



Chapter 10:
Safety and Security

CHAPTER 10: SAFETY AND SECURITY

Since the passage of SAFETEA-LU and the terrorist attacks of September 11, 2001, both safety and security have become major topics for those responsible for developing and implementing transportation infrastructure programs and projects. This increased interest can be credited to a continuing emphasis by the U.S. DOT on safety and the public's receptiveness to programs that save lives and advocates better quality of life for users of the nation's transportation systems.

10.1 SAFETY

DISCUSSION OF 2006-2011 US DOT STRATEGIC PLAN

The United States Department of Transportation (US-DOT) Strategic Plan was presented in September 2006. This plan outlines the national process for improving the transportation system for fiscal years 2006 to 2011. The plan's goals and strategies are divided into 5 strategic areas: Safety, Reduced Congestion, Global Connectivity, Environmental Stewardship, and Security, Preparedness and Response. The US-DOT considers improving safety their premier goal. The strategic goal for safety is stated as:

"enhance public health and safety by working toward the elimination of transportation-related deaths and injuries."



"New Ideas for a Nation on the Move"

<http://www.dot.gov/stratplan2011/>

The US-DOT strives to achieve this goal through 11 strategies that have been identified for all modes of transportation, and 9 strategies that are mode-specific. The Strategic Plan outlines safety outcomes and performance measures to chart progress.

In addition, the plan describes central safety strategies by mode, including the following:

- **HIGHWAY SAFETY.** The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) outlines innovative activities to support highway traffic safety. The US-DOT provides grants to States and local communities, supporting programs that aim to reduce motor vehicle crashes. States are also provided with assistance on Strategic Highway Safety Plans (SHSP) and roadway infrastructure and operational improvements that enhance geometric design, utilize more durable pavement markings, install more visible road signs, and increase skid-resistant roadway surfaces to enhance safety. The US-DOT also focuses on data-driven safety countermeasures, public information, education materials and activities, State grant programs, and emerging technologies as they enter the market.
- **TRUCK SAFETY.** The US-DOT's primary strategy for improving truck safety levels is through aggressive enforcement of Federal Motor Carrier Safety Regulations, with increased focus on driver behavior. Educational programs to heighten public awareness of best highway safety practices for commercial motor vehicles and passenger vehicles is another truck safety strategy outlined in the plan.
- **TRANSIT SAFETY.** The key strategy for transit is to integrate safety and security throughout every aspect of public transit, including planning, design, operations and maintenance; training for transit personnel; technical assistance and oversight for transit operators; safety research and technology development; support of drug and alcohol programs; and safety oversight of rail fixed route systems.

- **AVIATION SAFETY.** General aviation safety is outlined through strategies addressing education of the pilot community, new technologies, airport infrastructure, safety management program awareness, and runway safety training.
- **RAILROAD SAFETY.** The US-DOT will continue to implement the National Rail Safety Action Plan, which targets the most frequent and highest-risk causes of train accidents and accelerates research into new technologies that can improve rail safety levels. In order to further identify potential problem areas, the DOT will introduce two automated track inspection vehicles, and issue a Federal rule to reduce the most common human errors that lead to train accidents.
- **PIPELINE SAFETY.** Pipeline safety levels are based on 3 US-DOT strategic initiatives: managing risk & integrity, sharing responsibility, and providing effective stewardship. The US-DOT serves a stewardship role in assuring high national safety standards and guiding permitting for energy facilities.



<http://www.iowadot.gov/traffic/chsp/index.htm>

IOWA COMPREHENSIVE HIGHWAY SAFETY PLAN

**IOWA COMPREHENSIVE HIGHWAY SAFETY PLAN
TOP FIVE SAFETY POLICY STRATEGIES (LEGISLATIVE)**

- **YOUNG DRIVERS.** Strengthen minor school license (MSL) and graduated driver’s license (GDL) laws with stronger provisions that are proven to reduce specific risks and save lives.
- **OCCUPANT PROTECTION.** Require occupant restraints in all automotive vehicle seating positions.
- **MOTORCYCLE SAFETY.** Restore a motorcycle helmet law.
- **TRAFFIC SAFETY ENFORCEMENT.** Support traffic safety enforcement and adjudication with adequate resources.
- **TRAFFIC SAFETY IMPROVEMENT PROGRAM.** Increase Iowa’s Traffic Safety Improvement program (TSIP) funding from 0.5 percent to a full 1 percent of Iowa’s Road Use Tax Fund.

