

# **Spot Safety Project Evaluation**

Project Log # 200505136

Spot Safety Project # 06-96-207

**Spot Safety Project Evaluation of the Resurface – Wedge and Overlay, along US 401 from SR 2019 to SR 2035 in Harnett County**

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

11/01/2005  
Date

Traffic Safety Project Engineer

# ***Spot Safety Project Evaluation Documentation***

## **Subject Location**

Evaluation of Spot Safety Project Number 06-96-207 – along US 401 from SR 2019 to SR 2035 in Harnett County.

## **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 naive before and after analysis of the treatment versus comparison data 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 to resurface – wedge and overlay NC 401 from SR 2019 to SR 2035. NC 401 is a two-lane facility with no left turn lanes from SR 2019 to SR 2035. All intersections and access points are controlled by stop signs to control traffic onto NC 401 along this strip. NC 401 has a speed limit of 55 mph with a speed advisory, for the slight curve in this strip, of 45 mph. In the three year period beginning May 1, 1993, a total of 21 crashes were reported along this section. Of these, 10 were Ran Off Road, Left, 4 were Ran Off Road, Right, 3 were Angle, 3 were Rear-End, and 1 Left Turn Same Road type crash. There were 5 class B and 8 class C injuries that resulted from these crashes. There were 15 of the 21 total crashes that occurred during wet conditions. The final completion date for the resurfacing project was September 26, 1997 at a cost of \$35,000.

## **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 August 1997 through October 1997. The before period consisted of reported crashes from February 1, 1990 through July 31, 1997 (7 Years, 6 Months) and the after period consisted of reported crashes from November 1, 1997 through April 30, 2005 (7 Years, 6 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 on US 401 from 150' north of SR 2035 (MP 8.488) to 150' south of SR 2019 (MP 8.812). A 0-foot Y-line was used in the analysis. Please see attached location map for further details.

The following data table depicts the Naive Before and After Analysis for the above information. Please note that Ran Off Road crash types during wet road conditions 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>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total crashes	29	3	-89.7
Total Severity Index	6.9	1.0	-85.6
Target Crashes	22	0	-100.0
Target Severity Index	8.2	0.0	-100.0
Volume	5800	8200	41.4
<u>Treatment Injury Information</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal	0	0	0.0
Class A	1	0	-100.0
Class B	4	0	-100.0
Class C	9	0	-100.0
Property Damage Only	15	3	-80.0
<u>Target Injury Information</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Fatal	0	0	0.0
Class A	1	0	-100.0
Class B	3	0	-100.0
Class C	8	0	-100.0
Property Damage Only	10	0	-100.0

The naive before and after analysis at the treatment location resulted in an 89.7 percent decrease in Total Crashes, a 100.0 percent decrease in Target Crashes, and a 41.4 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1994 and the after period ADT year was 2001.

