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# Memorandum

The City of Traverse City  
Engineering Department



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TO: Timothy J. Lodge, P.E., City Engineer  
FROM: Abhishek Deora, Seasonal Engineering Aide  
DATE: Friday, September 1st, 2017  
SUBJECT: 24 Hour Speed and Volume of Bay St between Ramsdell St & M-72

City Engineering performed a 24 hour speed study on Bay St between Ramsdell St & M-72 beginning on Wednesday, August 30<sup>th</sup>, 2017 concluded Thursday, August 31<sup>st</sup>, 2017. This memo is to formalize City Engineering's initial data observations and findings with to the speed statistics and volume of vehicular traffic on Bay St.

The data was gathered using a JAMAR Radar Recorder, this data recorder collects both vehicle speed and volume using radar sensors in both Northbound and Southbound lanes. The raw data compiled and analyzed using TraxPro and reported vehicle speed count for every hour during the study in the increments of 5 miles per hour. The TraxPro software also compiled a report to be sent Traverse City Police Department to evaluate the possible percentage of enforceable violations. This data is organized into a small colored meter where red means there is a high enforcement potential and green equates to a low amount of speed infractions are occurring. For this report, the enforceable minimum speed a vehicle would need to be traveling is 5 miles per hour over the posted speed limit of 25 miles per hour.

During this 24 hour study, 4052 vehicles were recorded. The average (mean) speed of the 4052 vehicles is 29 miles per hour, with 80.9% of all vehicles traveling at speeds greater than the posted limit of 25 miles per hour. Giving motorist an extra 5 miles per hour over the posted speed limit for enforcement tolerance, the number of vehicles speeding is 46.6%.

## Summary (Combined):

- **Mean Speed:** 29 MPH
- **Number of Vehicles above Posted Speed Limit** 80.9%
- **85<sup>th</sup> Percentile of Speed:** 34 MPH
- **95<sup>th</sup> Percentile of Speed:** 37 MPH

## Enclosed:

Detailed TraxPro Speed Reports (Combined and Directional)  
TraxPro Police Enforcement Reports

Bay St  
Between M-72t & Ramsdell St  
Speed

Site Code: 00000001  
Station ID:  
Bay St  
Ramsdell & M-72  
Latitude: 0' 0.0000 South

A=Eastbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	Pace Speed	Number in Pace
08/30/17	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	0	5	9	<b>54</b>	64	8	<b>3</b>	0	0	0	0	0	0	0	143	26-35	118
11:00	0	<b>6</b>	<b>18</b>	54	<b>65</b>	<b>15</b>	1	0	0	0	0	0	0	0	<b>159</b>	26-35	119
12 PM	0	9	21	<b>72</b>	60	10	0	0	0	0	0	0	0	0	<b>172</b>	26-35	132
13:00	0	6	14	40	59	9	0	0	0	0	0	0	0	0	128	26-35	99
14:00	1	9	9	44	51	13	0	0	0	0	0	0	0	0	127	26-35	95
15:00	2	6	10	45	64	13	1	0	0	0	0	0	0	0	141	26-35	109
16:00	<b>3</b>	6	15	54	<b>65</b>	13	<b>3</b>	0	0	0	0	0	0	0	159	26-35	119
17:00	0	<b>14</b>	<b>23</b>	56	45	16	1	0	0	0	0	0	0	0	155	26-35	101
18:00	0	3	15	23	53	<b>17</b>	0	0	0	0	0	0	0	0	111	26-35	76
19:00	1	3	9	28	29	3	2	0	0	0	0	0	0	0	75	26-35	57
20:00	0	3	11	33	20	3	0	0	0	0	0	0	0	0	70	26-35	53
21:00	1	3	10	24	10	3	0	0	0	0	0	0	0	0	51	26-35	34
22:00	0	0	1	12	6	1	0	0	0	0	0	0	0	0	20	26-35	18
23:00	1	2	0	4	3	0	0	0	0	0	0	0	0	0	10	26-35	7
Total	9	75	165	543	594	124	11	0	0	0	0	0	0	0	1521		
Percent	0.6%	4.9%	10.8%	35.7%	39.1%	8.2%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak		11:00	11:00	10:00	11:00	11:00	10:00								11:00		
Vol.		6	18	54	65	15	3								159		
PM Peak	16:00	17:00	17:00	12:00	16:00	18:00	16:00								12:00		
Vol.	3	14	23	72	65	17	3								172		



