

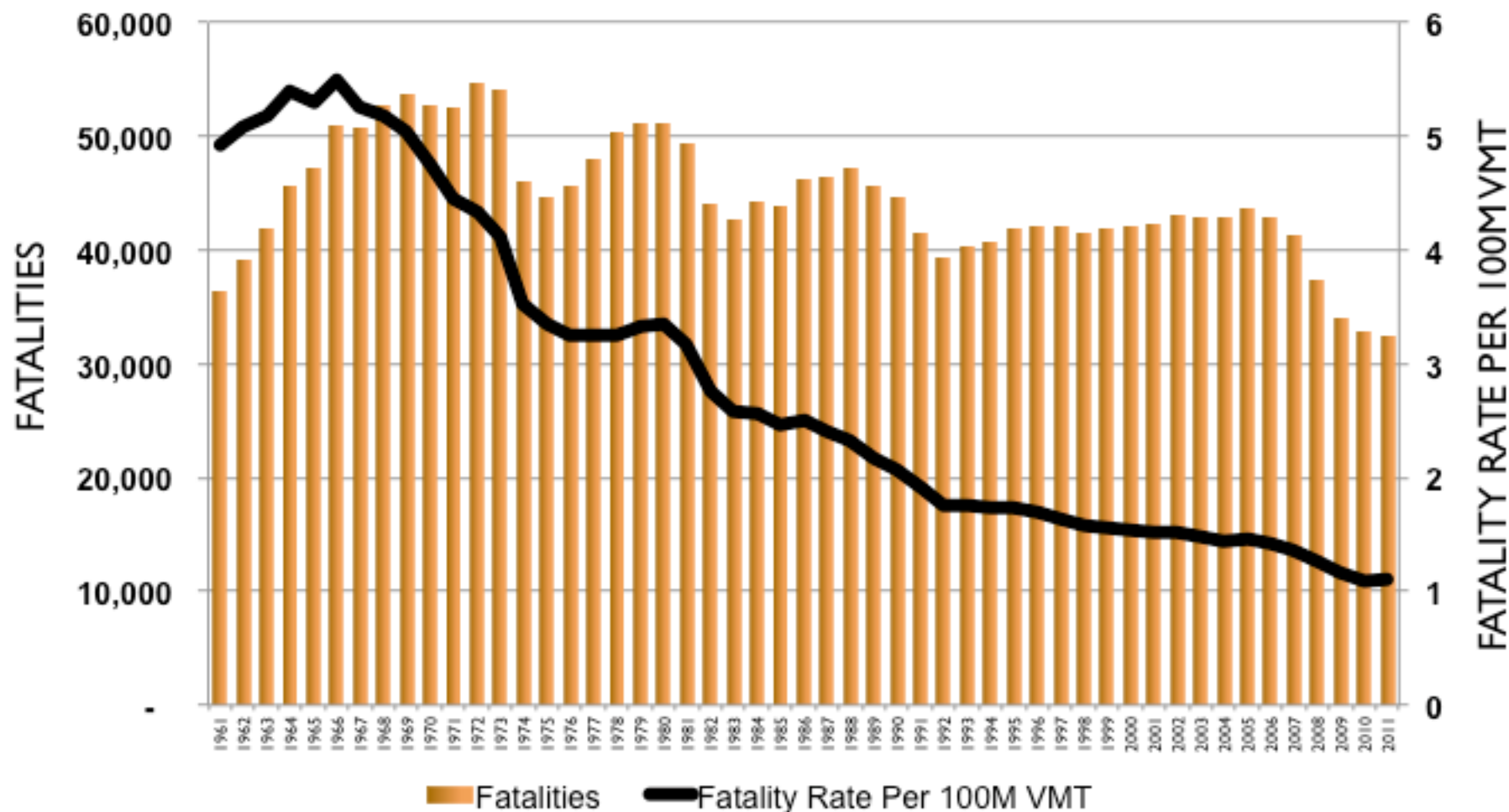
# Local Road Safety: Reducing Fatalities and Serious Injuries on County Roads Workshop

**Brian Roberts, PE**  
**NACE Executive Director**

**Brian Keierleber, PE**  
**Buchanan County, IA**  
**County Engineer**

# Topics

- Trends in Highway Fatalities
- Toward Zero Deaths (TZD)
- Strategic Highway Safety Plans
- Local Road Safety Plans
- Examples

