Hazard Elimination Project Evaluation

Project Log # 200608057

Hazard Elimination Project W-4429

Evaluation of the Shoulder Guardrail Installations on NC 150
At the Bridge Approaches to Bridge # 6, 26, 35, and 44, Lincoln County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

Carrie L. Simpson, PE — 1/3/08 Date

Traffic Safety Project Engineer

Hazard Elimination Project Evaluation Documentation

Subject Location

Evaluation of Hazard Elimination Project W-4429 – Installation of shoulder guardrail on NC 150 at the bridge approaches of Bridge # 6, 26, 35, and 44 in Lincoln County

Project Information and Background from the Project File Folder

The safety countermeasure chosen for the subject location was the installation of approximately 5200 linear feet of shoulder guardrail. NC 150 is a two-lane highway with varying shoulder widths of 2-10 feet and speed limit of 55 miles per hour. According to the project file, the narrow shoulder width was a contributing factor in the severity of the Ran Off Road crashes. The four bridges are narrow and did not have approach guardrail or bridge-end protection.

The initial crash analysis for this location was completed from August 1, 1996 through July 31, 1999 with a total of 2 reported crashes. Both of the crashes were Ran Off Road crashes, resulting in one fatality. The guardrail was installed as a proactive approach to lessen the severity of the Ran Off Road crashes. The location had been identified through Fatal Accident Investigations and the Annual Highway Safety Program. W-4429 was completed in March of 2002 at an estimated cost of $160,000.

Naïve Before and After Analysis

After reviewing the hazard elimination project file folder along with all the crashes at the subject locations, the crash data omitted from this analysis to consider for an adequate construction period was from January 1, 2002 through April 30, 2002. The before period consisted of reported crashes from January 1, 1997 through December 31, 2001 (5 Years) and the after period consisted of reported crashes from May 1, 2002 through April 30, 2007 (5 Years). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The treatment data consisted of all crashes on NC 150 from MP 1.83-2.14 (vicinity of Bridge #6), MP 2.69-3.00 (vicinity of Bridge #26), and MP 3.72-4.23 (vicinity of Bridge # 35 & 44). A total of 1.13 miles was analyzed. The study limits include the entire length of the bridges and approach guardrail, plus extends approximately 500’ beyond the guardrail terminals. A 0 feet Y-line was used in the analysis. Please see the attached *Location Map* and *Aerial Photos* for further detail.

The following tables depict the Naïve Before and After Analysis for the Total Crashes and Target Crashes at the aggregated treatment locations. Please note that Ran Off Road crash types were the target crashes for the applied countermeasure. Ran Off Road crash types considered are as follows: Ran Off Road – Left, Ran Off Road – Right, Ran Off Road – Straight, Fixed Object, Head-on, Sideswipe – Same Direction, Sideswipe – Opposite Direction, and Overturn / Rollover.

Total Treatment Information	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	28	22	-21.4%
Total Severity Index	8.00	5.71	-28.6%
Target Crashes	11	9	-18.2%
Target Severity Index	9.91	6.76	-31.8%
Volume	8400	8600	2.4%

Target Crash Information	Before	After	Percent Reduction (-)/ Percent Increase (+)
Target Crashes - Injuries			
Fatal Injury Crashes	1	0	-100.0%
Non-Fatal Injury Crashes	3	7	133.3%
Total Injury Crashes	4	7	75.0%
Target Crashes - Contributing Factors			
Night Crashes	8	7	-12.5%
Wet / Icy Crashes	5	4	-20.0%
Alcohol/Drug Involvement Crashes	2	0	-100.0%
Target Crashes - Crash Types			
Ran Off Road	8	1	-87.6%
Fixed Object	2	8	300.0%
Sideswipe, Opposite Direction	1	0	-100.0%

The naïve before and after analysis at the treatment location resulted in a 21 percent decrease in Total Crashes, an 18 percent decrease in Target Crashes, and a 2 percent increase in Average Daily Traffic (ADT). Further investigation shows there was a 29 percent decrease in the Severity Index for Total Crashes and a 32 percent decrease in the Severity Index for Target Crashes. The before period ADT year was 1999 and the after period ADT year was 2004.

Because we had specific information as to exactly where each run of guardrail was placed in this project, specific crash information for each run of guardrail could be analyzed. In the following tables, the data is provided separately for Bridges 6, 26, and 35/44.

Treatment Information - Bridge 6	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	6	8	33.3%
Total Severity Index	1.00	5.62	462.0%
Target Crashes	2	3	50.0%
Target Severity Index	1.00	5.93	493.0%
Volume	9000	9100	1.1%

Target Crash Information - Bridge 6	Before	After	Percent Reduction (-)/ Percent Increase (+)
Target Crashes - Injuries			
Fatal Injury Crashes	0	0	N/A
Non-Fatal Injury Crashes	0	2	N/A
Total Injury Crashes	0	2	N/A
Target Crashes - Contributing Factors			
Night Crashes	2	2	0.0%
Wet / Icy Crashes	0	0	N/A
Alcohol/Drug Involvment Crashes	1	0	-100.0%
Target Crashes - Crash Types			
Ran Off Road	1	0	-100.0%
Fixed Object	1	3	200.0%

The naïve before and after analysis at the Bridge 6 location resulted in a 33 percent increase in Total Crashes, a 50 percent increase in Target Crashes, and a 1 percent increase in Average Daily Traffic (ADT).

Treatment Information - Bridge 26	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	14	8	-42.9%
Total Severity Index	8.53	4.70	-44.9%
Target Crashes	2	3	50.0%
Target Severity Index	4.7	5.93	26.2%
Volume	6900	7300	5.8%

Target Crash Information - Bridge 26	Before	After	Percent Reduction (-)/ Percent Increase (+)
Target Crashes - Injuries			
Fatal Injury Crashes	0	0	N/A
Non-Fatal Injury Crashes	1	2	100.0%
Total Injury Crashes	1	2	100.0%
Target Crashes - Contributing Factors			
Night Crashes	1	2	100.0%
Wet / Icy Crashes	0	2	N/A
Alcohol/Drug Involvment Crashes	0	0	N/A
Target Crashes - Crash Types			
Ran Off Road	1	0	-100.0%
Fixed Object	1	3	200.0%

The naïve before and after analysis at the Bridge 26 location resulted in a 43 percent decrease in Total Crashes, a 50 percent increase in Target Crashes, and a 6 percent increase in Average Daily Traffic (ADT).

Treatment Information - Bridges 35 & 44	Before	After	Percent Reduction (-)/ Percent Increase (+)
Total Crashes	8	6	-25.0%
Total Severity Index	12.33	7.17	-41.8%
Target Crashes	7	3	-57.1%
Target Severity Index	13.94	8.4	-39.7%
Volume	9300	9500	2.2%

Target Crash Information - Bridges 35 & 44	Before	After	Percent Reduction (-)/ Percent Increase (+)
Target Crashes - Injuries			
Fatal Injury Crashes	1	0	-100.0%
Non-Fatal Injury Crashes	2	3	50.0%
Total Injury Crashes	3	3	0.0%
Target Crashes - Contributing Factors			
Night Crashes	5	3	-40.0%
Wet / Icy Crashes	5	2	-60.0%
Alcohol/Drug Involvment Crashes	1	0	-100.0%
Target Crashes - Crash Types			
Ran Off Road	6	1	-83.3%
Fixed Object	0	2	N/A
Sideswipe, Opposite Direction	1	0	-100.0%

The naïve before and after analysis at the Bridge 35/44 location resulted in a 25 percent decrease in Total Crashes, a 57 percent decrease in Target Crashes, and a 2 percent increase in Average Daily Traffic (ADT).

