

Spot Safety Project Evaluation


Spot Safety Project # 03-07-208

Spot Safety Project Evaluation of the Signal Installation at SR 1322 and SR 1175, Addition of Northbound and Eastbound Left-Turn Lanes and Extension of Northbound and Eastbound Right-Turn Lanes at SR 1322 and US 117 - NC 132, and Addition of Concrete Median on West Leg of SR 1322 at US 117 - NC 132

**SR 1322 (Bavarian Ln.) from SR 1175 (N. Kerr Ave.) to US 117 - NC 132 (N. College Rd.)
New Hanover County**

Documents Prepared By:
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for
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Transportation Mobility and Safety Division
North Carolina Department of Transportation

Principal Investigator



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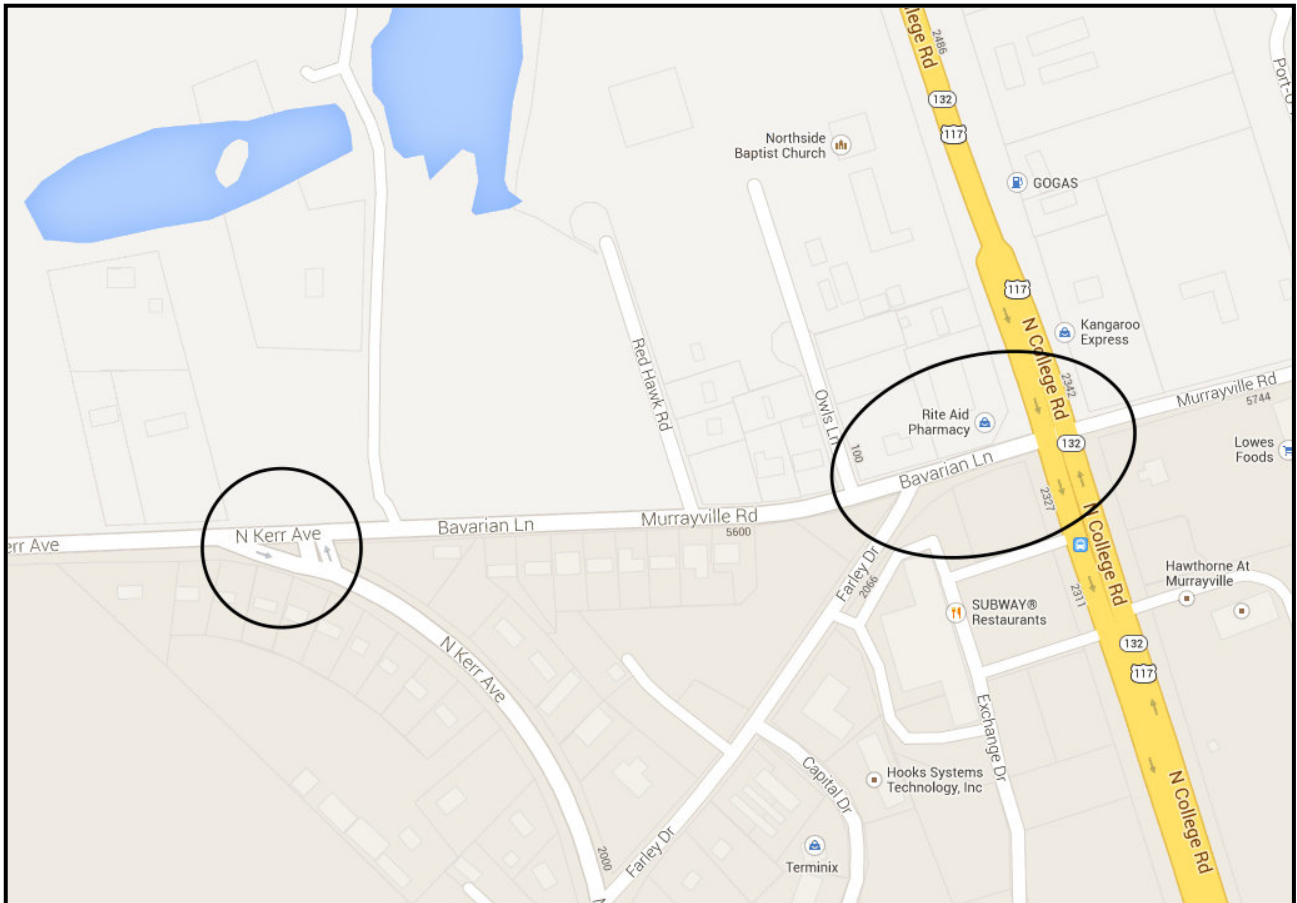
9-13-2013
Date

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 03-07-208 located on SR 1322 (Bavarian Lane) from SR 1175 (N. Kerr Avenue) to US 117 - NC 132 (N. College Rd.) in New Hanover County.

The Sig ID is 03-0302 for the 3-Phase Actuated Traffic Signal at SR 1322 and SR 1175.





Aerial Provided from Google Maps

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the addition of a signal at SR 1322 and SR 1175, along with several improvements in the area of the SR 1322 intersection with US 117 - NC 132. The countermeasures at that location include: the construction of additional left-turn lanes on the northbound and eastbound approaches, the extension of the right-turn lanes on the northbound and eastbound approaches, and the addition of a concrete median on the west leg of the intersection.

SR 1322 and SR 1175 are both 2-lane-lane facilities in the vicinity of the study location. US 117 - NC 132 is a four-lane road, which widens for left- and right-turn lanes at the intersection with SR 1322. The speed limit on SR 1322 is 55 mph west of SR 1175 and 45 mph east of SR 1175. The speed limit is 55 mph on both US 117 - NC 132 and SR 1175. The subject location consists of a three-leg intersection at SR 1322 and SR 1175, which is stop-controlled on SR 1175 and a four-leg signalized intersection at SR 1322 and US 117 - NC 132.

The original statement of problem was the presence of a high number of collisions and high traffic volumes along the section of SR 1322. There were three crash analyses prepared initially for this location. All were completed for the time period between November 1, 2001 and November 1, 2006. One was for the section of SR 1322 between SR 1175 and US 117 - NC 132 and resulted in nineteen (19) reported crashes. The second analysis was for the intersection of SR 1175 and SR 1322. This study resulted in twelve (12) reported crashes. The third analysis was for the intersection of SR 1322 and US 117 - NC 132. That study resulted in fifty-five (55) reported crashes. The final completion date for the improvement at the subject intersection was on November 4, 2008 with a total cost of \$865,000.00.

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 were the months of October through December 2008. The before period consisted of reported crashes from April 1, 2004 through September 30, 2008 (4 years, 6 months); and the after period consisted of reported crashes from January 1, 2009 through June 30, 2013 (4 years, 6 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 section of SR 1322 from SR 1175 to US 117 - NC 132. It should be noted that the study was broken up into two parts, Intersection #1 and Intersection Area #2. The study at Intersection #1 includes all crashes within 150 ft. of the intersection of SR 1322 (Bavarian Ln.) and SR 1175 (N. Kerr Ave.). The second study, Intersection Area #2, includes all crashes within 150 ft. of the section from 150 ft. west of the end of the concrete median that was constructed on the west leg of SR 1322 at US 117 – NC 132 to 150 ft. east of the intersection of SR 1322 and US 117 – NC 132. *Please see attached location map and aerial map for further details.*

The following data tables depict the Naive Before and After Analysis for the treatment locations. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. Frontal Impact crashes include: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

Intersection #1: SR 1322 (Bavarian Ln.) at SR 1175 (N. Kerr Ave.)

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	10	2	- 80.0 %
Total Severity Index	2.48	1.00	- 59.7 %
Target Crashes	4	2	- 50.0 %
Target Crash Severity Index	2.85	1.00	- 64.9 %
Volume – Section (2006, 2011)	15,800	12,800	- 19.0 %

Intersection #1: SR 1322 (Bavarian Ln.) at SR 1175 (N. Kerr Ave.)

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	2	0	- 100.0 %
Class C Injury Crashes	0	0	N/A
Property Damage Only	8	2	- 75.0 %

Intersection Area #2: SR 1322 (Bavarian Ln. / Murrayville Rd.) at US 117 – NC 132 (N. College Rd.)

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	79	60	- 24.1 %
Total Severity Index	4.68	3.34	- 28.6 %
Target Crashes	24	19	- 20.8 %
Target Crash Severity Index	4.70	4.89	+ 4.0 %
Volume – Section (2006, 2011)	15,800	12,800	- 19.0 %

Intersection Area #2: SR 1322 (Bavarian Ln. / Murrayville Rd.) at US 117 – NC 132 (N. College Rd.)

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	1	0	- 100.0 %
Class B injury Crashes	6	3	- 50.0 %
Class C Injury Crashes	23	16	- 30.4 %
Property Damage Only	49	41	- 16.3 %

The naive before and after analysis at the treatment locations resulted in an 80 percent decrease in Total Crashes at Intersection #1 and a 24.1 percent decrease in Total Crashes at Intersection Area #2. The tables also show a 50 percent reduction in Target Frontal Impact Crashes at Intersection #1 and a 20.8 percent reduction at Intersection Area #2. Additionally, there was a 64.9 percent decrease in the Total Severity Index at Intersection #1, while the Total Severity Index increased by 4 percent at Intersection Area #2. The before period ADT year was 2006 and the after period ADT year was 2011.

To further analyze the intersection crash patterns, the following chart shows different traffic movements and the change in crash totals through the study:

Intersection #1: SR 1322 (Bavarian Ln.) at SR 1175 (N. Kerr Ave.)

<u>Additional Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Left Turn, Same Roadway (Target)	2	0	- 100.0 %
Left Turn, Different Roadway (Target)	2	0	- 100.0 %
Right Turn, Different Roadway (Target)	0	2	+ 200.0 %
Rear End Crashes	3	0	- 100.0 %

Intersection Area #2: SR 1322 (Bavarian Ln. / Murrayville Rd.) at US 117 – NC 132 (N. College Rd.)

<u>Additional Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Angle (Target)	8	4	- 50.0 %
Left Turn, Same Roadway (Target)	6	2	- 66.7 %
Left Turn, Different Roadway (Target)	5	4	- 20.0 %
U-Turn, Same Roadway (Target)	1	7	+ 600.0 %
Southbound Rear End Crashes	11	8	- 27.3 %
Northbound Rear End Crashes	12	9	- 25.0 %
Eastbound Rear End Crashes	10	7	- 30.0 %

Results and Discussion

Referencing the *Collision Diagrams*, the target crashes experienced a 50 percent reduction in frontal impact collisions at Intersection #1 and a 20.8 percent reduction in frontal impact collisions at Intersection Area #2. From the additional information chart above for Intersection Area #2, the number of angle crashes decreased from eight (8) in the before period to four (4) in the after period. At Intersection #1, both left-turn, same roadway and left-turn, different roadway crashes decreased from two (2) in the before period to zero (0) in the after period. Rear end crashes decreased from three (3) in the before period to zero (0) in the after period. However, right-turn, different roadway crashes increased from zero (0) in the before period to two (2) in the after period.

Additionally, left-turn same roadway crashes at Intersection Area #2 decreased from six (6) in the before period to 2 (two) in the after period. U-turn same roadway crashes increased from one (1) in the before period to seven (7) in the after period. All of the U-turn same roadway crashes in the after period occurred at the end of the concrete median, just west of SR 2616.

The number of southbound rear-end collisions in Intersection Area #2 decreased from eleven (11) to eight (8) during the evaluation time frame. Similarly, the northbound and eastbound approaches saw decreases of 25 percent and 30 percent, respectively.

The target severity index for Intersection #1 decreased by 64.9 percent. However, at Intersection Area #2, the target severity index increased by 4 percent, despite a decrease in total target crashes of 20.8 percent.

Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for all approaches to the treatment intersection areas. 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.

Treatment Site Photos from Google Street View



Google Maps (July 2012) – Looking East on SR 1322 (Bavarian Ln.) at SR 1175 (N. Kerr Ave.)



Google Maps (September 2012) – Looking North from SR 1175 (N. Kerr Ave.) Approach



Google Maps (September 2012) – Looking West on SR 1322 (Bavarian Ln.) at SR 1175 (N. Kerr Ave.)



Google Maps (September 2012) – Looking East on SR 1322 (Bavarian Ln.) at US 117 - NC 132 (N. College Rd.)



Google Maps (July 2012) – Looking South on US 117 - NC 132 (N. College Rd.) at SR 1322 (Bavarian Ln. / Murrayville Rd.)



Google Maps (September 2012) – Looking West on SR 1322 (Murrayville Rd.) at US 117 - NC 132 (N. College Rd.)

