

Spot Safety Project Evaluation

Project Log # 200704312

Spot Safety Project # 02-99-208

**Spot Safety Project Evaluation of the Right Turn Lane Installation
At the Intersection of US-264 (Pactolus Highway) and SR 1409 (Wharton Station Rd)
Beaufort County, City of Washington**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
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Principal Investigator

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10-12-2007
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 02-99-208 – The Intersection of US 264 (Pactolus Hwy) and SR 1409 (Wharton Station Rd) in Beaufort County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the widening of the southbound SR 1409 leg for the installation of a dedicated right turn lane. In the study period, US 264 is a four-lane divided highway at this intersection with both left and right turn specified lanes in both directions. SR 1409 is a two-lane, two-way roadway and the intersection has speed limits of 55 mph on all approaches. The subject location is a crossroads type intersection, which is controlled by a stop condition on SR 1409 (Wharton Station Rd). In May of 2007, a directional crossover on US 264 was installed at this intersection due to an increasing number of angle collisions. Spot Safety funding was not used in the crossover installation.

The original statement of problem was the excessive delay on SR 1409 for through and left turning motorists. It was determined that vehicles traveling southbound must wait in queue for an abundance of right turning vehicles and then feel pressured to take insufficient gaps once it is their turn in the intersection. This intersection was listed in the 1998 Spring Highway Safety Improvement Program report.

The initial crash analysis was completed from June 1, 1996 to May 31, 1999 with eight (8) reported crashes, resulting in one (1) "A," three (3) "B," and eleven (11) "C" class injuries. The final completion date for the improvement at the subject intersection was on February 1, 2002 with a total cost of \$47,000.00.

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 November 1, 2001 to April 30, 2002. The before period consisted of reported crashes from January 1, 1997 through October 31, 2001 (4 years and 10 months) and the after period consisted of reported crashes from May 1, 2002 through February 28, 2007 (4 years and 10 months). The ending date for this analysis was determined by the date of available crash data at the time of analysis. The ending date also lines up with the installation of the directional crossover.

The treatment data consisted of all crashes within 150 feet of the subject intersection. *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 a particular target crash pattern was not analyzed for the applied countermeasure.

Treatment Information			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	17	33	94.12 %
Total Severity Index	9.81	10.30	4.99 %
Volume	17,800	19,000	6.74 %
Injury Crash Summary			
Fatal injury Crashes	0	1	100.00 %
Class A injury Crashes	1	1	0.00 %
Class B injury Crashes	4	7	75.00 %
Class C Injury Crashes	6	14	133.33 %
Total Injury Crashes	11	23	109.09 %

The naive before and after analysis at the treatment location resulted in a 94 percent increase in Total Crashes with a 5 percent increase in the Total Severity Index. The before period ADT year was 1999 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 a 94 percent increase in Total Crashes and a 5 percent increase in the Total Severity Index. The summary results above demonstrate that both Total Crashes and Severity appear to have increased at the treatment location from the before to the after period.

