

Spot Safety Project Evaluation

Spot Safety Project # 02-06-202

**Spot Safety Project Evaluation of Signal Modification
(Install Flashing Yellow Arrow Signal Heads)
NC 24 at SR 1141/SR 1144
Carteret County**

Documents Prepared By:

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

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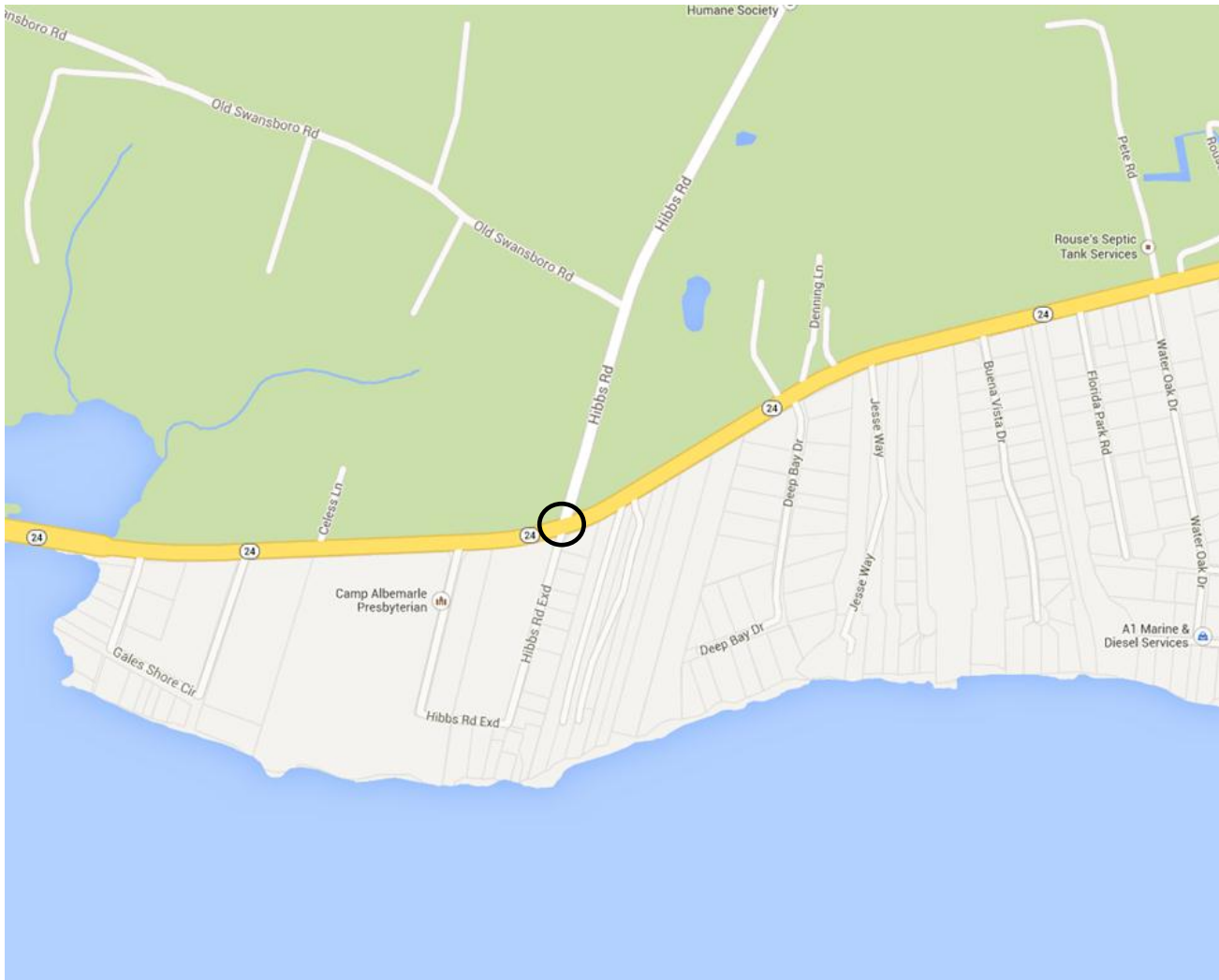
9-25-2013
Date

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 02-06-202 located at the intersection of NC 24 at SR 1141 (Hibbs Road)/SR 1144 (Hibbs Road Extension) in Carteret County.

The Sig ID is 02-0470 for this modified Three Phase fully actuated traffic signal.



Location Map Provided from Google Maps



Aerial Provided from Bing Maps

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 four section signal head with a Flashing Yellow Arrow for the eastbound NC 24 approach. Also, a three section signal head with a Flashing Yellow Arrow was installed for the westbound NC 24 approach, the signal timing was updated to current standards, the turning radius in the northwest quadrant was improved and the turn lanes were extended on the southbound SR 1141 (Hibbs Road) approach.

NC 24 is a five-lane facility having a center two-way left-turn lane. SR 1141 (Hibbs Road) is a two-lane facility that widens for a right-turn lane at the intersection. SR 1144 (Hibbs Road Extension) is also a two-lane facility. Speed limits around the intersection range from 35 mph to 55 mph. The subject location is a four-leg crossroads intersection, which is controlled by an existing traffic signal and a yield controlled right-turn pocket on the westbound approach.

The original statement of problem was the existence of motorists turning left from eastbound NC 24 onto northbound SR 1141 not yielding to oncoming westbound NC 24 traffic, resulting in left-turn crashes. In addition, the existing radii and turn lanes on SR 1141 at NC 24 were not adequate to accommodate traffic. The initial crash analysis was completed including data from August 1, 2000 to July 31, 2005 with thirty-three (33) reported crashes during that time frame. The final completion date for the improvements at the subject intersection was on April 15, 2008 with a total cost of \$22,500.00.

Naïve 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 includes the months of September 2007 through April 2008. The before period consists of reported crashes from July 1, 2002 through August 31, 2007 (5 years, 2 months). The after period consists of reported crashes from May 1, 2008 through June 30, 2013 (5 years, 2 months). The ending date for the analysis was determined by the date of the most recent available crash data at the time of analysis. This location has been selected as a Dynamic Red countermeasure test site, that was installed in the Spring of 2013. This latest countermeasure would not affect the target crashes in this evaluation and was not accounted for within this analysis.

The treatment data consists of all crashes within 150 feet of the subject intersection. *Please see the above location map and aerial photo for further details.*

The following data table depicts the Naïve Before and After Analysis for the treatment location. Please note that eastbound Left Turn Same Roadway (LTSR) Crashes were the target crashes for the applied countermeasure.

<u>Treatment Information</u>	Before Crashes	After Crashes	Percent Reduction (-) Percent Increase (+)
Total Crashes	37	47	27.03%
Total Severity Index	10.7	7.5	-29.91%
Target Crashes	13	13	0.00%
Target Crash Severity Index	22.5	11.4	-49.33%
Volume (2005, 2010)	18,800	19,500	3.72%

<u>Injury Crash Summary</u>	Before Crashes	After Crashes	Percent Reduction (-) Percent Increase (+)
Fatal injury Crashes	1	0	-100.00%
Class A injury Crashes	2	2	0.00%
Class B injury Crashes	7	8	14.29%
Class C Injury Crashes	11	13	18.18%
Property Damage Only	16	24	50.00%

The Naïve Before and After Analysis at the treatment location shows a 27 percent increase in the total crashes per year. There was no change in the Target Crashes, with thirteen (13) in both the before and the after period. There was a 30 percent reduction in the Total Severity Index and a 49 percent reduction in the Target Crash Severity Index. The before period ADT year was 2005 and the after period ADT year was 2010.

To further analyze the intersection crash patterns, the following chart shows different traffic movements and the change in crash totals through the study:

<u>Additional Information</u>	Before Crashes	After Crashes	Percent Reduction (-) Percent Increase (+)
Westbound NC 24 Left Turn Same Roadway	0	0	N/A
Southbound Left Turn Different Roadway	9	9	0.00%
Eastbound NC 24 Rear End	3	5	66.67%
Southbound SR 1141 Rear End	1	10	900.00%

Results and Discussion

Referencing the *Collision Diagrams*, the target crashes (eastbound approach with Flashing Yellow Arrow signal head) experienced no change in left turn same roadway collisions. However, the Total Severity Index of these target crashes was reduced 49 percent from 22.5 in the before period to 11.4 in the after period.

From the *Collision Diagrams* and the *Additional Information* chart above, there were no crashes in the before or after period involving left turning vehicles on NC 24. There was a pattern of southbound Left Turn Different Roadway crashes that stayed consistent throughout the analysis. In addition, the eastbound Rear End crashes increased from three (3) in the before period to five (5) in the after period. The southbound Rear End crashes increased from one (1) in the before period to ten (10) in the after period.

Please see the attached *Treatment Site Photos*. Photos are provided from Google Street View for all four approaches to the treatment intersection. As the Safety Evaluation Group facilitates additional spot safety review for these types of countermeasures, it is the goal to be able to provide objective and definite information regarding actual crash reduction factors for these types of treatments.

Treatment Site Photos from Google Street View



Google Maps (April 2009) – Looking East on NC 24 Approach



Google Maps (April 2009) – Looking West on NC 24 Approach



Google Maps (November 2007) – Looking North on SR 1144 Approach

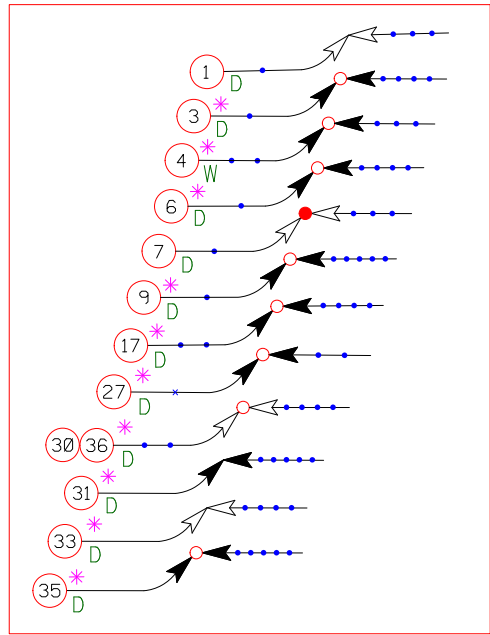


Google Maps (December 2007) – Looking South on SR 1141 Approach

SS# 02-06-202
 Carteret County
 BEFORE Period
 7/1/02 - 8/31/07

LEGEND

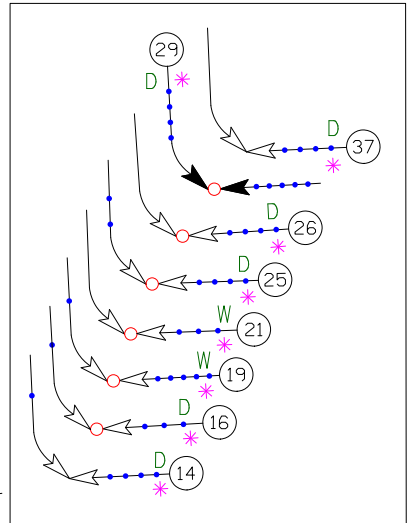
	MOVING VEHICLE		ANGLE		9 MPH OR LESS		A ANIMAL
	PARKED VEHICLE		TURNING		10 MPH TO 19		P PEDESTRIAN
	PARKING VEHICLE		BACKING		20 MPH TO 29		B BICYCLE
	MOVABLE OBJECT		SIDESWIPE		30 MPH TO 39		T TRAIN
	HEAD ON		INJURY		40 MPH TO 49		* DRIVER AT FAULT
	REAR END		FATALITY		50 MPH TO 59		D DRY
	RAN OFF ROAD		70 AND UP		60 MPH TO 69		I ICY OR SNOWY
	DAYLIGHT CRASH		SPEED UNKNOWN		Other		
	NIGHT CRASH						



ADT (Year)
 6,450 (2005)

SR 1141 (Hibbs Road)

