

Spot Safety Project Evaluation

Work Order #41000007804

Spot Safety Project # 02-02-272

Spot Safety Project Evaluation of the Construction of a Free-Flowing Right Turn Lane at the Intersection of US 13 and US 264 Alternate Pitt 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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8/13/2010

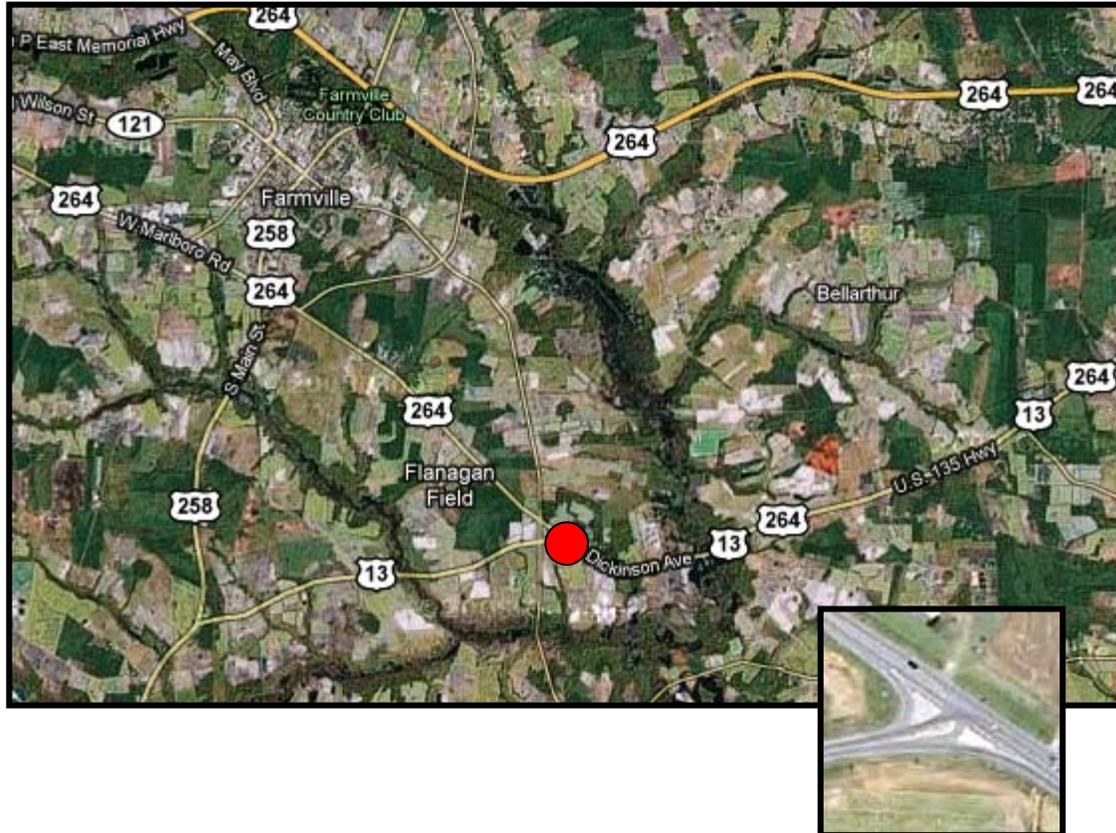
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 02-02-272 – The intersection of US 13 and US 264 Alt. near Farmville in Pitt County.



Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was to construct a free-flowing right turn lane from US 13 onto US 13-US 264A eastbound. In addition, the left turn lane storage was lengthened on US 13-US 264A westbound.

US 13 and US 264A are two-lane, two-way roadways with speed limits of 55 mph in the subject area. Left turns from US 13 onto US 264A are controlled by dual stop signs. In the before period there was a slip ramp with a yield condition for vehicles turning right from US 13 onto eastbound US 13-US 264A.

The initial crash analysis was conducted from September 1, 1999 to August 31, 2002 with a total of 27 reported crashes, 25 of which were considered correctable by the chosen countermeasure. The

final completion date for the improvements at the subject intersection was on August 3, 2005 with a total cost of \$207,000.

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 June 1, 2005 to August 31, 2005. The before period consisted of reported crashes from August 1, 2000 through May 31, 2005 (4 years and 10 months) and the after period consisted of reported crashes from September 1, 2005 through June 30, 2010 (4 years and 10 months). The ending date for this analysis was limited by the available crash data at the time the analysis was conducted.

