

# Spot Safety Project Evaluation

Order # 41000014145

Spot Safety Project # 08-02-208

**Spot Safety Project Evaluation of the Left Turn Lane Installation  
NC 134 (N. Main Street) at SR 1324 (Glen Road)  
Montgomery County, Town of Troy**

Documents Prepared By:

Safety Evaluation Group  
Traffic Safety Systems Management Section  
Transportation Mobility and Safety Division  
North Carolina Department of Transportation

**Principal Investigator**



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Jason B. Schronce

10-4-2011

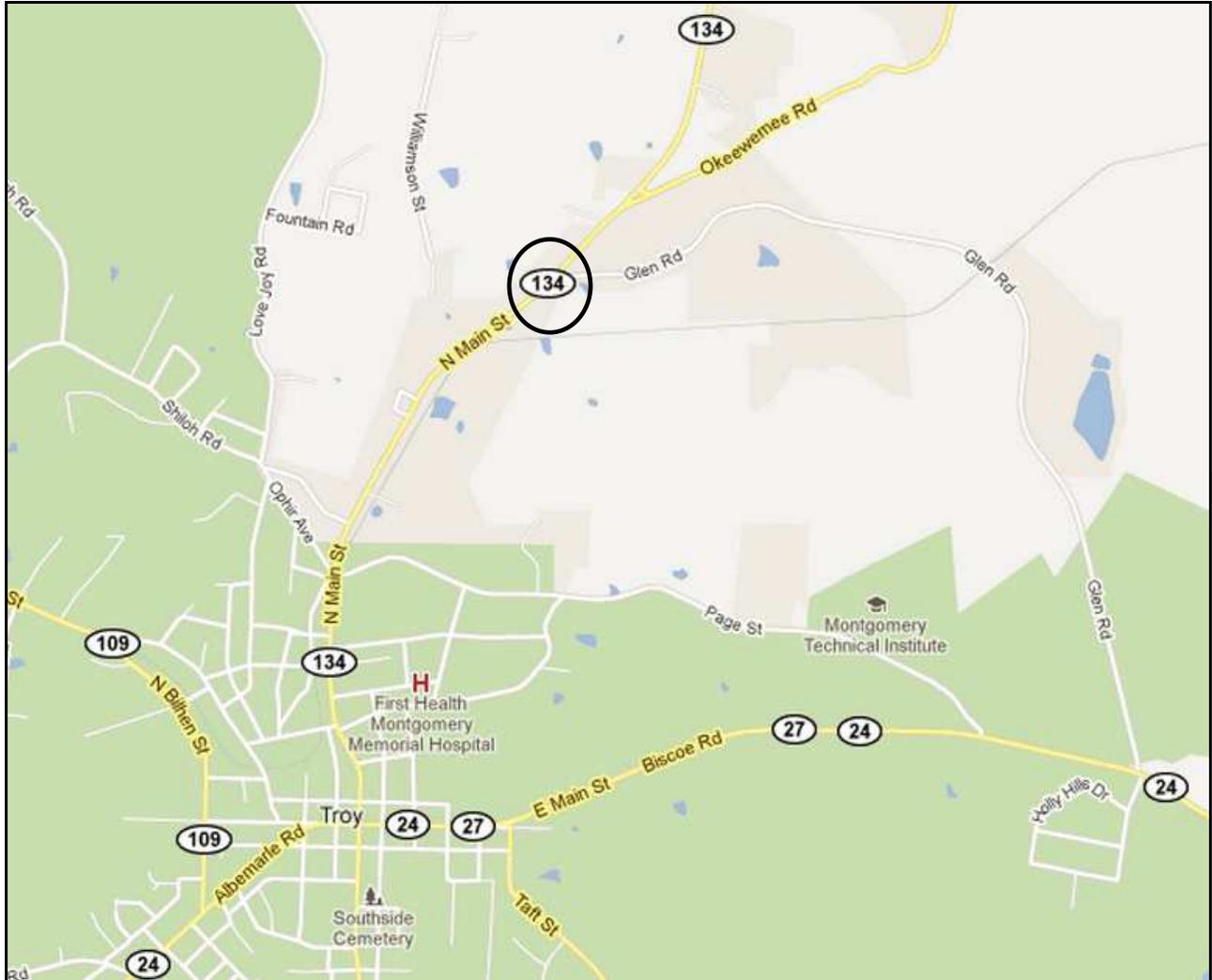
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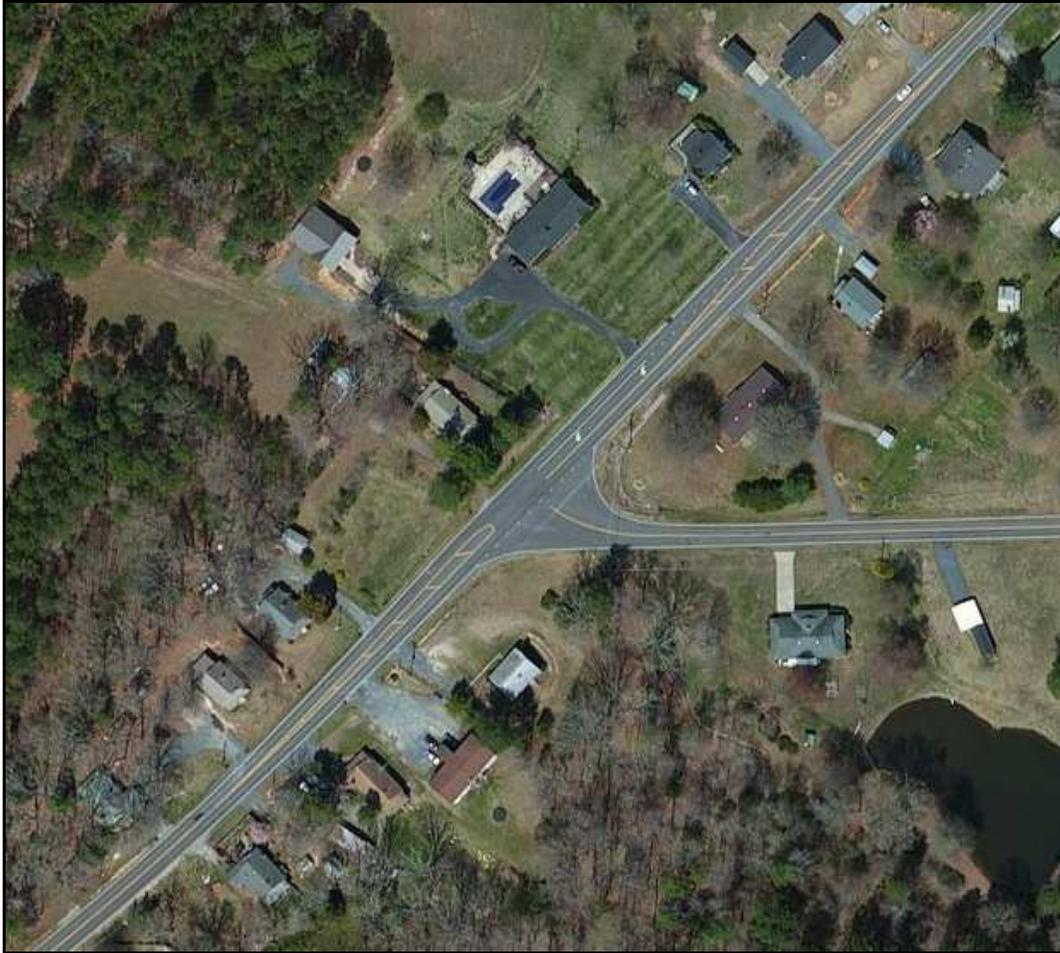
Traffic Safety Project Engineer

