FDOT Research Project

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Final Report

Safety Project Development Capacity for Small Communities in Coordination with Local Technical Assistance Program (LTAP) Center

October 2013

Prepared by:

UF | UNIVERSITY of FLORIDA

Florida Department of Transportation
FDOT Contract BDK77 977-21

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METERIC CONVERSION CHART

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	Km
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
in^2	squareinches	645.2	square millimeters	mm^2
ft^2	squarefeet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
NOTE: volumes greater than 1000 L shall be shown in m^3				

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16. Abstract

The goal of Florida's 2012 Strategic Highway Safety Plan is to reduce serious and fatal crashes on all of Florida's road system, including small rural communities. However, there are a few challenges in the way: most small communities lack technical expertise and crash data systems; Florida Department of Transportation's (FDOT) manpower to provide this support is limited; and the necessary funding is lacking. Given the long-time LTAP experience in assisting local communities, the purpose of this study was to research options to find a structured and sustainable solution that would address the challenge above by involving LTAP and in coordination with FDOT. To accomplish this goal, the research team reviewed existing efforts in Florida and in other states, surveyed small counties in Florida, and developed a case study for a selected rural (Union) county. Several findings emerged. First, for small agencies a "hands on" support with studies and analysis is required, which will need additional resources to accomplish. Second, some of the safety issues identified could be corrected through maintenance practices and training. Third, there is a need to incorporate the systemic approach with low cost countermeasures, and therefore, further development of systemic analytical tools is needed. Fourth, continued efforts are needed to develop ways to expedite the implementation of safety projects after they have been approved for federal funding. The following recommendations are proposed for a successful application of these findings: (a) establish a program and plan resources to conduct and execute safety studies for small local agencies through LTAP; (b) inform the larger agencies about the safety program through safety summits; (c) expand the outreach program at the state level by reaching to various relevant professional associations; (d) enhance tools for systemic analysis; and (e) expand methods for expediting implementation of safety improvements.

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EXECUTIVE SUMMARY

The Florida Strategic Highway Safety Plan calls for special attention to improvements on local roads. A real need exists, especially for small communities, to improve safety in three Emphasis Areas: Lane-Departure Crashes, Intersection Crashes, and Traffic Records. One of the challenges to addressing this need is the lack of engagement, capabilities, and funding of local governments to conduct and execute safety studies, especially in small rural communities. Also lacking is the ability to access crash data as well as the skill to be able to relate the statistical data with high crash segments and intersections and formulate acceptable solutions to mitigate the identified crash spots.

Since the transfer of the secondary road system from the Florida Department of Transportation (FDOT) to cities and counties in the early 1980s, FDOT's role in operating the highway system has been limited largely to state roads, but the goal of Florida's 2012 Strategic Highway Safety Plan (SHSP) is to reduce serious and fatal crashes on all of Florida's road system. This requires FDOT to play a larger role in addressing road safety on local roads. This expanded role is supported by the latest federal transportation legislation, Moving Ahead for Progress in the 21st Century (MAP 21), which authorizes the expenditure of federal safety funds for all public roads, including roads that are not on the federal aid system, and by Florida Statutes (FS 339.08 (h)) which authorize the department "To match any federal-aid funds allocated for any other transportation purpose, including funds allocated to projects not located in the State Highway System." Although FDOT support for local road safety programs is authorized, manpower to provide this support is limited, and FDOT districts are often faced with conflicts in priorities between local and state projects and programs. Some districts have engaged consultants to provide additional support, but the magnitude of the road safety challenges on the local road systems throughout the state requires a substantial expansion of the capacity to address these needs.

Local Technical Assistance Program (LTAP) / Tribal Technical Assistance Program (TTAP) Centers, established by the Federal Highway Administration (FHWA) in 1982 as technology transfer programs, have played an important role to provide training and technical assistance to local transportation agencies in the United States. Due to their capabilities, an opportunity is available to engage the LTAP/TTAP Centers in providing safety project development capacity for small agencies with limited resources. Additionally, many University Transportation Centers (UTCs) include technology transfer components that can be integrated with the LTAP/TTAP and DOT efforts to provide data, methods, tools, and project development assistance to agencies with limited resources.

The purpose of this research was to explore how to build safety project development capacity for agencies with limited capabilities and staff in coordination with LTAP/TTAP and UTCs. To accomplish this goal, the research focused on three main directions. *First*, an assessment was performed of existing models and best practices of other DOTs and LTAP/TTAP Centers in their efforts to develop programs to assist local communities to address safety challenges on local roads. *Second*, crash data was analyzed to assess the degree of traffic safety concern on local roads, and a survey of local agencies was conducted to better understand the existing expertise and capacities to inventory and manage crash databases. *Third*, a case study approach was used on a selected county to conduct a safety study in order to understand in more detail the challenges at the local level and to create a guide to assist local agencies in developing safety projects that can reduce crashes and compete for funding.

The review of best practices showed that, while several states are indeed helping small communities address safety issues (with the involvement of their LTAP/TTAP Centers), there are critical differences in needs, allocation of responsibilities, and the relationship between the DOT and the LTAP/TTAP Center across the states. This limits the extent to which a functional, comprehensive, statewide model from a different state may simply be borrowed for implementation in Florida. In developing a model for Florida, it is critical to ensure that the developed program has the capacity to meet the significant needs of the State, the technical expertise to educate local agencies and to perform the analyses for them, and can be administered by an LTAP Center housed outside of the state DOT. This study examined three specific aspects of the overall program from different states towards developing an approach appropriate for Florida. These aspects are education/training, technical support, and resources.

Provision of education and training is a critical first step in offering assistance to address local agency safety concerns. The overall training program should address both the management staff (including public officials) and technical/engineering staff. It is evident that each LTAP/TTAP Center, including Florida's LTAP Center, has a variety of courses readily available with the additional possibility of further customizing selected training to address local agency needs and capabilities. Moving ahead, it can be envisioned that the statewide local-area-safety assistance program headed by the Florida LTAP will be able to continue providing appropriate training.

Some local agencies do not have in-house expertise and thus need technical support to identify safety challenges, determine appropriate countermeasures, and apply for project funding. Upon being approved for funding, they also need assistance with designing and implementing the project. Further, from a statewide perspective, a need exists to ensure consistency in practice to improve efficiency and to enable comparison of funding requests from several local

agencies for project prioritization. Clearly, a program housed at the LTAP Center can provide the technical expertise to help both the local agencies and the state DOT.

Finally, the operation of a statewide program to assist locals with safety projects requires commitment of financial resources to fund at least one technical support person (fully) and one administrator (partially). Resources may also be necessary to maintain a good database of crashes and local roads networks to support the analyses needed to identify and prioritize safety projects.

The assessment of crash occurrences on local roads in Florida using three years of crash data from 2009 through 2011 showed that local roads in small counties – with population less than 50,000 – experienced annually 0.6037 fatal and serious injury crashes per 1,000 people which is 1.5 times greater than 0.4004 fatal and serious injury crashes per 1,000 people for statewide local roads. These numbers are especially pronounced in District Two, District Three, and District One. In addition to small counties, the mid-size counties – with population 50,000 to 150,000 – experienced fatal and serious injury crashes at 1.3 times the statewide rate of fatal and serious injury crashes on local roads. By comparing crashes on local roads with FDOT non-limited-access roads (interstates not included), the rates show a bigger problem on local roads in some counties such as Baker, Citrus, Dixie, Flagler, Gadsden, Gilchrist, Hamilton, Hendry, Holmes, Indian River, Liberty, Sumter, and Suwannee. For example, Hamilton County experienced annually 0.9685 fatal and serious injury crashes per 1,000 people on local roads which is 3.1 times greater than 0.3153 fatal and serious injury crashes per 1,000 people on FDOT non-limited-access roads.

Implementing safety improvements to reduce crashes on local roads for small counties is challenging, often due to the limited resources in staff and lack of crash data and analytical tools to conduct safety studies. To better understand the extent of this problem, the research team sent an email survey to the public works department of each county in Florida. Based on this survey, the research team found that most small counties have neither sufficient staff nor the necessary data management systems and analytical tools to conduct safety studies. Fourteen of these counties have no qualified staff, 20 counties have only one member that has the necessary expertise, and 19 counties have two or more experts. From the data management point of view, only one out of 26 small counties has a crash data management system. Counties with population between 50,000 and 150,000 usually have one or more safety professionals, but they also have very limited crash data management systems.

A safety case study in Union County (Florida) was conducted to help the research team understand more in depth the situation in small rural counties and serve as the basis to develop and test a manual outlining a process and templates for use by local agencies to develop

highway safety projects possibly with low cost safety improvement measures. After completing the study by following the principles of the FHWA Road Safety Audit Guidelines[1], the team proposed several types of improvements in Union County: upgrade signs and pavement markings; enhance conspicuity or other special signing or marking treatments; upgrade (install) guardrails; and widen and pave shoulders. Based on these options, a benefit/cost analysis was performed in accordance with the Florida Department of Transportation in State Safety Office Bulletin 10-01, regarding "Benefit/Cost Analysis, Roadside Safety Analysis Program, and Discount (Interest) Rate". A report of the analysis, findings, and recommendations is provided as a separate document.

Using the lessons learned from the Union County (Florida) experience, this study developed the process and templates for use in conducting road safety studies for local agencies and for preparing the documentation required to support the application for Federal Highway Safety Improvement Plan (HSIP) funding. This work is organized in the form of a manual and is provided as a separate document. This manual includes a funding guide, a process for developing safety projects, a template for developing field studies and B/C analysis, and a tutorial on how to perform crash data analysis using Signal Four Analytics, a statewide crash data system funded by the State of Florida and available free of charge to Florida public agencies that have a stake in traffic safety improvements.

Another separate document produced by this research is a training module in PowerPoint format designed to help local staff develop the capability to identify causes or factors that contribute to crashes at the selected study sites, identify potential measures to reduce these crashes, identify data necessary to justify expenditure of highway safety funds for correcting these challenges, and understand the process for collecting the field data.

The study revealed the following broader findings:

First, in Florida the level and type of assistance needed by local agencies for development of safety programs varies significantly with agency size and capability. For example, the outreach initiatives of District 7 (Tampa Region) have been very successful in working with the larger agencies that constitute most of that district. However, for small agencies that don't have the technical expertise within their staff, a more intense "hands on" support in the form of a team to actually perform the studies and analyses is required. Generally, FDOT districts are not equipped to provide this level of support with existing staff; therefore, a need for an additional resource that can provide this assistance is evident.

