

Spot Safety Project Evaluation

Project Log # 200512144

Spot Safety Project # 10-98-206

Spot Safety Project Evaluation of the Traffic Signal Installation At the Intersection of SR 1004 (Lawyers Rd) and SR 1524 (Stevens Mill Rd) Union County

Documents Prepared By:

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Traffic Safety Systems Management Section
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Principal Investigator

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8/4/2006
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 10-98-206 – The Intersection of SR 1004 (Lawyers Rd) and SR 1524 (Stevens Mill Rd) in Union 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 a traffic signal. SR 1004 (Lawyers Rd) and SR 1524 (Stevens Mill Rd) were both 2-lane roads with no turn lanes in the study period. Turn Lanes were added on the northbound approach of SR 1524 and both approaches of SR 1004 in 2002. The speed limit for all approaches is 45 mph at the subject location. The subject location is a four-leg intersection, which was controlled by stop signs on SR 1524 (Stevens Mill Rd).

The original statement of problem was that there were accidents, congestion, and delay at the stop sign controlled intersection. Two citizens submitted separate requests for the initial study. Both stated there were numerous subdivisions in the area and that the subject location was a dangerous intersection with many speeders. They also both stated that it was very difficult and dangerous to turn onto SR 1004 (Lawyers Rd) from SR 1524 (Stevens Mill Rd) during peak traffic hours.

The initial crash analysis was completed from January 1, 1995 to January 1, 1998 with 8 reported crashes; 5 Angle Crashes, 1 Head-On Crash, 1 Rear-End Crash, and 1 Ran-Off-Road Crash. The final completion date for the improvement at the subject intersection was on October 1, 1999 with a total cost of \$30,000.00.

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 September 1, 1999 to November 30, 1999. The before period consisted of reported crashes from March 1, 1997 through August 31, 1999 (2 years and 6 months) and the after period consisted of reported crashes from December 1, 1999 through May 31, 2002 (2 years and 6 months). The ending date for this analysis was determined by the date in which the turn lanes were installed. A separate study was conducted for your information after the turn lanes were installed from September 1, 2002 through December 31, 2005 (3 years and 4 months).

The treatment data consisted of all crashes within 150 feet of the subject intersection. *Please see attached location 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	8	6	-25.0
Total Severity Index	4.7	2.23	-52.6
Target Crashes	4	3	-25.0
Target Crash Severity Index	4.7	3.47	-26.2
Volume	8,600	10,200	18.6
<u>Injury Summary</u>			
Fatal injuries	0	0	N/A
Class A injuries	0	0	N/A
Class B injuries	1	0	-100.0
Class C Injuries	9	1	-88.9
Total Non-Fatal Injuries	10	1	-90.0
Total Injuries	10	1	-90.0

The naive before and after analysis at the treatment location resulted in a 25 percent decrease in Total Crashes, a 25 percent decrease in Target Crashes, a 53 percent decrease in the Total Severity Index, and a 19 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1998 and the after period ADT year was 2001.

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 25 percent decrease in both Total Crashes and Target Crashes, with a 19 percent increase in ADT. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have decreased at the treatment location from the before to the after period.

Referencing the *Collision Diagram, Before Period*, there was a pattern of Left Turn-Different Roadway crashes involving left turning vehicles on northbound SR 1524 and vehicles traveling east on SR 1004. This pattern decreased 67% (from 3 to 1) after the signal was installed. The signal installation did not appear to have resulted in any new crash pattern emerging.

Referencing the above table, injuries at the intersection appear to have reduced significantly from the before to the after period (from 10 to 1).

