

Spot Safety Project Evaluation

Order # 41000009802

Spot Safety Project # 09-04-201

**Spot Safety Project Evaluation of the Bridge Structure Removal
Bridge # 156 on SR 2370 (Saint Peters Church Road)
Rowan County**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
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1-5-2011

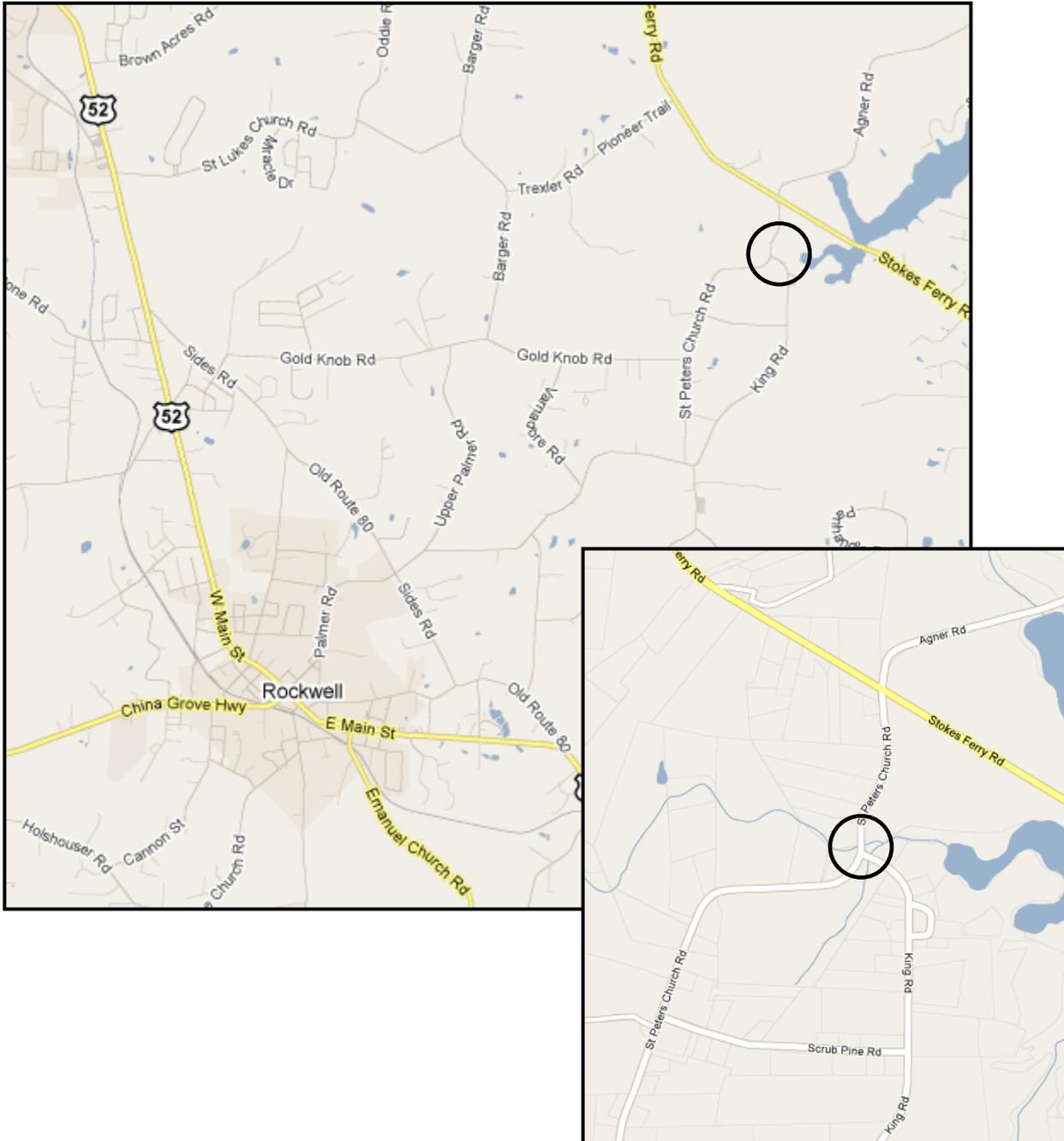
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 09-04-201 located along SR 2370 (St. Peters Church Road) at Bridge #156 (MP 0.31), next to the intersection of SR 2371 (King Road), in Rowan County, northeast of the City of Rockwell.





Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the replacement of the existing bridge structure with two (2) arched pipes and shoulder clearing to provide a grass shoulder for a motorist's recovery area. SR 2370 (St. Peters Church Road) is a two-lane facility at the subject location with a speed limit of 55 mph and a winding horizontal alignment which is heavily wooded. The former bridge #156 structure was 21 feet wide with a wooden deck and wooden bridge rails.

The original statement of problem was the existing crash pattern of northbound vehicles running off the roadway into the bridge rails after negotiating the sharp curve prior to the bridge. The intended purpose of this improvement was to reduce the severity of lane departure collisions and give motorists an area to correct their vehicles.