[1] http://safety.fhwa.dot.gov/rsa/guidelines/documents/FHWA_SA_06_06.pdf

Second, some of the safety issues on local roads could be corrected by improvements through maintenance practices and training. In addition to developing safety projects to correct specific hazards, there is also a need to include a broader look at other factors that contribute to the long term safety of the road system.

Third, there is a need to incorporate the systemic approach into the analysis of road safety issues, especially in the rural areas. Further development of the tools to use this analysis in Florida is needed.

Fourth, continued efforts are needed to develop ways to expedite the implementation of safety projects after they have been approved for federal funding.

Based on the findings above, the research team proposes the following recommendation for a successful application of these research results:

First, designate the Florida LTAP Center as the Road Safety Center and establish a program and plan resources to conduct safety studies for small local agencies. The Center will report to the State Safety Office and will work in close coordination with the District Safety Offices.

Second, encourage events like the District 7 Safety Summit and related resources as a means for communicating with larger agencies about the safety program.

Third, expand the outreach program at the state level to include presentations to organizations such as Florida Association of Counties (FAC), Florida Association of County Engineers and Road Superintendents (FACERS), and American Public Works Association (APWA).

Fourth, enhance tools for systemic analysis.

Fifth, enhance procedures for expediting implementation of safety improvements through expanded use of Design-Build Pushbutton contracts, development of unit price regional contracts for specialty work, and use of local agency manpower for urgent safety improvements.

Table of Contents

List of Figures

List of Tables

List of Acronyms

AADT	Annual Average Daily Traffic
AAA	American Automobile Association
APWA	American Public Works Association
ArcGIS	ESRI Desktop GIS Software
BIA	Bureau of Indian Affairs
CEI	Civil Engineering Institute
CHSP	Comprehensive Highway Safety Plan
CTSP	Community Transportation Safety Plan
DBPB	Design-Build Pushbutton
DLGF	Digital Line Graph Format
FAC	Florida Association of Counties
FACERS	Florida Association of County Engineers and Road Superintendents
FHWA	Federal Highway Administration
FTE	Full-time equivalent
HBP	Highway Bridge Program
HRRRP	High Risk Rural Roads Program
HSIP	Highway Safety Improvement Plan
HSM	Highway Safety Manual
LADOTD	Louisiana Department of Transportation and Development
LAP	Local Agency Program
LHJ	Local Highway Jurisdiction
LHTAC	Local Highway Technical Assistance Council
LTAP	Local Technical Assistance Program
MAP 21	Moving Ahead for Progress in the 21st Century
MDT	Montana Department of Transportation
NACo	National Association of Counties
NHTSA	National Highway Traffic Safety Administration
RHGCP	Railway-Highway Grade Crossing Program
RSA	Road Safety Audits
RSC	Road Safety Center
SCR	Safety Circuit Rider
SHSP	Florida Strategic Highway Safety Plan
STP	Surface Transportation Program
TTAP	Tribal Technical Assistance Program
usRAP	United States Road Assessment Program
UTC	University Transportation Center
WCP	Walkable Communities Program
WRRSP	Wyoming Rural Road Safety Program
WVDOH	West Virginia Division of Highways

Chapter 1: INTRODUCTION

1.1 Background

Florida Department of Transportation (2012) states that more than 4,000 people died in Florida and over 50,000 were seriously injured in intersection-related crashes between 2006 and 2010 (p. 9). Additionally, nearly 39 percent of the statewide traffic fatalities can be attributed to lane-departure crashes. According to the National Highway Traffic Safety Administration (NHTSA) Traffic Safety Facts 2010, 24.3 percent of Florida's fatal crashes occurred with a fixed object as the first harmful event (p.146). Although Florida is experiencing a decline in lane-departure crashes due to significant steps taken to implement strategies on the State Highway System identified in the 2006 Florida Strategic Highway Safety Plan (audible pavement markers, a median crossing/median barrier program, and use of Safety Edge), these strategies have not been implemented as widely on Florida's local roads, which, with 110,000 centerline miles, make up 90 percent of all Florida roads.

Improvement of traffic safety on local roads has been widely recognized as an important focus area for FDOT. In 2010, 35 percent of the fatal crashes as well as 35 percent of the fatalities happened on local roads (NHTSA Traffic Safety Facts 2010). Additionally, from 2007 to 2011, an average of 13,961 fatalities and serious injuries per year occurred on locally owned roads in Florida, accounting for 42 percent of all fatalities and serious injuries statewide.

1.2 Problem Statement

The Florida Strategic Highway Safety Plan calls for special attention to improvements on local roads. A real need exists, especially for small communities, to improve safety in three Emphasis Areas: Lane-Departure Crashes, Intersection Crashes, and Traffic Records. One of the challenges to addressing this need is the lack of engagement, capabilities, and funding of local governments to conduct and execute safety studies, especially in small rural communities. Also lacking is the ability to access traffic records data along with the skill to be able to relate the statistical data to high crash segments and intersections and formulate acceptable solutions to mitigate the identified challenges. Although FDOT's crash data systems and federal funds are available to help solve critical rural road safety issues, limited local capability can be a barrier that keeps some local governments from effectively using these resources.

Several opportunities to address this problem in Florida exist through the involvement of the Local Technical Assistance Program (LTAP) Center and the University Transportation Center (UTC). Local Technical Assistance Program (LTAP)/Tribal Technical Assistance (TTAP) Centers, established by the Federal Highway Administration (FHWA) in 1982 as technology transfer programs, have played an important role to provide training and technical assistance to local transportation agencies in the United States. Due to their capabilities, an opportunity is available to enable the LTAP/TTAP Centers to provide safety project development capacity for small agencies with limited resources. Additionally, many UTCs include technology transfer components that can be integrated with LTAP/TTAP and DOT efforts to provide data, methods, tools and project development assistance to agencies with limited resources. The recently created Southeastern Transportation Research, Innovation, Development and Education Center (STRIDE), a Federal Region 4 UTC housed at the University of Florida is developing a strong interdisciplinary network of researchers and educators to advance the state-of-the-art in transportation. Among other objectives, STRIDE focus includes safety research and knowledge dissemination and technology transfer. The unique position of the Florida LTAP Center and STRIDE, operating as part of the newly formed University of Florida Transportation Institute (UFTI) creates an opportunity to explore project development capacity for local agencies in coordination with LTAP, university transportation centers and DOT.

1.3 Research Purpose and Objectives

The purpose of this research was to explore how to build safety project development capacity for agencies with limited capabilities and staff in coordination with LTAP/TTAP and UTCs. The research also endeavored to clarify requirements for federal funding for safety improvements and create guides that the agencies can use to prepare the necessary evidence required when seeking funding support for implementation of the countermeasures in coordination with DOT. Last, this research investigated how to plan for a sustainable path to the success of future efforts considering aspects of funding, deployment, long-term expansion and maintenance. More specifically, the objectives of this research were:

- Identify the information required to conduct safety analysis appropriate for small communities especially in rural areas.
- Determine how to assemble the resources that are easily accessible and contain the appropriate data and tools to support the needs of local communities for conducting safety analysis.

- Explore options to document the safety analysis methods and processes and teach it to agencies in a way that is most effective to conduct safety studies and develop countermeasures with the assistance of the LTAP Center.
- Determine how to assemble the evidence necessary when applying for safety improvement project funds.

1.4 Research Approach

To accomplish the stated objectives, this research focused on three main directions. *First*, an assessment was performed of existing models and best practices of other DOTs and LTAP/TTAP Centers in their efforts to develop programs to assist local communities to address safety challenges on local roads. *Second*, crash data was analyzed to assess the degree of traffic safety problem on local roads and a survey of local agencies was conducted to better understand the existing expertise and capacities to inventory and manage crash databases. *Third*, a case study approach was used on a selected county to conduct a safety study in order to understand in more detail the challenges at the local level and to create a guide to assist local agencies in identifying safety projects that can reduce crashes and compete for funding.

1.5 Report Organization

The next chapter presents a review of best practices followed by Chapter 3 that provides a condensed description of the tasks of this research followed by discussion and lesson learned in Chapter 4. Chapter 5 summarizes conclusions and recommendations on how to move forward.

Chapter 2: Review of Best Practices

This chapter describes our review of the variety of practices adopted by different states in addressing local road safety issues. The intent of this review is to subsequently guide the development of an operational model to provide local agency assistance in developing appropriate safety projects for Florida. In particular, it is anticipated that this assistance will be provided through the Florida Local Technical Assistance Program (LTAP) Center.

2.1 Within Florida

There are significant differences in the way the FDOT Districts currently provide assistance to local agencies in the development of highway safety projects. To some extent, these differences respond to the wide variations in capabilities of the local agencies from district to district. The approaches by Districts 2 and 7 perhaps represent the most significant differences.

District 7 serves the five counties of the highly urbanized Tampa Bay Area. Even the smallest of these counties, with a population of just over 140,000, has a professional engineering staff. While there are a few small municipalities within the counties of District 7, most of the population of the district lies within the limits of local agencies that have staffs with significant expertise.

The District 7 Safety Office has initiated a proactive approach to helping local agencies develop highway safety projects. The District safety program involves an extensive community outreach effort including an annual District Safety Summit, a web site, and various other meetings and communications scheduled at key times during the Department's annual work program update cycle. The district has engaged engineering consultants to serve as "Safety Ambassadors" assisting local agencies with the development of safety projects and justification reports. These "Ambassadors" are equipped to provide additional assistance to the smaller agencies that have professional staff but limited capacity. Representatives of the District Local Agency Program (LAP) office also work closely with local agencies to develop construction contracts that conform to federal requirements, and District 7 has initiated the "Design Build Push Button" contracting process to expedite the implementation of certain safety projects.

District 7 has been successful in increasing the level of highway safety funds directed to local roads. The guidance provided by District 7 can serve as a valuable template for agencies

throughout the state to follow in preparing safety projects if they have technical expertise on staff.

In contrast, District 2 is representative of the rural areas of Florida. Eleven of the eighteen counties have a population of less than 50,000. Most of these counties have limited technical expertise in-house and engage outside consultants when professional engineering services are required. Because of the limited local capabilities, the District 2 Safety Office has conducted safety studies for the local roads using both FDOT personnel and consulting services. Less than ten agencies in the district are certified to conduct LAP projects[2]. For federally funded safety projects in these counties, District 2 generally handles the projects on behalf of the local agencies.

Discussions with representatives of all districts indicate that within each district, there are local agencies (city or county) that lack the capability to develop and implement federally funded safety projects. For the districts with large rural populations, this is especially problematical. District personnel recognize the urgency and importance of supporting their local agencies and some have engaged consultants to assist, but most districts do not have the capacity to fully address the safety challenges on both the state and local road systems.

