The Bicycle and Pedestrian Count Exchange (BP|CX)

User Manual

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Introduction and Purpose

The Texas Department of Transportation (TxDOT) Bicycle and Pedestrian Program has developed the Texas Bicycle and Pedestrian Count Exchange (BP|CX or Count Exchange), a nonmotorized count exchange system, to provide for the collection, quality control, and reporting of nonmotorized count data, including bicycle and pedestrian counts, for Texas.

The BP|CX was created for local agencies, TxDOT districts, and other entities that collect nonmotorized count data to encourage and promote the collection and use of bicycle and pedestrian count data. The BP|CX hopes to coordinate planning efforts, review counts for quality, and provide a means to organize statewide nonmotorized planning efforts.

This manual provides an overview of the BP|CX and a procedural guide for importing, quality-reviewing, factoring, exporting, and reporting the nonmotorized count collected in Texas in the BP|CX.

Effective Date

This is the first edition of the *Bicycle and Pedestrian Count Exchange (BP|CX) User Manual*, effective as of August 1, 2020. Further editions will summarize changes on this page.

Contact

Please contact the Bicycle and Pedestrian Program (BikePed@txdot.gov) with comments or questions about nonmotorized count collection, the count equipment loan program, or the use of nonmotorized counts in the local and statewide transportation planning process. Contact the BP|CX help desk (Support@txbpcx.org) for technical support or questions about using the BP|CX.

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1. BP|CX Access and Registration

1.1. Access to BP|CX

Two distinct modules comprise the Texas Department of Transportation (TxDOT) Texas Bicycle and Pedestrian Count Exchange (BP|CX):

- **The public-facing data visualization (https://mobility.tamu.edu/bikepeddata/):** This module is open to all users and the public and provides a means to access cleaned nonmotorized count data, statistics, and download usable data.
- **The access-restricted BP|CX data manager (https://txbpcx.org/):** This module is only accessible to registered users and provides tools to import/upload, review, factor, mass-export, and report collected nonmotorized count data for that user's counters only. Data from this portal, once reviewed and certified, are then viewable from the public-facing data visualization.

1.1.1. Who Can Use the BP|CX Data Manager?

The BP|CX was designed for four specific types of users to submit, review, certify, and manage nonmotorized count data:

- **Local and regional agencies collecting count data:** In many cases, local and regional agencies such as cities, metropolitan planning organizations, transit agencies, tolling authorities, water districts, park departments, conservation districts, etc., may collect nonmotorized count data in addition to or in lieu of the local TxDOT district.
- **TxDOT division personnel:** This category includes state staff and their consultants who may use the data in statewide planning efforts or who may prepare and submit nonmotorized count data to the state's data clearinghouse or the Federal Highway Administration (FHWA).
- **TxDOT district personnel:** This includes anyone at the TxDOT district level authorized by the bicycle and pedestrian coordinator to collect, review, and manage a local district's count data that may be collected by TxDOT.
- **Private entities collecting count data:** Researchers, private consulting firms, or other nongovernment entities may also access and contribute to the BP|CX. These groups may act as data providers (collecting data for another entity) or data owners (collecting and owning their own nonmotorized count data).

The BP|CX data manager is intended to manage the contribution and quality of nonmotorized count data by limiting and controlling access to those functions. By providing high quality data, the BP|CX hopes to encourage and expand the use of nonmotorized count data by all users to view, analyze, and use the counts in the best manner.

1.1.2. Registered User Types

The BP|CX data manager supports three user types in the registration process to provide the correct access and functionality:

- **Authorized agency user:** As the most common user type, this allows individual access to a specific agency's count data to upload/import, review, factor, certify, and export data as needed. Users can only see and interact with data for that agency.
- **Authorized agency administrator:** This user type operates exactly like an authorized agency user but also has the authority to add or remove authorized agency users from the BP|CX. Generally, this person should be a tenured authority within the agency to make decisions and is someone unlikely to change over time.
- **Authorized super administrator:** This rare user type is reserved for the TxDOT Bicycle and Pedestrian Program manager, BP|CX maintenance, and other users deemed critical for proper operation and maintenance of the count exchange. Authorized super administrators can log in as an administrator to any agency, make data corrections when an error has occurred, and download nonmotorized count data for FHWA's Traffic Monitoring Analysis System (TMAS) count upload from the state.

1.1.3. BP|CX Agency Registration

Before any TxDOT district, local or regional agency, or private entity can access and submit data to the BP|CX, it must first be registered with the BP|CX and approved by an authorized super administrator. In most cases, agencies already collecting nonmotorized data in Texas prior to 2018 will already be registered with the BP|CX.

If your agency is not registered or you are unsure of its status, you can check the public-facing data visualization (https://mobility.tamu.edu/bikepeddata/) by selecting your county or district and seeing if your agency is an option in the "Filter by Agency" dropdown menu. If your agency appears, then it has already been registered; you will need to contact your authorized agency administrator to request access to the BP|CX. If your agency does not appear, you will need to register your agency.

To **register an agency**, follow these steps:

1. Navigate to the BP|CX data manager (https://txbpcx.org/).
2. Click the "Register" link under the login screen.
3. Read and agree to the "Terms & Conditions."
4. Fill out the requested information and click "Submit."

Your contact information will be sent to an authorized super administrator, who will contact you (generally within 1 to 2 business days) and discuss your agency's count program and other details required to set up your agency, including who will be the primary contact (agency administrator), existing count locations, and counting needs. Once approved by the authorized super administrator, you will receive an email with your user name

(your email address) and instructions to reset your password. Once you have set a password, your agency has been registered.

In cases where an agency uses **Eco-Counter** technology and uses a modem connection to connect its counters to Eco-Visio, the agency will need to provide written permission to Eco-Counter to provide the BP|CX with access to Eco-Visio's API link. This will enable the BP|CX to automatically import the most recent count data into the agency's view. Agencies may use the following text to grant the BP|CX access to the Eco-Visio API:

Dear Eco-Counter,

I hereby grant the Texas Department of Transportation's (TxDOT's) Bicycle and Pedestrian Count Exchange (BP|CX), managed by the Texas A&M Transportation Institute (TTI), permission to automatically and directly access, on an ongoing basis, [your agency]*'s bicyclist and pedestrian count data that are stored in the Eco-Visio system.*

We reserve the right to terminate our participation at any time by simply notifying TxDOT or TTI and asking for our data to be removed from the BP|CX.

It may take 1 to 2 weeks for the connection with the Eco-Visio API to be completed and for all past count data to be initially imported. If there are any issues, an authorized super administrator will contact you to clarify any issues. Once data have been imported, you will receive an email notification that you have data ready for review.

If you have any questions about access or use of the data by the BP|CX, please contact an authorized super administrator with the TxDOT Bicycle and Pedestrian Program (BikePed@txdot.gov) or BP|CX Support (Support@txbpcx.org).

1.1.4. Terms and Conditions Overview

By registering with the BP|CX, you and your agency must agree to the following terms and conditions (these are also listed under the login window of https://txbpcx.org). Should you have any questions about these terms and conditions, please contact the TxDOT Bicycle and Pedestrian Program (BikePed@txdot.gov) or BP|CX Support (Support@txbpcx.org).

Eco-Visio Data Access Permission

By registering, you agree to give permission to the Texas A&M Transportation Institute (TTI) and the Texas Department of Transportation (TxDOT) for automatic and ongoing direct access to your agency's bicycle and pedestrian count data that are stored in the Eco-Visio system, should your organization subscribe to Eco-Visio.

These data will be downloaded into your agency's account in the Texas Bicycle and Pedestrian Count Exchange (BP|CX or Count Exchange) for your use, viewing, quality control, and submission to TxDOT.

Data Use and Benefits to You

Your reviewed and certified count data will be integrated into TxDOT's Texas Bicycle and Pedestrian Count Exchange. These counts and other metadata will be made publicly available to anyone who accesses the BP|CX website.

*TxDOT may also submit your **reviewed and certified** data to the Federal Highway Administration's Traffic Monitoring Analysis System (TMAS) for annual reporting purposes.*

Administrative and contact information will not be shared at any time with anyone outside your organization, TxDOT, or TTI.

The benefits to your participation include:

1. *Access to the BP|CX's data quality review tools (data contributors only).*
2. *Access to the BP|CX's data summary and visualization tools.*
3. *Access to seasonal adjustment factors and tools (future enhancement).*
4. *Help in telling a better story of increased levels of bicycling and walking in Texas and influencing future TxDOT nonmotorized planning efforts.*

TTI is continuing to support further development and maintenance of TxDOT's Texas Bicycle and Pedestrian Count Exchange at https://mobility.tamu.edu/bikepeddata/.

Email Policy

By registering, you agree to receive occasional emails from the BP|CX to inform designated users of new data downloads, new data needing quality control, or rare administrative messages about the BP|CX or new user requests. Your email will never be sold or used for marketing purposes.

Termination of Participation

You may terminate your participation in any part of the BP|CX (Eco-Visio download, FHWA's TMAS submission, data sharing, or all participation) at any time by simply notifying TxDOT or TTI and asking for your data to be removed from the BP|CX.

1.1.5. BP|CX User Registration

Only authorized agency administrators and authorized super administrators can add authorized agency users. To **add a new authorized agency user**, follow these steps:

1. Navigate to the BP|CX data manager (https://txbpcx.org/).
2. Log in to the BP|CX using your user name and password.
3. Click "Authorized Users" on the navigation panel on the left side of the screen. At this point, authorized agency administrators and authorized super administrators will see a list of authorized users. The administrator can remove existing users or edit a user's name, email, or password.
4. Click "Add User" at the top right corner of the window.
5. Enter the new user's name and email address.
6. Click "Add User."

At this point, the BP|CX will send the new user an email stating that the user has been added as an authorized agency user capable of uploading/importing, reviewing, factoring, certifying, and exporting the agency's nonmotorized count data. The email will also contain a user name (usually the user's email address) and a link to set a new password. Once the password has been set, the user will have access to the BP|CX and all the features set for that particular agency.

In rare cases, a user may need access to multiple agencies' nonmotorized count data. In this case, the user will need special permissions that require setup from an authorized super administrator. Please contact BP|CX Support (Support@txbpcx.org) for assistance in providing a single user access to multiple agencies.

1.2. BP|CX Login and Logout

Only registered users and administrators can log in to the BP|CX. For steps to register an agency or a single user, please refer to Section 1.1.3, "BP|CX Agency Registration," or Section 1.1.5, "BP|CX User Registration."

To **log in to the BP|CX**, follow these steps:

1. Navigate to the BP|CX data manager (https://txbpcx.org/).
2. Enter your user name (usually your email) and password.
3. Click "Login." You are now logged in to the system.

To **log out of the BP|CX**, follow these steps:

1. From any window in the BP|CX, find your name at the top left of the screen, to the right of the notification icon (bell).
2. Click your name and select “Logout.” You are now logged out of the system.

2. BP|CX Navigation

2.1. BP|CX Modules and Elements

The BP|CX is made up of a series of modules used for different purposes as well as other smaller elements that provide information and navigation throughout the BP|CX. This chapter describes each module or element, explains how each interacts with another, and provides guidance for navigating through the BP|CX.

