

# Spot Safety Project Evaluation

Order # 41000025592

Spot Safety Project # 10-07-214

**Spot Safety Project Evaluation of the Sight Distance Improvements  
NC 138 from SR 1956 (Old Aquadale Rd) to Charlie's Store  
Stanly County**

Documents Prepared By:

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

**Principal Investigator**



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Justin Green

8-7-2013

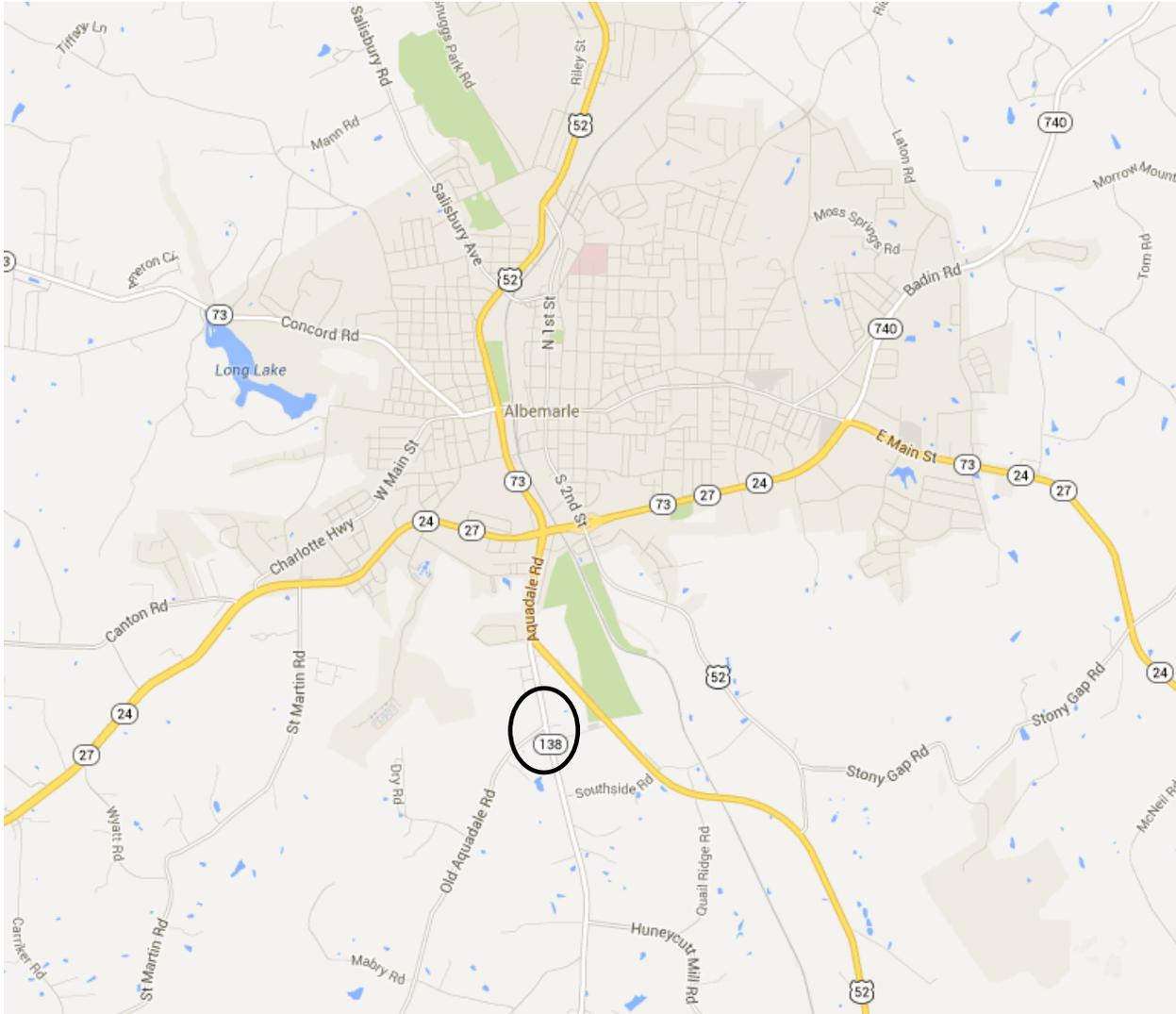
Date

Traffic Safety Project Engineer

# Spot Safety Project Evaluation Documentation

## Subject Location

Evaluation of Spot Safety Project Number 10-07-214 located on NC 138 from SR 1956 (Old Aquadale Rd) to Charlie's Store in Stanly County, south of the City of Albemarle.





Aerial Photo provided through Google Maps

## Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was to cut down the vertical hillcrest to improve sight distance for vehicles stopped at the stop sign on SR 1956. These improvements included asphalt wedging and/or grading down a vertical crest in the roadway alignment approximately two feet. NC 138 is a north/south route that is intersected by SR 1956 from the west to form a “tee” intersection. Approximately 600 feet north of this intersection is Charlie’s Store. NC 138 and SR 1956 are both two-lane facilities with speed limits of 45 mph on all legs. The subject location is a three-leg crossroads intersection which is extended 600 feet north of intersection along NC 138. This intersection is stop sign controlled on the NC 138 approach.

The original statement of problem states the vertical curve restricts sight distance between Old Aquadale Rd (SR 1956) and Charlie’s Store. The initial crash analysis was completed from May 1, 2002 to April 30, 2007 with fourteen (14) reported crashes. This was an intersection type analysis. The final completion date for the improvement at the subject intersection was on December 9, 2008 with a total cost of \$250,000.

## 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 September through December 2008. The before period consisted of reported crashes from March 1, 2004 through August 31, 2008 (4 years and 6 months); and the after period consisted of reported crashes from January 1, 2009 through June 30, 2013 (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 within 150 feet of the subject intersection and crashes within 600 feet north of intersection. *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 Frontal Impact Crashes (only at Charlie’s Store entrance) 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.

<b><u>Treatment Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	10	5	- 50.0 %
Total Severity Index	19.86	3.96	- 80.1 %
Target Crashes (Charlie’s Entrance)	3	1	- 66.7 %
Target Crash Severity Index	2.85	1.00	- 64.9 %
Volume (2006, 2011) (NC 138)	6,900	4,900	-29.0 %

<b><u>Injury Crash Summary</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal Crashes	1	0	-100.0 %
Class A Crashes	1	0	-100.0 %
Class B Crashes	3	0	-100.0 %
Class C Crashes	2	2	N/A
Property Damage Only Crashes	3	3	N/A

The naive before and after analysis at the treatment location resulted in a 50 percent decrease in Total Crashes, an 68 percent decrease in Target Crashes, and a 80 percent decrease in the Total Severity Index. The before period ADT year was 2006 and the after period ADT year was 2011.

## **Results and Discussion**

Referencing the *Collision Diagrams*, one noticeable change after the improvement was the crashes at Charlie's Grocery Store entrance. During the before period there were four (4) crashes at the Charlie's Grocery Store entrance with three (3) being target crashes. The after period shows one crash in the vicinity of the Charlie's Grocery Store entrance. This crash was considered to be a target crash due to vehicle avoiding a left turn collision. The before period displayed four (4) left turn crashes at the intersection. After the sight distance improvement the after period displayed one (1) left turn crash. Of the four (4) before period crashes three (3) crashes involved vehicles stopped at the stop sign on SR 1956.

It should be noted that the fatal crash (ID # 102127667) resulted in two fatalities, which occurred at the Charlie's Grocery Store entrance during the before period.

Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for all approaches to the treatment intersection and studied section location. 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



Google Street View (September 2009) Looking East on SR 1956 (Old Aquadale Rd) approaching intersection



Google Street View (September 2009) Looking East on SR 1956 (Old Aquadale Rd) sight distance to the North



**Google Street View (September 2009) Looking North on NC 138**



**Google Street View (September 2009) Looking South on NC 138**



**Google Street View (September 2009) Looking at Charlie's Store entrance from NC 138 Northbound**

SS# 10-07-214  
 Order# 41000025592  
 Stanly County  
 BEFORE Period  
 3/1/2004 - 8/31/2008



LEGEND			

CHARLIE'S STORE



Speed Limit  
45-mph

NC 138  
 ADT (2006)  
 6,900

Crash #5: Vehicle two ran off road  
 in avoidance of vehicle one who  
 was making left turn from SR 1956  
 Note: Non Contact Crash

NC 138  
 ADT (2006)  
 4,300

SR 1956  
 (Old Aquadale Rd)  
 ADT (2006)  
 1,800

Speed Limit  
45-mph

Frontal  
Impact

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

**TRAFFIC SAFETY UNIT**

Date: 8-6-2013

Prepared By: J. Green

SS# 10-07-214  
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 AFTER Period  
 1/1/2009 - 6/30/2013



LEGEND			

CHARLIE'S STORE

Crash #5: Vehicle ran off road and struck two fences and two trees

Speed Limit  
45-mph

Vertical Crest Cut Down Two Feet  
For Improved Site Distance

NC 138  
ADT (2011)  
4,900

NC 138  
ADT (2011)  
3,400

Crash #5: Vehicle one ran off road  
in avoidance of unknown vehicle who  
was making left turn into Charlies  
Note: Vehicle one stuck utility pole

SR 1956  
(Old Aquadale Rd)

Speed Limit  
45-mph

ADT (2011)  
1,750

Frontal  
Impact

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