The initial crash analysis was completed from March 1, 1993 to March 1, 2003 with fifteen (15) reported crashes, nine (9) of which were deemed correctable including one fatality crash. The final completion date for the improvement at the subject intersection was on August 29, 2006 with a total cost of \$64,535.

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 June through August 2006. The before period consisted of reported crashes from May 1, 2002 through May 31, 2006 (4 years and 1 month); and the after period consisted of reported crashes from September 1, 2006 through September 30, 2010 (4 years and 1 month). 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 bridge location which includes the intersection of SR 2370 (St. Peters Church Road) with SR 2371 (King Road). The study milepost range on SR 2370 was from 0.282 to 0.338. *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 Ran-off Roadway Crashes were the target crashes for the applied countermeasure.

<u>Treatment Information</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	2	0	- 100.0 %
Total Severity Index	38.90	0.00	- 100.0 %
Target Crashes – Ran-off Road	2	0	- 100.0 %
Target Crash Severity Index	38.90	0.00	- 100.0 %
Volume – Estimates (2004, 2008)	550	750	36.4 %

<u>Injury Crash Summary</u>	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	1	0	- 100.0 %
Class A injury Crashes	0	0	N/A
Class B injury Crashes	0	0	N/A
Class C Injury Crashes	0	0	N/A
Total Injury Crashes	1	0	- 100.0 %

The naive before and after analysis at the treatment location resulted in complete elimination of both Total Crashes and Target Crashes, and a 100 percent decrease in the Total Severity Index. The before period ADT year was 2004 and the after period ADT year was 2008.

Results and Discussion

Referencing the *Collision Diagrams*, the before period experienced two (2) northbound bridge strikes including a fatality crash. With the bridge removal and clearing for a grass shoulder recovery area this location did not present any after period collisions. The chosen countermeasures successfully eliminated the existing crash related issues at this location.

The calculated benefit to cost ratio for this project is **27.12 considering total or target crashes**. The benefits are calculated using the change in annual crash costs from the before to the after period. Operational and other benefits related to the project are not considered in this analysis. The costs of the project include the actual construction costs as well as the increase in annual maintenance and utility costs.

Photos were not provided from Google Street View for this particular roadway segment. However, the aerial diagram clearly shows the bridge removal and improved grass recovery area. 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 countermeasure improvement.



SR 2370
St. Peters Church Rd
55 MPH

Creek
(Heavily Wooded)

Bridge #156
MP: 0.31

Creek
(Heavily Wooded)



SR 2371
King Rd

ADT (Year)
550 (2004)
Estimate

LEGEND							
	MOVING VEHICLE		ANGLE		10 MPH OR LESS		P PEDESTRIAN
	PEDESTRIAN		T TURNING		20 MPH TO 29		T TRAIN
	PARKED VEHICLE		B BACKING		30 MPH TO 39		O OTHER AT FAULT
	PARKING VEHICLE		S SHOULDER		40 MPH TO 49		D DIRT
	FIXED OBJECT		O/C OUT OF CONTROL		50 MPH TO 59		W WET
	HEAD ON		H/A HEAD UP		60 MPH TO 69		I ICT OR SHIRT
	HEAD END		H/F HEADY		70 MPH TO 79		I ICT OR SHIRT
	RAN OFF ROAD		F FATALITY		80 MPH TO 89		O OLY

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Rowan County
BEFORE Period
5/1/02 - 5/31/06

Ran-off Road
Target Crashes

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

TRAFFIC SAFETY UNIT

Date: 12-30-2010 Prepared By: J. Schrone



SR 2370
St. Peters Church Rd
55 MPH

Former
Bridge #156
MP: 0.31

Creek
(Heavily Wooded)

Creek
(Heavily Wooded)

Grass
Recovery
Area
Created

Culvert
Installed
(Bridge Removed)

SR 2371
King Rd

ADT (Year)
750 (2008)
Estimate

LEGEND							
	MOVING VEHICLE		ANGLE		5 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		40 MPH TO 75		TRAIN
	PAKED VEHICLE		BACKING		30 MPH TO 35		OTHER AT FAULT
	PAKED VEHICLE		SIDESWIPE		40 MPH TO 45		DRY
	FIXED OBJECT		OUT OF CONTROL		50 MPH TO 55		WET
	HEAD ON		RAN OFF ROAD		60 MPH TO 65		TO AND UP
	HEAD ON		RAN OFF ROAD		75 MPH TO 85		CITY OR STREET
	HEAD ON		RAN OFF ROAD		85 MPH TO 95		FATALITY
	HEAD ON		RAN OFF ROAD		SPEED UNKNOWN		ONLY

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Rowan County
AFTER Period
9/1/06 - 9/30/10

Location
Experienced
Zero (0) Crashes
During the
After Period



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

TRAFFIC SAFETY UNIT

Date: 12-30-2010
Prepared By: J. Schronce