

# Spot Safety Project Evaluation

Order # 41000010406

Spot Safety Project # 04-04-213

**Spot Safety Project Evaluation of the Installation of the Box-span Flasher  
At the Intersection of NC 58 and SR 1145 (Old Spring Hope Road)  
West of Rocky Mount, In Nash 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

12-30-2010

Date

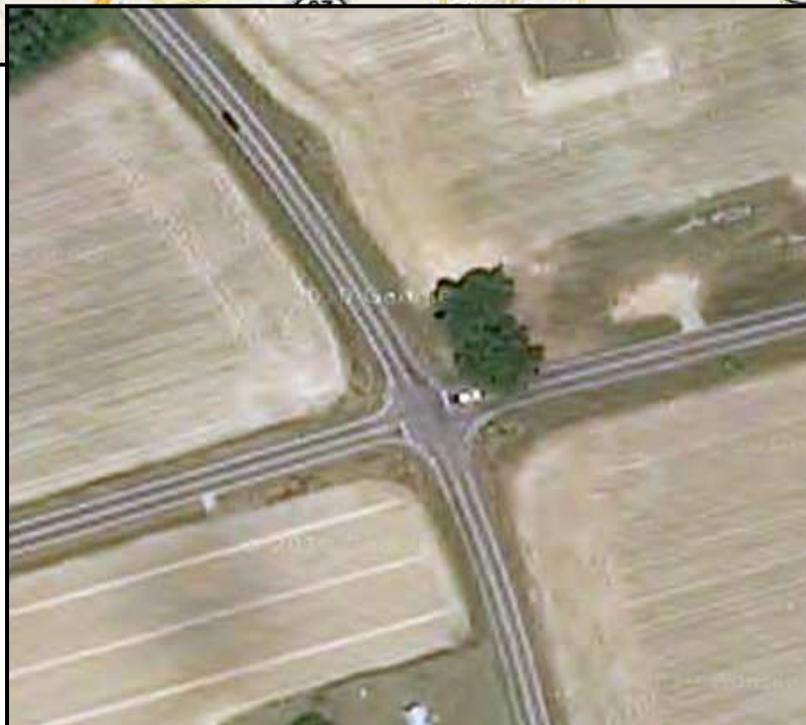
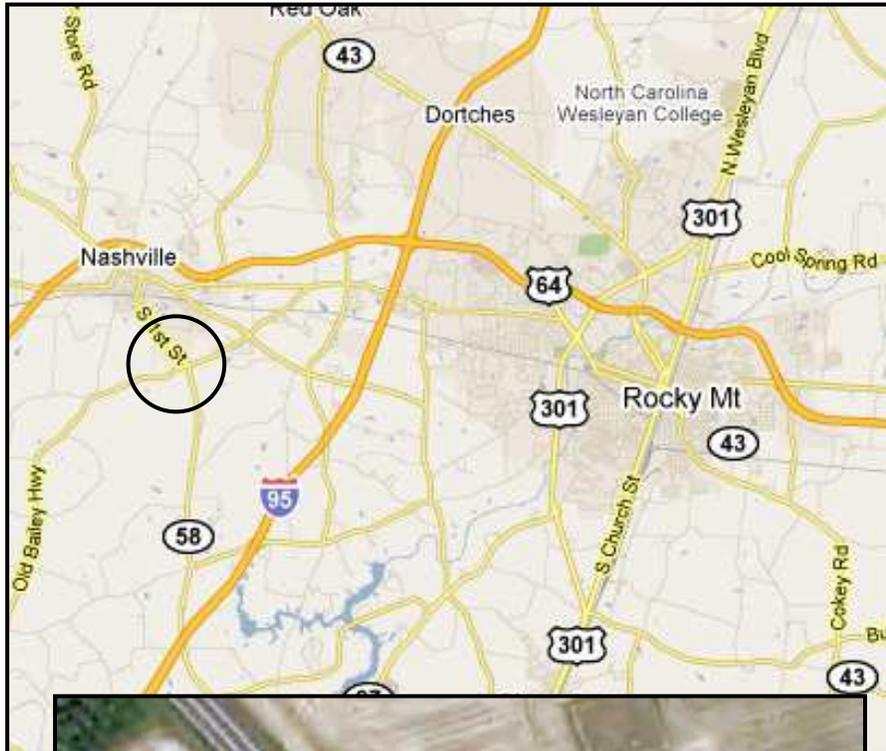
Traffic Safety Project Engineer

# *Spot Safety Project Evaluation Documentation*

## **Subject Location**

Evaluation of Spot Safety Project Number 04-04-213 located at the intersection of NC 58 and SR 1145 (Old Spring Hope Road) west of Rocky Mount, Nash County.