The treatment data consisted of all reported crashes within 150 feet of the subject intersection. The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that both Right Turn-Different Roadway and Rear-End Crashes involving vehicles attempting to turn right from US 13 on US 13-264A were the Target Crashes for the applied countermeasure. In the after period, Sideswipe-Same Direction Crashes involving vehicles using the free-flow right turn lane were also considered Target Crashes. The target crashes are clearly identified in the before and after period collision diagrams.

Treatment Information	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	43	5	-88.4
Total Severity Index	4.96	2.48	-50.0
Target Crashes	40	2	-95.0
Target Severity Index	4.88	1	-79.5
Volume	8,800	9,300	5.7
Target Crash Severity Summary			
Fatal Crashes	0	0	N/A
Class A Crashes	0	0	N/A
Class B Crashes	0	0	N/A
Class C Crashes	21	0	-100.0
PDO Crashes	19	2	-89.5

The naive before and after analysis at the treatment location resulted in an 88 percent decrease in Total Crashes, a 95 percent decrease in Target Crashes, and a 6 percent increase in Average Daily Traffic (ADT). The before period ADT year was 2002 and the after period ADT year was 2008.

Results and Discussion

The construction of the free flowing right turn lane appears to have been very effective at reducing Target Crashes at the subject intersection. In the before period there were 40 Rear-End Crashes involving vehicles who had either stopped or slowed at the yield condition prior to turning right

onto US 13-264A. In the after period there was only one Rear-End Crash involving a right turning vehicle.

In the before period there were three Right Turn-Different Roadway Crashes involving vehicles turning right from US 13. In the after period there were no crashes of this type. There was a single Sideswipe-Same Direction Crash in the after period involving a vehicle in the free flow turn lane, although it was not the fault of the right turning vehicle. An eastbound vehicle switched lanes in an attempt to pull off the roadway and failed to yield to the vehicle in the free flow lane.

The calculated benefit to cost ratio for this project is 1.57 considering total crashes. The benefit to cost ratio considering only target crashes is also 1.57. 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 were obtained from Google Street-view. 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.

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: US 13 and US 264A
 COUNTY: Pitt
 FILE NO.: SS 02-02-272 Target Crashes Only

BY: bdr
 DATE: 8/11/2010

DETAILED COST: TYPE IMPROVEMENT - Free Flow Right Turn Lane

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$0	0	0.000	\$0
	\$207,000	20	0.102	\$21,083
Right-of-Way	\$0	0	0.000	\$0
TOTALS	\$207,000	20	0.102	\$21,083

ESTIMATED INCREASE IN ANNUAL MAINT. COST = \$400
 ESTIMATED INCREASE IN ANNUAL UTILITY COST = \$0
 TOTAL ANNUAL COST= \$21,483
 TOTAL COST OF PROJECT= \$207,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

TIME PERIOD	YEARS	ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES				PDO		ANNUAL COSTS
		K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	CRASHES	CRASHES PER YR	
BEFORE	4.83	0	0.00	0	0.00	40	8.28	\$35,611
AFTER	4.83	0	0.00	0	0.00	2	0.41	\$1,781

