

# Kansas – High Speed Approach Rural Roundabouts



MoDOT State Traffic &  
Safety Conference  
May 11, 2007

David Church, P.E.  
KDOT, Bureau of Traffic Engineering

# Outline

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- ❑ Kansas Roundabouts (History)
- ❑ High Speed Approach Roundabouts
  - K-68 & Old KC Road – Paola, KS
  - N. Jct. of US-59 & US-169 – Garnett, KS
  - US-50 & US-77 – Florence, KS
- ❑ Future High Speed Approach Rural Roundabouts
- ❑ Questions?

# Kansas Roundabouts (History)

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- ❑ First modern roundabout in Kansas was installed in 1997
- ❑ Candlewood & Gary (two-collector roads) in Manhattan, KS



# Kansas Roundabouts (History)

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- ❑ Existing – 57
  - 9 on the SHS (16%)
- ❑ Under Constr. – 10
- ❑ Under Design – 20
- ❑ Planned – 17
- ❑ Cancelled - 2



# High Speed Approach Rural Roundabouts

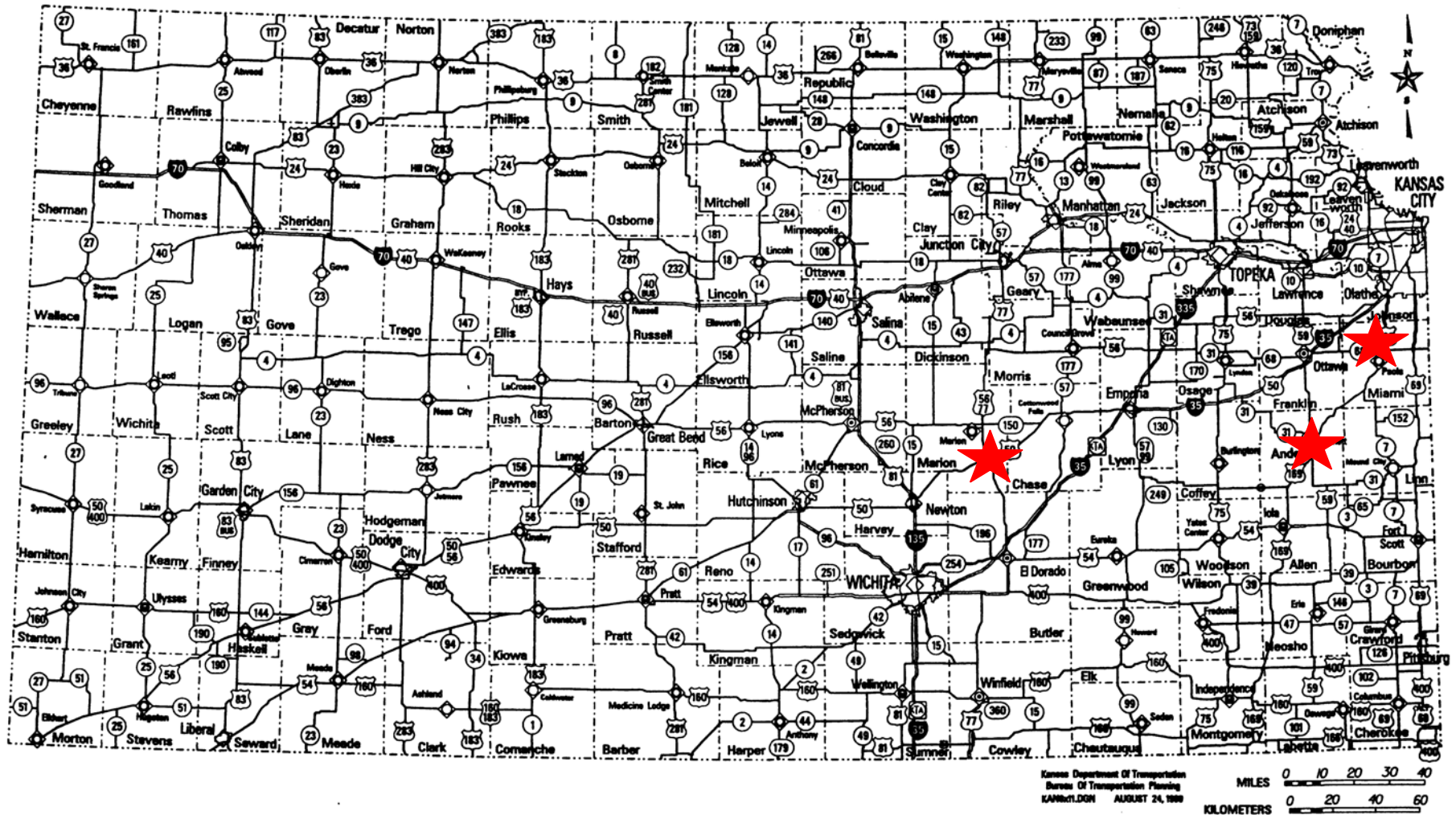
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- ❑ Existing – 3
- ❑ Under Design - 2
- ❑ Planned – 1
  
- ❑ Why install?
  - Safety, Safety ...
  - High Crash Loc.