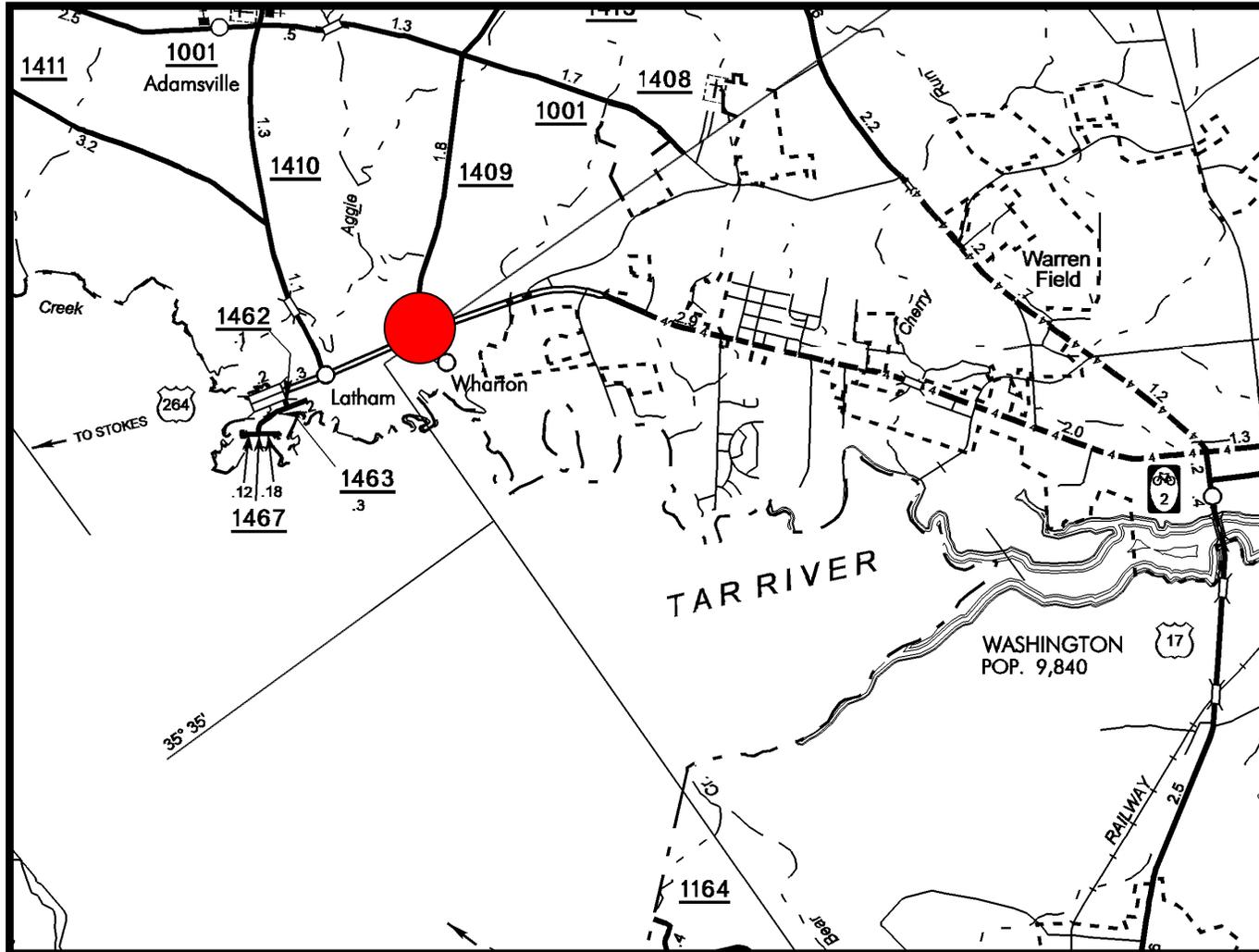
Referencing the *Collision Diagrams*, angle collisions increased at the intersection from nine (9) to sixteen (16). Also, rear-end crashes on the southbound leg where the right turn lane was installed increased from zero (0) crashes in the before period to five (5) in the after. This countermeasure seems to have been installed to enhance operational conditions instead of boosting safety. Although the crash data is not available to measure the crossover effectiveness, it should solve the major crash patterns at this location. The angle crash pattern in the after period resulted in one (1) fatality and one (1) class “A” injury collision.

The calculated benefit to cost ratio for this project is -29.63 considering total 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.

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection after the crossover was operational as explained in the *Project Background* section. In *Photo 1* notice the evidence of the removed right turn lane countermeasure.

