

Project Evaluation

Project Log # 200512004

**Project Evaluation of the Four-Way Stop Sign and Overhead Flasher Installation
At the Intersection of SR 1001 - Shannon Road and SR 1505 - Old Lowery Road
Robeson County**

Documents Prepared By:

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Traffic Safety Systems Management Section
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Principal Investigator

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03/01/2006
Date

Traffic Safety Project Engineer

Project Evaluation Documentation

Subject Location

The Intersection of SR 1001 - Shannon Road and SR 1505 - Old Lowery Road in Robeson County

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis and an Odds Ratio comparison analysis has been completed to measure the effectiveness of the improvement. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information

The project improvement countermeasure chosen for the subject location was the installation of a 4-way stop and an overhead flashing traffic signal. The 4-way stop was installed and operational on March 26, 2002. All improvements, including the overhead flashing traffic signal and "Stop Ahead" pavement markings, were completed by September 3, 2002. Prior to the project improvement, the location was controlled by stop signs located on SR 1505 - Old Lowery Road. Both SR 1001 - Shannon Road and SR 1505 - Old Lowery Road are two-lane facilities at the treatment intersection with a speed limit of 55 mph.

Comparison Analysis

After reviewing all of the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from February 1, 2002 through October 31, 2002. The before period consisted of reported crashes from February 1, 1999 through January 31, 2002 (3 Years) and the after period consisted of reported crashes from November 1, 2002 through October 31, 2005 (3 Years). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The analysis also consisted of two different sets of data, the treatment and the comparison data. The treatment data consisted of all crashes within 150 feet of the subject intersection. The comparison data consisted of all crashes within 150 feet of the intersections of:

SR 1001-Shannon Road at SR 1318-McQueen Road,
SR 1505-Old Lowery Road at SR 1777-SR 1778-Pearsall Road-Dixie Road, and
SR 1505-Old Lowery Road at SR 1774-Mt. Tabor Road.

Please see attached *Location Map* for further detail.

The following data table depicts the Naive Before and After Analysis for the treatment and comparison intersections. 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.

Treatment Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	26	2	- 92.3
Total Severity Index	9.04	4.70	- 48.0
Frontal Impact Crashes	23	2	- 91.3
Frontal Severity Index	9.44	4.70	- 50.2
Volume	3700	3700	0.0

Comparison Information

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	22	32	45.5
Total Severity Index	9.83	6.84	- 30.4
Frontal Impact Crashes	16	26	62.5
Frontal Severity Index	11.29	7.90	- 30.0
Volume	3500	3500	0.0

Odds Ratio: Treatment versus Comparison

	Before	After	Percent Reduction (-)/ Percent Increase (+)
Treatment Total Crashes	26	2	---
Comparison Total Crashes	22	32	- 94.7 %
	Before	After	Percent Reduction (-)/ Percent Increase (+)
Treatment Frontal Impact Crashes	23	2	---
Comparison Frontal Impact Crashes	16	26	- 94.7 %

The naive before and after analysis at the treatment location resulted in a 92.3 percent decrease in Total Crashes and a 48.0 percent decrease in the Total Severity Index. The comparison locations experienced a 45.5 percent increase in Total Crashes and a 30.4 percent decrease in the Total Severity Index. The before period ADT year was 2000 and the after period ADT year was 2004.

The Odds Ratio is used as another means of calculating the treatment effect. The number of crashes in the before and after period from the comparison locations are used to calculate the percent reduction in crashes for the Treatment Intersection. As shown in the previous table, using the Odds Ratio calculation, there is a 94.7 percent decrease in Total Treatment Intersection crashes and a 94.7 percent decrease in Frontal Impact Treatment Intersection crashes.

The following Table depicts additional Naive Before and After Analysis for the treatment information. The data consists of an injury summary and a roadway condition summary for the treatment intersection. As shown below, the number of Total Injury Crashes decreased by 94.7 percent from the before to the after period.