Bay St  
Between M-72t & Ramsdell St  
Speed

Site Code: 00000001  
Station ID:  
Bay St  
Ramsdell & M-72  
Latitude: 0' 0.0000 South

B=Westbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	Pace Speed	Number in Pace
08/30/17	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	0	<b>1</b>	13	<b>55</b>	<b>45</b>	9	<b>3</b>	0	0	0	0	0	0	0	<b>126</b>	26-35	100
11:00	0	0	<b>15</b>	40	45	<b>16</b>	1	0	0	0	0	0	0	0	117	26-35	85
12 PM	0	2	20	66	58	12	2	0	0	0	0	0	0	0	160	26-35	124
13:00	0	2	15	51	<b>77</b>	12	1	0	0	0	0	0	0	0	158	26-35	128
14:00	0	0	24	59	57	7	<b>3</b>	0	0	0	0	0	0	0	150	26-35	116
15:00	0	2	17	<b>71</b>	58	13	0	0	0	0	0	0	0	0	161	26-35	129
16:00	<b>64</b>	<b>50</b>	<b>48</b>	54	25	4	2	0	0	0	0	0	0	0	<b>247</b>	21-30	102
17:00	37	16	25	52	66	17	1	0	0	0	0	0	0	0	214	26-35	118
18:00	0	1	13	39	50	<b>21</b>	2	0	0	0	0	0	0	0	126	26-35	89
19:00	0	2	2	25	43	10	0	0	0	0	0	0	0	0	82	26-35	68
20:00	0	2	4	20	32	5	1	0	0	0	0	0	0	0	64	26-35	52
21:00	0	1	8	21	12	1	0	0	0	0	0	0	0	0	43	26-35	33
22:00	0	1	2	8	9	1	1	0	0	0	0	0	0	0	22	26-35	17
23:00	0	0	1	4	10	2	0	0	0	0	0	0	0	0	17	26-35	14
Total	101	80	207	565	587	130	17	0	0	0	0	0	0	0	1687		
Percent	6.0%	4.7%	12.3%	33.5%	34.8%	7.7%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak		10:00	11:00	10:00	10:00	11:00	10:00								10:00		
Vol.		1	15	55	45	16	3								126		
PM Peak	16:00	16:00	16:00	15:00	13:00	18:00	14:00								16:00		
Vol.	64	50	48	71	77	21	3								247		

Bay St  
Between M-72t & Ramsdell St  
Speed

Site Code: 00000001  
Station ID:  
Bay St  
Ramsdell & M-72  
Latitude: 0' 0.0000 South

B=Westbound

Start Time	15	20	25	30	35	40	45	50	55	60	65	70	75	76	999	Total	Pace Speed	Number in Pace
08/31/17	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	6	16-25	3
01:00	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	3	10-19	2
02:00	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	4	26-35	3
03:00	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	4	19-28	2
04:00	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	5	26-35	4
05:00	1	1	1	2	7	1	1	0	0	0	0	0	0	0	0	14	26-35	9
06:00	1	1	1	9	11	2	0	0	0	0	0	0	0	0	0	25	26-35	20
07:00	2	4	8	28	37	11	0	0	0	0	0	0	0	0	0	90	26-35	65
08:00	3	7	8	27	43	18	6	0	0	0	0	0	0	0	0	112	26-35	70
09:00	0	2	11	43	47	20	0	0	0	0	0	0	0	0	0	123	26-35	90
10:00	1	3	9	35	40	19	1	0	0	0	0	0	0	0	0	108	26-35	75
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	9	23	41	150	191	72	8	0	0	0	0	0	0	0	0	494		
Percent	1.8%	4.7%	8.3%	30.4%	38.7%	14.6%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	08:00	09:00	09:00	09:00	09:00	08:00									09:00		
Vol.	3	7	11	43	47	20	6									123		

PM Peak	110	103	248	715	778	202	25	0	0	0	0	0	0	0	0	2181		
Vol.	5.0%	4.7%	11.4%	32.8%	35.7%	9.3%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 22 MPH  
50th Percentile : 29 MPH  
85th Percentile : 34 MPH  
95th Percentile : 37 MPH

