



## I-95 Corridor Coalition

I-95 Corridor Coalition Vehicle  
Probe Project: Validation of  
INRIX Data  
Monthly Report  
New Jersey



*December 2011*

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# I-95 CORRIDOR COALITION VEHICLE PROBE PROJECT: VALIDATION OF INRIXDATA DECEMBER 2011

## *Monthly Report*

*Prepared for:*

I-95 Corridor Coalition

*Sponsored by:*

I-95 Corridor Coalition

*Prepared by:*

Ali Haghani, Masoud Hamedi, Kiavash Parvan  
University of Maryland, College Park

*Acknowledgements:*

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*December 2011*

# Evaluation Results for the State of New Jersey

## Executive Summary

Travel time samples were collected along nearly eight freeway miles and 15 arterial miles from Thursday, May 19, 2011 through Thursday, June 2, 2011 in New Jersey. Freeway segments studied were located along I-287 in Somerset County and the arterial data segments studied were located along US Route 1 and NJ Route 18 in Middlesex County. Data collected was compared with travel time and speed data reported by INRIX as part of the I-95 Vehicle Probe Project. The freeway validation data below represents nearly 820 hours of observations along six freeway segments, totaling nearly eight miles.

Note that this data collection exhibited some irregularities in the ground truth data processing that have been subsequently addressed for future validations. Based on before and after analysis of data collected in Delaware that exhibited similar issues, the impact on AASE and SEB in the lower two speed bins (as shown in ES Table 1) is an overestimation of approximately 1 mph.

ES Table 1, below summarizes the results of the comparison between the validation data and the INRIX data for freeway segments during this period. As shown, the average absolute speed error is within specification for all speed bins. Even when errors are measured against the mean (rather than the SEM band), INRIX data quality meets this contract quality standard for the average absolute speed error (AASE).

<b>ES Table 1 - New Jersey Evaluation Summary</b>						
<b>Speed Bin</b>	<b>Average Absolute Speed Error (&lt;10mph)</b>		<b>Speed Error Bias (&lt;5mph)</b>		<b>Number of 5 Minute Samples</b>	<b>Hours of Data Collection</b>
	Comparison with SEM Band	Comparison with Mean	Comparison with SEM Band	Comparison with Mean		
0-30 MPH	<b>6.00</b>	8.20	<b>5.30</b>	6.90	211	17.6
30-45 MPH	<b>7.30</b>	9.80	<b>6.80</b>	8.80	425	35.4
45-60 MPH	<b>3.00</b>	5.90	<b>2.50</b>	5.00	1776	148.0
> 60 MPH	<b>1.10</b>	3.50	<b>-0.50</b>	-1.50	7418	618.2
All Speeds	1.82	4.31	0.48	0.30	9830	819.2

Based upon data collected from May 19, 2011 through June 2, 2011 across 7.8 miles of roadway.

As part of the on-going validation process, vehicle probe data from each state is validated on a rotating basis. Since the inception of the validation process, data on roadways in New Jersey was validated on nine occasions: September/October 2008, April 2009, June 2009, September 2009, October 2009, May/June 2010, June 2010, April 2011 and May/June 2011. These nine validations represent more than 12,220 hours of observations along nearly 188 miles of freeway segments in New Jersey. ES Table 2 provides a summary of

the cumulative validation effort. As shown, the absolute average speed error is within specification for all speed bins.

<b>ES Table 2 - New Jersey - Cumulative to Date</b>						
<b>Speed Bin</b>	<b>Average Absolute Speed Error (&lt;10mph)</b>		<b>Speed Error Bias (&lt;5mph)</b>		<b>Number of 5 Minute Samples</b>	<b>Hours of Data Collection</b>
	<b>Comparison with SEM Band</b>	<b>Comparison with Mean</b>	<b>Comparison with SEM Band</b>	<b>Comparison with Mean</b>		
0-30 MPH	<b>7.14</b>	8.41	<b>5.17</b>	5.83	2822	235.2
30-45 MPH	<b>7.64</b>	10.38	<b>5.02</b>	6.72	2598	216.5
45-60 MPH	<b>2.33</b>	4.58	<b>0.71</b>	1.78	19358	1613.2
> 60 MPH	<b>2.62</b>	5.09	<b>-2.28</b>	-4.09	121939	10161.6
All Speeds	2.76	5.18	-1.62	-2.93	146717	12226.4

Travel time samples collected along two arterial routes, US Route 1 and NJ Route 18, were compared with travel time and speed data reported by INRIX as part of this project. The arterial data is included for informational purposes noting this arterial data is part of the 1000 miles that INRIX volunteers at no cost to the Coalition, and that the method to evaluate quality on arterial roadways has not been fully evaluated. The Coalition is currently in the process of developing appropriate quality metrics and validation methods.

### **Data Collection**

Bluetooth sensor deployments in New Jersey started on Thursday, May 19, 2011. The actual deployments in New Jersey were performed with the assistance of New Jersey Department of Transportation (NJDOT) personnel. Sensors remained in the same position until they were retrieved 14 days later on Thursday, June 2, 2011. This round of data collection in New Jersey was designed to cover arterial segments and segments of the highways along which both congested and free-flow conditions could be observed.

Figure 1 presents snapshots of the roadway segments over which Bluetooth sensors were deployed in New Jersey. In this figure, red segments represent freeway segments while the blue color indicates the arterial segments selected for analysis in this round of validation.

Table 1 presents a list of specific TMC segments that were selected for the validation sample in New Jersey. These segments cover a total length of about eight freeway miles, and about 15 miles of arterials. Since some TMC segments in this corridor are less than one mile long, when appropriate, consecutive TMC segments are combined to form path segments longer than one mile. This document includes the results of validation performed on six arterials and six freeway segments; eight of which are path segments combined from multiple standard TMC segments. The coordinates of the locations at which the Bluetooth sensors were deployed throughout the state of New Jersey are shown in Table 2. It should be noted that the configuration of consecutive TMC segments is such that the endpoint of

one TMC segment and the start point of the next TMC segment are overlapping, so one Bluetooth sensor in that location is covering both TMC segments.

Finally, Table 3 and 4 summarizes the segment identifications and definitions used in the validation process, and also provides the distances used in the estimation of Bluetooth speeds based on travel times. Details of the algorithm used to estimate equivalent path travel times based on INRIX data feeds for individual TMC segments are provided in a separate report. This algorithm finds an equivalent INRIX travel time (and therefore travel speed) corresponding to each sample Bluetooth travel time observation on the path segment of interest.

### ***Analysis of Results***

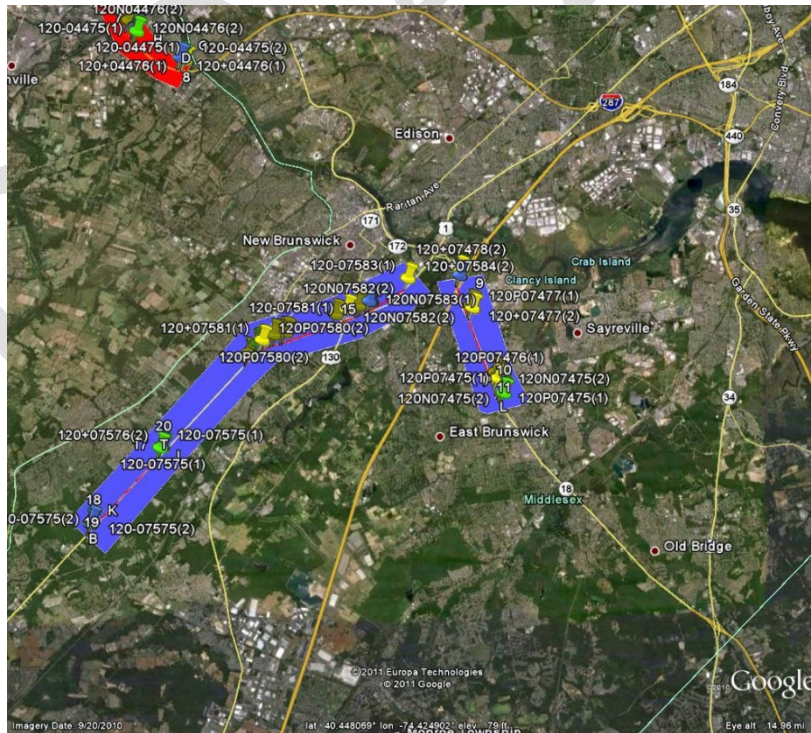
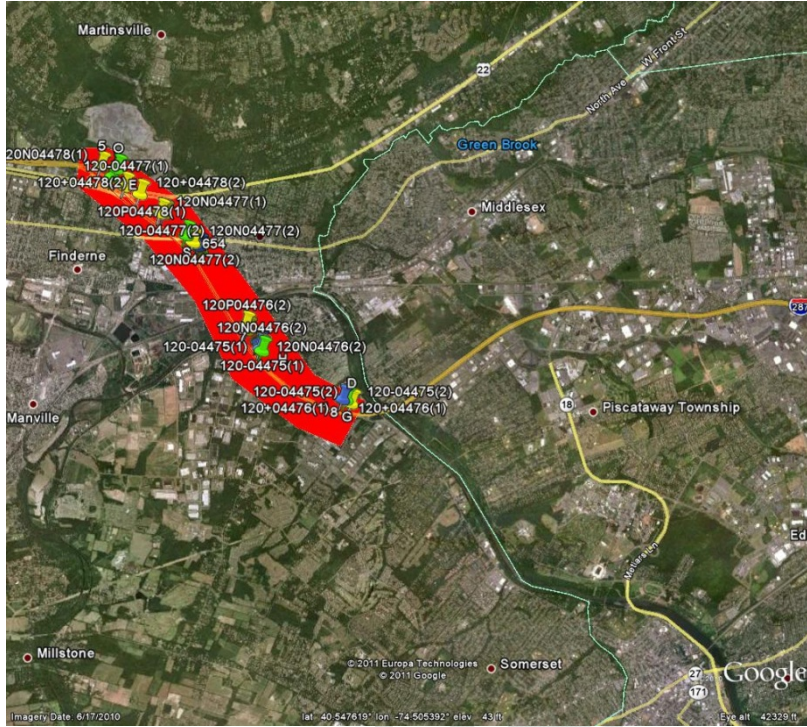
Table 5 summarizes the data quality measures obtained as a result of comparison between Bluetooth and all reported INRIX speeds. Note that this data collection exhibited some irregularities in the ground truth data processing that have been subsequently addressed for future validations. Based on before and after analysis of data collected in Delaware that exhibited similar issues, the impact on AASE and SEB in the lower two speed bins (as shown in Table 5) is an overestimation of approximately 1 mph.

