

# Spot Safety Project Evaluation

Project Log # 200712106

Spot Safety Project # 08-02-203

## Spot Safety Project Evaluation of the Center Turn Lane Installation At the Intersection of US 64 and SR 1344 (Old US 64) Randolph County

Documents Prepared By:

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

**Principal Investigator**



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Jason B. Schronce

4-6-2009

Date

Traffic Safety Project Engineer

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

## **Subject Location**

Evaluation of Spot Safety Project Number 08-02-203 located on US 64 between the intersections of SR 1344 (Old US 64) and SR 1390 (Gallimore Town Road) in Randolph 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 US 64 for the installation of a center turn lane between the two intersections. In the before period US 64, SR 1344, and SR 1390 were all two-lane facilities at the subject location with no turn lanes and speed limits of 55 mph. SR 1344 (Old US 64) and SR 1390 (Gallimore Town Rd) both intersect US 64 as three-leg intersections and are under stop sign control. In the fall of 2002, a new elementary school also opened in this vicinity and bus traffic increased.

The original statement of problem was that an accident problem exists due to motorists stopped in the thru-lane on a high speed corridor. The intended purpose of this improvement was to alleviate a pattern of rear-end and left turn type collisions.

The initial crash analysis was completed from November 30, 1998 to November 30, 2001 with eight (8) reported crashes, all of which were deemed correctable. The final completion date for the improvement at the subject intersection was on December 30, 2002 with a total cost of \$124,000.

## **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 November 1, 2002 to February 28, 2003. The before period consisted of reported crashes from December 1, 1996 through October 31, 2002 (5 years and 11 months); and the after period consisted of reported crashes from March 1, 2003 through January 31, 2009 (5 years and 11 months). The ending date for this analysis was determined by the date of available crash data at the time of analysis.

The treatment data consisted of all crashes along the strip from 500 feet west of SR 1344 (US 64 Milepost 2.775) to 650 feet east of SR 1390 (US 64 Milepost 3.063). *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 US 64 Mainline Rear-End collisions and Left Turn type crashes were the selected Target Crashes for this countermeasure. Left Turn type crashes include: Left Turn, Same Roadway and US 64 Mainline illegal passing maneuvers.

<u>Treatment Information</u>			
	<b>Before</b>	<b>After</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total crashes	12	10	- 16.7 %
Total Severity Index	5.93	1.74	- 70.7 %
Target Crashes	8	1	- 87.5 %
Target Crash Severity Index	4.70	1.00	- 78.7 %
Volume	8,100	7,650	- 5.6 %
<u>Injury Crash Summary</u>			
Fatal injury Crashes	0	0	N/A
Class A injury Crashes	0	0	N/A
Class B injury Crashes	2	0	- 100.0 %
Class C Injury Crashes	6	1	- 83.3 %
Total Injury Crashes	8	1	- 87.5 %

The naive before and after analysis at the treatment location resulted in a 17 percent decrease in Total Crashes, an 87.5 percent decrease in Target Crashes, and a 71 percent decrease in the Total Severity Index. The before period ADT year was 2000 and the after period ADT year was 2005.