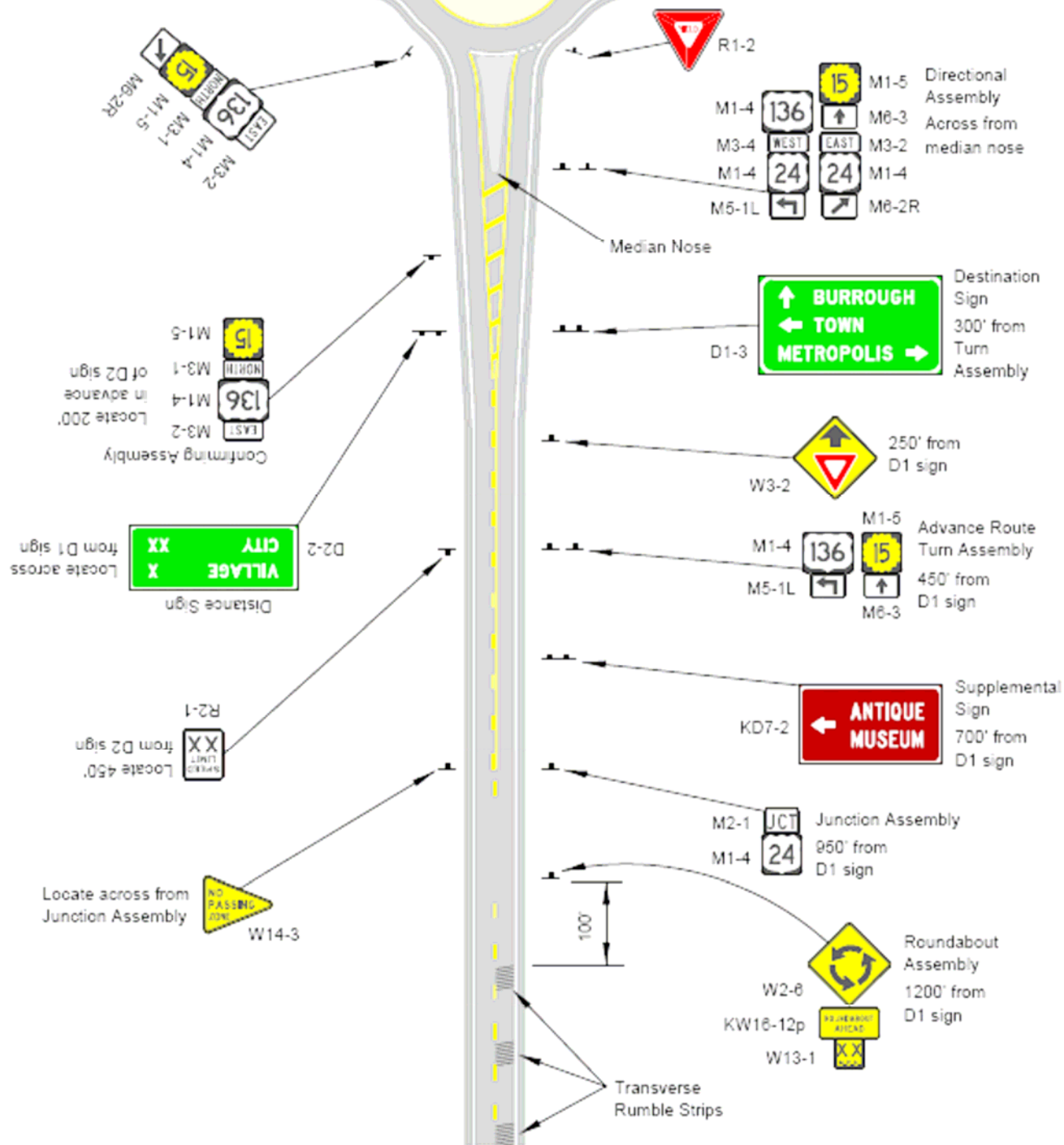


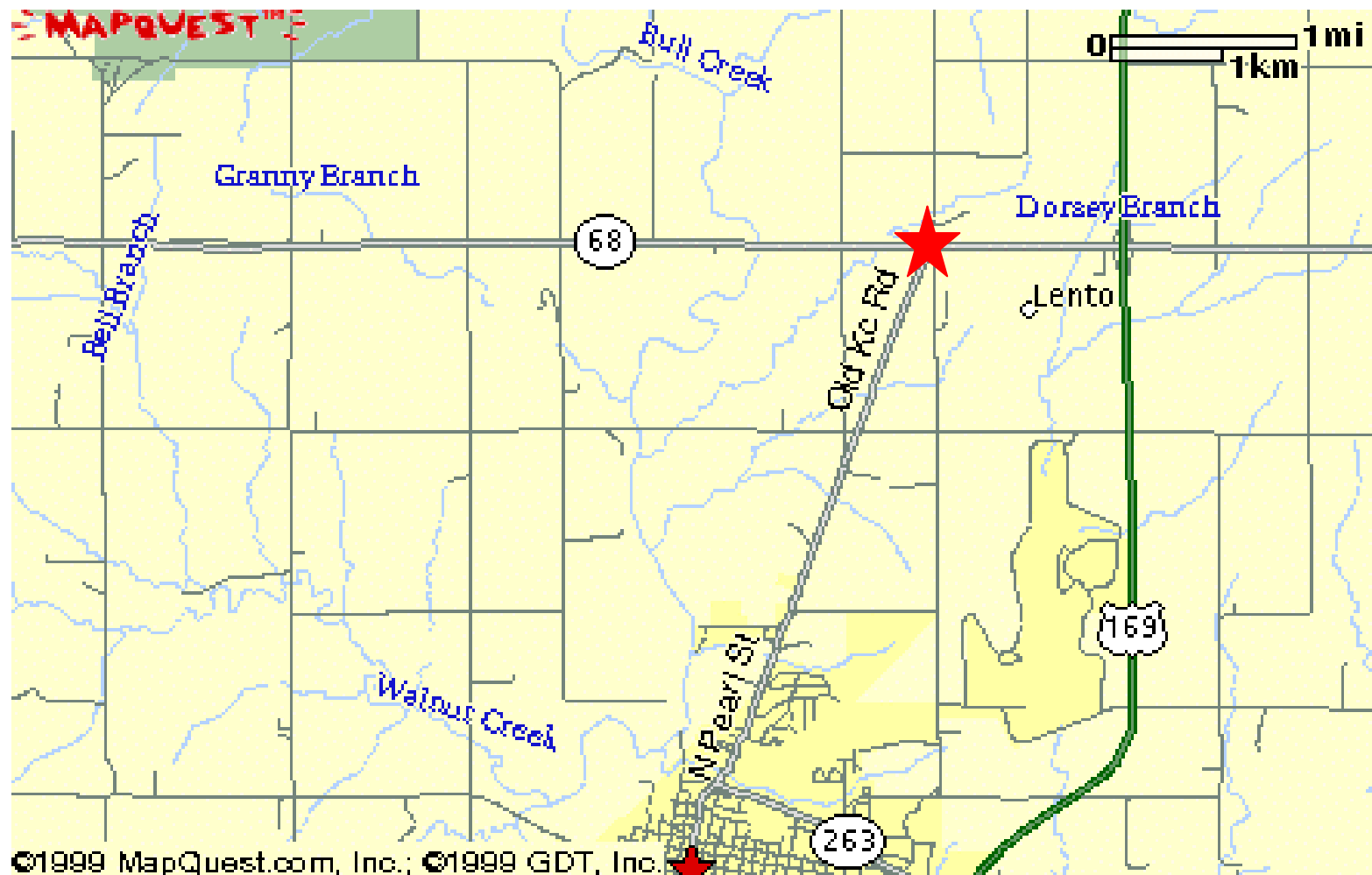


# KANSAS



High Speed Approach Rural Roundabouts  
(Paola, Garnett, Florence)





K-68 & Old K.C. Road  
Miami County (North of Paola, KS)



# K-68 & Old KC Road

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- ❑ Two way stop
- ❑ 1996 identified as a high crash location
- ❑ Converted to 4-way Stop in 1998 (temp).
- ❑ Roundabout opened in November 2001
- ❑ Five legs / Concrete
- ❑ Cost \$2.5 million



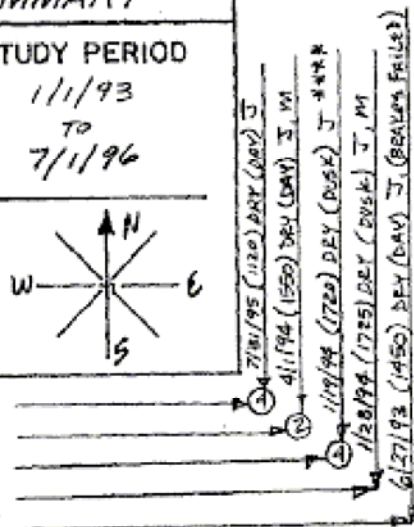
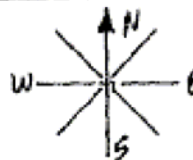
# ACCIDENT SUMMARY

NO. of ACCIDENTS  
 Fatal - 0  
 Personal Injury - 8  
 Property Damage - 9  
 Total - 17

STUDY PERIOD

1/1/93  
 TO  
 7/1/96

Injury Record  
 Fatalities - 0  
 Personal Injuries - 25



3 of 32 Acc.  
 mentioned that  
 traffic next to  
 them was partly  
 the cause of the acc.

