

Automated Bicycle Count Program: Background and Methodology

Introduction:

Each year, Hennepin County collects 48-hour bicycle counts at more than 30 locations in either the southern half or northern half of the county. Staff then look to six permanent counter locations across the county to provide year-round data, which is used to calculate Average Annual Daily Bicyclist (AADB) volumes for the 48-hour count sites.

Equipment:

Hennepin County uses MetroCount RoadPod tube counters for the bicycle counting program. Tubes are placed across a bikeway or roadway and bicycles are counted as they roll over the tube, compressing it and sending a pulse of air to the MetroCount device. This program uses unique thin-walled tubes specifically designed for counting bicycles.

Site Selection:



In locations with a shoulder or bicycle lane, tubes are placed across the shoulder or bike lane. In the absence of a dedicated bicycle facility, tubes are placed across the entire rightmost traffic lane. In locations with an existing off-street trail adjacent to the roadway, tubes are placed across the trail.

Data processing:

A one-page report is developed for each count location to illustrate the hourly trends at each site (click on “more info” in each bike count entry in the web map to view the PDF). AADB volumes are calculated for each site using data collected at permanent bicycle count sites. Much like average annual daily traffic (AADT) for motor vehicles, AADB represents the typical bicycle traffic on an average day at each location. AADB controls for weather and other daily influences so that data from all count sites can be compared to each other from year to year.

Hennepin County also calculates estimates to measure seasonal variation.

Calculating daily and seasonal averages:

Annual and seasonal average daily bicyclists (ADB) are calculated using data from permanent count sites. Permanent counters collection bicycle volumes 365 days per year and can be used to estimate how bicycle traffic on any given day compares to average bicycle traffic from the entire year. This serves as a control for weather and unknown daily factors.

The following permanent counters are used to calculate AADB/ADB for count sites:

- Central Avenue north of Lowry Avenue
- Franklin Avenue Bridge
- Park Avenue north of 28th Street
- Rush Creek Trail east of Douglas Drive
- County Road 19 (Shadywood Road) south of W Lafayette Road
- West River Parkway south of 32nd Street

Factors such as geographic location, facility type, and role in the bicycle network are considered when selecting the appropriate control site for each short-term count location.

Steps to calculate AADB are as follows:

2017 data from Site 3503, Portland Avenue S & N of 74th Street is used to illustrate AADB calculations below. Park Avenue was selected as the control site for this location.

1. Obtain a chart that lists the hourly traffic at each permanent count site for every hour of the year in which you have collected data.
2. Calculate bike volumes at the selected control site for the exact time period of each 48-hour count.
The count at site 3503 began at midnight on May 10th and ended at midnight on May 11th. A total of 960 bicyclists were counted at the Park Ave control site during the same 48-hour period.
3. Divide that number by the total volume for the year at the control site to determine the percent of annual traffic that took place at the control site during the same 48-hour period as the short-term count.

A total of 93,844 bicyclists were counted at the Park Ave counter in 2017. $960 / 93,844 = 0.01023$. Therefore 1.023% of annual traffic at the Park Ave control site occurred between midnight on May 10th and midnight on May 11th.

4. Divide the 48-hour raw counts for each short-term site by the percentage calculated in Step 3 to determine the estimated annual traffic at each location.
110 bicyclists were counted at Site 3503 during the 48-hour count period. $110 / 0.01023 = 10,752$. The estimated annual bicycle traffic at Site 3503 is 10,752.
5. Divide the estimated annual traffic at each location by 365 to get annual average daily bicycle traffic.
 $10,752 / 365 = 29$. The estimated AADB for Site 3503 is 29.

Steps to calculate monthly or seasonal averages are as follows:

1. Follow Steps 1 and 2 above, as you would for calculating AADB, in order to determine the percent of annual traffic that took place at the control site during the same 48-hour period as the short term count.
The count at Site 3503 began at midnight on May 10th and ended at midnight on May 11th. A total of 960 bicyclists were counted at the Park Ave control site during the same 48-hour period.
2. Divide that number by the total volume for the month or season of interest to determine the percent of monthly/seasonal traffic at the control site that occurred during each short-term count.
A total of 35,990 bicyclists were counted at the Park Ave counter in June, July and August. $960 / 35,990 = 0.026674$. Therefore, 2.6674% of summer traffic at the Park Ave control site occurred between midnight on May 10th and midnight on May 11th.
3. Divide the 48-hour raw counts at each location by the percent calculated in Step 2. This will give you the estimated monthly/seasonal bicycle traffic for each short-term count site.
110 bicyclists were counted at Site 3503 during the 48-hour count period. $110 / 0.026674 = 4,124$. The estimated summer bicycle traffic at Site 3503 is 4,124.
4. Divide the estimated monthly/seasonal traffic at the short-term site by the number of days in the period of interest in order to calculate the average daily bicycle traffic for that time period.
There are 92 days total during the months of June, July, and August. $4,124 / 92 = 45$. The estimated daily bicycle traffic in summer for Site 3503 is 45.

As part of Hennepin County's calculations, winter is defined as December through February and summer is June through August.

For all ADT calculations:

For one-way sites or sites where both directions were counted at the same place and at the same time, you are finished. For sites where the 48 hour raw counts are listed separately for each direction because they were calculated at different times or in different places, simply add the AADB for the two directions. Note that if counts were collected at different times or places, you need to calculate AADB independently for each direction.