

Traffic Safety Improvement Program

STUDIES, RESEARCH, PUBLIC INFORMATION INITIATIVES Applications FY 2019



Received by August 15, 2017

STUDIES, RESEARCH, PUBLIC INFORMATION INITIATIVES FY 2019

Applications listed in order received.

Page No.	Applicant	Title/Subject	\$\$\$	
			Project	Request
4	Iowa DOT – Traffic and Safety	Statewide Multi-Disciplinary Safety Team (MDST) Facilitator Program	\$70,000	\$70,000
6	Iowa DOT – Traffic and Safety	Local Roads Safety Liaison Program	\$85,000	\$85,000
9	Iowa DOT – Traffic and Safety	Iowa Safety Circuit Rider Program Supplemental Support	\$20,000	\$20,000
11	Iowa DOT – Traffic and Safety	Road Safety Assessment Supplement	\$25,000	\$25,000
13	Iowa DOT – Traffic and Safety	Work Zone Sign Package Program Extension	\$60,000	\$60,000
15	Iowa DOT – Traffic and Safety	A Designer’s Guide to Accommodating Horse-Drawn Vehicles on Rural Roadways	\$55,000	\$55,000
19	Iowa DOT – Traffic and Safety	Grandparents Alliance for Safer Roads	\$95,000	\$95,000
24	Iowa DOT – Traffic and Safety	Roadway Safety Engineering Facts Sheets	\$35,000	\$35,000
26	Iowa DOT – Traffic and Safety	Speed Feedback Sign Loan Program - PHASE I	\$35,000	\$35,000
28	Iowa DOT – Traffic and Safety	Speed Feedback Sign Loan Program - PHASE II	\$120,000	\$120,000
30	City of Dubuque	Smart Traffic Routing with Efficient and Effective Traffic Signals	\$100,000	\$100,000
38	Iowa DOT – Traffic and Safety	Intersection Conflict Warning System for 2-Lane Highways	\$200,000	\$200,000
40	Iowa DOT – Systems Planning	Urban Safety Analysis and Outreach	\$50,000	\$50,000
42	Iowa DOT – Traffic and Safety	Best practices in Speed Management for Iowa	\$30,000	\$30,000

**STUDIES, RESEARCH, PUBLIC INFORMATION INITIATIVES
(Continued)**

Page No.	Applicant	Title/Subject	\$\$\$	
			Project	Request
45	Iowa DOT – Traffic and Safety	Developing Standard CMFs for Iowa	\$50,000	\$50,000
48	Iowa DOT – Traffic and Safety	Identifying Secondary Crashes	\$25,000	\$25,000
50	Iowa DOT – Traffic and Safety	Rail Crossing Safety Education	\$60,000	\$15,000
55	Iowa DOT – Traffic and Safety	Developing a Research Grade Work Zone Database	\$50,000	\$50,000
57	Iowa DOT – Design	Phase II of TSIP Process and Evaluation of Crash Costs	\$50,000	\$50,000
59	Iowa DOT – Design	Non-motorized traffic monitoring: Phase II	\$60,000	\$60,000
65	Iowa DOT – Design	Statewide/Bicycle Safety Media Campaign	\$25,000	\$25,000
73	Iowa DOT – Design	Automating Wrong Way Detection Using Existing CCTV cameras	\$80,000	\$80,000
78	Iowa DOT – Traffic and Safety	Cyberinfrastructure Enabling Safety and Mobility Discoveries	\$80,000	\$80,000
81	Iowa DOT – Traffic and Safety	Cameras and Analytics for Wrong Way Driver Detection	\$100,000	\$100,000
86	City of Waterloo	Waterloo/ Metropolitan Wide Bike Lane Traffic Safety Awareness Campaign	\$22,000	\$22,000
	Totals	25 Projects	\$ 4,376,750	\$ 1,537,000



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August, 5, 2017

Location / Title of Project Statewide Multi-Disciplinary Safety Team (MDST) Facilitator Program

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Safety Engineer

Complete Mailing Address _____

Phone 515-239-1349 E-Mail Jan.Laaser-Webb@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ \$70,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

Iowa's Statewide Multidisciplinary Safety Team (MDST) Program assists with the facilitation, development and operation of local multi-discipline safety teams to help identify and resolve local crash causes and enhance crash response practices in the state of Iowa. These teams include a wide range of local and state safety participants from various backgrounds. These professionals meet on a regular basis to discuss safety topics, problems, projects, and improvements along local roadways within regional areas of Iowa.

By coordinating communication and collaborating with other stakeholders, participants gain a broader perspective on safety issues and learn best practices from professionals outside their area of expertise. This ultimately leads to the development of solutions that may not have been considered otherwise.

The Statewide MDST program assists with a number of technical services that can help further develop existing safety groups, establish new relationships and foster growth of innovative and effective safety practices within the transportation community.

Project

One of the program's main goals is interagency collaboration and information exchange. This approach will improve communication on technical transportation issues among professionals from local governments, cities, counties, metropolitan planning organizations and regional entities and the DOT statewide. The program also assist MDSTs by providing technical briefs, technical reports, and research documents; technical and safety workshops; outreach and technology services; and traffic safety assessments.

More specifically, the program, organized and applied by the statewide MDST program facilitator, will continue with the following initiatives with existing and new MDSTs: promotion of the ongoing growth of a safety culture in Iowa; work with GTSB, DOT safety staff, and others to provide appropriate topics, presentations, crash maps, GIS data, workshops, contacts, and requested safety analysis for MDST meetings; attendance and involvement with meetings to keep current on safety related information and issues, as well as current research projects and studies to share with our safety partners and MDSTs; provision of crash summary data; facilitation of multi-disciplinary processes to identify safety issues and improvements; the provision of assistance, information, and support to promote and enhance the formation and active participation of area agencies in MDSTs; the development and/or evolution of MDSTs and the MDST website (to be used as a tool and resource for MDSTs and their members); development of marketing material; and creation of an MDST planning, operation, and management document for local safety groups.

The \$70,000 in funding requested will be used over a 12 month period and allow the continuation of the statewide MDST program facilitator.

Cost

Requested Funding: \$70,000

Proposed by: Theresa Litteral



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August, 5, 2017

Location / Title of Project Local Roads Safety Liaison Program

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa

Phone (515) 239-1349 E-Mail Jan.Laaser-Webb@iowadot.us
 (Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
 (Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ \$85,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

With funding from Iowa DOT, the Local Roads Safety Liaison program commenced in March 2008 as a new outreach effort to local governments (primarily counties). Although initially established as a tool to disseminate DOT safety program information and provide technical assistance to county engineering offices that had not been active in safety, the program has expanded to include training coordination and grant program assistance to both cities and counties.

This work continues to be accomplished through personal on-site consultations; assistance with grant awareness and funding applications; planning and delivery of training at workshops such as the Fall Safety Series; and presentations to engineering organizations, multi-disciplinary teams, and regional planning commissions. These efforts have helped strengthen the safety community and safety culture throughout Iowa.

Local governments in Iowa continue to experience budgetary difficulties and staffing shortages. Many agencies lack sufficient human resources and funding to attend formal safety engineering training, analyze safety issues, or address roadway safety concerns at a scale that matches the extent of their safety problems. Misperceptions such as lack of understanding of the social and economic costs of injury crashes often interfere with implementation of effective safety interventions. The Local Roads Safety Liaison program can continue to help fill these gaps from an impartial position.

Scope of Work

In addition to continuing the county-oriented outreach efforts funded in previous years, for FFY 2019 an expanded emphasis on medium-sized cities is proposed. This portion of the effort would focus primarily on the 20 Iowa cities with populations in the 20,000 to 100,000 range (Ames, Ankeny, Bettendorf, Burlington, Cedar Falls, Clinton, Council Bluffs, Davenport, Dubuque, Fort Dodge, Iowa City, Marion, Marshalltown, Mason City, Muscatine, Ottumwa, Sioux City, Urbandale, Waterloo, and West Des Moines). Although they comprise only 2% of the city governments in Iowa, they are home to 30% of the state's population. Over the past 5 years, 20% of Iowa's fatal and serious injury crashes (and 36% of all crashes) occurred in these twenty communities. In spite of these facts, most of the cities in this size range have rarely applied for DOT financial assistance to address their roadway safety problems.

In FFY 2019, it is also anticipated that a portion of the Safety Liaison's time will be devoted to developing outreach materials that city and county engineers can use to explain the purpose and need for safety improvements to elected officials and other decision makers.

Overall, the project will continue and expand previous initiatives including:

- Working with the Safety Circuit Rider, ITS/SDS, GT/STB, state MDST teams and DOT safety staff and training personnel to provide crash maps; conduct agency-requested safety analysis; and develop topics, presentations, and other content for workshops, conferences, and technical training sessions.
- Participating in Local Road Safety Plan implementation efforts directed at counties that have completed such plans.
- Working with local agencies to build technical and organizational capacity for "local solutions to local safety problems."

- Disseminating safety research findings to local agencies through face-to-face meetings, fact sheets, newsletter articles, and similar materials.
- Providing safety analysis support to local agencies upon request, using traffic studies and crash analysis tools to identify safety improvement opportunities, suggest appropriate interventions, and match these strategies with available funding sources.
- Assisting cities and counties with road safety assessments (including GTSB “high five” program assessment assistance).
- Participating in meetings and conferences to keep current with road safety information and issues, as well as current research projects and studies, to provide a knowledge base that can be shared with other safety partners.
- Providing general support for proactive, evidence-based approaches to roadway safety at the county and city levels, including systemic safety improvements.

The proposed project funding is based on professional staff time of approximately 80 hours per month.

Requested funding: \$85,000

Proposed by: John Shaw



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 5, 2017

Location / Title of Project Iowa Safety Circuit Rider Program Supplemental Support

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa

Phone (515) 239-1349 E-Mail Jan.laaser-webb@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ \$20,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

The Safety Circuit Rider program was created over 20 years ago as a strategy to bring safety training to local government agency personnel at their own place of work. The Safety Circuit Rider program was established as a part of the Local Transportation Assistance Program by a coalition including the Iowa DOT, Governor's Traffic Safety Bureau, Federal Highway Administration, and the Institute for Transportation at Iowa State University. It provides training in transportation safety to local agencies across the State of Iowa in such topics as work zone temporary traffic control, flagging, roadside safety, as well as permanent signing and pavement markings from the Manual on Uniform Traffic Control Devices. The circuit rider also serves as a technical resource and provides information and advice on problems and concerns related to these topics and conducts research in related areas.

Project

The program currently receives \$55,000 annually in Section 402 Highway Safety funds from the Governor's Traffic Safety Bureau. Over time the program has expanded and requires a budget substantially greater than that. In light of this, the Safety Circuit Rider program has been partially funded by the Traffic Safety Improvement Program at the Iowa Department of Transportation for many years. The funds being requested from the TSIP will help the program meet the safety training needs of Iowa's roadway workers in the future. Iowa's safety program of outreach and training to local jurisdictions is nationally recognized, and has been a model for similar positions in other states. The funding sought by this application will be used for labor and travel expenses for a one year period, beginning on January 1, 2018.

Requested funding \$20,000

Proposed by: David Veneziano



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 5, 2017

Location / Title of Project Road Safety Assessment Supplement

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa

Phone (515) 239-1349 E-Mail jan.laaser-webb@iowadot.us
 (Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
 (Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ \$25,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

The Iowa LTAP has responded to local agency and DOT requests for road safety assessments for many years. The expenses and labor for these activities have been supported with safety funds. This request for funding is intended to replenish and supplement the budget for these activities.

Project

There has been an increase in requests by counties and cities (plus DOT Districts and RPAs) in Iowa for Road Safety Assessments (RSAs). For example during 2017, a total of six RSAs have been requested and completed (or are in the process of being completed) for agencies throughout the state, and many of these reviews involve multiple sites or corridors. These requests have come from agencies that are seeking to be proactive in addressing safety at a site or sites that are of concern, even where there has been a lack of crash history. As RSAs are conducted and discussed more frequently in different locations throughout the state, this pace of requests is expected to continue. The funding requested here will support the organization, conduct, and documentation for RSAs. The funding sought by this application will be used for labor and travel expenses.

Funding Requested: \$25,000

Proposed by: David Veneziano



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 5, 2017

Location / Title of Project Work Zone Sign Package Program Extension

Applicant Iowa DOT

Contact Person Dan Sprengeler Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa

Phone (515) 239-1823 E-Mail dan.sprengeler@iowadot.us
 (Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
 (Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ \$60,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

The first year for this project was completed July 31, 2017 and this request for funding would continue this much needed program. The goal of the project is to make work zones safer for smaller cities by providing an avenue for the selected cities to receive a basic work zone sign package. The introductory year of the program saw 10 cities apply for and receive new work zone traffic control devices in compliance with the Manual on Uniform Traffic Control Devices (MUTCD) through the project.

Project

This project is directed towards Iowa cities with populations of 10,000 residents or less. These smaller cities often have budget shortfalls that result in the use of temporary traffic control devices for work zones that are old, faded and not in compliance with the requirements determined by the MUTCD. Eligibility for the program may potentially include smaller cities that have had staff attend an Iowa Work Zone Safety Workshop, sponsored by the Iowa DOT, within the last 3 years, (which is the recommended interval by Iowa DOT) or other criteria set forth by the Technical Advisory Committee. The cities that are awarded a sign package demonstrate a need for the devices and a commitment to work zone safety based on the application they submit for the project. Awarded cities are granted a work zone sign package that possibly includes:

- 4 – ROAD WORK AHEAD Signs
- 2 – ONE LANE ROAD AHEAD Signs
- 2 – BE PREPARED TO STOP Signs
- 8 – Portable Sign Stands
- 2 – Type III Barricades
- 16 – 28” Traffic Cones
- 10 – 42” Channelizer Cones with Bases
- 6 – ANSI Class 2 Safety Vests

Requested funding: \$60,000

Proposed by: Paul Albritton



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 6, 2017

Location / Title of Project A Designer's Guide to Accommodating Horse-Drawn Vehicles on Rural Roadways

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Safety Engineer

Complete Mailing Address 800 West Lincolnway
Ames, Iowa

Phone 515-239-1349 E-Mail Jan.Laaser-Webb@iowadot.us
 (Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
 (Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

Site Specific

Traffic Control Device

Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ 55,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

In the summer of 2017 the Iowa LTAP Center was asked to participate in a Road Safety Assessment in Buchanan County in the aftermath of a serious-injury crash involving four Amish schoolchildren, which occurred when a pony cart was struck by a motor vehicle (Figure 1). In 2016, a similar near-miss occurred in northeast Iowa when a road maintenance truck struck a pony cart; the cart overturned and a child became trapped when the truck came to a stop on her bonnet strings, but she escaped with only minor injuries.