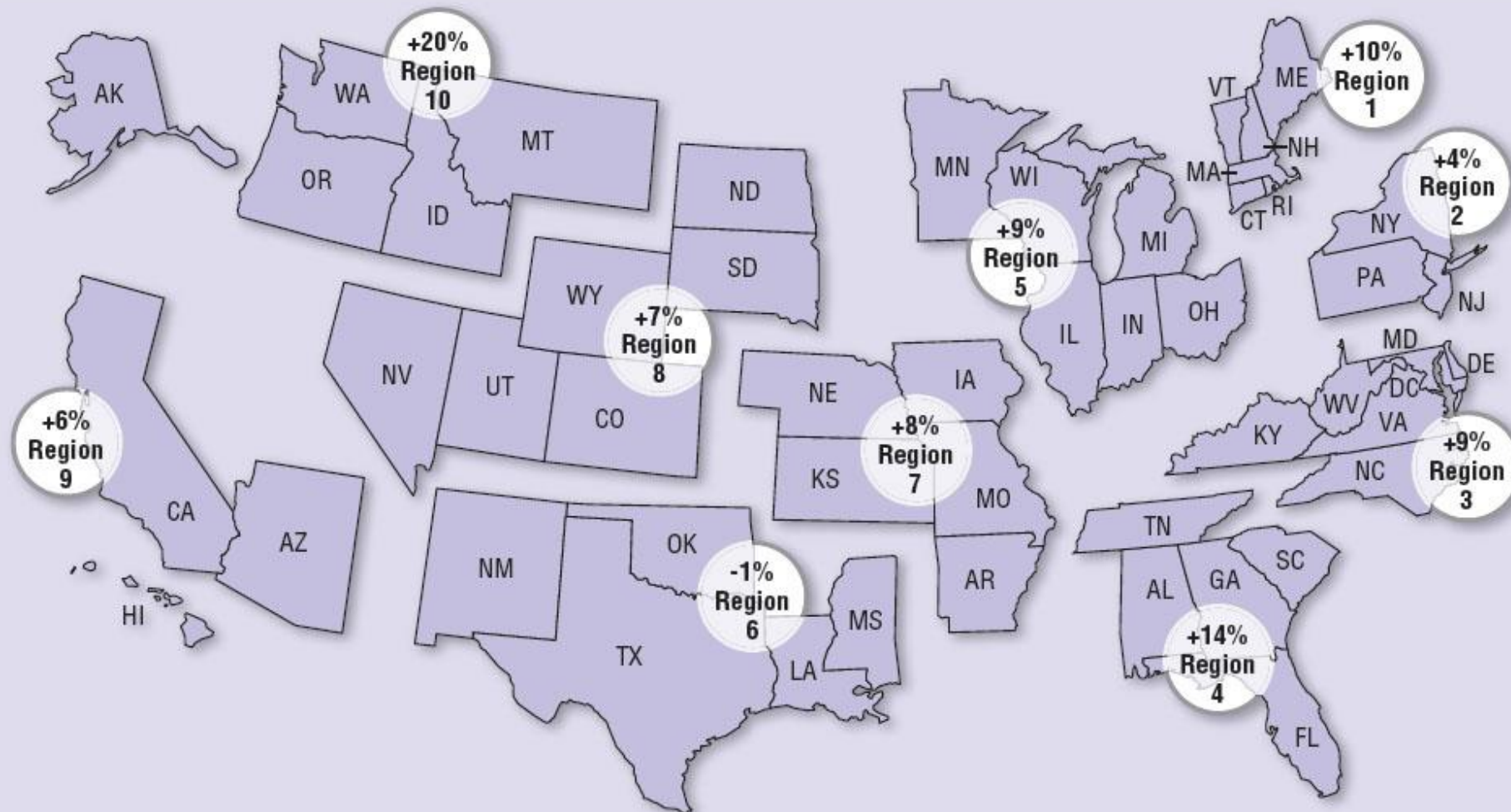




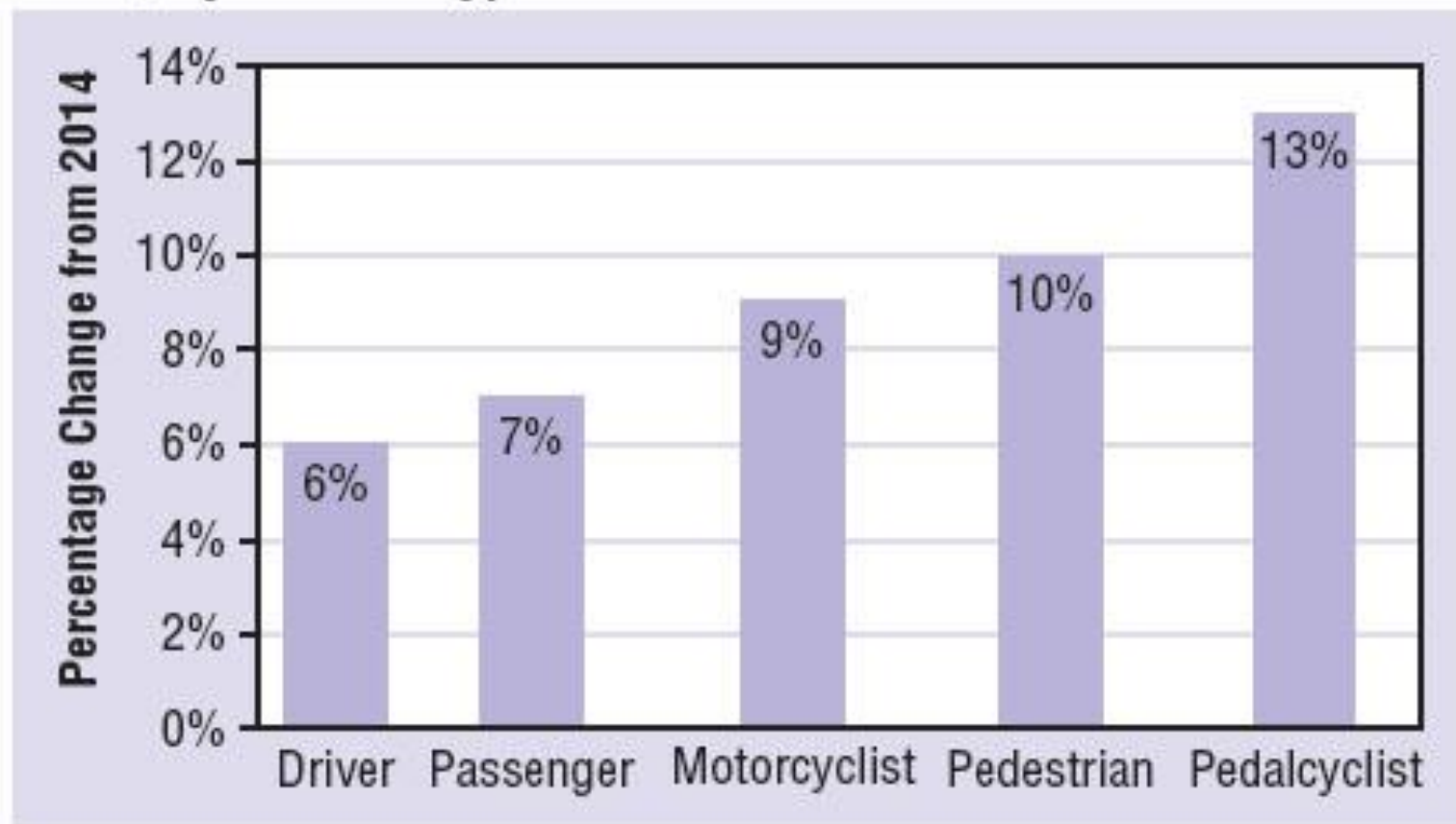
# 2015 BROUGHT BIGGEST PERCENT INCREASE IN U.S. TRAFFIC DEATHS IN 50 YEARS

32,675 → 35,200

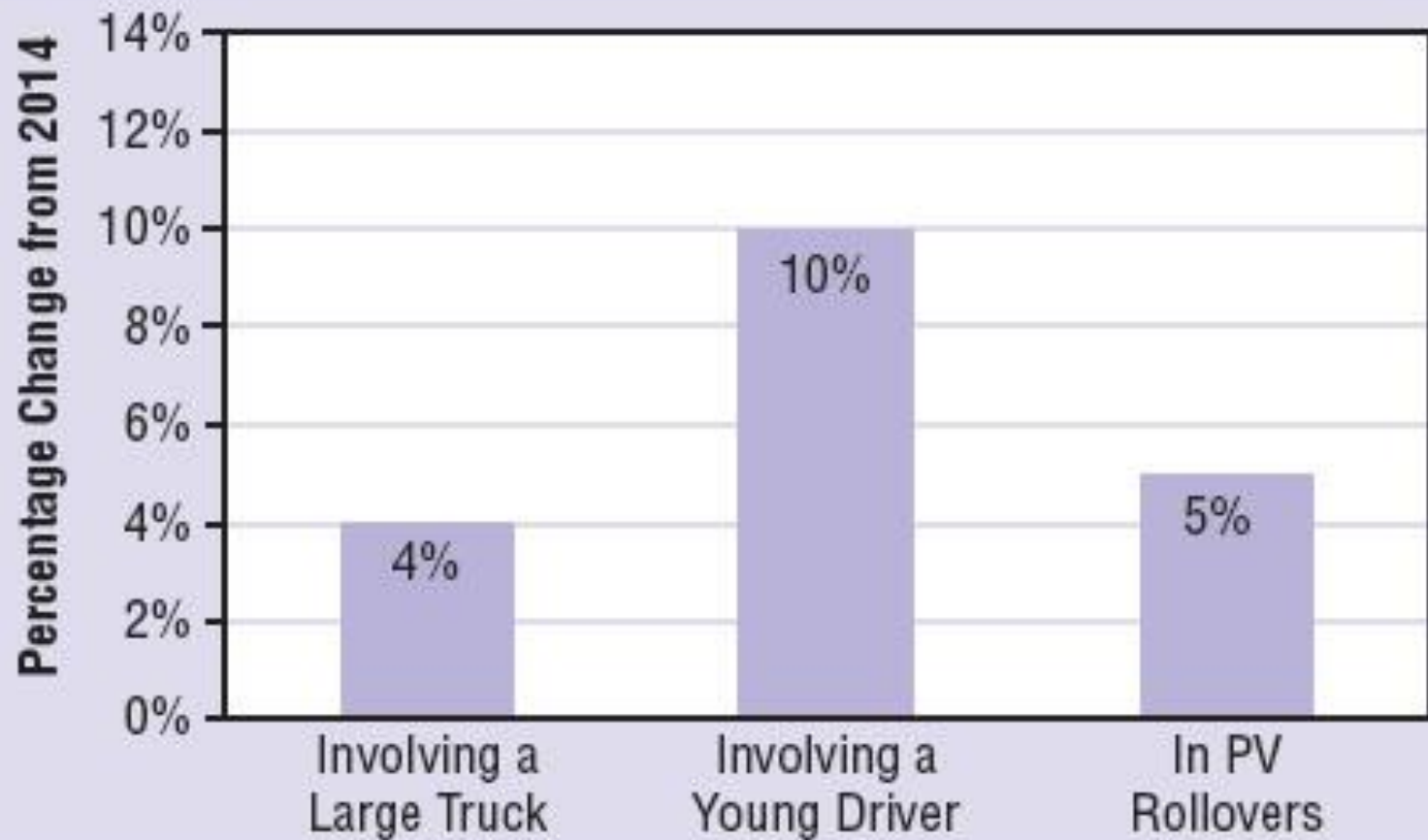
**Figure 2: Percentage Change in Estimated Fatalities in 2015 From Reported 2014 Fatality Counts, by NHTSA Region**



**Figure 3: Percentage Change in Fatalities From 2014 to 2015, by Person Type**



**Figure 4: Percentage Change in Fatalities From 2014 to 2015, by Crash Type (not mutually exclusive)**



% Fatalities on Rural Roads (FARS 2011)

AL	57%	GA	57%	ME	99%	NV	44%	OR	66%	VA	53%
AK	64%	HI	42%	MD	35%	NH	71%	PA	50%	WA	60%
AZ	46%	ID	81%	MA	13%	NJ	14%	RI	11%	WV	71%
AR	77%	IL	43%	MI	45%	NM	78%	SC	84%	WI	65%
CA	42%	IN	64%	MN	67%	NY	46%	SD	86%	WY	72%
CO	51%	IA	83%	MI	81%	NC	68%	TN	60%	PR	54%
CT	17%	KS	81%	MO	63%	ND	89%	TX	48%		
DE	59%	KY	78%	MT	86%	OH	65%	UT	48%		
FL	40%	LA	52%	NE	76%	OK	71%	VT	76%		

% Fatalities on Rural Roads (FARS 2011)

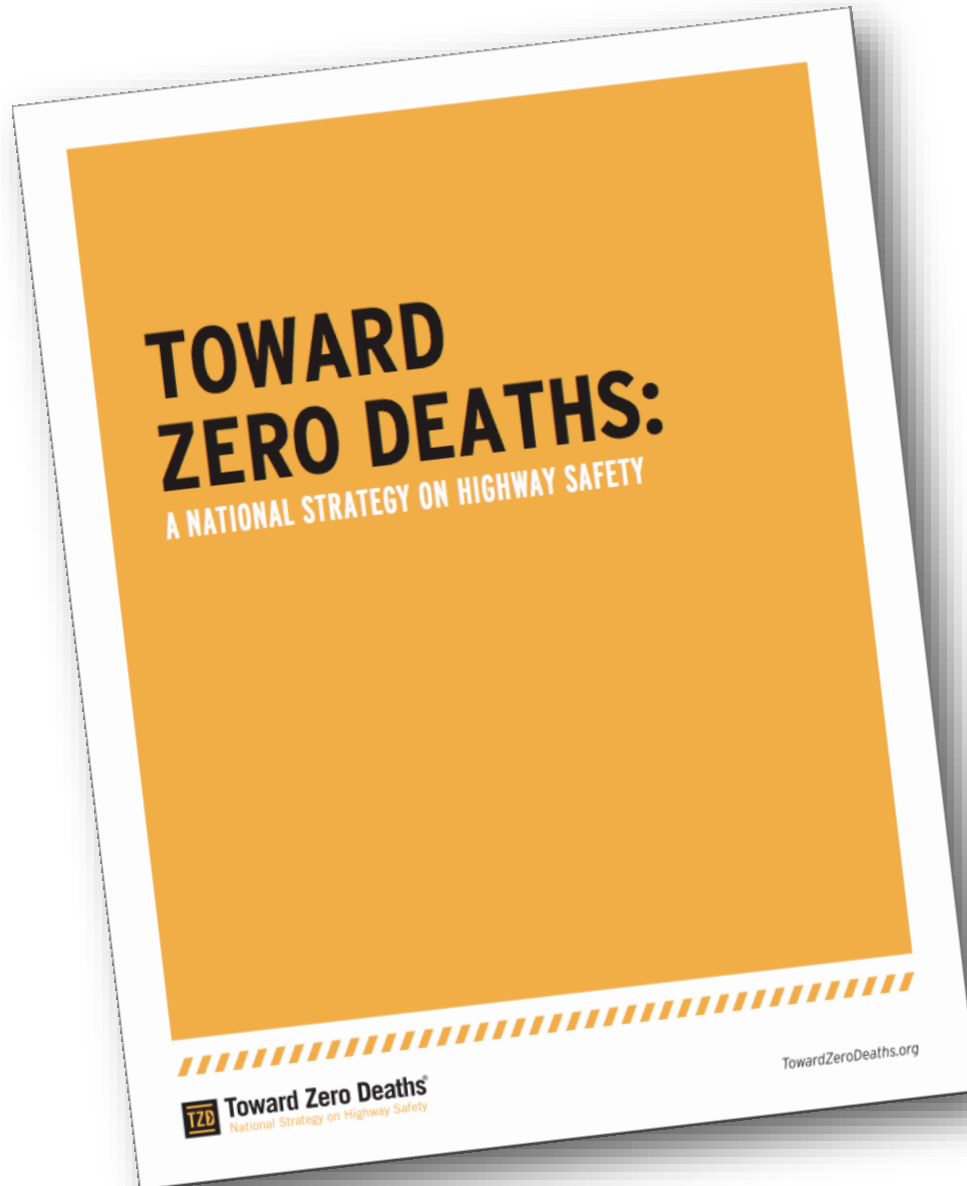


	2012 Fatalities	Percent of 2012 Total
Roadway departure	18,887	56%
Unrestrained occupants	11,189	33%
Alcohol-impaired	10,322	31%
Speeding*	9,944	31%
Intersections	8,766	26%
Motorcycles	4,957	15%
Pedestrians	4,743	14%
Large trucks	3,921	12%
Distraction	3,328	10%
Bicyclists	726	2%

\* 2011

Table 1. Sample of crash contributing factors (44, 36)