Stats  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 1493  
Percent in Pace : 68.5%  
Number of Vehicles > 25 MPH : 1720  
Percent of Vehicles > 25 MPH : 78.9%  
Mean Speed(Average) : 29 MPH

Bay St  
Between M-72t & Ramsdell St  
Speed

Site Code: 00000001  
Station ID:  
Bay St  
Ramsdell & M-72  
Latitude: 0' 0.0000 South

A=Eastbound, B=Westbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	Pace Speed	Number in Pace
08/30/17	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	0	<b>6</b>	22	<b>109</b>	109	17	<b>6</b>	0	0	0	0	0	0	0	269	26-35	218
11:00	0	6	<b>33</b>	94	<b>110</b>	<b>31</b>	2	0	0	0	0	0	0	0	<b>276</b>	26-35	204
12 PM	0	11	41	<b>138</b>	118	22	2	0	0	0	0	0	0	0	332	26-35	256
13:00	0	8	29	91	<b>136</b>	21	1	0	0	0	0	0	0	0	286	26-35	227
14:00	1	9	33	103	108	20	3	0	0	0	0	0	0	0	277	26-35	211
15:00	2	8	27	116	122	26	1	0	0	0	0	0	0	0	302	26-35	238
16:00	<b>67</b>	<b>56</b>	<b>63</b>	108	90	17	<b>5</b>	0	0	0	0	0	0	0	<b>406</b>	26-35	198
17:00	37	30	48	108	111	33	2	0	0	0	0	0	0	0	369	26-35	219
18:00	0	4	28	62	103	<b>38</b>	2	0	0	0	0	0	0	0	237	26-35	165
19:00	1	5	11	53	72	13	2	0	0	0	0	0	0	0	157	26-35	125
20:00	0	5	15	53	52	8	1	0	0	0	0	0	0	0	134	26-35	105
21:00	1	4	18	45	22	4	0	0	0	0	0	0	0	0	94	26-35	67
22:00	0	1	3	20	15	2	1	0	0	0	0	0	0	0	42	26-35	35
23:00	1	2	1	8	13	2	0	0	0	0	0	0	0	0	27	26-35	21
Total	110	155	372	1108	1181	254	28	0	0	0	0	0	0	0	3208		
Percent	3.4%	4.8%	11.6%	34.5%	36.8%	7.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak		10:00	11:00	10:00	11:00	11:00	10:00								11:00		
Vol.		6	33	109	110	31	6								276		
PM Peak	16:00	16:00	16:00	12:00	13:00	18:00	16:00								16:00		
Vol.	67	56	63	138	136	38	5								406		

Bay St  
Between M-72t & Ramsdell St  
Speed

Site Code: 00000001  
Station ID:  
Bay St  
Ramsdell & M-72  
Latitude: 0' 0.0000 South

A=Eastbound, B=Westbound

Start Time	1	16	21	26	31	36	41	46	51	56	61	66	71	76	Total	Pace Speed	Number in Pace
08/31/17	2	2	2	1	3	1	0	0	0	0	0	0	0	0	11	16-25	4
01:00	0	2	0	2	0	0	0	0	0	0	0	0	0	0	4	10-19	2
02:00	0	1	0	1	3	0	0	0	0	0	0	0	0	0	5	26-35	4
03:00	0	0	1	3	2	1	0	0	0	0	0	0	0	0	7	26-35	5
04:00	0	0	1	6	3	0	0	0	0	0	0	0	0	0	10	25-34	9
05:00	1	3	2	5	16	5	1	0	0	0	0	0	0	0	33	26-35	21
06:00	2	4	13	26	45	8	0	0	0	0	0	0	0	0	98	26-35	71
07:00	3	7	31	70	81	25	2	0	0	0	0	0	0	0	219	26-35	151
08:00	3	16	25	85	82	24	7	0	0	0	0	0	0	0	242	26-35	167
09:00	0	7	22	80	98	31	1	1	0	0	0	0	0	0	240	26-35	178
10:00	2	7	24	79	80	26	1	0	0	0	0	0	0	0	219	26-35	159
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	13	49	121	358	413	121	12	1	0	0	0	0	0	0	1088		
Percent	1.2%	4.5%	11.1%	32.9%	38.0%	11.1%	1.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	08:00	07:00	08:00	09:00	09:00	08:00	09:00							08:00		
Vol.	3	16	31	85	98	31	7	1							242		
PM Peak																	
Vol.																	
Total	123	204	493	1466	1594	375	40	1	0	0	0	0	0	0	4296		
Percent	2.9%	4.7%	11.5%	34.1%	37.1%	8.7%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile : 23 MPH  
50th Percentile : 29 MPH  
85th Percentile : 34 MPH  
95th Percentile : 37 MPH

Stats  
10 MPH Pace Speed : 26-35 MPH  
Number in Pace : 3060  
Percent in Pace : 71.2%  
Number of Vehicles > 25 MPH : 3476  
Percent of Vehicles > 25 MPH : 80.9%  
Mean Speed(Average) : 29 MPH

Bay St  
Between M-72t & Ramsdell St  
Speed

Site Code: 0000001  
Station ID:  
Bay St  
Ramsdell & M-72  
Latitude: 0' 0.0000 South

Start Time	28-Aug-17 Mon	29-Aug-17 Tue	30-Aug-17 Wed	31-Aug-17 Thu	01-Sep-17 Fri	Weekday Average	02-Sep-17 Sat	03-Sep-17 Sun
12:00 AM	*	*	*	11	*	11	*	*
01:00	*	*	*	4	*	4	*	*
02:00	*	*	*	5	*	5	*	*
03:00	*	*	*	7	*	7	*	*
04:00	*	*	*	10	*	10	*	*
05:00	*	*	*	33	*	33	*	*
06:00	*	*	*	98	*	98	*	*
07:00	*	*	*	219	*	219	*	*
08:00	*	*	*	242	*	242	*	*
09:00	*	*	*	240	*	240	*	*
10:00	*	*	269	219	*	244	*	*
11:00	*	*	276	*	*	276	*	*
12:00 PM	*	*	332	*	*	332	*	*
01:00	*	*	286	*	*	286	*	*
02:00	*	*	277	*	*	277	*	*
03:00	*	*	302	*	*	302	*	*
04:00	*	*	406	*	*	406	*	*
05:00	*	*	369	*	*	369	*	*
06:00	*	*	237	*	*	237	*	*
07:00	*	*	157	*	*	157	*	*
08:00	*	*	134	*	*	134	*	*
09:00	*	*	94	*	*	94	*	*
10:00	*	*	42	*	*	42	*	*
11:00	*	*	27	*	*	27	*	*
Total	0	0	3208	1088	0		0	0
Percentage	0.0%	0.0%	79.2%	26.9%	0.0%		0.0%	0.0%
AM Peak	-	-	11:00	08:00	-	-	-	-
Vol.	-	-	276	242	-	-	-	-
PM Peak	-	-	16:00	-	-	-	-	-
Vol.	-	-	406	-	-	-	-	-
Total		0	3208					



# Speed Enforcement Evaluator

**Location:**  
**Bay St**

**Total Percentage of Enforceable Violations**

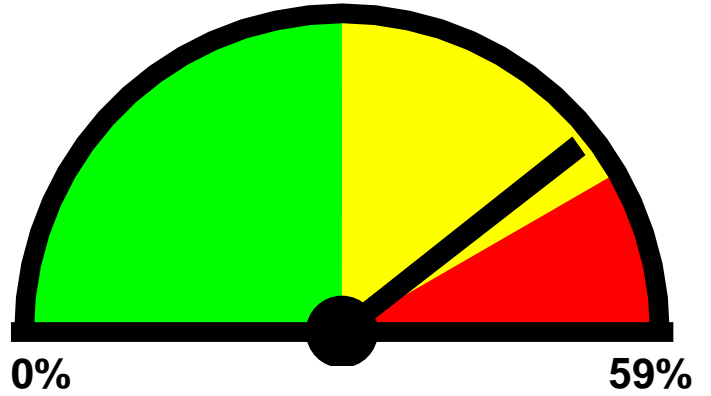
**GPS:**

0' 0.0000 South  
0' 0.0000 East

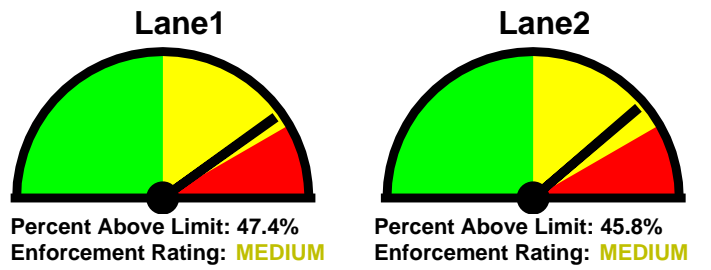
**Closest Cross Street:**  
Ramsdell & M-72