Improved tracking of horse-and-buggy crashes was implemented in TraCS in January 2015. Since that time, 26 crashes have been reported. Severity levels were high, with 2 crashes resulting in fatalities, 4 serious injuries, 8 minor injuries, 4 possible injuries, and 8 property-damage-only crashes. Eight of the crashes (31%) occurred on the primary system, 15 on the farm-to-market system (58%), and 3 on the local system (12%). The crashes occurred in 11 Iowa counties: eight crashes in Davis County; three each in Buchanan, Howard, and Johnson Counties; two each in Mitchell and Van Buren Counties; and one each in Allamakee, Clayton, Lucas, Washington, and Wayne Counties.

These incidents highlight inherent conflicts between motor vehicles, horse-drawn vehicles, and pedestrians on rural Iowa roadways—and the need for engineering guidance to assist roadway designers in managing these conflicts to reduce risk for all road users.



Figure 1. On the morning of May 23, 2017 three children were injured when a pick-up collided with a pony cart on W13 in Buchanan County. Photo: KCRG.

According to the Young Center for Anabaptist and Pietist Studies at Elizabethtown College, the Amish population in Iowa currently numbers more than 9000, of which roughly half are children (this total includes all Amish groups that use horse-and-buggy transportation, but excludes car-driving groups such as the Beachy Amish and Amish Mennonites). Nationally, the Amish population has doubled over the past 20 years due to sizeable families (5 or more children on

average) and high retention rates (on average about 85 percent of Amish youth eventually join the church). In addition, some Iowa Mennonites are also non-users of motor vehicles; their numbers are not as well documented, but total perhaps 1000.

Amish and conservative Mennonite populations currently live in at least 13 Iowa counties, and the geographic extent of horse-and-buggy use is likely to grow as young Amish families seek out inexpensive farmland. As a result, it is likely that the number of roadway miles with mixed motor vehicle and horse-drawn vehicle traffic will continue to increase for the foreseeable future.

The use of horse-drawn transportation is a cornerstone of daily life in Amish and conservative Mennonite communities. Although the groups are not inherently opposed to technology, they adopt it very selectively through a gradual process of community deliberation. Cars have long been rejected because adherents believe car ownership would encourage people to drive away from home more often and worry that cars would give young people easier access to corrupting influences. In short, adherents fear that cars would pull their community apart. The use of horse-drawn vehicles is also a symbol of separation from mainstream society.

Preliminary information gathered for the Buchanan County RSA suggests that highway designers often have only limited understanding of the functional requirements for managing mixed traffic that includes horse-drawn vehicles. Notably, these roadways often serve several conflicting functions and vehicle types:

- Mobility for non-Amish residents and businesses: motor vehicle drivers who are familiar with the area and want to travel at speeds of 55 mph or higher.
- Tourist access to Amish businesses: motor vehicle drivers not familiar with the area, often traveling at 40-45 mph.
- Horse-drawn buggies and farm wagons, typically driven at 5-8 mph by adults.
- Pony carts, typically driven by children at 3-7 mph.
- Pedestrians, mainly children walking 1 mile or more along roadsides to reach Amish schools.
- Motorized agricultural equipment used by non-Amish farmers.

Importantly, the horse-drawn vehicles currently used by Amish and conservative Mennonite communities are not crashworthy. They have wide turning radii, limited outward visibility, long reaction times, and limited maneuverability.

Project

Preliminary investigation suggests that highway designers have limited awareness of these issues and the available design solutions. For example, the provision of wide paved shoulders in Buchanan County appears to have resulted in confusion about whether the shoulder is intended as a travel lane for non-motorized road users. Preliminary information suggests that many road users treat it this way, but it lacks corresponding signing and marking. Similarly, there appears to be disagreement about the appropriate width for paved shoulders, particularly if shoulder paving results in horse-drawn vehicles operating with two wheels on pavement and two on gravel. Similarly, there appears to be little designer awareness of the prevalence of pedestrians in Amish communities and appropriate pedestrian accommodation options for high-speed rural roadways.

In 2009, Intrans researchers completed a research report titled *Improving Safety for Slow Moving Vehicles on Iowa's High-Speed Roadways*. It provided important information on the scope of road safety issues affecting agricultural equipment and Amish/Mennonite vehicles, including issues such

as vehicle lighting and conspicuity. Nevertheless, the report was not a roadway design guide. In fact, most of the existing US and international design guidance related to mixed traffic focuses on the interaction of motor vehicles, bicycles, and pedestrians on urban streets. Therefore, the development of a guidebook that addresses horse-drawn vehicles on rural roadways is proposed. The guidebook will draw on all available prior research and will be developed in consultation with stakeholders including state and county roadway designers and the Amish/Mennonite community.

Requested funding: \$55,000

Proposed by: John Shaw



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 6, 2017

Location / Title of Project Grandparents Alliance for Safer Roads

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa

Phone (515) 239-1349 E-Mail jan.laaser-webb@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ 95,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

Young Iowans are bombarded with anti-safety messages that skew risk perceptions and foster a culture of thoughtless risk-taking. For example, there are dozens (perhaps hundreds) of helmet camera videos on YouTube depicting the excitement of weaving in and out of heavy freeway traffic on a motorcycle at extremely high speeds (sometimes over 140 mph) (Figure 2). In other popular online videos, teens in high-speed car chases successfully evade the police, bringing the imagery and themes of popular video games to life. For many young people, these images are reinforced by peer and adult remarks suggesting that speed limits are arbitrary, helmets are unnecessary, and driving while intoxicated is OK as long as you don't get caught. The mainstream media often deems traffic deaths and exceptional near-misses to be newsworthy, yet seldom discusses the life-changing injuries that are a more frequent outcome of risky road user behavior. In alternative media outlets, these ingredients are blended into a concoction that conflates high-speed driving, non-use of seatbelts, and reckless operation of off-road vehicles with *freedom*. The result can be anti-safety attitudes that last a lifetime.

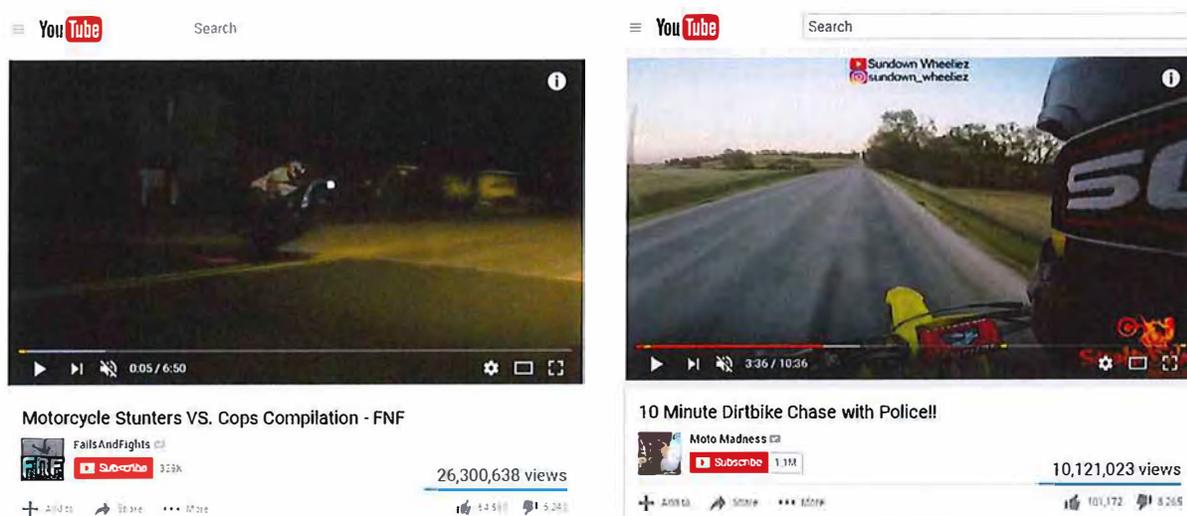


Figure 2. YouTube videos of real-life driving stunts have high view rates.

Iowa's Strategic Highway Safety Plan discusses the need to change attitudes and establish a positive safety culture, but the resources to accomplish this objective are few. For example, psychological research consistently shows that changing entrenched attitudes about speeding requires hundreds of repetitions of safety messages, but the scope of public outreach campaigns in Iowa is limited. Even when an audience is receptive to a safety message—for example when new parents shop for a child safety seat—the available resources are usually far smaller than the scale of the problem.

In business terms, solving this issue requires leverage. In military terms, a force multiplier.

Perhaps such a force multiplier exists. Grandparents all across Iowa are, by and large, healthier and more active any previous group of elders. Actively engaging them could bring much to the road safety discussion. Grandparents value life and health in a way that seems distant to children and teens. Grandparents have seen it all, and can speak with the authority and wisdom that comes only with experience. Strangely, even children who completely refuse to listen to their parents often pay attention when a grandparent has something to say. Perhaps most importantly, most grandparents

care deeply about protecting their grandchildren and making things better for the youngest generation.

Project

The long-term vision for the Grandparents Alliance for Road Safety is a statewide network of volunteers who can provide localized, carefully-targeted outreach on a wide range of road safety issues such as:

- Visiting expectant mothers to explain car seats and demonstrate how to use them correctly.
- Teaching preschoolers to cross streets safely, with fun and humor.
- Encouraging elementary school students to wear their bike helmets and use their brakes (not their toes).
- Demonstrating the principles of force and momentum in middle school science classes, and using these concepts to explain why seatbelts are essential.
- Speaking to teens about speeding, alcohol, and drugs with “been there, done that” frankness.

A few existing organizations touch on these issues to a degree. For example, a Kiwanis group in Ames periodically conducts bike rodeos in cooperation with elementary schools. What is needed is a dramatic expansion in the scale of the youth outreach efforts in terms of geographic coverage, age ranges served, and the number of times the safety messages are repeated and reinforced.

The vision of a scalable statewide network of pro-safety seniors cannot be accomplished overnight. “A journey of a thousand miles begins with a single step.” Therefore, this proposal seeks funding for a pilot program to engage grandparents in road safety issues in two Iowa communities, with a focus on delivering a pro-safety program for preschoolers.



“Stop, look, listen, think.”



“Wherever we go, we all know, to wear our helmets adjusted right, not loose or tight...”



“Now listen all you grownups, I hope you understand. To cross the road with me you’ve got to hold my hand.”



“[Children singing]: Everything you do, we’ll be watching you. Copy cat, copy cat.”

Figure 3. The Thingle Toodle video series empowers children (and parents) to take responsibility for transportation safety with silly characters and catchy songs. <http://www.tac.vic.gov.au/road-safety/tac-campaigns/thingletoodle/stop-look-listen-think>

More specifically, we propose to develop a cadre of seniors who can deliver a pro-safety message aimed at 3 to 6 year olds (and their parents). To avoid the time and expense involved in creating an entirely new set of collateral materials we believe it will be possible to license a set of exiting materials, such as one developed by TAC, the state auto liability insurance company in Victoria, Australia. This campaign features Thingle Toodle, a koala who teaches children to "stop, look, listen, think" as they cross roads safely, use seatbelts, and wear helmets on bikes, trikes and scooters. The characters and songs are pure silliness, infused with simple messages that encourage and empower children to act safely.

In addition to organizing distribution of Thingle Toodle DVDs and coloring sheets through preschools and kindergartens, Grandparents Alliance volunteers could support this road safety effort through classroom visits. In Victoria, these visits feature a costumed Thingle Toodle and his friend Professor E. Spearmint as they intermingle jokes, gags, and catchy songs with pro-safety messages and attitudes. In Victoria, these classroom visits are so popular with preschool teachers, parents, and children that they are booked years in advance.



Figure 4. Professor E. Spearmint and Thingle Toodle visit a kindergarten.

<https://www.youtube.com/watch?v=xfeLnwIM6XI>

The proposed two-year pilot project includes the following activities:

- Developing model chapters of the Grandparents Alliance for Safer Roads in two Iowa communities.
- Licensing the Thingle Toodle campaign from TAC and making minor modifications to adapt the graphics for Iowa conditions (for example, Australia is a left-hand-drive country so a few scenes in the videos will need to be digitally flipped to show driving on the right).
- Recruiting and training grandparent volunteers to organize in-classroom visits and distribute the safety campaign materials (DVDs and coloring books) to preschools and kindergartens.
- Conducting in-classroom visits with volunteer and/or professional actors.
- Conducting before-and-after assessments to gauge the acceptance and effectiveness of the effort.

Requested funding: \$95,000

Proposed by: John Shaw



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 6, 2017

Location / Title of Project Roadway Safety Engineering Facts Sheets

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa

Phone (515) 239-1349 E-Mail Jan.laaser-webb@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ 35,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

In recent years several roadway safety engineering techniques have begun moving from research into practice. Although in-depth studies about some of these techniques are available, city and county roadway designers and engineers often lack the time to read and digest academic studies, and seldom have ready access to academic journals. This can make it difficult for practitioners to determine which techniques are best suited for their situations. Since most of the national organizations that promote roadway safety engineering focus mainly on freeways and high-volume signalized arterials, safety engineering information relevant to rural highways and medium-volume city streets is not readily available. Objective information about methods to improve safety on gravel roads is particularly scarce.

Project

This proposed project will develop short (one to three page) summaries of approximately 10 techniques that are applicable to secondary and local roadways in Iowa. These briefs will encapsulate the scientific evidence about appropriate applications for each technique and its effectiveness, along with photos and practical information about public acceptance, costs, maintainability, longevity, and related issues. Where relevant, this information will be customized to the traffic, climate, and construction materials typically found in Iowa.

The topic list will be developed in consultation with Iowa DOT and local stakeholders. Possible topics could include high-friction surfacing, rumble strips/stripes, positive protection, speed management techniques, enhanced roadway delineation, effects of changing lane width, pedestrian and bicycle infrastructure, and various low-cost visibility and conspicuity enhancements.