2.2 Other States

While other states are indeed helping small communities address safety issues (with the involvement of their LTAP Centers), differences in needs and organizational structures across the states (discussed further in Section 2.3) may limit the extent to which a functional, comprehensive-, statewide- model from a different state may simply be borrowed for implementation in Florida. Therefore, the preferred approach would be to examine specific aspects of the overall program from different states (discussed further in Section 2.4) and subsequently develop an approach appropriate for Florida.

The chapter begins (Section 2.1) by discussing differences in needs and organizational structures. Some states have significantly greater volumes of road miles maintained by local agencies and/or have significantly large volumes of crashes on these roads. These states are clearly of greater interest for this study. This section also examines the division of

[2] The Local Agency Program (LAP) is the mechanism used by state highway agencies to pass Federal highway funds to local agencies. Under this program, the local agency performs the project design and administers the contract for construction. This work must all be done in conformance to FHWA requirements. Before authorizing local agencies to participate in LAP, FDOT evaluates their capability to perform this work and issues "LAP Certifications" to agencies that demonstrate this capability.

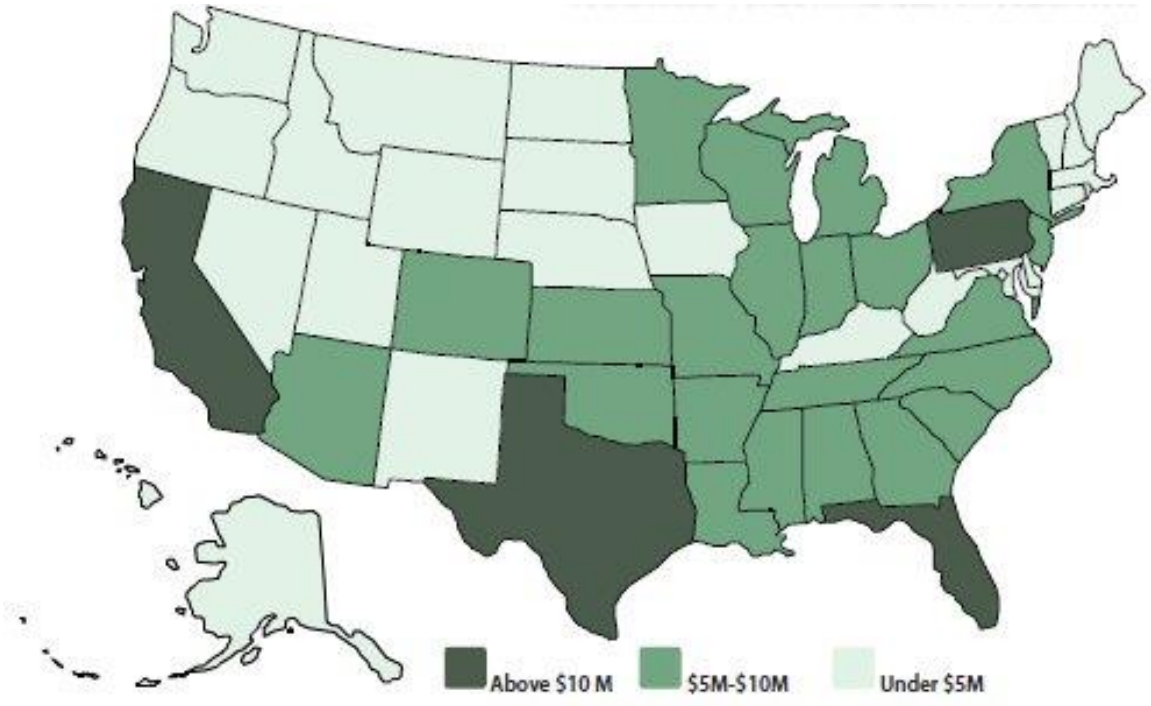
responsibilities between the state DOT and the local agencies in terms of local road maintenance. Those states having a similar allocation model as Florida (i.e., locals have a significant role in local road maintenance) are of interest to this study. Finally, some states house LTAP centers within the state DOT, while others like Florida do not. This is an important organizational distinction that bears upon the development of any safety program.

The next section (Section 2.2) focuses on three facets of an operational model for providing assistance to local agencies to address safety challenges: (1) provision of education and training on safety issues to local agencies; (2) provision of technical support to develop, program, and implement safety projects; and (3) commitment of resources. Alternative state approaches to address these facets are discussed in further detail in Section 2.2. It is useful to note here that these reviews are based on documented literature, notes from the FHWA LTAP/TTAP Peer Exchange Meetings, and interviews of selected LTAP/TTAP staff. Unless a reference (usually in the form of a Web link) is explicitly cited, it is to be taken that the material was obtained from LTAP/TTAP peer-exchange meeting notes and/or telephone conversations and email correspondence with appropriate LTAP/TTAP staff.

2.3 Variability in Needs and Organizational Structures

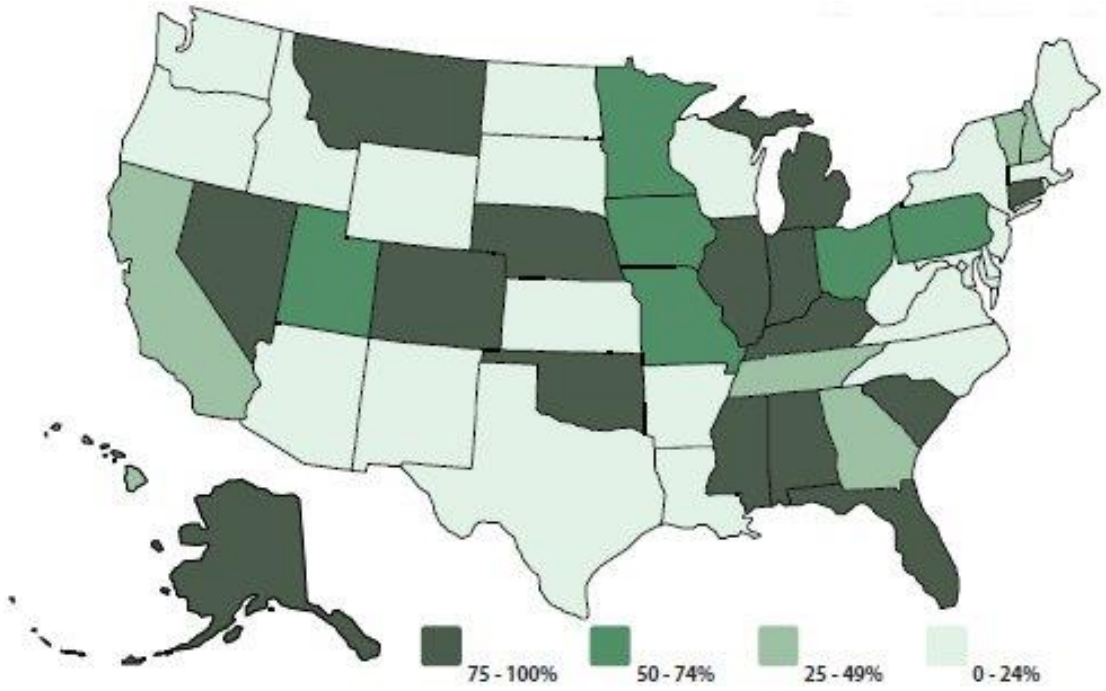
As a first step in a review of procedures to address safety challenges on local roads, it is important to understand the significant variability in the needs of each state and the differences in certain fundamental organizational structures.

Figure 2-1 shows High Risk Rural Roads Program (HRRRP) funds appropriated for each state in FY 2009, and Figure 2-2 shows the percentage of funds obligated as of September 30, 2009. The figures clearly indicate Florida as a “leader” in terms of implementing a systematic program to address rural road safety (given the amount of money appropriated and the proportion spent). Further, the figure vividly shows the variability placed on the importance of safety on rural roads across the states. Therefore, it would be appropriate for Florida to look to some states rather than others in developing its program; specifically, the states that were appropriated at least $5 million and had spent at least 50 percent of it may be of greater interest. These states include Alabama, Colorado, Illinois, Indiana, Michigan, Minnesota, Mississippi, Missouri, Ohio, Oklahoma, Pennsylvania, and South Carolina.



Source: USDOT FHWA Office of Safety

Figure 2-1 HRRRP funds available for obligation



Source: USDOT FHWA Office of Safety

Figure 2-2 Percent of available HRRRP obligated as of September 30, 2009.

A second consideration is that in some states (such as Delaware, North Carolina, South Carolina, and West Virginia), the state DOT has the primary responsibility for maintaining local roads. For instance, Delaware DOT maintains about 90 percent of the road inventory and the towns and cities are responsible for the rest. The West Virginia Division of Highways (WVDOH) is responsible for almost 95 percent of all roadways except those which are the responsibility of incorporated municipalities (on the order of 5 percent of the road mileage). In other states (such as California, Florida, Iowa, Kentucky, Louisiana, Massachusetts, Pennsylvania, Tennessee, Washington, and Wyoming), the local governments have a significant role in maintaining the off-system roads. In Iowa, each jurisdiction maintains their own roads. The roadways in the Northern Plains Tribal region represent the majority of the Regional Service Area roads in Montana, Wyoming, North Dakota, South Dakota and Northern Nebraska. The Tribes are responsible for their own road maintenance, which is handled in several ways: a) some Tribes have contracted road maintenance from the Bureau of Indian Affairs (BIA); b) others allow the BIA to completely handle road maintenance and road construction; or c) still other Tribes contract parts of the maintenance and construction. The states in this tribal region do maintain their own roads which are the primary roads that carry the most traffic.

This difference in organizational structure is of interest. At the level of the state DOT, significant expertise and resources are available to deal with safety challenges. Such knowledge and resources are not available at the local level. For example, in Kentucky only seven out of 120 counties have a county engineer.[3] In Florida, 26 of the 67 counties have a population of less than 50,000 – most counties with this small a population do not have a county engineer. The WVDOH has 'county organizations' rather than county road agencies or county engineers, i.e., personnel, equipment and materials in each county to maintain roads, but these folks are state DOT employees, maintaining state roads and thousands of miles of low and very low volume traffic roads. Since local agencies bear significant responsibilities in maintaining local roads in Florida, it is important to examine states with a similar organizational structure.

