Spot Safety Project Evaluation

Spot Safety Project # 14-03-215

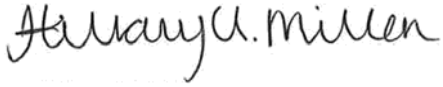
Spot Safety Project Evaluation of Signal Installation
NC 280 (Boylston Highway) at SR 1690 (Broadpointe Drive)
Henderson County

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 U. Millen

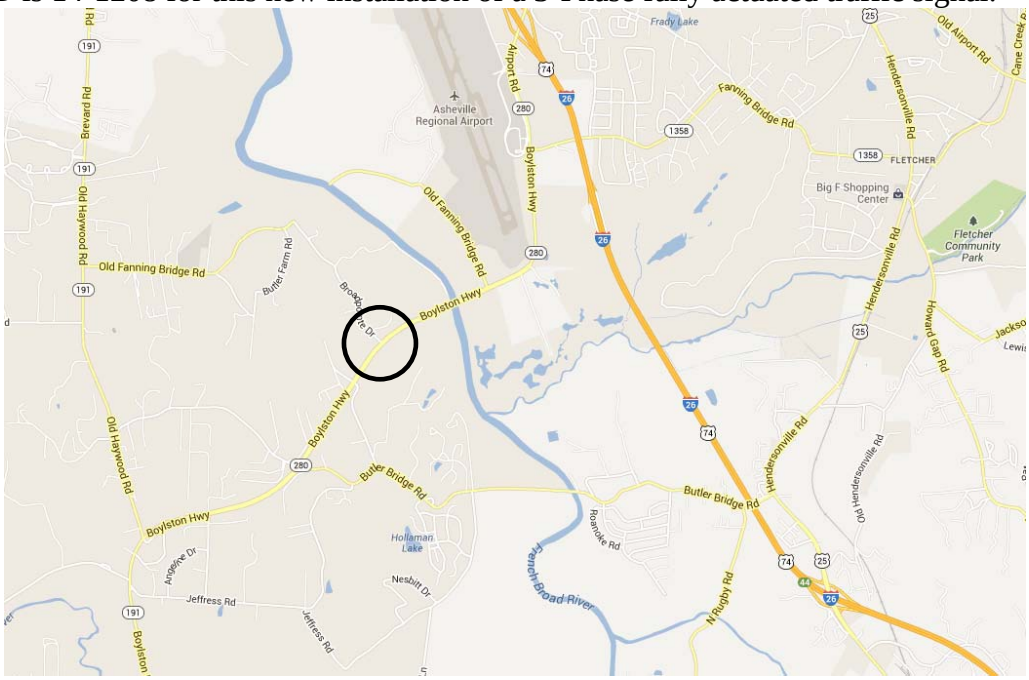
7-09-2013
Date

Spot Safety Project Evaluation Documentation

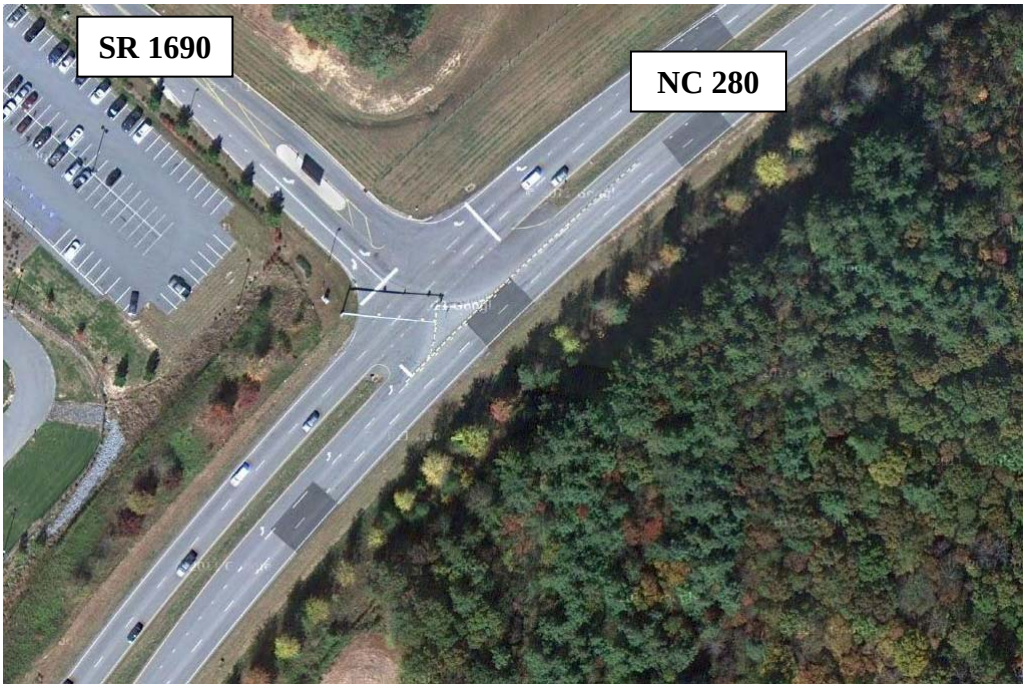
Subject Location

Evaluation of Spot Safety Project Number 14-03-215 located at the Intersection of NC 280 (Boylston Highway) at SR 1690 (Broadpointe Drive) in Henderson County.

The Sig ID is 14-1208 for this new installation of a 3-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 a new installation of a 3-phase actuated signal with protected-permitted left-turns (with flashing yellow arrow) on NC 280 (Boylston Highway). Also, flexible traffic delineators were installed at this location to channel the left-turns into and out of SR 1690 (Broadpointe Drive).

The subject intersection is a three-leg intersection, which was stop-controlled on the SR 1690 (Broadpointe Drive) approach before the countermeasure was put in place. Today, SR 1690 (Broadpointe Drive) is a two-lane facility north of NC 280 (Boylston Highway) and serves as access to an industrial park. NC 280 (Boylston Highway) is a four-lane divided facility through the study area. The speed limit on SR 1690 (Broadpointe Drive) is 25 mph and on NC 280 (Boylston Highway) the speed limit is 55 mph.

The original statement of problem was the existence of collisions due to trucks turning left out of SR 1690 (Broadpointe Drive) pulling out in front of opposing traffic on NC 280 (Boylston Highway). The initial crash analysis was completed from December 1, 2001 to November 30, 2006 with four (4) reported crashes. The final completion date for the improvement at the subject intersection was on October 17, 2008 with a total cost of $250,000.00.

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 November 2008. The Before Period consisted of reported crashes from March 1, 2004 through July 31, 2008 (4 years, 5 months). The After Period consisted of reported crashes from December 1, 2008 through April 30, 2013 (4 years, 5 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 and aerial map for further details.*

The following data table depicts the Naïve 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.

Treatment Information	Before	After	Percent Difference
Total Crashes	6	6	0.0%
Total Severity Index	16.10	16.10	0.0%
Target Crashes	5	2	-60.0%
Target Crash Severity Index	17.64	4.70	-73.4%
Volume (2006, 2011)	21,500	22,100	2.8%

Injury Crash Summary	Before	After	Percent Difference
Fatal injury Crashes	1	0	-100.0%
Class A injury Crashes	0	1	n/a
Class B injury Crashes	2	0	-100.0%
Class C Injury Crashes	0	2	n/a
Property Damage Only	3	3	0.0%

The naive before and after analysis at the treatment location resulted in the same number of Total Crashes and a 60.0 percent reduction in Target Frontal Impact Crashes from the Before Period to the After Period. The analysis also resulted in the same total severity index between the Before and After Period but a 73.4 percent reduction in the target crash severity index. The before period ADT year was 2006 and the after period ADT year was 2011.

Results and Discussion

Referencing the *Collision Diagrams*, the target crashes (frontal impact crashes) experienced a 60 percent reduction from five (5) to only two (2) crashes in the After Period. It does appear that there has been an increase in rear end type crashes from zero (0) rear end crashes in the Before Period to four (4) rear end crashes in the After Period. Although one of the rear end crashes in the After Period does not appear to be related to the signal as they had already proceeded through the intersection.

