

Spot Safety Project Evaluation

Project Log # 200806152

Spot Safety Project # 02-01-262

**Spot Safety Project Evaluation of the
Center Turn Lane Installation at the Intersection of
NC 55 and SR 1205 (Courtland Dr) / SR 1347 (Old Bay River Rd)
Pamlico County, Town of Alliance**

Documents Prepared By:

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

Principal Investigator



Jason B. Schronce

11-20-2008

Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 02-01-262 located at the Intersection of NC 55 and SR 1205 (Courtland Drive) / SR 1347 (Old Bay River Road) within the Town of Alliance in Pamlico County.

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 center turn lane surrounding this intersection to include markings for NC 55 eastbound and westbound dedicated left turns at the crossroads. In the before period, NC 55, SR 1205 (Courtland Drive), and SR 1347 (Old Bay River Road) were all two-lane facilities at the subject intersection with no turn lanes and speed limits of 45 mph and 35 mph, respectively. The subject location is a crossroads type intersection, which was controlled by stop signs on SR 1205 and SR 1347. In July 2005, work began on TIP R-2539C which is currently widening NC 55 to a five-lane segment through this intersection.

The original statement of problem concluded that numerous rear end crashes were occurring due to the lack of left turn lanes on both approaches of NC 55. The goal was to remove left turning motorists from the traffic flow through lane to reduce crashes and maintain better segment mobility.

The initial crash analysis was completed from April 1, 1998 to March 31, 2001 with six (9) reported crashes, six (6) of which were deemed correctable. The final completion date for the improvement at the subject intersection was on March 25, 2003 with a total cost of \$100,000.00.

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 was from February 1 to April 30, 2003. The before period consisted of reported crashes from February 1, 1998 through January 31, 2003 (5 years); and the after period consisted of reported crashes from May 1, 2003 through June 30, 2005 (2 years and 2 months). The ending date for this analysis was determined by the start date of the NC 55 widening project (R-2539C) in July 2005.

The treatment data consisted of all crashes within 150 feet of the subject intersection on the cross streets and 400 feet of the subject intersection on NC 55 to include the entire center turn lane segment that encompasses local businesses. *Please see attached location map and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Mainline Rear End Crashes resulting from a left turning vehicle were the target crashes for the applied countermeasure. These crash types included: Rear End, Turn; Rear End, Slow or Stop; and Ran Off Road, Right to include the avoidance of a Rear End Collision.

<u>Treatment Information</u>			
	Before 5.0 Yrs	After 2.16 Yrs	Percent Reduction (-) Percent Increase (+)
Total Crashes	19	0	- 100.0 %
Total Crashes per Year	3.8	0.0	
Total Severity Index	8.88	0.00	
Target Crashes	15	0	- 100.0 %
Target Crashes per Year	3.0	0.0	
Target Crash Severity Index	4.95	0.00	
Volume	11,300	12,400	9.7 %
<u>Injury Crash Summary</u>			
Fatal injury Crashes	1	0	- 100.0 %
Class A injury Crashes	0	0	
Class B injury Crashes	7	0	
Class C Injury Crashes	3	0	
Total Injury Crashes	11	0	

The naive before and after analysis at the treatment location resulted in total elimination of both Total and therefore, Target Crashes at this location. The before period ADT year was 2000 and the after period ADT year was 2004.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in significant improvement to the overall intersection safety and elimination of all crash patterns.

Referencing the *Collision Diagrams*, a large portion of crashes at the intersection in the before period (15 of 19) were the result of a vehicle waiting to turn left onto SR 1205, SR 1347, or a local business causing traffic queuing and ultimately a rear end collision. The implantation of the center turn / dedicated intersection left turn lanes were successful because they removed such vehicles from the high speed roadway.

