

Spot Safety Project Evaluation

Project Log # 200812256

Spot Safety Project # 07-02-220

Spot Safety Project Evaluation of the Traffic Signal Installation At the Intersection of SR 2565 (Hicone Rd) and SR 2832 (Rankin Mill Rd) 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



Jason B. Schronce

2-17-2009

Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 07-02-220 located at the Intersection of SR 2565 (Hicone Rd) and SR 2832 (Rankin Mill Rd) in 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 an actuated traffic signal (Sig ID 07-2043). The subject intersection is a T-type with a church driveway making up the fourth leg to the north. In the before period, SR 2565 (Hicone Rd) had one lane approaches and a left turn lane traveling westbound. After the signal installation, an eastbound left turn lane for the church driveway was striped on existing pavement. SR 2832 (Rankin Mill Rd) has a two lane approach consisting of a left turn and a thru-right lane. All roadway approaches to the subject intersection are posted at 45 mph.

The original statement of problem was that traffic volumes have increased to where motorists can no longer maneuver the intersection safely. The desired outcome of the countermeasure was to alleviate congestion and delay issues. The intersection met signal warrants 1B, 2, and 3B.

The initial crash analysis was completed from October 1, 1998 to September 30, 2001 with seven (7) reported crashes, four (4) of which were deemed correctable. The final completion date for the improvement at the subject intersection was on December 30, 2003 with a total cost of \$60,000.00.

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 October 1, 2003 to December 31, 2003. The before period consisted of reported crashes from December 1, 1998 through September 30, 2003 (4 years and 10 months); and the after period consisted of reported crashes from January 1, 2004 through October 31, 2008 (4 years and 10 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.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	9	9	0.0 %
Total Severity Index	11.89	4.29	- 63.9 %
Target Crashes	6	6	0.0 %
Target Crash Severity Index	16.10	5.93	- 63.2 %
Volume	11,700	12,100	3.4 %
<u>Injury Crash Summary</u>			
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	1	0	- 100.0 %
Class B injury Crashes	1	1	0.0 %
Class C Injury Crashes	2	3	50.0 %
Total Injury Crashes	4	4	0.0 %

The naive before and after analysis at the treatment location resulted in no change in Total Crashes or Target Crashes but a 64 percent decrease in the Total Severity Index. The before period ADT year was 2001 and the after period ADT year was 2006.

Results and Discussion

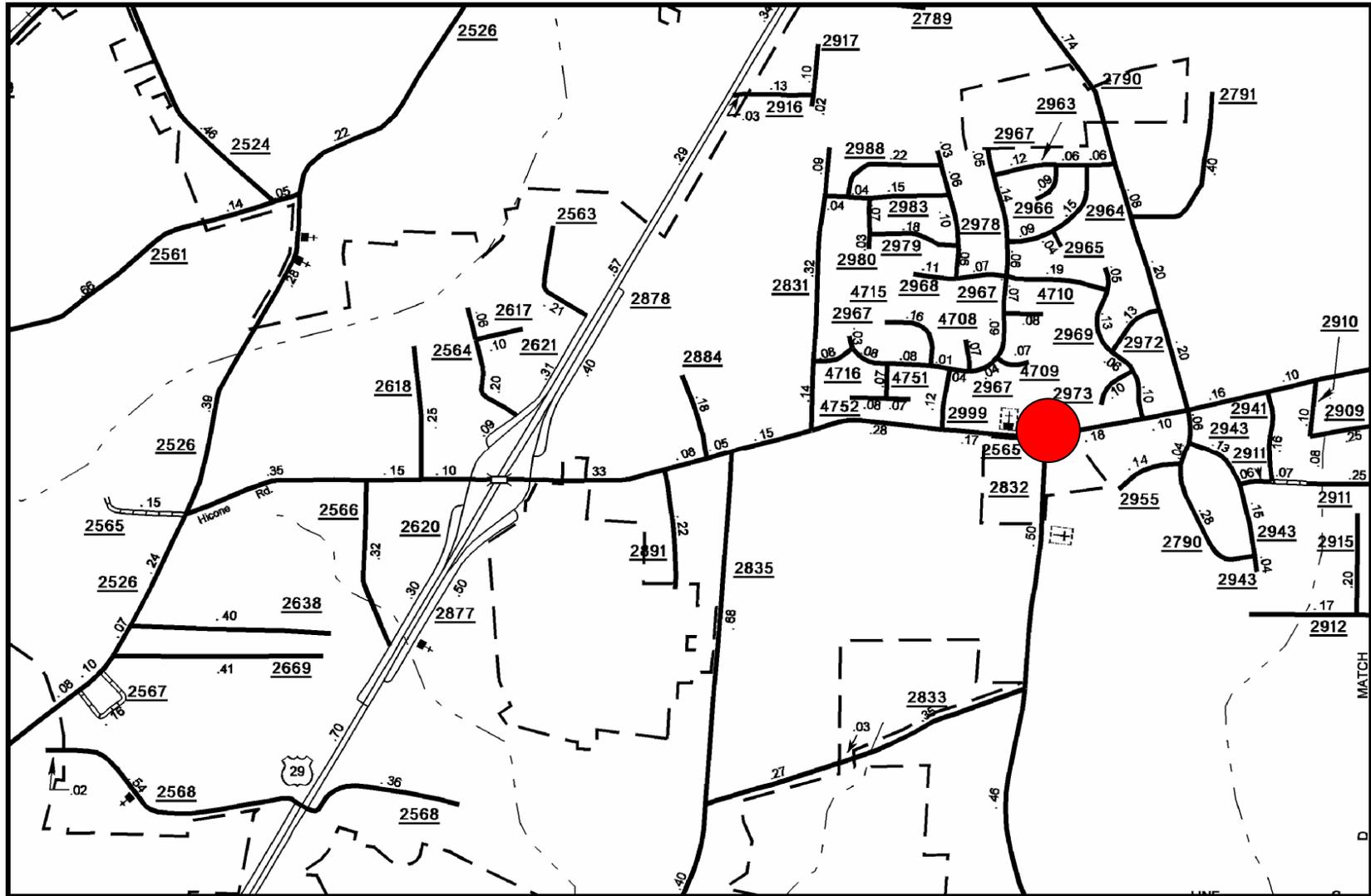
The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in no change of either Total Crashes or Target Crashes. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have remained consistent at the treatment location from the before to the after period with a positive benefit seen in the Crash Severity Index.

Referencing the *Collision Diagrams*, the frontal impact crashes at the intersection in the before period were split between 2 angles, 2 left turns, and 2 right turns. After the signal installation, target crashes consisted of 4 red light runs (1 – angle, 3 – left turn) and 2 left turn same roadway on Hicone Rd from the permissive green signal. Crash occurrence at this intersection does not indicate a significant reoccurring pattern.

The calculated benefit to cost ratio for this project is **8.29 considering total crashes**. The benefit to cost ratio **considering only target crashes is 8.04**. 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 for all 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.

Location Map
Guilford County
Evaluation of Spot Safety Project # 07-02-220



Treatment Location: SR 2565 (Hicone Road) at SR 2832 (Rankin Mill Road)

**SS# 07-02-220 Aerial Map
Guilford County**



TREATMENT SITE PHOTOS TAKEN 1-26-2009



Traveling North on SR 2832 (Rankin Mill Rd)



Traveling North on SR 2832 (Rankin Mill Rd)



Traveling East on SR 2565 (Hicone Road)



Traveling East on SR 2565 (Hicone Road)



Traveling West on SR 2565 (Hicone Road)



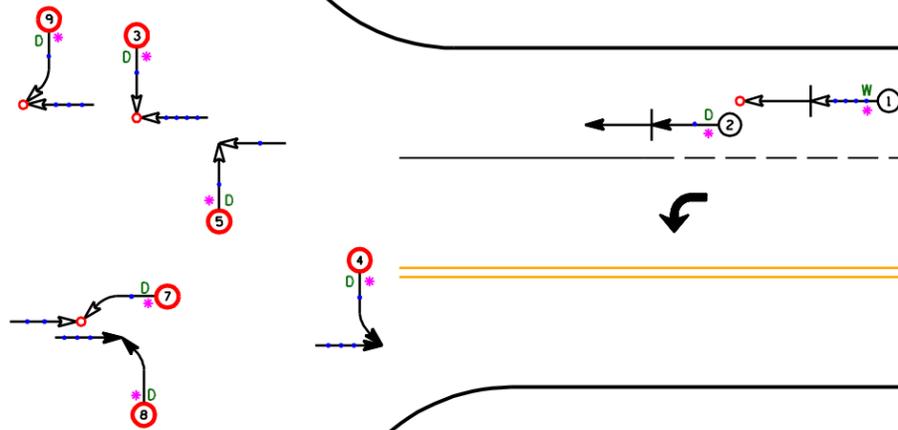
Traveling West on SR 2565 (Hicone Road)



Traveling South from Church PVA



Church Driveway



SR 2565
Hicone Rd
45 MPH

SR 2832
Rankin Mill Rd
45 MPH



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		INJURY		50 MPH TO 59		ICY OR SNOWY
	REAR END		FATALITY		60 MPH TO 69		OILY
	RAN OFF ROAD		70 AND UP		SPEED UNKNOWN		

SS# 07-02-220
 Guilford County
 City of Greensboro
 BEFORE Period
 12/1/98 - 9/30/03

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 7	AREA:
	STUDY PERIOD: 12/1/1998 - 9/30/2003	
	DISTANCE: Y-LINE = 150FT	
	ANALYSIS PREPARED BY: JBS	
	ANALYSIS CHECKED BY: N/A	
	DIAGRAM PREPARED BY: JBS	
	DIAGRAM REVIEWED BY: ST	
SCALE: NOT TO SCALE		
DATE: 1-14-2009		
LOG NUMBER: SS* 07-02-220 BEFORE		

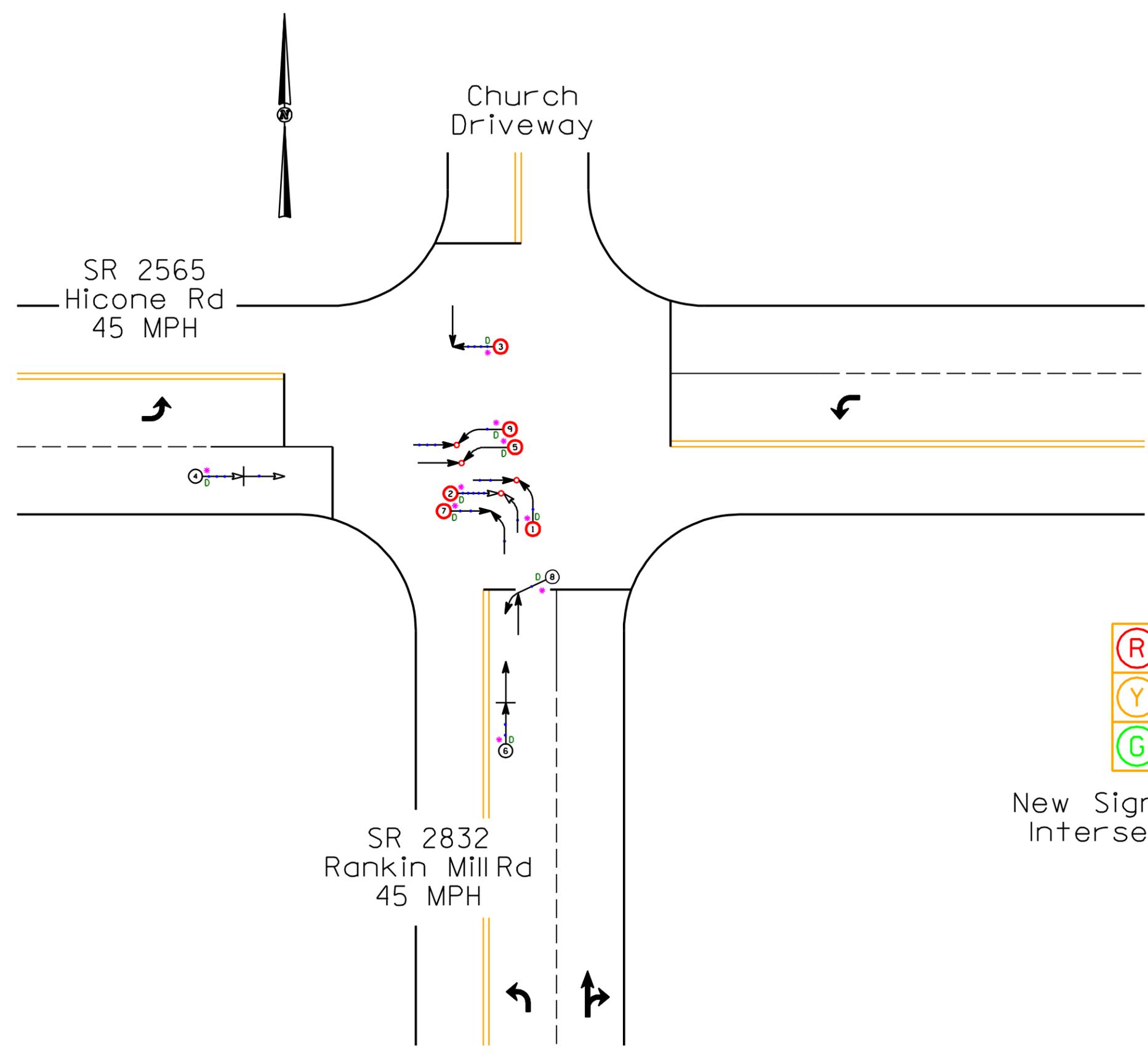
Target Crashes

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

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		INJURY		50 MPH TO 59		ICY OR SNOWY
	REAR END		FATALITY		60 MPH TO 69		OILY
	RAN OFF ROAD		SPEED UNKNOWN		70 AND UP		

SS# 07-02-220
 Guilford County
 City of Greensboro
 AFTER Period
 1/1/04 - 10/31/08



New Signalized Intersection

Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 7	AREA: 1
	STUDY PERIOD: 1/1/2004 - 10/31/2008	
	DISTANCE: Y-LINE : 150FT	
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: N/A		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 1-14-2009		
LOG NUMBER: SS* 07-02-220 AFTER		

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