## Results and Discussion

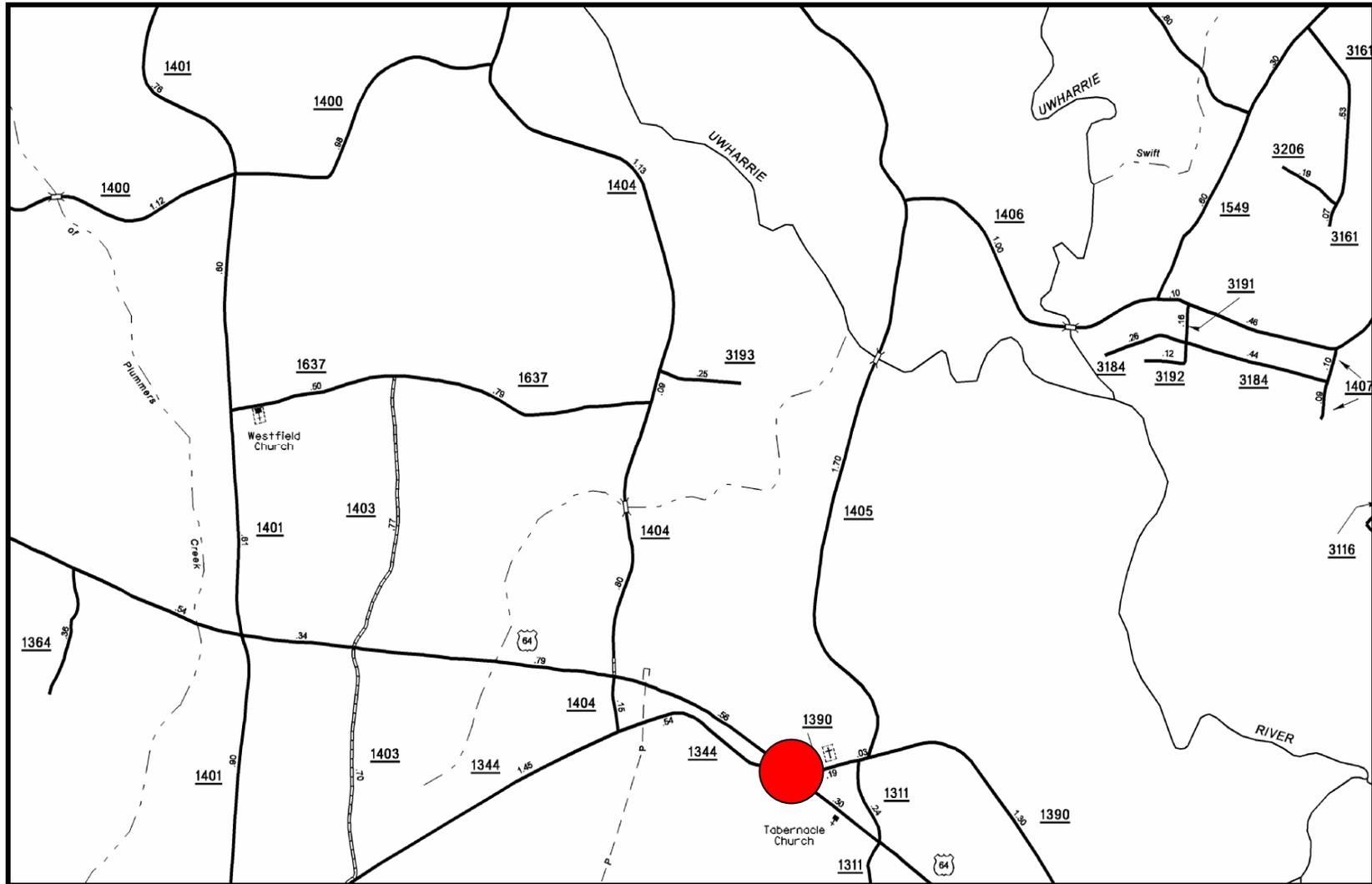
The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 17 percent decrease in Total Crashes and an 87.5 percent decrease in Target Crashes. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have decreased at the treatment location from the before to the after period.

Referencing the *Collision Diagrams*, the majority of crashes along the segment in the before period (8 of 12) were related to a vehicle turning left onto SR 1344 from US 64 and getting rear-ended in stopped traffic or illegally passing causing a left turn collision. After the center turn lane installation, target crashes were reduced to just one (1), which was the result of a rear-end crash in the turn lane. The table above also shows a significant reduction of 71 percent in the severity index through the analysis.