K-68

## ACCIDENT RATE

$$\frac{(\# \text{Acc})(10^7)}{(365)(\text{Yrs.})(\text{ADT})} = \frac{17 \times 10^7}{(365)(35) 6950} = 20.3$$
  
 Fatality Rate = 0

### LEGEND

Fatality —●— Uninvolved  
 Personal Injury —○— Vehicle  
 Property Damage —→— Pedestrian  
 Fixed Object —□—

DATE (TIME) ROAD COND. (LIGHT COND.) ACTION  
 1/1/8 (1100) | | A, J, M

## COLLISION DIAGRAM

KANSAS DEPT. OF TRANSPORTATION  
 BUREAU OF TRAFFIC ENGINEERING

COUNTY Miami Co. DATE 2/10/97  
 BY D.A.C.

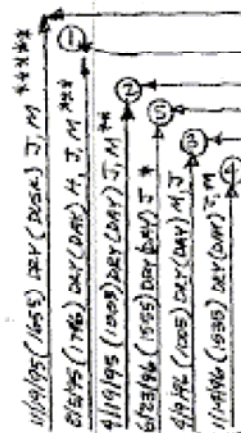
## CONTRIBUTING FACTORS

ROAD SURFACE COND. LIGHT COND.  
 1 Dry 1 Daylight  
 2 Wet 2 Dawn/Dusk  
 3 Water Const. 3 Dark, Ltg.  
 4 Snow/Ice 4 Dark, no Ltg.  
 5 Slippery 5 Unknown  
 6 Unknown  
 Alcohol Intake  
 1 Accident Factor (AF)  
 2 Not an AF  
 3 Unknown if AF

12/14/93 (1800) ICE (DAY) J, M, snow  
 1/19/95 (0810) Sunpacked (DAY) A

OLD K.C. ROAD

1/4/96 (0150) Snow (DARK W) Alcohol, A, M K-68



\*\*\*\*\* Thought it was a 4-way stop.  
 \*\*\*\*\* Semi parked on shoulder that night  
 \*\*\* RAN STOP SIGN  
 \*\* PI said he may have been blinded by the sun  
 \* vehicle next to VI turning right / VI in Vio 5

## DRIVER ACTION

- A. Illegal or Unsafe Speed
- B. Impeding Traffic
- C. Following Too Close
- D. Improper Overtaking
- E. Improper Turn
- F. Improper Start, Stop, Park
- G. Traf. Control Viol'n. Lights
- H. Traf. Control Viol'n. Signs
- J. Fail. to Yield R/W
- K. Drove Left of Center
- L. No or Improper Signal
- M. Careless - Inattention
- N. Avoid Vehicle, Object, Ped.



K-68 & Old KC Road  
AADT = 6900 vpd (20% trucks)



### Accident Summary

No. Of Accidents:  
Fatal: (0)  
Personal Injury: (0)  
Property Damage: (8)

STUDY PERIOD

Jan 2002 to Dec 2006



### COLLISION DIAGRAM

KANSAS DEPT. OF TRANSPORTATION  
BUREAU OF TRAFFIC ENGINEERING

### CONTRIBUTING FACTORS

#### ROAD SURFACE COND.

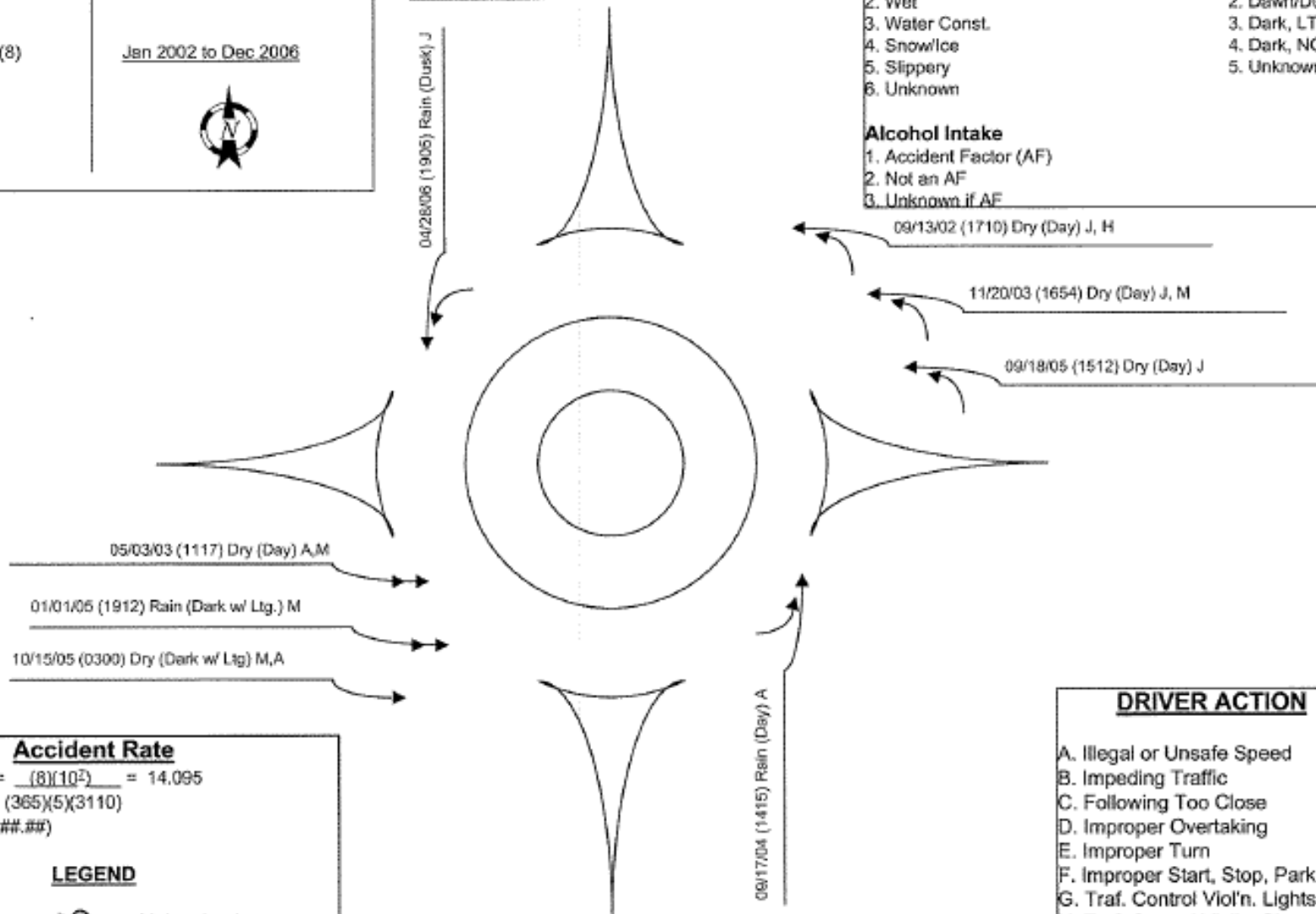
1. Dry
2. Wet
3. Water Const.
4. Snow/Ice
5. Slippery
6. Unknown