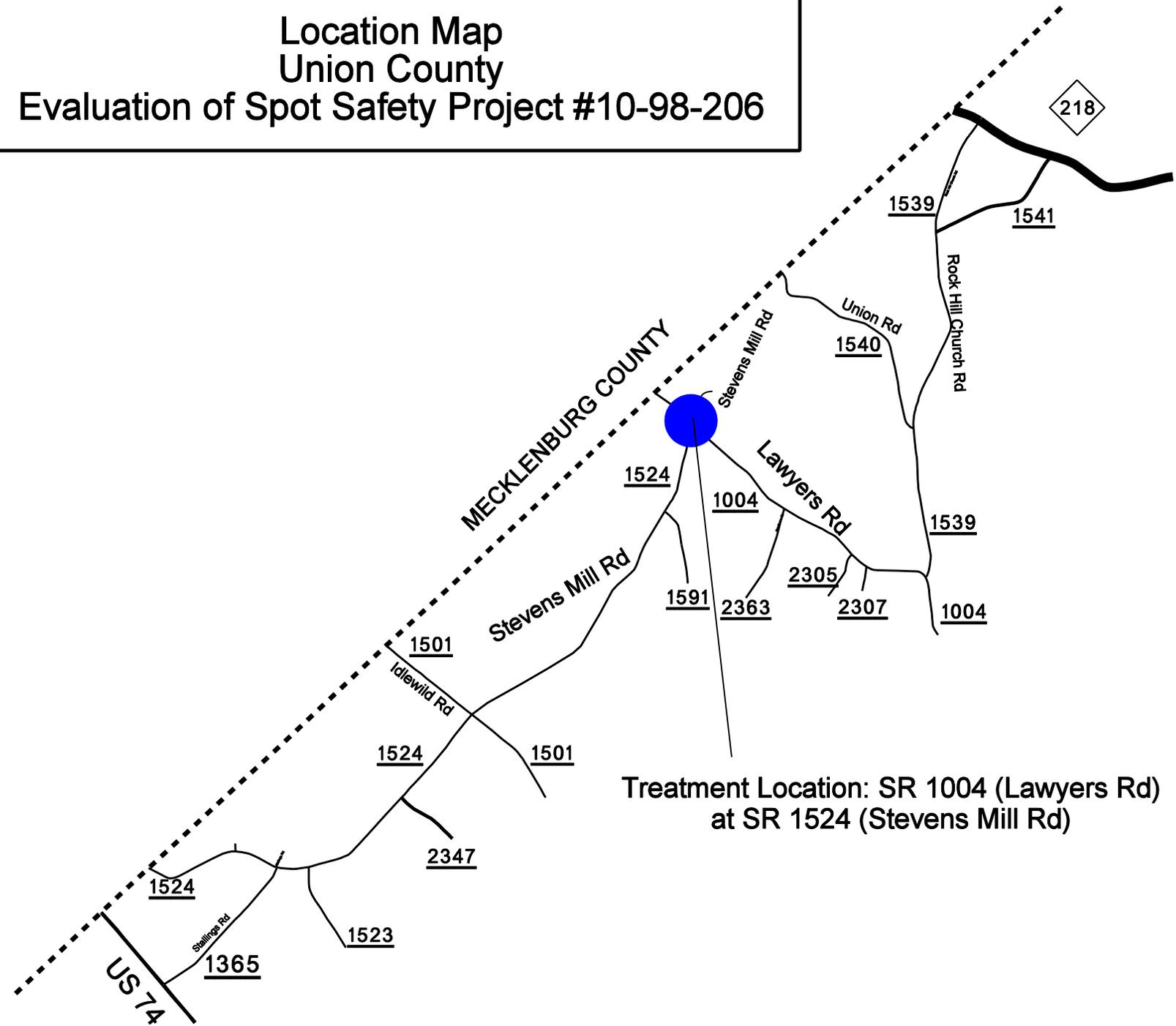
For your information, a crash analysis was conducted for the intersection after turn lanes were added in 2002. It consists of crashes from September 1, 2002 to December 31, 2005 (3 years, 4 months). The following data table depicts the After Analysis for these years.

After Turn Lane Construction	
Total crashes	6
Total Severity Index	3.47
Volume	13,400
<u>Injury Summary</u>	
Fatal injuries	0
Class A injuries	0
Class B injuries	4
Class C Injuries	3
Total Non-Fatal Injuries	7
Total Injuries	7

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
Union County
Evaluation of Spot Safety Project #10-98-206



Treatment Site Photos Taken July 11, 2006



Driving East on SR 1004 (Lawyers Rd)



Driving East on SR 1004 (Lawyers Rd)



Driving West on SR 1004 (Lawyers Rd)



Driving West on SR 1004 (Lawyers Rd)



Driving North on SR 1524 (Stevens Mill Rd)