# Spot Safety Project Evaluation Documentation

## Subject Location

Evaluation of Spot Safety Project Number 08-02-208 located at the Intersection of NC 134 (North Main Street) and SR 1324 (Glen Road) in Montgomery County, Town of Troy.





**Aerial Map provided by BING Maps**

### **Project Information and Background from the Project File Folder**

The spot safety project improvement countermeasure chosen for the subject location was the installation of a NC 134 southbound left turn lane. NC 134 (North Main Street) and SR 1324 (Glen Road) are both two-lane facilities at the subject intersection with speed limits of 45 mph on all approaches. The subject location is a three-leg intersection, which is controlled by a stop sign on SR 1324. Glen Road services several businesses, two (2) prisons, and a NCDOT Maintenance yard.

The original statement of problem proclaimed that traffic is queuing on NC 134 due to motorists attempting to turn left at the intersection. The vehicles in queue are therefore stopped on a vertical crest in the through lane of travel. This improvement was also in response to a fatal injury rear-end collision.

The initial crash analysis was completed from April 1, 1999 to March 31, 2002 with four (4) reported crashes, two (2) of which were deemed correctable including one fatality crash. The final completion date for the improvement at the subject intersection was on December 6, 2007 with a total cost of \$215,000.

## 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 were the months of November 2007 through January 2008. The before period consisted of reported crashes from June 1, 2004 through October 31, 2007 (3 years and 5 months); and the after period consisted of reported crashes from February 1, 2008 through June 30, 2011 (3 years and 5 months). The ending date for this analysis was determined by the date of available crash data at the time of analysis.

The treatment data consisted of all crashes within 150 feet of the subject intersection. *Please see attached location map, aerial map, and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Southbound NC 134 Rear-end Crashes were the target crashes for the applied countermeasure.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	2	0	- 100.0 %
Total Severity Index	4.7	0.0	- 100.0 %
Target Crashes	1	0	- 100.0 %
Target Crash Severity Index	8.4	0.0	- 100.0 %
Volume (2006, 2009)	6,700	5,900	- 11.9 %

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	0	0	N/A
Class C Injury Crashes	1	0	- 100.0 %
Total Injury Crashes	1	0	- 100.0 %

The naive before and after analysis at the treatment location resulted in a 100 percent decrease in both the Total Crashes, Target Crashes, and Total Severity Index. The before period ADT year was 2006 and the after period ADT year was 2009.