A third issue of interest is the relationship between the state DOT and the LTAP Center. As already indicated, Florida plans to provide statewide assistance to local agencies via the Florida LTAP Center. In some states, the LTAP center is housed within the DOT (Arizona, Arkansas, Georgia, Illinois, Maine, Mississippi, Ohio, and Washington) whereas the Centers are separate entities (often housed in universities) in other states (including Florida). Two exceptions exist: the Pennsylvania DOT funds a private company (Pennoni Associates, Inc.) to operate the LTAP Center, and the Idaho LTAP Center is funded through the Local Highway Technical Assistance Council (LHTAC), which is a governmental organization that assists the Local Highway

[3] An exception to this general trend appears to be the State of Alabama in which every county has a county engineer subsidized by the state

Jurisdiction (LHJ) with funding and technical support of Idaho's transportation system. Operational differences between centers housed in DOTs versus those housed externally (such as in universities) and the differences in the availability and access to resources (LTAPs within the state DOT have more "direct" access) can impact the performance. Further, restrictions that may apply to DOT activities (such as travel controls during strict fiscal restraint periods or agency-imposed limitations on serving local organizations) may impact an LTAP Center's ability to adequately address the needs of the locals.

In sum, differences in needs, allocation of responsibilities, and the relationship between the DOT and the LTAP Center significantly affect the organization of programs to improve local road safety. In developing a model for Florida, it is critical to ensure that the developed program has the capacity to meet the significant needs of the State, has the technical expertise to educate local agencies and to perform the analyses for them, and can be administered by an LTAP Center housed outside of the state DOT.

2.4 Facets of an Operational Model for Providing Assistance to Local Agencies

In 2005, after a presentation in Mendocino County, California, that showcased Road System Traffic Safety Reviews which resulted in sustained crash reduction of over 40 percent on arterials and collectors in the local roadway system, the Federal Highway Administration funded four Safety Circuit Rider (SCR) Pilot Programs to be administered through three national Local Technical Assistance Programs (LTAP) in Florida, Kentucky, and West Virginia, and one Tribal Technical Assistance Program (TTAP) in the Northern Plains Tribal Program. The object of the pilot programs was to establish Safety Circuit Riders in each respective state as the catalyst between local, state, and federal governments, private industry, and dedicated citizen special interest groups as stakeholders to reduce the high fatality numbers on local roads and lay the foundation for long-term and consistent crash reduction on urban highways and low volume roads. The states involved in the pilot program were exposed to and encouraged to continue supporting the established operational model. Although each pilot program was positively received in its respective state, continuation at an impactful level beyond the initial pilot was successful only in Kentucky as the LTAP Center applied for and received funding specifically to sustain and build on the previous efforts. This SCR program stresses that an operational model to provide assistance to local agencies should address the issues of education/training, technical support, and resources. In the next several paragraphs, approaches to addressing each of these issues are discussed.

2.4.1 Provision of education and training on safety Issues to local agencies

Training for locals through workshops, presentations, or websites is offered by all LTAP/TTAP Centers. For a comprehensive list of all LTAP Centers (and details including course offerings), please see www.ltap.org.

Alabama DOT also requires counties to participate in roadway safety training to be eligible for federal funds[4]. The Louisiana Local Road Safety Program has several training courses in which every engineer and engineering firm may enroll and receive PDH credits. The Pennsylvania Local Safe Roads Program (started in 2006) teaches the road safety audit process. Specific classes to deal with specific issues and provides hands-on technical assistance are taught by the Program Manager. The Pennsylvania Walkable Communities (sister program) was started in 2007 to focus on pedestrian safety.

Iowa's LTAP Center has been involved in an outreach program (Safety Circuit Rider) since about 1988; their Local Roads Safety Liaison program began in 2008. Both the Safety Circuit Rider and the Safety Liaison teach courses related to local road safety. Iowa LTAP's workshops on safety (such as work zone safety, flagger training, retroreflectivity, multidisciplinary safety team support) organized as part of the overall outreach program (Safety Circuit Rider) have a documented evidence of success with over 90 percent of all counties and 75-100 cities benefiting by attending these sessions.

Housed in the Washington DOT Office of Highways and Local Programs, the T2 Center is responsible for interfacing with locals under the umbrella of the Highway Safety Improvement Plan (HSIP). The safety program has been in existence for a number of years, but the county safety program was separated from the city safety program in 2009. The Washington LTAP Center is using FHWA to develop and present a class on how to perform the necessary steps to assess and mitigate local challenges. The T2 Center has been able to assist each of the 39 counties in the state.

The Montana LTAP/TTAP hosts annual conferences to bring together local safety stakeholders and helps local governments access federal resources and learn about national campaigns such as Toward Zero Deaths.

In contrast to all training discussed above which was primarily directed at engineers and technical staff, Alabama developed a joint session specifically for public officials held during their annual County Commission conference as part of a rural road safety program initiative

[4] http://safety.fhwa.dot.gov/local_rural/training/fhwasa10027/

through NACE and NACo. Several shorter joint sessions have taken place since the initial offering in order to create a safety culture.

Provision of education and training is a critical first step in offering assistance to address local agency safety challenges. The overall training program should address both the management staff (including public officials) and technical/engineering staff. It is evident that each LTAP/TTAP Center, including Florida's LTAP Center, has a variety of courses readily available, with the additional possibility of further customizing some of these to address local agency needs and capabilities. Moving ahead, it can be envisioned that the statewide local area safety assistance program headed by the Florida LTAP will be able to continue providing appropriate training.

2.4.2 Provision of technical support to develop, program, and implement safety projects

In addition to educating local agency staff regarding safety issues and federal funding programs, several states have programs that offer technical support to local agency staff to develop and program safety projects. Some of these practices are discussed next.

Douglas County, Georgia, identified a simple, effective rural road safety program[5] using a four-step approach: (1) Identify high-crash locations using available crash data; (2) Identify low cost safety solutions; (3) Determine potential benefits to establish implementation priorities; and (4) Implement solutions.

The Idaho LTAP Center (housed in LHTAC) outreach begins with phone calls and visits to help solicit project applications for local agencies. Systemic projects are encouraged and include signing and striping projects. Additionally, some large projects were funded, including signal installation. Fatalities and serious injuries are used in determining problem areas. Locals are provided with various representations of their crashes. The LHTAC has the ability to sort data by different parameters. LHTAC staff provides specific technical and hands-on assistance to locals to help them understand the data and possible countermeasures. They perform a number of RSAs, which has strengthened relationships. LHTAC identifies the five most harmful crash types, then identifies the five jurisdictions in each district with the highest amounts of those crash types. In 2014, this process will be expanded to ten jurisdictions in each district. In the first year, 49 local highway jurisdictions were eligible; of 32 projects submitted, 26 were funded. Projects were ranked/funded according to a benefit/cost ratio.

The Iowa Safety Circuit Rider as well as the Safety Liaison programs are partially funded by the Iowa DOT. Between these efforts, approximately 50 percent of the 99 counties in Iowa along

[5] http://www.countyengineers.org/ResourcesEdu/NACEPublications/Pages/default.aspx

with ten to fifteen cities receive road safety advice, reviews, assessments, or audits annually. In addition to working on requested safety reviews, the Safety Liaison examines five to ten year county and city crash data before making a consultation visit and suggests problem areas for further review plus offers possible solutions. A team consisting of the circuit rider, the Safety Liaison, agency engineer, and (when possible) law enforcement participate together to perform safety reviews, assessments, as well as compile written summaries and/or full audits including formal reports with occasional assistance from the DOT traffic and safety staff. Funding justification paperwork may be prepared by the Safety Liaison if requested by the agency; the DOT Traffic and Safety staff also offers assistance and the Safety Liaison works closely with them. Design is normally handled by the local agency, depending on the site, and the project is usually completed in conjunction with a larger project (for example, bridge construction or roadway reconstruction). Special or unusual details (such as roundabouts) may require attention from DOT or a consultant.

Kansas has formed a Local Road Safety Support Team including representatives from the 4Es to develop and implement an updated Strategic Highway Safety Plan (SHSP). The Local Road Safety Support Team is working to form local safety coalitions modeled after the Destination Safe Coalition, a partnership between local agencies involved in improving transportation system safety. Kansas' updated SHSP includes local system safety statistics and specific activities and tools to address crashes on the local system. The Data Support Team to the SHSP is working to improve local roads data accessibility, accuracy and completeness.

In Kentucky, the full time Safety Circuit Rider assists local officials with identification of possible funding sources and will offer assistance with application process. Cooperative agreements are continually implemented. The jurisdiction responsible for roadway is also responsible for implementing funded project. The Safety Circuit Rider assisted a total of twelve counties in 2011 and 2012.

The Louisiana Local Road Safety Program[6], administered by the Louisiana LTAP in coordination with the Louisiana Department of Transportation and Development (LADOTD), provides funding for local road safety improvement projects. The program was established as part of the implementation of the LA Strategic Highway Safety Plan as required by SAFETEA-LU in 2005 using reimbursable federal-aid monies subject to all requirements of Title 23, United States Code. On roads where the information is available, Louisiana conducts before- and after-evaluations (crash volumes and crash types). Eventually, it is planned to incorporate the Highway Safety Manual (HSM) practices into their evaluations to bring their data up to HSM standards. The program reaches every corner of the state – more than 300 local

[6] http://www.ltrc.lsu.edu/ltap/lrsp.html

organizations/governments. An average of a dozen public RSAs are conducted each year. LA LTAP also facilitates submittal and review of applications. LADOTD can select consultants for the engineering and design phase.

Montana Department of Transportation (MDT) maintains 12,000 of Montana's 75,000 public road miles. Ten percent of MDT-maintained roads are located within tribal reservations. MDT received $10.5 million in annual HSIP funding, which is administered through the Traffic and Safety Bureau at DOT headquarters [$750,000 from the High Risk Rural Roads Program (HRRRP) and $3.6 million from the Railway-Highway Grade Crossing Program (RHGCP)][7]. Significant efforts of the Montana LTAP/TTAP include participating with locals to conduct road safety audits and collect and analyze safety data. The MDT developed two safety planning documents with local support. The Community Transportation Safety Plan (CTSP), a collaborative effort involving local and tribal governments, outlines a program to provide technical and financial assistance to local communities. The CTSP goal is to identify partnerships, prioritize projects, and develop educational and programmatic strategies to implement and monitor local community safety assistance. Montana uses the Comprehensive Highway Safety Plan (CHSP - a data-driven statewide plan with emphasis areas across the 4Es of safety) to engage stakeholders statewide and identify risk areas. Local officials participate in the CHSP planning process and face challenges identifying safety risks due to limited data access and lack of ability or funding to analyze data. Montana has recently started developing smaller county and community safety plans[8].

In the Northern Plains Tribal, Road Safety Audits are organized by TTAP personnel along with representatives from respective state, tribe, and federal agencies. The Tribal planner prepares funding justification in most cases. Projects are designed by consultants or the BIA.