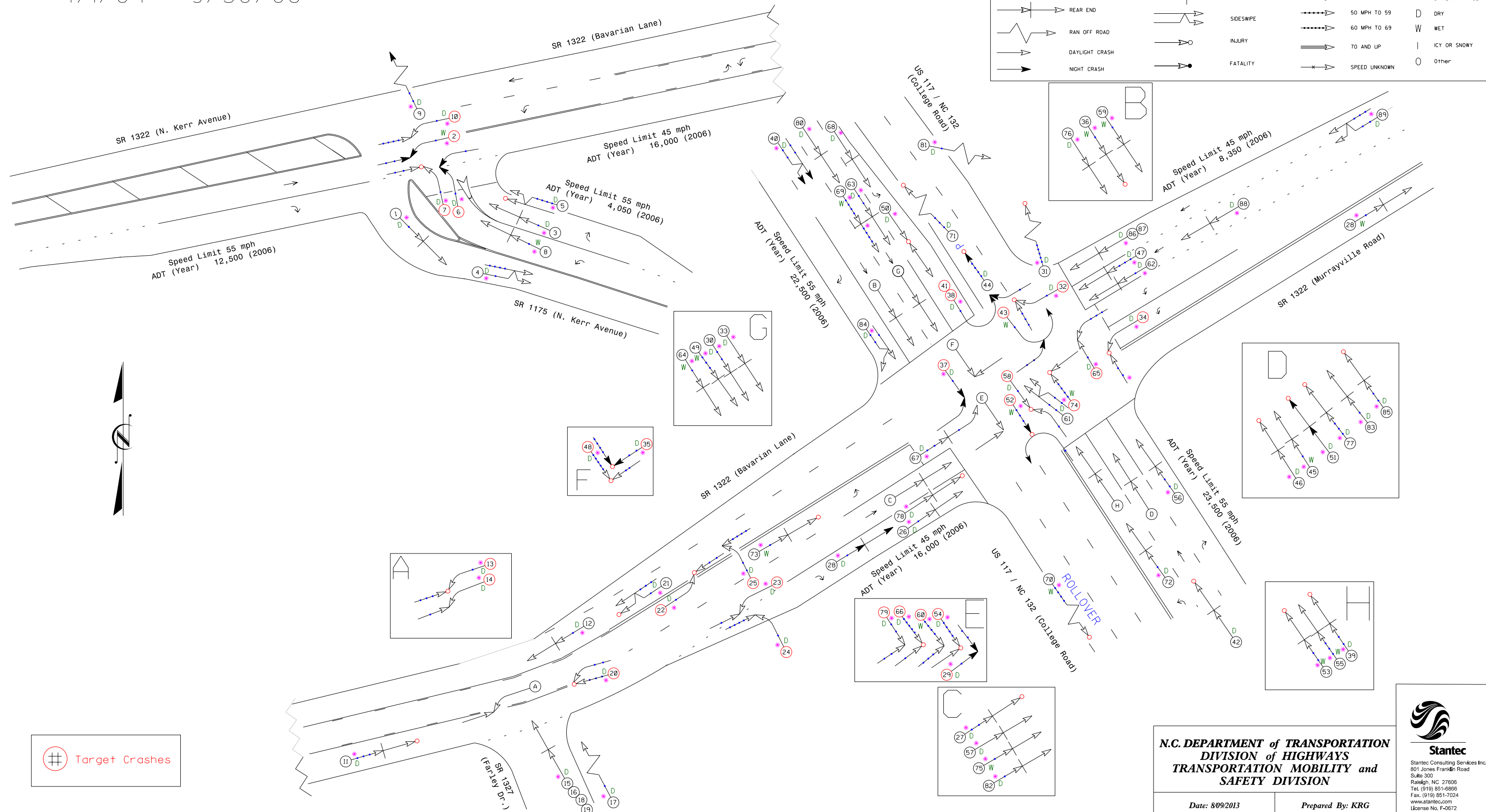


Google Maps (July 2012) – Looking North on US 117 - NC 132 (N. College Rd.) at SR 1322 (Bavarian Ln. / Murrayville Rd.)