## Results and Discussion

Referencing the *Collision Diagrams*, the before period experienced one southbound NC 134 rear-end collision during the evaluation time limits that resulted in a C-injury. There was also one additional left turn collision at the intersection without injuries. After the left turn lane installation, the intersection did not experience any collisions within our after period evaluation time restraints.

The calculated benefit to cost ratio for this project is **0.22 considering total crashes**. The benefit to cost ratio **considering only target crashes is 0.18**. The benefits are calculated using the change in annual crash costs from the before to the after period. Operational and other benefits related to the project are not considered in this analysis. The costs of the project include the actual construction costs as well as the increase in annual maintenance and utility costs.

Please see the attached *Treatment Site Photos*. Photos are provided from our Field Visit for all three approaches to the treatment intersection. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

### **Treatment Site Photos**



**Travelling Westbound on SR 1324 (Glen Road)**



**Travelling Southbound on NC 134 (N. Main Street)**



**Travelling Southbound on NC 134**



**Travelling Northbound on NC 134**

**BENEFIT-COST ANALYSIS WORKSHEET - Total Crashes**

LOCATION: NC 134 at SR 1324		BY: JBS						
COUNTY: Montgomery		DATE: 9/20/2011						
FILE NO.: SS 08-02-208								
DETAILED COST:	TYPE IMPROVEMENT - NC 134 Southbound Left Turn Lane							
ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST				
Construction	\$215,000	10	0.149	\$32,041				
Right-of-Way	\$0	0	0.000	\$0				
TOTALS	\$215,000	10	0.149	\$32,041				
ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$400				
ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$0				
TOTAL ANNUAL COST=				\$32,441				
TOTAL COST OF PROJECT=				\$215,000				
COMPREHENSIVE COST REDUCTION:								
ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES								
TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	3.42	0	0.00	1	0.29	1	0.29	\$7,105
AFTER	3.42	0	0.00	0	0.00	0	0.00	\$0
Annual Benefits from Crash Cost Savings								\$7,105
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST					=	(\$25,336)		
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST					=	0.22		
TOTAL COST OF PROJECT		-	\$215,000	COMPREHENSIVE B/C RATIO		-	0.22	

**BENEFIT-COST ANALYSIS WORKSHEET - Target Crashes**

LOCATION: NC 134 at SR 1324		BY: JBS						
COUNTY: Montgomery		DATE: 9/20/2011						
FILE NO.: SS 08-02-208		Target Crashes - SB Rear-End						
DETAILED COST:	TYPE IMPROVEMENT - NC 134 Southbound Left Turn Lane							
ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST				
Construction	\$215,000	10	0.149	\$32,041				
Right-of-Way	\$0	0	0.000	\$0				
TOTALS	\$215,000	10	0.149	\$32,041				
ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$400				
ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$0				
TOTAL ANNUAL COST=				\$32,441				
TOTAL COST OF PROJECT=				\$215,000				
COMPREHENSIVE COST REDUCTION:								
ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES								
TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	3.42	0	0.00	1	0.29	0	0.00	\$5,848
AFTER	3.42	0	0.00	0	0.00	0	0.00	\$0
Annual Benefits from Crash Cost Savings								\$5,848
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST					=	(\$26,593)		
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST					=	0.18		
TOTAL COST OF PROJECT		-	\$215,000	COMPREHENSIVE B/C RATIO		-	0.18	



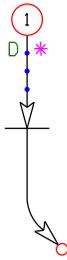
NC 134  
Main Street  
45-mph

ADT (Year)  
5,200 (2006)

ADT (Year)  
830 (2006)

SR 1324  
Glen Road  
45-mph

ADT (Year)  
7,300 (2006)



**LEGEND**

	MOVING VEHICLE		ANGLE		5 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PARKING VEHICLE		SIDESWIPE		30 MPH TO 39		WET
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		ICY OR SNOWY
	HEAD ON		RAN OFF ROAD		50 MPH TO 59		ONLY
	REAR END		HEAVY		60 MPH TO 69		FATALITY
	RAN OFF ROAD		TO AND UP		SPEED UNKNOWN		

SS# 08-02-208  
Order# 41000014145  
Montgomery County  
Town of Troy  
BEFORE Period  
6/1/04 - 10/31/07

SB Rear-End  
Target Crashes

**N.C. DEPARTMENT of TRANSPORTATION**  
**DIVISION of HIGHWAYS**  
**TRANSPORTATION MOBILITY and SAFETY DIVISION**

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**TRAFFIC SAFETY UNIT**

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Date: 9-19-2011 Prepared By: J. Schronce

