Transportation Planning Capacity Building (TPCB) Peer Program

North Central Texas Council of Governments Peer Exchange on Bicycle and Pedestrian Count Programs

A TPCB Peer Exchange

Location: Arlington, Texas

Date: May 29, 2013 – May 30, 2013

Host Agency: North Central Texas Council of Governments (NCTCOG)

Peer Agencies: Colorado Department of Transportation (CDOT)
Delaware Valley Regional Planning Commission (DVRPC)
Metropolitan Transportation Commission (MTC)
Texas A&M Transportation Institute (TTI)

Federal Agencies: Federal Highway Administration (FHWA)
Volpe Center

U.S. Department of Transportation
Federal Highway Administration • Federal Transit Administration

Table of Contents

INTRODUCTION 1

BACKGROUND AND OVERVIEW OF THE PEER EVENT 2

KEY THEMES 4

A. GOALS AND OUTCOMES 4
B. TECHNICAL STRUCTURE OF A COUNT PROGRAM 7
C. ORGANIZING AND OPERATING A COUNT PROGRAM 10
D. ADDITIONAL MONITORING PRACTICES 12
E. CHALLENGES 13

NEXT STEPS 14

ABOUT THE TRANSPORTATION PLANNING CAPACITY BUILDING (TPCB) PROGRAM 15

APPENDICES 16

A. KEY CONTACTS 16
B. PEER EXCHANGE AGENDA 20
C. LINKS TO ADDITIONAL RESOURCES 24
D. ACRONYMS 25
E. CDOT EQUIPMENT CHECKLIST AND SPECIFICATIONS FOR BICYCLE / PEDESTRIAN COUNTER INSTALLATION AND REPAIR 26

Introduction

This report highlights key recommendations and best practices identified at the peer exchange on bicycle and pedestrian count programs, held on May 29 and May 30, 2013 in Arlington, Texas. This event was sponsored by the Transportation Planning Capacity Building (TPCB) Peer Program, which is jointly funded by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA). Additional information about the TPCB Program, including the Peer Program, is available on page 15.

Background and Overview of the Peer Event

Transportation agencies have been monitoring motorized traffic for many years in order to analyze patterns; identify deficiencies in the transportation system; evaluate the impacts of projects; and inform future design, planning, and maintenance decisions. One of the greatest challenges facing bicycle and pedestrian planners seeking to perform comparable studies is the lack of data on usage and demand for non-motorized travel. To address this need, agencies have begun to implement monitoring and count programs for non-motorized traffic.

FHWA has developed a revised version of the Traffic Monitoring Guide for publication in 2013 (available via this web page: www.fhwa.dot.gov/policyinformation/travelmonitoring.cfm), which includes a chapter on non-motorized transportation and contains technical considerations for bicycle and pedestrian count programs. This peer exchange and summary report complement the Traffic Monitoring Guide chapter by providing information about phased approaches, funding strategies, equipment maintenance, partnerships, and other practical topics. The discussion during the exchange focused on the unique challenges that Metropolitan Planning Organizations (MPOs) may face in establishing a regional non-motorized travel monitoring program.

The North Central Texas Council of Governments (NCTCOG) requested this peer exchange to learn about different approaches for setting up and operating bicycle and pedestrian count programs to inform transportation planning. NCTCOG serves as the MPO for the Dallas-Fort Worth metropolitan area and is responsible for the regional transportation planning process for all modes. The NCTCOG Transportation Department is responsible for preparing and maintaining the Metropolitan Transportation Plan (Mobility 2035-2013 Update) for the 12-county area of the metropolitan planning area (MPA). This plan includes the region's 'Active Transportation' (bicycle and pedestrian) strategies for improving mobility region-wide. NCTCOG also coordinates the regional Bicycle and Pedestrian Advisory Committee (BPAC) which includes stakeholders and advocates from multiple agencies, cities, counties, special interest groups, and non-profit organizations. NCTCOG is seeking to implement a bicycle and pedestrian monitoring program in the region to support these efforts and to obtain reliable data to address bicycle and pedestrian performance measures, prioritize future projects, and quantify the benefits of investments.

The NCTCOG serves a 16-county metropolitan region with 240 members, including 16 counties, 169 cities, 24 independent school districts, and 31 special districts covering an area of approximately 12,800 square miles. The North Central Texas region is projected to grow from 6.5 million people in 2013 to 9.8 million persons by 2035.

NCTCOG's specific goals for the exchange included the following:

- To identify best practices for bicycle and pedestrian monitoring programs that could be used in the Dallas-Fort Worth region;
- To understand how the data from count programs could be used, such as in project prioritization, travel demand modeling, performance measures, and communication with local agencies, elected officials, and the public;
- To understand options for establishing a count program and the associated costs and benefits; and,
- To identify the next steps for establishing a count program in the region.

NCTCOG worked with FHWA and the Volpe Center to identify peers with established bicycle and/or pedestrian count programs that represented a range of different perspectives. The selected peers in attendance included the following:

- Colorado Department of Transportation (CDOT)
- Delaware Valley Regional Planning Commission (DVRPC, the Philadelphia region MPO)
- Metropolitan Transportation Commission (MTC, the San Francisco region MPO)
- Texas A&M Transportation Institute (TTI)

The following Texas agencies attended in order to learn from the peers:

- Capital Area Metropolitan Planning Organization (CAMPO, the Austin region MPO)
- City of Dallas

- City of Fort Worth
- Texas Department of Transportation (TxDOT) – Dallas District
- City of San Antonio
- Houston-Galveston Area Council (H-GAC, the Houston-Galveston region MPO)

To focus the discussion at the peer exchange, NCTCOG, FHWA, and the Volpe Center sent the following set of questions to the peers in advance of the event. Peers discussed their responses to these questions during a pre-event webinar as well as during the in-person exchange.

- What performance measures do you use that relate to bicycles and pedestrians?
- What organizational structure do you use to administer your count program?
- What are the operational characteristics of your count program?
    - Equipment purchased
    - Number and type of locations (automated or manual, continuous or periodic)
    - Length of the count period for periodic locations and frequency of resampling
    - Modes collected at the locations
    - Data retrieval method(s)
    - Strategy for archiving data
    - Methods for summarizing and reporting data
    - Methods for communicating results and making data available
- What is the total budget of your count program, and what are the funding sources?
- Who are the key champions essential to your count program and what role(s) did/do they play?
- What partners are involved (e.g. consultants, local governments, nonprofits, etc.)?
- What challenges have you faced, and what are your future plans?
- What else is important to mention about your count program that would be relevant to this exchange?

The agenda for the peer exchange is available in Appendix B of this report, and a list of key contacts is available in Appendix A.