Requested funding: \$35,000

Proposed by: John Shaw



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 7, 2017

Location / Title of Project Speed Feedback Sign Loan Program

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa

Phone (515) 239-1349 E-Mail Jan.laaser-webb@iowadot.us
 (Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
 (Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ \$35,000 (Phase 1); \$120,000
(Phase 2) = \$155,000 (total)

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

Speed feedback signs are used in a variety of situations. They have been implemented in work zones, school zones, and residential or commercial locations. Their impact on speeds have generally been shown to be a reduction from 1 to 10 miles per hour. These installations are also portable or permanent, post-mounted designs, or trailers. The project proposed below includes work toward the acquisition of speed feedback signs for loan to local agencies. At the same time the signs could be used for data collection and evaluation.

Project

It is proposed that this project develop a speed feedback sign loan program. Iowa LTAP would run the program and include these signs as part of its equipment "loan library". The primary objective of this project is to develop a program in a manner that makes the speed feedback signs as easily available to local agencies throughout Iowa as possible. It is suggested that the project be split into two phases and an indication of the funding involved for both phases are noted below. The first phase would be an investigation into the combination of the type of equipment to purchase (e.g., post mounted, trailers, or a combination of both) and how the organization and implementation of the program should be designed to allow widespread use. Some of the factors that might be considered in this phase would be the ability to install the signs by localities, cost of acquisition, liability for all parties, installation requirements, different methods to make the signs available, and how the potential impacts might be measured. Phase two of the project would include the acquisition of the speed feedback signs and the first year implementation of the program. The cost estimate for phase two is based on what is considered to be a conservative estimate of the equipment that might be acquired (i.e., six speed feedback trailers) along with the labor connected to program implementation. The actual equipment acquired will be determined in phase one of the project and the budget adjusted appropriately.

Requested funding: Phase 1 - \$35,000; Phase 2 – \$120,000

Proposed by: Keith Knapp



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 7, 2017

Location / Title of Project Speed Feedback Sign Loan Program

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa

Phone (515) 239-1349 E-Mail Jan.Laaser-Webb@Iowadot.us
 (Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
 (Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ _____

Safety Funds Requested \$ \$35,000 (Phase 1); \$120,000
(Phase 2) = \$155,000 (total)

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

Background

Speed feedback signs are used in a variety of situations. They have been implemented in work zones, school zones, and residential or commercial locations. Their impact on speeds have generally been shown to be a reduction from 1 to 10 miles per hour. These installations are also portable or permanent, post-mounted designs, or trailers. The project proposed below includes work toward the acquisition of speed feedback signs for loan to local agencies. At the same time the signs could be used for data collection and evaluation.

Project

It is proposed that this project develop a speed feedback sign loan program. Iowa LTAP would run the program and include these signs as part of its equipment "loan library". The primary objective of this project is to develop a program in a manner that makes the speed feedback signs as easily available to local agencies throughout Iowa as possible. It is suggested that the project be split into two phases and an indication of the funding involved for both phases are noted below. The first phase would be an investigation into the combination of the type of equipment to purchase (e.g., post mounted, trailers, or a combination of both) and how the organization and implementation of the program should be designed to allow widespread use. Some of the factors that might be considered in this phase would be the ability to install the signs by localities, cost of acquisition, liability for all parties, installation requirements, different methods to make the signs available, and how the potential impacts might be measured. Phase two of the project would include the acquisition of the speed feedback signs and the first year implementation of the program. The cost estimate for phase two is based on what is considered to be a conservative estimate of the equipment that might be acquired (i.e., six speed feedback trailers) along with the labor connected to program implementation. The actual equipment acquired will be determined in phase one of the project and the budget adjusted appropriately.

Requested funding: Phase 1 - \$35,000; Phase 2 – \$120,000

Proposed by: Keith Knapp



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: 08/07/2017

Location / Title of Project City of Dubuque /SMART TRAFFIC ROUTING WITH EFFICIENT AND EFFECTIVE TRAFFIC SIGNALS (STREETS)

Applicant City of Dubuque

Contact Person Dave Ness Title Traffic Engineer

Complete Mailing Address 50 W. 13th Street
Dubuque, IA 52001

Phone 563-589-4270 E-Mail dness@cityofdubuque.org
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ 100,000

Total Project Cost \$ 2,709,750

Safety Funds Requested \$ 100,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?

Yes – Explain _____

No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Dubuque

Signed: David Ness 8-8-17
Signature Date Signed

David Ness
Typed Name

Attest: Dwane Richter 8-8-17
Signature Date Signed

DWANE RICHTER
Typed Name

Smart Traffic Routing with Efficient and Effective Traffic Signals (STREETS)

I. PROJECT ABSTRACT

The goal of the Smart Traffic Routing with Efficient and Effective Traffic Signals (STREETS) project is to develop a smart, next-generation, traffic management and control system. This system will use traffic control strategies to enable dynamic traffic routing on ten corridors to maximize the use of existing roadway capacities in the Dubuque metro area. This project will be funded through a combination of funds from various agencies. The Dubuque MPO is requesting \$998,000 in funding from ATCMTD and is providing a match of \$1.71 million.

The project addresses the following TIDP Goals: Significantly accelerate the adoption of innovative technologies; Improve highway efficiency, safety, mobility, reliability, service life, environmental protection and sustainability; and Develop and deploy new tools, techniques, and practices to accelerate the adoption of innovation in all aspects of highway transportation

II. PROJECT DESCRIPTION

Project Details

The STREETS project includes four major tasks.

TASK A - Systems Engineering Concept - Develop a Systems Engineering (SE) model that will fully define the project and prepare detailed requirements and scope of services that are suitable for use in the procurement process of the following project tasks. Development of the SE model requires that vendors specify all of the components of the V model recommended by Federal Highway. The development of the V model should include constant and regular correspondence and input from project stakeholders including citizen groups, Dubuque County, City of Dubuque, Iowa Department of Transportation, Dubuque MPO, Dubuque School District, EMS groups, freight groups, and others as recommended. The consultant needs to communicate with project team members and stakeholders to ensure that inputs and outputs of the V model are acceptable for the stakeholders and that final results meet project expectations.

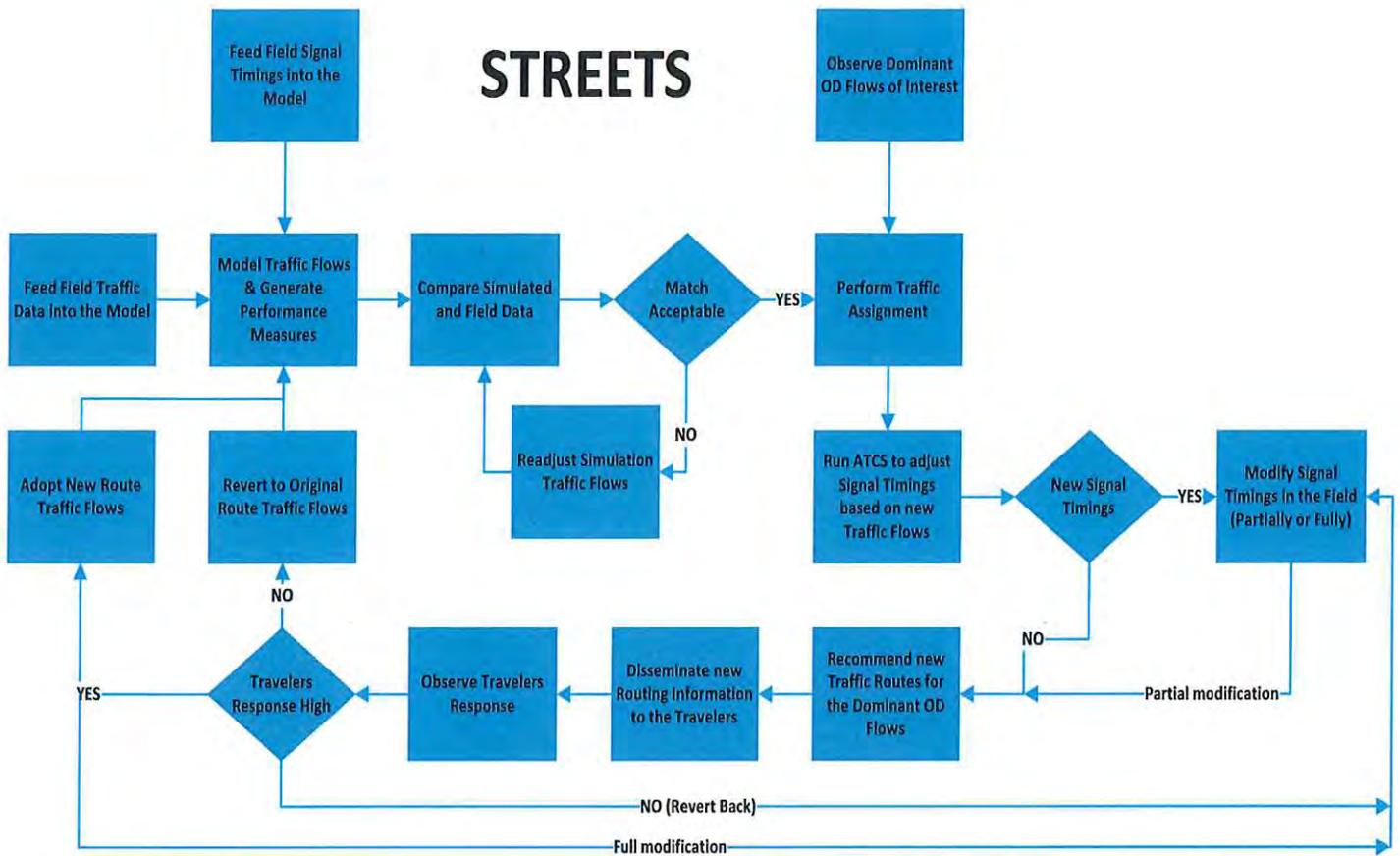
TASK B - Traffic Model – Develop a microsimulation traffic model of the Dubuque metro area (including all relevant roads and all of the signalized intersections) to represent existing traffic conditions. The model will be capable of replicating signal operations from the field and it will produce truthful outputs of the field traffic conditions (travel times, delays, etc.) so that following traffic assignments/routing can be executed based on verified data. The model will execute traffic assignments (reroute vehicles) based on the estimated/measured traffic impedances of the network links. Prior to integration in the STREETS system, the model will be calibrated and validated to confirm that field data are matched properly.

TASK C - Adaptive (Dynamic) Traffic Control System - Develop a new (or modify an existing) Adaptive Traffic Control System (ATCS) which will change signal timings in real-time after changes in traffic conditions are detected (by the STREETS system) for 57 intersections on ten corridors. The ATCS is expected to be fed by simulation data, recalibrated on field data in near real-time (e.g. 15 minutes), where its adaptive algorithm is triggered only after optimal traffic flows are determined through a traffic assignment procedure. Even then, signal timings must be adjusted in a partial and progressive fashion until it is observed that the proposed routing changes are implemented in the field.

TASK D - System Integration - Develop a framework to utilize existing data sources (and potentially new ones) to feed the above-mentioned model and recalibrate/revalidate it in near real-time. Define which data sources (video, detection loops, radar, etc.) should be used (and how) for model inputs and which ones should be used for recalibration of the model and validation of the routes adoption by travelers. Develop protocols and specs to define how those data will be integrated in the STREETS system.

The flow chart below provides overall project process.

STREETS



Project Objectives

- Reduce wear and tear on major corridors in the Dubuque metro area by distributing traffic more evenly throughout the metro area.
- Reduce congestion and improve safety in the metro area by dynamically rerouting traffic on the roads with extra capacities.
- Reduce/eliminate some of traffic bottlenecks.
- Reduce secondary vehicle crashes by identifying incidents and rerouting traffic onto detour routes.
- Provide data to all major agencies Including Emergency Management Systems, Police Departments, City and County Engineering, MPO, School district, and IADOT.
- Identify future projects that will improve safety and reduce congestion in the metro area.
- Measure the effectiveness of safety and congestion projects.
- Constant collection of traffic volumes on all major corridors for peak and off peak.
- Provide data for MPO performance measures including vehicle miles traveled and vehicle hours travelled for whole system and address performance measure for MPO process.
- Provide public with information 24/7 to make better travel choices.

Performance Measures

- Overall improvement in travel times
- Traffic flows at strategic points
- Comparison of travel speeds with posted speed limit
- Volume to Capacity ratio
- Emission rates
- Intersection delays
- Location of choke points on the network

Current Experience

The proposed project is the first of its kind and we cannot refer to any other system in the nation that provides similar outputs. Thus, it is difficult to cite any similar experiences from other places.

Benefits

The STREETS project intends to deliver an automatic system that gives the City staff the ability to monitor traffic operations and intervene as necessary, but does not require constant or significant manual operations. Ideally, if no significant traffic disturbance events occur, STREETS will run 24/7 without requiring operators to interfere manually with traffic operations. The project will reduce equipment costs at individual intersections by providing signal timings through a centralized Adaptive (Dynamic) Traffic Control System. The project will help the MPO measure the performance of the system by providing 24/7 traffic volumes at all major corridors and intersections.

The project will enable more equalized utilization of the available infrastructure. Currently drivers are unaware if an alternate route could reduce their travel time. This system, first of its kind, will give the city's operators the ability to help drivers to reduce their commuting time by efficiently utilizing existing road capacity. This project will help the MPO and City to identify future projects that will improve safety and reduce congestion in the metro area. The project will use the existing system to reduce congestion and improve safety in the metro area by rerouting traffic on the roads with extra capacities dynamically.

The STREETS project is a pilot project in the State of Iowa. Once implemented and tested it will be implemented in other parts of the state and could be used as a best practice for similar sized communities across the country.

III. INNOVATION PERFORMANCE

How will the innovation be monitored?

The data generated from Traffic model and Adaptive Traffic Control System (ATCS) will help to monitor and assess the system. The data collected can provide information like intersection delays, travel speeds on the corridors, and traffic volumes on the corridors. This data can be compared to the overall performance measures and make adjustments to the system if the performance measures are not met.

The system performance will be measured (this is what the SE process will define) before and after the system is implemented in the field. Specific performance measures, which can capture intended goal and true nature of the system, will be defined and compared in before and after conditions. This comparison will serve to assess success of the system in addition to other potential assessment methods (e.g. survey of the traveling public, local businesses, stakeholders, etc.).

