

# **Spot Safety Project Evaluation**

Project Log # 200610095

Spot Safety Project # 04-01-228

## **Spot Safety Project Evaluation of the Traffic Signal Installation at US 301 and Peedin Street and Canterbury Road in Johnston County**

Documents Prepared By:

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

**Principal Investigator**

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Samuel D. Coleman, EI

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Date

Traffic Safety Project Engineer

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

## **Subject Location**

Evaluation of Spot Safety Project Number 04-01-228 – Traffic Signal Installation at US 301 at Peedin Street and Canterbury Road in Johnston County.

## **Project Information and Background from the Project File Folder**

In the before period Peedin St. and Canterbury Rd. intersected US 301 at a 110' offset from each other. The Town of Smithfield purchased right of way to realign Caterbury Road to intersect US 301 directly across from Peedin Street by the end of 2001.

US 301 is a five lane roadway with a center turn lane and a speed limit of 35 mph at the treatment intersection. Peedin Street and Canterbury Road are both two lane roadways without left turn lanes and a speed limit of 35 mph and 25 mph respectively. The intersection was controlled by a stop condition on Peedin Street and Canterbury Road.

The original problem statement was that the offset geometrics and heavy traffic volume may have contributed to the crashes. There were 28 total and 19 correctable (frontal type) crashes at the intersection. There were 13 left turn, 4 angle, and 2 head on crashes. The improvement chosen for the subject location was to install a traffic signal. The final completion date for the improvement at the subject location was on December 2, 2002 at a cost of \$50,000.

## **Naive Before and After Analysis**

After reviewing the spot safety project file folder along with all the crashes along the subject road, the crash data omitted from this analysis to consider for an adequate construction period was from November 2002 through January 2003. The before period consisted of reported crashes from March 1, 1999 through October 31, 2002 (3 years, 8 months) and the after period consisted of reported crashes from February 1, 2003 through September 30, 2006 (3 years, 8 months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The treatment data consisted of all crashes within 150 feet of the subject intersection. The following data table depicts the Naive Before and After Analysis for the above information. Please note that Frontal Impact crash types were the target crashes for the applied countermeasure. These crash types considered are as follows: Left Turn, same roadway; Left Turn, different roadway; Right Turn, same roadway; Right Turn, different roadway; Head On and Angle.

<u>Treatment Information</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	46	41	-10.9
Total Severity Index	6.4	3.9	-39.1
Frontal Impact Crashes	29	17	-41.4
Frontal Severity Index	6.4	5.8	-9.9
Volume	24000	25000	4.2
<u>Treatment Injury Crashes</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal	0	0	N/A
Class A	2	0	-100.0
Class B	2	5	150.0
Class C	11	11	0.0
Property Damage Only	31	25	-19.4
<u>Frontal Impact Injury Crashes</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal	0	0	N/A
Class A	1	0	-100.0
Class B	2	5	150.0
Class C	9	6	-33.3
Property Damage Only	17	6	-64.7

Table 1.

The naive before and after analysis at the treatment location resulted in an 11 percent decrease in Total Crashes, a 41 percent decrease in Frontal Impact Crashes, and a 4 percent increase in Average Daily Traffic (ADT). The before period ADT year was 2001 and the after period ADT year was 2005.

## Results and Discussion

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in an 11 percent decrease in Total Crashes and a 41 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.

Table 1 and the collision diagrams show a significant decrease in frontal impact crashes. Referencing the before period collision diagram there were 22 frontal impact crashes which may be considered correctable, for the after period there were 9 (see Figures 1 and 2). This information shows that the signal was successful in reducing frontal impact crashes.