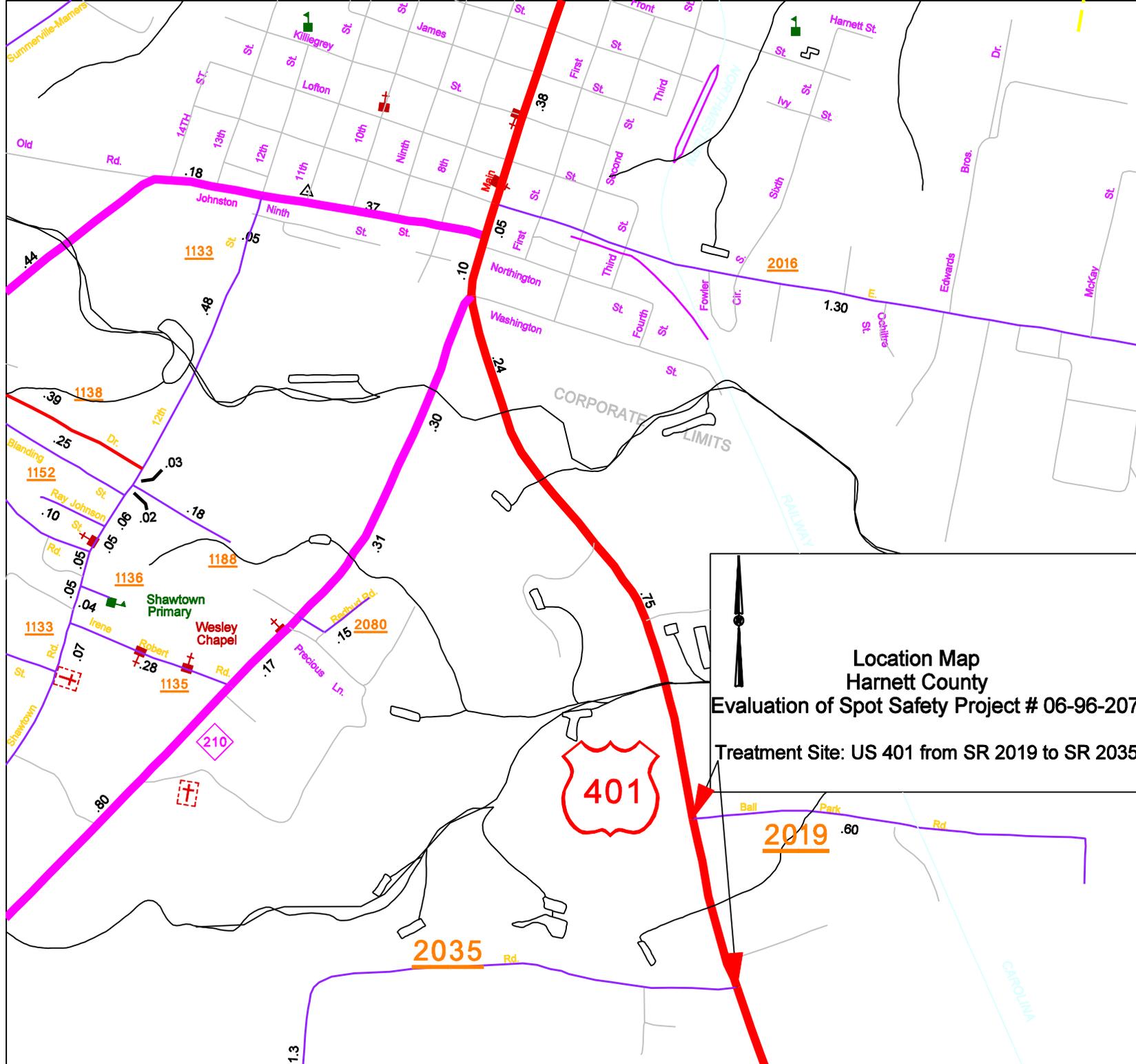
## **Results and Discussion**

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in an 89.7 percent decrease in Total Crashes and a 100.0 percent decrease in Target Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in the number of Total Crashes and a decrease in the number of Target Crashes from the before to the after period.

As previously stated, wet crashes were the targeted crashes to resolve for this strip of road. Reading the crash reports and project folder it seems vehicles were traveling too fast for wet conditions along US 401. Also the crash reports often referred to standing water being a problem.

With these factors included, there were a total of 22 wet crashes in the before period. After resurfacing US 401 with skid resistant materials, the wet crash total was reduced to 0. Referencing the included photos, there is a super-elevation in the curve that may help with drainage, helping to reduce the number of wet crashes. In the after period there is also a speed advisory for the slight curve that exists along this road which may contribute to the lower speeds for the after period crashes decreasing the severity.

The countermeasure seems to have a positive effect this case. Instead of a barrier treatment to keep vehicles on the road, the cause of the Ran Off Road problem was addressed directly and proved to be successful. 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 condition.



Location Map  
 Harnett County  
 Evaluation of Spot Safety Project # 06-96-207  
 Treatment Site: US 401 from SR 2019 to SR 2035