<u>Total Crash Information</u>	Before	After	Percent Reduction (-)/ Percent Increase (+)
Fatal Injury Crashes	0	0	N/A
Non-Fatal Injury Crashes	19	1	-94.7%
Total Injury Crashes	19	1	-94.7%
Night Crashes	4	0	-100.0%
Wet Crashes	3	1	-66.7%

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 92.3 percent decrease in Total Crashes and a 91.3 percent decrease in Frontal Impact Crashes. Using the Odds Ratio to calculate the treatment effect resulted in a 94.7 percent decrease in Total Crashes and a 94.7 percent decrease in Frontal Impact Crashes at the Treatment Intersection. The summary results above demonstrate that the treatment location appears to have had a substantial decrease in the number of crashes from the before to the after period when using both analysis methods.

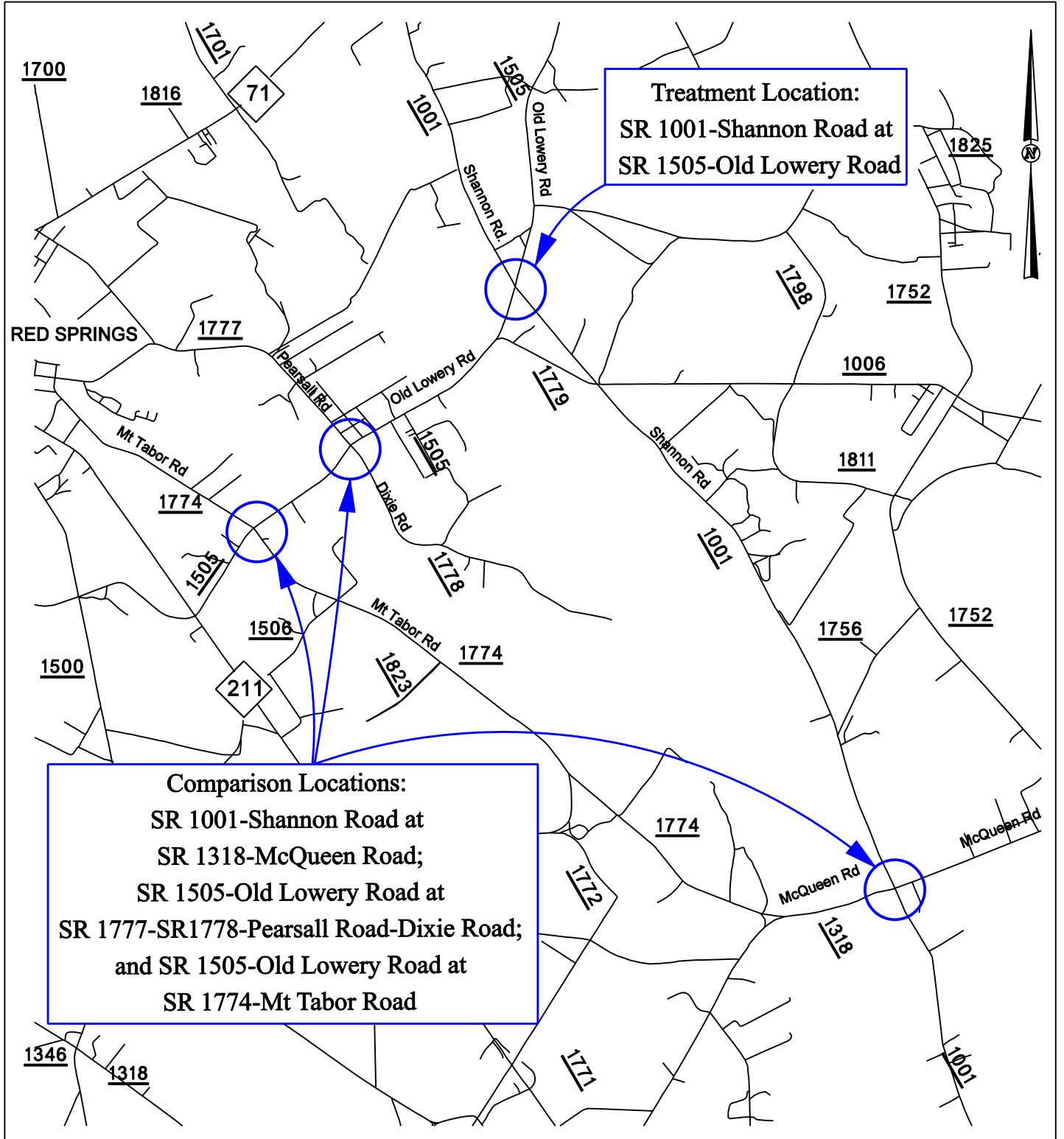
The treatment location also experienced a considerable decrease in crash severity. The Severity Index for Total Crashes and Frontal Impact Crashes at the treatment intersection decreased by 48.0 percent and 50.2 percent, respectively. In the before period, there was one Class A injury crash, two Class B injury crashes, sixteen class C injury crashes, and seven PDO crashes. Analysis of the crash data in the after period reveals that both crashes at the treatment intersection were caused by the vehicles at fault running through the stop signs at the intersection, resulting in one class C injury crash and one PDO crash. Total Injury Crashes decreased by 94.7 percent from the before to the after period.

