

# Spot Safety Project Evaluation

Spot Safety Project # 05-06-228

**Spot Safety Project Evaluation of the Signal Installation, Removal of Slip Ramps, and  
Addition of Left-Turn Lanes  
US 401 at SR 1100 (Tarboro Road)  
Franklin 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**



Kellie L. Reep  
Transportation Designer

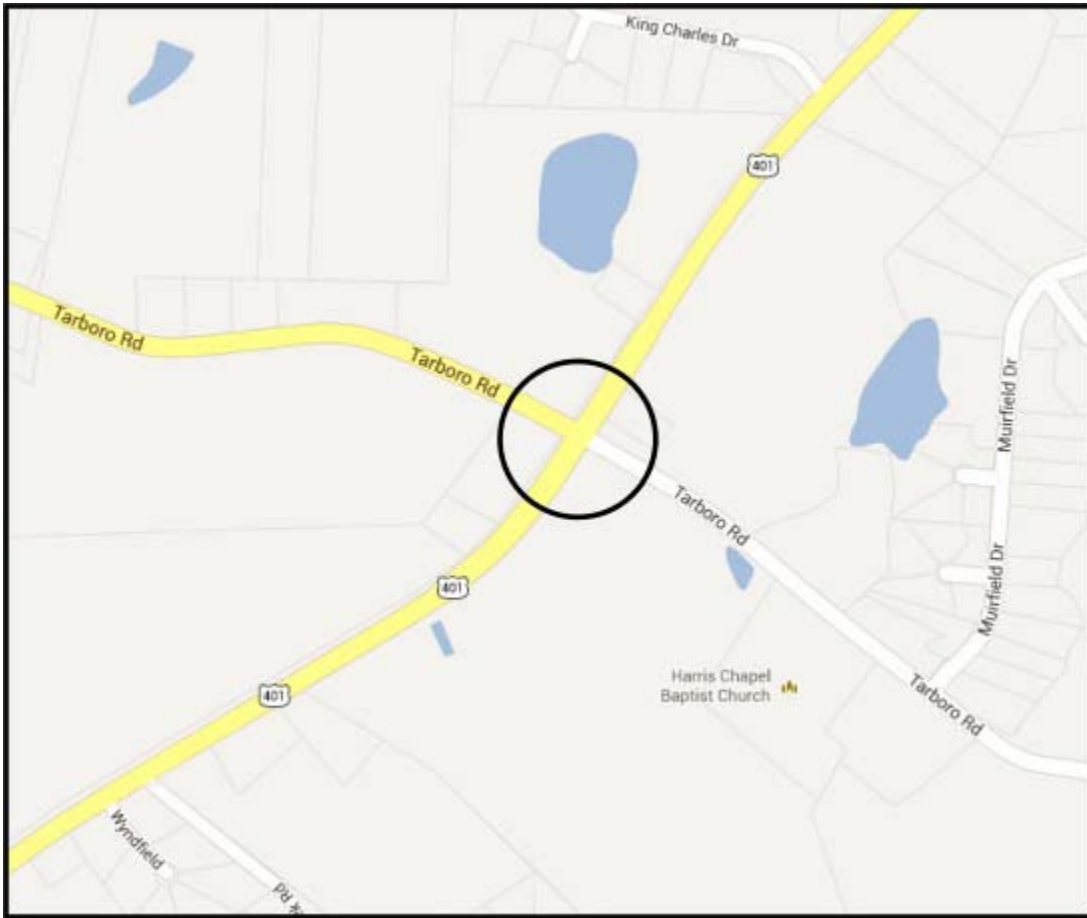
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Date