The data generated from traffic model and ATCS depends on data coming through the feedback loop. The feedback loop will be designed to collect data from travel-time measurement systems, detection at signalized intersections (Wavetronix, Inductive loops), CCTV, and video detection devices. The data collected through feedback loop, traffic model and ATCS will be stored by the system to compare.

Timeline

TASK	Start Date	End Date
Task A: Systems Engineering Concept	August 17th, 2017	February 28th, 2018
Release of RFP for Task B, C & D		
Release of RFP	February 1st, 2018	March 9th, 2018
Selection of Consultant	March 9th, 2018	March 30 th , 2018

Contract approval	March 30 th , 2018	April 12 th , 2018
Task B: Traffic Model		
Model development	April 12 th , 2018	December 31st, 2018
Task C: Adaptive (Dynamic) Traffic Control System		
Approval of funding from FHWA		March 31st, 2018
Contract with IADOT		April 30th, 2018
Adaptive (Dynamic) Traffic Control System	May 1st, 2018	December 31st, 2018
Task D: System Integration		
Approval of funding from FHWA		March 31st, 2018
Contract with IADOT		April 30th, 2018
System Integration	May 1st, 2018	March 31st, 2019
Testing the project	April 1st, 2019	June 30th, 2019

IV. APPLICANT INFORMATION AND COORDINATION WITH OTHER ENTITIES

The project will be a partnership between Iowa Department of Transportation, Dubuque MPO and the City of Dubuque. The figure below provides the project organization structure.



Chandra Ravada will be the primary point of contact for this grant. His contact information is:
 Chandra Ravada
 Director of Transportation
 East Central Intergovernmental Association
 Dubuque, Iowa 52002
 Office: (563) 556-4166
 Mobile: (563) 213-0886
 Email: cravada@ecia.org

V. FUNDING REQUEST

This project will be funded through a combination of funds from various agencies. The Dubuque MPO is requesting \$100,000 in funding through Traffic Safety Improvement Program (TSIP). Table below summaries a breakdown of the estimated costs for the project and identifies funding sources and amounts.

Major Work Elements	Total Estimated Costs	Costs to ATCMTD	Other funds	Source of Cost Share
Project Management				
Dubuque MPO	\$60,000	\$48,000	\$12,000	City of Dubuque
City of Dubuque	\$60,000	\$48,000	\$12,000	City of Dubuque
Upgrades to Traffic Signals				

Traffic Signal Upgrades	\$500,000		\$500,000	\$320,000 - Dubuque MPO \$180,000 - City of Dubuque
Fiber	\$147,000		\$147,000	\$80,000 - Dubuque MPO \$67,000 - City of Dubuque
Systems Engineering				
Develop a Systems Engineering (SE) using V model	\$150,000		\$150,000	\$75,000 - Dubuque MPO \$75,000 - IADOT
Traffic Model				
Project testing and observation by FAU and INTRANS	\$20,000	\$16,000	\$4,000	City of Dubuque
Develop a microsimulation traffic model	\$450,000		\$450,000	\$325,000 - Dubuque MPO \$125,000 - IADOT
Adaptive (Dynamic) Traffic Control System				
Project testing and observation by Florida Atlantic University and INTRANS	\$30,000	\$24,000	\$6,000	City of Dubuque
Develop a new (or modify an existing) Adaptive Traffic Control System (ATCS).	\$450,000	\$360,000	\$90,000	City of Dubuque
System Integration				
Installation of Equipment and Connecting to ATCS				
Project testing and observation by FAU and INTRANS	\$15,000	\$12,000	\$3,000	City of Dubuque
Intersection software updates and install new equipment	\$612,750	\$490,200	\$122,550	City of Dubuque
Technology and Equipment for Public Update				
Project testing and observation by FAU and INTRANS	\$15,000		\$15,000	\$172,000 - Iowa CMAQ \$43,000 - City of Dubuque
Equipment	\$100,000		\$100,000	
Technology	\$100,000		\$100,000	
TOTAL	\$2,709,750	\$998,200	\$1,711,550	



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: 8/11/17

Location / Title of Project Intersection Conflict Warning Systems for 2-lane Highways

Applicant Iowa DOT / Office of Traffic & Safety

Contact Person Chris Poole Title Safety Programs Engineer

Complete Mailing Address 800 Lincoln Way
Ames, IA 50010

Phone (515) 239-1267 E-Mail chris.poole@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost	\$ <u>200,000</u>
Total Project Cost	\$ <u>200,000</u>
Safety Funds Requested	\$ <u>200,000</u>

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain See narrative

A. Application Certification: Not applicable

B. Narrative:

These funds will be used by the Iowa DOT's Office of Traffic and Safety to install approximately ten intersection conflict warning systems at rural two-lane, two-way stop-controlled intersections. Locations will be selected based on the potential to reduce broadside-type crashes, which often result in serious injuries or fatalities.

Funds may also be used to screen the roadway system for potential installation locations (likely via the state's SICL), develop construction plans, and study the effectiveness of the improvements over time.

C. Cost: \$200,000

D. Schedule: July 1, 2018 through June 30, 2020

E. Map: N/A

F. Pictures of the Site: N/A

G. Plan View: N/A

H. Aerial Photograph: N/A

I. Crash Reports: To be determined.

J. Traffic Volumes: To be determined.

K. Traffic Signal Information: N/A

L. B/C Ratio: Crash reduction factors in the range of 45-55%.



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: 8/11/17

Location / Title of Project Urban Safety Analysis and Outreach

Applicant Iowa DOT / Office of Traffic & Safety

Contact Person Chris Poole Title Safety Programs Engineer

Complete Mailing Address 800 Lincoln Way
Ames, IA 50010

Phone (515) 239-1267 E-Mail chris.poole@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ 50,000

Total Project Cost \$ 50,000

Safety Funds Requested \$ 50,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____

A. Application Certification: Not applicable

B. Narrative:

These funds will be used by the Iowa DOT's Office of Traffic and Safety to fund safety analysis and outreach efforts targeted at low- to medium-sized cities in Iowa. Potential uses of these funds include:

- Crash mapping and analysis
- Identification of safety risk factors
- Network screening
- Travel and attendance at meetings or conferences with city representatives and staff, regional planners, and other safety stakeholders
- Development and distribution of electronic or printed materials promoting awareness of urban safety issues, available countermeasures, and/or urban-focused safety programs

C. Cost: \$50,000

D. Schedule: July 1, 2018 through June 30, 2020

E. Map: N/A

F. Pictures of the Site: N/A

G. Plan View: N/A

H. Aerial Photograph: N/A

I. Crash Reports: N/A

J. Traffic Volumes: N/A

K. Traffic Signal Information: N/A

L. B/C Ratio: N/A



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 11, 2017

Location / Title of Project Best Practices in Speed Management for Iowa

Applicant Iowa DOT

Contact Person Jan Laaser-Webb Title Safety Engineer

Complete Mailing Address 800 West Lincoln Way
Ames, Iowa 50010

Phone (515) 239-1349 E-Mail Jan.Laaser-Webb@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ 30,000

Total Project Cost \$ 30,000

Safety Funds Requested \$ 30,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the Institute for Transportation

Signed:  8/12/2017
Signature Date Signed

Shauna Hallmark
Typed Name

Attest: _____
Signature Date Signed

Typed Name

Several speed management ideas were proposed at various 2017 quarterly traffic and safety meetings held at InTrans. This proposal combines the various ideas into one synthesis project.

The objective is to summary state of the practice and best practice for speed management in Iowa. This includes synthesizing best practices for setting speed limits and use of speed management countermeasures. Tasks would include:

- 1) Assess current state of the practice and best practices in setting speed limits. This would summarize information that can be used to address legislators and policy makers.
- 2) Summarize best practices in use of dynamic speed feedback signs (DSFS). DSFS have been shown to be effective in both urban and rural applications. However the devices are reasonably expensive so agencies need guidance on when they are the most appropriate rather than reacting to citizen requests for unilateral application. This task would summarize known research on their effectiveness in different roadway settings. Recommendations on the use specific to Iowa will be developed.



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 11, 2017

Location / Title of Project Developing Standard CMFs for Iowa

Applicant Iowa DOT

Contact Person Chris Poole Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa 50010

Phone (515) 239-1267 E-Mail chris.poole@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ 50,000

Total Project Cost \$ 50,000

Safety Funds Requested \$ 50,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the Institute for Transportation

Signed:  8/12/2017
Signature Date Signed

Shauna Hallmark
Typed Name

Attest: _____
Signature Date Signed

Typed Name

Several recent activities have been conducted to develop or identify crash modification factors specific to Iowa. The purpose of these activities is to ultimately provide guidance to the Iowa DOT or other Iowa agencies about which CMFs are the most appropriate for roadway and driver conditions unique to Iowa. These activities have included:

- Development of a webpage which synthesized all relevant research on CMFs for 3 areas (rural intersection, roadway departure, and speed management). This resource compiled information which can be used by agencies but did not assess whether the CMFs were appropriate for Iowa
- Development of CMFs for Iowa: this project is nearing completion and utilized Iowa data to develop CMFs for several countermeasures including the Safety Edge and rural lighting
- Identification of Iowa Specific CMFs. This project is also nearing completion and selected 5 countermeasures frequently used by Iowa agencies which did not have sufficient data to develop CMFs. A literature review was conducted and CMFs most appropriate for Iowa were selected.
- Development of risk factors: this project used Iowa crash data to identify roadway and driver characteristics associated with intersection and rural curves
- Development of SPFs for Iowa roadways.

The first objective of this project is to synthesize currently conducted research to ensure it is available in a format which is useful to the Iowa DOT. The second objective is to select additional CMFs of interest and develop a master list of recommended CMFs for Iowa agencies.

Accordingly the following tasks are proposed:

- 1) Summarize products resulting from current/existing research in Iowa, such as the items listed above. This will entail developing a master list of CMFs already developed and identifying projects which may lead to future CMFs.
- 2) Using the information from Task 1, work with a technical advisory committee to identify additional countermeasures where CMFs are needed.
- 3) Conduct literature reviews for the CMFs identified in Task 2 and select and recommend CMFs most appropriate for Iowa.
- 4) Develop a master list of recommended countermeasures which includes recommendations on which CMFs should be used. This includes CMFs by type of crash, situation (i.e. roadway departure, wet weather crashes), etc.
- 5) Update the synthesis webpage to include the updated information.
- 6) Develop a protocol for tracking existing and future installations of countermeasures so CMFs can be developed when sufficient after crash data are available.



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

 DATE: August 10, 2016

 Location / Title of Project Identifying Secondary Crashes

 Applicant Iowa Dot

 Contact Person Steve Gent Title Director Traffic & Safety

 Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa

 Phone (515) 239-1129 E-Mail steve.gent@iowadot.us
 (Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

 Phone _____ E-Mail _____
 (Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:
Application Type

 Site Specific
 Traffic Control Device
 Safety Study
Funding Amount

 Total Safety Cost \$ 25,000

 Total Project Cost \$ 25,000
Safety Funds Requested \$ 25,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project?

 Yes – Explain _____
 No

Background

Secondary crashes are incidents which occur within the scene of a primary incident or within the queue of an incident in either direction of travel. Previous research has shown that the likelihood of a secondary crashes increases by 1.2 to 2.8% every minute until an incident is cleared. The longer an incident takes to clear the roadway significantly impacts the occurrence of these types of crashes which pose both a safety and mobility problem for motorist. The Iowa DOT has made it a priority to address secondary crashes to improve safety and mobility. Because of the increased awareness, multiple other agencies, including state patrol, have sent requests for secondary crash information as well as the national trend of including secondary crashes in traffic incident management (TIM) performance measures. The extent of how often secondary crashes occur in Iowa can be difficult to extract from existing databases. Secondary crashes can currently be identified by either using the crash data or ATMS data from the traffic management center. Both databases have different limitations but are maintained independently. This can make reporting of the secondary crashes difficult and results vary based on the source of data.

The crash report has a field which law enforcement officers can use to identify secondary crashes. The identification by law enforcement is subjective and severely limited because there must be direct observation of the queue or awareness of an incident upstream. In cross-jurisdictional situations, an officer may not be aware of an incident upstream that is being handled by another jurisdiction. The DOT has attempted to use additional fields from the crash report to identify secondary crashes including various types of contributing circumstances which could indicate a queue was present (ex. non-highway work, traffic backup, and disabled vehicle). These values are still subjective to the officer, requires observation of the contributing circumstance, and may be due to recurring congestion.

The traffic management center (TMC) tracks secondary crashes in the advanced transportation management system (ATMS). The TMC has a wider perspective of overall traffic conditions and can more accurately identify secondary crashes, especially in cross-jurisdictional locations. While this database may have higher accuracy in identifying secondary crashes, the TMC still requires direct observation of the incidents. With cameras only located in the metro areas across Iowa, they are limited in the ability to identify secondary crashes outside of those areas.

Project

This project will investigate the ability to identify secondary crashes by fusing data from multiple sources. Secondary crashes do not have to be the result of another crash but could be a stalled vehicle, or a traffic queue outside of everyday occurrences. The Iowa DOT has access to multiple datasets, including third party data, which can be fused to better identify secondary crashes. The potential data sources available include crash data, ATMS data, crowdsourced data (Waze), speed sensors and probe data.

By including speed data from either sensors or probe data, an objective approach can be applied to identify the presence of queues which can then be used to identify secondary crashes. Using the INRIX data, the duration of congestion can be found for each incident and then used to classify a crash as secondary. In addition to identifying a secondary crash, the cause of the crash can be identified such as a stalled vehicle, an upstream crash, or a non-recurring traffic queue. A sensitivity analysis will also be conducted to determine the spatial and temporal extents that can be applied to identify secondary crashes. Ultimately, a methodology will be recommended which can be applied quarterly or annually to identify secondary crashes across the state.