Table 5 shows that the average absolute speed error is within specification for all speed bins. Even when errors are measured against the mean (rather than the SEM band), INRIX data quality meets contract quality standards for the average absolute speed error (AASE).

Table 6 shows the percentage of the time intervals that fall within 5 mph of the SEM band and the mean for each speed bin for all TMC segments in New Jersey. Tables 7 and 8 present detailed data for individual TMC segments in New Jersey in similar format as Tables 5 and 6, respectively. Note that for some segments and in some speed bins the comparison results may not be reliable due to small number of observations.

Figures 2 and 3 show the overall speed error biases for different speed bins, and the average absolute speed errors for all validation segments in New Jersey, respectively. These figures correspond to Table 5.

**Figure 1**  
**TMC segments selected for validation in New Jersey**



**Table 1**  
**Traffic Message Channel segments picked for validation in New Jersey**

<b>TYPE</b>	<b>TMC</b>	<b>HIGHWAY</b>	<b>STARTING AT</b>	<b>ENDING AT</b>	<b>COUNTY</b>	<b>DIRECTION</b>	<b>LENGTH (mile)</b>
Freeway	120+04476	I-287	EASTON AVE/EXIT 10	WESTON CANAL RD/EXIT 12	SOMERSET	NORTHBOUND	1.2
Freeway	120P04476	I-287	WESTON CANAL RD/EXIT 12	WESTON CANAL RD/EXIT 12	SOMERSET	NORTHBOUND	0.2
Freeway	120+04477	I-287	WESTON CANAL RD/EXIT 12	NJ-28/EXIT 13	SOMERSET	NORTHBOUND	1.0
Freeway	120P04477	I-287	NJ-28/EXIT 13	NJ-28/EXIT 13	SOMERSET	NORTHBOUND	0.5
Freeway	120+04478	I-287	NJ-28/EXIT 13	US-22/EXIT 14	SOMERSET	NORTHBOUND	0.4
Freeway	120P04478	I-287	US-22/EXIT 14	US-22/EXIT 14	SOMERSET	NORTHBOUND	0.4
Freeway	120N04478	I-287	US-22/EXIT 14	US-22/EXIT 14	SOMERSET	SOUTHBOUND	0.4
Freeway	120-04477	I-287	US-22/EXIT 14	NJ-28/EXIT 13	SOMERSET	SOUTHBOUND	0.5
Freeway	120N04477	I-287	NJ-28/EXIT 13	NJ-28/EXIT 13	SOMERSET	SOUTHBOUND	0.5
Freeway	120-04476	I-287	NJ-28/EXIT 13	WESTON CANAL RD/EXIT 12	SOMERSET	SOUTHBOUND	1.2
Freeway	120N04476	I-287	WESTON CANAL RD/EXIT 12	WESTON CANAL RD/EXIT 12	SOMERSET	SOUTHBOUND	0.3
Freeway	120-04475	I-287	WESTON CANAL RD/EXIT 12	EASTON AVE/EXIT 10	SOMERSET	SOUTHBOUND	1.2
<b>SUBTOTAL</b>							<b>7.8</b>

**Table 1 (Cont'd)**  
**Traffic Message Channel segments picked for validation in New Jersey**

<b>TYPE</b>	<b>TMC</b>	<b>HIGHWAY</b>	<b>STARTING AT</b>	<b>ENDING AT</b>	<b>COUNTY</b>	<b>DIRECTION</b>	<b>LENGTH (mile)</b>
Arterial	120-07477	NJ-18	I-95/NEW JERSEY TPKE	CR-527/OLD BRIDGE TPKE	MIDDLESEX	SOUTHBOUND	0.7
Arterial	120N07477	NJ-18	CR-527/OLD BRIDGE TPKE	CR-527/OLD BRIDGE TPKE	MIDDLESEX	SOUTHBOUND	0.1
Arterial	120-07476	NJ-18	CR-527/OLD BRIDGE TPKE	MILLTOWN RD	MIDDLESEX	SOUTHBOUND	1.4
Arterial	120N07476	NJ-18	MILLTOWN RD	MILLTOWN RD	MIDDLESEX	SOUTHBOUND	0.1
Arterial	120-07475	NJ-18	MILLTOWN RD	CR-535	MIDDLESEX	SOUTHBOUND	0.1
Arterial	120N07475	NJ-18	CR-535	CR-535	MIDDLESEX	SOUTHBOUND	0.2
Arterial	120P07475	NJ-18	CR-535	CR-535	MIDDLESEX	NORTHBOUND	0.1
Arterial	120+07476	NJ-18	CR-535	MILLTOWN RD	MIDDLESEX	NORTHBOUND	0.2
Arterial	120P07476	NJ-18	MILLTOWN RD	MILLTOWN RD	MIDDLESEX	NORTHBOUND	0.2
Arterial	120+07477	NJ-18	MILLTOWN RD	CR-527/OLD BRIDGE TPKE	MIDDLESEX	NORTHBOUND	1.4
Arterial	120P07477	NJ-18	CR-527/OLD BRIDGE TPKE	CR-527/OLD BRIDGE TPKE	MIDDLESEX	NORTHBOUND	0.1
Arterial	120+07478	NJ-18	CR-527/OLD BRIDGE TPKE	I-95/NEW JERSEY TPKE	MIDDLESEX	NORTHBOUND	0.8
Arterial	120+07580	US-1	ADAMS LN	JERSEY AVE	MIDDLESEX	NORTHBOUND	0.2
Arterial	120P07580	US-1	JERSEY AVE	JERSEY AVE	MIDDLESEX	NORTHBOUND	0.2
Arterial	120+07581	US-1	JERSEY AVE	LIVINGSTON AVE	MIDDLESEX	NORTHBOUND	0.3
Arterial	120P07581	US-1	LIVINGSTON AVE	LIVINGSTON AVE	MIDDLESEX	NORTHBOUND	0.2
Arterial	120+07582	US-1	LIVINGSTON AVE	US-130/GEORGES RD	MIDDLESEX	NORTHBOUND	1.1
Arterial	120P07582	US-1	US-130/GEORGES RD	US-130/GEORGES RD	MIDDLESEX	NORTHBOUND	0.6
Arterial	120+07583	US-1	US-130/GEORGES RD	MAIN ST (NORTH BRUNSWICK)	MIDDLESEX	NORTHBOUND	0.1
Arterial	120P07583	US-1	MAIN ST (NORTH BRUNSWICK)	MAIN ST (NORTH BRUNSWICK)	MIDDLESEX	NORTHBOUND	0.2



**Table 1 (Cont'd)**  
**Traffic Message Channel segments picked for validation in New Jersey**

<b>Arterial</b>	<b>120N07583</b>	US-1	MAIN ST (NORTH BRUNSWICK)	MAIN ST (NORTH BRUNSWICK)	MIDDLESEX	SOUTHBOUND	0.2
<b>Arterial</b>	<b>120-07582</b>	US-1	MAIN ST (NORTH BRUNSWICK)	US-130/GEORGES RD	MIDDLESEX	SOUTHBOUND	0.1
<b>Arterial</b>	<b>120N07582</b>	US-1	US-130/GEORGES RD	US-130/GEORGES RD	MIDDLESEX	SOUTHBOUND	0.3
<b>Arterial</b>	<b>120-07581</b>	US-1	US-130/GEORGES RD	LIVINGSTON AVE	MIDDLESEX	SOUTHBOUND	1.4
<b>Arterial</b>	<b>120N07581</b>	US-1	LIVINGSTON AVE	LIVINGSTON AVE	MIDDLESEX	SOUTHBOUND	0.2
<b>Arterial</b>	<b>120-07580</b>	US-1	LIVINGSTON AVE	JERSEY AVE	MIDDLESEX	SOUTHBOUND	0.3
<b>Arterial</b>	<b>120N07580</b>	US-1	JERSEY AVE	JERSEY AVE	MIDDLESEX	SOUTHBOUND	0.1
<b>Arterial</b>	<b>120-07575</b>	US-1	DEANS LN	NEW RD	MIDDLESEX	SOUTHBOUND	2.1
<b>Arterial</b>	<b>120+07576</b>	US-1	NEW RD	DEANS LN	MIDDLESEX	NORTHBOUND	2.2
<b>SUBTOTAL</b>							<b>15.0</b>
<b>TOTAL</b>							<b>22.8</b>

**Table 2**  
**TMC segment lengths and distances between sensor deployment locations in the state of New Jersey**

SEGMENT TYPE	TMC	STANDARD TMC					SENSOR DEPLOYMENT			
		Endpoint (1)		Endpoint (2)		Length (mile)	Endpoint (1)		Endpoint (2)	
		Lat	Long	Lat	Long		Lat	Long	Lat	Long
Freeway	120+04476	40.539724	-74.521589	40.549112	-74.539813	1.2	40.539790	-74.520740	40.549350	-74.539870
Freeway	120P04476	40.549112	-74.539813	40.551898	-74.542551	0.2				
Freeway	120+04477	40.551898	-74.542551	40.564684	-74.552634	1.0				
Freeway	120P04477	40.564684	-74.552634	40.570165	-74.559958	0.5	40.564220	-74.552060		
Freeway	120+04478	40.570165	-74.559958	40.573387	-74.565140	0.4				
Freeway	120P04478	40.573387	-74.565140	40.577585	-74.570482	0.4			40.577540	-74.570140
Freeway	120N04478	40.578045	-74.573708	40.574641	-74.568510	0.4	40.576290	-74.571230		
Freeway	120-04477	40.574641	-74.568510	40.570286	-74.560774	0.5				
Freeway	120N04477	40.570286	-74.560774	40.565552	-74.553774	0.5				
Freeway	120-04476	40.565552	-74.553774	40.551137	-74.542163	1.2	40.566710	-74.555310		
Freeway	120N04476	40.551137	-74.542163	40.548177	-74.539261	0.3				
Freeway	120-04475	40.548177	-74.539261	40.53916	-74.519618	1.2	40.547750	-74.538940	40.539050	-74.519780
<b>SUBTOTAL</b>						<b>7.8</b>				
Arterial	120-07477	40.473427	-74.409503	40.464314	-74.405118	0.7	40.473830	-74.409680		
Arterial	120N07477	40.464314	-74.405118	40.463456	-74.404559	0.1				
Arterial	120-07476	40.463456	-74.404559	40.443812	-74.395252	1.4				
Arterial	120N07476	40.443812	-74.395252	40.442297	-74.394700	0.1				
Arterial	120-07475	40.442297	-74.394700	40.440475	-74.394055	0.1				
Arterial	120N07475	40.440475	-74.394055	40.438233	-74.392520	0.2			40.437550	-74.391920
Arterial	120P07475	40.438492	-74.392562	40.439289	-74.393173	0.1	40.438570	-74.392650		
Arterial	120+07476	40.439289	-74.393173	40.441934	-74.394401	0.2				
Arterial	120P07476	40.441934	-74.394401	40.444051	-74.395124	0.2				
Arterial	120+07477	40.444051	-74.395124	40.463453	-74.404390	1.4				
Arterial	120P07477	40.463453	-74.404390	40.464338	-74.404953	0.1				
Arterial	120+07478	40.464338	-74.404953	40.474871	-74.409658	0.8			40.475260	-74.409290
Arterial	120+07580	40.449708	-74.493937	40.452138	-74.490948	0.2	40.449300	-74.494260		
Arterial	120P07580	40.452138	-74.490948	40.453676	-74.488546	0.2				
Arterial	120+07581	40.453676	-74.488546	40.455444	-74.482841	0.3				
Arterial	120P07581	40.455444	-74.482841	40.456115	-74.479194	0.2				
Arterial	120+07582	40.456115	-74.479194	40.461546	-74.459291	1.1				
Arterial	120P07582	40.461546	-74.459291	40.464261	-74.449355	0.6				

<b>Arterial</b>	<b>120+07583</b>	40.464261	-74.449355	40.46468	-74.447863	0.1			
<b>Arterial</b>	<b>120P07583</b>	40.46468	-74.447863	40.465475	-74.444987	0.2			40.465140 -74.445980
<b>Arterial</b>	<b>120N07583</b>	40.465387	-74.445781	40.464634	-74.448600	0.2	40.465640	-74.444860	
<b>Arterial</b>	<b>120-07582</b>	40.464634	-74.448600	40.464227	-74.450034	0.1			
<b>Arterial</b>	<b>120N07582</b>	40.464227	-74.450034	40.462969	-74.454698	0.3			
<b>Arterial</b>	<b>120-07581</b>	40.462969	-74.454698	40.456053	-74.480152	1.4			
<b>Arterial</b>	<b>120N07581</b>	40.456053	-74.480152	40.45537	-74.483970	0.2			
<b>Arterial</b>	<b>120-07580</b>	40.45537	-74.483970	40.453551	-74.489072	0.3			
<b>Arterial</b>	<b>120N07580</b>	40.453551	-74.489072	40.452128	-74.491188	0.1			40.452820 -74.490430
<b>Arterial</b>	<b>120-07575</b>	40.421156	-74.528907	40.398643	-74.556403	2.1	40.420880	-74.529290	40.398430 -74.556810
<b>Arterial</b>	<b>120+07576</b>	40.397776	-74.557316	40.421094	-74.528830	2.2	40.398140	-74.556770	40.421290 -74.528350
<b>SUBTOTAL</b>						<b>15.0</b>			
<b>TOTAL</b>						<b>22.8</b>			

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**Table 3**  
**Path segments identification for validation in New Jersey**

Type	Validation Segment	STARTING AT	ENDING AT	LENGTH (MILE)		
				Standard	Deployment	Error (%)
Freeway	120+04476	EASTON AVE/EXIT 10	WESTON CANAL RD/EXIT 12	1.2	1.23	4.69%
Freeway	NJ09-0001	WESTON CANAL RD/EXIT 12	NJ-28/EXIT 13	1.3	1.21	-4.71%
Freeway	NJ09-0002	NJ-28/EXIT 13	US-22/EXIT 14	1.3	1.33	2.31%
Freeway	NJ09-0003	US-22/EXIT 14	NJ-28/EXIT 13	1.4	1.07	-23.57%
Freeway	NJ09-0004	NJ-28/EXIT 13	WESTON CANAL RD/EXIT 12	1.4	1.56	9.63%
Freeway	120-04475	WESTON CANAL RD/EXIT 12	EASTON AVE/EXIT 10	1.2	1.19	-3.16%
Arterial	NJ09-0005	I-95/NEW JERSEY TPKE	CR-535	2.6	2.68	2.97%
Arterial	NJ09-0006	CR-535	I-95/NEW JERSEY TPKE	2.7	2.69	0.30%
Arterial	NJ09-0007	ADAMS LN	RYDERS LN	2.8	2.81	0.36%
Arterial	NJ09-0008	RYDERS LN	JERSEY AVE	2.6	2.56	-1.54%
Arterial	120-07575	DEANS LN	NEW RD	2.1	2.12	-0.13%
Arterial	120+07576	NEW RD	DEANS LN	2.2	2.19	-0.42%

**Table 4**  
**Path segments definition for validation in New Jersey**

Type	Validation Segment	STANDARD SEGMENTS INCLUDED							
		TMC(1)	TMC(2)	TMC(3)	TMC(4)	TMC(5)	TMC(6)	TMC(7)	TMC(8)
Freeway	120+04476	120+04476							
Freeway	NJ09-0001	120P04476	120+04477						
Freeway	NJ09-0002	120P04477	120+04478						
Freeway	NJ09-0003	120-04477	120N04477						
Freeway	NJ09-0004	120-04476	120N04476						
Freeway	120-04475	120-04475							
Arterial	NJ09-0005	120-07477	120N07477	120-07476	120N07476	120-07475	120N07475		
Arterial	NJ09-0006	120P07475	120+07476	120P07476	120+07477	120P07477	120+07478		
Arterial	NJ09-0007	120+07580	120P07580	120+07581	120P07581	120+07582	120P07582	120+07583	120P07583
Arterial	NJ09-0008	120N07583	120-07582	120N07582	120-07581	120N07581	120-07580	120N07580	
Arterial	120-07575	120-07575							
Arterial	120+07576	120+07576							

**Table 5**  
**Data quality measures for freeway segments greater than one mile in New Jersey**

SPEED BIN	Data Quality Measures for				No. of Obs.
	1.96 SE Band		Mean		
	Speed Error Bias	Average Absolute Speed Error	Speed Error Bias	Average Absolute Speed Error	
0-30	5.3	6.0	6.9	8.2	211
30-45	6.8	7.3	8.8	9.8	425
45-60	2.5	3.0	5.0	5.9	1776
60+	-0.5	1.1	-1.5	3.5	7418

**Table 6**  
**Percent observations meeting data quality criteria for freeway segments greater than one mile in New Jersey**

SPEED BIN	Data Quality Measures for				No. of Obs.
	1.96 SE Band		Mean		
	Percentage falling inside the band	Percentage falling within 5 mph of the band	Percentage equal to the mean	Percentage within 5 mph of the mean	
0-30	21%	67%	0%	60%	211
30-45	13%	41%	0%	32%	425
45-60	29%	76%	0%	48%	1776
60+	58%	95%	0%	75%	7418

**Table 7**  
**Data quality measures for individual freeway validation segments greater than one mile in the state of New Jersey**

TMC	Standard TMC length	Bluetooth distance	SPEED BIN	Data Quality Measures for				No. of Obs.
				1.96 SE Band		Mean		
				Speed Error Bias	Average Absolute Speed Error	Speed Error Bias	Average Absolute Speed Error	
120+04476	1.17	1.23	0-30	6.07	6.07	7.42	7.42	11*
			30-45	6.69	7.01	7.86	8.44	168
			45-60	2.96	3.25	4.85	5.51	258
			60+	-0.67	1.06	-2.17	3.53	1592
NJ09-0001	1.27	1.21	0-30	60.8	60.81	60.81	60.81	1*
			30-45	10.2	10.27	12.29	12.29	45
			45-60	2.45	2.56	4.29	4.63	266
			60+	-0.34	0.92	-1.14	3.13	1113
NJ09-0002	1.30	1.33	0-30	9.12	9.12	36.01	36.01	2*
			30-45	11.1	11.12	24.06	24.06	9*
			45-60	1.41	1.41	3.93	4.01	248
			60+	-0.49	0.78	-1.56	3.01	1045
NJ09-0003	1.37	1.07	0-30	2.40	3.28	3.23	5.02	154
			30-45	9.08	10.24	14.51	16.66	31
			45-60	3.43	3.75	6.79	7.26	655
			60+	0.67	1.07	1.79	3.41	945
NJ09-0004	1.42	1.56	0-30	13.6	13.69	16.59	16.63	22*
			30-45	4.13	4.91	5.13	6.59	94
			45-60	1.33	2.57	3.86	5.68	148
			60+	-0.49	1.05	-1.69	3.50	1217
120-04475	1.22	1.19	0-30	14.5	14.61	17.78	18.04	21*
			30-45	6.85	7.52	9.35	10.86	78
			45-60	0.87	2.94	2.80	6.00	201
			60+	-1.06	1.40	-2.85	4.03	1506

\*Results in the specified row may not be reliable due to small number of observations

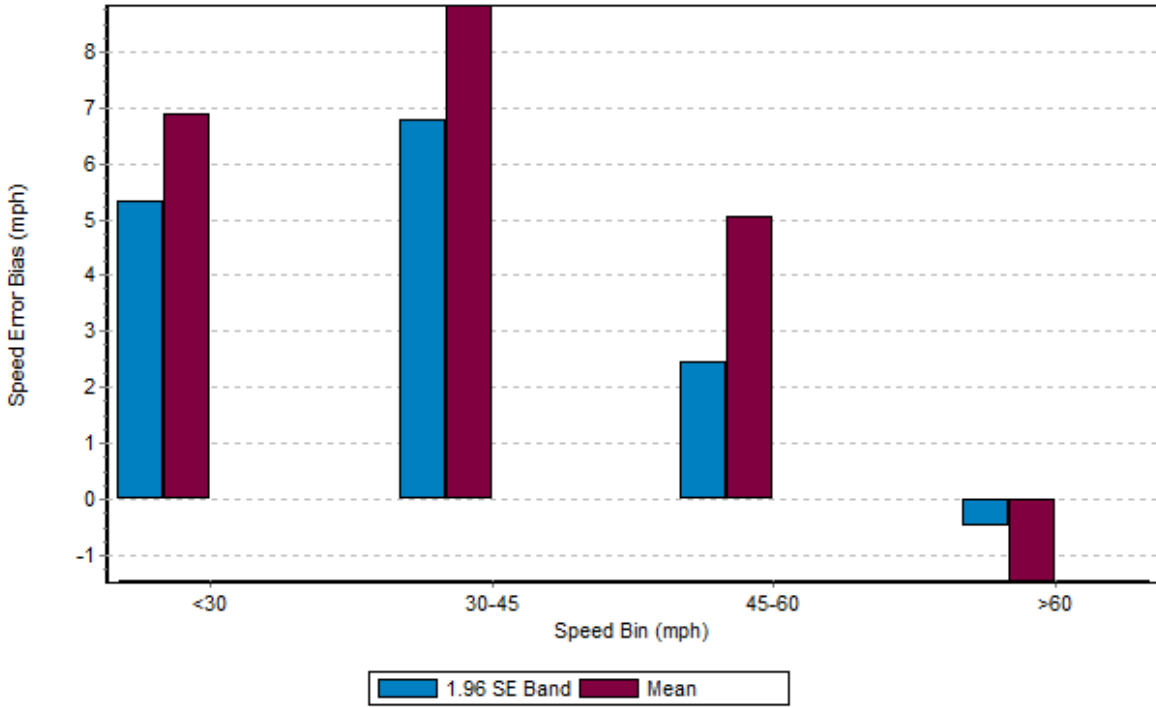
**Table 8**  
**Observations meeting data quality criteria for individual freeway validation segments**  
**greater than one mile in the state of New Jersey**

TMC	SPEED BIN	Data Quality Measures for								No. of Obs.
		1.96 SE Band				Mean				
		Speed Error Bias		Average Absolute Speed Error		Speed Error Bias		Average Absolute Speed Error		
		No. falling inside the band	% falling inside the band	No. falling within 5 mph of the band	% falling within 5 mph of the band	No. equal to the mean	% equal to the mean	No. within 5 mph of the mean	% within 5 mph of the mean	
120+04476	0-30	0	0%	5	45%	0	0%	4	36%	11*
	30-45	21	13%	67	40%	0	0%	54	32%	168
	45-60	71	28%	181	70%	0	0%	131	51%	258
	60+	886	56%	1526	96%	0	0%	1163	73%	1592
NJ09-0001	0-30	0	0%	0	0%	0	0%	0	0%	1*
	30-45	0	0%	7	16%	0	0%	4	9%	45
	45-60	77	29%	219	82%	0	0%	171	64%	266
	60+	672	60%	1066	96%	0	0%	895	80%	1113
NJ09-0002	0-30	0	0%	0	0%	0	0%	0	0%	2*
	30-45	0	0%	1	11%	0	0%	0	0%	9*
	45-60	116	47%	231	93%	0	0%	173	70%	248
	60+	681	65%	1008	96%	0	0%	846	81%	1045
NJ09-0003	0-30	40	26%	121	79%	0	0%	109	71%	154
	30-45	3	10%	9	29%	0	0%	5	16%	31
	45-60	124	19%	442	67%	0	0%	203	31%	655
	60+	566	60%	892	94%	0	0%	726	77%	945
NJ09-0004	0-30	3	14%	9	41%	0	0%	9	41%	22*
	30-45	17	18%	58	62%	0	0%	49	52%	94
	45-60	56	38%	119	80%	0	0%	79	53%	148
	60+	729	60%	1142	94%	1	0%	913	75%	1217
120-04475	0-30	1	5%	6	29%	0	0%	4	19%	21*
	30-45	16	21%	34	44%	0	0%	23	29%	78
	45-60	78	39%	155	77%	0	0%	100	50%	201
	60+	766	51%	1386	92%	1	0%	1011	67%	1506

\*Results in the specified row may not be reliable due to small number of observations



**Figure 2**  
**Speed error bias for freeway segments greater than one mile in New Jersey**



**Figure 3**  
**Average absolute speed error for freeway segments greater than one mile in New Jersey**