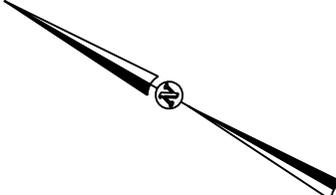
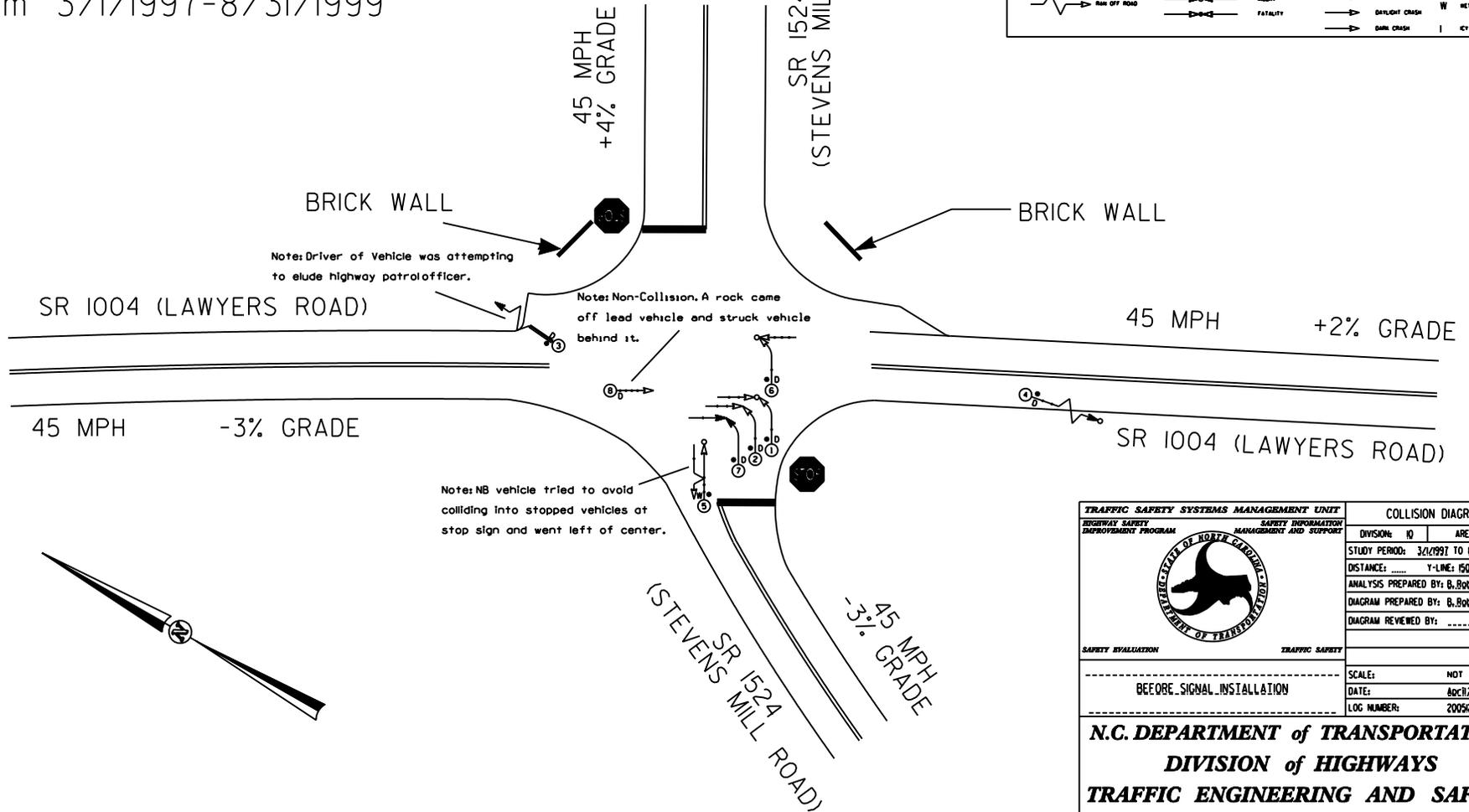
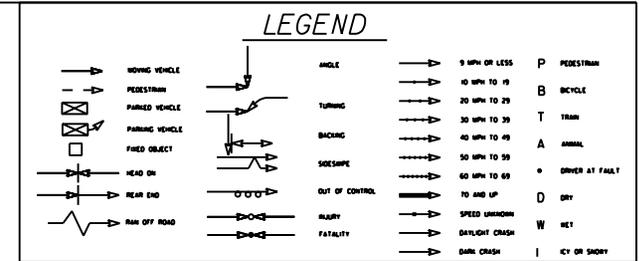