Cost

\$25,000

Prepared by: Skylar Knickerbocker



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

 DATE: 8/14/17

 Location / Title of Project Rail Crossing Safety Education Support

 Applicant Iowa DOT Office of Rail Transportation

 Contact Person Phillip Meraz Title Regulation and Analysis Program Coordinator

 Complete Mailing Address Iowa DOT: Office of Rail Transportation
800 Lincoln Way, Ames IA 50010

 Phone 515-239-1420 E-Mail phillip.meraz@iowadot.us
 (Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

 Phone _____ E-Mail _____
 (Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:
Application Type

 Site Specific
 Traffic Control Device
 Safety Study
Funding Amount

 Total Safety Cost \$ 60,000

 Total Project Cost \$ 60,000
Safety Funds Requested \$ 15,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain Part of the State of Iowa Highway-Rail Grade Crossings Safety Action Plan (2012)

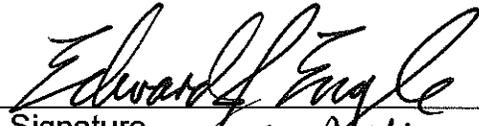
No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

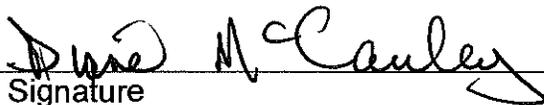
To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the Iowa Department of Transportation, Office of Rail Transportation

Signed:  8/14/17
Signature *For Phillip Meraz* Date Signed

Edward J Engle
Typed Name

Attest:  8/14/17
Signature Date Signed

Diane McCauley
Typed Name

A

In 2010, the Federal Railroad Administration (FRA) identified Iowa to be among the top ten states for the number of railroad crossing collisions. Due to this fact, federal legislation 49 CFR part 234 mandated that the state of Iowa research and create a rail crossing safety action plan. The plan prepared by the department's Office of Rail Transportation was approved by the FRA in 2012 and can be found at: <https://iowadot.gov/iowarail/safety/crossing-safety>

B

The *State of Iowa Highway-Rail Grade Crossing Safety Action Plan* recognizes "education" as one of the four action categories. The main component of the department's educational effort is a working partnership with Iowa Operation Lifesaver (OL); a non-profit education and awareness program dedicated to ending tragic collisions, fatalities, and injuries at highway, rail grade crossings and on railroad right-of-way.

Historically, OL has conducted free presentations for small groups such as driver's education classes and civic organizations. These programs, conducted by certified volunteers, are the "public face" for railroad crossing safety and an integral part of the educational efforts in Iowa. However, the majority of the funding is used for presentation materials and handouts leaving inadequate resources for advertising and building the program.

To broaden the reach of their message, the OL board has modified their approach to add a focus for larger venues such as the Iowa State Fair and the Farm Progress Show. This past year they have grown their presence on social media, have a standing morning announcement on Iowa Public Radio, added the Thresher's Reunion as a large venue event, and participated in a week-long "community safety blitz" in Council Bluffs. In the upcoming years they would like to add a television commercial spot during in-state rivalry college football games.

Using this strategy they have drastically increased the number of people contacted each year from thousands to tens of thousands. These more informal educational contacts have also increased the number of formal small group program opportunities.

Because of the implementation of other action items the reduction of deaths that can be attributed to these programs is not easily quantifiable. However, OL is accepted by the FRA as a *significant* contributing factor for the downward trend in rail crossing collisions over the past 30 years.

The objective for the use of this requested funding is to better support the department's partnership with OL by:

- Purchasing needed presentation materials and equipment for dozens of volunteers
- Providing vendor fees for large-scale events
- Increasing their visibility and media campaign

Railroad Crossing Safety Education Support

- Funding community “blitzes” in areas that demonstrate high-risk driving behavior or have imminent events near railroad right-of-way

It is anticipated that continuing these educational initiatives will increase the number of lowans being educated and raise awareness of the safety issues at railroad crossings.

C

As a non-profit organization, the amount of funding currently being used for OL operations changes from year to year. All funding comes from contributions. Last year’s funding was approximately:

\$28,000	provided by \$7/crossing request from the railroads operating in Iowa
\$2,000	provided by the Iowa Association of Railroad Passengers
\$0	provided by private corporate donation
\$10,000	provided by Iowa DOT TSIP (\$10,000 is provided for FY 2017)
<u>\$0</u>	The National OL organization no longer contributes to the states due to federal cutbacks
\$40,000	

These Funds have been used for operations, displays, and materials for presentations by volunteer labor in an organization with one staff member employed one-quarter time. The estimated costs for usage of the requested funds are:

\$8,000	presentation materials and equipment
\$7,000	vendor fees
\$4,000	marketing and transportation costs for community blitzes
<u>\$11,000</u>	production and on-air time during in-state rivalry football games
\$30,000	

D

These funds will be used throughout a 12-month period beginning July 1, 2018 and ending June 30, 2019.



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 15, 2017

Location / Title of Project Developing a Research Grade Work Zone Database

Applicant Iowa DOT

Contact Person Willy Sorenson Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way
Ames, Iowa 50010

Phone 515- 23 9 - 1 21 2 E-Mail willy.sorenson@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ 50,000

Total Project Cost \$ 100,000

Safety Funds Requested \$ 50,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

A. APPLICATION CERTIFICATION(S) or RESOLUTION(S) – N/A

B. NARRATIVE

Currently, the lack of broadly available information on current and historical work zone activities is one of the key limiting factors in proactive work zone management. There is an urgent need for developing guidance and methods to collect, store and utilize work zone activity data, as well as to develop a set of effective work zone management plans and applications. This includes paper and electronic information collected on the type of work, place of work, materials, work phasing, traffic counts, accidents, costs, and others. While some of this information is being collected through daily work report systems, it is not being compiled, analyzed, consumed, or applied to effectively improve work zone safety and operations.

The research team at Iowa State University (ISU) and the Institute for Transportation (InTrans) recently completed a nationwide survey to understand the current practices of daily work reports (DWR) data collection, utilization, level of automation of various analyses, and challenges for better collection and utilization of DWR data. While collecting data regarding the specifics of the construction site is necessary and beneficial, this information is not comprehensive nor easily integrated with other data systems which may be used for improving work zone safety and operations. Other types of information, including, but not limited to, distance of the work area, average daily traffic (ADT), speed, signage, access points, resource needs, types of traffic control, presence of law enforcement, public notification through 511 and other sources, may be available but collected in other systems, either paper based or electronic. The *lack of resources* or the *availability of limited resources* is one of the factors that have forced the state DOTs to use outdated systems, either paper based or digital, but not useful for the purpose of traffic analysis, prediction, control, and management.

As a part of this project, the research team will: a) investigate current data collection techniques used on highway construction sites; b) develop effective data recordkeeping practices for work zone activities; and c) design a set of effective practices and recommendations that can be used to measure work zone safety performances and evaluate strategies to address the safety impacts of the work zones.

This research will result in explicit recommendations for the Iowa DOT to better collect, compile, analyze, consume, and apply information from, around, and about work zones to improve safety.

C. ESTIMATED COST - \$100,000 TOTAL
\$50,000 (TSIP) and \$50,000 (SWZDI, tentative)

D. TIME SCHEDULE – July 1, 2018 to December 31, 2019 (18 months)



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 15, 2017

Location / Title of Project Phase II of TSIP Process and Evaluation of Crash Costs

Applicant Iowa State University Institute for Transportation

Contact Person Chris Poole Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way

Ames, Iowa 50010

Phone (515) 239-1 267

(Area Code)

E-Mail chris.poole@iowadot.us

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____

(Area Code)

E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

Site Specific
 Traffic Control Device
 Safety Study

Funding Amount

Total Safety Cost \$ 50,000

Total Project Cost \$ 50,000

Safety Funds Requested \$ 50,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____

No

A. APPLICATION CERTIFICATION(S) or RESOLUTION(S) – N/A

B. NARRATIVE

The Traffic Safety Improvement Program (TSIP) allocates Traffic Safety Funds (TSF) for site-specific improvements and the installation of traffic control devices. These funds, which are available for use by city and county governments, as well as the Iowa DOT, require completion of an application that justifies the need for the project. In the case of site-specific improvements, applications require an estimate of the magnitude of the safety problem at the candidate location, including a summary of motor vehicle crashes over the most recent three to five year period. Applicants are also required to estimate the anticipated reduction in crashes, as well as the associated crash cost savings that would be realized as a result of this reduction.

Several technical issues arise with respect to this process, creating potential confusion and inconsistency across applications. While companion work is identifying the most appropriate crash modification factors (CMFs) for use in Iowa, several issues warrant further investigation. First, there has recently been extensive discussion regarding how best to quantify the costs of traffic crashes and there is significant variability in the dollar values used by various state DOTs. Anecdotally, there is also confusion in terms of how the TSIP worksheet should be used as some of the costs are per crash while others are per injury/fatality.

As a part of this Phase 2 effort, CTRE will investigate the existing, national state of the practice regarding the TSIP application process. Emphasis will be on identification of potentially more consistent, systematic and automated, e.g. web-based, application approaches as well as evaluation metrics.

CTRE will also consult with the Iowa DOT to examine common issues that arise as a part of the application process and determine how such issues may be avoided through process improvements. This will include consideration of technical issues including the application of CMFs (particularly when multiple treatments are applied), the assignment of crash costs, and related issues such as service life determination and the assumption of traffic growth rates. CTRE will summarize the findings and provide recommendations to the Office of Traffic and Safety. CTRE will work with the Office of Traffic and Safety to draft possible TSIP application alternative and corresponding timelines for implementation.

C. ESTIMATED COST - \$50,000

D. TIME SCHEDULE – July 1, 2018 to June 30, 2019 (12 months)



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: 11 August 2017

Location / Title of Project Non-motorized traffic monitoring: Phase II

Applicant Sam Sturtz

Contact Person Sam Sturtz Title Transportation Planner

Complete Mailing Address 800 Lincoln Way

Ames, IA 50010

Phone 515.233.7801 E-Mail samuel.sturtz@dot.iowa.gov
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) Cara Hamann and Steve Spears

Contact Person Cara Hamann Title Faculty Associate

Complete Mailing Address 145 N Riverside Dr

Iowa City, IA 52242

Phone 319.384.1513 E-Mail cara-hamann@uiowa.edu
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

Site Specific
Traffic Control Device
Safety Study

Funding Amount

Total Safety Cost \$ 60,000

Total Project Cost \$ 70,000

Safety Funds Requested \$ 60,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____

No

B. NARRATIVE

Monitoring of non-motorized traffic (bicycles and pedestrians) is needed for project evaluation (e.g., before/after impact studies) and planning as well as computation of crash exposure rates, which can then be compared over time. However, bicycle and pedestrian counts are currently being collected on a very limited basis in Iowa (e.g., project specific or limited 2-hr counts), not allowing for estimation of figures such as bicycle and pedestrian miles traveled (BMT and PMT), as is traditionally done with vehicles in the form of VMT. Phase I of this project involved piloting a counting program in the greater Cedar Rapids area, starting with a limited number of count sites.

Project objective

We propose the expansion and maintenance of a non-motorized traffic monitoring program in the Cedar Rapids area to estimate bicycle and pedestrian miles traveled (BMT & PMT) and measure the safety impact of bicycle and pedestrian improvements (before/after studies).

The long-term goal of this project is to establish a statewide non-motorized traffic monitoring program. We expect this goal to be accomplished through several phases. The current application is Phase II of the project, to be conducted in the greater Cedar Rapids metropolitan area, working with the Corridor MPO. The objective is to continue 24 short duration counts (1 week at each site) and one continuous count location, established in Phase I (FY 2017) and expand the program in FY 2018 to include two more continuous count locations, as well as 10 more short duration count sites, which will focus on hot spot bike or pedestrian crash locations. Additional phases/years (beyond the scope of the current proposal) will include further expansion of the number of short and continuous count locations within the Cedar Rapids area and also to other selected locations throughout the state.

Counting technology

Based on Phase I of this project (FY2017) we would like to continue with the use of tube and infrared counters for the short duration counts and loop and infrared counters for the continuous counter locations. The tube counters are capable of counting bicycles along with their speed, and direction. The vendor we would like to order additional counters from is [Eco-Counter](#). Eco-counter products are currently in use for Phase I, and we have price quotes from them for the additional counting technology needed for Phase II (2 continuous count sites with 2 counters each and one additional short duration count system). Eco-Counter products include user-friendly wireless data transmission and data analysis software resources in the price of the counter.

Site selection and crash data

We will work with Brandon Whyte (Corridor MPO Non-motorized transportation planner), as well as representatives from the Corridor's cities (Cedar Rapids, Marion, Hiawatha) to select the additional 10 short duration count sites, focusing on problem areas by using crash data from the past five years (Figure 1). Figure 1 shows an overlay

of our Phase 1 count locations, as well as the pedestrian- and bicycle-motor vehicle crash locations from the past 5 years. Although there is some overlap, our Phase 1 locations leave some gaps relative to problem crash areas. Phase I site selection was based primarily on locations with high bicycle and pedestrian volumes and/or locations with planned improvements (e.g., future bicycle lane installation). Therefore, we propose a Phase II focus on problem crash areas, to round out the diversity of count locations within the Cedar Rapids metro area.