The calculated benefit to cost ratio for this project is **1.34 considering total crashes**. The benefit to cost ratio **considering only target crashes is 1.05**. 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 location. 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**  
**Randolph County**  
**Evaluation of Spot Safety Project # 08-02-203**



**Treatment Location: US 64 at SR 1344 (Old US 64) / SR 1390 (Gallimore Town Rd)**

**TREATMENT SITE PHOTOS TAKEN 3/26/2008**



Traveling East on US 64 approaching SR 1344



Traveling East on US 64



Traveling West on US 64 approaching SR 1390



Traveling West on US 64 at SR 1344



Traveling North on SR 1344 (Old US 64)



Traveling South on SR 1390 (Gallimore Town Road)



**BENEFIT-COST ANALYSIS WORKSHEET**

LOCATION: US 64 at SR 1344  
 COUNTY: Randolph  
 FILE NO.: SS 08-02-203

BY: JBS  
 DATE: 3/31/2009  
 NOTES: Target Crashes

DETAILED COST: TYPE IMPROVEMENT - Center Turn Lane

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$124,000	20	0.102	\$12,630
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$124,000	20	0.102	\$12,630

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$800  
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0  
 TOTAL ANNUAL COST= \$13,430  
 TOTAL COST OF PROJECT= \$124,000

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	5.92	0	0.00	4	0.68	4	0.68	\$14,797
AFTER	5.92	0	0.00	0	0.00	1	0.17	\$659

Annual Benefits from Crash Cost Savings \$14,139

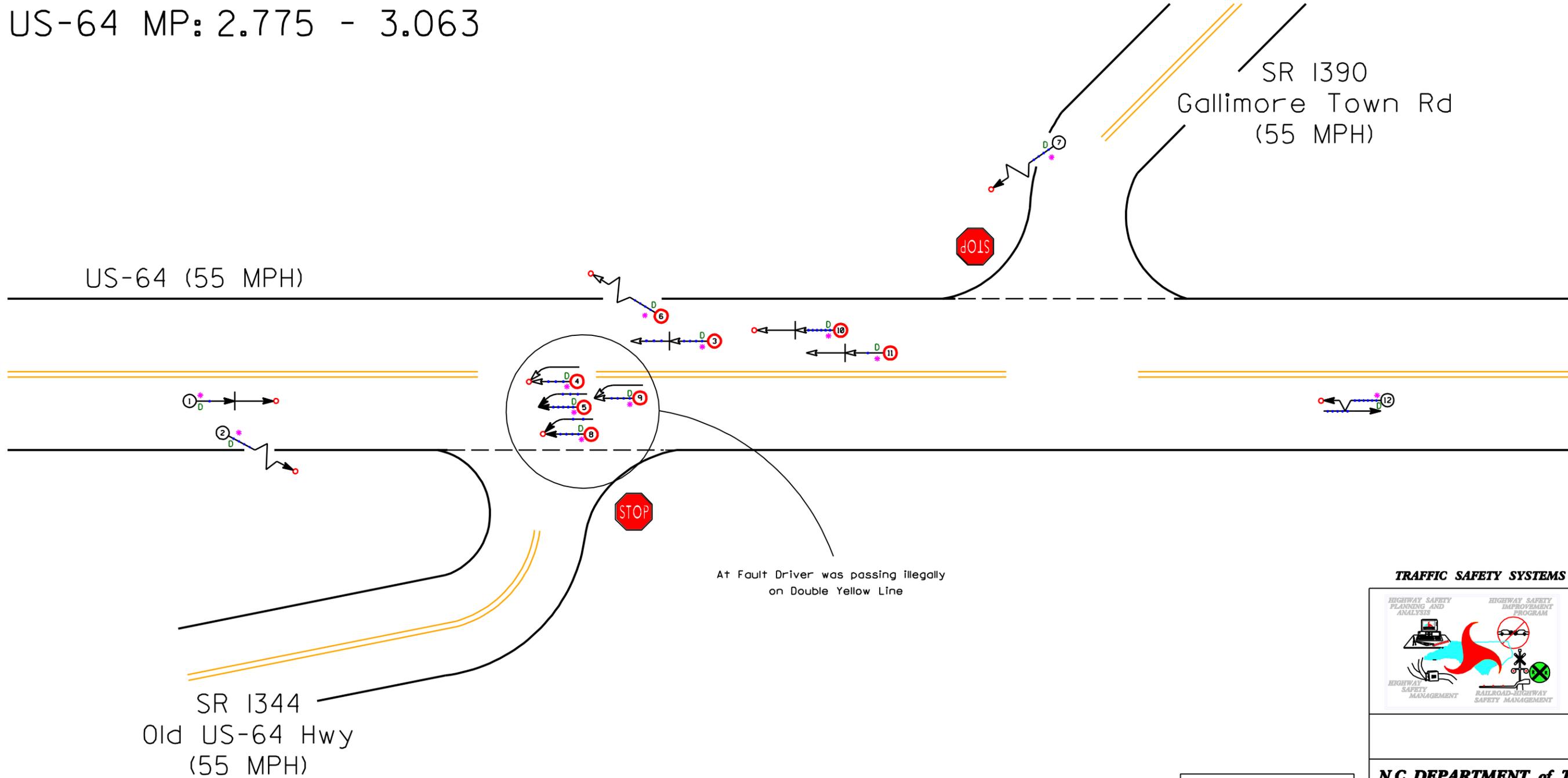
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = \$709