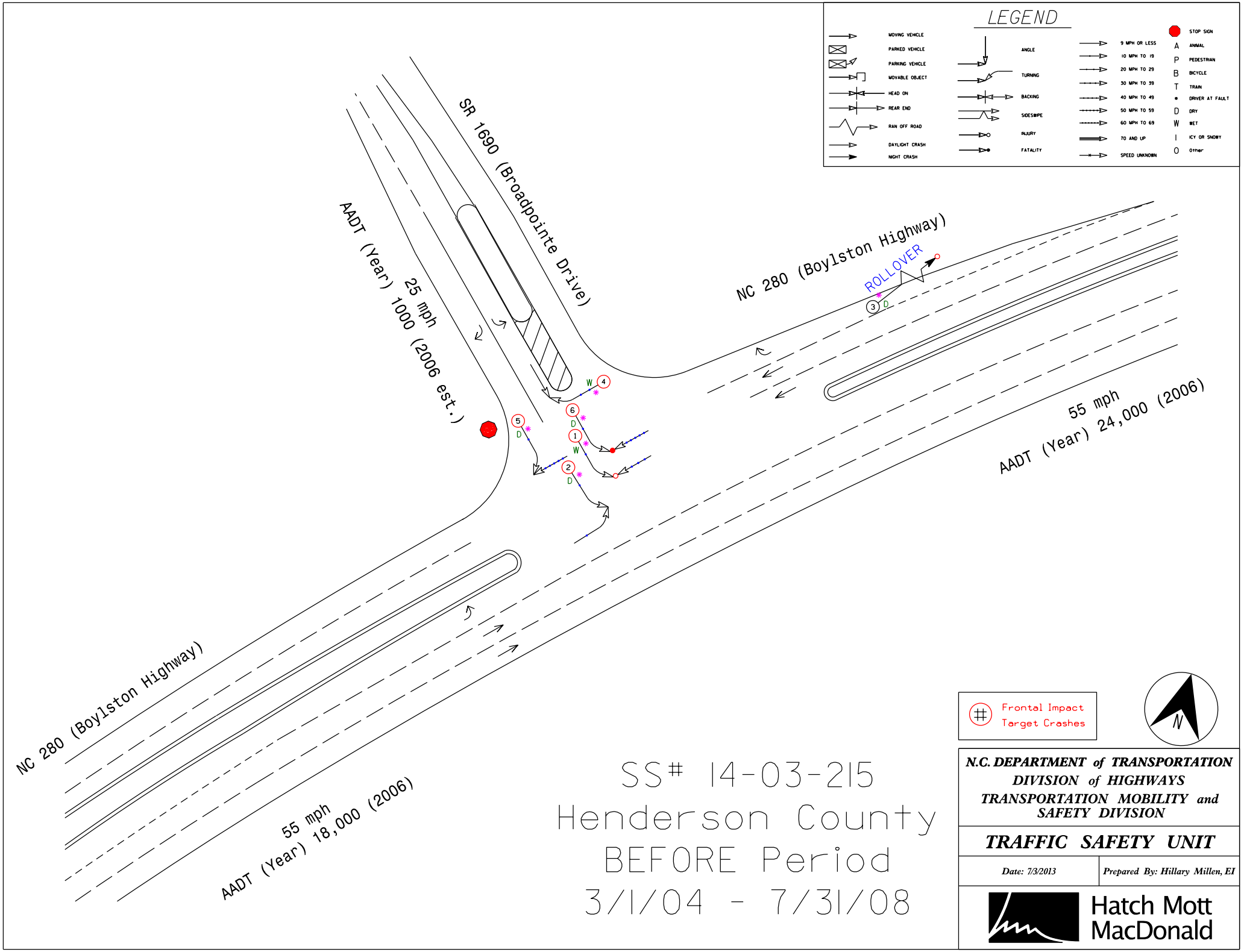
Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for all three approaches to the treatment intersection. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

Treatment Site Photos from Google Street View

Google Maps (March 2013) – Northern Approch on NC 280

Google Maps (March 2013) – Southern Approach on NC 280

Google Maps (March 2013) – Western Approach on SR 1690, Looking West

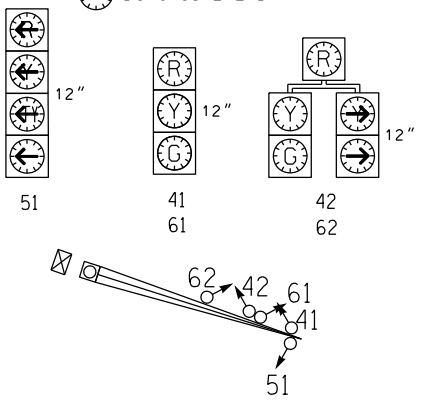

LEGEND
MOVING VEHICLE
PARKED VEHICLE
PARKING VEHICLE
MOVABLE OBJECT
HEAD ON
REAR END
RAN OFF ROAD
DAYLIGHT CRASH
NIGHT CRASH
ANGLE
TURNING
BACKING
SIDESWIPE
INJURY
FATALITY
9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
STOP SIGN
A ANIMAL
P PEDESTRIAN
B BICYCLE
T TRAIN
• DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
O Other
SR 1690 (Broadpointe Drive)
AADT (Year) 1000 (2006 est.)
25 mph
NC 280 (Boylston Highway)
ROLLOVER
55 mph
AADT (Year) 24,000 (2006)
NC 280 (Boylston Highway)
55 mph
AADT (Year) 18,000 (2006)
Frontal Impact Target Crashes
N
SS# 14-03-215
Henderson County
BEFORE Period
3/1/04 - 7/31/08
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRANSPORTATION MOBILITY and SAFETY DIVISION
TRAFFIC SAFETY UNIT
Date: 7/3/2013
Prepared By: Hillary Millen, EI
Hatch Mott MacDonald

SIG. INVENTORY NO. 14-1208

FY = Flashing Yellow Arrow

SIGNAL FACE I.D.

Denotes L.E.D.



LEGEND

MOVING VEHICLE
PARKED VEHICLE
PARKING VEHICLE
MOVABLE OBJECT
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REAR END
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DAYLIGHT CRASH
NIGHT CRASH

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

SS# 14-03-215
Henderson County
AFTER Period
12/1/08 - 4/30/13

(#) Frontal Impact Target Crashes

N

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

TRAFFIC SAFETY UNIT

Date: 7/9/2013

Prepared By: Hillary Millen, EI

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