

Spot Safety Project Evaluation

Order # 41000017073

Spot Safety Project # 01-01-232 & 01-01-246

**Spot Safety Project Evaluation of the
Center Turn Lane Installation & Traffic Signal Improvements
NC 12 from N. Virginia Dare Trail to Skyline Drive
Dare County, Town of Southern Shores**

Documents Prepared By:

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

Principal Investigator



Jason B. Schronce

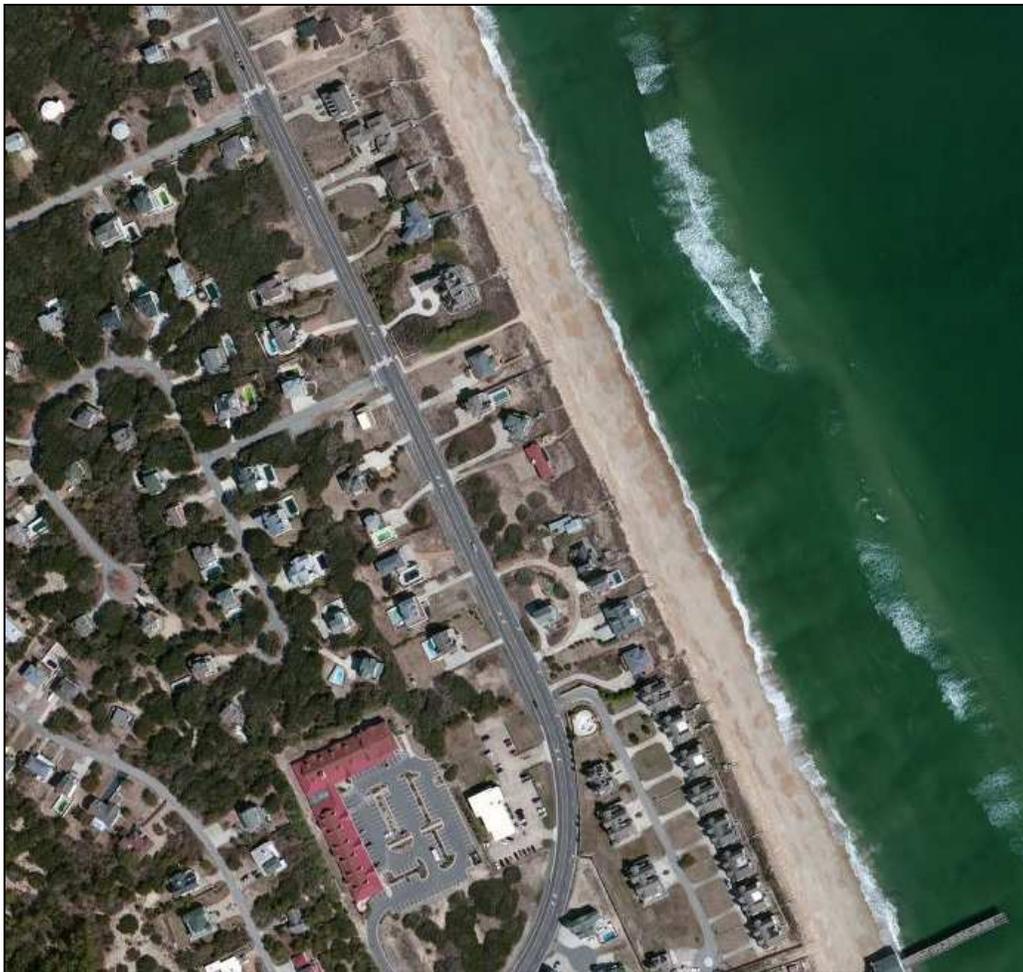
3-22-2012

Date

Traffic Safety Project Engineer



Aerial from Bing Maps showing improved VA Dare & Ocean Intersection



Aerial Photo from Bing Maps showing the Center Turn Lane through Skyline Drive

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasures chosen for the subject roadway segment were the installation of a continuous center left turn lane and signal improvements. The continuous left turn lane was installed on the north leg of NC 12 through the 3-leg intersection of Skyline Drive. This strip services a gas station, a multiple business commercial property, a Realtor's office, and approximately twenty residential driveways. The northbound direction of the NC 12 north leg also comprises of an additional through lane that drops near the Ocean View Loop 3-leg intersection. The signal improvements to 01-0718 included installing mast arm poles, added raised channelization for the southbound right turn movement, slight lane reconfiguration, and additional signal phases for left turn movements. NC 12 is mainly a two-lane roadway with a 35/45-mph speed limit that serves as the main thoroughfare for residents and tourists of the Outer Banks.

This project was initially planned as two separate Spot Safety Projects: SS# 01-01-232 installing a left turn lane at Skyline Drive and SS# 01-01-246 installing a left turn lane at Ocean View Loop Road. However, these projects were combined with companion Small Construction Funds to create the project as completed.

