

# **Spot Safety Project Evaluation**

Spot Safety Project # 05-05-208

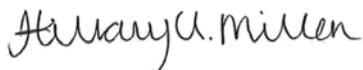
**Spot Safety Project Evaluation of the Signal Installation  
at the Intersection of  
US 501 (North Roxboro Road) and  
SR 1601 (Moore's Mill Road)/ SR 1468 (Quail Roost Farm Road)  
Durham County**

Documents Prepared By:

Hatch Mott MacDonald for

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

**Principal Investigator**



Hillary Millen

11-4-2013

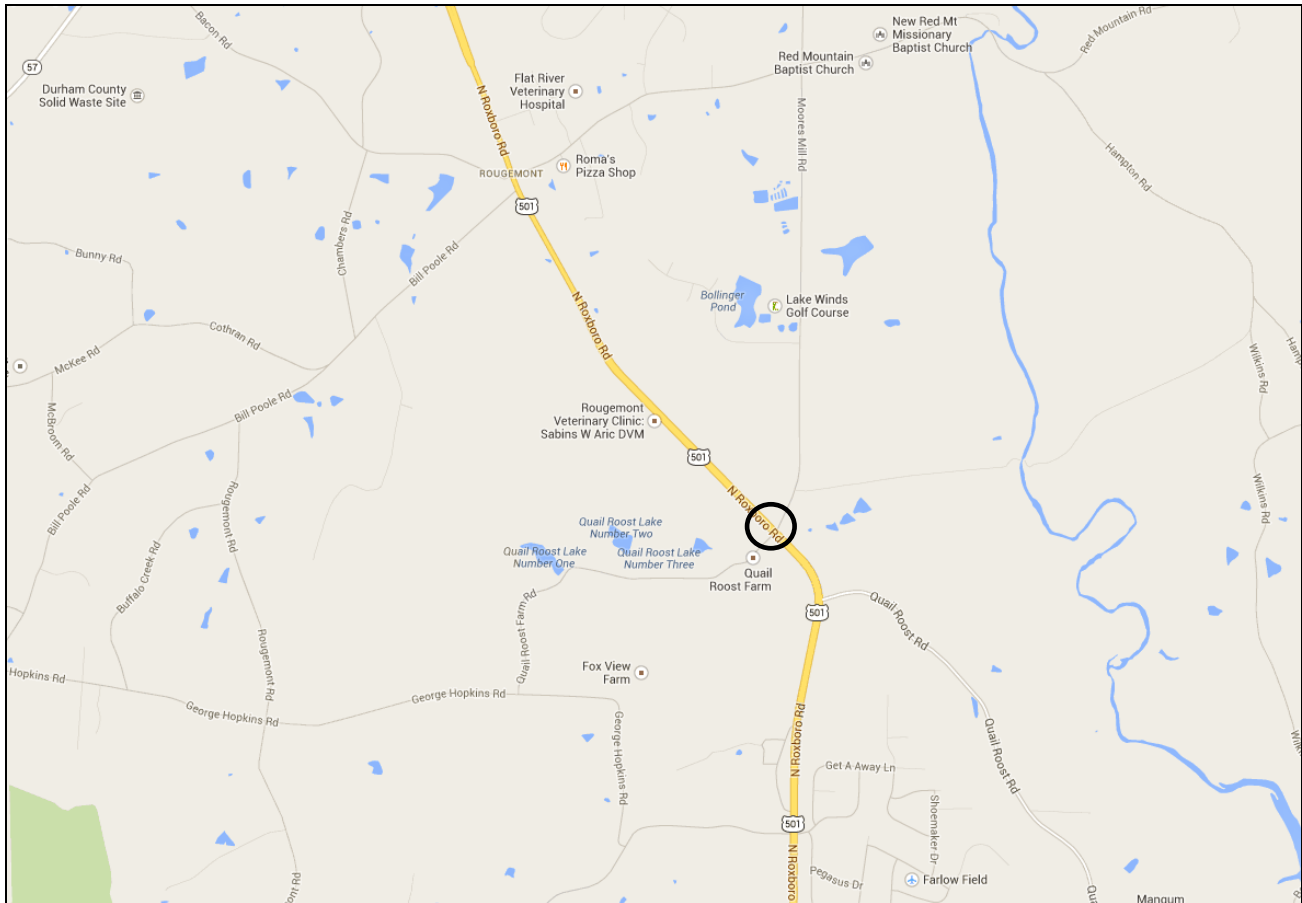
Date

