

# Spot Safety Project Evaluation

Order # 41000023402

Spot Safety Project # 08-07-205

**Spot Safety Project Evaluation of the  
4-Way Stop Intersection Conversion  
NC 902 at SR 1006 (Siler City Glendon Road)  
Chatham County**

Documents Prepared By:

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

**Principal Investigator**



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Jason B. Schronce

5-13-2013

Date

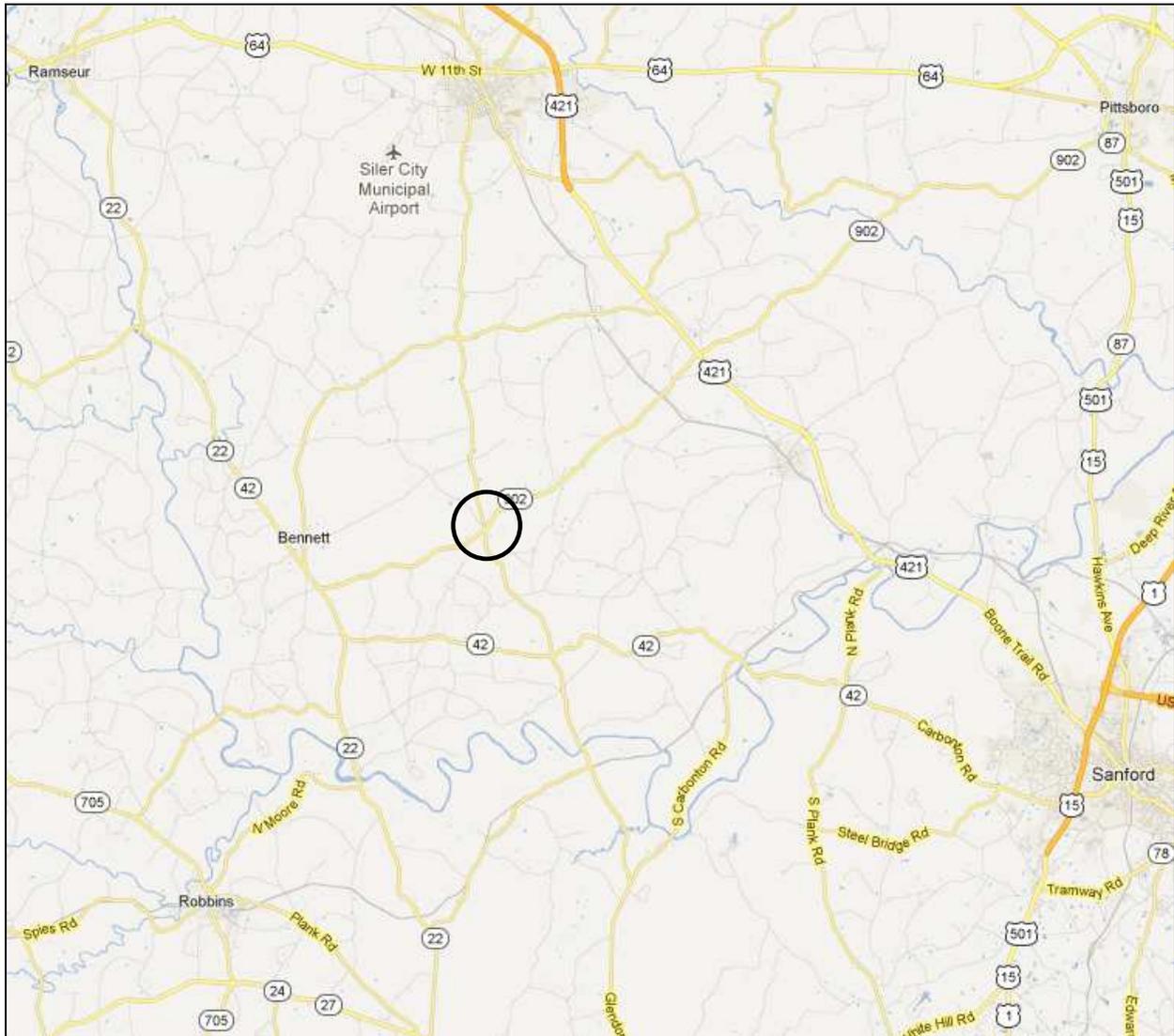
Traffic Safety Project Engineer

# *Spot Safety Project Evaluation Documentation*

## **Subject Location**

Evaluation of Spot Safety Project Number 08-07-205 located at the Intersection of NC 902 and SR 1006 (Siler City Glendon Road) in Chatham County, intersection referred to as Harpers Crossroads.

The pre-existing and modified intersection flasher is Sig ID 08-0611.





**Before Period Aerial Map from Google Maps**



**After Period Aerial Map from BING Maps**

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

The spot safety project improvement countermeasure chosen for the subject location was the intersection conversion to 4-Way Stop Control. NC 902 and SR 1006 are both two-lane facilities at the subject intersection with approach speed limits ranging from 45-mph to 55-mph. The subject location is a four-leg crossroads intersection, which was previously controlled by a stop condition on the SR 1006 (Siler City Glendon Road) approaches. The intersection does maintain an overhead flasher (Sig ID 08-0611) and there is a slip ramp for southwest NC 902 motorists accessing northbound SR 1006.

The original statement of problem concluded that vehicles travelling on SR 1006 were failing to yield to vehicles on NC 902. This location met 2005 HSIP Listing (PH#18I000024) due to chronic problem of angle and left turn different road type crashes. Overall, vehicles are obeying the stop condition on SR 1006 but fail to yield to traffic on NC 902; potentially due to skew angle of the intersection.

The initial crash analysis was completed from March 1, 2002 to February 28, 2007 with eleven (11) reported right angle crashes, all of which were deemed correctable. The final completion date for the improvement at the subject intersection was on September 30, 2008 with a total cost of \$19,000.

## **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 September 2008. The before period consisted of reported crashes from May 1, 2004 through July 31, 2008 (4 years and 3 months); and the after period consisted of reported crashes from October 1, 2008 through December 31, 2012 (4 years and 3 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. *Please see attached location map, aerial 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	7	4	- 42.9 %
Total Severity Index	3.11	4.70	51.1 %
Target Crashes	7	2	- 71.4 %
Target Crash Severity Index	3.11	8.40	100+ %
Volume (2006, 2010)	2,900	2,600	- 10.3 %

<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	1	0	- 100.0 %
Class C Injury Crashes	1	2	100.0 %
Property Damage Only	5	2	- 60.0 %

The naive before and after analysis at the treatment location resulted in a 43 percent reduction in Total Crashes, a 71 percent reduction in Target Crashes, but a 51 percent increase in the Total Severity Index. The before period ADT year was 2006 and the after period ADT year was 2010.

## Results and Discussion

Referencing the *Collision Diagrams*, the before period presented a pattern of five (5) angle crashes, one (1) left turn different roadway, and one (1) head-on collision from a southwest NC 902 motorist who swerved into oncoming traffic to avoid an angle collision. Of the seven (7) target crashes in the before period only one (1) resulted from a vehicle disregarding the stop condition on SR 1006.

After the intersection conversion to 4-way Stop Control, there were two (2) angle collisions at the intersection. One (1) after period angle was caused by a southwest NC 902 vehicle running the stop sign and the other resulted from vehicles on different approaches assuming they had the right-of-way. Overall, safety appears to have been increased as a result of the all-way stop condition being implemented at this location.

Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for the approaches that show the 4-way stop condition. 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



Google Maps (Sept 2009) - Travelling West/Southwest on NC 902 approaching intersection



Google Maps (Sept 2009) - Looking West onto East/Northeast NC 902 Approach



**Google Maps (Sept 2009) - Looking South onto Northbound SR 1006 (Siler City Glendon Rd) Approach**



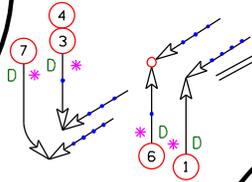
**Google Maps (Sept 2009) - Looking North onto Southbound SR 1006 Approach**



ADT (Year)  
1,700 (2006)

SR 1006  
Siler City Glendon Rd  
55-MPH

ADT (Year)  
1,700 (2006)



Note Crash 5: VEHICLE 1 TRIED TO  
AVOID ANOTHER VEHICLE TRAVELING  
SOUTH ON RP 1006



NC 902  
45-MPH

ADT (Year)  
900 (2006)

ADT (Year)  
1,500 (2006)

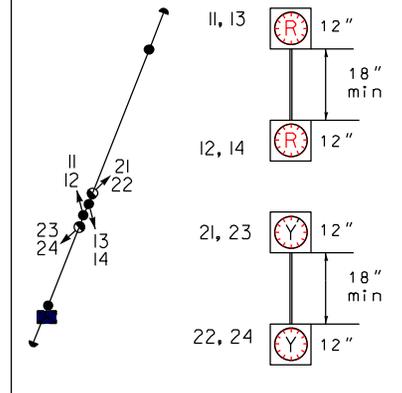
**LEGEND**

	MOVING VEHICLE		ANGLE		5 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PAKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PARKING VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		RAN OFF ROAD		50 MPH TO 59		ICY OR SNOWY
	REAR END		HAZY		60 MPH TO 69		FATALITY
	FATALITY		SPEED UNKNOWN		ONLY		

SS# 08-07-205  
Order# 41000023402  
Chatham County  
BEFORE Period  
5/1/2004 - 7/31/2008

SIG ID 08-0611

Denotes L.E.D.



Frontal Impact  
Target Crashes

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

**TRAFFIC SAFETY UNIT**

Date: 3-7-2013

Prepared By: Jason Schronce  
(Associate - Eric Thomas)



ADT (Year)  
1,500 (2010)

SR 1006  
Siler City Glendon Rd  
55-MPH

ADT (Year)  
1,600 (2010)

NC 902  
45-MPH

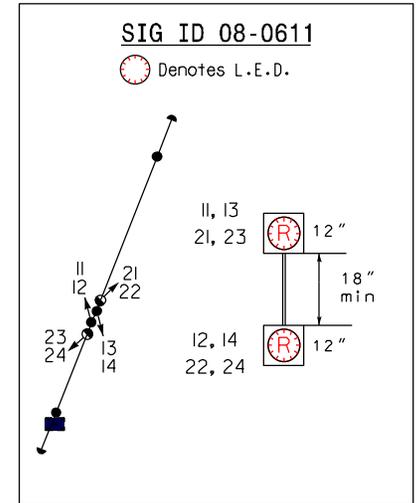
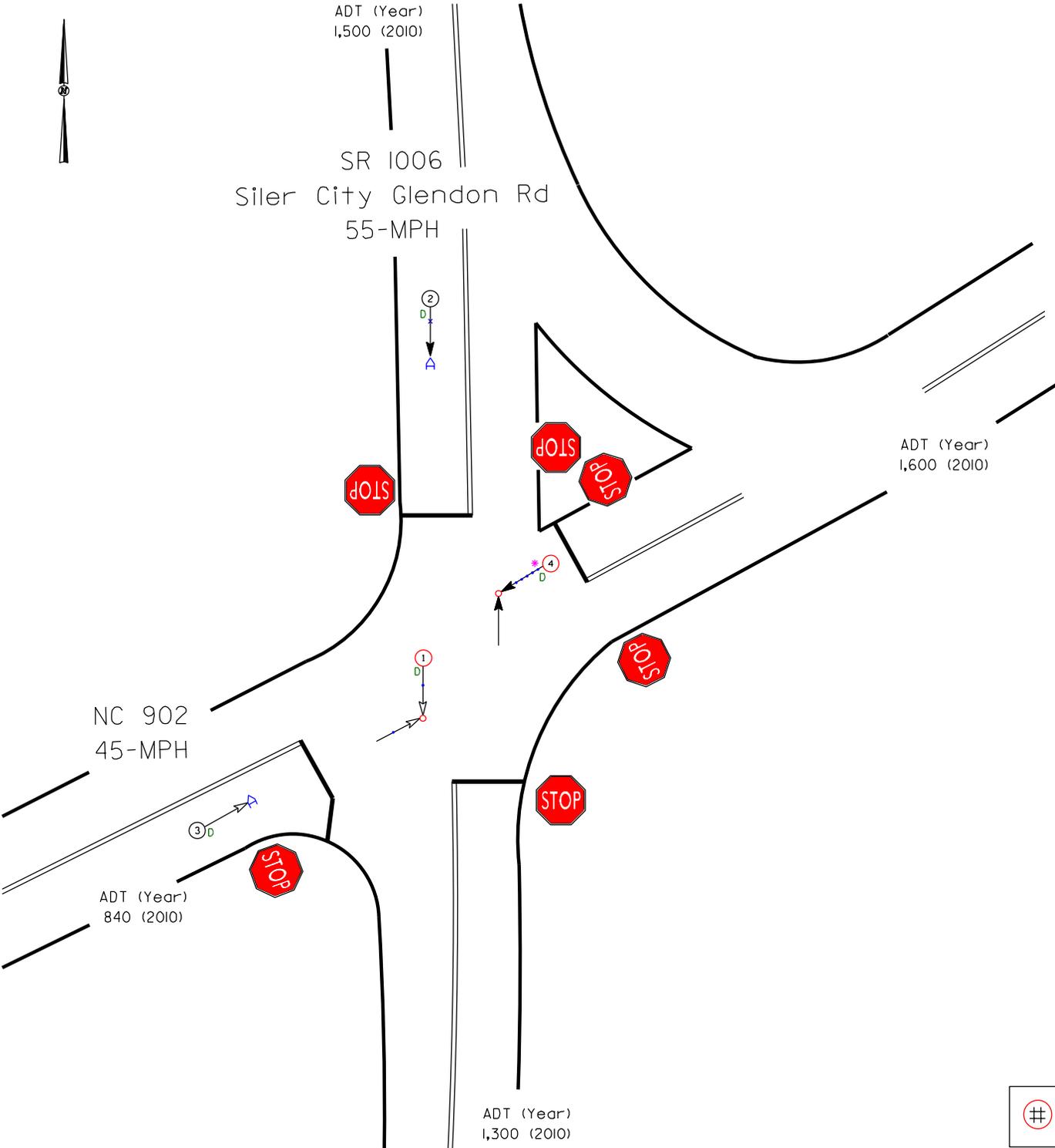
ADT (Year)  
840 (2010)

ADT (Year)  
1,300 (2010)

**LEGEND**

	MOVING VEHICLE		ANGLE		5 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PAKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PARKING VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		RAN OFF ROAD		50 MPH TO 59		ICY OR SNOWY
	REAR END		RAN OFF ROAD		60 MPH TO 69		FATALITY
	RAN OFF ROAD		RAN OFF ROAD		TO AND UP		FATALITY
			RAN OFF ROAD		SPEED UNKNOWN		FATALITY
					SPEED UNKNOWN		FATALITY

SS# 08-07-205  
Order# 41000023402  
Chatham County  
AFTER Period  
10/1/2008 - 12/31/2012



Frontal Impact  
Target Crashes

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

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