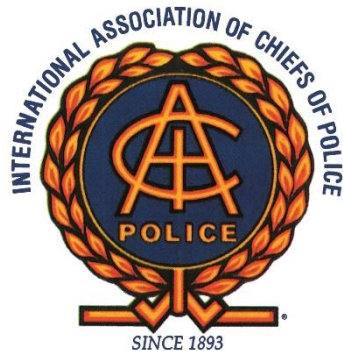
**Vision:** A highway system free of fatalities, changing the nation's culture to the point where even one traffic-related death is unacceptable

A commitment to a comprehensive, multidisciplinary, aggressive, and proactive approach to improving highway safety

# Stakeholders



American Association of  
Motor Vehicle Administrators





# TZD Emphasis Areas

## Drivers and Passengers



## Vulnerable Users



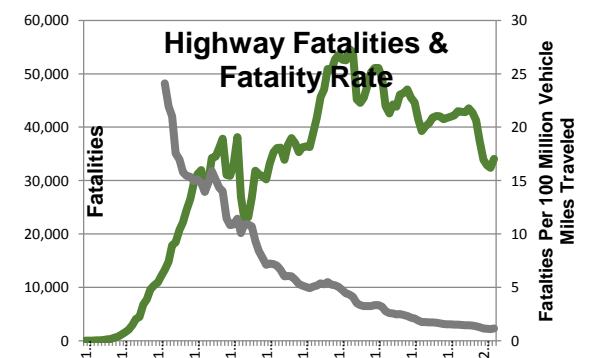
## Vehicles



## Infrastructure



## Emergency Medical Services



## Data Processes

## APPENDIX DETAILED LIST OF STRATEGIES

This list of strategies includes the key strategies presented Section 3, as well as additional strategies effective in reducing risk of fatalities and serious injuries. When appropriate, strategies presented in Section 3 are expanded to provide more detail. As with the key areas, there is overlap between these lists. This list was developed with input from National Cooperative Highway Research Program project 17-51(4), which developed input to the TZD National Strategy, and information from many highway safety stakeholders.

### SAFER DRIVERS

#### Occupant Protection

- Enact and enforce primary seatbelt laws
- Implement high-visibility restraint enforcement, including nighttime and child restraint use
- Implement advanced seat belt reminder systems, including those for rear-seat occupants
- Strengthen state child safety seat legislation to support federally approved child restraint use
- Implement parent education programs on topics related to child restraints and child occupant safety practices
- Implement programs to provide approved child safety seats to parents and caregivers needing financial assistance
- Implement driver restraint monitoring systems
- Increase fines for violating seatbelt and child restraint legislation
- Speeding and Aggressive Driving
- Enact targeted enforcement for speeding-related offenses
- Enact legislation and implement automated traffic enforcement—including pervasive automated speed enforcement and applications for school and work zones
- Implement rigorous aggressive driving and speeding-related enforcement programs
- Implement real-time speed-feedback warning systems: on roadside
- Set appropriate speed limits and deploy other speed management techniques

#### Impaired Driving

- Enact legislation and implement high-visibility sobriety checkpoints.
- Implement appropriate penalties and DWI/DUI courts.
- Enact legislation and implement standard ignition interlock programs for offenders
- Improve alcohol and drug detection technology
- Implement ignition interlock systems
- Implement Screening and Brief Intervention (SBI) for repeat DUI offenders
- Coordinate with private sector establishments serving alcohol
- Implement policies that prevent excessive consumption of alcohol, a.k.a. binge drinking
- Implement policies (incompliance checks, responsible beverage server training, etc.) that prevent access to alcohol by persons under the age of 21
- Increase fines and penalties associated with impaired driving

- Implement Ignition Interlock reciprocity
- Train and deploy Drug Recognition Experts
- Enact legislation and develop detection and enforcement methods to handle drug impairment, including prescription drugs
- Develop .08 equivalent for marijuana impairment

#### Distracted Driving

- Enact and enforce legislation to address distracted driving—including texting bans
- Implement technologies to prohibit or limit cell phones and electronic equipment while vehicle is in motion
- Implement and enforce employer policies to eliminate distracted driving

#### Teen Drivers

- Strengthen GDL legislation and enforce graduated driver licensing laws
- Improve driver education by standardizing materials and laws requiring driver education across the nation
- Implement teenage driver oriented technologies that adjust stereo volume, increase seat belt warning signals and react to signs of distraction
- Implement public education campaigns and enforcement of safe driving practices in proximity of commercial vehicles—with an emphasis on targeting teen drivers
- Implement parent education programs
- Implement driver-monitoring systems for teen drivers

#### Older Drivers

- Improve older driver licensing policies and screening of older drivers, including potentially tailoring licensing to specific needs such as daylight driving only
- Educate older drivers about driver rehabilitation
- Implement safe driving courses for older drivers
- Implement Medical Advisory Boards (MABs) that independently review older driver capabilities
- Implement vehicle enhancements for older drivers
- Increase involvement of family-practice and internal medicine physicians who are in regular contact with older drivers in the decision about driving and licensing

#### Unlicensed Drivers and Drivers with Suspended or Revoked Licenses

- Implement One Driver, One Record
- Enact legislation to remove license actions for non-driving violations

#### Work Zones

- Educate drivers on safer driving practices in work zones

# Vulnerable Users

- Pedestrians and Bicyclists
  - Increased fatalities in 2011, 2012 and 2015
- Motorcyclists
  - 4.9M in 2001 to 8.4M in 2011  
Registered
- Highway Workers
  - 609 Fatalities in 2012

# EMS

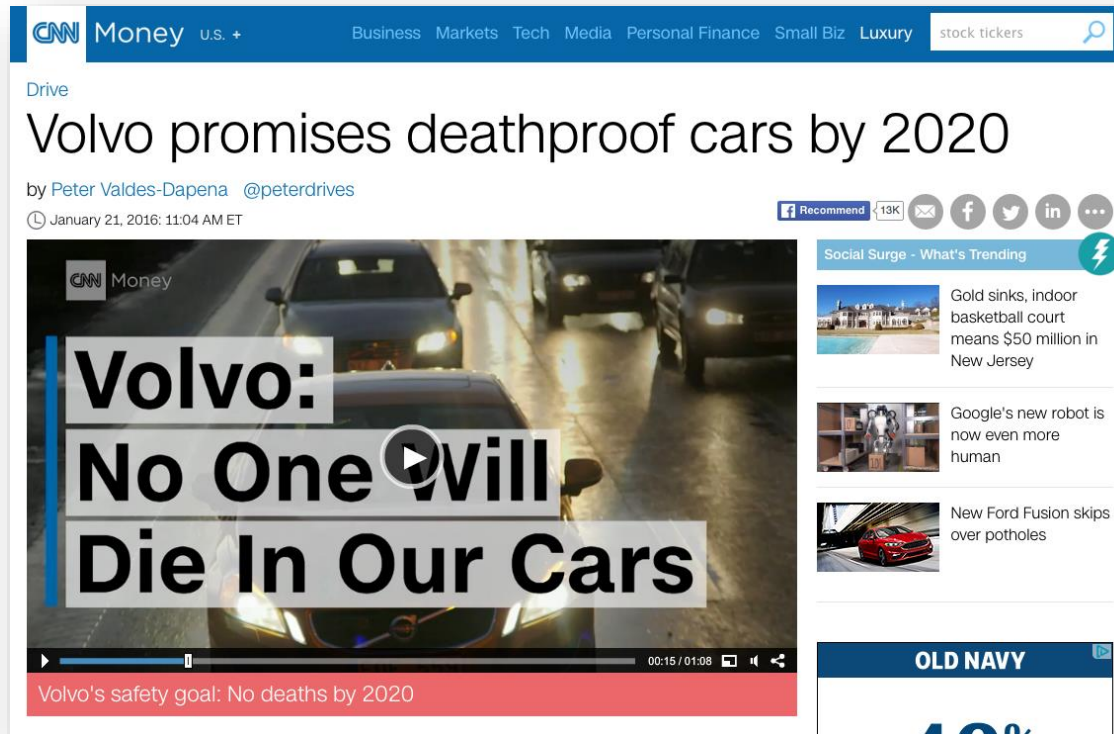
Of the drivers who died while being transported to the hospital, 75 % were rural drivers compared to 25% for urban drivers

# Automated Vehicles (AV)

- Enable Communication with Other Vehicles and the Roadway (V2V)
- Vehicle-to-infrastructure (V2I) technologies
- V2X



# Safety Culture



- ▶ Safety culture is more than public information campaigns
- ▶ Safety must be a factor in every transportation decision

# TZD > The National Strategy vision is a highway system free of fatalities.

[Read the TZD National Strategy](#)



## TZD > Communication Plan

A variety of communication tools for the Toward Zero Deaths program are provided. In addition, the Communication Plan includes suggested audiences and stakeholders, goals, objectives, tactics, timelines, milestones and measurement metrics.



## TZD > Become a Participant

Actively engage your state, organization or company in the Toward Zero Deaths (TZD) vision. Sign up to receive TZD updates and download the TZD logo.



## Moving Toward Zero Deaths

Zero is not an impossible goal, but it will take all of us to get there. See how all of our efforts are helping us on our way Toward Zero Deaths.

# Implementation Plan for Counties/Locals

- Formal Adoption
- Establishment of Inter-Departmental and/or Inter-Agency work group
- Review and consideration of all identified strategies (high impact, time frame, etc)
- Commitment to data collection and analysis
- **Participation with State SHSPs**
- **Development of Local Road Safety Plans**
- Continuing Education



# Strategic Highway Safety Plans (SHSP)

- Developed by each state DOT in cooperation with other officials & stakeholders
- Data-driven multi-year, comprehensive plan
- Establishes statewide goals, objectives, & key emphasis areas
- Updated every five years
- **Local programs must be included in the SHSP or no HSIP (federal) funds can be used!**
- And your county officials should be at the table!