The original statement of problem and justification for both Spot Safety Projects revolved around the heavy congestion on NC 12 in this vicinity which was exacerbated by the lack of left turn storage. Motorists waiting to turn left at these locations were causing long traffic queues while waiting for a safe time to make their turns. The improvements were more focused on mobility of this roadway segment than on immediate safety crash concerns.

The initial crash analysis for both projects was completed from January 1, 1998 to December 31, 2000 with nine (9) combined reported crashes, four (4) of which were deemed correctable. The final completion date for the improvement along the segment was on June 20, 2007 with a total combined cost of \$543,475.

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 April through June 2007. The before period consisted of reported crashes from October 1, 2002 through March 31, 2007 (4 years and 6 months); and the after period consisted of reported crashes from July 1, 2007 through December 31, 2011 (4 years and 6 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 on NC 12 from 150 feet south of SR 1418 (MP 76.889) to 150 feet north of Skyline Drive (MP 77.525). *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 a specific target crash type was not selected due to multiple roadway improvements.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	51	43	- 15.7 %
Total Severity Index	2.16	6.07	181.0 %
Signal Intersection Crashes (150' y-line)	34	23	- 32.4 %
Segment Crashes	17	20	17.6 %
Volume (2004, 2009)	17,900	10,600	- 40.8 %

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	0	1	100.0 %
Class A injury Crashes	0	1	100.0 %
Class B injury Crashes	3	0	- 100.0 %
Class C Injury Crashes	5	9	80.0 %
Total Injury Crashes	8	11	37.5 %

The naive before and after analysis at the treatment location resulted in a 16 percent decrease in Total Crashes but a 181 percent increase in the Total Severity Index. The before period ADT year was 2004 and the after period ADT year was 2009.

<u>Additional Crash Breakdown</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Signal Angle Crashes (Red Light Run)	8	5	- 37.5 %
Signal Left Turn-Same Road Collisions	9	10	11.1 %
Segment Rear-End Crashes	8	13	62.5 %
Segment Left Turn In (from Rd to PVA)	1	0	- 100.0 %
Segment Left Turn Out (from PVA to Rd)	2	2	0.0 %

Results and Discussion

Referencing the *Collision Diagrams*, the most evident crash pattern is the left turn same roadway crashes from southbound NC 12 (Ocean Blvd) to NC 12 (Virginia Dare Trail). This crash pattern remained consistent from eight (8) crashes in the before period to seven (7) in the after period even though the phasing was changed from permissive to protected-permissive. Also, this movement had an after period A-injury collision. There was an after period fatal crash between a vehicle and a bicycle at the PVA entrance located approximately 400 feet north of the intersection.

Overall, this segment is experiencing the same general crash history as the before period with the exception of red light run crashes at the signalized intersection which reduced by 37.5 percent throughout the study. However, rear-end collisions between Ocean View Loop Road and Skyline Road doubled from four (4) in the before period to eight (8) in the after period.

A benefit to cost ratio was not calculated for this project considering the multiple countermeasures and additional funding that was required to complete the project.

Please see the attached *Treatment Site Photos*. Photos are provided from our Field Visit on February 13, 2012 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 (Field Visit 2/13/2012)



North NC 12 (Ocean) at additional lane ending / Ocean View Loop Rd



North NC 12 (Ocean) at Skyline Road



North NC 12 (Ocean) showing Center Turn Lane & Dual Thru



Southbound NC 12 (Ocean) showing new Raised Channelization



Travelling West on NC 12 (VA Dare Trail) approaching Intersection



Travelling North on SR 1493 (Ocean Blvd) approaching Intersection

LEGEND

SS# 01-01-232 / 01-01-246
 Order# 41000017073
 Dare County
 BEFORE Period
 10/1/02 - 3/31/07
 4.5 Years

End Study
 NC-12 MP 77.525

Skyline Road
 25-MPH

Ocean View Loop
 25-MPH

NC 12
Ocean Boulevard
 45-MPH

Realtor Office
 PVA

Commerical
 PVA

Gas Station
 PVA

	Traffic Signal Sig # 01-0718 All Permissive Phasing

Begin Study
 NC-12 MP 76.889

NC 12
N. Virginia Dare Trail
 35-MPH

SR 1418
N. Virginia Dare Trail
 35-MPH

SR 1493
Ocean Blvd
 (Not Posted)