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 1.05

TOTAL COST OF PROJECT - \$124,000 COMPREHENSIVE B/C RATIO - 1.05

SS# 08-02-203  
 Randolph County  
 BEFORE Period  
 12/1/96 - 10/31/02  
 US-64 at SR 1344  
 US-64 MP: 2.775 - 3.063

MOVING VEHICLE		ANGLE		9 MPH OR LESS		P PEDESTRIAN	
- - - - ->	PEDESTRIAN	↙	TURNING	→	10 MPH TO 19	→	T TRAIN
☒	PARKED VEHICLE	↘	BACKING	→	20 MPH TO 29	*	DRIVER AT FAULT
☒	PARKING VEHICLE	↔	SIDESWIPE	→	30 MPH TO 39	D	DRY
□	FIXED OBJECT	↗	OUT OF CONTROL	→	40 MPH TO 49	W	WET
— — —	HEAD ON	↖	FATALITY	→	50 MPH TO 59	I	ICY OR SNOWY
— — —	REAR END	↗		→	60 MPH TO 69	O	OILY
— — —	RAN OFF ROAD	↘		→	70 AND UP		
		↙		→	SPEED UNKNOWN		



At Fault Driver was passing illegally on Double Yellow Line

⊕ Target Crashes

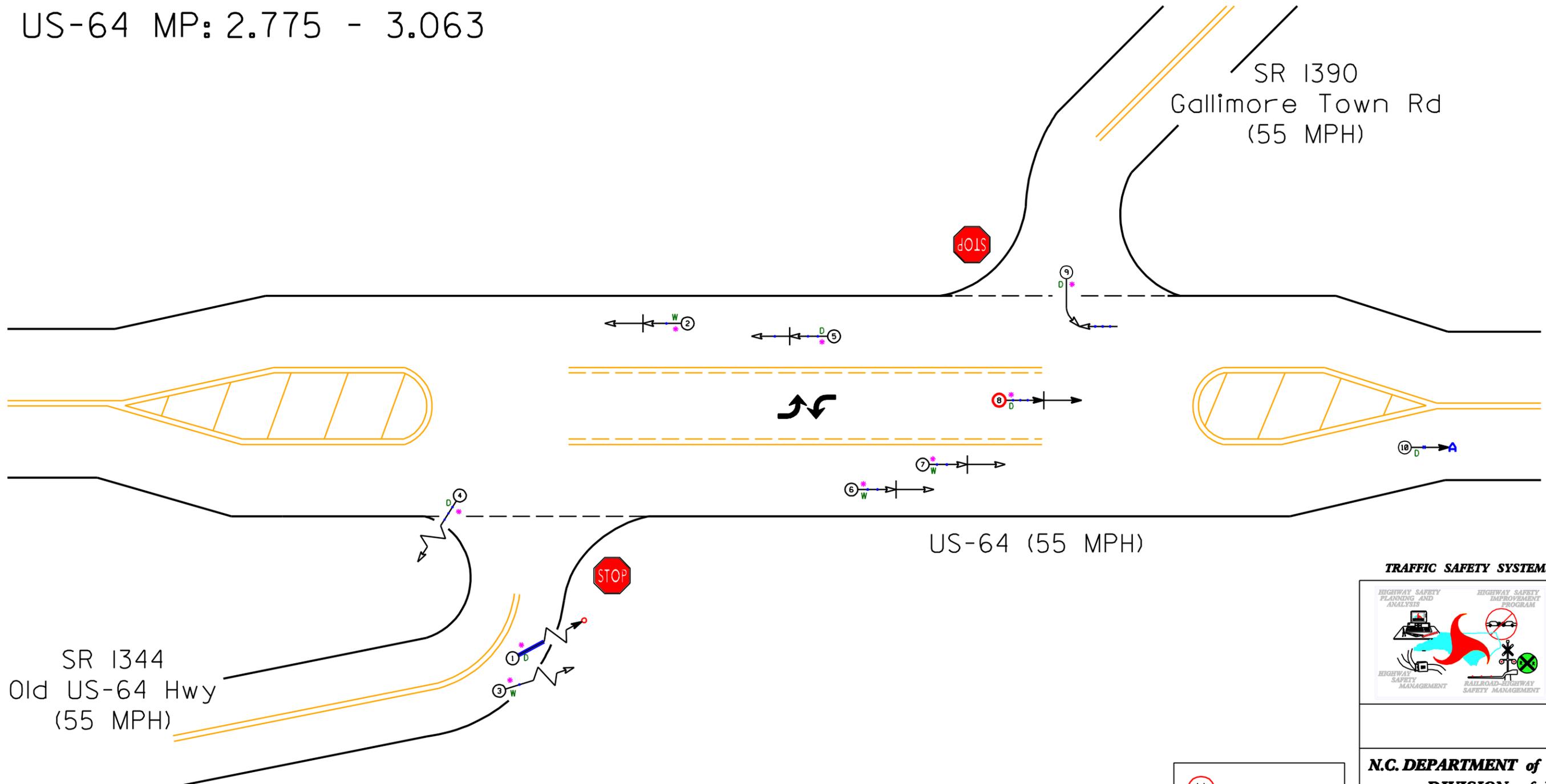
**TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT**

COLLISION DIAGRAM	
DIVISION: 8	AREA:
STUDY PERIOD: 12/1/1996 - 10/31/2002	
DISTANCE: Y-LINE : 150 FT	
ANALYSIS PREPARED BY: JBS	
ANALYSIS CHECKED BY: BR	
DIAGRAM PREPARED BY: JBS	
DIAGRAM REVIEWED BY: ST	
SCALE: NOT TO SCALE	
DATE: 3-31-2009	
LOG NUMBER: SS# 08-02-203 BEFORE	

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

SS# 08-02-203  
 Randolph County  
 AFTER Period  
 3/1/03 - 1/31/09  
 US-64 at SR 1344  
 US-64 MP: 2.775 - 3.063

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
			30 MPH TO 39
			40 MPH TO 49
			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



Target Crashes

**TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT**

	COLLISION DIAGRAM	
	DIVISION: B	AREA: A
	STUDY PERIOD: 3/1/2003 - 1/31/2009	
	DISTANCE: Y-LINE = 150 FT	
	ANALYSIS PREPARED BY: JBS	
	ANALYSIS CHECKED BY: BR	
	DIAGRAM PREPARED BY: JBS	
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 3-31-2009		
LOG NUMBER: SS# 08-02-203 AFTER		

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