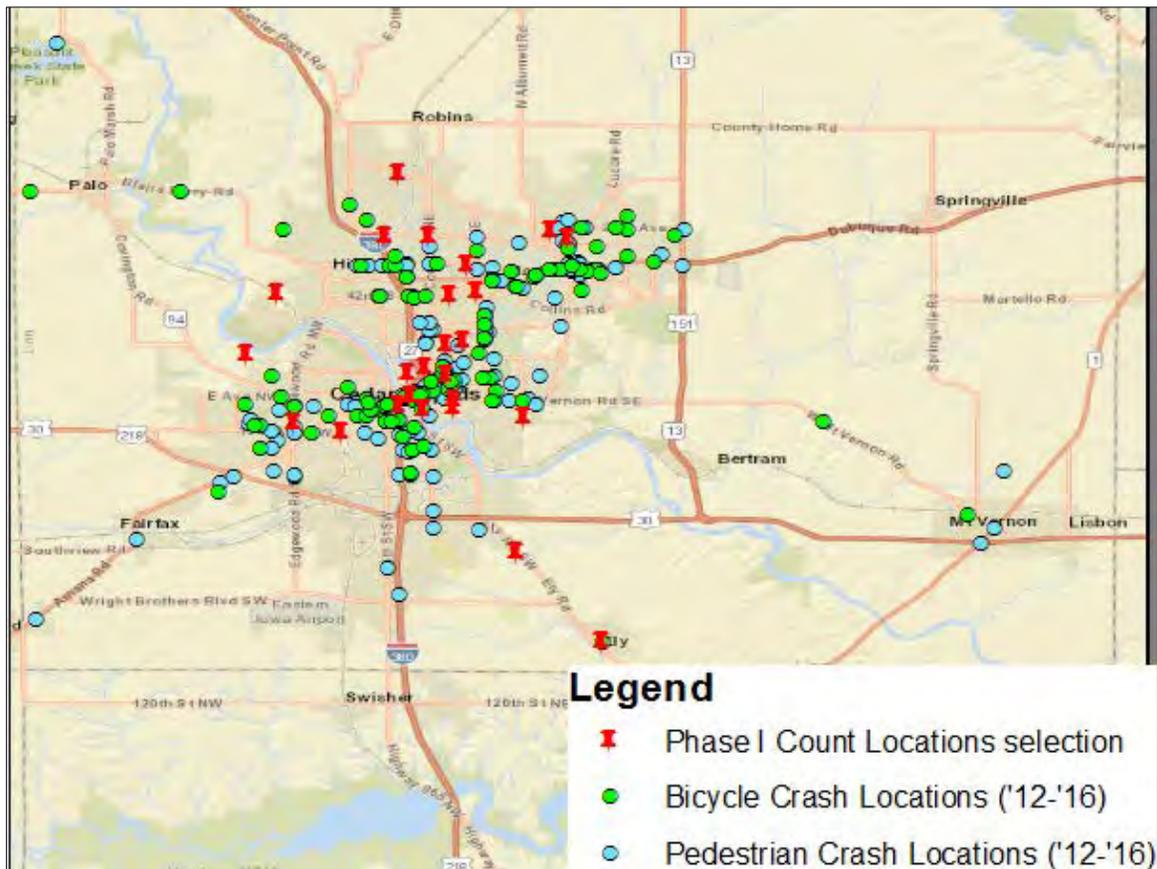


Figure 1. Phase I Count Locations and Bicycle- and Pedestrian- Motor Vehicle Crash Locations, 2012-2016, Greater Cedar Rapids Area

We have already identified many potential problem corridors, which have repeated pedestrian or bicycle crash patterns over the past five years. For example, 1st Ave NE in Cedar Rapids and US-151 BR/7th Ave in Marion.

Continuous counts are needed to optimize estimates, as they provide the data needed for adjustment factors for season and weather. Therefore, Phase II will focus add two additional continuous counter locations that offer variation compared to the Phase I location, which is located on a trail. For one of the continuous counter locations, we are planning to use 3rd Ave SW, Cedar Rapids, between 3rd St SW and 4th St SW. This location was recently converted from a one-way to a two-way with parking protected bike lanes in both directions. The second continuous counter location will be selected in

consultation with the MPO Bicycle and Pedestrian coordinator, but we plan to choose another on-road location.

We will also use available bicycle and pedestrian counting program recommendations to guide our site selection and estimation of BMT and PMT. These include Chapter 4 (Traffic monitoring for non-motorized traffic) from the [2013 Traffic Monitoring Guide, TRB Circular E-C183](#) ('Monitoring bicyclist and pedestrian travel and behavior'), as well as online resources available through the [Portland State University Initiative for Bicycle and Pedestrian Innovation](#). These resources indicate that a combination of short duration and long duration counts is preferred, but stress the importance of a variety of continuous counter locations (multiple uses—commute, recreation; urban/rural/suburban, etc.).

Reporting

We will prepare a final (Phase II) report with our findings. As part of this report, we will outline Iowa-specific best practices and recommendations for maintaining and expanding non-motorized counting programs, which could be adopted by MPOs, cities, or counties throughout the state. We will also provide BMT and PMT estimates, speed studies, and before-after studies (to the extent possible within this second proposed year) that will be useful for transportation safety planning.

C. ESTIMATED COST

Item	QTY	Price	Total
Counting technology			
Infrared sensor and pneumatic tubes (for short duration counts)	1	\$5,000.00	\$5,000.00
Multi system-inductance loops and infrared sensor (for continuous counts) and installation costs	4	\$5,200.00	\$20,800.00
Salaries			
Students (conduct field work and assist with data management, analysis, and report preparation)	2	\$7,500.00	\$15,000.00
Faculty/Research Specialist (project management, analysis, report preparation)	1	\$11,500.00	\$11,500.00
Supplies and fees (misc. supplies, computer network fees)	1	\$750.00	\$750.00
Travel (to counting sites, to present results)	1	\$2,500.00	\$2,500.00
Indirect Costs (8%)			\$4,450.00
Total			\$60,000.00



Smarter Transportation, Better Community

101 First Street SE
Cedar Rapids, Iowa 52401
319-286-5041 PH
corridormpo@cedar-rapids.org Email

WWW.CORRIDORMPO.COM

Samuel Sturtz
Transportation Planner
Iowa DOT Office of Systems Planning
800 Lincoln Way
Ames, IA 50010

Dear Mr. Sturtz,

The Corridor MPO is pleased to continue to support the Iowa DOT's grant application for the Transportation Safety Improvement Program (TSIP). The proposed bicycle and pedestrian counting program will greatly expand and complement our current count efforts, and help us to better understand the impacts of existing and proposed bike/ped infrastructure in the Cedar Rapids metropolitan area. Improved accessibility for cyclists and pedestrians has been a major emphasis in our region for several years now, and we feel that evaluation of the impact of our efforts, both in terms of transportation mode shift and safety, are vital to continued support from both the public and elected officials.

We will continue providing support to the Iowa DOT and their partners at the University of Iowa in the following ways:

- Access to previously collected Corridor MPO bicycle and pedestrian counts.
- Assistance with securing permission for the placement of temporary and permanent bicycle and pedestrian counting devices.
- Technical advice and support in planning and execution of the count program, including count location and timing.

The Corridor MPO recognizes the importance of providing safe, efficient pedestrian and bicycle mobility to the citizens of our region. We support the proposed TSIP project and its potential to help us evaluate the impacts of bike/ped projects and to identify safety impacts as we work toward a greener and more active metro area. We look forward to continue working with the Iowa DOT and its partners at the University of Iowa on this important initiative.

Sincerely,

Brandon Whyte
Multimodal Transportation Planner
Corridor Metropolitan Planning Organization



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 15, 2017

Location / Title of Project Statewide/ Bicycle Safety Media Campaign

Applicant Iowa DOT - Systems Planning

Contact Person Craig Markley Title Office Director

Complete Mailing Address 800 Lincoln Way
Ames, IA 50010

Phone 515-239-1027 E-Mail craig.markley@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) Iowa Bicycle Coalition

Contact Person Mark Wyatt Title Executive Director

Complete Mailing Address P.O. Box 5562
Coralville, IA 52241

Phone 515-309-2867 E-Mail mark@iowabicyclecoalition.org
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

Site Specific

Traffic Control Device

Safety Study

Funding Amount

Total Safety Cost \$ 25,000

Total Project Cost \$ 25,000

Safety Funds Requested \$ 20,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain Study
 No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the IOWA DEPARTMENT OF TRANSPORTATION

Signed:  8-15-2017
Signature Date Signed
CRAIG MARKLEY
Typed Name

Attest: _____
Signature Date Signed

Typed Name

**NARRATIVE outlining the proposed concept and the goals or expected results.
Include statewide applicability, and provide adequate transportation safety justification.**

Overtaking crashes involving bicycles are a problem in Iowa. Statistics suggest Iowa's average of fatal overtaking crashes is larger than the national average. Efforts need to be expanded to decrease overtaking crashes involving bicycles.

According to Iowa Bicycle Crash data, non-intersection crashes have been on a steady rise since 2010 when 157 crashes occurred to 186 crashes in 2012. Unsafe passing movements contributed to 75% of fatal bike crashes in Iowa in 2013, 100% in 2012, and 100% in 2011. Nationally, rear end collisions with bicycles comprised 40% of fatal crashes from February 2011 to February 2013. Eleven bicyclists lost their lives in fatal bicycle crashes in Iowa during 2016.

Recently, the Iowa Attorney General issued a letter of advice to the Iowa DOT on passing bicyclists. The letter of advice stated, "1. A bicycle does constitute a "vehicle" under Iowa Code §321.299; and 2. The rules set forth in that section relating to the overtaking and passing of vehicles also apply to the overtaking and passing of bicycles." The Iowa DOT changed the drivers manual to reflect this by changing the manual to read, "Give bicycle riders the room they deserve and need for safety. When passing a bicycle rider, pass as if the cyclist were a vehicle and move into the other lane."

Anecdotally, most Iowans understand this when driving. People riding bicycles on streets or highways will have a story of one or two motorists that "buzz" the riders. Operationally, motorists need to treat people riding bicycles as they would any other vehicle and change lanes to pass. An informational campaign will be focused on the change lanes to pass bikes message.

The Iowa Bicycle Coalition recommends an informational awareness campaign on passing bicyclists safely.

Mass Media

Create an intensive local media campaign for radio stations.

30 second spots:

V1: Hey drivers –you're not the only one on the road... remember these tips as you share the road with bicycles

V2 - One – always change lanes when passing cyclists,... just like any other vehicle.

V1- Two – make sure the passing lane is clear of oncoming traffic

V2- Three – when you pass allow room for bicyclists to avoid obstacles

V1 - Four – don't return to your lane until you are safely past the cyclist

V2: Iowa's Cyclists thank you for paying attention and passing with care. Get more tips at Iowa bicycle coalition dot org remember, cyclist's lives are in your hands.

15 second spots:

Hey you - behind the wheel – share the road with people on bicycles. Remember to always change lanes when passing cyclists - just like you do with any other vehicle. Remember, cyclists' lives are in your hands.... Get more safety tips at Iowa Bicycle coalition dot org

ESTIMATED COST including a list of the sources and amounts of supplementary funds (itemized if possible).

Item	Quantity	Cost/Unit	Total Cost	TSIP	In-kind
Des Moines Radio Group Marketing Package	1	\$12,500	\$12,500	\$10,000	\$2,500
Radio Iowa Marketing Package	1	\$12,500	\$12,500	\$10,000	\$2,500
TOTAL			\$25,000	\$20,000	\$5,000

¹ People for Bikes Community Grant

A TIME SCHEDULE for the proposed project with a completion date.

Mass Media

- Des Moines Radio Group
 - Timeframe: July 1, 2018 to August 31, 2018
 - 668 spots across eight (8) stations.
 - Duration: 15 and 30 second spots
 - Scope is attached.

- Radio Iowa
 - Timeframe: July 1, 2018 to July 28, 2018
 - 32 paid spots across 71 stations.
 - Duration: 15 and 30 second spots
 - Scope is attached.

Iowa Bicycle Coalition

July – August 2018



Prepared for Mark Wyatt, Iowa Bicycle Coalition

Presented by Ryan Patrick, Des Moines Radio Group

7/17/2017

The Des Moines Radio Group is excited to once again partner with the Iowa Bicycle Coalition. In 2016, we worked to bring increase the public awareness of bicyclists, specifically with motorists. We are looking to continue that partnership with a safety campaign in the Summer of 2018. As the number of bicyclists, bike lanes and trails continue to grow in central Iowa, we want to ensure their safety is top of mind with people behind the wheel.

Advertising

Bicycle safety is important to everyone, from 8 to 80. Our portfolio of stations will be able to get your message out across platforms and demographics our stations include:

KSTZ – Star 102.5
KMYR – More 104.1
KAZR – Lazer 103.3
KIOA - HD2 - Hits 99.9
KRNT –AM – 1350 ESPN
KSTZ -HD2 - 97.3 The Outlaw
KAZR -H2 – 104.5 Pure Oldies



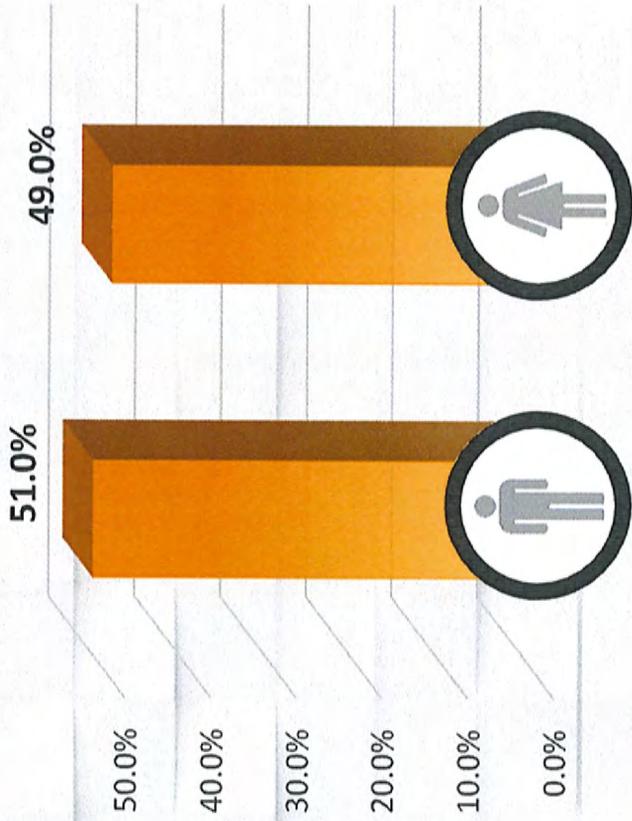
We have a variety of different ways that we can package your message at the Des Moines Radio Group. This particular package has both :30 and :15 spots to maximize your message, while fitting into your budget.

We want to do everything we can to ensure that the public awareness campaign is a success. The Des Moines Radio Group will supply a 25% matching schedule, stretching you advertising dollar further.