Key Themes

This section highlights key themes and recommendations from the peer exchange that emerged from the peer exchange, and summarizes best practices employed by peer agencies and other attendees.

A. Goals and Outcomes

1. Consider the intended uses of the count data prior to setting up a program.

Count data can be used for a variety of purposes, such as to identify safety concerns, to communicate benefits, to encourage people to cycle and walk, to convince decisionmakers or partners to devote funds for bicycle and pedestrian infrastructure, to analyze trends, and to evaluate the impacts of specific projects. Analysis of the results can inform future design, policy, planning, maintenance, and budgeting decisions. It is important to consider the intended uses of the data in the beginning, because this will help to inform the planning and design for the program. It may also be helpful to focus first on developing fundamental end products, such as producing a one-page summary of bicycle and pedestrian activity within a "state of the system" report.

> ***Best Practice Example:*** CDOT has been able to use count data for a wide variety of purposes. The data provide important information for engineers on non-motorized design decisions and also inform policy and budgeting decisions. For instance, count data have been used to justify spending funds for winter maintenance for shared use facilities. CDOT also uses the data in the same ways as motorized count data, such as inputs for travel demand models. Additionally, local Colorado jurisdictions use the information to support requests for additional funding in support of non-motorized infrastructure from a range of sources, such as the Centers for Disease Control and Prevention (CDC).

2. Recognize that bicycles and pedestrians are fundamentally different from one another, and that the goals and strategies for monitoring each will differ.

Bicycles are more similar to cars than to pedestrians in terms of functionality and user behavior. An MPO or State Department of Transportation (DOT) should consider the intended uses of the data and the overall goals of the count program (see section 1) in deciding where and how to measure bicycle and/or pedestrian traffic. The best locations for collecting data may differ for pedestrians as compared to bicycles and will also depend upon the intended applications of the monitoring program results for each group.

In some cases it may be worthwhile to collect pedestrian and bicycle data together at a given location, but an MPO or State DOT should consider the implications of collecting combined counts, understanding that conflated data may be misrepresented. Most automated counters that use infrared sensors to count pedestrians cannot distinguish between a person walking, walking a bicycle, or riding a bicycle. However, if such a sensor is combined with another type of sensor that only records bicycles (such as a tube counter), the data can be separated.

> ***Best Practice Example:*** TTI helped the city of San Antonio, Texas to set up a permanent counter with the ability to differentiate between bicycles and pedestrians at a location along the Mission Reach Trail. TTI and the city then used a portable counter to collect additional data at a variety of other locations. Although the portable counter could not distinguish between bicycles and pedestrians, TTI and the city used the ratio from the permanent counter to estimate the numbers of bicycles versus pedestrians at the other locations. The confidence that one may hold in the accuracy of such an assumption depends upon an understanding of land use and other contextual factors that would affect that ratio. An MPO or State DOT should verify such an estimate by referring to other sources of information where possible (see section 18).

3. Prioritize outreach and actively communicate results.

It is important for an MPO or State DOT to engage other organizations and the public from the outset in order to gain support and align goals to be inclusive of stakeholder interests. Once the count program is under way, the agency should actively communicate results to maintain interest. At each stage, the agency should allocate funding for marketing, advertising, and other communication efforts. This is necessary to sustain a broad base of ongoing support and to ensure that the data is useful to as many entities as possible.

Best Practice Examples: MTC shares count data on its website, and has developed a one-page summary document (www.mtc.ca.gov/planning/bicyclespedestrians/counts.htm) that communicates key trends for non-motorized travel. Within the region, San Francisco installed a "bicycle barometer," a tower linked to an automated counter that displays the number of cyclists crossing in real time (see Figure 1 and http://totem-eb-market.sanfrancisco.visio-tools.com/). The counter is linked to social media sites and serves as a marketing and public relations tool.

Figure 1: San Francisco installed a bicycle barometer on Market Street, which displays the cumulative number of cyclists that pass the intersection in real time.

DVRPC provides public access to its bicycle and pedestrian count data via an interactive web viewer (www.dvrpc.org/webmaps/pedbikecounts/), which exists in parallel to the version for motorized traffic data. The bicycle and pedestrian web viewer contains a "street view" column, which links to Google maps street view and allows users to visualize the location of a counter (see Figure 2). DVRPC reports that this regional resource is popular and receives a great deal of web traffic.

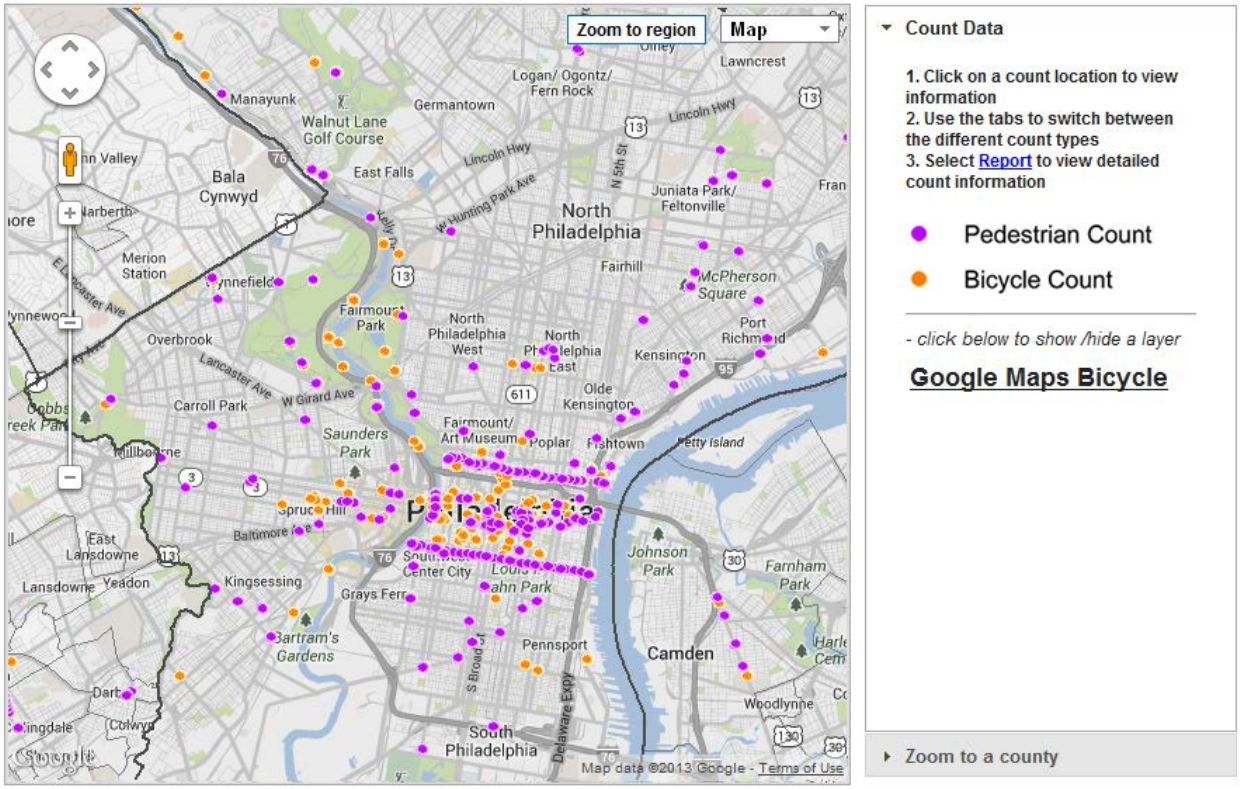
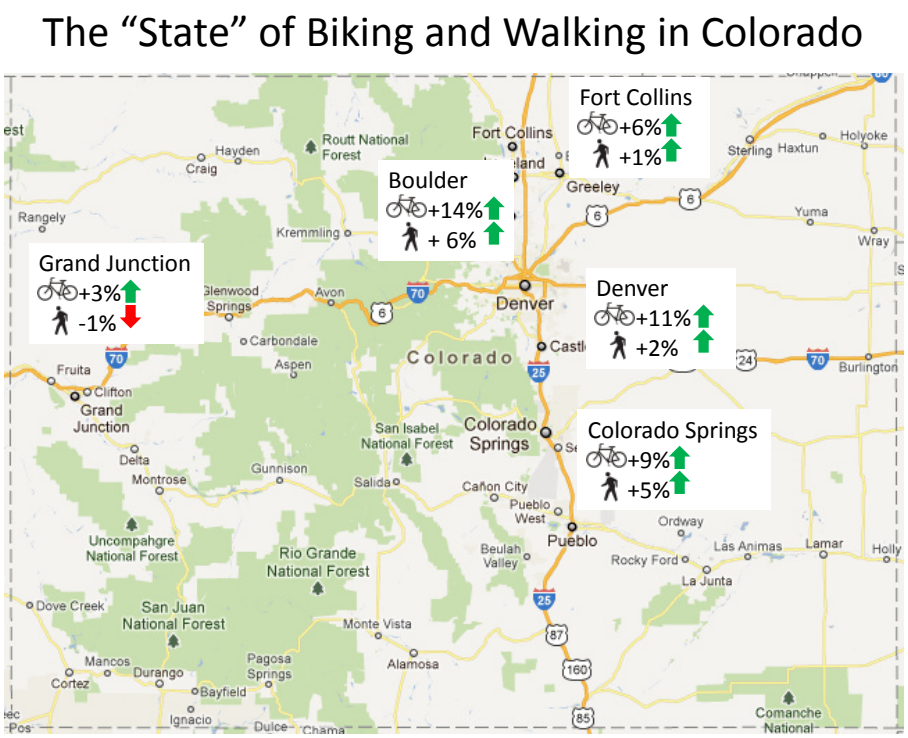
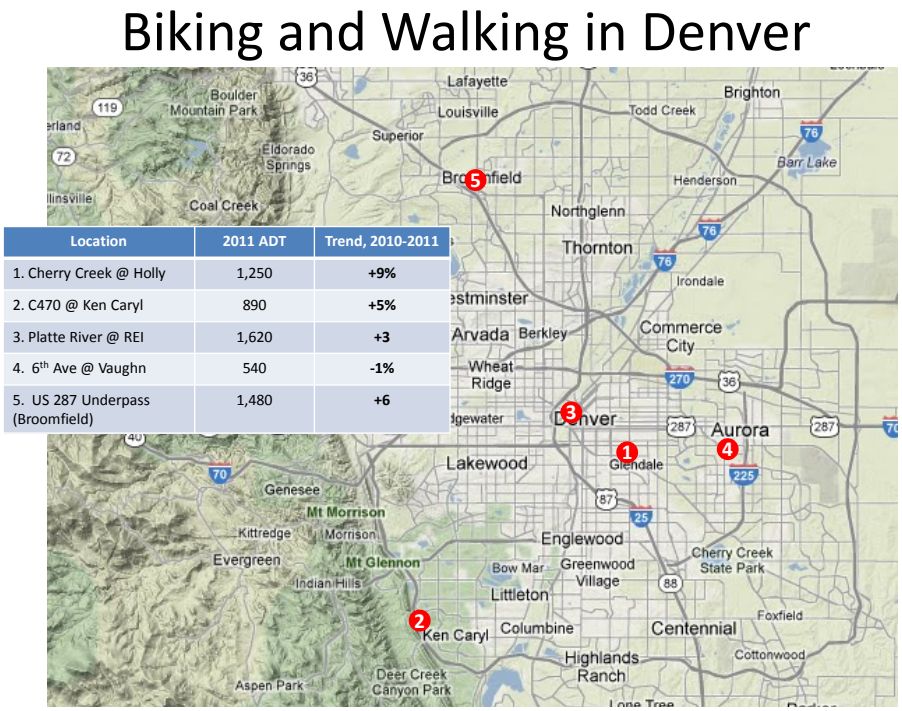


Figure 2: DVRPC provides public access to bicycle and pedestrian count data via an interactive web viewer.

TTI recommended prototype graphics that CDOT could use to report results to internal and external audiences (see Figure 3).





Location	2011 ADT	Trend, 2010-2011
1. Cherry Creek @ Holly	1,250	+9%
2. C470 @ Ken Caryl	890	+5%
3. Platte River @ REI	1,620	+3
4. 6th Ave @ Vaughn	540	-1%
5. US 287 Underpass (Broomfield)	1,480	+6

Figure 3: TTI developed prototype graphics to report active transportation trends.

4. Anticipate that initial data will enhance and change the perceived need for more data.

The initial information that an MPO or State DOT gains from a count program may generate more questions than answers. If shared with stakeholders and the public, this information may bolster support for gathering more data in order to answer the new questions. Such interest can lead to additional funding but also suggests that a count program may need to change over time to adapt to new questions and shifting priorities.

> ***Best Practice Example:*** CDOT count data have often returned unexpected results, such as high traffic volumes in unexpected directions or at unexpected times of the day, and in each case the agency has responded by investigating the causes to understand these results.

B. Technical Structure of a Count Program

5. Communicate the limitations of the technology.

It is important for an implementing agency to understand the limitations of the technology associated with a non-motorized counting program. DVRPC emphasized that it is important that an MPO or State DOT clearly communicates known limitations to stakeholders. For instance, tube counters only provide data on bicycle traffic volume and direction. The FHWA Traffic Monitoring Guide includes additional detail on the capabilities and limitations of various technologies.

6. Consider a range of strategies for selecting count locations.

A counting program may include a mix of both permanent counters and portable counters that can be moved among locations. Prior to installing a permanent counter, an agency may find that it is worthwhile to use portable counters initially to gather data at several potential locations for comparison before

deciding upon the best alternative. Ultimately, one should seek to maintain a broad mixture of permanent count locations that represent the full spectrum of facility types in the region such as off-street, on-street, rural, and urban locations. Although this is ideal, it may not be achievable in the beginning of a monitoring program. One potential strategy for selecting locations is to identify gaps by comparing supply (based on an inventory of facilities) and demand (using proxies such as transportation analysis zone demographics, household travel surveys, and the U.S. Environmental Protection Agency (EPA) smart location database (www.epa.gov/smartgrowth/smartlocationdatabase.htm), or other sources of information). The FHWA Traffic Monitoring Guide is a resource for more information on this topic.

> ***Best Practice Example:*** TTI worked with CDOT to identify potential count locations by asking partners, such as local agencies and advocacy groups, for recommendations. CDOT staff then visited each location to consider its potential. Within Texas, TTI has helped H-GAC and CAMPO to compare supply and demand in their respective regions in order to prioritize counts at locations with a low supply of appropriate facilities and a high demand from current and potential users.

7. Install permanent counters to provide context for the short duration counters.

As suggested in section 2, permanent counters generate foundational information (traffic profile characteristics and factor types), which helps with the interpretation of data from short duration counts in other locations. For instance, if a short duration count takes place during a popular season for bicycling, that count would not otherwise be comparable to another count that was taken during an unpopular season unless permanent counters can provide an estimate of seasonal variation, placing both counts in context.

The factors that influence non-motorized travel patterns vary by locality and region, as does the relative importance of these factors. The variability of non-motorized travel patterns is currently not well understood by the research community, but the variability is far greater than for motorized traffic. For this reason, automated short duration counts for bicycles and pedestrians should last seven days at a minimum, and ideally several weeks. The FHWA Traffic Monitoring Guide describes these best practices in more detail.

> ***Best Practice Example:*** CDOT uses a mix of permanent counters and portable counters. To help with data interpretation, the agency has defined three primary factor types: recreational travel, with high weekend and evening peaks; commuter travel, with morning and evening peaks that are consistent across working days and seasons; and a hybrid combination of the above, which represents most locations. Permanent locations within a given factor type allow the agency to obtain typical travel patterns that can be used to interpret and extrapolate the short duration data from portable counters.

Figure 4: CDOT staff install a permanent loop counter.

Figure 5: CDOT staff install a temporary counter on a multi-use trail

8. Use social networks to learn from peers, as the state of the practice is rapidly changing

The FHWA Traffic Monitoring Guide includes detailed guidance on technical considerations for bicycle and pedestrian count programs. However, TTI cautioned that developments are rapid in this burgeoning field and the information may be dated within a few years. Practitioners should seek avenues for continuing to share knowledge with peers, such as the Transportation Research Board (TRB) Bicycle Transportation Committee (www.bicyclinginfo.org/trbbike/), TRB Pedestrian Committee (www.walkinginfo.org/trbped/), the Association of Pedestrian and Bicycle Professionals (www.apbp.org/), and other social networks.

> ***Best Practice Example:*** TTI stays current in the field by participating in relevant professional associations and email list serves. TTI posts questions to the above discussion boards and list serves in order to benefit from the collective experience of a community of practitioners.

C. Organizing and Operating a Count Program

9. Consider a phased approach

Realistically, a monitoring program is most likely to be successful if accomplished in an incremental, phased approach. The goal in the beginning should be to establish a pilot project that focuses on a few locations and easily attainable goals. The initial results can be used to demonstrate success and generate further interest on the part of the public, stakeholders, and decisionmakers. This may help to garner additional funding for the count program. Throughout this incremental process, however, the MPO or State DOT should try to maintain sight of the long-range vision while understanding that this vision may change over time.

> ***Best Practice Example:*** DVRPC began its non-motorized count program on a small scale, and used initial successes to secure additional funding from a range of sources (see section 15).

10. Look for other sources of information.

An MPO or State DOT should seek to identify potential partners that may have a stake in the program and may be able to share information or provide support. A surprising range of organizations may have an interest in a count program, such as health organizations and advocacy groups, and many may already have data. An initial pilot project and ongoing communications efforts can be useful tools for engaging potential partners. It is also worthwhile to look for additional sources of information, such as data from the U.S. Census, the American Community Survey (ACS), and the National Household Travel Survey (NHTS). It is possible for a region to purchase an add-on to the ACS or the next NHTS in order to obtain additional information. However, geographic information in NHTS data has been intentionally blurred to protect respondent identities, which may hinder the use of the data for non-motorized travel estimation. Local chambers of commerce or business associations often collect useful data, as do universities, major employers, and transportation management associations. Partner organizations and additional sources of information can help to influence the goals of the program and may aid in prioritizing initial count locations.

> ***Best Practice Example:*** CDOT has a traffic data committee that brings together local agencies from around the State to coordinate on traffic data issues. CDOT used this mechanism to gather motorized and non-motorized counts on off-system roads. CDOT also used the committee to establish a network of partner agencies and disseminate technical guidance to locals for non-motorized monitoring.

11. Identify an effective institutional structure.

The institutional structure of a count program is just as important as the technical structure and should not be overlooked. All operating models have strengths and weaknesses, whether the program is conducted in-house, with volunteers, or through consultants. Similarly, manual or hand counting and automated counters both have benefits and drawbacks. It is important to consider the advantages and disadvantages that will be most relevant for each situation.

One important question is who will administer the program. Locating it within the organization's existing travel monitoring program may be efficient, because there is an existing organizational structure and substantial staff experience. However, staff resources may be insufficient to expand the existing program. Another option may be to use a consultant to operate the program, which would expand capacity, but may also introduce additional training needs and quality control issues, particularly if the contract will be rebid annually. A third option is to house the program within the organization's bicycle and pedestrian office, which would allow for closer oversight and control by those who are most attuned to those users. However, staff resources may be insufficient, and the count program would likely require training and a new organizational structure with unfamiliar roles. A hybrid organizational form may also be possible.

Another important decision is whether to use volunteers to collect counts. Volunteer collection relies on hand counts, which are discussed in more detail in section 19 below. Hand counts can be low cost if conducted by volunteers, but the data may be unreliable and/or incompatible with other data, unless there is a determined effort to ensure consistent data quality. In addition, management of a volunteer program

requires a significant investment of time and resources on an ongoing basis. Staff or consultants can also conduct hand counts, but limited resources may preclude this.

12. Identify a repository for the data and ensure access.

Ideally, the MPO or implementing agency should take the lead in storing and providing access to the data, but it should also make sure to work with locals to understand their data objectives. In establishing agreements with partners, the MPO should focus on access to data as a key goal. If an MPO pursues an approach that involves devolving responsibility or ownership of the program to other agencies or groups, it is important to establish a memorandum of understanding (MOU) with the primary administrator(s) to ensure that roles are clearly delineated and that data guidelines are followed. The MOU will also help to ensure that the MPO does not lose access to the data due to an administrative or policy change at a partner organization, and it will ensure that the data are collected in a usable format (the FHWA Traffic Monitoring Guide includes guidance on data specifications).

> ***Best Practice Example:*** DVRPC acts as the data steward and clearinghouse for bicycle and pedestrian data for the region. DVRPC receives data from partners, vets all of the data to ensure quality and accuracy, and publishes the data for the public on its website.

13. Establish a plan to ensure quality control.

An MPO or State DOT should periodically validate automated counters using hand counts to ensure that any observable errors are within an acceptable range. The data steward can also identify problems with data quality by running automated macros (short sequences of computations to evaluate data consistency and reasonableness) on the raw data in order to detect possible errors. Computer programmers use macros to simplify and reduce errors from repetitive tasks.

> ***Best Practice Example:*** DVRPC validates each automated counter by comparing automated data with hand counts that are conducted annually. Through data validation and subsequent adjustments to the equipment settings, the agency has achieved a high level of accuracy with its automated counters and has calculated a correction factor to apply to all automated count data based on the average rate of undercounting. DVRPC also uses automated macros as a quality control measure before inputting data into its database.

14. Consider training needs and opportunities

An MPO or State DOT should build capacity among stakeholder groups and local municipalities, encouraging local jurisdictions to take initiative and ownership over a portion of the count program. However, one should also expect that partners may not be able to install counters on their own, even after receiving training and/or instructions.

> ***Best Practice Example:*** CDOT has design specifications that it provides to locals that would like to install their own counters, and CDOT encourages local agencies to include counters in the costs of their projects. However, some local agencies have had difficulty performing installations on their own, so CDOT now visits each partner to provide assistance.

15. Pursue non-traditional funding sources.

There are a variety of potential funding sources for a non-motorized count program. Individual project funds can be used, where appropriate, as well as Unified Planning Work Program (UPWP) funds. It is important for an MPO to educate board members about the benefits of a count program to help during the funding decisionmaking process. Non-traditional sources of funding such as grants from public health and environmental organizations and sponsorships from universities, health systems, and conservancies may also be available. An MPO may be able to leverage connections through its member governments to establish relationships with potential funders. An organization may be more likely to contribute funds if it gains favorable publicity as a result or develops a sense of ownership. MPOs and State DOTs should also pursue cost-sharing agreements with local agencies. For cost-sharing, it is important to enter the conversation with set expectations, while being open to negotiation.

> ***Best Practice Example:*** DVRPC received funding through a CDC grant to administer bicycle and pedestrian counts that will be used to compare data before and after the introduction of an education campaign to encourage active transportation. DVRPC also received a grant from the Philadelphia-

based William Penn Foundation to construct a non-motorized trail network, and the funding includes an allocation of project funding for traffic monitoring. In an example of leveraging educational funding, Drexel University is providing funding to DVRPC for the purchase of count equipment that will be used to provide data for a research study in epidemiology.

D. Additional Monitoring Practices

16. Focus on key goals and objectives in deciding whether to pursue additional monitoring practices.

An MPO or State DOT should refer to the key goals of the bicycle and pedestrian monitoring program before deciding whether or not to pursue additional information through avenues other than counts (see section 1).

17. Consider the use of Bluetooth and smartphone applications, but be aware of the limitations.

Bluetooth devices and smartphones can be useful for obtaining a sample of travel patterns, because they can track the routes traversed by users. However, these only capture patterns for people that own and use those devices, and may not accurately reflect the travel patterns of the general population. Low-income or older populations may be underrepresented due to a lack of ownership of these devices. Bluetooth signal detection requires roadside monitors, and smartphone applications typically require some amount of user intervention to collect data.

18. Use multiple sources of information to demonstrate the plausibility of results and inferences.

As mentioned, the variability of non-motorized traffic patterns is currently not well understood. It is always useful to verify the results of traffic counts, but this is particularly important if an MPO or State DOT seeks to use the data for a regional expansion or projection. Experimental surveys and intercept surveys are valuable means of checking assumptions. It is also important for the MPO or State DOT to demonstrate any efforts to verify information in order to build confidence among stakeholders and decisionmakers. The agency should critically evaluate the weaknesses of its data collection efforts and analysis and seek to address them.

Best Practice Example: MTC supplemented count data with an intercept survey on what was previously considered to be a trail primarily used for recreational and discovered that a surprising number of people were using the trail to commute to work. MTC also recommends the San Jose State University Mineta Transportation Institute low-cost survey instrument (http://transweb.sjsu.edu/project/2907.html), which is free and available to the public.

19. Manual surveys may still have advantages.

The classic approach to bicycle and pedestrian counting has been to have volunteers or paid staff manually record bicycle and pedestrian activity using clipboards or electronic collection devices. Such surveys (known as “manual” or “hand” counts) are often limited to a just a few hours on a few days and thus provide considerably less information about overall travel volumes than automated counters. However, it may be possible to collect certain additional information such as helmet use, age, or gender that is impossible to obtain with automated collection equipment.

“Observer fatigue” is an important factor that may affect the quality of the data. Observers cannot be expected to reliably record data for longer than a few hours. Automated equipment does not have this problem. However, automated equipment requires a substantial initial investment of capital ($500 to $5,000 per portable counter, and $1,000 to $10,000 per permanent counter), as well as ongoing maintenance costs. Prices for automated equipment will likely drop as markets expand. To ensure continued accuracy, automated equipment should also be periodically validated with hand counts (see section 13).

E. Challenges

20. Anticipate that some processes may take longer than expected.

Installation of a counter (either permanent or temporary) can take a significant amount of time to plan and implement, including the time needed for equipment purchases, the permitting process, and other details. CDOT has found that the minimum timeframe for this is about three months, and it may often require even more time. Establishing an MOU with partners can also take a long time to complete. Overall, an MPO or State DOT should recognize that a robust count program takes time to develop, but it is important to continue taking incremental steps.

21. Develop a plan to deal with damage and attrition.

An agency should consider establishing a contingency budget for the program. Equipment may become damaged or lost over time. To reduce potential theft or damage, counters should be secured to fixed structures with locks. Explanatory signage may help to avoid vandalism, although it may increase vandalism in specific circumstances. Staff or partners should be equipped with a basic toolkit to address minor repairs, and equipment should be checked regularly to ensure that it is functioning properly. If automated procedures are used to check data quality (see section 13), they may be able to identify malfunctioning equipment. If modems are used to retrieve counter data at a central location, an agency may discover problems immediately. If data are downloaded on site at each individual counter, the capital cost will be cheaper than installing modems (which requires additional equipment plus a service package to cover the data transmission), but a problem may go undiscovered for quite some time, depending upon how frequently the counters are checked.

> ***Best Practice Example:*** CDOT secures all counters with bicycle cable locks, and as of May 2013, only one counter had been stolen. CDOT equips staff with a basic toolkit for installations and site visits, described in Appendix E.

22. Identify and negotiate resolutions for potential conflicts with advocacy groups.

Advocacy groups will likely serve as valuable allies in building a count program. However, there may be some unexpected conflicts, especially in the beginning. If an advocacy group has previously managed all counting, it may resist involvement from the MPO or State DOT, as the group may anticipate that it will lose sole control over the messaging about the program and the results. An MPO or State DOT should listen to the concerns of advocacy groups and explain that the effort to establish a count program will result in better data, which will be beneficial for all in the long term. Advocacy groups will likely become valuable partners if these conversations are handled well. Advocacy groups may resist reporting unfavorable data that show low numbers of cyclists and pedestrians. An MPO or State DOT should emphasize the importance of reporting all data and explain the constructive reasons for doing so (for example, that unexpectedly low counts may reveal the need to eliminate barriers to access). All data provide potentially valuable information, and even low numbers can be used to inspire questions and actions to understand the nature of the findings and address problems.

> ***Best Practice Example:*** DVRPC faced resistance from advocacy groups in the initial stages of its count program, as some stakeholders were concerned about losing sole control over the data on non-motorized travel. Through active listening and proactive communication, the agency engaged the detractors, and they are now among the strongest supporters and most valuable allies for the count program.

Next Steps

As part of its next steps, NCTCOG plans to improve internal coordination between its Active Transportation Group and Traffic Data Management Group. During the peer exchange it became clear that the Traffic Data Management Group already has much of the infrastructure that will be necessary to house, maintain, and steward the data, and can provide valuable advice to the Active Transportation Group in implementing a pilot program. NCTCOG also plans to host trainings on the FHWA Traffic Monitoring Guide and will invite TxDOT and other agencies to participate in the training.

NCTCOG will continue discussions with local and State agencies on establishing a bicycle and pedestrian count program. The agency plans to begin by establishing a small-scale pilot program, consistent with the advice conveyed during the peer exchange. NCTCOG will use the pilot program to demonstrate success and garner further support for an expanded program. NCTCOG will also focus on outreach, communication, and engagement in order to build a coalition and refine the goals of the count program.

The TxDOT Dallas District will confer with colleagues within TxDOT to learn about the questions that TxDOT has already fielded about count programs and the data that the agency has already encountered. The Dallas District will report back to NCTCOG with some suggestions on how TxDOT may be able to assist in the efforts to establish a count program.

About the Transportation Planning Capacity Building (TPCB) Program

The Transportation Planning Capacity Building (TPCB) Program is a joint venture of the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) that delivers products and services to provide information, training, and technical assistance to the transportation professionals responsible for planning for the capital, operating, and maintenance needs of our nation's surface transportation system. The TPCB Program website (www.planning.dot.gov) serves as a one-stop clearinghouse for state-of-the-practice transportation planning information and resources. This includes over 70 peer exchange reports covering a wide range of transportation planning topics.

The TPCB Peer Program advances the state of the practice in multimodal transportation planning nationwide by organizing, facilitating, and documenting peer events to share noteworthy practices among State DOTs, MPOs, transit agencies, and local and Tribal transportation planning agencies. During peer events, transportation planning staffs interact with one another to share information, accomplishments, and best practices from the field and help one another overcome shared transportation planning challenges.

Appendices

A. Key Contacts

Scott Brady

Manager, Office of Travel Monitoring
DVRPC
8th floor
190 N Independence Mall W
Philadelphia, PA 19106-1520
(215) 238-2814
sbrady@dvrpc.org
www.dvrpc.org/

Andrew Breck
Environmental Protection Specialist
U.S. DOT Volpe National Transportation Systems Center
55 Broadway
Cambridge MA 02142
(617) 494-2213
andrew.breck@dot.gov
www.volpe.dot.gov

Sean Co
Active Transportation Planner
MTC
101 Eighth Street
Oakland, CA 94607-4700
(510) 817-5748
sco@mtc.ca.gov
www.mtc.ca.gov

Betsy Jacobsen
Bicycle/Pedestrian/Byways Section Manager
CDOT
4201 E. Arkansas Avenue
Denver, CO 80222
303-757-9982
betsy.jacobsen@state.co.us
www.coloradodot.info

Kevin Kokes, AICP, LEED AP BD+C
Senior Transportation Planner
Congestion Management & System Operations: Sustainable Development Team
NCTCOG
616 Six Flags Drive
Arlington, TX 76011
817-695-9275
kkokes@nctcog.org
www.nctcog.org/trans/sustdev/

Barbara C. Maley, AICP
Environment and Transportation Planning Coordinator
FHWA - Texas Division
(214) 224-2175
barbara.maley@dot.gov
www.fhwa.dot.gov

Jeremy Raw, P.E.
FHWA Office of Planning
Systems Planning and Analysis Team
(202) 366-0986
jeremy.raw@dot.gov
www.fhwa.dot.gov

Shawn Turner, P.E.
Senior Research Engineer and Division Head
Mobility Division
Texas A&M Transportation Institute
3135 TAMU
College Station, TX 77843-3135
(979)845-8829
shawn-turner@tamu.edu
http://tti.tamu.edu

Karla Weaver, AICP
Program Manager
Congestion Management & System Operations: Sustainable Development Team
NCTCOG
616 Six Flags Drive
Arlington, TX 76011
(817) 608-2376

kweaver@nctcog.org

www.nctcog.org/trans/sustdev

B. Peer Exchange Agenda

Wednesday, May 29 – Full Day

Time	Topic	Lead Presenter
8:30 a.m.	**Welcome and Overview (25 Minutes)** Welcome attendees, conduct introductions, review the agenda, describe documentation/follow-up, and establish ground rules for discussions.	**Facilitator**
8:55 a.m.	**NCTCOG Welcome and Goals (10 Minutes)** NCTCOG welcomes participants and reviews the context for what motivated the peer exchange request and NCTCOG's goals for the day. **NCTCOG Goals and Outcomes (25 minutes)** NCTCOG discusses its current and proposed goals and outcomes related to bicycles and pedestrians, including performance measures.	**NCTCOG**
9:30 a.m.	**Session 1: Goals and Outcomes (45 Minutes)** *Introduction: Betsy Jacobsen of CDOT* What are the important considerations in developing goals and outcomes for a bicycle and pedestrian program? **End products:** What end products will the data generate or inform? (E.g. performance measures, route choice models, funding applications, etc.) and how should the end products influence the design of the monitoring program? Which end products require support from a count program, and which may not? **Communicating results**: How should the data be represented? **Performance measures:** How can an MPO establish appropriate performance measures for bicycles and pedestrians? What are the factors that a large MPO should consider in developing *count-based* performance measures for bicycles and pedestrians? • Identifying planning requirements • Establishing metrics • Specifying data requirements	**Peers**

Time	Topic	Lead Presenter
	Are pedestrian count programs needed at the regional level? If so why, and if not then how should they addressed?	
10:15 a.m.	***Break (15 Minutes)***	
10:30 a.m.	**Session 1 (continued) (90 minutes)** A continuation of the above discussion. **Question and Answer Session (15 minutes)** **Highlights and Lessons Learned (5 minutes)**	
12:00 p.m.	***Lunch (75 Minutes)***	

Day 1
Afternoon Session

Time	Topic	Lead Presenter
1:15 p.m.	**Session 2: Technical Structure of a Count Monitoring Program in a Large Region (60 Minutes)** *Introduction: Shawn Turner of TTI* What are the steps and efforts an agency must take to design and implement a monitoring program? What are the important considerations at each stage, and how should the goals and performance measures inform each of these decisions: • Who should collect the data, and who should manage it? (in-house vs. consultant vs. collaboration through local partnerships or support organizations) • What data should be collected? • Where should data be collected (and in how many locations)? • When should data be collected? • How often should data be collected (how much data is required)? • What equipment should be used (permanent vs. mobile, etc.)?	**Peers**
2:15 p.m.	***Break (15 Minutes)***	
2:30 p.m.	**Session 2 (continued) (30 minutes)** A continuation of the above discussion. **Question and Answer Session (15 minutes)** **Highlights and Lessons Learned (5 minutes)**	**Peers**
3:00 p.m.	**Session 3: Organizing and Operating a Monitoring Program (90 minutes)** *Introduction: Scott Brady of DVRPC* What is the most cost effective means for gathering reliable data?	**Peers**

Time	Topic	Lead Presenter
	How do the costs of automated systems (initial capital costs as well as ongoing operations and maintenance) compare to the costs of hand counts? How can a large MPO fund a count program on an ongoing basis? What potential funding sources can be used (including non-traditional sources)? How should the MPO and local municipalities share in the costs and ongoing maintenance of permanent data collection equipment? What policies or programs should the MPO or region have in place for permanent and mobile (loaned) data gathering equipment? **Question and Answer Session (15 minutes)** **Highlights and Lessons Learned (5 minutes)**	
4:30 p.m.	***Adjourn***	

Day 2, Morning Session (no Afternoon)

Time	Topic	Lead Presenter
8:30 a.m.	***Convene*** Recap of First Day	
8:50 a.m.	**Session 4: Additional Monitoring Practices (70 minutes)** *Introduction: Sean Co of MTC* How can an MPO support performance measures that require monitoring from methods other than counts? How should transit facilities (rail and bus) and environmental justice areas with large transit dependent populations be integrated into the data collection process? Are online surveys or on-the-street surveys cost effective and do they provide useful data? How much investment is needed to provide the right level of accuracy/precision for such a large region? **Question and Answer Session (15 minutes)** **Highlights and Lessons Learned (5 minutes)**	**Peers**
10:00 a.m.	***Break (15 Minutes)***	
10:15 a.m.	**Session 5: Challenges (75 minutes)** What major challenges have peers faced regarding bicycle and pedestrian monitoring programs, and how have they dealt with them? What challenges may NCTCOG confront, and how can the agency proactively address them? **Question and Answer Session (15 minutes)** **Highlights and Lessons Learned (5 minutes)**	

Time	Topic	Lead Presenter
11:30 p.m.	**Open Discussion on Key Topics (30 minutes)**	**Facilitator**
12:00 p.m.	**Wrap up & Follow Up Actions (30 minutes)**	**Facilitator**
12:30 p.m.	***Adjourn***	

C. Links to Additional Resources

FHWA Traffic Monitoring Guide
www.fhwa.dot.gov/policyinformation/travelmonitoring.cfm

FHWA Bicycle and Pedestrian Program
www.fhwa.dot.gov/environment/bicycle_pedestrian/index.cfm

TRB paper on QUALITY COUNTS FOR PEDESTRIANS AND BICYCLISTS: Two Quality Assurance Procedures for Non-Motorized Traffic Count Data
http://docs.trb.org/prp/13-2552.pdf

Survey instrument developed by the San Jose State University Mineta Transportation Institute
http://transweb.sjsu.edu/project/2907.html

Transportation Research Board (TRB) Bicycle Transportation Committee
www.bicyclinginfo.org/trbbike/

TRB Pedestrian Committee
www.walkinginfo.org/trbped/

TRB Bicycle and Pedestrian Data Subcommittee
https://sites.google.com/site/bikepeddata/

Association of Pedestrian and Bicycle Professionals
www.apbp.org/

D. Acronyms

ACS	American Community Survey
BPAC	Bicycle and Pedestrian Advisory Committee
CAMPO	Capital Area Metropolitan Planning Organization (the Austin region MPO)
CDC	Centers for Disease Control and Prevention
CDOT	Colorado Department of Transportation
DOT	Department of Transportation
DVRPC	Delaware Valley Regional Planning Commission
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HGAC	Houston-Galveston Area Council (the Houston-Galveston region MPO)
MOU	Memorandum of Understanding
MPA	Metropolitan Planning Area
MPO	Metropolitan Planning Organization
MTC	Metropolitan Transportation Commission
NCTCOG	North Central Texas Council of Governments
NHTS	National Household Travel Survey
TPCB	Transportation Planning Capacity Building
TRB	Transportation Research Board
TTI	Texas Transportation Institute
TxDOT	Texas Department of Transportation
UPWP	Unified Planning Work Program

E. CDOT Equipment Checklist and Specifications for Bicycle/Pedestrian Counter Installation and Repair

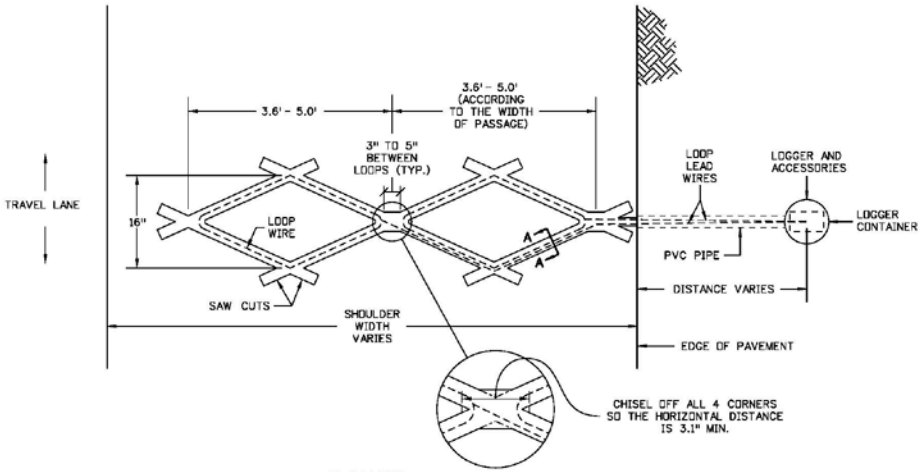
June 13, 2013

When checking a prospective installation location, bring:

- Camera for site pictures
- Overhead tester (to learn if there's any interference from overhead wires) and D-size batteries
- Tape measure (to measure the width of the path or street)

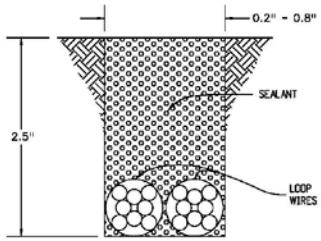
Materials needed at the actual installation:
Permit if the local jurisdiction requires it
Overhead tester (and extra D batteries)
Chalk or marker to identify specific cut lines
Saw cutter (preferably wet) – loops will be cut in the concrete/asphalt in a specific diamond shape for bicycle counting
Chisel for popping out small sections of the cut
Electric drill (used to spin the wires together)
Backer Board
Epoxy or other joint sealant
Squeegee for epoxy
Conduit to protect the wires from the cut to the counter box
Shovel
Hammer
Screw drivers in various sizes in both formats (flat and Phillips)
Wire cutters
Duct tape
¾" anchors and bolts if installing metal post directly into concrete
Bicycle for testing
Laptop for testing installation
Wet/dry vacuum for environmental control

When installing, checking, or removing a portable counter, bring:
Overhead tester (and extra D batteries)
Screw drivers in various sizes in both formats (flat and Phillips)
Duct tape (for taping over the lens when you retrieve a counter)
Hammer
Wire cutters
Laptop



PLAN VIEW

DIAMOND LOOP, WIRE AND LOGGER INSTALLATION



SECTION A-A

LOOP DETECTOR WIRE INSTALLATION

GENERAL NOTES

1. THE WORKING SITE MUST BE SECURED AND MAINTAINED TO MEET ALL SAFETY CONCERNS.
2. ALL COMPONENTS OF THE BIKE COUNTER DEVICE SHALL BE INSTALLED ON FLAT SURFACES ONLY.
3. ALL SAW CUTS SLOTS SHALL BE STRAIGHT.
4. BEFORE INSTALLATION OF THE WIRE, ALL SAW CUT SLOTS SHALL BE CLEANED OF DEBRIS AND BE DRY.
5. ALL WIRES SHALL BE CONTINUOUS AND TAUGHT IN THE PAVEMENT AND TO THE LOGGER DEVICE.
6. ALL SAW CUT SLOTS AND HOLES SHALL BE SEALED USING A SELF CURING, SELF BONDING, WEATHERPROOF, DURABLE SEALANT APPROVED BY THE CDOT INSTALLATION MANAGER AND BE FLUSHED WITH THE EXISTING ROADWAY SURFACE.
7. THE LOOP LEAD WIRE SHALL BE TWISTED A MINIMUM OF 30 TIMES PER 40 INCHES.
8. ONLY ONE SET OF LOOP WIRES SHALL BE PLACED IN A SAW CUT SLOT.
9. ONLY A MAXIMUM OF TWO LOOPS SHALL BE CONSTRUCTED.
10. INSTALLATION OF THE BIKE COUNTER DEVICE SHALL BE DONE IN THE PRESENCE OF A CDOT ENGINEER, A TRAFFIC ANALYSIS UNIT REPRESENTATIVE FROM THE CDOT DTD SECTION, AND A MANUFACTURE'S REPRESENTATIVE, UNLESS STATED IN WRITING BY THE DTD TRAFFIC ANALYSIS UNIT THAT THE MANUFACTURER'S REPRESENTATIVE DOES NOT HAVE TO BE THERE.
11. AFTER INSTALLATION OF THE DEVICE IS COMPLETED, TESTING SHALL BE REQUIRED USING A BICYCLE OR ANY OTHER METAL DEVICE THAT CAN BE DETECTED BY THE DEVICE.

BIKE COUNTER
D-615-1

APPLICATION: WHERE BIKES RIDDEN ON A CDOT HIGHWAY OR ROAD NEED TO BE COUNTED.

HISTORY: REQUESTED BY THE TRAFFIC ANALYSIS UNIT IN DTD.

DESIGNER NOTES:

PLEASE CALL THE STANDARDS ENGINEER AT 303-757-9083 FOR ANY QUESTIONS.

PLEASE DELETE THIS BLOCK BEFORE USING THIS DETAIL ON A PROJECT. DATE: DECEMBER 08, 2011 DD/LTA

Computer File Information		Sheet Revisions			Colorado Department of Transportation	As Constructed		BIKE COUNTER			Project No./Code
Creation Date: 09/21/11 Initials: DD	(R-X)	mm/dd/yy	XXXXXXX	XXXXXX	DOT Street Address XXXXXXXXX City, State Zip Code Phone: XXX-XXX-XXXX FAX: XXX-XXX-XXXX	No Revisions:	mm/dd/yy				D-615-1
Last Modification Date: 12/08/11 Initials: LTA	(R-X)	mm/dd/yy	XXXXXXX	XXXXXX		Revised:	mm/dd/yy	Designer:	XXXXXXXX		Code
Full Path: www.dot.state.co.us/DesignSupport/	(R-X)	mm/dd/yy	XXXXXXX	XXXXXX		Void:	mm/dd/yy	Detailer:	XXXXXXXX		
Drawing File Name: D0615010101	(R-X)	mm/dd/yy	XXXXXXX	XXXXXX	Region Number or Staff Initials			Sheet Subset:	XXXXXXX	Subset Sheets: XXX of XXX	Sheet Number: 1 of 1
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)	mm/dd/yy	XXXXXXX	XXXXXX							