# Spot Safety Project Evaluation Documentation

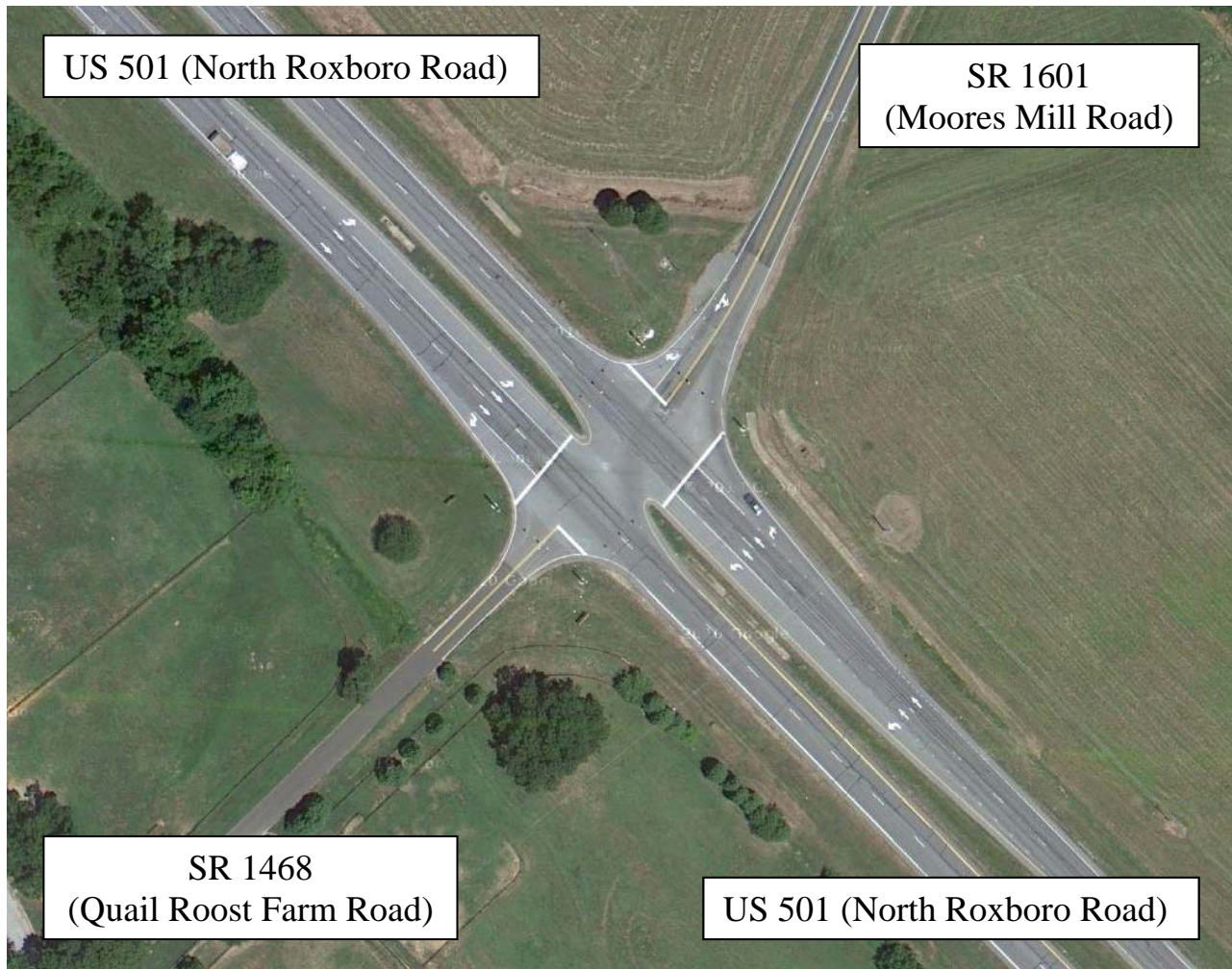
## Subject Location

Evaluation of Spot Safety Project Number 05-05-208 located at the intersection of US 501 (North Roxboro Road) and SR 1601 (Moore's Mill Road)/ SR 1468 (Quail Roost Farm Road) in Durham County.

The Signal Inventory Number of the signal that was installed is 05-2275. The signal is a two-phase fully actuated traffic signal.



Location Map Provided from Google Maps



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 an actuated traffic signal.

