

# Spot Safety Project Evaluation

Order # 41000010093

Spot Safety Project # 07-02-225

## Spot Safety Project Evaluation of Center Traffic Islands with Stop Signs Installation At the Intersection of SR 1002 (Scalesville Road) and SR 2305 (Witty Road) In Scalesville, Guilford County

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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Chad J. Neilson

12-6-2010

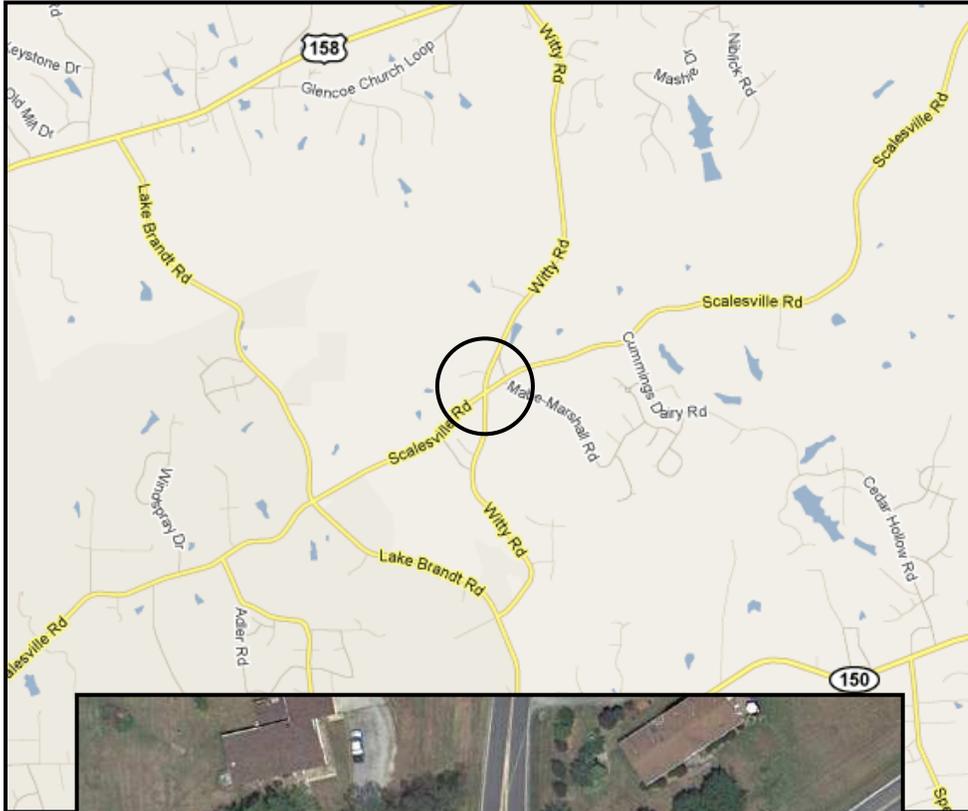
Date

Traffic Safety Project Engineer

# *Spot Safety Project Evaluation Documentation*

## **Subject Location**

Evaluation of Spot Safety Project Number 07-02-225 located at the intersection of SR 1002 (Scalesville Road) and SR 2305 (Witty Road) in Scalesville, Guilford County.



## Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of center traffic islands with stop signs on SR 2305 (Witty Road). SR 1002 (Scalesville Road) is a two-lane facility at the subject intersection with speed limit of 55 mph for both approaches. SR 2305 (Witty Road) is a two-lane facility with a speed limit of 55 mph for both approaches. The subject location is a stop sign controlled four-leg intersection with the SR 2305 (Witty Road) approaches encounter the stop sign condition.

The original statement of problem was vehicles were running the existing stop signs on SR 2305 (Witty Road).

The initial crash analysis was completed from February 1, 1999 to January 1, 2002 with four (4) reported crashes, of which two (2) were deemed correctable. The final completion date for the improvement at the subject intersection was on October 30, 2006 with a total cost of \$50,000.00.

