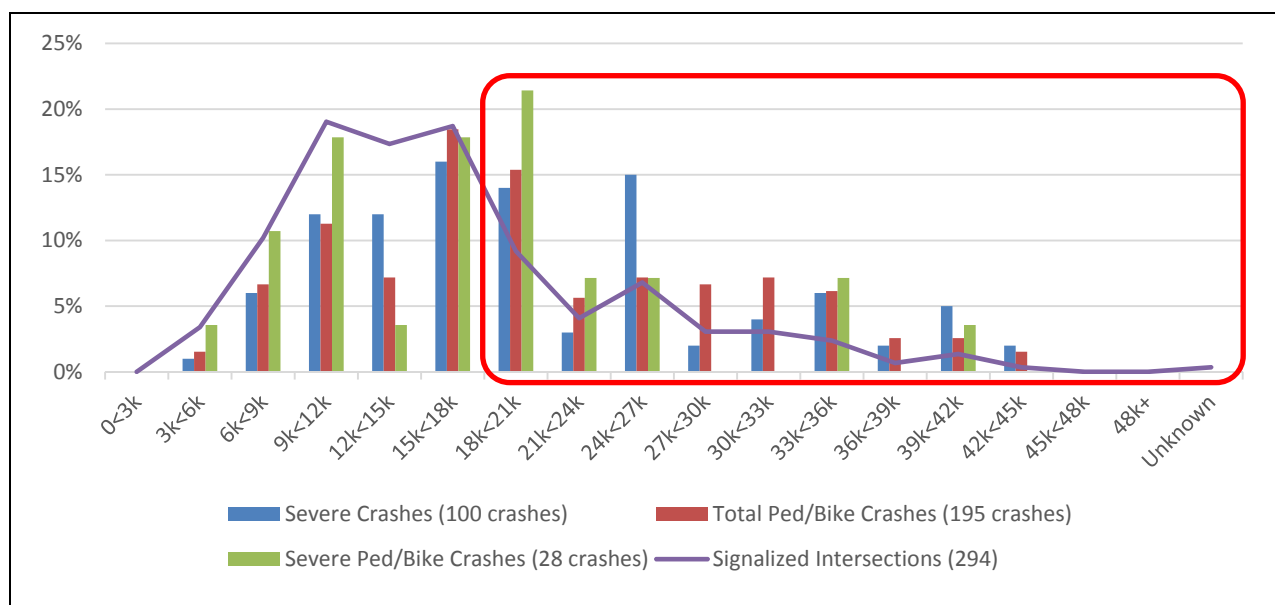


FIGURE 2-24
Phase 1 and Phase 2 Urban Pedestrian/Bicycle Crashes by ADT

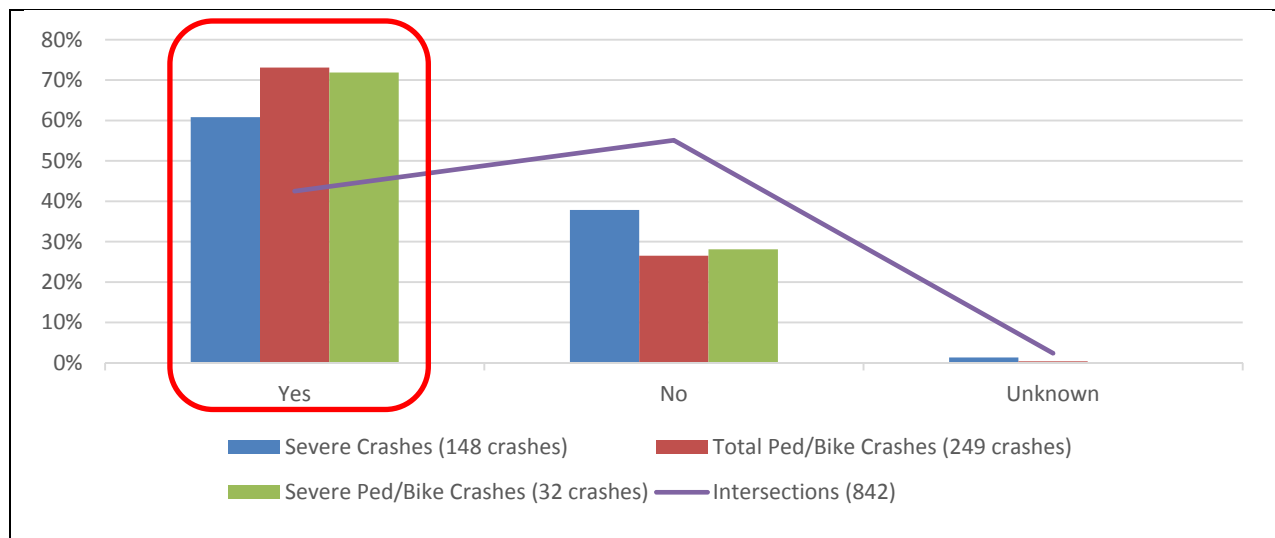


FIGURE 2-25
Phase 1 and Phase 2 Pedestrian and Bicycle Crashes at Urban Intersection with a Pedestrian Generator

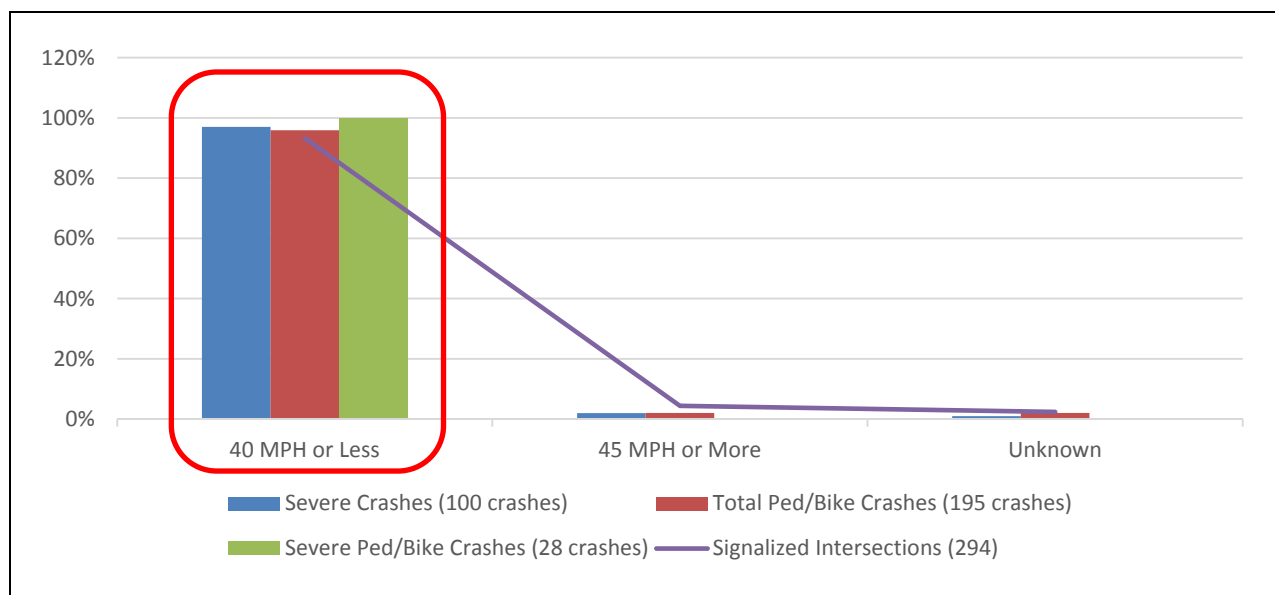


FIGURE 2-26
Phase 1 and Phase 2 Urban Pedestrian/Bicycle Crashes by Speed Limit

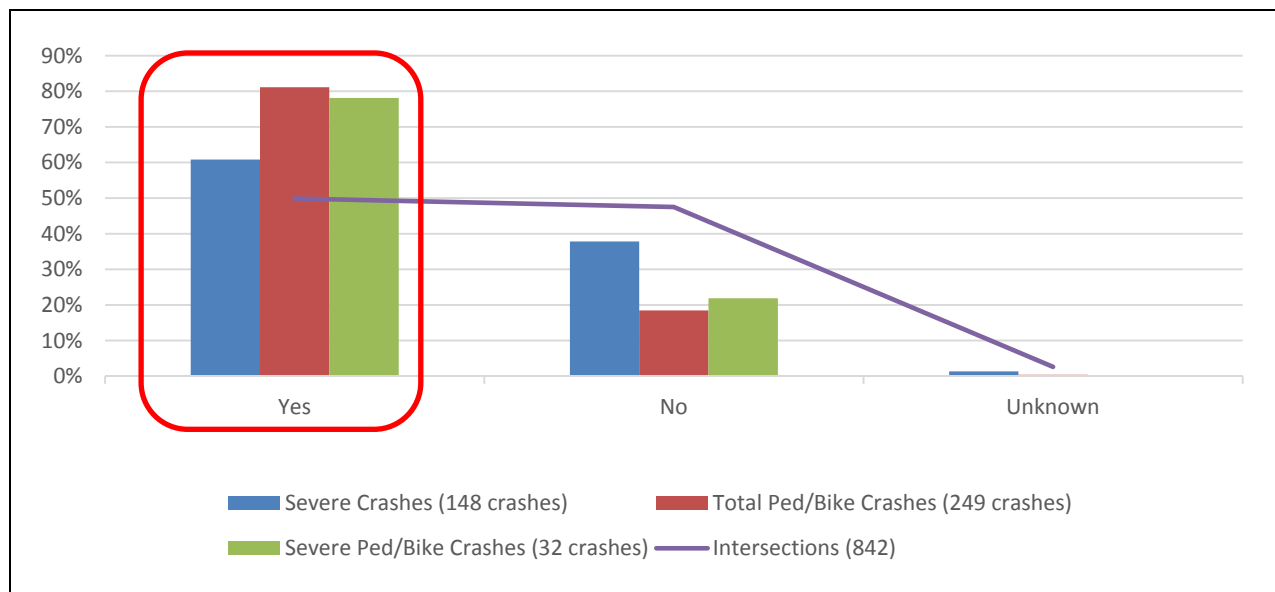


FIGURE 2-27
Phase 1 and Phase 2 Urban Pedestrian/Bicycle Crashes by Crosswalk Presence

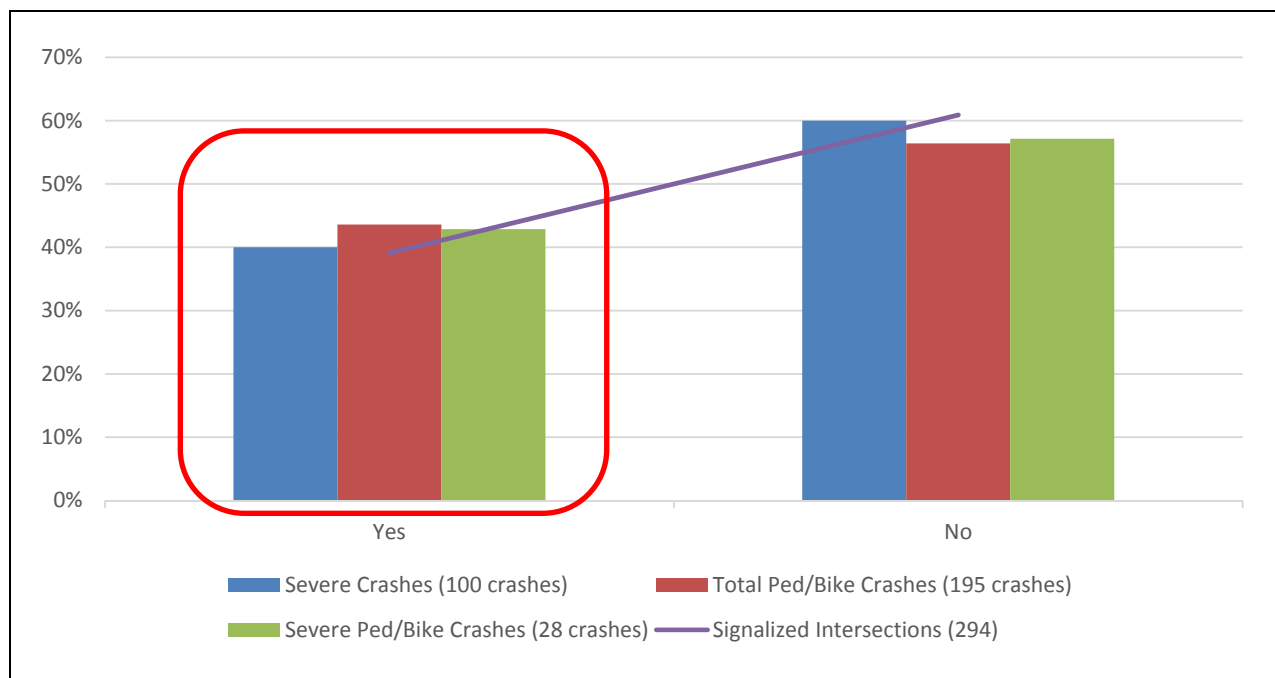


FIGURE 2-28
Phase 1 and Phase 2 Urban Pedestrian/Bicycle Crashes by Bus Stop Presence (Grand Forks, Fargo, and West Fargo only)

2.4 Eastern Region Risk Summary

Table 2-3 summarizes the risk factors, ranges, and sources used in the eastern region's systemic analysis.

TABLE 2-3
Eastern Region Risk Summary

Risk Factors	Eastern Region		
	Minimum	Maximum	Source
Rural Roadway Segments			
ADT Range	225	Unlimited	Phases 1 and 2
Lane Departure Density	0.040	Unlimited	Phases 1 and 2
Access Density	6	Unlimited	Phases 1 and 2
Curve Critical Radius Density	0.111	Unlimited	Phases 1 and 2
ERA	2	3	Phases 1 and 2
Rural Curves			
Radius	500	1,200	National
ADT Range	500	Unlimited	Phases 1 and 2
Intersection on Curve	Present		Phases 1 and 2
Visual Trap	Present		Phases 1 and 2
Serious Crashes	1	Unlimited	Phases 1 and 2
Rural Intersections			
ADT Cross Product	60000	Unlimited	Phases 1 and 2
Skew	Present		National
On/Near Curve	Present		Phases 1 and 2
Development	Present		Phases 1 and 2
Railroad Crossing	Present		Phases 1 and 2
Previous STOP >5 Miles	Present		National
Total Crashes	1	Unlimited	Phases 1 and 2
Urban Roadway Segments			
ADT	6,000	Unlimited	All Urban Phases 1 and 2
Road Geometry	Multilane		All Urban Phases 1 and 2
Access Density	30	Unlimited	All Urban Phases 1 and 2
Corridor Speeds	Low (≤40 mph)		All Urban Phases 1 and 2
Urban Right-Angle Crash Corridors			
Entering ADT	18,000	Unlimited	All Urban Phases 1 and 2
Traffic Control	Signal		All Urban Phases 1 and 2
Major Corridor Speeds	Low (≤40 mph)		All Urban Phases 1 and 2
Road Geometry	Divided		All Urban Phases 1 and 2
Total Lanes on Major Approach	≤6 Approach Lanes		All Urban Phases 1 and 2
Serious Crashes	1	Unlimited	All Urban Phases 1 and 2

TABLE 2-3
Eastern Region Risk Summary

Risk Factors	Eastern Region		
	Minimum	Maximum	Source
Urban Pedestrian and Bicycle Crash Corridors			
Traffic Control	Signal		All Urban Phases 1 and 2
Entering ADT	18,000	Unlimited	All Urban Phases 1 and 2
Major Corridor Speeds	Low (≤ 40 mph)		All Urban Phases 1 and 2
Pedestrian Generator	Yes		All Urban Phases 1 and 2
Marked Crosswalk	Yes		All Urban Phases 1 and 2
Pedestrian/Bicycle Crashes	1	Unlimited	All Urban Phases 1 and 2
Bus Stop	Yes		Cities of Grand Forks, Fargo, and West Fargo only

3.0 Eastern Region Priority Safety Strategies

3.1 Background

A variety of strategies are available to address each safety emphasis area. The implementation of high-priority strategies will assist state and local agencies in reducing traffic-related fatalities and incapacitating injuries. The primary sources for these strategies are the National Cooperative Highway Research Program (NCHRP) *Report 500* series and the National Highway Traffic Safety Administration (NHTSA) *Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices*, (Seventh Edition, 2013). Each guide includes a description of the problem, strategies, and model implementation processes. In addition, to assist practitioners in assessing the safety strategies, the guides document the expected effectiveness of each strategy. NCHRP *Report 500* series assigns strategies to one of the following categories:

- **Proven:** These strategies have been used in multiple locations with multiple studies, and have been demonstrated to be effective.
- **Tried:** These strategies have been implemented in many locations; however, no rigorous evaluations have been completed to determine their effectiveness.
- **Experimental:** These strategies represent ideas that are considered to be effective; however, the ideas have not been widely implemented or evaluated.

3.2 Initial/Comprehensive List of Potential Strategies

NCHRP safety strategies were the basis for identifying safety strategies for the LRSP. For the LRSP process, NDDOT team members sought to identify viable safety strategies for the top safety emphasis areas (see Tables 3-1 through 3-10). The LRSP team reviewed the full range of safety strategies, and did an initial screening based on cost and effectiveness. For example, the NCHRP report lists over 70 potential strategies to address intersection safety. The screening conducted by the LRSP team narrowed the list of strategies for all safety emphasis areas down to strategies considered to be the most applicable in North Dakota.

Behavioral strategies include information on the expected effectiveness of the strategy to influence driver behavior based on current best practice and evaluation research results when available.

Each infrastructure strategy includes information on the relative cost to implement or operate, along with the typical timeframe for implementation. Relative costs were separated into three categories:

- Low = less than \$10,000 per mile or location
- Medium = between \$10,000 and \$100,000 per mile or location
- High = more than \$100,000 per mile or location

The typical timeframe to implement the strategy was also separated into three categories:

- Short = less than 1 year to implement
- Medium = between 1 and 2 years to implement
- Long = more than 2 years to implement

TABLE 3-1
Impaired Driving Strategies (Behavioral Strategies)

Objectives	Strategies	Effectiveness	Programs and Tactics
A – Eliminate Drinking and Driving	A1 – Promote Responsible Beverage Service Policies for Alcohol Servers and Retailers	Moderate	Advocate for responsible alcohol server and retailer training and compliance checks.
	A2 – Employ Alcohol Screening and Brief Interventions	Proven	Implement health care provider interventions with crash victim after an alcohol-related crash (traumatic event) to screen for alcohol use problems, educate on risks of impaired driving, and treatment referral. Develop fact sheets and materials to be used.
	A3 – Support Community Programs for Alternative Transportation	Moderate	Employ “Safe Cab” initiatives via partnership among beer distributors, bar owners and/or county/city community programs. Conduct public outreach on accessible safe-ride alternatives.
	A4 – Promote ND “No Refusal” Law	Moderate	Educate high-risk populations/communities on North Dakota’s new “No Refusal” law where consequences of DUI test refusal are greater than test failure.
	A5 – Promote Sobriety Initiatives for DUI offenders	Proven	Promote 24/7, DUI courts, and ignition interlock programs through educating local judicial and legal counsel members, probation officers, counseling and treatment providers as well as the general public.
B – Enforce DWI Laws	B1 – Conduct Regular High-Visibility DUI Enforcement Saturations	Proven	Conduct a multi-agency, multi-squad car enforcement effort. Agencies work in collaboration to provide data-driven, high-visibility education/media outreach and enforcement for high-risk roadways.
	B2 – Expand Use of DUI Sobriety Checkpoints	Proven	Local law enforcement to expand the use of multi-jurisdictional sobriety checkpoints that include public outreach/media campaigns about the checkpoints.
	B3 – Educate and Enforce Zero Tolerance Laws for Drivers Under Age 21	Tried	Conduct education and high-visibility enforcement through community events including local media and public outreach about underage drinking and driving.
	B4 – Monitor Prosecution and Sentencing of DUI Offenders	Moderate	Monitor prosecution and judicial sentencing of DUI cases Courts or Intensive Supervision Programs
	B5 – Strengthen Alcohol Compliance	Tried	Promote judicial monitoring of “last place of drink” for bar-related DUI offenders and notify establishments of their over-serving.

TABLE 3-2
Seat Belt Use Strategies (Behavioral Strategies)

Objectives	Strategies	Effectiveness	Programs and Tactics
A – Enforce Seat Belt use laws	A1 – Conduct High-Visibility Enforcement to Maximize Restraint Use	Proven	Conduct a multi-agency, multi-squad car enforcement effort. Agencies work in collaboration to provide data-driven, saturated, high-visibility enforcement coupled with media outreach targeted toward high-risk populations. Conduct enhanced enforcement on North Dakota's secondary roads. Incorporate enhanced nighttime enforcement including multi-agency (when possible) and multiple squad cars in well-lit areas where slow-moving vehicles are passing and conducting seat belt observations for a limited time.
	A2 – Enforce Secondary Belt Use Law	Proven	Reinforce officers issuing second belt use ticket during traffic stops.
	A3 – Pursue Tribal Ordinances for Primary Enforcement of Seat Belt Laws.	Proven	Under tribal ordinance, pursue primary seat belt enforcement for occupants in all seating positions.
B – Maximize use of occupant restraints by all vehicle occupants	B1 – Encourage Employer Traffic Safety Programs and Policies	Tried	Encourage employers to offer traffic safety education programs to employees and to enact traffic safety policies with clear consequences for failure to comply. Utilize materials and policy statements designed for employers by Network of Employers for Traffic Safety.
	B2 – Brief intervention regarding unbelted risks	Experimental	Health care provider conducts brief intervention with crash victim after an unbelted crash (traumatic event) on unbelted risks and consequences. Develop fact sheets and materials to be used.
	B3 – Provide Insurance Incentives	Experimental	Promote local insurance provider incentives (for example, reduced premium rates) for safe driving practices including belt use at the time of traffic crash.

TABLE 3-3
Speed and Aggressive Driving Strategies (Behavioral Strategies)

Objectives	Strategies	Effectiveness	Programs and Tactics
A – Deter aggressive driving for high-risk populations and locations	A1 – Identify High-Risk Speed Locations/Corridors for Enforcement.	Proven	Analyze crash data to define high-risk speed locations for enhanced enforcement and public outreach efforts.
	A2 – Conduct High-Visibility Enforcement of Speeding and Aggressive Driving	Proven	Conduct a multi-agency, multi-squad car enforcement effort. Agencies work in collaboration to provide data-driven, saturated, high-visibility enforcement at high-risk speed corridors/roadways coupled with media outreach to high-risk populations.
	A3 – Pursue Local/Tribal Use of Automated Enforcement in High-Risk Areas	Proven	Pursue the use of automated enforcement in high-risk highway work zones and school crossing zones through the use of local/tribal safety ordinances.
	A4 – Conduct Enhanced Enforcement of Red Light Running	Proven	Provide enhanced enforcement for red-light-running violators using officer enforcement support for intersection RLR confirmation lights.
B – Maximize driver compliance and awareness	B1 – Conduct Brief Interventions for Speed-Related Injuries	Tried	Implement health care provider brief intervention with crash victim after crash (traumatic event) due to excessive speed on speed risks and consequences. Develop fact sheets and materials to be used.
	B2 – Increase Driver Awareness of Speed Using Speed Reader Boards	Proven	Expand use of speed reader boards providing feedback to drivers on their actual speed (for example, flash warnings when speeds exceeds limit). Most effective in slowing traffic on residential streets, near school zones and around playgrounds.

TABLE 3-4
Young Driver Strategies (Behavioral Strategies)

Objectives	Strategies	Effectiveness	Programs and Tactics
A – Publicize, enforce, and adjudicate laws pertaining to young drivers	A1 – Conduct high visibility enforcement of GDL, no cell and texting laws, underage drinking and driving, and seatbelt use laws	Proven	Conduct enhanced enforcement and public outreach for young driver safety. Publicizing is best done through community events to attract local media and a community public education campaign about young driver laws, enhanced enforcement, and the necessary parental involvement.
B – Actively engage parents in managing teen driving skill development	B1 – Encourage driver education providers (local schools and private providers) to require parent education component	Tried	Promote required parent education component of local driver education programs (private and public school providers) to educate parents about teen driving risks, Graduated Driving License (GDL) provisions and their protections, parental role in supervising teen driving skill development, encourage selection of safer vehicles for teen driver, and to facilitate parent/teen driving agreements.
	B2 – Promote use of in-vehicle teen safety technology	Experimental	To help reduce and eliminate teen driving distractions and high-risk driving maneuvers (excessive speed, hard acceleration, deceleration, and swerves) promote the use of in-vehicle monitoring devices for parental monitoring and coaching.
	B3 – Promote Safe Teen Driving Outreach	Tried	Encourage driver education, local insurance, and public health organizations to provide teens and their parents with brochures, guides, and web resources to help parents understand risks, GDL provisions, their role, and how to develop a Parent/Teen Driving Agreement, and on-line driving logs.
	B4 – Provide information on insurance provider parent-teen safe driving programs	Tried	Inform parents of local insurance programs providing policy discounts for parents and their teen enrolling in parent-teen safe driving programs.
C – Educate Young Drivers	C1 – Brief interventions regarding driving risks and consequences	Experimental	When teen driver receives a moving violation or is involved in a crash, health care provider conducts brief intervention with crash victim after crash (traumatic event) on driving risks and consequences
	C2 – Conduct Peer-to-Peer safety outreach	Moderate	Promote peer education of traffic safety through peer-to-peer outreach campaigns and contests to engage teens on teen driving risks and socially reinforced safe driving behaviors.

TABLE 3-5

Cross-Cutting Safety Strategy (Behavioral Strategy)

Objectives	Strategies	Effectiveness	Programs and Tactics
A – Improved Quality and Timeliness of Crash Data	A1 – Local and Tribal Enforcement use of Traffic and Criminal Software (TraCS)	Proven	Promote local and tribal enforcement full deployment of TraCS for in-the-field incident reporting and electronic submission of crash reports to the NDDOT.

TABLE 3-6

Speeding Strategies (Infrastructure Strategies)

Objectives	Strategies	Effectiveness	Cost to Implement and Operate ¹	Timeframe for Implementation ²
A – Set appropriate speed limits	A1 – Install speed signage using variable message signs in school zones	Tried	Low	Medium
B – Communicate appropriate speeds through use of traffic control devices	B1 – Implement dynamic speed feedback signs , including dynamic message boards at rural to urban transitions	Tried	Low	Medium
	B2 – Use in-pavement measures to communicate the need to reduce speeds	Tried	Moderate	Short
C – Ensure that roadway supports appropriate and safe speeds	C1 – Effect safe speed transitions through design elements and on approaches to lower-speed areas	Tried	High	Long

Notes:

¹ Cost: Low = <\$100,000 per intersection; Moderate = \$100,000 to \$500,000 per intersection; High = >\$500,000 per intersection

² Implementation: Short = <1 year; Medium = 1 to 2 years; Long = >2 years

Source: NCHRP Report 500 Series, 2004

TABLE 3-7
Lane Departure Strategies (Infrastructure Strategies)

Objectives	Strategies	Effectiveness	Cost to Implement and Operate ¹	Timeframe for Implementation ²
A – Keep vehicles from encroaching on the roadside	A1 – Install edge rumble strips (shoulder or edge line)	Proven	Low	Short
	A2 – Install enhanced pavement markings , 6-inch edge line, or embedded wet-reflective pavement markings on section with narrow or no paved shoulders	Experimental/ Tried	Low	Short
	A3 – Provide enhanced shoulders, lighting, delineation (for example, Chevrons), or pavement markings for sharp horizontal curves	Tried / Proven	Low	Short
	A4 – Provide skid-resistance pavement surfaces	Proven	Moderate	Medium
	A5 – Apply shoulder treatments *Eliminate shoulder drop-offs *Safety edge *Widen and/or pave shoulders	Experimental/ Proven	Moderate	Medium
B – Minimize the likelihood of crashing into an object or overturning if the vehicle travels off the shoulder	B1 – Design safer slopes and ditches to prevent rollovers	Proven	Moderate to High	Medium
	B2 – Remove/relocate objects in hazardous locations	Proven	Moderate to High	Medium
C – Reduce the severity of the crash	C1 – Improve design and application of barrier and attenuation systems	Tried	Moderate to High	Medium
D – Keep vehicles from encroaching into opposite lane	D1 – Install centerline rumble strips for two-lane roads	Tried	Low	Short
	D2 – Reallocate total two-lane roadway width (lane and shoulder) to include a “buffer median”	Tried	Low	Medium
E – Minimize the likelihood of crashing into an oncoming vehicle	E1 – Use alternating passing lanes or four-lane sections at key locations (Swedish “2+1”)	Tried	Moderate to High	Medium
Notes: ¹ Cost: Low = <\$10,000 per mile; Moderate = \$10,000 to \$100,000 per mile; High = >\$100,000 per mile ² Implementation: Short = <1 year; Medium = 1 to 2 years; Long = >2 years Source: NCHRP Report 500 Series, 2003				

TABLE 3-8
Signalized Intersection Strategies (Infrastructure Strategies)

Objectives	Strategies	Effectiveness	Cost to Implement and Operate ¹	Timeframe for Implementation ²
A – Reduce frequency and severity of intersection conflicts through traffic control and operational improvements	A1 – Optimize signal operation (phasing/timing, etc.)	Tried / Proven	Low	Short
	A2 – Optimize clearance intervals	Proven	Low	Short
	A3 – Employ signal coordination along a corridor or route	Proven	Low	Medium
	A4 – Employ emergency vehicle preemption	Proven	Moderate	Medium
B – Reduce intersection conflicts through geometrics	B1 – Provide/improve left-turn channelization	Proven	Moderate	Long
C – Improve pedestrian safety with signal improvements	C1 – Install countdown timers	Tried	Low	Short
	C2 – Re-time signals to provide a leading pedestrian interval (advanced walk)	Tried	Low	Short
D – Improve driver awareness of intersections and signal control	D2 – Improve visibility of signals (overhead indications, 12-inch lenses, background shields, LED's) and signs (mast arm mounted street names) and signs (mast arm mounted street names) at intersections	Tried	Low	Short
E – Improve driver compliance with traffic control devices	E1 – Supplement conventional enforcement of red-light running with confirmation lights ; include a public information campaign to increase awareness and compliance	Tried	Low	Short
F – Improve safety through other infrastructure treatments	F1 – Restrict or eliminate parking on intersection approaches	Proven	Low	Short
Notes: ¹ Cost: Low = <\$100,000 per intersection; Moderate = \$100,000 to \$500,000 per intersection; High = >\$500,000 per intersection ² Implementation: Short = <1 year; Medium = 1 to 2 years; Long = >2 years Source: NCHRP Report 500 Series, 2004				

TABLE 3-9
Unsignalized Intersection Strategies (Infrastructure Strategies)

Objectives	Strategies	Effectiveness	Cost to Implement and Operate ¹	Timeframe for Implementation ²
A – Reduce the frequency and severity of intersection conflicts through geometric design improvements	A1 – Provide left-turn lanes at intersections	Tried	Moderate	Medium
	A2 – Provide offset turn lanes at intersections	Proven	Moderate	Medium
	A3 – Realign intersection approaches to reduce or eliminate intersection skew	Tried	Moderate to High	Medium
	A4 – Improve pedestrian and bicycle facilities to reduce conflicts between motorists and nonmotorists	Proven	High	Medium
	A5 – Use indirect left-turn treatments to minimize conflicts at divided highway intersections	Varies	Moderate	Medium
B – Improve sight distance at unsignalized intersections	B1 – Clear sight triangle on approaches and in medians by clearing grub, eliminating parking, etc	Tried	Moderate	Medium
C – Improve driver awareness of intersections as viewed from the intersection approach	C1 – Improve visibility of intersections by providing enhanced signing, delineation or pavement markings/messages (stop bar, larger regulatory signs, LED stop signs, etc)	Tried	Low	Short
	C2 – Improve visibility of intersections by providing appropriate street lighting	Tried	Low	Short
	C3 – Install larger regulatory and warning signs at intersections, including the use of dynamic warning signs at appropriate intersections	Proven	Low to Moderate	Medium
	C4 – Call attention to the intersection by installing rumble strips or splitter islands on intersection approaches	Tried	Low	Short
D – Appropriate intersection traffic control to minimize crash frequency and severity	D1 – Construct roundabouts at appropriate locations	Tried	Low to Moderate	Medium
Notes: ¹ Cost: Low = <\$50,000 per intersection; Moderate = \$50,000 to \$500,000 per intersection; High = >\$500,000 per intersection ² Implementation: Short = <1 year; Medium = 1 to 2 years; Long = >2 years Source: NCHRP Report 500 Series, 2003				

TABLE 3-10
Urban Segment Strategies (Infrastructure Strategies)

Objectives	Strategies	Effectiveness	Cost to Implement and Operate ¹	Timeframe for Implementation ²
A – Include pedestrian and bicycle accommodations	A1 – Install sidewalks in appropriate locations	Proven	Moderate to High	Medium
	A2 – Minimize pedestrian crossing distances using curb extensions or median islands	Proven	Low	Medium
B – Improve roadway configuration to accommodate left turns	B1 – Restripe roadway to a three-lane (road diet) or five-lane cross-section.	Proven	Low	Medium
C – Improve access management near intersections	C1 – Restrict or eliminate turning maneuvers by providing channelization or closing median openings	Tried	Low	Short
	C2 – Restrict access to properties using driveway closures or turn restrictions	Tried	Low	Medium
	C3 – Restrict cross-median access near intersections	Tried	Low	Medium
Notes: ¹ Cost: Low = <\$50,000 per intersection; Moderate = \$50,000 to \$500,000 per intersection; High = >\$500,000 per intersection ² Implementation: Short = <1 year; Medium = 1 to 2 years; Long = >2 years Source: NCHRP <i>Report 500</i> Series, 2003				

3.3 Safety Strategies Workshop

A Safety Planning Workshop was held with representatives from the nine eastern counties in Valley City on December 4, 2013. Two additional workshops were held in the Grand Forks and Fargo as part of the LRSP Phase 2 analysis. The primary focus of the safety workshop was to discuss and prioritize the safety strategies.

The basic workshop structure included introductions and an overview of the current NDDOT safety program. This was followed by local speakers Kasey Skalicky (City-County Health District), Sgt. Luke Hendrickson (North Dakota Highway Patrol), Chief Fred Thompson (Valley City Police Department), and Kerry Johnson (Barnes County Highway Department), who shared information on local safety initiatives and programs. The morning was concluded with a review of the latest crash data on the local roadway system. In the afternoon, the workshop participants discussed potential safety strategies and began the process of prioritizing the strategies. The group reviewed and discussed driver-behavior and roadway infrastructure strategies. The final agenda item was a voting exercise where each participant voted for their preferred strategies to focus efforts on in the future local roadway program in their regions.

Workshop participants included county and city representatives, county commissioners, enforcement representatives, and NDDOT staff in order to include a variety of backgrounds and experiences to enable valuable interaction and discussions during the workshop.

3.4 Prioritizing Safety Strategies

Through the group (infrastructure and driver behavior) discussion and voting exercise, the top safety strategies for the eastern region are:

- **Behavioral strategies**
 - Support community programs for alternative transportation
 - Promote sobriety initiatives for DUI offenders
 - Educate and enforce zero tolerance laws for drivers under age 21
 - Conduct high-visibility targeted enforcement of speeding and aggressive driving
 - Encourage driver education providers to require parent education component
 - Enforce secondary belt use law
 - Pursue local support for primary seat belt law
- **Infrastructure strategies**
 - Provide enhanced shoulders, lighting, delineation, or pavement markings for sharp horizontal curves
 - Implement dynamic speed feedback signs, including dynamic message boards at rural to urban transitions
 - Install countdown timers
 - Improve visibility of intersections by providing appropriate street lighting
 - Restripe roadway to a three-lane or five-lane cross-section

Infrastructure safety projects that are developed as part of this LRSP are considered eligible for funding through the state's Highway Safety Improvement Program (HSIP). The managers of this program have identified implementation cost and effectiveness as priorities in their evaluation process of selecting projects for funding. Low-cost projects allow the limited funding to support a wider deployment and the use of proven-effective strategies provides the highest level of confidence that a given project will result in an overall crash reduction.

The ability of the selected strategies to reduce crashes is based on information in the FHWA's CMF [Crash Modification Factors] Clearinghouse and other published research. Table 3-11 provides a summary for driver behavior strategies reviewed in Chapter 5 of this report. In addition, Table 3-11 provides a summary of the crash reduction factors that were found in the CMF Clearinghouse for infrastructure safety strategies considered and/or suggested for the eastern region, along with an estimated unit cost for each strategy. Most factors reported are based on research that was assigned with higher-quality ratings.

TABLE 3-11
Proposed Strategies, Crash Reduction Factors, and Typical Installation Costs

Strategy	Crash Reduction Factor ^a	Typical Installation Costs
Impaired Driving		
Support community programs for alternative transportation	Up to 15% reduction in alcohol-related crashes	Low to moderate, depending on fares and tavern contributions
Promote sobriety initiatives for DUI offenders	Varies, depending on the program structure	
Educate and enforce zero tolerance laws for drivers under age 21	Up to 30% reduction when highly publicized	Up to \$50 per hour of officer overtime
Speeding and Aggressive Driving		
Conduct high-visibility targeted enforcement of speeding and aggressive driving	3%	Up to \$50 per hour of officer overtime
Young Drivers		
Encourage driver education providers to require parent education component	2%	\$1,500 per school district
Seat Belt Use		
Enforce secondary belt use law	3% to 5% increase in belt use; depending on intensity of enforcement	Up to \$50 per hour of officer overtime
Pursue local support for primary seat belt law	Up to a 9% increase in belt use after a state law is passed	Low to Moderate
Rural Segments		
4-inch latex edge line		\$1,320 per mile
4-inch latex centerline		\$660 per mile
6-inch latex edge line	10% to 45% all rural serious crashes	\$1,980 per mile
Shoulder or edge line rumble strips	20% run off road crashes	\$4,200 per mile
Ground in wet-reflective markings		\$36,000 per mile
Centerline rumble strips	40% head-on/sideswipe-crashes	\$3,600 per mile
6-inch centerline		\$1,020 per mile

TABLE 3-11
Proposed Strategies, Crash Reduction Factors, and Typical Installation Costs

Strategy	Crash Reduction Factor ^a	Typical Installation Costs
Rural Curves		
Chevrons	20% to 30%	\$3,960 per curve
Arrow board only		\$1,200 per curve
Advance warning sign and advisory speed plaque		\$1,440 per curve
2-foot paved shoulder and shoulder rumble strips	20% to 30% run-off-the-road crashes	\$44,400 per mile +\$3,600 per mile
Rural Intersections		
Roundabout	20% to 50% all crashes/ 60% to 90% right-angle crashes	\$3,000,000 per intersection
Directional median (RCI or J-Turn)	17% all crashes/ 100% angle crashes	\$900,000 per intersection
Mainline dynamic warning sign	50% all crashes/ 75% serious right-angle crashes	\$60,000 per intersection
Close median		\$30,000 per intersection
Intersection lighting	25% to 40% nighttime crashes	\$10,200 per streetlight
Upgrade signs and pavement markings	40% upgrade of all signs and pavement markings/ 15% for STOP AHEAD pavement marking	\$2,640 per approach ^b
Clear sight triangle	37% serious injury crashes ^c	\$2,940 per intersection ^d
Urban		
Conversions (three-lane/five-lane)	30% to 50%	\$30,000 per mile [three-lane] \$42,000 per mile [five-lane] +\$30,000 per signalized intersection for updates (for example, loop and signal head placement)
Access management	5% to 31%	\$360,000 per mile ^e
Signal – confirmation lights	25% to 84% reduction in violations	\$1,200 per two approaches
Pedestrian/bicycle – advanced walk	Up to 60% pedestrian/vehicle crashes	\$0 per intersection
Pedestrian/bicycle – countdown timers	25% vehicle/pedestrian crashes	\$12,000 per intersection
Pedestrian/bicycle – curb extensions	Increase in vehicles yielding to pedestrians	\$36,000 per corner
Pedestrian/bicycle – median refuge island	46% in vehicle/pedestrian crashes	\$24,000 per approach

TABLE 3-11

Proposed Strategies, Crash Reduction Factors, and Typical Installation Costs

Strategy	Crash Reduction Factor ^a	Typical Installation Costs
Notes: ^a Crash reduction factors based on review of CMF Clearinghouse and other published research ^b Includes \$540 per STOP sign, \$540 per junction sign assembly, \$600 per STOP AHEAD sign, \$600 per STOP AHEAD pavement marking message, and \$360 per stop bar ^c Reduction based on increasing sight distance triangle ^d Inclusive of sign upgrades identified and materials and labor for clearing of sight triangle. ^e For management of unsignalized intersection movements within a corridor that has a divided median. Typical project may include minor street diverters, signed turn restrictions, and median closings. N/A = not applicable		



4.0 Eastern Region Infrastructure Safety Projects

4.1 Eastern Region Proactive Project Decision Process

The primary objectives of the LRSP effort are to identify low-cost, safety-related infrastructure projects focused on each county's documented safety emphasis areas and target crash types. These emphasis areas account for the greatest number of serious crashes occurring on the local road system. Mitigating the factors that contribute to these crashes will assist each county in reducing serious crashes on the local road system.

Projects were developed that include identifying a specific improvement at a specific location based on risk factors described in Chapter 2 and the high-priority safety strategies described in Chapter 3. Improvement strategies are consistent with the NDDOT's SHSP with a focus on proven effectiveness at reducing the target crash type and low cost of implementation. Proven-effective strategies give safety program managers the highest level of confidence that the deployment will result in a reduction of crashes. Low-cost strategies allow improvements to be widely deployed across a system to address the low density of crashes and are less expensive than complete reconstruction of high-risk locations. Project development and mitigation focused on the following improvements:

- **Rural**
 - Lane-departure crashes along roadway segments and in curves
 - Intersection-related crashes
- **Urban**
 - Rear-end and head-on crashes on roadway segments
 - Angle crashes and pedestrian and bicycle crashes at intersections

For consistency across the eastern region, project decision trees were created so that locations with similar characteristics across the region received the same suggested mitigation treatment. Projects were chosen based on the identification of at-risk locations and the availability of proven strategies for crash reduction. This resulted in a systemic focus on rural paved roadway segments, horizontal paved curves, and rural intersections. In cities with populations over 5,000, the focus was on arterial and collector roadway segments and intersections along these segments. Projects were originally suggested based on the technical analysis and then revised in accordance with input from the local agencies and NDDOT.

High-priority rural roadway segment projects focused on addressing the most common type of serious segment-related crash—a single-vehicle, lane-departure crash—by implementing road edge improvements to alert drivers when they are drifting too far to the edge of the road (Figure 4-1).

High-priority rural curve projects focused on enhancing the curve delineation to improve driver's ability to successfully navigate the curves (Figure 4-2). As shown in the figure, a curve is eligible for a safety improvement project in three ways.

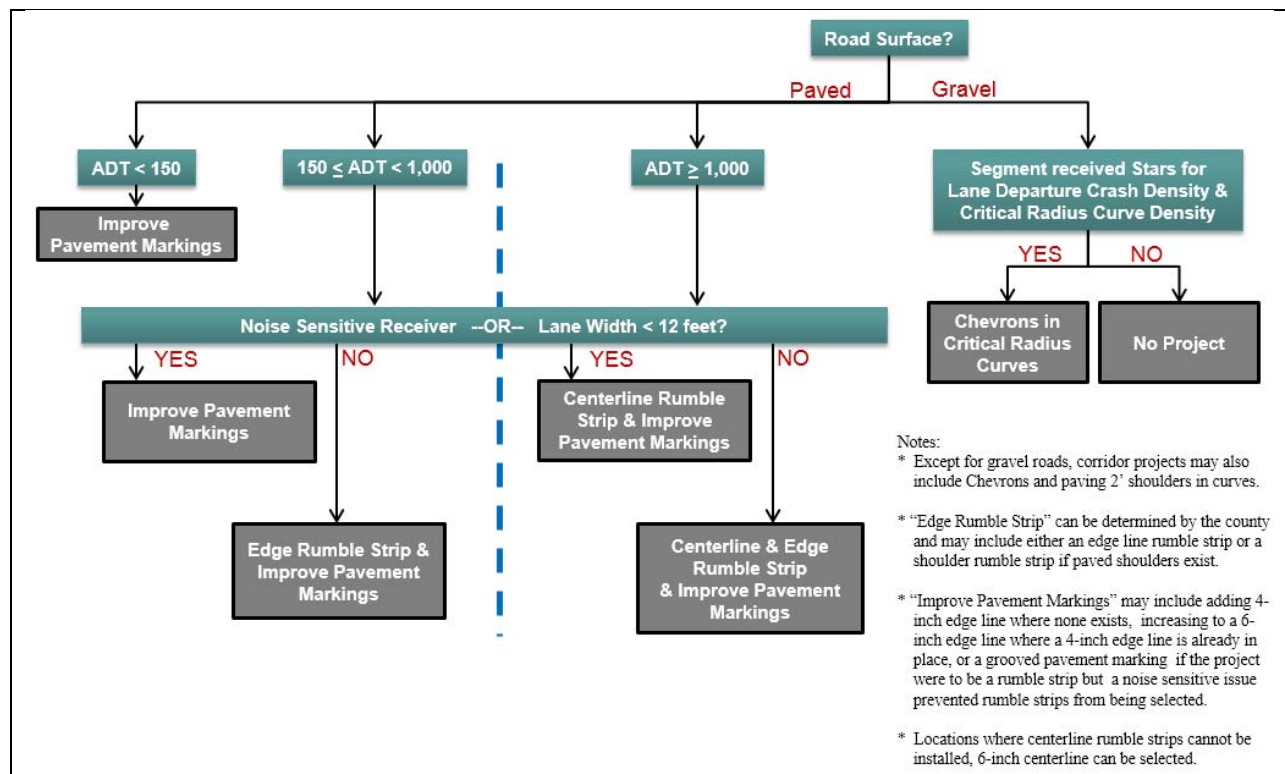


FIGURE 4-1
High-Priority Rural Roadway Segment Project Decision Tree

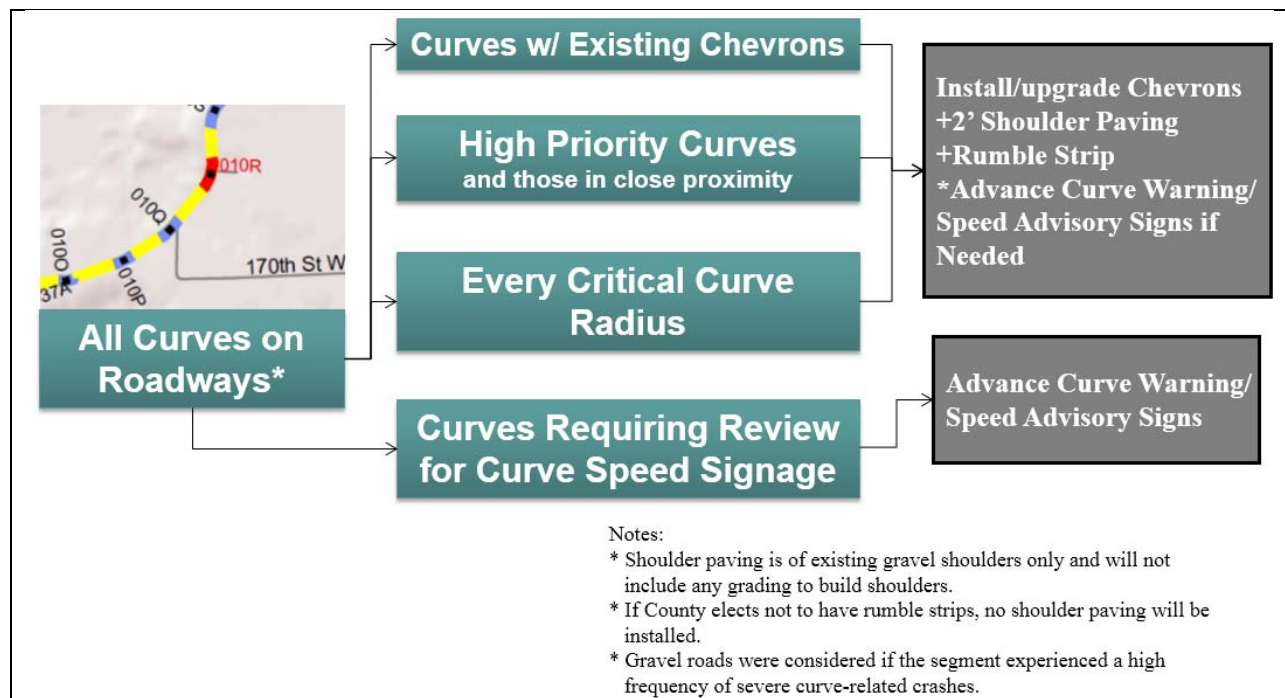


FIGURE 4-2
High-Priority Rural Curve Project Decision Tree

High-priority rural intersection projects (Figure 4-3) focused on addressing the most common type of serious intersection crash – a right-angle collision – by making the intersection more visible to drivers and by reducing the number of intersection conflicts. Examples of suggested projects are shown in Figure 4-4.

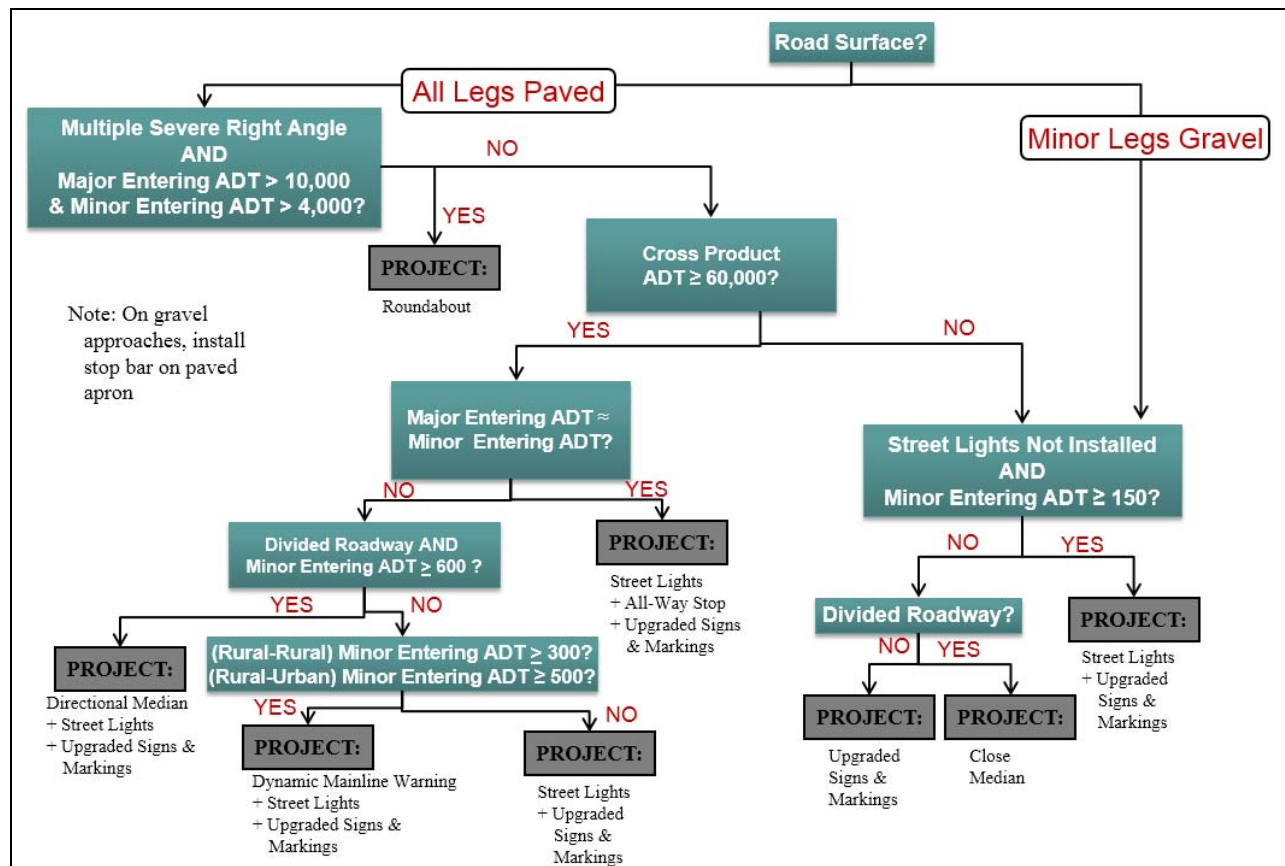


FIGURE 4-3
High-Priority Rural Intersection Project Decision Tree

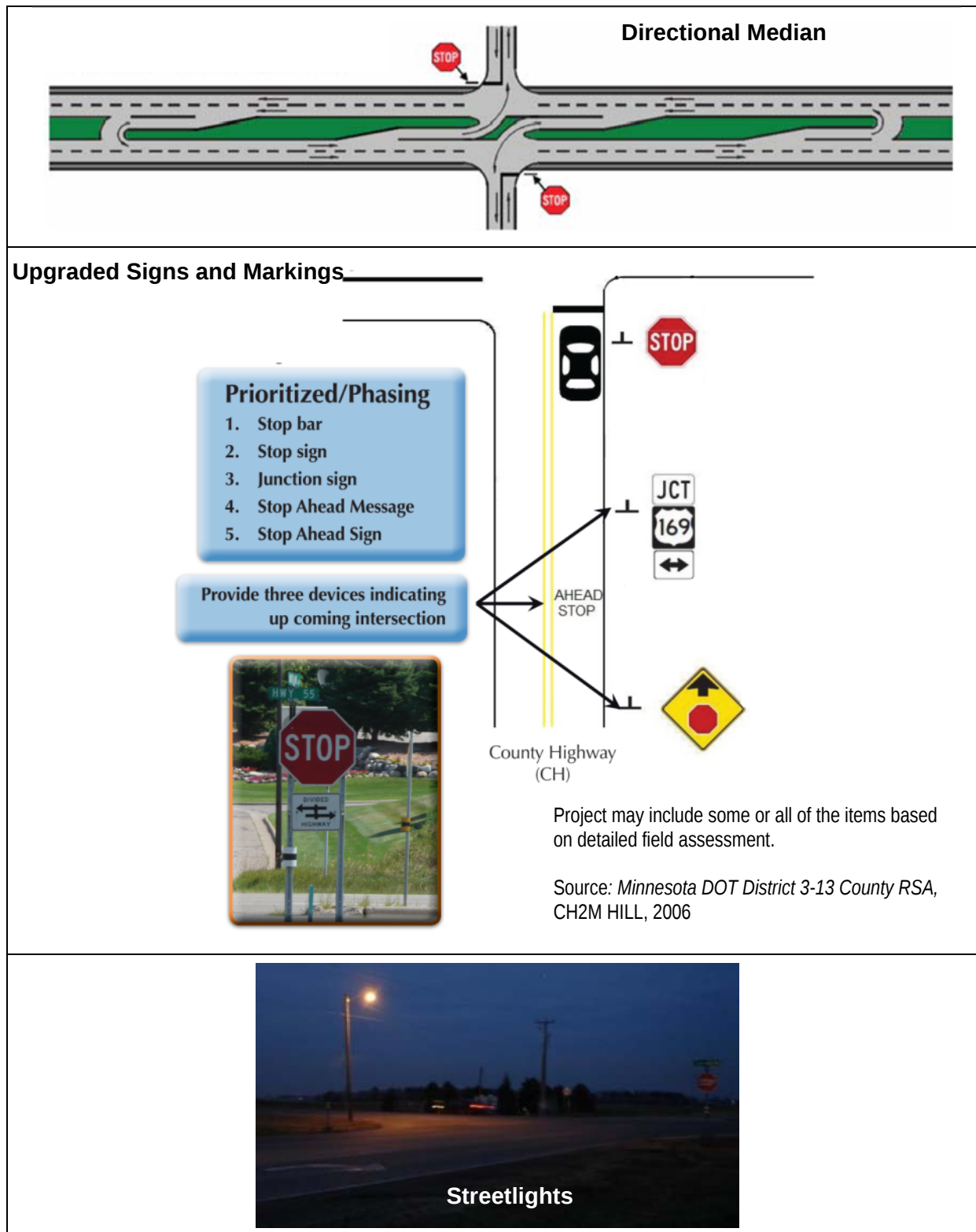


FIGURE 4-4
Intersection Safety Strategies Considered for Deployment

High-priority urban roadway segment projects focused on reducing rear-end and head-on crashes by creating buffer space in the middle of the roadway. This buffer space would be created by converting to a three-lane or five-lane roadway and by better managing access along divided arterials (Figure 4-5).

High-priority urban right-angle intersection projects focused on reducing right-angle crashes by reducing red-light running and managing access to reduce the number of conflict points along a corridor, particularly at signalized intersections (Figure 4-6).

High-priority urban pedestrian and bicycle intersection projects focused on reducing pedestrian and bicycle crashes by providing shorter crossing distances or median refuge islands, as well as advanced walk intervals and countdown timers at signalized intersections (Figure 4-7).

Project forms were completed for each high-priority intersection, curve, and roadway segment, including a description of the location, brief crash history, ranking factors, a picture of the location from the LRSP process (if needed), and the identified safety strategy. These forms were formatted so they could be submitted directly through the HSIP process, but may require supplemental information for the evaluation and scoring process.

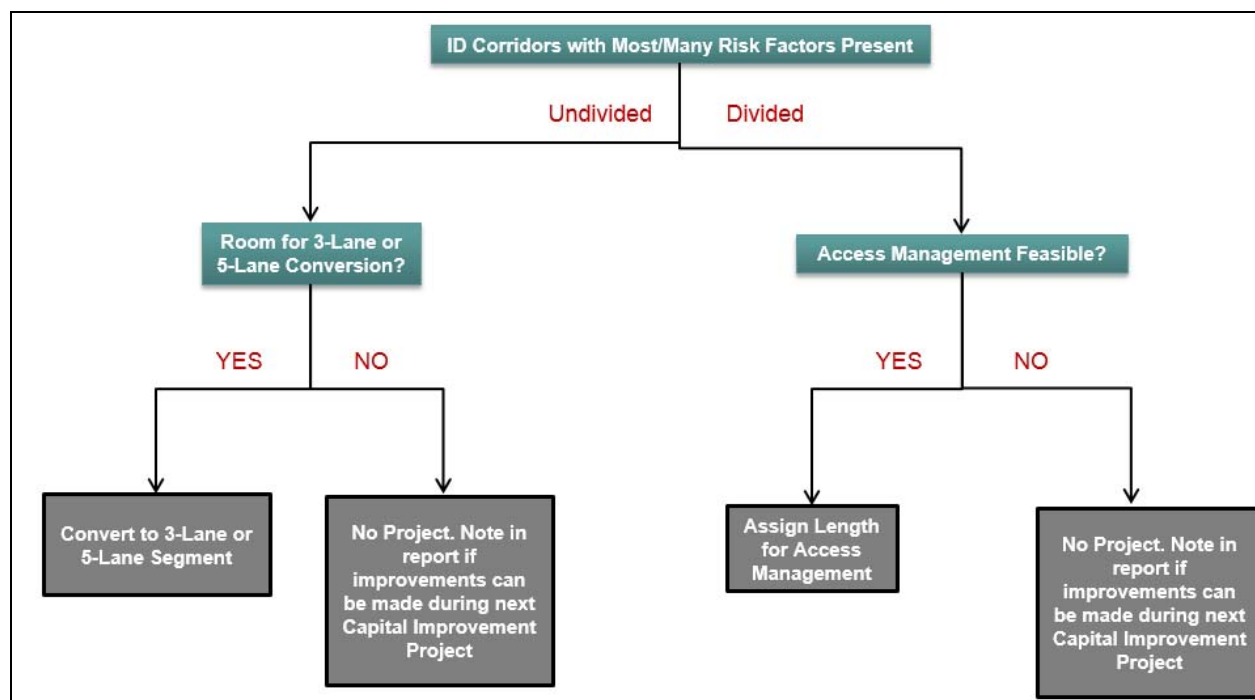


FIGURE 4-5
High-Priority Urban Roadway Segment (Turning) Project Decision Tree

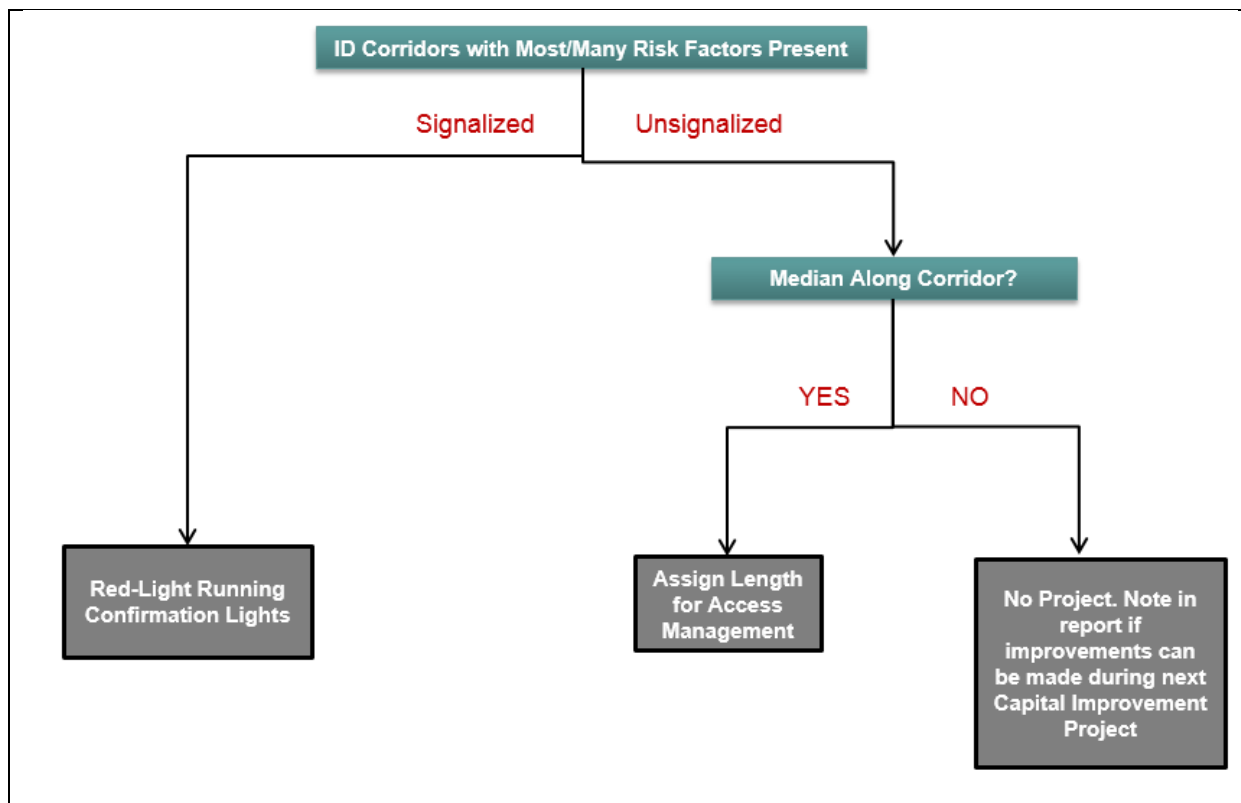


FIGURE 4-6
High-Priority Urban Right-Angle Intersection (Signalized) Project Decision Tree

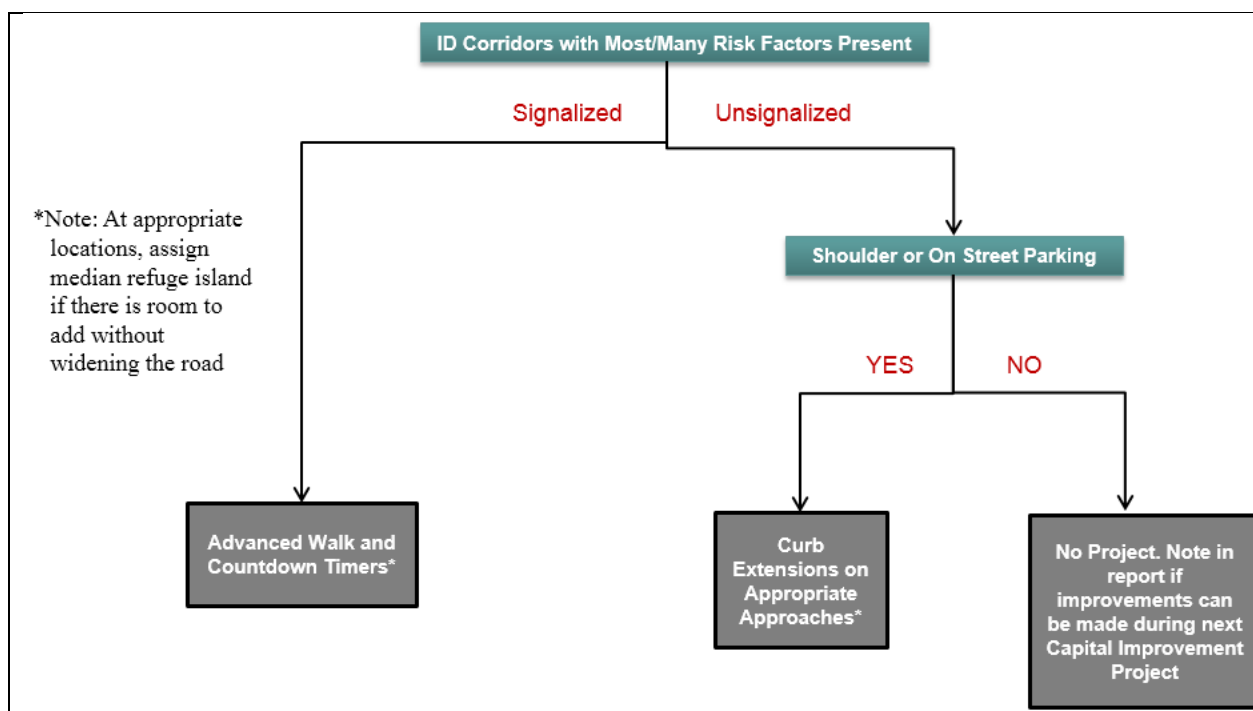


FIGURE 4-7
High-Priority Urban Pedestrian and Bicyclist Intersection Project Decision Tree

The suggested low-cost safety projects for the eastern region are described in the following sections. The costs assigned to each project are planning level estimates and do not include right-of-way or some other supplemental costs such as signal revisions or replacement for three-lane conversion projects. Because of funding limitations, all potential projects would not be completed in 1 year. The actual schedule for implementing individual projects will necessitate securing funding from the state's HSIP. The safety planning process followed for the eastern region is consistent with the North Dakota SHSP. In addition, several of the high-priority safety strategies are among those recommended for the state road system in the state's SHSP.

It is not expected or required that each county or city pursue safety projects in the suggested ranking order. The ranking suggests general priorities, given that actual project development decisions will be made by each county or city staff based on economic, social, and political issues and in coordination with other pavement and reconstruction projects that are part of the county's Capital Improvement Program.

Many project details are still undetermined, including general project termini. Each county or city will determine specific project details (such as termini and exceptions) as decisions regarding implementation of specific projects are made. These decisions may require that the county coordinate with various municipal departments, the public, and other county transportation departments.

The total cost of projects suggested for the eastern region is \$6,710,822. A cost breakout by project type and county/city is provided in Table 4-1.

TABLE 4-1
Eastern Region Total Safety Project Costs

Rural Projects	Roadway Segments	Intersections	Curves	Total
Barnes County	\$239,909	\$304,320	\$391,719	\$935,948
Eddy County	\$72,468	\$21,840	\$101,272	\$195,580
Foster County	\$144,240	\$104,400	\$72,246	\$320,886
Griggs County	\$36,762	\$160,320	\$53,640	\$250,722
Ransom County	\$150,936	\$141,240	\$29,520	\$321,696
Richland County	\$447,912	\$441,480	\$89,541	\$978,933
Sargent County	\$168,156	\$342,360	\$37,800	\$548,316
Steele County	\$134,683	\$54,000	\$65,172	\$253,855
Traill County	\$140,147	\$238,920	\$129,369	\$508,436
Urban Projects	Roadway Segments	Intersections – Right-Angle	Intersections – Pedestrians and Bicyclists	Total
Valley City	\$171,000	\$7,200	\$1,584,000	\$1,762,200
City of Wahpeton	\$175,850	\$374,400	\$84,000	\$634,250

Barnes County

The total project cost suggested for Barnes County is \$935,948. The project cost breakout for intersection, roadway segment, and curve projects are listed in Table 4-2. High-priority locations that received a project are shown in Figures 4-8 and 4-9. These locations are described in further detail in Appendix: Barnes County, along with priority rankings and suggested project sheets.

TABLE 4-2
Barnes County Project Costs

Project Type	Cost
Intersections	\$304,320
Roadway Segments	\$239,909
Curves	\$391,719
Total	\$935,948

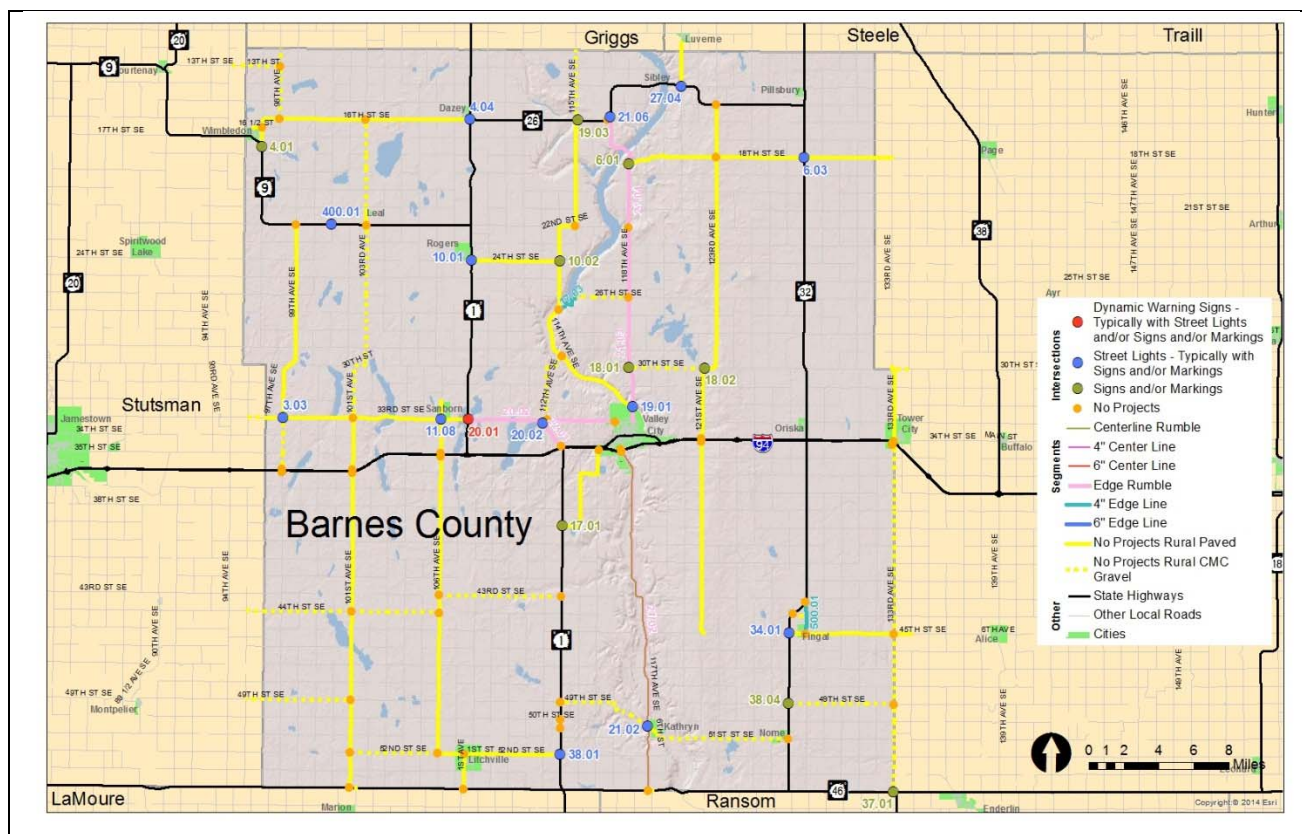


FIGURE 4-8
Barnes County Intersection and Segment Project Locations Map

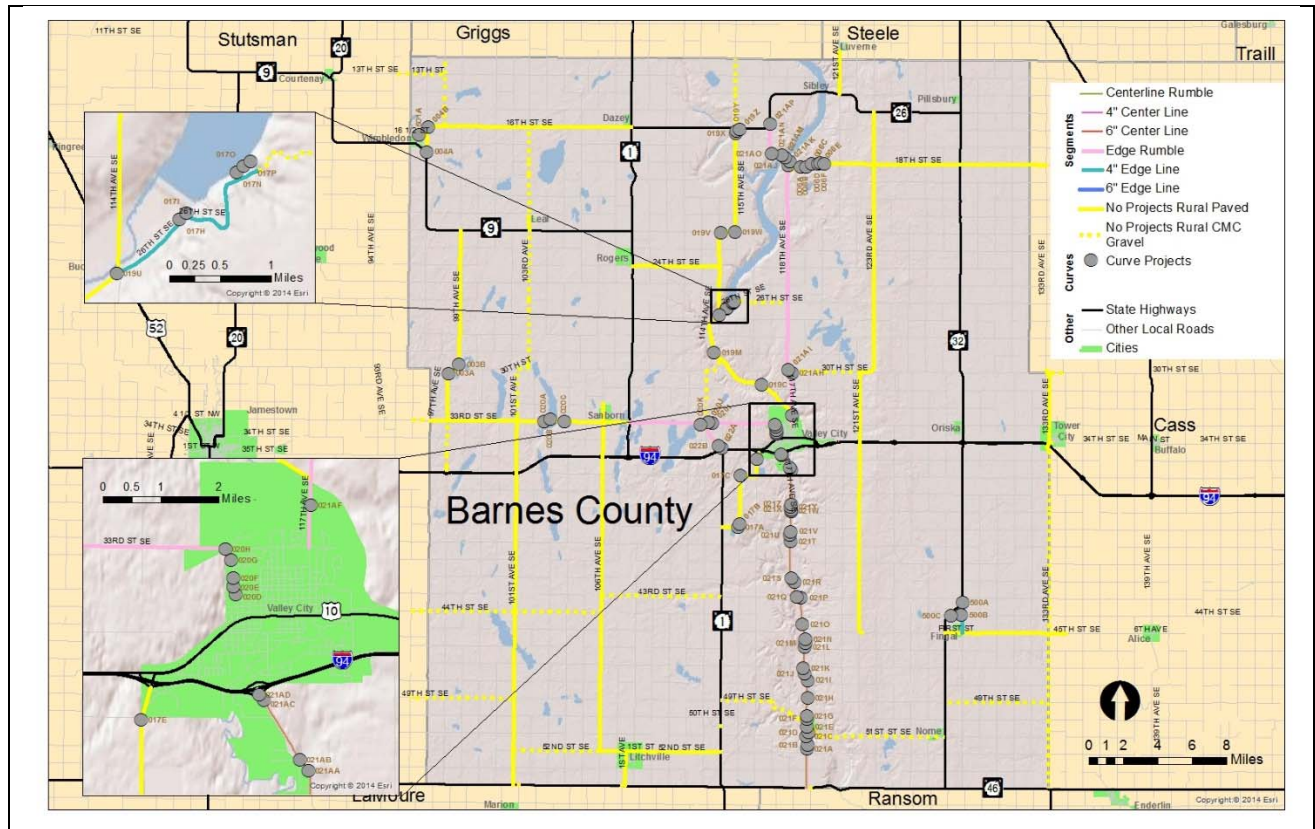


FIGURE 4-9
Barnes County Curve Project Locations Map

City of Valley City

The total project cost suggested for Valley City is \$1,762,200. The project cost breakout for roadway segment, right-angle intersection, and pedestrian/bicyclist intersection projects are listed in Table 4-3. High-priority locations that received a project are shown in Figures 4-10 and 4-11. These locations are described in further detail in Appendix: City of Valley City, along with priority rankings and suggested project sheets.

TABLE 4-3
Valley City Project Costs

Project Type	Cost
Roadway Segments	\$171,000
Right-Angle Intersections	\$7,200
Pedestrian and Bicyclist Intersections	\$1,584,000
Total	\$1,762,200

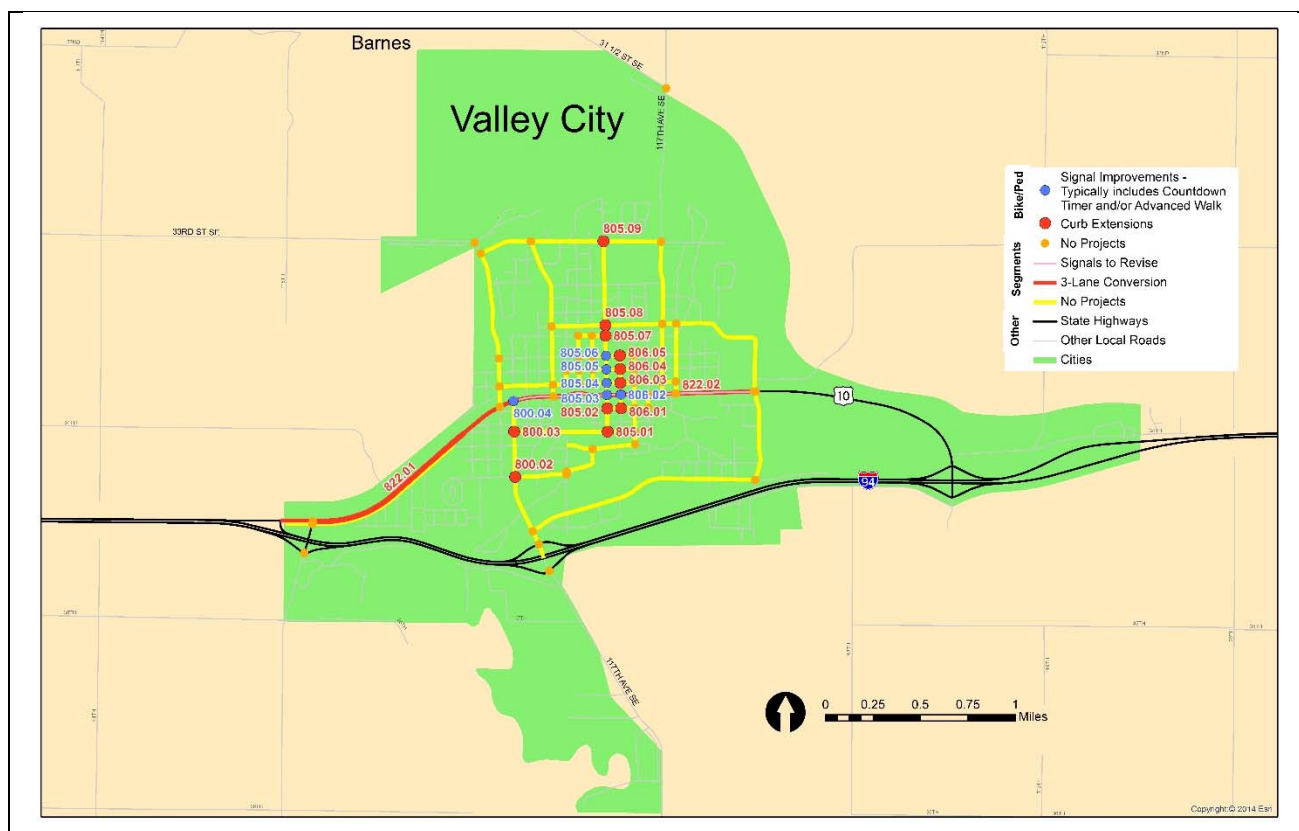


FIGURE 4-10
Valley City Urban Segment and Bicycle/Pedestrian Project Locations Map

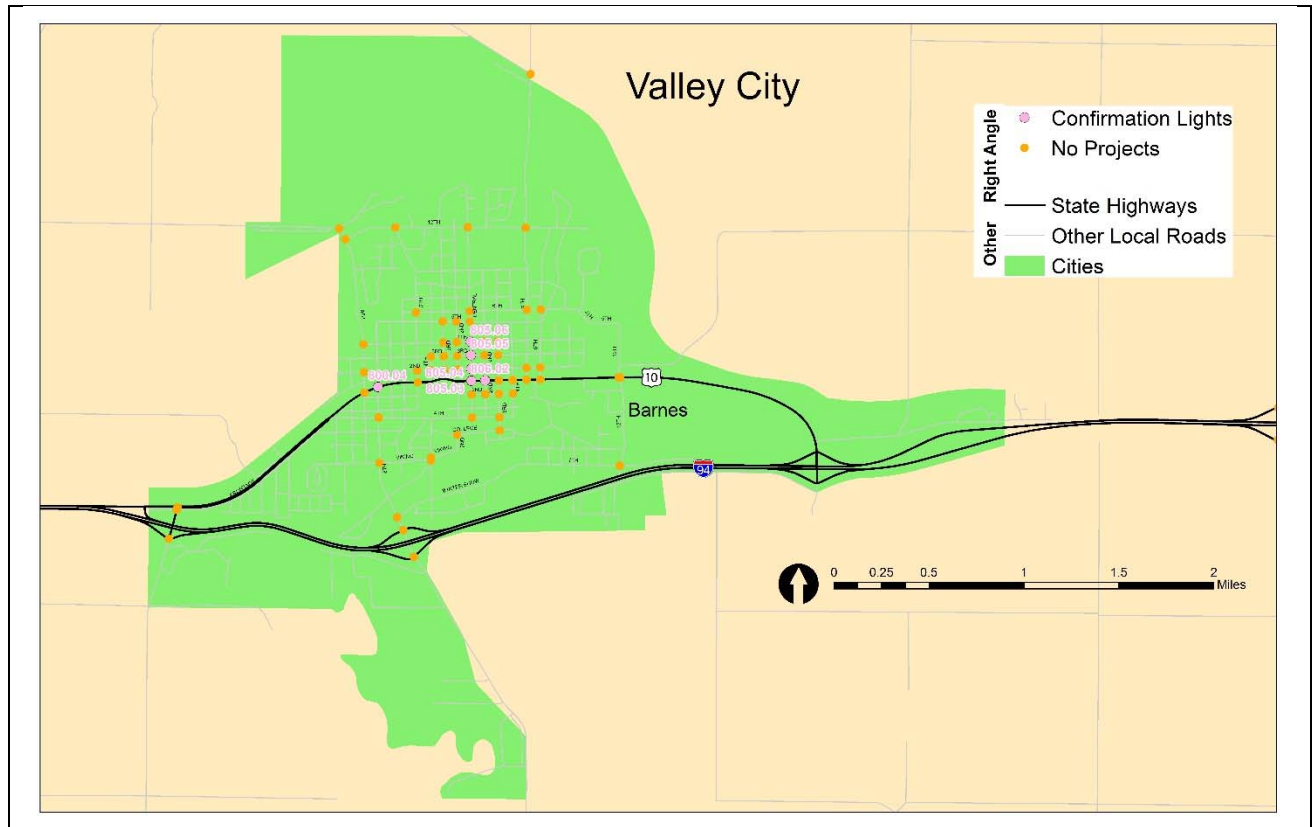


FIGURE 4-11
Valley City Right-Angle Project Locations Map

Eddy County

The total project cost suggested for Eddy County is \$195,580. The project cost breakout for intersection, roadway segment, and curve projects are listed in Table 4-4. High-priority locations that received a project are shown in Figure 4-12. These locations are described in further detail in Appendix: Eddy County, along with priority rankings and suggested project sheets.

TABLE 4-4
Eddy County Project Costs

Project Type	Cost
Intersections	\$21,840
Roadway Segments	\$72,468
Curves	\$101,272
Total	\$195,580

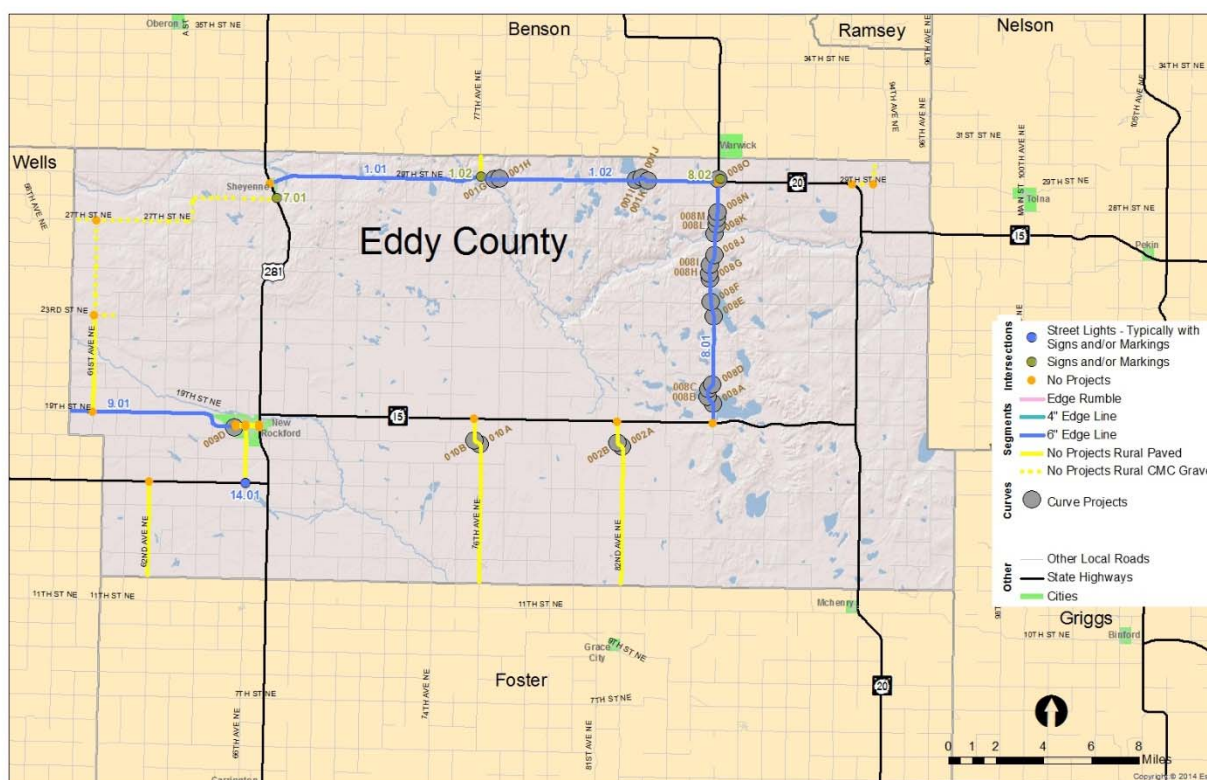


FIGURE 4-12
Eddy County Projects Location Map

Foster County

The total project cost suggested for Foster County is \$320,885.58. The project cost breakout for intersection, roadway segment, and curve projects are listed in Table 4-5. High-priority locations that received a project are shown in Figure 4-13. These locations are described in further detail in Appendix: Foster County, along with priority rankings and suggested project sheets.

TABLE 4-5
Foster County Project Costs

Project Type	Cost
Intersections	\$104,400
Roadway Segments	\$144,240
Curves	\$72,246
Total	\$320,886

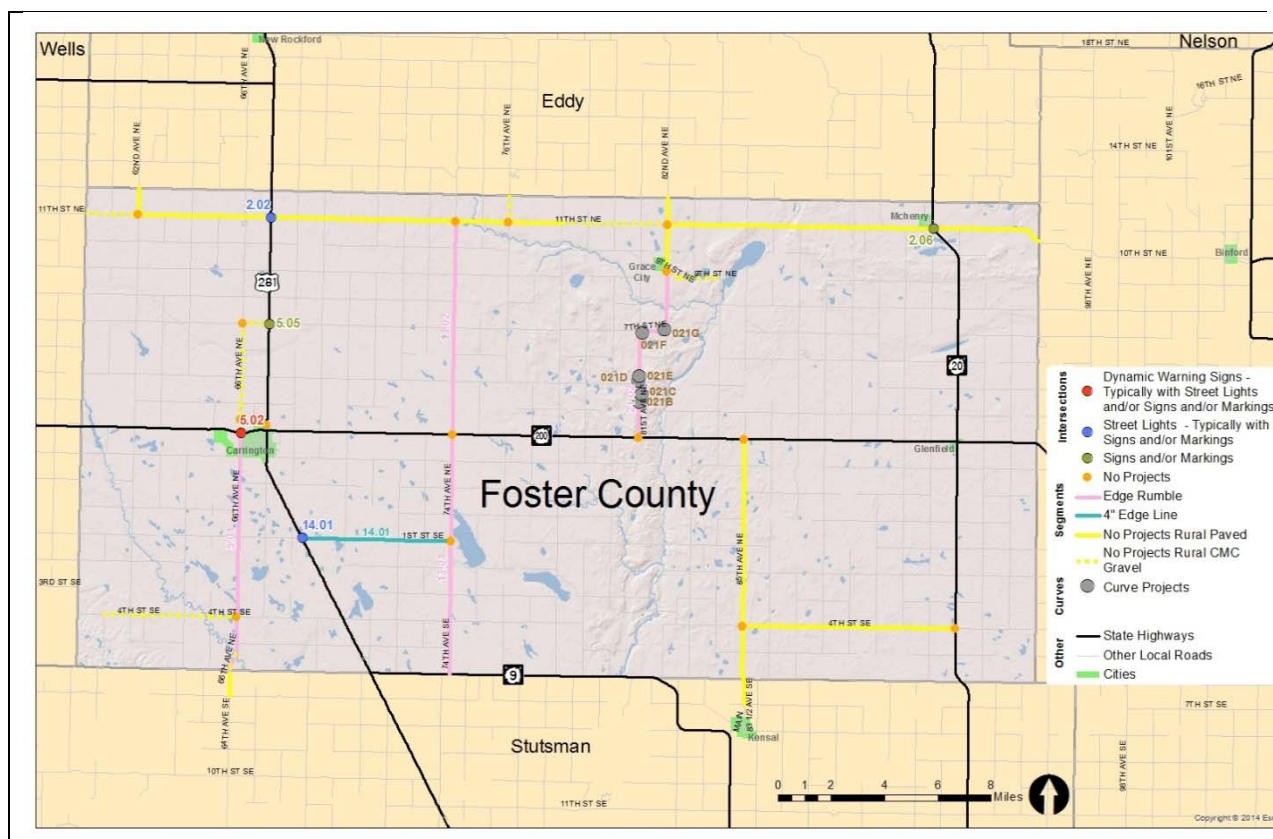


FIGURE 4-13
Foster County Project Locations Map

Griggs County

The total project cost suggested for Griggs County is \$250,722. The project cost breakout for intersection, roadway segment, and curve projects are listed in Table 4-6. High-priority locations that received a project are shown in Figure 4-14. These locations are described in further detail in Appendix: Griggs County, along with priority rankings and suggested project sheets.

TABLE 4-6
Griggs County Project Costs

Project Type	Cost
Intersections	\$160,320
Roadway Segments	\$36,762
Curves	\$53,640
Total	\$250,722

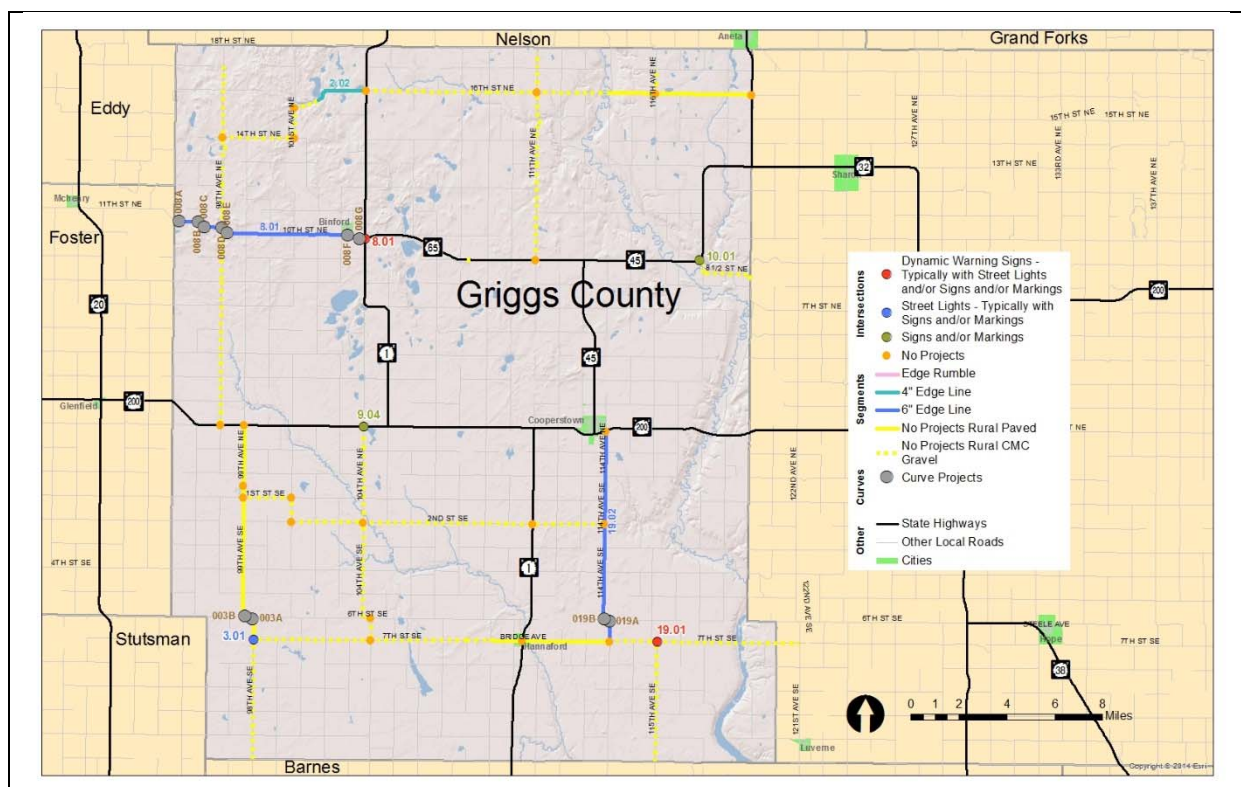


FIGURE 4-14
Griggs County Project Locations Map

Ransom County

The total project cost suggested for Ransom County is \$321,696. The project cost breakout for intersection, roadway segment, and curve projects are listed in Table 4-7. High-priority locations that received a project are shown in Figure 4-15. These locations are described in further detail in Appendix: Ransom County, along with priority rankings and suggested project sheets.

TABLE 4-7
Ransom County Project Costs

Project Type	Cost
Intersections	\$141,240
Roadway Segments	\$150,936
Curves	\$29,520
Total	\$321,696

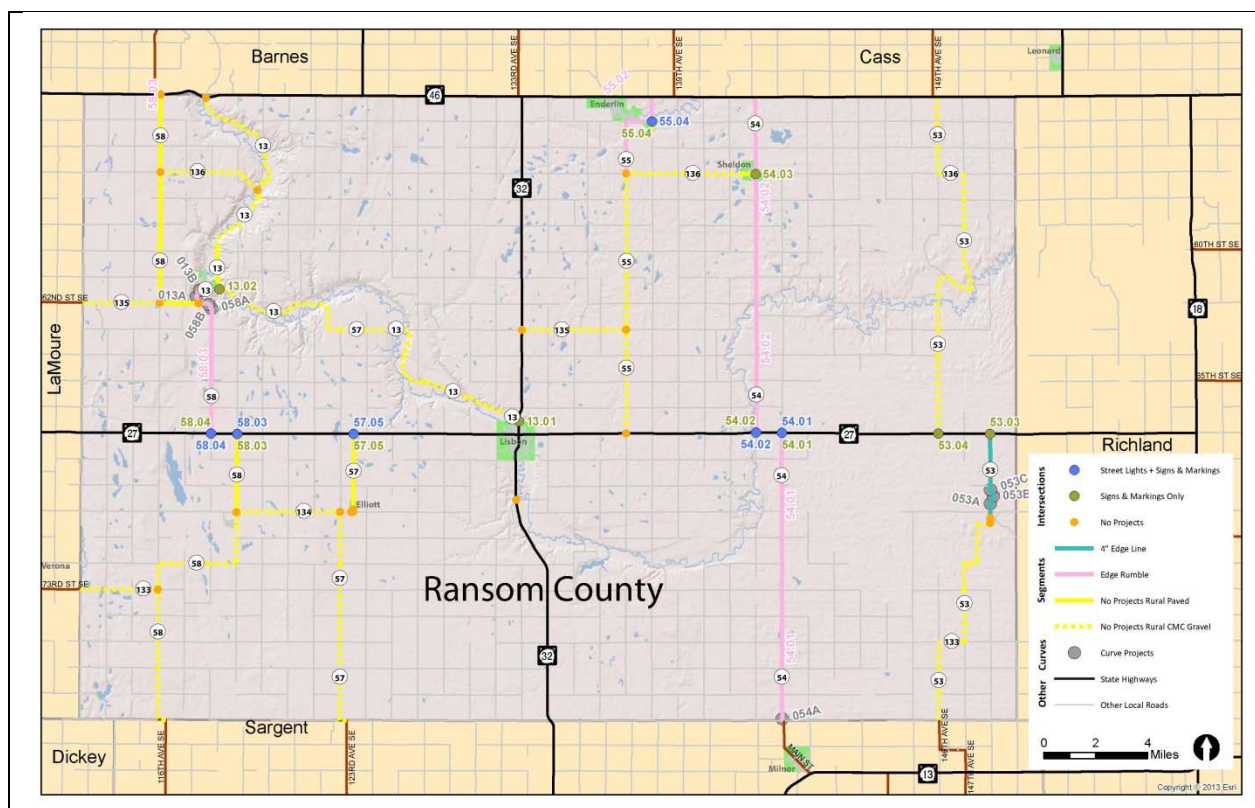


FIGURE 4-15
Ransom Project Locations Map

Richland County

The total project cost suggested for Richland County is \$978,933. The project cost breakout for intersection, roadway segment, and curve projects are listed in Table 4-8. High-priority locations that received a project are shown in Figure 4-16. These locations are described in further detail in Appendix: Richland County, along with priority rankings and suggested project sheets.

TABLE 4-8
Richland County Project Costs

Project Type	Cost
Intersections	\$441,480
Roadway Segments	\$447,912
Curves	\$89,541
Total	\$978,933

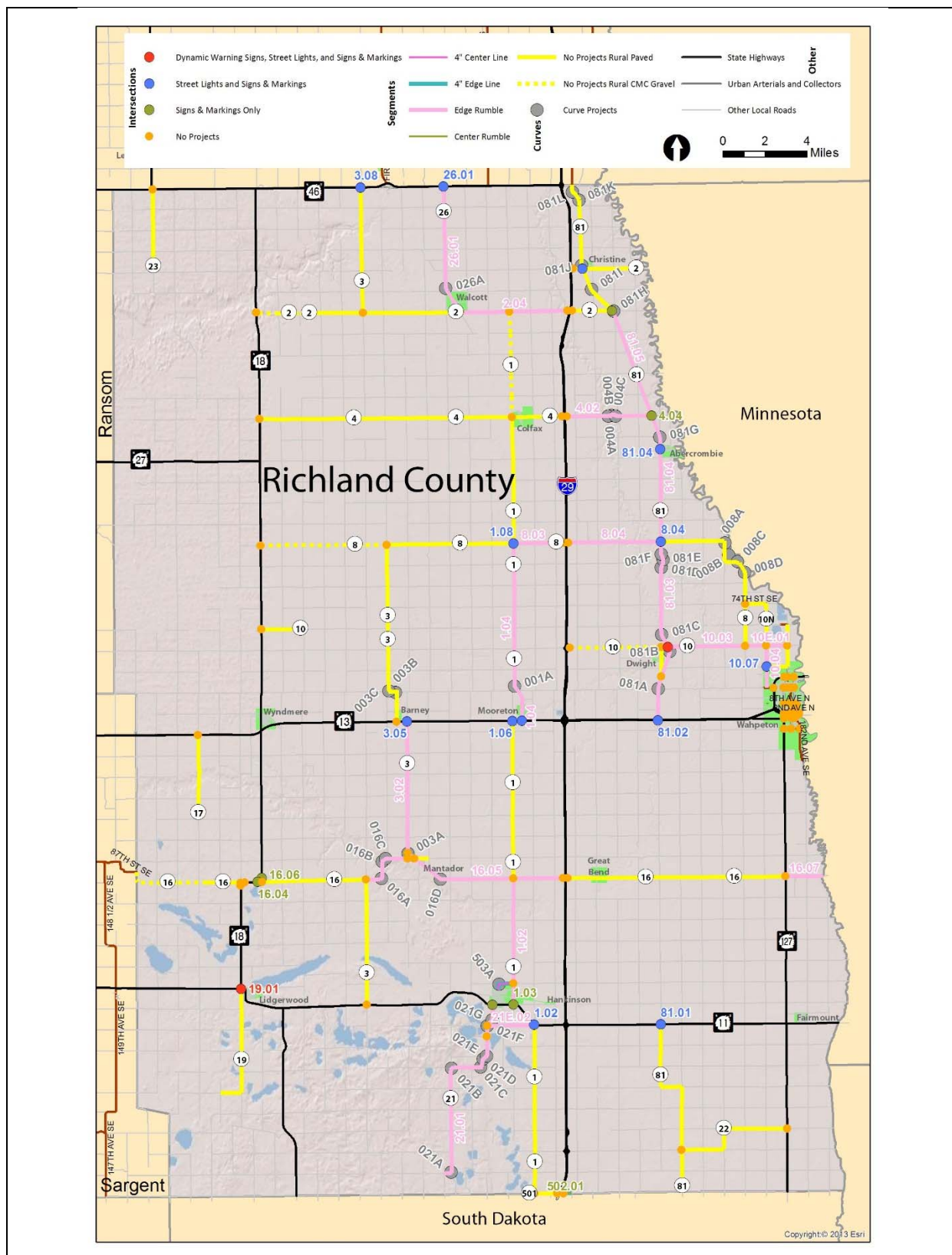


FIGURE 4-16
Richland Project Locations Map

City of Wahpeton

The total project cost suggested for City of Wahpeton is \$634,250. The project cost breakout for roadway segment, right-angle intersection, and pedestrian/bicyclist intersection projects are listed in Table 4-9 High-priority locations that received a project are shown in Figure 4-17. These locations are described in further detail in Appendix: City of Wahpeton, along with priority rankings and suggested project sheets.

TABLE 4-9
 City of Wahpeton Project Costs

Project Type	Cost
Roadway Segments	\$175,850
Right-Angle Intersections	\$374,400
Pedestrian and Bicyclist Intersections	\$84,000
Total	\$634,250

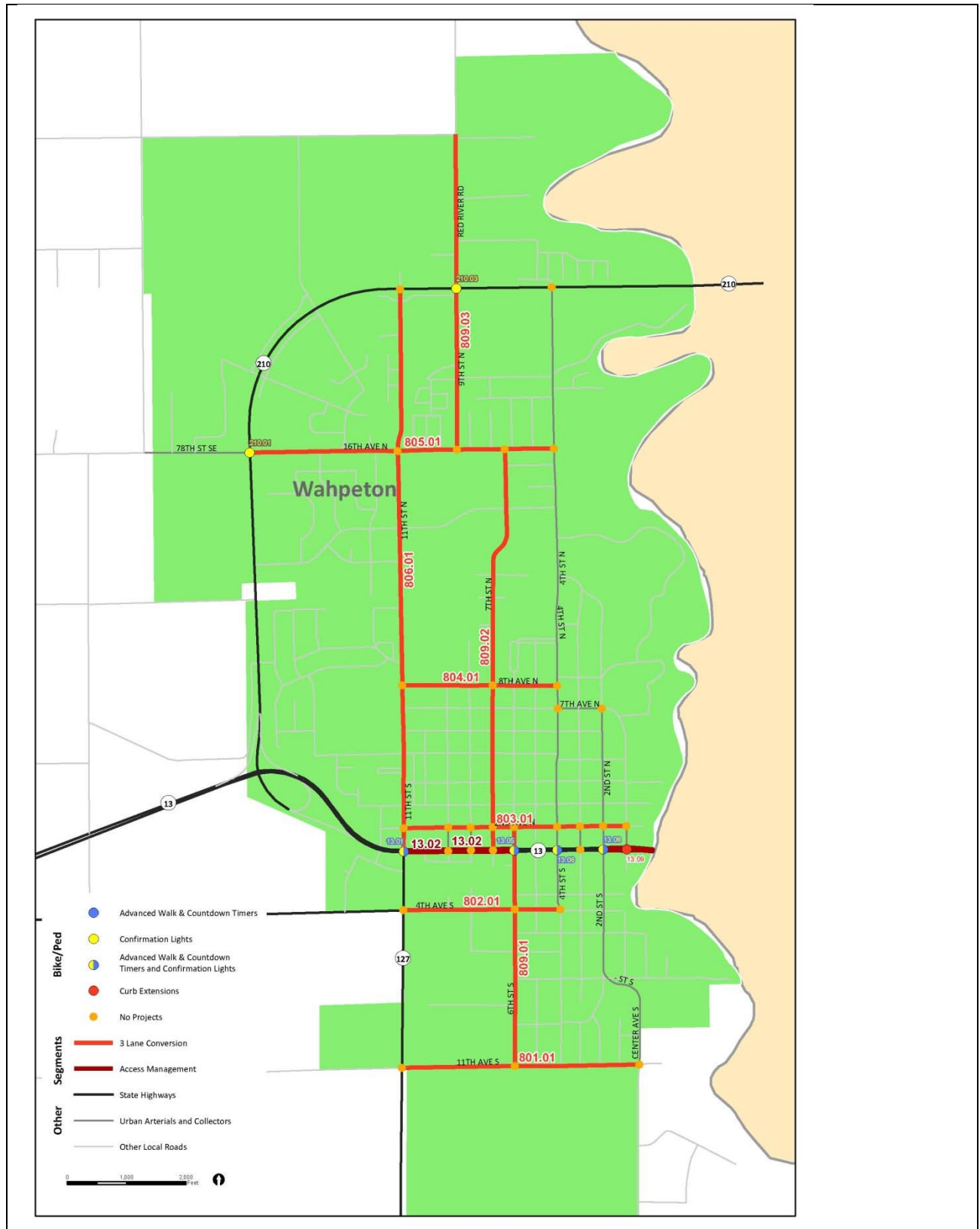


FIGURE 4-17
City of Wahpeton Urban Segment, Right-Angle, and Bicycle/Pedestrian Project Locations Map

Sargent County

The total project cost suggested for Sargent County is \$548,316. The project cost breakout for intersection, roadway segment, and curve projects are listed in Table 4-10. High-priority locations that received a project are shown in Figure 4-18. These locations are described in further detail in Appendix: Sargent County, along with priority rankings and suggested project sheets.

TABLE 4-10
Sargent County Project Costs

Project Type	Cost
Intersections	\$342,360
Roadway Segments	\$168,156
Curves	\$37,800
Total	\$548,316

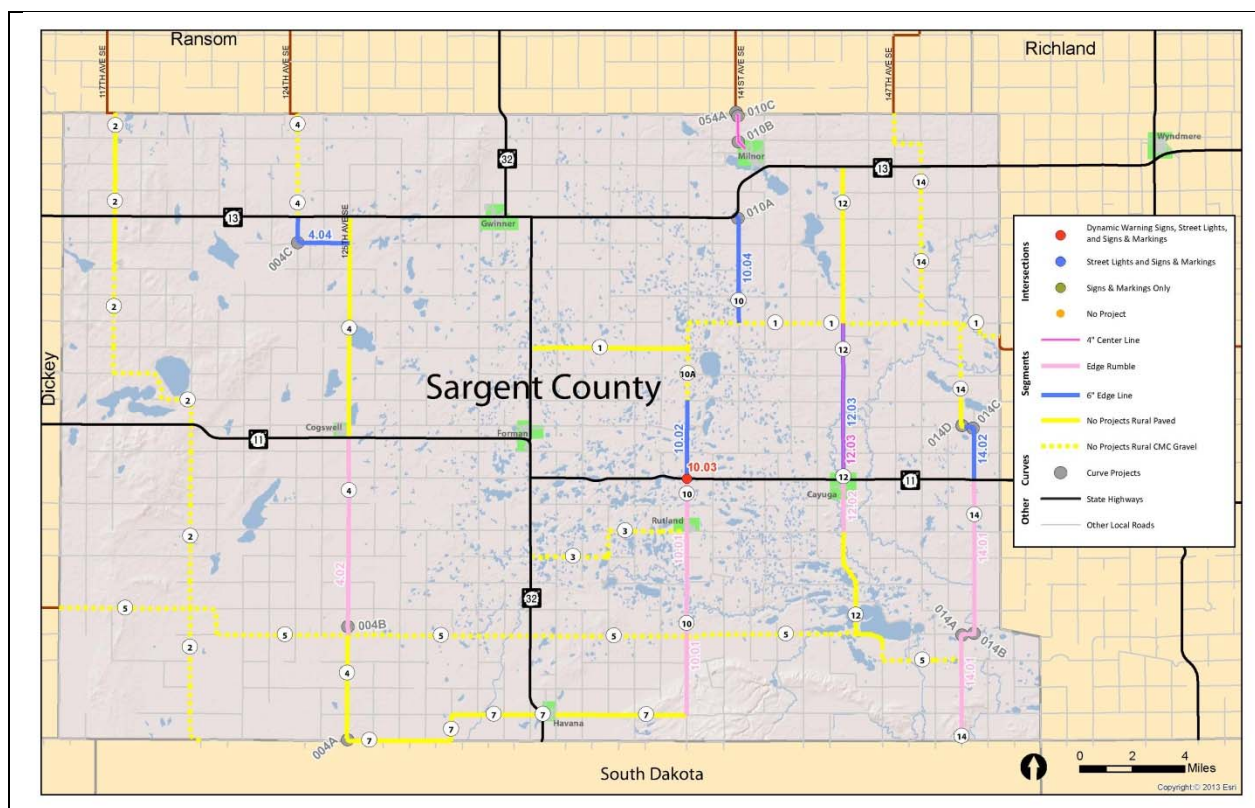


FIGURE 4-18
Sargent Project Locations Map

Steele County

The total project cost suggested for Steele County is \$253,855. The project cost breakout for intersection, roadway segment, and curve projects are listed in Table 4-11. High-priority locations that received a project are shown in Figure 4-19. These locations are described in further detail in Appendix: Steele County, along with priority rankings and suggested project sheets.

TABLE 4-11
Steele County Project Costs

Project Type	Cost
Intersections	\$54,000
Roadway Segments	\$134,683
Curves	\$65,172
Total	\$253,855

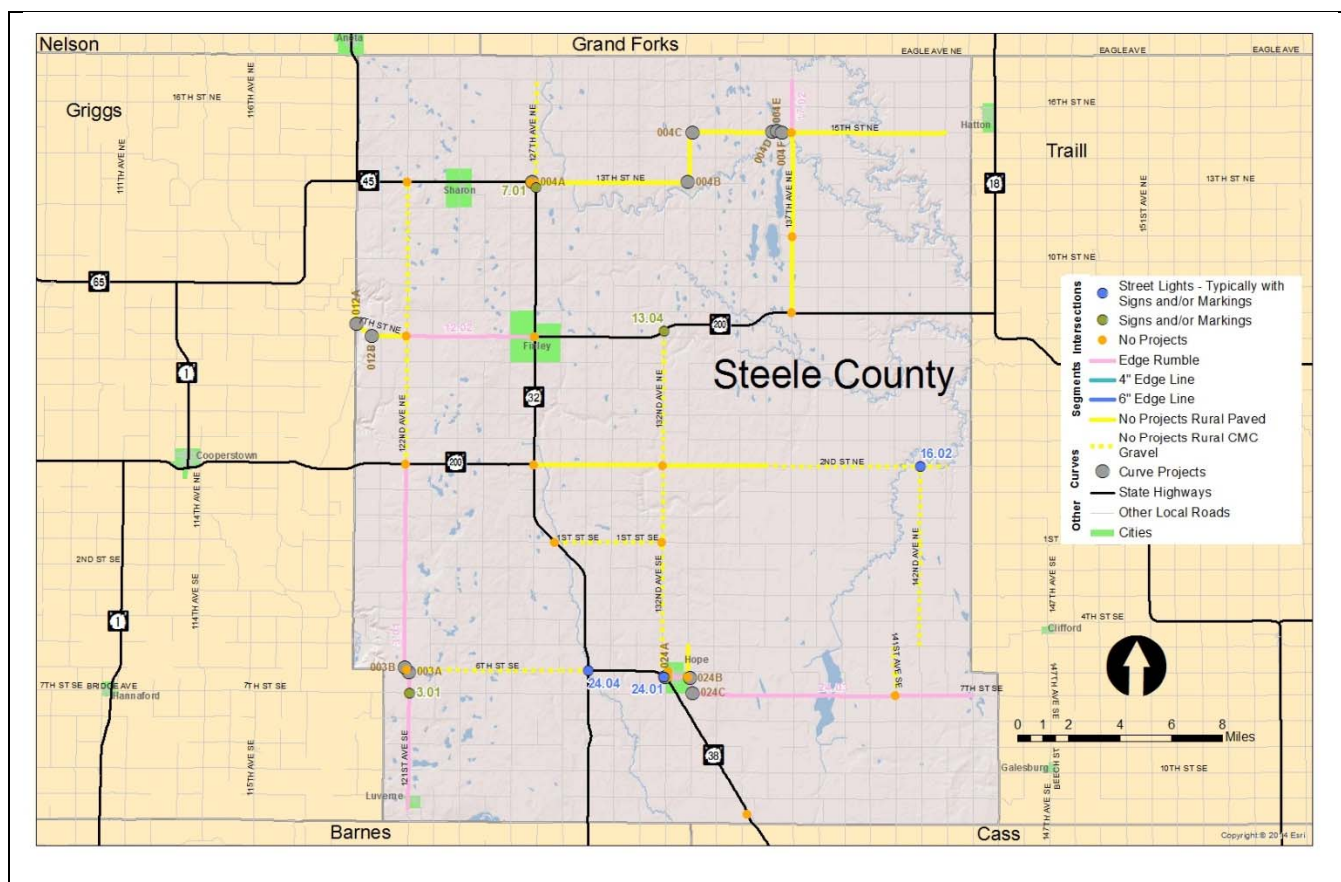


FIGURE 4-19
Steele Project Locations Map

Trail County

The total project cost suggested for Trail County \$508,436. The project cost breakout for intersection, roadway segment, and curve projects are listed in Table 4-12. High-priority locations that received a project are shown in Figure 4-20. These locations are described in further detail in Appendix: Trail County, along with priority rankings and suggested project sheets.

TABLE 4-12
Trail County Project Costs

Project Type	Cost
Intersections	\$238,920
Roadway Segments	\$140,147
Curves	\$129,369
Total	\$508,436

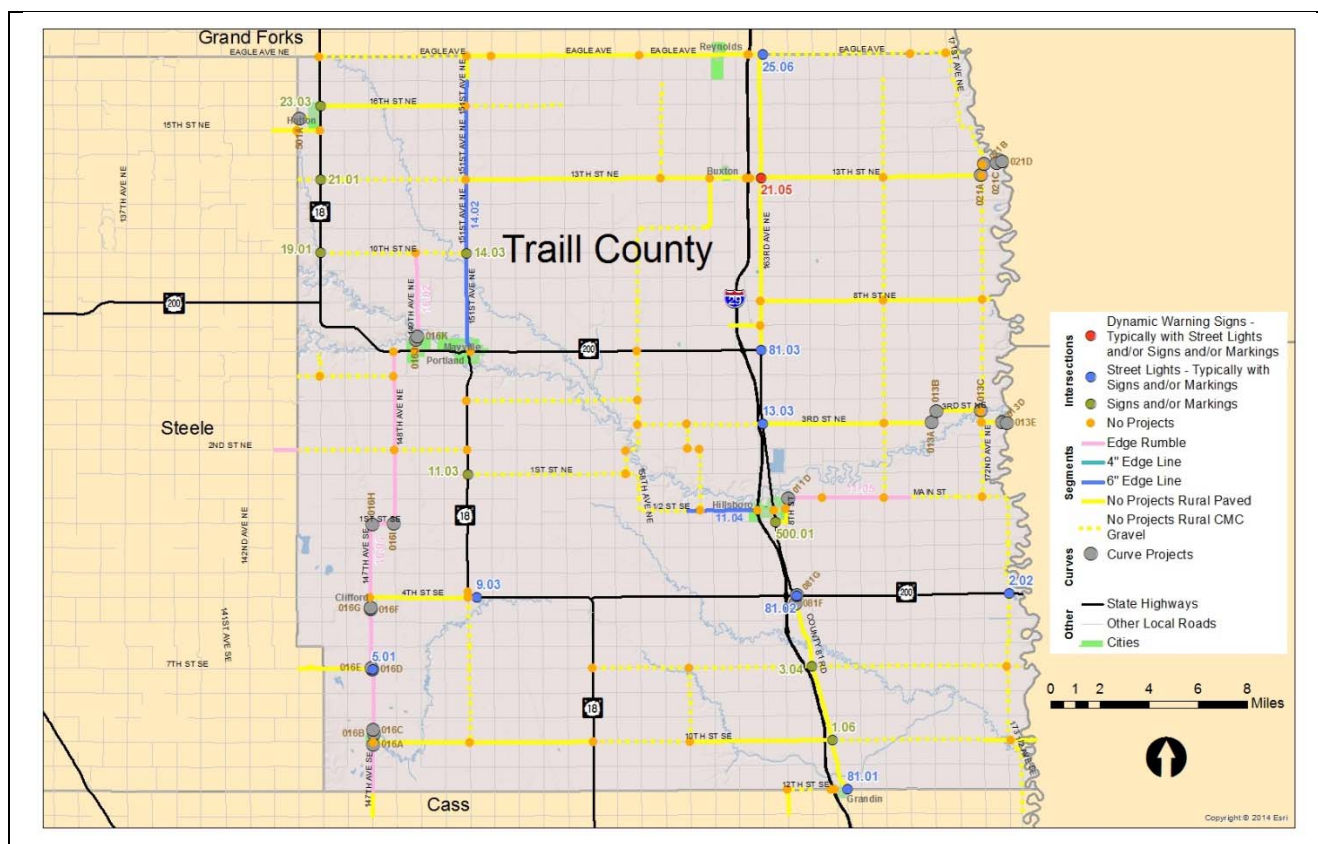


FIGURE 4-20
Trail Project Locations Map

23 USC 409
NDDOT Reserves All Objections

APPENDIX
Barnes County

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23 USC 409
NDDOT Reserves All Objections

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23 USC 409
NDDOT Reserves All Objections

APPENDIX
Eddy County

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23 USC 409
NDDOT Reserves All Objections

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23 USC 409
NDDOT Reserves All Objections

APPENDIX
Griggs County

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23 USC 409
NDDOT Reserves All Objections

APPENDIX
Ransom County

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23 USC 409
NDDOT Reserves All Objections

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23 USC 409
NDDOT Reserves All Objections

City of Wahpeton
Urban Segment Listing

23 USC 409
NDDOT Reserves All Objections

Seg #	Sys	Local Name	Start	End	Length	ADT	Multi-Lane	Access Density	Major Speed Limit	Total Severe Rear End / Sideswipe / Head On Crash	Crash Cost
13.01	ND 13	Dakota Ave	180th Ave	11th St S (ND 127)	2.3	5,044	Yes	3.09	45	0	\$ 870,000
13.02	ND 13	Dakota Ave	11th St S (ND 127)	6th St S	0.7	9,158	Yes	38.47	25	0	\$ 1,209,000
13.03	ND 13	Dakota Ave	6th St S	2nd St S	0.6	10,098	Yes	15.85	25	0	\$ 1,435,000
13.04	ND 13	Dakota Ave	2nd St S	East border of Richland/ND	0.3	11,940	Yes	28.20	25	0	\$ 275,000
127.01	ND 127	11th St S	11th Ave S	Dakota Ave	0.7	2,887	No	30.36	45	0	\$ 307,000
210.01	ND 210	Bypass Rd	Dakota Ave (ND 13)	78th St/16th Ave N (Richland 10)	1.2	2,500	No	6.82	45	0	\$ 662,000
210.02	ND 210	Bypass Rd	78th St/16th Ave N (Richland 10)	East border of Richland/ND	2.0	4,955	No	6.61	45	2	\$ 2,304,000
506.01	No designation	78th St SE	181st Ave SE	Bypass Rd (ND 210)	0.3	3,995	No	11.92	55	0	\$ 103,000
801.01	No designation	11th Ave S	11th St S (ND 127)	Center St S	0.8	543	No	39.71	25	0	\$ 24,000
802.01	No designation	4th Ave S	11th St S (ND 127)	4th St S	0.5	1,295	No	82.07	25	0	\$ 194,000
803.01	No designation	2nd Ave N	11th St N	1st St N	0.7	3,212	No	66.38	25	0	\$ 1,040,000
804.01	No designation	8th Ave N	11th St S (Richland 10)	4th St N	0.5	1,498	No	101.32	25	0	\$ 304,000
804.02	No designation	7th Ave N	4th St N	2nd St N	0.1	655	No	86.15	25	0	\$ 151,000
805.01	No designation	16th Ave	Bypass Rd (ND 210)	4th St N	1.0	2,495	No	39.25	25	0	\$ 426,000
806.01	No designation	11th St (Richland 10)	Dakota Ave	Bypass Rd (ND 210)	1.8	3,752	No	43.76	25	0	\$ 1,717,000
807.01	No designation	9th St N	Dakota Ave	2nd Ave N	0.1	1,050	No	100.33	25	0	\$ 91,000
808.01	No designation	8th St N	Dakota Ave	2nd Ave N	0.1	490	No	114.69	25	0	\$ 136,000
809.01	No designation	6th St S	11th Ave S	2nd Ave N	0.8	1,400	No	71.20	25	0	\$ 393,000
809.02	No designation	7th St N	Dakota Ave	16th Ave N	1.3	2,327	No	74.03	25	0	\$ 1,057,000
809.03	No designation	9th St N (Richland 87)	16th Ave N	25th Ave N (Richland 87W)	1.0	2,100	No	50.99	25	0	\$ 196,000
810.01	No designation	4th St	4th Ave S	Bypass Rd (ND 210)	2.0	3,489	No	70.35	25	0	\$ 1,096,000
811.01	No designation	3rd St N	Dakota Ave	2nd Ave N	0.1	755	No	85.38	25	0	\$ 91,000
812.01	No designation	Center Ave/2nd St	11th Ave S	7th Ave N	1.2	1,362	No	75.90	25	0	\$ 1,006,000
813.01	No designation	1st St N	Dakota Ave	2nd Ave N	0.1	900	No	129.54	25	0	\$ 12,000

19.9

	Min	Max
ADT	6000	5000000
Multi-Lane	Yes	
Access Density	30	5000
Major Speed Limit	0	40

City of Wahpeton
Urban Segment Prioritization

23 USC 409
NDDOT Reserves All Objections

Rank	Seg #	Sys	Local Name	Start	End	Length	ADT	Multi-Lane	Access Density	Speed Limit	Severe Rear End Sideswipe or Head-on Crash	Priority	Tiebreakers	
													Crash Cost	Access Density
1	13.02	ND 13	Dakota Ave	11th St S (ND 127)	6th St S	0.7	★	★	★	★		★★★★	\$ 1,209,000	38.5
2	13.03	ND 13	Dakota Ave	6th St S	2nd St S	0.6	★	★		★		★★★	\$ 1,435,000	15.9
3	13.04	ND 13	Dakota Ave	2nd St S	East border of Richland/ND	0.3	★	★		★		★★★	\$ 275,000	28.2
4	806.01	No designation	11th St (Richland 10)	Dakota Ave	Bypass Rd (ND 210)	1.8			★	★		★★	\$ 1,717,000	43.8
5	810.01	No designation	4th St	4th Ave S	Bypass Rd (ND 210)	2.0			★	★		★★	\$ 1,096,000	70.3
6	809.02	No designation	7th St N	Dakota Ave	16th Ave N	1.3			★	★		★★	\$ 1,057,000	74.0
7	803.01	No designation	2nd Ave N	11th St N	1st St N	0.7			★	★		★★	\$ 1,040,000	66.4
8	812.01	No designation	Center Ave/2nd St	11th Ave S	7th Ave N	1.2			★	★		★★	\$ 1,006,000	75.9
9	805.01	No designation	16th Ave	Bypass Rd (ND 210)	4th St N	1.0			★	★		★★	\$ 426,000	39.2
10	809.01	No designation	6th St S	11th Ave S	2nd Ave N	0.8			★	★		★★	\$ 393,000	71.2
11	804.01	No designation	8th Ave N	11th St S (Richland 10)	4th St N	0.5			★	★		★★	\$ 304,000	101.3
12	809.03	No designation	9th St N (Richland 87)	16th Ave N	25th Ave N (Richland 87W)	1.0			★	★		★★	\$ 196,000	51.0
13	802.01	No designation	4th Ave S	11th St S (ND 127)	4th St S	0.5			★	★		★★	\$ 194,000	82.1
14	804.02	No designation	7th Ave N	4th St N	2nd St N	0.1			★	★		★★	\$ 151,000	86.1
15	808.01	No designation	8th St N	Dakota Ave	2nd Ave N	0.1			★	★		★★	\$ 136,000	114.7
16	807.01	No designation	9th St N	Dakota Ave	2nd Ave N	0.1			★	★		★★	\$ 91,000	100.3
17	811.01	No designation	3rd St N	Dakota Ave	2nd Ave N	0.1			★	★		★★	\$ 91,000	85.4
18	801.01	No designation	11th Ave S	11th St S (ND 127)	Center St S	0.8			★	★		★★	\$ 24,000	39.7
19	813.01	No designation	1st St N	Dakota Ave	2nd Ave N	0.1			★	★		★★	\$ 12,000	129.5
20	210.02	ND 210	Bypass Rd	78th St/16th Ave N (Richland 10)	East border of Richland/ND	2.0					★	★	\$ 2,304,000	6.6
21	13.01	ND 13	Dakota Ave	180th Ave	11th St S (ND 127)	2.3		★				★	\$ 870,000	3.1
22	127.01	ND 127	11th St S	11th Ave S	Dakota Ave	0.7			★			★	\$ 307,000	30.4
23	210.01	ND 210	Bypass Rd	Dakota Ave (ND 13)	78th St/16th Ave N (Richland 10)	1.2							\$ 662,000	6.8
24	506.01	No designation	78th St SE	181st Ave SE	Bypass Rd (ND 210)	0.3							\$ 103,000	11.9

Totals				Total Stars --	3	4	18	19	1
				% That Gets Star --	13%	17%	75%	79%	4%
	#	%	Miles	%					
★★★★★	0	0%	0.0	0%					
★★★★	0	0%	0.0	0%					
★★★	1	4%	0.7	4%					
★★	2	8%	0.9	4%					
★	16	67%	11.9	60%					
-	3	13%	4.9	25%					
	2	8%	1.5	8%					
	24	100%	19.9	100%					

Stars

- If segment has a major entering ADT greater than or equal to 6000 vpd.
- If segment has lanes greater than or equal to 4.
- If segment has an access density > 30.
- If segment has a speed less than or equal to 40 mph.
- If segment has at least 1 severe rear end or sideswipe or head on crash.

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Agency Name: City of Wahpeton
Contact Name: Dennis Miranowski
Email Address: dennism@wahpeton.com

ND DOT District: 8
Telephone Number: 701-642-6565

Location Description

Describe Current Safety Issues & Systemic Ranking Review

5 years

	Value	Critical	Star Ranking
ADT:	3,752	$\geq 10,000$	
Major Approach Lanes:	2	≥ 4	
Access Density:	44	≥ 30	★
Speed Limit:	25	≤ 40	★
Severe Rear End / Sideswipe / Head On Crashes:	0	≥ 1	
			★★

Description	Type	Cost per mi / #	Mileage / #	Cost	Notes - Being converted to 3-lane from
3-Lane Conversion	Proactive	\$30,000	1.0	\$31,011	8th Ave to 16th Ave in summer of 2014,
5-Lane Conversion	Proactive	\$42,000	0.0	\$0	convert North and South of this section
Signal Revisions	Proactive	\$30,000	0	\$0	
	Consider Access Management in the Future			Yes	

Proposed Year of Construction

NDDOT Central Office Only

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

7th St N from Dakota Ave to 16th Ave N Project**Agency Name:** City of Wahpeton**ND DOT District:** 8**Contact Name:** Dennis Miranowski**Telephone Number:** 701-642-6565**Email Address:** dennism@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Number: 809.02 ADT: 2327
Local Road Name: 7th St N Lanes: 2
Start: Dakota Ave Access Density: 74
End: 16th Ave N Speed Limit: 25
City/Rural: Urban Length (miles): 1.283264828
County: Ramsey

SHSP Emphasis Area (check all that apply)

- ☐ Reduce Alcohol Impaired Driving
☐ Increase the Use of Safety Restraints for all Occupants
☐ Younger Driver/Older Driver Safety
☐ Curb Aggressive Driving
☐ Improvements to Address Lane Departure Crashes
☐ Enhancing Emergency Medical Capabilities to Increase
☒ Improve Intersection Safety

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Crashes	K+A
Rear End	0
Sideswipe Passing	0
Head On	0
Sideswipe Opposing	0
	0

	Value	Critical	Star Ranking
ADT:	2,327	≥ 10,000	
Major Approach Lanes:	2	≥ 4	
Access Density:	74	≥ 30	★
Speed Limit:	25	≤ 40	★
Severe Rear End / Sideswipe / Head On Crashes:	0	≥ 1	
			★★

Describe Proposed Safety Improvements

Description	Type	Cost per mi / #	Mileage / #	Cost	Notes - Do not convert South of 8th Ave - inadequate room
3-Lane Conversion	Proactive	\$30,000	0.8	\$23,099	
5-Lane Conversion	Proactive	\$42,000	0.0	\$0	
Signal Revisions	Proactive	\$30,000	0	\$0	
Consider Access Management in the Future				Yes	

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds \$20,789
Local Match (10% of Total project cost) \$2,310
Total Project Cost \$23,099

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

2nd Ave N from 11th St N to 1st St N Project**Agency Name:** City of Wahpeton**ND DOT District:** 8**Contact Name:** Dennis Miranowski**Telephone Number:** 701-642-6565**Email Address:** dennism@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Number: 803.01 ADT: 3212
Local Road Name: 2nd Ave N Lanes: 2
Start: 11th St N Access Density: 66
End: 1st St N Speed Limit: 25
City/Rural: Urban Length (miles): 0.708081458
County: Ramsey

SHSP Emphasis Area (check all that apply)

- ☐ Reduce Alcohol Impaired Driving
☐ Increase the Use of Safety Restraints for all Occupants
☐ Younger Driver/Older Driver Safety
☐ Curb Aggressive Driving
☐ Improvements to Address Lane Departure Crashes
☐ Enhancing Emergency Medical Capabilities to Increase
☒ Improve Intersection Safety

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Crashes	K+A
Rear End	0
Sideswipe Passing	0
Head On	0
Sideswipe Opposing	0
	0

	Value	Critical	Star Ranking
ADT:	3,212	$\geq 10,000$	
Major Approach Lanes:	2	≥ 4	
Access Density:	66	≥ 30	★
Speed Limit:	25	≤ 40	★
Severe Rear End / Sideswipe / Head On Crashes:	0	≥ 1	
			★★

Describe Proposed Safety Improvements

Description	Type	Cost per mi / #	Mileage / #	Cost	Notes -
3-Lane Conversion	Proactive	\$30,000	0.7	\$21,242	
5-Lane Conversion	Proactive	\$42,000	0.0	\$0	
Signal Revisions	Proactive	\$30,000	0	\$0	
Consider Access Management in the Future				Yes	

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds \$19,118
Local Match (10% of Total project cost) \$2,124
Total Project Cost \$21,242

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

16th Ave from Bypass Rd (ND 210) to 4th St N Project**Agency Name:** City of Wahpeton**ND DOT District:** 8**Contact Name:** Dennis Miranowski**Telephone Number:** 701-642-6565**Email Address:** dennism@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Number: 805.01 ADT: 2495
Local Road Name: 16th Ave Lanes: 2
Start: Bypass Rd (ND 210) Access Density: 39
End: 4th St N Speed Limit: 25
City/Rural: Urban Length (miles): 0.968209241
County: Ramsey

SHSP Emphasis Area (check all that apply)

- ☐ Reduce Alcohol Impaired Driving
☐ Increase the Use of Safety Restraints for all Occupants
☐ Younger Driver/Older Driver Safety
☐ Curb Aggressive Driving
☐ Improvements to Address Lane Departure Crashes
☐ Enhancing Emergency Medical Capabilities to Increase
☒ Improve Intersection Safety

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Crashes	K+A
Rear End	0
Sideswipe Passing	0
Head On	0
Sideswipe Opposing	0
	0

	Value	Critical	Star Ranking
ADT:	2,495	$\geq 10,000$	
Major Approach Lanes:	2	≥ 4	
Access Density:	39	≥ 30	★
Speed Limit:	25	≤ 40	★
Severe Rear End / Sideswipe / Head On Crashes:	0	≥ 1	
			★★

Describe Proposed Safety Improvements

Description	Type	Cost per mi / #	Mileage / #	Cost	Notes - Being reconstructed, converting to 3-lane West of 11th St in 2016.
3-Lane Conversion	Proactive	\$30,000	0.5	\$14,523	
5-Lane Conversion	Proactive	\$42,000	0.0	\$0	
Signal Revisions	Proactive	\$30,000	0	\$0	
Consider Access Management in the Future				Yes	

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds \$13,071
Local Match (10% of Total project cost) \$1,452
Total Project Cost \$14,523

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

6th St S from 11th Ave S to 2nd Ave N Project**Agency Name:** City of Wahpeton**ND DOT District:** 8**Contact Name:** Dennis Miranowski**Telephone Number:** 701-642-6565**Email Address:** dennism@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Number: 809.01 ADT: 1400
Local Road Name: 6th St S Lanes: 2
Start: 11th Ave S Access Density: 71
End: 2nd Ave N Speed Limit: 25
City/Rural: Urban Length (miles): 0.758398568
County: Ramsey

SHSP Emphasis Area (check all that apply)

- ☐ Reduce Alcohol Impaired Driving
☐ Increase the Use of Safety Restraints for all Occupants
☐ Younger Driver/Older Driver Safety
☐ Curb Aggressive Driving
☐ Improvements to Address Lane Departure Crashes
☐ Enhancing Emergency Medical Capabilities to Increase
☒ Improve Intersection Safety

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Crashes	K+A
Rear End	0
Sideswipe Passing	0
Head On	0
Sideswipe Opposing	0
	0

	Value	Critical	Star Ranking
ADT:	1,400	$\geq 10,000$	
Major Approach Lanes:	2	≥ 4	
Access Density:	71	≥ 30	★
Speed Limit:	25	≤ 40	★
Severe Rear End / Sideswipe / Head On Crashes:	0	≥ 1	
			★★

Describe Proposed Safety Improvements

Description	Type	Cost per mi / #	Mileage / #	Cost	Notes - Appears to be 3-lane North of Fargo Ave - no conversion necessary
3-Lane Conversion	Proactive	\$30,000	0.6	\$19,339	
5-Lane Conversion	Proactive	\$42,000	0.0	\$0	
Signal Revisions	Proactive	\$30,000	0	\$0	
Consider Access Management in the Future				Yes	

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds \$17,405
Local Match (10% of Total project cost) \$1,934
Total Project Cost \$19,339

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATIONNorth Dakota Department of Transportation Programming
SFN 59959 (06-2011)**8th Ave N from 11th St S (Richland 10) to 4th St N Project**

Agency Name: City of Wahpeton

ND DOT District: 8

Contact Name: Dennis Miranowski

Telephone Number: 701-642-6565

Email Address: dennism@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Number: 804.01	ADT: 1498
Local Road Name: 8th Ave N	Lanes: 2
Start: 11th St S (Richland 10)	Access Density: 101
End: 4th St N	Speed Limit: 25
City/Rural: Urban	Length (miles): 0.493495662
County: Ramsey	

SHSP Emphasis Area (check all that apply)

- ☐ Reduce Alcohol Impaired Driving
☐ Increase the Use of Safety Restraints for all Occupants
☐ Younger Driver/Older Driver Safety
☐ Curb Aggressive Driving
☐ Improvements to Address Lane Departure Crashes
☐ Enhancing Emergency Medical Capabilities to Increase
☒ Improve Intersection Safety

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Crashes	K+A
Rear End	0
Sideswipe Passing	0
Head On	0
Sideswipe Opposing	0
	0

	Value	Critical	Star Ranking
ADT:	1,498	$\geq 10,000$	
Major Approach Lanes:	2	≥ 4	
Access Density:	101	≥ 30	★
Speed Limit:	25	≤ 40	★
Severe Rear End / Sideswipe / Head On Crashes:	0	≥ 1	
			★★

Describe Proposed Safety Improvements

Description	Type	Cost per mi / #	Mileage / #	Cost	Notes -
3-Lane Conversion	Proactive	\$30,000	0.5	\$14,805	
5-Lane Conversion	Proactive	\$42,000	0.0	\$0	
Signal Revisions	Proactive	\$30,000	0	\$0	
Consider Access Management in the Future				Yes	

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$13,324
Local Match (10% of Total project cost)	\$1,480
Total Project Cost	\$14,805

NDDOT Central Office OnlyProject Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Agency Name: City of Wahpeton
Contact Name: Dennis Miranowski
Email Address: dennism@wahpeton.com

ND DOT District: 8
Telephone Number: 701-642-6565

Location Description

Number: 809.03 Local Road Name: 9th St N (Richland 87) Start: 16th Ave N End: 25th Ave N (Richland 87) City/Rural: Urban County: Ramsey	ADT: 2100 Lanes: 2 Access Density 51 Speed Limit: 25 Length (miles): 1.000286407	SHSP Emphasis Area (check all that apply) ☐ Reduce Alcohol Impaired Driving ☐ Increase the Use of Safety Restraints for all Occupants ☐ Younger Driver/Older Driver Safety ☐ Curb Aggressive Driving ☐ Improvements to Address Lane Departure Crashes ☐ Enhancing Emergency Medical Capabilities to Increase ☒ Improve Intersection Safety
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North Dakota Crashes, 2008 - 2012

5 years

Crashes	K+A
Rear End	0
Sideswipe Passing	0
Head On	0
Sideswipe Opposing	0
	0

	Value	Critical	Star Ranking
ADT:	2,100	$\geq 10,000$	
Major Approach Lanes:	2	≥ 4	
Access Density:	51	≥ 30	★
Speed Limit:	25	≤ 40	★
Severe Rear End / Sideswipe / Head On Crashes:	0	≥ 1	
			★★

Description	Type	Cost per mi / #	Mileage / #	Cost	Notes -
3-Lane Conversion	Proactive	\$30,000	1.0	\$30,009	
5-Lane Conversion	Proactive	\$42,000	0.0	\$0	
Signal Revisions	Proactive	\$30,000	0	\$0	
		Consider Access Management in the Future		Yes	

Proposed Year of Construction

Federal Funds	\$27,008
Local Match (10% of Total project cost)	\$3,001
Total Project Cost	\$30,009

Project Accepted?	☐ Yes ☐ No	Reference Number	ID Number
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Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

4th Ave S from 11th St S (ND 127) to 4th St S Project**Agency Name:** City of Wahpeton**ND DOT District:** 8**Contact Name:** Dennis Miranowski**Telephone Number:** 701-642-6565**Email Address:** dennism@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Number: 802.01 ADT: 1295
Local Road Name: 4th Ave S Lanes: 2
Start: 11th St S (ND 127) Access Density: 82
End: 4th St S Speed Limit: 25
City/Rural: Urban Length (miles): 0.499576343
County: Ramsey

SHSP Emphasis Area (check all that apply)

- ☐ Reduce Alcohol Impaired Driving
☐ Increase the Use of Safety Restraints for all Occupants
☐ Younger Driver/Older Driver Safety
☐ Curb Aggressive Driving
☐ Improvements to Address Lane Departure Crashes
☐ Enhancing Emergency Medical Capabilities to Increase
☒ Improve Intersection Safety

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Crashes	K+A
Rear End	0
Sideswipe Passing	0
Head On	0
Sideswipe Opposing	0
	0

	Value	Critical	Star Ranking
ADT:	1,295	≥ 10,000	
Major Approach Lanes:	2	≥ 4	
Access Density:	82	≥ 30	★
Speed Limit:	25	≤ 40	★
Severe Rear End / Sideswipe / Head On Crashes:	0	≥ 1	
			★★

Describe Proposed Safety Improvements

Description	Type	Cost per mi / #	Mileage / #	Cost	Notes - Do not convert East of 6th St - unnecessary
3-Lane Conversion	Proactive	\$30,000	0.3	\$10,491	
5-Lane Conversion	Proactive	\$42,000	0.0	\$0	
Signal Revisions	Proactive	\$30,000	0	\$0	
Consider Access Management in the Future				Yes	

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds \$9,442
Local Match (10% of Total project cost) \$1,049
Total Project Cost \$10,491

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Email Address: dennism@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Number: 801.01 Local Road Name: 11th Ave S Start: 11th St S (ND 127) End: Center St S City/Rural: Urban County: Ramsey	ADT: 543 Lanes: 2 Access Density 40 Speed Limit: 25 Length (miles): 0.755398445	SHSP Emphasis Area (check all that apply) ☐ Reduce Alcohol Impaired Driving ☐ Increase the Use of Safety Restraints for all Occupants ☐ Younger Driver/Older Driver Safety ☐ Curb Aggressive Driving ☐ Improvements to Address Lane Departure Crashes ☐ Enhancing Emergency Medical Capabilities to Increase ☒ Improve Intersection Safety
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North Dakota Crashes, 2008 - 2012	5 years
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Crashes	K+A
Rear End	0
Sideswipe Passing	0
Head On	0
Sideswipe Opposing	0
	0

	Value	Critical	Star Ranking
ADT:	543	$\geq 10,000$	
Major Approach Lanes:	2	≥ 4	
Access Density:	40	≥ 30	★
Speed Limit:	25	≤ 40	★
Severe Rear End / Sideswipe / Head On Crashes:	0	≥ 1	
			★★

Description	Type	Cost per mi / #	Mileage / #	Cost	Notes - Do not convert West of 6th St - inadequate room
3-Lane Conversion	Proactive	\$30,000	0.4	\$11,331	
5-Lane Conversion	Proactive	\$42,000	0.0	\$0	
Signal Revisions	Proactive	\$30,000	0	\$0	
		Consider Access Management in the Future		Yes	

Proposed Year of Construction

Federal Funds	\$10,198
Local Match (10% of Total project cost)	\$1,133
Total Project Cost	\$11,331

Project Accepted?	☐ Yes ☐ No	Reference Number	ID Number
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Notes

City of Wahpeton Right Angle Project Summary

Segment #	Local Name	Cross Street	Projects		Project Cost
			Access Management	Confirmation Lights	
13.01	ND 13	11th St S/N	0	1	\$ 1,200
13.02	Dakota Ave	9th St N	1	0	\$ 253,200
	Dakota Ave	8th St S/N	1	0	
	Dakota Ave	7th St S/N	1	0	
	Dakota Ave	6th St S/N	0	1	
13.03	Dakota Ave	4th St S/N	0	1	\$ 2,400
	Dakota Ave	3rd St S/N	0	0	
	Dakota Ave	2nd St S/N	0	1	
13.04	Dakota Ave	1st St S/N	1	0	\$ 115,200
210.01	ND 210	16th Ave N	0	1	\$ 1,200
210.02	Bypass Rd	11th St N	0	0	\$ 1,200
	Bypass Rd	9th St N/Red River Rd	0	1	
	Bypass Rd	4th St N	0	0	

23 USC 409
NDDOT Reserves All Objections

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Right Angle Crashes @ Signals Intersection Improvements

Intersections on Dakota Ave from 180th Ave to 11th St S (ND 127)

Agency Name: City of Wahpeton
Contact Name: Dennis Miranowski
Email Address: dennis@wahpeton.com

ND DOT District: 8
Telephone Number: 701-642-6565

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Corridor 13.01
Street Name Dakota Ave
Urban/Rural: Urban
County: Richland
Length 2.3

- SHSP Emphasis Area (check all that apply)
- ☐ Reduce Alcohol Impaired Driving
 - ☐ Increase the Use of Safety Restraints for all Occupants
 - ☐ Younger Driver/Older Driver Safety
 - ☐ Curb Aggressive Driving
 - ☐ Improvements to Address Lane Departure Crashes
 - ☐ Enhancing Emergency Medical Capabilities to Increase
 - ☒ Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Config	Traffic Control	Entering ADT	Major Config	Severe Crashes	Severe RA Crashes	Confirmation Lights	Notes
13.01	ND 13	11th St S/N	X	Signal	11,905	Undivided	0	0	1	None

Describe Current Safety Issues & Systemic Ranking Review

Intersection Criteria		North Dakota Crashes, 2008 - 2012		5 years	
		Description	Unit Cost	Quantity	Total Cost
Traffic Control Device	Signal	Confirmation Lights	\$1,200 per intersection	1	\$1,200
Entering ADT	> 18000	Unsignalized and Divided Access Management	\$360,000 per mile	0.0	\$0
Road Geometry	Divided	*Corridor includes miles of divided roadway.			\$1,200
Severe Crashes	> 0				

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$1,080
Local Match (10% of Total project cost)	\$120
Total Project Cost	\$1,200

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Right Angle Crashes @ Signals Intersection Improvements

Intersections on Dakota Ave from 11th St S (ND 127) to 6th St S

Agency Name: City of Wahpeton

ND DOT District: 8

Contact Name: Dennis Miranowski

Telephone Number: 701-642-6565

Email Address: dennis@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Corridor 13.02
Street Name Dakota Ave
Urban/Rural: Urban
County: Richland
Length 0.7

- SHSP Emphasis Area (check all that apply)
- ☐ Reduce Alcohol Impaired Driving
 - ☐ Increase the Use of Safety Restraints for all Occupants
 - ☐ Younger Driver/Older Driver Safety
 - ☐ Curb Aggressive Driving
 - ☐ Improvements to Address Lane Departure Crashes
 - ☐ Enhancing Emergency Medical Capabilities to Increase
 - ☒ Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Config	Traffic Control	Entering ADT	Major Config	Severe Crashes	Severe RA Crashes	Confirmation Lights	Notes
13.02	Dakota Ave	9th St N	X	Thru-STOP	9,545	Undivided	0	0	0	None
13.03	Dakota Ave	8th St S/N	X	Thru-STOP	9,573	Undivided	0	0	0	None
13.04	Dakota Ave	7th St S/N	X	Thru-STOP	9,935	Undivided	0	0	0	None
13.05	Dakota Ave	6th St S/N	X	Signal	11,680	Undivided	0	0	1	None

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Intersection Criteria		Description	Unit Cost	Quantity	Total Cost
Traffic Control Device	Signal	Confirmation Lights	\$1,200 per intersection	1	\$1,200
Entering ADT	> 18000	Unsignalized and Divided Access Management	\$360,000 per mile	0.7	\$252,000
Road Geometry	Divided	*Corridor includes 0.7 miles of divided roadway.			\$253,200
Severe Crashes	> 0				

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds \$227,880
Local Match (10% of Total project cost) \$25,320
Total Project Cost **\$253,200**

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Right Angle Crashes @ Signals Intersection Improvements

Intersections on Dakota Ave from 6th St S to 2nd St S

Agency Name: City of Wahpeton
Contact Name: Dennis Miranowski
Email Address: dennis@wahpeton.com

ND DOT District: 8
Telephone Number: 701-642-6565

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Corridor 13.03
Street Name Dakota Ave
Urban/Rural: Urban
County: Richland
Length 0.6

- SHSP Emphasis Area (check all that apply)
- ☐ Reduce Alcohol Impaired Driving
 - ☐ Increase the Use of Safety Restraints for all Occupants
 - ☐ Younger Driver/Older Driver Safety
 - ☐ Curb Aggressive Driving
 - ☐ Improvements to Address Lane Departure Crashes
 - ☐ Enhancing Emergency Medical Capabilities to Increase
 - ☒ Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Config	Traffic Control	Entering ADT	Major Config	Severe Crashes	Severe RA Crashes	Confirmation Lights	Notes
13.06	Dakota Ave	4th St S/N	X	Signal	12,708	Undivided	0	0	1	None
13.07	Dakota Ave	3rd St S/N	X	Thru-STOP	11,175	Undivided	0	0	0	None
13.08	Dakota Ave	2nd St S/N	X	Signal	14,028	Undivided	1	1	1	None

Describe Current Safety Issues & Systemic Ranking Review

Intersection Criteria		North Dakota Crashes, 2008 - 2012		5 years	
Traffic Control Device	Signal	Description	Unit Cost	Quantity	Total Cost
Entering ADT	> 18000	Confirmation Lights	\$1,200 per intersection	2	\$2,400
Road Geometry	Divided	Unsignalized and Divided Access Management	\$360,000 per mile	0.0	\$0
Severe Crashes	> 0	*Corridor includes miles of divided roadway.			\$2,400

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$2,160
Local Match (10% of Total project cost)	\$240
Total Project Cost	\$2,400

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Right Angle Crashes @ Signals Intersection Improvements

Intersections on Dakota Ave from 2nd St S to East border of Richland/ND

Agency Name: City of Wahpeton
Contact Name: Dennis Miranowski
Email Address: dennis@wahpeton.com

ND DOT District: 8
Telephone Number: 701-642-6565

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Corridor 13.04
Street Name Dakota Ave
Urban/Rural: Urban
County: Richland
Length 0.3

- SHSP Emphasis Area (check all that apply)
- ☐ Reduce Alcohol Impaired Driving
 - ☐ Increase the Use of Safety Restraints for all Occupants
 - ☐ Younger Driver/Older Driver Safety
 - ☐ Curb Aggressive Driving
 - ☐ Improvements to Address Lane Departure Crashes
 - ☐ Enhancing Emergency Medical Capabilities to Increase
 - ☒ Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Config	Traffic Control	Entering ADT	Major Config	Severe Crashes	Severe RA Crashes	Confirmation Lights	Notes
13.09	Dakota Ave	1st St S/N	X	Thru-STOP	12,675	Undivided	0	0	0	None

Describe Current Safety Issues & Systemic Ranking Review

Intersection Criteria		North Dakota Crashes, 2008 - 2012		5 years	
Traffic Control Device	Signal	Description	Unit Cost	Quantity	Total Cost
Entering ADT	> 18000	Confirmation Lights	\$1,200 per intersection	0	\$0
Road Geometry	Divided	Unsignalized and Divided Access Management	\$360,000 per mile	0.3	\$115,200
Severe Crashes	> 0	*Corridor includes 0.32 miles of divided roadway.			\$115,200

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$103,680
Local Match (10% of Total project cost)	\$11,520
Total Project Cost	\$115,200

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Right Angle Crashes @ Signals Intersection Improvements

Intersections on Bypass Rd from Dakota Ave (ND 13) to 78th St/16th Ave N (Richland 10)

Agency Name: City of Wahpeton

ND DOT District: 8

Contact Name: Dennis Miranowski

Telephone Number: 701-642-6565

Email Address: dennism@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Corridor 210.01
Street Name Bypass Rd
Urban/Rural: Urban
County: Richland
Length 1.2

- SHSP Emphasis Area (check all that apply)
- ☐ Reduce Alcohol Impaired Driving
 - ☐ Increase the Use of Safety Restraints for all Occupants
 - ☐ Younger Driver/Older Driver Safety
 - ☐ Curb Aggressive Driving
 - ☐ Improvements to Address Lane Departure Crashes
 - ☐ Enhancing Emergency Medical Capabilities to Increase
 - ☒ Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Config	Traffic Control	Entering ADT	Major Config	Severe Crashes	Severe RA Crashes	Confirmation Lights	Notes
210.01	ND 210	16th Ave N	X	Signal	7,145	Undivided	2	1	1	None

Describe Current Safety Issues & Systemic Ranking Review

Intersection Criteria		North Dakota Crashes, 2008 - 2012		5 years	
Traffic Control Device	Signal	Description	Unit Cost	Quantity	Total Cost
Entering ADT	> 18000	Confirmation Lights	\$1,200 per intersection	1	\$1,200
Road Geometry	Divided	Unsignalized and Divided Access Management	\$360,000 per mile	0.0	\$0
Severe Crashes	> 0	*Corridor includes miles of divided roadway.			\$1,200

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$1,080
Local Match (10% of Total project cost)	\$120
Total Project Cost	\$1,200

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATION

North Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Right Angle Crashes @ Signals Intersection Improvements

Intersections on Bypass Rd from 78th St/16th Ave N (Richland 10) to East border of Richland/ND

Agency Name: City of Wahpeton

ND DOT District: 8

Contact Name: Dennis Miranowski

Telephone Number: 701-642-6565

Email Address: dennism@wahpeton.com

Please attach a location map(s). You may use additional sheets to further describe your project.

Location Description

Corridor 210.02
Street Name Bypass Rd
Urban/Rural: Urban
County: Richland
Length 2.0

- SHSP Emphasis Area (check all that apply)
- ☐ Reduce Alcohol Impaired Driving
 - ☐ Increase the Use of Safety Restraints for all Occupants
 - ☐ Younger Driver/Older Driver Safety
 - ☐ Curb Aggressive Driving
 - ☐ Improvements to Address Lane Departure Crashes
 - ☐ Enhancing Emergency Medical Capabilities to Increase
 - ☒ Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Config	Traffic Control	Entering ADT	Major Config	Severe Crashes	Severe RA Crashes	Confirmation Lights	Notes
210.02	Bypass Rd	11th St N	X	Thru-STOP	4,735	Undivided	0	0	0	Already has adequate access management
210.03	Bypass Rd	9th St N/Red River Rd	X	Signal	7,990	Undivided	0	0	1	None
210.04	Bypass Rd	4th St N	X	Thru-STOP	7,127	Undivided	1	1	0	Already has adequate access management

Describe Current Safety Issues & Systemic Ranking Review

Intersection Criteria		North Dakota Crashes, 2008 - 2012		5 years	
Traffic Control Device	Signal	Description	Unit Cost	Quantity	Total Cost
Entering ADT	> 18000	Confirmation Lights	\$1,200 per intersection	1	\$1,200
Road Geometry	Divided	Unsignalized and Divided Access Management	\$360,000 per mile	0.0	\$0
Severe Crashes	> 0	*Corridor includes miles of divided roadway.			\$1,200

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$1,080
Local Match (10% of Total project cost)	\$120
Total Project Cost	\$1,200

NDDOT Central Office Only

Project Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

City of Wahpeton Ped/Bike Project Summary

Projects							
Segment #	Local Name	Cross Street	Advanced Walk	Countdown Timers	Curb Extensions	Median Refuge	Intersection Project Cost
13.01	ND 13	11th St S/N	1	1	0	0	\$ 12,000
13.02	Dakota Ave	9th St N	0	0	0	0	\$ -
	Dakota Ave	8th St S/N	0	0	0	0	\$ -
	Dakota Ave	7th St S/N	0	0	0	0	\$ -
	Dakota Ave	6th St S/N	1	1	0	0	\$ 12,000
13.03	Dakota Ave	4th St S/N	1	1	0	0	\$ 12,000
	Dakota Ave	3rd St S/N	0	0	0	0	\$ -
	Dakota Ave	2nd St S/N	1	1	0	0	\$ 12,000
13.04	Dakota Ave	1st St S/N	0	0	1	0	\$ 36,000
210.01	ND 210	16th Ave N	0	0	0	0	\$ -

23 USC 409
NDDOT Reserves All Objections

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATIONNorth Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Pedestrian and Bicycle Intersection Improvements

Intersections on ND 13 from 180th Ave to 11th St S (ND 127)

Agency Name: City of Wahpeton

Contact Name: Dennis Miranowski

Email Address: dennism@wahpeton.com

ND DOT District: 8

Telephone Number: 701-642-6565

Please attach a location map(s). You may use additional sheets to further describe your project.

Location DescriptionCorridor 13.01
Street Name ND 13
Urban/Rural: Urban
County: Richland
Corridor ADT: 5,044

SHSP Emphasis Area (check all that apply)

- ☐
- Reduce Alcohol Impaired Driving
-
- ☐
- Increase the Use of Safety Restraints for all Occupants
-
- ☐
- Younger Driver/Older Driver Safety
-
- ☐
- Curb Aggressive Driving
-
- ☐
- Improvements to Address Lane Departure Crashes
-
- ☐
- Enhancing Emergency Medical Capabilities to Increase
-
- ☒
- Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Traffic Control	Entering ADT	Development / Ped Generator	Total Ped/Bike Crashes	Advanced Walk	Countdown Timers	Curb Extensions	Median Refuge Island	Notes
13.01	ND 13	11th St S/N	Signal	11,905	Yes	0	1	1	0	0	None

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Intersection Criteria		Description	Unit Cost	Quantity	Total Cost
Traffic Control Device	Signal	Advanced Walk	\$0 per intersection	1	\$0
Entering ADT	> 18000	Countdown Timers	\$12,000 per intersection	1	\$12,000
Development / Ped Generator	Yes	Curb Extensions	\$36,000 per corner	0	\$0
Total Ped/Bike Crashes	> 0	Median Refuge Island	\$24,000 per side	0	\$0
					\$12,000

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$10,800
Local Match (10% of Total project cost)	\$1,200
Total Project Cost	\$12,000

NDDOT Central Office OnlyProject Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

Page: 1

Intersection ID: 13.01

Date: 6/12/2014

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NDDOT Reserves All Objections

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATIONNorth Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Pedestrian and Bicycle Intersection Improvements

Intersections on Dakota Ave from 11th St S (ND 127) to 6th St S

Agency Name: City of Wahpeton

Contact Name: Dennis Miranowski

Email Address: dennism@wahpeton.com

ND DOT District: 8

Telephone Number: 701-642-6565

Please attach a location map(s). You may use additional sheets to further describe your project.

Location DescriptionCorridor 13.02
Street Name Dakota Ave
Urban/Rural: Urban
County: Richland
Corridor ADT: 9,158

SHSP Emphasis Area (check all that apply)

- ☐
- Reduce Alcohol Impaired Driving
-
- ☐
- Increase the Use of Safety Restraints for all Occupants
-
- ☐
- Younger Driver/Older Driver Safety
-
- ☐
- Curb Aggressive Driving
-
- ☐
- Improvements to Address Lane Departure Crashes
-
- ☐
- Enhancing Emergency Medical Capabilities to Increase
-
- ☒
- Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Traffic Control	Entering ADT	Development / Ped Generator	Total Ped/Bike Crashes	Advanced Walk	Countdown Timers	Curb Extensions	Median Refuge Island	Notes
13.02	Dakota Ave	9th St N	Thru-STOP	9,545	Yes	1	0	0	0	0	Has maximum # of curb extensions
13.03	Dakota Ave	8th St S/N	Thru-STOP	9,573	Yes	0	0	0	0	0	Has maximum # of curb extensions
13.04	Dakota Ave	7th St S/N	Thru-STOP	9,935	Yes	1	0	0	0	0	Has maximum # of curb extensions
13.05	Dakota Ave	6th St S/N	Signal	11,680	Yes	0	1	1	0	0	None

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Intersection Criteria		Description	Unit Cost	Quantity	Total Cost
Traffic Control Device	Signal	Advanced Walk	\$0 per intersection	1	\$0
Entering ADT	> 18000	Countdown Timers	\$12,000 per intersection	1	\$12,000
Development / Ped Generator	Yes	Curb Extensions	\$36,000 per corner	0	\$0
Total Ped/Bike Crashes	> 0	Median Refuge Island	\$24,000 per side	0	\$0
					\$12,000

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$10,800
Local Match (10% of Total project cost)	\$1,200
Total Project Cost	\$12,000

NDDOT Central Office OnlyProject Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

Page: 2

Intersection ID: 13.02

Date: 6/12/2014

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NDDOT Reserves All Objections

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATIONNorth Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Pedestrian and Bicycle Intersection Improvements

Intersections on Dakota Ave from 6th St S to 2nd St S

Agency Name: City of Wahpeton

Contact Name: Dennis Miranowski

Email Address: dennism@wahpeton.com

ND DOT District: 8

Telephone Number: 701-642-6565

Please attach a location map(s). You may use additional sheets to further describe your project.

Location DescriptionCorridor 13.03
Street Name Dakota Ave
Urban/Rural: Urban
County: Richland
Corridor ADT: 10,098

SHSP Emphasis Area (check all that apply)

- ☐
- Reduce Alcohol Impaired Driving
-
- ☐
- Increase the Use of Safety Restraints for all Occupants
-
- ☐
- Younger Driver/Older Driver Safety
-
- ☐
- Curb Aggressive Driving
-
- ☐
- Improvements to Address Lane Departure Crashes
-
- ☐
- Enhancing Emergency Medical Capabilities to Increase
-
- ☒
- Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Traffic Control	Entering ADT	Development / Ped Generator	Total Ped/Bike Crashes	Advanced Walk	Countdown Timers	Curb Extensions	Median Refuge Island	Notes
13.06	Dakota Ave	4th St S/N	Signal	12,708	Yes	0	1	1	0	0	None
13.07	Dakota Ave	3rd St S/N	Thru-STOP	11,175	Yes	0	0	0	0	0	Has maximum # of curb extensions
13.08	Dakota Ave	2nd St S/N	Signal	14,028	Yes	1	1	1	0	0	None

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Intersection Criteria		Description	Unit Cost	Quantity	Total Cost
Traffic Control Device	Signal	Advanced Walk	\$0 per intersection	2	\$0
Entering ADT	> 18000	Countdown Timers	\$12,000 per intersection	2	\$24,000
Development / Ped Generator	Yes	Curb Extensions	\$36,000 per corner	0	\$0
Total Ped/Bike Crashes	> 0	Median Refuge Island	\$24,000 per side	0	\$0
					\$24,000

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$21,600
Local Match (10% of Total project cost)	\$2,400
Total Project Cost	\$24,000

NDDOT Central Office OnlyProject Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

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Intersection ID: 13.03

Date: 6/12/2014

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NDDOT Reserves All Objections

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT APPLICATIONNorth Dakota Department of Transportation Programming
SFN 59959 (06-2011)

Pedestrian and Bicycle Intersection Improvements

Intersections on Dakota Ave from 2nd St S to East border of Richland/ND

Agency Name: City of Wahpeton

Contact Name: Dennis Miranowski

Email Address: dennism@wahpeton.com

ND DOT District: 8

Telephone Number: 701-642-6565

Please attach a location map(s). You may use additional sheets to further describe your project.

Location DescriptionCorridor 13.04
Street Name Dakota Ave
Urban/Rural: Urban
County: Richland
Corridor ADT: 11,940

SHSP Emphasis Area (check all that apply)

- ☐
- Reduce Alcohol Impaired Driving
-
- ☐
- Increase the Use of Safety Restraints for all Occupants
-
- ☐
- Younger Driver/Older Driver Safety
-
- ☐
- Curb Aggressive Driving
-
- ☐
- Improvements to Address Lane Departure Crashes
-
- ☐
- Enhancing Emergency Medical Capabilities to Increase
-
- ☒
- Improve Intersection Safety

Describe Proposed Safety Improvements

Intersection ID	Street Name	Cross Street	Traffic Control	Entering ADT	Development / Ped Generator	Total Ped/Bike Crashes	Advanced Walk	Countdown Timers	Curb Extensions	Median Refuge Island	Notes
13.09	Dakota Ave	1st St S/N	Thru-STOP	12,675	Yes	0	0	0	1	0	None

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2008 - 2012

5 years

Intersection Criteria		Description	Unit Cost	Quantity	Total Cost
Traffic Control Device	Signal	Advanced Walk	\$0 per intersection	0	\$0
Entering ADT	> 18000	Countdown Timers	\$12,000 per intersection	0	\$0
Development / Ped Generator	Yes	Curb Extensions	\$36,000 per corner	1	\$36,000
Total Ped/Bike Crashes	> 0	Median Refuge Island	\$24,000 per side	0	\$0
					\$36,000

Project Cost Estimate (attach detailed copy)**Proposed Year of Construction**

Federal Funds	\$32,400
Local Match (10% of Total project cost)	\$3,600
Total Project Cost	\$36,000

NDDOT Central Office OnlyProject Accepted? ☐ Yes ☐ No Reference Number ID Number

Notes

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NDDOT Reserves All Objections

APPENDIX
Sargent County

[Appendix Intentionally Left Blank]

23 USC 409
NDDOT Reserves All Objections

APPENDIX
Steele County

[Appendix Intentionally Left Blank]

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APPENDIX
Trail County

[Appendix Intentionally Left Blank]

5.0 Behavioral Safety Strategies

5.1 Purpose of Driver Behavior Safety Strategies

North Dakota's Local Road Safety Program (LRSP) recognizes that driver behavior is a significant factor contributing to a majority of the serious crashes on North Dakota's local roads. Traffic crashes may result from any combination of overlapping crash factors, such as the roadway, the vehicle, and driver behavior. Research supports and experts agree that in most cases driver behavior—risky decisions, driver error, lapses of attention, and driver limitations—is a chief factor contributing to traffic crashes (Lerner et al., 2010). Serious traffic crashes in the eastern region can be largely prevented and reduced if motorists, especially younger drivers, were persuaded to engage in key safe driving practices to buckle up, drive at safe speeds, pay attention, and plan ahead to avoid impaired driving. For maximum safety benefit, these measures should be undertaken in addition to adopting infrastructure safety strategies to help ensure the safest and most forgiving roadway possible.

5.2 Overview of Behavioral Crash Data for Eastern Region

Unbelted Vehicle Occupants: Traffic safety research demonstrates that a motorist's seat belt is the most effective defense in the event of a crash. When lap and shoulder seat belts are used, the risk of fatal injury to front-seat passenger car occupants is reduced by 45 percent and the risk of moderate-to-critical injury is reduced by 50 percent (NHTSA, 2001). Safety benefits are even greater for light-truck occupants, with seat belts reducing fatalities by 60 percent and moderate-to-critical injury by 65 percent (NHTSA, 2009). North Dakota's 2013 statewide seat belt use of drivers and right-front seat passengers is 77.7 percent; lower than the nationwide use of 86 percent in 2012. Unbelted serious crashes are the eastern region's greatest opportunity to strengthen road safety through improving driver behavior. The trend of serious unbelted crashes is increasing statewide. The eastern region is above the 48 percent statewide-unbelted serious crashes with 53 percent of the region's serious crashes involving unbelted motorists.

Alcohol-Related Crashes: Nationally, although impaired driving fatalities have decreased since 2007, the percentage of alcohol-impaired fatalities in the U.S. has remained essentially unchanged (NHTSA, 2012). Similarly, over the last decade, each year nearly half of motor vehicle fatalities statewide in North Dakota continue to be alcohol-related. In the eastern region, 34 percent of the county's serious crashes are alcohol-related—slightly higher than the statewide 30 percent. From statewide crash data, nearly half of these preventable serious crashes are on the local road system.

Young Driver-Involved: Young drivers have the highest involvement in fatal crashes of any age group. The fatal crash involvement of drivers age 16 to 20 is nearly twice that of drivers' age 21 and older (NHTSA, 2012a). Key underlying factors to their high crash risk are the developmental and behavioral issues of adolescence coupled with driving inexperience. Young drivers too often immaturely take risks while driving without thinking through the potential consequences of their life-threatening decisions (Keating, 2007). Such high-risk behaviors

typically include lack of seat belt use, aggressive driving/speeding, and distractions while driving. Although serious injury crashes involving young drivers have gradually declined statewide, young drivers under the age of 21 continue to be overrepresented in crashes with 67 percent occurring on local roads. In the eastern region, 22 percent of serious crashes involve young drivers, which is the same as the 22 percent of statewide serious crashes.

Excessive Speed or Aggressive Driving: Speeding is common and is a tough nut to crack nationally and in North Dakota. Although drivers generally acknowledge that speeding is an unsafe behavior, speeding remains common because the perceived risk of injury is low relative to the perceived benefits of driving fast such as saving time and driving pleasure (Lerner et al., 2010). Consequently, the percentage of speeding-related fatal crashes has remained essentially unchanged over the years and remains a contributing factor in 31 percent of traffic fatalities in the U.S. (NHTSA, 2012b). Speeding and aggressive driving continue to account for approximately 26 percent of all serious crashes in North Dakota with 62 percent of these crashes occurring on the local road system. In the eastern region, 35 percent of its serious crashes involve speeding or aggressive driving, above the statewide percentage of 26 percent.

5.3 Importance of Traffic Safety Culture Change

5.3.1 Influence of Traffic Safety Culture

In adopting North Dakota's long-term vision of zero fatalities, the 2013 North Dakota SHSP establishes a statewide goal to reduce the 3-year average of traffic fatalities to 100 or fewer by 2020. To accomplish this interim goal, the eastern region, together with its traffic safety partners, seeks to develop and implement its LRSP safety strategies within the broader societal context of motorists' behavior and North Dakota's traffic safety culture. Traffic safety culture can be defined as the implicit shared values, beliefs, and perceptions that shape motorists' behavior.

5.3.2 Social Norms Inhibiting a Strong Traffic Safety Culture

At the core of the nation's and North Dakota's traffic safety challenge is a complacency toward risk-taking by drivers and a tolerance for traffic crashes and the resulting deaths and incapacitating injuries. Contributing factors include a sense of individual driver invulnerability, perceived driving skills and vehicle control, and a sense of anonymity and entitlement on the road. The latest data from the *2012 Traffic Safety Culture Index Survey* reports that, as in previous years, the safety culture in the United States surrounding distracted driving can best be described as "do as I say, not as I do" — due to the high numbers of people who object to certain behaviors, yet will admit that they, themselves, engage in them (AAA, 2012). Real progress in traffic safety depends largely on addressing and changing this culture of indifference to effectively implement and see results of both SHSP and LRSP safety strategies.

5.3.3 Social Levels Influencing Safety Culture

Efforts to change individual driver and motorist behaviors should be planned and executed from an ecological viewpoint — one that examines the driving public and their interaction with their social environments. Traffic safety culture and its influence operate at different levels within society. Therefore, a broader definition of traffic safety culture includes the values, beliefs, and perceptions of not only the individual driver, but of those shared by the various communities of which the driver is a part (Figure 5-1). The individual driver exists within a

system that includes the following levels, each embodying factors that influence driving culture and crash risk (Ward et al., 2010; Dahlberg and Krug, 2002):

- Individual level – Factors such as driver age, driving experience, self-esteem, income, and substance abuse
- Relationship level – Factors such as relationships with peers, co-workers, supervisors, and family members
- Community level – Factors include the settings or environments in which relationships occur such as school, church, workplaces, and neighborhoods
- Societal level – Large-scale factors such as safety, health, economic, and educational policies, as well as government commitments and priorities

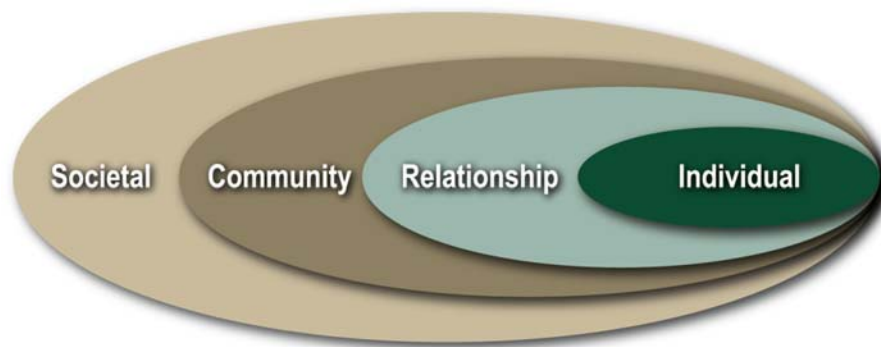


FIGURE 5-1

Social Ecological Perspective of Culture

Source: "Violence – A Global Public Health Problem" by L.L. Dahlberg and E.G. Krug, in *World Report on Violence and Health* (World Health Organization)

Social norms at each level and within each group point to what behaviors are perceived as important. Norms create conformity to expectations that allows people (that is, drivers) to successfully socialize to the subcultures in which they belong. These norms create a climate in which unsafe driving behavior is either encouraged or discouraged. Perceived social norms condoning high-risk driving behaviors provide the case for drivers to rationalize their own high-risk behaviors. To accomplish the culture change, traffic safety behavioral strategies seek to make safe-driving behaviors the accepted norm across all social ecological levels.

The implication of the social ecological model for LRSP efforts is that the implementation plans of LRSP strategies plans should attempt to:

- Increase perceived social pressure to comply with traffic safety laws and practices, thereby, producing safety behavioral norms (Ward et al., 2010)
- Shift the social acceptance of high-risk behaviors to one of perceived unacceptance by significant others and one's peers.

5.4 Behavioral Safety Strategies

5.4.1 Role of Policy, Education, and Enforcement

Techniques or strategies to change driver behavior essentially fall into one of three categories: (1) *policy change* or laws, local ordinances, regulations, sanctions and penalties; (2) *enforcement* of the laws; and (3) *education* or public information, media, and training. These three categories of behavioral safety strategies work together to have the greatest impact on changing risky driver behavior. The degree of effectiveness of any one strategy on behavioral change depends not only on how effectively the strategy is implemented, but also on how these three categories of policy, enforcement, and education are working together.

For example, a state or local agency that is seeking to increase motorists' seat belt use and decides to use a "buckle up" public information campaign (behavioral change strategy). The effectiveness of the campaign not only depends on the quality of the education or public information campaign (relevance to target group, duration, saturation of the messaging), but also the strength of the law in place (primary vs. secondary seat belt law, all passengers vs. front seat only, higher penalty/fee vs. low penalty/fee) and, most important, the degree of seat belt use enforcement (coverage, intensity, visible by the public).

Consequently, the strength of driver safety policy, enforcement, and education surrounding a behavioral strategy selected greatly impact its effectiveness. Therefore, when selecting and implementing a behavioral strategy, an agency must examine the policy, enforcement, and educational context of the strategy and explore ways to strengthen each, as appropriate, to gain the most from a selected strategy.

Finally, it is critically important that traffic safety enforcement is viewed as a priority within local law enforcement agencies and that agency leaders and administrators advocate for strong local enforcement of traffic laws. It is imperative that agency leaders actively address political and public resistance and provide a pathway to deploy the leading strategy to save lives on North Dakota roadways—effective traffic enforcement coupled with public outreach. By advocating for enforcement, educating local elected officials, and equipping officers to effectively enforce traffic safety laws, North Dakota will reap far greater life-saving outcomes from its local safety initiatives.

5.4.2 Effective Use of Public Information Strategies

Public information (education) strategies are often popular among communities seeking to change risky driving behaviors. Education or public information campaigns can range from brochures and mailings to peer-to-peer safety messaging. Brochures and mailings are a passive approach, while peer-to-peer messaging provides a more effective behavioral change approach. In general, a key challenge in influencing driver behavior is that most drivers know what they are supposed to do to drive safely, yet, due to successfully driving with risky patterns with no incidence of crashes, drivers underestimate the risk of their choices. For this reason, research supports that education, coupled with enforcement, will have the strongest impact in changing driver behavior (NHTSA, 2013).

Following are key characteristics of impactful public information/education campaigns (Williams, 2007):

- Implemented in support of a high-visibility enforcement program

- Focused messaging for a target group
- Longer-term programs delivering messages of sufficient intensity over time
- Messages communicating new information not previously well known
- Messages that are part of a broader-based, longer-term community program with similar messaging coming from multiple sources
- Using behavior change models including interactive methods teaching skills to resist social pressure (such as role playing, group discussion)

5.4.3 LRSP Phase 2 Priority Strategies

During the LRSP workshop, participants reviewed the eastern region's behavioral crash data and discussed behavioral safety strategy alternatives that could be implemented at the local level. Out of the strategy review discussions, participants engaged in a prioritization process with six strategies emerging as the preferred local behavioral safety strategies for the four behavioral critical emphasis areas. Table 5-1 reflects the LRSP Phase 2 results of the strategy prioritization, as well as each strategy's alignment with the North Dakota SHSP (indicated by an "X" if included in the SHSP).

TABLE 5-1

North Dakota Phase 2 LRSP Workshop Priority Behavioral Strategies and Relationship with the North Dakota SHSP

Phase 2 LRSP Workshop Priority Driver Behavior Strategies	Cass County Region	Eastern Region	Grand Forks Region	2013 North Dakota SHSP
Impaired Driving				
• Employ Alcohol Screening and Brief Interventions	X			X
• Support Community Program for Alternative Transportation		X		X
• Promote Sobriety Initiatives for DUI Offenders (24/7, Ignition Interlock, DUI Courts)	X	X		X
• Educate and Enforce Zero Tolerance Laws for Drivers Under Age 21		X		
• Court Monitoring of Prosecution and Sentencing of DUI Offenders			X	
Speeding and Aggressive Driving				
• Conduct high-visibility targeted enforcement of speeding and aggressive driving • <i>Note: Added following speed and aggressive driving enforcement strategy to support priority lane departure infrastructure safety strategy:</i> • <i>Provide enhanced enforcement on local, at-risk locations for lane departure.</i>	X	X	X	X
• Conduct Enhanced Enforcement of Red-Light Running			X	X
Young Drivers				
• Publicize and conduct a high-visibility enforcement of GDL restrictions, cell phone use and texting laws, underage drinking and driving, and seatbelt laws	X			X
• Encourage driver education providers (local schools and private providers) to require parent education component		X	X	X

Phase 2 LRSP Workshop Priority Driver Behavior Strategies	Cass County Region	Eastern Region	Grand Forks Region	2013 North Dakota SHSP
Unbelted Occupants				
• Conduct highly publicized enforcement campaigns to maximize restraint use.			X	X
• Enforce Secondary Belt Use Law		X		X
• Pursue Local Support for Primary Seat Belt	X	X	X	X
Note: DUI = driving under the influence GDL = graduated driver's license				

The following subsections provide a more complete description of each priority strategy, suggested steps to launch local agency efforts, recommended implementation resources, and potential future considerations for expanded local agency and community-based support for the SHSP safety strategies. It is important to note that multidisciplinary SHSP implementation teams will be formed to support the implementation of priority strategies for each of the six SHSP priority emphasis areas including lane departure, unbelted vehicle occupants, alcohol-related, speed or aggressive drivers, young drivers, and intersections. Therefore, local agencies seeking to leverage local-level safety initiatives described in the following subsections are encouraged to coordinate with and/or engage in the statewide SHSP implementation teams.

5.4.4 Impaired Driving

Eastern Region Priority Strategy – Support Community Programs for Alternative Transportation

Description: A growing strategy in local communities to combat alcohol-impaired driving is to provide alternative community transportation services for those who have been drinking and who might otherwise choose to drink and drive. Alternative transportation programs may employ a variety of transportation alternatives including taxis, privately owned vehicles, buses, tow trucks, and law enforcement agents. To increase accessibility of services, local communities often seek cooperative programming and cost-sharing approaches involving a spectrum of partners such as local drinking establishments and restaurants, alcohol beverage industry, local transportation providers, non-profit community organizations and volunteers, agency participation, and the users themselves. Programs reflect a spectrum of options, from those that provide alternative transportation services within a limited time frame--a particular community festival or holiday--to professional year-round services to pick up drivers and their vehicles at a bar and transport both home after drinking (Sprattler, 2010). The most effective characteristics of safe ride programs most widely used by drinkers choosing not to drive include programs that are continually available, low or no cost to users, convenient, and easy to use (NHTSA, 2009a).

Getting Started:

- Contact the Traffic Safety Office (TSO) to participate in the SHSP process as a stakeholder in the implementation of strategies identified for priority safety emphasis areas, such as impaired driving, in the SHSP.

- The following steps offer guidance to start a safe ride initiative in the local communities of the eastern region (adapted from Sprattler, 2010):
 1. Access community needs by identifying local impaired driving issues and potential barriers to the use of alternative transportation
 2. Identify community supporters and potential partners
 3. Call a meeting of all interested parties
 4. Determine the service area
 5. Choose or create transportation providers
 6. Develop “level of service” program model
 7. Establish hours and days of operation
 8. Price services and secure cooperative funding
 9. Determine program structure and management
 10. Market the program to the hospitality industry, its patrons, and the public

Implementation Resources:

- See Section 5.5, Traffic Safety Office Supporting Resources.
- Local impaired driving/alternative transportation community resources in the eastern region include:
 - Kasey Skalicky, Traffic Safety Program Coordinator, City-County Health District, kskalicky@barnescounty.us or 701-845-6672 (for all of eastern region)
 - South Central Adult Services (Barnes, Ransom & surrounding counties)
 - Pat Hansen at pat@southcentralseniors.org or 701-845-4300
- For information on The SAFE CAB Program in Isanti County, Minnesota visit <http://www.centurycouncil.org/drunk-driving/safe-cab-program>.
- For information on how Minnesota has set up regional/county based safe ride programs visit: <http://www.minnesotatzd.org/topics/impaired/saferide/documents/report.pdf>.
- For guidance on local community development or expansion of alternative transportation programs for impaired drivers and for a list of selected alternative transportation programs meeting core program evaluation criteria, see *Alternative Transportation Programs: A Countermeasure for Reducing Impaired Driving* at: <http://mcs.nhtsa.gov/index.cfm/product/449/alternative-transportation-programs-a-countermeasure-for-reducing-impaired-driving-booklet.cfm>
- For information on establishing community designated drivers programs, visit: <http://www.nhtsa.gov/people/injury/alcohol/DesignatedDriver/comm1.html>
- To contact local public health unit addressing alcohol use/impaired driving issues, see state listing located at: <http://www.ndhealth.gov/localhd/lphu-directory.pdf>

- For North Dakota road safety information including impaired driver facts sheets, issue briefs, and other education and outreach resources, visit the NDSU Rural Transportation Safety and Security Center (RTSSC) at:
<http://www.ugpti.org/rtssc/resources/>

The NDSU Upper Great Plains Transportation Institute at:
<http://www.ugpti.org/resources/>

Eastern County Region Priority Strategy – Promote Sobriety Initiatives for DUI Offenders: 24/7, Ignition Interlock, DUI Courts.

Description: To reduce impaired driving on state and local roadways, in addition to regular high-visibility DUI enforcement saturation patrols and DUI sobriety checkpoints, North Dakota uses 24/7, alcohol ignition interlocks, and DUI court programs to effectively monitor hardcore DUI offenders. Most hardcore repeat DUI offenders are alcohol dependent and often unable to control their drinking and driving behavior. For this reason, the following programs are important and proven tools in North Dakota’s strategy to combat impaired driving.

24/7 – North Dakota’s 24/7 Sobriety Program provides an alternative to jail time for DUI offenders charged with or convicted of two or more or drunk driving offenses; first-time drunk driving offenders under the age of 18 are also required to participate in the 24/7 program. The program requires offenders to abstain from alcohol use and submit to sobriety testing twice per day through preliminary breath test (PBTs) or through continuous monitoring via a SCRAM; requiring sobriety 24 hours per day, 7 days per week. If the arrestee’s test registers any alcohol use then he or she is immediately taken into custody. If the arrestee fails to show for testing, his or her jail bond is revoked. An offender may participate in the 24/7 Sobriety Program as a condition of bond or pre-trial release and to participate in the program as a condition of sentence or probation.

Ignition Interlock – Ignition interlock is an aftermarket technology device installed in a motor vehicle to prevent a DUI offender from operating a vehicle if the offender has been drinking. Before starting the vehicle, the driver must breathe into the device and if the driver’s breath alcohol reading is above a preset blood alcohol concentration (BAC) limit, the interlock device will not allow the vehicle to start. In North Dakota, the use of alcohol ignition interlocks is discretionary for all DUI offenders.

DUI Courts – North Dakota’s four Drug/DUI Courts are hybrid courts; namely, they are drug courts that also work with DUI offenders. North Dakota Drug/DUI Courts are an effective tool to combat the hardcore impaired driver by using intensive supervision and treatment to change the offender’s behavior. DUI Courts use all the criminal justice stakeholders (judge, prosecutor, defense attorney, law enforcement, probation, and treatment) using a cooperative approach to change the offender’s behavior by meeting regularly as a team to discuss the status of each offender’s case and to assure that alcohol treatment and all sentencing requirements are satisfied. With the input of all parties, Judges are more informed and can immediately revise restrictions when necessary.

Getting Started:

- Contact the Traffic Safety Office (TSO) to participate in the SHSP process as a stakeholder in the implementation of strategies identified for priority safety emphasis areas, such as impaired driving, in the SHSP.

- Enlist the support of local traffic safety stakeholders to conduct a proactive publicity and education campaign on the above discussed tools to:
 - Inform local policy makers—county board and city council members, judges, prosecutors, defense attorneys, treatment officials and other concerned local stakeholders of the important role of 24/7, ignition interlock, and DUI courts in combating hard core drunk drivers.
 - Educate the public on the nature of the impaired driving problem in the local community and how these tools will provide necessary sanctions on the offenders as well as enhance the safety of all roadway users; and
 - Act as a general deterrent by putting potential offenders on notice that if they are arrested for impaired driving they may become subject to a highly supervised sanction with the costs and stigma associated with its use.

Implementation Resources:

- See Section 5.5, Traffic Safety Office Supporting Resources.
- For information on ND sobriety initiatives (24/7, Ignition Interlock, DUI/Drug Courts) and for DUI data sources, contact ND Traffic Safety Resource Prosecutors:
 - Aaron Birst at aaron.birst@ndaco.org, 701-328-7342
 - Kristi Pettit Venhuizen at 701/780-9276
- Local impaired driving community resources in the eastern region include:
 - Mental Health Access Group (Barnes County/City of Valley City)
Theresa Will, CCHD Director at twill@barnescounty.us or 701-845-8518
Sharon Buhr at SharonBuhr@CatholicHealth.net
 - DUI Court Team (located in Richland County, but a resource all of the eastern region)
Kasey Skalicky, Traffic Safety Program Coordinator, City-County Health District,
kskalicky@barnescounty.us or 701-845-6672 (for all of the eastern region)
Honorable B. Cruff – bcruff@ndcourts.gov
- To contact local public health unit addressing alcohol use/impaired driving issues, see state listing located at:
<http://www.ndhealth.gov/localhd/lphu-directory.pdf>
- For information on county DUI conviction and recidivism rates, see the North Dakota 2013 DUI Recidivism Fact Sheet at:
http://www.ugpti.org/rtssc/briefs/downloads/2013_Recidivism.pdf
- For information on the North Dakota's 24/7 Program:
<http://www.ag.nd.gov/TwentyFourSeven/>
- For a helpful overview of alcohol interlocks and their use as well as public outreach talking points, see *Ignition Interlocks - What You Need to Know: A Toolkit for Policymakers, Highway Safety Professionals, and Advocates* at:
http://www.nhtsa.gov/staticfiles/nti/pdf/IgnitionInterlocks_811883.pdf
- The National Center for DWI Courts provides quick reference information for traffic safety stakeholders and policy makers on what they need to know about DUI courts:
<http://www.dwicourts.org/sites/default/files/ncdc/The%20Bottom%20Line.pdf>

<http://www.dwicourts.org/node/98>

- For North Dakota road safety information including facts sheets, issue briefs, and other education and outreach resources, visit the NDSU Rural Transportation Safety and Security Center (RTSSC) at:

<http://www.ugpti.org/rtssc/resources/>

And the NDSU Upper Great Plains Transportation Institute at:

<http://www.ugpti.org/resources/>

For additional impaired driving safety strategies, see the following priority ND Local Road Safety Program strategies:

- Employ alcohol screening and brief Interventions by health care providers following an impaired driving crash. (Further explanation can be found in the North Dakota Local Road Safety Program, Phase 2, Cass County Report located at: <http://www.dot.nd.gov/divisions/safety/trafficsafety.htm>)
- Conduct court monitoring of prosecution and sentencing of DUI offenders. (Further explanation can be found in the North Dakota Local Road Safety Program, Phase 2, Grand Forks Report located at: <http://www.dot.nd.gov/divisions/safety/trafficsafety.htm>)

Potential future considerations for expanded local agency and community-based support of SHSP impaired-driving safety strategies:

- Engage local safety stakeholders (law enforcement, Mothers Against Drunk Driving [MADD], Students Against Drunk Driving [SADD], North Dakota Safety Council, community health provider, emergency medical service providers) and facilitate coalition development to educate local elected officials on the importance of state agency impaired-driving legislative initiatives resulting from the state's comprehensive assessment of North Dakota impaired-driving laws.

Eastern County Region Priority Strategy – Educate and Enforce Zero Tolerance Laws for Drivers under Age 21

Description: North Dakota has a zero tolerance standard for anyone under the age of 21 operating a motor vehicle. Under North Dakota's "Use/Lose Laws," when minors measure a BAC of 0.02 or above, there is loss of driving privileges. The North Dakota Highway Patrol receives and distributes Enforcement of Underage Drinking Laws (EUDL) funds provided by the North Dakota Department of Human Services (federal Office of Juvenile Justice and Delinquency Prevention [OJJDP] funding). These funds are used by the Highway Patrol and dispersed to local law enforcement to facilitate underage drinking enforcement efforts across the state. The Highway Patrol participates with local law enforcement in multiagency efforts to stop underage drinking and driving using the following strategies to enforce Zero Tolerance Laws:

- Cops in Shops
- Shoulder Tap Operations
- Party Patrol Operations
- Underage Alcohol-Related Fatality Investigations

In addition, North Dakota state, county, and city law enforcement participate in the national impaired driving prevention campaign, Driver Sober or Get Pulled Over, to ensure high visibility enforcement including North Dakota's zero-tolerance law for those under age 21.

In addition to enforcement, research demonstrates the primary role of parents in shaping their children's decision to not drink. To support parents' healthy influence, North Dakota's comprehensive Parents LEAD (Listen, Educate, Ask, Discuss) program is a primary resource for local traffic safety partners to engage parents to discuss the topic of underage drinking on an ongoing basis with their younger and adult children. Finally, OJJDP program outreach also provides information on social hosting, parental involvement, and consequences of underage drinking.

Getting Started

- Contact the Traffic Safety Office (TSO) to participate in the SHSP process as a stakeholder in the implementation of strategies identified for priority safety emphasis areas, such as impaired driving, in the SHSP.
- Inquire about and support law enforcement efforts to actively enforce laws and programs that fight underage drinking. For example, when an underage drinker is involved in a traffic crash, find out how the youths obtained the alcohol, then hold whoever gave or sold it to them accountable.
- The TSO may offer grant funds for law enforcement to conduct alcohol compliance checks and server training programs; other communities conduct server training as required through city or county ordinances including Dickinson, Fargo, Grand Forks and Williston.
- The North Dakota Department of Human Services (DHS) administers funds from the Federal Office of Juvenile Justice and Delinquency Prevention (OJJDP) which allowed state and local law enforcement agencies to deter underage drinking through various enforcement strategies (compliance checks, shoulder taps, saturation, and party patrols). OJJDP program outreach also provided information on social hosting, parental involvement, and consequences of underage drinking.

