

# Spot Safety Project Evaluation

Work Order # 41000014948

Spot Safety Project # 07-04-210

**Spot Safety Project Evaluation of the Construction of Center Islands with Stop Signs at the  
Intersection of SR 1538 (New Sharon Church Rd) and SR 1548 (Schley Rd)  
Orange County**

Documents Prepared By:

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

Principal Investigator



Brad Robinson, PE

12/8/11

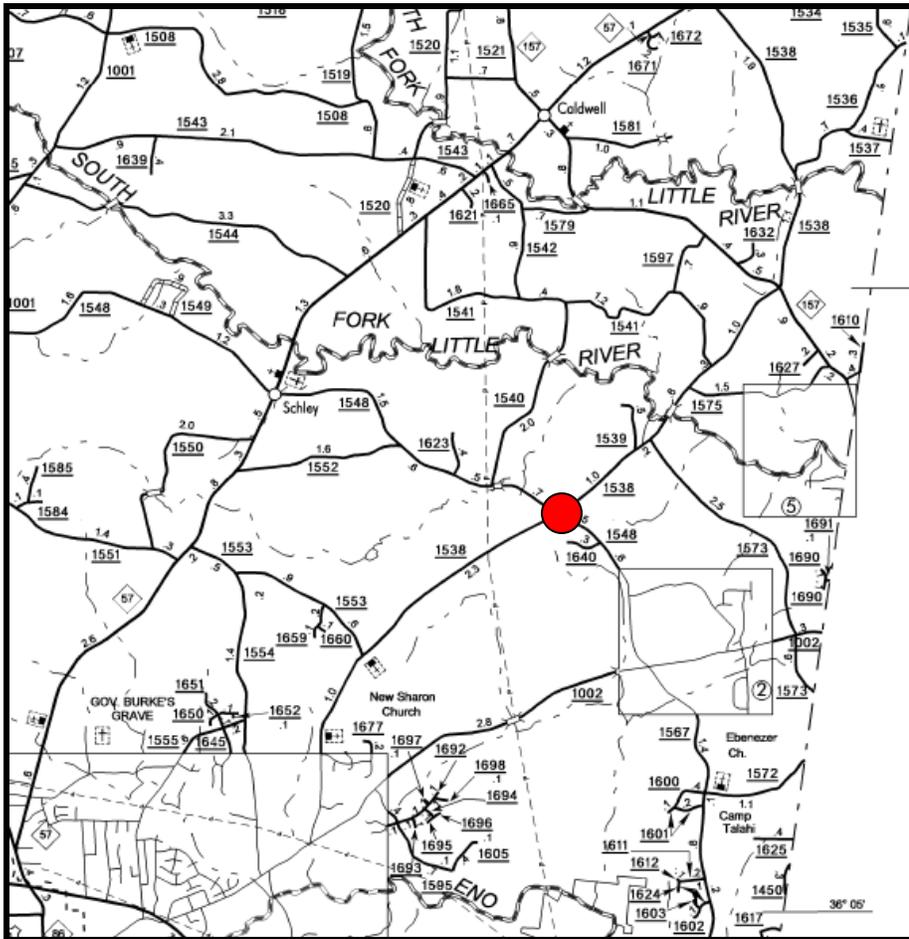
Date

Traffic Safety Project Engineer

# *Spot Safety Project Evaluation Documentation*

## **Subject Location**

Evaluation of Spot Safety Project Number 07-04-210 – The Intersection of SR 1538 (New Sharon Church Rd) and SR 1548 (Schley Rd) in Orange County.



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

The spot safety project improvement countermeasure chosen for the subject location was to install center traffic islands with stop signs on SR 1538 (New Sharon Church Rd).

The subject intersection is a four-leg intersection which is controlled by stop signs on SR 1538. SR 1548 and SR 1538 are both two lane roads with single-lane approaches to the intersection and speed limits of 55 mph.

The initial crash analysis was conducted from November 1, 2000 to November 30, 2003 with a total of five reported crashes, one of which was considered correctable by the chosen countermeasure and resulted in a fatality. The final completion date for the improvements at the subject intersection was on December 15, 2007 with a total cost of \$66,000.00.

### 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 November 1, 2007 to December 31, 2007. The before period consisted of reported crashes from April 1, 2004 through October 31, 2007 (3 years and 7 months) and the after period consisted of reported crashes from January 1, 2008 through July 31, 2011 (3 years and 7 months). The ending date for this analysis was limited by the available crash data at the time the analysis was conducted.

The treatment data consisted of all reported crashes within 150 feet of the subject intersection. The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that crashes resulting from vehicles running the stop signs are the Target Crashes for the applied countermeasure. Vehicles were considered running a stop sign if explicitly stated in the crash report or if the vehicle was traveling more than 20 mph.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	6	0	-100.0
Total Severity Index	3.47	0	-100.0
Target Crashes	3	0	-100.0
Target Crash Severity Index	3.47	0	-100.0
Volume	2,600	2,400	-7.7
<u>Target Crash Severity Summary</u>			
Fatal Crashes	0	0	N/A
Class A Crashes	0	0	N/A
Class B Crashes	0	0	N/A
Class C Crashes	1	0	-100.0
PDO Crashes	2	0	-100.0

The naive before and after analysis at the treatment location resulted in a 100 percent decrease in both Total and Target Crashes and a 8 percent decrease in Average Daily Traffic (ADT). The before period ADT year was 2006 and the after period ADT year was 2009.

### Results and Discussion

There were three target crashes in the before period. Two were angle crashes involving vehicles traveling northeast on SR 1538 running the stop sign. The third was actually a ran-off-road crash

but was considered a target crash for analysis purposes. A vehicle was traveling southwest on SR 1538 when the driver realized the stop condition too late and swerved in the roadway, crossing the intersection and running off the road. There were no reported crashes in the after period.

The calculated benefit to cost ratio for this project is 1.12 considering total crashes. The benefit to cost ratio considering only target crashes is 0.56. 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.

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.

**BENEFIT-COST ANALYSIS WORKSHEET - TOTAL**

LOCATION: SR 1538 at SR 1548		BY: bdr							
COUNTY: Orange		DATE: 12/8/2011							
FILE NO.: SS 07-04-210									
DETAILED COST:	TYPE IMPROVEMENT - center islands w/ stop signs								
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST				
	Construction	\$0	0	0.000	\$0				
		\$66,000	6	0.216	\$14,277				
	Right-of-Way	\$0	0	0.000	\$0				
	TOTALS	\$66,000	6	0.216	\$14,277				
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$0				
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$0				
	TOTAL ANNUAL COST=				\$14,277				
	TOTAL COST OF PROJECT=				\$66,000				
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	3.58	0	0.00	2	0.56	4	1.12	\$15,978	
AFTER	3.58	0	0.00	0	0.00	0	0.00	\$0	
						Annual Benefits from Crash Cost Savings		\$15,978	
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST					=	\$1,701			
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST					=	1.12			
TOTAL COST OF PROJECT		-	\$66,000	COMPREHENSIVE B/C RATIO		-	1.12		

**BENEFIT-COST ANALYSIS WORKSHEET - TARGET**

LOCATION: SR 1538 at SR 1548		BY: bdr							
COUNTY: Orange		DATE: 12/8/2011							
FILE NO.: SS 07-04-210									
DETAILED COST:	TYPE IMPROVEMENT - center islands w/ stop signs								
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST				
	Construction	\$0	0	0.000	\$0				
		\$66,000	6	0.216	\$14,277				
	Right-of-Way	\$0	0	0.000	\$0				
	TOTALS	\$66,000	6	0.216	\$14,277				
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$0				
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$0				
	TOTAL ANNUAL COST=				\$14,277				
	TOTAL COST OF PROJECT=				\$66,000				
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	3.58	0	0.00	1	0.28	2	0.56	\$7,989	
AFTER	3.58	0	0.00	0	0.00	0	0.00	\$0	
						Annual Benefits from Crash Cost Savings		\$7,989	
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST					=	(\$6,288)			
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST					=	0.56			
TOTAL COST OF PROJECT		-	\$66,000	COMPREHENSIVE B/C RATIO		-	0.56		

Treatment Site Photos Taken December 2, 2011



Traveling southwest on SR 1538 (New Sharon Church Rd)



Traveling northeast on SR 1538 (New Sharon Church Rd)



Traveling northwest on SR 1548 (Schley Rd)



Traveling southeast on SR 1548 (Schley Rd)

SS# 07-04-210  
 Order# 41000014948  
 Orange County  
 BEFORE Period  
 4/1/2004-10/31/2007

LEGEND			
	MOVING VEHICLE		ANGLE
	PEDESTRIAN		TURNING
	PARKED VEHICLE		BACKING
	PARKING VEHICLE		SIDESWIPE
	FIXED OBJECT		OUT OF CONTROL
	HEAD ON		INJURY
	REAR END		FATALITY
	RAN OFF ROAD		9 MPH OR LESS
			10 MPH TO 19
			20 MPH TO 29
			30 MPH TO 39
			40 MPH TO 49
			50 MPH TO 59
			60 MPH TO 69
			70 AND UP
			SPEED UNKNOWN
			P PEDESTRIAN
			T TRAIN
			* DRIVER AT FAULT
			D DRY
			W WET
			I ICY OR SNOWY
			O ONLY

SR 1548  
 Schley Rd  
 55 mph

SR 1538  
 New Sharon Church Rd  
 55 mph

Target Crashes

SR 1538  
 New Sharon Church Rd  
 55 mph

SR 1548  
 Schley Rd  
 55 mph

Note: Crash #3 considered a target crash. Driver was traveling west on SR 1538 and did not notice the stop condition until it was too late and instead swerved off the road.

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

TRAFFIC SAFETY UNIT

Date: September 2011

Prepared By: BDR

SS# 07-04-210  
 Order# 41000014948  
 Orange County  
 AFTER Period  
 1/1/2008-7/31/2011

LEGEND			
	MOVING VEHICLE		ANGLE
	PEDESTRIAN		TURNING
	PARKED VEHICLE		BACKING
	PARKING VEHICLE		SIDESWIPE
	FIXED OBJECT		OUT OF CONTROL
	HEAD ON		INJURY
	REAR END		FATALITY
	RAN OFF ROAD		9 MPH OR LESS
			10 MPH TO 19
			20 MPH TO 29
			30 MPH TO 39
			40 MPH TO 49
			50 MPH TO 59
			60 MPH TO 69
			70 AND UP
			SPEED UNKNOWN
			P PEDESTRIAN
			T TRAIN
			* DRIVER AT FAULT
			D DRY
			W WET
			I ICY OR SNOWY
			O OILY

**SR 1548  
 Schley Rd  
 55 mph**

**SR 1538  
 New Sharon Church Rd  
 55 mph**

Target Crashes

**NO REPORTED CRASHES**

**SR 1538  
 New Sharon Church Rd  
 55 mph**

**SR 1548  
 Schley Rd  
 55 mph**



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**TRAFFIC SAFETY UNIT**

Date: September 2011

Prepared By: BDR