### 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 were the months of September 2006 through November 2006. The before period consisted of reported crashes from October 1, 2002 through August 31, 2006 (3 years and 11 months); and the after period consisted of reported crashes from December 1, 2006 through October 31, 2010 (3 years and 11 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 Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

<b><u>Treatment Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	11	4	- 63.64 %
Total Crash Severity Index	2.35	6.55	178.72 %
Target Crashes	10	3	- 70.00 %
Target Crash Severity Index	2.48	5.93	139.11 %
Volume (2005, 2009)	4,300	4,400	2.33 %

<u>Injury Crash Summary</u>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	1	2	100.00 %
Class C Injury Crashes	1	1	0.00 %
Total Injury Crashes	2	3	50.00%

The naive before and after analysis at the treatment location resulted in a sixty-three (63) percent decrease in Total Crashes, seventy (70) percent decrease of Target Crashes, and a one-hundred and seventy-eight (178) percent increase in the Total Severity Index. The before period ADT year was 2005 and the after period ADT year was 2009.

### **Results and Discussion**

Referencing the *Collision Diagrams*, the before period presented ten (10) target crashes. There was a northbound angle crash pattern at the intersection that accounted for seven (7) target crashes and the southbound angle crash pattern consisted of three (3) target crashes. After the center traffic island with stop signs installation, there were three (3) target crashes. The northbound angle crash pattern decreased in the after period to two (2) crashes. The southbound angle crash pattern accounted for one (1) crash in the after period.

The calculated benefit to cost ratio for this project is **0.72 considering total crashes**. The benefit to cost ratio **considering only target crashes is 1.51**. 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.

Photos were provided for this location by Google Street View for all four approaches of this 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



Looking North on SR 2305 (Witty Road)



Looking West on SR 1002 (Scalesville Road)



Looking South on SR 2305 (Witty Road)



Looking East on SR 1002 (Scalesville Road)

**BENEFIT-COST ANALYSIS WORKSHEET - TOTAL**

LOCATION: SR 1002 (Scalesville Road) at SR 2305 (Witty Road)		BY: C Neilson						
COUNTY: Guilford		DATE: 12/2/2010						
FILE NO.: SS 07-02-225								
DETAILED COST:	TYPE IMPROVEMENT - Traffic Island with Stop Signs							
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$50,000	20	0.102	\$5,093			
	Right-of-Way	\$0	0	0.000	\$0			
	TOTALS	\$50,000	20	0.102	\$5,093			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$0			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$0			
	TOTAL ANNUAL COST=				\$5,093			
	TOTAL COST OF PROJECT=				\$50,000			
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	3.92	0	0.00	2	0.51	9	2.30	\$20,077
AFTER	3.92	0	0.00	3	0.77	1	0.26	\$16,403
						Annual Benefits from Crash Cost Savings		\$3,673
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST					=	(\$1,419)		
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST					=	0.72		
TOTAL COST OF PROJECT		-	\$50,000	COMPREHENSIVE B/C RATIO		-	0.72	