Driving North on SR 1524 (Stevens Mill Rd)



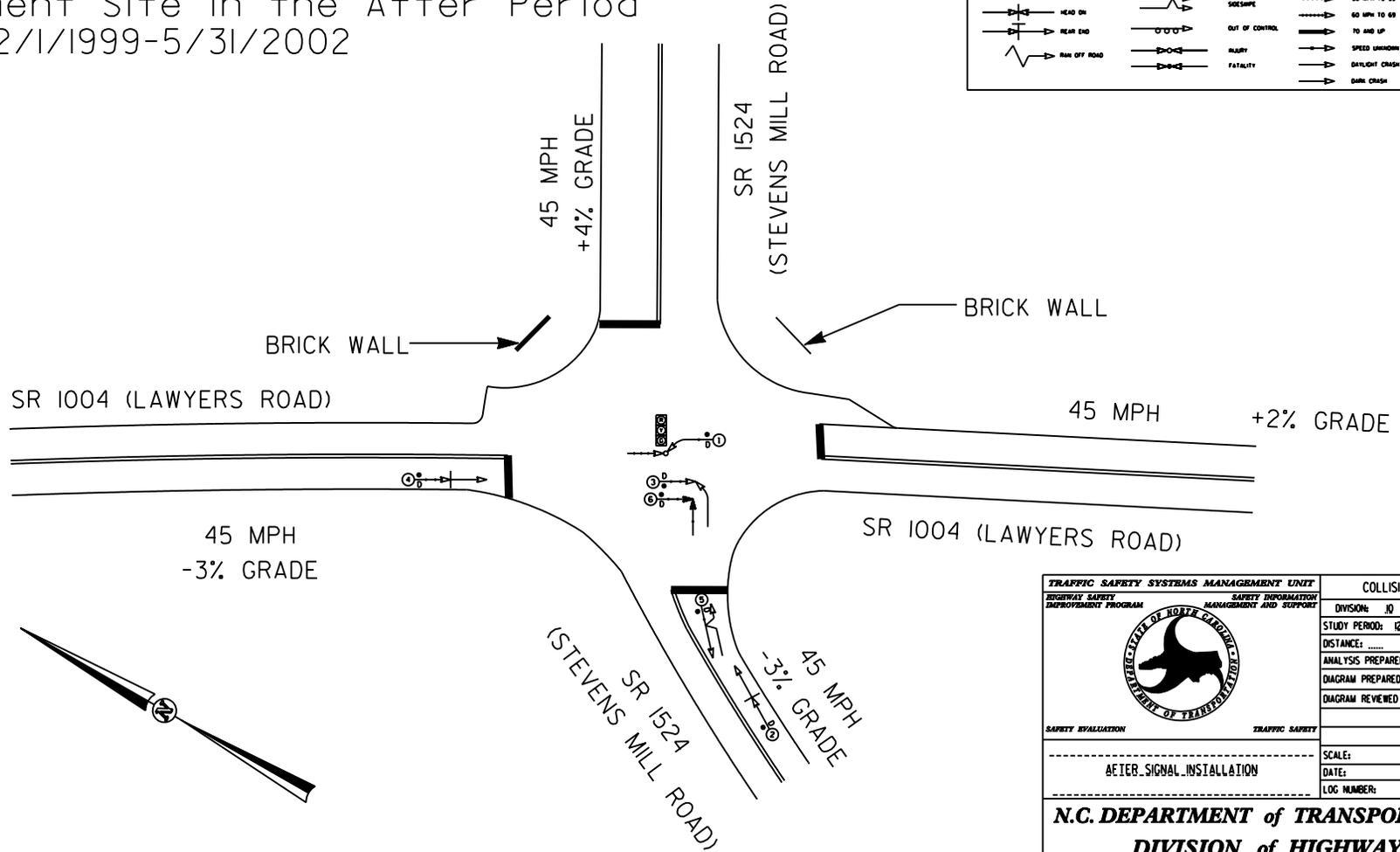
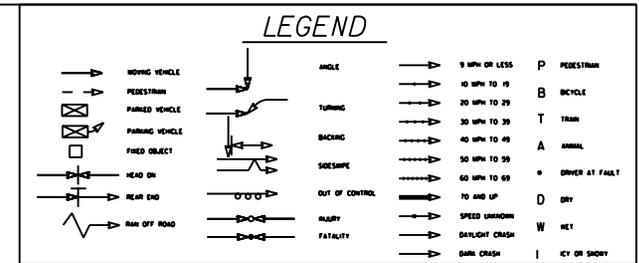
Driving South on SR 1524 (Stevens Mill Rd)