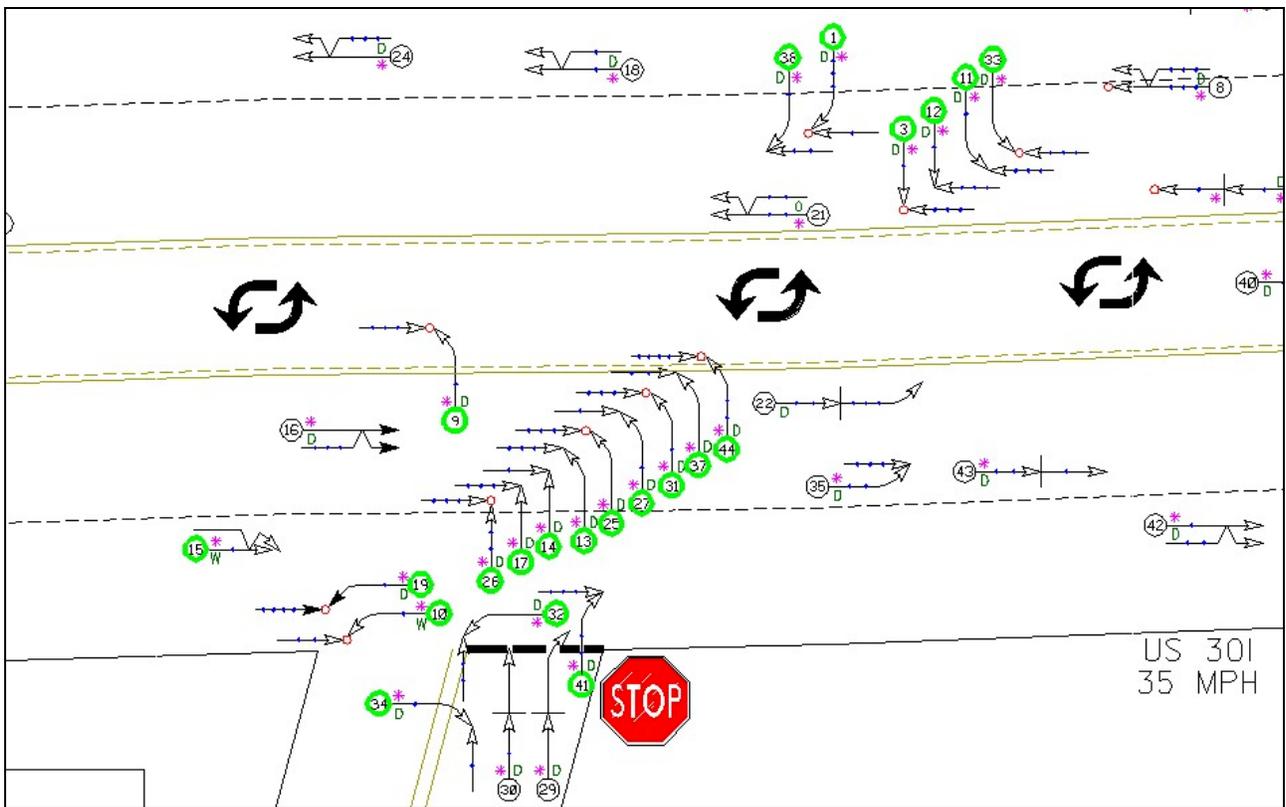


Figure 1. (The green, bolded circles denote “correctable crashes”)

