



# Safety Aspects of a 4- to 3-Lane Conversion Waverly IA 3

David L. Little, P.E.  
Assistant District Engineer, Iowa DOT

## Public Information Meeting

August 22, 2016

# What's a "Road Diet"?

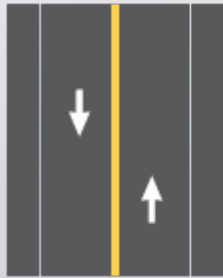
*Diet – “a regimen of food intake planned to meet specific requirements of the individual, including or excluding certain foods.”\**

## Many Reasons to Diet:

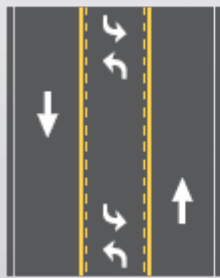
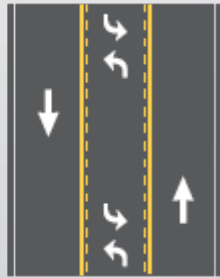
- Regulate weight, lose or gain weight
- Lower blood sugar or blood pressure
- Improve athletic performance
- Avoid indigestion
- Food compatible with medications

\* Source: The Free Dictionary by Farlex

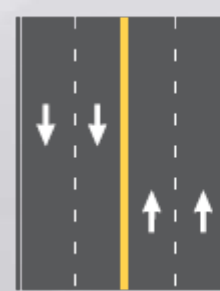
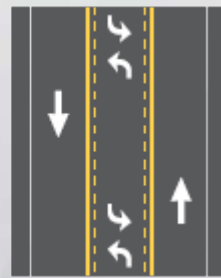
# What's a "Road Diet"?



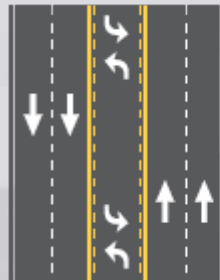
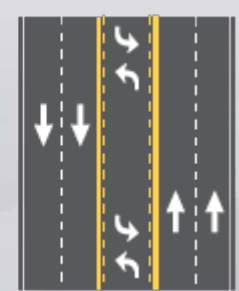
2- to 3-lane



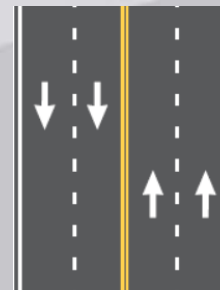
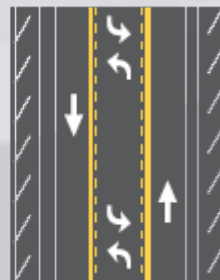
3- to 3-lane



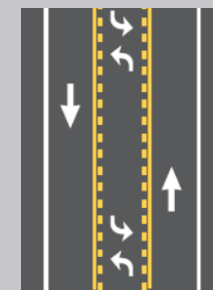
4- to 5-lane



5- to 3-lane



4- to 3-lane



Source: Road Diet Informational Guide, Federal Highway Administration

# What do we want from IA 3?

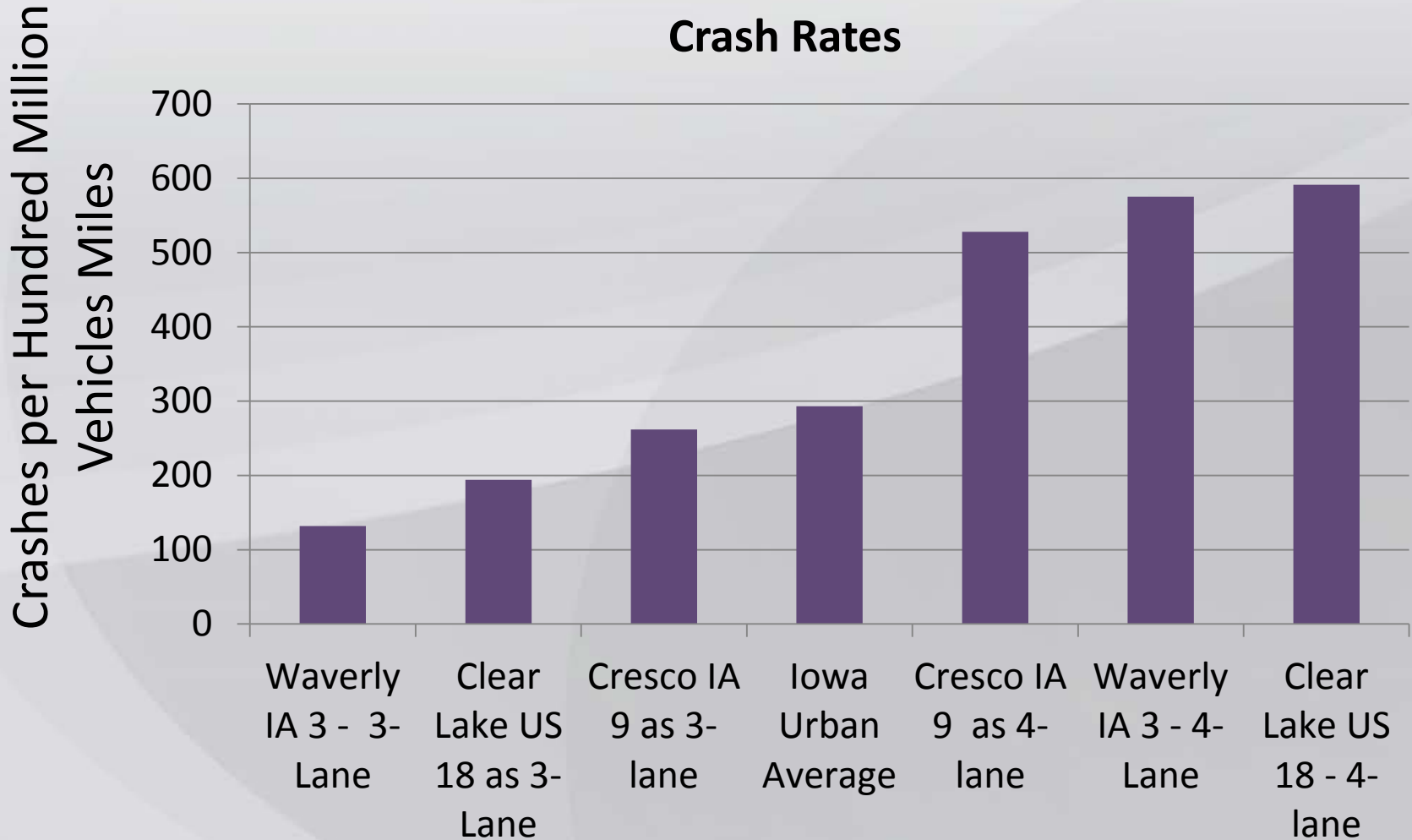
Desired Result	4-Lane Option	3-Lane Option
Mobility	Same as Past	Same as Past, but in a somewhat different way
Accessibility	Provided for Peds	Provided for Peds
Contribute Positively to Economy	Same as past	Same as Past
Community Image	Improved	Improved
Parking	Provided as in past	Provided as in past
Safety	Same as Past	Potentially Great Improvement
Access to Property	Same as Past	Mostly Same as Past, w/Minor Improvements
Self-Enforcing Traffic Flow	Same as Past	Reduction in traffic enforcement and crash investigation workload