In Pennsylvania, the LTAP Safety Circuit Rider receives annual crash data from PennDOT along with a priority list of municipalities with high crash data. Even though crash data for local roads is scarce, available statistics for the previous five years are provided to the locals during the first meeting. Road Safety Audits are performed by the LTAP SCR on three sites prioritized with local input and a report is generated containing a list of suggestions and formulating a community plan (Local Safe Roads Program – Roadway Safety Improvement Plan). The report includes resources and is left behind for the municipality or township. Because the PA LTAP Center is operated by a private company, the LTAP SCR is restricted from offering assistance if the township or municipality decides to work with a consultant as it would be a conflict of interest. Once the report is received, it is up to the municipality or township to design, construct, or

[7] http://safety.fhwa.dot.gov/p2p/mt_hsip/hsip_mt.pdf
[8] http://safety.fhwa.dot.gov/p2p/region7/

otherwise implement improvements. The program puts much emphasis on low cost safety improvements that can be implemented quickly by the municipality. The Pennsylvania Local Safe Roads Program assists 12 communities per year. Their Walkable Communities Program assists 6 communities per year. During the first several years, 30 road safety audits were performed annually (20 for the LSRP and 10 for WCP). To date, more than 200 studies with safety recommendations have been completed at over 800 locations.

The Utah LTAP Center completed 19 Road Safety Audits (RSAs) over a four-year period and has begun working more closely with some Tribes. Local agencies contact the LTAP Center and the LTAP coordinates the RSA. Other services provided to locals by the Utah LTAP include: assessing sign retroreflectivity, providing a safety software suite to any requesting city/county, assisting with warrant studies, providing crash tool reports, and conducting asset management and safety studies. The LTAP has a GIS program used with local governments as many do not have GIS capability.

Wyoming LTAP worked with WYDOT through a pilot research project in 2006 to develop and implement the Wyoming Rural Road Safety Program (WRRSP) - a methodology to identify, fund and administer local safety projects. The methodology uses ten years of crash data and the results of windshield surveys to develop weighting factors for the roadway environment. The factors are combined into crash and geometric ratings which are then used to prioritize high-risk sites. The methodology has helped WYDOT identify low-cost and high-impact projects like signs, striping, rumble strips and delineation projects. For example, Wyoming has used HRRRP funding to implement a statewide sign program to fund new safety signs for local agencies[9].

In summary, local agencies need technical support to identify safety issues, determine appropriate countermeasures, and apply for project funding. Upon being approved for funding, they also need assistance with designing and implementing the project. Further, from a statewide perspective, a need may exist to ensure consistency in practice to improve efficiency and to enable comparison of funding requests from several local agencies for project prioritization. Clearly, a program housed at the LTAP Center can provide the technical expertise to help both the local agencies and the state DOT.

2.4.3 Commitment of resources

The operation of a statewide program to assist locals with safety projects requires commitment of financial resources to fund at least one technical support person (fully) and one administrator (partially).

[9] http://safety.fhwa.dot.gov/systemic/

In Iowa, local assistance is provided through a single point of contact (HRRRP). Level of funding for the technical assistance program is about $150K to LTAP. The support includes administration/technical support (~1.5 FTE) and clerical, etc. (~.25 FTE). The level of funding for design, construction, and implementation by DOT is ~$4-5M/yr for DOT, counties and cities for safety related work.

In Kentucky, funding is provided for one Safety Circuit Rider and partially (.10 FTE) for a Traffic Safety Engineer. Funding is also provided for administrative support.

Louisiana LTAP employs two contract circuit riders that perform RSAs along with the LA local Road Safety Engineer, all funded by DOTD. The level of funding for the entire program is between $3 - $5M annually. The State funding cannot exceed $500K per project or sponsor, and usually requires 10 percent local match on construction projects and 5 percent for other projects[10].

Northern Plans Tribal Region has three staff members to review road safety audits (only a small percentage of their time). The funding depends on the current levels of the TTAP funding. The Tribes/BIA across the United States share about $27 million to conduct road maintenance. The road maintenance funds come from the Department of Interior and must compete with social programs for funding. Much of the road construction money (about $450 million from FHWA either directly or through the BIA) is used for road maintenance measures, such as chip sealing.

In Pennsylvania, the safety program has funds to support two full-time staff members and additional funds to support administrative duties and training (1 to 2 FTE).

In Washington, the T2/LTAP Center primarily uses HSIP funds to assist the locals. The entire program is handled by 2 FTEs.

Wyoming's Rural Road Safety Program utilizes around $100K annually and employs a full time transportation safety engineer who is the program's champion. WRRSP has overseen $1.5 million through the spring of 2011 to implement low-cost safety improvements. Around four agencies apply for funding each year.

In addition to the above summary of resources typically allocated to operate a local safety-assistance program, it is also useful to note that other states have additional funding programs that ultimately address the issue of improving local safety. For example, Kansas DOT has established a federal funds exchange program, which allows local governments to exchange federally allocated funds from the Surface Transportation Program (STP) and Highway Bridge

[10] http://www.ltrc.lsu.edu/ltap/lrsp.html

Program (HBP) for state funds to accelerate project delivery[11]. The state of Alabama subsidizes around 70 percent of each county engineer position per the Code of Alabama, Section 11-6-4 (Acts 1971, No. 1945, p. 3143, §5.)

Finally, resources may also be necessary to maintain a good database of crashes and local roads network to support the analyses needed to identify and prioritize safety projects.

2.5 Summary

While several states are indeed helping small communities address safety issues (with the involvement of their LTAP/TTAP Centers), there are critical differences in needs, allocation of responsibilities, and the relationship between the DOT and the LTAP/TTAP Center across the states. This limits the extent to which a functional, comprehensive, statewide model from a different state may simply be borrowed for implementation in Florida. In developing a model for Florida, it is critical to ensure that the developed program has the capacity to meet the significant needs of the state, has the technical expertise to educate local agencies and to perform the analyses for them, and can be administered by an LTAP Center housed outside of the state DOT. This study examined three specific aspects of the overall program from different states towards developing an approach appropriate for Florida. These aspects are education/training, technical support, and resources.

Provision of education and training is a critical first step in offering assistance to address local agency safety challenges. The overall training program should address both the management staff (including public officials) and technical/engineering staff. It is evident that each LTAP/TTAP Center, including Florida's LTAP Center, has a variety of courses readily available with the additional possibility of further customizing some of these to address local agency needs and capabilities. Moving ahead, it can be envisioned that the statewide local area safety assistance program headed by the Florida LTAP will be able to continue providing appropriate training.

Some local agencies do not have in-house expertise and thus need technical support to identify safety challenges, determine appropriate countermeasures, and apply for project funding. Upon being approved for funding, they also need assistance with designing and implementing the project. Further, from a statewide perspective, a need exists to ensure consistency in practice to improve efficiency and to enable comparison of funding requests from several local

[11] http://safety.fhwa.dot.gov/p2p/region7/

agencies for project prioritization. Clearly, a program housed at the LTAP Center can provide the technical expertise to help both the local agencies and the state DOT.

Finally, the operation of a statewide program to assist locals with safety projects requires commitment of financial resources to fund at least one technical support person (fully) and one administrator (partially). Resources may also be necessary to maintain a good database of crashes and local roads network to support the analyses needed to identify and prioritize safety projects.

Chapter 3: SUMMARY OF THIS STUDY

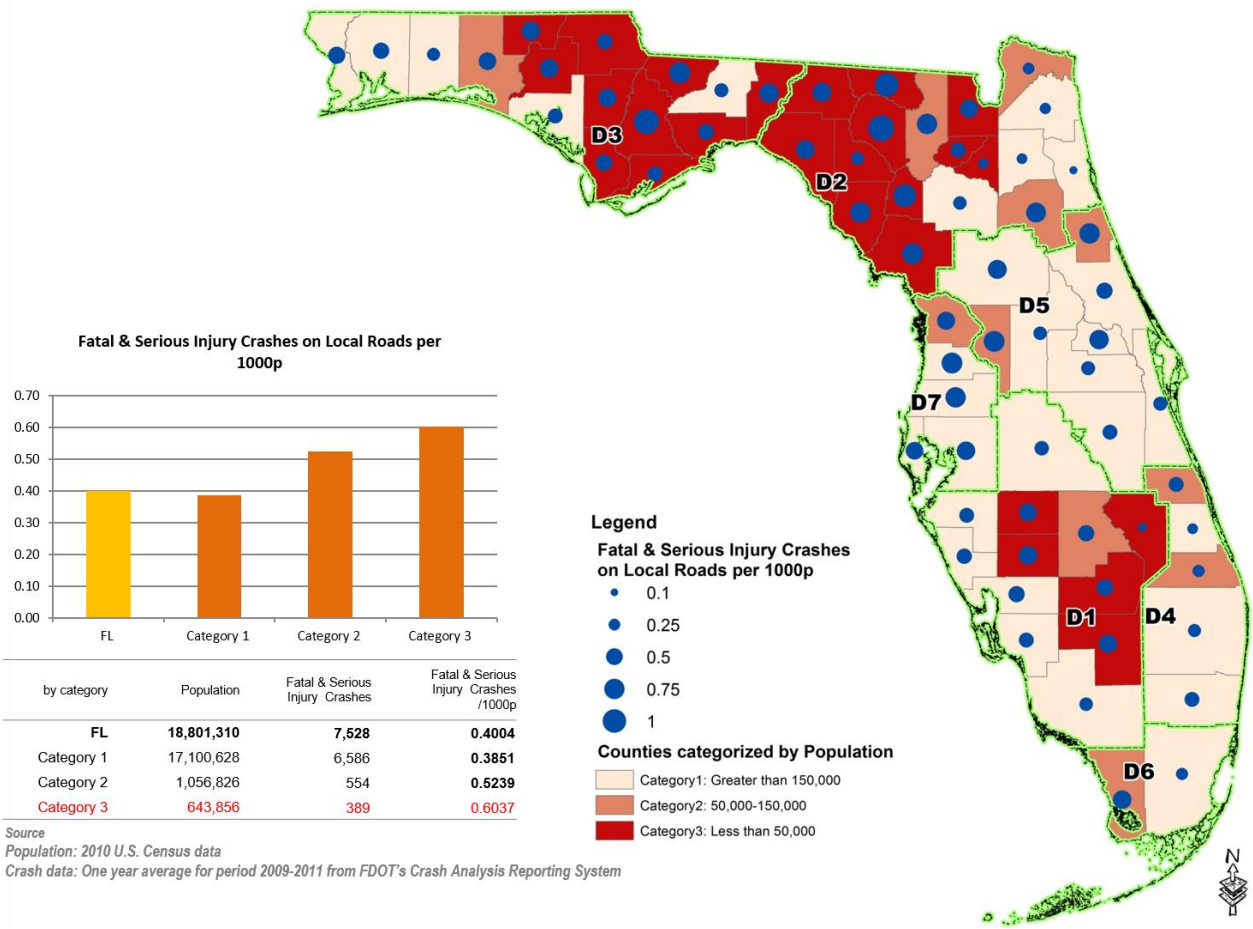
This chapter provides a summary of the research activities of this study including the assessment of the safety challenges in small counties, the review of best practices, and the development of a case study. A summary of the products that were generated from this study - provided as separate documents – is outlined here, as well.

3.1 Assessment of Safety Challenges in Small Counties

Three areas were explored to gain a better understanding on the extent of the safety challenges in small counties: crash statistics on local roads, limitations of local agencies to conduct safety studies, and the limitation facing FDOT in helping local agencies. The findings are described below.

3.1.1 Crash statistics on local roads

To better understand the crash statistic on local roads in Florida, the research team analyzed county crash data for a three year period between 2009 and 2011. The counties were grouped by population in three categories: urban counties with population greater than 150,000, rural counties with population smaller than 50,000 and the mid-size counties with population between 50,000 and 150,000.



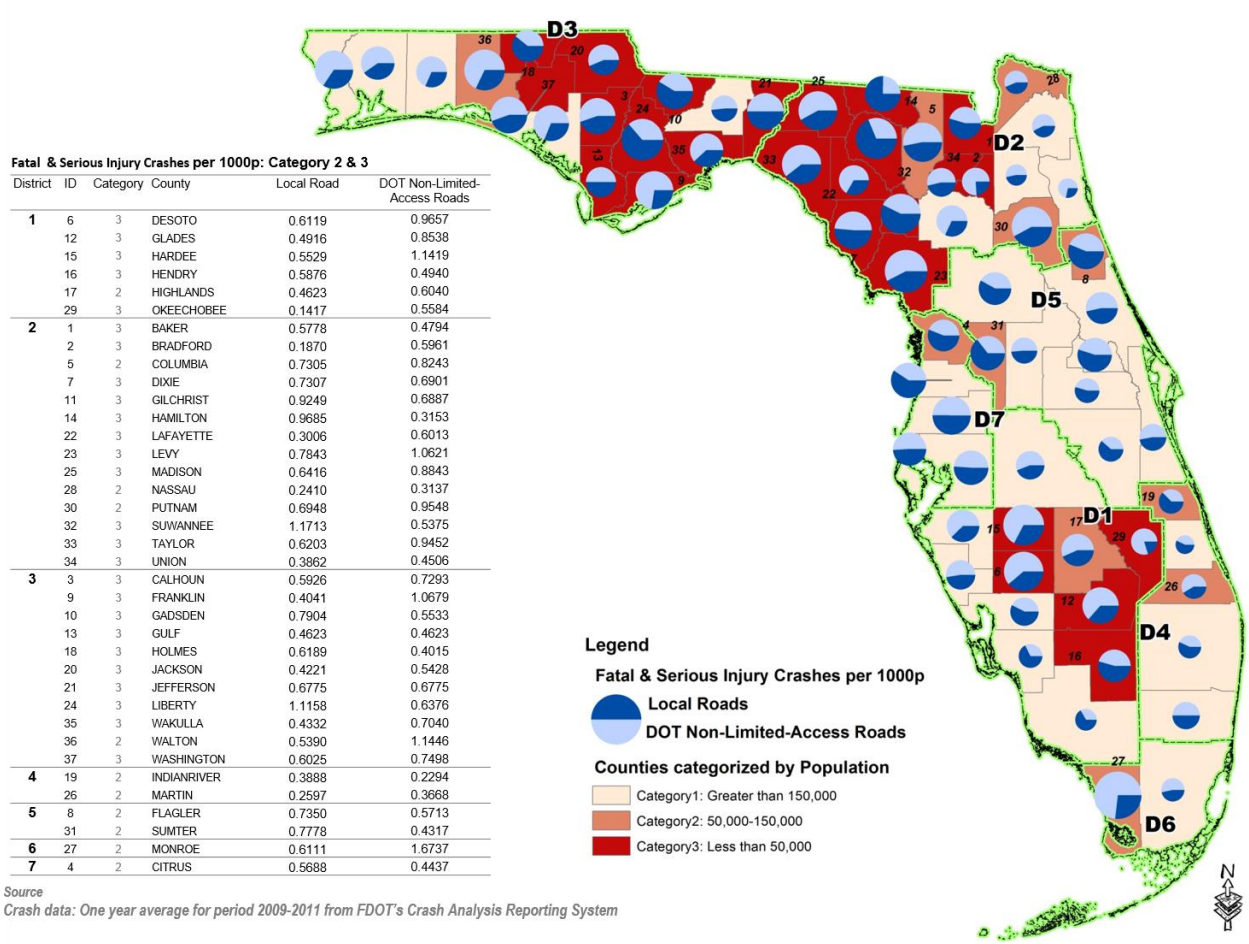
by category	Population	Fatal & Serious Injury Crashes	Fatal & Serious Injury Crashes /1000p
FL	**18,801,310**	**7,528**	**0.4004**
Category 1	17,100,628	6,586	**0.3851**
Category 2	1,056,826	554	**0.5239**
Category 3	643,856	389	0.6037

Source
Population: 2010 U.S. Census data
Crash data: One year average for period 2009-2011 from FDOT's Crash Analysis Reporting System

Figure 3-1 Fatal and serious injury crashes on local roads per 1000 people

During a three year period from 2009 to 2011, local roads in small counties experienced annually 0.6037 fatal and serious injury crashes per 1,000 people which is 1.5 times greater than 0.4004 fatal and serious injury crashes per 1,000 people for statewide local roads. The chart and map in Figure 3-1 illustrates these statistics. These numbers are especially pronounced in District Two, District Three and District One. In addition to small counties, the mid-size counties – with population 50,000 to 150,000 – experienced fatal crashes at 1.3 times the statewide rate of fatal and serious injury crashes on local roads.

By comparing crashes on local roads with FDOT non-limited-access roads (interstates not included), the rates show a bigger concern on local roads, in some counties such as Baker, Citrus, Dixie, Flagler, Gadsden, Gilchrist, Hamilton, Hendry, Holmes, Indian River, Liberty, Sumter, and Suwannee. For example, Hamilton County experienced annually 0.9685 fatal and serious injury crashes per 1,000 people on local roads which is 3.1 times greater than 0.3153 fatal and serious injury crashes per 1,000 people on FDOT non-limited-access roads. The chart and map in Figure 3-2 illustrate these statistics.



Fatal & Serious Injury Crashes per 1000p: Category 2 & 3

District	ID	Category	County	Local Road	DOT Non-Limited-Access Roads
1	6	3	DESOTO	0.6119	0.9657
	12	3	GLADES	0.4916	0.8538
	15	3	HARDEE	0.5529	1.1419
	16	3	HENDRY	0.5876	0.4940
	17	2	HIGHLANDS	0.4623	0.6040
	29	3	OKEECHOBEE	0.1417	0.5584
2	1	3	BAKER	0.5778	0.4794
	2	3	BRADFORD	0.1870	0.5961
	5	2	COLUMBIA	0.7305	0.8243
	7	3	DIXIE	0.7307	0.6901
	11	3	GILCHRIST	0.9249	0.6887
	14	3	HAMILTON	0.9685	0.3153
	22	3	LAFAYETTE	0.3006	0.6013
	23	3	LEVY	0.7843	1.0621
	25	3	MADISON	0.6416	0.8843
	28	2	NASSAU	0.2410	0.3137
	30	2	PUTNAM	0.6948	0.9548
	32	3	SUWANNEE	1.1713	0.5375
	33	3	TAYLOR	0.6203	0.9452
	34	3	UNION	0.3862	0.4506
3	3	3	CALHOUN	0.5926	0.7293
	9	3	FRANKLIN	0.4041	1.0679
	10	3	GADSDEN	0.7904	0.5533
	13	3	GULF	0.4623	0.4623
	18	3	HOLMES	0.6189	0.4015
	20	3	JACKSON	0.4221	0.5428
	21	3	JEFFERSON	0.6775	0.6775
	24	3	LIBERTY	1.1158	0.6376
	35	3	WAKULLA	0.4332	0.7040
	36	2	WALTON	0.5390	1.1446
	37	3	WASHINGTON	0.6025	0.7498
4	19	2	INDIANRIVER	0.3888	0.2294
	26	2	MARTIN	0.2597	0.3668
5	8	2	FLAGLER	0.7350	0.5713
	31	2	SUMTER	0.7778	0.4317
6	27	2	MONROE	0.6111	1.6737
7	4	2	CITRUS	0.5688	0.4437

Source
Crash data: One year average for period 2009-2011 from FDOT's Crash Analysis Reporting System

Figure 3-2 Fatal and serious injury crashes on local roads vs. DOT Non-limited-access roads

3.1.2 Limitations facing local agencies in developing safety programs and projects

Implementing safety improvements to reduce crashes on local roads for small counties is challenging, often due to the limited resources in staff and funding of local agencies responsible for maintenance. Also lacking is access to crash data and the knowledge to relate the statistical data to challenges and formulate acceptable solutions to mitigate the identified challenges. In the absence of expertise and data, elected officials or non-technical managers are forced to direct operations or road crews using priorities that may not necessarily be based on supported safety issues.

To better understand the extent of the lack of expertise and data in small counties, the research team sent an email survey to public works department of each county in Florida. Based on this survey, most small counties have neither sufficient staff nor the necessary data management systems and analytical tools to conduct safety studies. Fourteen of these counties have no

qualified staff, 20 counties have only one member that has the necessary expertise, and 19 counties have two or more experts. From the data management point of view, only one out of 26 small counties has a crash data management system. Counties with population between 50,000 and 150,000 usually have one or more safety professional, but they also have limited crash data management systems.

3.1.3 FDOT role in addressing safety opportunities on local road systems

Since the transfer of the secondary road system from FDOT to cities and counties in the early 1980s, FDOT's role in operating the highway system has been limited largely to state roads, but the goal of Florida's 2012 Strategic Highway Safety Plan is to reduce serious and fatal crashes on all of Florida's road system. This requires FDOT to play a larger role in addressing road safety on local roads. This expanded role is supported by Moving Ahead for Progress in the 21st Century (MAP 21), the latest federal transportation legislation, which authorizes the expenditure of federal safety funds for all public roads, including roads that are not on the federal aid system, and by Florida Statutes (FS 339.08 (h)) which authorize the department "To match any federal-aid funds allocated for any other transportation purpose, including funds allocated to projects not located in the State Highway System."

