

# Spot Safety Project Evaluation

Spot Safety Project # 14-07-204

## Spot Safety Project Evaluation of the Signal Installation NC 9 at NC 108 Polk County

Documents Prepared By:  
Stantec Consulting Ltd.  
for  
Safety Evaluation Group  
Traffic Safety Systems Management Section  
Transportation Mobility and Safety Division  
North Carolina Department of Transportation

### Principal Investigator



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Transportation Designer

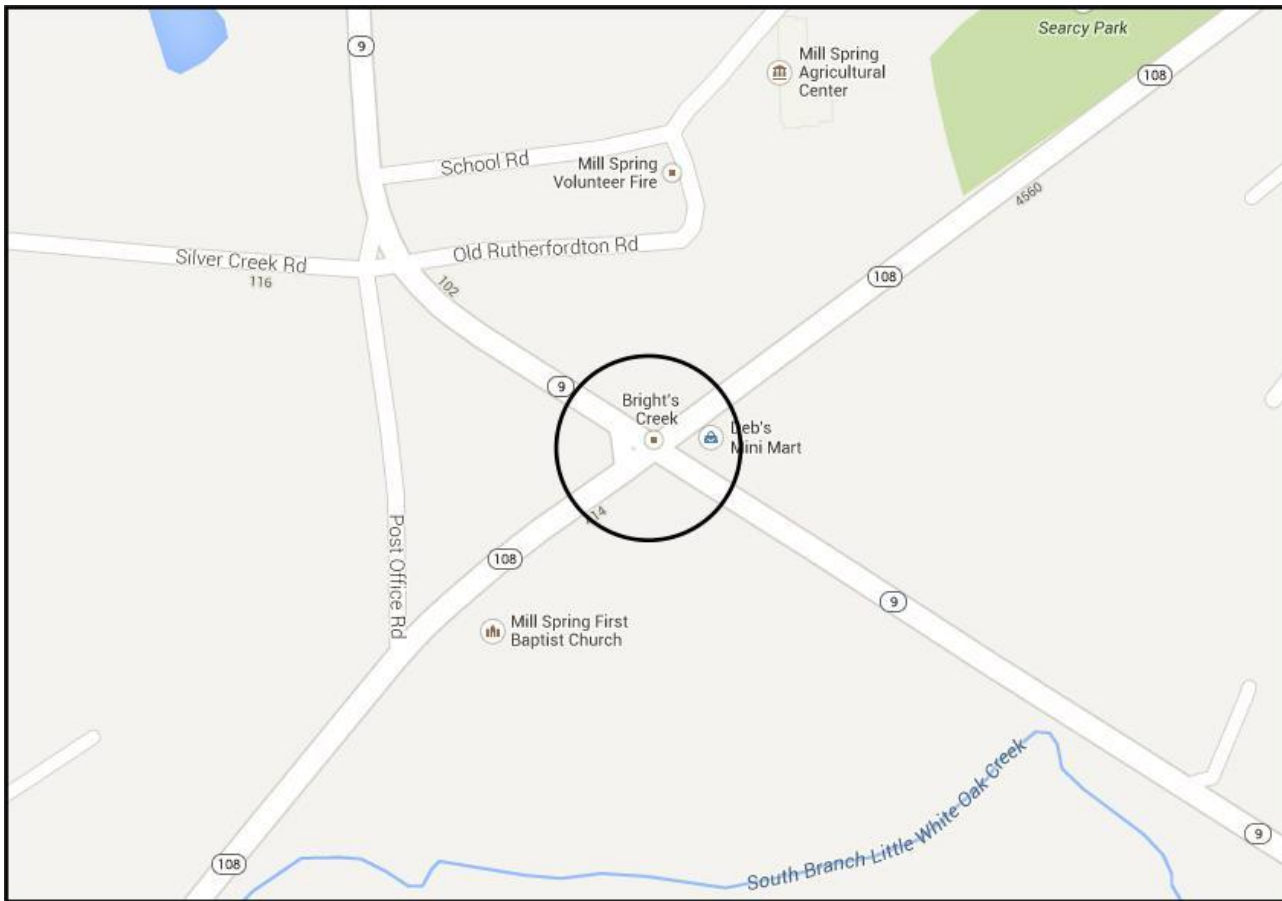
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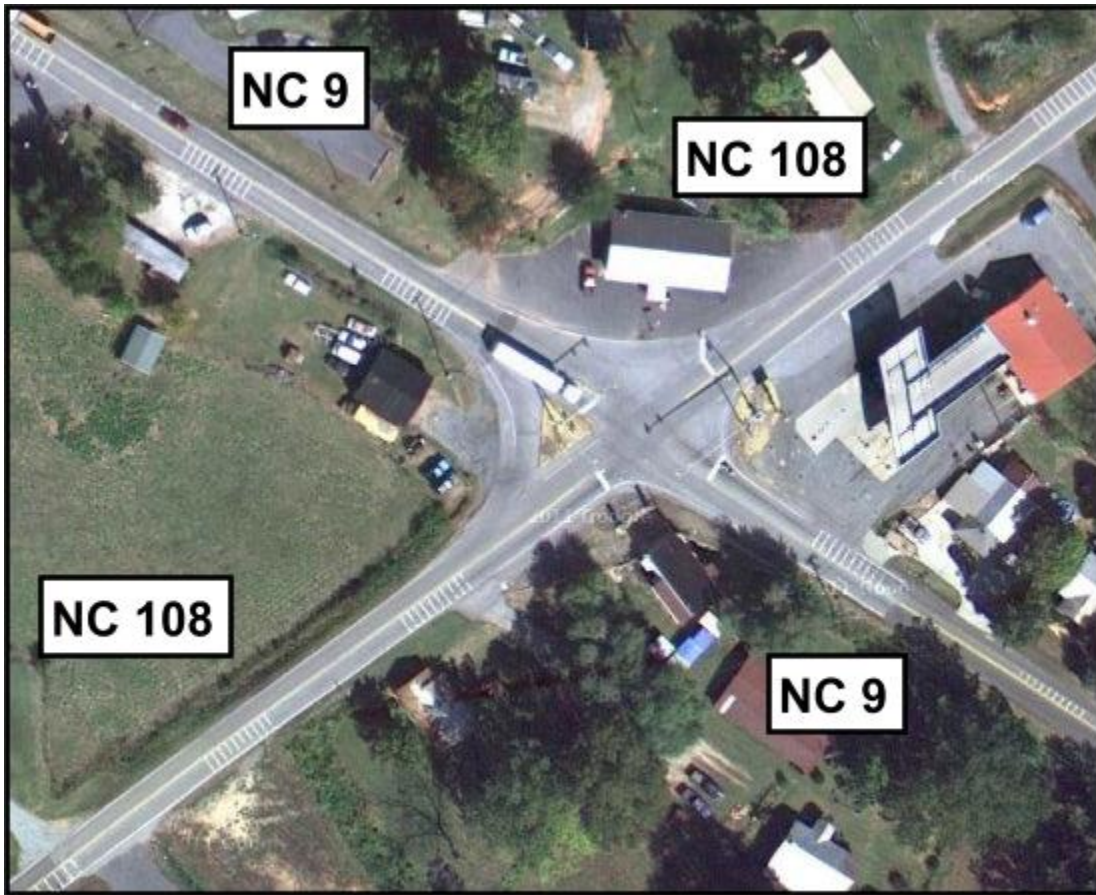
# *Spot Safety Project Evaluation Documentation*