#### LIGHT COND.

1. Daylight
2. Dawn/Dusk
3. Dark, LTG.
4. Dark, NO LTG.
5. Unknown

#### Alcohol Intake

1. Accident Factor (AF)
2. Not an AF
3. Unknown if AF



### Accident Rate

$(\# \text{ Acc.})(10^2) = \frac{(8)(10^2)}{(365)(\text{Yrs.})(\text{ADT})} = 14.095$   
Critical Rate: (##.##)

### LEGEND

Fatality → ● Uninvolved  
Personal Injury → ○ Vehicle  
Property Damage → → Pedestrian  
Fixed Object → □

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Date (Time) Road Cond. (Light Cond.) Action

### DRIVER ACTION

- A. Illegal or Unsafe Speed
- B. Impeding Traffic
- C. Following Too Close
- D. Improper Overtaking
- E. Improper Turn
- F. Improper Start, Stop, Park
- G. Traf. Control Viol'n. Lights
- H. Traf. Control Viol'n. Signs
- J. Fail to Yield R/W
- K. Drove Left of Center
- L. No or Improper Signal
- M. Careless- Inattention
- N. Avoid Vehicle, Object, Ped.
- O. Bad Lane Change

K-68 & Old KC Road

COUNTY: Miami

DATE: 04/05/2007

COMPLETED BY: Cheryl Lambrecht

# K-68 & Old KC Road

(Before and After Crash Data)

Years	Crashes	Injuries	Property Damage Only
1995-2000	33	42	17
2001-2006	9	0	9
% Change	-73%	-100%	-53%



## PAOLA

### Percentage Change in Measures Of Effectiveness Between AWSC and Roundabout

Sr.No.	Measures of Effectiveness	AWSC	Roundabout	% change	Significantly Different
1	95% Queue Length (ft)	92	21	-77.2	YES
2	Ave. Intersection Delay (sec)	19.0	5.5	-71.1	YES
3	Max. Approach Delay (sec)	41.5	6.5	-84.3	YES
4	Proportion Stopped	0.98	0.35	-64.3	YES
5	Max. Proportion Stopped	0.80	0.23	-71.3	YES
6	Degree of Saturation	0.537	0.155	-71.1	YES

