Source: FHWA

SECTION I:

Resources and Information

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CASE STUDY 1 –
Strategic Highway Safety Plan Involvement

Problem

A local agency has not participated in statewide safety planning efforts. The agency would like to participate but is unsure how to begin.

Noteworthy Solution

A state DOT's collaboration with local agencies who have successfully implemented safety measures is critical to planning efforts. Frequently, local agencies are not sufficiently engaged during project identification and development to effectively implement the recommended measures. This case study shows how North Dakota DOT (NDDOT) and New Jersey DOT (NJDOT) are addressing this issue by including commitments in their Strategic Highway Safety Plan (SHSP) to:

- Encourage local agencies to develop safety practices.
- Increase the level of engagement of local agencies in statewide planning.
- Increase available resources for safety on local roads.

The first step is to identify existing commitments related to local agency participation. These are often listed in the state's SHSP. When reviewing the SHSP, a few questions to ask are:

- Does the state SHSP have data documenting the distribution of crashes across the state and local system?
- Is there a discussion of how local road safety fits into the total statewide effort?
- Is there a commitment to engage local agencies in statewide safety planning?

If this information is provided in the state SHSP, the local agency can contact the SHSP program coordinator to ask for information about how to participate in the safety planning process and develop safety practices. If not, the local agency can contact the state's SHSP program coordinator and advocate for local agency input to the next SHSP. An agency may offer to participate as either a member of an Advisory Committee and/or a representative of a statewide association of counties, cities, or metropolitan planning organizations (MPOs).

To increase the level of involvement, local agencies should collect updated data, participate in training and development, and request technical assistance and implementation support. A state DOT's commitment to increasing available resources for local road safety may include providing:

- Funding to support implementation of projects along local road systems (including, but not limited to, HSIP funds).
- Training and technical support for local agency staff.
- Accountability and performance measures to ensure funding and projects are correctly allocated and managed.
- Information about roadway safety issues to local practitioners.

The following examples show NDDOT's and NJDOT's commitment to local road safety.

NDDOT SHSP

As stated in the North Dakota SHSP, NDDOT successfully implemented and documented safety practices. *"The statewide Highway Safety Improvement Program will include all roads by increasing the level of engagement of local highway agencies in the HSIP. The specific steps that NDDOT will take to increase the level of participation by local agencies includes the following*:

- *Prepare safety plans for local systems around the state.*
- *Dedicate significantly more HSIP funds to improvements on local systems where the majority of fatal and injury crashes occur.*
- *Investigate and identify future data needs to support on-going participation by local agencies in the HSIP (for example, traffic volumes, traffic-control device inventories, video logs, etc.).*
- *Identify and then remove the barriers for local participation in the statewide HSIP, such as the current practice of deducting any HSIP award from the current formula driven distribution of federal aid.*
- *Identify needs and then provide safety training to local agency staff"* (NDDOT, 2013).

NDDOT provided technical assistance and funding to prepare safety plans for 53 counties and 12 cities in the state of North Dakota. In Fiscal Year 2017, the state allocated approximately 35% of its HSIP funding to support safety project implementation on local roads. In previous years, the allocation was only 2%.

NJDOT SHSP

NJDOT has increased available resources by committing funding and training/technical support to local agencies. The SHSP states, "(NJDOT)…*supports safety on local systems through the dedication of HSIP funds and by providing technical assistance"* (NJDOT, 2015).

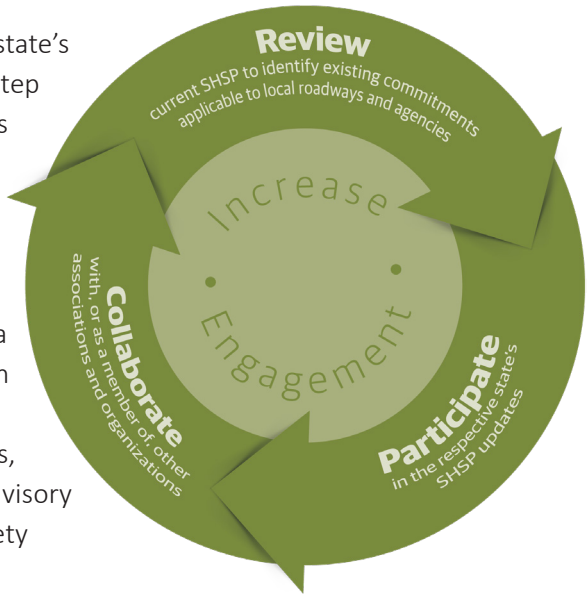
NJDOT has also incorporated a system for accountability and performance measures to ensure projects are correctly approved and managed. For example, local safety projects must be approved by a Technical Review Committee, made up of representatives from MPOs and staff from NJDOT's Local Aid, Environmental Services, and Safety Programs. The U.S. Federal Highway Administration (FHWA) also sits on the Committee as a non-voting member. Once the project is approved, NJDOT holds recurring meetings to track the project's progress and outcome.