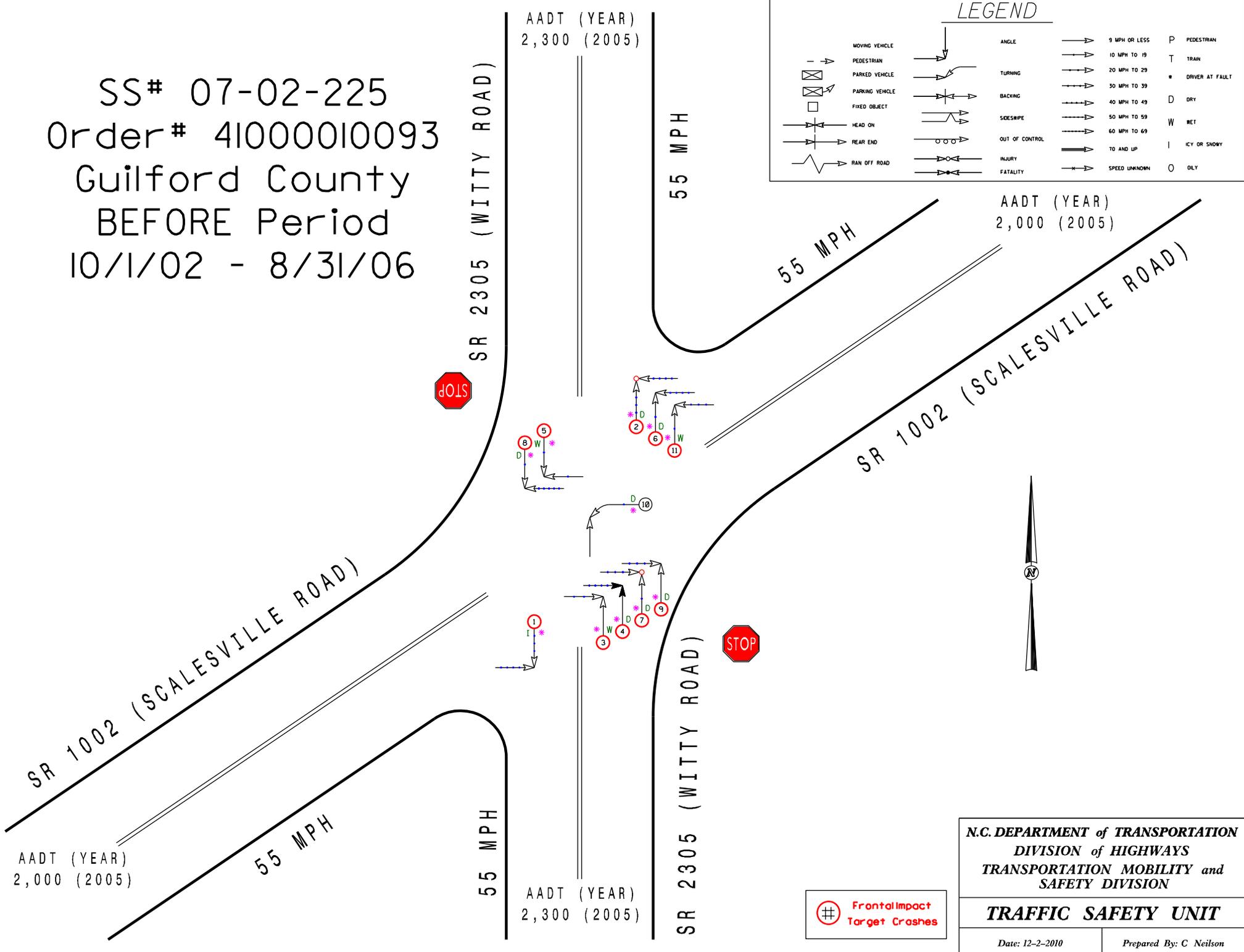
**BENEFIT-COST ANALYSIS WORKSHEET - TARGET**

LOCATION: SR 1002 (Scalesville Road) at SR 2305 (Witty Road)		BY: C Neilson						
COUNTY: Guilford		DATE: 12/2/2010						
FILE NO.: SS 07-02-225								
DETAILED COST:	TYPE IMPROVEMENT - Traffic Island with Stop Signs							
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$50,000	20	0.102	\$5,093			
	Right-of-Way	\$0	0	0.000	\$0			
	TOTALS	\$50,000	20	0.102	\$5,093			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$0			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$0			
	TOTAL ANNUAL COST=				\$5,093			
	TOTAL COST OF PROJECT=				\$50,000			
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	3.92	0	0.00	2	0.51	8	2.04	\$18,990
AFTER	3.92	0	0.00	2	0.51	1	0.26	\$11,301
						Annual Benefits from Crash Cost Savings		\$7,679
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST					=	\$2,586		
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST					=	1.51		
TOTAL COST OF PROJECT		-	\$50,000	COMPREHENSIVE B/C RATIO		-	1.51	

SS# 07-02-225  
 Order# 41000010093  
 Guilford County  
 BEFORE Period  
 10/1/02 - 8/31/06

**LEGEND**

	MOVING VEHICLE		ANGLE		9 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		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		TO AND UP		50 MPH TO 59		ICY OR SNOW
	REAR END		INJURY		60 MPH TO 69		FATALITY
	RAN OFF ROAD		SPEED UNKNOWN		SPEED UNKNOWN		ONLY



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

**TRAFFIC SAFETY UNIT**

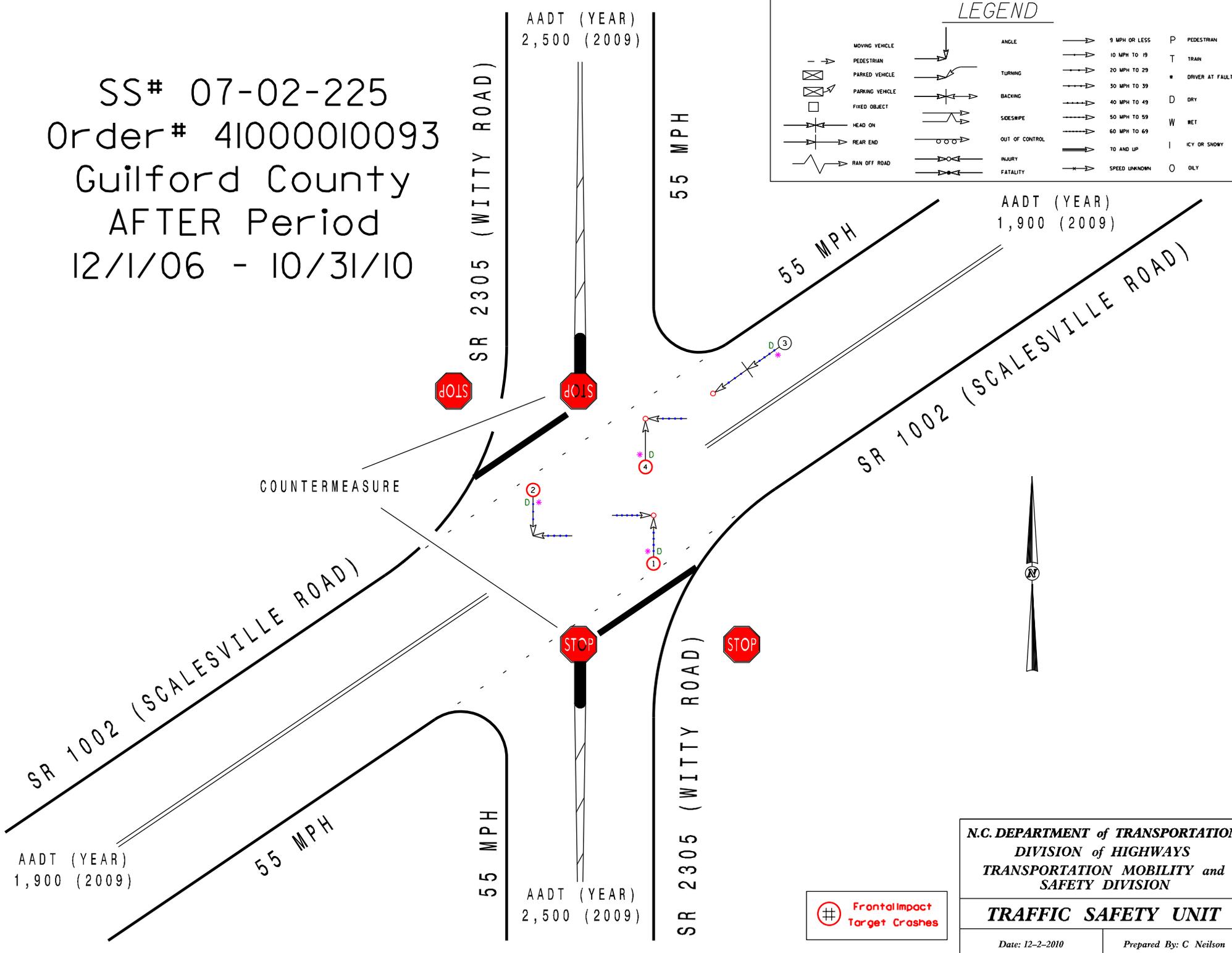
Date: 12-2-2010      Prepared By: C Neilson

Frontal Impact Target Crashes

SS# 07-02-225  
 Order# 41000010093  
 Guilford County  
 AFTER Period  
 12/1/06 - 10/31/10

**LEGEND**

	MOVING VEHICLE		ANGLE		9 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		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		TO AND LIP		50 MPH TO 59		ICY OR SNOW
	REAR END		INJURY		60 MPH TO 69		ONLY
	RAN OFF ROAD		FATALITY		SPEED UNKNOWN		



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Date: 12-2-2010      Prepared By: C Neilson

Frontal Impact Target Crashes