# K-68 & Old KC Road (Long Splitter Islands)













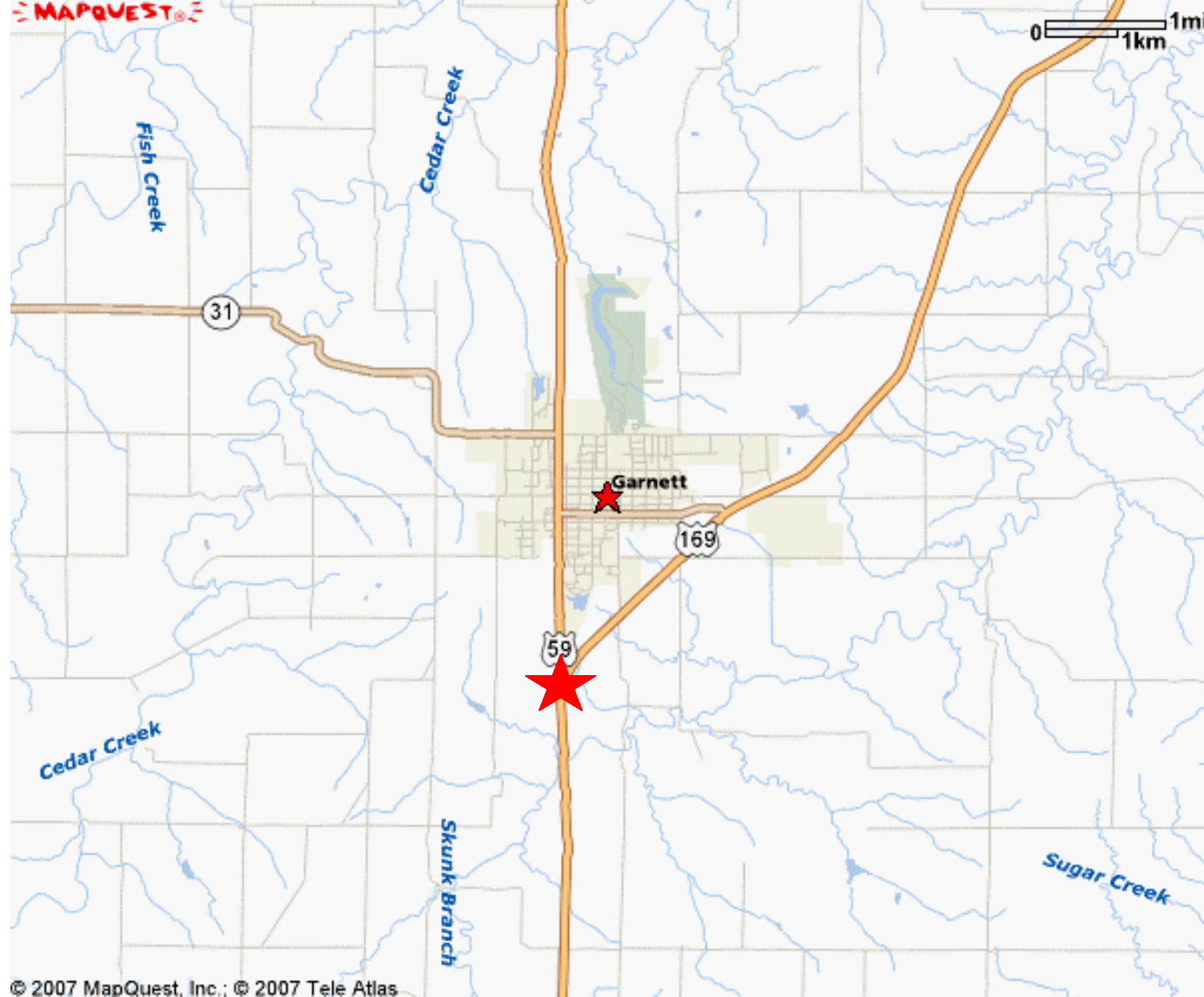












N. Jct. of US-59 & US-169  
Anderson Co. (S. of Garnett, KS)

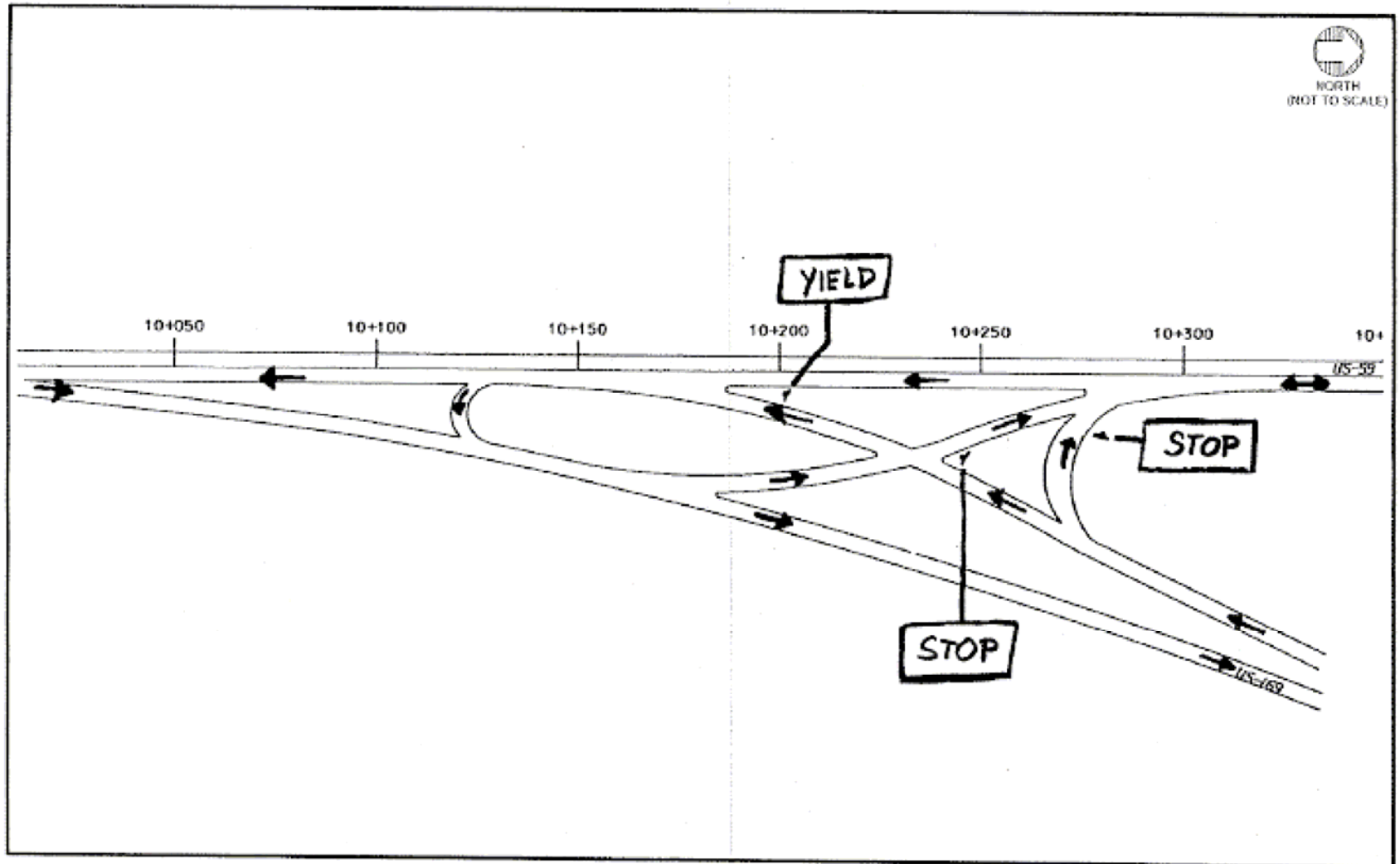
# N. Jct. of US-59 & US-169

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- ❑ Three leg braided intersection
- ❑ 2001 identified as a high crash location
- ❑ Roundabout opened in April 2006
- ❑ No known crashes
- ❑ Three legs / Concrete
- ❑ Cost \$2.4 million



# N. Jct. of US-59 & US-169 (Previous Geometry)



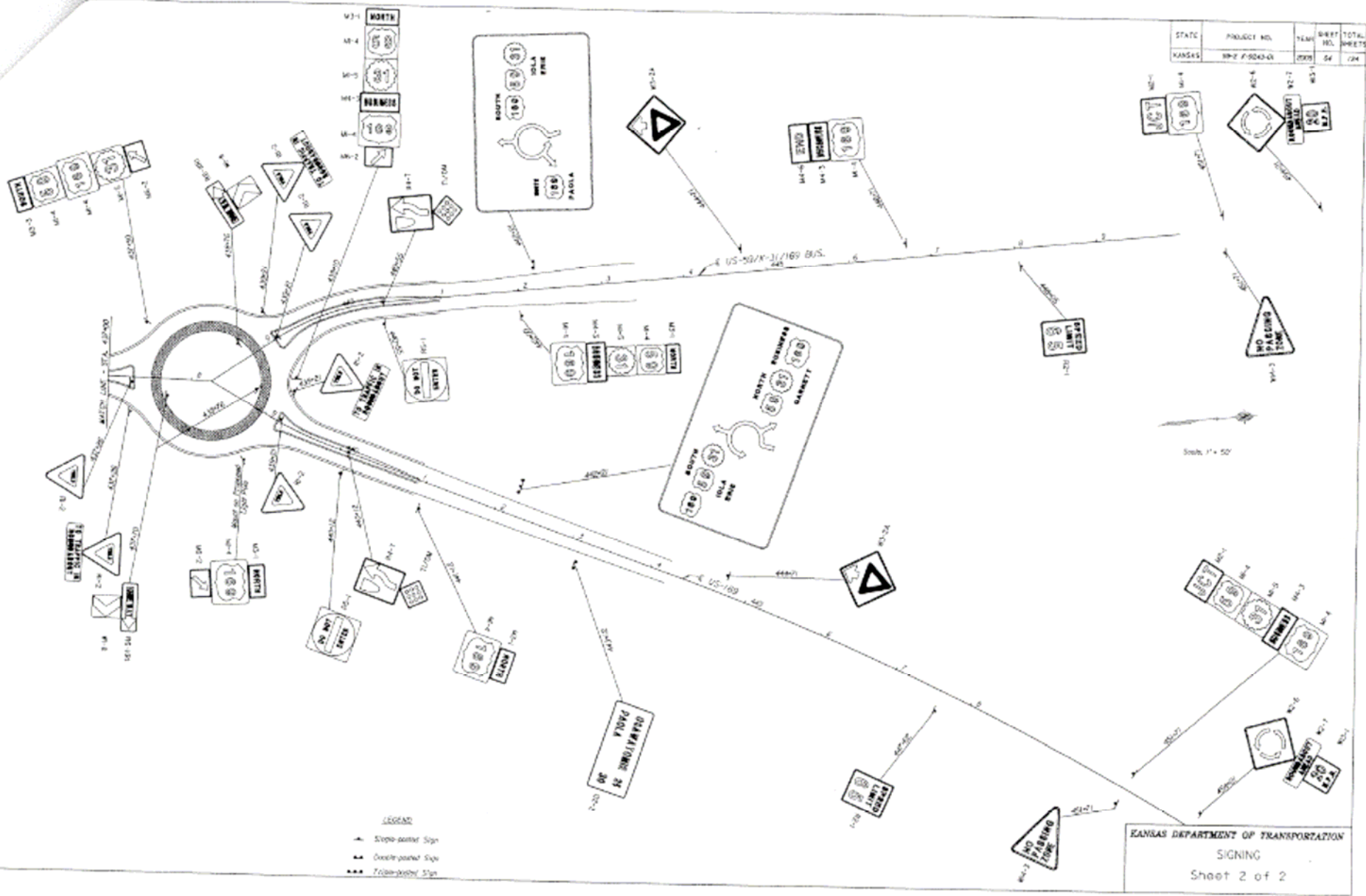




N. Jct. of US-59 & US-169  
AADT = 5845 vpd (20% trucks)



STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	WP-2 F-9243-01	2005	54	124





SOUTH

169

59

31

IOLA  
ERIE



NORTH

59

31

BUSINESS

169

GARNETT





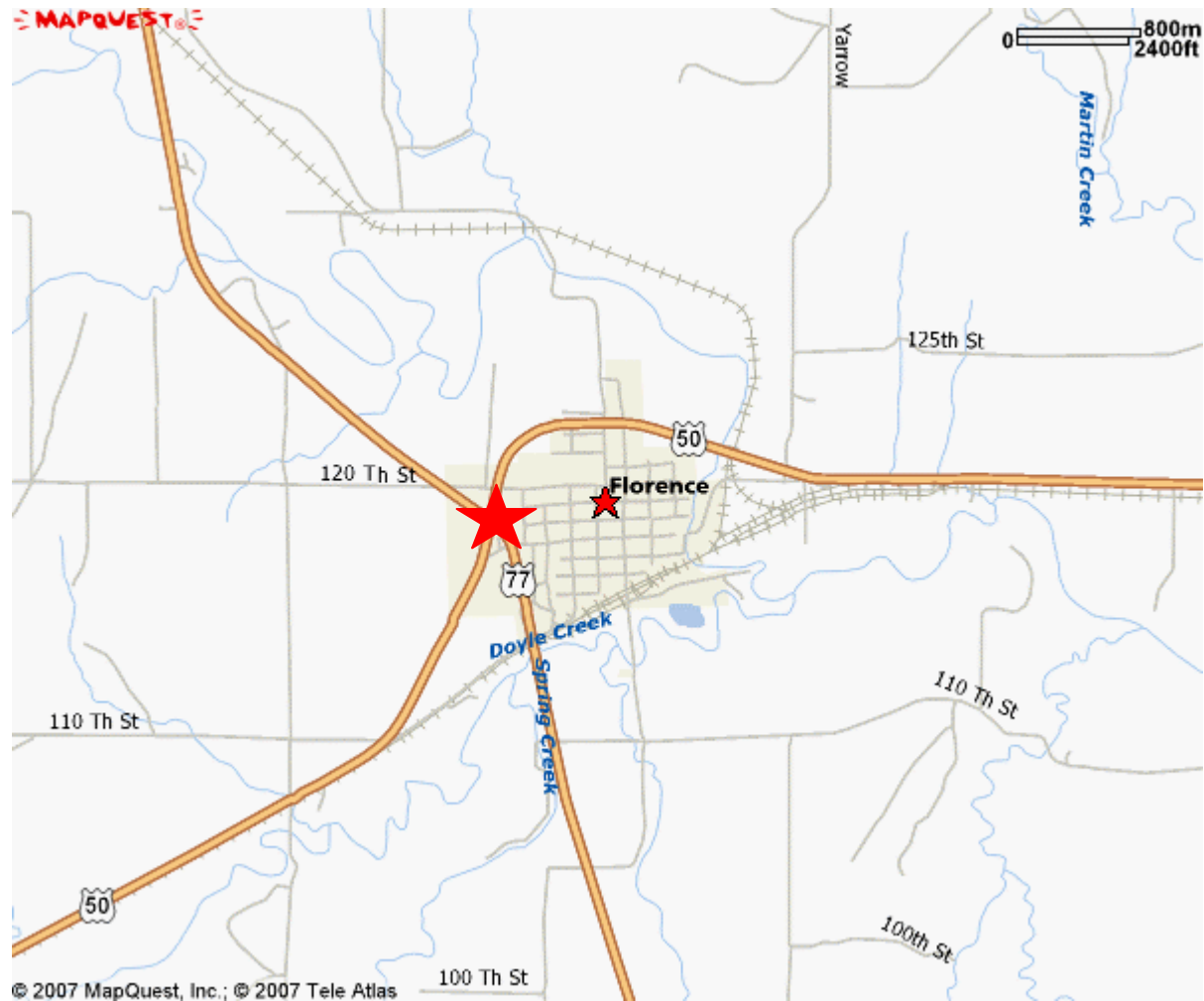


Rear tire tracks over  
central island



Rear tire tracks over  
outside curb





US-50 & US-77  
Marion Co. (W. of Florence, KS)

# US-50 & US-77

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- ❑ Two way stop
- ❑ High crash location
- ❑ Converted to 4-way Stop (temp).
- ❑ Roundabout opened in September 2006
- ❑ One roll-over crash
- ❑ Five legs / concrete
- ❑ Cost \$3.2 million





## Accident Summary

No. Of Accidents: 16  
 Fatal: 1  
 Personal Injury: 10  
 Property Damage: 5

### STUDY PERIOD

(2000-2002)



## CONTRIBUTING FACTORS

### ROAD SURFACE COND.

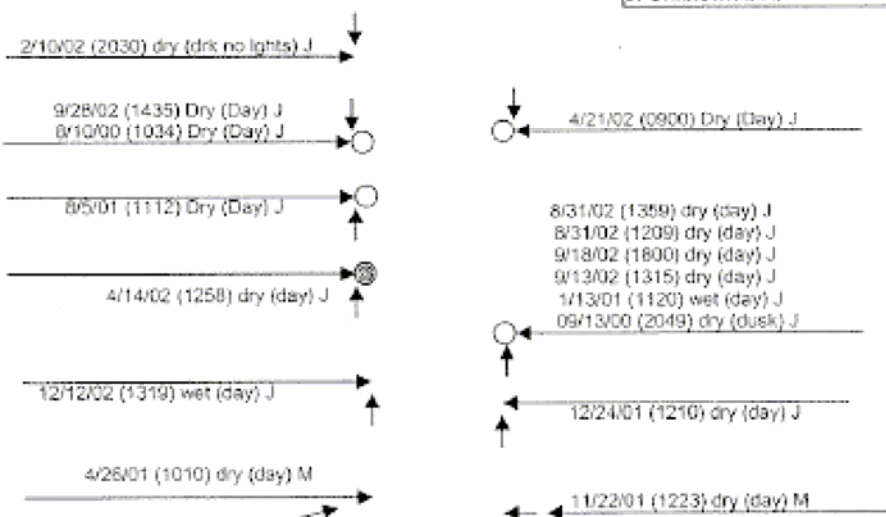
1. Dry
2. Wet
3. Water Const.
4. Snow/Ice
5. Slippery
6. Unknown

### LIGHT COND.

1. Daylight
2. Dawn/Dusk
3. Dark, LTG.
4. Dark, NO LTG.
5. Unknown

### Alcohol Intake

1. Accident Factor (AF)
2. Not an AF
3. Unknown if AF



## Accident Rate

(# Acc.) (10<sup>3</sup>)  
 (365) (Yrs.) (ADT)  
 Critical Rate:

### LEGEND

Fatality → ● Uninvolved Vehicle → ○  
 Personal Injury → ○ Pedestrian → ●  
 Property Damage → □  
 Fixed Object → □

Date (Time) Road Cond. (Light Cond.) Action



## COLLISION DIAGRAM

KANSAS DEPT. OF TRANSPORTATION  
 BUREAU OF TRAFFIC ENGINEERING

US-50 & US77  
 City of Florence

COUNTY: Marion DATE: March 9, 2004  
 COMPLETED BY: CH

## DRIVER ACTION

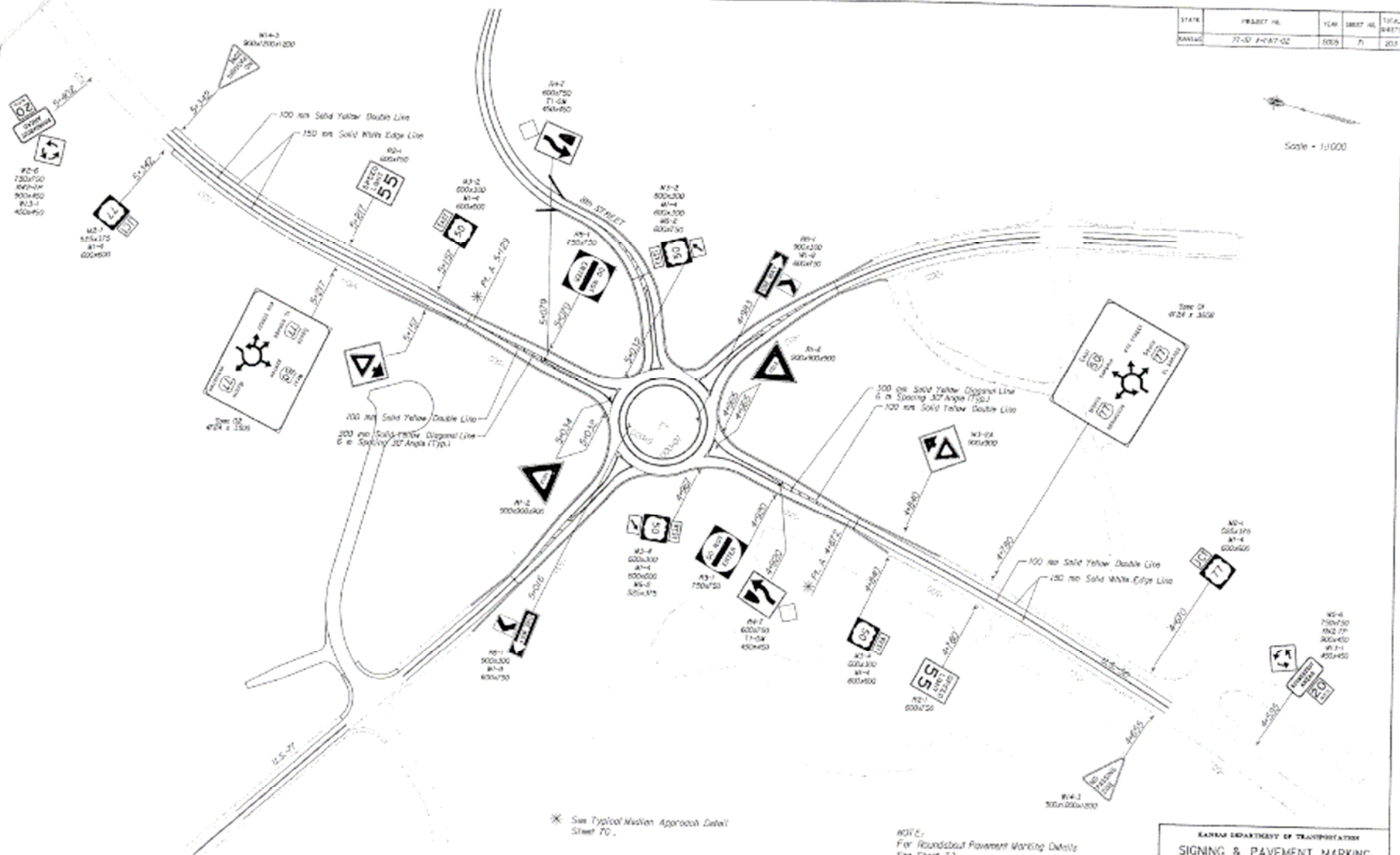
- A. Illegal or Unsafe Speed
- B. Impeding Traffic
- C. Following Too Close
- D. Improper Overtaking
- E. Improper Turn
- F. Improper Start, Stop, Park
- G. Traf. Control Viol'n. Lights
- H. Traf. Control Viol'n. Signs
- J. Fail to Yield R/W
- K. Drove Left of Center
- L. No or Improper Signal
- M. Careless- Inattention
- N. Avoid Vehicle, Object, Ped.

US-50 & US-77  
AADT = 4827 vpd (42% trucks)



STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	77-57 H-17-02	2009	71	201

Scale = 1/1000



\* See Typical Median Approach Detail Sheet 70.

NOTE:  
For Roundabout Pavement Marking Details  
See Sheet 73.

KANSAS DEPARTMENT OF TRANSPORTATION  
SIGNING & PAVEMENT MARKING  
PLAN  
U.S. 50

SOUTH



EL DORADO

8TH STREET

EAST



EMPORIA



WEST



NEWTON





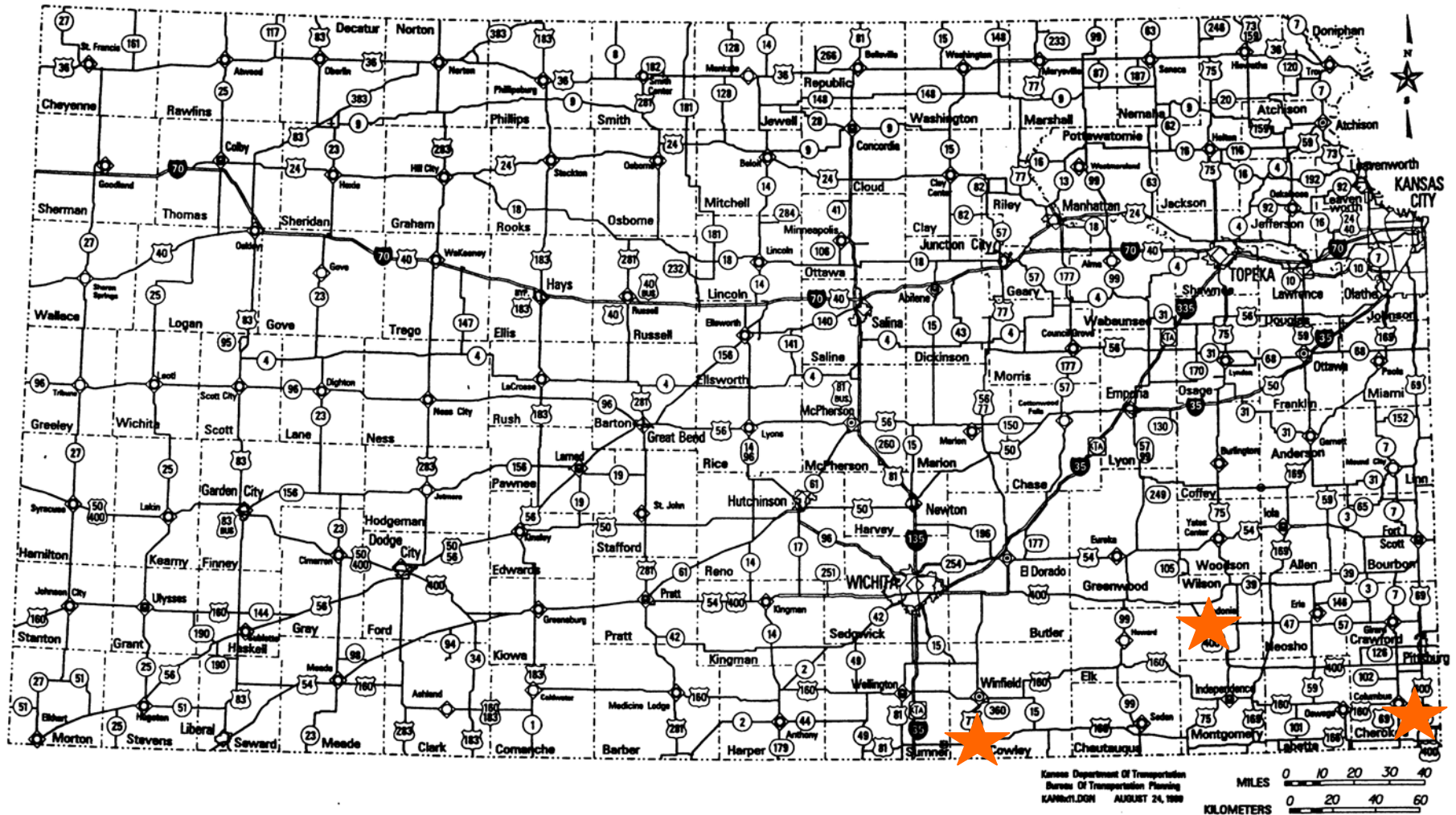








# KANSAS



Future High Speed Approach Rural Roundabouts  
(Arkansas City, Fredonia, Riverton)

# 2008 National Roundabout Conference in Kansas City



TRANSPORTATION RESEARCH BOARD

OF THE NATIONAL ACADEMIES

## National Roundabout Conference

The Westin Crown Center • Kansas City, Missouri

May 18-21, 2008

### Announcement & Call for Abstracts

Organized under the auspices of the TRB and the Roundabouts Task Force (ANB75T), this conference will provide a forum for the exchange of technical and administrative information concerning aspects of roundabouts. The purpose of this conference is to fully inform a large audience about the science and application of roundabouts.

#### Call for Abstracts

Organizers are seeking quality papers and presentations on a wide range of roundabout topics. Abstracts should be no more than one page in length, and may be on any topic relevant to the conference. Presentation options include research papers presented in lecture or poster format, panel sessions, or project displays using pictures, models, and/or computer graphics. Submit abstracts by June 25, 2007 at [Roundabout Call](#). Accepted papers and presentations must be completed and made available to TRB in electronic format by February 28, 2008 for inclusion in the conference proceedings.

Topics include all aspects of roundabout research, experience, and practice including:

- policy and procedure development
- funding strategies
- planning and programming
- integrating into existing road systems design
- traffic control
- transit
- bicycles
- pedestrian use
- meeting the needs of those with disabilities
- use in a range of settings
- urban to rural and low speed to high speed
- performance measures
- safety measures
- modeling for capacity and design
- system integration
- large vehicle and emergency vehicle use
- construction techniques
- illumination
- public involvement and outreach
- analysis comparing intersection alternatives

#### Exhibits

Organizations are invited to set up a table-top display during the conference. The exhibit fee includes one complimentary conference registration and a listing in the conference final program. Space is limited and reservations will be accepted on a first come, first served basis. Submit your contact information to be added to the [Prospect List](#).

#### The Conference

This is a national conference on roundabouts for all private and public interests. The use of roundabouts as an alternative to stop or signal-controlled intersections is rapidly advancing in the United States. Local governments and state highway agencies are moving forward to develop policies and procedures when managing roundabout decisions, design, and operation.

Make a hotel reservation directly with [The Westin Crown Center](#). The Hallmark Crown Center has shopping, restaurants, and a variety of attractions nearby including the National World War I Museum at Liberty Memorial, Major and Minor League Baseball, Auto Racing, Union Station, Science City, Jazz District, and the Negro Leagues Baseball Museum. There are numerous roundabouts in the Kansas City area so extend your stay to visit these sites.

Additional conference information and registration will be available at this website in the future.

For information, contact:  
Gene Russell, Conference Chairman  
785-539-9422, [Geno@KSU.edu](mailto:Geno@KSU.edu)

Richard Pain, TRB Staff  
202-334-2964, [RPain@NAS.edu](mailto:RPain@NAS.edu)

# Thanks for your time and attention

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- ❑ Questions?
- ❑ Open invitation to field review our roundabouts
- ❑ Happy to give you a tour of these locations