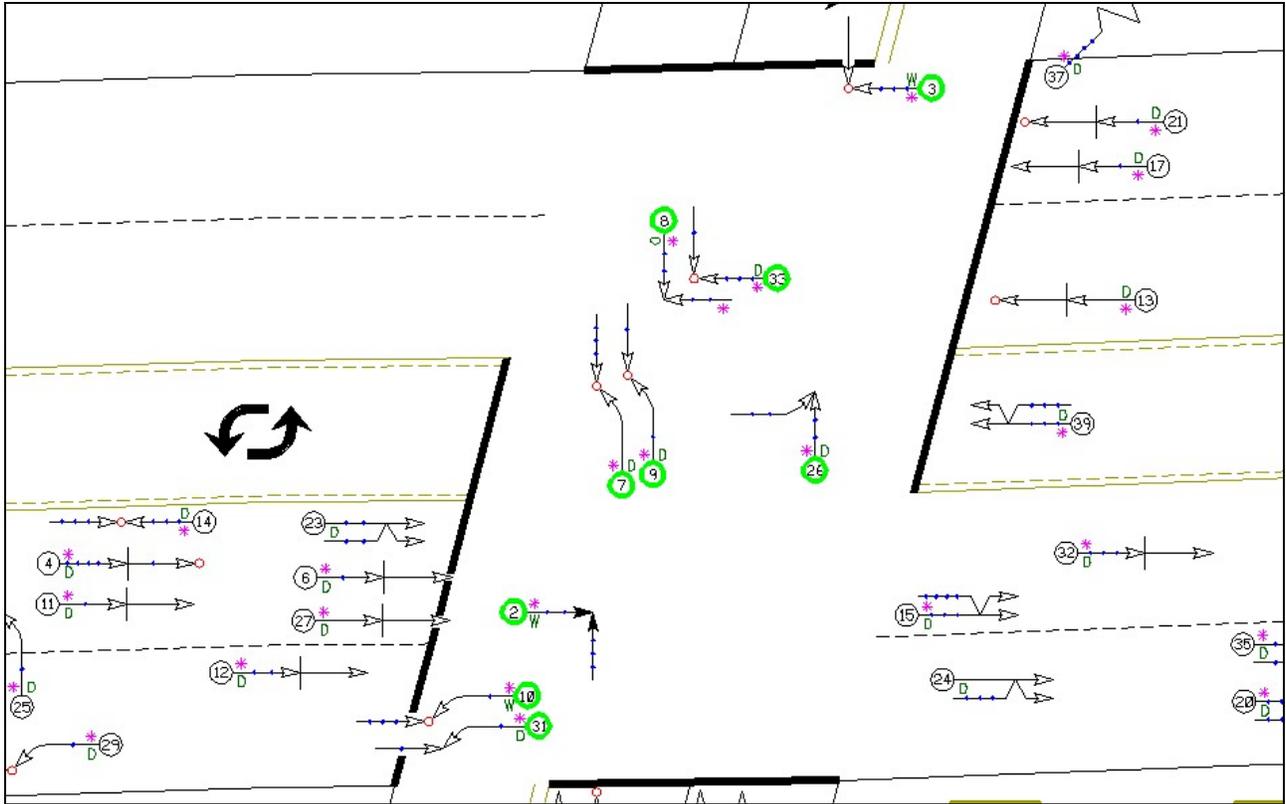
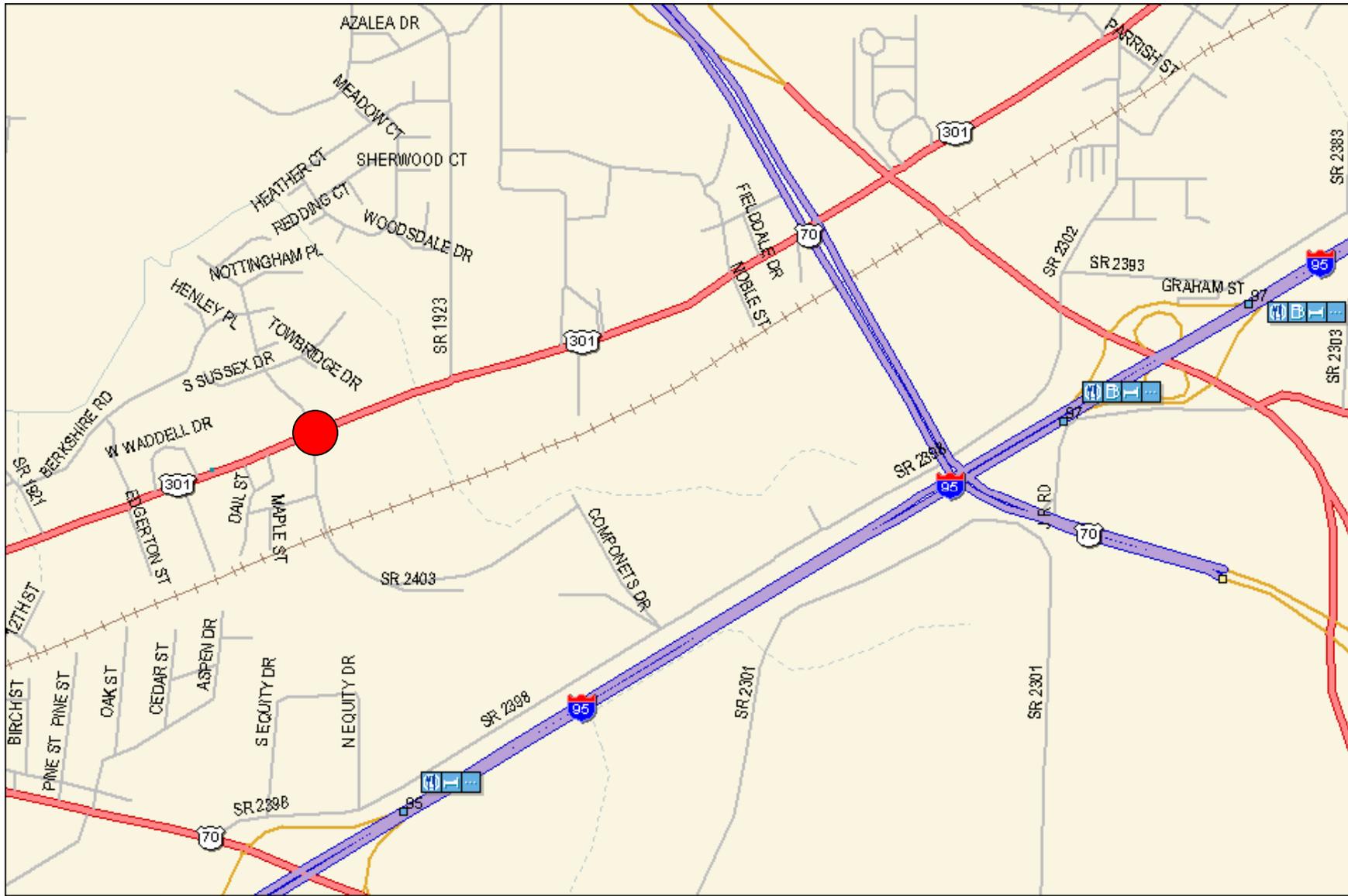