**Analysis Dates:**  
Wednesday, August 30, 2017  
Thursday, August 31, 2017

**Equipment Used:**



**0%** **59%**  
**Posted Speed Limit:** 25 MPH  
**Enforcement Tolerance:** 5 MPH  
**Enforcement Limit:** 31 MPH & Up  
**Percentage Above Limit:** 46.6%  
**Enforcement Rating:** **MEDIUM**



**Lane1** **Lane2**  
**Percent Above Limit:** 47.4% **Percent Above Limit:** 45.8%  
**Enforcement Rating:** **MEDIUM** **Enforcement Rating:** **MEDIUM**

**Combined**

1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	>65
0	0	119	208	508	1514	1630	379	40	2	0	0	0	0

85 percentile = 33

**Lane1**

1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	>65
0	0	12	102	251	772	836	174	15	1	0	0	0	0

85 percentile = 33

**Lane2**

1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	>65
0	0	107	106	257	742	794	205	25	1	0	0	0	0

85 percentile = 33

# Best Times for Enforcement

**Location:**

**Bay St**

**Closest Cross Street:**

Ramsdell & M-72

**Analysis Dates:**

Wednesday, August 30, 2017

Thursday, August 31, 2017

**Sun**

**Mon**

**Tue**

**Wed**

**Combined: Noon to 2 PM**

**Lane1: 3 PM to 5 PM**

**Lane2: Noon to 2 PM**

**Thu**

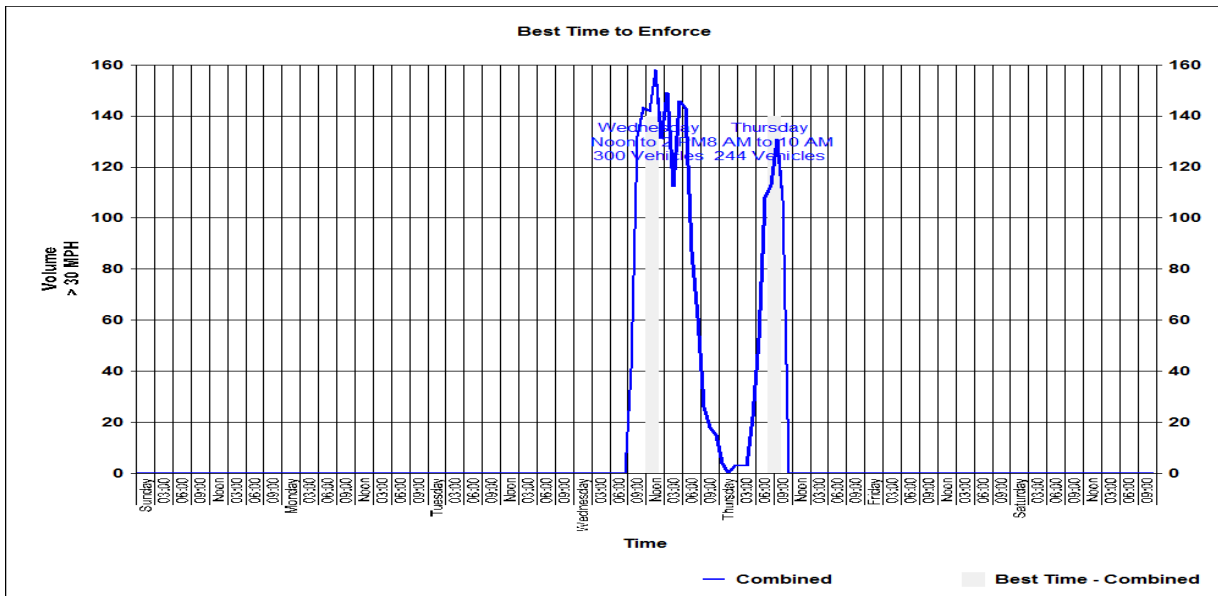
**Combined: 8 AM to 10 AM**

**Lane1: 9 AM to 11 AM**

**Lane2: 8 AM to 10 AM**

**Fri**

**Sat**



Bay St  
Between M-72t & Ramsdell St  
Speed