## **Subject Location**

Evaluation of Spot Safety Project Number 14-07-204 located at the Intersection of NC 9 at NC 108 in Polk County.

The Sig ID is 14-0717 for this 2-Phase Actuated Traffic Signal.





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 installation of a signal.

NC 9 and NC 108 are 2-lane roadways. NC 9 has a channelized right turn lane at the intersection on its eastbound leg. The speed limit on all approaches is 35-mph. The subject location is a four-leg intersection, which is stop-controlled on NC 9.

The original statement of problem was the existence of left turn crash patterns. The initial crash analysis was completed from December 1, 2001 to November 30, 2006 with twenty-two (22) reported crashes. The final completion date for the improvement at the subject intersection was on September 24, 2008 with a total cost of \$130,000.00.

### **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 August through October 2008. The before period consisted of reported crashes from February 1, 2004 through July 31, 2008 (4 years, 6 months); and the after period consisted of

reported crashes from November 1, 2008 through February 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 subject intersection for the NC 9 and NC 108 approaches. *Please see attached location map and aerial map 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. Frontal Impact crashes include: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

<b><u>Treatment Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	34	9	- 73.5 %
Total Severity Index	8.51	3.47	- 59.2 %
Target Crashes	27	7	- 74.0 %
Target Crash Severity Index	9.9	3.11	- 68.6 %
Volume (2006, 2011)	9,000	7,300	-18.8 %

<b><u>Injury Crash Summary</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal injury Crashes	1	0	- 100.0 %
Class A injury Crashes	1	0	- 100.0 %
Class B injury Crashes	3	0	- 300.0 %
Class C Injury Crashes	11	3	- 72.7 %
Property Damage Only	18	6	- 66.7 %

The naive before and after analysis at the treatment location resulted in a 73.5 percent decrease in Total Crashes, a 74 percent reduction in Target Frontal Impact Crashes, and a 68.6 percent decrease in the Target Crash Severity Index. 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:

<b><u>Additional Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Angle	21	2	- 90.5 %
Left Turn, Same Roadway on NC 108	4	2	- 50.0 %
Left Turn, Same Roadway on NC 9	0	3	+ 300.0 %
Rear End crashes on NC 108	0	1	+100.0 %
Rear End Crashes on NC 9	4	0	-400.0 %

## Results and Discussion

Referencing the *Collision Diagrams*, the target crashes decreased from twenty-seven (27) to seven (7) from the before to the after period. In the before period, the target crashes were 79.4% all crashes that occurred. The target crashes in the after period were 77.7% of all crashes in the study.

From the additional information chart above, the angle crashes reduced from twenty-one (21) to two (2) in the after period. Of the left turn, same roadway crashes on NC 9 three (3) occurred in the after period, and increase from zero (0) in the before period. The left turn, same roadway crashes on NC 108 decreased from four (4) to two (2) through the evaluation time frame.

The target severity index did decrease by 68.6 percent. There were two (2) K and A level crashes in the before period, and zero (0) after. Additionally, the B and C level crashes decreased from twelve (12) to two (2) from the before period to the after period for target crashes.

Along NC 108, the rear end crashes decreased from four (4) to zero (0) throughout the evaluation period. However, the rear-end crashes on NC 9 increased from zero (0) to one (1).

Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for all three 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.