As the Safety Evaluation Group completes additional reviews for this type of countermeasure, we will be able to provide more objective and definite information regarding actual crash reduction factors.

Location Map

4 Way Stop Treatment

Robeson County



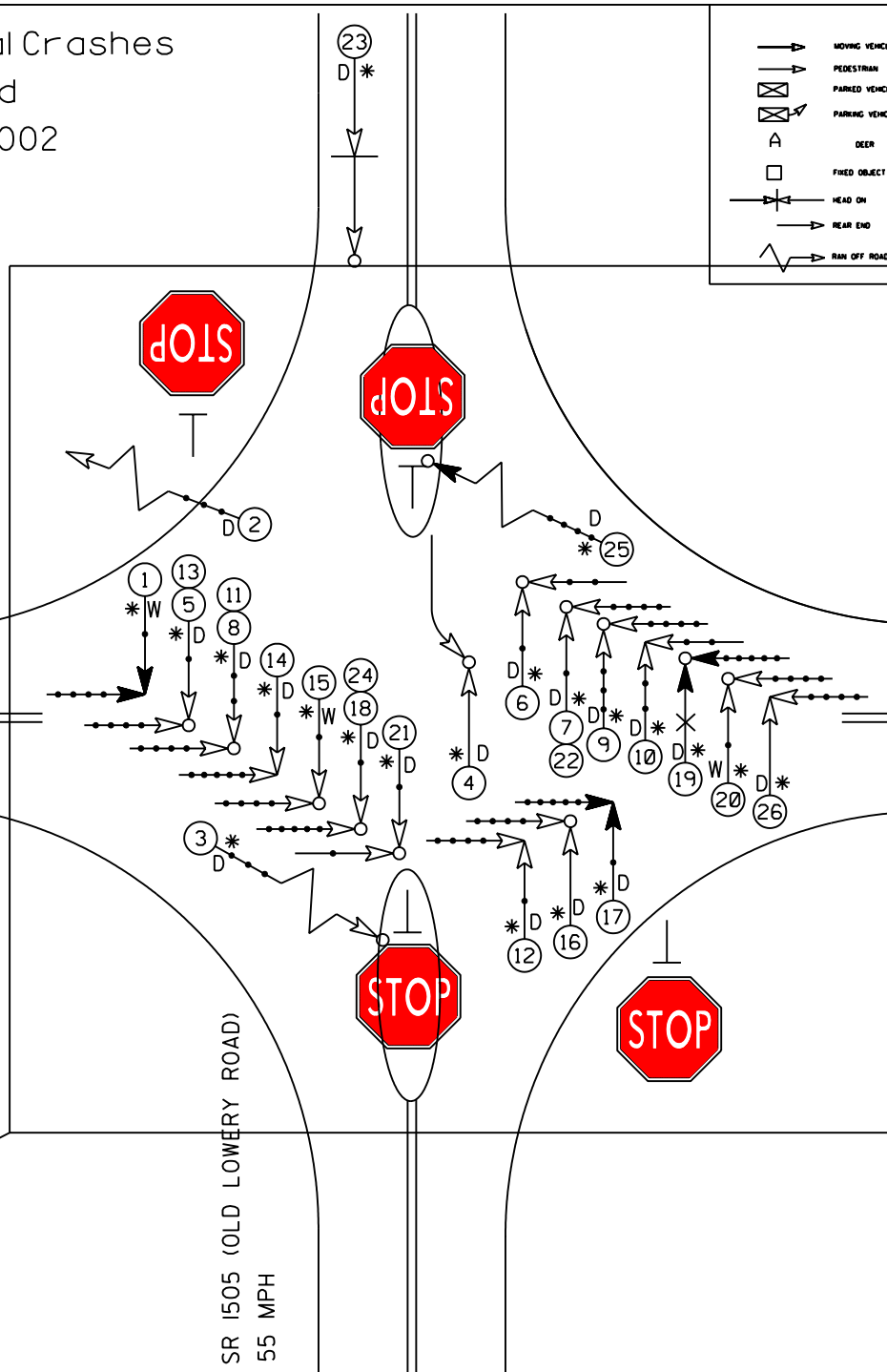
Treatment Site - TotalCrashes
 Before Period
 2/1/1999 - 1/31/2002
 (3 years)