Results and Discussion

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 21 percent decrease in Total Crashes and an 18 percent decrease in Target Crashes. Further investigation shows that the Severity Index of Total Crashes and Target Crashes appear to have decreased 29 and 32 percent respectively using naïve methodologies. The summary results above demonstrate that overall the treatment locations appear to have had a decrease in Total Crashes, Target Crashes, and the Severity Index from the before to the after period.

The calculated benefit to cost ratio for this project is 7.37 considering total crashes. The benefit to cost ratio considering only target crashes is 3.66. 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 costs.

There were two predominant contributing factors associated with Target Crashes in both the before and after period. Night Crashes accounted for 73 percent of Target Crashes (8 of 11) in the before period and 78 percent of crashes in the after period (7 of 9). Also, Wet / Icy conditions were a contributing factor in 45 percent of Target Crashes (5 of 11) in the before period and 44 percent of crashes in the after period (4 of 9). All five of the Wet / Icy Crashes in the before period occurred in one day (December 23, 1998) at Bridge 35, when the bridge was icy.

Typically, one would expect guardrail installation projects to result in an increased number of Ran Off Road crash types and a decrease in the severity of Ran Off Road crash types. The increase in Ran Off Road crash types is expected due to the placement of a fixed object (guardrail) near the travel way. The decrease in the severity of Ran Off Road crash types is expected due to the guardrail being more forgiving than the object it is protecting. The results from this project seem to be in concurrence with the above-mentioned expectations except for the appearance of a slight decrease in the number of Ran Off Road crash types. Keep in mind that if the one-day event on December 23, 1998 (as described in the previous paragraph) was removed from the before period, then the expectations do hold true.

Because we had specific information as to exactly where each run of guardrail was placed in this project and because each location experienced differing results, specific crash information for each run of guardrail was analyzed. To supplement the discussion below, please see the *Collision Diagrams* provided for each Bridge Location.

The number of Total Crashes at the Bridge 6 location increased by 33 percent, from six crashes in the before period to eight crashes in the after period. Also, the number of Target Crashes at the Bridge 6 location increased by 50 percent, from two crashes in the before period to three crashes in the after period. Both the Total and Target Severity Index increased at the Bridge 6 location due to several injury crashes in the after period.

The number of Total Crashes at the Bridge 26 location decreased by 43 percent, from 14 crashes in the before period to eight crashes in the after period. The decrease in Total Crashes is attributed primarily to a decrease in crashes at the intersection of NC 150 at SR 1236 / SR 1175, which was included in the crash analysis due its proximity to the guardrail approaches. Also, the number of Target Crashes at the Bridge 26 location increased by 50 percent, from two crashes in the before period to three crashes in the after period. The Total Severity Index decreased by 45 percent while the Target Severity Index increased by 26 percent at the Bridge 26 location.

The number of Total Crashes at the Bridge 35/44 location decreased by 25 percent, from eight crashes in the before period to six crashes in the after period. Also, the number of Target Crashes at the Bridge 35/44 location decreased by 57 percent, from seven crashes in the before period to three crashes in the after period. One Fatal Target Crash occurred in the before period (see Crash 6 in the Bridge 35/44 Before Period Collision Diagram), where contributing factors included Alcohol/Drug Involvement and excessive speed. As previously stated, five Target Crashes in the before period occurred within one day, all of which were attributed to icy conditions and occurred at night (see Crashes 3,4,5,7,and 8 in the Bridge 35/44 Before Period Collision Diagram). In the after period, all three Target Crashes occurred at night, two of which also were attributed to icy conditions. Both the Total and Target Severity Index decreased at the Bridge 35/44 location in the after period.

Please see the attached *Aerial Photos* and *Treatment Site Photos* for additional visual information. As the Safety Evaluation Group completes additional reviews for this type of countermeasure, we will be able to provide more objective and definite information regarding actual crash reduction factors.

TOTAL BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: NC 150 at Bridges 6, 26, 35, 44 BY: CLS
COUNTY: Lincoln DATE: 12/5/2007
FILE NO.: W-4429

DETAILED COST: TYPE IMPROVEMENT - Guardrail

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	$160,000	10	0.149	$23,845
	$0	0	0.000	$0
Right-of-Way	$0	0	0.000	$0
TOTALS	$160,000	10	0.149	$23,845

ESTIMATED INCREASE IN ANNUAL MAINT. COST = $640
ESTIMATED INCREASE IN ANNUAL UTILITY COST = $0

TOTAL ANNUAL COST= $24,485
TOTAL COST OF PROJECT= $160,000

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	5.00	2	0.40	6	1.20	20	4.00	$237,200
AFTER	5.00	0	0.00	14	2.80	8	1.60	$56,640

Annual Benefits from Crash Cost Savings $180,560

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = $156,075

BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 7.37

TOTAL COST OF PROJECT - $160,000 COMPREHENSIVE B/C RATIO - 7.37

TREATMENT BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: NC 150 at Bridges 6, 26, 35, 44 BY: CLS
COUNTY: Lincoln DATE: 12/5/2007
FILE NO.: W-4429

DETAILED COST: TYPE IMPROVEMENT - Guardrail

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	$160,000	10	0.149	$23,845
	$0	0	0.000	$0
Right-of-Way	$0	0	0.000	$0
TOTALS	$160,000	10	0.149	$23,845

ESTIMATED INCREASE IN ANNUAL MAINT. COST = $640
ESTIMATED INCREASE IN ANNUAL UTILITY COST = $0

TOTAL ANNUAL COST= $24,485
TOTAL COST OF PROJECT= $160,000

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	5.00	1	0.20	3	0.60	7	1.40	$116,260
AFTER	5.00	0	0.00	7	1.40	2	0.40	$26,760