Although FDOT support for local road safety programs is authorized, manpower to provide this support is limited, and FDOT districts are often faced with conflicts in priorities between local and state projects and programs. Some districts have engaged consultants to provide additional support, but the magnitude of the road safety issue on the local road systems throughout the state requires a substantial expansion of the capacity to address these needs.

3.2 Review of Best Practices

Because of limited capability to conduct safety studies, local agencies in small counties need technical support to identify safety challenges, determine appropriate countermeasures, apply for project funding and implement the safety improvements. To learn from experience in other states that are addressing this challenges, the research team reviewed the variety of practices adopted by other states in addressing local road safety issues. The review focused on understanding the resource distribution and relationship between the DOT and the LTAP/TTAP Center as well as learning how the LTAP/TTAP Center can play a significant role in assisting small agencies to improve safety on local roads. A detailed account is presented in Chapter 2.

3.3 Case Study

In order to develop a template for conducting field studies and prepare the required analysis, the research team worked with Union County to conduct a pilot study as a basis for this template. To select the sites for the study, the team looked for roads where crashes could be mitigated with low cost improvements, and examined crash information from two sources: the FDOT Safety Portal and Signal Four Analytics[12]. The team also discussed the crash occurrences with Union County staff and visited several locations before selecting the test sites. The analysis was conducted by following the principles of the FHWA Road Safety Audit Guidelines. The study team included UF's research team, the County Commission Chairman, Road Superintendent, and a representative of the County Emergency Management office. Field studies were conducted during both daylight and nighttime conditions.

After completing the study, the team proposed several types of improvements in Union County: upgrade signs and pavement markings, enhance conspicuity or other special signing or marking treatments, upgrade (install) guardrails, and widen and pave shoulders. Based on these options, a benefit/cost analysis was performed in accordance with the Florida Department of Transportation in State Safety Office Bulletin 10-01, regarding "Benefit/Cost Analysis, Roadside Safety Analysis Program, and Discount (Interest) Rate."

3.4 Additional Documents Produced

In addition to this report, three other documents were produced from this research. A brief summary of these documents is provided here. The complete documents are provided separately.

- **Local Agency Guide for developing Highway Safety Projects.** This manual was developed in response to the need to address safety issues on local roads in Florida with the assistance of the LTAP Center and the FDOT. The purpose of the manual is to assist local agencies in identifying safety projects that can reduce crashes and compete for funding. The manual includes a funding guide, a process for developing safety projects, a template for developing field studies and B/C analysis and a tutorial on how to use Signal Four Analytics for crash data analysis.

[12] Signal Four Analytics was used to produce maps showing locations of fatalities, clusters of crashes, and sites where there appeared to be an unusual concentration of night time crashes. Crash data for the period from 2006 through 2011 were used for the analysis

- **Field Studies Guide for Rural Road Safety:** This is a PowerPoint training module designed to help local staff develop the capability to identify causes or factors that contribute to crashes at the selected study sites, identify potential measures to reduce these crashes, identify data necessary to justify expenditure of highway safety funds for correcting these issues, and review the process for collecting the field data.
- **Union County Site Analysis and Justification:** This report contains the detailed description of the case study conducted for the purpose of developing a template to conduct field studies and to prepare the required analysis and funding justification.

Chapter 4: DISCUSSION / LESSONS LEARNED

4.1 Need for Help for Local Agencies

Florida's Strategic Highway Safety Plan[13] calls for reductions in serious and fatal crashes. With more than 40 percent of the serious crashes in Florida occurring on local roads, it is essential that more emphasis is placed on reducing crashes on local roads. Although federal funds are available, local agencies have difficulty accessing these funds. Many local agencies are not aware of the resources available or are unfamiliar with the process to obtain federal highway safety funds. Most small agencies lack the technical capability to prepare the documentation needed to support funding requests.

All FDOT districts are responsive to the requests for help from local agencies, but the level and nature of the support needed for local agencies varies with the size and characteristics of the counties that comprise each district. District 7 has developed a robust outreach program to assist local agencies with their safety programs. This initiative includes an annual "District Safety Summit" and other regular meetings with local agencies, a manual, a web site, and other extensive guidance for application for federal safety funds. District 7 has also engaged consultants as "safety ambassadors" assigned to provide assistance to local agencies within the district. The District 7 program has worked well with the larger counties and cities that have the capability to conduct the studies and manage federally funded projects.

At the other end of the spectrum, small counties with limited staff usually require outside services to do this type of work for them. Mid-sized counties typically have small technical staffs that include one or two professional engineers. Although these staff members may have the expertise to perform safety studies and develop and manage federally funded projects, they may also require additional outside help. .

Table 4-1 shows the distribution of county population groups among the districts. While the more densely developed districts can rely on a program modeled after District 7, a more intensive "hands on" approach is needed to help the rural counties in Districts 1, 2 and 3.

[13] http://www.dot.state.fl.us/safety/SHSP2012/StrategicHwySafetyPlan.pdf

Table 4-1 Distribution of county population groups by district

District	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*Totals*
<50,000	5	11	10					26
50,000 to 150,000	1	3	1	2	2	1	1	11
>150,000	6	4	5	3	7	1	4	30
	12	18	16	5	9	2	5	67

4.2 Need to Address System-wide Issues

The HSIP is oriented to develop an annual program of cost efficient projects to improve highway safety, and the focus of this case study has been on development of tools to facilitate identification and analysis of high hazard locations on the local road system. While this is a critical element of any comprehensive program to address safety challenges on a road network, observations during this study emphasize the importance of also including a broader look at factors affecting the safe operation of the road network. The observations in Table 4-1 are specific to the pilot county, but similar conditions have been observed in other nearby rural counties.

Table 4-2 General observations and trends for Union county

Pavement edge drop-offs	This is a chronic issue for many of the roads, especially narrow roads. The county attempts to address these through maintenance using materials such as limerock or millings, but the correction of these drop-offs is beyond the scope of routine maintenance. Data collected at limited sites in this study appear to show a close link between the frequency of drop-offs and lane departure crashes. Pavement widening and shoulder paving are appropriate countermeasures for this condition. Where these treatments are recommended, the work should also include the addition of a Safety Edge.

Table 4-2 General observations and trends for Union county (continued)

Pavement markings	Markings on most roads are badly worn and need to be upgraded. Edge lines are rarely used, but adding edge lines could reduce the incidence of lane departures– especially where these occur primarily in the non-daylight hours. Adding raised pavement markers, especially along curves, would be valuable. The county uses rumble strips as advanced warning devices. These are usually formed from asphaltic material and are not readily visible at night. Use of a white, reflective material instead of asphalt would enhance their visibility and add to their effectiveness. The county has limited resources to install or refresh these markings.
Curve markings	Few curves are marked with chevrons or other enhanced warnings. Although some have advisory speed plaques, these are not consistently applied. There appears to be a need for a county-wide review of rural curves to ensure that adequate warnings and advisory speeds are posted. The county does not currently have the staff capability to perform studies as required to set advisory speeds.
"T" intersections	There appears to be a pattern of crashes involving vehicles that fail to stop when approaching a "T" intersection from a minor side street. Within the various roads studied, there were five such crashes, and four of these occurred during non-daylight hours. All resulted in injuries; two were classified as incapacitating. A countywide project to upgrade the markings and warnings at such "T" intersections has the potential for significant benefits.

Table 4-2 General observations and trends for Union county (continued)

Signage	Basic signage is in place at most required locations, but a large number of the stop and warning signs are small (24"X24"), and need to be replaced with larger signs. Additional attention to advanced warning and enhanced sign conspicuity at problem locations could help reduced lane departure crashes, especially on curves. There is a need to review all regulatory and warning signs and to upgrade as appropriate to conform to current MUTCD standards. Although the county has a sign shop and capability to produce most signs, personnel have had limited training in use of MUTCD.
Culverts	A large number of culverts crossing the road have a vertical drop-offs or headwalls within the clear zone. These should be corrected by either extending culverts with appropriate end treatments or installing guardrail. Culverts under driveways and cross roads commonly do not have mitered end sections. These should be addressed through a combination of requiring such end sections as part of the permitting process and retrofitting existing culverts in conjunction with other work.
Guardrail	Much of the guardrail is either obsolete or needs repair. In some cases, guardrail installations do not conform to current standards. There is a need for a countywide review and upgrade of guardrail. The county does not have the capability to perform significant guardrail repairs or maintenance.

The county has indicated that budget limitations are a major consideration in addressing issues that require contracting for services like guardrail repairs, bucket truck rental for tree trimming, installing or refreshing pavement markings, and consulting services for studies. The analysis of an agency's safety concerns should identify critical issues that highlight a need for change in an agency's priorities.

Some issues, such as upgrading the signs to meet current standards or requiring mitered end sections on driveway culverts, could have been addressed through the county's regular maintenance program without additional funding. Analysis of an agency's safety issues should

include an assessment of practices and policies that can affect the long term safety of the road network. This should also include identifying areas where additional training is needed.

4.3 Need to Refine Use of Systemic Approach

The primary focus of the safety program has been on the use of the spot analysis to identify high hazard locations and develop safety improvement projects. Recent emphasis has been placed on the systemic approach to road safety challenges, concentrating on road characteristics that are likely to contribute to crashes rather than a history of crashes. This is especially relevant for low volume rural roads where crashes occur at random locations.

Observations from this study underscore the importance of also including the systemic approach to identifying road safety challenges and solution. For example, in the CR 229 corridor north of SR 121, a high percentage of the crashes occurred at night at random locations along a road with poorly marked curves and limited pavement markings. No particular "hot spot" was evident, but the analysis indicated that a modest investment to improve the markings and signage would yield a significant benefit. It is likely that similar conditions and opportunities exist along other roads throughout the county.

AAA and FHWA have developed tools for the systemic analysis. There is a need for further development of these tools and incorporation into the analysis for highway safety challenges in Florida.

4.4 Need for Ongoing Technical Support for Locals – LTAP to Provide

Small agencies that do not have a professional engineering staff usually engage the services of a consultant to act as County (or City) Engineer. For some agencies, there appears to be a reluctance to call their consultant for help unless the need for engineering services is obvious. This can be especially problematical when staff member must obtain authorization from the elected body before contacting the engineer.

There is a need for an additional technical resource accessible to local agency staff for advice on a wide variety of issues related to road safety. The MUTCD has identified the LTAP Center as the appropriate resource to assist local agencies with this type of question (*Section 1A.09 of 2009 MUTCD)*[14]. LTAP has the basic infrastructure and well developed communications networks

[14] http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm

established to provide this service, but additional resources are needed to be able to serve this function on an ongoing basis.

4.5 Implementation

The road safety issues usually need to be corrected as quickly as possible after they are identified. While projects involving significant design and construction understandably take time to produce, other improvements like signing, striping, or guardrail could be addressed quickly with an expedited process.