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

TRAFFIC SAFETY UNIT

Date: 3-13-2012

Prepared By: J. Schronce

LEGEND

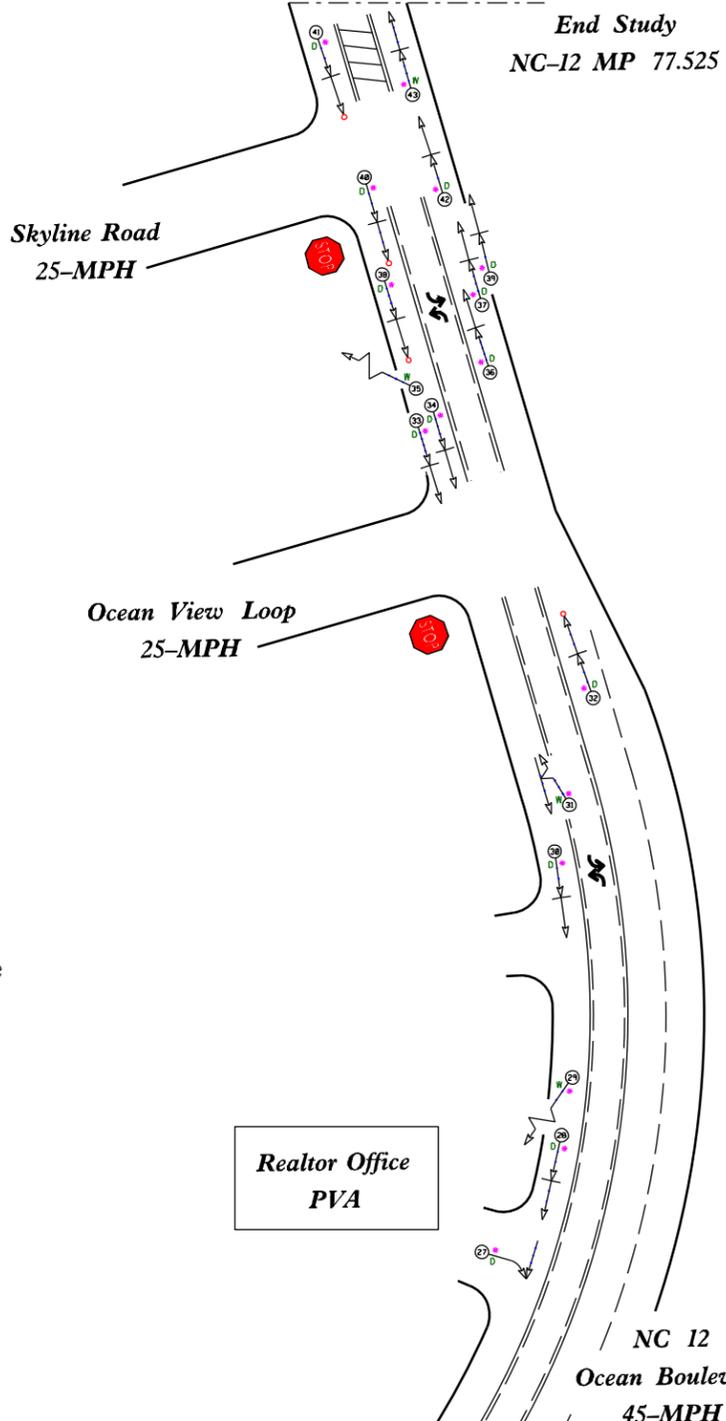
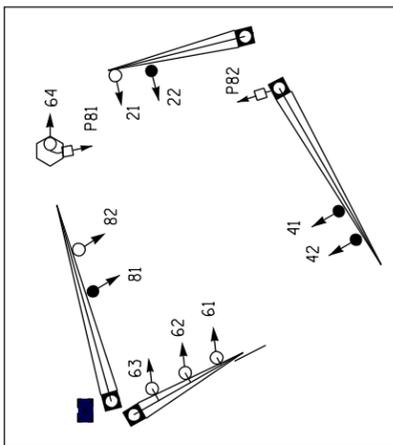
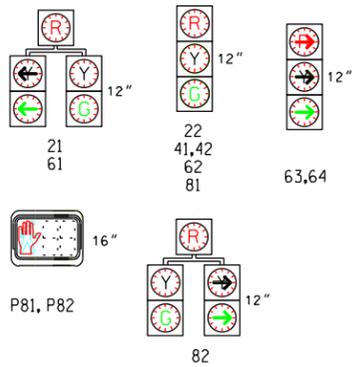
SS# 01-01-232 / 01-01-246
 Order# 41000017073
 Dare County
 AFTER Period
 7/1/2007 - 12/31/2011
 4.5 Years

Countermeasure:

1. Center Turn Lane from Skyline to the Intersection with VA Dare
2. Signal Lane Configuration & concrete median barrier for right turn

SIGNAL I.D. 01-0718

Denotes L.E.D.



Realtor Office
PVA

Commercial
PVA

Gas Station
PVA

Begin Study
NC-12 MP 76.889

NC 12
N. Virginia Dare Trail
35-MPH

SR 1418
N. Virginia Dare Trail
35-MPH

SR 1493
Ocean Blvd
(Not Posted)

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