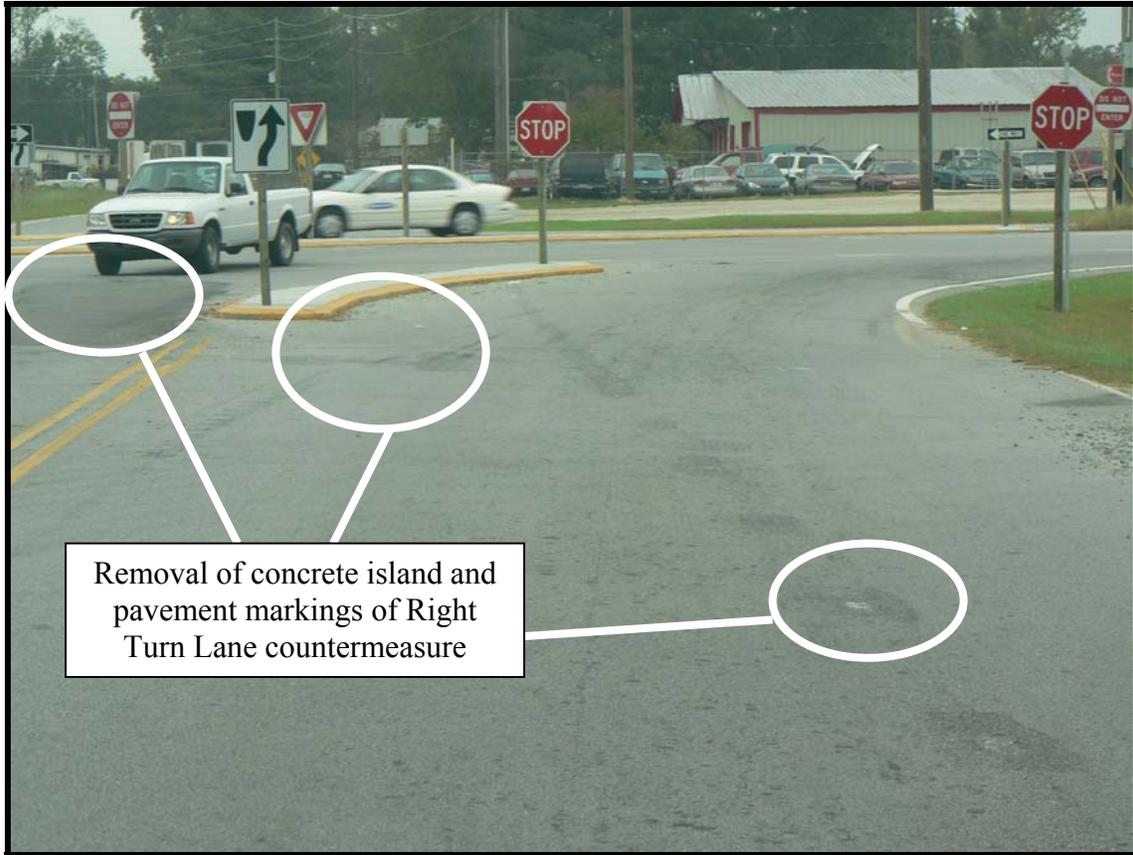
As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

Location Map
Beaufort County, near City of Washington
Evaluation of Spot Safety Project # 02-99-208



Treatment Location: US 264 (Pactolus Hwy) at SR 1409 (Wharton Station Road)

TREATMENT SITE PHOTOS TAKEN 10/3/2007



Traveling South on SR 1409 (Wharton Station Rd)
Notice the removal of Spot Safety Countermeasure under evaluation



Traveling South on SR 1409 (Wharton Station Rd)
Notice where the Right Turn Lane was installed prior to the crossover



Traveling East on US-264 (Pactolus Highway)



Traveling West on US-264 (Pactolus Highway)



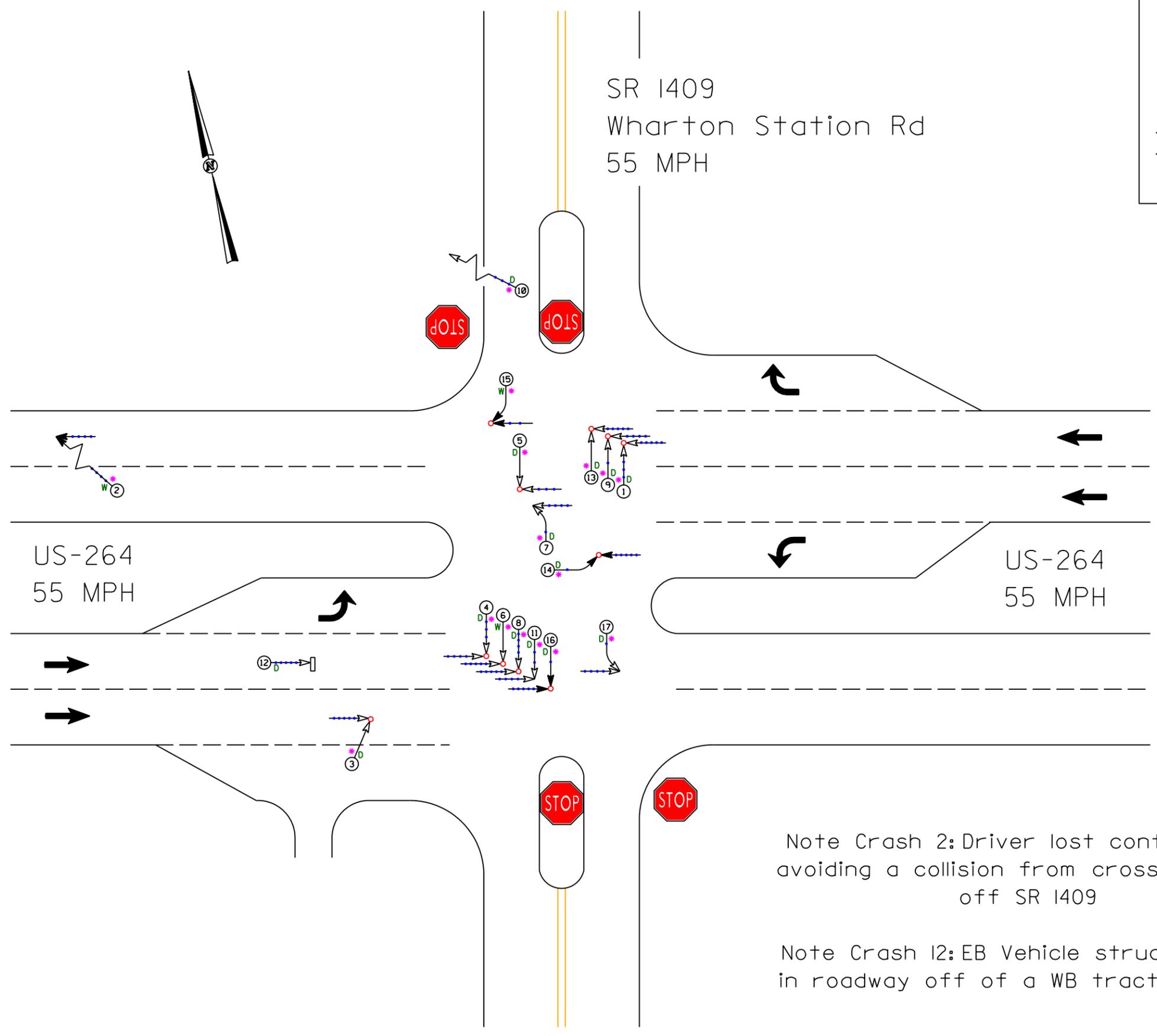
Traveling North on SR 1409

LEGEND

	MOVING VEHICLE		ANGLE		9 MPH OR LESS		PEDESTRIAN
	PEDESTRIAN		TURNING		10 MPH TO 19		TRAIN
	PARKED VEHICLE		BACKING		20 MPH TO 29		DRIVER AT FAULT
	PARKING VEHICLE		SIDESWIPE		30 MPH TO 39		DRY
	FIXED OBJECT		OUT OF CONTROL		40 MPH TO 49		WET
	HEAD ON		INJURY		50 MPH TO 59		ICY OR SNOWY
	REAR END		FATALITY		60 MPH TO 69		ONLY
	RAN OFF ROAD		70 AND UP		SPEED UNKNOWN		

SR 1409
Wharton Station Rd
55 MPH

SS# 02-99-208
Beaufort County
Before Period
1/1/97 - 10/31/01
US-264 at SR 1409



Note Crash 2: Driver lost control after avoiding a collision from cross traffic off SR 1409

