

**Monitoring of Sections of I-40 / NC-903  
Pavement Abrasion & Asphalt Rejuvenator  
I-40 Sections in Pender & New Hanover Counties / NC-903 in Duplin County**

Per our stated commitment, the Safety Evaluation Group has completed a preliminary after period crash analysis on the following roadway segments listed below:

Seg-1: I-40 Pender County – Eastbound Only – Mile Marker 406.00 – 413.50  
(MP 18.33-25.83) – Total Distance = 7.50 Miles

Seg-2: I-40 Pender County – Westbound Only – Mile Marker 411.00 – 411.40  
(MP 23.33 – 23.73) – Total Distance = 0.4 Mile

Seg-3: I-40 New Hanover County – Eastbound Only – Mile Marker 417.70 – 418.50  
(MP 4.324 – 5.124) – Total Distance = 0.8 mile

Seg-4: I-40 New Hanover County – Westbound Only – Mile Marker 417.70 – 418.50  
(MP 4.324 – 5.124) – Total Distance = 0.8 mile

Seg-5a: NC-903 Duplin County – Southbound Only – US-117 to SR 1911 (Brooks Quinn Rd)  
(MP 8.890 – 10.080) – Total Distance = 1.19 miles (*Abrasion Only*)

Seg-5b: NC-903 Duplin County – Southbound Only – SR 1911 to SR 1909 (Tracey Brown)  
(MP 10.080 – 10.880) – Total Distance = 0.80 mile (*Rejuvenator & Abrasion*)

Seg-6: NC-903 Duplin County – Northbound Only – US-117 to SR 1909 (Tracey Brown)  
(MP 8.890 – 10.880) – Total Distance = 1.99 miles (*Abrasion Only*)

A summary table of the crash analysis is attached for each segment. The southbound Segment-5 of NC-903 was split into parts A and B after the Safety Evaluation Group learned that the Rejuvenator process was halted after 0.8 mile of application due to complications with machinery and the pavement. A quick field visit verified the exact limits of the rejuvenator process on NC-903. All segments of I-40 were completed with both the Rejuvenator and Pavement Abrasion applications.

The before period consisted of reported crashes from May 1, 2009 through April 30, 2012 (3 Years) and the after period consisted of reported crashes from July 1, 2012 through March 31, 2013 (0.75 Year).

<b>Seg-1 I-40 Pender County Eastbound: MP 18.33 - 25.83</b>	<b>Before 3.0 Yrs</b>	<b>After 0.75 Yr</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	81	10	N/A
Total Severity Index	3.12	2.48	- 20.5 %
<b>Total Crashes Per Year</b>	<b>27.0 CPY</b>	<b>13.3 CPY</b>	<b>- 50.7 %</b>
Total WET Crashes	26	1	N/A
Total WET Severity Index	2.71	1.00	- 63.1 %
<b>Total WET Crashes Per Year</b>	<b>8.7 CPY</b>	<b>1.3 CPY</b>	<b>- 85.1 %</b>
Lane Departure Crashes	46	7	N/A
Lane Departure Crash Severity Index	2.45	3.11	26.9 %
<b>Lane Departure Crashes Per Year</b>	<b>15.3 CPY</b>	<b>9.3 CPY</b>	<b>- 39.2 %</b>
LD-Wet Crashes	22	1	N/A
LD-Wet Crash Severity Index	2.35	1.00	- 57.4 %
<b>LD-Wet Crashes Per Year</b>	<b>7.3 CPY</b>	<b>1.3 CPY</b>	<b>- 82.2 %</b>

The naive before and after analysis at the treatment location of Segment-1 resulted in a 51 percent reduction in Total Crashes per year, a 39 percent reduction in Lane Departure Crashes per year, and an 82 percent reduction in Lane Departure Wet crashes per year.

<b>Seg-2 I-40 Pender County Westbound: MP 23.33 - 23.73</b>	<b>Before 3.0 Yrs</b>	<b>After 0.75 Yr</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	24	1	N/A
Total Severity Index	1.62	1.00	- 38.3 %
<b>Total Crashes Per Year</b>	<b>8.0 CPY</b>	<b>1.3 CPY</b>	<b>- 83.8 %</b>
Total WET Crashes	14	0	N/A
Total WET Severity Index	1.53	0.00	- 100.0 %
<b>Total WET Crashes Per Year</b>	<b>4.7 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>
Lane Departure Crashes	18	1	N/A
Lane Departure Crash Severity Index	1.82	1.00	- 45.1 %
<b>Lane Departure Crashes Per Year</b>	<b>6.0 CPY</b>	<b>1.3 CPY</b>	<b>- 78.3 %</b>
LD-Wet Crashes	14	0	N/A
LD-Wet Crash Severity Index	1.53	0.00	- 100.0 %
<b>LD-Wet Crashes Per Year</b>	<b>4.7 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>

The naive before and after analysis at the treatment location of Segment-2 resulted in an 84 percent reduction in Total Crashes per year, a 78 percent reduction in Lane Departure Crashes per year, and a 100 percent reduction in Lane Departure Wet crashes per year.

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<b><u>Seg-3 I-40 New Hanover County Eastbound: MP 4.324 – 5.124</u></b>	<b>Before 3.0 Yrs</b>	<b>After 0.75 Yr</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	9	2	N/A
Total Severity Index	1.00	1.00	0.0 %
<b>Total Crashes Per Year</b>	<b>3.0 CPY</b>	<b>2.7 CPY</b>	<b>- 10.0 %</b>
Total WET Crashes	6	0	N/A
Total WET Severity Index	1.00	0.00	- 100.0 %
<b>Total WET Crashes Per Year</b>	<b>2.0 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>
Lane Departure Crashes	9	1	N/A
Lane Departure Crash Severity Index	1.00	1.00	0.0 %
<b>Lane Departure Crashes Per Year</b>	<b>3.0 CPY</b>	<b>1.3 CPY</b>	<b>- 56.7 %</b>
LD-Wet Crashes	6	0	N/A
LD-Wet Crash Severity Index	1.00	0.00	- 100.0 %
<b>LD-Wet Crashes Per Year</b>	<b>2.0 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>

The naive before and after analysis at the treatment location of Segment-3 resulted in a 10 percent reduction in Total Crashes per year, a 57 percent reduction in Lane Departure Crashes per year, and a 100 percent reduction in Lane Departure Wet crashes per year.

<b><u>Seg-4 I-40 New Hanover County Westbound: MP 4.324 – 5.124</u></b>	<b>Before 3.0 Yrs</b>	<b>After 0.75 Yr</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	10	1	N/A
Total Severity Index	2.48	1.00	- 59.7 %
<b>Total Crashes Per Year</b>	<b>3.3 CPY</b>	<b>1.3 CPY</b>	<b>- 60.6 %</b>
Total WET Crashes	4	0	N/A
Total WET Severity Index	1.00	0.00	- 100.0 %
<b>Total WET Crashes Per Year</b>	<b>1.3 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>
Lane Departure Crashes	6	1	N/A
Lane Departure Crash Severity Index	2.23	1.00	- 55.2 %
<b>Lane Departure Crashes Per Year</b>	<b>2.0 CPY</b>	<b>1.3 CPY</b>	<b>- 35.0 %</b>
LD-Wet Crashes	3	0	N/A
LD-Wet Crash Severity Index	1.00	0.00	- 100.0 %
<b>LD-Wet Crashes Per Year</b>	<b>1.0 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>

The naive before and after analysis at the treatment location of Segment-4 resulted in a 61 percent reduction in Total Crashes per year, a 35 percent reduction in Lane Departure Crashes per year, and a 100 percent reduction in Lane Departure Wet crashes per year.

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<b>Seg-5a NC-903 Duplin County Southbound: MP 8.890 – 10.080</b>	<b>Before 3.0 Yrs</b>	<b>After 0.75 Yr</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	5	1	N/A
Total Severity Index	1.00	1.00	0.0 %
<b>Total Crashes Per Year</b>	<b>1.7 CPY</b>	<b>1.3 CPY</b>	<b>- 23.5 %</b>
Total WET Crashes	1	0	N/A
Total WET Severity Index	1.00	0.00	- 100.0 %
<b>Total WET Crashes Per Year</b>	<b>0.3 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>
Lane Departure Crashes	1	0	N/A
Lane Departure Crash Severity Index	1.00	0.00	- 100.0 %
<b>Lane Departure Crashes Per Year</b>	<b>0.3 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>
LD-Wet Crashes	1	0	N/A
LD-Wet Crash Severity Index	1.00	0.00	- 100.0 %
<b>LD-Wet Crashes Per Year</b>	<b>0.3 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>

The naive before and after analysis at the treatment location of NC-903 Segment-5a resulted in a 23.5 percent reduction in Total Crashes per year, but a 100 percent reduction in all other measured categories including lane departure and wet roadway crashes.

<b>Seg-5b NC-903 Duplin County Southbound: MP 10.080 – 10.880</b>	<b>Before 3.0 Yrs</b>	<b>After 0.75 Yr</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	8	1	N/A
Total Severity Index	4.70	8.40	100.0 %
<b>Total Crashes Per Year</b>	<b>2.7 CPY</b>	<b>1.3 CPY</b>	<b>- 51.9 %</b>
Total WET Crashes	0	1	N/A
Total WET Severity Index	0.00	8.40	100.0 %
<b>Total WET Crashes Per Year</b>	<b>0.0 CPY</b>	<b>1.3 CPY</b>	<b>100.0 %</b>
Lane Departure Crashes	1	0	N/A
Lane Departure Crash Severity Index	8.40	0.00	- 100.0 %
<b>Lane Departure Crashes Per Year</b>	<b>0.3 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>
LD-Wet Crashes	0	0	N/A
LD-Wet Crash Severity Index	0.00	0.00	- 100.0 %
<b>LD-Wet Crashes Per Year</b>	<b>0.0 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>

The naive before and after analysis at the treatment location of NC -903 Segment-5b resulted in a 52 percent reduction in Total Crashes per year, a 100 percent reduction in Lane Departure Crashes per year, and zero (0) lane departure wet crashes in the before or after period.

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<b><u>Seg-6 NC-903 Duplin County Northbound: MP 8.890 – 10.880</u></b>	<b>Before 3.0 Yrs</b>	<b>After 0.75 Yr</b>	<b>Percent Reduction (-) Percent Increase (+)</b>
Total Crashes	7	1	N/A
Total Severity Index	2.06	8.40	100+ %
<b>Total Crashes Per Year</b>	<b>2.3 CPY</b>	<b>1.3 CPY</b>	<b>- 43.5 %</b>
Total WET Crashes	1	0	N/A
Total WET Severity Index	8.40	0.00	- 100.0 %
<b>Total WET Crashes Per Year</b>	<b>0.3 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>
Lane Departure Crashes	2	0	N/A
Lane Departure Crash Severity Index	4.70	0.00	- 100.0 %
<b>Lane Departure Crashes Per Year</b>	<b>0.7 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>
LD-Wet Crashes	1	0	N/A
LD-Wet Crash Severity Index	8.40	0.00	- 100.0 %
<b>LD-Wet Crashes Per Year</b>	<b>0.3 CPY</b>	<b>0.0 CPY</b>	<b>- 100.0 %</b>

The naive before and after analysis at the treatment location of NC-903 Segment-6 resulted in a 43.5 percent reduction in Total Crashes per year, a 100 percent reduction in Lane Departure Crashes per year, and a 100 percent reduction in Lane Departure Wet crashes per year.

In addition to examining crashes at the subject locations, Weather Data was also evaluated to compare the before period to the rainfall totals in the 6-month after period. The Weather Data was collected from the New Hanover County Airport located approximately 6 miles from subject roadway segments. The following table describes the result:

<b><u>Weather Data (Greater than 0.01in)</u></b>	<b>Before 3.0 Yrs</b>	<b>After 0.75 Yr</b>
Total Calendar Days	1,096	274
Total Precipitation (inches)	163.88 in	42.09
Total Wet Days	439	99
<b>Average Rain Total Per Event (inches)</b>	<b>0.37 in</b>	<b>0.43 in</b>
<b>Percentage of Rain Days</b>	<b>40.1 %</b>	<b>36.1 %</b>

From the Weather Data above, the average rainfall total (inches) per rainfall event slightly increased from 0.37 inches in the before period to 0.43 inches in the after period. There was also 4 percent less days of rain events in the after period.

We will continue to monitor this location and provide a 1.0-year supplemental report once more after period crash data is available. If you have any questions, I can be reached at 919-773-2967.

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