

Spot Safety Project Evaluation

Project Log # 200806153

Spot Safety Project # 02-01-263

**Spot Safety Project Evaluation of the Left Turn Lane Installation
At the Intersection of NC 55 and SR 1204 (Main St) / 1348 (Keel Rd)
Pamlico County, Town of Alliance**

Documents Prepared By:

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

Principal Investigator



Jason B. Schronce

11-4-2008

Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 02-01-263 located at the Intersection of NC 55 and SR 1204 (Main Street) / SR 1348 (Keel Road) in Pamlico County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of a center turn lane with dedicated left turn lanes for the intersection on the NC 55. In the study period, NC 55, SR 1204, and SR 1348 were all two-lane facilities at the subject intersection with no turn lanes and speed limits of 55 mph and 35 mph, respectively. The subject location is a four-leg intersection, which was controlled by a stop signs on SR 1204 (Main Street) and SR 1348 (Keel Road). In July of 2005, construction began at this location under TIP R-2539C which is in the process of widening NC 55 to a five lane segment.

The original statement of problem was that a pattern of rear-end collisions were occurring due to the lack of left turn lanes on the NC 55 approaches.

The initial crash analysis was completed from April 1, 1998 to March 31, 2001 with nine (9) reported crashes, four (4) of which were deemed correctable. The final completion date for the improvement at the subject intersection was on March 23, 2003 with a total cost of \$100,000.00.

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 were the months of February and March 2003. The before period consisted of reported crashes from February 1, 1998 through January 31, 2003 (5 years); and the after period consisted of reported crashes from April 1, 2003 through June 30, 2005 (2 years and 3 months). The ending date for this analysis was determined by the TIP project construction of NC 55 in 2005.

The treatment data consisted of all crashes within 400 feet of the subject intersection to incorporate the entire center turn lane section. *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 NC 55 Rear-End Crashes were the target crashes for the applied countermeasure. The Rear-End Crash types considered are as follows: Rear End, Slow or Stop; and Rear End, Turn.

Also note that Left Turn, Same Roadway type crashes were also selected as a secondary target crash for the creation of the center turn lane for PVAs surrounding the subject intersection.

Treatment Information			
	Before 5.0 Yrs	After 2.25 Yrs	Percent Reduction (-) Percent Increase (+)
Total Crashes	18	8	
Total Crashes/ Year	3.60	3.56	- 1.1 %
Total Severity Index	12.71	3.78	- 70.3%
Target 1 Crashes – Rear End NC 55			
Target 1 Crashes	5	0	
Target 1 Crashes / Year	1.00	0.00	- 100.0 %
Target 1 Crash Severity Index	6.92	0.00	- 100.0 %
Target 2 Crashes – Left Turn, Same			
Target 2 Crashes	3	1	
Target 2 Crashes / Year	0.60	0.44	- 26.7 %
Target 2 Crash Severity Index	1.00	8.40	200+ %
Volume			
Volume	12,540	13,520	7.8 %
<u>Injury Crash Summary - Total</u>			
Fatal injury Crashes	2	0	- 100.0 %
Class A injury Crashes	0	0	N/A
Class B injury Crashes	1	0	- 100.0 %
Class C Injury Crashes	7	3	- 57.1 %
Total Injury Crashes	10	3	- 70.0 %

The naive before and after analysis at the treatment location resulted in a 1 percent decrease in Total Crashes per year, complete elimination of Rear End Target Crashes, and a 70 percent decrease in the Total Severity Index. The before period ADT year was 2000 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 1 percent decrease in Total Crashes per year and a 72 percent decrease in Target Crashes combined per year. 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 Diagram*, a portion of the crashes at the intersection in the before period (5 of 18) were the result of a vehicle waiting to turn left onto SR 1348 from NC 55 heading west. After the left turn lane installation, this rear-end crash pattern was completely eliminated. Left turn, same roadway crashes also reduced from the before to the after period from three (3) to one (1).

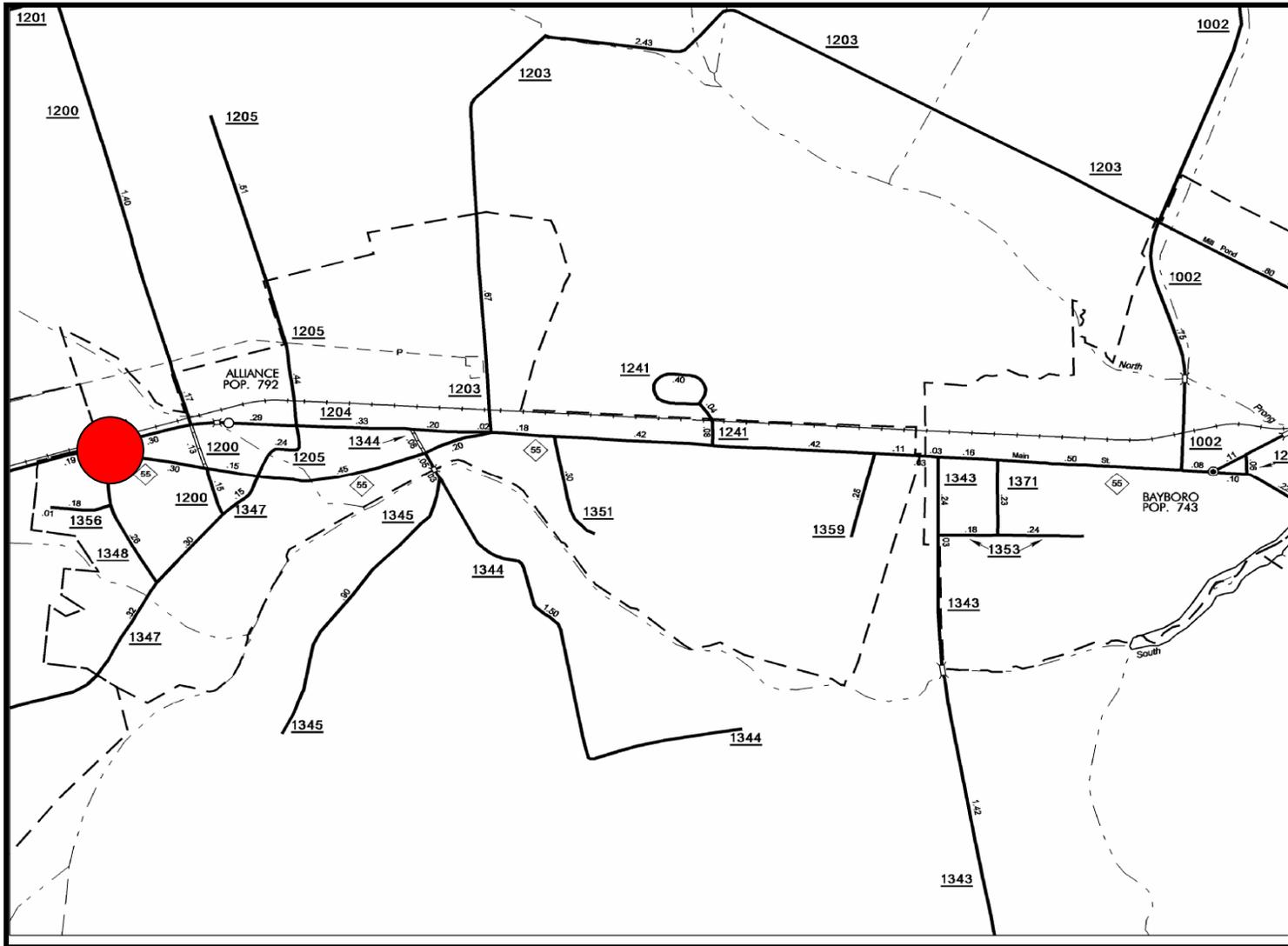
Also, the small pattern of head on collisions to the west of the intersection, which resulted in two fatality crashes in the before period, was eliminated in the after period. The elimination of this pattern provided this countermeasure with a significant benefit-cost ratio as shown below.

The calculated benefit to cost ratio for this project is **23.19 considering total crashes**. The benefit to cost ratio **considering only rear end target crashes is 1.53**. 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, although the construction zone of R-2539C on NC 55 is shown in the photographs as explained in the *Project Background* section.