The signal ID for the flasher signal is 04-1065.



## 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 box-span flasher. NC 58 is a two-lane facility at the subject intersection with speed limit of 55 mph for northbound approach and 45 mph for the southbound approach. SR 1145 (Old Spring Hope 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 1145 (Old Spring Hope Road) approaches encountering the stop sign condition.

The original statement of problem was not all motorists are stopping at the stop signs along SR 1145 (Old Spring Hope Road).

The initial crash analysis was completed from September 1, 2000 to August 31, 2003 with nine (9) reported crashes, of which two (2) were deemed correctable. The final completion date for the improvement at the subject intersection was on February 2, 2006 with a total cost of \$11,600.00.

## 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 January 2006 through March 2006. The before period consisted of reported crashes from May 1, 2001 through December 31, 2005 (4 years and 8 months); and the after period consisted of reported crashes from April 1, 2006 through November 30, 2010 (4 years and 8 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	16	18	12.50 %
Total Crash Severity Index	5.16	6.34	22.87 %
Target Crashes	11	12	9.09 %
Target Crash Severity Index	6.38	5.93	- 7.05 %
Volume (2004, 2008)	6,100	7,400	21.31 %

<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	4	5	25.00 %
Class C Injury Crashes	5	8	60.00 %
Total Injury Crashes	9	13	44.44 %

The naive before and after analysis at the treatment location resulted in a twelve (12) percent increase in Total Crashes, nine (9) percent increase of Target Crashes, and a twenty-two (22) percent increase in the Total Severity Index. The before period ADT year was 2004 and the after period ADT year was 2008.

### **Results and Discussion**

Referencing the *Collision Diagrams*, the before period presented eleven (11) target crashes. There was a westbound crash pattern where the westbound vehicle failed to yield to traffic along NC 58 that accounted for eight (8) target crashes. There was an eastbound crash pattern where the eastbound vehicle failed to yield to traffic along NC 58 that accounted for three (3) target crashes. After the installation of the box-span flasher, there were twelve (12) target crashes. The westbound crash pattern accounted for eight (8) target crashes. The eastbound crash pattern accounted for three (3) target crashes in the after period.

The calculated benefit to cost ratio for this project is **(-6.25) considering total crashes**. The benefit to cost ratio **considering only target crashes is (-0.38)**. 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 NC 58



Looking West on SR 1145 (Old Spring Hope Rd)



Looking South on NC 58



Looking East on SR 1145 (Old Spring Hope Rd)

**BENEFIT-COST ANALYSIS WORKSHEET - TOTAL**

LOCATION: NC 58 at SR 1145 (Old Spring Hope Road)		BY: C Neilson						
COUNTY: Nash		DATE: 12/29/2010						
FILE NO.: SS 04-04-213								
DETAILED COST:	TYPE IMPROVEMENT - <b>Flasher Installation</b>							
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$11,100	10	0.149	\$1,654			
		\$0	0	0.000	\$0			
	Right-of-Way	\$500	50	0.082	\$41			
	TOTALS	\$11,600	10	0.146	\$1,695			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$400			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$350			
	TOTAL ANNUAL COST=				\$2,445			
	TOTAL COST OF PROJECT=				\$11,600			
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	4.67	0	0.00	9	1.93	7	1.50	\$44,989
AFTER	4.67	0	0.00	13	2.78	5	1.07	\$60,278
								Annual Benefits from Crash Cost Savings (\$15,289)
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST					=	(\$17,734)		
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST					=	-6.25		
TOTAL COST OF PROJECT		-	\$11,600	COMPREHENSIVE B/C RATIO		-	-6.25	