2.1.1. Dashboard

The *Dashboard* (Figure 2-1) serves as the landing page once a user logs in to the BP|CX. From here, users can:

- View their most recent notifications from the BP|CX system.
- See their agency's count locations on a map and relevant statistics about those locations.
- View what stations need to be quality controlled.

The navigation menu at the left of the screen allows users to easily jump from one module to another, with the *Dashboard* serving as the home page. The ribbon at the top of the screen has links to the *Notifications* window and *User Profile* (both discussed later).

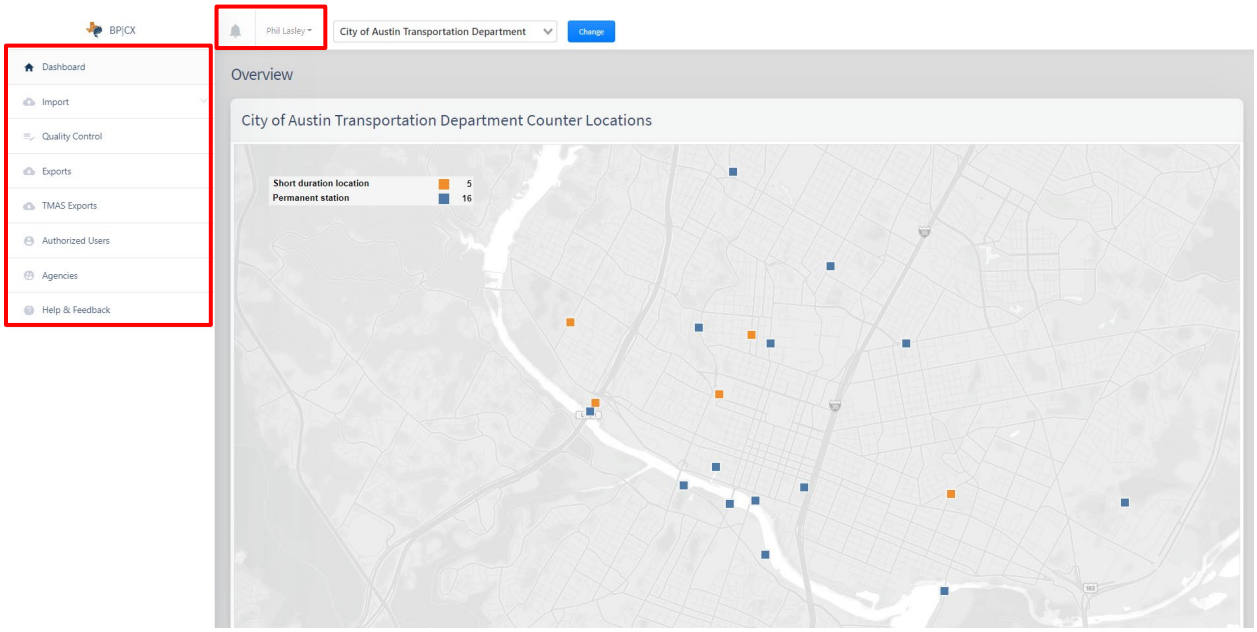


Figure 2-1. BP|CX Dashboard (Not Showing Counter Table Below Map).

2.1.2. Import

The *Import* module controls all functions relating to:

- Count location setup.
- Location editing.
- Data import.
- Count location, data import, and updates via Eco-Visio's API plugin with the BP|CX.

On the navigation menu on the left, clicking on the *Import* module reveals four import options (Figure 2-2):

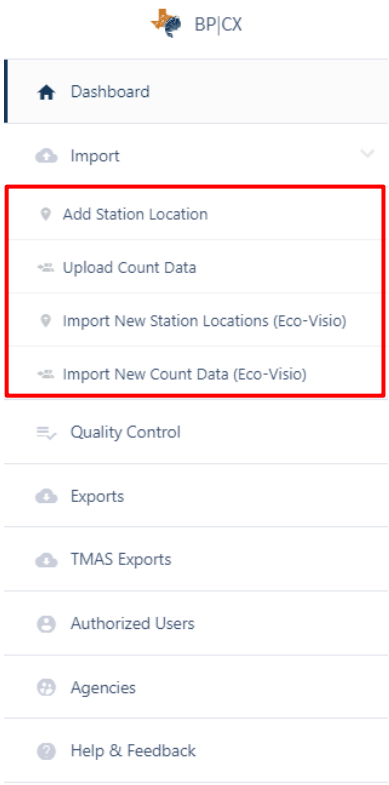


Figure 2-2. Import Submodules in the Navigation Menu.

- **Add Station Locations:** This submodule allows a user to set up a new counter or count location in the BP|CX that is not associated with Eco-Visio. Users are guided through a setup wizard that collects important metadata about the counter and count location, such as GPS coordinates, modes counted, direction, counter brand, and other required information.

- **Upload Count Data:** This submodule allows the user to manually upload and import count data and match it to an existing station location already in the BP|CX. The BP|CX will recognize standard data formats from common count equipment or from a standard Microsoft Excel template that can be downloaded on this page. Once data are successfully imported, they will then be available to review in the *Quality Control* module.

- **Import New Station Locations (Eco-Visio):** This submodule displays Eco-Counters in Eco-Visio that have not been set up in the BP|CX but that are available to be included. This could include a new counter recently installed or a counter that is out of commission that should be excluded. Local knowledge about which counters are in use or not in use is necessary to correctly import new Eco-Counters. Users will be guided through the setup wizard if they decide to include a counter or count location from this submodule.

- **Import New Count Data (Eco-Visio):** This submodule displays existing counters or count locations that have been previously connected to the BP|CX through the Eco-Visio API and contributed data to the system. Selecting locations, an end date, and clicking "Import" retrieves the latest count data since the previous data import from Eco-Visio to the specified end date.

2.1.3. Quality Control

The *Quality Control* module allows users to review, factor, and certify cleaned data for public consumption.

The module can be accessed from the navigation pane on the left or directly from the *Dashboard*. The initial view displays count locations needing quality review and certification. Each location displays the station name, station ID number, city, and number of count days needing review.

After clicking on the "QC" action button for a count location, the user is directed to the primary quality control page, which includes:

- A quality control visualization.
- A view of the current filters enabled and bulk actions menu.
- The quality control table where bad counts can be flagged and annotated.

A deeper discussion about the quality control process can be found in Chapter 4,"Data Quality Review, Factoring, and Certification."

From this page, users may also apply bulk adjustment factors, such as for occlusion or counter error correction, and certify counts for accuracy. Certifying count data releases quarantined counts into the public-facing data visualization (https://mobility.tamu.edu/bikepeddata/).

2.1.4. Exports

The *Exports* module allows a user to bulk-export count data from a single location, multiple locations, or all count locations in a single download. This differs from the public-facing data visualization (https://mobility.tamu.edu/bikepeddata/) in that it can export more than a single location at a time. This feature is useful for special data requests, data backups, or other research that requires more than one count location.

2.1.5. TMAS Export

The *TMAS Export* module is only available to authorized super administrators or specific TxDOT employees who upload statewide data to FHWA's TMAS. This allows reviewed and certified BP|CX data to be bundled and formatted specifically to TMAS requirements and then bulk-exported for submission to TMAS.

2.1.6. Authorized Users

The *Authorized Users* module is only available to authorized agency administrators or authorized super administrators. It displays who the authorized agency users are, allows the administrator to edit or delete existing users, and allows the addition of new authorized users.

Section 1.1.5, "BP|CX User Registration," provides more information about adding new users.

2.1.7. Notifications

The *Notifications* link, shown as a bell icon (see Figure 2-1), gives access to system notifications generated by the BP|CX for various reasons. These could include a welcome to the BP|CX, the completion of a data import or upload, the presence of new data requiring quality control and review, the completion of a bulk data export, or other notifications about maintenance and updates. BP|CX notifications area also emailed to the user.

2.1.8. User Profile

The *User Profile* menu displays as your name on the ribbon at the top of every screen (see Figure 2-1) and provides users with two options under this menu:

- The user can edit the name, preferred email address, and password. This email address serves as the BP|CX login user name and is also where the system sends notifications of new tasks.
- The user can log out and be redirected to the home login screen.

2.2. Helpful Terminology

The following is a list of terms commonly used in the BP|CX and their definitions within the system:

- **Count station:** A unique location where nonmotorized counts have been or are being collected (sometimes also referred to simply as a station). Each station includes data attributes such as geographic descriptors, mode and direction of travel, roadway inventory and land use characteristics, counter equipment type and descriptions, and relevant owner information. Many of these attributes are required, but some are optional. Stations are delineated by a six-digit station ID: the first two digits indicate the city or area, and the last four are a sequential number from introduction to the database.

  A count station is a unique location that can be considered independent of other count locations. For nonmotorized counts, a station can take several forms:

  - A screen line on a street or road that includes nonmotorized travel (regardless of travel direction) on both sides of the road.
  - A screen line on a street or road that includes nonmotorized travel (regardless of travel direction) on ONLY ONE side of the road.
  - A screen line on a shared-use path or other distinct nonmotorized facility.
  - One or more intersections or mid-block street crossings.
  - An open space (e.g., pedestrian plaza) without discretely marked travel paths.

  Extensive guidance on designating stations can be found in FHWA's *Coding Nonmotorized Station Location Information in the 2016 Traffic Monitoring Guide Format* available at https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/tmg_coding/. Additional guidance can also be found in the Texas A&M Transportation Institute's (TTI's) *Guide for Pedestrian and Bicyclist Count Data Submittal (Technical Report 0-6927-P7)* available at https://static.tti.tamu.edu/tti.tamu.edu/documents/0-6927-P7.pdf.

- **Channel or flow:** A fundamental subset of a count location that includes only one direction of travel by one mode. For example, a channel may be northbound pedestrians. Channels are usually found as labels on Eco-Counter data downloads for counters that count bicycles and pedestrians separately or counters that can determine directionality. Channels are given unique ID numbers called flow IDs. These include the six-digit station ID, a two-digit direction, and a three-digit mode identifier. Channels are the lowest level of detail in count metadata (e.g., AU0001-NB-Bic).

- **Count data**: The nonmotorized counts that have been collected at stations listed in the corresponding station metadata. Each count includes a flow ID and several other required and optional attributes:

  - Date, time, and reporting interval of the nonmotorized count.
  - Nonmotorized count for the corresponding date/time/interval.
  - Validity codes indicating whether each count is valid, invalid, or abnormal but valid.
  - Descriptive attributes of nonmotorized travelers (e.g., helmet use, gender, or age group).
  - Weather conditions at the time of count (e.g., precipitation and temperature range).

3. Importing Data into BP|CX

3.1. Overview

Combining data from disparate sources and counters into a unified format presents issues for planners who want to easily compare or use nonmotorized count data. The BP|CX *Import* module remedies this formerly time-consuming issue by recognizing, formatting, and organizing multiple types of nonmotorized count data into a unified data format.