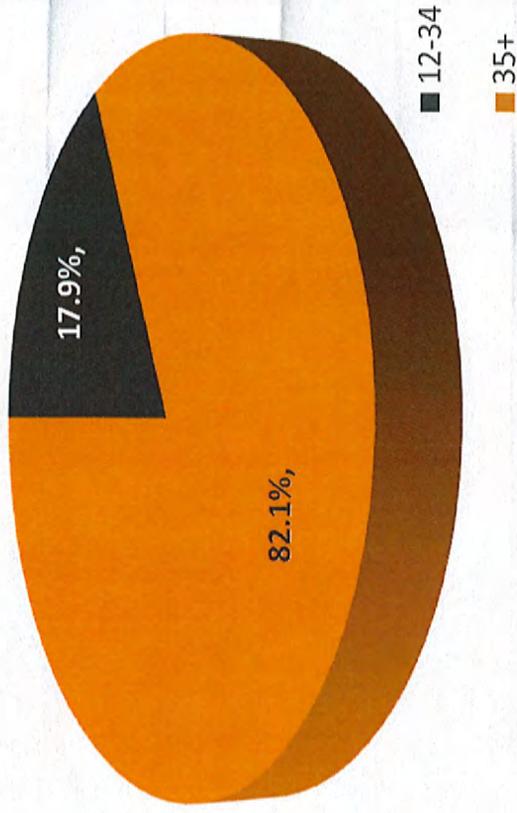
With the attached schedule, The Iowa Bicycle Coalition will receive a minimum of 668 spots across eight stations from July 1st 2018 – August 31st 2018.

Total cost: \$10,000

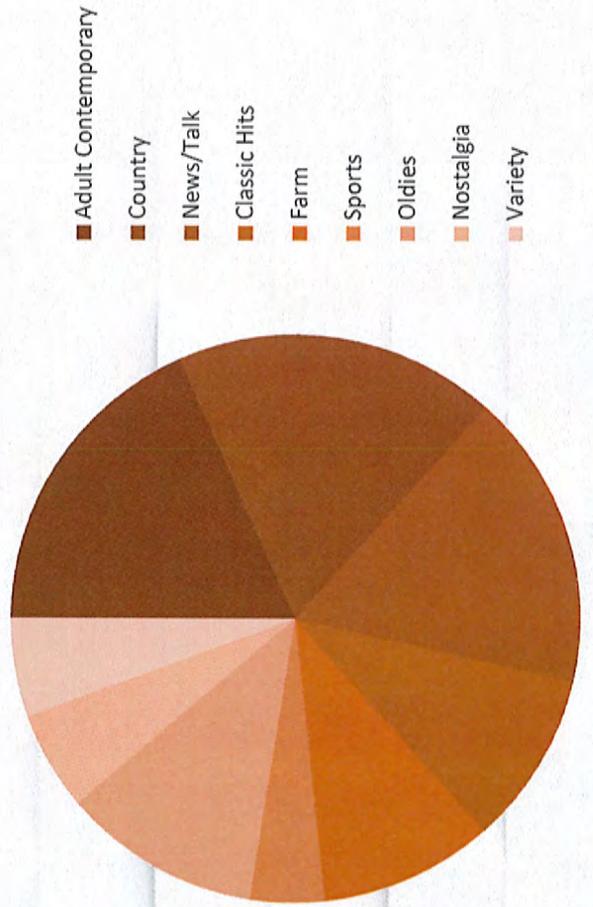
Radio Iowa Listeners Gender



Radio Iowa Listeners Age



Radio Iowa Formats



RADIO IOWA

Source: Arbitron TAPSCAN, National Regional Database



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: 08/13/2017

Location / Title of Project Automating Wrong Way Detection Using Existing CCTV cameras

Applicant Iowa DOT

Contact Person Willy Sorenson Title Sr Safety Engineer

Complete Mailing Address 800 West Lincolnway
Ames, Iowa

Phone 515-239-1212 E-Mail Willy.Sorenson@iowadot.us
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ 80,000

Safety Funds Requested \$ 80,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____

Automating Wrong Way Detection Using Existing CCTV cameras

PI: Anuj Sharma, Soumik Sarkar, Neal Hawkins, Skylar Knickerbocker

Background

Wrong way driving has been defined as “vehicular movement along a travel lane in a direction opposing the legal flow of traffic” (1). Although wrong way driving crashes occur infrequently accounting for almost 3 percent of all crashes, but, they have a very high likelihood of resulting in fatal or serious injury crashes. Vaswani (2) found that wrong-way crashes had 27 times higher fatality rates as compared to any other kind of crashes occurring on controlled-access highways in Virginia. Another study, from Michigan, found that 22% of all wrong-way crashes resulted in a fatality, as compared to, only 0.3% percent of all highway crashes resulted in fatality for the same time frame (3). The main causes of wrong way driving constitute of:

- a.) Alcohol- In an analysis conducted on FARS database, from 2002-2009, it was found that 60% of wrong way crash drivers had some indications of alcohol involvement (4).
- b.) Age- Driver over age of 70 constitute nearly 15 percent of wrong way drivers as compared to only 3 percent of the right way drivers involved in wrong way crashes (4).
- c.) Poorly marked ramps- The primary origin was for controlled-access highway was found to be the exit-ramps (4).
- d.) Time of day- Disproportionate amount of the wrong-way fatalities happen during night time.

The causes associated with wrong way crashes tend to make them spatially concentrated to particular stretches of roads, thus making it important to identify and monitor such high-risk locations. FHWA Highway Safety Improvement Program recommends generating *wrong way monitoring warrants* based on total collision and fatal collision rates. If either total wrong-way collision are greater than 0.5 event per mile per year, or a fatal wrong-way collision rate of 0.12 per mile per year and at least 3 wrong-way collisions are recorded for a five-year period, the monitoring warrants are met. This approach is reactive and needs the crash history to develop for a period of at least 3 to 5 years. In this research, we propose to use a pro-active technology that count the number of wrong-way drivers that are detected using image based technology. The proposed solution is discussed in detail in subsequent sections.

Proposed Solution

This study proposes to automate wrong-way detection using existing CCTV cameras. Vision based solutions are attractive as they also provide images for the operators to manually validate the alarms. Use of other technologies for wrong way detection require additional camera for manual ground truth. Iowa DOT has deployed over 365 cameras on their freeway system which can be accessed over the network. If the proposed technology proves viable, these connected cameras can be converted into a wrong-way detection system. The study will design two applications described below.

- a.) Wrong way likelihood estimation using existing cameras – The study will develop software solution to batch process the data recorded from cameras for detecting wrong way movements. The data collected from all the cameras across the system will then be used to estimate wrong way likelihood across the system for a given time of day. The current method of using crash rates to identify problem locations, is a reactive method implying that crashes must happen to identify critical locations. The proposed method is pro-active which detects wrong way movement and can identify high risk location even before the crash history develops.
- b.) Real-time wrong-way alerting system – The study will develop a real-time wrong way detection and alerting system. Most of the existing solutions are plagued with high false alarm rates. In absence of manual validation capability, a response action needs to be taken for every alert. Even a small percentage of false alarm rates (5-8%) can generate hundreds of calls per day with increasing number of cameras. A camera based system can provide a second level of scrutiny. In addition to generation of alarm a pictorial evidence can be transmitted to the operator. The operator can then either respond to the alarm or mark it as false after manually verifying the clip. The real-time wrong way detection implementation prototype will involve showcase both edge detection and server detection technologies. The edge detection is critical when the communication bandwidth is limited. In edge based detection, the video is processed in field and only relevant information is communicated back to the operator. On the other hand, for server based implementation the entire video feed is brought back to the central server location and processed at the central location.

Enabling Technology

In past few years, there has been a significant revolution in the field of image processing. This has been due to the emergence of hardware called a GPU cluster and a machine learning technique called deep-learning. Deep-learning has revolutionized the field of multi-object detection and classification. The technique uses multi-layered graphs to mimic the working of neurons in the brain by providing ability to execute multiple linear and non-linear transformations. In a recent experiment done by Google, deep-learning showed twice as much accuracy in identifying objects accurately in 10 million images extracted from you-tube images compared to any other image processing technique. Although these algorithms have been proven to be a very good classifier in past, their application was restricted because as the number of layers increased the training of these graphs became prohibitively slower. This problem was solved by the hardware innovation of GPU cluster. According to NVIDIA corp. "A simple way to understand the difference between a CPU and GPU is to compare how they process tasks. A CPU consists of a few cores optimized for sequential serial processing while a GPU has a massively parallel architecture consisting of thousands of smaller, more efficient cores designed for handling multiple tasks simultaneously." This provides the solution for quickly training the Deep-Learning networks. Hence, this is an ideal time to revisit the issue of using CCTV cameras as a traffic sensor.

PI Sharma used some existing video clips obtained from existing cameras on Iowa network to demonstrate the feasibility of wrong way detection. Figure 1 shows proof of concept results under varying camera angles and light conditions. The red box marks the automatic detection of wrong way car as obtained from the algorithm.



Figure 1: Shows successful wrong-way detection using 3 different cameras under varying light conditions.

Tasks

Task 1- Literature Review

A comprehensive literature review will be conducted to synthesize the existing state-of-art for monitoring wrong way detection.

Task 2- Develop and test server based – Wrongway likelihood estimation algorithm

A curated data set will be generated using manually verified wrong way detections and control case scenarios with normal traffic conditions. End to end algorithm will be developed to include features like associating new cameras for wrong way detection, mark the correct direction of travel, associating the preset and zoom settings for which the wrong way detection will be performed. The deep-net based algorithm developed will be tested on the curated data set to see the performance. The algorithm will be implemented on a selected set of cameras for a month to ascertain the accuracy of the algorithm, need of GPU resources per camera and the impacts of light and angle of camera on performance. This will generate likelihood of wrong-way occurrence based on the time of day and location.

Task 3- Develop and test real-time alerting system

A real-time alerting system will be developed for both server side and edge implementation. This system will be tested in field. The system will be tested for generating a feed with alarm and image of the wrong-way vehicle for manual verification. The system will be fine-tuned and tested for the ease of transferability across different cameras.

Task 4 - Final report

A final report detailing the insights gained from the development and evaluation of the prototype systems will be prepared and distributed.

Budget

The proposed cost of this project will be \$80,000. Initial development of the algorithm, that is shown in Figure 1 above, has been supported by additional sources of Funding.

Timeline : 7/1/2018- 12/31/2019

Tasks	Q1	Q2	Q3	Q4	Q5	Q6
Task 1						
Task 2						
Task 3						
Task 4						

References:

1. T.N. Tamburri and D.J. Theobald, "Wrong-way driving (Phase II)" California Department of Public Works, 1965.
2. N.K. Vaswani, "Measures for Preventing wrong-way entries on highways," report number VHRC 72-R41, Virginia Highway Research Council, 1973
3. D.A. Morena and T.J. Leix, "Where these drivers went wrong," Public Roads, vol. 75, no. 6, 2012.
4. Wrong-way Driving, Highway Special Investigation report, NTSB/SIR-12/01, PB2012-917003.



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: 08/13/2017

Location / Title of Project Cyberinfrastructure Enabling Safety and Mobility Discoveries

Applicant Iowa DOT

Contact Person Willy Sorenson Title Traffic & Safety Engineer

Complete Mailing Address 800 W. Lincoln Way, Ames, Iowa

Phone 515-239-1212 E-Mail Willy.Sorenson@iowadot.us
 (Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
 (Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

- Site Specific
- Traffic Control Device
- Safety Study

Funding Amount

Total Safety Cost \$ _____

Total Project Cost \$ 80,000

Safety Funds Requested \$ 80,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____

Cyberinfrastructure Enabling Safety and Mobility Discoveries

PI: Anuj Sharma, Hridesh Rajan, Neal Hawkins, Skylar Knickerbocker

Background

Iowa DOT consumes data from multiple streams which is stored to assist in smart decision making. Table 1 gives an example of some traffic operations related data sources. In addition to these sources, DOT maintains a state-of-the-art crash repository. DOT also has access to very detailed weather data through Mesonet. The data archive of all these sources extends for past several years. The cumulative data size for past 5 years of data can easily be in the range of 15-20 terabytes.

Table 1: Different Traffic Operations Related Data Sources

Data	Memory	Per Month
Inrix	3.4 Gb/Day	102 Gb
Wavetronix	1 Gb/Day	30 Gb
Waze Data	330 Mb/Day	10 Gb
DMS Inventory	0.2 Mb/Day	0.005 Gb
Workzone Events	1 Mb/ Month	0.03 Gb
Inrix Performance Measures	3 Mb/ Day	0.1 Gb
Total	4.8 Gb/Day	144 Gb

Despite access to unprecedented amount of data, the decision makers are often restricted in their ability to explore these data sets. In general, pre-canned reports are serially produced from each of these individual sources of data and circulated to the decision maker without providing a comprehensive picture of the issue. Under the present set up, a simple query, such as, how many crashes happen during congested conditions can't be answered easily and requires a dedicated research project. There are four main reasons for inability of decision makers to easily query mobility and safety trends:

- a. Current data architecture restricts queries across data sources.
- b. Data manipulation is not distributed and hence takes a significant amount of time to come up for even a simple aggregate query, such as, average snowfall per county for a given year.
- c. Lack of easy to visual or natural language based querying tool. It requires an expert to create complex programs to answer these simple questions, thus restricting decision makers to answering a few critical questions rather than having an ability to query the whole data base
- d. No automatic datamining is currently used to detect trends and anomalies. This implies that data is not being continuously mine to detect interesting trends

automatically and thus the onus lies on the agency to reactively explore the data if the system crashes.

This research proposes to demonstrate a simple proof of concept cyberinfrastructure that addresses all four reasons that constraints the decision makers. The three datasets that will be used for this demonstration will be crash dataset, INRIX mobility data set, and weather dataset for past three years. The demonstration will include the following benefits over the existing system:

- a. Data from multiple sources will be saved in a format that leads to extended ability to query across these data sources. So, queries like how many crashes happened during snow and congested conditions should be easy to perform.
- b. The high-performance compute cluster will be used to store and manipulate the data and hence the data processing time will be significantly reduced.
- c. The data-set will be available for visual queries. The decision maker can visually filter and explore the data using dashboard developed for the project.
- d. Automatic data mining and clustering techniques will be deployed to identify typical trends and anomalies that depart from these trends.

Budget

The proposed cost of this project will be \$80,000. Initial development of this architecture is supported by.

