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MEMORANDUM

TO: Dan Williams, P.E. Director of Engineering
Scott Pomento, P.E. Deputy Director of Engineering
FROM: Don MacLean, P.E. Acting Traffic Manager
DATE: January 23, 2013
RE: Intercounty Connector (MD 200) Analysis of 1-year Crash Data

As the final step in our analysis of the existing speed limits along the Intercounty Connector (MD 200 or ICC), we have completed an evaluation of the crashes during the first full year of operation. This analysis is based on information available from MDTA Police Reports and covers the period from December 5, 2011 through December 1, 2012 which represents the first full year of revenue operations for ICC Segments A, B and C.

It is important to note that crash rates can be highly variable over time due to the unpredictable nature of crashes combined with the influences of driver, vehicle, roadway and environment. In order to reduce the impact of these factors, safety studies will typically evaluate a minimum of three (3) years of crash data. When looking at short time frames, it is impossible to know if the crash rates are above, below or precisely at the long term averages. Therefore this review focuses on identifying trends based on groupings of crashes, proximity of the crash to points of horizontal curvature, and contributing factors identified in the crash data.

During the study period, there were a total of 30 crashes identified, of which one occurred on a side road (MD 97) and one occurred before tolls were being collected on the facility. Traffic volumes were much higher before toll collection began and therefore the one crash occurring during this period was not representative of normal traffic conditions. The remaining 28 crashes break down as follows:

Table with 3 columns: Location, Number, Percent. Rows: Mainline (21, 75%), Ramp (7, 25%), Total (28, 100%)

Of the seven (7) ramp crashes during the first year of operations, six (6) were on ramps to/or from I-95 and the remaining ramp crash was at US 29. Four (4) of the Six (6) crashes on ramps inside the I-95 interchange were on the ramp from MD 200 EB to I-95 SB.

Attached to this memorandum are the Crash Summary and the Crash Worksheet provided by Maryland SHA. Crash rates for the first year of MD 200 operations are:

	MD 200 <sup>(1)</sup>	Statewide Rate <sup>(2)</sup>
Total Crashes	16.1	46.7
Fatal Crashes	0.0	0.3
Injury Crashes	7.8	17.2
Property Damage Only	8.4	29.2

(1) Crashes per Million Vehicle Miles Traveled

(2) Statewide Average Rate per Million Vehicle Mile Traveled for all state maintained roadways (SHA and MDTA)

Based on the first year crash data, the MD 200 Crash Rates for Total Crashes, Fatal Crashes and Injury Crashes are all below the statewide rates.

### **Crash Locations**

An analysis of the crash locations shows one significant grouping of crashes within the I-95 interchange. There have been Eight (8) crashes (or 28% of all crashes) on the mainline of MD 200 and on the ramps to and from I-95.

- Six (6) of these crashes were on the ramps to and from I-95
  - Four (4) ramp crashes involved loss of vehicular control
  - Two (2) involved animals.
- Two (2) crashes were on Mainline MD 200 within the I-95 Interchange. Both indicated the drivers were going too fast for conditions.

There is also a secondary cluster of three (3) crashes along MD 200 between Needwood Road and Muncaster Mill Road, however there is no trend among the three crashes at this location.

- One crash involved a wrong way driver
- One involved an animal
- One involved a medical condition.

The remaining groupings have only two (2) or fewer crashes. The following table provides a summary of crashes by location.

Location	Mile Markers	Number	In Curve	Percent
I-95 Interchange (Ramps)	18.2 - 18.6	6	Yes	21%
Needwood to Muncaster Mill	5.1 - 5.8	3	Yes	11%
I-95 Interchange (Mainline)	17.9 - 18.8	2	Yes	7%
MD 182 ( Layhill Rd) Ramps, West of Interchange	10.1 - 10.3	2		7%
East of New Hampshire Ave	13.6 - 13.7	2		7%
Between Notley Rd and MD 650 (New Hampshire Ave)	12.8 - 13.0	2		7%
Between Shady Grove Rd and Redland Rd	3.5 - 3.5	2	Yes <sup>(1)</sup>	7%
Isolated locations	various	9		32%
		28		100%

(1) Mile Marker 3.5 is just west of the Redland Rd reverse curves

**Probable Causes**

The top two probable causes identified are Failure to Drive in a Single Lane and crashes involving an Animal, which make up 21% each (6 crashes each) or a combined 42% of the total crashes. The third most common probable cause identified is “Too Fast for Conditions” which contributes 11% or 3 total crashes.

