

# **Spot Safety Project Evaluation**

Project Log # 200501222

Spot Safety Project # 05-99-238

**Spot Safety Project Evaluation, of the Flashing Traffic Signal Installation at the Intersection of SR 1519 (Vicksboro Road) and SR 1533 (Carey Chapel Road/Rock Mill Road) in Vance Co.**

Documents Prepared By:

Safety Evaluation Group  
Traffic Safety Systems Management Section  
Traffic Engineering and Safety Systems Branch  
North Carolina Department of Transportation

**Principal Investigator**

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Samuel D. Coleman

08/24/2005  
Date

Traffic Safety Project Engineer

# ***Spot Safety Project Evaluation Documentation***

## **Subject Location**

Evaluation of Spot Safety Project Number 05-99-238 – The Intersection of SR 1519 (Vicksboro Road) and SR 1533 (Carey Chapel Road/Rock Mill Road) in Vance 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 of the treatment versus comparison data has been completed to measure the effectiveness of the spot safety 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 and Background from the Project File Folder**

The spot safety project improvement countermeasure chosen for the subject location was the installation of a flashing traffic signal. SR 1519 (Vicksboro Rd) is a two-lane facility with no left turn lanes at the intersection with SR 1533 (Carey Chapel Rd/Rock Mill Rd). SR 1533 (Carey Chapel Rd/Rock Mill Rd) is also a two-lane facility with no left-turn lanes. The southbound approach on SR 1519 (Vicksboro Rd) has a 35mph speed limit. All other approaches have a 45mph speed limit. The intersection is controlled by stop signs on SR 1533 (Carey Chapel Rd/Rock Mill Rd). This intersection was investigated due to a citizen's request for a signal warrant. The initial crash analysis for this location was completed from August 1, 1996 through July 31, 1999 with a total of 18 reported crashes. Eleven of these crashes (angle type) are considered correctable by the proposed improvements. There were seven class B and ten class C injuries reported in these crashes. The final completion date for the flashing traffic signal installation at the subject intersection was on September 28, 2000.

## **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 August 2000 through October 2000. The before period consisted of reported crashes from November 1, 1996 through July 31, 2000 (3 Years, 9 Months) and the after period consisted of reported crashes from November 1, 2000 through July 31, 2004 (3 Years, 9 Months). 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, at the intersections only

excluding the treatment intersection, from MP 0.028 to MP 5.302 on SR 1519. The following data table depicts the Naive Before and After Analysis for the above information. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. These 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>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total crashes	25	11	-56.0
Total Severity Index	8.5	5.0	-40.5
Frontal Impact Crashes	16	3	-81.3
Frontal Severity Index	9.9	5.9	-40.1
Volume	6400	9300	45.3
<u>Comparison Information</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total crashes	27	24	-11.1
Total Severity Index	4.8	11.4	135.5
Frontal Impact Crashes	14	10	-28.6
Frontal Severity Index	6.3	17.6	180.4
Volume	2600	3000	15.4
<u>Odds Ratio: Treatment versus Comparison</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Treatment Total Crashes	25	11	<b>-50.5</b>
Comparison Total Crashes	27	24	
Treatment F.I. Crashes	16	3	<b>-73.8</b>
Comparison F.I. Crashes	14	10	

The naive before and after analysis at the treatment location resulted in a 56.0 percent decrease in Total Crashes, an 81.3 percent decrease in Frontal Impact Crashes, and a 45.3 percent increase in Average Daily Traffic (ADT). The comparison locations resulted in an 11.1 percent decrease in Total Crashes, a 28.6 percent decrease in Frontal Impact Crashes, and a 15.4 percent increase in ADT. The before period ADT year was 1998 and the after period ADT year was 2002.

The Odds Ratio is used as another means of calculating the treatment effect. The total crashes in the before and after period from the Comparison Strip are used to calculate the percent reduction in total crashes for the Treatment Intersection. As shown in the table above, using the Odds Ratio calculation, there is a 50.5 percent decrease in Treatment Intersection crashes and a 73.8 percent decrease in Frontal Impact crashes.

