

# Seward Highway Traffic Study at Potter Marsh

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State of Alaska DOT&PF

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## **I. Background**

Residents of the Potter Marsh community reached out to DOT&PF and have explained that installation of rumble strips near two Seward Highway intersections would produce excessive noise for the surrounding populace. The community has asked DOT&PF to consider turn pockets at both the New Seward Highway/Potter Valley Rd intersection, and also the New Seward Highway/Potter Creek Trailhead intersection, as a means of reducing unwanted noise. The DOT&PF is conducting a peak traffic volume study in order to determine if turn pockets are warranted for these unsignalized intersections.

## **II. Methodology**

Peak traffic volume is a serious determining factor when deciding whether or not a turn pocket is warranted at an un-signalized intersection. Traffic counts will be performed at both intersections to determine if turn pockets are warranted for both left and right turning movements.

There is already a left hand turn pocket at the New Seward Highway/Potter Valley Rd intersection for southbound traffic, so only turning movements and traffic volume flowing northbound will be studied at that intersection in order to determine if a right turn pocket is warranted at this intersection.

At the New Seward Highway/Potter Creek Trailhead, there are currently no turn pockets. This means that turning movements for both northbound and southbound traffic volumes must be studied in order to determine if a right and/or left turn pocket is warranted.

A local resident of the Potter Marsh area recommended that this traffic study be completed on Friday, Saturday, or Sunday, within the summer months of June – August. A traffic volume report at Potter Marsh from 2011-2013 was used by an analysis team to determine the time and day for peak volume of traffic flow through this area. The greatest flow of traffic through this area in August, as shown in figure 1, is on Sundays from 4-7 PM. There will be an engineer stationed at both intersections conducting manual counts of vehicles passing through every 15 minutes. Manual counts are more isolated in time than automatic counts and therefore will be used for this three hour traffic study. The count will determine peak traffic volumes entering each intersection in question. This peak data will then be analyzed with highway design guidelines to decide if turn pockets may be warranted.

### SEWARD HIGHWAY AT POTTER MARSH - TOTAL

ROUTE: 130000      MILEPOINT: 116.460      STATION NUMBER: 11410031 9      PERMANENT STN SUMMARY: 2013

| MNTH | MADT  | % AADT | 6AM   |      | PERCENT OF AADT FOR DAY OF WEEK |      |       |      |       |       |       |       |      |      | HISTORY |  | PERCENT GROWTH |
|------|-------|--------|-------|------|---------------------------------|------|-------|------|-------|-------|-------|-------|------|------|---------|--|----------------|
|      |       |        | -10PM | -6AM | MON                             | TUE  | WED   | THU  | FRI   | WKDY  | SAT   | SUN   | YEAR | AADT |         |  |                |
| JAN  | 5912  | 63.7   | 93.5  | 6.5  | 93.6                            | 86.1 | 89.3  | 92.5 | 117.5 | 95.8  | 119.1 | 101.8 | 2013 | 9283 | 4.5     |  |                |
| FEB  | 6231  | 67.1   | 93.7  | 6.3  | 100.7                           | 85.9 | 85.2  | 93.4 | 114.5 | 95.9  | 120.0 | 100.3 | 2012 | 8880 | -1.9    |  |                |
| MAR  | 7432  | 80.1   | 93.8  | 6.2  | 87.3                            | 93.3 | 91.4  | 90.7 | 108.6 | 94.3  | 118.5 | 110.0 | 2011 | 9050 | -1.5    |  |                |
| APR  | 8394  | 90.4   | 93.6  | 6.4  | 81.9                            | 77.3 | 78.8  | 89.8 | 117.5 | 89.1  | 133.1 | 121.6 | 2010 | 9187 | 1.5     |  |                |
| MAY  | 10912 | 117.5  | 91.8  | 8.2  | 102.9                           | 87.9 | 84.5  | 86.7 | 110.2 | 94.4  | 105.3 | 122.5 | 2009 | 9051 | 4.4     |  |                |
| JUN  | 14021 | 151.0  | 89.5  | 10.5 | 89.8                            | 86.0 | 88.1  | 91.6 | 111.9 | 93.5  | 115.8 | 116.9 | 2008 | 8670 | -6.9    |  |                |
| JUL  | 17000 | 183.1  | 88.2  | 11.8 | 84.4                            | 80.2 | 87.7  | 92.6 | 114.6 | 91.9  | 120.0 | 120.5 | 2007 | 9316 | 4.3     |  |                |
| AUG  | 12756 | 137.4  | 91.5  | 8.5  | 91.3                            | 86.6 | 82.3  | 91.6 | 112.8 | 92.9  | 117.6 | 117.7 | 2006 | 8936 | -4.1    |  |                |
| SEP  | 9835  | 105.9  | 93.6  | 6.4  | 91.6                            | 86.4 | 82.2  | 91.1 | 109.4 | 92.1  | 121.9 | 117.3 | 2005 | 9321 | -0.4    |  |                |
| OCT  | 7492  | 80.7   | 93.7  | 6.3  | 87.7                            | 89.3 | 90.7  | 89.7 | 121.5 | 95.8  | 123.4 | 97.6  | 2004 | 9356 | 1.4     |  |                |
| NOV  | 5597  | 60.3   | 93.2  | 6.8  | 94.4                            | 96.1 | 103.5 | 95.4 | 111.3 | 100.1 | 111.4 | 87.8  | 2003 | 9224 | -0.9    |  |                |
| DEC  | 5810  | 62.6   | 93.1  | 6.9  | 103.6                           | 96.7 | 86.2  | 90.2 | 111.1 | 97.6  | 110.7 | 101.4 | 2002 | 9311 | 9.4     |  |                |
| AADT | 9283  |        | 92.4  | 7.6  | 92.4                            | 87.7 | 87.5  | 91.3 | 113.4 | 94.5  | 118.1 | 109.6 | 2001 | 8514 | 2.5     |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 2000 | 8309 | 0.2     |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1999 | 8294 | 0.0     |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1998 | 8296 | 9.5     |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1997 | 7574 | 1.5     |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1996 | 7464 | -1.3    |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1995 | 7565 | -0.1    |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1994 | 7571 | 2.8     |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1993 | 7366 | 6.3     |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1992 | 6929 | 4.7     |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1991 | 6621 | 69.3    |  |                |
|      |       |        |       |      |                                 |      |       |      |       |       |       |       | 1990 | 3910 |         |  |                |

| HIGH DAYS | 1ST   | 2ND   | 3RD   | 4TH   | 5TH   | 6TH   | 7TH   | 8TH   | 9TH   | 10TH  | AVG   |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| VOLUME    | 23411 | 22305 | 22092 | 20988 | 20209 | 19503 | 19270 | 19067 | 19031 | 18749 | 20463 |
| DAY       | 07/21 | 07/19 | 07/20 | 07/06 | 07/28 | 07/13 | 07/07 | 07/14 | 07/27 | 07/26 |       |
| % AADT    | 252.2 | 240.3 | 238.0 | 226.1 | 217.7 | 210.1 | 207.6 | 205.4 | 205.0 | 202.0 | 220.4 |

| HIGH HOURS | 1ST   | 2ND   | 3RD   | 4TH   | 5TH   | 6TH   | 7TH   | 8TH   | 9TH   | 10TH  | 20TH  | 30TH  | 40TH  | 50TH  | AVG  |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| VOLUME     | 1922  | 1920  | 1859  | 1826  | 1762  | 1758  | 1732  | 1703  | 1695  | 1694  | 1626  | 1539  | 1490  | 1462  | 1787 |
| HOUR       | 6PM   | 7PM   | 4PM   | 5PM   | 5PM   | 3PM   | 3PM   | 7PM   | 4PM   | 5PM   | 2PM   | 4PM   | 6PM   | 6PM   |      |
| DAY        | 07/19 | 07/19 | 07/21 | 07/21 | 07/07 | 07/06 | 07/21 | 07/28 | 07/06 | 07/06 | 07/07 | 07/19 | 07/05 | 07/20 |      |
| % AADT     | 20.7  | 20.7  | 20.0  | 19.7  | 19.0  | 18.9  | 18.7  | 18.3  | 18.3  | 18.2  | 17.5  | 16.6  | 16.1  | 15.7  | 19.3 |
|            | Fri   | Fri   | Sun   | Sun   | Sun   | Sat   | Sun   | Sun   | Sat   | Sat   |       |       |       |       |      |

| PERCENT OF AADT BY HOUR |     |     |     |     |     |     |     |     |      |      |      |     |     |     |     |     |     |     |     |     |      |      |      |
|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| 1AM                     | 2AM | 3AM | 4AM | 5AM | 6AM | 7AM | 8AM | 9AM | 10AM | 11AM | 12PM | 1PM | 2PM | 3PM | 4PM | 5PM | 6PM | 7PM | 8PM | 9PM | 10PM | 11PM | 12AM |
| 1.1                     | 0.7 | 0.5 | 0.4 | 0.5 | 0.9 | 1.9 | 3.3 | 4.1 | 5.0  | 5.5  | 6.0  | 6.7 | 6.9 | 7.3 | 7.7 | 8.1 | 7.9 | 7.2 | 5.8 | 4.6 | 3.6  | 2.5  | 1.6  |

**Figure 1: 2011-2013 Traffic Volume Report at Potters Marsh [1]**

### III. Results

Traffic on Sunday, August 12<sup>th</sup>, 2018 was steady throughout the three hour time period. The weather was fair, being mostly sunny with some overcast during the duration of the study. There were no major traffic issues, or notable accidents that would slow traffic during the study.

Northbound traffic turning right at the New Seward/Potter Valley Rd intersection was at peak volume from 5pm – 6pm, as observed in table 1. Northbound traffic flowing on the Seward Highway during this peak hour was approximately 757 vehicles, while the peak number of vehicles taking a right hand turn at

the intersection was found to be 12. Visit appendix A to see the number of vehicles passing through this intersection every 15 minutes.

**Table 1:** Peak Traffic Volume at New Seward and Potter Valley Road

|   | Southbound | Northbound | Left Hand Turn | Right Hand Turn |
|---|------------|------------|----------------|-----------------|
| Peak # Right Turns Per Hour (5pm – 6pm) | NA         | 757        | NA             | 12              |

Traffic turning left at the New Seward/Potter Creek Trailhead intersection was at peak volume from 4pm – 5pm, as observed in table 2. Southbound traffic flowing on the New Seward Highway during this peak hour was approximately 496 vehicles, while the peak number of vehicles taking a left hand turn at the intersection was found to be 6.

Traffic turning right at the New Seward/Potter Creek Trailhead intersection was at peak volume from 4pm – 5pm as well. The northbound traffic flowing on the New Seward Highway during this peak hour was approximately 751 vehicles, while the peak number of vehicles taking a right hand turn at the intersection was found to be 6. Visit appendix B to see the number of vehicles passing through this intersection every 15 minutes.

**Table 2:** Peak Traffic Volume at New Seward and Potter Creek Trailhead

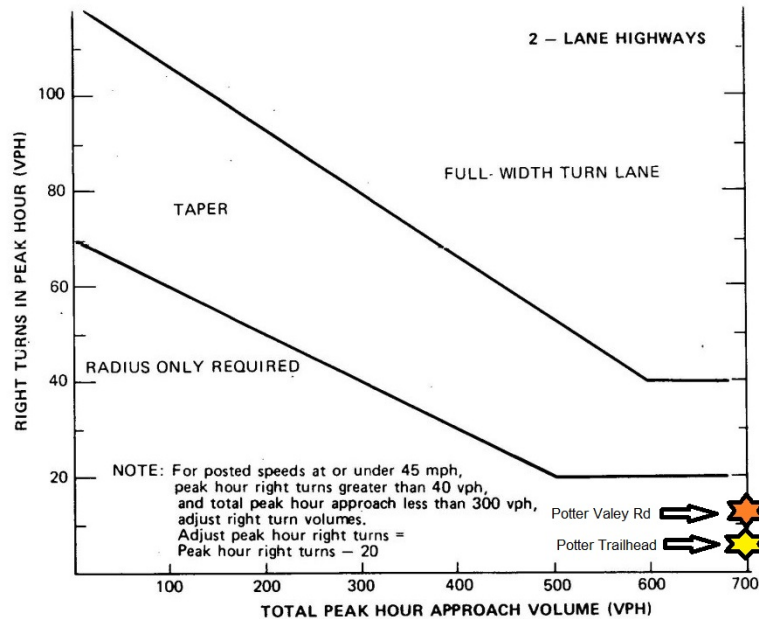
|  | Southbound | Northbound | Left Hand Turn | Right Hand Turn |
|--|------------|------------|----------------|-----------------|
| Peak # Left/Right Turns Per Hour (4pm – 5pm) | 496        | 751        | 6              | 6               |

#### IV. Conclusion

##### A. New Seward and Potter Valley Rd

As shown in Figure 2, 40 right hand turning vehicles per hour may warrant a full-width turn pocket on a two lane road with a posted speed limit above 45 mph and an approach volume of 700+ vehicles. DOT&PF currently does not practice taper turn pockets, therefore this style of turn lane is not considered in this report. With the current peak at 12 right turns, it is not advised to add a turn pocket to this intersection. It is advised however that this study be

repeated periodically, preferably during the peak travel month of July, because this pocket may be warranted in the near future.



**Figure 2:** Volume warrants for right hand turn lanes at unsignalized intersections [2]

### B. New Seward and Potter Creek Trailhead Intersection

As shown in Figure 2, and similar to the Potter Valley Road Intersection, 40 right turning vehicles per hour are needed to warrant a right turn pocket. With current peak right turns at 6 turns per hour, it is not advised to add a turn pocket to this intersection. It is advised however that this study be repeated periodically because this pocket may be warranted in the future.

In figure 3, Opposing Volume ( $V_0$ ) is considered northbound through traffic at the trailhead intersection, and Advancing Volume ( $V_A$ ) is considered southbound through traffic. When applying 496 vehicles per peak hour to the bottom axis and 751 vehicles per peak hour to the left axis, the graph indicates that a left turn is warranted. However, vehicle through movement data at this intersection was collected during what might be considered a peak or worst case time, while left turn volume is relatively low. This worst case scenario could lead to the decision that a left turn pocket may not be warranted, when compared with

average traffic volumes. With these two conflicting findings, a left turn pocket *may* be warranted. This intersection requires further analysis, which may include automatic traffic data and a Level of Service (LOS) determination based on the Highway Capacity Manual (HCM).

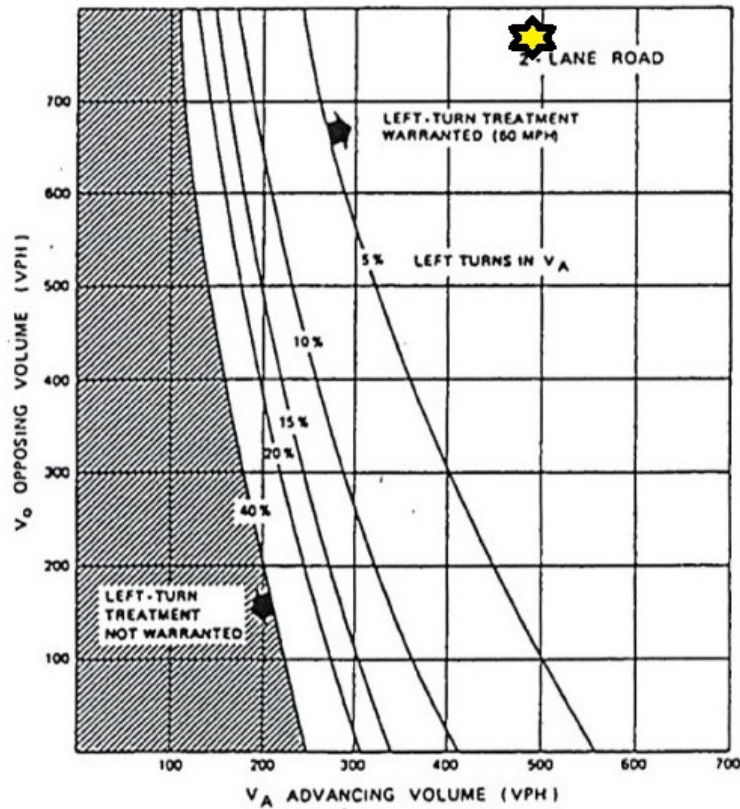


Figure 3: Volume warrants for left turn lanes at unsignalized intersections [3]

## V. References

- [1] J. W. Witt, "Central Region Traffic Volume Report," Highway Data Section, 2013.
- [2] T. R. Neuman, "National Cooperative Highway Research Program 279, Intersection Channelization Design Guide," Transportation Research Board, Washington, D.C, 1985.
- [3] M. Harmelink, "Volume Warrant for Left Turn Storage Lanes at Unsignalized Grade Intersections," Highway Research Board, Highway Research Record 211, 1967.

## VI. Appendix A: New Seward & Potter Valley Road Traffic Volume

| Seward Highway Traffic Count                            |                                     |   |            |                 |    |
|---|-------------------------------------|---|------------|-----------------|----|
| DATE:   | 8/12/2018                           |   |            |                 |    |
| WEATHER:  | Sunny w/ Overcast, High Winds       | (Note any pertinent change in weather) -> 5:15 Overcast turned into cloud cover |            |                 |    |
| Temp:   | Upper 60's                          |   |            |                 |    |
| # of Cars at New Seward/Potter Valley Road Intersection |                                     |   |            |                 |    |
|   |                                     | Southbound  | Northbound | Right Hand Turn |    |
| Time Intervals:   | 4:00 - 4:15                         | NA  |            | 227             | 2  |
|   | 4:15 - 4:30                         | NA  |            | 186             | 1  |
|   | 4:30 - 4:45                         | NA  |            | 201             | 2  |
|   | 4:45 - 5:00                         | NA  |            | 213             | 2  |
|   | 5:00 - 5:15                         | NA  |            | 173             | 2  |
|   | 5:15 - 5:30                         | NA  |            | 199             | 5  |
|   | 5:30 - 5:45                         | NA  |            | 208             | 3  |
|   | 5:45 - 6:00                         | NA  |            | 182             | 2  |
|   | 6:00 - 6:15                         | NA  |            | 177             | 1  |
|   | 6:15 - 6:30                         | NA  |            | 196             | 3  |
|   | 6:30 - 6:45                         | NA  |            | 146             | 2  |
|   | 6:45 - 7:00                         | NA  |            | 181             | 3  |
|   | Peak Right Turns Per Hour (5pm-6pm) |   | 0          | 757             | 12 |

## VII. Appendix B: New Seward & Potter Creek Trailhead Traffic Volume

| Seward Highway Traffic Count |  |  |                |                  |   |
|------------------------------|--|--|----------------|------------------|---|
| DATE:                        | 8/12/2018                                      |  |                |                  |   |
| WEATHER:                     | Partly Cloudy, 25 MPH Wind Gusts               | (Note any pertinent change in weather) -> 5pm-7pm: High Clouds, 26 MPH Wind Gusts, 69 Degrees Fahrenheit |                |                  |   |
| Temp:                        | 71 Degrees Fahrenheit                          |  |                |                  |   |
|                              | # of Cars at New Seward/Potter Creek Trailhead |  |                |                  |   |
|                              | Southbound                                     | Northbound   | Left Hand Turn | Right Hand Turns |   |
| Time Intervals:              | 4:00 - 4:15                                    | 138  | 173            | 4                | 5 |
|                              | 4:15 - 4:30                                    | 121  | 189            | 1                | 1 |
|                              | 4:30 - 4:45                                    | 128  | 188            | 1                | 0 |
|                              | 4:45 - 5:00                                    | 109  | 201            | 0                | 0 |
|                              | 5:00 - 5:15                                    | 102  | 181            | 0                | 0 |
|                              | 5:15 - 5:30                                    | 101  | 182            | 3                | 0 |
|                              | 5:30 - 5:45                                    | 101  | 180            | 1                | 1 |
|                              | 5:45 - 6:00                                    | 81   | 182            | 0                | 0 |
|                              | 6:00 - 6:15                                    | 72   | 189            | 0                | 1 |
|                              | 6:15 - 6:30                                    | 66   | 188            | 0                | 0 |
|                              | 6:30 - 6:45                                    | 74   | 135            | 0                | 0 |
|                              | 6:45 - 7:00                                    | 63   | 157            | 0                | 0 |
|                              | Peak Left/Right Turns Per Hour (4pm-5pm)       | 496  | 751            | 6                | 6 |