The “Five E’s” of Highway Safety



<http://www.iowadot.gov/traffic/chsp/index.htm>

The Comprehensive Highway Safety Plan (CHSP) is a process aimed at increasing roadway safety. The Federal Strategic Highway Safety Plan was last issued in April 2006 and encouraged the CHSP development in Iowa through the Iowa Safety Stakeholders, whose mission is to “identify target areas and strategies that will move the numbers to significantly reduce fatalities and injuries on public roadways.” The “Top Five Safety Policy Strategies” of the Iowa CHSP are shown above. Some of the strategies identified by this group address infrastructure while others target driving behavior and the need for culture change. The top legislative policy strategies and administrative program strategies were outlined as follows:

*IOWA COMPREHENSIVE HIGHWAY SAFETY PLAN
TOP EIGHT PROGRAM STRATEGIES (ADMINISTRATIVE)*

- **LANE DEPARTURE.** Enhance lane departure related design standards and policies (e.g., paved shoulders, rumble strips and median barriers).
- **SAFETY CORRIDORS.** Identify safety corridors and use multidisciplinary strategies to mitigate specific crash causes such as impairment, speeding, driver inattention, and other factors.
- **INTERSECTIONS.** Promote innovative intersection designs, such as roundabouts and other configurations.
- **LOCAL ROADS.** Create local multidisciplinary safety teams to identify and resolve local crash causes.
- **STATE TRAFFIC RECORDS.** Enhance data availability and use by all stakeholders.
- **SENIOR MOBILITY.** Develop a single point of contact to help older persons and their caregivers navigate existing programs regarding changing mobility needs.
- **SAFETY TRAINING AND EDUCATION.** Provide state and local multidisciplinary traffic safety education programs for professionals and the driving public.
- **UNPAVED RURAL ROADS.** Promote public awareness of the risks of driving on unpaved rural roads.

IOWA DOT TOP 200 SAFETY IMPROVEMENT CANDIDATE LOCATIONS

Only 2 intersections in the Ames area are included on the Iowa Statewide Safety Improvement Candidate Location Listing (SICL). The most recent listing used crash data from 2003 to 2006. This list is published by the Iowa Department of Transportation Office of Traffic and Safety annually and includes the Top 200 locations based on number of crashes, crash severity, and the rate at which crashes occur. The locations on this list are eligible for funding assistance to develop safety improvements under the Iowa Traffic Safety Fund Program.

The intersections on this list within the AAMPO boundaries include:

- US 69/S Duff Ave & Airport Rd & Billy Sunday Rd
 - Statewide ranking: 128
- Lincoln Way & S Dakota Ave & N Dakota Ave
 - Statewide ranking: 197

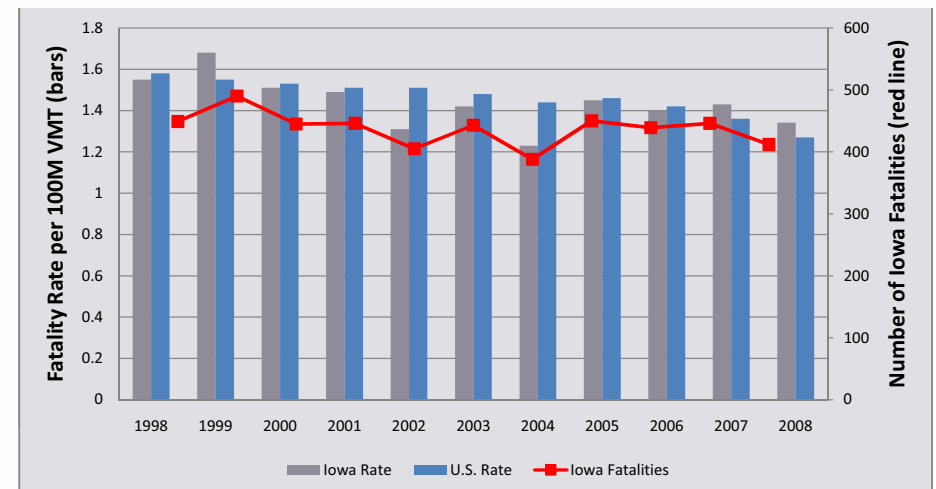
AAMPO CRASH DATA

FATAL CRASH DATA

According to the Iowa Department of Transportation (Iowa DOT), Iowa averages 445 deaths per year caused by motor vehicle accidents. The estimated economic impact of motor vehicle crashes in Iowa is \$1.3 billion annually.