# Safety in “Our ”IA 3 Corridor

- From 2012-2014 Crash History
  - 111 crashes in four-lane IA 3 corridor
    - 429 crashes in entire City of Waverly
  - **26% of city’s crashes occur in the IA 3 4-lane**
    - 20 injury crashes resulting in 24 total injuries
    - Property damage loss = \$400,000
    - Societal cost of injuries = \$720,000
    - Total economic loss = \$1.1 million/3 years
  - **\$367,000 per year in economic losses**

# Urban Highway Crash Rates

## Crash Rates

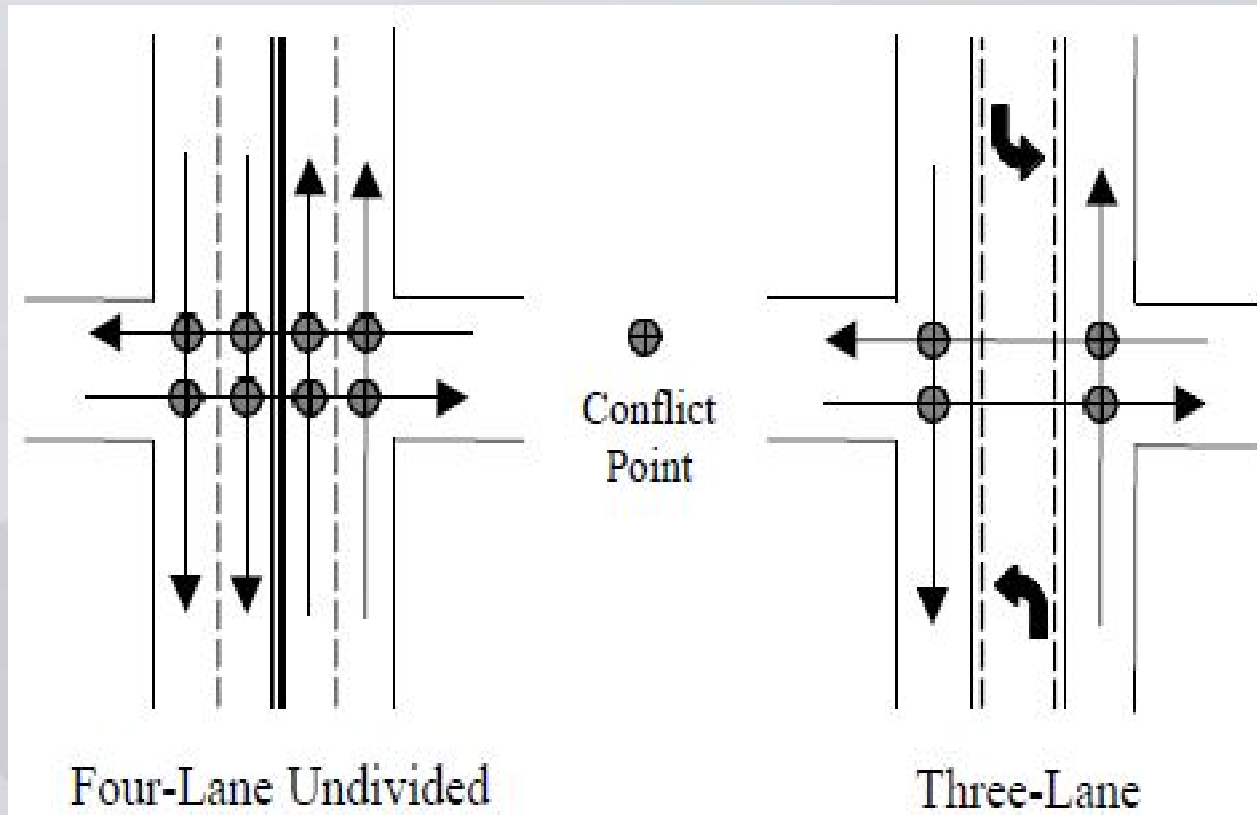


## Why is a three-lane safer?

- Driving decisions are simpler
- Speeds are more uniform
- Drivers can better see conflicting vehicles (and other road users)
- More forgiving of poor driver decisions.



# Making driving decisions simpler



Source: Knapp, 1999



# Speeds are more uniform



	Ave Speed	85%	Pace	% in Pace	% speeding	% >5 mph over
Before 3-lane	49 mph	54 mph	45-54 mph	78%	68%	26%
After 3-lane	48 mph	51 mph	42-51 mph	79%	46%	12%

