

Spot Safety Project Evaluation

Project Log # 200505114

Spot Safety Project # 02-97-254

**Spot Safety Project Evaluation of the Bridge Barrier Retrofitting and the Guardrail Installation
on US 258 at Middle Swamp Bridge No. 17 at Greene-Pitt County Line.**

Documents Prepared By:

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

Principal Investigator

Majed Bazzari

11/23/2005
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 02-97-254 – The Guardrail Installation on US 258 at Middle Swamp Bridge No. 17 at Greene - Pitt county line.

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naïve before and after analysis has been completed to measure the effectiveness of the spot safety improvement. Additional analysis methods were not utilized for this evaluation because a suitable comparison group was unattainable. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the retrofitting of Middle Swamp Bridge No.17 on US 258 and the installation of guardrails on this bridge. US 258 is a two-lane facility with a speed limit of 55 mph, the bridge ends are signed with bridge end delineators.

The initial crash analysis was completed from August 1, 1991 through July 31, 1997 with a total of Nine (9) reported crashes. There were Five Ran Off Road crashes, Two Rear End crashes and the other Two were random crashes. There was 1 Fatal injury, 1 class A injury, 1 class B injury and 2 class C injuries resulting from these crashes. The statement of the problem was vehicles running off the roadway at this bridge into the Swamp because there was no guardrail protection on this bridge. The final completion date for the improvement at the subject location was on January 31, 2001.

Naïve 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 December 1, 2000 through February 28, 2001. The before period consisted of reported crashes from November 1, 1996 through November 30, 2000 (4 Years, 1 Month) and the after period consisted of reported crashes from March 1, 2001 through March 31, 2005 (4 Years, 1 Month). 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 on US 258 within 1000 ft from both ends of The Middle Swamp bridge (Bridge # 17), which included all crashes on US 258 from MP 0.0 to MP 0.19 in Pitt

County and all crashes on US 258 from MP 16.54 to MP 16.73 in Greene County. A 0 feet Y-line was used in the analysis. Please see attached *Location Map* and Photos for further detail.

The following data Table 1 depicts the Naive Before and After Analysis for the Total Crashes and Target Crashes at the treatment location. Table 2 provides an in depth examination of the Naïve Before and After Analysis of the Total Crashes and Table 3 provides an in depth examination of the Naïve Before and After Analysis for the Guardrail Installation Target Crashes. Please note that the guardrail installation Target Crashes include the following crash types: Ran Off Road - Right, Ran Off Road - Left, Ran Off Road - Straight, Overturn/Rollover, Fixed Object, Head On, Sideswipe - Same Direction, and Sideswipe - Opposite Direction. Target Crashes are all potential Ran-Off Road crashes and include those crash types where at least one vehicle was involved in a lane departure.

Table 1. Treatment Information

	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	7	5	-28.6
Total Severity Index	13.94	5.44	-61.0
Total Target Crashes	4	3	-25.0
Target Severity Index	21.8	5.93	-72.8
Volume	6000	5500	-8.3

Table 2. Total Crashes Information

	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	7	5	-28.6
Fatal Crashes	1	0	-100.0
Non Fatal Injury Crashes	2	3	50.0
Total Injury Crashes	3	3	0.0
PDO Crashes	4	2	-50.0
Fatal Injuries	1	0	-100.0
Non-Fatal Injuries	5	7	40.0
Total Injuries	6	7	16.7
Night Crashes	3	2	-33.3
Wet Crashes	3	1	-66.7
Alcohol/ Drug Crashes	0	0	N/A

Table 3. Target Crashes Information

	Before Period	After Period	Percent Reduction (-)/ Percent Increase (+)
Total Target Crashes	4	3	-25.0
Fatal Crashes	1	0	-100.0
Non Fatal Injury Crashes	1	2	100.0
Total Injury Crashes	2	2	0.0
PDO Crashes	2	1	-50.0
Fatal Injuries	1	0	-100.0
Non-Fatal Injuries	4	2	-50.0
Total Injuries	5	2	-60.0
Night Crashes	1	1	0.0
Wet Crashes	2	1	-50.0
Alcohol/ Drug Crashes	0	0	N/A
Guardrail/ Bridge Struck	0	1	N/A
Ran Off the Road into the Swamp	1	0	-100.0

The naive before and after analysis at the treatment location resulted in a 28.6 percent decrease in Total Crashes, a 61.0 percent decrease in the Total Severity Index, and a 8.3 percent decrease in Average Daily Traffic (ADT). There was also a 25.0 percent decrease in Target Crashes and a 72.8 percent decrease in the Severity Index for Target Crashes. The before period ADT year was 1998 and the after period ADT year was 2003.