LEGEND

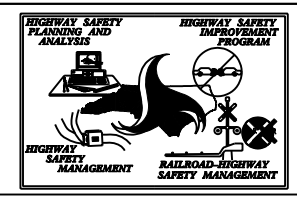
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PAKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PAKED VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	DEER		OUT OF CONTROL		40 MPH TO 49		WET
	FIXED OBJECT		INJURY		50 MPH TO 59		KEY OR SHORT
	HEAD ON		FATALITY		60 MPH TO 69		TO AND UP
	REAR END		SPEED UNKNOWN		70 MPH OR MORE		ONLY
	RAN OFF ROAD						

SR 1001 (SHANNON ROAD)
 55 MPH

SR 1505 (OLD LOWERY ROAD)
 55 MPH



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT



COLLISION DIAGRAM	
DIVISION:	AREA:
STUDY PERIOD: 2/1/1999 - 1/31/2002	
DISTANCE: Y-LINE : 150 ft	
ANALYSIS PREPARED BY: CLS	
ANALYSIS CHECKED BY:	
DIAGRAM PREPARED BY: CLS	
DIAGRAM REVIEWED BY:	
SCALE: NOT TO SCALE	
DATE: 2/14/2006	
LOG NUMBER: 20052004	

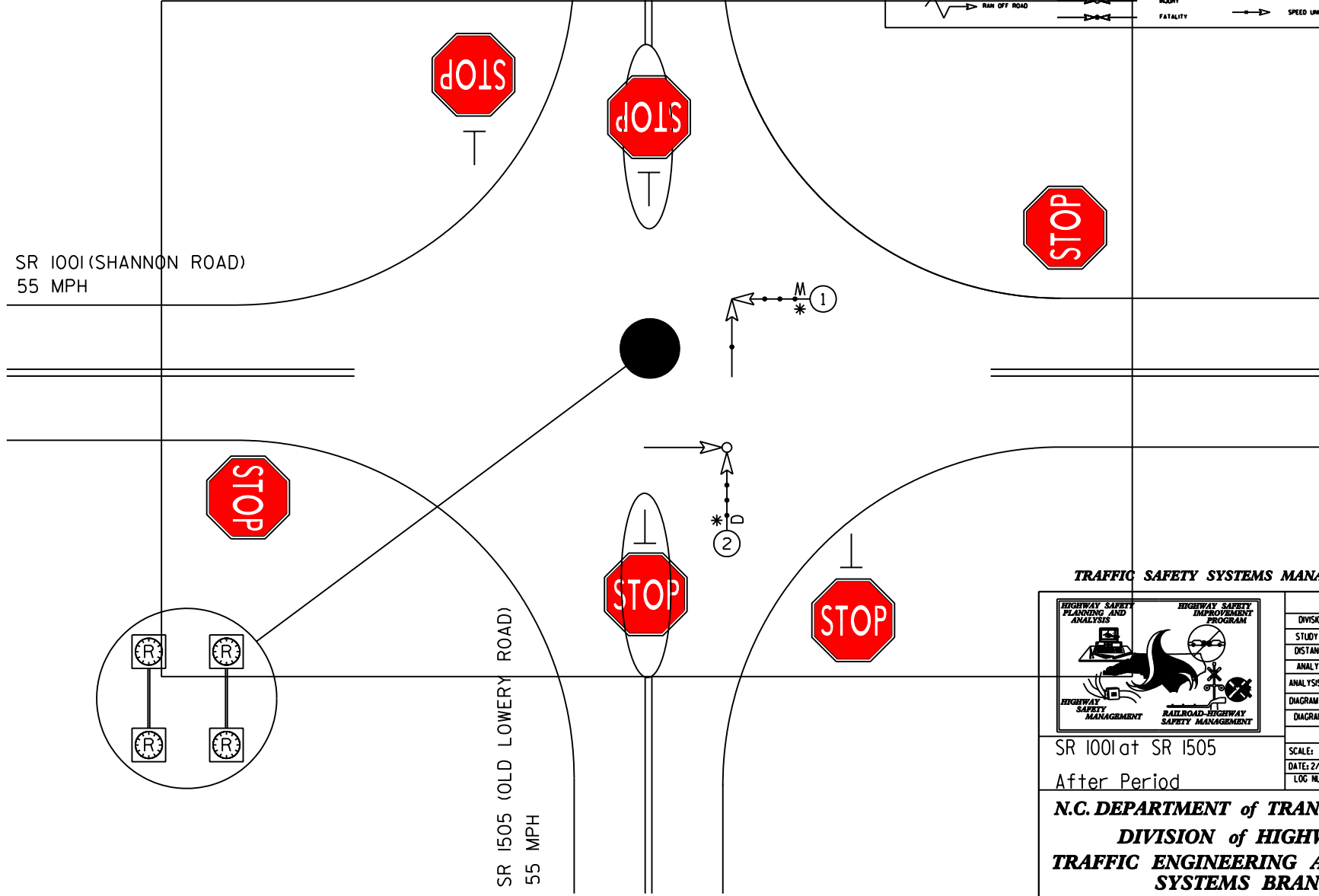
SR 1001 at SR 1505
 Before Period

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH

Treatment Site - TotalCrashes
 After Period
 11/1/2002 - 10/31/2005
 (3 years)

LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PAKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PAKED VEHICLE		SLOPESIDE		30 MPH TO 39		DRY
	DEER		OUT OF CONTROL		40 MPH TO 49		WET
	FIXED OBJECT		INJURY		50 MPH TO 59		KEY OR SHOVT
	HEAD ON		FATALITY		60 MPH TO 69		SPEED UNKNOWN
	REAR END				70 AND UP		ONLY
	RAN OFF ROAD						



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION:	AREA:
	STUDY PERIOD: 11/1/2002 - 10/31/2005	
	DISTANCE: Y-LINE = 150 ft	
	ANALYSIS PREPARED BY: CLS	
	ANALYSIS CHECKED BY:	
DIAGRAM PREPARED BY: CLS		
DIAGRAM REVIEWED BY:		
SR 1001 at SR 1505		
After Period		
SCALE: NOT TO SCALE		
DATE: 2/14/2006		
LOG NUMBER: 20052004		
<p>N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH</p>		