45 Mph



ADT (Year)
 15,000 (2005)

NC 24

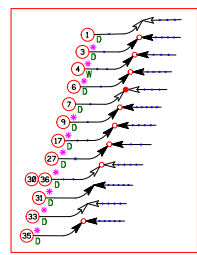


ADT (Year)
 16,000 (2005)

NC 24

55 Mph

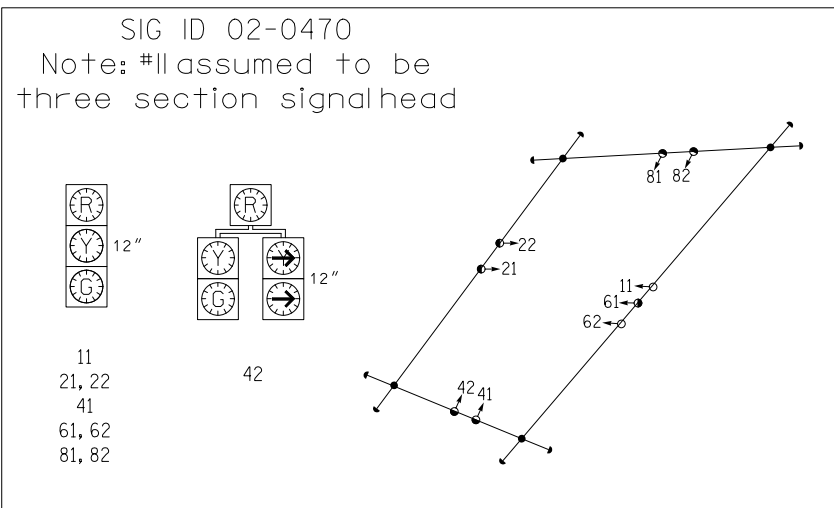
55 Mph



SR 1144
 (Hibbs Road Extension)

ADT (Year)
 200 (2005 est.)

Target - Eastbound Left Turn Crashes



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

TRAFFIC SAFETY UNIT

Date: 9-16-13

Prepared By: T. Braswell



SS# 02-06-202
 Carteret County
 AFTER Period
 5/1/08 - 6/30/13

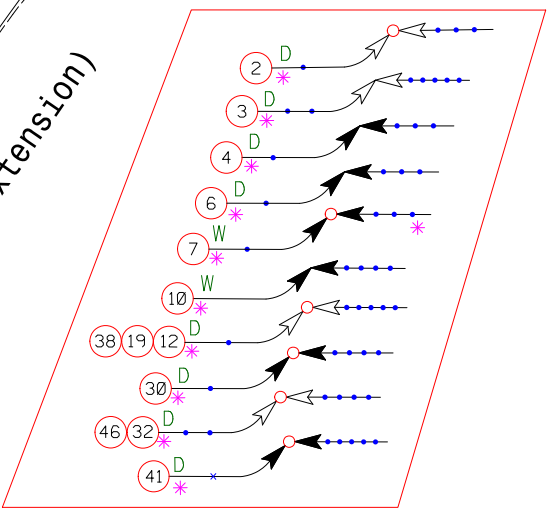
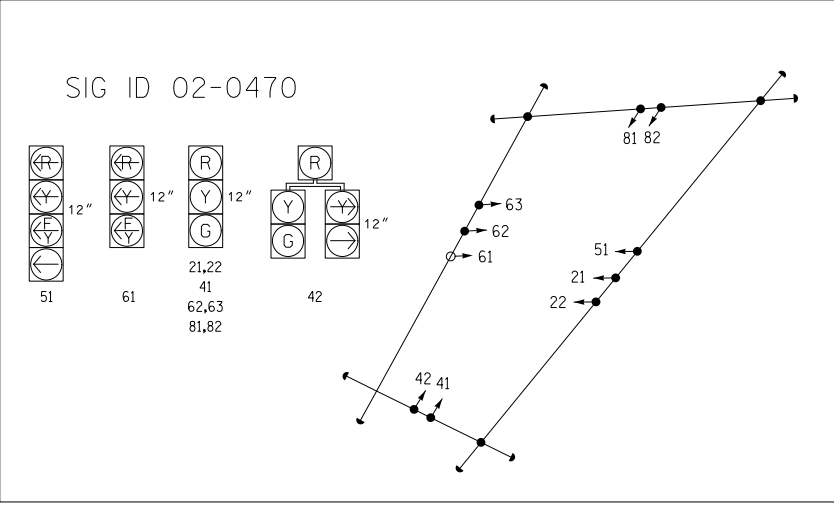
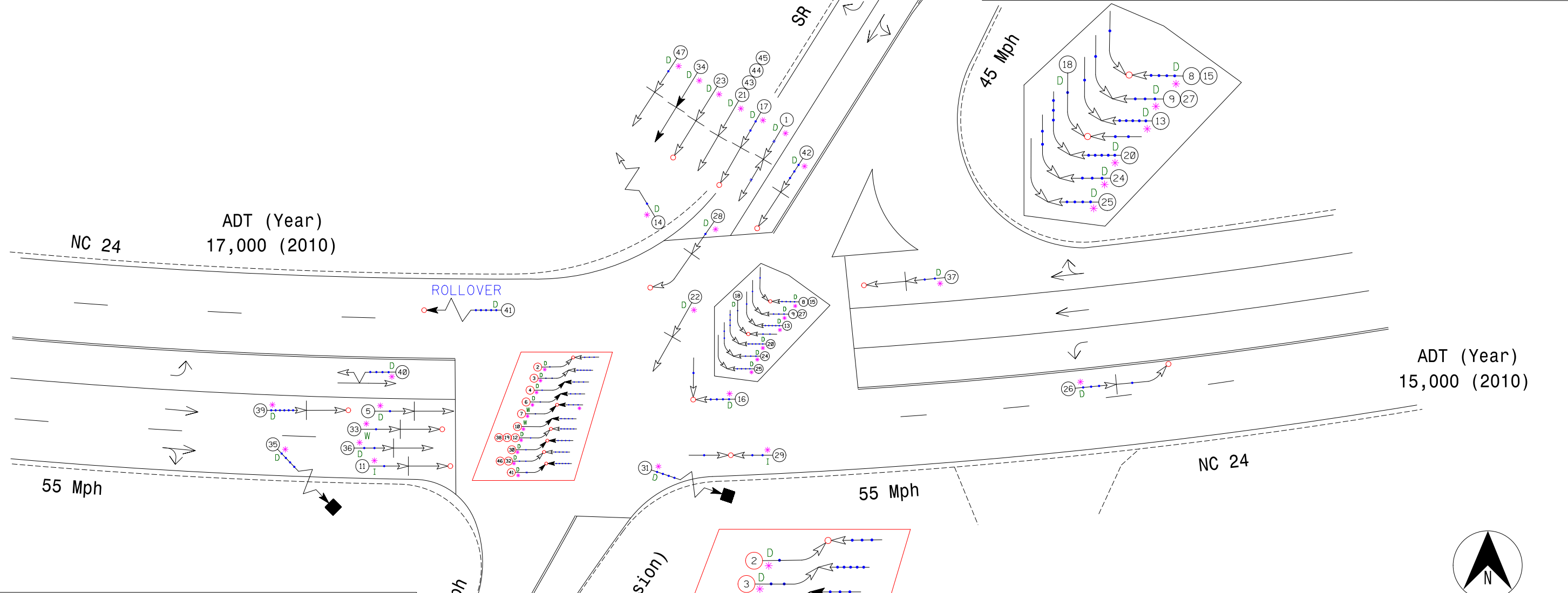
ADT (Year)
 6,800 (2010)

ADT (Year)
 17,000 (2010)

ADT (Year)
 15,000 (2010)

ADT (Year)
 200 (2010 est.)

LEGEND			
	MOVING VEHICLE		ANGLE
	PARKED VEHICLE		TURNING
	PARKING VEHICLE		BACKING
	FIXED OBJECT		SIDESWIPE
	HEAD ON		INJURY
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			W WET
			I ICY OR SNOWY
			O Other



Target - Eastbound Left Turn Crashes



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