NJDOT has provided training on using the Highway Safety Manual and preparing contract documents. Between 2013 and 2014 NJDOT funding for local roads increased from less than $4 million (2013) annually to an average of $25 million (based on a comparison of 2013, 2014, 2015, and 2016 HSIP reports [FHWA, 2013; 2014; 2015; 2016]).

Local Agency Action Items

NDDOT and NJDOT have successfully increased local agency participation in safety planning through close collaboration and engagement. To become engaged, a local agency could:

- **Review** the current SHSP to identify existing commitments applicable to local roadways and agencies.
- **Participate** in the respective state's SHSP update process. A first step could be to contact the state's SHSP coordinator to request more information and discuss opportunities for participation.
- **Collaborate** with or become a member of organizations such as NACE, the MPO, state and county engineer organizations, professional societies, and Advisory Committees to champion safety planning efforts.



Relevant Contacts

North Dakota
Shawn Kuntz
North Dakota Department of Transportation
(701) 328-2673

New Jersey
Daniel Lisanti
New Jersey Department of Transportation
(609) 530-5742

References

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CASE STUDY 2 –
Crash Mapping Analysis Tool

Problem

A lack of accessible/user-friendly data prevents local agencies from participating in statewide safety planning efforts.

Noteworthy Solution

Minnesota Department of Transportation (MnDOT) developed the Minnesota Crash Mapping Analysis Tool (MnCMAT) to increase the accessibility and user-friendly features of its crash data. MnDOT's Division of State Aid for Local Transportation partnered with the Minnesota Local Road Research Board and the Minnesota County Engineers Association to develop the analysis tool. MnCMAT is a web-based application that provides 10 years of crash data for public roads in Minnesota. Individual crashes are spatially located along public roadways and up to 67 pieces of information are provided for each crash.

MnDOT's original computer-based crash record system was used for more than 40 years and used reference points to locate features along a linear element. In addition to providing a location for each crash in the state, more than 15 data elements were documented from the investigating officers' crash reports, including:

- Highway system (state, county, city, and township).
- Route.
- Reference point.
- Date, day, and time.
- Severity.
- Crash causation.
- Weather.
- Road characteristics.
- Driver conditions.

The data output was provided to local agencies in response to requests for crash data. However, few local agencies used the data regularly because the output was not considered user friendly.

The concept of a crash mapping analysis tool was first developed in the 1990s by the Iowa DOT and Iowa State University's Center for Transportation Research and Education. Following a demonstration of the desktop-based mapping tool at a county engineer's peer exchange in 2006, MnDOT (with funding support from county engineers) and the Local Road Research Board modified the mapping tool to a web-based application meeting the crash data needs of Minnesota.

MnCMAT is currently used by Minnesota's city and county engineers, law enforcement, and other traffic safety experts to conduct analyses across state and local roadways. Users have access to crash data in multiple formats in addition to macroscopic (large scale coverage plus trends and statistics) and microscopic (small scale coverage showing crash details) analyses.

Key features include:

» Filters that allow analysts to select specific crash data elements—such as severity, type, roadway condition, driver conditions, and contributing factors (Figure 2-1).

» A multi-dimensional stacking function that shows locations with multiple crashes and uses colors to differentiate crashes by level of severity (Figure 2-2).

» Visual analysis tools including (Figure 2-3):
  – Charts.
  – Maps.
  – Reports.
  – Data files.

Relevant Contacts

Minnesota

Mark Vizecky
Minnesota Department of Transportation
(651) 366-3839

General
Minnesota Department of Transportation – State Aid for Local Transportation
(651) 296-3000

Local Agency Action Items

MnDOT has successfully developed a web-based system that improves crash data accessibility and analysis capabilities. To expedite the development of similar platforms, a local agency could:

» **Check** with state DOT and university research centers about the availability of similar tools.

» **Identify** data needs (agencies need support with data retrieval, management, or analysis) to understand what is essential for using web-based crash data.