Annual Benefits from Crash Cost Savings \$33,830

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = \$12,347

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 1.57

TOTAL COST OF PROJECT - \$207,000 COMPREHENSIVE B/C RATIO - 1.57

Treatment Site Photos from Google Street-View



Looking northeast on US 13



Looking northeast on US 13



Looking northwest on US 13-US 264A

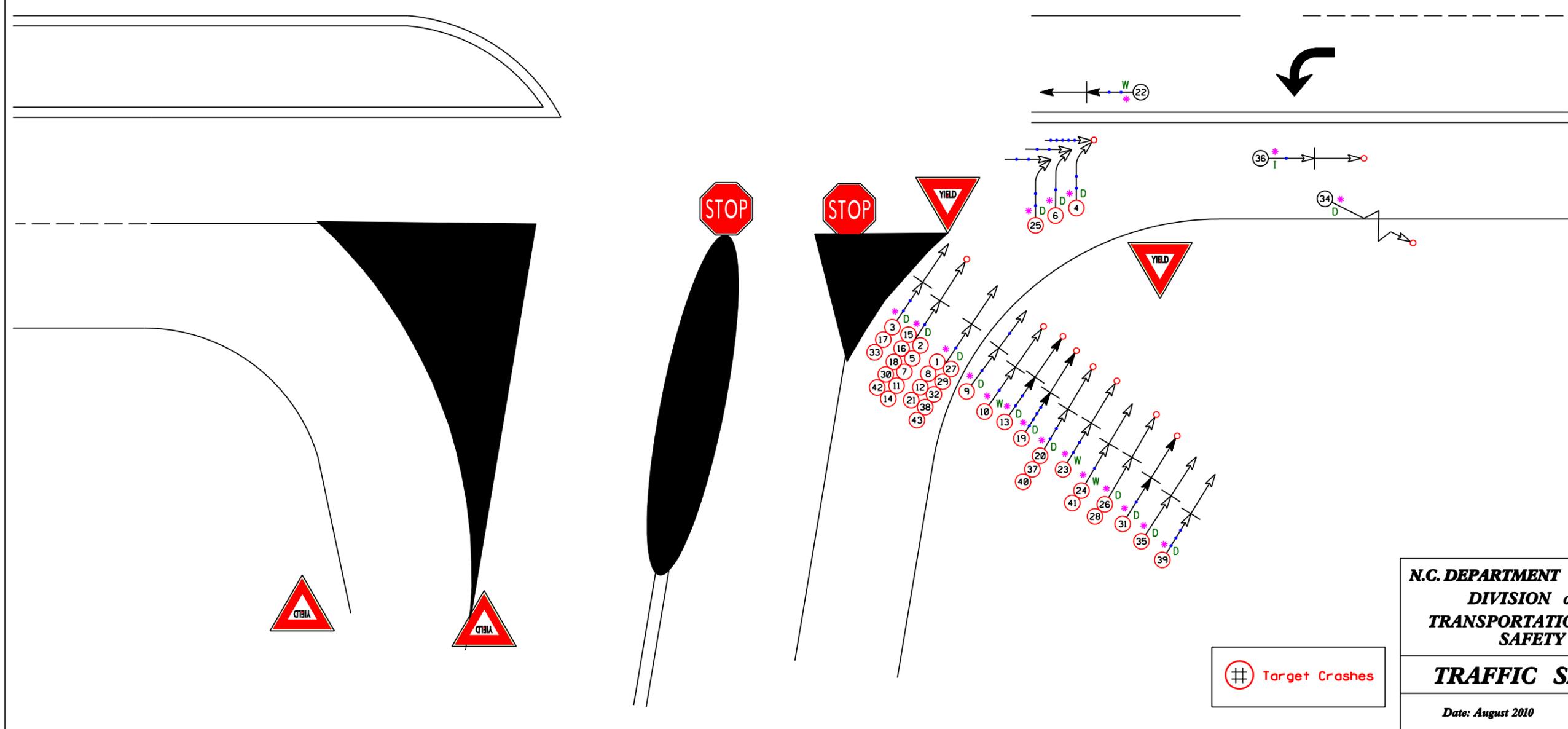


Looking southeast on US 264A

SS# 02-02-272
 Order# 41000007804
 Pitt County
 BEFORE Period
 8/1/00 - 5/31/05



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 ONLY



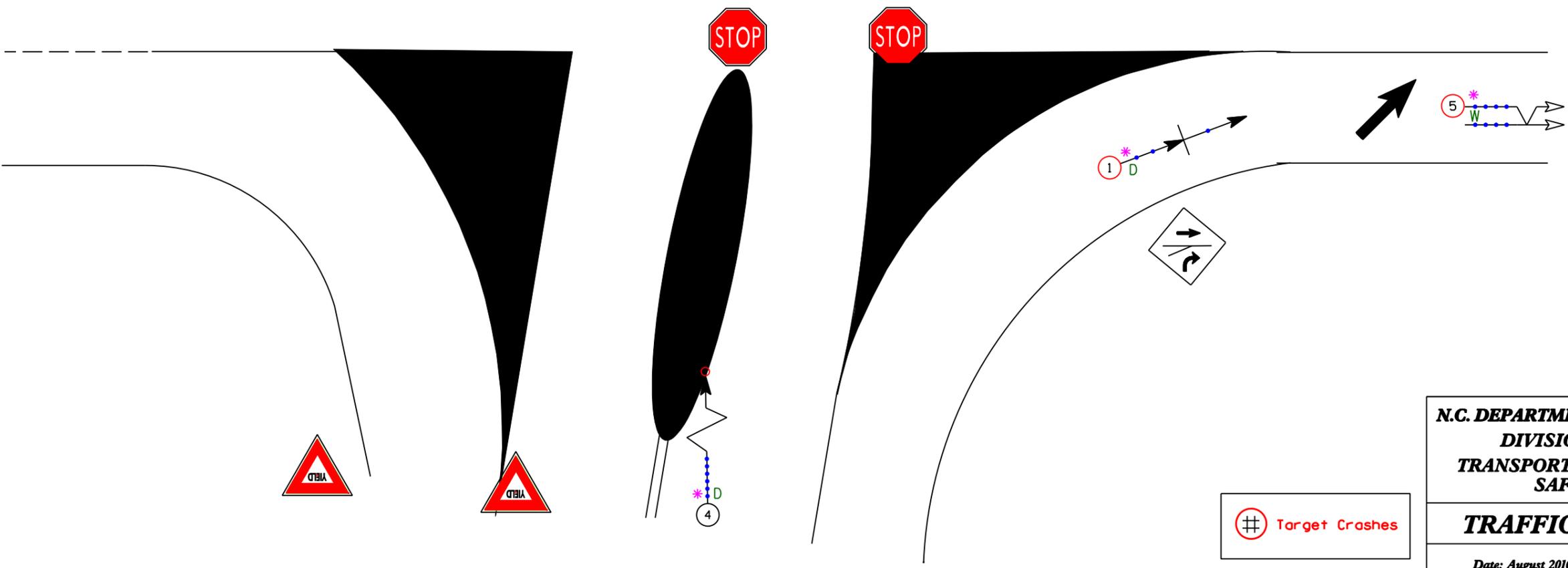