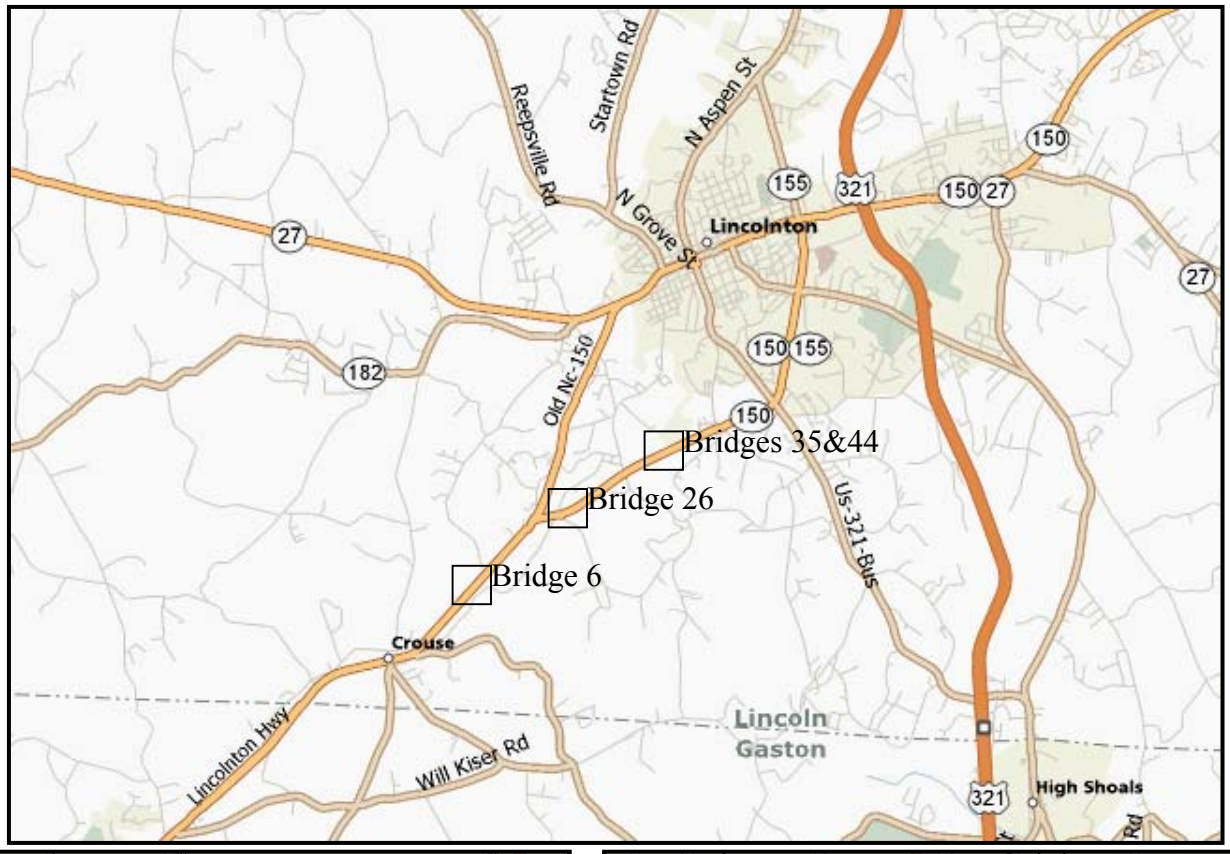
Annual Benefits from Crash Cost Savings $89,500

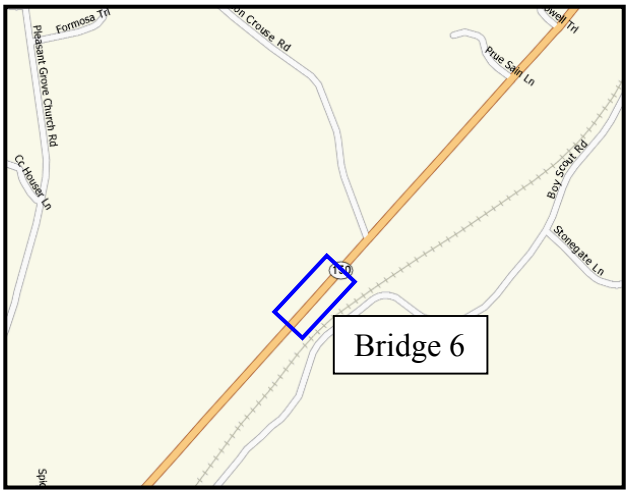
NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST = $65,015

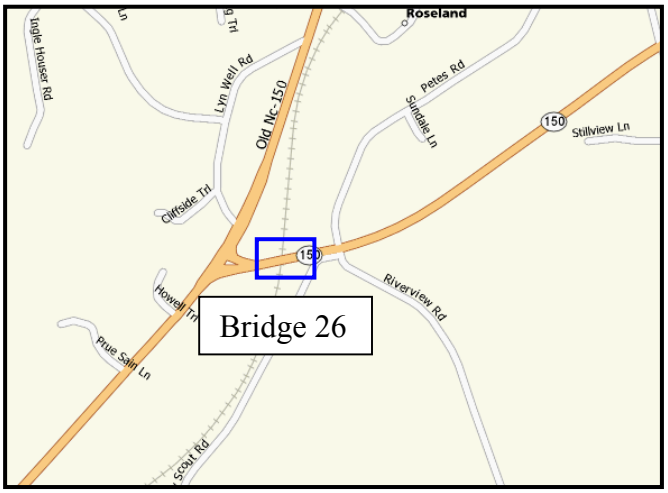
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST = 3.66

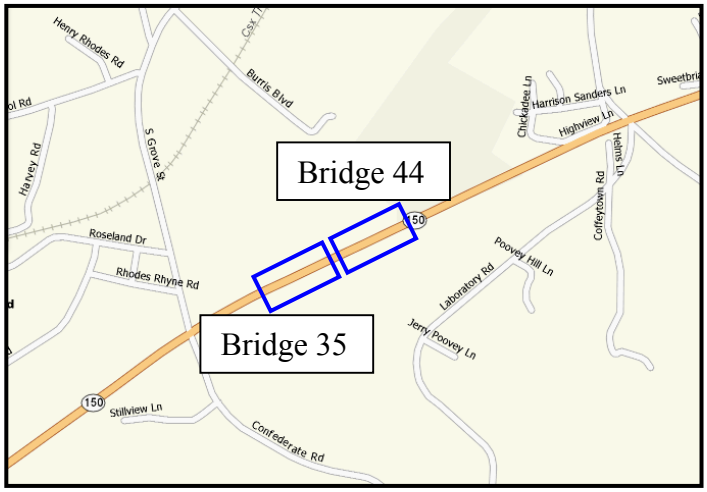
TOTAL COST OF PROJECT - $160,000 COMPREHENSIVE B/C RATIO - 3.66

W-4429 LOCATION MAP









AERIAL PHOTOGRAPH OF BRIDGE 6

BRIDGE 6 - BEFORE PERIOD (PHOTOS TAKEN 3/14/2000)

Looking East

Looking West

Looking East

BRIDGE 6 – AFTER PERIOD (PHOTOS TAKEN 12/15/2003)