Note Crash 12: EB Vehicle struck bumper in roadway off of a WB tractor-trailer

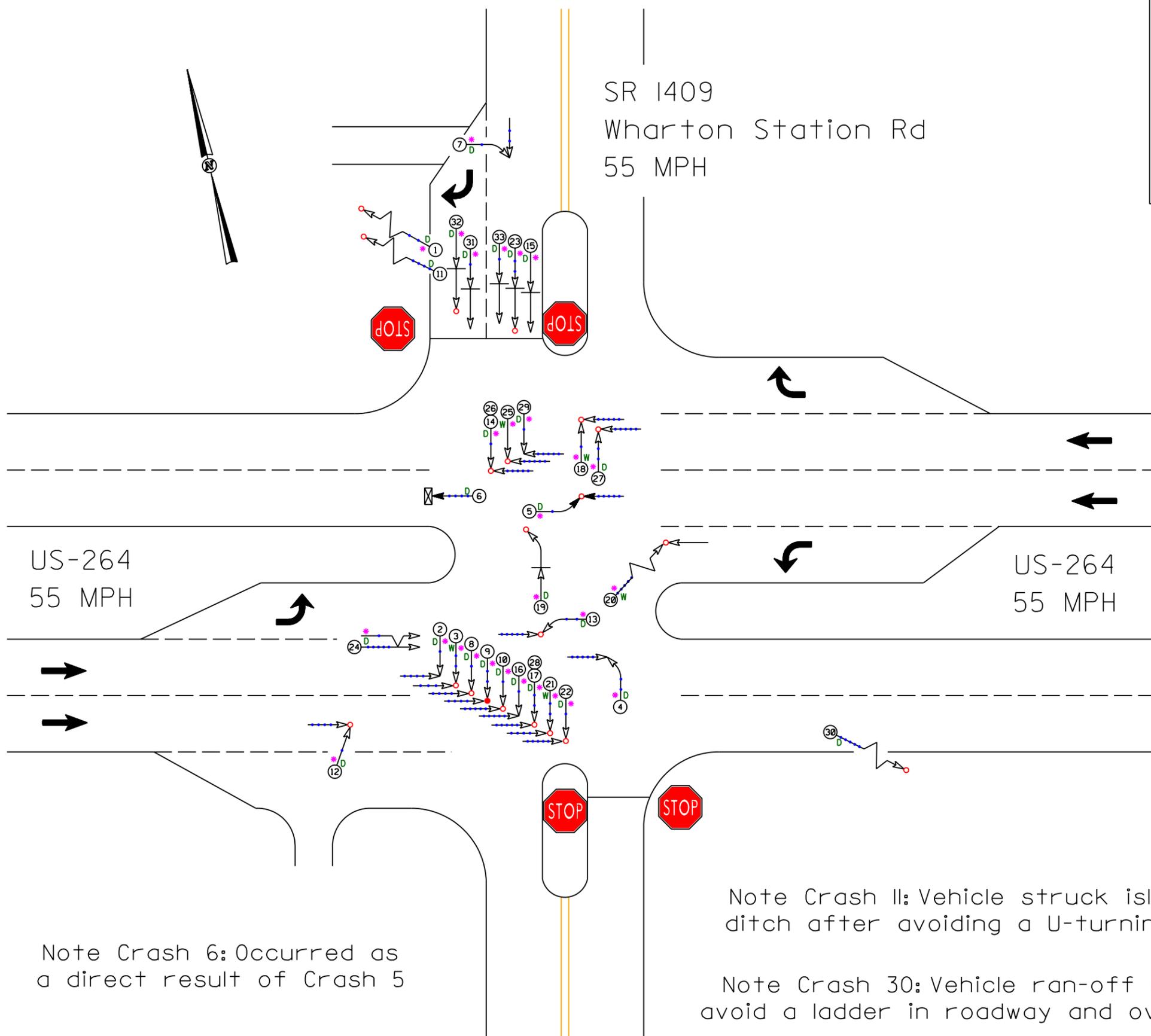
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 2	AREA: 1
STUDY PERIOD: 1/1/1997 TO 10/31/2001		
DISTANCE: Y-LINE = 150FT		
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: BR		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 6-18-2007		
LOG NUMBER: SS* 02-99-208		

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



SR 1409
Wharton Station Rd
55 MPH



LEGEND			
	MOVING VEHICLE		ANGLE
	PEDESTRIAN		TURNING
	PARKED VEHICLE		BACKING
	PARKING VEHICLE		SIDESWIPE
	FIXED OBJECT		OUT OF CONTROL
	HEAD ON		INJURY
	REAR END		FATALITY
	RAN OFF ROAD		9 MPH OR LESS
			10 MPH TO 19
			20 MPH TO 29
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			50 MPH TO 59
			60 MPH TO 69
			70 AND UP
			SPEED UNKNOWN
			P PEDESTRIAN
			T TRAIN
			• DRIVER AT FAULT
			D DRY
			W WET
			I ICY OR SNOWY
			O OILY

SS# 02-99-208
Beaufort County
After Period
5/1/02 - 2/28/07
US-264 at SR 1409

After Period Changes:
Installed SB Right Turn
Lane on SR 1409

Note Crash 6: Occurred as
a direct result of Crash 5

Note Crash 11: Vehicle struck island and
ditch after avoiding a U-turning truck

Note Crash 30: Vehicle ran-off road to
avoid a ladder in roadway and overturned

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 2	AREA: 1
	STUDY PERIOD: 5/1/2002 TO 2/28/2007	
	DISTANCE: Y-LINE = 150FT	
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: BR		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 6-18-2007		
LOG NUMBER: SS* 02-99-208		

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SYSTEMS BRANCH