US 501 (North Roxboro Road) is a four-lane divided facility having left and right-turn lanes at the intersection. SR 1601 (Moore's Mill Road) is a two-lane facility that has a right-turn flare at the intersection. SR 1468 (Quail Roost Farm Road) is a two-lane road. Speed limits around the intersection are 55 mph except for SR 1468 (Quail Roost Farm Road) where the speed limit is not posted. The subject location is a four-leg crossroads intersection, which was stop controlled on the northeast bound and southwest bound approaches.

The original statement of problem was vehicles on SR 1601 (Moore's Mill Road) and SR 1468 (Quail Roost Farm Road) cannot safely cross or enter the intersection due to insufficient gaps in traffic on US 501 (North Roxboro Road). The initial crash analysis was completed including data from November 1, 1999 to October 31, 2004 with six (6) reported crashes during that time frame. The final completion date for the improvement at the subject intersection was on May 16, 2008 with a total cost of \$98,000.00.

### Naïve 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 includes the months of March through June 2008. The before period consists of reported crashes from January 1, 2003 through February 29, 2008 (5 years, 2 months). The after period consists of reported crashes from July 1, 2008 through August 31, 2013 (5 years, 2 months). The ending date for the analysis was determined by the date of the most recent available crash data at the time of analysis.

The treatment data consists of all crashes within 150 feet of the subject intersection. *Please see the above location map and aerial photo for further details.*

The following data table depicts the Naïve Before and After Analysis for the treatment location. Please note frontal impact crashes were considered the target crashes for this type of 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.

<b><u>Treatment Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	12	10	-16.7%
Total Severity Index	16.7	4.0	-76.3%
Target Crashes	8	3	-62.5%
Target Crash Severity Index	23.7	8.4	-64.5%
Volume (2005, 2011)	15,600	14,300	-8.3%

<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	2	1	-50.0%
Class C Injury Crashes	3	3	0.0%
Property Damage Only	5	6	+20.0%

The Naïve Before and After Analysis at the treatment location shows a 16.7 percent reduction in the total crashes and a 62.5 percent reduction in target crashes. The total severity index decreased from the before period to the after period by over 76 percent. The before period ADT year was 2005 and the after period ADT year was 2011. Also, all Fatal and Class A types of injuries were eliminated. Property Damage Only crashes experienced a 20 percent increase.

To further analyze the intersection crash patterns, the following chart shows additional types of crashes 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>
Rear End Type Crashes	4	5	+25.0%

### **Results and Discussion**

Referencing the *Collision Diagrams*, the target crashes (frontal impact crashes) were reduced from eight crashes in the before period to three in the after period, which equates to a 62.5 percent reduction. Also shown in the *Additional Information* table above, rear end type crashes experienced a 25 percent increase.

Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for all four approaches to the treatment intersection. As the Safety Evaluation Group facilitates additional spot safety review for these types of countermeasures, it is the goal to be able to provide objective and definite information regarding actual crash reduction factors for these types of treatments.

**Treatment Site Photos from Google Street View**



**Google Maps (June 2012) – Looking Southwest at SR 1468**



**Google Maps (May 2009) – Looking Northeast at SR 1601**



**Google Maps (May 2009) – Looking Southeast on US 501**



**Google Maps (June 2012) – Looking Northwest on US 501**

SS# 05-05-208  
 Durham County  
 BEFORE Period  
 1/1/03 - 2/29/08

**LEGEND**

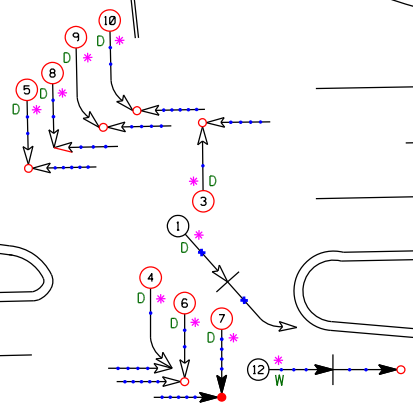
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		STOP SIGN
	PARKED VEHICLE		TURNING		10 MPH TO 19		ANIMAL
	PARKING VEHICLE		BACKING		20 MPH TO 29		PEDESTRIAN
	MOVABLE OBJECT		SIDESWIPE		30 MPH TO 39		BICYCLE
	HEAD ON		INJURY		40 MPH TO 49		TRAIN
	REAR END		FATALITY		50 MPH TO 59		DRY
	RAN OFF ROAD		SPEED UNKNOWN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



SR 1601  
 (Mores Mill Road)  
 55 mph  
 AADT (Year)  
 3000 (2005 est.)