# Uniform speeds result in fewer crashes

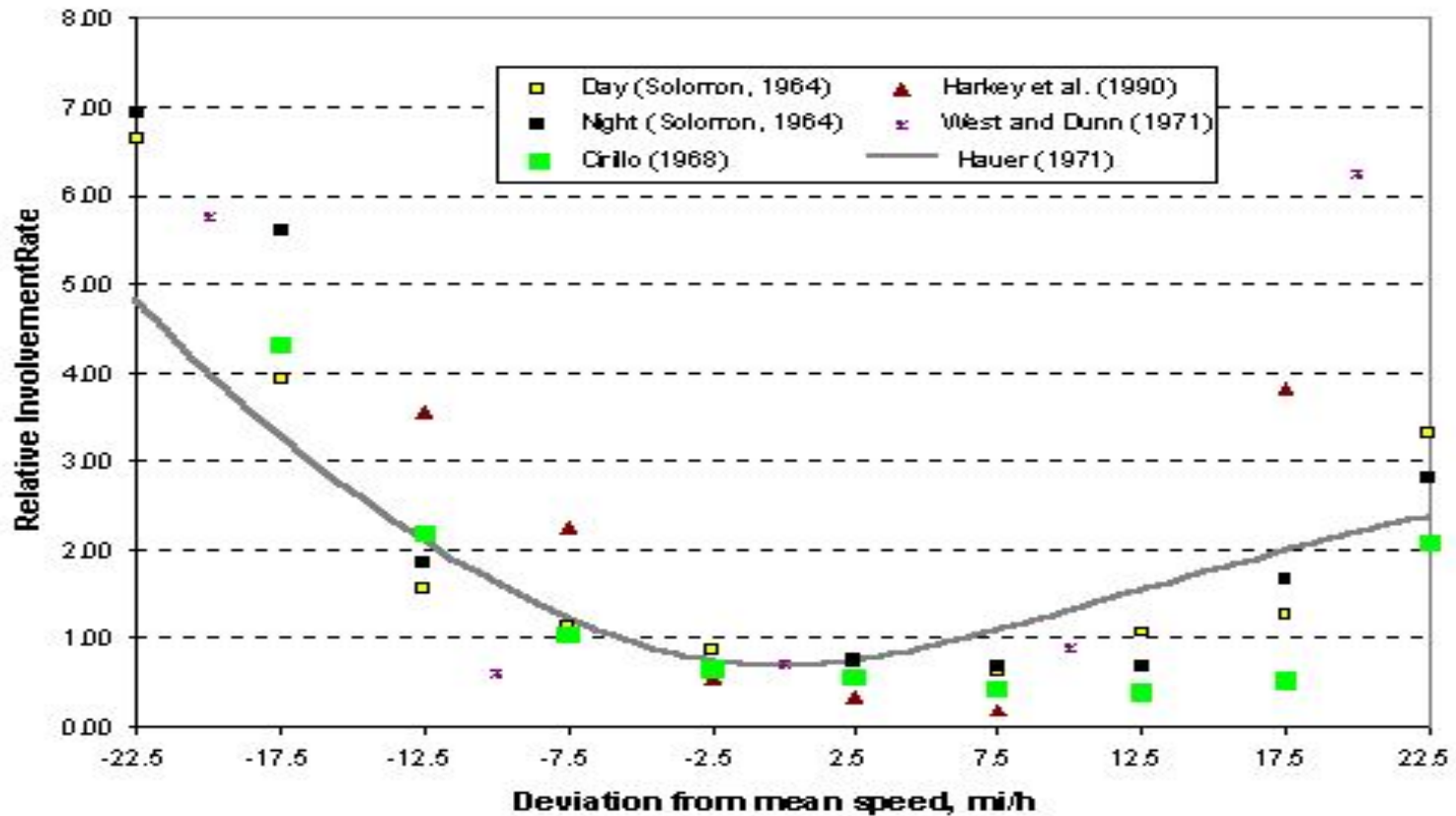
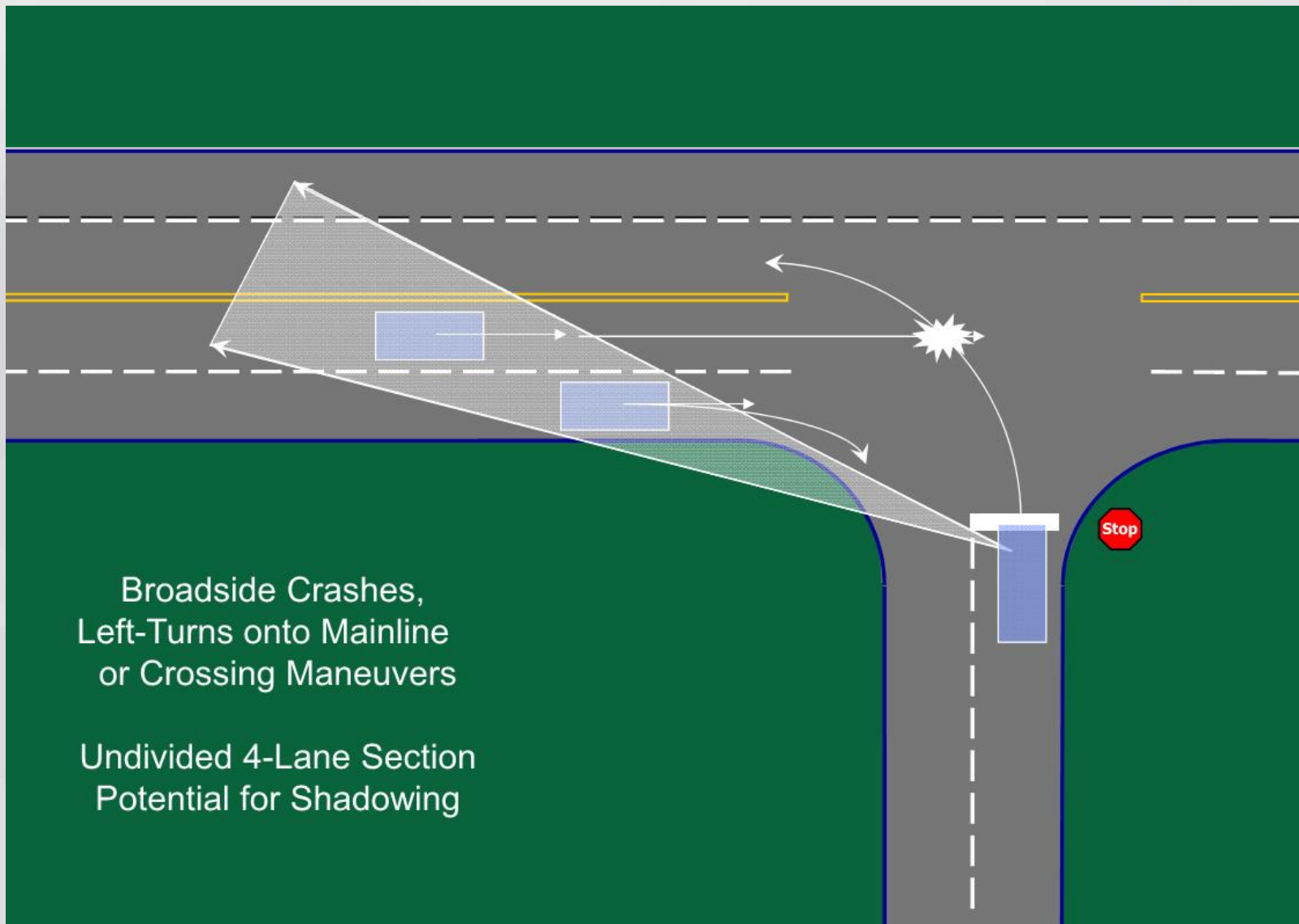


Figure 4. Crash involvement and overtaking rates relative to average rate and speed.





