

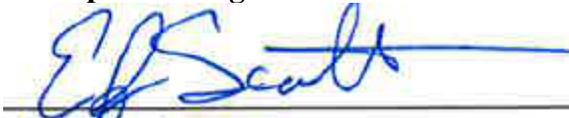
Spot Safety Project Evaluation

Spot Safety Project # 01-03-209

**Spot Safety Project Evaluation of the Signal Addition
(Installation of Traffic Signal with Metal Poles and Mast Arms)
US-158 at Bonnett St
Dare County**

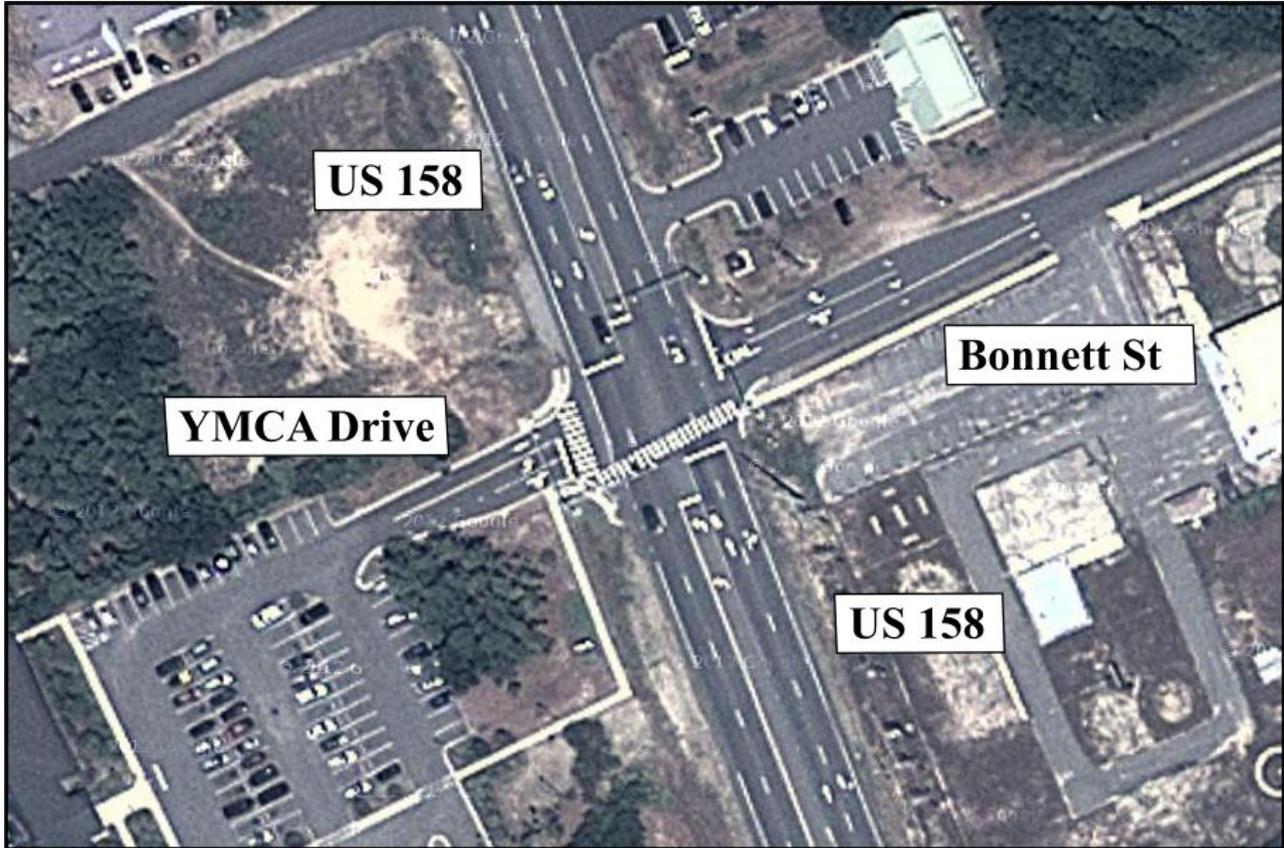
Documents Prepared By:
Stantec Consulting Ltd.
for
Safety Evaluation Group
Traffic Safety Systems Management Section
Transportation Mobility and Safety Division
North Carolina Department of Transportation

Principal Investigator



Elizabeth S. Scott
Transportation Designer

3-20-2013
Date



Aerial Provided from Google Maps

Project Information and Background from the Project File Folder

The original problem statement was that the realignment of the YMCA driveway to US 158 at Bonnett Street would create congestion problems. The spot safety project improvement countermeasure chosen for the subject location was the installation of a signal with metal poles and mast arms. The initial crash analysis was completed from January 1, 2000 to December 31, 2002 with four (4) reported crashes. The final completion date for the improvement at the subject intersection was on June 23, 2008 with a total cost of \$100,000.00.

US-158 is a five lane road with a two way left turn lane which is used as a left turn lane at this intersection. Bonnett Street is a 2-lane facility that widens for a right turn lane at the intersection. The YMCA Drive has a shared through and right turn lane and an exclusive left turn lane. Speed limits around the intersection are 50-mph on US 158 and 25-mph on Bonnett Street, the speed limit for the YMCA driveway is un-posted. The subject location was a three-leg intersection, which was stop-controlled on Bonnett Street; the old YMCA driveway was 150 feet south of the intersection.

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 allow for an adequate construction period were from

May 2007 through June 2008. The long construction period is due to multiple phases: First the signal was to be installed at the US 158 & Bonnett Street intersection, and then the YMCA driveway was realigned to become the 4th leg of a T-intersection. The construction period was determined from crash reports during this period. The first report to represent a signal was in June 2007. The last report to show the off-set drive of the YMCA was in May of 2008. Therefore, the after period was set to show both the new signal installation and the re-alignment of the YMCA drive. The before period consisted of reported crashes from October 1, 2002 through April 30, 2007 (4 years, 7 months); and the after period consisted of reported crashes from July 1, 2008 through January 31, 2013 (4 years, 7 months). The ending date for this analysis was determined by the date of available crash data at the time of analysis.

The Before treatment data consisted of all crashes within 150 feet north and 300 feet south of the subject intersection at US 158 and Bonnett Street. The After treatment data consisted of all crashes within 150 feet north and 150 feet south of the subject intersection at US 158 and Bonnett Street. *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.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	5	8	+ 60.0 %
Total Severity Index	19.12	3.77	- 80.3 %
Target Crashes	1	0	-100.0%
Target Crash Severity Index	1	0	-100.0%
Volume (2005, 2010)	29,400	23,000	- 21.8 %

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	1	0	-100.0%
Class B injury Crashes	0	1	+ 100.0 %
Class C Injury Crashes	2	2	0.0 %
Property Damage Only	2	5	+ 150.0 %

The naive before and after analysis at the treatment location resulted in a 60.0 percent increase in Total Crashes, and an 80.3 percent reduction 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:

<u>Additional Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Rear-end Crashes (Slow or Stop and Turn)	2	6	+ 200.0 %
Pedalcyclist	2	1	-50.0 %

Results and Discussion

Referencing the *Collision Diagrams*, there were no target crashes (frontal impact) in the after period. The overall after period intersection experienced a lower severity index than in the before period.

From the additional information chart above, there was an increase in Rear-end crashes. Three (3) of the six (6) Rear-end crashes that occurred in the after period occurred as the vehicles were traveling out of the intersection itself. The Rear-end crashes occurring on the NB leg of US 158 remained the same from the before period to the after period, with two (2) crashes.

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 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 – Looking South on US 158 Approach



Google Maps – Looking East from YMCA Drive



Google Maps – Looking West from Bonnett St

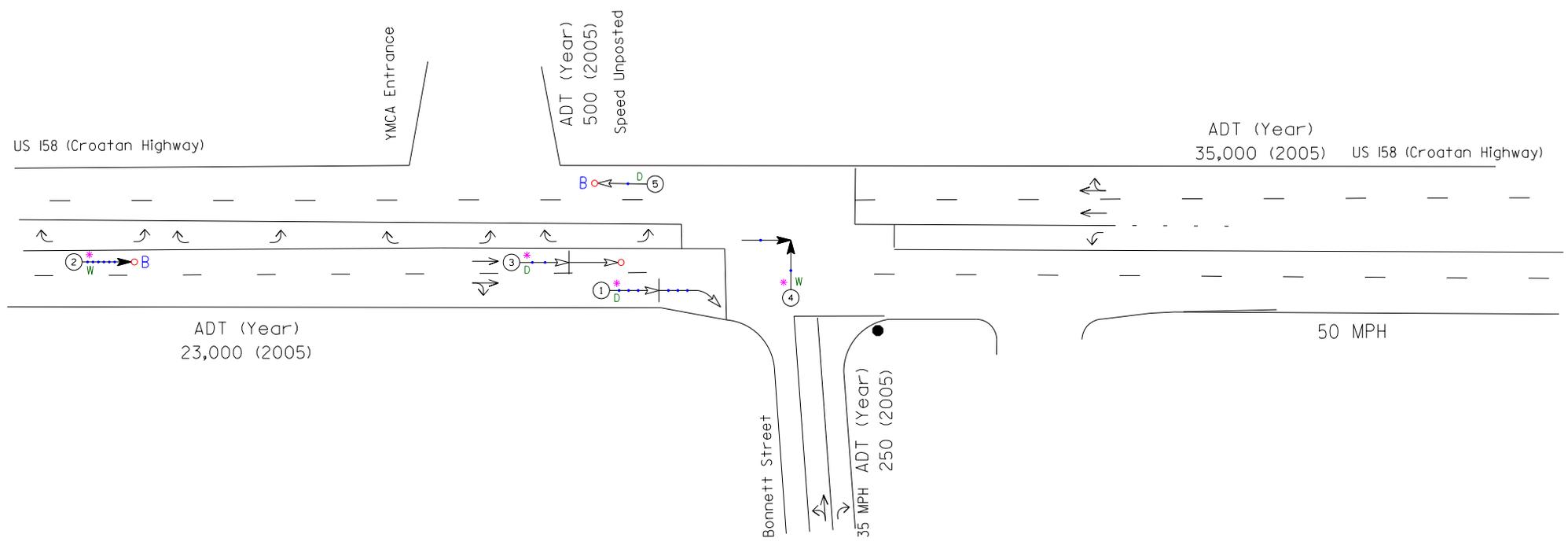


Google Maps – Looking North on US 158 Approach

SS# 01-03-209
 Dare County
 Before Period
 10/1/02 - 4/30/07



LEGEND			
	MOVING VEHICLE		ANGLE
	PARKED VEHICLE		TURNING
	MOVABLE OBJECT		BACKING
	HEAD ON		SIDESWIPE
	REAR END		INJURY
	RAN OFF ROAD		FATALITY
	DAYLIGHT CRASH		SPEED UNKNOWN
	NIGHT CRASH		ANIMAL
	PEDESTRIAN		BICYCLE
	TRAIN		DRIVER AT FAULT
	DRY		WET
	ICY OR SNOWY		OTHER
	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		



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

Date: 3/25/2013

Prepared By: ESS

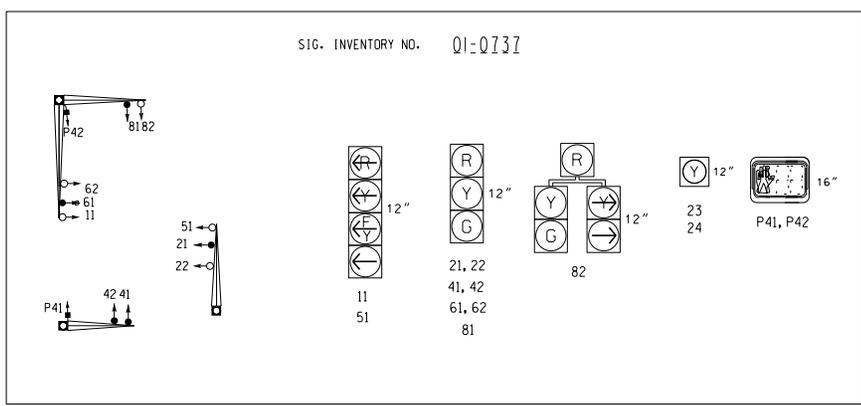
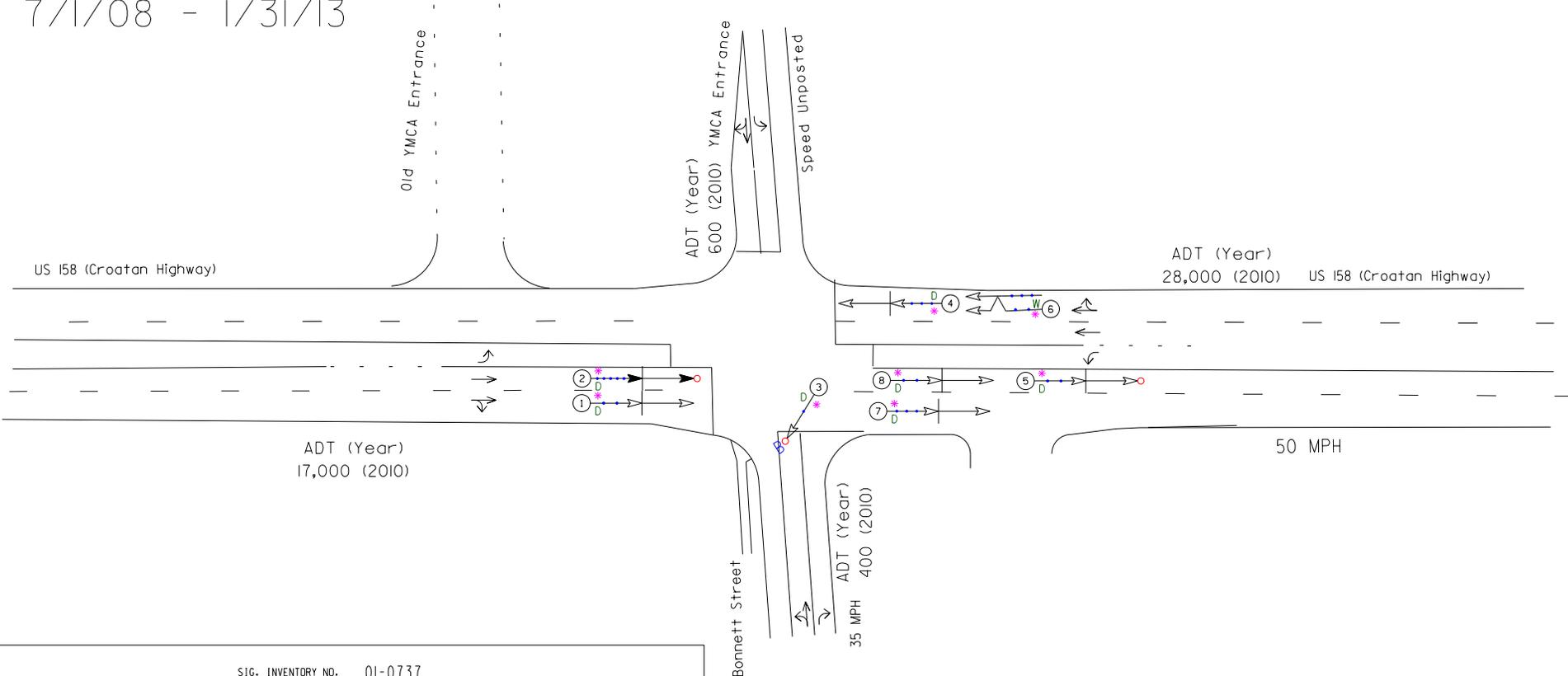


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SS# 01-03-209
 Dare County
 AFTER Period
 7/1/08 - 1/31/13



LEGEND							
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		ANIMAL
	PARKED VEHICLE		TURNING		10 MPH TO 19		PEDESTRIAN
	PARKING VEHICLE		BACKING		20 MPH TO 29		BICYCLE
	MOVABLE OBJECT		SIDESWIPE		30 MPH TO 39		TRAIN
	HEAD ON		INJURY		40 MPH TO 49		DRIVER AT FAULT
	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		



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