US 501 (N Roxboro Rd)  
 55 mph

AADT (Year)  
 14000 (2005)  
 55 mph



AADT (Year)  
 14000 (2005)

AADT (Year)  
 100 (2005 est.)

SR 1468  
 (Quail Roost Farm Road)

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

**TRAFFIC SAFETY UNIT**

Date: 10/16/2013

Prepared By: H. Millen



**Hatch Mott  
 MacDonald**

Frontal Impact  
 Target Crashes



SS# 05-05-208  
 Durham County  
 AFTER Period  
 7/1/08 - 8/31/13

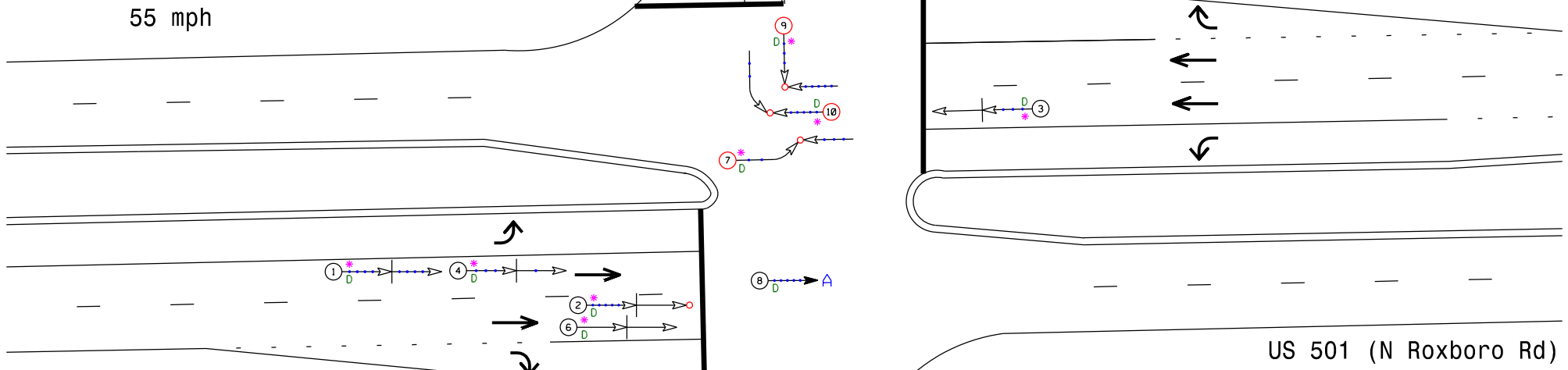
LEGEND							
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		A ANIMAL
	PARKED VEHICLE		TURNING		10 MPH TO 19		P PEDESTRIAN
	MOVABLE OBJECT		BACKING		20 MPH TO 29		B BICYCLE
	HEAD ON		SIDESWIPE		30 MPH TO 39		T TRUCK
	REAR END		INJURY		40 MPH TO 49		* DRIVER AT FAULT
	RAN OFF ROAD		FATALITY		50 MPH TO 59		D DRY
	DAYLIGHT CRASH		TO AND UP		60 MPH TO 69		W WET
	NIGHT CRASH		SPEED UNKNOWN		70 MPH TO 79		I ICY OR SNOWY
					80 MPH TO 89		O OTHER



SR 1601  
 (Mores Mill Road)  
 55 mph  
 AADT (Year)  
 24000 (2010 est.)

AADT (Year)  
 13000 (2010)  
 US 501 (N Roxboro Rd)  
 55 mph

AADT (Year)  
 13000 (2010)  
 55 mph



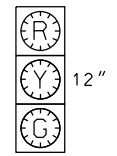
AADT (Year)  
 100 (2010 est.)

SR 1468  
 (Quail Roost Farm Road)

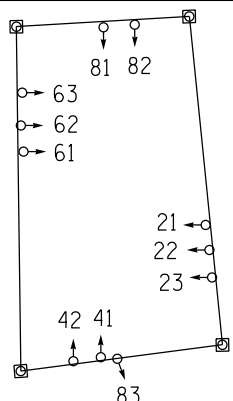
US 501 (N Roxboro Rd)

SIG. INVENTORY NO.  
 05-2275

SIGNAL FACE I.D.  
 Denotes L.E.D.



21, 22, 23  
 41, 42  
 61, 62, 63  
 81, 82, 83



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

**TRAFFIC SAFETY UNIT**

Date: 10/21/2013

Prepared By: H. Millen



Hatch Mott  
 MacDonald