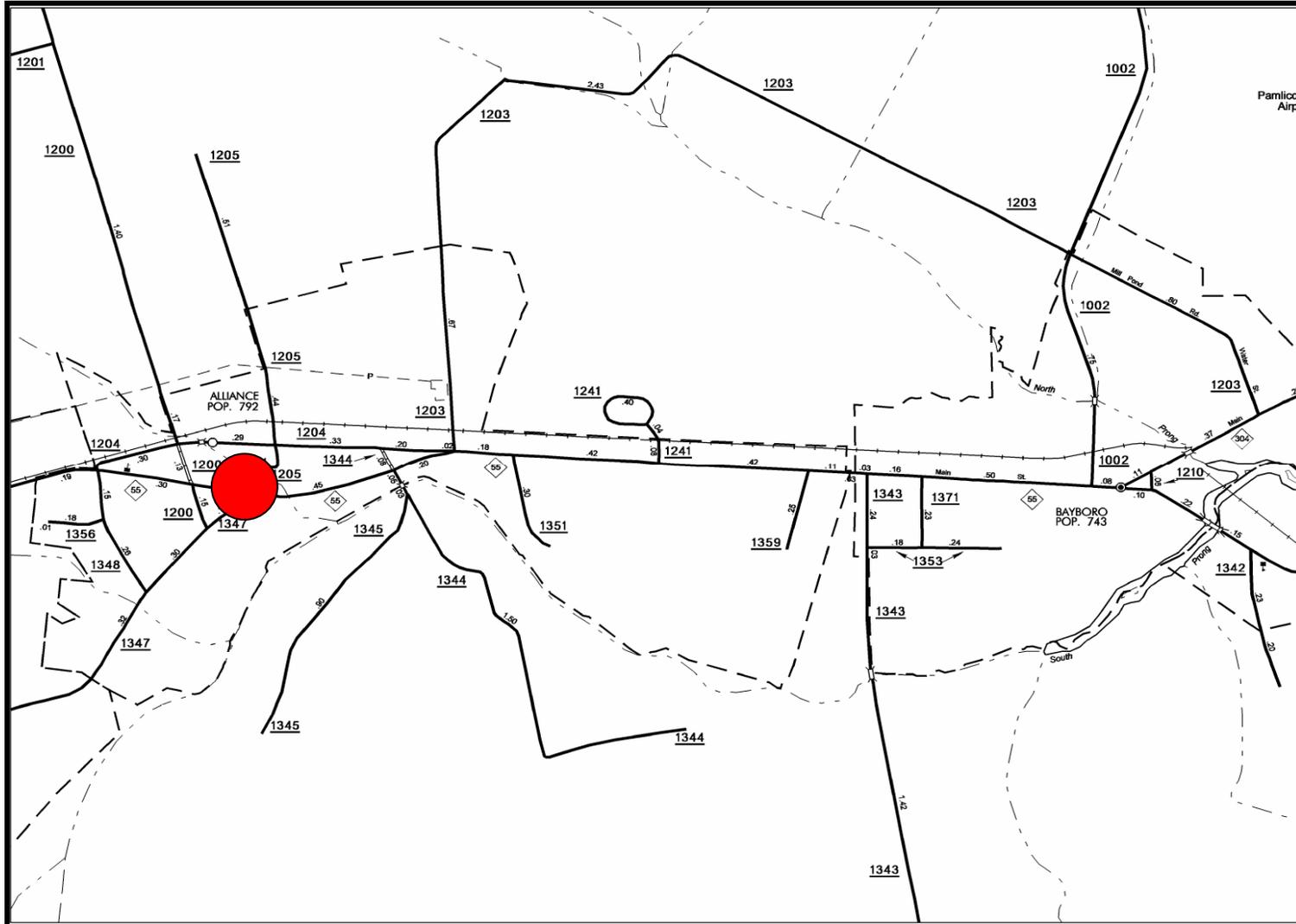
A small pattern of intersection angle collisions did exist in the before period, including one motorcycle fatality, which was also eliminated in the after period.

The calculated benefit to cost ratio for this project is **12.95 considering total crashes**. The benefit to cost ratio **considering only target crashes is 3.12**. 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.