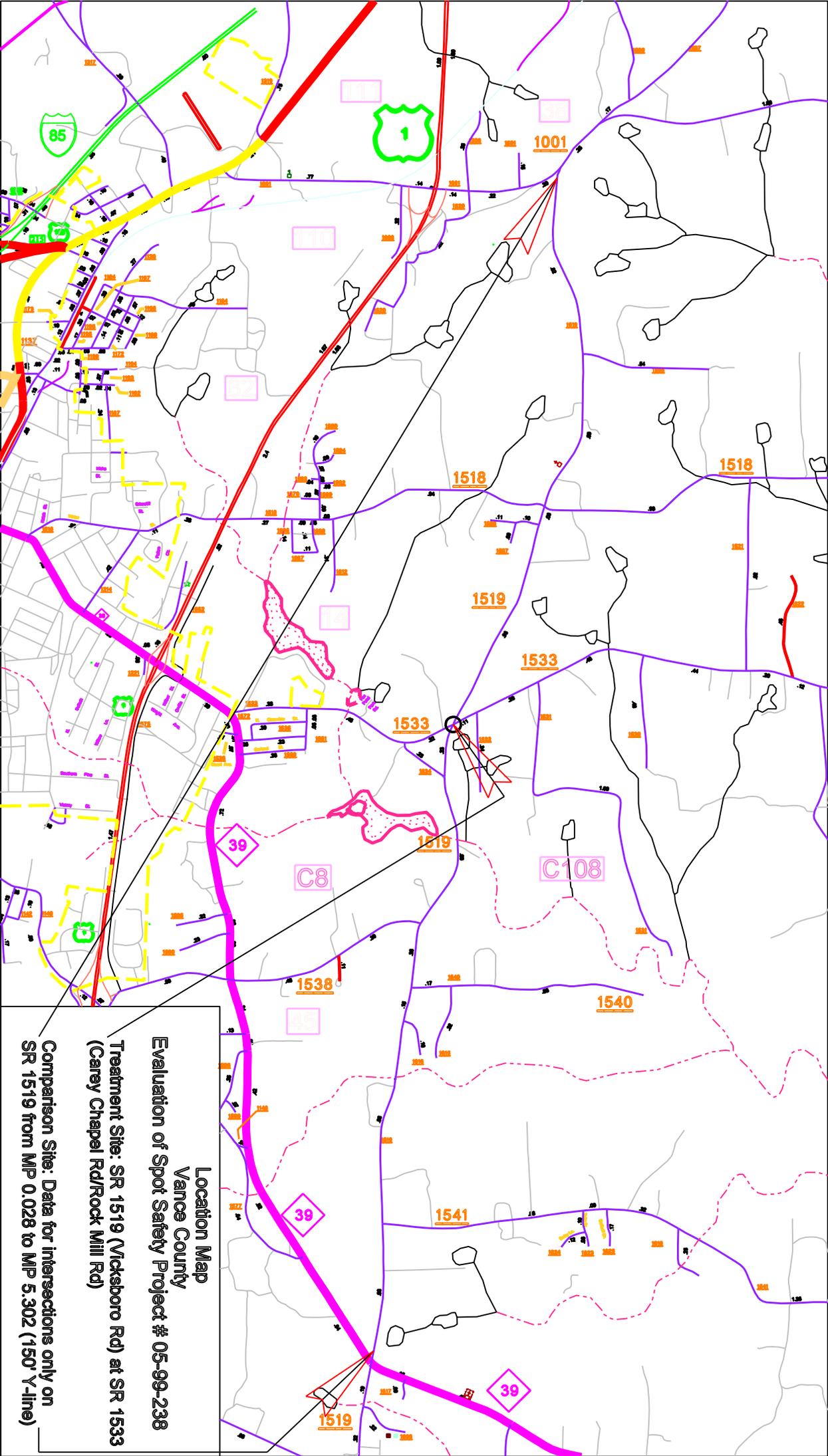
## **Results and Discussion**

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 56.0 percent decrease in Total Crashes and an 81.3 percent decrease in Frontal Impact Crashes. Using the Odds Ratio to calculate the treatment effect resulted in a 50.5 percent decrease in Total Crashes at the Treatment Intersection and a 73.8 percent decrease in Frontal Impact crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in the number of Total Crashes and a decrease in the number of Frontal Impact Crashes from the before to the after period.

As previously mentioned, the flashing traffic signal was installed due to a citizens request and crash investigation. There were 15 angle crashes in the before period, 6 of which may have been caused by drivers not adhering to the stop condition. Vehicles on the south approach accounted for 13 of the 15 angle crashes. The included on-site photos reveal the west approach has a vertical crest, which may make it difficult for either driver to see from the west or south approach. A further investigation of sight distance may need to be completed for the south approach.

Peak distribution for the crash data in the before period occurred from 3pm to 6pm (2 crashes, 3:00p-4:00p; 2 crashes, 4:00p-5:00p; 6 crashes, 5:00p-6:00p). Rush hour may have played a role in vehicles not finding a safe gap to proceed through or made it difficult for drivers to recognize the intersection condition. After installation of the flasher only 3 angle crashes occurred. From the data presented the flasher has met its intended traffic safety improvement goal successfully.

The countermeasure crash reduction for Total Crashes at the subject intersection can be in the range of a 50.5 to a 56.0 percent decrease in crashes. The countermeasure crash reduction for Frontal Impact Crashes at the subject intersection can be in the range of a 73.8 to an 81.3 percent decrease in crashes. 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.



Driving west toward SR 1519



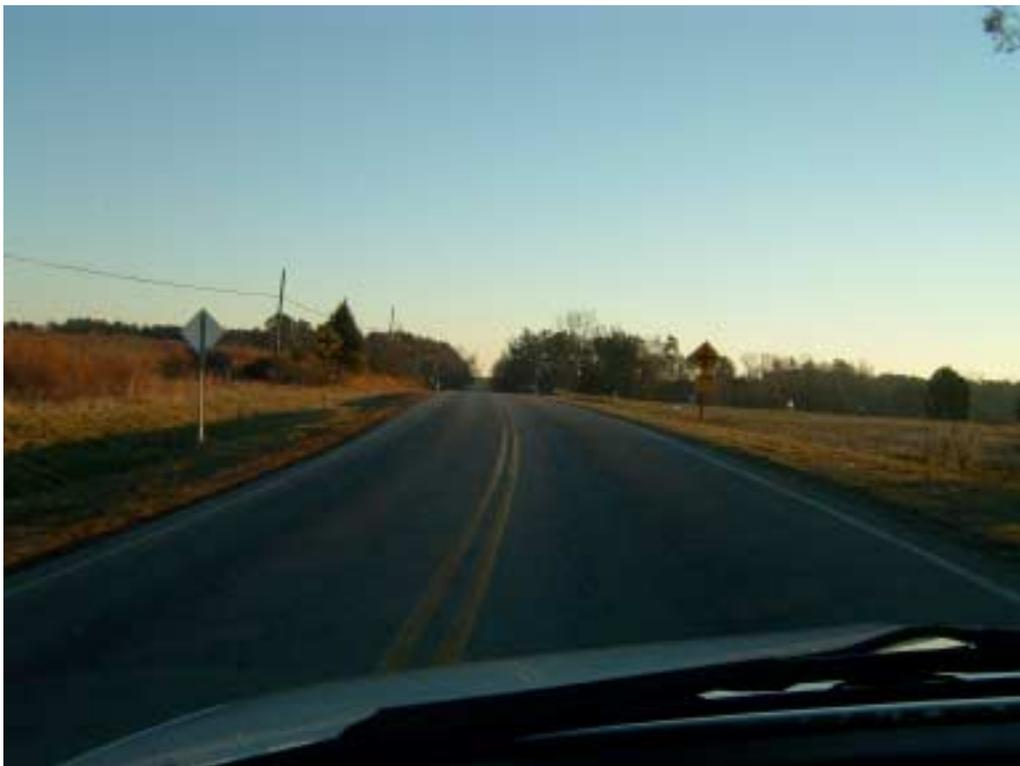
Driving west toward SR 1519