Implementation Resources:

- Local underage drinking prevention community resources in the eastern region include:
 - Safe Communities Coalition (All of the eastern region)
Kasey Skalicky, Traffic Safety Program Coordinator, City-County Health District,
kskalicky@barnescounty.us or 701-845-6672 (for all of the eastern region)
Doug Kiefert, dkiefert@hotmail.com
 - VCSU alcohol prevention group (Barnes County and City of Valley City)
Erin Klingenberg, erin.klingenberg@vcsu.edu
 - Juvenile Court
Karen Kringlie - kkringlie@ndcourts.gov (All of the eastern region)
Curt Brown - cbrown@ndcourts.gov (Barnes County, Eddy County, Foster County,
Griggs County, LaMoure County)
 - ND Safety Council
Terry Weaver, Traffic Safety Coordinator, TerryW@ndsc.org, 701-751-6106

- To contact local public health unit addressing alcohol use/impaired driving issues, see state listing located at: <http://www.ndhealth.gov/localhd/lphu-directory.pdf>

Enforcement Resources:

- For a list of approved DHS OJJDP grant enforcement strategies:
<http://www.nd.gov/dhs/services/mentalhealth/prevention/pdf/eudl-enforcement-strategies-v2.pdf>
- For information on effective enforcement strategies, challenges, and suggested solutions, see NHTSA “Community How To Guide on Underage Drinking Enforcement” at:
http://www.nhtsa.gov/people/injury/alcohol/community%20guides%20html/Book5_Enforcement.html
- For enforcement training and technical assistance in most promising practices for law enforcement operations to reduce underage drinking, see the Underage Drinking Enforcement Training Center at:
<http://www.udetc.org/LawEnforcement.htm>

Education Outreach Resources

- For underage drinking laws and resources for parents on how to start and continue the conversation about alcohol use with their children, see the North Dakota’s *Parents LEAD* (Listen, Educate, Ask, Discuss) program at:
<http://www.parentslead.org/>
- For information on MADD’s underage drinking programs and information resources such as Power of Parents, Power of You(th), PowerTalk 21, and Why 21? see MADD’s underage drinking website at:
<http://www.madd.org/underage-drinking/>

Additional information provided by Students Against Destructive Decisions or SADD at:
<http://www.sadd.org/u21toolkit.htm>

- For North Dakota road safety information including facts sheets, issue briefs, and other education and outreach resources, visit the NDSU Rural Transportation Safety and Security Center (RTSSC) at:
<http://www.ugpti.org/rtssc/resources/>

The NDSU Upper Great Plains Transportation Institute at:
<http://www.ugpti.org/resources/>

5.4.5 Speeding and Aggressive Driving

Eastern County Region Priority Strategy – Conduct highly publicized and targeted speeding and aggressive driving enforcement campaigns

Description: High-visibility enforcement is a high-priority, proven safety strategy to reduce serious crashes in North Dakota and across the nation. The most effective way to deter unsafe driving is through a highly visible enforcement effort to reinforce the driving public’s perception that driving behavior, such as speeding, is at high risk of being stopped and ticketed. High-visibility enforcement consists of multiple jurisdictions and/or multiple squads patrolling a segment of roadway at the same time, often using brightly colored signage and vests. Planned

high-visibility enforcement is publicized extensively through community kickoff events involving the local media and public education campaigns about the enforcement. High visibility also includes enforcement agencies reporting to news media the outcome of the campaign such as tickets issued and arrests made.

North Dakota law enforcement agencies (state, county, city and tribal) participate in the state's cooperative enforcement programs to reduce speed-related fatalities and incapacitating injuries through stepped up enforcement of aggressive cars and trucks primarily in oil-impacted counties. For aggressive driving enforcement, officers focus on drivers who commit a combination of moving traffic violations such as speeding, following too closely, and running red lights endangering other persons or property.

Getting Started:

- Contact the Traffic Safety Office (TSO) to participate in the SHSP process as a stakeholder in the implementation of strategies identified for priority safety emphasis areas, such as speeding, in the SHSP.
- Assist local law enforcement agencies with identifying locations with high-speed and aggressive driving-related crash involvement for high-visibility enforcement.
- With local law enforcement, attend county board/city council meetings to speak on the importance of enforcing speed and aggressive driving.
- Collaborate with highway patrol, local law enforcement, community health officials, and local traffic safety stakeholders to use TSO speed campaign materials to conduct community outreach on the enforcement campaign.

Implementation Resources:

- For crash data and analysis to focus speed enforcement efforts, contact the NDDOT Traffic Safety Office (TSO) at (701) 328-4692.
- To learn about local traffic safety enforcement initiatives and enforcement grant opportunities, contact the TSO and the state's Law Enforcement Liaison at (701) 328-4692. Enforcement grant application information for overtime speed enforcement can be found at: <https://www.dot.nd.gov/divisions/safety/trafficsafety.htm>
- See Section 5.5, Traffic Safety Office Supporting Resources.
- For guidance for law enforcement on planning and publicizing local speed saturation patrols and successful case examples, see NHTSA's *Guidelines for Developing a Municipal Speed Enforcement Program* at: <http://www.nhtsa.dot.gov/people/injury/enforce/program.htm>
- For a summary of successful aggressive driving enforcement programs deployed at the local and state-level across the country, see NHTSA's *Aggressive Driving Enforcement: Strategies for Implementing Best Practices* at: <http://www.nhtsa.gov/people/injury/enforce/aggressdrivers/aggenforce/>
- Other speed-related safety resources:

Governor's Highway Safety Administration:

<http://www.ghsa.org/html/issues/speeding.html>

Insurance Institute for Highway Safety:

<http://www.iihs.org/iihs/topics/t/speed/topicoverview>

- For North Dakota road safety information including facts sheets, issue briefs, and other education and outreach resources, visit the NDSU Rural Transportation Safety and Security Center (RTSSC) at:
<http://www.ugpti.org/rtssc/resources/>

The NDSU Upper Great Plains Transportation Institute at:

<http://www.ugpti.org/resources/>

Eastern Region's Priority Strategy – Provide enhanced enforcement on local, at-risk locations for lane-departure crashes.

Description: To reduce serious lane-departure crashes on rural paved roads, the eastern region plans to deploy infrastructure safety improvements (for example, centerline rumble strips, edge line rumble strips, adding or widening edge lines, high-visibility pavement markings) at select at-risk corridors. To maximize the expected safety benefit of the road improvements, integrating increased enforcement presence at targeted at-risk locations and timeframes will reduce risky driving behaviors through strengthening the public's perceived risk of being stopped.

Getting Started:

- Contact the Traffic Safety Office (TSO) to participate in the SHSP process as a stakeholder in the implementation of strategies identified for priority safety emphasis areas, such as lane departure, in the SHSP.
- Work with NDDOT staff regarding specific design features of the system. Contact NDDOT Traffic Operations Section, Shawn Kuntz, 701-328-2673.
- Coordinate with local law enforcement to provide enhanced enforcement at local, at-risk locations for lane departure.
 - Based on crash data, identify timeframes for high crash risk (such as Saturday evening hours)
 - Ask for an agreement regarding minimum levels of enforcement (such as 1 hour per day at any of the equipped locations, target contacts per hour, etc.)

Implementation Resources:

- For crash data and analysis to focus lane departure enforcement efforts, contact the NDDOT Traffic Safety Office (TSO) at 701-328-4692.
- See Section 5.5, Traffic Safety Office Supporting Resources.
- Safety project developed as part of the LRSP are eligible for funding through the state's Highway Safety Improvement Program (HSIP) including enhanced enforcement.
- See Section 5.4.5 for speed and aggressive driving implementation resources.

For additional potential aggressive driving safety strategies, see the following ND Local Road Safety Program strategy:

- Conduct enhanced enforcement of red-light-running using confirmation lights in high-risk intersections. (Further explanation can be found in the North Dakota Local Road Safety

Program, Phase 2, Grand Forks County Region Report located at:

<http://www.dot.nd.gov/divisions/safety/trafficsafety.htm>)

Potential future considerations for expanded local agency, tribal, and community-based support of SHSP safety strategies:

- Engage local safety stakeholders (law enforcement, Mothers Against Drunk Driving [MADD], Students Against Drunk Driving [SADD], North Dakota Safety Council, community health provider, emergency medical service providers) and facilitate coalition development to educate local elected officials on the importance of state agency legislative initiatives to strengthen penalties such as increased fines for right-of-way and speed violations.

5.4.6 Young Drivers

Eastern Region Priority Strategy – Encourage driver education providers (local schools and private providers) to require a parent education component

Description: Effective parental monitoring of teen driving can go a long way in helping to keep novice drivers safe on the roadway. Programs offering teen driver safety materials together with facilitated guidance help parents make the important connection between teen driving restrictions and teen driving risks. Without a required parent component for teen driver education, parents lack awareness of graduated driver's license (GDL) safety provisions, don't fully recognize teen driving risks, are often anxious to be relieved of shuttling their teens, may be reluctant to invest the necessary time to instruct and supervise their teen's driving, and often believe their teen is the exception and is a good and safe driver. To help overcome these parent challenges and more effectively engage parents, incorporating a parent education component into driver education programs is demonstrating promising results.

Key components of a good parent education program include:

- Discusses risks for novice teen drivers
- Explains how and why GDL works to address risks
- Reviews the critical role parents play in teaching, supporting and managing their novice drivers
- Explains the importance of and provides an opportunity to try out a parent/teen driving agreement
- Delivery by trained, educated facilitators
- Emphasizes parents and teens working together for safety

Getting Started:

- Contact the Traffic Safety Office (TSO) to participate in the SHSP process as a stakeholder in the implementation of strategies identified for priority safety emphasis areas, such as young drivers, in the SHSP.
- Learn about education providers in your local community by contacting the Traffic Safety Office at (701) 328-4692.
- Explore county-mandated parent training through examining the state of Virginia's Planning District 8 (includes four counties and four cities) 90-minute driving safety program for parents and teens as part of the in-classroom portion of the state's driver education

curriculum. Contact Ben Swecker (703) 791-7328 or Tim TeWalt (703) 791-7353 at Prince William County Schools.

- With local law enforcement and driver educators, attend county board/city council meetings to inform them of the local initiative to incorporate parent education into driver's education programs to more fully engage parents and reduce teen driver serious crashes.
- Post information on teen driving laws on local school websites or request school resource officer to send information to parents highlighting driving risks for teens and existing North Dakota teen driver laws.
- Consider linking parent-teen participation in a teen-driving program to school parking privileges.

Implementation Resources:

- See Section 5.5, Traffic Safety Office Supporting Resources.
- For educational materials for parents of teen drivers including guidelines to ensure teen drivers are educated on safe driving practices as well as *The North Dakota Parent Guide to Teen Driving* and the *Parent Teen Driver Agreement*, see the Teen Drivers & Parents section of the NDDOT website:
<http://www.dot.nd.gov/divisions/safety/teens-parents.htm>
- For an example parent-teen class outline and discussion guide, download the Minnesota Department of Public Safety, Office of Traffic Safety's *Teen Drivers: The Parent's Role* at:
<https://dps.mn.gov/divisions/ots/teen-driving/Documents/Parent-class-leaders-guide-july-2013.doc>
- The Minnesota Office of Traffic Safety developed, *Point of Impact: Teen Driver Safety Parent Awareness Program*, as a community-based class for parents and their soon-to-be teen drivers. The Point of Impact Leader's Guide is a resource for implementing the class. The Point of Impact video is an important component of the program. A PowerPoint presentation and other information are available by contacting Gordy Pehrson at gordy.pehrson@state.mn.us.
- For information on the nationally recognized University of Michigan's *Checkpoints* program offering facilitated parent education:
<http://youngdriverparenting.org/> and <http://www.saferdrivingforteens.org/>
- For a comprehensive guide to strengthen parental roles in teen safe driving, see the Governors Highway Safety Association's (GHSA's) *Promoting Parent Involvement in Teen Driving: An In-Depth Look at the Importance and the Initiatives*.
<http://www.ghsa.org/html/publications/pdf/sfteens13.pdf>
- For additional information on mandated and voluntary parent/teen education programs in Connecticut, Massachusetts, Georgia, and select Virginia counties, see GHSA's *Curbing Teen Driver Crashes: An In-Depth Look at State Initiatives*.
<http://www.ghsa.org/html/publications/pdf/sfteens12.pdf>
- For age-specific information and resources for parents on how to start and continue the conversation about alcohol use with their children, see the North Dakota's *Parents LEAD* program (Listen, Educate, Ask, Discuss).
<http://www.parentslead.org/>

- For PowerPoint presentations, parent/teen activities and other tools to be adopted for driver education providers, see *Teendriversource: Research Put into Action*.
www.teendriversource.org
 - For information on *Teen Driving Parents/Alive at 25* that includes a 1-hour parent, 4-hour teen driving program including a comprehensive publication, *Teen Driver; A Family Guide to Teen Safe Driving*.
http://www.nsc.org/products_training/Products/MotorVehicleSafety/Pages/TeenDriving.aspx
 - For information in Utah's award winning "Don't Drive Stupid" Parent Night Program.
<http://publicsafety.utah.gov/highwaysafety/documents/smart.pdf>
<http://www.ghsa.org/html/meetings/awards/2013/13utah.html>
 - For information on *Parents are the Key* and free downloadable resources that can be customized.
www.cdc.gov/ParentsAreTheKey/
 - For North Dakota road safety information including facts sheets, issue briefs, and other education and outreach resources, visit the NDSU Rural Transportation Safety and Security Center (RTSSC) at:
<http://www.ugpti.org/rtssc/resources/>
- The NDSU Upper Great Plains Transportation Institute at:
<http://www.ugpti.org/resources/>

Other high-impact, proven strategies for local agency consideration:

- Conduct locally facilitated peer-to-peer driver safety outreach campaigns designed for high school students to raise peer awareness of the common risk factors threatening novice drivers.

Considerations for future expanded local agency/community support of North Dakota SHSP young-driver safety strategies:

- Engage local traffic safety stakeholders (law enforcement, school administrators, driving schools, insurance companies, community health providers, emergency medical service providers) and facilitate coalition development to educate local elected officials on the importance of state agency GDL and teen driver safety policy initiatives.

5.4.7 Unbelted Occupants

Eastern Region Priority Strategy – Enforce secondary seat belt law

Description: Research has demonstrated that the most important difference between the high and low seat belt use states is enforcement of the states' belt use law and this is true for both secondary and primary law states (NHTSA, 2008). Although a few geographic, demographic, and cultural factors are associated with lower seat belt use, none of these factors is a barrier to high seat belt use. However, law enforcement officers find it more difficult to enforce secondary belt laws than primary laws and are sometimes reluctant to issue tickets because secondary status implies that these laws are of lower priority to their superiors, policy makers, judges, and the general public (NHTSA, 2008).

With the emphasis on enforcing the state's secondary belt law as the most effective strategy to increase belt use and reduce serious unbelted crashes, North Dakota law enforcement agencies

(state, county, city, and tribal) participate in the state's *Click It or Ticket* mobilization program through stepped up enforcement of unrestrained occupants. The mobilization is supported by national and local paid advertising and earned media campaigns aimed at raising awareness before the enforcement saturation. North Dakota now conducts four annual *Click It or Ticket* campaigns – including participation in the national *Click It or Ticket* campaign in May. North Dakota has increased its focus on nighttime seat belt use because fewer motorists buckle up at night resulting in a greater number of serious nighttime crashes.

See Section 5.4.5 for a description of high-visibility/highly publicized enforcement campaigns.

Getting Started:

- Contact the Traffic Safety Office (TSO) to participate in the SHSP process as a stakeholder in the implementation of strategies identified for priority safety emphasis areas, such as unbelted crashes, in the SHSP.
- Assist local law enforcement agencies with identifying locations with high unbelted crash involvement for high-visibility enforcement.
- With local law enforcement, attend county board/city council meetings to speak on the importance and safety benefits of local enforcement of belt use.
- Collaborate with highway patrol, local law enforcement, community health officials, and local traffic safety stakeholders to use TSO belt use campaign materials to conduct community outreach on the enforcement campaign.

Implementation Resources:

- For crash data and analysis to focus seat belt enforcement efforts, contact the NDDOT Traffic Safety Office (TSO) at 701-328-4692.
- To learn about local traffic safety enforcement initiatives, secondary enforcement strategies, and enforcement grant opportunities, contact the TSO and the state's Law Enforcement Liaison at (701) 328-4692. Enforcement grant application information for overtime belt enforcement can be found at:
<https://www.dot.nd.gov/divisions/safety/trafficsafety.htm>
- See Section 5.5, Traffic Safety Office Supporting Resources.
- For statewide belt use mobilizations, the TSO distributes media outreach materials to local enforcement agencies which may include: press releases, talking points, camera-ready artwork and posters, belt-use fact sheets, a print public service announcement (PSA), and live-read radio PSAs. (*Note: TSO to assemble available information resources.*)
- For information on strategies and recommendations for effective enforcement of secondary belt use:

How States Achieve High Seat Belt Use Rates

<http://www-nrd.nhtsa.dot.gov/Pubs/810962.pdf>

Innovative Seat Belt Demonstration Programs in Kentucky, Mississippi, North Dakota, and Wyoming, NHTSA, Report No. DOT HS 811 080, March 2009.

<http://www.nhtsa.gov/Driving+Safety/Occupant+Protection>

Avoiding “Tween” Tragedies: Demonstration Project to Increase Seat Belt Use Among 8- to 15-year-old Motor Vehicle Occupants, NHTSA, Report No. DOT HS 811 096, June 2012.

<http://www.nhtsa.gov/Driving+Safety/Occupant+Protection>

- For guidance on planning and publicizing belt-use saturation patrols:

NHTSA 2014 national seat belt enforcement *Products for Enforcement Action Kit (PEAK)* to help enforcement rally officers and alert the public to prepare for maximum high-visibility seat belt enforcement during the day and also at night.

<http://www.trafficsafetymarketing.gov/CIOT-PEAK>

Nighttime Enforcement of Seat Belt Laws: An Evaluation of Three Community Programs, NHTSA, Report No. DOT HS 811 189, August 2009.

For the above and other belt enforcement and information outreach resources:

<http://www.nhtsa.gov/Driving+Safety/Occupant+Protection>

- Other seat-belt safety resources:

Governor’s Highway Safety Administration:

<http://www.ghsa.org/html/issues/occprotection/index.html>

Insurance Institute for Highway Safety:

<http://www.iihs.org/iihs/topics/t/safety-belts/topicoverview>

- For North Dakota road safety information including facts sheets, issue briefs, and other education and outreach resources, visit the NDSU Rural Transportation Safety and Security Center (RTSSC) at:

<http://www.ugpti.org/rtssc/resources/>

The NDSU Upper Great Plains Transportation Institute at:

<http://www.ugpti.org/resources/>

Potential future considerations for expanded local agency, tribal, and community-based support of SHSP safety strategies:

- Pursue tribal ordinances for primary enforcement of seat belt laws.
- Conduct community-wide and sustained public information outreach to educate and create cultural awareness of the risks associated with unbelted motorists.

Eastern Region Priority Strategy – Pursue local support for primary seat belt law

Description: Seat belts save lives. Research supports that lap/shoulder seat belts reduce the risk of fatal injury to front-seat passenger car occupants by 45 percent and the risk of moderate-to-critical injury by 50 percent. For light-truck occupants, seat belts reduce the risk of fatal injury by 60 percent and moderate-to-critical injury by 65 percent. Seat belts are extremely effective in preventing occupant ejection from the vehicle, the most injurious of crash outcomes (NHTSA, 2014).

Primary enforcement of seat belt laws has a proven track record of getting more people to buckle up. A primary enforcement seat belt law enables a law officer to stop motorists if the driver or any occupant is unbelted. North Dakota’s secondary enforcement law permits law enforcement to ticket unbelted motorists only if they are stopped for some other offense such as speeding.

Studies show that seat belt use in states with primary laws is 9 percentage points higher compared to states with secondary laws (Shults and Beck, 2012). Primary enforcement sends a clear message to the motoring public that the State views safety belt use (and the safety belt law) as essential for the safe operation of a motor vehicle. When States upgrade their laws from secondary to primary, the perceived public importance of safety belt use is strengthened leading to greater seat belt compliance. Increasing adult belt use also has a significant impact on child passenger safety, because drivers who wear safety belts are more likely to restrain their child passengers.

The foundation of enacting a primary seat belt law begins with developing grassroots, local-level support. Local community support, when thoughtfully and strategically applied, gets the attention of state elected officials. A community shift toward supporting primary seat belt occurs incrementally, one step at a time. Following are some initial steps and resources to launch the eastern region's efforts.

Getting Started:

- Contact the Traffic Safety Office (TSO) to participate in the SHSP process as a stakeholder in the implementation of strategies identified for priority safety emphasis areas, such as unbelted crashes, in the SHSP.
- Establish a local seat belt coalition or advocacy group to strengthen grassroots support for upgrading North Dakota's secondary belt law to primary seat belt enforcement. Following the national model of engaging multiple disciplines for traffic safety, support for primary enforcement can be found and strengthened throughout the community, including:
 - Enforcement: NDDOT District State Patrol, county sheriff and city police enforcement personnel
 - Emergency Medical Response/Medical Community: EMS, fire and rescue departments; local county health and injury prevention organizations; injury prevention advocacy groups; ER doctors and nurses, and other health care professionals
 - Education Outreach: NDDOT District, county, and city public affairs/media outreach professionals; local school boards, PTAs, school administrators, Mothers Against Drunk Driving [MADD], Students Against Destructive Decision (SADD), North Dakota Safety Council, AAA North Dakota
 - Engineering: NDDOT District, county, and city traffic safety and road maintenance personnel
 - Employers/Business Leaders: Chambers of commerce, leading local companies/major employers, insurance companies, auto dealers and manufacturers
- Engage advocacy group members to develop unified key messages for a consistent and clear message of support for primary seat belt (key unbelted crash facts, primary belt benefits, employer and societal costs of unbelted crashes, key community supporters of primary). Seek example outreach resources from neighboring "primary" states and states who've passed primary seat belt law.
- Create advocacy web portal of information in support of primary seat belt (key unbelted crash facts, primary seat belt benefits, employer and societal costs of unbelted crashes).

- Identify key local champions to help carry the message to local elected officials (city council, county board, mayoral offices) and key community influencers (for example, business leaders).
- Conduct legislative outreach in support of primary seat belt using interdisciplinary team from primary advocacy group (enforcement, engineering, health/injury prevention).

Implementation Resources:

- For crash data and analysis to focus seat belt enforcement efforts, contact the NDDOT Traffic Safety Office (TSO) at (701) 328-4692.
- Local primary seat belt community resources in the eastern region include:
 - Safe Communities Coalition (All of the eastern region)
Kasey Skalicky, Traffic Safety Program Coordinator, City-County Health District,
kskalicky@barnescounty.us or 701-845-6672 (for all of the eastern region)
Doug Kiefert, dkiefert@hotmail.com
- Upgrading Minnesota's secondary seat belt law to a primary law resulted in an estimated 68 to 92 fewer deaths, between 320 and 550 fewer incapacitating injuries, and \$45 million in avoided hospital charges in the 2 years since the primary law was enacted and enforced. See *Impacts of Minnesota's Primary Seat Belt Law* at:
<https://dps.mn.gov/divisions/ots/seat-belts-air-bags/Documents/dps-eval-primary-seat-belt-law.pdf>
- For Minnesota Seat Belt Coalition's Primary Seat Belt legislative talking point booklet addressing key questions about Primary Seat Belt, facts sheets, and unbelted fatalities and serious injuries by legislative district, contact the Minnesota Safety Council at 651-291-9150 or msc@minnesotasafetycouncil.org
- Florida's statewide belt usage leaped from 80.9 percent in May 2009 to 87.4 percent after the May 2010 seat belt enforcement campaign and the passage of the state's primary seat belt law. See *Impact of Implementing a Primary Enforcement Seat Belt Law in Florida: A Case Study* at:
<http://ntl.bts.gov/lib/45000/45800/45875/811656.pdf>
- For seat belt key messages see NHTSA CIOTI web site:
<http://www.nhtsa.gov/nhtsa/2013ciot/stats.html>
- Center for Disease Control and Prevention seat belt briefing:
<http://www.cdc.gov/motorvehiclesafety/seatbeltbrief/>
- For example tribal council primary seat belt law:
<http://staging.dl-online.com/content/white-earth-council-passes-seat-belt-law>
- For North Dakota road safety information including facts sheets, issue briefs, and other education and outreach resources, visit the NDSU Rural Transportation Safety and Security Center (RTSSC) at:
<http://www.ugpti.org/rtssc/resources/>

The NDSU Upper Great Plains Transportation Institute at:
<http://www.ugpti.org/resources/>

5.5 Traffic Safety Office Supporting Resources

Unless otherwise indicated, for technical assistance and supporting resources contact the NDDOT Traffic Safety Office (TSO) at (701) 328-4692.

5.5.1 TSO Grant Program Application Process

The TSO solicits grant applications from eligible state and local agencies and for-profit and non-profit organizations that address North Dakota's problem solution plans or PSPs. PSPs reflect the state's greatest opportunities for behavioral safety improvement. Grant applications are due June 30 of each year and are evaluated based on: (1) response to identified problems; (2) proposed evidenced-based strategy; (3) clear objectives; (4) comprehensive evaluation plans; and (5) cost-effective budgets. Selected projects are included in TSO's Highway Safety Plan and once approved by NHTSA, grant contracts are generally effective October 1 through September 30.

5.5.2 Technical Assistance

County Outreach Program

The TSO, in cooperation with the North Dakota Association of Counties, offers a county-based Traffic Safety Outreach program to provide advocacy and community mobilization, media support, public outreach, and training to address seat belt use, impaired driving, speeding, and distracted driving at the county level. County participants include county employees, county officials, law enforcement, transportation engineering, public health, schools, businesses, nonprofit agencies, media, and other entities.

5.5.3 Traffic Records/Crash Data

Traffic and Criminal Software (TraCS)

The quality of traffic safety issue identification and decision-making regarding effective safety strategies and their implementation is based on the quality and timeliness of crash data. Data is collected from officer crash reports at the time of the incident when a crash involves fatalities, injuries, or at least \$1,000 in property damage. NDDOT reviews the crash report and enters the data into a centralized database called the Crash Reporting System (CRS).

To assist law enforcement in providing timely, complete, and accurate crash reports, the NDDOT Traffic Safety Office (TSO) supports the installation of Traffic and Criminal Software or TraCS and provides technical assistance and training to local agency and tribal law enforcement to effectively deploy TraCS for in-the-field incident reporting. Local and tribal enforcement agencies are strongly encouraged to utilize the convenience of TraCS for the electronic submission of crash reports to the NDDOT. Key benefits to participating agencies and tribes are the reduced officer time and effort required for duplicate entry into local and state crash databases, reduced need for data entry resources and administrative support, as well as improving the overall quality and timeliness of the crash report.

Local Agency Crash Data Support

The Upper Great Plains Transportation Institute develops crash data summaries for each law enforcement agency under contract with the TSO for overtime enforcement supporting impaired driving and seat belt enforcement campaigns. The crash data summaries demonstrate the priority crash factors and trends within each local agency's jurisdiction.

Annual Crash Summary

The NDDOT annually publishes the Crash Summary to identify and describe the annual crash data and historical crash trends in North Dakota including the description of factors contributing to the occurrence of traffic crashes and the resulting injuries and fatalities. The Crash Summary is a valuable reference resource for local agencies and their safety partners for problem identification, safety strategy planning, targeted strategy implementation, program evaluation, and media inquiries, and is located at:

<http://www.dot.nd.gov/divisions/safety/docs/crash-summary.pdf>

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