Treatment Strip Photos Taken October 2, 2005



Driving North on NC 401



Driving North on NC 401



Driving North on NC 401



Driving South on NC 401



Driving South on NC 401

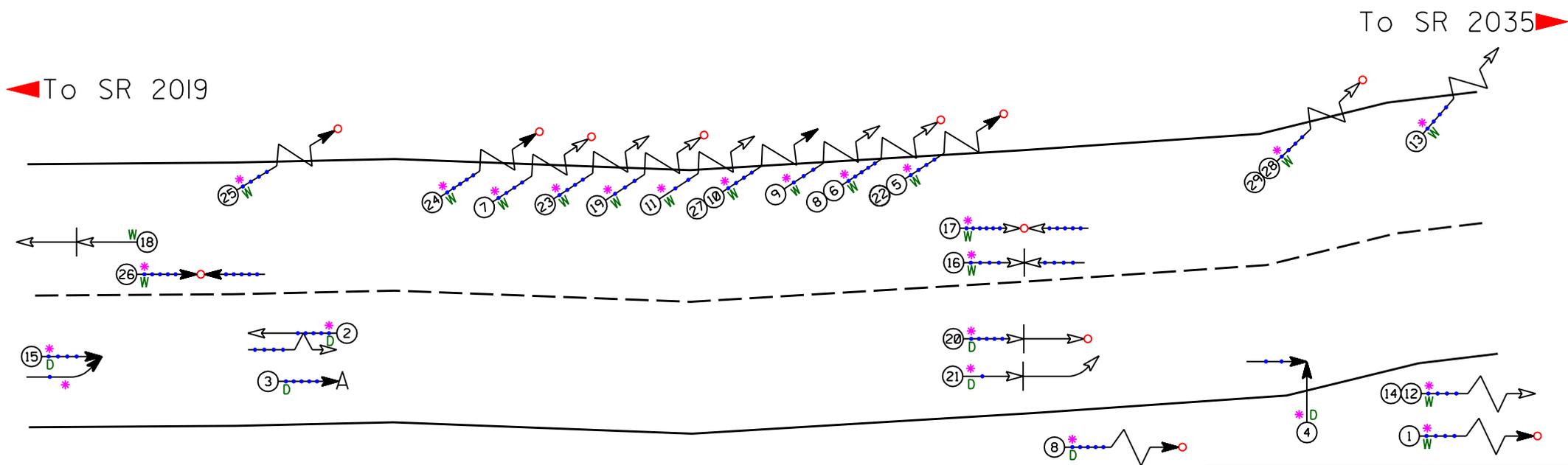


Driving South on NC 401



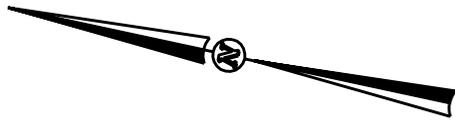
Treatment Site - Total Crashes  
 Before Period  
 February 1, 1990 - July 31, 1997  
 (7 years 6 months)  
 Harnett County

LEGEND							
	MOVING VEHICLE		VEHICLE		9 MPH OR LESS		P PEDESTRIAN
	PEDESTRIAN		10 MPH TO 19		B BICYCLE		T TRAIN
	PAKED VEHICLE		20 MPH TO 29		T TRUCK		A ANIMAL
	PAKED VEHICLE		30 MPH TO 39		A ANIMAL		• DRIVER AT FAULT
	ROAD OBJECT		40 MPH TO 49		• DRIVER AT FAULT		D DRIVER
	ROAD OBJECT		50 MPH TO 59		D DRIVER		W VEHICLE
	ROAD OBJECT		60 MPH TO 69		D DRIVER		I CY OR SHOOT
	ROAD OBJECT		70 MPH TO 79		D DRIVER		
	ROAD OBJECT		80 MPH TO 89		D DRIVER		
	ROAD OBJECT		90 MPH TO 99		D DRIVER		
	ROAD OBJECT		100 MPH OR MORE		D DRIVER		
	ROAD OBJECT		D DRIVER		W VEHICLE		
	ROAD OBJECT		VEHICLE		I CY OR SHOOT		
	ROAD OBJECT		VEHICLE				



US 401  
 55 mph  
 (45 mph speed advisory for curve)

<b>TRAFFIC SAFETY SYSTEMS MANAGEMENT SECTION</b> <small>IDENTIFY SAFETY DEFICIENCIES</small> <small>SAFETY INFORMATION MANAGEMENT AND SUPPORT</small>		<b>COLLISION DIAGRAM</b>	
		DIVISION: _____ AREA: _____	STUDY PERIOD: 2/1/1990 TO 7/31/1997 DISTANCE: _____      T-LINE: 190 FT
<small>SAFETY EVALUATION</small> <small>TRAFFIC SAFETY</small>		ANALYSIS PREPARED BY: S. COMBODD DIAGRAM PREPARED BY: S. COMBODD DIAGRAM REVIEWED BY: _____	
BEFORE RESURFACING		SCALE: NOT TO SCALE	DATE: September 2005
<b>N.C. DEPARTMENT of TRANSPORTATION</b> <b>DIVISION of HIGHWAYS</b> <b>TRAFFIC ENGINEERING AND SAFETY</b> <b>SYSTEMS BRANCH</b>			