Results and Discussion

The naive before and after analysis involving the comparison of the treatment actual before data versus the treatment actual after data resulted in a 28.6 percent decrease in Total Crashes and a 25.0 percent decrease in Target Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in both Total and Target Crashes from the before to the after period.

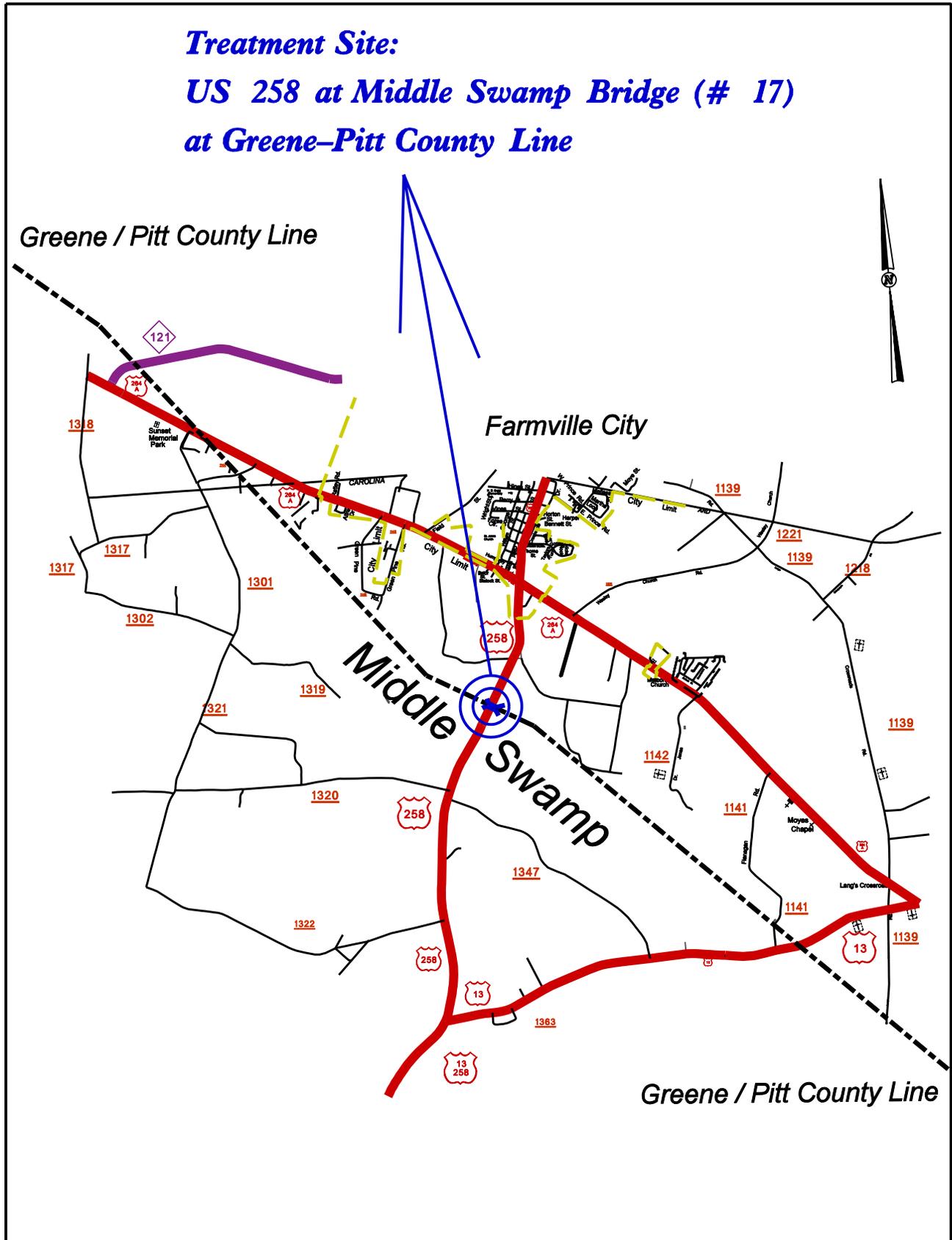
As previously stated, the guardrail was installed to prevent vehicles that run off the roadway at the subject bridge from entering the swamp. There was no protection on the treatment bridge in the before period. One Fatality occurred in the before period due to a vehicle running off the bridge into the swamp. From the crash statistics it can be seen that the guardrail installation had a positive effect on reducing the number and severity of both the Total and Target Crashes from the before to the after period. Looking only at the Ran Off Road crashes into the swamp the guardrail installation has reduced this type of crashes by a 100 percent from the before to the after period, on the other hand there was one crash that struck the guardrail in the after period.

