

# **Hazard Elimination Project Evaluation**

Project Log # 200502086

Hazard Elimination Project W-2941

**Evaluation of the Installation of Left Turn Lanes at Five Median Crossovers on  
US 29-601 from North of SR 1210-Old Beatties Ford Road to Centerview Street  
In Rowan County**

Documents Prepared By:

Safety Evaluation Group  
Traffic Safety Systems Management Section  
Traffic Engineering and Safety Systems Branch  
North Carolina Department of Transportation

**Principal Investigator**

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Carrie L. Simpson, EI

Traffic Safety Project Engineer

3/1/2006  
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Date

## ***Spot Safety Project Evaluation Documentation***

### **Subject Location**

Evaluation of Hazard Elimination Project W-2941 –  
Five Crossovers on US 29-601 from north of SR 1210-Old Beatties Ford Road (MP 2.94) to  
Centerview Street (MP 4.94)

The project contained the following crossovers:

Location 1: Crossover, 0.25 miles north of SR 1210-Old Beatties Ford Road  
MP 2.94

Location 2: Crossover, 0.25 miles north of SR 1243-Daugherty Road  
MP 3.33

Location 3: Crossover, 0.21 miles north of SR 1221-Bostian Road  
MP 3.78

Location 4: Rose Street, 0.12 miles north of SR 1238-China Grove Road  
MP 4.17; Three-Leg Intersection

Location 5: Centerview Street, 0.61 miles north of SR 1232-Pine Ridge Road  
MP 4.94; Three-Leg Intersection

Please see the attached *Location Map* for further detail.

### **Introduction**

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis has been completed to measure the effectiveness of this hazard elimination project. Additional analysis methods were not utilized for this evaluation because a suitable comparison group was unattainable. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

## Project Information and Background from the Project File Folder

The safety countermeasure chosen for the subject location was to construct left turn lanes at five existing median openings on US 29-601. US 29-601 is a four-lane divided facility with a grass median. The surrounding development is rural undeveloped and commercial. The speed limit along US 29-601 varies from 50 mph to 55 mph at this location.

No initial crash analysis for this location was documented in the Project File Folder. The Project Report states that there was a problem of vehicles making left-turns from the through lanes on the high-speed, high-volume divided roadway. The project was completed in 1999 at a cost of \$450,000.

## Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from April 1, 1998 through March 31, 2000. The before period consisted of reported crashes from April 1, 1993 through March 31, 1998 (5 Years) and the after period consisted of reported crashes from April 1, 2000 through March 31, 2005 (5 Years). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

In order to include the left turn lanes within the project limits, the treatment data consisted of all crashes within a 350 Y-Line of the Treatment Locations. Please note that the Target Crashes for the applied countermeasure were Rear End crashes on US 29-601 that occurred in advance of each median crossover. The following tables depict the Naïve Before and After Analysis for the Total Crashes and Target Crashes at Locations 1 through 5.

Table 1a. Treatment Information

	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)/ Percent Increase (+)</b>
Total Crashes: Locations 1-5	16	7	-56.3%
Total Severity Index	5.62	4.17	-25.8%
Target Crashes: Locations 1-5	5	0	-100.0%
Target Severity Index	5.44	0.00	-100.0%
Volume	12,900	12,900	0.0%

Table 1b. Target Crash Information

<b>Locations 1-5</b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)/ Percent Increase (+)</b>
Fatal Injury Crashes	0	0	N/A
Non-Fatal Injury Crashes	3	0	-100.0%
Total Injury Crashes	3	0	-100.0%
Night Crashes	1	0	-100.0%
Wet Crashes	0	0	N/A

Table 2. Crash Breakdown by Location

<b>Median Crossovers Summary</b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-)/ Percent Increase (+)</b>
<b>Location 1</b>			
Total Crashes	2	0	-100.0%
Target Crashes	2	0	-100.0%
<b>Location 2</b>			
Total Crashes	2	0	-100.0%
Target Crashes	1	0	-100.0%
<b>Location 3</b>			
Total Crashes	3	0	-100.0%
Target Crashes	2	0	-100.0%
<b>Location 4</b>			
Total Crashes	4	1	-75.0%
Target Crashes	0	0	N/A
<b>Location 5</b>			
Total Crashes	5	6	20.0%
Target Crashes	0	0	N/A

As shown in the previous tables, Locations 1-5 overall experienced a 56.3 percent decrease in Total Crashes, a 25.8 percent decrease in the Total Severity Index, a 100.0 percent decrease in Target Crashes, and a 0.0 percent change in Average Daily Traffic (ADT). The before period ADT year was 1995 and the after period ADT year was 2002.

## **Results and Discussion**

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 56.3 percent decrease in Total Crashes and a 100.0 percent decrease in Target Crashes. Further investigation shows there was a 25.8 percent decrease in the Severity Index for Total Crashes. The summary results above demonstrate that when using the naïve before and after analysis method the treatment locations appear to have had a reduction in the frequency and severity of crashes from the before to the after period.

Although there was a reduction in the number of Target Crashes at the treatment locations, there were only five Target Crashes in the entire five-year before period. The Target Crashes at all treatment locations in the before period resulted in three injury crashes, one class B injury crash and two class C injury crashes. It appears that there was a minimal crash pattern at the treatment locations in the before period and that the project was set up based on crash potential, not actual before period crashes.

Location 5 was the only crossover that experienced an increase in Total Crashes from the before to the after period. In the before period, there were four Frontal Impact Crashes that involved a vehicle from Centerview Street pulling out in front of a southbound US 29-601 vehicle. In the after period, there were six crashes that occurred in the same manner. Please see the Before and After Collision Diagram provided for Locations 1-5.

Please see the attached *Treatment Site Location Photos*. Photos are provided for Locations 1 through 5. As the Safety Evaluation Group completes additional reviews for this type of countermeasure, we will be able to provide more objective and definite information regarding actual crash reduction factors.



*Treatment Site Photos (Taken on November 14, 2005)*



Looking north at Crossover 1



Looking south at Crossover 1

*Treatment Site Photos (Taken on November 14, 2005)*



Looking north at Crossover 2



Looking south at Crossover 2

*Treatment Site Photos (Taken on November 14, 2005)*



Looking north at Crossover 3



Looking south at Crossover 3

*Treatment Site Photos (Taken on November 14, 2005)*



Both photos above are looking north at Crossover 4

*Treatment Site Photos (Taken on November 14, 2005)*



Looking north at Crossover 5



Looking south at Crossover 5

Five Crossover Locations on US 29-60I from north of SR 1210-  
Old Beatties Ford Rd. (MP 2.94) to Centerview St. (MP 4.94)

Rowan Co.

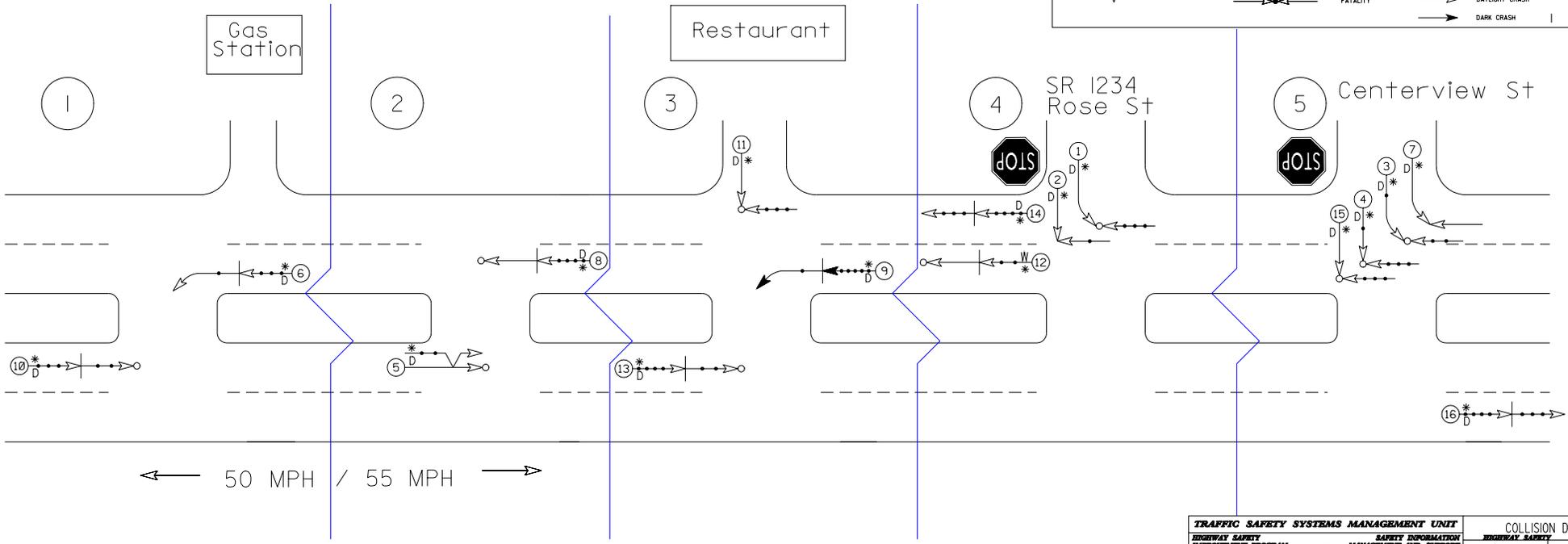
April, 1993 - March 31, 1998 (5 Yrs)

BEFORE PERIOD - TOTAL CRASHES



**LEGEND**

→	MOVING VEHICLE	↘	ANGLE	→	9 MPH OR LESS	P	PEDESTRIAN
- - - →	PEDESTRIAN	↙	TURNING	→	10 MPH TO 19	B	BICYCLE
☒	PARKED VEHICLE	↔	BACKING	→	20 MPH TO 29	T	TRAIN
☒	PARKING VEHICLE	↔	SIDESWIPE	→	30 MPH TO 39	A	ANIMAL
□	FIXED OBJECT	↔	OUT OF CONTROL	→	40 MPH TO 49	🔥	VEHICLE FIRE
⊕	HEAD ON	↔	INJURY	→	50 MPH TO 59	*	DRIVER AT FAULT
⊖	REAR END	↔	FATALITY	→	60 MPH TO 69	D	DRY
↘	RAN OFF ROAD	↔	DAYLIGHT CRASH	→	70 AND UP	W	WET
		↔	DARK CRASH	→	SPEED UNKNOWN	I	ICY OR SNOWY



<b>TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT</b>		<b>COLLISION DIAGRAM</b>	
<small>                 HIGHWAY SAFETY IMPROVEMENT PROGRAM                  SAFETY INFORMATION MANAGEMENT AND SUPPORT             </small>	<small>                 HIGHWAY SAFETY                  MANAGEMENT AND SUPPORT             </small>	DIVISION: 9	REGION: TRIAD
		STUDY PERIOD: 04/01/93 - 03/31/98	
		ANALYSIS PREPARED BY: CLS	
		DIAGRAM PREPARED BY: CLS	
SAFETY EVALUATION		TRAFFIC SAFETY	
US 29 / 60I AT 5 Crossover Locations		SCALE:	NOT TO SCALE
		DATE:	02/16/06
		LOG NUMBER:	200502086
		PAGE:	1 OF 1
<b>N.C. DEPARTMENT of TRANSPORTATION</b> <b>DIVISION of HIGHWAYS</b> <b>TRAFFIC ENGINEERING AND SAFETY</b> <b>SYSTEMS BRANCH</b>			

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Rowan Co.

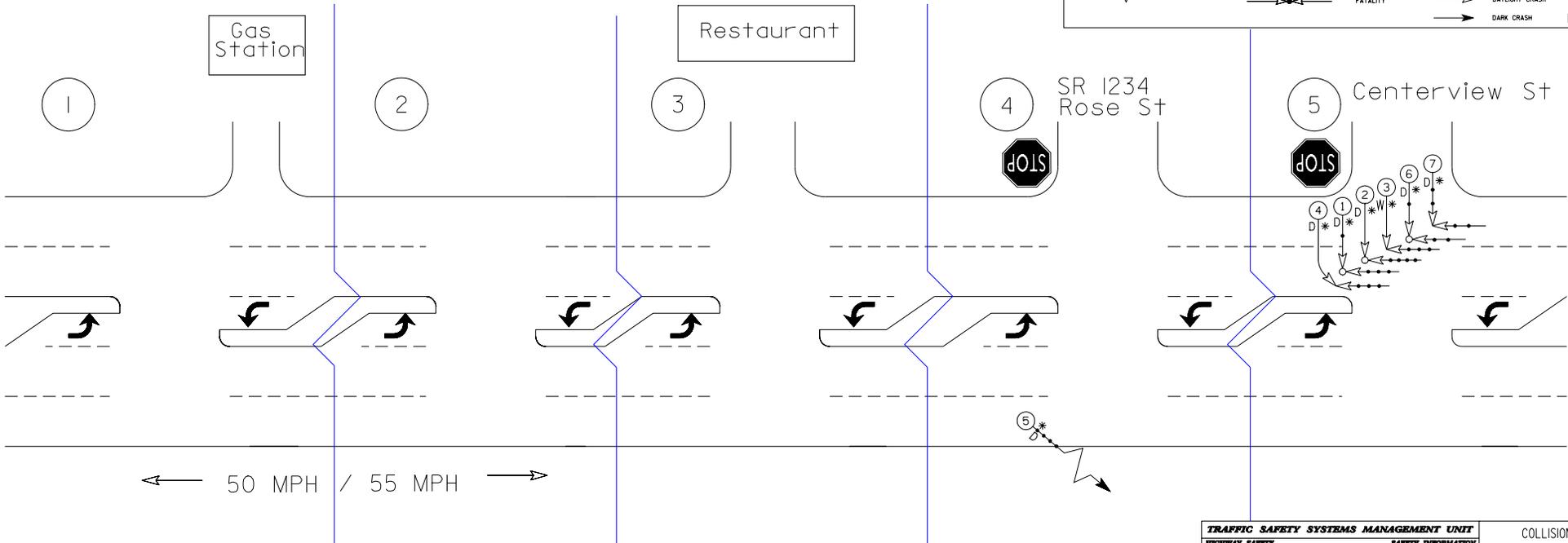
April, 2000 - March 31, 2005 (5 Yrs)

AFTER PERIOD - TOTAL CRASHES



**LEGEND**

MOVING VEHICLE	ANGLE	9 MPH OR LESS	PEDESTRIAN
PEDESTRIAN	TURNING	10 MPH TO 19	BICYCLE
PARKED VEHICLE	BACKING	20 MPH TO 29	TRAIN
PARKING VEHICLE	SIDESWIPE	30 MPH TO 39	ANIMAL
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		DARK CRASH	



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		STUDY PERIOD: 04/01/00 - 03/31/05	
		ANALYSIS PREPARED BY: CLS	
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