**Treatment Site Photos from Google Street View**



**Google Maps (May 2012) – Looking Northwest on NC 9 Approach**



**Google Maps (May 2012) – Looking Northeast from NC 108 Approach**

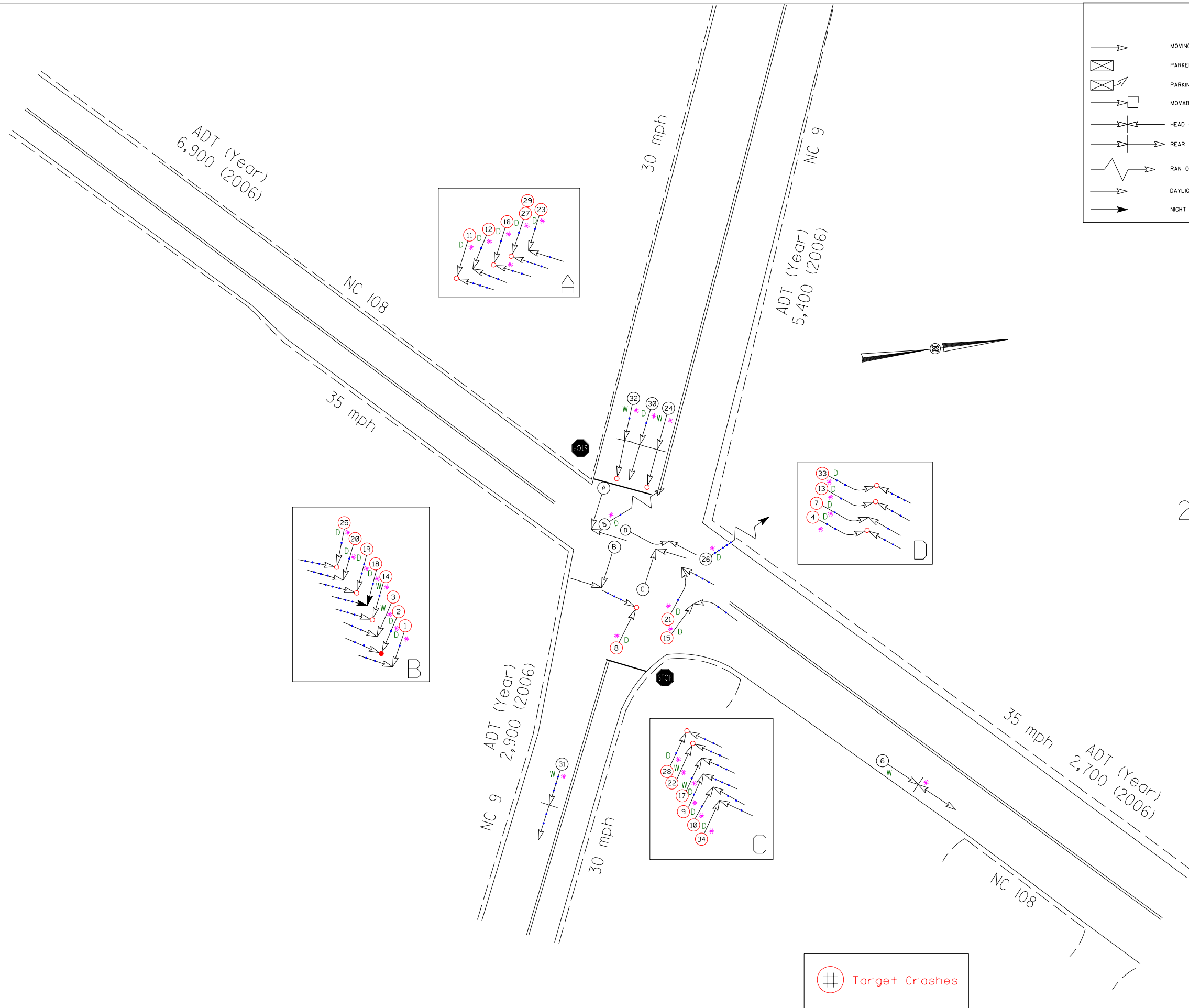


Google Maps (May 2012) – Looking Southwest from NC 108 Approach



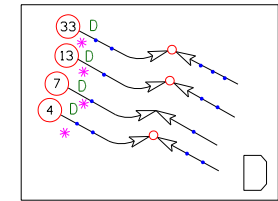
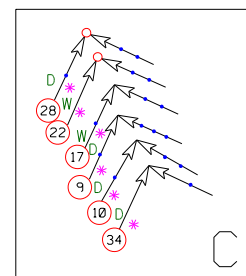
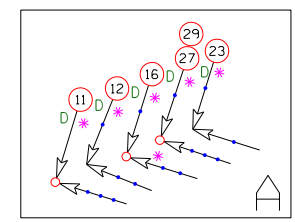
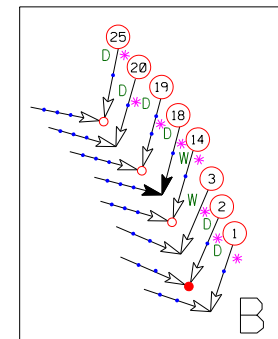
Google Maps (May 2012) – Looking Southeast from NC 9 Approach





SS# 14-07-204  
 Polk County  
 Before Period  
 2/1/04 - 7/31/08

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



Target Crashes

PREPARED FOR  
**N.C. DEPARTMENT of TRANSPORTATION**  
**DIVISION of HIGHWAYS**  
**TRANSPORTATION MOBILITY and**  
**SAFETY DIVISION**