4.5.1 Local Agency Program

The Local Agency Program (LAP) has been the standard program for local projects funded with federal aid. Through this program, local agencies handle the development and construction of a project, with oversight by FDOT and FHWA. Plans must be developed in accordance with federal requirements and FDOT is accountable for ensuring all applicable federal standards are satisfied.

FDOT, FHWA, and FACERS are working together to streamline the LAP process, but use of LAP for local road safety projects is usually time consuming and cumbersome. Many small agencies do not have the ability to effectively produce highway projects consistent with the federal requirements, and LAP is not a viable option for implementing safety projects for such agencies. Some FDOT districts have assumed responsibility for development of local safety projects. In other cases the districts provide technical assistance for locals who do not have the capability to do it alone. While the LAP process has been successful for projects that involve major construction, other methods are more expeditious for certain urgent safety projects.

4.5.2 Design-Build Pushbutton Contracts

District 7 has initiated a Design-Build Pushbutton (DBPB) contract as a method for expediting certain safety projects. A contract is awarded with unit pricing for various items that may be included in a safety project. Projects developed after the contract has been awarded may then be assigned via task orders for construction at the contracted unit prices. This concept has been approved for federal funding on a pilot basis

4.5.3 Unit Price Contracts for Specialty Items

There is a need for emphasis on such work as pavement markings and sign upgrades, usually performed by specialty contractors. Small counties have indicated that they also experience

difficulty in attracting competitive bids for work like pavement markings simply because the quantity of work is small when agencies bid the work individually. Development of unit price contracts for specialty items like pavement markings, signing, or guardrail, would allow for rapid implementation of these projects at competitive prices.

Such contracts would be managed by FDOT. To take advantage of economies of scale, the contracts should cover a wide region – including multiple counties and perhaps multiple districts. For agencies that would normally be certified to perform this kind of work as a LAP project, FDOT and the agencies may agree to provide some services (i.e. design and /or inspection) through a LAP agreement even though the implementation contract is administered by FDOT.

FHWA has approved the Design Build Push Button contract on a pilot basis for federally funded safety projects. Unit price contracts for specialty items would simply be an extension of the Design Build Push Button concept.

4.5.4 Use of Local Agency Forces

FDOT has a program to provide materials and equipment purchased with federal funds directly to local agencies for installation by their own forces. Generally, the costs incurred by the local agency are not reimbursed. This process works well for quick mobilization of certain types of improvements when the agency has the capability to install the equipment.

Federal rules also permit the use of a force account to reimburse an agency's labor costs for a federally funded project. This procedure is described at http://www.fhwa.dot.gov/legsregs/directives/orders/50601.cfm and requires certain justifications and documentation of costs. (State statutes (FS 336.41) place certain limits on the size of a project that can be performed by an agency's in-house crews. Where local agencies already have the system in place to track costs associated with design and CEI for LAP projects, it may be appropriate to consider force account work for certain safety work.)

4.6 Need for Education / Marketing Program

Elected officials and senior administrators are faced with a large number of urgent matters that compete for their attention daily. Often, road safety is a priority for local agency officials only after a high profile crash or other catastrophic event. There is a need to develop an education and information component of any outreach program to help local agency officials understand the urgency of the safety challenges and opportunities and resources available to help them

formulate solutions. Preliminary discussions with staff of FAC indicate there may be opportunities to bring these issues to commissioners in future Association workshops.

4.7 Summary

The level and type of assistance needed by local agencies for development of safety programs varies significantly with size and capability of the agencies. The outreach initiatives of District 7 have been very successful in working with the larger agencies that constitute most of that district. For small agencies that don't have the technical expertise within their staff, a more intense "hands on" support in the form of a team to actually perform the studies and analyses is required. Generally, FDOT districts are not equipped to provide this level of support with existing staff. There is a need for an additional resource that can provide this assistance.

Some of the safety issues on local roads could be corrected by improvements in maintenance practices and through training. In addition to developing safety projects to correct specific hazards, safety studies for small agencies should also include a broader look at other factors that contribute to the long-term safety of the road system.

There is a need to incorporate the systemic approach into the analysis of road safety challenges, especially in the rural areas. Further development of the tools to use this analysis in Florida is needed.

Continued efforts are needed to develop ways to expedite the implementation of safety projects after they have been approved for federal funding.

Chapter 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary and Conclusions

FDOT District 7 has developed an effective process for working with the larger counties that comprise that district. The program has been successful in helping personnel from local agencies conduct safety analyses and prepare applications for federal funding for safety improvements.

Small agencies that do not have technical staffs require additional support for the development of safety projects. Some districts have assumed the responsibility of conducting this work for the counties; however, the Department does not have the capacity to provide support at the level needed to solve the safety issues on the local road networks.

The LTAP Center at the University of Florida is a resource that can provide this assistance. LTAP has working relationships and contacts with local agencies throughout the state, has the ability to engage technical experts as, has a well-developed training curriculum for road safety issues, and is recognized as the appropriate source for local governments to contact for technical assistance with the management of their road systems.

This study has developed the process and templates for use in conducting road safety studies for local agencies and for preparing the documentation required to support the application for federal HSIP funding. While this process and manual was designed to be used by LTAP in conducting studies for small agencies, it is also applicable for use by larger agencies that have the resources to conduct studies with their own staff and/or consultants.

5.2 Recommendations

The following steps are recommended for implementation:

5.2.1 Establish a Road Safety Center (RSC) within LTAP

The Center would report to the State Safety Office, but would work in close coordination with the District Safety Offices. The intent of the Center is to complement and support the Districts in their work with local agencies.

5.2.1.1 Functions of the center:

- Conduct network screening to help prioritize agencies for review. This information would be reviewed with FDOT before establishing priorities and selection of counties.
- Conduct detailed reviews for each agency following the process defined in the template for this study. These studies would include: prioritization of potential study sites, field studies to analyze problems and develop countermeasures, and analysis and documentation to support federal funding for the improvements.
- Serve as a technical resource for all cities and counties regarding the federal safety program.
- Provide training as needed to assist local agency personnel with the site study and ongoing maintenance practices.
- Provide maintenance and support for analytic tools and the Signal four Analytics system. This support would be available to all local agencies in Florida.
- Assist FDOT in providing outreach to local agencies. This would include establishment of web site to be hosted by LTAP and participation in meetings with representatives of local agencies, including professional associations such as Florida Association of Counties, League of Cities, APWA, and various affiliates.

5.2.1.2 Set target for assisting small agencies and plan for resources to conduct the studies. The suggested level of effort is:

a. For small counties, provide direct technical support for safety studies:

   i. Conduct initial safety studies for 26 small agencies over the next three to five years.

   ii. Plan future reviews of these agencies on intervals of approximately five years.

> *Note: The limitations for small municipalities are similar. While the process developed through this study is applicable to all cities and counties, counties are suggested as the first priority, especially in the rural areas.*
>
> *This level is suggested for resource planning purposes. It is recognized that studies in certain counties may be performed by the agency's consultant or the FDOT district staff.*

b. For larger agencies with technical staff, provide assistance for training and support for use of analytic tools and templates on a continuing basis. It is assumed that some of the larger agencies will continue to work directly with the District Safety Offices.

5.2.1.3 Staffing for center

- A core staff consisting of professional, administrative and web site support would provide overall coordination and management of the program.

- Individual technical experts strategically placed throughout the state would be engaged on a part time basis as team leaders conducting the field studies and preparing the documentation. These technical experts may be associated with other educational institutions or may be independent consultants (such as retired public employees with expertise in safety). Technical experts would also be engaged as required by the Center for such activities as developing content for the web site, preparing reports, and meeting with various agencies.

- The University of Florida will support the analytical requirements for the program. This will include crash data using Signal Four Analytics and analysis of crash reductions for proposed countermeasures. UF will also be able to provide additional student assistants to help with field data collection.

5.2.2 Enhance analytic tools for identification and analysis of road safety concerns

- **Enhance tools for network screening**

  Signal Four Analytics provides a powerful tool for identification of safety problems. The ability to map and categorize crashes using current data was a critical feature in selecting the study sites and conducting the crash analysis for the pilot program in Union County. While use of the system relied heavily on a visual presentation of the data, further development of the system to correlate crashes with road geometry and other characteristics can make it a more robust analytical tool.

- **Develop tools for systemic analysis**

  This pilot study has concentrated on the use of historic crash data to identify locations where correction of hazardous conditions is needed. This is a critical component of any comprehensive program to address safety in an agency's road network. However, during the investigation it also became evident that there is a need to address some

issues using a systemic approach, especially for low volume roads where hazards may be widespread and crashes occur at random locations.

Tools have been developed by various organizations, including AAA (usRAP) and FHWA, to allow estimation of potential crashes based on road characteristics instead of historical crash data, but these tools require collection and organization of additional.

There is a need to develop the database related to road characteristics (width, shoulder, alignment, markings, etc.) for the local road system in Florida to support a systemic approach to analysis.

5.2.3 Enhance /extend Design-Build Pushbutton contracts to include unit price contracts for specialty work

As noted above, there is a significant need to address deficiencies like pavement markings, non-conforming signs, markings at horizontal curves and intersections, and guardrail in rural counties throughout the state. In addition to refinement of the systemic tools and data to prioritize this work, there is a need for system-wide implementation of improvements like pavement markings or sign upgrades. It is recommended that unit price contracts for these specialty items be developed for implementation on a regional basis. These contracts can be similar to the Design Build Push Button contracts already approved for federal funding, but by limiting the scope to the specialty item of interest and covering multi-county regions, significant economies of scale can be expected.

5.2.4 Develop a marketing and education program for elected officials

The urgency of the highway safety concern or the availability of resources to address the concern is not well understood by many local elected officials. A communication strategy should be implemented for elected officials and senior management of local agencies to acquaint them with the program and the process to access federal safety funds.

This should include:

- Participation in and presentations to meetings of organizations such as Florida Association of Counties or its affiliates
- Development of a Web site and other materials describing the challenge and program
- Meetings with individual local officials (elected and/or senior managers)

5.2.5 Summary of recommendations

Designate LTAP as the Road Safety Center and establish the program to perform safety studies for small local agencies.

Encourage events like the District 7 Safety Summit and related resources as a means for communicating with larger counties about the safety program.

Expand the outreach program at the state level to include presentations to organizations such as FAC, FACERS, and APWA.

Enhance tools for systemic analysis.

Enhance procedures for expediting implementation of safety improvements through expanded use of Design Build Push Button contracts, development of unit price regional contracts for specialty work, and use of local agency manpower for urgent safety improvements.

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