Chapter 8

AADT: 
Annual Average Daily Traffic

Revised: February 4, 2013
**AADT**

Annual average daily traffic - taken over year and divided by the number of days within the year; normalizes seasonal, special event, and other fluctuations (used for crash analyses)

**ADT**

Average daily traffic - taken over a period of a few days or weeks; does not normalize seasonal, special event, and other fluctuations (NOT used for crash analyses)
Mainline interstates, freeways, and major arterials are generally counted every year.

Collectors and most local routes are generally counted every other year.

Low volume local routes may never be counted and, therefore, their volumes may have to be estimated.

Municipal street volumes are usually not maintained by the NCDOT.
AADT Data (cont.)

County AADT maps are available for the years 1999 through 2011.

Urban AADT maps are available for the years 1997 through 2011 (depending on the urban area).

county map AADT counts (state-maintained roads only)
urban AADT counts (state-maintained roads + some local roads)
Traffic volumes tend to increase over time. Because traffic volumes are used to calculate crash rates, it is recommended that the median year’s volume is used in crash analyses so that crash rates (CR) are not artificially inflated or deflated:

\[
CR = \frac{\text{Crashes}}{\text{Exposure}}
\]

Smaller volume in the denominator can artificially increase the crash rate.

Larger volume in the denominator can artificially decrease the crash rate.

Median year is recommended.

Exposure = (volume)(distance)(time)
• Used in calculating crash rates on the Intersection and Strip Analysis reports.

• Estimates the vehicle traffic through the study area

• Use the median year’s AADT for a study.

• AADT data can be estimated by assuming an AADT growth rate of 3% per year.

**NOTE:** Only use AADT data from NCDOT Traffic AADT maps, volume counts, or some other accurate source!
• For intersections, if the AADT for a leg is missing then the AADT from the opposite leg may be extended through the intersection

• If an AADT is not given, local knowledge can be used to estimate an AADT

• Growth rates other than the usual 2% and 3% may be used if based on other information or local knowledge

• A modification rate of ±1.03 may be used instead of the adjustment formula

• Averages and estimates are now acceptable!
AADT Adjustment Formula

This formula is used if the AADT is not in the median year and the AADT needs to “grow” or “shrink” to the median year. Standard adjustment rates of 2% for rural locations and 3% for urban locations are used.

\[
\text{Adjusted AADT} = \text{AADT} \times \left(1 + \%\right)^n
\]

Where:

\(n\) = Number of years (positive if adjusting up and negative if adjusting down)

\(\%\) = adjustment rate (rural or urban)
A study is being completed in a rural location with a date range of January 1, 2000 through December 31, 2002. The desired median year is 2001. However, the only AADT available is a 1999 AADT of 3,000 vehicles per day (VPD). The AADT would need to be adjusted for two years at a 2% growth rate:

\[
\text{Adjusted AADT} = 3,000 \times \left(1 + 0.02\right)^2
\]

\[
= 3,000 \times \left(1 + 0.02\right)^2
\]

\[
= 3,000 \times 1.0404
\]

\[
= 3121 \approx 3,100
\]
AADT Averages and Estimates

AADT averages and estimates can be calculated as follows...

Example 1: (missing year in middle)

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>17,000</td>
</tr>
<tr>
<td>2006</td>
<td>?</td>
</tr>
<tr>
<td>2005</td>
<td>13,000</td>
</tr>
</tbody>
</table>

2006 = 15,000 VPD

((17,000 + 13,000)/2)

Example 2: (multiple missing years)

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>25,000</td>
</tr>
<tr>
<td>2008</td>
<td>?</td>
</tr>
<tr>
<td>2007</td>
<td>?</td>
</tr>
<tr>
<td>2006</td>
<td>?</td>
</tr>
<tr>
<td>2005</td>
<td>18,000</td>
</tr>
</tbody>
</table>

(25,000 - 18,000) / (2009 - 2005)

= 7,000 / 4 = 1,750

Therefore,

2006 = (18,000 + 1,750) = 19,750
2007 = (19,750 + 1,750) = 21,500
2008 = (21,500 + 1,750) = 23,250
AADT averages and estimates can be calculated as follows...

Example 3:
(missing future year)

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>?</td>
</tr>
<tr>
<td>2010</td>
<td>9,800</td>
</tr>
<tr>
<td>2009</td>
<td>9,400</td>
</tr>
</tbody>
</table>

Growth rate 2009 to 2010 is
\[
(9,800 - 9,400) / 9,400 \\
= 0.0425 = 4.3%
\]

Therefore, assume same rate:
\[
2011 = 9,800 + (9,800 * 4.3%) \\
= 10,217 \\
\text{rounded to 10,200 VPD}
\]
What are the volumes for 2007 and 2008?

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>10,000</td>
</tr>
<tr>
<td>2008</td>
<td>?</td>
</tr>
<tr>
<td>2007</td>
<td>?</td>
</tr>
<tr>
<td>2006</td>
<td>6,400</td>
</tr>
</tbody>
</table>
What are the volumes for 2007 and 2008?

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>10,000</td>
</tr>
<tr>
<td>2008</td>
<td>8,800</td>
</tr>
<tr>
<td>2007</td>
<td>7,600</td>
</tr>
<tr>
<td>2006</td>
<td>6,400</td>
</tr>
</tbody>
</table>

\[
\frac{(10,000 - 6,400)}{(2009 - 2006)} = \frac{3,600}{3} = 1,200
\]

Therefore:
2007 = 6,400 + 1,200 = 7,600
2008 = 7,600 + 1,200 = 8,800
Calculate AADT for an intersection by:

1) Adding up the counts from all the legs

2) Dividing the total AADT by 2
   (Done to counteract the fact that each vehicle passing through intersection is counted twice, once entering and once leaving)

3) Round the result (usually to the nearest hundred)
Intersection AADT Calculation Example

Remember – if the AADT for a leg is missing then the AADT from the opposite leg may be extended through the intersection.
Intersection AADT Calculation Exercise

2,000

4,400

5,000
Intersection AADT Calculation Exercise

\[ \frac{13,400}{2} = 6,700 \]
The AADT used for a strip location is a weighted average

Calculate AADT for a strip by:

1) Multiply the AADT counts along the strip by the distance that each AADT value represents

2) Sum all of the AADT counts x distances

3) Divide by the total length of the strip

4) Round the result (usually to the nearest hundred)
Update AADT to 1998 figures: $1623 \times 1.03 = 1,672 \approx 1,700$

**Strip AADT Calculation Example**

Calculate the 1998 AADT for this strip using 1997 AADT data

![Diagram showing strip with AADT counts](image)

(1997 AADT Counts)

\[
\begin{align*}
0.70 \text{ Mi} \times 1,900 &= 1,330 \\
1.20 \text{ Mi} \times 2,300 &= 2,760 \\
2.38 \text{ Mi} \times 1,200 &= + 2,856 \\
\end{align*}
\]

\[
\frac{6,946}{4.28} = 1,623
\]

Update AADT to 1998 figures: $1623 \times 1.03 = 1,672 \approx 1,700$
The total distance is 2.22 miles.

\[
\begin{align*}
1.14 \text{ mi} \times 2,000 &= 2,280 \\
0.38 \text{ mi} \times 1,300 &= 494 \\
0.70 \text{ mi} \times 1,300 &= 910 \\
\hline
3,684 &= 1,659 \\
\hline
\end{align*}
\]

(round to either 1,700 or 1,650)