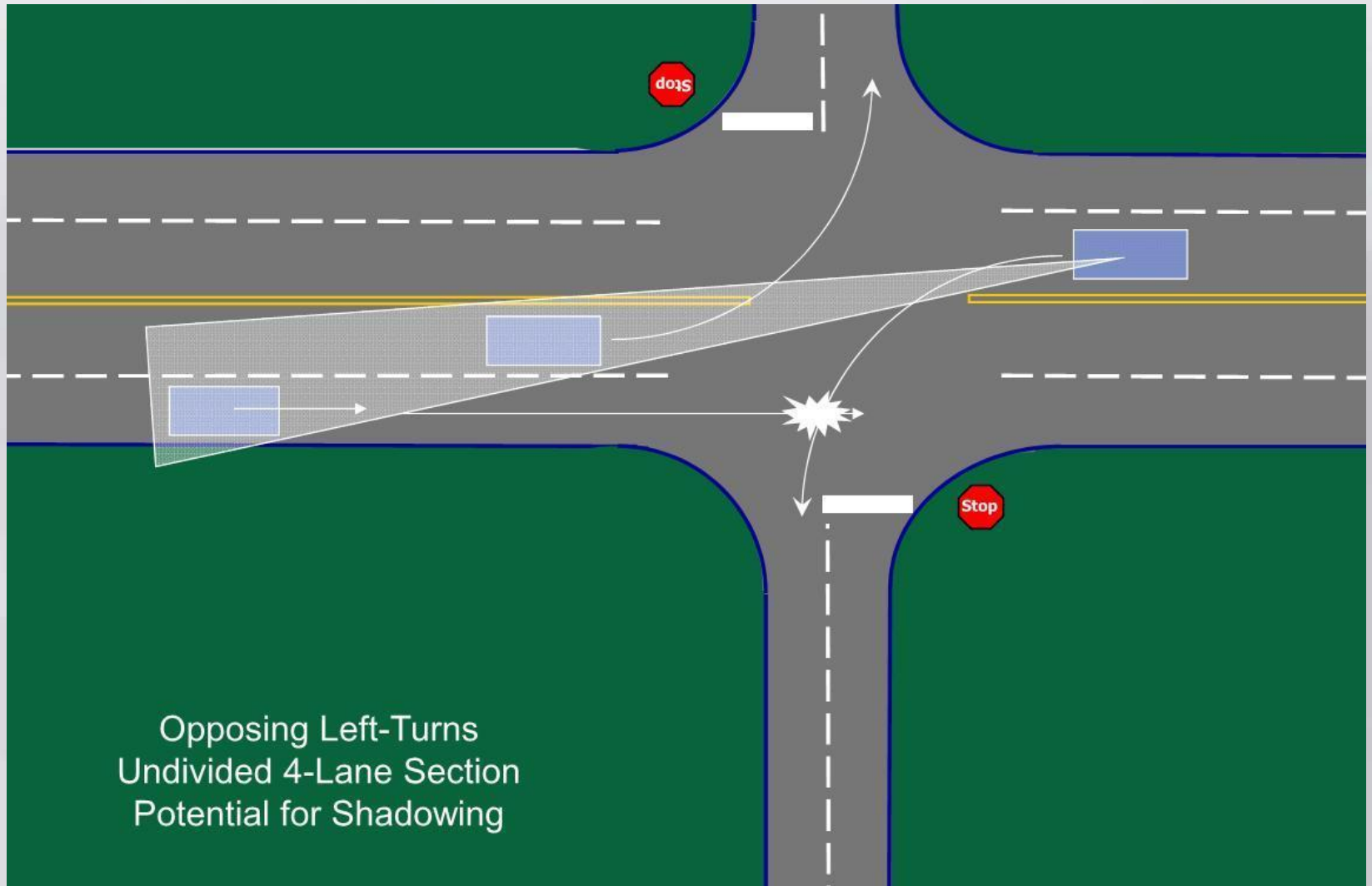


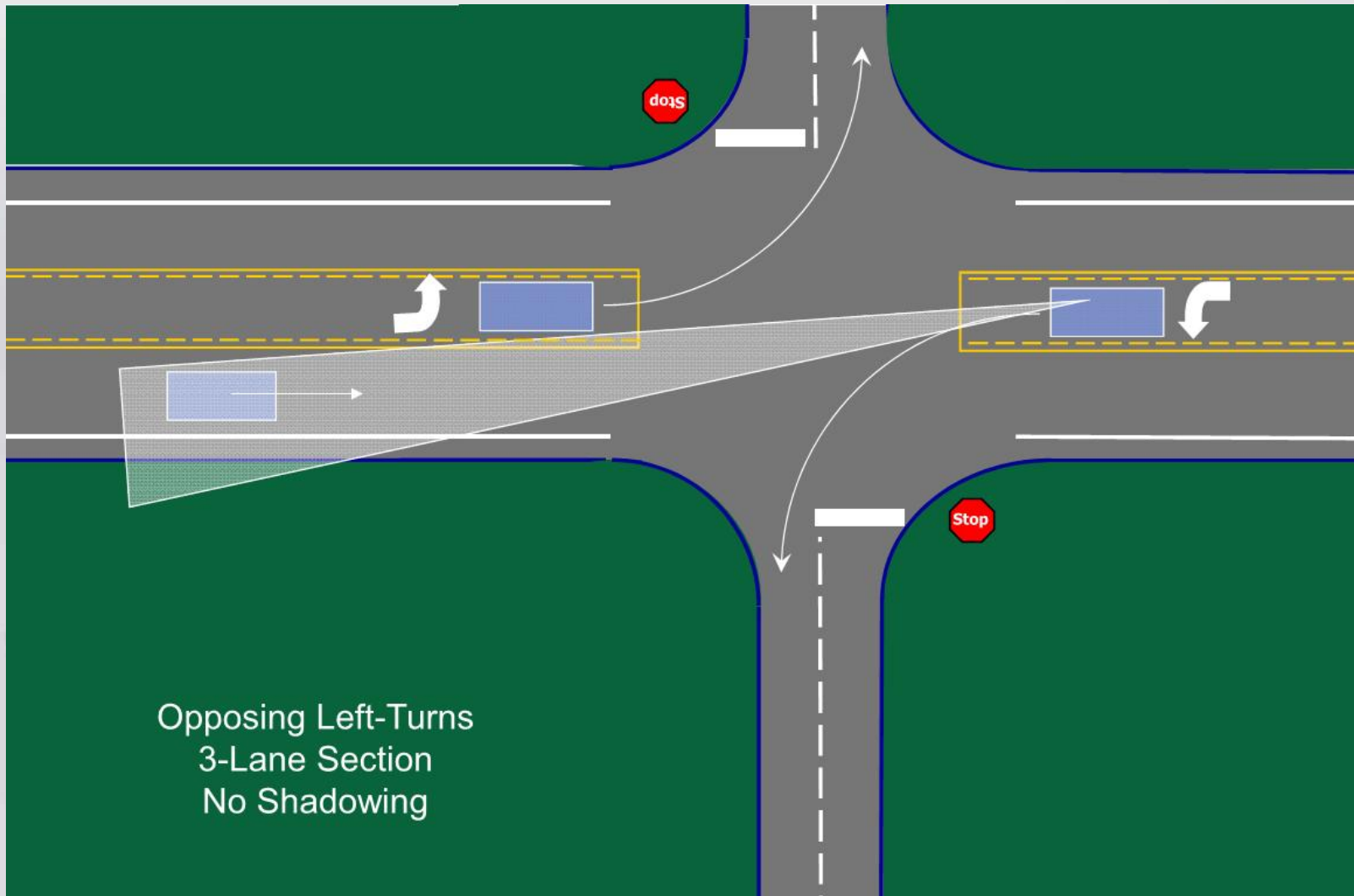


Broadside Crashes,  
Left-Turns onto Mainline  
or Crossing Maneuvers

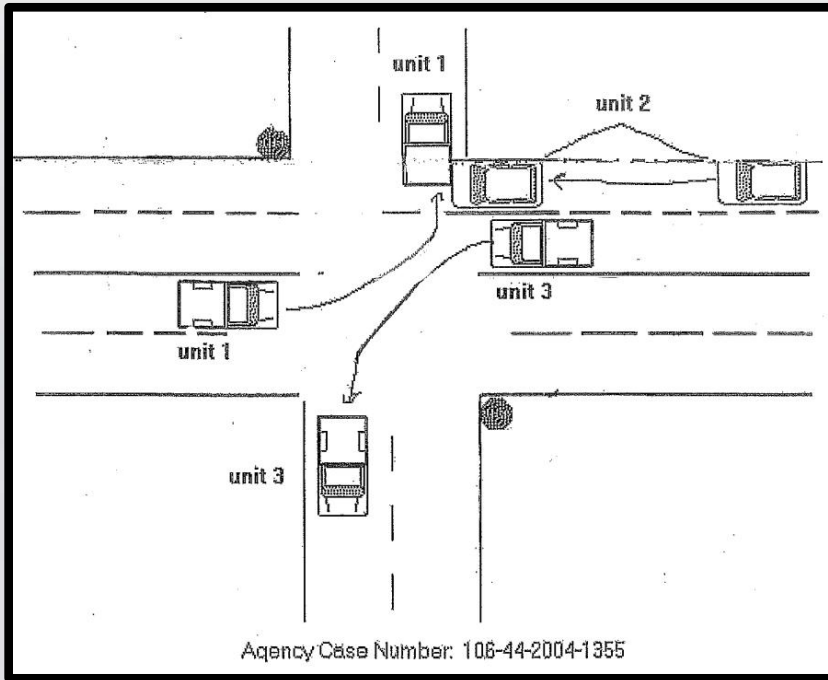
Undivided 4-Lane Section  
Potential for Shadowing











### NARRATIVE

(Describe what happened (refer to vehicle by number))

BOUND ON HIGHWAY 18 IN THE LEFT HAND TURNING

BOUND ON HIGHWAY 18 IN THE RIGHT HAND LANE.

BOUND ON HIGHWAY 18 IN THE LEFT HAND TURNING

LANE.

UNIT 1 ATTEMPTED TO MAKE A LEFT HAND TURN ONTO MAIN AV N.