# Local Road Safety Plans

- County-wide safety plans
- Data driven and systemic
- Have been developed by States and Counties
- Should be referenced in SHSPs
- **The key to obtaining HSIP funds**
- Huge successes in WA, MN
- More states moving in this direction





# BUCHANAN COUNTY SAFETY PROGRAM

## NACO 2016



# BUCHANAN COUNTY IOWA

## BUCHANAN CO.



## SECONDARY ROADS

- 963 miles of roads
- 201 miles of Paved roads
- 35 miles of Dirt Roads
- 259 Bridges
- 21093 people
- 12 fatalities in 10 years



# Many of our bridges are old





PLACE THE EMPHASIS WHERE THE  
PROBLEMS EXIST





# Buchanan County



## Local Road Safety Plan



# What is a Local Road Safety Plan?

- An LRSP is a document that provides a basis for systemic safety improvements along local roads



- Focus on all the five E's of safety:
  - Engineering
  - Emergency response
  - Education
  - Enforcement
  - Everyone

# No School Busses



# A different Culture





# Safety Issues are created



Different cultures have different risks



# Iowa Statistics

- Driver-Related
  - **Speed-related (48% of fatal and serious injury crashes)**
  - **Unprotected persons (38% of fatal and serious injury crashes)**
  - **Younger drivers (37% of fatal and serious injury crashes)**
  - Impaired driving (18% of fatal and serious injury crashes)
  - Older drivers (16% of fatal and serious injury crashes)
  - Inattentive/distracted drivers (5% of fatal and serious injury crashes)
- Traffic safety culture (n/a)
- Roadway/Infrastructure
  - **Lane departure (53% of fatal and serious injury crashes)**
  - **Local roads (52% of fatal and serious injury crashes)**
  - Intersections (30% of fatal and serious injury crashes)



# Both Methods are Needed

**CMAT is Reactive**



**LOCAL ROAD SAFETY PLANS are Systemic**



# LRSP Recommendations

- Driver Related Countermeasures
  - Speed-related
  - Unprotected persons
  - Younger drivers
  - Impaired driving
  - Inattentive/distracted driving
  - Older drivers



# LRSP Speed Related

- Conduct speed enforcement.
- Dynamic speed signs have been used to record speeds at various locations throughout the day. The Sheriff's department then passes this information to the deputies to let them know what time of day the speeding occurs (for directed enforcement).
- County has eight contracted cities for Sheriff/law enforcement services, so speed enforcement is part of these contracts. (Underway/Ongoing)

# LRSP Sheriffs and Schools on Speed Issues

- Implement rigorous aggressive driving and speeding-related enforcement programs.
- Education campaigns relative to locations with high-risk of speed-related crashes, potentially in schools.

# LRSP Unprotected Individual Seatbelts

- Conduct publicized enforcement campaigns (Underway/Ongoing)
- **Conduct instructions in proper child restraint use in community locations (Underway/Ongoing)**
- **Conduct high-profile “child restraint inspection and/or installation” events at community locations**
- Sheriff Department currently holds a yearly safety fair to provide training for proper child seat installation (Underway/Ongoing)
- Train law enforcement to check for proper child restraint use in all motorist encounters (Underway/Ongoing)
- Education campaigns in grade schools (Underway/Ongoing)

# LRSP YOUNGER DRIVERS

- School districts no longer teach Drivers Education (D.E.) during the school year, so this is no longer a built-in opportunity for school-based strategies.
- Improve content and delivery of driver education/training
- Review transportation plans for new/expanded/existing high school sites
- Conduct additional training in schools ("drunk goggles"; "don't veer for deer"; what to do when on an edge drop-off; training in health class; etc.)
  - The sheriff's department uses "drunk goggles" in local D.E. programs for a hands-on demonstration of the effects of drunk driving.  
(Underway/Ongoing)
  - The County Sheriff's department currently participates in some in school training. They go whenever asked. (Underway/Ongoing)
- "Operation Prom" mock disaster
  - Mock crash events (every 4 years) have been used by the Sheriff's department to more effectively present the messages of don't text/drive, obey the speed limits, and don't drink/drive.  
(Underway/Ongoing)
- Prosecute and impose sanctions on drivers not obeying school bus stop bars



# YOUNGER DRIVERS

- My Answer is Enforce Graduated Drivers License

## **Instruction Permit**

Drive with parent, etc. and no cell phones

## **Minor School License**

Restricted Hours

\*\*\* passenger restrictions

\*\* No Cell Phones

## **Intermediate License**

\*\* NO Cell Phones

# LRSP Impaired Drivers

- Conduct regular well-publicized safety checkpoints
- Proactively conduct OWI enforcement
- Conduct regular well-publicized compliance checks of alcohol retailers to reduce sales to underage drivers
- Prosecute, impose sanctions on, and treat operating while intoxicated (OWI) offenders

# LRSP Older Drivers

- Establish resource centers within communities to promote safe mobility choices
- Paratransit for older drivers
- Recommend re-testing of older drivers involved in crashes and citations
- Larger Signs and wider pavement markings

# LRSP Engineering Countermeasures

- Intersections 15 \$312,000
- Curves 16 \$385,000
- Segments 23 \$8,156,000
- **Total Improvement Costs 54 \$8,853,000**



# LRSP UNPAVED ROADS

- Upgrade Signs
- Realign Intersection
- Improve/Increase Shoulder/Lane Width
- Delineate Roadside Hazards with Retroreflective Tape
- Curve Chevrons
- Advance Curve Warning Signs and Speed Advisory Plaques
- Maintenance of Gravel
- Clear and Grub
- Winter Maintenance

# Poor Curve Design





# REMOVE THE EMOTIONS FROM THE DECISIONS





# HOW ARE the LOCATIONS IDENTIFIED?



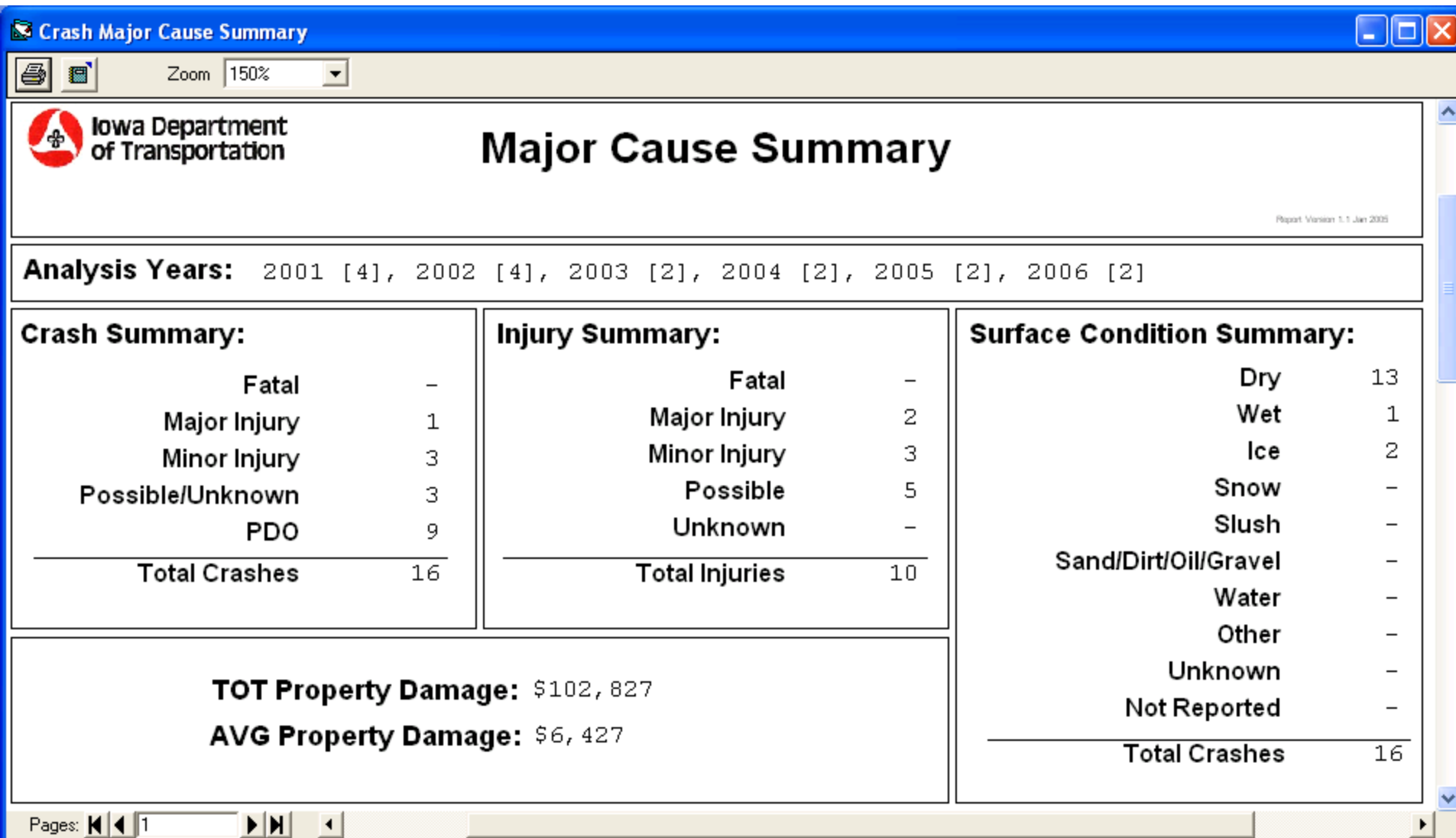


# CMAT (Crash Mapping Analysis Tool)

- Free
- 2003–2012 crash data
- Limited data fields
- Maps, reports, & crash details
- Developed & maintained for DOT by Dan Gieseeman, CTRE

[CMAT](#)  
[Demo](#)

# Major Cause Summary



(Top Half)

# Major Cause Summary

## Major Cause Summary:

Animal	Improper Backing
Ran Traffic Signal	Illegally Parked/Unattended
1 Ran Stop Sign	3 Swerving/Evasive Action
Crossed Centerline	Over-Correcting/Over-Steering
FTYROW: At Uncontrolled Intersection	Downhill Runaway
FTYROW: Making Right Turn on Red Signal	Equipment Failure
4 FTYROW: From Stop Sign	Separation of Units
FTYROW: From Yield Sign	Ran Off Road - Right
3 FTYROW: Making Left Turn	Ran Off Road - Straight
FTYROW: From Driveway	Ran Off Road - Left
FTYROW: From Parked Position	Lost Control
FTYROW: To Pedestrian	Inattentive/Distracted By: Passenger
1 FTYROW: Other (explain in narrative)	Inattentive/Distracted By: Use of Phone or Other
Traveling Wrong Way or on Wrong Side of Rd	Inattentive/Distracted By: Fallen Object
1 Driving Too Fast for Conditions	Inattentive/Distracted By: Fatigued/Asleep
Exceeded Authorized Speed	1 Other: Vision Obstructed
1 Made Improper Turn	Oversized Load/ Oversized Vehicle
Improper Lane Change	Cargo/Equipment Loss or Shift
Followed Too Close	Other: Other Improper Action
Disregarded Railroad Signal	1 Unknown
Disregarded Warning Sign	Other: No Improper Action
Operating Vehicle in Reckless/Aggressive Manner	None Indicated

(Bottom Half)

# Driver & Time Summary



## Iowa Department of Transportation Driver and Time Summary

Report Version 1.0 Aug 2008

### Crash Time of Day Summary:

From To	00:00 01:59	02:00 03:59	04:00 05:59	06:00 07:59	08:00 09:59	10:00 11:59	12:00 13:59	14:00 15:59	16:00 17:59	18:00 19:59	20:00 21:59	22:00 23:59	NR	Total	%
SUN	-	-	-	-	-	-	-	-	-	1	-	-	-	1	6
MON	1	-	-	-	1	1	1	-	-	-	-	-	-	4	25
TUE	-	-	-	-	-	-	-	-	1	-	-	-	-	1	6
WED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
THU	-	-	-	-	-	1	-	-	-	-	-	-	-	1	6
FRI	-	-	-	1	-	-	1	-	1	1	1	-	-	5	31
SAT	-	-	-	-	-	-	1	1	-	2	-	-	-	4	25
Tot.	1			1	1	2	3	1	2	4	1			16	
%	6			6	6	12	19	6	12	25	6				100

(Top Half)



# Driver & Time Summary

(Bottom Half)


Age	Male	Female	NR	Drivers	%
<14	-	-	-		
14	-	-	-		
15	-	-	-		
16	1	2	-	3	9
17	-	1	-	1	3
18	2	1	-	3	9
19	-	1	-	1	3
20	-	-	-		
21 to 24	1	-	-	1	3
25 to 29	1	3	-	4	12
30 to 34	1	-	-	1	3
35 to 39	2	-	-	2	6
40 to 44	1	1	-	2	6
45 to 49	2	-	-	2	6
50 to 54	2	3	-	5	16
55 to 59	-	-	-		
60 to 64	-	-	-		
65 to 69	2	1	-	3	9
70 to 74	-	-	-		
75 to 79	2	-	-	2	6
80 to 84	-	1	-	1	3
85 to 89	-	-	-		
90 to 94	-	-	-		
95 plus	-	-	-		
NR	-	-	1	1	3
<b>Drivers</b>	17	14	1	32	
<b>%</b>	53	44	3		100

	Total	%
Drug		
Alcohol, Less than Statutory		
Alcohol, Statutory		
Drug/Alcohol, Less than Statutory		
Drug/Alcohol, Statutory		
Refused		
Under Influence of Alc/Drugs/Meds		
None Indicated	16	100
<b>Total Crashes</b>	16	100








## Fixed Object Struck Summary:

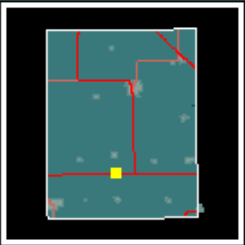
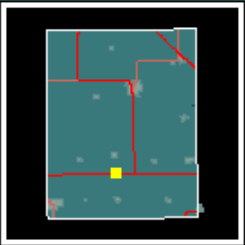
	Vehs.	%
Bridge/Bridge rail/Overpass		
Underpass/Structure Support		
Culvert	1	3
Ditch/Embankment	3	9
Curb/Island/Raised Median		
Guardrail		
Concrete Barrier		
Tree		
Pole - Utility/Light/Etc		
Sign Post		
Mailbox		
Impact Attenuator		
Other Fixed Object		
None	28	88
<b>Total Vehicles</b>	32	100

# Individual Crash Details

 **Crash Mapping Analysis Tool**

File Tools Options Incident Selection Map Help





Incidents Selected: 16

Select Mode: Rectangle

An

Selection Info

Selected Case Numbers

2006213661  
2006237570  
2005208815  
2005265931  
2004255096  
2004255097  
2003012238  
2003039653  
2002004753  
2002014304  
2002052862  
2002063701  
2001022854  
2001038419  
2001054158  
2001056851

Crash Severity: ☒ PDO

Property Damage: 4000

Total Fatalities: 0

Major Injuries: 0

Minor Injuries: 0

Possible Injuries: 0

Unknown Injuries: 0

Total Vehicles: 2

Major Cause: ☒ FTY other

Manner of Crash: ☒ Sideswipe, same

Surface Conditions: ☒ Dry

Roadway Type: ☒ Intersection:

Drug or Alcohol Related: ☒ none indicated

Light Conditions: ☒ Daylight

Weather Conditions: ☒ Partly cloudy

Initial Direction Vehicle 1: ☒ West

Initial Direction Vehicle 2: ☒ West

Initial Direction Vehicle 3: ☒

Action Vehicle 1: ☒ Overtaking/passing

Action Vehicle 2: ☒ Turning left

Action Vehicle 3: ☒

Configuration Vehicle 1: ☒ Passenger car

Configuration Vehicle 2: ☒ Passenger car

Configuration Vehicle 3: ☒

Driver Age Vehicle 1: ☒ 18

Driver Age Vehicle 2: ☒ 49

<< < > >> ☒

Record 1 of 16

☐ Auto-Center

# View/Print Detailed Reports



## Crash Detail Report

Print Version 12 Aug 2020

**2001004968** 01/24/2001 16:09 On SB/WE NW 114TH ST and NE/EE UNIVERSITY AVE and 50TH ST  
County: 77 City: West Des

**Major Cause:** Ran traffic signal

**Roadway Type:** Intersection: Four-way intersection

**Severity:** Poss/Unk

**Manner of Crash:** Broadside

**Fatalities:** 0

**Surface Conditions:** Dry

**Major Injuries:** 0

**Light Conditions:** Dusk

**Minor Injuries:** 0

**Weather Conditions:** Clear

**Possible Injuries:** 2

**Drug/Alc Involved:** none indicated

**Unknown Injuries:** 0

**Property Damage:** \$6000

**Number of Vehicles:** 4

	Unit 1	Unit 2	Unit 3
<b>Init Trav Dir:</b>	East	South	South
<b>Veh Action:</b>	Essentially straight	Essentially straight	Essentially straight
<b>Configuration:</b>	Van or mini-van	Passenger car	Passenger car
<b>Driver Age:</b>	67	18	33
<b>Driver Gender:</b>	M	F	M
<b>Driver Cond:</b>	unknown	Normal	Normal
<b>Drivr Contr 1:</b>	Ran traffic signal	not reported	not reported
<b>Drivr Contr 2:</b>	Exceeded speed limit	not reported	not reported
<b>Fixed Object:</b>	none	none	none

**2001024005** 05/01/2001 20:00 NW 114TH ST and NE/EE UNIVERSITY AVE and 50TH ST  
County: 77 City: West Des

**Major Cause:** FTY making left turn

**Roadway Type:** Intersection: Four-way intersection

**Severity:** Poss/Unk

**Manner of Crash:** Angle, oncoming left turn

**Fatalities:** 0

**Surface Conditions:** Dry

**Major Injuries:** 0

**Light Conditions:** Dark - roadway lighted

**Minor Injuries:** 0

**Weather Conditions:** Cloudy

**Possible Injuries:** 1

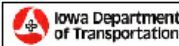
**Drug/Alc Involved:** none indicated

**Unknown Injuries:** 0

**Property Damage:** \$6000

**Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
<b>Init Trav Dir:</b>	East	West	-
<b>Veh Action:</b>	Essentially straight	Turning left	-
<b>Configuration:</b>	Sport utility vehicle	Passenger car	-
<b>Driver Age:</b>	44	20	-
<b>Driver Gender:</b>	F	F	-
<b>Driver Cond:</b>	Normal	Normal	-
<b>Drivr Contr 1:</b>	none	FTY making left turn	-
<b>Drivr Contr 2:</b>	not reported	not reported	-
<b>Fixed Object:</b>	none	none	-



## Crash Detail Report

Print Version 12 Aug 2020

**2001029528** 05/20/2001 13:30 SB/WE NW 114TH ST and UNIVERSITY AVE and 50TH ST  
County: 77 City:

**Major Cause:** Followed too close

**Roadway Type:** Intersection: Four-way intersection

**Severity:** PDO

**Manner of Crash:** Rear-end

**Fatalities:** 0

**Surface Conditions:** Dry

**Major Injuries:** 0

**Light Conditions:** Daylight

**Minor Injuries:** 0

**Weather Conditions:** Partly cloudy

**Possible Injuries:** 0

**Drug/Alc Involved:** none indicated

**Unknown Injuries:** 0

**Property Damage:** \$2000

**Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
<b>Init Trav Dir:</b>	not reported	not reported	-
<b>Veh Action:</b>	Stopped for sign/signal	not reported	-
<b>Configuration:</b>	Passenger car	unknown	-
<b>Driver Age:</b>	18	67	-
<b>Driver Gender:</b>	F	M	-
<b>Driver Cond:</b>	Normal	not reported	-
<b>Drivr Contr 1:</b>	Followed too close	not reported	-
<b>Drivr Contr 2:</b>	not reported	not reported	-
<b>Fixed Object:</b>	none	none	-