Evaluation of Spot Safety Project Number 02-97-254

Location Map, Greene-Pitt County Line

Treatment Site:

**US 258 at Middle Swamp Bridge (# 17)
at Greene-Pitt County Line**



Treatment Site Photos Taken on (June 27, 2005)



Travelling South on US 258



Travelling South on US 258



Travelling South on US 258



Travelling South on US 258

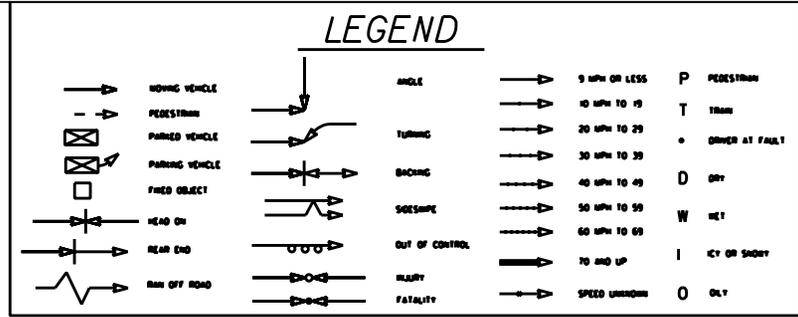


Travelling North on US 258



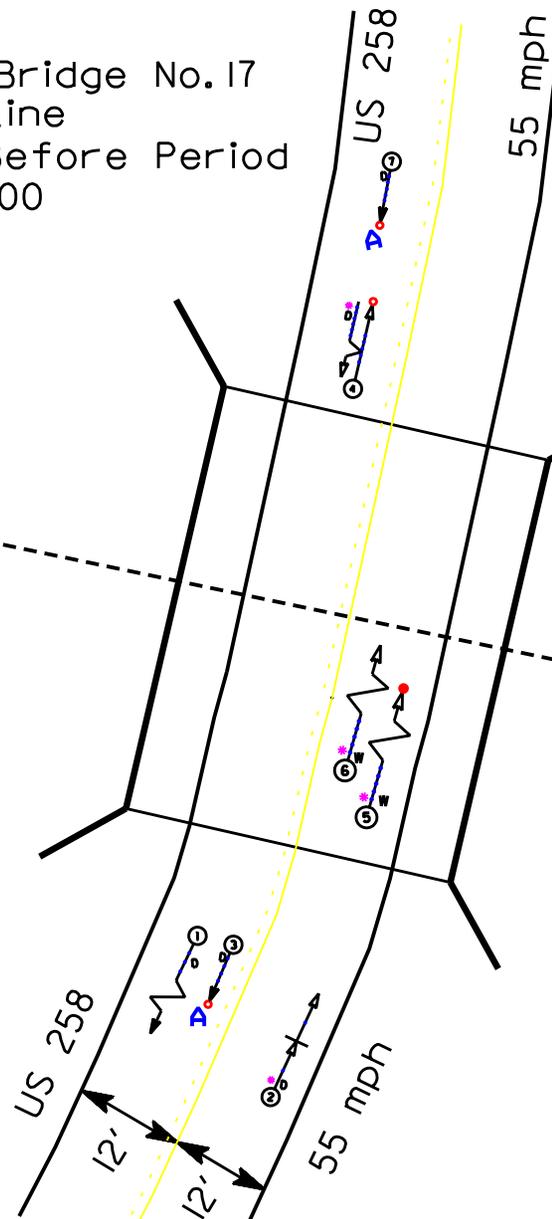
Travelling North on US 258

Pitt / Greene County
 US 258 at Middle Swamp Bridge No.17
 at Greene-Pitt County Line
 Treatment Site in The Before Period
 From 11/1/1996 To 11/30/2000