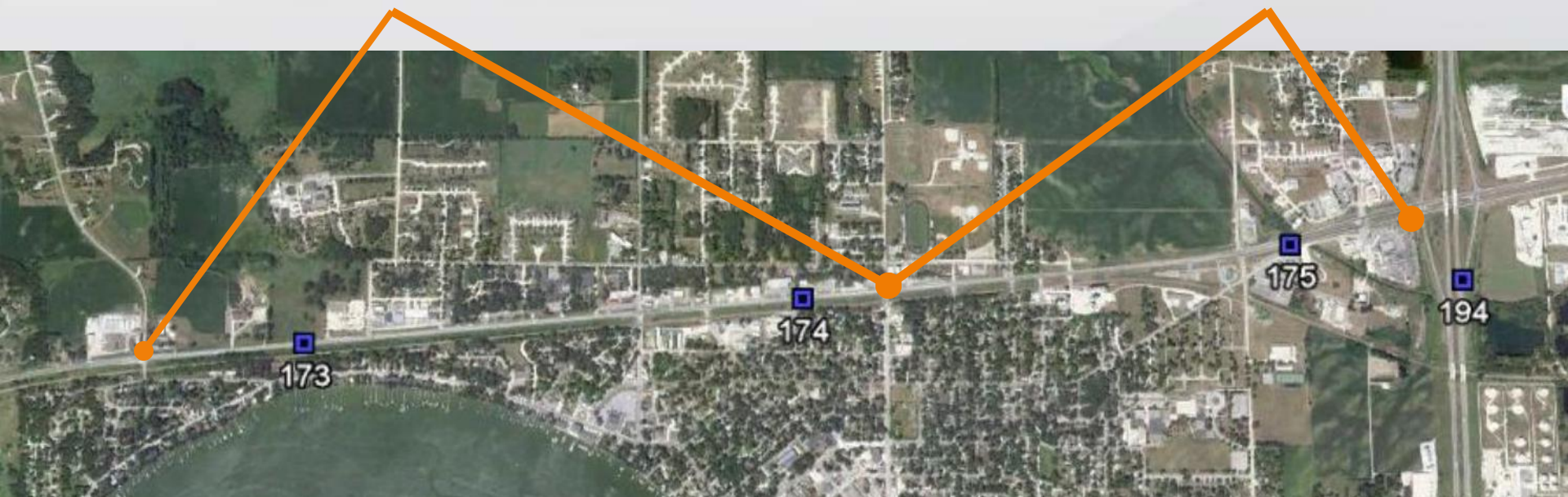
UNIT 2 WAS APPARENTLY IN THE BLIND SPOT OF UNIT 3 WHERE UNIT 1 COULD NOT SEE IT. UNIT 1 CROSSED BOTH LANES OF WEST BOUND TRAFFIC WHERE UNIT 2 STRUCK UNIT 1.

UNIT 3 IS AN UNKNOWN VEHICLE.

Officer ██████████	Badge No. ██████████	Time Officer Notified of Accident 17:40 Hrs.	Time Officer Arrived At Scene 17:40 Hrs.
Name BRITT POLICE DEPARTMENT	Date of Report 12/10/2004	Investigation made at scene? NO	T.I.#
Report Reviewed By ██████████ Y	Date Reviewed 12/10/2004	Report Given to All Drivers? YES	Other Technical Investigation Agency

Three-Lane since 2003

Four-Lane



	ADT	2009-2013 Crashes	Crash Rate, per HMVM	Major Injuries	Minor Injuries	Possible injuries
Three Lane	12,500	88	256	2	4	16
Four Lane	15,000	148	409	4	10	33



# WHY IS CAPACITY MAINTAINED?



## How Does a 3-lane Highway Become More Self-Enforcing?

- *No opportunities to pass in 3-Lane*
- *Reasonable Drivers set speeds, need for speed enforcement reduced*
- *50% reduction in reported crashes,*
- *unknown reduction in unreported crashes,*

# What kind of Safety Improvement is Possible?

Type of Crash	# Crashes in 3 Years	% Reduction in Iowa projects	Estimated Crashes/Costs	Possible Improvement
Rear End	53	-35%	34	-19
Broadside	14	-41%	8	-6
Sideswipe, Same Direction	23	-49%	12	-11
Angle, Oncoming Left Turn	14	-73%	4	-10
Sideswipe, Opposite Direction	0	-49%	0	0
Head On	1	-42%	0	-1
Other, Single Vehicle	6	-85%	1	-5
Total	111		59	-52
Injuries	25	64%	9	-16
Injury Losses	\$965,000	77%	\$222,000	-\$743,000
Property Damage	\$521,000	52%	\$250,000	-\$271,000

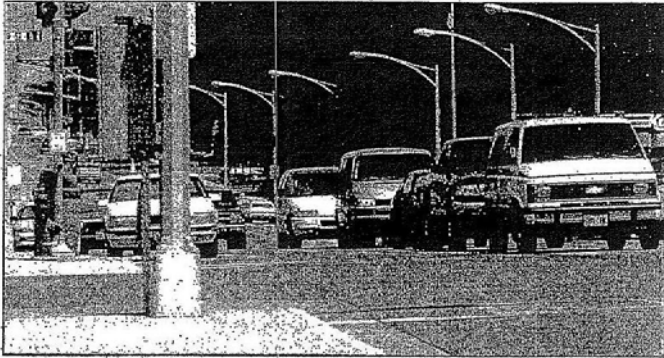
Source for Crash Reductions: *Safety Impacts of Road Diets in Iowa*, Stout, et al.

Source for Injury Reductions: Cresco IA 9 experience



# SIoux CENTER News

Wednesday, July 12, 2000 Sioux Center, Iowa



This week marks the one-year anniversary of the switch of Highway 75 from a four-lane corridor to a three-lane corridor. While city officials acknowledge that there are still some problems, such as delays during peak usage times on the highway around noon and 5 p.m., they say that generally, the change has helped highway safety a great deal.

## City officials say they are pleased with 3-lane highway after one year

By Heather Kuipers

It's been one year since a segment of Highway 75 in Sioux Center was transformed from a four-lane to a three-lane roadway, and city officials say they are generally pleased with the results.

Sioux Center Police Chief Paul Adkins said the switch has accomplished exactly what the city council hoped it would.

"Primarily, it's slowed down traffic—there's absolutely no doubt about that," he said. "It has certainly cut down on our accidents and we have the statistics to back that up. That's due simply to the slower speeds. It's also made it safer for pedestrians to cross Highway 75."