Driving east toward SR 1519



Driving east toward SR 1519



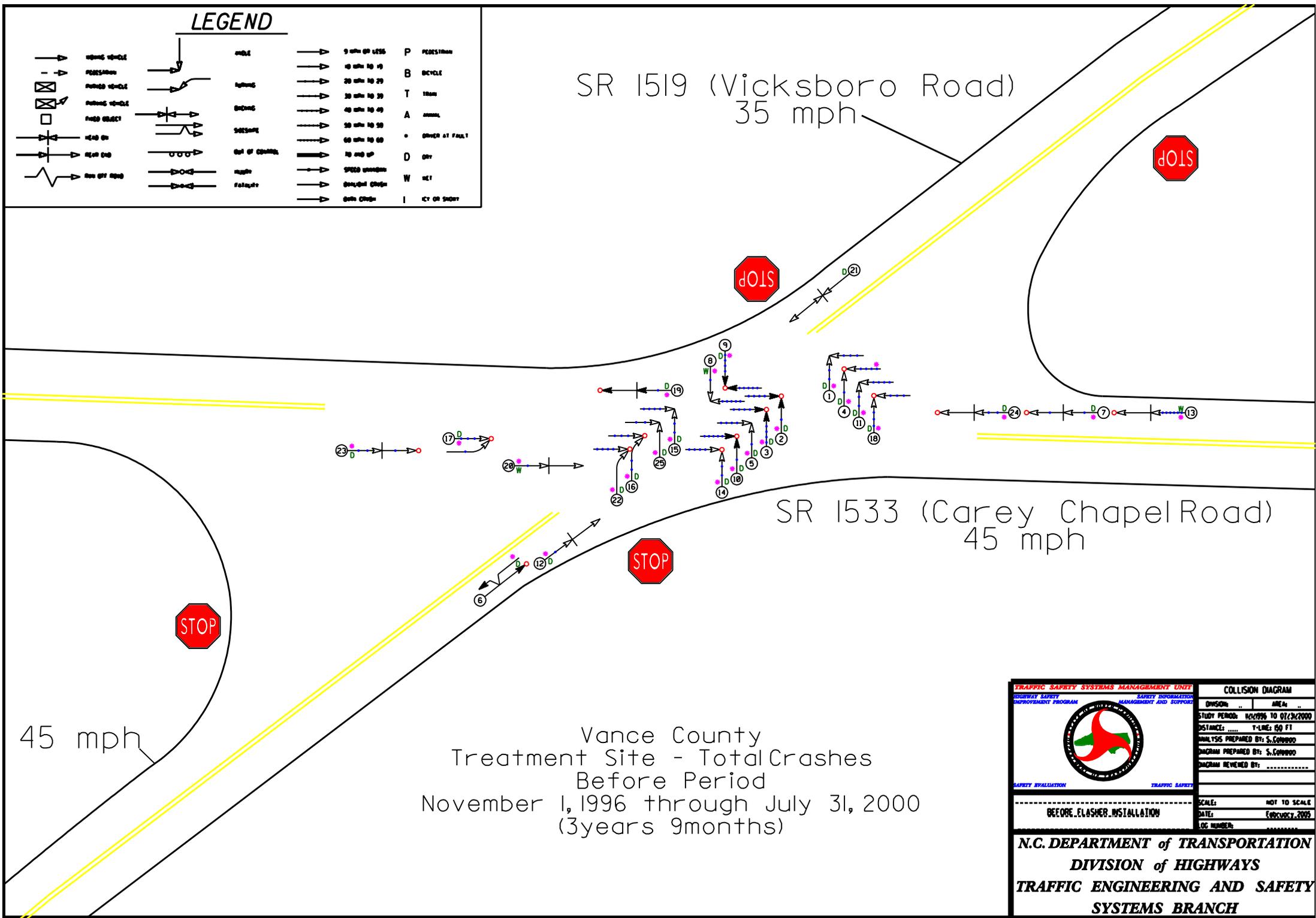
Driving east toward SR 1519



**LEGEND**


SR 1519 (Vicksboro Road)  
35 mph

SR 1533 (Carey Chapel Road)  
45 mph



Vance County  
Treatment Site - Total Crashes  
Before Period  
November 1, 1996 through July 31, 2000  
(3 years 9 months)

<b>TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT</b>		<b>COLLISION DIAGRAM</b>	
HIGHWAY SAFETY IMPROVEMENT PROGRAM	SAFETY INFORMATION MANAGEMENT AND SUPPORT	DIVISION: .....	AREA: .....
		STUDY PERIOD: 11/01/96 TO 07/31/2000	DISTANCES: ..... T-LINES: 150 FT
		ANALYSIS PREPARED BY: S. CONWOOD	DIAGRAM PREPARED BY: S. CONWOOD
SAFETY EVALUATION		TRAFFIC SAFETY	
BEOGEE ELASHER INSTALLATION		SCALE: NOT TO SCALE	DATE: FEBRUARY 2005
N.C. DEPARTMENT of TRANSPORTATION		LOG NUMBER: .....	
DIVISION of HIGHWAYS			
TRAFFIC ENGINEERING AND SAFETY			
SYSTEMS BRANCH			

**LEGEND**

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