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
Pamlico County, Town of Alliance
Evaluation of Spot Safety Project # 02-01-263



Treatment Location: NC 55 at SR 1204 / 1348

TREATMENT SITE PHOTOS TAKEN 8/6/2008



Traveling East on NC 55



Traveling East on NC 55



Traveling North on SR 1348 (Keel Road)



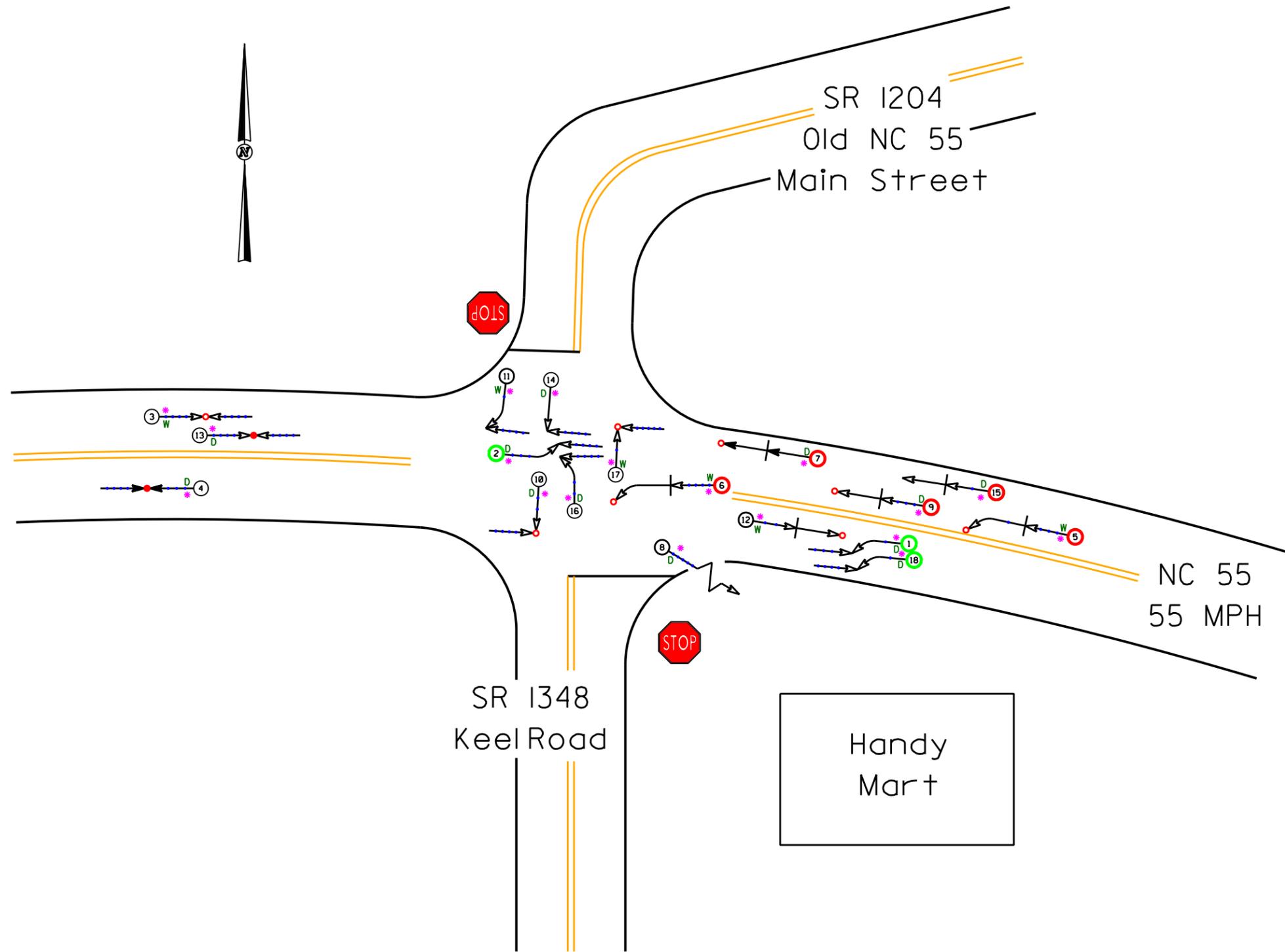
Traveling North on SR 1348
SR 1204 (Main Street) Closed for Construction



Traveling West on NC 55



Traveling West on NC 55



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		

SS# 02-01-263
 Pamlico County
 Town of Alliance
 BEFORE Period
 2/1/98 - 1/30/03
 5 Years Data