The three-lane concept took effect as a pilot project one year ago. The Sioux Center City Council requested the change after studies by the Iowa Department of Transportation (DOT) showed that the three-lane concept would increase

safety. The DOT and city council took into consideration that approximately 14,000 vehicles per day travel through Sioux Center on Highway 75.

In April, the city council voted to stay with the three-lane concept for an indefinite period of time.

Adkins said one of the most important improvements brought about by the three-lane design is in pedestrian safety. People crossing the road can now use the center-left-turn lane as a "buffer zone," he said.

"We still have trouble sometimes with vehicles stopping for pedestrians at crosswalks, but we are enforcing that more, and I'm seeing cars stopping for pedestrians more and more," he said.

Adkins said the three-lane has also helped slow traffic through the downtown area, even though speed limits were not lowered.

"We don't see the speeds we used

to," he said. "We used to see a lot of speeding vehicles through what is now the three-lane area. Now, we still get some, but generally speaking, people have slowed down."

A DOT study from earlier this year showed that the average travel speed through the downtown area is now 21 m.p.h. Before the conversion, it was 28 m.p.h.

Adkins said those slower speeds are the biggest factor in a significant reduction in accidents along the three-lane roadway.

According to the police department, only four accidents have occurred along the three-lane section of Highway 75 from January through June of this year. After the three-lane was put in place last July, nine accidents were reported through the end of 1999.

(Continued on backside)

- 14,000 vehicles per day through downtown
- *"It has certainly cut down on our accidents..."*
- *"Made it safer for pedestrians to cross Highway 75"*
- *"We used to see a lot of speeding vehicles...."*
- *"The council voted to stay with the three-lane concept."*

January 31, 2012



By Kyle Ocker - Sports editor  
[Daily Iowegian \(http://dailyiowegian.com\)](http://dailyiowegian.com)

CENTERVILLE — The number of accidents on Highways 2 and 5 occurring in town continued to decline in 2011. The numbers have been on a steep decline ever since the somewhat controversial decision by the Iowa Department of Transportation was made to change the in-city highways from four lanes to three lanes, with a center turn lane.

In 2008, the last full year with the four lane highway setup, there were 88 total accidents occurring on Highways 2 or 5, with 13 occurring at the intersection of the two highways (18th Street and Maple St.).

In the fall of 2009, the highways made the official change-over to the new setup. Accidents dropped slightly that year, with 78 accidents on the highways and six at the intersection.

In 2010, the first full year with the three-lane configuration, accidents began to take a sharp decline on the highways. A total of 42 accidents were reported with only three accidents occurring at the intersection.

That trend continued in 2011, the second full year with the configuration, with 34 accidents being reported on the highways and only one being reported at the intersection of the two highways.

The amount of accidents on the highways that resulted in personal injuries has also taken a steep decline. In 2008, 19 accidents resulted in a personal injury. That number went down slightly in 2009 with 12 personal injury accidents. There were eight personal injuries in 2010 and only three last year.

In 2011, the Centerville Police Department worked 169 total accidents, a number which has also dropped from 249 in 2008, 230 in 2009 and 187 in 2010.

## Des Moines, Iowa – Ingersoll Avenue

TEMPORARY ROAD DIET BECOMES PERMANENT

*“We were critical of the Des Moines City Council for its decision to approve the restriping of Ingersoll Avenue to change it from four lanes to three lanes... On all accounts, we were wrong. Our concerns proved to be unwarranted.”*

*Cityview, Central Iowa's Independent Weekly!*



- Up to 17,000 vehicles per day along 2-mile length
- Bicycle lanes included
- Mix of parallel and diagonal parking
- 50% reduction in crashes
- Traffic up 5% as more motorists chose to use this corridor after 3-lane rather than other parallel corridors.



## Resources:

- *Guidelines for the Conversion of 4-lane Undivided Roadways to 3-lane 2-way Left-turn Lane Facilities*, Iowa State University, Knapp, 2001
- *Road Diet Informational Guide*; Federal Highway Administration, Office of Safety; 2014
- *Going on a Road Diet*, Tan, Public Roads, FHWA, Sept/Oct 2011;
- *Road Diets Fact Sheet*; American Association for Retired Persons (AARP);
- *Guidelines for Road Diet Conversions*, Kentucky Transportation Cabinet; 2011

## Going Forward

- DOT's wants to proceed with the 3-lane conversion
- DOT asks for a commitment from the City Council to proceed with the 3-lane
- DOT will be here to support the City of Waverly should there be unexpected traffic or crash problems.

Questions?



## Barriers to Implementation

City Concern	A (US xx and US xx)	B (IA 3)	C (IA xx)	D (US xx)	E (US xx)	F (IA xx)
Lack or Denial of Crashes/Need to Have a problem to solve	Y (Lack and Denial)	Y (Denial)	Y (Denial)	Y (Denial)	Y (Lack)	Y (Lack)
Congestion/Slow-moving Vehicles	Y	Y	Y	Y	Y	Y
Concern for Speed Reduction/Travel Time	Y	Y	Y	Y	Y	Y
Keep Unwarranted Signals		Y	Y	Y	Y	
Concern for Business Climate		Y			Y	
School Bus Stops					Y	Y
Other Stopped Vehicles		Y				
Transitions to 4-Lanes	Y			Y	Y	Y
Proximity to Schools/Young Drivers				Y		

# Pedestrian Crossings