Union County
 SR 1004 (Lawyers Rd) and
 SR 1524 (Stevens Mill Rd)
 Treatment Site in the Before Period
 From 3/1/1997-8/31/1999



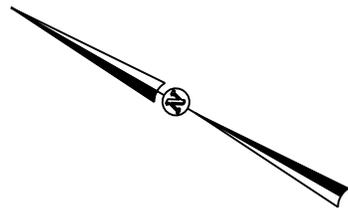
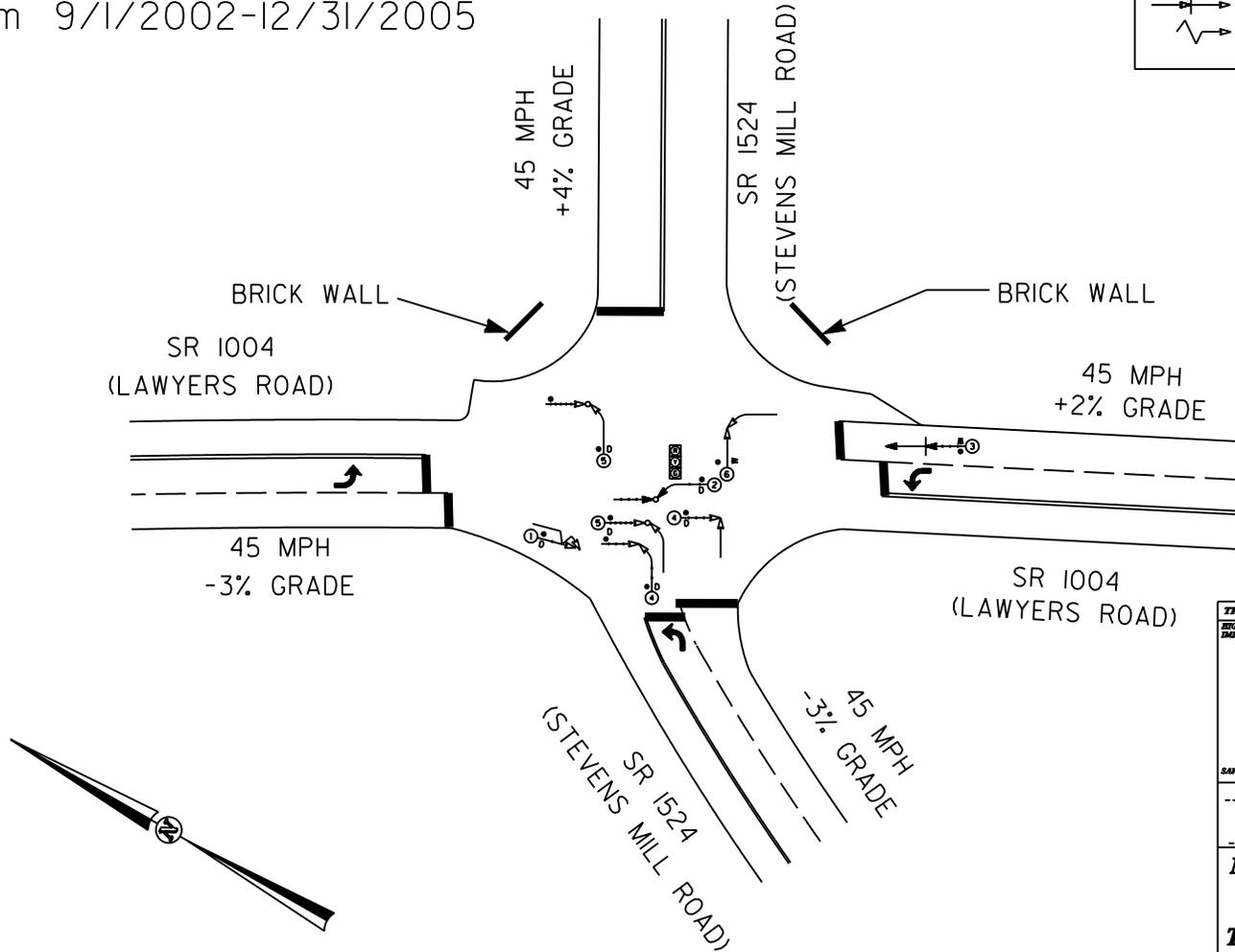
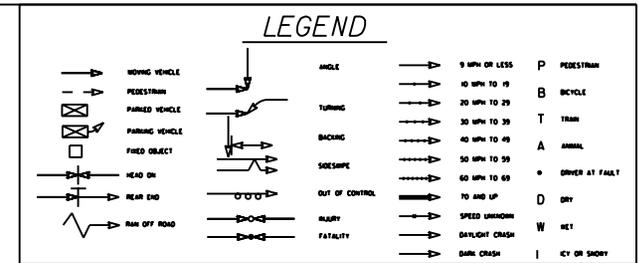
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT <small>HIGHWAY SAFETY IMPROVEMENT PROGRAM</small>		COLLISION DIAGRAM	
		DIVISION: 10	AREA: ..
<small>SAFETY INFORMATION MANAGEMENT AND SUPPORT</small>		STUDY PERIOD: 3/1/1997 TO 8/31/1999	
<small>SAFETY EVALUATION</small>		DISTANCE: Y-LINE: 150 FT	
<small>TRAFFIC SAFETY</small>		ANALYSIS PREPARED BY: B.Bohler000	
BEFORE SIGNAL INSTALLATION		DIAGRAM PREPARED BY: B.Bohler000	
		DATE: 8/21/2006	
		LOG NUMBER: 2005R244	
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			