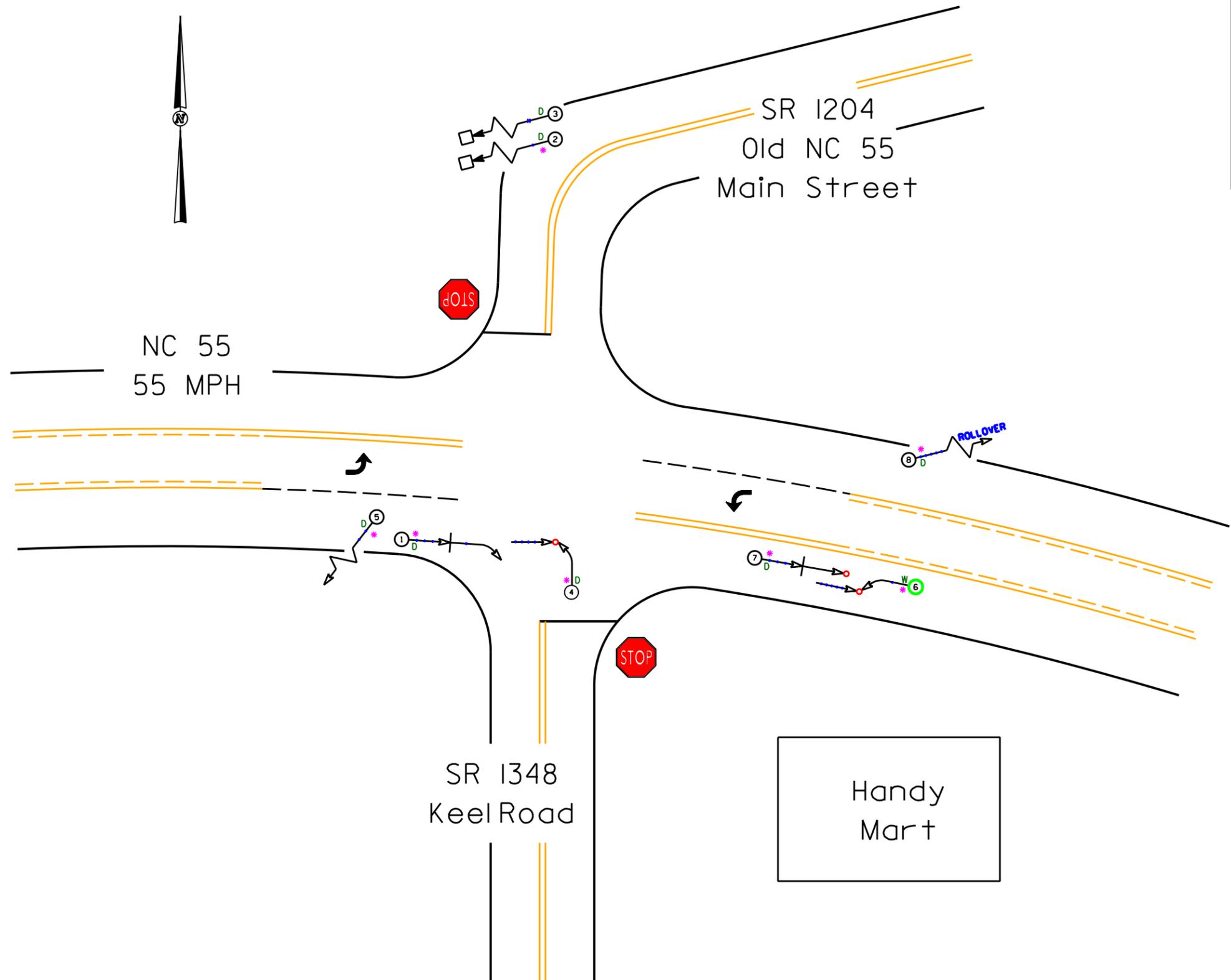
REAR-End Targets

Left Turn, Same Targets

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 2	AREA: 2
	STUDY PERIOD: 2/1/1998 - 1/30/2003 (5.0)	
	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: 10-30-2008		
LOG NUMBER: SS* 02-01-263 BEFORE		

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



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		OILY
	RAN OFF ROAD		70 AND UP		SPEED UNKNOWN		

SS# 02-01-263
 Pamlico County
 Town of Alliance
 AFTER Period
 4/1/03 - 6/30/05
 2.25 Yrs Data

REAR-End Targets
 Left Turn, Same Targets

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

	COLLISION DIAGRAM	
	DIVISION: 2	AREA: 1
	STUDY PERIOD: 4/1/2003 - 6/30/2008	
	DISTANCE: Y-LINE = 400FT	
ANALYSIS PREPARED BY: JBS		
ANALYSIS CHECKED BY: BR		
DIAGRAM PREPARED BY: JBS		
DIAGRAM REVIEWED BY: ST		
SCALE: NOT TO SCALE		
DATE: 10-30-2008		
LOG NUMBER: SS* 02-01-263 AFTER		

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