Timeline : 7/1/2018- 12/31/2019



Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: August 15, 2017

Location / Title of Project Cameras and Analytics for Wrong Way Driver Detection

Applicant Iowa DOT - Office of Traffic & Safety

Contact Person Willy Sorenson, P.E. Title Traffic & Safety Engineer

Complete Mailing Address Iowa DOT, North Annex

800 Lincoln Way, Ames Iowa 50010

Phone 515-239-1212

(Area Code)

E-Mail willy.sorenson@iowadot.us

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) n/a

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____

(Area Code)

E-Mail _____

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

Site Specific
 Traffic Control Device
 Safety Study

Funding Amount

Total Safety Cost \$ 100,000

Total Project Cost \$ 225,000

Safety Funds Requested \$ 100,000

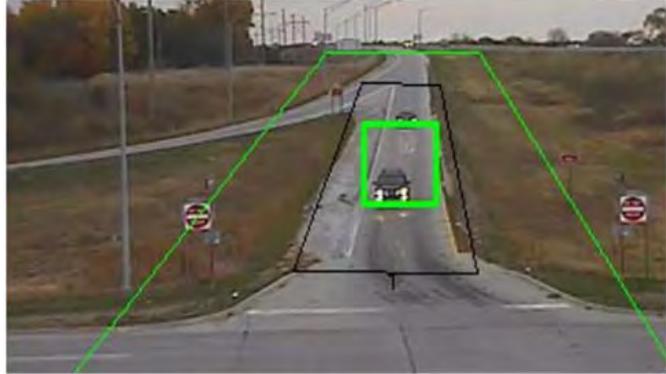
Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain attach

No

TSIP Application Summary Concept: To purchase cameras running video analytic software to document, detect and alert staff of wrong way drivers at select locations on Iowa's multilane highways.

These cameras can provide:

- Confirmation of the event
- Detection at the point of entry
- Direction the vehicle came from



Wrong way driving experience along US 30 from Boone to Nevada, Iowa: After a request for assistance from the Ames MDST to help combat wrong way driving, in July 2014, the Iowa DOT installed 23 side-fire radar sensors with the intention of detecting wrong way drivers (WWD). Along with these sensors, 21 cameras and a central recording server was also installed. Both of the field devices were installed in locations best suited for highway traffic surveillance and speed/volume determinations. Adding the wrong way detection feature was an after-thought and device locations were not adjusted to optimize catching how wrong way drivers entered US 30. For most of the 26-mile route, a wrong way driver must drive approximately one mile before they “trip” a sensor.

Over the last three years, 70 wrong way drivers have been either detected by the system, from a 911 call, or a personal experience of a co-worker or friend. Of the 70 confirmed WWD, 52 could be seen on camera video. Using the video, we could document 335 dangerous situations where the wrong way driver “passed by” a person driving in the correct direction. Even though this situation happened so many times, not a single crash occurred during these three years because the wrong way driver and the correct driver were in what each perceived as the “right lane”, thus no head-on crashes.

Of the 52 WWD caught on video approximately 39 (just over 50% of the total 70 drivers) were able to be back-tracked on the video to determine the point of entry. This was extremely important because combating wrong way driving requires either 1) systemic statewide signing and painting procedures



(which tends to be cost prohibitive and unnecessary in most areas) or 2) specific signing, painting, geometry or other treatments unique to the point of entry. If the point of entry is not known, the Department does not know where to apply resources and countermeasures.

Since we do not have ‘point of entry’ detection cameras, we do not know how many drivers started going the wrong way, but self-corrected before they ‘triggered’ our side-fire sensor spaced at 1 mile intervals. The photo above shows one WWD that self-corrected before they triggered a sensor.

Iowa's experience with video analytics and other WWD counters measures: Iowa DOT has also demoed five different vendor's WWD systems. Four used video analytics and one used radar. A report was written on the first three vendors and can be found here:

http://enterprise.prog.org/Projects/2010_Present/nextgenerationvideo/ENT_VideoAnalytics_Report_Sept2014_FINAL.pdf



Summary of the report is that video cameras with analytic software works and can provide Department staff with following:

- 1) Confirmation of the event
- 2) Where the vehicle came from and what the vehicle was doing just prior to turning the wrong way
- 3) Detection at the point of entry, (all vehicles that self-correct before driving a full mile are captured and documented)

Iowa DOT next steps: These last three years of testing side-fire radar and other vendor's technology for detecting wrong way drivers has provided an excellent knowledge base for expansion of the US 30 corridor and other areas in Iowa where wrong way driving has been reported.

With the purchase of cameras and video analytic software, the Iowa DOT can focus on specific points of entry to collect data and confirmation of a problem area. With this information in hand, specific countermeasures can be implemented and tested for long term effect. Our assumption is that with point of entry detection methods, problem areas will found much faster than waiting for multiple 911 calls or a crash.

Tool for the Safety Tool Box: With the approval of this TSIP application, the Iowa DOT will use the funds to procure a camera vendor with video analytic software that can be deployed within a short amount of time to areas where Districts, Law Enforcement or other sources of information that provide us with 911 calls or first-hand knowledge of a problem area, but cannot narrow down the specific intersection/interchange for signing, painting, lighting or even geometric counter-measures.

Costs: Costs to deploy a camera at an intersection can vary from \$2,500 to \$25,000 or more. Existing electric power, communication and support structures can reduce the costs. This TSIP application is only requesting funding to purchase the hardware and software for cameras. If prices come in low, we will be able to purchase more cameras with the available funding. The labor to install and the power and communications costs will be provided by matching funds from other sources.

The US 30 corridor between Boone and Nevada has 26 points of entry. Some of these might be able to be covered with one camera, however the interchanges will require two. Other areas will be looked at for a wrong way camera such as the I-80 diverging diamond in Dallas County and other corridors Districts have experienced requests for assistance.

Schedule: Under the direction from Iowa DOT Director Mark Lowe to look into using technology as a tool to combat wrong way driving, the offices of Traffic & Safety, Maintenance and Traffic Operations along with InTrans have formed a task force to review existing literature / counter-measures and review Iowa's data on wrong way driving.

As a tangent task, the Offices of Traffic Operations and Traffic & Safety will continue to evaluate and demo various vendor's devices and technology during FY 2018, so if this TSIP application is approved, we will be ready to purchase hardware and software from a selected vendor during the 1st half of FY 2019.

Since it is assumed that these cameras will be installed at existing locations where power, communication and a support structure already exist, field deployment should be able to occur very shortly after receiving the equipment.

Example of the benefits of a camera with video analytic software focused at a point of entry:





Application for TRAFFIC SAFETY FUNDS

GENERAL INFORMATION

DATE: 8/14/2017

Location / Title of Project Waterloo/ Metropolitan Wide Bike Lane Traffic Safety Awareness Campaign

Applicant City of Waterloo

Contact Person Mohammad Elahi Title Traffic Engineer

Complete Mailing Address 625 Glenwood Street
Waterloo, Iowa 50703

Phone (319) 291-4440 E-Mail mohammad.elahi@waterloo-ia.org
(Area Code)

If more than one highway authority is involved in this project, please indicate and fill in the information below (use additional sheets if necessary).

Co-Applicant(s) _____

Contact Person _____ Title _____

Complete Mailing Address _____

Phone _____ E-Mail _____
(Area Code)

PLEASE COMPLETE THE FOLLOWING PROJECT INFORMATION:

Application Type

Site Specific
Traffic Control Device
Safety Study

Funding Amount

Total Safety Cost \$ 22,000

Total Project Cost \$ 22,000

Safety Funds Requested \$ 22,000

Does this project appear on a Safety Improvement Candidate List or is there a safety study recommendation for this project? Yes – Explain _____
 No

APPLICATION CERTIFICATION FOR LOCAL GOVERNMENT

To the best of my knowledge and belief, all information included in this application is true and accurate, including the commitment of all physical and financial resources. This application has been duly authorized by the participating local government(s). I understand the attached resolution(s) binds the participating local government(s) to assume responsibility if any additional funds are committed, and to ensure maintenance of any new or improved city streets or secondary roads.

I understand that, although this information is sufficient to secure a commitment of funds, a firm contract between the applicant and the Department of Transportation is required prior to the authorization of funds.

Representing the City of Waterloo

Signed: Mohammad Elahi 8/14/2017
Signature Date Signed

Mohammad elahi
Typed Name

Attest: Susan Holmes 08/14/17
Signature Date Signed

Susan Holms
Typed Name

B. NARRATIVE

Metropolitan Wide Bike Lane Traffic Safety Awareness Campaign

INTRODUCTION

A safety awareness campaign covering Waterloo Cedar Falls metro area is proposed. The campaign will aim at pedalcyclists and drivers with an emphasis on bike lanes and shared lane street routes. Basic simple instructional messages are proposed.

The City of Waterloo is planning and is in the process of making complete streets infrastructure changes to some City streets to accommodate bicycle lanes. Number of bicycle lanes and bicycle fatalities are on the rise nationwide. National Highway Traffic Safety Administration 2015 estimates most of the nation saw significant increases in bicyclist fatalities (13%)¹. This was the highest rate of fatality increase than any mode of travel. Many organizations and jurisdictions are encouraging more bicycling. There is even a national Bike to School Day. As more people are using bicycles more of them are killed or injured in crashes with cars. A safety campaign will be beneficial addressing the drivers and the low but rising number of bicyclists in Waterloo.

BICYCLE SAFETY

The Black Hawk County MPO long range bicycle accommodation plan shows numerous on-street bicycle accommodations and shared lanes. The City of Waterloo is proceeding with installing on-street bicycle lanes. Mostly four-lane streets will be converted to 2 or 3 lane streets to add bicycle lanes. The City of Cedar Falls has already installed some bike lanes. Many elements can contribute to an increase in the risk of bicycle-car crashes. Number of bicycle lanes nationwide has been on the rise. People are being encouraged to do more cycling. Unfortunately the number and rate of bicycle fatalities has been on the rise as well. It is essential to conduct a public traffic safety awareness campaign regarding the new travel patterns and in line with vision zero. Both the driver and bicyclist need to be made aware of the safety issues in order to reduce the risk of bicycling deaths and injuries.

EXISTING SITUATION

In Waterloo driver expectancy makes it a more challenging task to have safe bicycle lanes and shared lanes. Like most cities in Iowa car is the major mode of transportation in Waterloo. Waterloo drivers do not expect bicyclists on the roadway. Waterloo does not enjoy the “safety in numbers”. Not expecting a bicyclist might cause maneuvers that could endanger a bicyclist’s life. Driver Expectancy is based on what drivers routinely experience when navigating the streets over time. After a while drivers do not expect what they have not seen and experienced in the past. In this case it is not seeing a bicyclist often enough. The message to cyclist should emphasize not to have a false sense of safety because of bicycle lanes and sharrow markings.

¹ US Department of Transportation, National Highway Traffic Safety Administration, *Traffic Safety Facts Crash Stats a Brief Statistical Summary*, DOT HS 812 269, July 2016

Waterloo's plans involve some parking-protected bicycle lanes. Installing parking protected bike lanes creates an unfamiliar roadway operational setting. Driver Expectancy could be violated because motorists, for the most part, will not encounter cyclists using the bike lane on the other side of the parked cars. Once in a while, they will encounter a cyclist at an intersectional conflict point. There's a chance that a right-turning motorist will not expect a conflicting cyclist. Bicyclist themselves do not follow the rules of the road as they should. In Waterloo the observed behavior of most of the bicyclists is a disregard for rule of the roads as they run red lights and enter wrong ways. Motor vehicle collision with bicycle could easily end up with an injured bicyclist and even a fatality. A safety campaign could help reduce the risk of collisions.

THE CAMPAIGN

A safety awareness campaign is proposed to address the cyclists and the motorists. The proposed campaign has to provide for a delicate balance between 2 opposing elements. Bicycling is good for health and environment but has a higher risk of death and injury. Number of bicycle trips is about 1% of total trips. Bicycle fatality is between 2% to 3% of total traffic deaths. Bicyclists face a higher risk of fatality. On the other hand the more people use bicycles, the healthier they become and the safer it would be for individual cyclist. As the number of bicyclists grows larger driver awareness of cyclists increases. It increases the likelihood that a driver might be a cyclist himself and therefore be more mindful of bicyclists' safety. It will be more politically feasible to ask the City government for funds to improvement bicycle safety such as installing infrastructure related bicycle safety features, or asking for other changes such as reduced speed limits. Campaign messages, therefore, should not encourage or discourage bicycling but should concentrate on safety.

The proposed campaign will include messages targeted to both drivers and cyclists. The messages will generally be simple basic instructional messages. Messaging will be relevant to Waterloo's continuing safety messaging "Our lives are in your hands" since 2007 and vision zero. Messages will be directed towards reinforcing safety and the responsibilities of sharing the road for both drivers and cyclists respectfully. Existing messaging from NHTSA and other sources will be considered. An emphasis will be on the fact that bicyclist is considered a vehicle on the road with all the rights and responsibilities of motorized traffic, and both motorist and bicyclist should look out for each other and show mutual respect, etc.

The project will be branded with appropriate slogan or icon that will be used on all related campaign materials and news releases. The icon will increase the audience's recall and retention of related messaging throughout the campaign.

As part of the campaign area bicycle shops and other stakeholders will be approached to explore opportunities for campaign partnership. Potential partnership opportunities include:

- Sponsorship via funding contribution - allowing the campaign to have greater exposure levels
- Invitation to contribute - guest editorials for web/social media
- Extend message reach - hang posters in their businesses; include our safety messages in their promotions

To reach motorists, we foresee some radio spots to be played during commuter day parts and perhaps print advertising. While messaging to both audiences is interrelated, they receive their information from different resources. Radio and print content will allow the City to present similar information to the broader driving audience. Instructional material in form of brochures, or video, or audio or combination will be produced.

C. GRANT REQUEST AMOUNT

The estimated cost of the campaign is \$22,000. Grant request amount is \$22,000.

1	PROJECT MANAGEMENT	\$3,300	15%
2	SOCIAL MEDIA ADVERTISING	\$3,300	15%
3	LOGO /BRAND PUBLISHING	\$2,200	10%
4	TRADITIONAL MEDIA	\$6,600	30%
5	OUTREACH/ PARTNER RECRUITMENT	\$3,300	15%
6	PROMOTIONAL MATERIAL	\$3,300	15%
	TOTAL	\$22,000	

D. PROPOSED TIME FRAME

July 2018	Funds Available
July-Aug 2018	Ad Agency/Consultant Selection
Aug-Sept 2018	News Campaign - Bicycle Safety & Street Changes
Sept 2018	Posters in area bike shops - bicyclist awareness and responsibilities
Aug – Oct 2018	Bicycle Shop/Business Sponsorships - Funding, guest editorials for web/social media, in-store displays/awareness, safety messages in their own promotions, events, etc.
Sept 2018-Oct 2018	Traditional Advertising
November 2018	Project Completions