

# Spot Safety Project Evaluation

Spot Safety Project # 10-04-213

## Spot Safety Project Evaluation for Installation of Fully Actuated Traffic Signal

**SR 1002 (Old Salisbury-Concord Rd) at SR 2180 (Lane Street)/Heritage Oaks Drive  
Cabarrus County**

Documents Prepared By:

AECOM Technical Services of North Carolina, Inc.

For:

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

### Principal Investigator

Heath Gore, PE

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AECOM

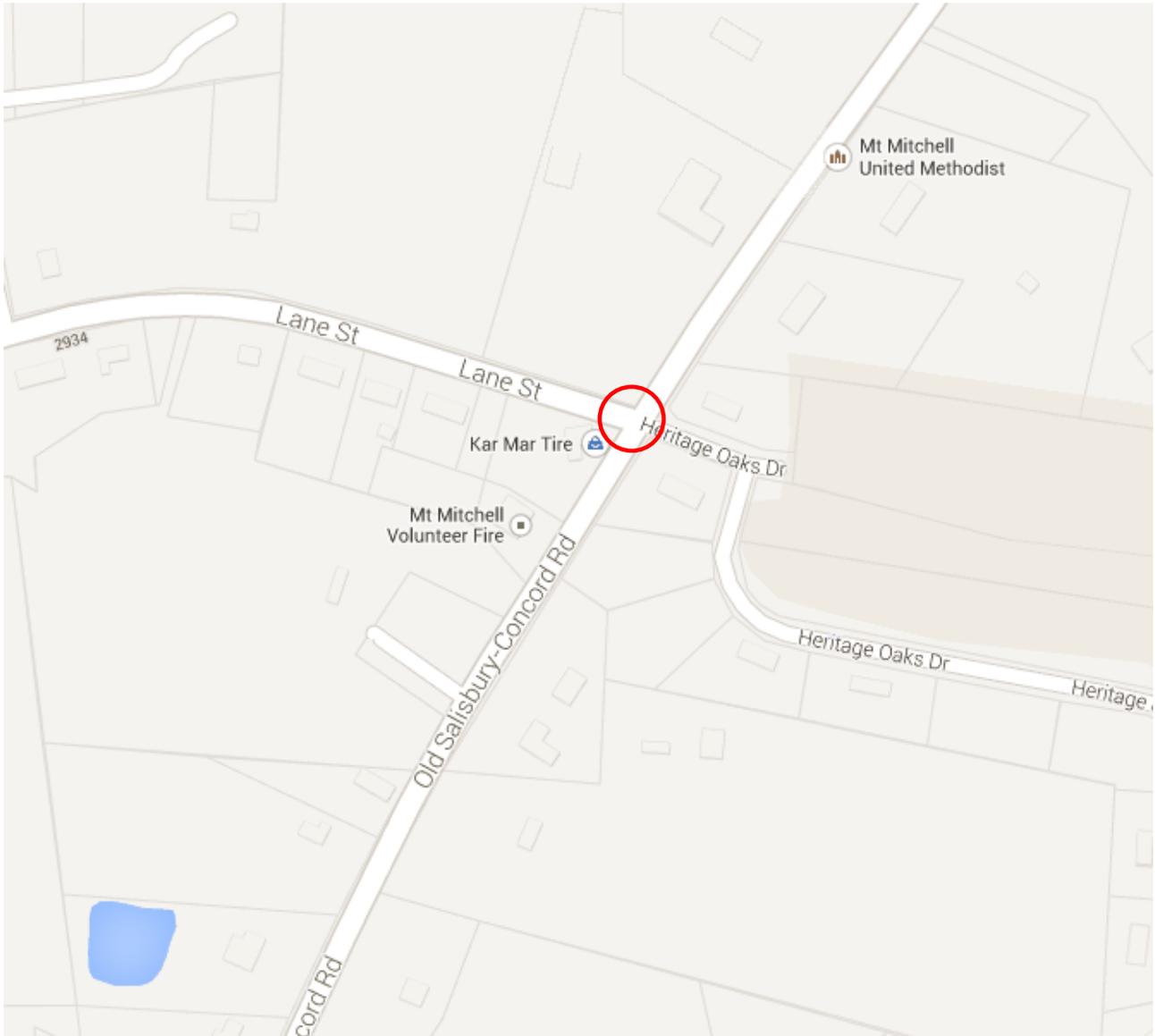
8-19-2013  
Date

# *Spot Safety Project Evaluation Documentation*

## **Subject Location**

Evaluation of Spot Safety Project Number 10-04-213 located at the intersection of SR 1002 (Old Salisbury-Concord Road) and SR 2180 (Lane Street)/Heritage Oaks Drive in Kannapolis in Cabarrus County.

The Sig ID is 10-1965 for this 2-Phase Fully Actuated Traffic Signal.



**Location Map Provided from Google Maps**



**Aerial Map 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 installation of a fully actuated traffic signal.

SR 1002 (Old Salisbury-Concord Road) is a two-lane facility with left-turn lanes on both approaches of the intersection and a speed limit of 55 mph. SR 2180 (Lane Street) is a two-lane facility with a speed limit of 35 mph on the eastbound approach. Heritage Oaks Drive is a small development road with no posted speed limit.

The original statement of problem was that numerous collisions occurred due to the high volume of traffic with insufficient gaps. The initial crash analysis was completed from December 1, 2000 to November 30, 2003 with fifteen (15) total reported crashes, of which there were eleven (11) angle

crashes. The final completion date for the improvement at the subject intersection was on April 16, 2008 with a total cost of \$55,000.00.

### 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 July through September 2007. The before period consisted of reported crashes from November 1, 2001 through June 30, 2007 (5 years 8 months); and the after period consisted of reported crashes from October 1, 2007 through May 31, 2013 (5 years 8 months). The begin date for this analysis was determined by the earliest crash report showing a traffic signal at the study intersection. 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 for the SR 1002 (Old Salisbury-Concord Road) and SR 2180 (Lane Street)/Heritage Oaks Drive intersection. *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. 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	23	15	- 34.8 %
Total Severity Index	4.54	4.45	- 1.98 %
Target Crashes	17	9	- 47.1 %
Target Crash Severity Index	4.92	5.11	- 3.86%
Volume (2004, 2010)	12,900	12,000	-7.0 %

<b><u>Injury Crash Summary</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	5	0	-100.0 %
Class C Injury Crashes	6	7	+16.7 %
Property Damage Only	12	8	- 33.3 %

The naive before and after analysis at the treatment location resulted in a 35 percent reduction in Total Crashes, a 47 percent reduction in Target Frontal Impact Crashes and a 2 percent decrease in the Total Severity Index. The before period ADT year was 2004 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:

<b><u>Additional Information</u></b>	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Sideswipe, opposite direction	3	1	-66.7 %
Rear End Slow or Stop	1	2	+ 100.0 %

## **Results and Discussion**

Referencing the *Collision Diagrams*, target crashes (Frontal Impact Crashes) experienced a reduction from 17 crashes in the before period to 9 crashes in the after period. The installation of the signal was beneficial in reducing the target crashes at this location during the after period.

Sideswipe, opposite direction crashes decreased from 3 crashes in the before period to 1 crash in the after period. Also, rear end crashes increased from 1 crash in the before period to 2 crashes in the after period.

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 (Image Date: 8/12) - Looking North on SR 1002 (Old Salisbury-Concord Rd) Approach**



**Google Maps (Image Date: 6/09) - Looking South on SR 1002 (Old Salisbury-Concord Rd) Approach**



Google Maps (Image Date: 8/12) – Looking East from SR 2180 (Lane Street) Approach