Union County
 SR 1004 (Lawyers Rd) and
 SR 1524 (Stevens Mill Rd)
 Treatment Site in the After Period
 From 12/1/1999-5/31/2002



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		COLLISION DIAGRAM	
ROADWAY SAFETY IMPROVEMENT PROGRAM	SAFETY INFORMATION MANAGEMENT AND SUPPORT	DIVISION: 10	AREA: ..
		STUDY PERIOD: 12/1/1999 TO 5/31/2002	
		DISTANCE: Y-LINE: 150 FT	
SAFETY EVALUATION		ANALYSIS PREPARED BY: B.Booth0000	
TRAFFIC SAFETY		DIAGRAM PREPARED BY: B.Booth0000	
AFTER SIGNAL INSTALLATION		DIAGRAM REVIEWED BY:	
SCALE: NOT TO SCALE		DATE: 8oct2006	
LOG NUMBER: 2005R244			
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			

Union County
 SR 1004 (Lawyers Rd) and
 SR 1524 (Stevens Mill Rd)
 Treatment Site After Turn Lanes
 From 9/1/2002-12/31/2005



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		COLLISION DIAGRAM	
<small>HIGHWAY SAFETY IMPROVEMENT PROGRAM</small>	<small>SAFETY INFORMATION MANAGEMENT AND SUPPORT</small>	DIVISION: 10	AREA: ..
		STUDY PERIOD: 9/1/2002 TO 12/31/2005	
		DISTANCE:	Y-LINE: 150 FT
		ANALYSIS PREPARED BY: B.Boyd0500	
		DIAGRAM PREPARED BY: B.Boyd0500	
SAFETY EVALUATION		TRAFFIC SAFETY	
AFTER TURN LANE INSTALLATION		SCALE: NOT TO SCALE	
		DATE: 8/21/2006	
		LOG NUMBER: 2005R215	
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			