**BENEFIT-COST ANALYSIS WORKSHEET - TARGET**

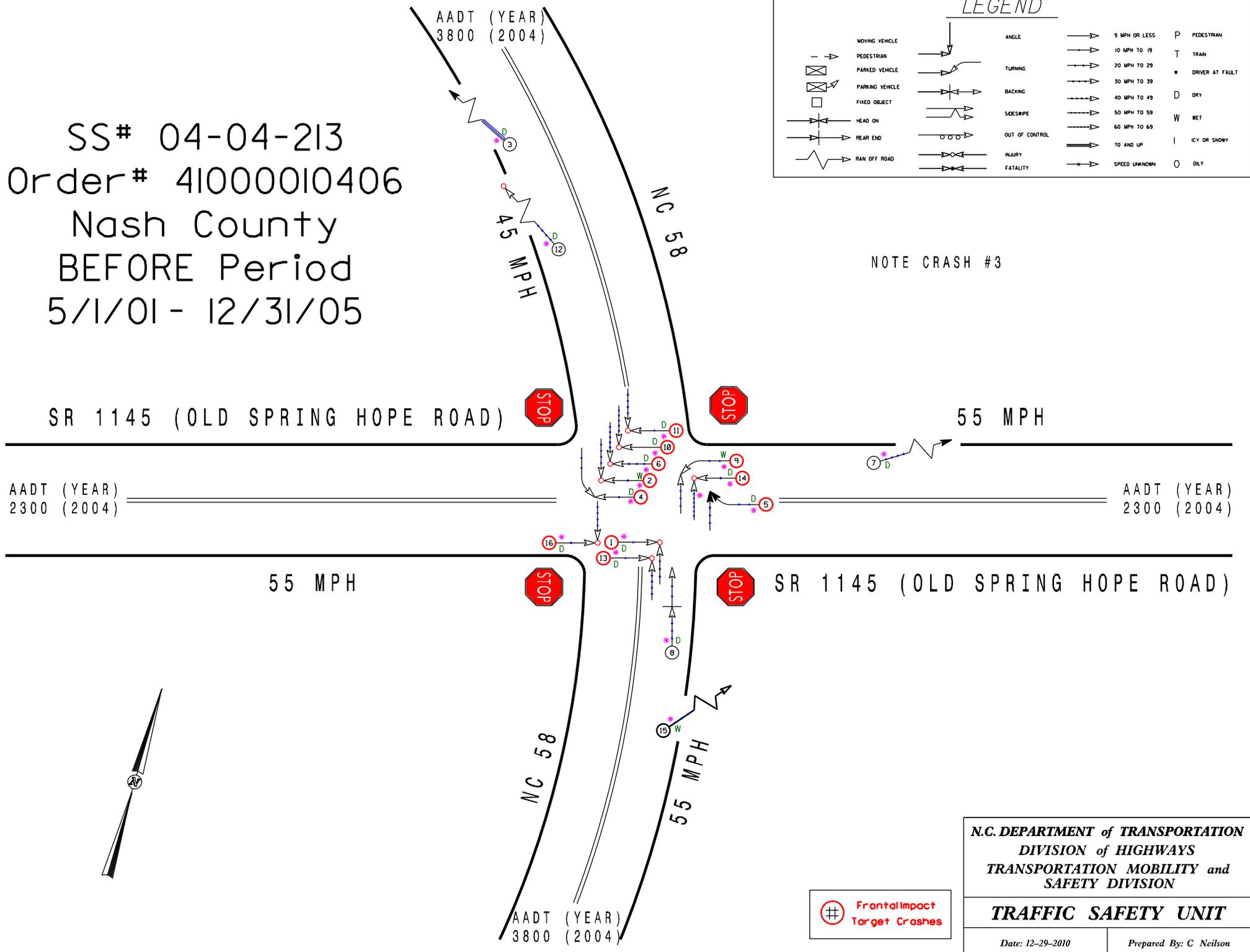
LOCATION: NC 58 at SR 1145 (Old Spring Hope Road)		BY: C Neilson						
COUNTY: Nash		DATE: 12/29/2010						
FILE NO.: SS 04-04-213								
DETAILED COST:	TYPE IMPROVEMENT - <b>Flasher Installation</b>							
	ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST			
	Construction	\$11,100	10	0.149	\$1,654			
		\$0	0	0.000	\$0			
	Right-of-Way	\$500	50	0.082	\$41			
	TOTALS	\$11,600	10	0.146	\$1,695			
	ESTIMATED INCREASE IN ANNUAL MAINT. COST =				\$400			
	ESTIMATED INCREASE IN ANNUAL UTILITY COST =				\$350			
	TOTAL ANNUAL COST=				\$2,445			
	TOTAL COST OF PROJECT=				\$11,600			
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	4.67	0	0.00	8	1.71	3	0.64	\$37,024
AFTER	4.67	0	0.00	8	1.71	4	0.86	\$37,944
								Annual Benefits from Crash Cost Savings (\$921)
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST					=	(\$3,366)		
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST					=	-0.38		
TOTAL COST OF PROJECT		-	\$11,600	COMPREHENSIVE B/C RATIO		-	-0.38	

SS# 04-04-213  
 Order# 41000010406  
 Nash County  
 BEFORE Period  
 5/1/01 - 12/31/05

**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		D DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		W WET
	HEAD ON		INJURY		50 MPH TO 59		I ICY OR SNOWY
	REAR END		FATALITY		60 MPH TO 69		O ONLY
	RAN OFF ROAD				TO AND LIP		