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection, although the site is currently under construction (NC 55 widening project) as explained in the *Project Background* section.

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.

Location Map
Pamlico County, Town of Alliance
Evaluation of Spot Safety Project # 02-01-262



Treatment Location: NC 55 at SR 1205 (Courtland Drive) / SR 1347 (Old Bay River Road)

TREATMENT SITE PHOTOS TAKEN 8/6/2008



Traveling East on NC 55



Traveling East on NC 55



Traveling South on SR 1205 (Courtland Drive)



Traveling North on SR 1347 (Old Bay River Road)



Traveling West on NC 55



Traveling West on NC 55

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: NC 55 at SR 1205
 COUNTY: Pamlico
 FILE NO.: SS 02-01-262

BY: JBS
 DATE: 11/19/2008
 NOTES: Total Crashes

DETAILED COST: TYPE IMPROVEMENT - Center Turn Lane, Left Turn Lanes

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$100,000	20	0.102	\$10,185
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$100,000	20	0.102	\$10,185

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$800
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0
 TOTAL ANNUAL COST= \$10,985
 TOTAL COST OF PROJECT= \$100,000

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	5.00	1	0.20	10	2.00	8	1.60	\$142,240
AFTER	2.16	0	0.00	0	0.00	0	0.00	\$0

Annual Benefits from Crash Cost Savings \$142,240

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = \$131,255
 BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 12.95

TOTAL COST OF PROJECT - \$100,000 COMPREHENSIVE B/C RATIO - 12.95

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: NC 55 at SR 1205
 COUNTY: Pamlico
 FILE NO.: SS 02-01-262

BY: JBS
 DATE: 11/19/2008
 NOTES: Target Crashes - Mainline Rear End Turn

DETAILED COST: TYPE IMPROVEMENT - Center Turn Lane, Left Turn Lanes

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$100,000	20	0.102	\$10,185
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$100,000	20	0.102	\$10,185

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$800
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0
 TOTAL ANNUAL COST= \$10,985
 TOTAL COST OF PROJECT= \$100,000

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	5.00	0	0.00	8	1.60	7	1.40	\$34,260
AFTER	2.16	0	0.00	0	0.00	0	0.00	\$0

Annual Benefits from Crash Cost Savings \$34,260

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = \$23,275

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 3.12

TOTAL COST OF PROJECT - \$100,000 COMPREHENSIVE B/C RATIO - 3.12



SR 1205
COURTLAND DR
35 MPH

NC 55
45 MPH

HARDISON'S
CAR WASH

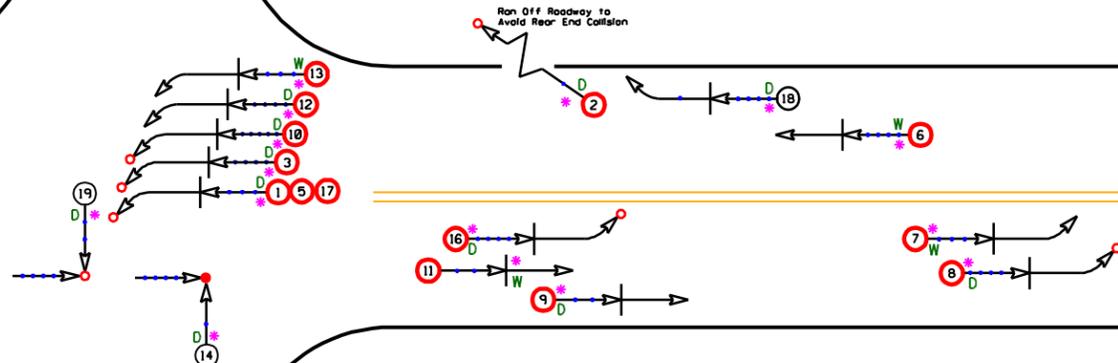
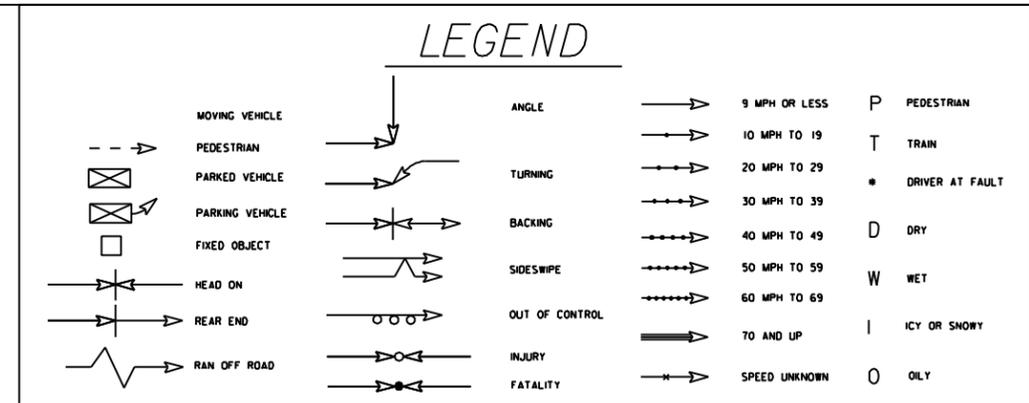
PAMLICO
QUICK LUBE