Pitt County Line

Bridge No.17
 Over Middle Swamp



Greene County Line

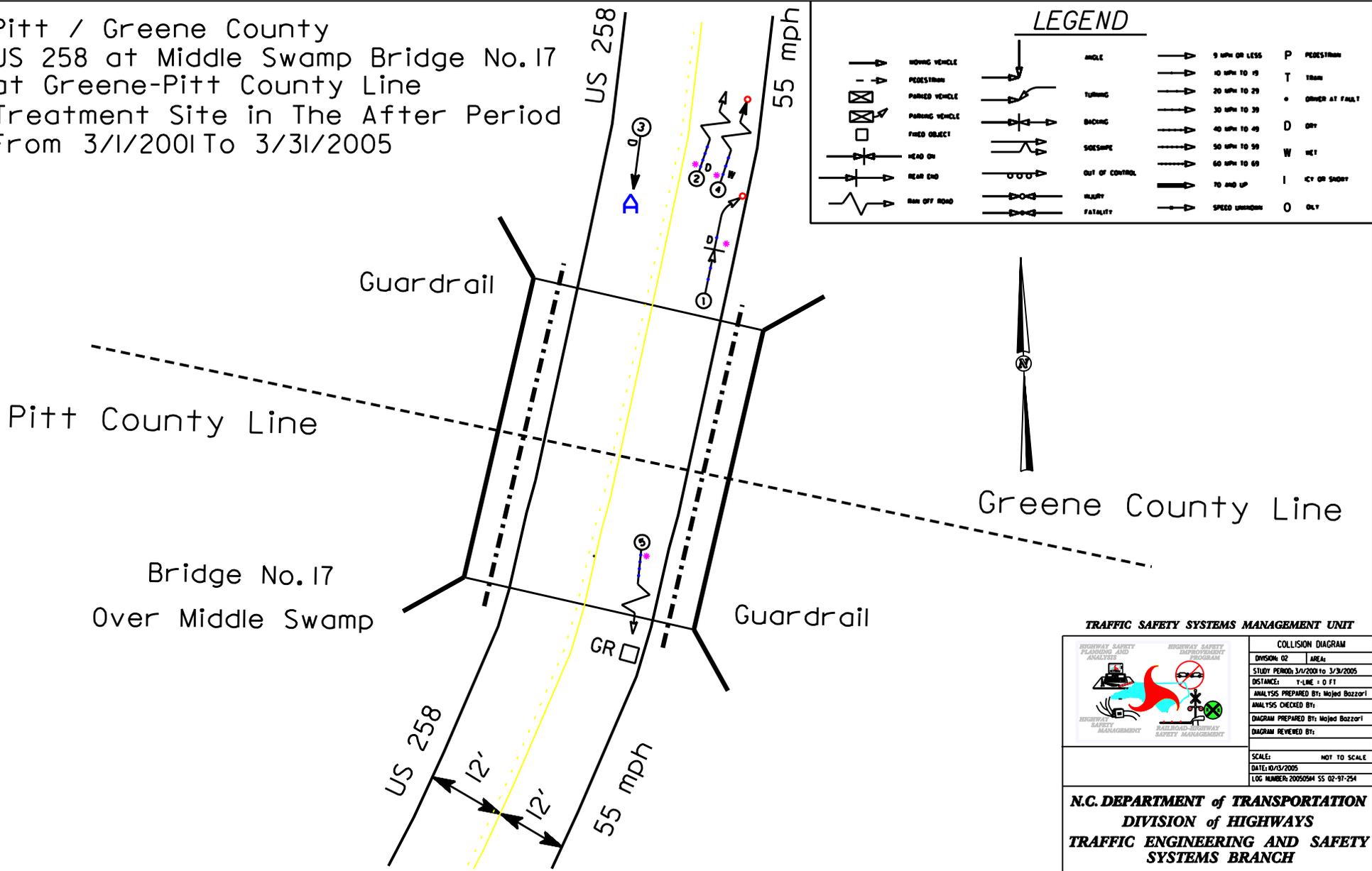


TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 02	AREA:
	STUDY PERIOD: 11/1/1996 TO 11/30/2000	
	DISTANCE: Y-LINE + 0 FT	
ANALYSIS PREPARED BY: Mojed Bozzori		
ANALYSIS CHECKED BY:		
DIAGRAM PREPARED BY: Mojed Bozzori		
DIAGRAM REVIEWED BY:		
SCALE: NOT TO SCALE		
DATE: 10/13/2005		
LOG NUMBER: 20050504 55 02-91-254		

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH

Pitt / Greene County
 US 258 at Middle Swamp Bridge No.17
 at Greene-Pitt County Line
 Treatment Site in The After Period
 From 3/1/2001 To 3/31/2005



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 02	AREA:
	STUDY PERIOD: 3/1/2001 to 3/31/2005	
	DISTANCE: T-LINE = 0 FT	
ANALYSIS PREPARED BY: Mojed Bozzori		
ANALYSIS CHECKED BY:		
DIAGRAM PREPARED BY: Mojed Bozzori		
DIAGRAM REVIEWED BY:		
SCALE: NOT TO SCALE		
DATE: 10/13/2005		
LOG NUMBER: 200505H 55 02-9T-254		

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TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH