

**Appendix L -  
AASHTO AADT Calculation**



## APPENDIX L. AASHTO AADT CALCULATION

This appendix provides equations to obtain AADTs using the AASHTO method.

AADT – Annual Average Daily Traffic – The total volume of vehicle traffic of a highway or road for a year divided by 365 days. It is meant to represent traffic on a typical day of the year.

The AASHTO approach first computes average monthly days of the week. These 84 values (12 months × 7 days) are then averaged to yield the AADT. This method explicitly accounts for missing data by weighting each day of the week the same, and each month the same, regardless of how many days are actually present within that category; however, there must be between one and five records for each day of the week in each month. In the AASHTO procedure, the first computation of the seven average days of the week allows the two Saturdays to be used to estimate the average June Saturday, while three Mondays are used to compute the average June Monday. When these seven values are then averaged to compute the average June day, the proper balance between weekdays and weekend days can be maintained.

The AASHTO method for computing AADT is currently the adopted practice through both FHWA’s TMG and AASHTO’s Guidelines for Traffic Data Program. This is because it allows factors to be computed reasonably accurately even when a considerable number of data are missing from a year at a site, and because it works accurately under a variety of data conditions (both with and without missing data).

The AASHTO formulation for AADT is as follows:

$$AADT = \frac{1}{7} \sum_{i=1}^7 \left[ \frac{1}{12} \sum_{j=1}^{12} \left( \frac{1}{n} \sum_{k=1}^n VOL_{ijk} \right) \right]$$

Where:

- $VOL$  = daily traffic for day  $k$ , of DOW  $i$ , and month  $j$
- $i$  = day of the week
- $j$  = month of the year
- $k$  = 1 when the day is the first occurrence of that day of the week in a month, 4 when it is the fourth day of the week
- $n$  = the number of days of that day of the week during that month (usually between one and five, depending on the number of missing data)

Recent work performed in 2015 by Battelle Memorial Institute for FHWA and reported in *Assessing Roadway Traffic Count Duration and Frequency Impacts on Annual Average Daily Traffic Estimation* (Krile, et. al.), FHWA-PL-16-008, has shown that there are two limitations with the traditional AASHTO method. One limitation is that the above equation uses only complete days of data. This means that the loss of one hour of data due to errors in the data collection process results in the loss of a full day of data from the AADT computation, reducing the potential accuracy of the resulting AADT estimate. The second limitation is that the averaging process used in the AASHTO method produces a small amount of bias in the resulting AADT estimate by slightly under-valuing both weekday traffic and traffic occurring in months with 31 days in comparison to months with fewer days.

As a result, FHWA is offering the use of an alternative modified formulation for computing AADT. This computation is performed in two steps. The first step computes monthly average daily traffic from the available hourly (or other temporal period) count records. The formula will work equally well with any temporal interval data, such as the 5-minute or 1-minute data frequently recorded by ITS-based traffic

management systems. The second step then computes AADT from the twelve available monthly values. These two mathematical steps are as follows:

$$MADT_m = \frac{\sum_{j=1}^7 w_{jm} \sum_{h=1}^{24} \left[ \frac{1}{n_{hjm}} \sum_{i=1}^{n_{hjm}} VOL_{ihjm} \right]}{\sum_{j=1}^7 w_{jm}}$$

and

$$AADT = \frac{\sum_{m=1}^{12} d_m * MADT_m}{\sum_{m=1}^{12} d_m}$$

Where:

- $AADT$  = average annual daily traffic
- $MADT_m$  = monthly average daily traffic for month  $m$
- $VOL_{ihjm}$  = total traffic volume for  $i$ th occurrence of the  $h$ th hour of day within  $j$ th day of week during the  $m$ th month
- $i$  = occurrence of a particular hour of day within a particular day of the week in a particular month ( $i=1, \dots, n_{hjm}$ ) for which traffic volume is available
- $h$  = hour of the day ( $h=1, 2, \dots, 24$ ) – or other temporal interval
- $j$  = day of the week ( $j=1, 2, \dots, 7$ )
- $m$  = month ( $m=1, \dots, 12$ )
- $n_{hjm}$  = the number of times the  $h$ th hour of day within the  $j$ th day of week during the  $m$ th month has available traffic volume ( $n_{hjm}$  ranges from 1 to 5 depending on hour of day, day of week, month, and data availability)
- $w_{jm}$  = the weighting for the number of times the  $j$ th day of week occurs during the  $m$ th month (either 4 or 5); the sum of the weights in the denominator is the number of calendar days in the month (i.e., 28, 29, 30, or 31)
- $d_m$  = the weighting for the number of days (i.e., 28, 29, 30, or 31) for the  $m$ th month in the particular year