**2001029427** 05/21/2001 07:15 NW 114TH ST and NE/EE UNIVERSITY AVE and 50TH ST  
County: 77 City: West Des

**Major Cause:** Ran traffic signal

**Roadway Type:** Intersection: Four-way intersection

**Severity:** Poss/Unk

**Manner of Crash:** Broadside

**Fatalities:** 0

**Surface Conditions:** Dry

**Major Injuries:** 0

**Light Conditions:** Daylight

**Minor Injuries:** 0

**Weather Conditions:** Clear

**Possible Injuries:** 1

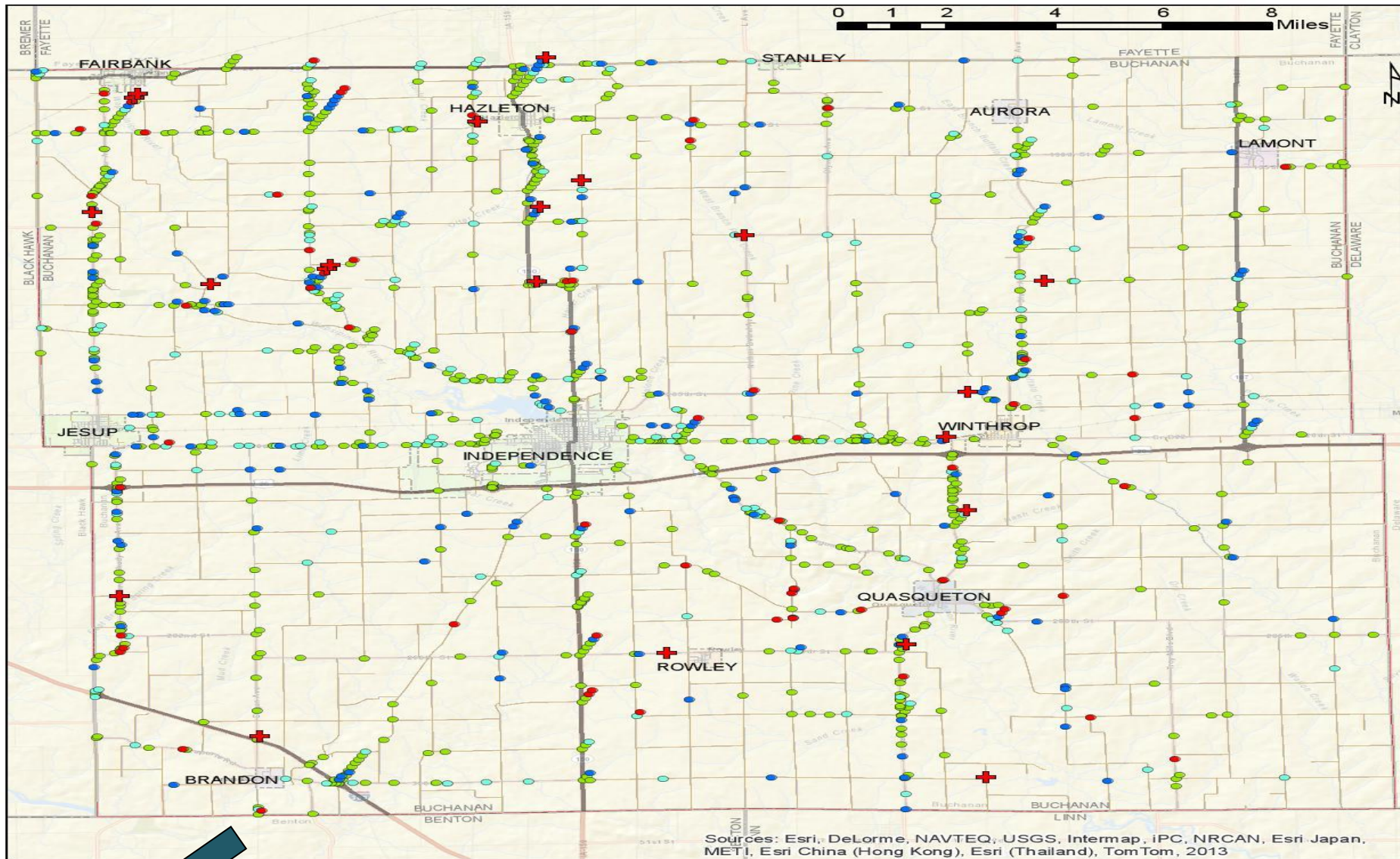
**Drug/Alc Involved:** none indicated

**Unknown Injuries:** 0

**Property Damage:** \$6000

**Number of Vehicles:** 2

	Unit 1	Unit 2	Unit 3
<b>Init Trav Dir:</b>	East	North	-
<b>Veh Action:</b>	Essentially straight	Essentially straight	-
<b>Configuration:</b>	Passenger car	Van or mini-van	-
<b>Driver Age:</b>	51	62	-
<b>Driver Gender:</b>	F	M	-
<b>Driver Cond:</b>	Normal	Normal	-
<b>Drivr Contr 1:</b>	Ran traffic signal	none	-
<b>Drivr Contr 2:</b>	not reported	not reported	-
<b>Fixed Object:</b>	none	none	-



## All Secondary Road Crashes in Buchanan County, Iowa 2003–2012

### Crash Severity

- + Fatal (21)
- Major Injury (61)
- Minor Injury (177)
- Possible/Unknown (179)
- PDO (694)

- Primary Roads
- Other Paved Roads
- Unpaved Roads

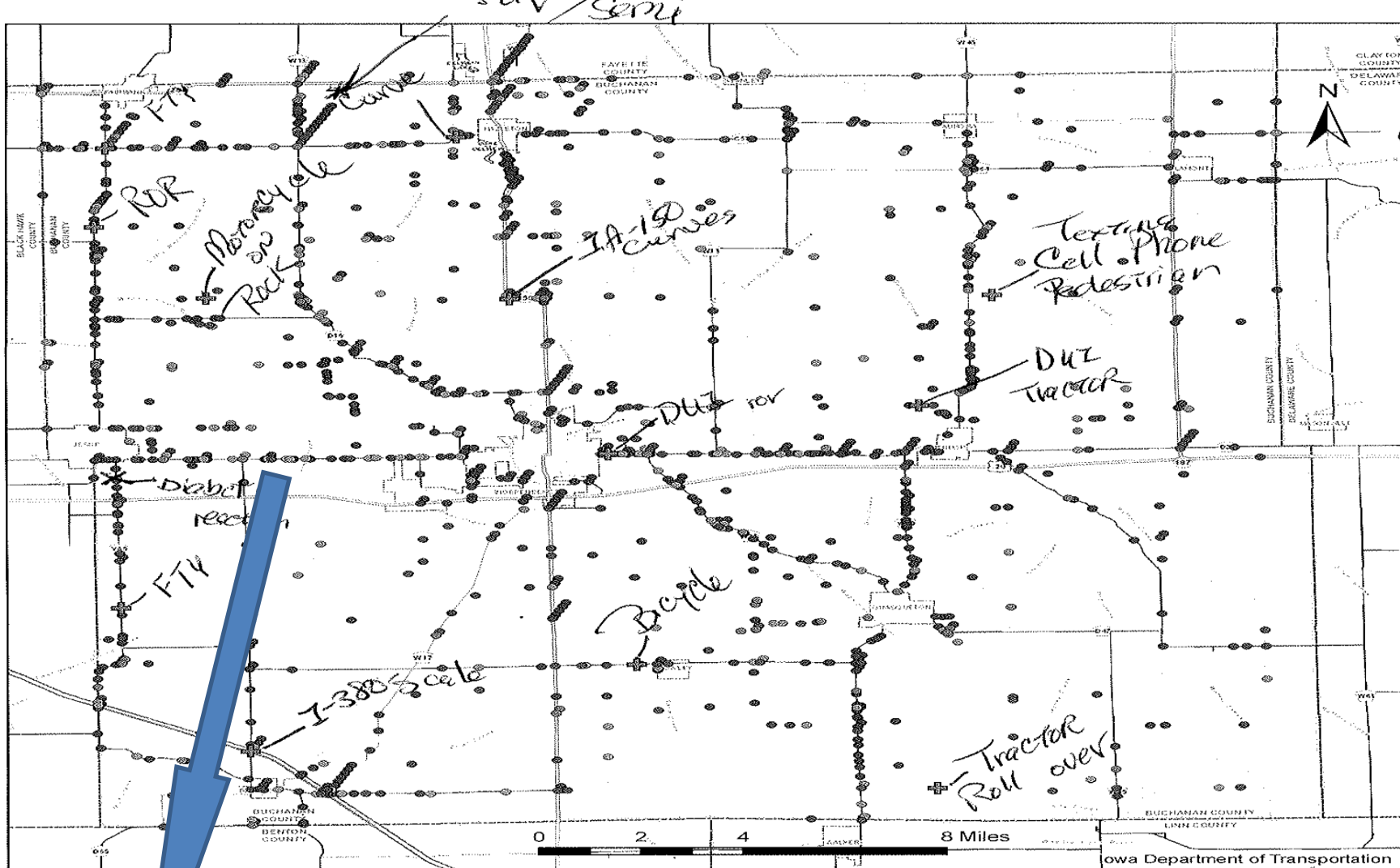
### Disclaimer:

The information contained in this report was derived from the August 19, 2013 Iowa Department of Transportation crash database. If errors or odd cases are found, please communicate the case number or send a printed crash report to Michael Pavlovich, Iowa DOT, Office of Traffic and Safety, (Michael.Pavlovich@dot.iowa.gov, 515.239.1428). Since the database is actively being updated, edited, and reviewed, some of the fatality totals may differ from the Fatality Analysis Reporting System (FARS).



**Iowa Department  
of Transportation**





## All Secondary Road Crashes in Buchanan County, Iowa 2005-2014

### Crash Severity

- ✚ Fatal (12)
- Major Injury (50)
- Minor Injury (167)
- Possible/Unknown Injury (175)
- Property Damage Only (715)

### Primary Roads

- Paved Secondary Roads
- Unpaved Secondary Roads

### Disclaimer:

The information contained in this report was derived from the Aug 15, 2015 Iowa Department of Transportation crash database. If errors or odd cases are found, please communicate the case number or send a printed crash report to Michael Pawlovich, Iowa DOT, Office of Traffic and Safety, (Michael.Pawlovich@dot.iowa.gov, 515.239.1428). Since the database is actively being updated, edited, and reviewed, some of the fatality totals may differ from the Fatality Analysis Reporting System (FARS).

# Safety data on the WWW

- Iowa's 5% Safety Report
- Iowa's Strategic Highway Safety Plan (SHSP)
- Safety Improvement Candidate Locations (SICL)
- Comparables
- County Profiles/City Profiles

<http://www.iowadot.gov/crashanalysis/data.htm>

# Intersection & Corridor Comparable Rates

Comparables - Iowa Department of Transportation - Microsoft Internet Explorer

File Edit View Favorites Tools Help Links X AADT Maps Crash Analysis DOT Maps DOTnet

Address <http://www.dot.state.ia.us/crashanalysis/comparablesprofiles.m> Go

Iowa Department of  
**TRANSPORTATION**

**Comparables**

**Office of Traffic & Safety**  
P: (515) 239-1557  
F: (515) 239-1891

[Iowa DOT](#) > [Traffic and Safety](#) > [Crash Analysis Resources](#) > [Crash Data](#)

Crash and Crash Rate Comparables:

- [Crash Rates and Crash Densities in Iowa by Road System 2002-2005](#) (pdf, 150KB, 17pg.)
- [Average Intersection Crash Rates \(from 1989\)](#) (pdf, 13KB, 1pg.)

Internet



# CTRE

## Iowa State University

- Complex, Unique or Custom data requests
- All Disciplines
- Funded by:
  - Federal Traffic Records funds
  - Iowa DOT
  - Governor's Traffic Safety Bureau, DPS



# Help is available

## *Qualitative Analysis*

### Field Assessments



- *Informal Assessment*
  - Generally performed by an in-house team.
- *Road Safety Audit (RSA)*
  - Performed by an independent, multidisciplinary team.