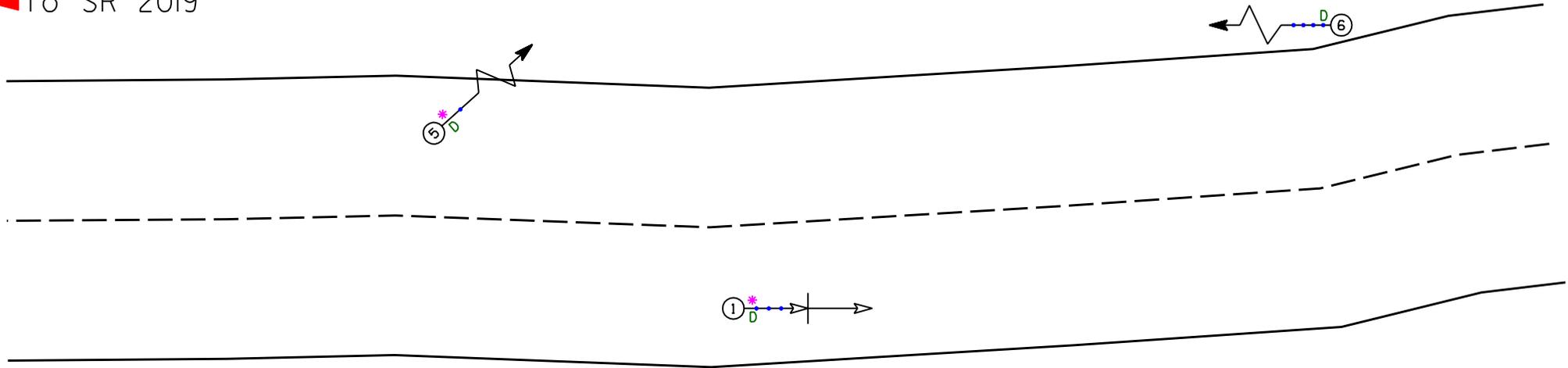


Treatment Site - Total Crashes  
 After Period  
 November 1, 1997 - April 30, 2005  
 (7 years 6 months)  
 Harnett County

LEGEND							
	MOVING VEHICLE		VEHICLE		9 MPH OR LESS		P PEDESTRIAN
	PEDESTRIAN		10 MPH TO 19		B BICYCLE		
	PAKED VEHICLE		20 MPH TO 29		T TRUCK		
	MOVING VEHICLE		30 MPH TO 39		A ANIMAL		
	ROAD OBJECT		40 MPH TO 49		50 MPH TO 59		• DRIVER AT FAULT
	ROAD SIGN		60 MPH TO 69		70 MPH OR UP		D DRIVER
	ROAD SIGN		80 MPH OR UP		SPEED WARNING		W WET
	ROAD SIGN		90 MPH OR UP		FOG/ICE		I ICY OR SNOWY
	ROAD SIGN		100 MPH OR UP		FOG/ICE		

◀ To SR 2019

To SR 2035 ▶



US 401  
 55 mph  
 (45 mph speed advisory for curve)

TRAFFIC SAFETY SYSTEMS MANAGEMENT SECTION		COLLISION DIAGRAM	
HIGHWAY SAFETY IMPROVEMENT PROGRAM	SAFETY INFORMATION MANAGEMENT AND SUPPORT	DIVISION:	AREA:
		STUDY PERIOD:	11/01/97 TO 04/30/2005
		DISTANCE:	T-MILE: 1.00 P1
SAFETY EVALUATION		ANALYSIS PREPARED BY:	S. COOPER
TRAFFIC SAFETY		DIAGRAM PREPARED BY:	S. COOPER
AETER RESURFACING		DIAGRAM REVIEWED BY:	
SCALE:		NOT TO SCALE	
DATE:		SEPTEMBER, 2005	
LOG NUMBER:			

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