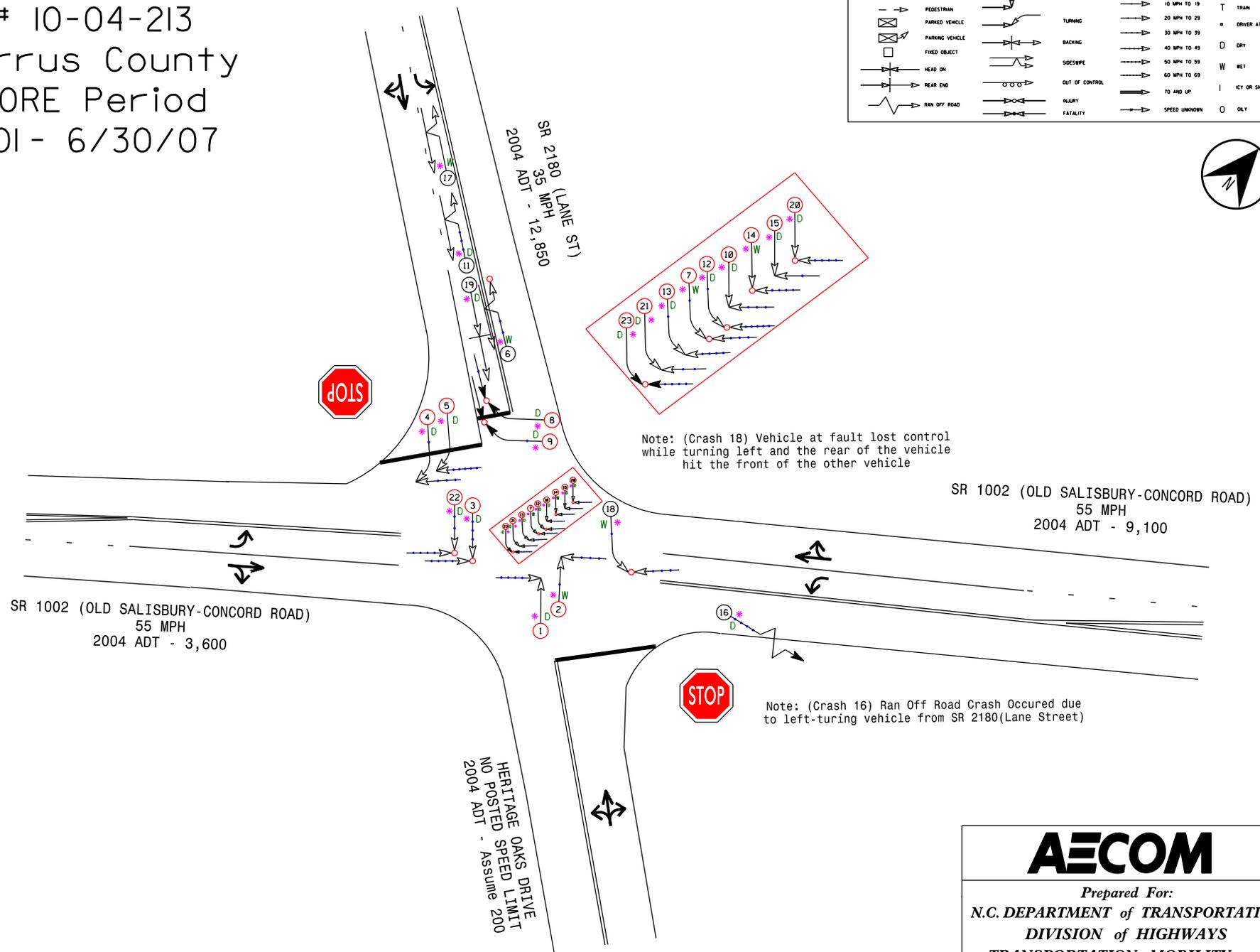


Google Maps (Image Date: 8/12) – Looking East toward Heritage Oaks Approach

SS# 10-04-213  
 Cabarrus County  
 BEFORE Period  
 11/1/01 - 6/30/07

**LEGEND**

	MOVING VEHICLE		ANGLE		1 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PARKING VEHICLE		SKID		30 MPH TO 39		DRY
	FIXED OBJECT		SLOPE		40 MPH TO 49		WET
	HEAD ON		OUT OF CONTROL		50 MPH TO 59		ICY OR SHORT
	REAR END		INJURY		60 MPH TO 69		FATALITY
	RAN OFF ROAD		FATALITY		70 AND UP		ONLY



Frontal Impact Crashes

**AECOM**

Prepared For:  
 N.C. DEPARTMENT of TRANSPORTATION  
 DIVISION of HIGHWAYS  
 TRANSPORTATION MOBILITY and SAFETY DIVISION

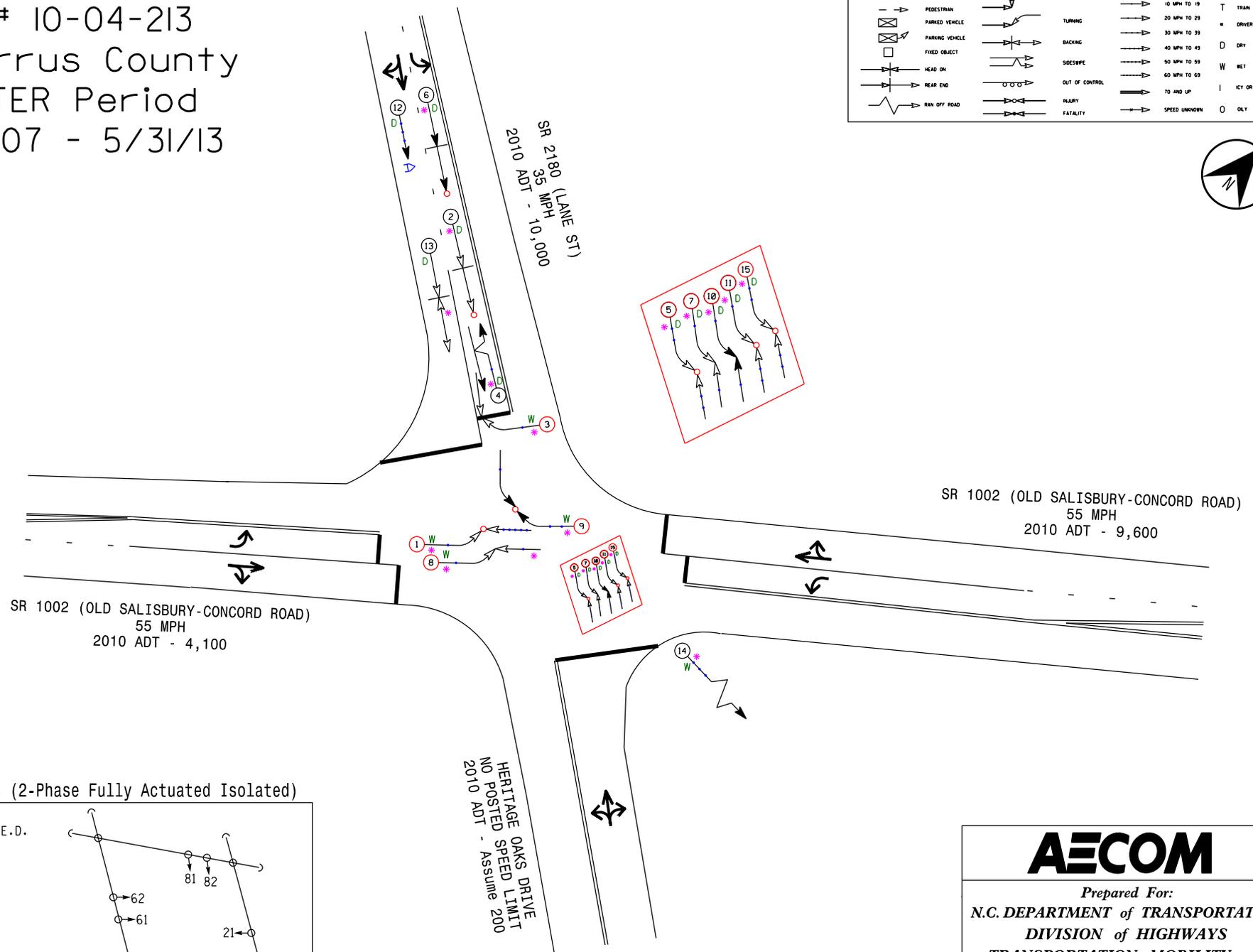
**TRAFFIC SAFETY UNIT**

Date: 8-19-2013      Prepared By: Heath Gore, PE

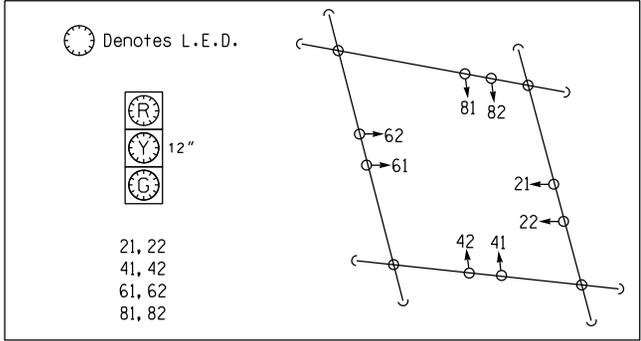
SS# 10-04-213  
 Cabarrus County  
 AFTER Period  
 10/1/07 - 5/31/13

**LEGEND**

	MOVING VEHICLE		ANGLE		1 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PAKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PAKED VEHICLE		SLOESWPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		HURRY		50 MPH TO 59		ICY OR SHORT
	NEAR END		FATALITY		60 MPH TO 69		SPEED UNKNOWN
	RAN OFF ROAD				70 AND UP		



SIG ID 10-1965 (2-Phase Fully Actuated Isolated)



Frontal Impact Crashes

**AECOM**

Prepared For:  
 N.C. DEPARTMENT of TRANSPORTATION  
 DIVISION of HIGHWAYS  
 TRANSPORTATION MOBILITY and SAFETY DIVISION

**TRAFFIC SAFETY UNIT**

Date: 8-16-2013      Prepared By: Heath Gore, PE