# DEVELOP A SOLUTION

# Best Practices

**for Low-Cost Safety Improvements  
on Iowa's Local Roads**

December 2008



U.S. Department of Transportation  
Federal Highway Administration



Iowa Department  
of Transportation

**ctre**

Center for Transportation  
Research and Education

IOWA STATE  
UNIVERSITY

# Minnesota's Sign Manual

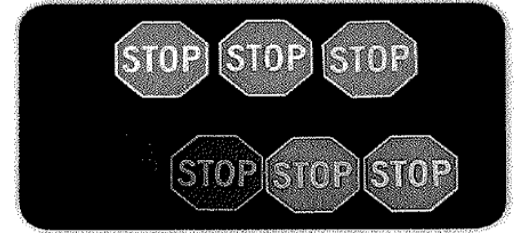
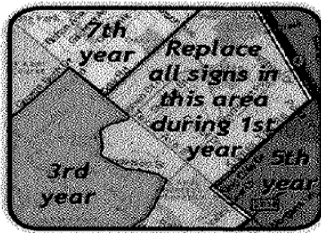
## MINNESOTA'S BEST PRACTICES FOR **Traffic Sign Maintenance/ Management Handbook**

**Including Insight on How to Remove Unnecessary and Ineffective Signage**

**REPORT NO. 2010RIC10  
VERSION 1.1**

**October 2010**
















Mn/DOT Research Services Section  
MS 330, 395 John Ireland Blvd.  
St. Paul, Minnesota 55155  
Phone: 651-366-3780  
Fax: 651-366-3789  
E-mail: [research.dot@state.mn.us](mailto:research.dot@state.mn.us)



**CH2MHILL.**

# Avoid Counterproductive Signs

## Sign Effectiveness Summary

	Signs that ARE proven to be effective	Signs that have not been tested for effectiveness	Signs that appear to be ineffective	Signs that are proven ineffective
Regulatory		 	 	
Warning	 	  	 	 
Guide			 	

### ■ OK, which signs have been proven effective at either reducing crashes or changing driver behavior?

- A search of the traffic safety literature found that the only types of signs that have been proven effective are the Horizontal Alignment Series (but only in a fairly narrow range of curve radii).
- Research published by NCHRP found that pedestrian warning signs in combination with marked crosswalks at uncontrolled intersections in fact resulted in greater numbers of pedestrian crashes.
- Guide Signs have been found to only have a minimal effect on intersection crashes but are assumed to improve way finding and navigation.
- Bottom line – if your decision to install a sign is based on an expectation of effectiveness – either reducing crashes or changing driver behavior – the literature in support is virtually non-existent.
- It appears that most signs fall into a category of hope - hope they do some good and an expectation that at least they don't do any harm.

# Limit Your expenses when possible

## Sign Removal – Which Signs Are Candidates? (2/2)



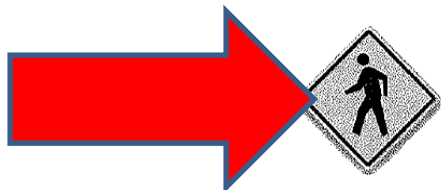
- Static signs that warn drivers of hazardous conditions they rarely encounter quickly lose credibility and become part of the background noise that drivers tune out.



- Mn/DOT is removing DEER CROSSING Warning signs because they have not proven to be effective at reducing deer/vehicle collisions. (They also determined that the signs had proven ineffective at training the deer where to cross the highways.)



- Advance curve warning signs were found to be effective in only a fairly narrow range of curve radii – curves with radii between 1,000 feet and 1,800 feet. There was no safety effect in larger radius curves and in shorter radius curves it was found that a combination of Advance Curve Warning **PLUS** Chevrons was required to produce a crash reduction. Try to achieve consistency across your system. If you have curve warning signs in advance of long radius curves, those could be candidates for removal based on system wide considerations.



- A number of studies have found that marked pedestrian crosswalks and their advance warning signs are **NOT** safety devices when used at uncontrolled locations. Pedestrian crash rates are actually higher at marked locations.



- There is no evidence that special warning signs of this type either change driver behavior (reduce travel speed) or improve safety.



In 5 Counties in Minnesota 80% severe  
crashes on curves with Radius 500-  
1500 ft.





# CHEVRONS





# ADVANCED WARNING ON CURVE



# FLASHING LIGHT ABOVE STOPSIGN





# LED Stop Signs in Blackhawk Co.



# Double STOP AHEAD





# DOUBLE STOP SIGNS



# What the report includes on intersections

## Local Road Safety Plan Project Description for Intersection Improvements

Risk Factor Points: 14

Project Name: Co Rd C57/120TH ST and Co Rd W13/FAIRBANK-AMISH BLVD Intersection  
Agency Name: Buchanan County  
Contact Name: Keilerlober, Brian  
E-mail: engineer@co.buchanan.ia.us

Date: 10/5/15

Prepared By: DJG/DVM  
Checked By: MMO

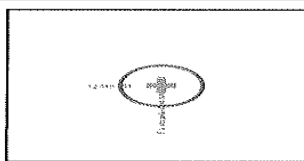
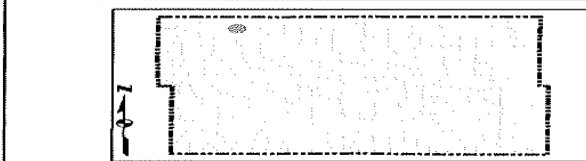


## Location Description

Paved Road: Co Rd C57/120TH ST  
Intersecting Road: Co Rd W13/FAIRBANK-AMISH BLVD

GPS ID: 55568

## Project Location



## Intersection Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Daily Entering Vehicles	2380	6
Approach Angle (Degrees)	90	0
Distance from Previous Stop	> 5 mi	4
K or A Crash	Yes	2
Distance from Driveway or Intersection	< 250 ft	2
<b>Total Risk Factor Points (18 MAX)</b>		<b>14</b>

Other Information	Value
Number of Approaches	4
Number of Paved Approaches	4
Major ADT	1160
Minor ADT	740
Destination Lighting	No
Transverse Rumble Strips	No
Control Type	Two-way stop

Key Emphasis Areas	Value
Younger Drivers	
Older Drivers	
Speed-Related	
Impaired Driving	
Inattentive/Distracted Driving	
Unprotected Persons	
Lane Departures	
Roadside Collisions	
Intersections	X
Local Roads	X

Crash Data, 2004-2013	Value
Total Crashes	11
K and A Crashes	1
Right angle, rear-end, or turning crashes	10

## Opinion of Probable Cost

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Roundabout (Single-Lane, Cost Includes Design and Construction, but No ROW)	0	EA	\$ 1,250,000	\$ -
	Install Destination Lighting	0	EA	\$ 8,000	\$ 8,000
	Upgrade Signs and Pavement Markings	2	LEG	\$ 2,200	\$ 4,400
	Upgrade Signs and Stop Bar	0	LEG	\$ 1,000	\$ -
	Install Second Stop Sign and Stop Ahead Sign	2	LEG	\$ 1,200	\$ 2,400
	Install Solar-Powered Flashing Beacon on Stop Sign	0	EA	\$ 2,500	\$ -
	Install Solar-Powered Flashing Beacon on Yield Sign	0	EA	\$ 2,500	\$ -
	Install Transverse Rumble Strips	2	LEG	\$ 1,000	\$ 2,000
	Clear and Grub within Sight Triangle	4	LEG	\$ 1,500	\$ 6,000
	All-way Stop Warrant Analysis	0	EA	\$ 5,000	\$ -
	Install New Signs and Pavement Markings	0	LEG	\$ 2,800	\$ -
Basis for Cost Projection				Subtotal:	\$ 22,800
<input checked="" type="checkbox"/> No Design Completed				Engineering: (% +/-)	15% \$ 3,638
<input type="checkbox"/> Preliminary Design				Mobilization: (% +/-)*	10% \$ 2,500
<input type="checkbox"/> Final Design				Traffic Control: (% +/-)	5% \$ 1,213
				Contingency: (% +/-)	20% \$ 4,850
				<b>Estimated Project Cost:</b>	<b>\$ 35,000</b>

\* Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000.

## Opinion of Probable Construction Cost Disclaimer:

Kimley-Horn has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Kimley-Horn at this time and represent only the Kimley-Horn's judgment as a design professional familiar with the construction industry. The Kimley-Horn cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

## Project Description Form Disclaimer:

The recommended improvements contained in this project description form were developed through a Geographic Information System (GIS) database risk assessment and project decision tree selection process, as specifically stated in our scope of services. Kimley-Horn has no control over the accuracy of the GIS databases nor the suitability of the specific improvements for the location, and has provided recommended improvements for consideration by the County Engineer. The County Engineer may use this project description form to aid in the selection and development of projects, but this project description form should not be used as the sole basis for the County Engineer's decision making process. We endeavored to research issues and constraints to the extent practical given the scope, budget, and schedule agreed to with the Client. Our assessment is based in large part on information provided to us by others (DOT, county staff, etc.) and therefore is only as accurate and complete as the information provided to us. This project description form is based on our knowledge as of August 2015.

## Project Location Map Sources:

Esri, DeLorme, NAVTEQ, USGS, Intermap, IPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

## End of Project Description



# Portable Solar powered speed sign





# Solar Powered LED Speed Signs



# Speed Display Signs



# Texting While Driving Is:

- About 6 times more likely to cause an accident than driving intoxicated.
- The same as driving after 4 beers – National Hwy Transportation Safety Admin.
- The number one driving distraction reported by teen drivers.



# The LRSP on Segments

## Local Road Safety Plan Project Description for Segment Improvements

Project Name: OTTERVILLE BLVD between FAIRBANK-AMISH BLVD and JAMESTOWN AVE  
Agency Name: Buchanan County  
Contact Name: Kelerleber, Brian  
E-mail: engineer@co.buchanan.ia.us

Risk Factor Points: 10

Date: 8/17/15

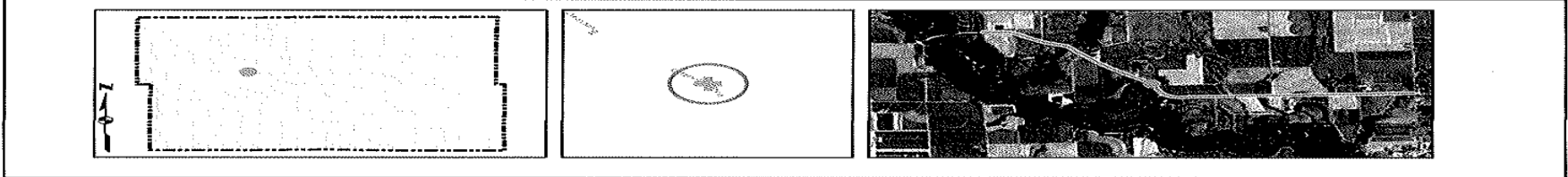
Prepared By: DJG/DVM  
Checked By: MMO



Location Description  
Paved Road: OTTERVILLE BLVD  
Length (mi): 4.22

GPS ID: 664

## Project Location



## Segment Information and Systemic Ranking Summary

Systemic Ranking Summary	Value	Points
Average Daily Traffic (ADT)	822	6
Pavement and Shoulder Width (ft)	30.0	0
Number of Driveways/Intersections per Mile	15.18	2
Lane Departure Crash Rate per VMT	0.00009	2
<b>Total Systemic Ranking Points</b>		<b>10</b>

Other Information	No
Paved Shoulder	No
Shoulder Width (ft)	4
Speed Limit (mph)	55
Lane Width (ft)	11.0
Number of Lanes	2
Rumble Strips	No

Key/Emphasis Factor
<input type="checkbox"/> Younger Drivers
<input type="checkbox"/> Older Drivers
<input type="checkbox"/> Speed-Related
<input type="checkbox"/> Impaired Driving
<input type="checkbox"/> Inattentive/Distracted Driving
<input type="checkbox"/> Unprotected Persons
<input checked="" type="checkbox"/> Lane Departures
<input checked="" type="checkbox"/> Roadside Collisions
<input checked="" type="checkbox"/> Intersections
<input checked="" type="checkbox"/> Local Roads

Crash Data 2005-2013	
Total Crashes	28
K and A Crashes	0

## Opinion of Probable Cost

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Install 4" Retroreflective Edgeline (Both Sides of Road)	4.22	MILE	\$ 1,200	\$ 5,058
	Install 8" Retroreflective Edgeline (Both Sides of Road)	0.00	MILE	\$ 1,800	\$ -
	Install 4" Retroreflective Centerline	4.22	MILE	\$ 800	\$ 3,372
	Pave 2' Shoulder with Safety Edge (Both Sides of Road)	0.00	MILE	\$ 65,000	\$ -
	Install Edgeline Rumble Strips (Both Sides of Road)	4.22	MILE	\$ 2,000	\$ 8,431
	Install Centerline Rumble Strips	0.00	MILE	\$ 1,000	\$ -
	Clear and Grub (15 ft Both Sides of Road)	4.22	MILE	\$ 20,000	\$ 84,366
Subtotal:				\$	101,167
Engineering: (% +/-)				15%	\$ 15,267
Mobilization: (% +/-)*				10%	\$ 10,120
Traffic Control: (% +/-)				5%	\$ 5,089
Contingency: (% +/-)				20%	\$ 20,356
Estimated Project Cost:					\$ 152,000

\* Mobilization is 10% +/- of the subtotal with a minimum of \$2,500 and a maximum of \$75,000.