Figure 2. (The green, bolded circles denote “correctable crashes”)

During the field investigation there were two issues noted. While driving along US 301 at the speed limit, we were being passed by a majority of the vehicles. There were also conflicts at the access point of the Hess gas station on US 301. Some vehicles would attempt to make a left turn out of the gas station on US 301 instead of using the Peedin Street exit to turn left at the traffic signal.

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 road.



**DeLORME**  
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 www.delorme.com  
 Street Atlas USA® 2004

★  
 MN (8.9° W)

0 1000 2000 ft  
 Data Zoom 13-0

Location Map: US 301 at Peedin St. and Canterbury Rd.

*Treatment Site Photos taken January 22, 2007*



Driving north on Peedin St.



Driving north on Peedin St.



Driving south on Canterbury Rd



Driving south on Canterbury Rd



Driving west on US 301



Driving east on US 301



CANTERBURY RD  
25 MPH

Johnston County  
Treatment Site - Total Crashes  
Before Period  
March 1, 1999 - October 31, 2002  
(3 years, 8 months)



15  
D

28  
D

39  
D

24  
D

16  
D

38  
D  
1  
D  
3  
D  
12  
D  
11  
D  
33  
D

8  
D

4  
D

7  
D

5  
D



10  
D

6  
D

16  
D

9  
D

4  
D

37  
D

4  
D

31  
D

2  
D

32  
D

27  
D

17  
D

13  
D

29  
D

39  
D

43  
D

39  
D

42  
D

20  
D

49  
D

2  
D

Gas Station



US 301  
35 MPH

PEEDIN ST  
35 MPH

### LEGEND

	vehicle		truck		10 mph or less		P pedestrian
	motorcycle		turning		10 mph to 19		B bicycle
	parked vehicle		backing		20 mph to 29		T train
	parked vehicle		backing		30 mph to 39		A animal
	parked vehicle		backing		40 mph to 49		OTHER AT FAULT
	vehicle		backing		50 mph to 59		D driver
	vehicle		backing		60 mph to 69		W wheel
	vehicle		backing		70 mph or more		O out of control
	vehicle		backing		80 mph or more		R right
	vehicle		backing		90 mph or more		L left
	vehicle		backing		100 mph or more		O other at fault
	vehicle		backing		110 mph or more		O other at fault
	vehicle		backing		120 mph or more		O other at fault
	vehicle		backing		130 mph or more		O other at fault
	vehicle		backing		140 mph or more		O other at fault
	vehicle		backing		150 mph or more		O other at fault
	vehicle		backing		160 mph or more		O other at fault
	vehicle		backing		170 mph or more		O other at fault
	vehicle		backing		180 mph or more		O other at fault
	vehicle		backing		190 mph or more		O other at fault
	vehicle		backing		200 mph or more		O other at fault