ALLIANCE
AUTO

SS# 02-01-262
PAMLICO County
TOWN of ALLIANCE
BEFORE Period
2/1/98 - 1/31/03

LITTLE ITALY
PIZZA

SR 1347
OLD BAY RIVER RD
35 MPH



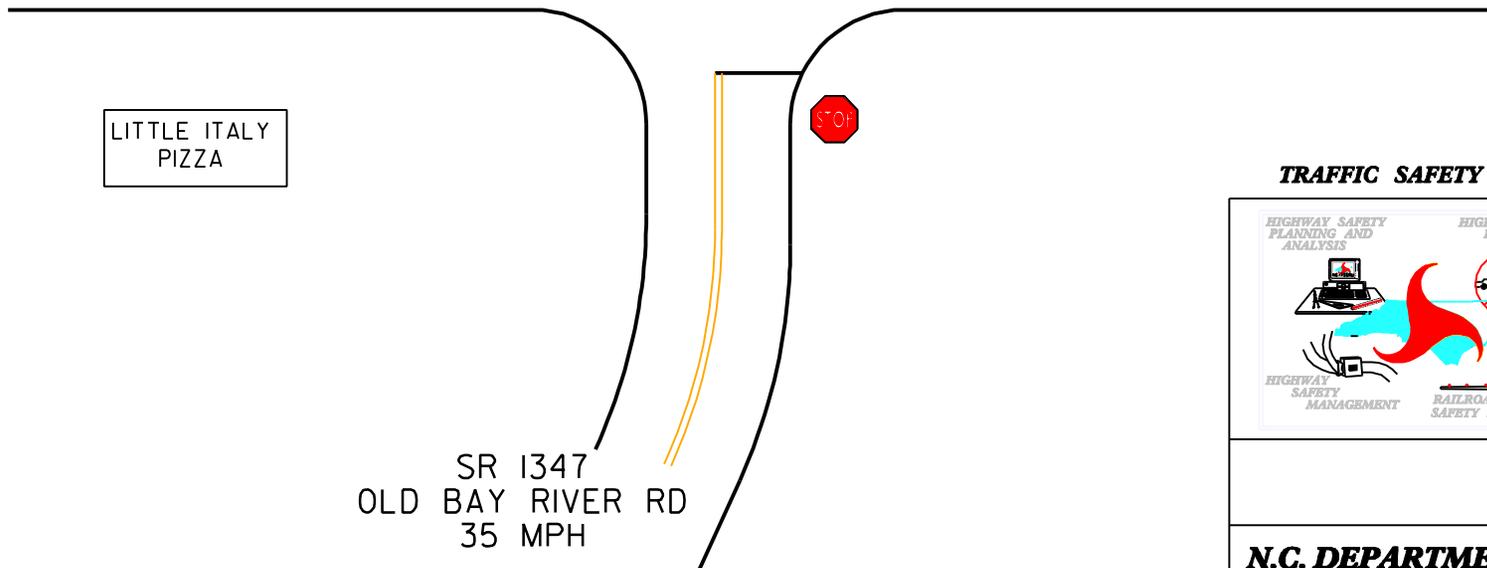
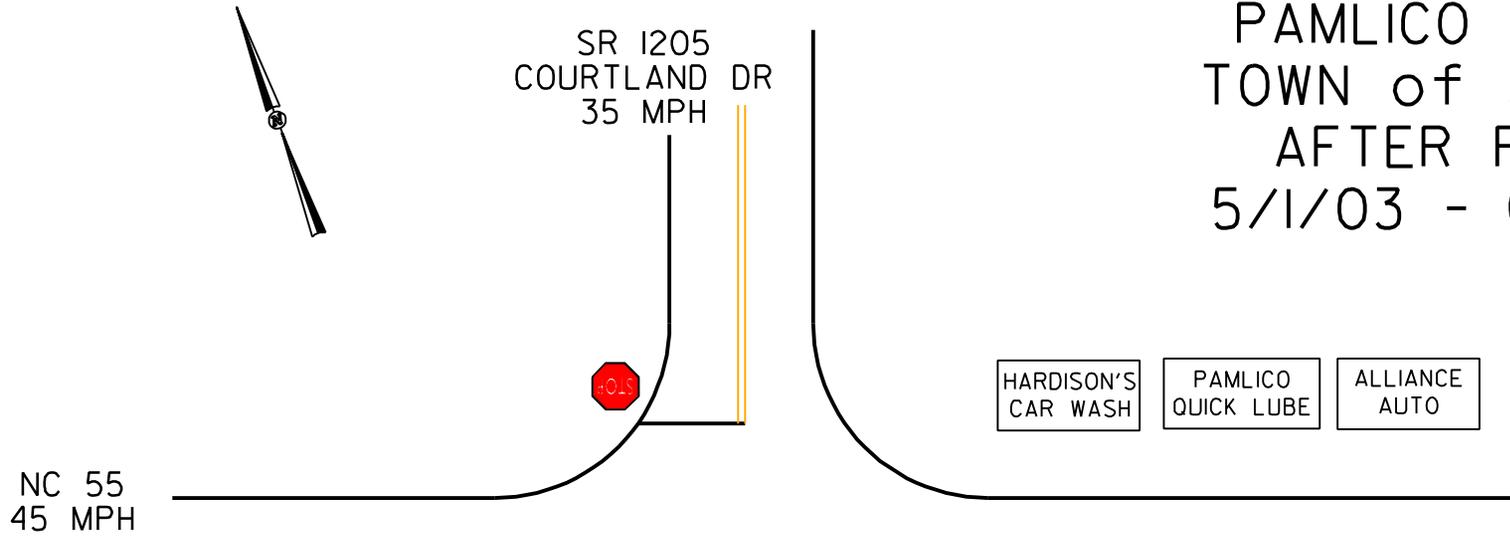
Target Crashes

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 2	AREA:
	STUDY PERIOD: 2/1/1998 - 1/31/2003	
	DISTANCE: Y-LINE = 400 FT / 150 FT	
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: BR		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 11-19-2008		
LOG NUMBER: SS# 02-01-262 BEFORE		

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

SS# 02-01-262
 PAMLICO County
 TOWN of ALLIANCE
 AFTER Period
 5/1/03 - 6/30/05



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 2	AREA:
STUDY PERIOD: 5/1/2003 - 6/30/2005		
DISTANCE: Y-LINE = 400 FT / 150 FT		
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: BR		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 11-19-2008		
LOG NUMBER: SS* 02-01-262 AFTER		

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