FIGURE 10.1 shows the fatal crash statistical trends for Iowa compared to the United States as a whole for years 1998 to 2008. Although for several years Iowa ranked below the national average in the crash fatality rate, in more recent years (2007 and 2008) the rate of fatalities caused by motor vehicle accidents has exceeded the U.S. national average. This figure also shows the number of Iowa fatalities per year continues to range above 400.

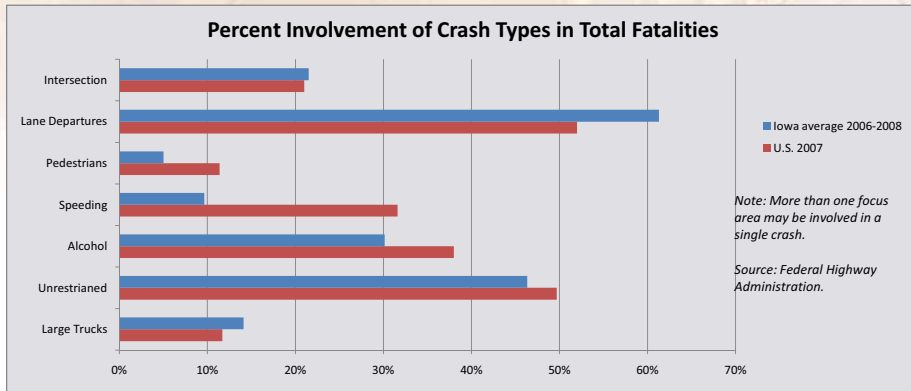
FIGURE 10.1. FATALITY TRENDS FOR U.S. AND IOWA



Source: Federal Highway Administration

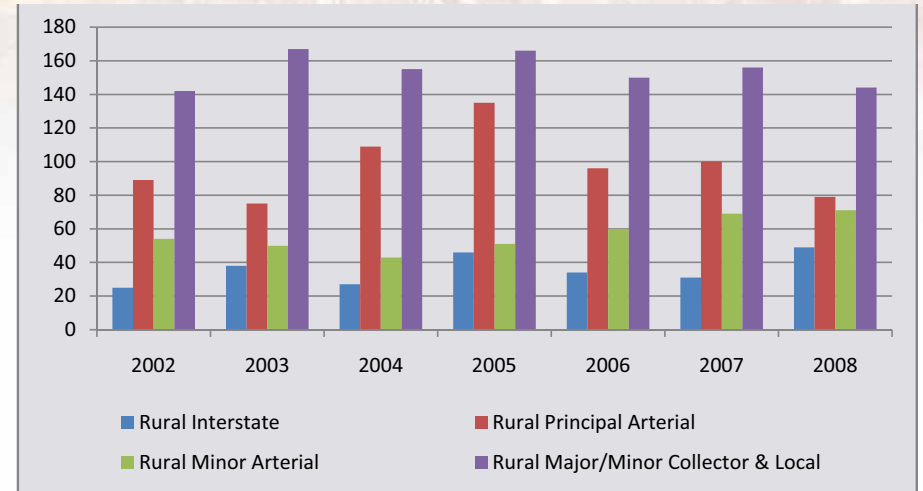
The characteristics of fatal crashes for Iowa compared to the United States as a whole are shown in **FIGURE 10.2**. In Iowa for years 2006 to 2008, vehicle lane departures have been included in over 60% of fatalities, while nearly 50% of crashes involved unrestrained passengers.

FIGURE 10.2. TOTAL FATALITIES CRASH TYPES BY PERCENT INVOLVEMENT



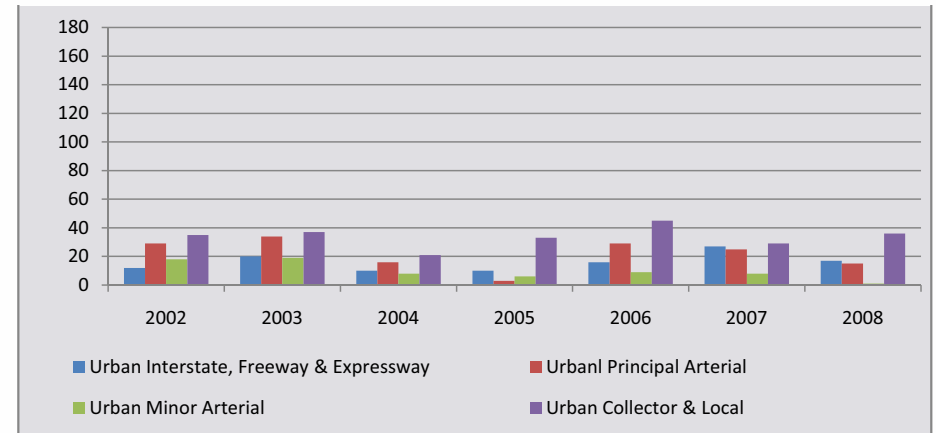
The majority of motor vehicle fatalities in Iowa occur in rural areas, compared to urban areas, as shown in **FIGURE 10.3** and **FIGURE 10.4**. These figures illustrate that lower volume roadways, such as roadways classified with a facility type of collector or local road, contain more fatal crashes than roadways with a higher functional classification such as an interstate.