Date: 7/11/2013

Prepared By: ESS

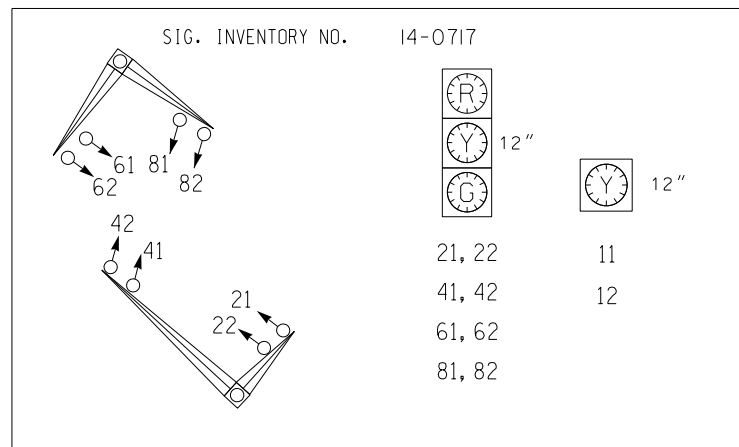
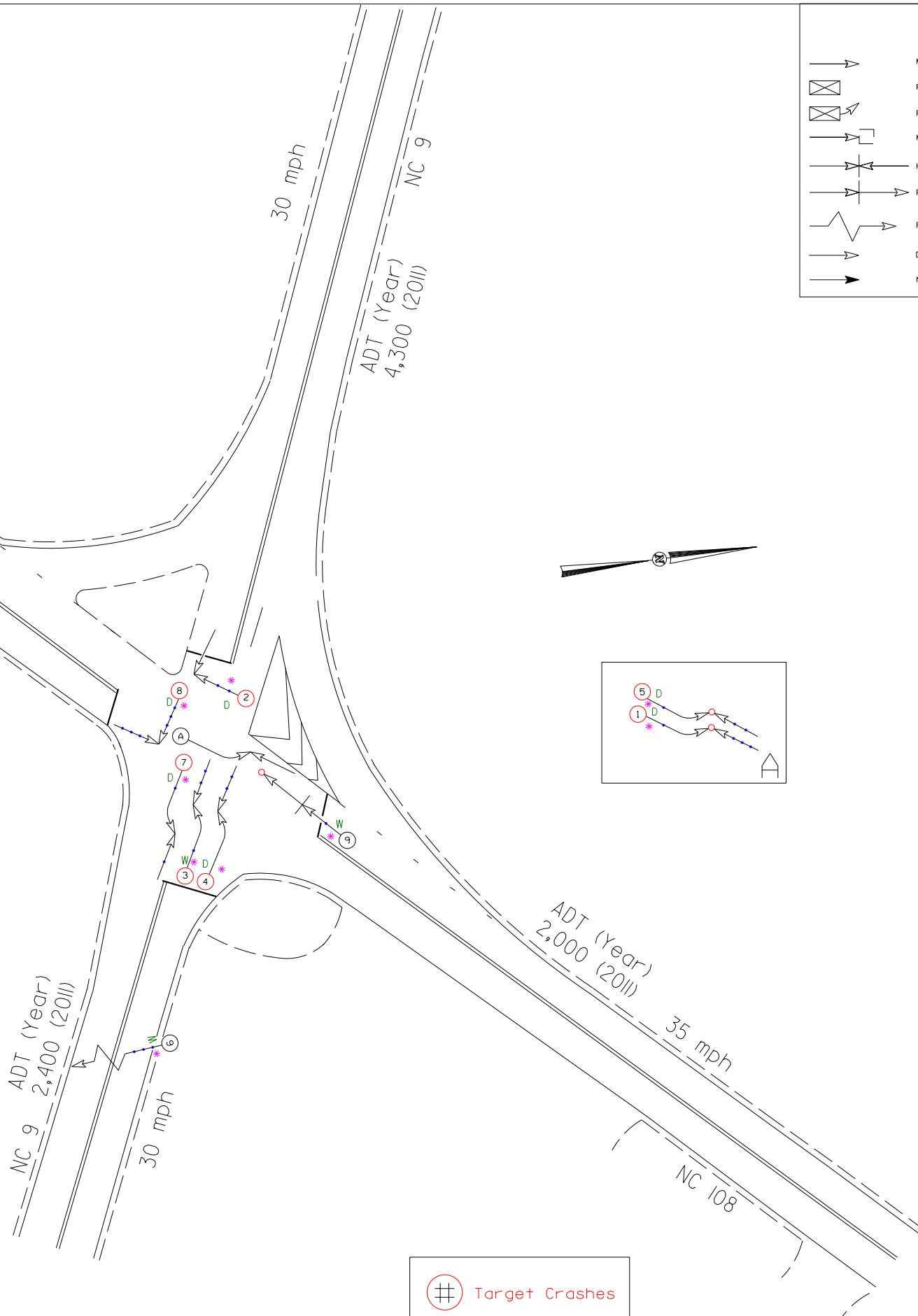
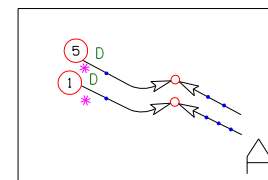
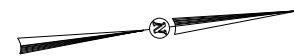
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# LEGEND

	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		WET		60 MPH TO 69		I ICY OR SNOWY
	DAYLIGHT CRASH		SPEED UNKNOWN		70 AND UP		O Other
	NIGHT CRASH						

SS# 14-07-204  
 Polk County  
 After Period  
 11/1/08 - 4/30/13



Target Crashes

PREPARED FOR  
**N.C. DEPARTMENT of TRANSPORTATION**  
**DIVISION of HIGHWAYS**  
**TRANSPORTATION MOBILITY and**  
**SAFETY DIVISION**

Date: 7/11/2013

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