Looking East

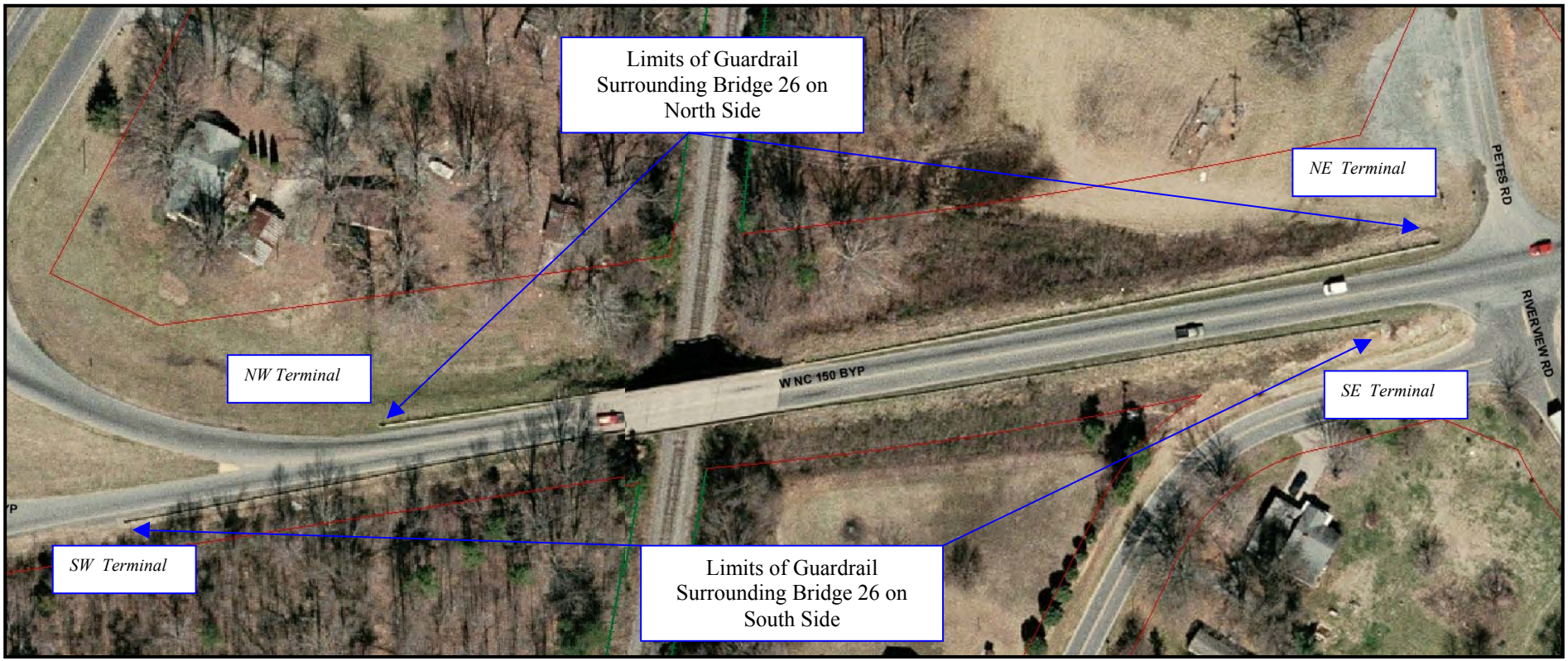
Looking West

Typ. G.R. Terminal at NE & NW Corners (NE Shown)

Typ. G.R. Terminal at SE & SW Corners (SE Shown)

BRIDGE 6 – AFTER PERIOD Cont'd (PHOTOS TAKEN 12/15/2003)

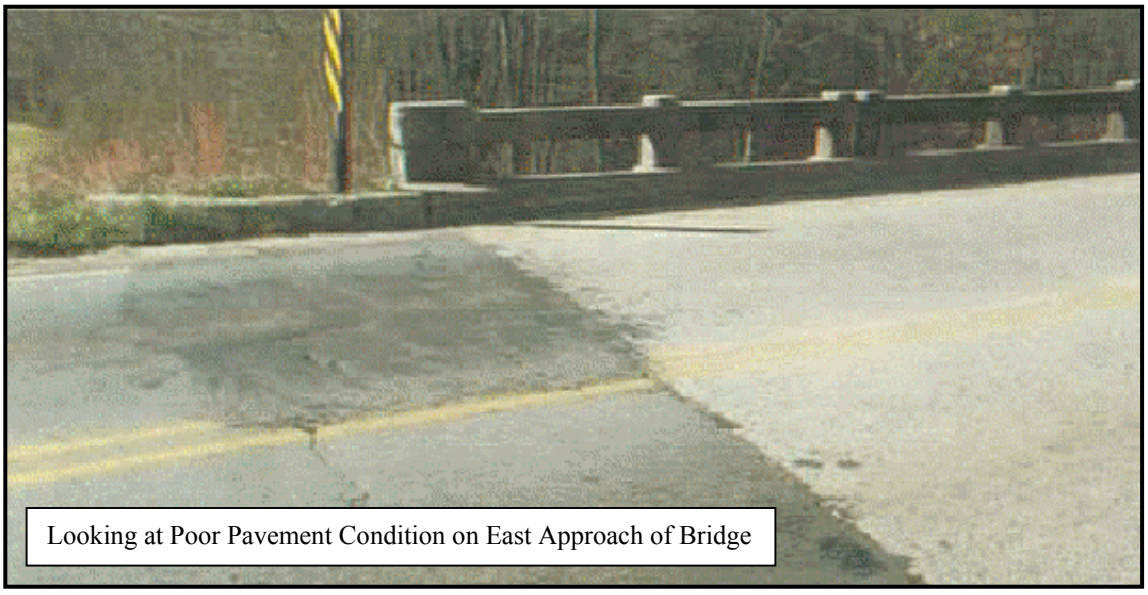
AERIAL PHOTOGRAPH OF BRIDGE 26



BRIDGE 26 – BEFORE PERIOD (PHOTOS TAKEN 3/14/2000)

Looking East

Looking West



Looking at Poor Pavement Condition on East Approach of Bridge

BRIDGE 26 – AFTER PERIOD (PHOTOS TAKEN 12/11/2003)

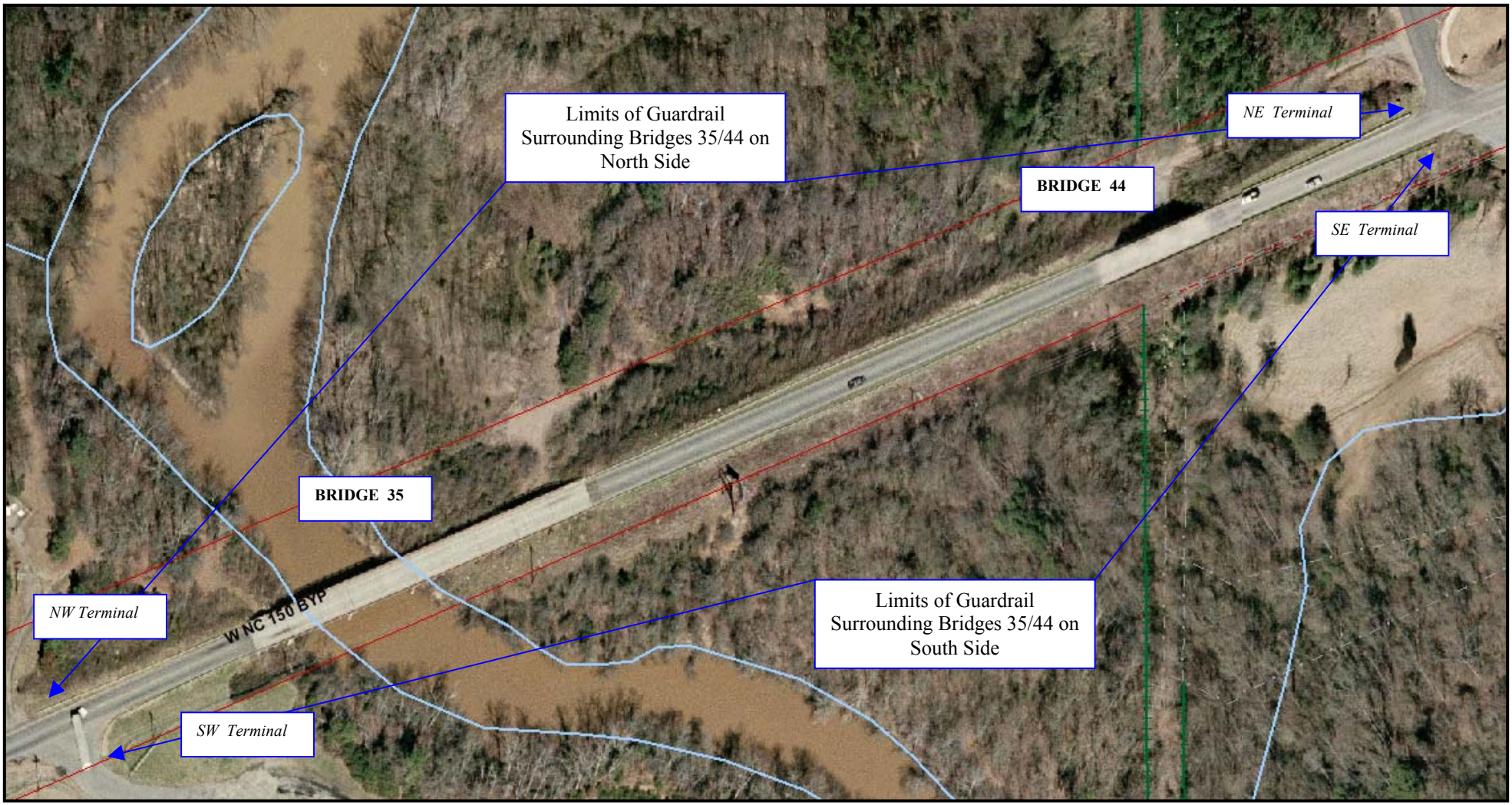
Looking East

Looking West

Typ. G.R. Terminal at all 4 Corners (NE Shown)

Typ. G.R. Conn.& Post Spacing at all 4 Corners (NE Shown)

AERIAL PHOTOGRAPH OF BRIDGES 35 AND 44



BRIDGE 35 – BEFORE PERIOD (PHOTOS TAKEN 3/15/2000)

Looking East

Looking East

Looking East

BRIDGE 35 – BEFORE PERIOD Cont'd (PHOTOS TAKEN 3/15/2000)

Looking East

Looking West

West Approach of Bridge

BRIDGE 35 – AFTER PERIOD (PHOTOS TAKEN 12/15/2003)

Looking East

G.R. at West End of Bridge

Typ. G.R. Terminal at NW Corner

BRIDGE 35 – AFTER PERIOD Cont'd (PHOTOS TAKEN 12/15/2003)

Typ. G.R. Terminal at SW Corner

G.R. at West End of Bridge

G.R. at East End of Bridge – Note G.R. Conn. W/Structure 44

BRIDGE 44 – BEFORE PERIOD (PHOTOS TAKEN 3/15/2000)

Looking East

West Approach

East Approach

Looking West

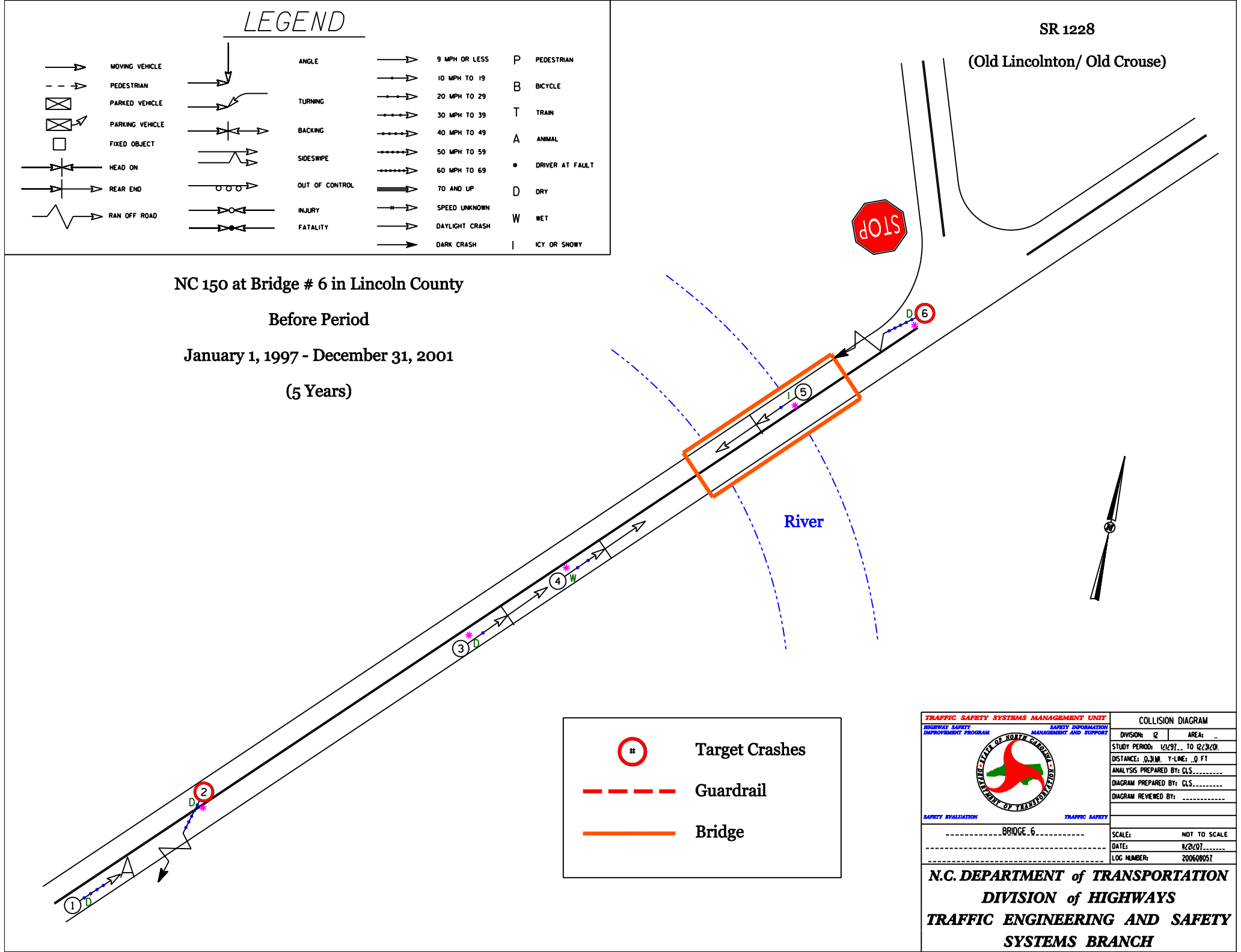
BRIDGE 44 – AFTER PERIOD (PHOTOS TAKEN 12/16/2003)