This chapter discusses the station setup and data import processes:

- The first section addresses the process options available for users in the BP|CX.
- The second section provides step-by-step instructions for setting up a new station and uploading count data.

3.2. Station Setup and Data Import Processes

In practice, setting up count equipment can be a messy and unorganized process. Count equipment can be placed quickly with little data preparation, or count stations can be meticulously organized prior to deployment. The BP|CX allows users to deploy equipment in any way that suits their needs by providing flexibility in the station setup process.

3.2.1. Data Import Process Flow

Figure 3.1 illustrates the data import process flow, starting with no data and displaying three options for how data can be imported into the BP|CX:

- New or existing count location setup.
- New count location setup.
- New or existing Eco-Counter setup in Eco-Visio.

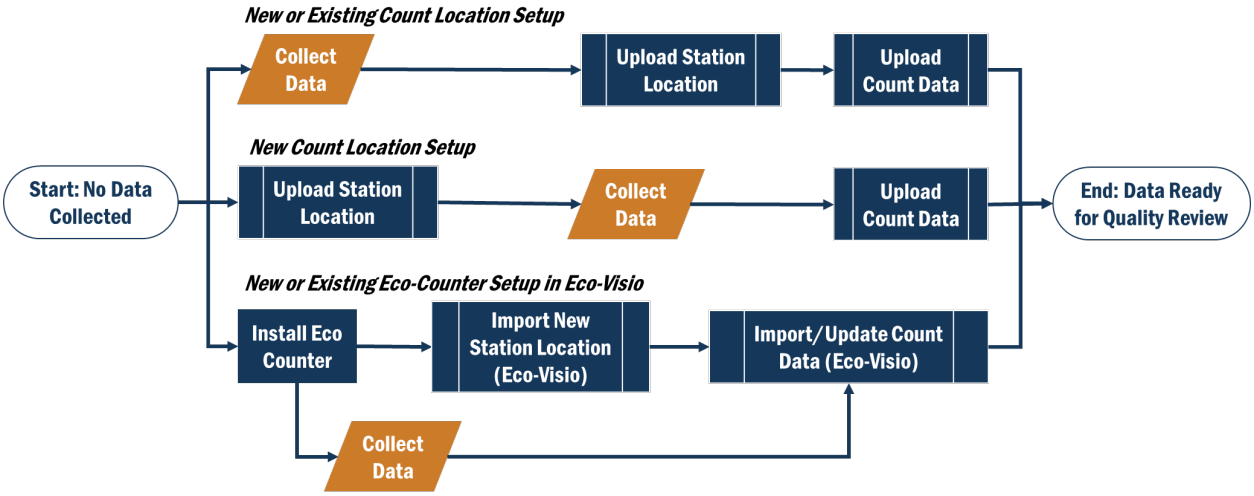


Figure 3-1. BP|CX Data Import Process Flow.

The *Import* module supports three primary data flows, based on the user's time and needs, corresponding to the three horizontal process flows seen in Figure 3.1:

1. **New or Existing Count Location Setup:** This flow starts with counts being collected before any station metadata have been set up in the BP|CX. This will most likely occur when users first begin using the BP|CX because they will likely already be collecting data. Users will use processes 1 and 2 (from Section 3.2.3, "Import Processes in *Import* Module") to set up a station and then import data to the system by matching the count data with the station meta data.

2. **New Count Location Setup**: This process flow is only used when no counts have yet been physically collected. Users can pre-enter stations into the BP|CX before deploying the count equipment. Upon data retrieval and upload, users will match the count data with the previously entered station information.

3. **New or Existing Eco-Counter Setup in Eco-Visio:** This final process flow works only with stations set up in Eco-Visio (which would mean the counter has been installed and is collecting data). The BP|CX displays a list of available stations that can be imported. Upon setup completion, data may be imported for the first time and then subsequently updated from the date of last upload from Eco-Visio.

In all cases, the import follows two basic steps in this order: set up the station by entering metadata, and then import the actual counts and match them to station metadata.

3.2.2. Types of Data

Two types of data must be collected with any nonmotorized count:

- The metadata about the count station, such as location, what is being counted and how, owner information, functional class of the facilities, etc.

- The counts themselves.

Each type of data has different requirements. In all cases, any count data must be associated with station metadata; however, station metadata can exist without associated counts. This provides the flexibility to enter new station metadata before counters are deployed or after the counts have been collected (but before the counts are imported).

3.2.3. Import Processes in Import Module

The BP|CX *Import* module contains four import processes that correspond to Figure 3.1 (two processes are associated with Eco-Counter imports):

1. **Add Station Locations:** This process sets up a new count station or location in the BP|CX that is not associated with Eco-Visio. This process must be completed before any nonmotorized counts are imported for that station.

2. **Upload Count Data:** This process imports count data and matches it to an existing count station or location already in the BP|CX that is not associated with Eco-Visio. This could include a new station that was just set up or a station that already has data associated with it.

3. **Import New Station Locations (Eco-Visio):** This process is like the first but specifically imports stations that are Eco-Counters in Eco-Visio that have not been set up in the BP|CX but that are available to be included. This process automatically populates many metadata fields that must normally be manually imputed by a user. This process also establishes a connection with the corresponding data feed from Eco-Visio for this location.

4. **Import New Count Data (Eco-Visio):** Like the second process, this process imports nonmotorized count data specifically from counters linked to Eco-Visio. Counts can be imported for the first time or updated from the last date of import.

3.3. Step-by-Step Data Imports

This section provides step-by-step instructions for importing station metadata and then importing and matching count data to those stations, including for counters in Eco-Visio. These two processes are similar to those for Eco-Counters set up through Eco-Visio; therefore, special steps for Eco-Visio will be included after each set of instructions.

3.3.1. Setting Up a New Count Location

The steps in this section correspond to the "Upload Station Location" box in Figure 3.1. The following steps walk a user through **the process of setting up a new or existing count location** but do not discuss how to import count data. Section 3.3.3, "Importing Count Data," provides more information on this topic.

1. **Navigate to the "Add Station Locations" tab** from the *Import* module on the left of the screen by clicking on "Import" and then "Add Station Locations." This opens the "Import New Station Location" screen (Figure 3-2) with a form for entering in station meta data.

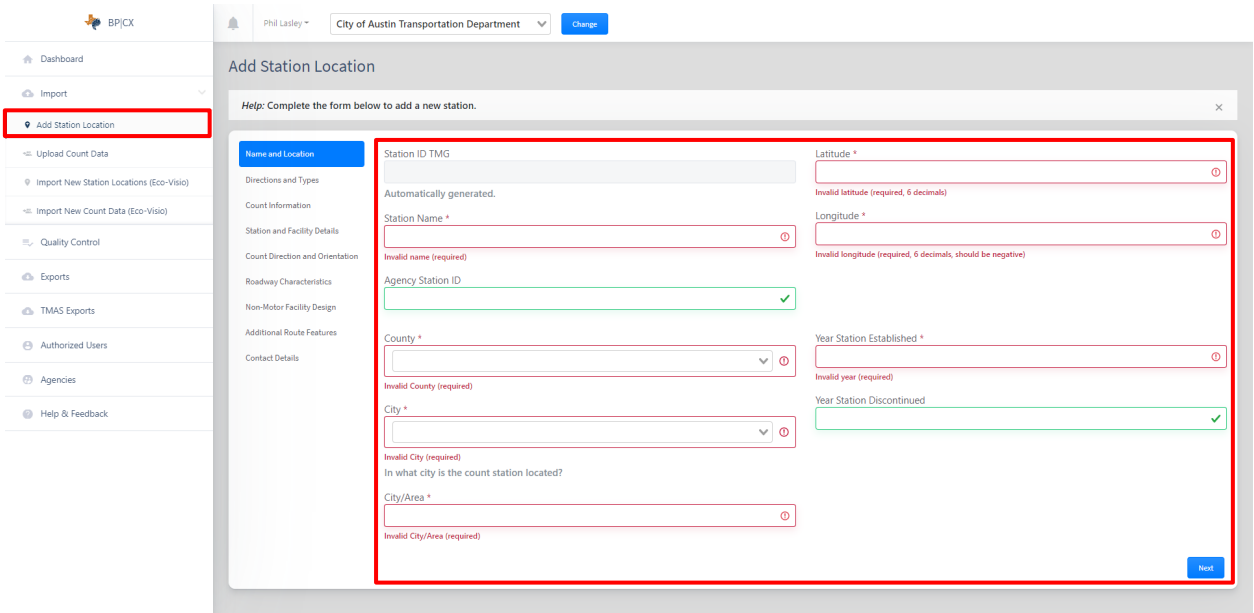


Figure 3-2. The Import New Station Location Screen.

2. **Fill out each screen of the form** as completely as possible. Some fields required by TxDOT or FHWA are noted with an asterisk (*). Clicking in each box will reveal general instructions about filling in each field. The form contains nine tabs; the following will discuss each tab and the required fields. More information about the fields can be found in Chapter 9. Appendix A: Station Location Fields.

    a. **Name and Location tab:** Requires information about the station's name, location (including county, city, special area or district, latitude, and longitude), and the year the station was established or discontinued. Agency Station ID refers to any internal name or code unique to the agency entering the information.

    b. **Direction and Types tab:** Requires information about the travel mode (pedestrian, bicycling, all nonmotorized traffic, or other types), direction of travel, and sensor type **matched to a particular channel from the counter**. For multi-channel counters (like many Eco-Counters or count technology that differentiates direction and mode), **one row must be filled out for each channel**. This step is crucial for connecting the counter information with the counts.

    To enter channel information, click "Add Row" and enter the information for one channel at a time. Add additional rows for each channel in the counter. If possible, match the Channel ID with the channel ID number in the count data file.

    c. **Count Information tab:** Requires general information about how the count took place, the counter vendor, and count purpose. A Notes field allows the input of comments about the location, such as unique conditions, adjustment factors, and other pertinent information.

d. **Station and Facility Details tab:** Requires a detailed description of where the count equipment was located and the facility type and functional classification of the count location. When entering the description, provide enough detail to allow someone to locate and replace the counter if necessary.

e. **Count Direction and Orientation tab:** Requires additional information about **how the count equipment was oriented to the facility and traffic on the facility**. This does not refer to what direction of travel the equipment was capturing. These fields are complicated and may be confusing to enter; please see Section 9.2, "Required Station Attributes" for additional details about each.

f. **Roadway Characteristics tab:** Requests information about the roadway **if the counter was placed on or near a roadway** (such as on a bike lane, cycletrack, or roadway-adjacent sidewalk). Details include roadway width in feet, posted speed limit, posted route signing and number, and if the roadway is part of the National Highway System.

g. **Non-Motor Facility Design tab:** Requests design information about the nonmotorized facility being counted, such as width, if there is a buffer between the facility and if so, the width of the buffer, surface type, and condition.

h. **Additional Features tab:** Requests ancillary condition information, such as the presence of parking, shade, transit options, street lighting, ADA ramps, surrounding land use, and traffic volume.

i. **Contact Details tab:** Requests information about data providers or data requesters, if applicable. A data provider is an agency other than the data owner that performed and provided the count data on behalf of the data owner. An example would be a consulting firm or research agency under contract to provide counts to an agency. A data requester is an agency separate from the data owner that requested the counts be performed.

3. **Click the "Add Station" button** in the bottom righthand corner of the form after filling out each screen of the new station input form.

Once the form has been successfully completed, a new count station will be created in the BP|CX for that agency. The name of this station will now be viewable when uploading count data and the location will be noted on the map of stations and table in the *Dashboard*.

3.3.2. Setting Up a New Count Location from Eco-Visio

Setting up a new count location from an Eco-Counter that is subscribed to Eco-Visio follows similar steps as in the previous section but with a few key differences. The steps in this section correspond to the "Import New Station Location (Eco-Visio)" box in Figure 3.1.

1. **Navigate to the "Import New Station Locations (Eco-Visio)" tab** from the *Import* module on the left of the screen by clicking on "Import" and then "Import New Station Locations" (Figure 3-3). This opens a list of all the count stations and their ID numbers found for the agency in Eco-Visio. If no Eco-Visio stations are listed and you are an Eco-Visio user, Eco-Counter may not yet have added your Agency; contact BP|CX Support (Support@txbpcx.org) for more information to resolve this issue.

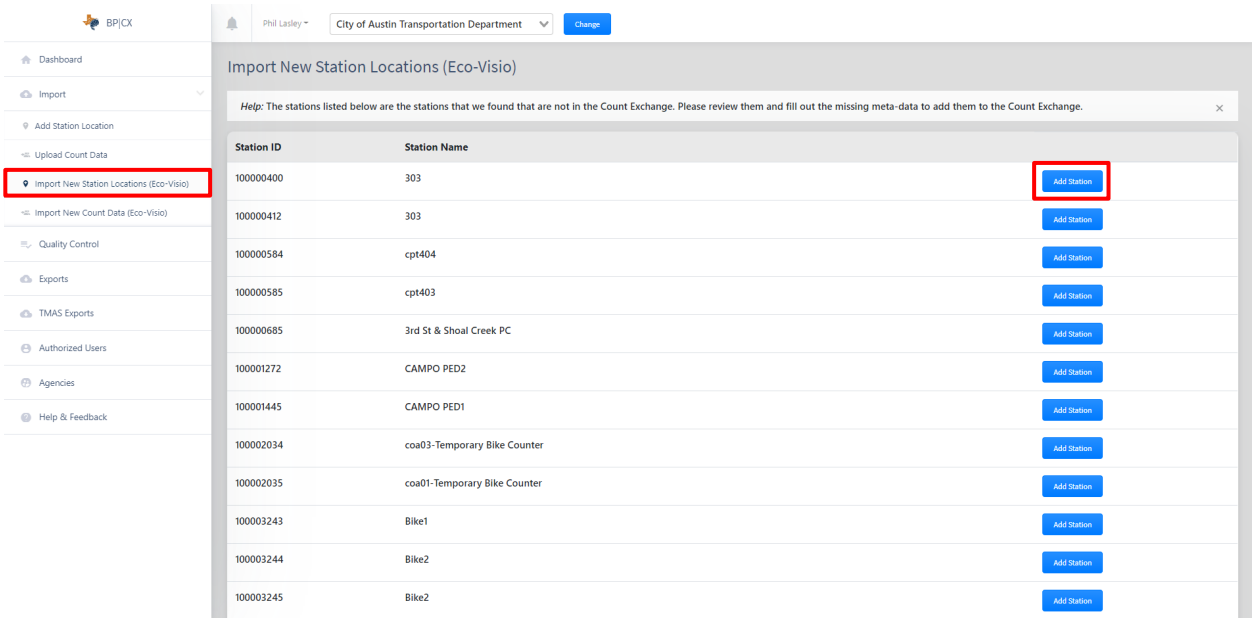


Figure 3-3. Import New Station Locations from Eco-Counters in Eco-Visio.

2. **Find the new station to import** by identifying the correct station **using the Eco-Counter Station ID number** in the first column with the Station ID number in Eco-Visio. This will ensure the correct station is matched with the correct metadata.

   If no Eco-Counter stations load in this screen and your Agency has Eco-Counters that regularly send data to Eco-Visio, contact BP|CX Support (Support@txbpcx.org). The Eco-Visio API likely may not have yet been updated with your Agency's authorization for use.

3. **Select "Add Station" and fill out each screen of the form** as completely as possible. This is the same form as described in the previous section; however, some fields will be pre-filled by Eco-Visio where possible. Specifically, the latitude, longitude, channel name, and channel ID fields will be prefilled. Verify those are correct. Do not change the channel ID numbers and those are the direct links to the count data in Eco-Visio.

4. **Click the "Add Station" button** in the bottom righthand corner of the form after filling out each screen of the new station input form.

Once complete, the station name will appear in the "Import New Count Data (Eco-Visio) tab and is ready to import count data.

3.3.3. Importing Count Data

The steps in this section correspond to the "Upload Count Data" box in Figure 3.1. The following steps walk a user through **the process of importing count data and matching it to channel information from a count location**. These steps are the same for importing count data to a new count location or an existing count location.

1. **Navigate to the "Upload Count Data" tab** from the *Import* module on the left of the screen by clicking on "Import" and then "Upload Count Data" (Figure 3-4). This opens a data input form to manually upload count data to a specific count station.

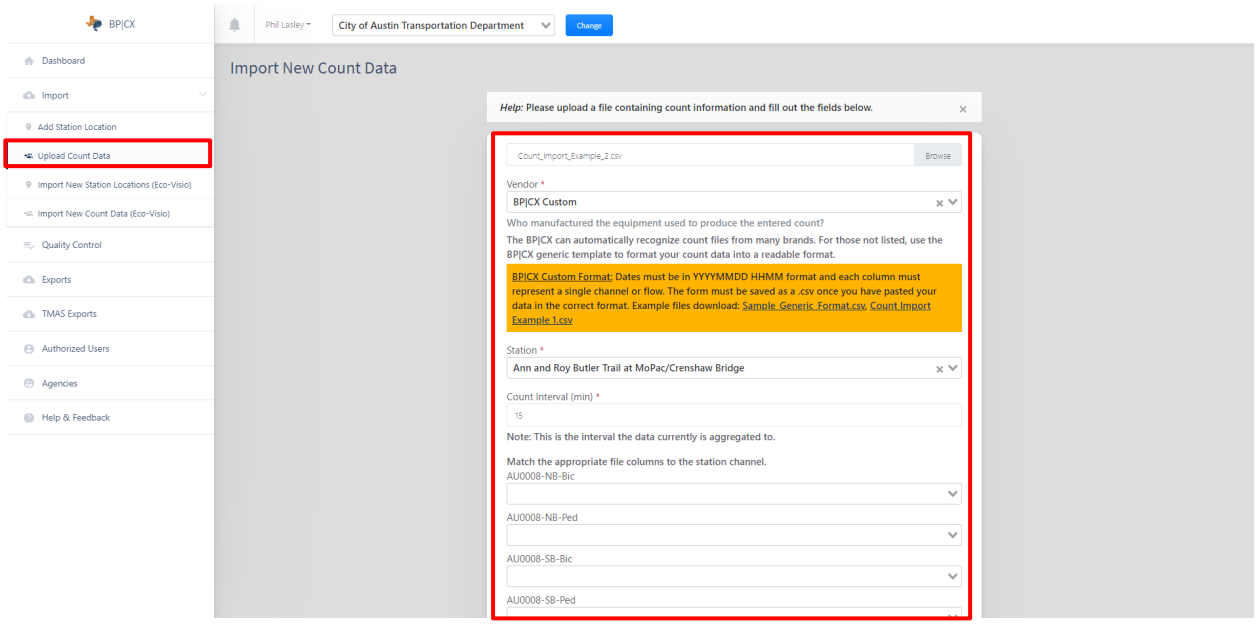


Figure 3-4. Manually Import Count Data into the BP|CX.

2. **Find and upload the count file** by dragging and dropping the count file in the form or by finding the file by clicking "Browse" and locating the file.

   The BP|CX can accept the count data files from most counter technologies, including Eco-Counter (for counters not using an Eco-Visio subscription), TRAFx, TimeMark, JAMAR, and Diamond Traffic. **Data not from one of these brands and all intersection or hand-count data must use the BP|CX generic data template, which can be downloaded from the "Upload Count Data" tab.**

3. **Select the vendor** from the dropdown menu. If the counter vendor is absent from the list, choose "BP|CX Custom" and ensure the count data are in the BP|CX custom data template.

4. **Select the station location** from the dropdown menu. This list includes all existing count locations in addition to new station locations that have just been setup in the system.

5. **Enter the count interval in minutes as a number.** Count intervals are how often count totals are summed in the data. The most common types are 15-minute and 60-minute intervals, but intervals can range from 5-minute to 60-minute in 5-minute increments.

6. **Match the data to the channel ID.** After filling in the vendor, station, and count interval fields, the BP|CX will generate a Flow ID based on the channel ID in the count station information entered earlier. This will drop down in the form within a few seconds of entering the previous fields, as see in Figure 3-4. Flow IDs are descriptive, giving the station ID, direction, and mode. Each Flow ID will have a dropdown menu based on the uploaded data file. Match the Flow ID to the correct channel ID or direction and mode in the count file. **Verify these are correct before moving forward.**

7. **Click "Load File."**

The BP|CX will email the user when all the data have been successfully imported. The new data will now be available for quality review.

3.3.4. Importing Count Data from Eco-Visio

While counts from Eco-Visio counters will be automatically downloaded on a regular interval (quarterly), users can easily manually import count data from an Eco-Counter that is subscribed to Eco-Visio. The count station must first be imported into the BP|CX following steps in Section 3.3.2, "Setting Up a New Count Location from Eco-Visio." The steps in this section correspond to the "Import/Update Count Data (Eco-Visio)" box in Figure 3.1.

1. **Navigate to the "Import New Count Data (Eco-Visio)" tab** from the *Import* module on the left of the screen by clicking on "Import" and then "Import New Count Data (Eco-Visio)" (Figure 3-5). This opens a list of all the Eco-Counters registered for the agency, their names, BP|CX station ID numbers, and the date of last data import.

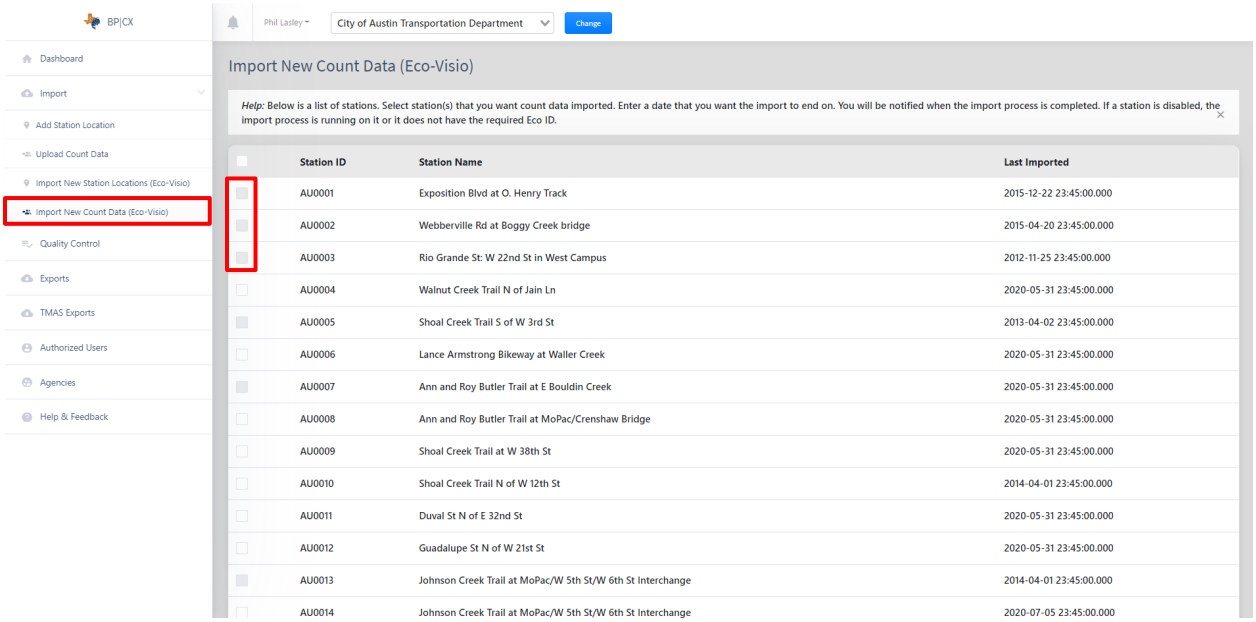


Figure 3-5. Automatically Import Count Data from Eco-Visio to Eco-Counter Stations.

2. **Select the stations to import count data** by clicking the checkbox to the left of each station ID number. If all stations should have data imported or updated, select the checkbox in the header direction to the left of the header, "Station ID." If a box is grayed out, this indicates the station is no longer actively collecting data.

3. **Entre the desired end date** of the import at the bottom of the table. Use the column "Last Imported" to reference when data were last imported. Data can only be imported through the last complete day (yesterday).

4. **Click "Import"** at the bottom of the screen.

Once the import button has been clicked, the BP|CX begins the connection and download process from Eco-Visio. This process may take several minutes, depending upon the amount of data needing to be imported into the system. Once complete, the BP|CX will email the user when all the data from each station have been successfully imported. The new data will now be available for quality review.

Upon completion, navigate to the *Dashboard* or the *Quality Control* tab and find the counter in the table. Verify the correct number of days have been imported into the system. If you feel there has been an error, contact BP|CX Support (Support@txbpcx.org).

4. Data Quality Review, Factoring, and Certification

4.1. Overview

The quality assurance and control process for nonmotorized count data has historically been difficult and lies at the center of why nonmotorized count data are not often used even if collected. The BP|CX attempts to streamline a cumbersome process away from large spreadsheets and pivot tables to a manageable and more automated process.

This chapter addresses the process and the theoretical elements of quality review for nonmotorized data:

- The first section discusses the quality review process.
- The second section gives step-by-step directions for performing the review.
- The third section discusses tips, tricks, and nuances of quality-controlling nonmotorized count data.

4.2. Quality Review Process

Users should be aware of the overall process and flow of the quality review process in order to better use the features in the BP|CX. Figure 4.1 summarizes the quality review process flow in the BP|CX.

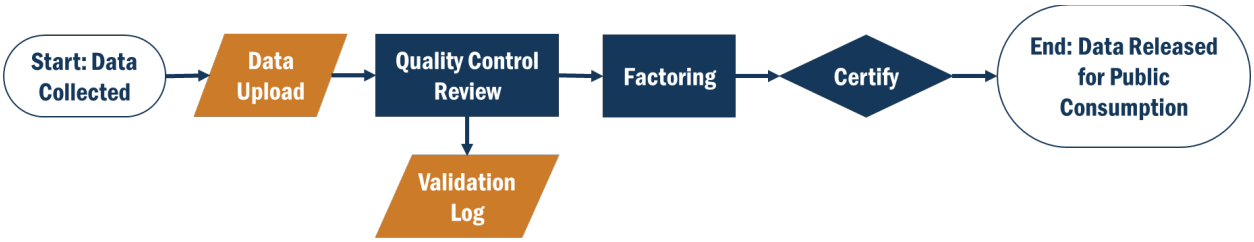


Figure 4-1. BP|CX Quality Review Process Flow.

The process is described as follows:

1. **Data collected:** The process begins as data are collected from physical counters in specific locations around your community.
2. **Data upload:** Data are then imported into the BP|CX through the *Import* module discussed in Chapter 3, "Importing Data into the BP|CX." The import process places all new data in a quarantined data holding pen where it remains until the data have been reviewed and certified.
3. **Quality control review:** During the quality control review process, authorized users employ tools in the BP|CX to find, flag, and log invalid or abnormal data. Validation tests from research and FHWA have been integrated into the BP|CX to aid users with this task. As invalid or abnormal data points are found, users flag the point with one of several predetermined validation flags and then log the reason for the flag. This creates a note in the BP|CX **validation log** that serves as a record for why data were excluded. This log also serves to record events such as festivals, races, abnormal activity, and severe weather events that may have skewed the data even though they are valid counts. The logs for certified data are not viewable to the public. An interface to review the log will be added later.

4. **Factoring:** Once data have been reviewed and flagged for quality, users may then apply factors to the count data. These may include occlusion or other error adjustment factors that have been determined through counter validation or seasonal adjustment factors to annualize short-duration counts depending upon the month. **At this time, this feature is not available in the BP|CX.**

5. **Certify:** Finally, authorized users are required to certify the reviewed counts for quality to the best of the reviewer's ability. This certification also ensures that invalid or abnormal counts have been properly logged and that all counts are now ready for use and public consumption. The certification text reads:

> ***Certify and Finish Quality Control***
> *I confirm that I have reviewed the previous count data for quality, have flagged and logged any suspect data to the best of my knowledge and professional judgment, and certify these data as clean and ready for submission and use.*

6. **Data released:** Data are released for use and public consumption.

4.3. Step-by-Step Quality Review

Once nonmotorized count data have been successfully imported into the BP|CX, the imported station(s) should appear both in the "Needing Quality Control Review" window on the *Dashboard* and the window of the same name in the *Quality Control* module (Figure 4-2). Additionally, users should receive an email notification upon successful importation of the data that new data are ready for quality review.

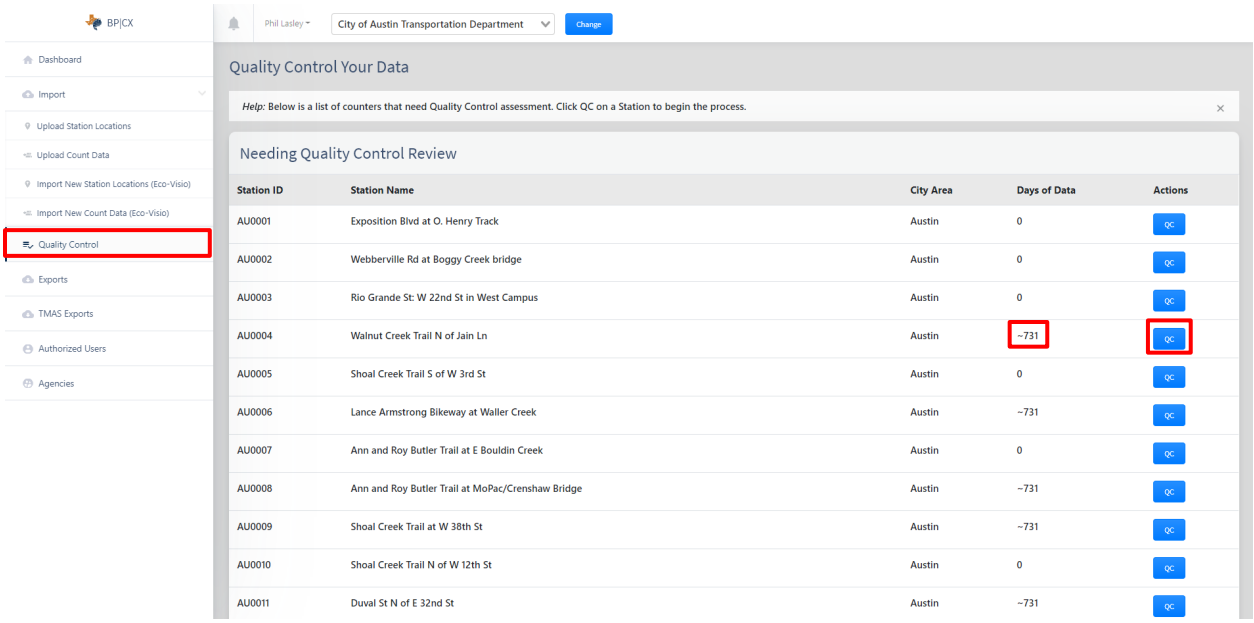


Figure 4-2. Quality Control and Data Needing Quality Review.

In the "Needing Quality Control Review" window, users see the unique station ID number and station name, identifying the location of the count data, the corresponding city, and the number of count days needing quality review. An action button to quality-control ("QC") the data is to the left of each station.

4.3.1. Quality Control Page Orientation

Upon clicking on the "QC" button in the "Needing Quality Control Review" window, users will be directed to the "Validate Count Data" window. This is the heart of the BP|CX quality review process. Users should familiarize themselves with this tool, what features are available, and how to properly use the tool to quality review counts. Figure 4-3 and Figure 4-4 provide an orientation to how the tool is formatted.

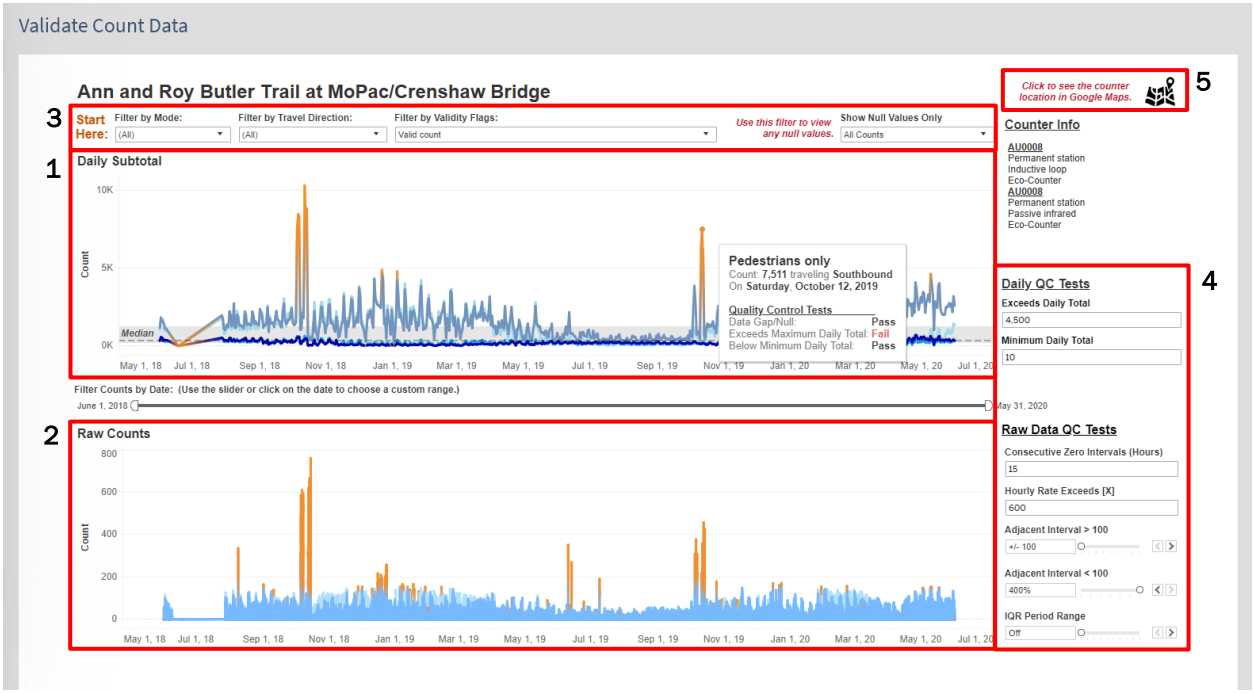


Figure 4-3. Validate Count Data Window Overview, Part 1.

1. **Daily Subtotal Chart**: This chart displays high-level daily totals split by mode and direction. A median line is displayed over the 25th/75th percentiles forming the upper and lower limit of the gray box on the chart. Hovering over any point will display a tooltip with the date, mode, count, and quality control test outcomes (pass/fail).

2. **Raw Counts Chart**: This chart displays the individual count data at either 15- or 60-minute intervals, based on the count. This is the finest-grained view of the data possible. Hovering over any point will display a tooltip with the date and time, mode, count, and quality control test outcomes (pass/fail).

3. **Filter Row**: These filters adjust both charts based on the selection. Users can narrow their view by mode, direction, date (slider bar in between the charts), if data have been assigned a validity flag, or by null data (shows null values not displayed by default in each view).

4. **Quality Control Tests**: These specialized filters and highlighters adjust parameters that determine if data pass or fail quality review tests. More information about these tests will be discussed in Section 4.3.5, "FHWA Quality Control Tests and Thresholds."

5. **Map Button**: Clicking this icon will open a new tab and display the Google Maps location of the counter.

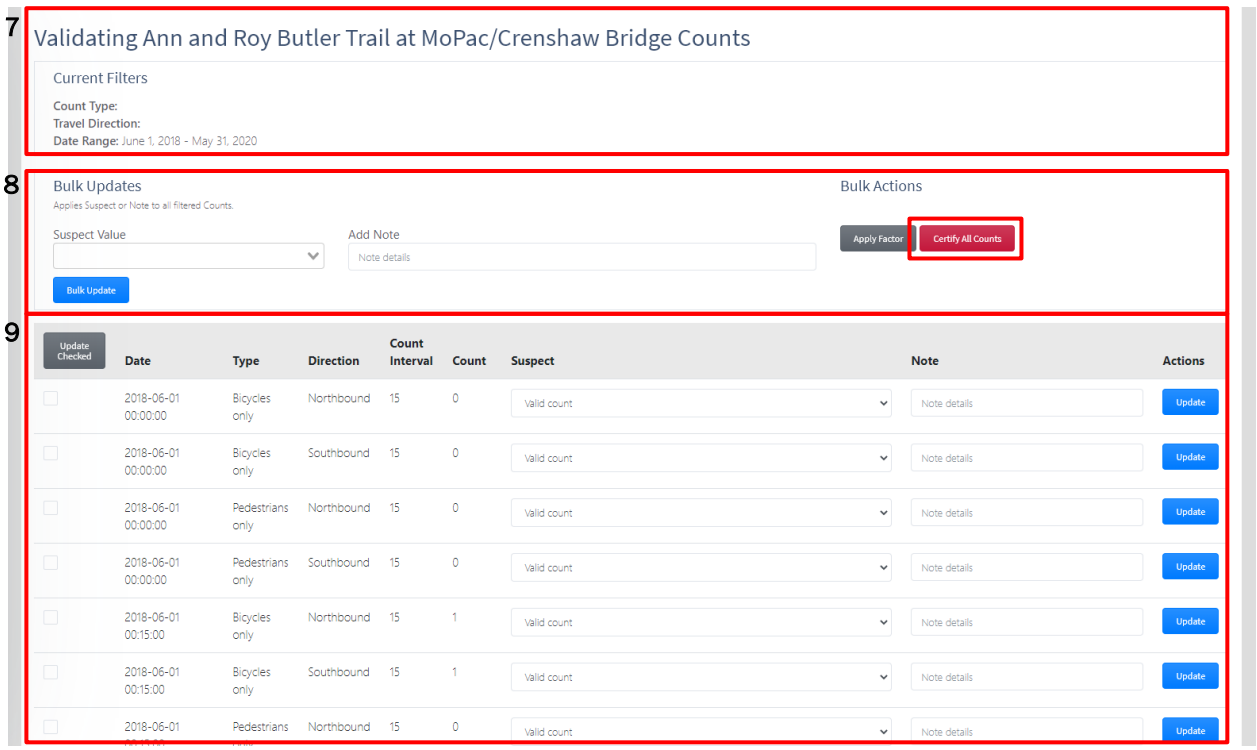


Figure 4-4. Validate Count Data Window Overview, Part 2.

6. **Current Filters Window**: This window, below the visualization, displays the counter name, date range, mode filter, and direction filter that is being displayed in the Data Table below. Use this window to verify the visualization and table match.

7. **Bulk Actions Window**: This window allows users to perform a bulk action to all the data being displayed in the table below as opposed to performing individual actions. Users may set a validity flag, add a common note to the log, apply factors (not yet available), or certify all the data.

   Do not press the red "Certify All Counts" button until you have completely finished with the data review. It will transfer all data over, irrespective of any filters in the visualization.

8. **Data Table**: This table displays the raw count data in tabular form, including the date/time of the count, the mode and direction, the count interval, the count itself, a validity flag, and a note about that count. Use this to individually flag bad or abnormal data points.

4.3.2. Validity Flags and Definitions

During the quality control review process, users must use their best professional judgment to determine if count values are good or bad; however, in many cases it may be difficult to determine if the count actually occurred or the counter is in error. This section describes the different validity flags and their definitions.

Count values fall into one of three categories:

- **Valid:** The count appears to be normal, realistic, and acceptable given the facility's history and could have reasonably occurred for that time period.
- **Invalid:** The count appears to be in error, not representative of reality, or is unlikely to have occurred for that time period.
- **Abnormal but valid (ABV):** The count appears to be in error but is actually valid and did occur.

It is important to mark valid extreme counts as ABV. The BP|CX excludes these counts, either much higher or lower than normal, when calculating certain performance measures about average use throughout the year but includes these in total count summations. For example, counts collected during a hurricane should be flagged as ABV because this is a rare and nonrecurring event that may skew average use even though the counts may be valid.

A gray area for flagging counts as ABV occurs with festivals or other events that happen in the same month every year that produce extremely high count totals. An example of this would be the South by Southwest (SXSW) conference or Austin City Limits (ACL), which both take place in Austin. These festivals produce extremely high counts that could skew numbers for March and October if imputation for other days were needed. In these cases, the agency must determine how to mark these counts as either valid or ABV.

Eight different **types of invalid flags** can be used to mark count data as invalid:

- **Data Gaps:** A date stamp exists, but there are no count data. This discrepancy generally indicates a counter malfunction and is indicated by a gap in the line, null value, or a negative value on a data visualization.
- **Consecutive Zeros:** There are 15 hours (or 60 15-minute periods) worth of zero counts in a row. Generally, this error occurs for multiple days or months, unlike a 1- to 3-day period where weather may be a factor. Do not flag normal rainy or snowy days. Also, this flag should not apply to low-usage count locations because multiple days of zero counts may be normal. FHWA guidance recommends 7 periods, but this may be too short a window on low-use areas.
- **Consecutive Non-zeros:** There are 3 or more periods of the same count. This is only used with counts of 15 or more at the finest level of detail (i.e., by direction or by mode). This discrepancy generally indicates the counter malfunctioned and became stuck with the same count for several periods.

- **Maximum Count Exceeds Limit:** This error occurs if count totals exceed 5,000 per day or 1,500 per hour or time period. Use your best professional judgment if a spike in counts is observed because some recurring and nonrecurring events may create valid count spikes. Understand what is normal for the location, time period, and day to determine if the count that occurred is realistic and feasible. A single small spike (usually under 500) could be a valid occurrence, but more information would need to be gathered and logged in the notes field.

- **Interquartile Range Violation:** This error occurs if the count is outside the 25th and 75th percentile over a rolling average of counts per period (usually ±2 months). This flag is more cautionary and is better used to identify periods that are not normal for a normal period of time rather than invalid data.

- **Adjacent Interval**: A count jumps from 0 to 50 or higher in the adjacent period (or the reverse from 50 or higher to 0). While this could indicate an error, it could also be normal daily count spikes in the morning or late evening periods.

- **Inverted AM/PM:** The ratio of 3:00 a.m. to 3:00 p.m. counts in a day is less than 1. This error usually occurs in the data import process from TRAFx passive infrared counters. Nonmotorized facilities near bars and late-night districts may break this rule. If this principle is understood, clarification can be easily identified by looking at the time with the date stamp in the base data.

- **Invalid for Multiple Inconsistencies (General Error):** At times, none of the previous errors adequately convey what is occurring, or more than one of these errors is happening at once over a span of time. This flag serves as a catch-all for any error or cluster of errors that cannot be adequately identified for a specific cause.

These flags are constantly being developed and refined, so this manual will be updated as needed when new flags are created or definitions significantly change.

4.3.3. Quality Control Review

The steps in this section correspond to the "Quality Control Review" box in Figure 4.1. The following steps walk a user through **the process of quality-reviewing data** but do not discuss how to discern if data are invalid or abnormal. Section 4.4, "Tips for Reviewing Data: What to Look For," provides more information on this topic.

1. **Select a station to review** from either the *Dashboard* or the *Quality Control* module by clicking on the "QC" action button in the table below the map (Clicking on the map will not do anything). This opens the "Validate Count Data" screen where the review will take place. A data visualization will appear at the top, followed by current filters, bulk update actions, and individual count actions. In the review process, start at the top and move down.

2. **Assess the daily subtotal trend and range.** The first step in reviewing data is to familiarize yourself with what should be considered normal for that location. Examine the daily subtotals (upper chart in Figure 4-3) and note the range of the y axis. A relatively stable seasonal pattern should be visible if

counts are longer than a few months. Look for extreme values (both high and low), large gaps in the data, irregular or unlikely patterns, or extreme values that repeat.

a. **Click the map icon** to see a Google Maps view of the count location for greater context. In many cases, a street view is also available.

b. **Adjust the thresholds for QC tests** by editing the values on the right side of the visualization using your best judgment. The visualization uses built-in quality control tests based on FHWA and research recommendations. A full list of these tests, their definitions, and default values is in Section 4.3.5, "FHWA Quality Control Tests and Thresholds." Tests correspond to the chart to which they lie directly adjacent.

   When a day or count period fails a test, that mark turns from blue to orange on the visualization, and hovering over the point displays a pop-up window telling you exactly which test(s) has (have) failed. First assessing what is normal will allow you to adjust these thresholds from their FHWA default values to what may be more reasonable for that location.

c. **Use the filters to refine your view** by choosing to view only one mode or one direction at a time. These are located along the top of the visualization. Other filters are available for more advanced review and are discussed in later steps.

Pro Tip

Filter the count mode to only show one mode at a time but keep both directions. This provides a simpler view while increasing review speed and accuracy.

3. **Assess the raw counts and their range.** After familiarizing yourself with what a typical day looks like in the Daily Subtotal chart, begin to assess patterns and normalcy within the raw data in the lower chart. Like before, using your best judgment, adjust the thresholds for the QC tests to fit with the typical range of what appears normal. Again, look for extreme values (both high and low), large gaps in the data, irregular or unlikely patterns, or extreme values that repeat. Note these areas as locations that will likely need to be flagged as invalid or abnormal.

   First look at the data as a whole and then zoom in to a smaller time frame (usually a range of around 1 to 4 weeks) using the date filter bar nestled in between the two line charts. This should reveal a distinct daily pattern where weekends and weekdays are generally distinguishable and individual count intervals (i.e., hours or minutes) are seen. **This view will be the basis for your quality control assessment.**

4. **Flag bulk errors first.** Once you feel you have a grasp of what is considered normal for that count location, begin the quality review process by flagging large data gaps or errors first. These are primarily identified in the Daily Subtotals chart with no date filter used.

   Identify data gaps by toggling the "Show Null Values Only" filter at the top-right side of the screen. If null values exist, you will see both the Daily Subtotal and Raw Counts charts appear but be blank (i.e., dates will appear on the x axis and only the dotted zero line. No colored lines will appear on the chart, but data in the table below will appear with those counts labeled "NULL." Filter the visualization like normal and flag all counts in this view as "Data gap" in the Suspect Value. You may have different reasons to note for different periods, so be sure to use the date filter. When finished, toggle the filter back to "All Counts."

   Next, use the date filter to zoom to specific larges areas of errors, being sure to exclude any good data from your view using the date filter. The "Current Filters" panel immediately below the visualization will read exactly what is being filtered to verify the correct counts are being displayed.

   Once the visualization shows only bad or abnormal data, scroll down to the "Bulk Updates" panel and flag the data with the appropriate suspect value from the dropdown menu. A list of the suspect values and their definitions can be found in Section 4.3.2, "Validity Flags and Definitions." Note why the count was flagged in the "Add Note" field immediately to the right of the "Suspect Values" dropdown menu. For each flagging action, click the blue "Update" button.

Warning!

Let the data table load after each filter change, otherwise the table may display incorrect data or not load at all. If this occurs, refresh the browser.

Always double check the table to ensure the correct data were loaded before flagging.

5. **Review and flag individual errors second.** Once you have flagged all bulk errors or abnormalities in the data, return the visualization to its full view (this may require a refresh of the browser or pressing F5), keeping mode and directional filters and keeping the thresholds in the quality control tests. Now, use the date filter to reduce the visualization to displaying the first 1 to 4 weeks of counts.

   Visually inspect this time period for errors and abnormalities. **Though some values are highlighted orange, they may not represent an error.** Use your best professional judgment to determine if an error has occurred, if a count is valid but abnormal, or if a count is likely valid. Conservatively default to giving counts the benefit of the doubt.

   a. **Flag individual errors** in the data table below the "Bulk Actions" panel. Find the correct time period from the visualization requiring the flag in the table and select the appropriate value from the "Suspect" dropdown menu. Note why the count was flagged in the "Note" field

Warning!

Only click "Bulk Update," "Update Checked," or "Update" **one time**. The process takes a couple seconds to begin. Be patient.

immediately to the right of the "Suspect" dropdown menu. For only one flagged value, click the blue "Update" button to the right of the "Note" field. If there are multiple flagged value, select the check boxes to the far left of the table and then click the gray "Update Checked" button at the top of the table.

b. Once all errors or abnormal counts have been flagged and annotated in the filtered view, **move the filter to the next time period** in sequence by clicking on the date filter bar inside the filter end caps and dragging the filter to the next time period.

c. **If there are no errors in the view**, click on the date filter bar inside the filter end caps and drag the filter to the next time period in sequence. Repeat the process of flagging individual errors for this time period.

d. Repeat steps 5a and 5b until there are no more counts needing to be reviewed for that mode.

6. **Repeat steps 2 through 5c for other modes or directions.** Once you feel you have completed all modes and directions, refresh the browser (press F5 on a PC or Cmd+Shift+R on a Mac). This will refresh the visualization with your flagged values. Use the "Filter by Validity Flag" filter to display only valid data. Carefully examine the Daily Subtotal and Raw Counts charts to ensure all suspect values have been flagged.

The quality control review process corresponding to Figure 4.1 is now complete for this count station. **At any time before certifying the data, you may leave the page and come back; your progress is always saved.** However, once counts have been certified, you will no longer be able to come back to this data.

4.3.4. Factoring

[Note: This process is still under development and is unavailable.]

The steps in this section correspond to the "Factoring" box in Figure 4.1. Factoring is the process by which counts can be expanded or contracted to correct for occlusion,[1] general counter errors, or seasonal adjustment (only in the case of short-duration counts).

Individual factors for pedestrians and bicyclists are usually determined by on-site counter validation by manually determining if a counter over- or undercounts nonmotorized traffic. Users can either use generic statewide seasonal adjustment factors or create specific seasonal adjustment for their region. By default, the statewide seasonal adjustment factors will be used unless the users input their own region-specific factors. Users are urged to create their own regional or location-specific factors as counts differ greatly based on many factors. Section 4.4, "Tips for Reviewing Data: What to Look For," provides more information on counter validation and determining appropriate adjustment and seasonal factors.

[1] *Occlusion* occurs when two or more people are counted as one because they are walking or biking side-by-side and the count equipment detects only one person or cyclist.

Users may follow these steps to **factor their data**:

1. **Complete the quality review process** described in Section 4.3.3, "Quality Control Review."
2. **Apply correction factors** to the counts by direction or mode. Click on the gray "Apply Factor" button in the "Bulk Updates" panel. A new window will appear based on if the count location being reviewed is a permanent count site or a short-duration count site:
    - **Permanent count sites:** In the new window, enter the appropriate factors in number and decimal format for the appropriate mode and direction.
    - **Short-duration count sites:** In the new window, enter the seasonal adjustment factor as a number in decimal format for the month(s) counts occurred. Users may also enter seasonal factors for the entire year, which will be saved for later use at that location. If no counts are entered, the default statewide adjustment factors will be used.

Pro Tip

For count expansions, enter a number greater than 1. For count reductions, enter a number less than 1.

3. **Click "Apply Factor."**

4.3.5. Certify

The steps in this section correspond to the "Certify" box in Figure 4.1. Upon completion of reviewing, flagging, and annotating counts for all directions and modes and applying any necessary factors, users must certify all counts have been reviewed and the data are now clean. Certifying that counts have been reviewed and are accurate is the final step in the quality review process before counts are released into the public-facing data visualization.

Users must follow these steps to **certify their data**:

1. **Click on the red "Certify All Counts" button** on the right side of the "Bulk Updates" panel.
2. Read the message in the pop-up window and **click "Certify and Finish."** This action begins a process that usually takes less than 5 minutes to releases the data from the quarantined holding pen to the public-facing visualization (https://mobility.tamu.edu/bikepeddata/). At this point, the public-facing dashboard is now updated with the latest data.

Any changes in the review process after certification will require the assistance of an authorized super administrator. If you find you have made an error, please contact BP|CX Support (Support@txbpcx.org).

4.3.6. FHWA Quality Control Tests and Thresholds

FHWA has developed a series of quality control tests and thresholds for nonmotorized count data submitted to TMAS. While many of the quality control tests in the BP|CX meet or exceed those used by FHWA, users should still be aware of these tests, their default thresholds, and BP|CX recommended threshold values:

- **Historical QC Variance:** Tests how the total count for a day performs in comparison to the same day of the week historically. Variance is set to ±20% from the historical value (variance from the same day of the week data for the day versus the number or weeks back average from the prior month time marker). The test uses 6 weeks from the time marker as a default with a minimum of 2 weeks from the prior month needed to run the test. The threshold value of 200 counts is set to determine if the test uses a percent variance (if over the threshold value), or a count variance (if under the threshold value). For counts under the threshold, use +/− the variance * threshold and calculate the quartiles based on the size of the historical data (100%, 75%, 50%, and 25%).

  For example, a count of 1,750 would use the variance of 20% of the historical average as the threshold. If the historical average is 1,250, the threshold would be 250 (1250 * 20%) plus the historical average (1,500). A count of 1,750 would fail this test.

  Alternately, a count of 115 would require the use of a count based on the variance (20%) of the threshold (200). The threshold to use for the test would be ±30 (200 * 20% = 40; 40 * 75% quartile = 30). If the historical average is 150, the count of 115 would fail because 115 is less than 150 − 30. If the count was 175, the count would pass because 175 is less than 180 (150 + 30).

- **Year-over-Year MADT:** The monthly average daily traffic (MADT) for the same month from the prior does not exceed ±20%.

- **Consecutive Zeros:** There are 7 time periods of zero counts in a row with no overlapping days.

- **Any Zero-Adjacent Hour**: A count jumps from 0 to 50 or higher in the adjacent period (or the reverse from 50 or higher to 0) unless the count is the first of the day.

- **Total Maximum Hourly Count:** The sum of all count intervals for all lanes and directions for the hour exceeds 4,000.

- **Total Minimum Daily Counts:** The sum of all count intervals for all lanes and directions for the day is less than 100. Applies only to a full day of counts.

- **Total Maximum Daily Count:** The sum of all count intervals for all lanes and directions for the day exceeds 5,000. Applies only to a full day of counts.

- **Multiple Identical Counts:** Any consecutive N intervals with identical counts, independent of the time interval counted.

- **Inverted AM/PM:** The 3:00 a.m. hour is greater than the 3:00 p.m. hour.

FHWA places a significant emphasis on metadata quality about the count location and the counter itself. While the BP|CX has system checks in place to keep errors from occurring, users should be vigilant to check and double-check station metadata for accuracy.

4.4. Tips for Reviewing Data: What to Look For

This section provides tips and things to look for in the data—based on researchers' experiences reviewing millions of data points—to ensure the highest quality review. These suggestions are not mandatory but are recommended to streamline the review process and maximize accuracy.