SS# 03-07-208
 New Hanover County
 Before Period
 4/1/04 - 9/30/08

LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		A ANIMAL
	PARKED VEHICLE		TURNING		10 MPH TO 19		P PEDESTRIAN
	PARKING VEHICLE		BACKING		20 MPH TO 29		B BICYCLE
	MOVABLE OBJECT		SIDESWIPE		30 MPH TO 39		T TRAIN
	HEAD ON		INJURY		40 MPH TO 49		* DRIVER AT FAULT
	REAR END		FATALITY		50 MPH TO 59		D DRY
	RAN OFF ROAD		SPEED UNKNOWN		60 MPH TO 69		W WET
	DAYLIGHT CRASH				70 AND UP		I ICY OR SNOWY
	NIGHT CRASH				SPEED UNKNOWN		O Other



Target Crashes

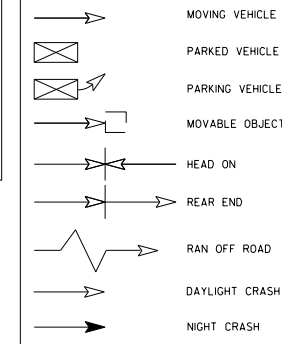
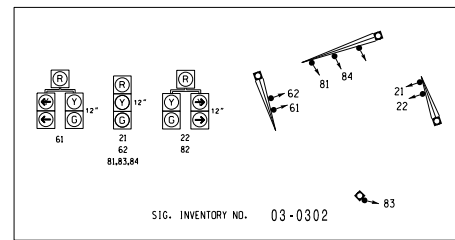
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRANSPORTATION MOBILITY and
SAFETY DIVISION