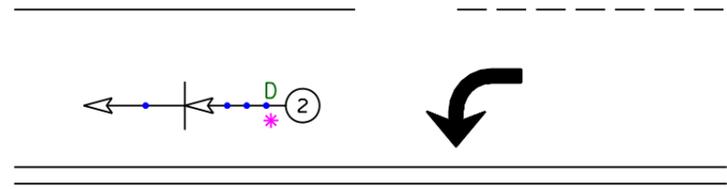
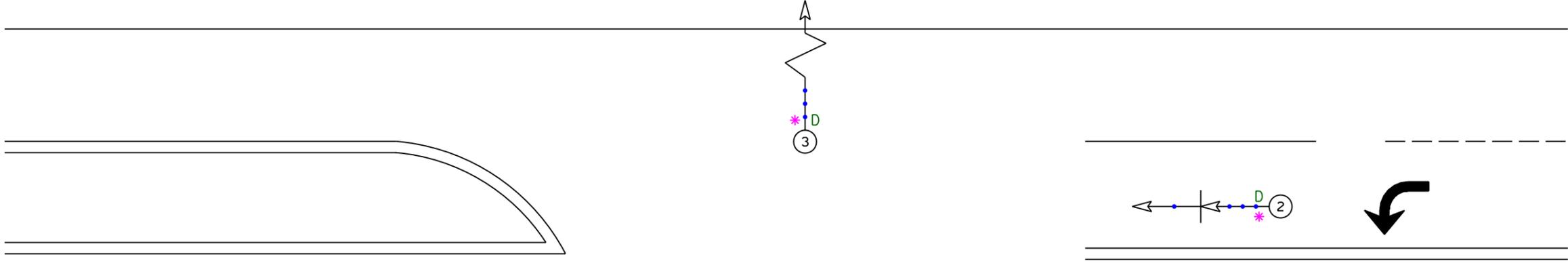
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRANSPORTATION MOBILITY and
SAFETY DIVISION

TRAFFIC SAFETY UNIT

Date: August 2010 Prepared By: bdr

SS# 02-02-272
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 Pitt County
 AFTER Period
 9/1/05 - 6/30/10

LEGEND							
	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		INJURY		50 MPH TO 59	I	ICY OR SNOWY
	REAR END		FATALITY		60 MPH TO 69	O	ONLY
	RAN OFF ROAD		70 AND UP		SPEED UNKNOWN		



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 Target Crashes