## Opinion of Probable Construction Cost Disclaimer:

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## Project Description Form Disclaimer:

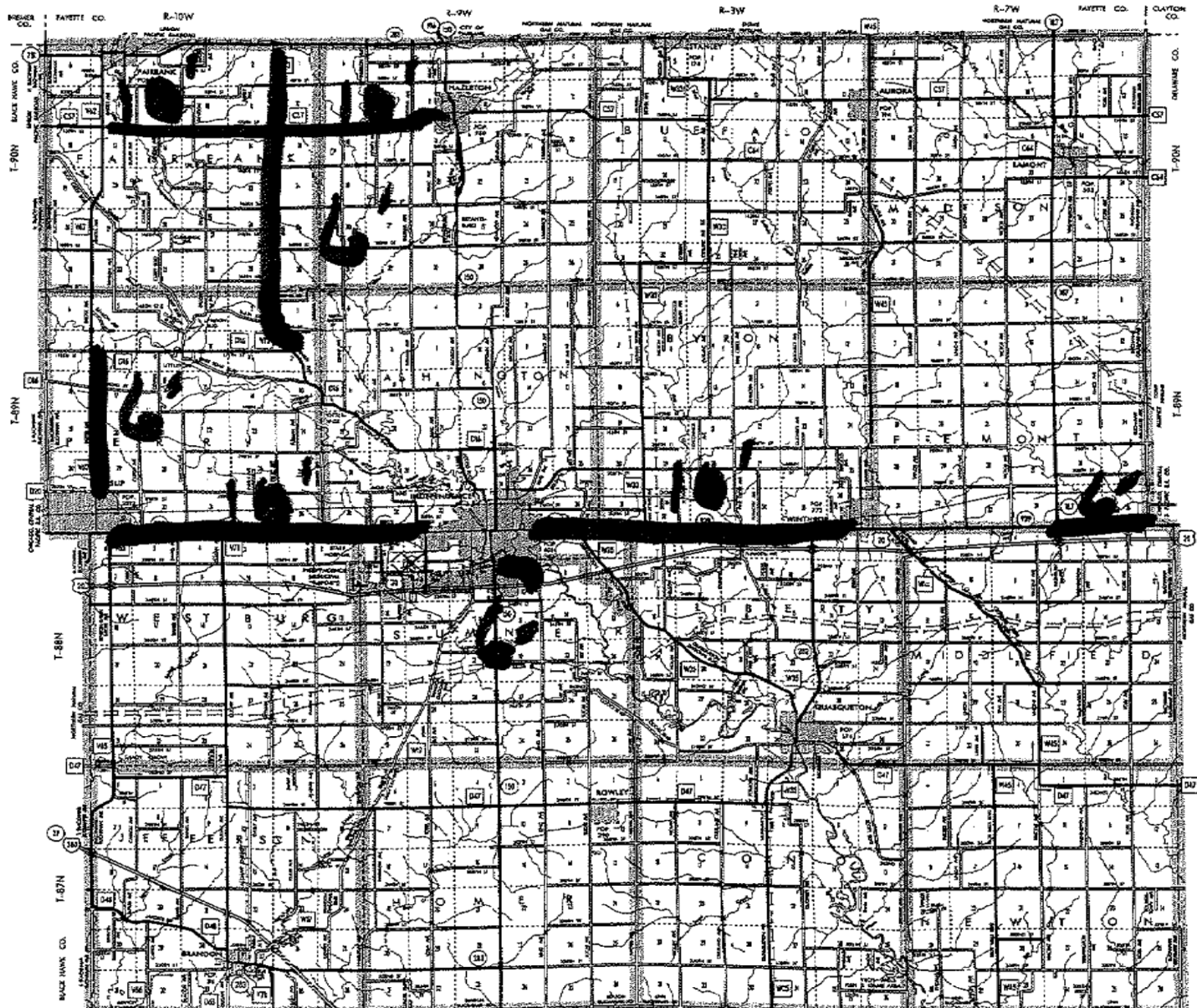
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## Project Location Map Sources:

Esri, DeLorme, NAVTEO, USGS, Intermap, IPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013, DigitalGlobe, GeoEye, i-cubed, USDA, AEX, Getmapping, Aerogrip, IGN, IGP, swisstopo, and the GIS User Community

End of Project Description

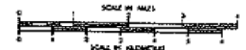
# 34 miles of widened shoulders



 Iowa Department of Transportation

Phone (319) 239-1282  
In Cooperation With

United States  
Department of Transportation



JANUARY 1, 2003



## LEGEND

DRAWN HIGHWAY  
PAVED ROAD  
UNPAVED ROAD  
GRAND AVENUE  
DART ROAD

WETLANDS HIGHWAY  
UNITED STATES HIGHWAY  
STATE HIGHWAY  
COUNTY HIGHWAY

AIRPORT  
WETLANDS  
WETLAND

STATE BOUNDARY  
COUNTY BOUNDARY  
CADD SW 1/4 UNIT LINE  
TOWNSHIP LINE  
SECTION LINE  
ROAD NAME





# Centerline Rumbles





# Wider Shoulders and Flatter slopes save lives





# Paved shoulders with safety edge



# Paved Shoulders with a safety edge





# RUMBLE STRIPS





# Rumble Stripes





# RUMBLE STRIPES



Friction Courses on Curves we are working on this yet.





# Epoxy Friction on Bridge





# PROVIDE TRAINING



# TRAIN THE APPROPRIATE PEOPLE





It works at Jesup



# SAFETY EDGE





# Safety Edge on Concrete





# \$14:\$1 return Safety Saves not Costs

## Intersection or Spot Benefit / Cost Safety Analysis Iowa DOT Office of Traffic & Safety

Rev. 5/08

County: Buchanan Prepared by: ZH Date Prepared: Jan 13, 2009  
Intersection: C57 and V62

### Improvement

Proposed Improvement(s): Convert to roundabout

\$ 850,000 Estimated Improvement Cost, EC 25 Est. Improvement Life, years, Y  
\$ 500 Other Annual Cost (after initial year), AC 76 Crash Reduction Factor (integer), CRF  
\$ 7,811 Present Value Other Annual Costs, OC 4.0% Discount Rate (time value of \$), INT  
$$OC = \frac{AC}{INT} \left( 1 - \frac{1}{(1 + INT)^Y} \right)$$
 \$ 857,811 Present Value Cost, COST = EC + OC

### Traffic Volume Data

Source: Iowa DOT GIMS 2007 2005 Date of traffic count

Daily Entering Vehicles by Approach (or AADT / 2)



1,053,025 Current Annual Entering Veh., AEV = DEV \* 365

4,733 veh / day, Final Year DEV, FDEV

33.73 MEV, Total Million Entering Veh. Over life of Project, TMEV

2.0% Projected Traffic Growth (0%-10%), G

2,885 Current Daily Entering Vehicles, DEV

$$TMEV = \frac{AEV}{-G} \left( 1 - \left( \frac{1+G}{1} \right)^T \right) / 10^6$$

### Crash Data

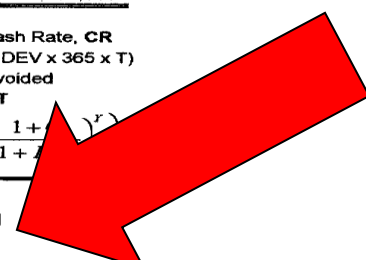
<u>2003</u> First full year →	<u>2007</u> Last full year	<u>5.0</u> years, Time Period, T
Additional months		values as of Dec. 2007
<u>2</u> Fatal Crashes	<u>1</u> Fatalities @	\$3,500,000 \$ 3,500,000
	<u>2</u> Major Injuries @	\$240,000 \$ 480,000
<u>3</u> Injury Crashes	<u>3</u> Minor Injuries @	\$48,000 \$ 144,000
<u>0</u> Property Damage Only	<u>3</u> Possible Injuries @	\$25,000 \$ 75,000
	(assumed cost per crash)	\$2,700 \$ -
<u>5</u> Total Crashes, TA	-OR- enter Actual Cost of all property damage:	Total \$ Loss, LOSS \$ 4,199,000

1.00 Current Crashes / Year, AA = TA / T  
\$ 839,800 Cost per Crash, AVC = LOSS / TA  
32.0 Total Expected Crashes, TECR = CR x TMEV  
0.76 Crashes Avoided First Year AAR = AA x CRF / 100  
\$ 638,248 Crash Costs Avoided in First Year, AAR x AVC  
24.3 Total Avoided Crashes, TECR x CRF / 100

0.95 Crashes / MEV, Crash Rate, CR  
CR = TA x 10^6 / (DEV x 365 x T)  
##### Present Value of Avoided Crashes, BENEFIT  
$$BEN. = \frac{AVC \times AAR}{(INT - G)} \left( 1 - \left( \frac{1+G}{1+INT} \right)^T \right)$$

### Benefit / Cost Ratio

Benefit : Cost = ##### : \$857,811 = 14.31 : 1



# ROUNDABOUTS





# Completed Roundabout





# Friendly for ALL Users





Some complaints on snow issues.  
Possibly designed out.



Look at things from a different perspective.





Some ideas will take a while to be  
implimented



25/06/2005



# USE YOUR IMAGINATION WITH SOUND ENGINEERING





I thought you might ask.





# QUESTIONS?





# THANK YOU





