INTERIM
COUNT METHODOLOGY GUIDANCE
FOR
ACTIVE TRANSPORTATION PROGRAM (ATP)

This Interim Count Methodology Guidance (Interim Guidance) is intended to guide ATP applicants and project awardees in meeting the minimum expectations for conducting user counts, surveys, and evaluation requirements for active transportation projects funded through the Active Transportation Program (ATP).

These instructions are labeled *INTERIM* to acknowledge that more research, feedback, collaboration, and documentation is needed prior to finalizing guidance on: 1) determining the number and location of the counts that should be required for varying project types and 2) only estimating the total number of active transportation users generated by ATP funds within specified project limits based on limited count locations. To this goal, the Active Transportation Resource Center (ATRC) is exploring options for developing more expansive statewide guidance for the evaluation of ATP funded projects.

This Interim Guide covers the following six topics that represent central steps to ensure that ATP applicants and awardees can provide consistent and uniform project-user data in their applications and in subsequent project progress and completion reports:

The guidance provided here shall be used for any ATP project applications which require user data and for all ATP-funded projects that receive a construction phase California Transportation Commission (CTC) allocation at or after the October 2019 meeting. Any project that has already completed the pre-construction phase counts shall use the same methodology for the post-construction counts. Since there is a vast range of evaluation and techniques that exist for collecting data on bicycle and pedestrian volumes, agencies wishing to utilize methodologies that do not conform to the methodologies shown in Tables 1 through 3, must secure approval of their methodology from the Caltrans ATP Office prior to initiating data collection efforts. See "Approval Process for Other Methodologies."
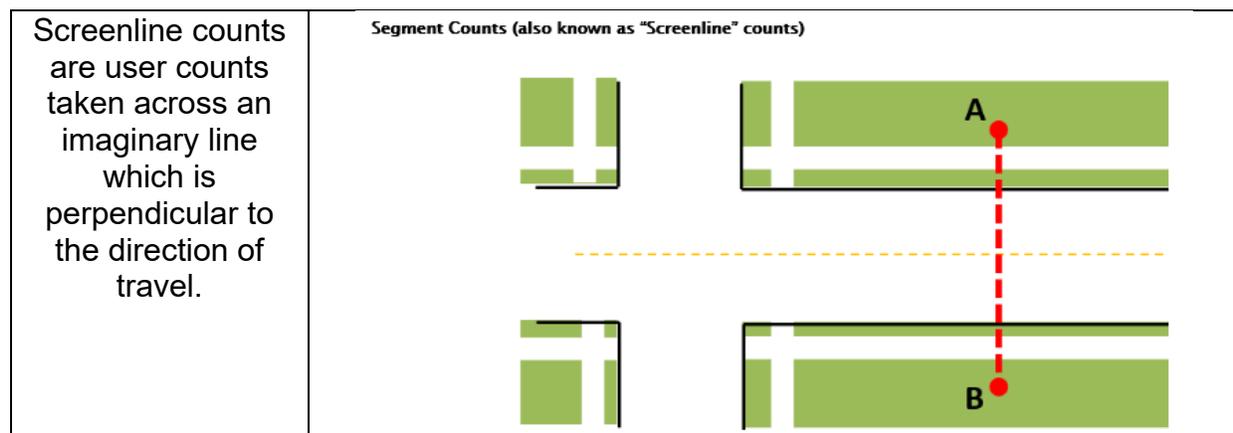
1. Determining the Type of Count Data Collection Needed

The ATP currently funds infrastructure, non-infrastructure (NI), and plan project types, as well as projects that combine infrastructure and NI strategies. While these project types necessitate different ways to collect the data, all projects (except for plan projects) are required to collect the necessary user data so that Caltrans can report on the impact of ATP investments in relation to the ATP's legislated goals and the CTC's SB 1 Accountability Requirements. Table 1 summarizes the preferred type of user data that is needed for each project type. For projects that include infrastructure and NI components, a combination of data collection strategies should be used.

As shown in Table 3, for Safe Routes to School (SRTS) and community/jurisdiction-wide NI projects, obtaining field counts is not considered an ideal methodology for project evaluation purposes. Instead, project-specific surveys and/or modeling may be more appropriate. SRTS NI awardees must complete student travel tallies. Additional details are provided in Appendix A of this document. If an agency believes an alternative method of data collection would be more suitable, it must have its methodology approved by the Caltrans ATP Office prior to beginning their data collection, see Section 6. Agencies will be asked to fully document their proposed methodology to a level that ensures consistency in how before and after user counts are conducted.

For Plan projects, obtaining "Before/After" user counts will not show any meaningful difference in volumes until an improvement identified in the plan is implemented. Therefore, agencies awarded a plan project are not required to conduct or report user counts, but they may do so if they wish to obtain current user levels.

A variety of methodologies exist for collecting user counts (Please see a list of references at the end of this guide). Common methods include screenline counts (see the diagram below), intersection counts, student travel tallies, and parent and/or community-wide surveys. In addition, within a particular methodology there are often many varieties of counting. For example, screenline counts can be completed manually, by video, using automated technologies, etc. Surveys can be administered online or in-person. This Interim Guide provides standard expectations for estimating user counts for each type of ATP project; and seeks to follow national best practices and accommodate existing regional pedestrian and bicycle count methodologies across California.

Screenline counts are user counts taken across an imaginary line which is perpendicular to the direction of travel.	

Segment Counts (also known as "Screenline" counts)

Count Data Collection Methods (Table 1)

ATP Project Types	Recommended Count Type & Method	Duration	Alternative Count Type & Method	Duration
Infrastructure (Including SRTS Infrastructure projects)	Automated 24 Hour Manual Count from Video 24 Hour	One Week	Manual In-field Counts Peak Period	4-total Hours on 3 Weekdays (T, W, TH) at 7 – 9 AM and 4 – 6 PM and 1 Weekend day 11 AM - 1 PM*
Safe Routes to School Non-Infrastructure	Classroom Student Travel Tallies (at each school in project) **	Two Days for Tallies-averaged	Automated or Manual Volume Counts (Per Infrastructure Recommendations)	
Community Wide/ Jurisdiction Wide Non-Infrastructure	Surveys***/ Modeling	Variable	Automated or Manual Volume Counts (Per Infrastructure Recommendations)	

*For manual counts, it is preferable that counts be taken on three consecutive days during the AM and PM 2-hour PEAK plus one weekend day's 2-hour peak. This interim guidance will allow an agency to opt to conduct one weekday am/pm 2-hour peak + one weekend day 2-hour peak count. If the location's 2-hour peak is different from these, that 2-hour period should be used.

** See Appendix A for details on the Student Travel Tallies.

***FHWA's Non-Motorized Transportation Pilot Program – Community Wide Evaluation Study and the Mineta Institute's Pedestrian and Bicycle Survey are two available examples. Additional ideas for collecting data to inform community-wide non-infrastructure evaluation can be also be found in Alta Planning +Design's Measure for Success: New Tools for Shaping Transportation Behavior. Your MPO may also have suggested tools and methods. See References for related links.

Note: New facilities, such as a new Class 1 trail, do not require pre-construction user counts. The initial user count will be assumed to be zero. An agency may elect to do field counts at location(s) that have an existing facility, such as a dirt trail, for reporting purposes.

2. Determining the Number of Count Locations Needed

Active Transportation Program projects vary greatly in size, shape, and type, and each of these variables directly impacts the number, location, and types of data collection efforts that are necessary to measure project success. There are well-established common practices for conducting the physical active transportation field counts (as discussed in the following sections) but little state or national guidance exists on how to determine the number and location of the counts necessary to establish reliable estimations of the total number of active transportation users within a specified project limit.

The goal of this Interim Guidance is to establish a minimum number of count locations for the widely varying ATP project types that accounts for both the limited resources available to conduct counts and the need for developing reliable user estimates for ATP reporting. This document establishes interim guidance on this topic with the understanding that it can be adjusted as more research, feedback, and data becomes available.

While this Interim Guidance acknowledges that the minimum "number" of counts is being intentionally constrained to reduce the burden on agencies implementing ATP projects, there is also an expectation that projects seeking larger amounts of ATP funding will provide higher levels of 'before vs. after' user count data. Therefore, this guidance requires larger ATP projects to provide more count locations.

For projects that include both infrastructure and NI components, a combination of data collection strategies should be used; however, the combined count requirements could produce an unintended burden on the agency. If an agency believes this applies to their project, they must have their methodology for the total number of count locations/types approved by Caltrans ATP Office prior to beginning their data collection.

The following tables provide simple, high-level guidance to ATP applicants and project implementers when determining the required/recommended evaluation to determine project success for either Infrastructure (Table 2) or Non-Infrastructure (Table 3) projects.

Data Collection Requirements for Infrastructure Projects (Table 2)

ATP Infrastructure Project Types*	Minimum Required # of count locations (# maximum)	Alternative Minimum Required # of count locations
Small Infrastructure Projects (Total Project Cost less than $1.5M)	1	N/A
Medium Infrastructure Projects Multiple Corridors/Intersections and Networks (Total Project Cost between $1.5M and $7M)	1 per two Corridors or Intersections (3 maximum)	0.05 * Total Centerline or Center lane Miles of Project[4]
Large Infrastructure Projects Multiple Corridors/Intersections and Networks (Total Project Cost greater than $7M)	1 per Corridor or Intersection (7 maximum)	0.10 * Total Centerline or Center lane Miles of Project[5]

*Includes SRTS Infrastructure Projects

[4,5]Washington State DOT, A Guidebook for When and Where to Count

Data Collection Methodology for Non-Infrastructure (NI) Projects (Table 3)

ATP Non-infrastructure Project Types	Minimum Required #	Alternative Minimum Required #
Safe Routes to School Projects	1 Set of Tallies*/School	N/A
Community/Jurisdiction Wide	Survey***	Modeling

***See Appendix A for details on the Student Travel Tallies.

***FHWA's Non-Motorized Transportation Pilot Program – Community Wide Evaluation Study and the Mineta Institute's Pedestrian and Bicycle Survey are two available examples. Additional ideas for collecting data to inform community-wide non-infrastructure evaluation can be also be found in Alta Planning +Design's Measure for Success: New Tools for Shaping Transportation Behavior. Your MPO may also have suggested tools and methods. See References for related links.

The following four examples demonstrate the wide variety of ATP Infrastructure projects. With each of these example projects, the number and location of the user counts necessary to establish reliable estimations of the total number of active transportation users within the project limits would vary.
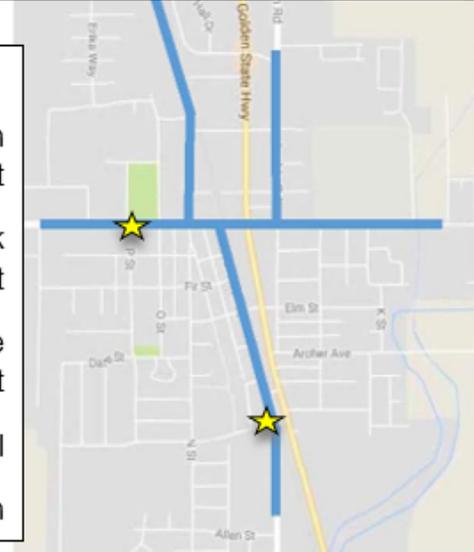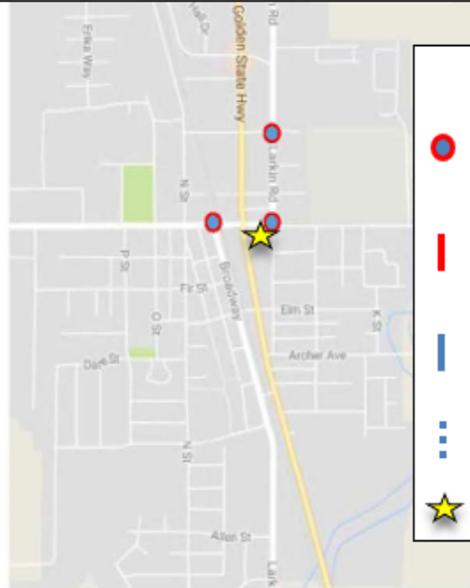
Count Location Examples 1 through 4

Example 1: $1M total project cost (Small) Intersection Improvement only project-

- Only 1 count is required
- Conduct count at intersection with highest number of expected users.

Example 2: $2M total project cost (Medium) Bike lane only project-

- 4 corridors = 2 counts are required
- Conduct counts at locations with highest number of expected users.

Legend

- 🔴 Intersection Improvement
- ❚ Sidewalk Improvement
- ❙ Bike Lane Improvement
- ⋮ Multi-Use Trail
- ⭐ Count Location

**Example 3: $1.4M total project cost (Small) Sidewalk gap closure only project-**

- Only 1 count is required
- Conduct count at a location with highest number of expected users.

Example 4: $10M total project cost (Large) With all improvement types

- 5 bike corridors, 7 intersections, 9 sidewalks = 7 counts are required
- Ideally counts would be taken at locations where both bike and pedestrian data can be gathered.
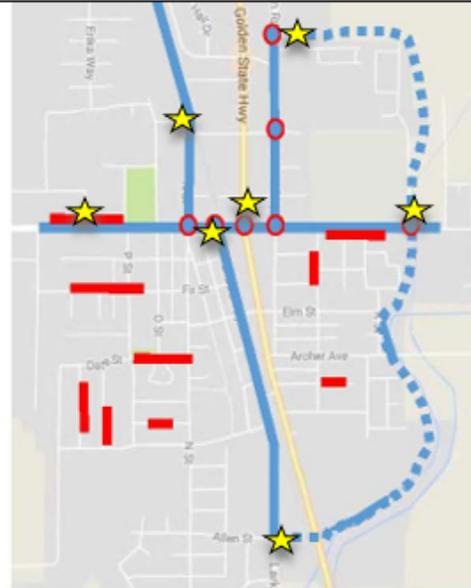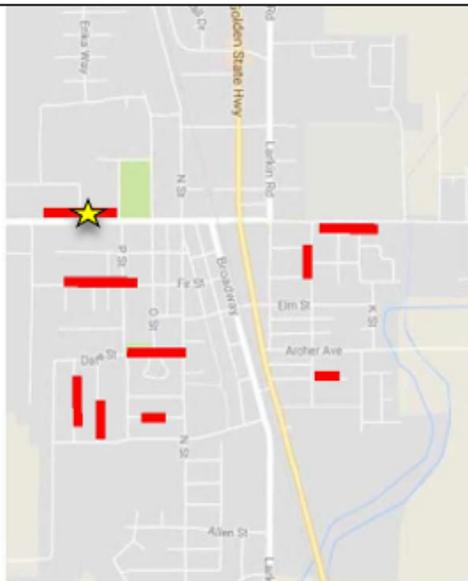
3. Selecting Count Locations

Knowing that the number of active transportation field-counts for ATP project applications is constrained, it is critical that applicants carefully select the most effective locations for their limited counts. There is no set formula for determining the best count locations, but instead there are some generally accepted best practices that need to be combined with the project implementer's knowledge and judgement of the project limits.

The following [National Bicycle and Pedestrian Documentation (NBPD) Project](#) criteria are recommended for short-duration (week-long or peak period) counts:

- Locations where pedestrian and bicycle activity is high (downtowns, near schools, parks, etc.) to increase accuracy;

- Representative locations in urban, suburban, and rural locations;

- Key corridors that can be used to gauge the impacts of future improvements;

- Locations where counts have been conducted historically;

- Locations where ongoing counts are being conducted by other agencies through a variety of means, including videotaping;

- Gaps, pinch points, and locations that are operationally difficult for bicyclists and pedestrians (potential improvement areas);

- Locations where either bicycle and/or pedestrian collision numbers are high; and

- Select locations that meet as many of these criteria as possible.

In the case of ATP projects, the following should also be considered:

- For corridors where a single count is being conducted, it should be centrally located along the corridor or at a location where volumes are expected to be high;

- For networks, counts should be spread throughout the network in varying land uses, on varying roadway types, and in locations where future improvements are expected;

- For long corridors, multiple count locations will improve the accuracy of user volume estimations.

Additional guidance on siting count locations can be found in the following resources:

- 2016 FHWA Traffic Monitoring Guide (TMG) (Chapter 4): https://www.fhwa.dot.gov/policyinformation/tmguide/tmg_fhwa_pl_17_003.pdf

- Nation Cooperative Highway Research Program (NCHRP) 797 – Guidebook on Pedestrian and Bicycle Volume Data Collection (Chapter 3): https://www.nap.edu/catalog/22223/guidebook-on-pedestrian-and-bicycle-volume-data-collection

- Washington State Department of Transportation – Collecting Network-wide Bicycle and Pedestrian Data: A Guidebook for When and Where to Count (Chapter 4): https://www.wsdot.wa.gov/research/reports/800/collecting-network-wide-bicycle-and-pedestrian-data-guidebook-when-and-where

- SCAG Active Transportation Database (Creating a Count Program): https://atdb.scag.ca.gov/Pages/Tutorials.aspx

For SRTS Infrastructure projects, there should be at least one count at each school served by the project. Count location(s) should be conducted along the improved route where volume is expected to change. As previously noted, for SRTS NI projects, agencies can work with local school administrators to administer in-classroom Student Travel Tallies to determine the number of students walking to and from school, instead of field-counts. (See Appendix A).

4. Conducting Pedestrian and Bicycle Counts:

In an effort to create consistency for ATP applications/projects in how user counts are conducted and the resulting data, this Interim Guide establishes baseline requirements for user counts and recommends that all fields-counts be consistent with Southern California Association of Governments (SCAG) Active Transportation Database. Agencies not wishing to use SCAG's methodology and database should follow the guidance in the Federal Highway Administration 2016 TMG and/or the NCHRP Report 797 (listed on page 7 as well as in the Reference section).

All of these best practices will impact the resulting count data and are required to be followed for ATP projects:

- General consistency for all methods

  a. All counts should be conducted no more than six months before the construction phase begins and again at least six months after it is completed. If this timeframe would make item *b* below impossible, the agency should receive approval for an alternative date. Agencies are encouraged but not required to conduct additional counts two years after the project has been completed, to allow projects to come to "maturity."

  b. Before and after user counts are to be conducted at the same location on the same days of the week, the same time(s) of day, and the same week of the year. This will reduce the chances of variability due to seasonal or daily changes in travel behavior.

     i. If inclement weather or another constraint is present, counts should be rescheduled to the next possible day that is the same day of the week. For example, if the count was expected to take place on a Tuesday-Thursday-Saturday during the second week of July, and it rained, the count should be rescheduled for the Tuesday-Thursday-Saturday in the third week of July.

  c. Consistency related to location, time of year and weather conditions is extremely important and should be accounted for prior to initiating user data collection.

- Consistency in tracking and recording data in before and after counts:

  a. Counts should be consistent with the 2016 TMG format.

     i. In basic terms this means that directionality (flows) and the mode of travel should be captured for each facility being measured. For

example, a typical screenline count on a two-way street with sidewalks would have four facilities (two sidewalks and either two bikeways or two general travel lanes) and a minimum of eight mode/direction combinations. This assumes only bikes and pedestrians are counted. If wheelchairs and other wheeled devices are captured there would be sixteen combinations. *SCAG's Active Transportation Database is consistent with this methodology. Agencies interested in using SCAG's methodology and storing their data in the database should contact atdb@scag.ca.gov to discuss coordination.*

    ii. Alternatively, aggregate information can be gathered for a location for all facilities in each direction for each mode/direction combination. This method is usually used for trails or with manual counts using paper tally sheets to reduce the complexity for the counter.

b. Counts should be conducted at the lowest level of aggregation possible. Typically for automated counters, this can be done with timestamps for each bicyclist or pedestrian. SCAG's mobile Bike Ped Counter application also allows for timestamped data for each record. For manual counts, data should be aggregated into 15-minute increments or bins. 15-minute bins are also acceptable for automated counters.

c. Manual Counts:

    i. For manual screenline counts, SCAG has developed a paper count form and a mobile application that can be used to count locations: https://atdb.scag.ca.gov/Pages/Tutorials.aspx. As noted above, agencies can use other formats if they conform to Federal Highway Administration 2016 TMG and/or the NCHRP Report 797.

    ii. For manual intersection counts, NCHRP 797 (pg. 119-120) should be consulted and a 12-movement method should be used to capture the entry and exit of each bicyclist and pedestrian. Agencies can use other formats if they conform to the TMG standards.

Typical intersection 12 movements, 4 through, 4 right tuns, and 4 left turns	
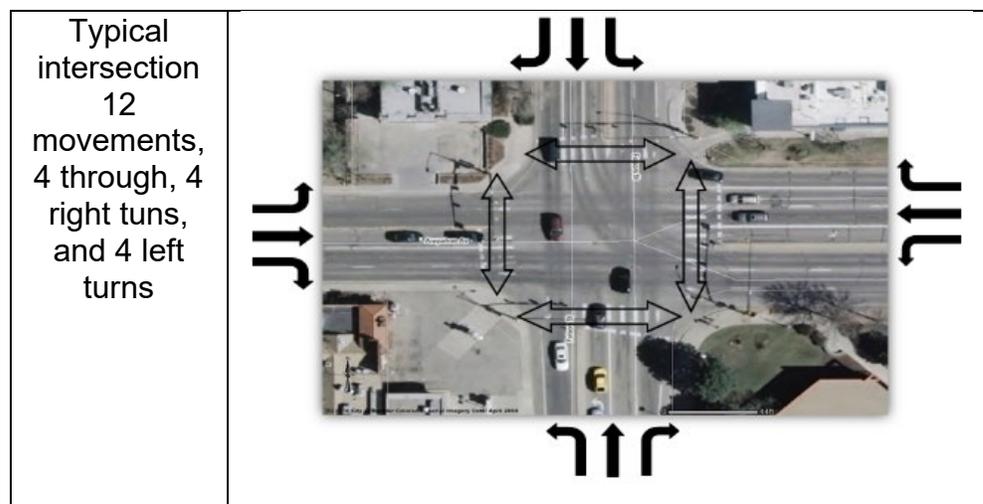
iii. User data such as helmet use, gender, and age should be captured when possible.

iv. Ideally, counts would be taken on three consecutive weekdays or for a continuous 24-hour period to provide more accurate measurements. This Interim Guide allows data to be collected for a minimum of six hours at each location including one weekday AM and PM peak, and one weekend day peak. See table 1.

d. Automated Counts:

i. Automated Counts should be completed for a minimum of 24 hours per day for one week.

ii. A variety of technologies and methods currently exist for collecting both bicycle and pedestrian counts. Please see the Reference section at the end of this document that include recommendations on technology types.

- Safe Routes to School Non-Infrastructure

    a. Appendix A has additional guidance for conducting student travel tallies.

    b. If the project only spans one school year, tallies should be taken on the same days of the week on days with similar temperature and weather conditions.

- Community wide/Jurisdiction wide Non-Infrastructure

    a. Surveys can utilize in-person or electronic methods, but implementers should consider how the target community will access the platform and resource the effort accordingly. This may require paid staff to conduct surveys in person.

    b. Modeling efforts should be conducted in partnership with county and regional planning organizations whenever possible.

    c. The use of big data will be considered by Caltrans on a case by case basis until final guidance on this topic can be developed. Agencies wishing to use big data sources should secure prior approval.

5. Estimating the Total Volume (Number of Users) within the Project Limits:

Once the actual field-count data has been collected (manual or automated or surveys), the final step in the ATP reporting process is to estimate the total number of active transportation users within the proposed project limits.

> **For the Active Transportation Program, the units for a project's total number of users are to be in <u>Daily Pedestrian Volume</u> and <u>Daily Bicycle Volume</u>**

For this Interim Guide, the priority has been to establish a consistent and repeatable approach for estimating the total number of users for the individual ATP projects. For ATP reporting purposes, establishing a methodology that will result in consistent before

and after counts for individual project analysis is a higher priority than the numeric accuracy of the total number of users.

In order to make a highly reliable estimate of the total number of users within a project's boundaries based on a relatively small number of spot-location counts, extensive details of the active transportation travel patterns and complex calculation-factors are required.

It is understood that at the time this guidance is being developed, these details and corresponding calculation-factors are not available for most California cities and counties. Therefore, in this interim guidance, the number of factors and the complexity of the adjustment calculations are intentionally constrained, with the goal of meeting the needs of ATP reporting while minimizing the time and resources to complete the calculations.

This ATP guidance breaks the "total volume" for bicyclists and pedestrians calculation process into two steps:

> <u>Step 1</u>- Converting the count data into Average Daily Volume for each of the individual count locations:
>
> > For this Interim Guide, the Average Daily Volume will be an average for the whole week. For most projects with will be an average of the 5 weekdays and 2 weekend days. The process for calculating this single value for each count location will vary significantly based on "Type of Count Data Collection Needed". With this in mind, two calculation methodologies are provided (24-hour counts and Manual Partial-day counts):
> >
> > **24-hour Counts**:
> > - For locations with a full week of 24-hour count data, the calculation is much easier. The implementing agency can simply take the total users for a 7-day period and divide by 7.   The result = "Total Daily Volume" for the individual count location ($tdt_{c\text{-}location}$).
> > - Use this number in <u>Step 2</u>.
> >
> > **Manual Partial-Day Counts**:
> > - For locations with partial-day field counts, each weekday and weekend field-count will be converted into an estimation of the "Total Daily Volume" for the full 24-hour period.
> > - In order to do this, there needs to be a method of estimating the number of users in each hour of the weekday and weekend for the specific count location.
> >   a. Ideally, this distribution of "<u>Daily Pedestrian Volume</u>" and "<u>Daily Bicycle Volume</u>" would be known for each count location. But at the time this guidance is being developed, this is not a practical expectation.
> >   b. In locations where this active transportation data is not known, daily vehicle average daily traffic counts ($\#_{td}$) can be used. (If traffic

count data for the exact count location is not available, the agency should use data from a nearby location)

- Once the 24-hour vehicle count is made for each location ($\#_{td}$), then the pedestrian and bicycle count data collected for the peak hours on the weekdays and weekends can be extrapolated into 24-hour totals.

- The following is a brief example of how to convert the count data into total Average Daily Volume for each of the individual count locations. (Note: This process needs to be completed for both "Pedestrian" and "Bicycle" counts.) ***For examples, see Appendix B.***

     Converting Weekday Counts Example: 7 – 9 AM and 4 – 6 PM counts:
     1. If counts were taken on multiple weekdays, the first step is to calculate a single average total count value for each of the blocks of times counted.
     2. Using the 24-hour <u>vehicle</u> count total for an average weekday ($\#_{td\text{-}weekday}$), calculate the general ratio of the pedestrian and bicycle counts between 7-9 AM ($\#_{7\text{-}9}$) plus 4-6 PM ($\#_{4\text{-}6}$) as compared to the full 24-hour counts. Here is a sample calc:
        $$(\#_{7\text{-}9} + \#_{4\text{-}6}) / \#_{td\text{-}weekday} = \text{ratio of count volumes vs. total volumes } (rv_{weekday})$$
     3. Then divide the sum of the actual count data collected from 7-9 AM and 4-6 PM by this general ratio.
        $$(Count\#_{7\text{-}9} + Count\#_{4\text{-}6}) / rv_{weekday} = \text{an estimation of the total daily volume for the full 24-hour period of an average weekday } (tdt_{weekday}).$$
     Converting Weekend Counts Example: Saturday 11 AM - 1 PM count:
     1. Using the 24-hour vehicle count for an average weekend ($\#_{td\text{-}weekend}$), calculate the general ratio of the counts between 11AM - 1 PM ($\#_{11\text{-}1}$) as compared to the full 24-hour counts. Here is a sample calc:
        $$(\#_{11\text{-}1}) / \#_{td\text{-}weekend} = \text{ratio of count volumes vs. total volumes } (rv_{weekend})$$
     2. Then divide the actual count data collected from 11AM - 1 PM by this general ratio.
        $$Count\#_{11\text{-}1} / rv_{weekend} = \text{an estimation of the total daily volume for the full 24-hour period of an average weekend } (tdt_{weekend}).$$
     Converting Weekday and Weekend volumes into an Average Daily Volume:
     1. Once the total daily volumes are estimated for the weekdays ($tdt_{weekday}$) and weekend-days ($tdt_{weekend}$), then these values can be used to calculate a single average "Total Daily Volume".
     2. Take 5 times the weekday value plus 2 times the weekend-day value and divide by 7

(5 x $tdt_{weekend}$ + 2 x $tdt_{weekend}$) / 7 = total daily volume for the count location ($tdt_{c-location}$)

3. *Use this number in Step 2.*

For SRTS and/or other project/count types:
- ATP includes a wide range of projects that are expected to utilize very different count types that result in many different types of count data.
- For this interim guidance, local agencies are expected to establish **consistent and repeatable approaches** for estimating the total daily volume for each of their count locations. Agencies are encouraged to consult with Caltrans staff as they establish their approaches.

Step 2- Converting the Average Daily Volume(s) into a single Total Project Volume:

With each of the project's count-location volumes converted into a single "Total Daily Volume" value (separate values for "Pedestrians" and "Bicycles"), the final step is to convert these Total Daily Volume values for each count-location into an estimation of the project's total number of users presented in total "Daily Pedestrian Volume" and total "Daily Bicycle Volume".

Note: For this step (more than for any of the previous steps), the emphasis is placed on establishing a methodology that will result in consistent and repeatable before and after counts for individual projects. For this Interim Guidance, the numeric-accuracy of the following calculations will vary widely depending on the size and complexity of each individual project.

Projects with a single improvement location using a vehicular count data conversion:
- When the total daily volume calculated for the count location is considered a reasonable approximation of the total daily volume of users within the overall the project limits, then the 'total daily volume' value from Step 1 (above) can be used as the final total volume of users in the project limits.
  1. The 'daily volume' value from step 1 should be multiplied by an adjustment factor(s). This factor is expected to vary based on the number and length of improvement locations within the overall project limits.
  2. **This factor must be the same for the before and after counts**.
  3. This factor must be established by the implementing agency.
  4. The following two brief example calculations are intended to provide the implementing agency some insight on how to establish this factor. This example is based on Count Location Example1 shown above on Page 6 in Section 2 of this guidance.

  For an example of how to develop and utilize this process see Appendix B.

Count Location Example 1- This example shows a project improving 3 intersections with only one count location:

- When the project includes multiple corridors/intersections and/or long corridors, the single count location is probably not a reasonable approximation of the total volume of users in the project limits. For these projects, a second calculation is needed to convert the single location volume to an approximate total daily volume of the overall the project limits:

    - If the agency has reason to believe that each intersection will have similar numbers of users and most users-trips only cross through one of the intersections, then the agency can simply multiply the 'total daily volume' value calculated in Step 1 by a factor of 3:

        $tdt_{c\text{-location}}$ x 3 = total daily volume for the entire project limits

    For an example of how to develop and utilize these factors, see Appendix B, Example 1.

    OR
    - If the agency has reason to believe that each intersection will have widely varying numbers of users, then the agency could multiply the 'total daily volume' value calculated in Step 1 by 2 different factors for the intersections not counted:

        $tdt_{c\text{-location}}$ + $tdt_{c\text{-location}}$ x Factor 1 + $tdt_{c\text{-location}}$ x Factor 2 = total daily volume for the entire project limits

    For an example of how to develop and utilize these factors, see Appendix B, Example 1A.

    OR
    - If the agency has reason to believe that a large percentage of the users at the count location are also traveling through the other intersections, then a reduction-factors should be applied to the other two intersections, so multi-location user-trips are not double counted:

        $tdt_{c\text{-location}}$ + $tdt_{c\text{-location}}$ x Reduction-factor 1 + $tdt_{c\text{-location}}$ x Reduction-factor 2 = total daily volume for the entire project limits

    For an example of how to develop and utilize these factors, see Appendix B, Example 1B.

Count Location Example 3: This example project shows a project improving numerous (9) small segments of sidewalk with only one count location:

- If the agency has reason to believe that each segment of sidewalk will have widely varying numbers of users, then the agency could multiply the 'total daily volume' value calculated in Step 1 by different factors for each of the segments not counted:

$$tdt_{c\text{-location}} + tdt_{c\text{-location}} \times Factor\ 1 + tdt_{c\text{-location}} \times Factor\ 2 + tdt_{c\text{-location}} \times Factor\ 3 + tdt_{c\text{-location}} \times Factor\ 4 + tdt_{c\text{-location}} \times Factor\ 5 + tdt_{c\text{-location}} \times Factor\ 6 + tdt_{c\text{-location}} \times Factor\ 7 + tdt_{c\text{-location}} \times Factor\ 8 = \text{total daily volume for the entire project limits}$$

For an example of how to develop and utilize these factors, see Appendix B, Example 3.

AND

- If the agency has reason to believe that a large percentage of the user-trips at the count location (or on a corridor) are also traveling through one or more of the other segments/corridors, then reduction-factors should be applied so the expected multi-location user-trips are not double counted.

Projects with multiple count locations:

- When the sum of the total daily volumes calculated for the count locations is considered a reasonable approximation of the total daily volume of users within the overall the project limits, then the sum of the 'daily volume' values from each location in Step 1 (above) can be used as the final total volume of users in the project limits.
- When the project includes multiple corridors and/or intersections where counts were not taken, then the sum of the total daily volumes calculated for the count locations is probably not a reasonable approximation of the total volume of users in the project limits. For these projects, a second calculation is needed to convert the count location volumes to an approximate total daily volume of the overall the project limits:
  1. The 'daily volume' values calculated from Step 1 need to be multiplied by an adjustment factor. These adjustments are expected to vary based on the number and length of improvement locations within the overall project limits. These factors will need to account for each of the corridors and/or intersections that did not have counts collected at them.
  2. **This factor <u>must be the same</u> for the before and after counts**.
  3. This factor must be established by the implementing agency.
  4. The following two brief example calculations are intended to provide the implementing agency some insight on how to establish this factor. These examples are based on the count location

examples shown above on Page 6 in Section 2 of this guidance.
***For an example of how to develop and utilize these factors,
see Appendix B.***

Count Location Example 2: This example shows a project adding Class 2 bike lanes to 4 corridors with only two required count locations:
- For projects with multiple count locations and with additional improvement corridors locations that don't require counts, the implementing agency needs to consider adjustment factors for the segments/corridors with and without count locations.
- Where the agency believes that the field count volume(s) is a good representation of the total volume for one or more of the corridors, then they can simply use that value for the total daily volume for the corridor.

$$tdt_{c\text{-}location\text{-}1} + tdt_{c\text{-}location\text{-}2} + tdt_{c\text{-}location\text{-}(1\ or\ 2)} \times Factor\ 1 + tdt_{c\text{-}location\text{-}(1\ or\ 2)} \times Factor\ 2 = total\ daily\ volume\ for\ the\ entire\ project\ limits$$

***For an example of how to develop and utilize these factors,
see Appendix B, Example 2.***

Count Location Example 4: This example project shows a large project improving 5 bike corridors, 7 intersections, and 9 sidewalk segments with only 7 count locations:
- Although this project has far more improvement locations than any of the other examples discussed above, the process for estimating the volume at each of the project's improvement locations and then summing them together is similar.   Therefore, this guidance will refer to the other examples instead of restating the same process for this example project.

SRTS NI Projects:
- For SRTS NI projects that have Student Travel Tally Project data the method to calculate the Average Daily Bicycle and Pedestrian Volumes is as follows:

  o <u>Pedestrian Volume</u> = Enrollment multiplied by the AM plus PM Walk percentages (as a decimal) divided by two.

  o <u>Bicycle Volume</u> = Enrollment multiplied by the AM plus PM Bike percentages (as a decimal), divided by two.

  For an example of how to develop and utilize this process* see *Appendix A.

6. Approval Process for Other Count Methodologies:

If an agency determines that none of the previously mentioned methodologies are appropriate for their project they can request that Caltrans Office of State Funded projects approve a substitute methodology. The process is as follows:

- Contact your ATP Manager and notify them that you are planning to request approval of a count method that is not mentioned in this guidance.
- E-mail the manager your proposed count methodology and equations along with a map that indicates your proposed count locations.
  - Include any reference literature that supports your proposed method.
- Count methodology approval will be made via an e-mail and may take up to one month.

Glossary:

- Allocation

  When a project is ready to proceed, the CTC must vote to allocate the funds. Any work that is started prior to the funds being allocated is not eligible for reimbursement.

- Centerline or Centerlane mile

  The length of a roadway from its starting point to its endpoint.

- Non-Infrastructure (NI)

  A project that does not result in construction; but does education and encouragement activities.

- Infrastructure

  A project that constructs facilities, such as bike lanes or sidewalk.

- Plan project

  A community-wide active transportation plan, including bike, pedestrian, safe routes to schools, or comprehensive active transportation plans.

- Screenline Counts or Segment Counts

  User counts taken across an imaginary line which is perpendicular to the direction of travel.

- Parent Surveys

  A survey designed to help understand the various forms of travel used by students use to get from home to school and back.

- Student Travel Tallies

  Data on how students get from home to school and back.

<u>Appendix A – Interim SRTS NI Count Guidance</u>

This guidance addresses minimum standards for evaluation data collection for ATP Safe Routes to School Non-Infrastructure awardees. All ATP applicants and awardees must do the necessary advanced preparation to ensure pre- and post-project data collection protocols meet the following requirements for each school targeted by the project or covered under the umbrella of the project for a school district/region-wide project:

- *Utilization of the National Center for Safe Routes to School (NCSRTS) Student Travel Tally form and protocol OR utilization of an existing regional or local Student Travel Tally form that captures student travel mode data similar to the NCSRTS tool.* NCSRTS forms and an online data management system is available, free of charge, at http://saferoutesdata.org. Please check with your MPO to see if an alternate form may be available.

- *Administration of the Student Travel Tally on two (2) separate days within the same week.*

- *Consistent timing of pre-project implementation ('Before') data collection*:

  o Within six (6) months prior to the implementation of the first ATP public education, encouragement or enforcement activity, and

  o Within the regular school year.

- *Consistent timing of post-project implementation ('After') data collection:*

  o Within six (6) months after the completion of the last ATP public education, encouragement, or enforcement activity;

  o Within the regular school year; and, if possible,

  o Within the same month and roughly the same days during which the 'Before' data collection occurred.

ATP awardees that conducted Student Travel Tally counts as part of their ATP application may be able to use that data for their 'Before' count reporting requirements if the data meet the standards above and were conducted within a year of the program's initial education, encouragement, or enforcement activity start date. Agencies must verify this allowance with the Caltrans ATP NI Program Manager and will need to document this information as part of their ATP reporting requirements.

ATP applicants and awardees must submit tally summary reports for each school and/or aggregate reports that combine data from multiple schools as part of their applications and/or project reporting requirements. Additional assistance on meeting the data

(Appendix A continued)

collection requirements are available from the Active Transportation Resource Center by emailing atsp@cdph.ca.gov.

Student Tally report conversion to Average Daily Bicycle and Pedestrian Volumes

The Travel Tally Project is a TWO (2) DAY in-classroom data collection exercise to capture how students travel to and from school. Analysis of students' travel behavior assists Safe Routes to School (SRTS) in developing plans to reduce speed and promote responsible travel by adults and children on our city streets.
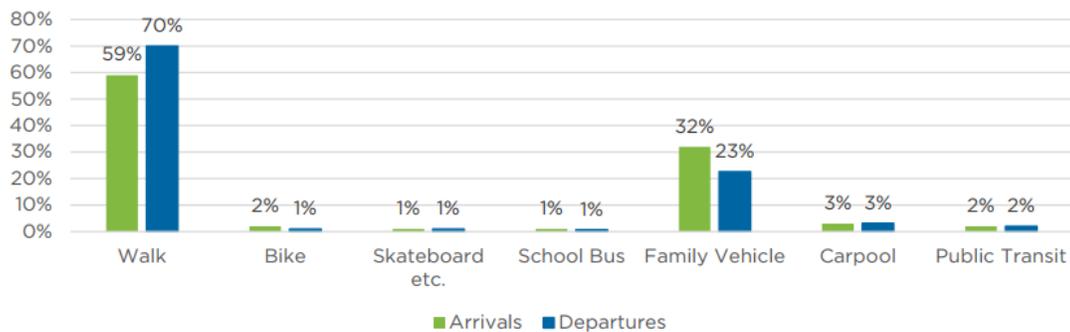
Dates of Data Collection: Sept 13th and 14th, 2017
Weather: Sunny

Students:
- Enrollment   715
- Survey Participation   71%

Student Mode Share by School Arrival vs Departure

The calculations for the Safe Routes to Schools Average Daily Bicycle and Pedestrian Volumes will be as follows (the data from this report shows that the data for kindergarten was collected, but was not utilized in calculating the percentages shown above):

Average Daily Pedestrian Volume= 715 * (.59 + .70) = 922.4 / 2 = **461**

Average Daily Bicycle Volume= 715 * (.02 + .01) = 21.4 / 2 = **11**

Overview of the Safe Routes to School Evaluation Data System

In 2006, the National Center for Safe Routes to School (NCSRTS) (www.saferoutesinfo.org) developed a centralized data collection and reporting system to evaluate the uptake of the Federal SRTS Program. Use of the NCSRTS Data System has the potential to save valuable ATP resources by eliminating the need for ATP SRTS NI awardees to design their own data collection process. This system is available online at http://saferoutesdata.org/. Use of the data system is free for participating SRTS practitioners.

(Appendix A continued)

The NCSRTS' Data System allows local, regional, and state SRTS partners to enter/view data from a standardized Student Travel Tally form. The system can generate summary reports to make it easy to share findings about walking and biking rates for students.

Overview of NCSRTS Student Travel Tally form

The Student Travel Tally form captures how students get to and from school over a few days (Tuesday – Thursday) in a given week. This form requires an in-class hand-raising protocol to collect data and a prepared individual to count and record the data on either electronic or paper form.

The NCSRTS Student Travel Tally demonstrates high test-retest reliability and validity with parental responses. More information is available here: https://activelivingresearch.org/reliability-and-validity-safe-routes-school-parent-and-student-surveys

ATP applicants/awardees must register for an account at http://saferoutesdata.org to use the NCSRTS Data System.

The NCSRTS has prepared a helpful resource entitled *Navigating the Data System 2.0* to assist data system users with getting started: http://saferoutesdata.org/downloads/SafeRoutesData_NavigatingtheDataSystem_2.0.pdf

Additional support is available by contacting: data@saferoutesinfo.org

Additional tips from the NCSRTS for Working with Schools
(http://guide.saferoutesinfo.org/evaluation/ways_to_collect_information.cfm)

Data collection will require close coordination with the school. Schools may have rules about collecting information from students. Data collection will require time and commitment from teachers, school staff, and administrators in order to be successful.

<u>References</u>

2016 FHWA Traffic Monitoring Guide (TMG) (Chapter 4):
https://www.fhwa.dot.gov/policyinformation/tmguide/tmg_fhwa_pl_17_003.pdf

Nation Cooperative Highway Research Program (NCHRP) 797 – Guidebook on Pedestrian and Bicycle Volume Data Collection (Chapter 3)
https://www.nap.edu/catalog/22223/guidebook-on-pedestrian-and-bicycle-volume-data-collection

Washington State Department of Transportation – Collecting Network-wide Bicycle and Pedestrian Data: A Guidebook for When and Where to Count (Chapter 4):
https://www.wsdot.wa.gov/research/reports/800/collecting-network-wide-bicycle-and-pedestrian-data-guidebook-when-and-where

SCAG Active Transportation Database (Creating a Count Program):
https://atdb.scag.ca.gov/Pages/Tutorials.aspx

Appendix B – Sample Calculations
Converting Vehicular Count data to Average Daily Bicycle and Pedestrian Volumes

Time Period	Weekday Vehicle Counts	Weekend Vehicle Counts	Weekday Peak 2-hour Bike Counts	Ped. Counts	Weekend 2- hour peak Bike Counts	Ped. Counts
Midnight	2	3				
1:00 AM	0	2				
2:00 AM	1	0				
3:00 AM	3	3				
4:00 AM	4	3				
5:00 AM	12	6				
6:00 AM	15	8				
7:00 AM	**26**	11	3	8		
8:00 AM	**33**	10	6	12		
9:00 AM	20	13				
10:00 AM	21	14				
11:00 AM	22	**15**			3	6
Noon	35	**18**			4	8
1:00 PM	22	17				
2:00 PM	23	17				
3:00 PM	26	18				
4:00 PM	**36**	21	4	9		
5:00 PM	**44**	24	8	10		
6:00 PM	30	23				
7:00 PM	29	14				
8:00 PM	25	10				
9:00 PM	15	12				
10:00 PM	8	5				
11:00 PM	6	6				
Total	458	273				

Step 1-weekday= $(26+33+36+44)/458=$

$rv_{weekday}$ 0.303

Step 1-weekend= $(15+18)/273=$

$rv_{weekend}$ 0.121

Pedestrian

$tdt_{weekday}$ $(8+12+9+10)/0.303=$

     128.7

$tdt_{weekend}$ $(6+8)/0.121=$

     115.7

Average daily pedestrian volume

$(5 * 128.7 + 2 * 115.7)/7=$ **124.9**

Bicycle

$tdt_{weekday}$ $(3+6+4+8)/0.303=$

     69.3

$tdt_{weekend}$ $(3+4)/0.121=$

     57.8

Average daily bicycle volume

$(5 * 69.3 + 2 * 57.8)/7=$ **66**

(Appendix B – Continued)

Example 1- Improving 3 Intersections and using 1 Count Location (assuming all 3 intersections have similar numbers of users)

The agency can choose to use one of the following methods to count the users at the intersection with the highest volume (in order of preference)-

1. A week of automated 24-hour non-motorized counts

2. An automated 24-hour non-motorized count

3. Use the previous example to convert vehicular count data

Once the total daily volume has been counted or calculated at the intersection with the highest number of users; if the agency believes that that the other two intersections will have similar numbers of users. Then multiply the 'total daily volume' value by a factor of 3, to get the volume for the entire project.

> **The Average Daily Pedestrian Volume calculation for this example would be as follows:**

>   1. Divide the total of the week of automated bicycle and pedestrian counts by 7 to get the daily average at that location, then multiply by 3 to get the Average Daily Volume for the project

>   2. Multiply the total of the 24-hour counts for Bicycles and Pedestrians by 3 to get the Average Daily Volume for the project

>   3. Multiply the calculated Average daily volume for Bicycles and Pedestrians by 3 to get the Average Daily Volume for the project

> **The Average Daily Bicycle Volume calculation for this example would be as follows:**

> $tdt_{c\text{-location}}$ x 3 = total daily volume for the entire project limits

>   o Using the Average Daily Bicycle Volume calculated above, the Average Daily Bicycle Volume for the project will be (66 * 3) = **<u>198</u>**

Example 1A- Improving 3 Intersections and using 1 Count Location (assuming all 3 intersections have different users)

(Appendix B – Continued)

Once the volume has been calculated at the intersection with the highest number of users, a factor can be applied to that number based on an estimate or assumption of how much lower the user volume will be at the other two locations.

If the agency assumes that one intersection will have 70% of both bicycles and pedestrians as the count intersection and the third intersection will have 50% of both types of users as the count intersection.

The Average Daily Bicycle Volume calculation for this example would be as follows:

$tdt_{c\text{-}location}$ + $tdt_{c\text{-}location}$ x Factor 1 + $tdt_{c\text{-}location}$ x Factor 2 = total daily volume for the entire project limits

o Using the Average Daily Bicycle Volume calculated above, the Average Daily Bicycle Volume for the project will be (66 + 66*.70 + 66*.50) = **145.2**

Example 1B- Improving 3 Intersections and using 1 Count Location (assuming 1 intersection is close enough to the count intersection that some of the user are the same. The 3rd intersection has different users)

If the agency assumes that one intersection will have 70% of both bicycles and pedestrians as the count intersection; but because the intersections are adjacent that 15% of the users have been counted by the automated count and the third intersection will have 50% of both types of users as the count intersection.

The Average Daily Bicycle Volume calculation for this example would be as follows:

$tdt_{c\text{-}location}$ + $tdt_{c\text{-}location}$ x Reduction-factor 1 + $tdt_{c\text{-}location}$ x Reduction-factor 2 = total daily volume for the entire project limits

o Using the Average Daily Bicycle Volume calculated above, the Average Daily Bicycle Volume for the project will be (66 + (66*(.70-(.70*.15))) + 66*.50) = **138.3**

(Appendix B – Continued)

Example 2- This example shows a project adding class 2 bike lanes to 4 corridors with only 2 required count locations

Where the agency believes that the field count volume(s) is a good representation of the total volume for one or more of the corridors, then they can simply use that value for the total daily volume for the corridor.

> **The Average Daily Bicycle Volume calculation for this example would be as follows:**
>
> $tdt_{c\text{-location-1}}$ + $tdt_{c\text{-location-2}}$ + $tdt_{c\text{-location-(1 or 2)}}$ x Factor 1 + $tdt_{c\text{-location-(1 or 2)}}$ x Factor 2 = total daily volume for the entire project limits
>
> o Using the Average Daily Bicycle Volumes derived from the 2 count locations, the Average Daily Bicycle Volume for the project will be 66 + 82 + 66 * .80 + 82 * .90 = **274.6**

Example 3- This example shows a project improving numerous (9) small segments of sidewalk with only one required count location

> If the agency believes that each segment of the sidewalk will have widely varying numbers of users, then the agency can multiply the 'total daily volume' value that was calculated in Step 1 by different factors for each of the segments that aren't getting a count.

> **The Average Daily Pedestrian Volume calculation for this example would be as follows:**
>
> $tdt_{c\text{-location}}$ + $tdt_{c\text{-location}}$ x Factor 1 + $tdt_{c\text{-location}}$ x Factor 2 + $tdt_{c\text{-location}}$ x Factor 3 + $tdt_{c\text{-location}}$ x Factor 4 + $tdt_{c\text{-location}}$ x Factor 5 + $tdt_{c\text{-location}}$ x Factor 6 + $tdt_{c\text{-location}}$ x Factor 7 + $tdt_{c\text{-location}}$ x Factor 8 = total daily volume for the entire project limits
>
> o Using the Average Daily Pedestrian Volume calculated above, the Average Daily Bicycle Volume for the project will be 125 + 125 * 0.53 + 125 * 0.75 + 125 * 0.99 + 125 * .90 + 125 * .95 + 125 * 0.8 +125 * 0.85 + 125 * 0.83 = **950**