FIGURE 10.3. IOWA FATALITIES ON RURAL ROADWAYS



Source: Federal Highway Administration

FIGURE 10.4. IOWA FATALITIES ON URBAN ROADWAYS



Source: Federal Highway Administration

TOTAL CRASHES DATA

Total crashes that have occurred in the AAMPO area for years 2002 to 2008 are shown in **TABLE 10.1**. In total there were 12 fatalities related to motor vehicle crashes, 124 major injuries, and 2098 minor or possible injuries.

TABLE 10.1. CRASHES IN THE AAMPO AREA, 2002- 2008

YEAR	TOTAL CRASHES	NUMBER OF FATALITIES	NUMBER OF MAJOR INJURIES	NUMBER OF MINOR/POSSIBLE INJURIES
2002	1000	0	21	292
2003	1079	2	20	291
2004	1114	1	11	310
2005	1035	2	13	237
2006	963	4	19	296
2007	1077	3	23	329
2008	1248	0	17	343
7-Year Total	7516	12	124	2098

Source: Iowa DOT GIS crash data

Locations for fatal and injury crashes in the 7-year period are shown in **FIGURE 10.5**.

The number of crashes per mile of roadway segment is shown in **FIGURE 10.6**.

FIGURE 10.5. AMES AREA FATAL AND MAJOR INJURY CRASHES YEARS 2002 TO 2008

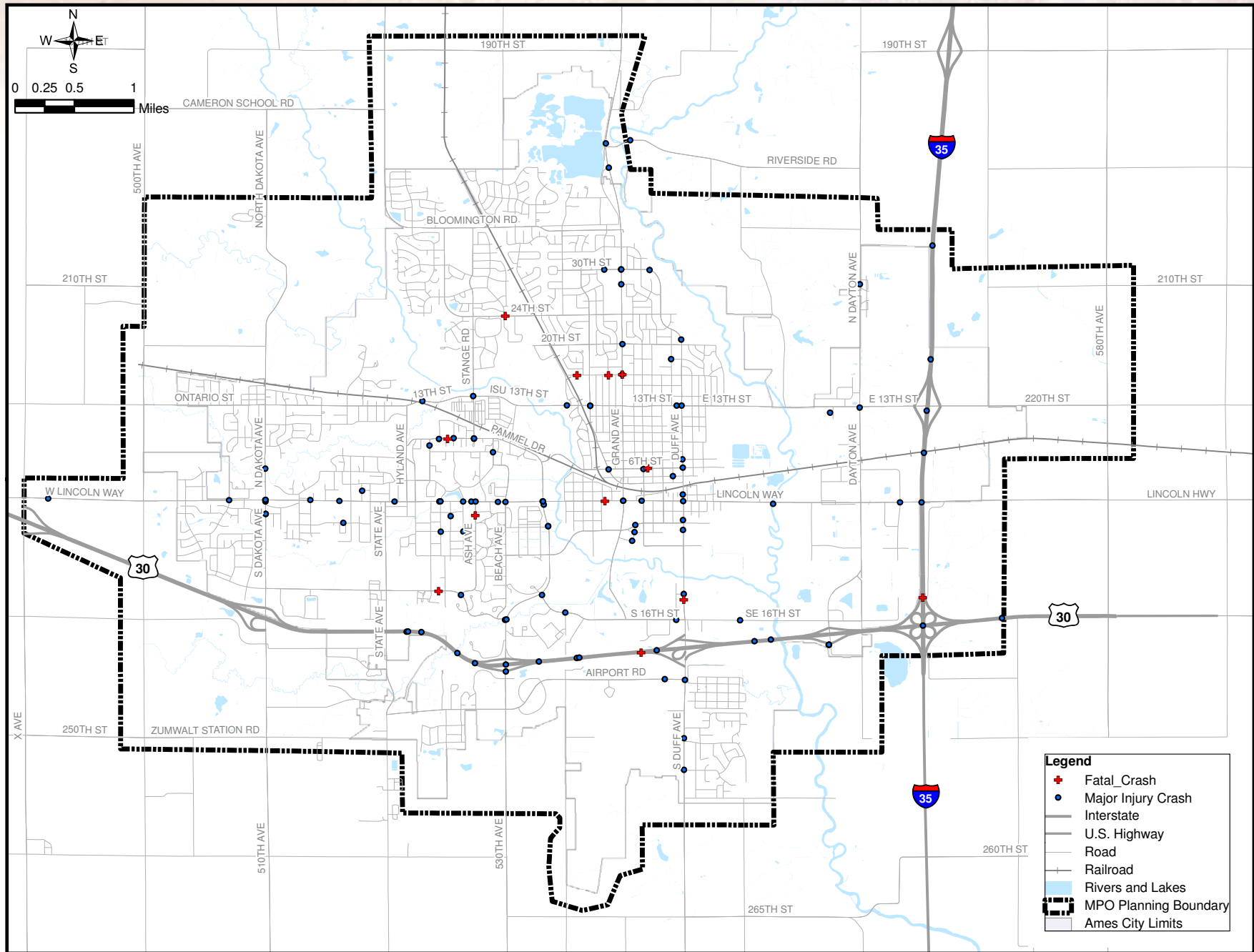
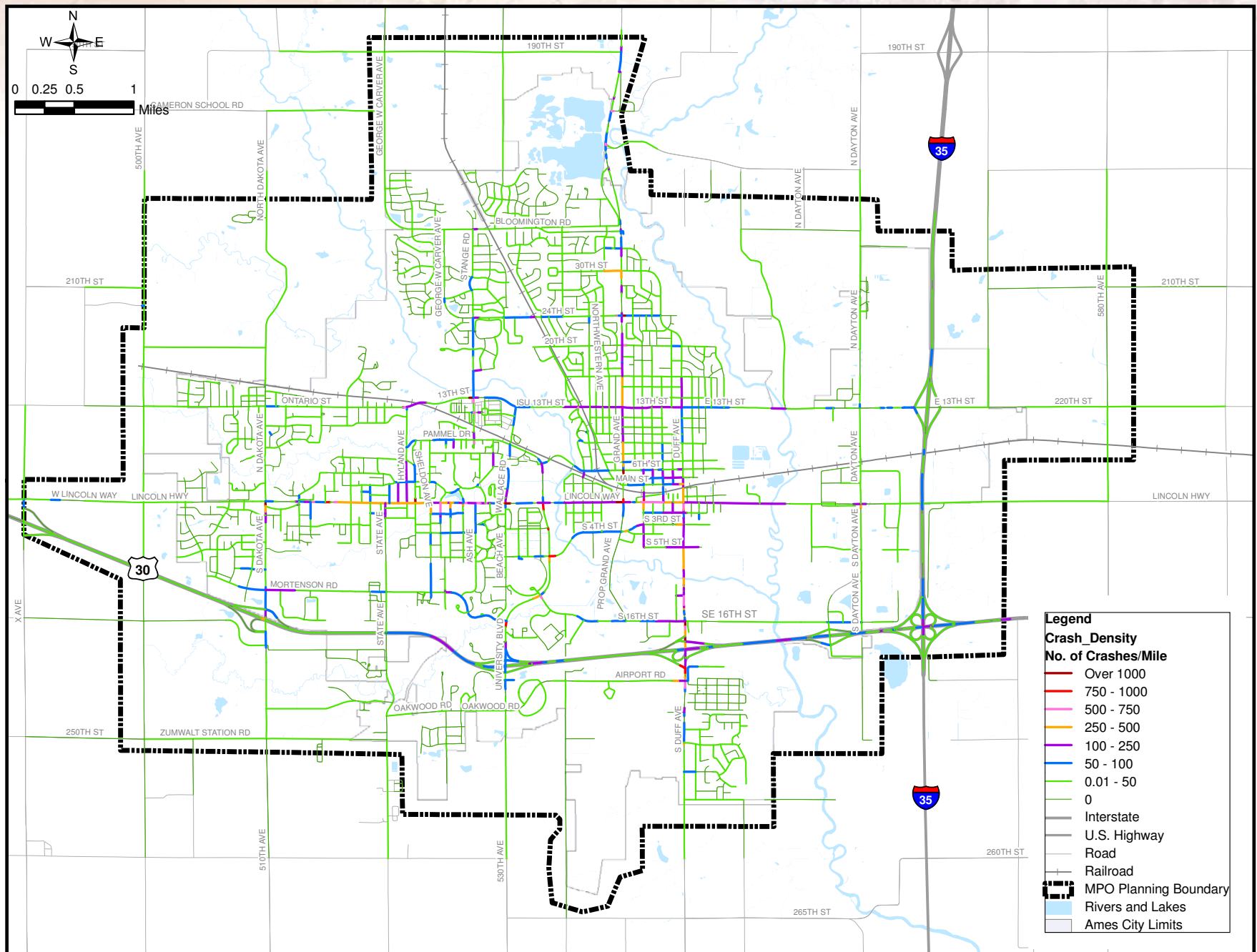


FIGURE 10.6. AMES AREA CRASH DENSITY YEARS 2002 TO 2008



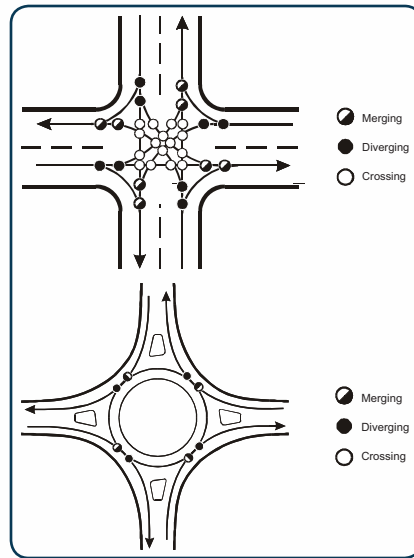
DISCUSSION OF LOCAL AGENCY SAFETY ISSUES/ CONSIDERATIONS

ROUNDAOBOUTS

A modern roundabout is a roadway junction where vehicles circulate counterclockwise around a center island. There are several benefits to the installation of a roundabout compared to a signalized intersection including:

- Safety
- Sustainability
- Reduction in off-peak delay
- Long-term maintenance cost savings

A typical four-legged two-lane intersection has 32 conflict points whereas a modern single-lane roundabout has only 8 conflict points. In addition to fewer potential crash locations, circulating traffic in a roundabout operates at slower speeds than vehicles passing through a signalized intersection. The slower speeds and directional circulation offer safety benefits including less severe crashes. Right-angle crashes are eliminated and the typical roundabout crashes that occur are sideswipes which result in fewer fatalities and injury crashes than other crash types. Additionally, the slower speeds and single direction circulation make it easier for younger and elderly drivers to enter the traffic stream and appropriately judge adequate gaps in



Single-approach Intersection and Roundabout Conflict Points

the circulating traffic. Although the number of conflict points increases from a single-lane to a multi-lane roundabout, the relative number of conflict points remains substantially lower compared to a signalized intersection.

Not only are roundabouts safer for drivers, but roundabouts offer safety benefits for pedestrian and bicycle traffic. Roundabouts are designed



Middle Road/ 53rd Street, Bettendorf, Iowa

to have splitter islands dividing vehicles entering and exiting the roundabout at each approach. The divider islands offer pedestrians a refuge when crossing the street allowing pedestrians to cross each direction of traffic independently. Cyclists can either

dismount and cross as pedestrians or they can enter the roundabout as non-motorized vehicles. The slow circulating speeds of roundabouts are more cyclist friendly than signalized intersections.

One of the benefits of roundabouts is sustainability. Since roundabouts allow continuous vehicular flow, vehicle emissions are lower for roundabouts compared to signalized intersections. Additionally, as noted previously, roundabouts are typically safer for all modes of traffic including pedestrian and bicycle traffic as well as vehicular traffic.

Roundabouts are yield controlled which results in minimal vehicular delay during uncongested time periods. Initial costs for the installation of roundabouts are typically higher than signalized intersections due to the need for additional right of way, but roundabouts offer improved long-term maintenance costs compared to signalized intersections and typically cost less over time.

A few disadvantages of roundabouts include:

- Heavy vehicles may need to utilize both lanes of traffic when traversing multilane roundabouts, or will require installation of a truck apron in single lane roundabout.
- Emergency vehicles are required to reduce their speed when passing through roundabouts regardless of time of day ; however, the slowing required to negotiate a roundabout typically represents a negligible impact on total emergency vehicle travel time (and it's noted that emergency vehicles typically have to slow on approaches with red signal indications before proceeding through the intersection).
- Vehicles are continuously flowing through roundabouts prohibiting the opportunity to stop vehicular traffic for pedestrians unlike signalized intersections; however, vehicles are moving slow enough that yielding for pedestrians crossing or waiting to cross becomes very easy.

Modern roundabouts that are designed properly with sufficient horizontal deflection and adequate pavement markings offer several advantages over signalized intersections given the vehicular volumes can be adequately served by a roundabout and the roundabout is geometrically feasible. The traffic operations of a roundabout need to be analyzed with future traffic projections to ensure a roundabout is the best solution. Additionally, other considerations may prohibit the installation of a roundabout including approach grades, right of way constraints or at a location within a network of signalized intersections.

ACCESS MANAGEMENT

Part of the transportation planning process includes access management. The Transportation Research Board (TRB) Access Management Committee defines access management as the systematic control of the

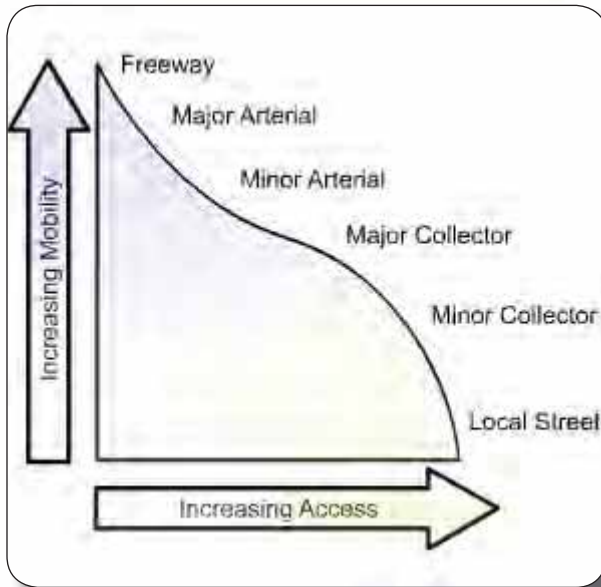
location, spacing, design and operation of driveways, median openings, interchanges, and street connections. Access management also includes roadway design treatments such as medians and auxiliary lanes, and the appropriate spacing of traffic signals. By managing roadway access, government agencies can increase public safety, extend the life of major roadways, reduce traffic congestion, support alternative transportation modes, and improve the appearance and quality of the built environment.

Good access management promotes safe and efficient use of the transportation network. A set of techniques that state and local governments can use to control access to highways, major arterials, and other roadways include:

- **ACCESS SPACING:** increasing the distance between traffic signals improves the flow of traffic on major arterials, reduces congestion, and improves air quality for heavily traveled corridors.
- **DRIVEWAY SPACING:** Fewer driveways spaced further apart allows for more orderly merging of traffic and presents fewer challenges to drivers.
- **SAFE TURNING LANES:** dedicated left- and right-turn, indirect left-turns and U-turns, and roundabouts keep through-traffic flowing. Roundabouts represent an opportunity to reduce an intersection with many conflict points or a severe crash history (T-bone crashes) to one that operates with fewer conflict points and less severe crashes (sideswipes) if they occur.
- **MEDIAN TREATMENTS:** two-way left-turn lanes (TWLTL) and nontraversable, raised medians are examples of some of the most effective means to regulate access and reduce crashes.
- **RIGHT-OF-WAY MANAGEMENT:** as it pertains to R/W reservation for future widenings, good sight distance, access location, and other access-related issues.

Access Management provides an important means of maintaining mobility. It calls for effective ingress and egress to a facility, efficient spacing and design to preserve the functional integrity, and overall operational viability of street and road systems.

In areas of dynamic development, such as the S. Duff Avenue corridor, it is important to define access standards that achieve a balance between property access and functional mobility of the road system.



South Duff Avenue, south of S. 2nd Street

10.2 SECURITY

Transportation security has generated a heightened attention since the terrorist attacks of September 11, 2001. Transportation infrastructure is vulnerable to terrorist attack due to the high concentrations of people, the threat to daily life as an essential public service, and the likelihood of the system being used both as the delivery and escape mechanism for terrorists.

Securing our nation from further attack includes focusing on what can be done now to prevent threats from being carried out, mitigating the results if they do occur, and expediting the response and recovery efforts following the event. It has been recognized that the most cost-effective time to begin to address security issues is when transportation projects are being planned and designed.

NATIONAL RESPONSE FRAMEWORK

The National Response Framework (NRF) was issued by the US Department of Homeland Security in January 2008. This document defines the key principles, roles, and structures that organize response methods in the United States. The NRF is classified as a framework, written to guide the local, tribal, State and Federal response efforts. The NRF identifies special circumstances where the Federal Government exercises a larger role, including incidents where Federal interests are involved and catastrophic incidents where a State would require significant support. The NRF enables first responders, decision makers, and supporting entities to provide a unified national response.

The NRF is written for senior elected and appointed leaders, such as Federal department or agency heads, Governors, mayors, tribal leaders, and city/county officials. Personal preparedness by individuals and households is also emphasized. The NRF and supporting documents are available online.

KEY PRINCIPLES INCLUDED IN THE NRF:

- **ENGAGED PARTNERSHIP.** Leaders at all levels must communicate and actively support engaged partnerships by developing shared goals and aligning capabilities so that no one is overwhelmed in times of crisis.
- **TIERED RESPONSE.** Incidents must be managed at the lowest possible jurisdictional level and supported by additional capabilities when needed.
- **SCALABLE, FLEXIBLE, AND ADAPTABLE OPERATIONAL CAPABILITIES.** As incidents change in size, scope, and complexity, the response must adapt to meet requirements.
- **UNITY OF EFFORT THROUGH UNIFIED COMMAND.** Effective unified command is indispensable to response activities and requires a clear understanding of the roles and responsibilities of each participating organization.
- **READINESS TO ACT.** Effective response requires readiness to act balanced with an understanding of risk. From individuals, households, and communities to local, tribal, State, and Federal governments, national response depends on the instinct and ability to act.

DISCUSSION OF 2006-2011 U.S. DOT STRATEGIC PLAN

One of the 5 strategic areas outlined in the U.S. DOT Strategic Plan is Security, Preparedness and Response. The strategic goal for security is stated as:

“Balance transportation security requirements with the safety, mobility and economic needs of the Nation and be prepared to respond to emergencies that affect the viability of the transportation sector”

The U.S. DOT strives to achieve this goal with 3 outcomes:

1. Expert transportation sector intelligence
2. Preparedness for emergencies affecting the transportation sector
3. Effective response to emergencies affecting the transportation sector

The Strategic Plan states the importance of working closely with the Department of Homeland Security to assess and reduce the vulnerabilities of transportation services and infrastructure to terrorist or criminal attacks while ensuring the mobility needs of the Nation for personal travel and commerce. The list of security strategies in the plan include:

1. Work with the Operating Administrations to communicate and validate timely, relevant, expert intelligence analysis that focuses preparedness efforts, supports operational response, supports international programs, and informs technical requests from the Intelligence and Law Enforcement Communities.
2. Work with the Operating Administrations to develop a security policy framework that will ensure preparedness, mitigate the consequences of transportation sector emergencies, and support the Department’s mission.
3. Fulfill DOT commitments to international partners and agreements, such as the Security and Prosperity Partnership for North America, and the North Atlantic Treaty Organization (NATO).

4. Maintain DOT responsibility for oversight of national security initiatives affecting the maritime transportation system within the Maritime Administration.
5. Maintain government-owned sealift assets and provide assured access to commercial sealift and related commercial intermodal assets for use in defense mobilizations and national emergencies.
6. Develop and implement actions to work aggressively on closing identified security program gaps and emergency operation gaps throughout the transportation system.
7. Work with the States, the Department of Defense, Surface Deployment and Distribution Command, State military offices, and applicable military units to identify and address the highway infrastructure and operational requirements that support National defense and deployment needs.
8. Represent government and industry stakeholders within the civil community in the identification of U.S. Space-Based Position, Navigation, and Timing (PNT) needs and requirements, the promotion, coordination and leveraging of PNT capabilities across the civil community, and in the development of backup position and timing capabilities that can support critical infrastructure applications within the U.S. (Supports all outcomes)
9. Develop, promote and enforce performance-based national and international hazardous materials security standards.

ROLE OF AAMPO

State DOTs and MPOs may have the ability to promote interagency coordination between the different modes of transportation, governmental agencies, groups focused on security, and others. MPOs can support programs and fund projects that enhance secure travel for all transportation system users. As the entities that plan and select projects for implementation, the MPO can ensure that whatever criterion is used to select and advance projects in a particular region recognizes, highlights, and promotes projects that address transportation security.