

Spot Safety Project Evaluation

Project Log # 200702010

Spot Safety Project # 10-98-210

**Spot Safety Project Evaluation of the Guardrail Installation on SR 3445 (Tilley Morris Rd)
approximately 500 feet south of SR 4349 in Mecklenburg Co.**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

Samuel D. Coleman, EI

7/16/2007
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 10-98-210 - The Guardrail Installation on SR 3445 (Tilley Morris Rd) approximately 500 feet south of SR 4349 in Mecklenburg County.

Project Information and Background from the Project File Folder

SR 3445 is a two lane roadway with a speed limit of 35 mph through the treatment section (MP 0.61 to 0.672). There is a 30 mph speed advisory plaque when approaching the treatment section from either side of SR 3445. Observation shows poor horizontal and vertical alignment through the treatment section.

The original problem statement shows a run off road problem due to excessive operating speeds and poor horizontal and vertical alignment. The original crash analysis yielded 4 total crashes from 1/7/1997 through 4/27/1998, with a fatal occurring on 4/27/1998. The improvement chosen for the subject location was to install a guardrail to prevent vehicles from entering the culvert in the event of a crash. The final completion date for the improvement at the subject location was on August 15, 2002 at a cost of \$30,000.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes along the subject road, the crash data omitted from this analysis to consider for an adequate construction period was from July 2002 through September 2002. The before period consisted of reported crashes from May 1, 1998 through June 30, 2002 (4 years, 2 months) and the after period consisted of reported crashes from October 1, 2002 through November 30, 2006 (4 years, 2 months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The treatment data consisted of all crashes from 1060 feet north of Deerfield Creek Drive to 50 feet south of Stonemede Lane (MP 0.610 to MP 0.690). The following data table depicts the Naive Before and After Analysis for the above information. Please note that Ran Off Road Crashes were the target crashes for the applied countermeasure. These crash types considered are as follows: Ran Off Road-Left, Ran Off Road-Right, Ran Off Road-Straight, Overturn/Rollover, Fixed Object, Head-On; Sideswipe, Same Direction; Sideswipe, Opposite Direction.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	0	6	N/A
Total Severity Index	0.0	3.5	N/A
Target Crashes	0	6	N/A
Target Severity Index	0.0	3.5	N/A
Volume	7650	7700	0.7
<u>Treatment Injury Crashes</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	0	0	0.0
Class B	0	1	0.0
Class C	0	1	0.0
Property Damage Only	0	4	0.0
<u>Target Injury Crashes</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	0	0	0.0
Class B	0	1	0.0
Class C	0	1	0.0
Property Damage Only	0	4	0.0

Table 1.

The naive before and after analysis at the treatment location resulted in an increase in Total Crashes, an increase in Frontal Impact Crashes, and a 1.0 percent increase in Average Daily Traffic (ADT). The before period ADT year was 2000 and the after period ADT year was 2004.

Results and Discussion

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in an increase in Total Crashes and an increase in Frontal Impact Crashes from the before to the after period. Information from the crash report narratives indicates weather, dodging oncoming traffic, and excessive speed as reasons for the 6 crashes. There are curve ahead warning and 30 mph speed advisory signs at both approaches to the treatment section. There are street lamps and chevrons along the roadside to assist with identifying the curve during daylight and at night.

The calculated benefit to cost ratio for this project is -2.45 considering total crashes. The benefit to cost ratio considering only target crashes is -2.45 . 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 costs.

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 road.

TOTAL BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: SR 3445 approx. 500' south of SR 4349
 COUNTY: Mecklenburg
 FILE NO.: SS 10-98-210

BY: SDC
 DATE: 6/19/2007

DETAILED COST: TYPE IMPROVEMENT - **Guardrail**

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$30,000	10	0.149	\$4,471
	\$0	0	0.000	\$0
Right-of-Way	\$0	0	0.000	\$0

TOTALS \$30,000 10 0.149 \$4,471

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$580
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0
 TOTAL ANNUAL COST= \$5,051
 TOTAL COST OF PROJECT= \$30,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	4.17	0	0.00	0	0.00	0	0.00	\$0
AFTER	4.17	0	0.00	2	0.48	4	0.96	\$12,374

Annual Benefits from Crash Cost Savings (\$12,374)

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = (\$17,425)

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = -2.45

TOTAL COST OF PROJECT - \$30,000 COMPREHENSIVE B/C RATIO - -2.45

TREATMENT BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: SR 3445 approx. 500' south of SR 4349
 COUNTY: Mecklenburg
 FILE NO.: SS 10-98-210

BY: SDC
 DATE: 6/19/2007

DETAILED COST: TYPE IMPROVEMENT - **Guardrail**

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$30,000	10	0.149	\$4,471
	\$0	0	0.000	\$0
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$30,000	10	0.149	\$4,471

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$580
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0
 TOTAL ANNUAL COST= \$5,051
 TOTAL COST OF PROJECT= \$30,000

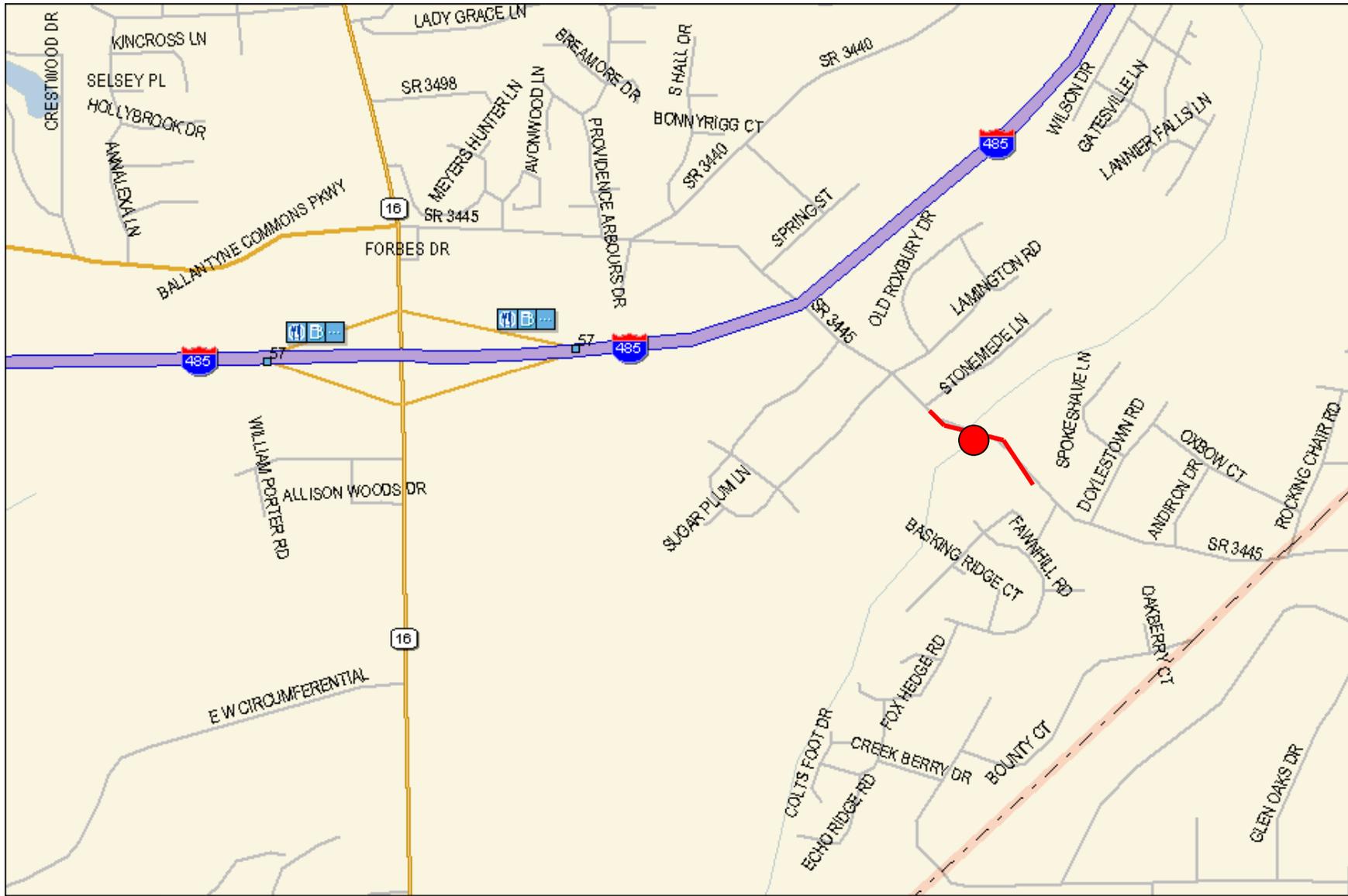
COMPREHENSIVE COST REDUCTION:

TIME PERIOD	YEARS	ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES						ANNUAL COSTS
		K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	
BEFORE	4.17	0	0.00	0	0.00	0	0.00	\$0
AFTER	4.17	0	0.00	2	0.48	4	0.96	\$12,374

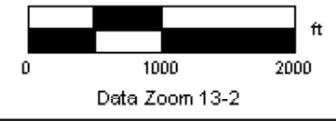
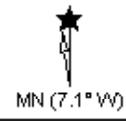
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TOTAL COST OF PROJECT - \$30,000 COMPREHENSIVE B/C RATIO - -2.45



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Location Map: SR 3445 (Tilley Morris Rd) approximately 500 feet south of SR 4349 (Stonemedle Ln)

Treatment Site Photos taken March 23, 2007



Driving south on SR 3445



Driving south on SR 3445



Driving south on SR 3445



Driving south on SR 3445



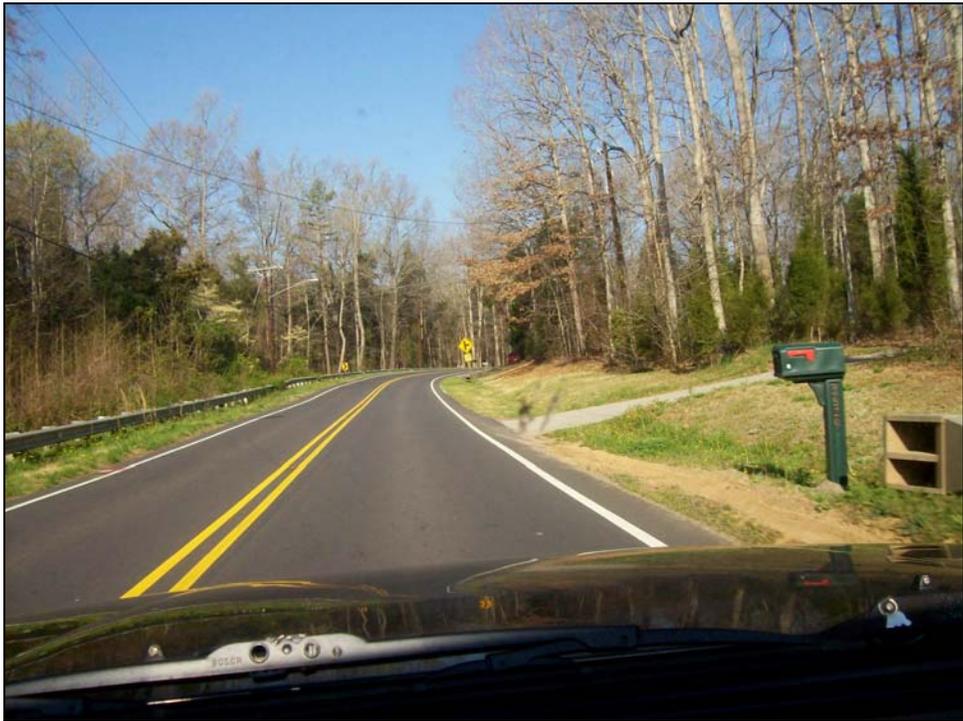
Driving south on SR 3445



Driving north on SR 3445



Driving north on SR 3445



Driving north on SR 3445



Facing south from Stonemedede Ln



Facing north from culvert



Facing south toward culvert