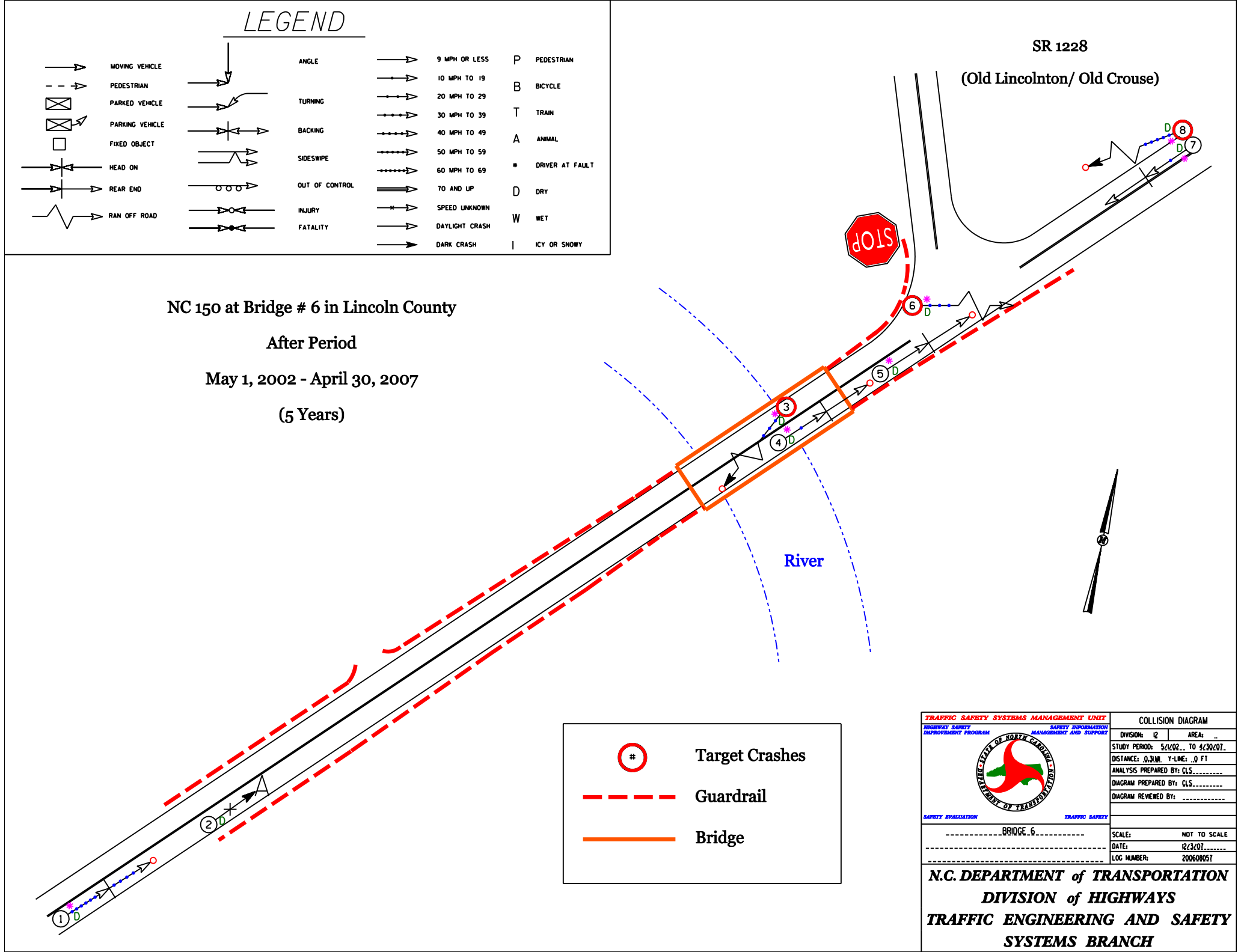
Looking East

Looking West

Typ. G.R. Terminal at NE & SE Corners (SE Corner Shown)

Typ. G.R. Conn.& Post Spacing at all 4 Corners (NE Corner Shown)


LEGEND
MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD
ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY
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
DAYLIGHT CRASH
DARK CRASH
P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
SR 1228
(Old Lincolnton/ Old Crouse)
STOP
NC 150 at Bridge # 6 in Lincoln County
Before Period
January 1, 1997 - December 31, 2001
(5 Years)
River
Target Crashes
Guardrail
Bridge
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY
COLLISION DIAGRAM
DIVISION: 12
AREA:
STUDY PERIOD: 1/1/97 TO 12/31/01
DISTANCE: 0.3 MI. Y-LINE: 0 FT
ANALYSIS PREPARED BY: CLS
DIAGRAM PREPARED BY: CLS
DIAGRAM REVIEWED BY:
BRIDGE 6
SCALE: NOT TO SCALE
DATE: 11/21/07
LOG NUMBER: 20060805
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH


LEGEND
MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
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ANGLE
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SPEED UNKNOWN
DAYLIGHT CRASH
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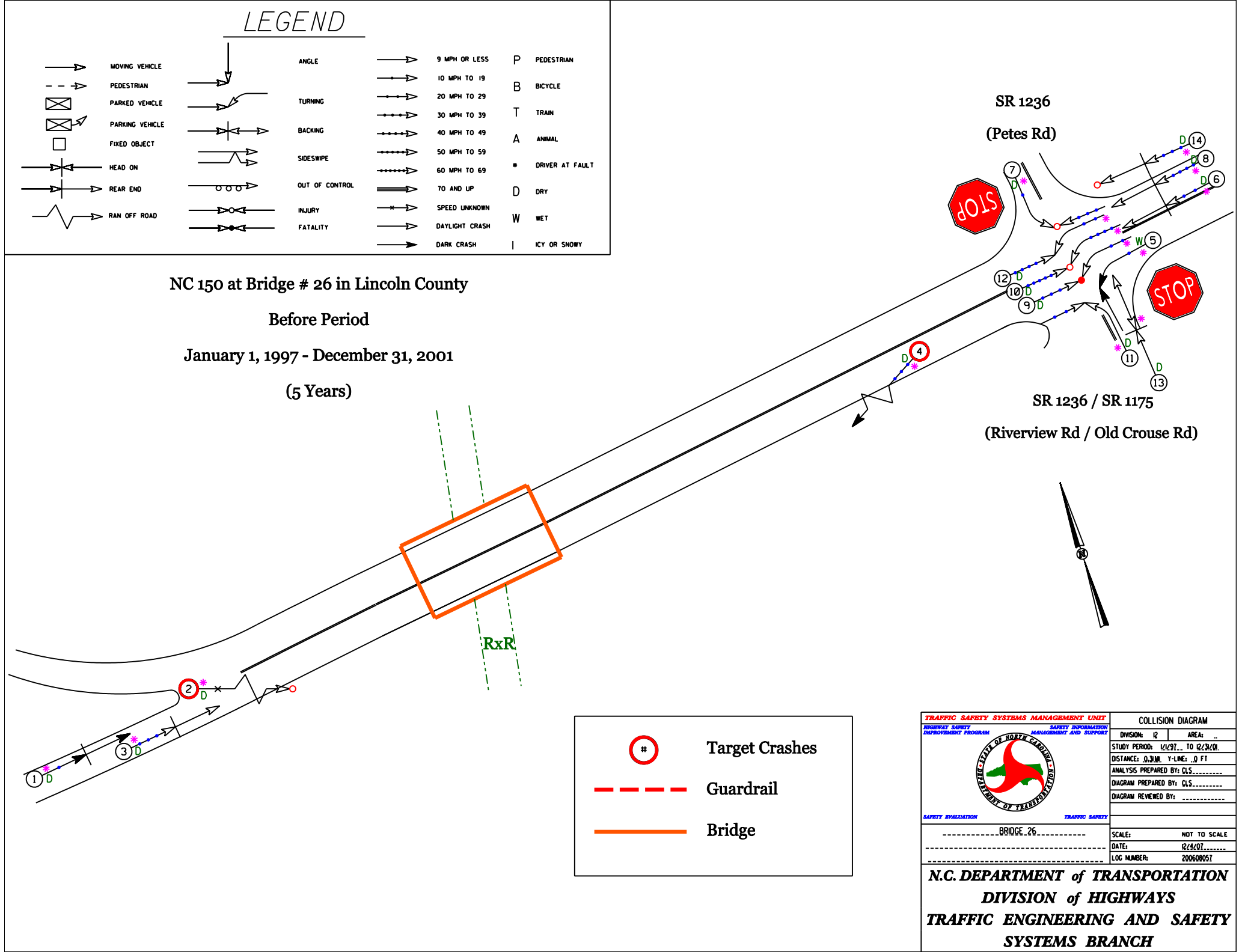
P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
SR 1228
(Old Lincolnton/ Old Crouse)
STOP
River
NC 150 at Bridge # 6 in Lincoln County
After Period
May 1, 2002 - April 30, 2007
(5 Years)
Target Crashes
Guardrail
Bridge
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY
COLLISION DIAGRAM
DIVISION: 12
AREA:
STUDY PERIOD: 5/1/02 TO 4/30/07
DISTANCE: 0.3 MI. Y-LINE: 0 FT
ANALYSIS PREPARED BY: CLS
DIAGRAM PREPARED BY: CLS
DIAGRAM REVIEWED BY:
BRIDGE 6
SCALE: NOT TO SCALE
DATE: 12/3/07
LOG NUMBER: 20060805
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH


LEGEND
MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD
ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY
9 MPH OR LESS
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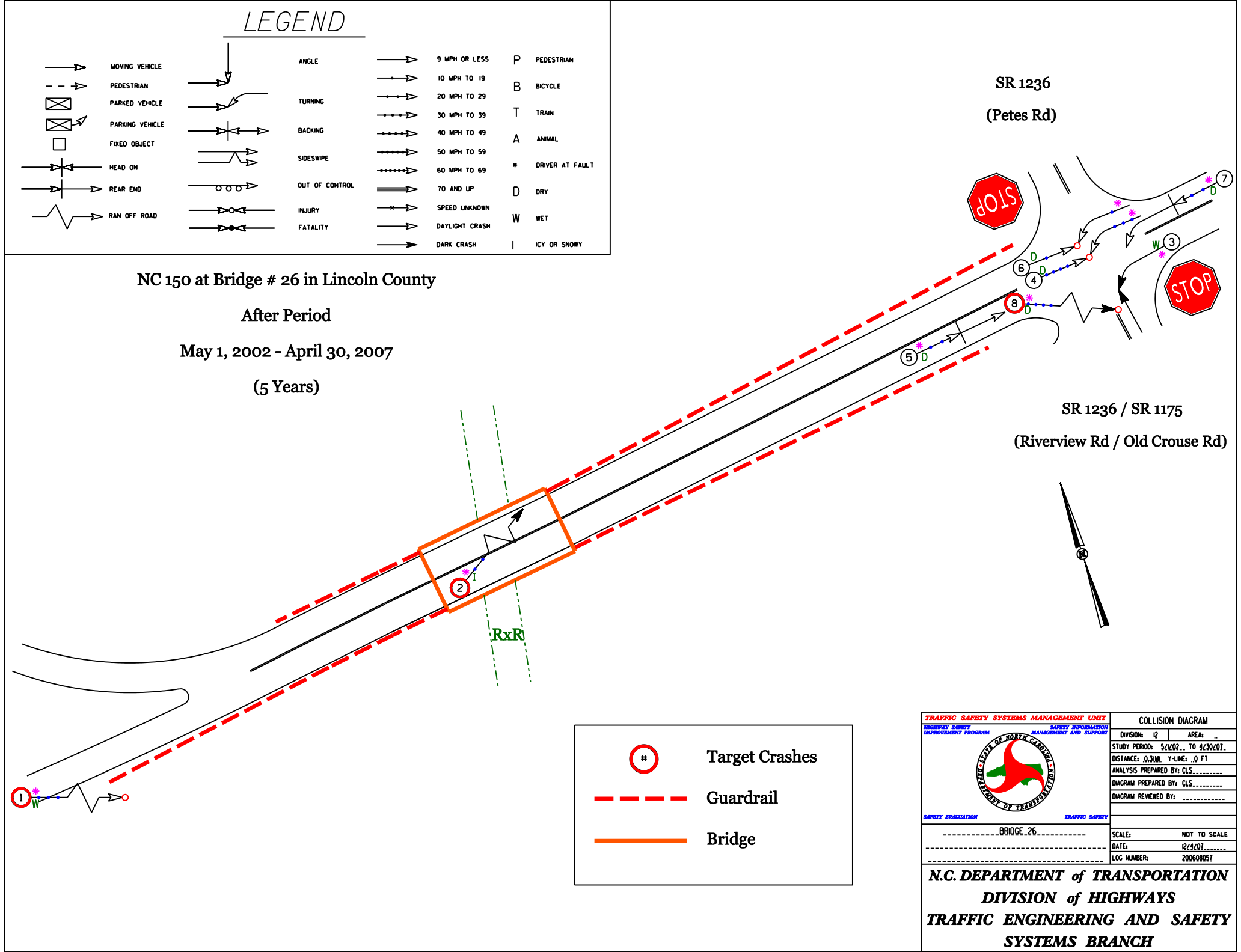
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH
P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
NC 150 at Bridge # 26 in Lincoln County
Before Period
January 1, 1997 - December 31, 2001
(5 Years)
SR 1236
(Petes Rd)
SR 1236 / SR 1175
(Riverview Rd / Old Crouse Rd)
STOP
STOP
RxR
N
Target Crashes
Guardrail
Bridge
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY
COLLISION DIAGRAM
DIVISION: 12
AREA:
STUDY PERIOD: 1/1/97 TO 12/31/01
DISTANCE: 0.3MI. Y-LINE: 0 FT
ANALYSIS PREPARED BY: CLS
DIAGRAM PREPARED BY: CLS
DIAGRAM REVIEWED BY:
BRIDGE 26
SCALE: NOT TO SCALE
DATE: 12/4/07
LOG NUMBER: 20060805?
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH


LEGEND
MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD
ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY
9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
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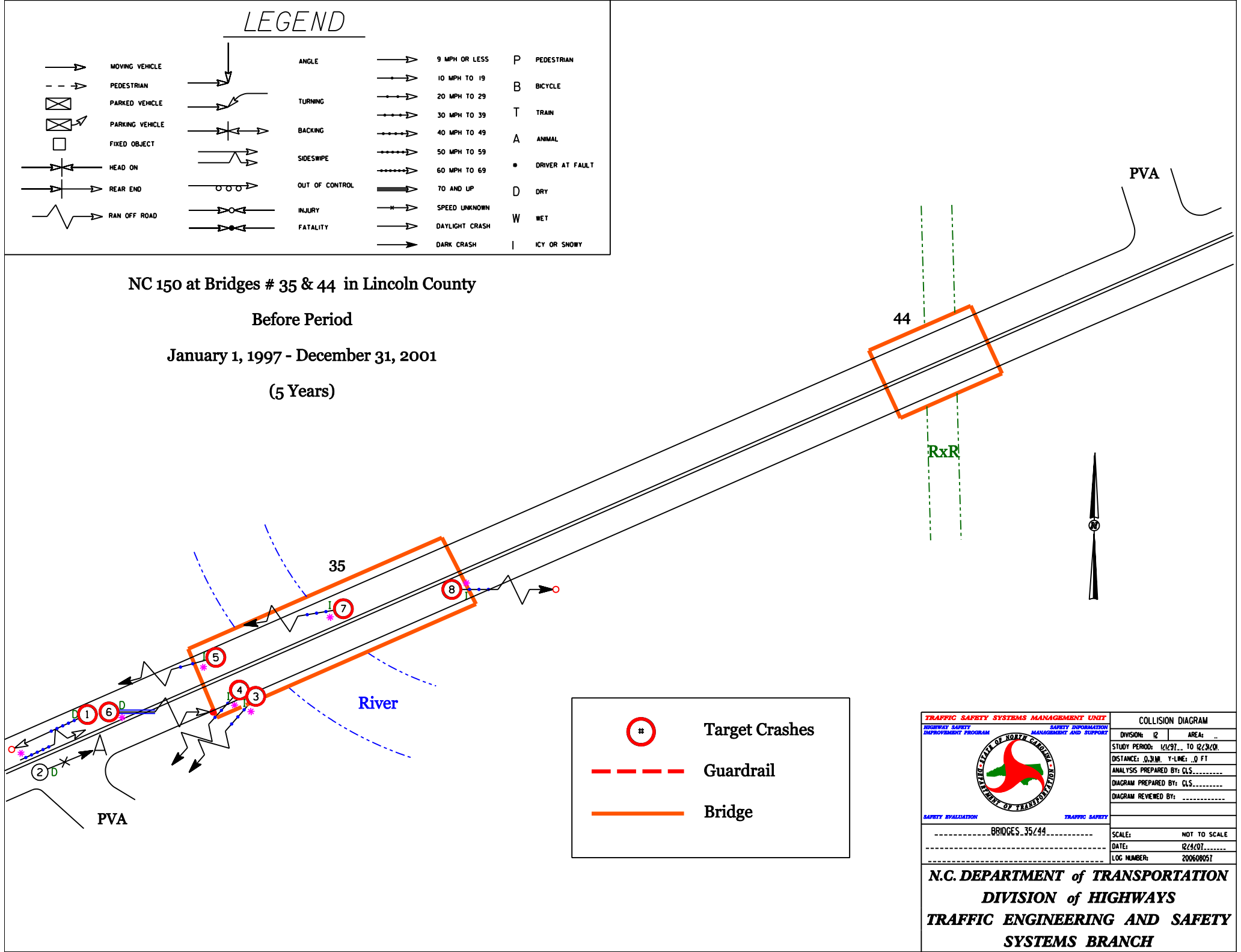
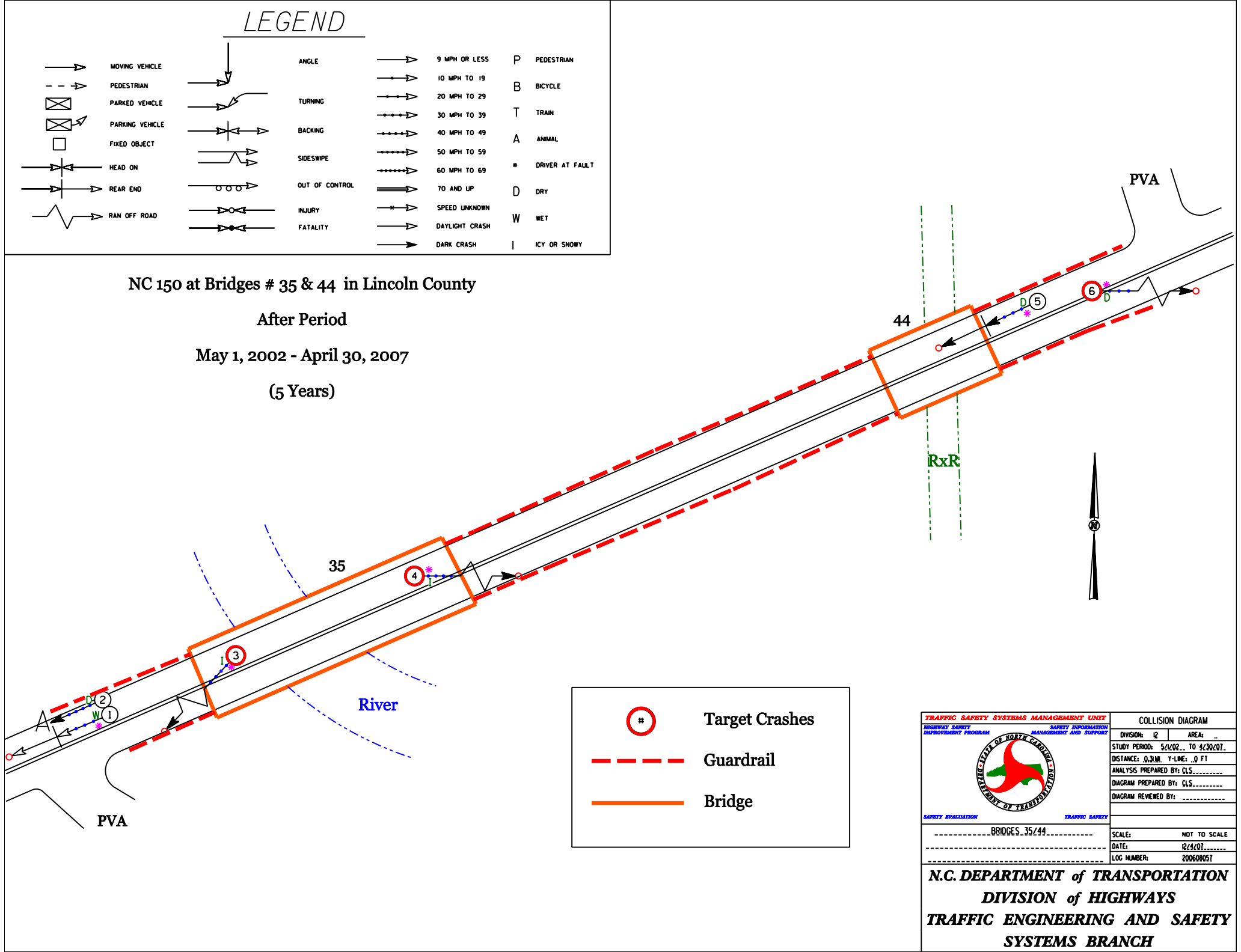
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH
P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
NC 150 at Bridge # 26 in Lincoln County
After Period
May 1, 2002 - April 30, 2007
(5 Years)
SR 1236
(Petes Rd)
SR 1236 / SR 1175
(Riverview Rd / Old Crouse Rd)
STOP
STOP
RxR
N
Target Crashes
Guardrail
Bridge
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY
COLLISION DIAGRAM
DIVISION: 12
AREA:
STUDY PERIOD: 5/1/02 TO 4/30/07
DISTANCE: 0.3 MI. Y-LINE: 0 FT
ANALYSIS PREPARED BY: CLS
DIAGRAM PREPARED BY: CLS
DIAGRAM REVIEWED BY:
BRIDGE 26
SCALE: NOT TO SCALE
DATE: 12/4/07
LOG NUMBER: 20060805
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH


LEGEND
MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD
ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY
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
DAYLIGHT CRASH
DARK CRASH
P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
NC 150 at Bridges # 35 & 44 in Lincoln County
Before Period
January 1, 1997 - December 31, 2001
(5 Years)
PVA
44
RxR
35
River
PVA
Target Crashes
Guardrail
Bridge
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY
COLLISION DIAGRAM
DIVISION: 12
AREA:
STUDY PERIOD: 1/1/97 TO 12/31/01
DISTANCE: 0.3 MI. Y-LINE: 0 FT
ANALYSIS PREPARED BY: CLS
DIAGRAM PREPARED BY: CLS
DIAGRAM REVIEWED BY:
BRIDGES 35/44
SCALE: NOT TO SCALE
DATE: 12/4/07
LOG NUMBER: 20060805
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH


LEGEND
MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD
ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY
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
DAYLIGHT CRASH
DARK CRASH
P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY
NC 150 at Bridges # 35 & 44 in Lincoln County
After Period
May 1, 2002 - April 30, 2007
(5 Years)
PVA
44
RxR
35
River
PVA
Target Crashes
Guardrail
Bridge
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY
COLLISION DIAGRAM
DIVISION: 12
AREA:
STUDY PERIOD: 5/1/02 TO 4/30/07
DISTANCE: 0.3 MI. Y-LINE: 0 FT
ANALYSIS PREPARED BY: CLS
DIAGRAM PREPARED BY: CLS
DIAGRAM REVIEWED BY:
BRIDGES 35/44
SCALE: NOT TO SCALE
DATE: 12/4/07
LOG NUMBER: 20060805
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH