

Spot Safety Project Evaluation

Spot Safety Project # 10-03-211

Spot Safety Project Evaluation for Installation of Traffic Signal

**SR 2475 (Prosperity Church Road) and SR 2601 (Ridge Road)
Mecklenburg 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



Andrew Covington
AECOM

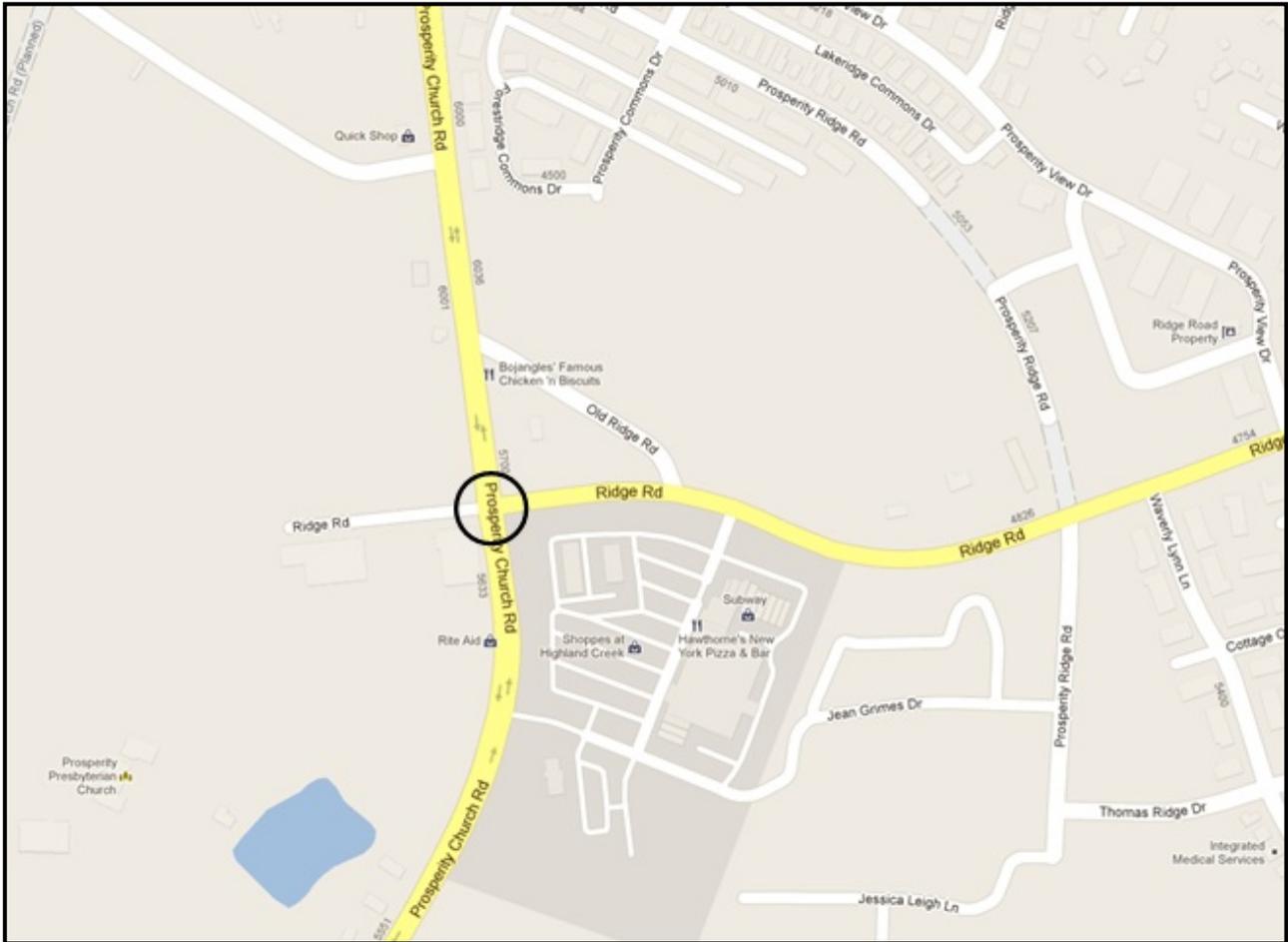
4-26-2013
Date

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 10-03-211 located at the intersection of SR 2475 (Prosperity Church Road) and SR 2601 (Ridge Road) near Charlotte in Mecklenburg County.

The Sig ID for this signal is unknown because it is maintained by the City of Charlotte.



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 the installation of a traffic signal.

SR 2475 (Prosperity Church Road) is a two-lane facility with left turn lanes on both approaches of the intersection and a speed limit of 45 mph. SR 2601 (Ridge Road) is a two-lane roadway that serves a large residential area on one side and serves a drug store/grocery store on the other side. SR 2601 (Ridge Road) also has a speed limit of 45 mph.

The original statement of problem was that there were insufficient gaps in SR 2475 (Prosperity Church Road) traffic for a motorist on SR 2601 (Ridge Road) to safely enter. The initial crash analysis was completed from March 1, 2000 to March 1, 2003 with thirteen (13) total reported crashes, of which there were seven (7) left-turn different roadway crashes. The completion date given in the spot safety project folder was May 13, 2008; however, the crash reports indicated that the signal was installed between September and October of 2005 with a total cost of \$70,000.00.

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 October through December 2005. The completion date given in the spot safety project folder was May 13, 2008; however, the crash reports indicated that the signal was installed between September and October of 2005. The before period consisted of reported crashes from October 1, 2002 through September 30, 2005 (3 years); and the after period consisted of reported crashes from January 1, 2006 through February 28, 2013 (7 years 2 months). Due to the discrepancies in completion date for this project, a standard three year before time period was chosen for this analysis. 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 2475 (Prosperity Church Road) and SR 2601 (Ridge Road) approaches. *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 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.

<u>Treatment Information</u>	Before (3 years)	After (7 years 2 months)	Percent Reduction (-) Percent Increase (+)
Total Crashes	20	27	n/a
Crashes Per Year	6.67	3.77	- 43.5 %
Total Severity Index	9.23	3.19	- 65.4 %
Target Crashes	19	14	n/a
Target Crashes Per Year	6.33	1.95	- 69.2 %
Target Crash Severity Index	9.27	3.64	- 60.7 %
Volume (2004, 2009)	12,000	16,300	35.8 %

<u>Injury Crash Summary</u>	Before (total)	Before (per year)	After (total)	After (per year)	Percent Reduction (-) Percent Increase (+) (per year)
Fatal injury Crashes	0	0.00	0	0.00	N/A
Class A injury Crashes	1	0.33	0	0.00	- 100.0 %
Class B injury Crashes	3	1.00	1	0.14	- 86.0 %
Class C Injury Crashes	9	3.00	7	0.98	-67.3 %
Property Damage Only	7	2.33	19	2.65	13.7 %

The naive before and after analysis at the treatment location resulted in a 43.5 percent reduction in total crashes per year, a 69.2 percent reduction in frontal impact crashes per year, and a 65.4 percent reduction in the Total Severity Index. The before period ADT year was 2004 and the after period ADT year was 2009.

To further analyze the intersection crash patterns, the following chart shows different traffic movements and the change in crash totals through the study:

Additional Information	Before (total)	Before (per year)	After (total)	After (per year)	Percent Reduction (-) Percent Increase(+) (per year)
Frontal Impact Crashes (Target)	19	6.33	14	1.95	-69.2%
Left Turn, Same Roadway	1	0.33	11	1.53	360.4%
Left Turn, Different Roadway	12	4.00	1	0.14	-96.5%
Rear End Slow or Stop	1	0.33	8	1.12	234.9%
Sideswipe	0	0.00	5	0.70	100.0%

Results and Discussion

Referencing the *Collision Diagrams*, target crashes per year (Frontal Impact Crashes) experienced a reduction from 6.33 crashes per year in the before period to 1.95 crashes per year in the after period. The installation of the signal was beneficial in reducing the target crashes per year at this location during the after period.