Probable Cause	Number	Percent	Speed Related?
Fail to drive in a single lane	6	21%	
Animal	6	21%	
Too Fast for Conditions	3	11%	Yes
Influence of Alcohol	2	7%	
Fell Asleep/Fainted	2	7%	
Followed too Closely	2	7%	Yes
Physical/Mental Difficulty	1	4%	
Fail to give full attention	1	4%	
Fail to Yield Right of way	1	4%	
Exceeding the Speed Limit	1	4%	Yes
Improper Turn	1	4%	
Improper Lane Change	1	4%	
Wet	1	4%	
	28	100%	

The probable causes which are directly related to vehicular speeds are identified with a Yes in the last column of the table above. These probable causes represent six (6) crashes or 21% of the total crashes. In addition, four (4) of the six (6) crashes citing Failure to Drive in a Single Lane as a Probable Cause were at locations near a horizontal curve in the road. Two (2) of these crashes were between Shady Grove Road and Redland Road and one of these cite alcohol as a contributing factor. The remaining two (2) crashes were within the I-95 Interchange.

### **Contributing Factors**

Contributing factors identify additional circumstances that may have contributed to each crash and should be considered as part of the crash analysis. While there is only one (1) Probable Cause identified for each crash, there are multiple contributing factors identified for each crash.

<b>Code</b>	<b>Contributing Factor</b>	<b>Number of Times Cited</b>
7	Failed to give full time and attention	20
9	Failed to drive in a single lane	10
21	Too Fast for Conditions	9
46	Animal	8
2	Under influence of alcohol	4
6	Fell asleep/fainted	3
5	Physical/mental difficulty	2
22	Following too closely	2
24	Improper lane change	2
61	Wet	2
11	Failure to yield right of way	1
13	Failure to obey traffic sign/signal	1
14	Failure to obey other traffic control device	1
17	Wrong way on one way road	1
18	Exceeded Speed Limit	1
23	Improper turn	1

Failure to give full time and attention and Failed to drive in a single lane were the two most commonly cited contributing factors. This suggests that driver error and inattention has played a role in many of the crashes.

### **Conclusion**

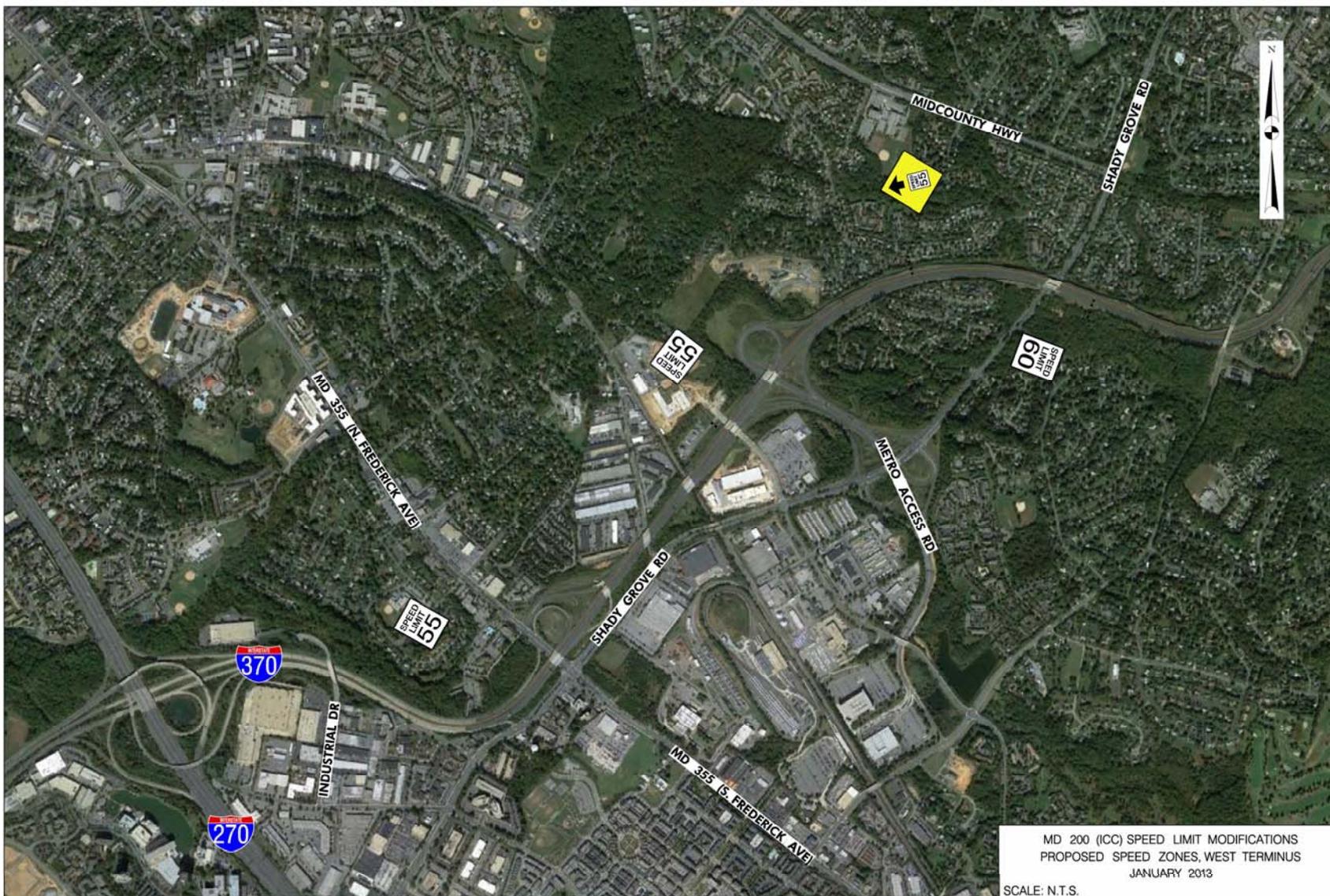
During the first full year of revenue operations, the MD 200 crash rates for Total Crashes, Fatal Crashes, Injury Crashes and Property Damage Only crashes were much lower than the statewide average rates. Based on the crash data analysis, mainline MD 200 does not demonstrate any identifiable crash trends where vehicle speeds are a probable cause. While driving too fast for conditions has been identified as a contributing factor in 30% of all crashes, there is no identifiable trend based on the data available for this analysis. In addition, six (6) out of seven (7) total ramp crashes took place on ramps inside the I-95 interchange. Based on these crash trends a 60 MPH speed limit can be supported beginning west of the I-95 interchange.

### **Recommendations**

West of the MD 200 terminus, I-370 is posted at 55 MPH and a speed limit reduction can be adequately signed as shown in the graphic below. In the eastbound direction a speed limit increase will require a logical transition between the proposed 60 MPH speed limit west of I-95 and the 40 MPH speed limit that will be installed at Virginia Manor Rd. Speed limit reductions are commonly done in 10 MPH increments with a minimum of ½-mile between speed reductions. At least two speed reductions should be used to reduce the speed from 60 MPH to 40 MPH. Therefore I recommend the following:

1. Reduce the EB speed limit from 60 MPH to 55 MPH beginning west of the ramps to and from I-95 and continuing east through the interchange. This will establish a transition zone heading towards the Contract D/E section which ends with a signalized intersection at US 1 and also encourage lower speeds through the I-95 interchange and ramps.
2. When MD 200 opens to Virginia Manor Rd, reduce the eastbound speed limit to 50 MPH beginning just east of the I-95 Overpass.
3. A 40 MPH speed limit will begin at Virginia Manor Rd once the ICC is fully opened to traffic with a terminus at US 1.





## **Crash Data**

Maryland State Highway Administration  
 Office of Traffic and Safety - Traffic Development and Support Division  
 SHA 52.1 ADC Summary Output rev. 03/2010-1

Name: William MacLeod  
 Date: 12/15/2012

Location: MD0200

Logmiles: From 000.00 To 19.33 Length: 19.33

County: Cross County

Period: December 5, 2011 To December 1, 2012

Note: milepoints reflect 0-17.21(Mont)+0-2.12(PG)

SEVERITY					DAY OF THE WEEK																
FATAL	INJURY	P-DAMAGE	TOTAL		SUN	MON	TUE	WED	THU	FRI	SAT	UNK									
Accidents		13	14	28																	
Veh Occ	1	16			4	5	3	4	4	3	5										
Pedestrian																					
MONTH OF THE YEAR													CONDITION	DRIVER	PED						
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	UNK	Normal:	6							
1			4	1	4	4	2	3	1	4	4		Alcohol:	1							
													Other:	23							
TIME	12	01	02	03	04	05	06	07	08	09	10	11	UNK	VEHICLES INVOLVED PER ACCIDENT							
AM:	2	1	1		2			3			1	1		1	2	3	4	5	6+	UNK	TOTAL
PM:	1		4	2	1	1	2	1	1	1	2	1		19	9						37
VEHICLE TYPE			SURFACE			MOVEMENTS															
1	Motorcycle/Moped	1	Tractor Trailer	4	Wet	NORTH			SOUTH			EAST			WEST						
24	Passenger Vehicle		Passenger Bus	24	Dry	LF	ST	RT	LF	ST	RT	LF	ST	RT	LF	ST	RT				
2	Sport Utility Veh		School Bus		Sno/Ice					3			17				16				
2	Pick-Up Truck		Emergency Veh		Mud	OTHER MOVEMENTS															
5	Trucks (2+3 axles)	3	Other Types		Other	1															
PROBABLE CAUSES					COLLISION TYPES					FATAL	INJURY	PROP	TOTAL								
Influence of Drugs					1	Improper Lane Change				Opposite Dir	Related: -----										
2 Influence of Alcohol Influence of Medication Influence of Combined Subst.						Improper Backing					UnRelated: -----										
1 Physical/Mental Difficulty						Improper Passing					1										
2 Fell Asleep/Fainted, etc.						Improper Signal					1										
1 Fail to give full Attention						Improper Parking					4										
Lic. Restr. Non-compliance						Passenger Interfere/Obstruct.					2										
6 Fail to Drive in Single Lane						Illegally in Roadway					2										
Improper Right Turn on Red						Clothing Not Visible					2										
1 Fail to Yield Right-of-way						Sleet, Hail, Freezing Rain					2										
Fail to Obey Stop Sign						Severe Crosswinds					2										
Fail to Obey Traffic Signal					6	Rain, Snow					2										
Fail to Obey Other Control						6 Animal					2										
Fail to Keep Right of Center						Vision Obstruction					2										
Fail to Stop for School Bus					1	Wet					2										
Wrong Way on One Way						Icy or Snow Covered					2										
1 Exceeded Speed Limit						Debris or Obstruction					2										
Operator Using Cell Phone						Ruts, Holes or Bumps					2										
Stopping in Lane Roadway						Road Under Construction					2										
3 Too Fast for Conditions						Traffic Control Device Inop.					2										
2 Followed too Closely						Shoulders Low, Soft or High					2										
1 Improper Turn						Other or Unknown					2										
WEATHER		ILLUMINATION			TOTALS																
25	Clear / Cloudy	14	Day		11-12	28	F	Bridge	01												
	Foggy	1	Dawn/Dusk				I	Building	02												
3	Raining	5	Dark - Lights On				X	Culvert/Ditch	03	1	1										
	Snow / Sleet	8	Dark - No Lights				E	Curb	04												
	Other		Other				D	Guardrail/Barrier	05	5	5	10									
								Embankment	06												
							O	Fence	07												
							B	Light Pole	08												
							J	Sign Pole	09												
							E	Other Pole	10												
							C	Tree/Shrubbery	11												
							T	Contr. Barrier	12												
							S	Crash Attenuator	13												
								Other Fixed Object													

Maryland State Highway Administration  
 Office of Traffic and Safety - Traffic Development and Support Division  
 SHA 52.1 ADC Study Worksheet Output rev. 12/2012-3

Name: William MacLeod  
 Date: 12/15/2012

Location: MD0200  
 County: Cross County Period: December 05, 2011 To December 1, 2012

Logmiles: From 000.00 To 19.33 Length: 19.33  
 Note: milepoints reflect 0-17.21(Mont)+ 0-2.12(PG)

Type Controls: 1U-100%

\* Significantly Higher than Statewide

YEAR >>	2011	2012	Total	Study	StateWd
<b>Fatal</b>	0	0	0	0.0	0.3
<b>No. Killed</b>	0	1	1		
<b>Injury</b>	1	12	13	7.8	17.2
<b>No. Injured</b>	1	15	16		
<b>Prop. Damage</b>	2	12	14	8.4	29.2
<b>Total Crashes</b>	3	24	27	16.1	46.7
<b>RATE</b>	26.7	16.0			
<b>WAADT</b>	22315	22315			
<b>VMT millions</b>	11.2	156.1	167.4		
<b>Opposite Dir.</b>	0	1	1	0.6	0.3
<b>Rear End</b>	0	5	5	3.0	18.1
<b>Sideswipe</b>	0	4	4	2.4	7.2
<b>Left Turn</b>	0	0	0	0.0	0.1
<b>Angle</b>	0	0	0	0.0	0.4
<b>Pedestrian</b>	0	0	0	0.0	0.1
<b>Parked Veh.</b>	0	0	0	0.0	0.7
<b>Fixed Object</b>	3	8	11	6.6	13.2
<b>Other</b>	0	6	6	3.6 *	1.5
<b>U-Turn</b>	0	0	0		
<b>Backing</b>	0	0	0		
<b>Animal</b>	0	2	2		
<b>Railroad</b>	0	0	0		
<b>Fire / Expl.</b>	0	0	0		
<b>Overturn</b>	0	1	1		
<b>Truck Related</b>	1	5	6	3.6	5.6
<b>Night Time</b>	2	11	13	48 %	32 %
<b>Wet Surface</b>	0	4	4	15 %	28 %
<b>Alcohol</b>	0	1	1	4 %	8 %
<b>Intersection</b>	0	0	0		
<b>Total Vehicles</b>	3	34	37		
<b>Total Trucks</b>	1	5	6		
<b>Truck %</b>	33.3	14.7	16.2		
Comments:					
_____					
_____					
_____					