» **Partner** with other local agencies and collectively request that the state DOT create web-based systems to access and analyze crash data.

Figure 2-1. Examples of the Crash Mapping Analysis Tool Filters

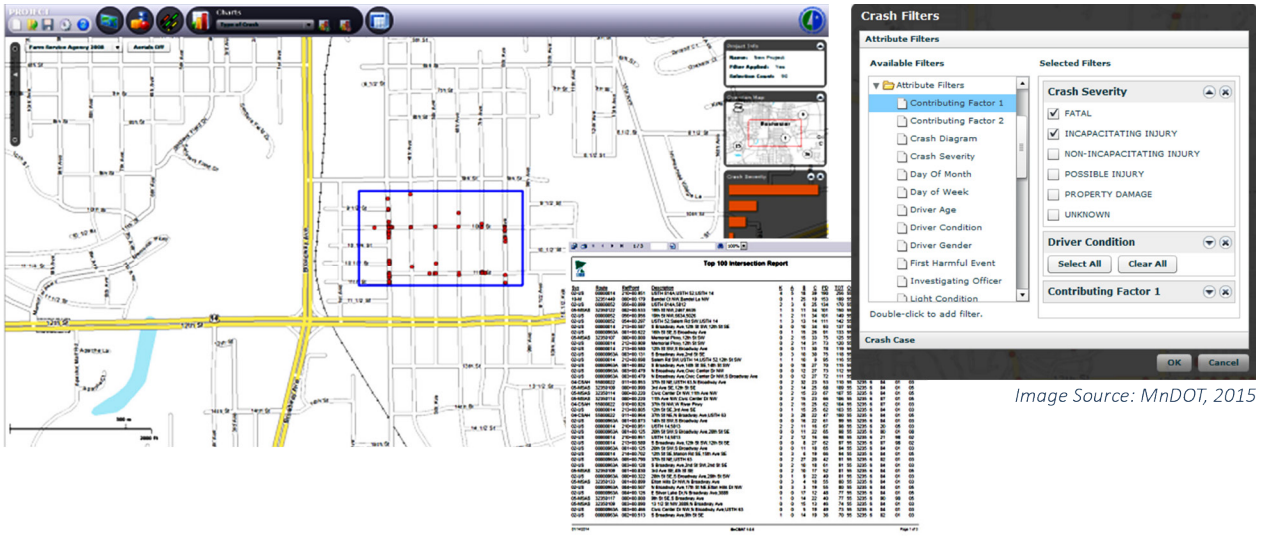

Image Source: MnDOT, 2015

Figure 2-2. Stacking Function of the Crash Mapping Analysis Tool

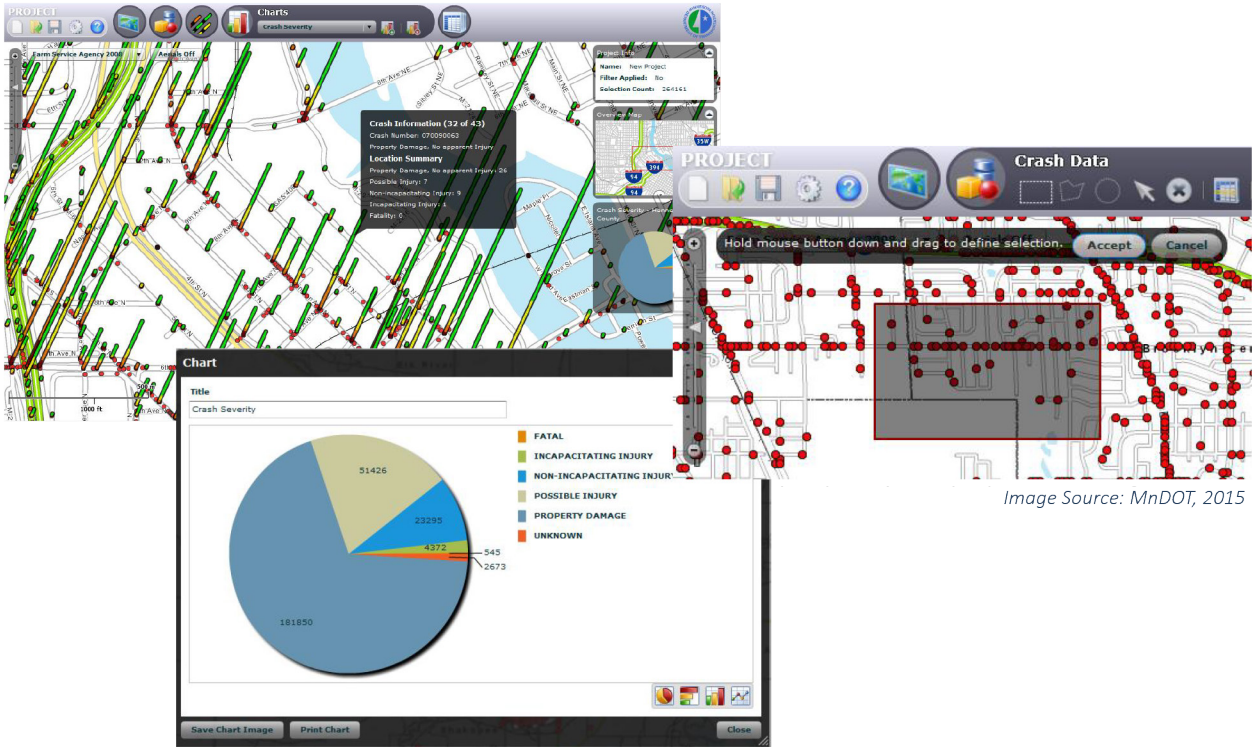

Image Source: MnDOT, 2015

Figure 2-3. Examples of the Crash Mapping Analysis Tool Reporting Capabilities

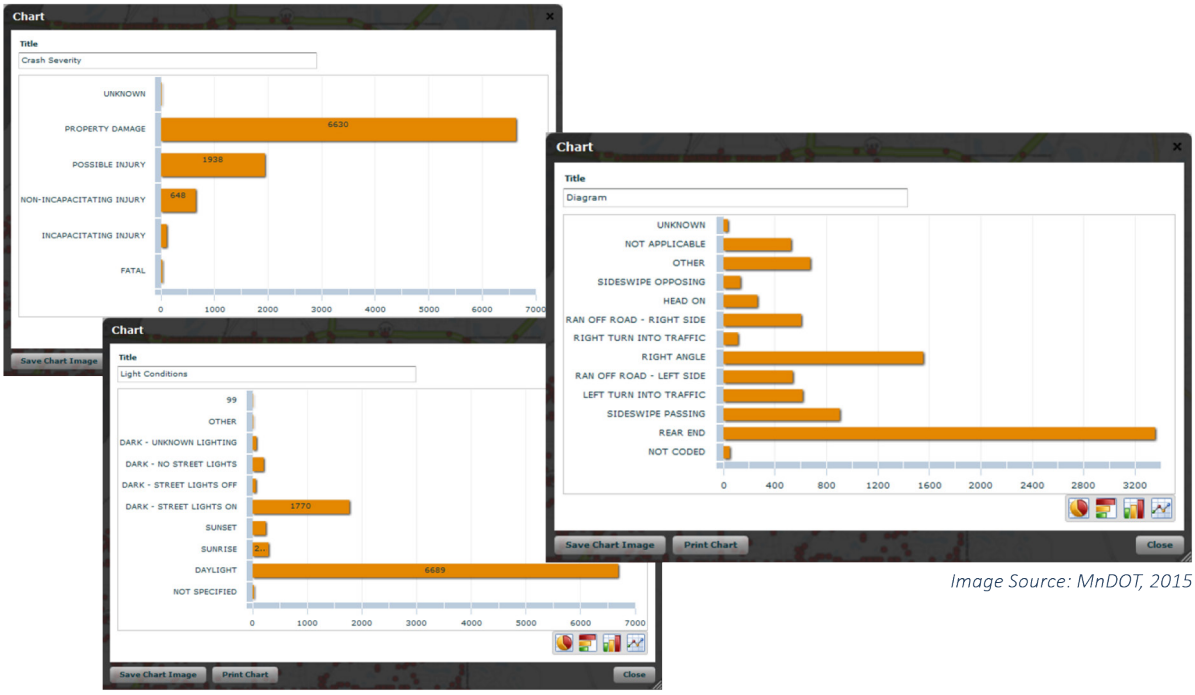

Image Source: MnDOT, 2015

References

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CASE STUDY 3 –
HSIP Application Guidance Document

Problem

The Highway Safety Improvement Program (HSIP) funding application process is a barrier for local agency staff due to the information required, a lack of prior experience with the process, limited resources, and competition for limited funds.

Noteworthy Solution

A funding process that considers the constrained resources of local public agencies and simplifies the funding applications is critical to enabling local agencies access to HSIP funds. One solution is to provide guidance to local agencies to help them successfully complete the application. The New Hampshire Department of Transportation's (NHDOT) *HSIP Manual and Guidance* (2013) document is a good example of this approach.

The purpose of the Manual is, *"to provide documentation and guidance to NHDOT staff and other safety stakeholders involved with implementing the HSIP in New Hampshire."* The Manual was developed by an HSIP Committee directed by NHDOT staff and includes representatives from NHDOT, U.S. Federal Highway Administration (FHWA), local state agencies, metropolitan planning organizations (MPOs), and regional development commissions.

The *HSIP Manual and Guidance* document includes an overview of key principles of New Hampshire's HSIP, including (NHDOT, 2013):

- The HSIP funding process directs resources to projects that are most likely to achieve results (crash reductions).
- The HSIP is data driven and directs safety funds to the most effective treatments at the locations with the greatest needs.
- Funding decisions are based on prioritization and identify projects with the greatest return.
- Safety funding is provided to projects that address Critical Emphasis Areas (CEAs) identified in New Hampshire's Strategic Highway Safety Plan (SHSP) (NHDOT, 2012). For example, crashes involving animals is an eligible CEA activity in MAP-21, but not in New Hampshire's current SHSP. As a result, HSIP funds would not be allocated for that purpose.
- HSIP funds are reserved for standalone projects targeting specific, high-priority safety needs whereas other federal funds are eligible to support and leverage the program for routine safety features and design elements. For example, providing safety features—such as guard rails, paved shoulders, and auxiliary turning lanes—that are generally included as part of a larger federal-aid project should be included in funding for the larger project, not HSIP.

The Manual also describes NHDOT's three-step HSIP selection process (NHDOT, 2013).

1. Eligibility

- Targets CEAs identified in the SHSP.
- Specifies a need for data-driven solutions with benefit/cost ratios greater than 1.
- Identifies candidate locations through network screening for high crash (fatal and serious injury crashes) or high risk (systemic assessment) and presents the results of road safety audits.

2. Prioritization

- Results of an incremental Benefit/Cost Analysis consider:
  - Value of expected safety benefits.
  - Countermeasure effectiveness.
  - Construction.
  - Maintenance costs and service life.

3. Optimization

- Optimizes available funding to implement the most effective projects.
- Allows program managers to adjust a prioritized list of projects based on project risk, completion date, and level of reduction for serious crashes.

NHDOT considers projects that are quick, low-cost, have minimal environmental and right-of-way impacts, and are expected to make significant improvements in safety to be the most effective. Even though systemic and non-infrastructure projects may not have all the data required, the HSIP Committee uses best judgment in fairly and equally evaluating them alongside projects with the necessary data. To help with this evaluation, the Manual includes the one-page Application Spreadsheet (Appendix B) that local agencies can use to provide the required information, including:

- Requesting agency and contact.
- Site description.
- Crash data.
- Traffic data.
- Improvement description.
- Economic evaluation (cost/benefit ratio, net benefits, and estimated annual fatal and severe injury crash reduction).

In addition, the NHDOT created a Highway Safety Improvement webpage (https://www.nh.gov/dot/org/projectdevelopment/highwaydesign/hwysafetyimprovements). Local communities and local agency staff can use this site to obtain additional information and guidance on the HSIP process

in New Hampshire (request forms, links to FHWA requirements, and the HSIP Manual).

Results

The availability of the HSIP Manual has increased the local agency level of engagement in New Hampshire's statewide safety planning. Currently, 10% of HSIP projects are implemented on the local system.

Local Agency Action Items

NHDOT has successfully resolved the funding application process barrier. To streamline its HSIP application process, a local agency could:

- **Identify** state DOT resources through the HSIP application process. Agencies can coordinate with the state's HSIP manager to identify available resources.
- **Collaborate** with or become a member of such organizations as DOT, FHWA, local agencies around the state, MPOs, state and county engineer associations, advisory committees, and regional development commissions to share resources and best practices.

Relevant Contacts

New Hampshire

Michael Dugas
New Hampshire Department of Transporation
(603) 271-2604
michael.dugas@dot.nh.gov

References

1. New Hampshire Department of Transportation (NHDOT). 2012. *Strategic Highway Safety Plan.*https://www.nh.gov/dot/projects/documents/2012_2016_strategic_highway_safety_plan_single_pages_suitable_for_printing.pdf. Accessed November 30, 2018.
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CASE STUDY 4 –
HSIP Application Preparation Assistance

Problem

Local agencies implement few Highway Safety Improvement Program (HSIP)-funded safety projects because project funding applications are seen as too complex and difficult.

