AADT:
Annual Average Daily Traffic

Revised: February 4, 2013

AADT vs. ADT

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)

AADT Data

https://connect.ncdot.gov/resources/safety/Pages/TEAAS%20Information.aspx

- 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.)

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

County AADT maps are available for the years 1999 through 2011

http://www.ncdot.gov/travel/statemapping/trafficvolumemaps/default.html
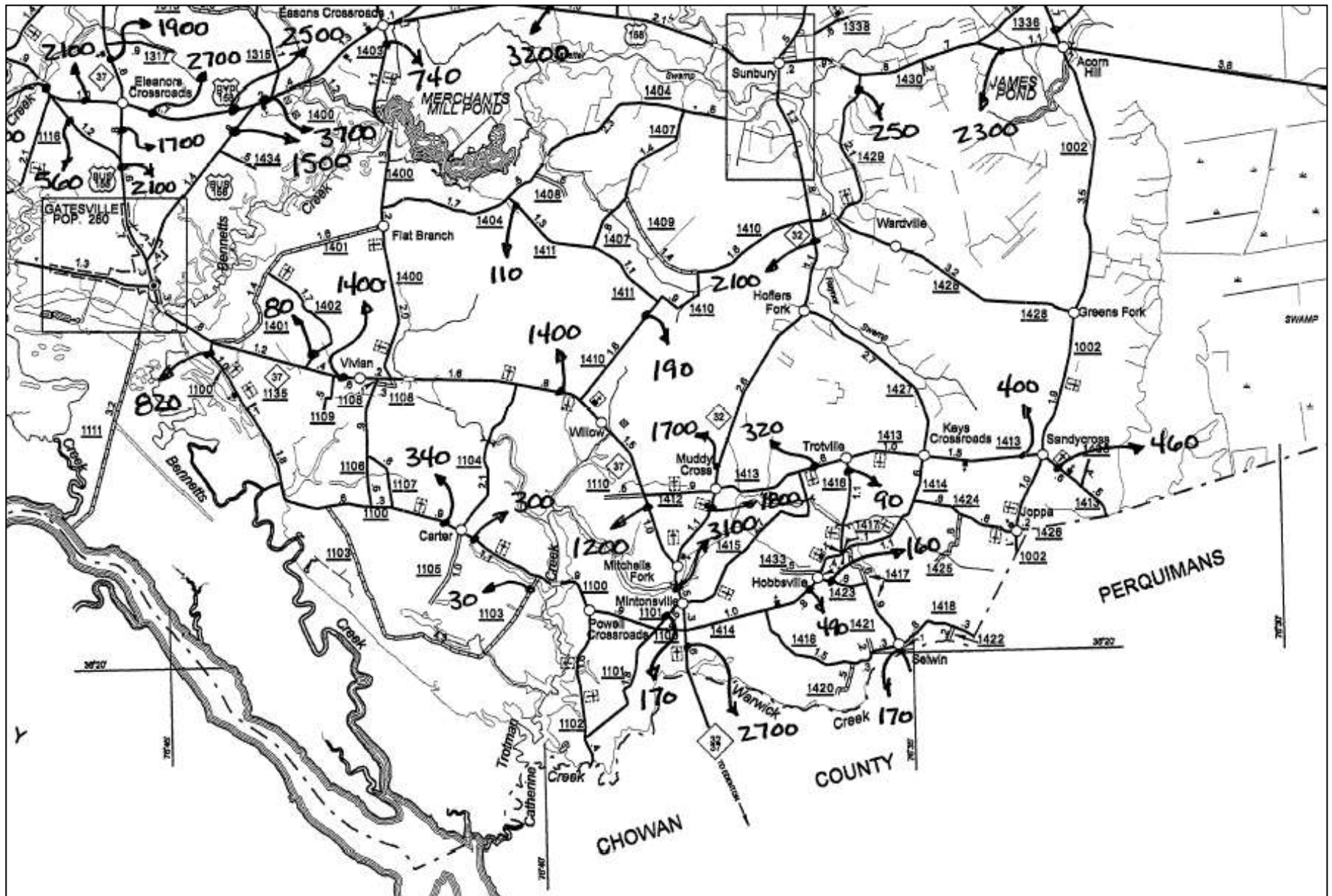
county map AADT counts (state-maintained roads only)

AADT Data (Cont.)
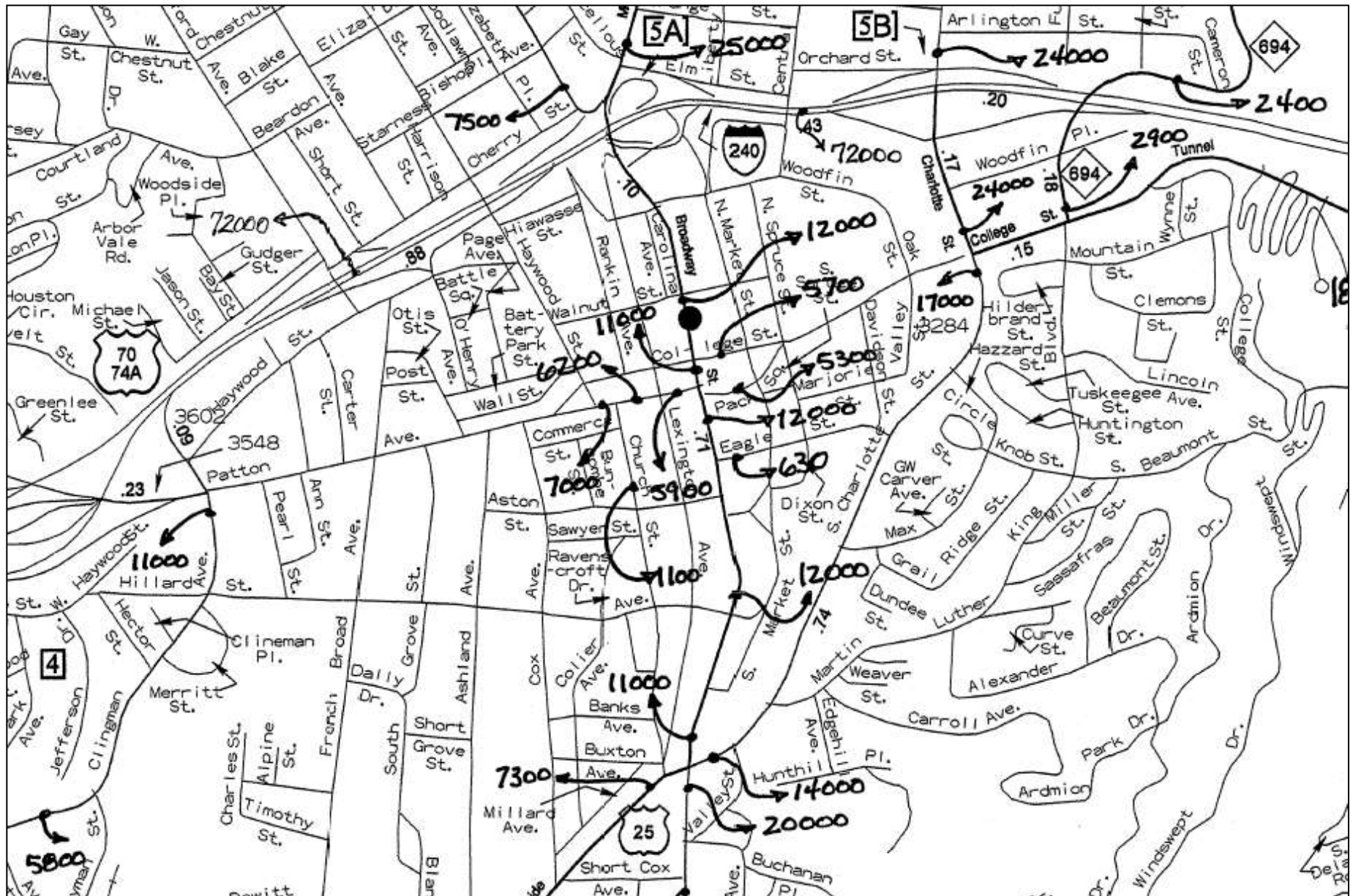
urban AADT counts (state-maintained roads + some local roads)

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:

$$CR = \frac{Crashes}{Exposure}$$

Larger volume in denominator can artificially decrease the crash rate

Traffic Volume

Median year is recommended

Smaller volume in denominator can artificially increase the crash rate

Exposure = (volume)(distance)(time)

AADT Data (cont.)

• 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!

AADT Data (cont.)

• 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.

$$\text{Adjusted AADT} = \text{AADT} * \left(1 + \% \right)^{n}$$

Where:

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

% = adjustment rate (rural or urban)

AADT Adjustment Example

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:

$$\text{Adjusted AADT} = 3{,}000 * \left(1 + 0.02\right)^2$$

$$= 3121 \approx 3{,}100$$

AADT Averages and Estimates

AADT averages and estimates can be calculated as follows…

**Example 1:
(missing year in middle)**

Year	Volume
2007	17,000
2006	?
2005	13,000

2006 = 15,000 VPD
((17,000 + 13,000)/2)

**Example 2:
(multiple missing years)**

Year	Volume
2009	25,000
2008	?
2007	?
2006	?
2005	18,000

(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)

Year	Volume
2011	?
2010	9,800
2009	9,400

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
(rounded to 10,200 VPD)

AADT Averages and Estimates Exercise

What are the volumes for 2007 and 2008?

Year	Volume
2009	10,000
2008	?
2007	?
2006	6,400

AADT Averages and Estimates Exercise

What are the volumes for 2007 and 2008?

Year	Volume
2009	10,000
2008	8,800
2007	7,600
2006	6,400

(10,000 – 6,400) / (2009 – 2006)
= 3,600 / 3 = 1,200

Therefore:
2007 = 6,400 + 1,200 = 7,600
**2008 = 7,600 + 1,200 = 8,800**

Intersection AADT Calculation

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
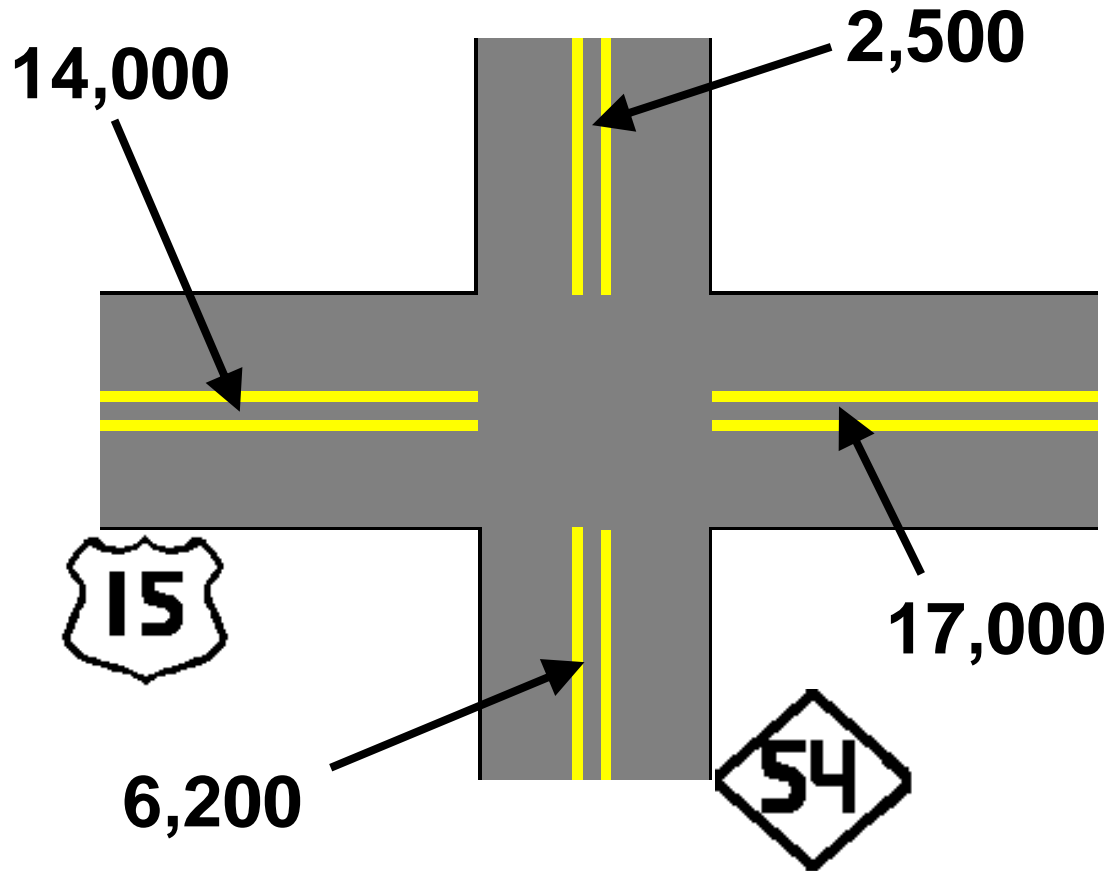
$$\frac{39{,}700}{2} = 19{,}850 \approx 19{,}900$$

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   14,000
   17,000
    6,200
 +  2,500
 _____
   39,700
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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

5,000

2,000
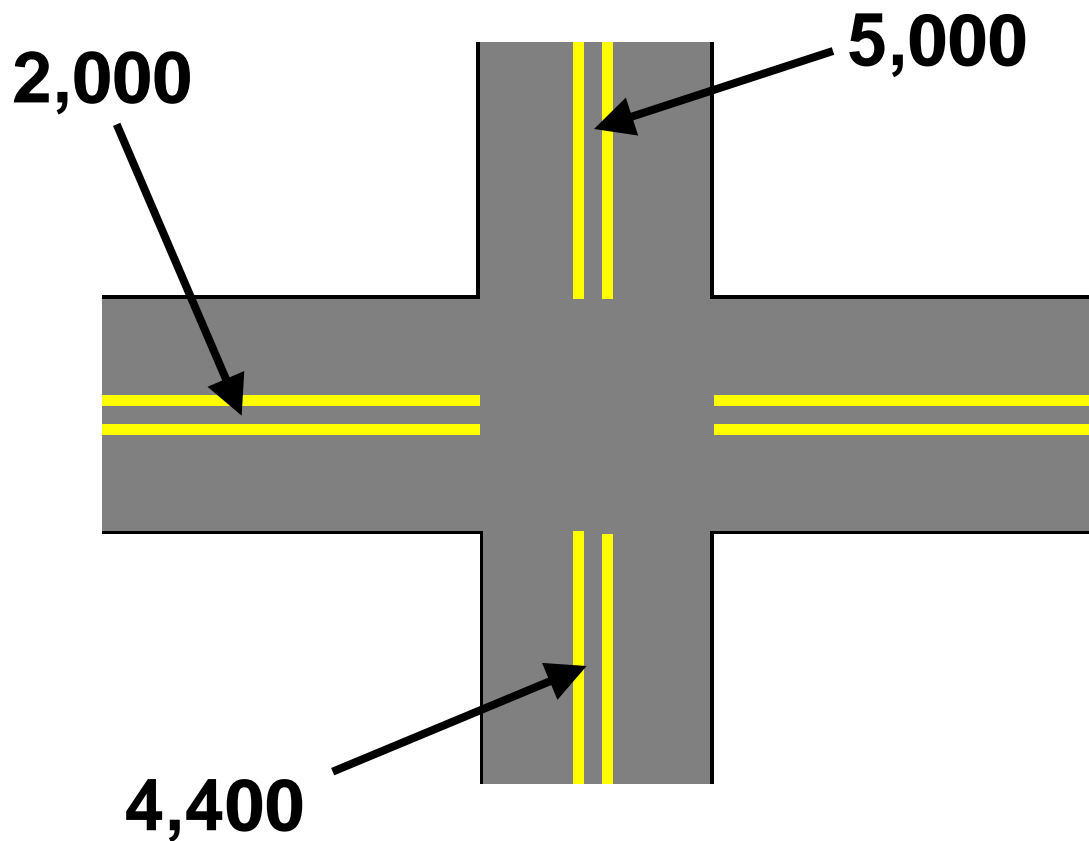
4,400

Intersection AADT Calculation Exercise
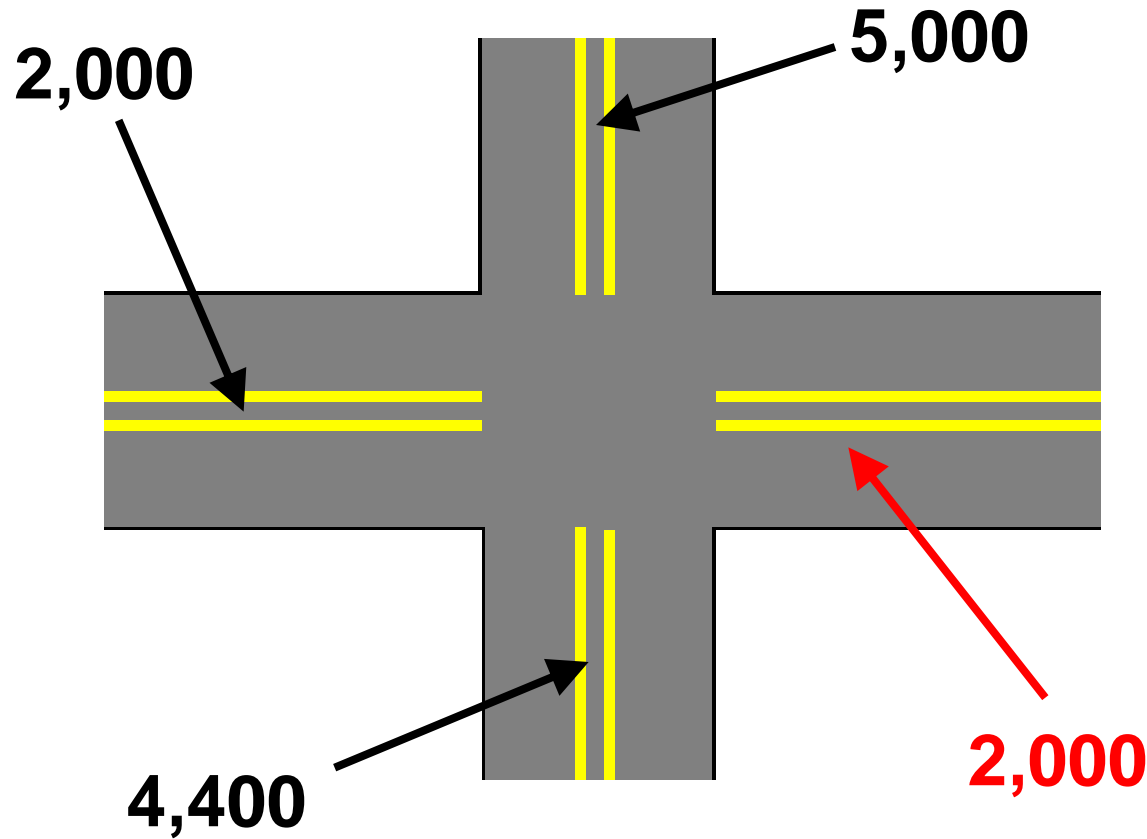
5,000

2,000

4,400

2,000

2,000
5,000
2,000
+ 4,400
13,400

$$\frac{13,400}{2} = 6,700$$

Strip AADT Calculation

- 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)

Strip AADT Calculation Example

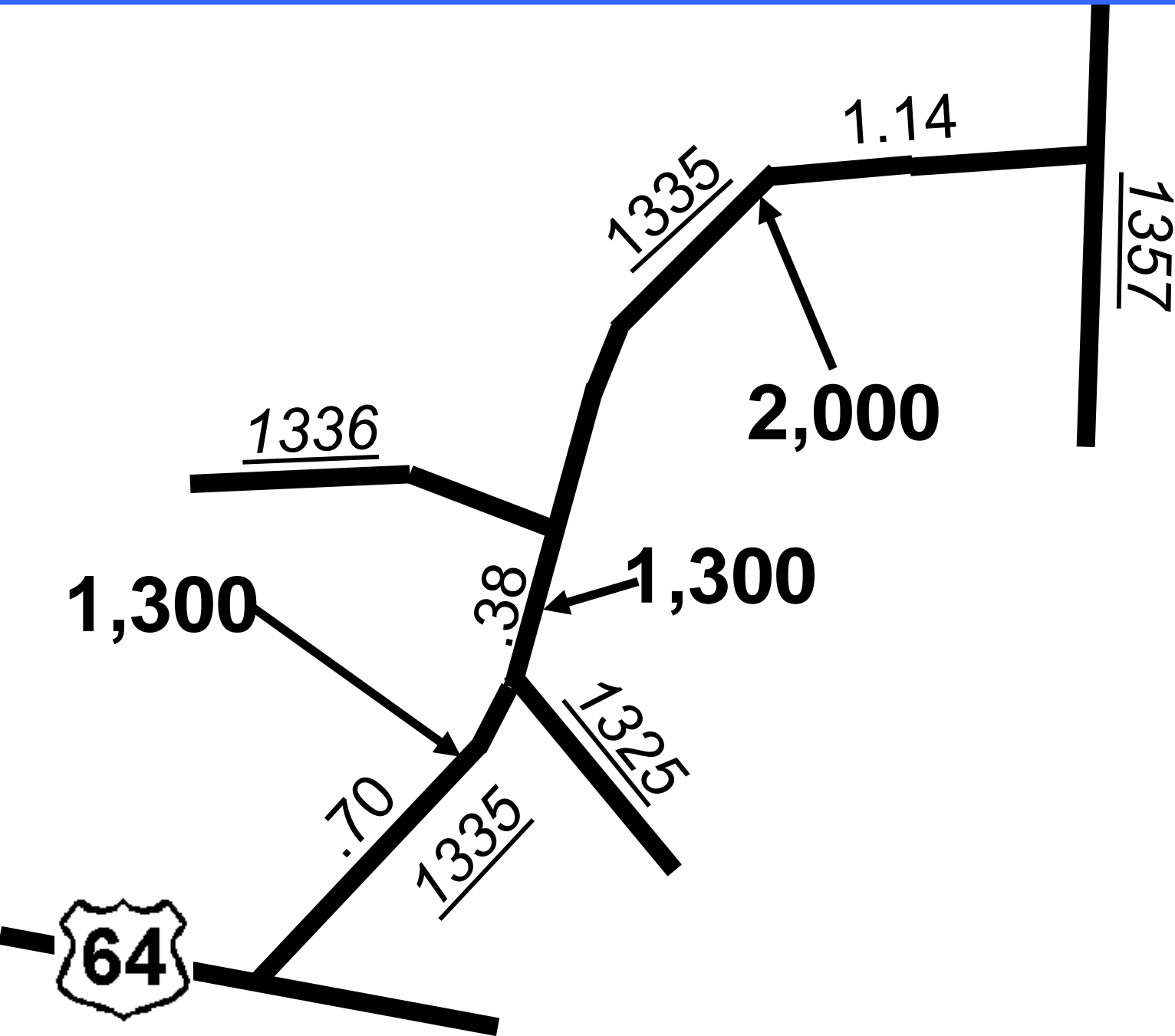*Calculate the 1998 AADT for this strip using 1997 AADT data*

|←— 0.70 Mi —→|←——— 1.20 Mi ———→|←——— 2.38 Mi ———→|

Begin   End

1,900   2,300   1,200

(1997 AADT Counts)
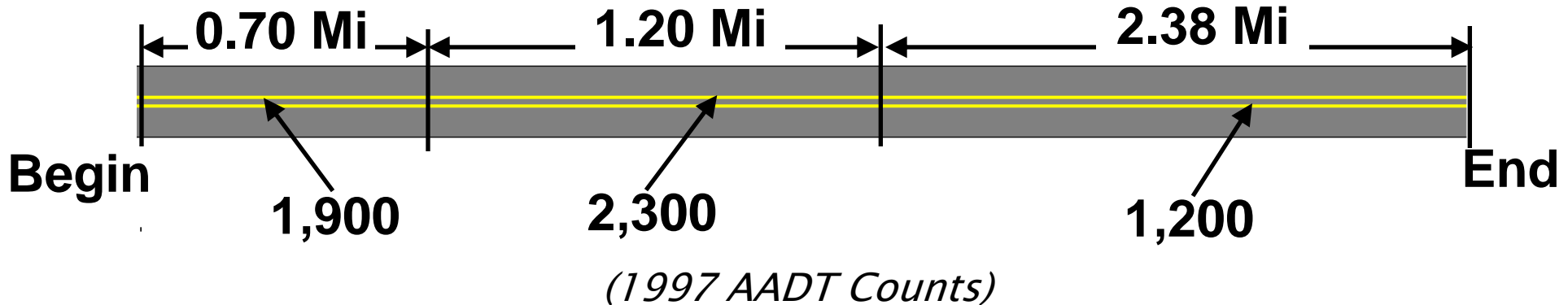
.70 mi * 1,900 =   1,330

1.20 mi * 2,300 =   2,760

2.38 mi * 1,200 =   + 2,856

                        6,946
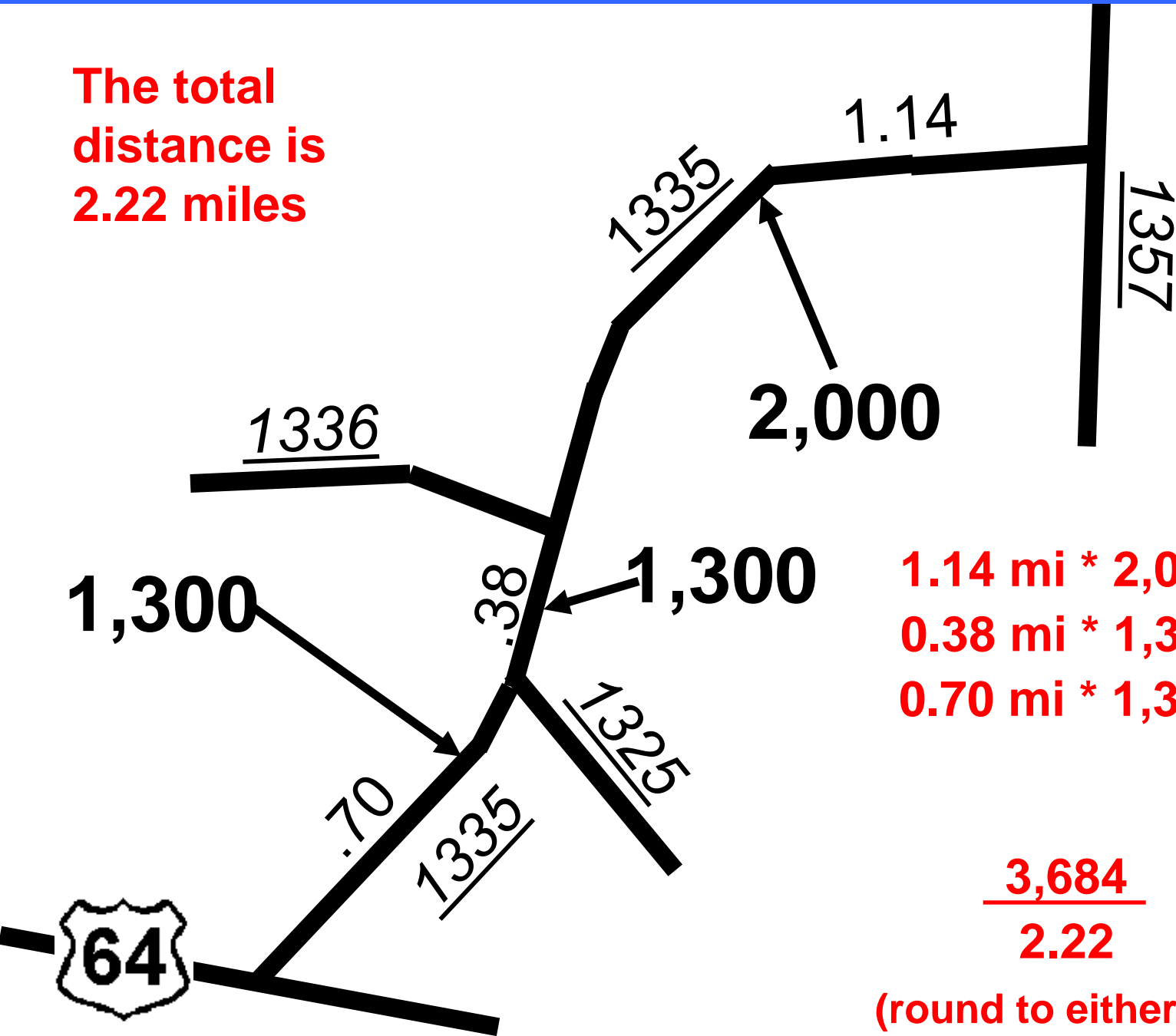
$\Longrightarrow \dfrac{6,946}{4.28} = 1,623$

Update AADT to 1998 figures: 1623 * 1.03 = 1,672 ≈ 1,700

Strip AADT Calculation Exercise

Strip AADT Calculation Exercise

The total distance is 2.22 miles

1.14

1335

1357

1336

2,000

1,300

.38

1,300

1325

.70

1335

64

1.14 mi * 2,000 =   2,280

0.38 mi * 1,300 =   494

0.70 mi * 1,300 =   +   910

                 3,684

$$\frac{3,684}{2.22} = 1,659$$

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