NOTE CRASH #3



Frontal Impact  
Target Crashes

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

**TRAFFIC SAFETY UNIT**

Date: 12-29-2010

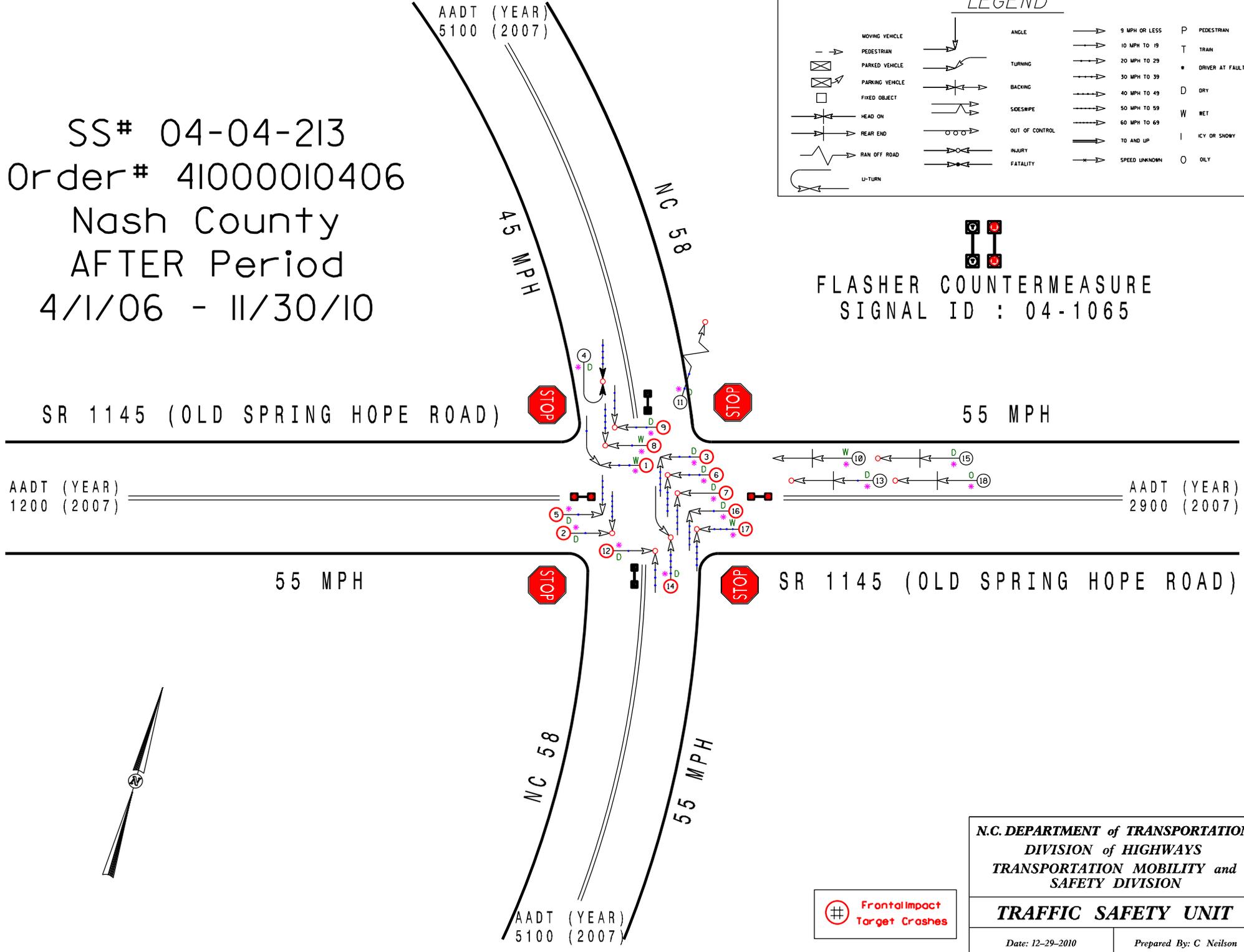
Prepared By: C Neilson

SS# 04-04-213  
 Order# 41000010406  
 Nash County  
 AFTER Period  
 4/1/06 - 11/30/10

**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 SNOWY
	REAR END		INJURY		60 MPH TO 69		FATALITY
	RAN OFF ROAD		SPEED UNKNOWN		9 MPH OR LESS		ONLY
	U-TURN						

FLASHER COUNTERMEASURE  
 SIGNAL ID : 04-1065



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

**TRAFFIC SAFETY UNIT**

Date: 12-29-2010      Prepared By: C Neilson

Frontal Impact  
Target Crashes