Left turn, different roadway crashes decreased from 4.00 crashes per year in the before period to 0.14 crashes per year in the after period. Left-turn, same roadway crashes increased from 0.33 crashes per year in the before period to 1.53 crashes per year in the after period.

Although the target crashes were reduced, the number of rear end crashes and sideswipe crashes per year at the intersection increased. Rear end crashes increased from 0.33 crash per year in the before period to 1.12 crashes per year in the after period. Sideswipe crashes also increased from 0 crashes per year in the before period to 0.70 crashes per year 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: 9/07) – Looking North on SR 2475 (Prosperity Church Rd) Approach



Google Maps (Image Date: 9/07) – Looking South on SR 2475 (Prosperity Church Rd) Approach



Google Maps (Image Date: 9/07) – Looking West on SR 2601 (Ridge Road) Approach



Google Maps (Image Date: 9/11) – Looking West on SR 2601 (Ridge Road) Approach

SS# 10-03-211
 Mecklenburg County
 BEFORE Period
 10/1/02 - 9/30/05

Note: The before and after time periods
 are not equal

Eckerd/Aldi Driveway
 Speed Limit Unknown
 2004 ADT (estimated)-1,000

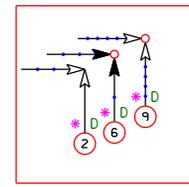
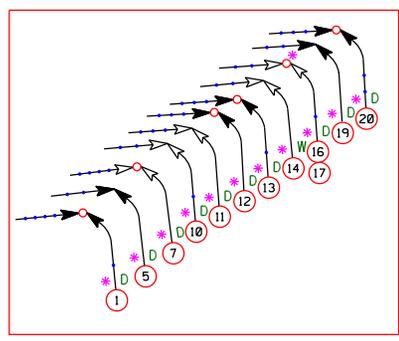
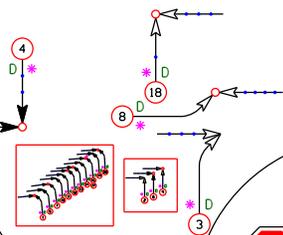
LEGEND							
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PARKING VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		TO AND UP		50 MPH TO 59		ICY OR SNOWY
	REAR END		INJURY		60 MPH TO 69		SPEED UNKNOWN
	RAN OFF ROAD		FATALITY		TO AND UP		ONLY



SR 2475 (Prosperity Church Road)
 45 MPH
 2004 ADT-9,000

SR 2475 (Prosperity Church Road)
 45 MPH
 2004 ADT-9,000

SR 2601 (Ridge Road)
 45 MPH
 2004 ADT-4,900



Frontal Impact
 Crashes

AECOM

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

TRAFFIC SAFETY UNIT

Date: 4-26-2013 Prepared By: Andrew Covington

SS# 10-03-211
 Mecklenburg County
 AFTER Period
 1/1/06 - 2/28/13

Note: The before and after time periods are not equal

Eckerd/Aldi Driveway
 Speed Limit Unknown
 2009 ADT (estimated) -1,000

LEGEND

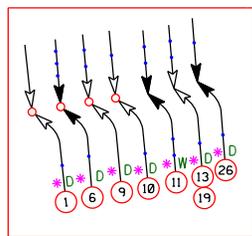
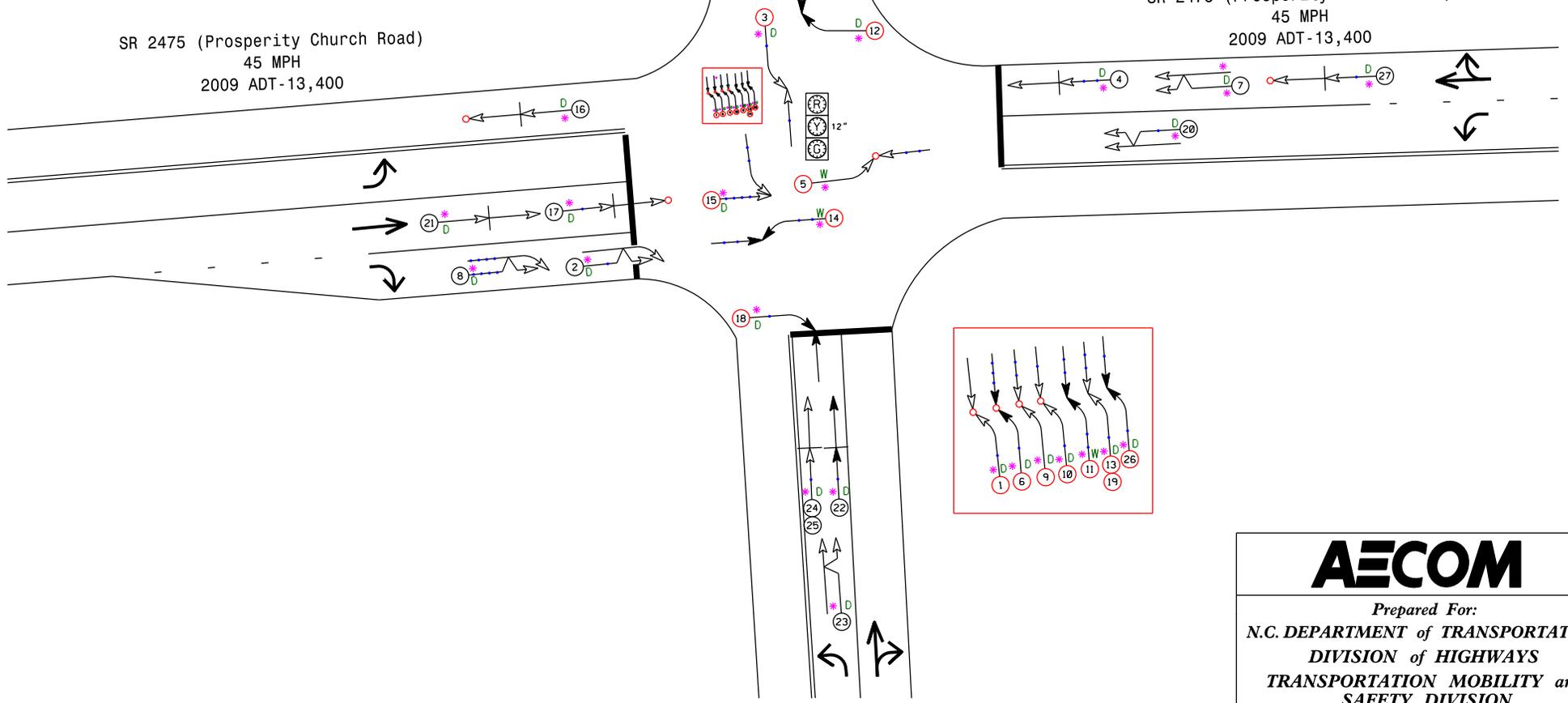
	MOVING VEHICLE		ANGLE		1 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PARKED VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		HIT AND UP		50 MPH TO 59		ICY OR SNOWY
	REAR END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



SR 2475 (Prosperity Church Road)
 45 MPH
 2009 ADT-13,400

SR 2475 (Prosperity Church Road)
 45 MPH
 2009 ADT-13,400

SR 2601 (Ridge Road)
 45 MPH
 2009 ADT-4,700



Frontal Impact Crashes

AECOM

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

TRAFFIC SAFETY UNIT

Date: 4-26-2013 Prepared By: Andrew Covington