Date: 8/09/2013

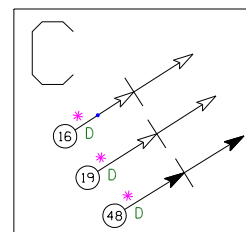
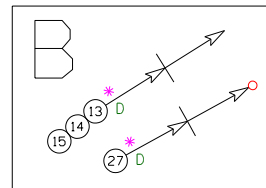
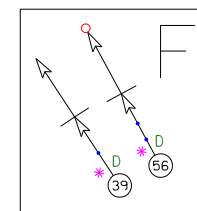
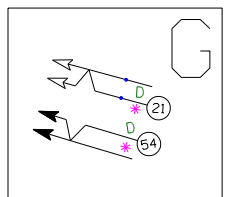
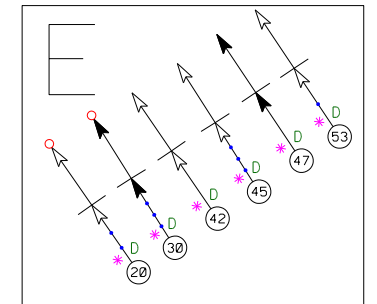
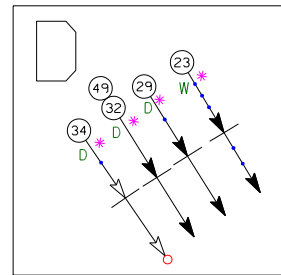
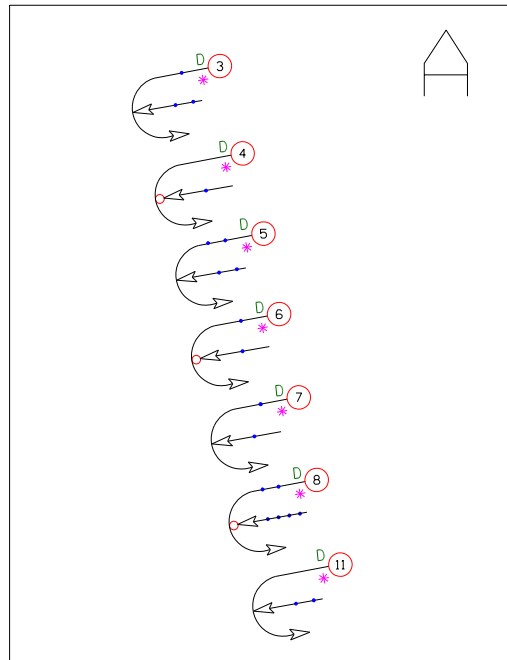
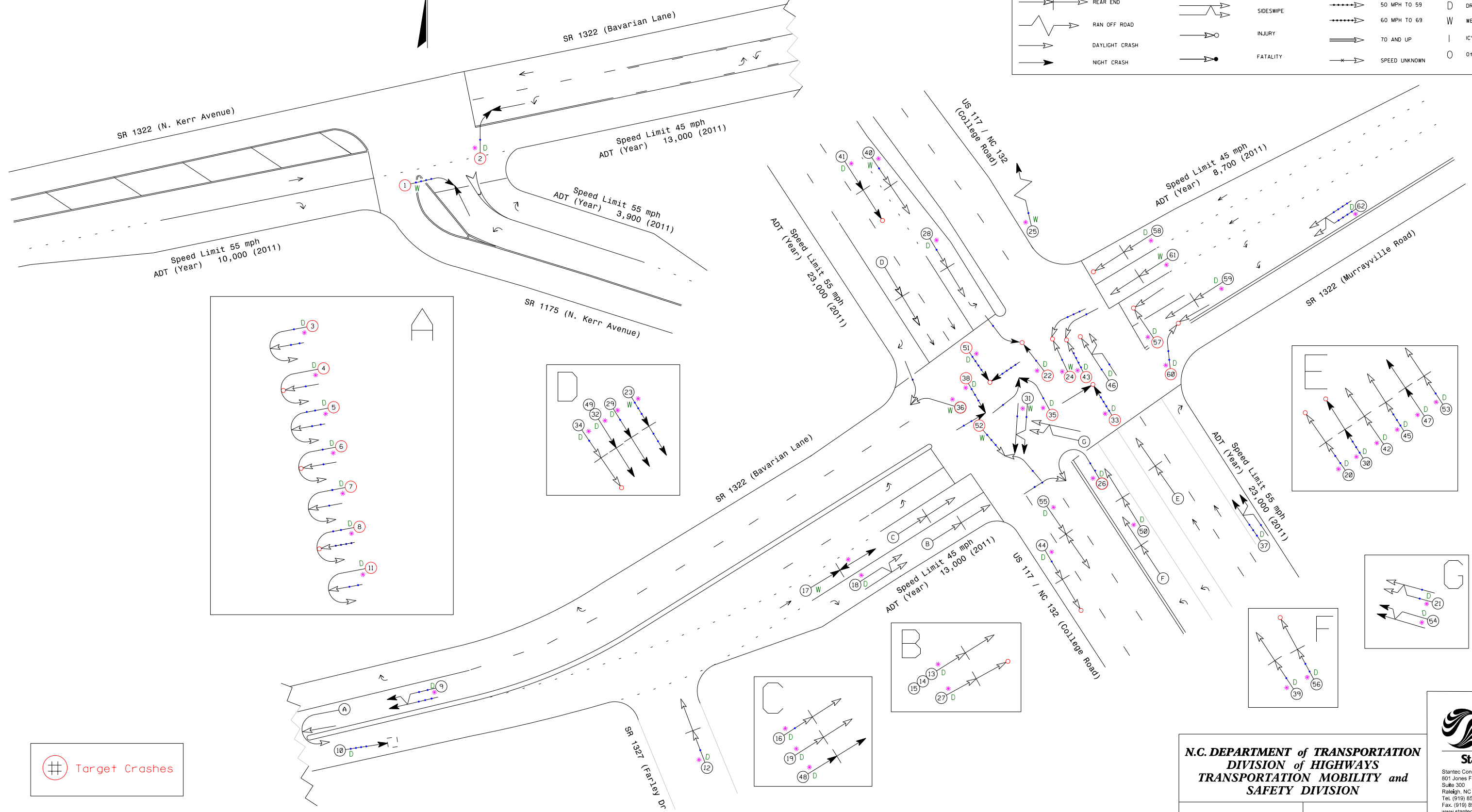
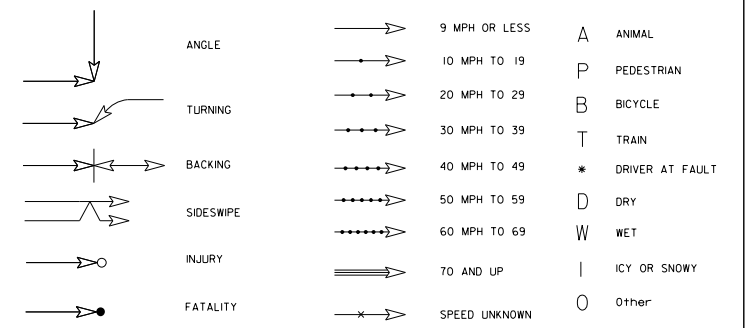
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SS# 03-07-208
 New Hanover County
 After Period
 1/1/09 - 6/30/13



LEGEND



⊕ Target Crashes

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

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