Noteworthy Solution

To increase local participation in the HSIP process, the Minnesota and North Dakota DOTs developed Local Road Safety Plans (LRSPs) for each of the state counties (Refer to Case Study 10 for detailed information). To expedite project development, they provided local agencies with the HSIP project forms and required data for projects identified in the two state safety plans (approximately 14,000 specific actions at individual locations in Minnesota [Leuer, 2016, pers. comm.] and 3,000 actions in North Dakota [Kuntz, 2016, pers. comm.]). The project forms included the required information to describe the safety program for the funding application (Figure 4-1):

- Name of the submitting agency.
- Project description.
- Location information.
- Overview of crash data.
- Risk factors.
- List of safety strategies considered.
- Selected strategy and estimated implementation cost.

Local agency staff and DOT HSIP manager feedback on this successful program indicated:

- The application process is simple and encourages local agency participation.
- State DOT effort is reduced because returned applications are more consistent and complete.

Local participation in the North Dakota HSIPs increased after agencies received additional assistance (Kuntz, 2016, pers. comm.). In Minnesota 85% of the counties have secured HSIP funding for at least one project directly through the assisted applications (Leuer, 2016, pers. comm.).

Local Agency Action Items

Minnesota and North Dakota DOTs have successfully provided local agencies with HSIP project forms and relevant data. Local agencies facing complex HSIP funding applications could:

- **Contact** the state DOT to identify available HSIP application resources.
- **Collaborate** with other local agencies to standardize and streamline application instructions.
- **Identify** opportunities to modify application requirements.

Figure 4-1. HSIP Project Form Example

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

13th Ave NE from Intersection with 98th St NE to Intersection with ND 43

Agency Name: Bottineau County — **ND DOT District:** 4
Contact Name: Ritchie Gimbel — **Telephone Number:** 701-228-3698
Email Address: ritch.gimbel@co.bottineau.nd.us

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

Location Description

Start: Intersection with 98th St NE
End: Intersection with ND 43
Facility Type: 2-Lane
ADT: 606
Road Type Rural Paved
Length (miles): 10.4
County Road: No Designation
Local Name: 13th Ave NE

Lane Width: 12'
Speed Limit: High
Shoulder Width: 0'
Shoulder Type: None
Rumble Installed: No
Oil Project: No

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 EMS Capabilities to Increase Survivability
- ☐ Improve Intersection Safety

Describe Current Safety Issues & Systemic Ranking Review

North Dakota Crashes, 2009 - 2013 — 5 years

	Total	Road Dept	K+A
Crashes	31	19	2
Density (per mile per year)	0.60	0.37	0.04
Rate (per MVM)	2.70	1.65	0.17

	Value	Critical	Road
ADT Range	606	450≤ADT≤1000000	★
RD Density	0.365	0.054	★
Access Density	10.7	8.0	★
Curve Critical Radius Density	1.536	0.130	★
Edge Risk	2	2 or 3	★
			★★★★★

Describe Proposed Safety Improvements

Description	Type	Cost per mi	Mileage	Cost	Notes -
4" Edge Lines	Proactive	$1,320	0.0	$0	
6" Edge Lines	Proactive	$1,980	0.5	$1,030	
Edge Rumble Strip	Proactive	$5,850	9.9	$57,798	
Ground In Wet-Reflective Markings	Proactive	$36,000	0.0	$0	
Center Line Rumble Strip	Proactive	$3,600	0.0	$0	
6" Center Line	Proactive	$1,020	0.0	$0	

Project Cost Estimate (attach detailed copy)

Federal Funds	$52,945
Local Match (10% of Total project cost)	$5,883
Total Project Cost	**$58,828**

Proposed Year of Construction

NDDOT Central Office Only

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

Notes

23 USC 409
NDDOT Reserves All Objections

Page: 2
Segment ID: 503.01
Date: 3/18/2015

Image Source: NDDOT, 2017

Relevant Contacts

Minnesota
Derek Leuer
Minnesota Department
of Transportation
(651) 234-7372

North Dakota
Shawn Kuntz
North Dakota Department
of Transportation
(701) 328-2673

References

1. Kuntz, Shawn, North Dakota Department of Transportation (NDDOT). 2016. Personal communication with Howard Preston/CH2M HILL.
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