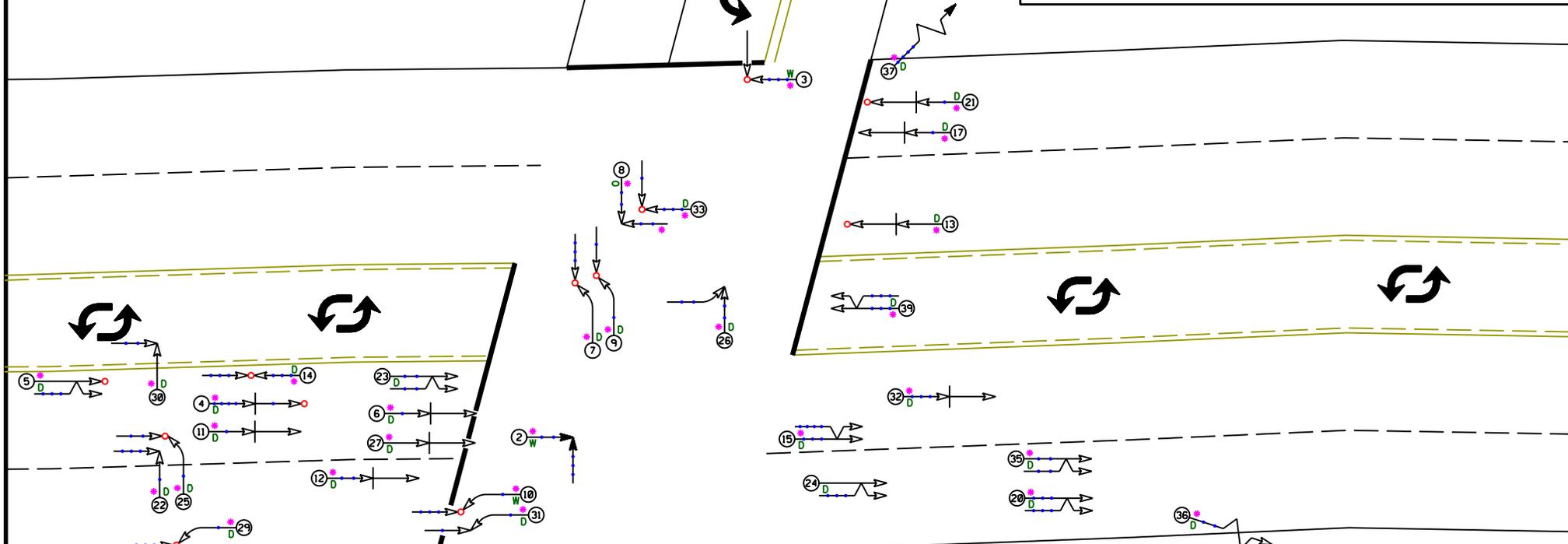
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		COLLISION DIAGRAM	
ROADWAY SAFETY IMPROVEMENT PROGRAM	SAFETY ORGANIZATION MANAGEMENT AND SUPPORT	DIVISION:	AREA:
		STUDY PERIOD:	3/1/1999 TO 10/31/2002
		DISTANCE:	1-MILE: 150 FT
SAFETY EVALUATION		DATE:	NOT TO SCALE
TRAFFIC SAFETY		DATE:	W/1/2006
BEFORE TRAFFIC SIGNAL		LOG NUMBER:	
<p><b>N.C. DEPARTMENT of TRANSPORTATION</b>  <b>DIVISION of HIGHWAYS</b>  <b>TRAFFIC ENGINEERING AND SAFETY</b>  <b>SYSTEMS BRANCH</b></p>			



CANTERBURY RD  
25 MPH

Johnston County  
Treatment Site - Total Crashes  
After Period  
February 1, 2003 - September 30, 2006  
(3 years, 8 months)

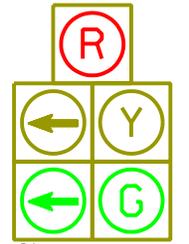
LEGEND			



Gas Station

PEEDIN ST  
35 MPH

US 301  
35 MPH



Signal over  
Left Turn lane  
on US 301



Signalized  
Intersection

	COLLISION DIAGRAM	
	Division: _____	Area: _____
	Study Period: 2/1/2003 to 9/30/2006	
	Distance: _____	
Analysis Prepared By: S. Colombo		
Diagram Prepared By: S. Colombo		
Diagram Reviewed By: _____		
Scale: NOT TO SCALE		
Date: NOV 2006		
Log Number: _____		
<b>N.C. DEPARTMENT of TRANSPORTATION</b> <b>DIVISION of HIGHWAYS</b> <b>TRAFFIC ENGINEERING AND SAFETY</b> <b>SYSTEMS BRANCH</b>		