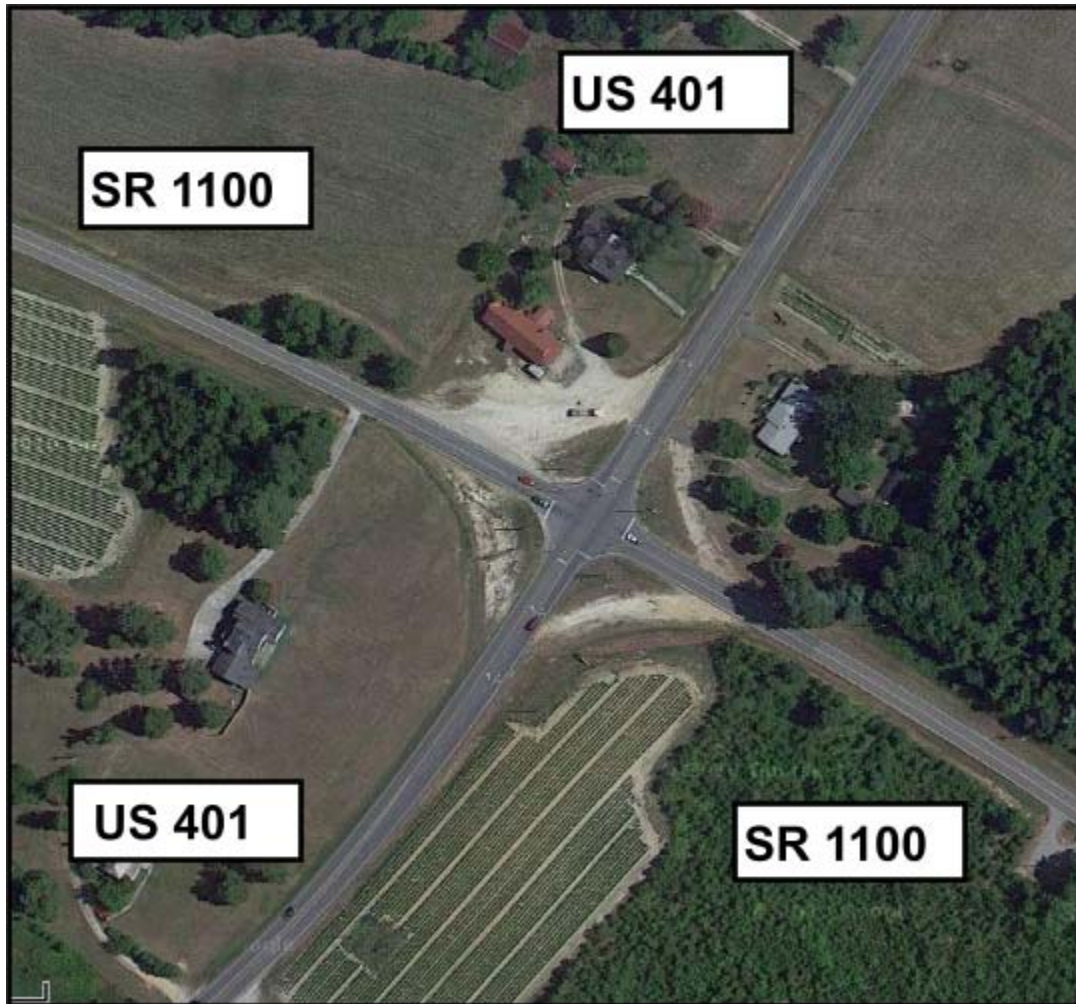
# *Spot Safety Project Evaluation Documentation*

## **Subject Location**

Evaluation of Spot Safety Project Number 05-06-228 located at the Intersection of US 401 at SR 1100 (Tarboro Road) in Franklin County, Town of Youngsville.

The Sig ID is 05-2309 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 removal of the slip ramps on all four approaches, the installation of a traffic signal, and the addition of left-turn lanes on both approaches of US 401.

US 401 and SR 1100 are both 2-lane-lane facilities in the vicinity of the study location. The speed limit on both US 401 and SR 1100 is 55-mph. The subject location is a four-leg intersection, which is stop-controlled on SR 1100. According to the TEAAS ordinance database, the speed limit on the east leg of SR 1100 was reduced from 55-mph to 45-mph in 2007, near the end of the before period.

The original statement of problem was the existence of frontal impact crash patterns. The initial crash analysis was completed from October 1, 2001 to September 30, 2006 with twenty-three (23) reported crashes. The final completion date for the improvement at the subject intersection was on February 18, 2008 with a total cost of \$350,000.00.

## 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 January through March 2008. The before period consisted of reported crashes from December 1, 2002 through December 31, 2007 (5 years, 1 month); and the after period consisted of reported crashes from April 1, 2008 through April 30, 2013 (5 years, 1 month). 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 US 401 and SR 1100 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	20	8	- 60.0 %
Total Severity Index	13.76	3.77	- 72.6 %
Target Crashes	17	2	- 88.2 %
Target Crash Severity Index	15.58	1.00	- 93.6 %
Volume (2005, 2010)	11,100	10,500	-5.4 %

<b><u>Injury Crash Summary</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal injury Crashes	2	0	- 100.0 %
Class A injury Crashes	0	0	N/A
Class B injury Crashes	5	0	- 100.0 %
Class C Injury Crashes	9	3	- 66.7 %
Property Damage Only	4	5	+ 25.0 %

The naive before and after analysis at the treatment location resulted in a 60 percent decrease in Total Crashes, an 88.2 percent reduction in Target Frontal Impact Crashes, and a 72.6 percent decrease in the Total Severity Index. The before period ADT year was 2005 and the after period ADT year was 2010.

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 (Target)	13	1	- 92.3 %
Head On (Target)	1	0	- 100.0 %
Left Turn, Same Roadway (Target)	2	1	- 50.0 %
Left Turn, Different Roadway (Target)	1	0	- 100.0 %
Rear End Crashes	2	5	+ 150.0 %

## **Results and Discussion**

Referencing the *Collision Diagrams*, the target crashes experienced an 88.2 percent reduction in frontal impact collisions. From the additional information chart above, the number of angle crashes decreased from thirteen (13) in the before period to one (1) in the after period. Head-on and left-turn, different roadway crashes each decreased by 100% from one (1) to zero (0) from the before period to the after period.

The number of rear-end collisions increased from two (2) to five (5) during the evaluation time frame. The rear-end crashes in the after period occurred on the northbound, southbound, and eastbound approaches.

The target severity index decreased by 93.6 percent. All of the target crashes in the after period were property damage only.

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 (April 2012) – Looking West on SR 1100 (Tarboro Road) Approach**



**Google Maps (April 2012) – Looking North from US 401 Approach**



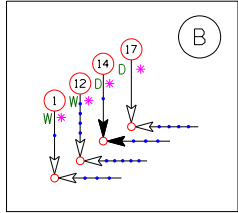
**Google Maps (April 2012) – Looking East from SR 1100 (Tarboro Road) Approach**



**Google Maps (April 2012) – Looking South from US 401 Approach**

SS# 05-06-228  
 Franklin County  
 Before Period  
 12/1/02 - 12/31/07

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 TRAM
			* DRIVER AT FAULT
			D DRY
			W WET
			I ICY OR SNOWY
			O Other



US 401

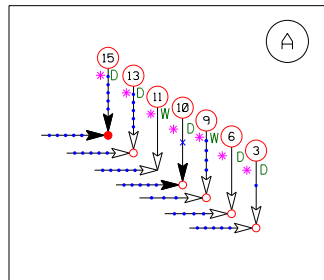
US 401

55 MPH

ADT (Year)  
10,000 (2005)

55 MPH

ADT (Year)  
8,400 (2005)



ADT (Year)  
1,500 (2005)

ADT (Year)  
1,500 (2005)

Target Crashes

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

Date: 7/2013

Prepared By: KLR

**Stantec**  
 Stantec Consulting Services Inc.  
 801 Jones Franklin Road  
 Suite 500  
 Raleigh, NC 27606  
 Tel. (919) 851-6866  
 Fax. (919) 851-7024  
 www.stantec.com  
 License No. F-0572



SS# 05-06-228  
Franklin County  
After Period  
4/1/08 - 4/30/13

ADT (Year)  
1,800 (2010)

55 MPH

SR 1100 (Tarboro Road)

LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		ANNUAL
	PARKED VEHICLE		TURNING		10 MPH TO 19		PEDESTRIAN
	PARKING VEHICLE		BACKING		20 MPH TO 29		BICYCLE
	MOVABLE OBJECT		SIDESWIPE		30 MPH TO 39		TRAM
	HEAD ON		INJURY		40 MPH TO 49		DRIVER AT FAULT
	REAR END		FATALITY		50 MPH TO 59		DRY
	RAN OFF ROAD				60 MPH TO 69		WET
	DAYLIGHT CRASH				70 AND UP		ICY OR SNOWY
	NIGHT CRASH				SPEED UNKNOWN		OTHER



US 401

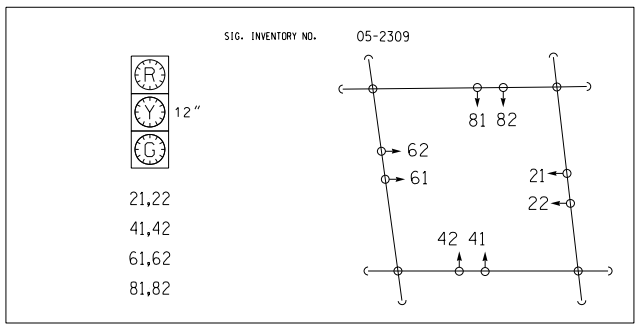
US 401

55 MPH

55 MPH

ADT (Year)  
8,700 (2010)

ADT (Year)  
8,600 (2010)



Target Crashes

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Fax. (919) 851-7024  
www.stantec.com  
License No. F-0572