Users may find the following tips helpful during the review process:

- **Start with the whole picture and then zoom:** Always begin by looking at the daily subtotals for the entire period and then zoom in to the data and scan through the entire data for anomalies. This practice allows reporting agencies to quickly spot potential issues or events that occur on an annual basis. Do a web search on days where a dramatic spike in counts has been registered.

- **Connect behavior with the count:** Sometimes it may be difficult to look at numbers and tests to determine whether the data are valid or not. Try to imagine the time of day in question and how many users the count represents. For example, go outside and count in person if needed to visualize what 25 users looks like in a 15-minute period.

- **Look for rainy or snowy days:** If a count has a stable pattern and then suddenly drops to a low or zero number for a day or two, check the historical weather record. Sometimes a rainy day can look very similar to an error in the data. Consult Weather Underground (www.wunderground.com) for easy-to-read historical weather information.

- **Look for overnight count spikes:** Counts can dramatically elevate from 0 to over 100 as early as 5:00 a.m. These spikes are usually normal and represent an exercise group or early commuters. Counts may again elevate in the later afternoon and evenings. As a general rule, do not mark these as abnormal. Instead, look for dramatic spikes during overnight periods because these are less likely to occur. Be sure the facility in question is not near a bar district or commercial businesses open late that might cause the spike.

- **Be aware of wrong-way riders:** For bicycle counts on on-street bikeways that measure direction, beware of counts showing a stable pattern in one direction and showing incredibly low and unstable counts in the other direction. These unstable patterns are the result of wrong-way riders. When calculating performance measures, those riders must be added to the correct direction on another count location.

- **Pay attention to directional splits:** In general, the count in one direction should be close to or related to the count in the other direction. A sudden departure from this pattern may indicate counter error. Counters that determine directionality are generally set to default indeterminable counts to a northbound or eastbound direction. If either of those two directions becomes abnormally high, that period may be in error.
- **Look for spikes after or before null or zero values:** One pattern sometimes seen occurs immediately before or after a counter begins to show an error. Sudden spikes, like the ones seen in Figure 4-17 may likely occur and should be flagged as invalid. The spike is likely the counter catching up with all the counts it missed over the error period, but there is no way to ensure the count validity.

4.4.1. Importance of Visually Inspecting Data and Assessing What Is Normal

The first main steps of the data review process (steps 2 and 3 in Section 4.3.3, "Quality Control Review") involve assessing the daily subtotals, raw count data, and their corresponding typical ranges to **determine what is normal for that location**. However, determining what's normal and typical may be difficult in some circumstances, especially in cases where no solid pattern has emerged, counts are generally very low, or there are not enough counts to establish a pattern—often the case with short-duration counts. Figure 4-5 through Figure 4-7 provide views of typical count data at the daily subtotal scale and at the lowest level of detail (raw count data) both zoomed out for an entire period and zoomed in to reveal daily and hourly patterns.

To determine what is normal, look at the data using these three views: daily subtotals, raw count data for the entire period, and raw count data zoomed into the daily views. Visually inspect the data and using best professional judgement is the only way to determine what is normal for a location. During visual inspection, note the average maximums and minimums, any recurring count spikes, and daily use patterns by direction and mode. Also note potential errors like erratic count behavior and unrealistic counts.

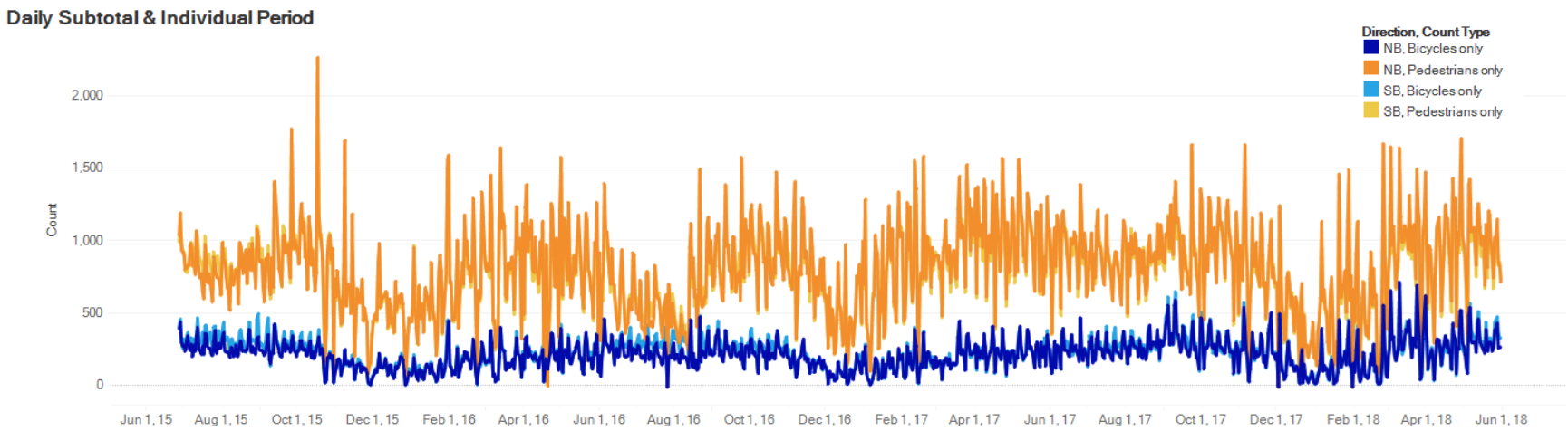


Figure 4-5. Typical View for Daily Subtotals—All Modes and Directions.

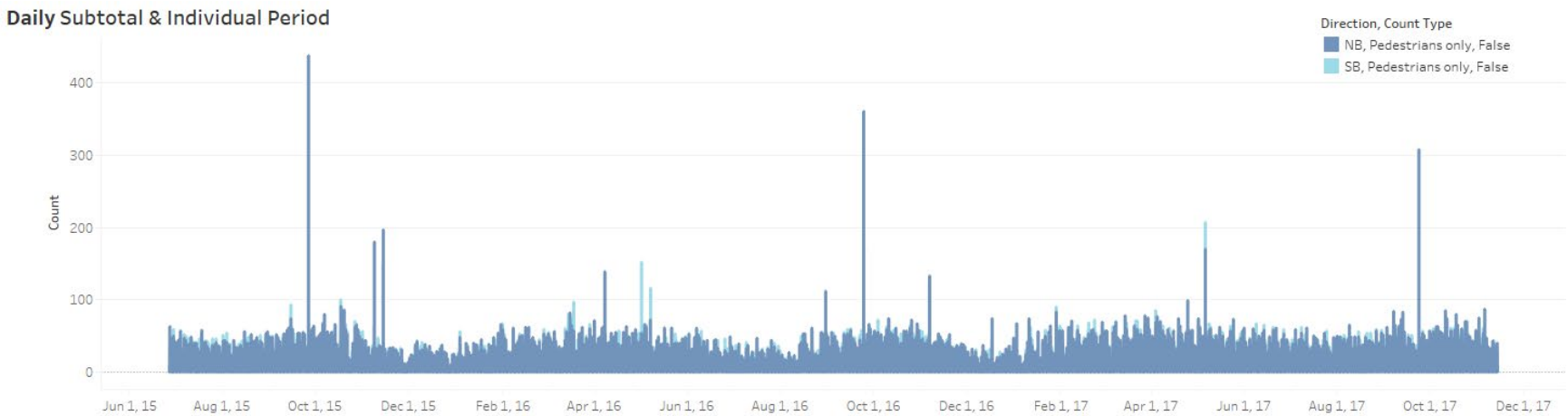


Figure 4-6. Typical View for Raw Data Zoomed Out—Single Mode.

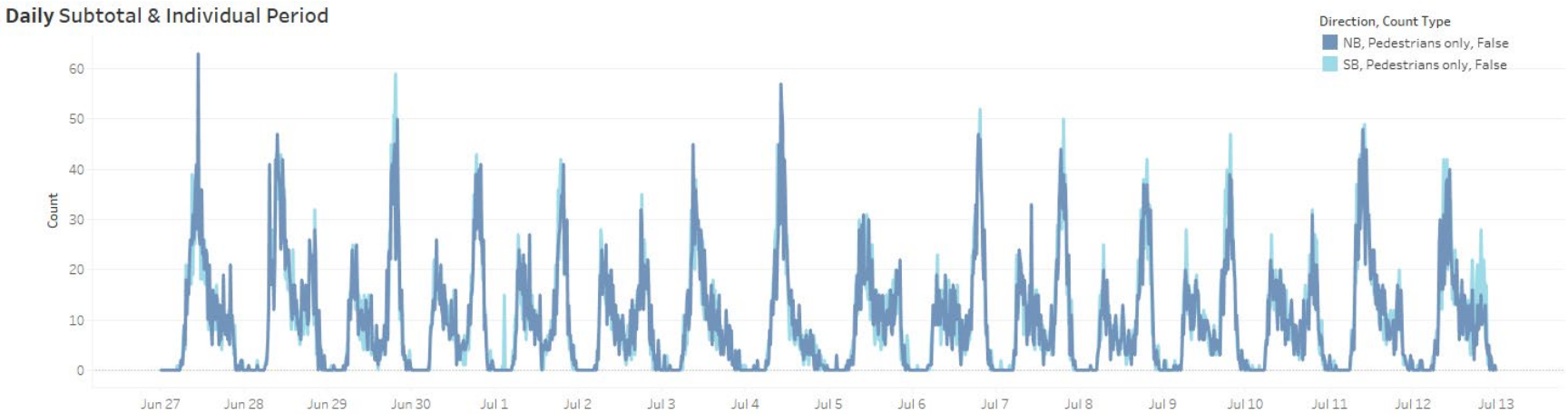


Figure 4-7. Typical View for Raw Data Zoomed In (about Two Weeks)—Single Mode.

4.4.2. What Good Data Look Like

Users must have a good idea of what good and "normal" look like before they determine what is not normal. Figure 4-8 through Figure 4-16 provide examples from different types of counters, locations, and scenarios that illustrate good data. Review yearly patterns and ask yourself:

- Are there consistent count spikes or recurring patterns each year, month, day?
- Are there slumps or peaks during seasons?
- Does one direction have consistently higher or lower use than the other?
- Is any other pattern clear in the data?

Like the steps discussed previously, start with daily subtotals and then move on to raw count data.

Good data exhibit a strong and consistent data pattern over the course of a year. While there may be subtle fluctuations from time to time, the general use of the facility does not appear to change. Most of the examples display some sort of stability—even with an occasional abnormal count spike. While every count is different, many of these patterns can still be seen consistently in various locations.

In cases with very low counts or not enough counts to establish a pattern, look at if the counts are reasonable for that location. Could a pattern emerge from what exists once more data come in? Also look at the lowest level of detail; patterns can be seen at all levels of detail and seeing a stable pattern at the lowest level of detail will indicate good data.

Also, there is often a difference between bicycle and pedestrian count patterns: bicycle count patterns are usually more stable and consistent. Pedestrian patterns introduce more variation from day to day and month to month. Adjust judgment and expectations accordingly when looking for suspect data.

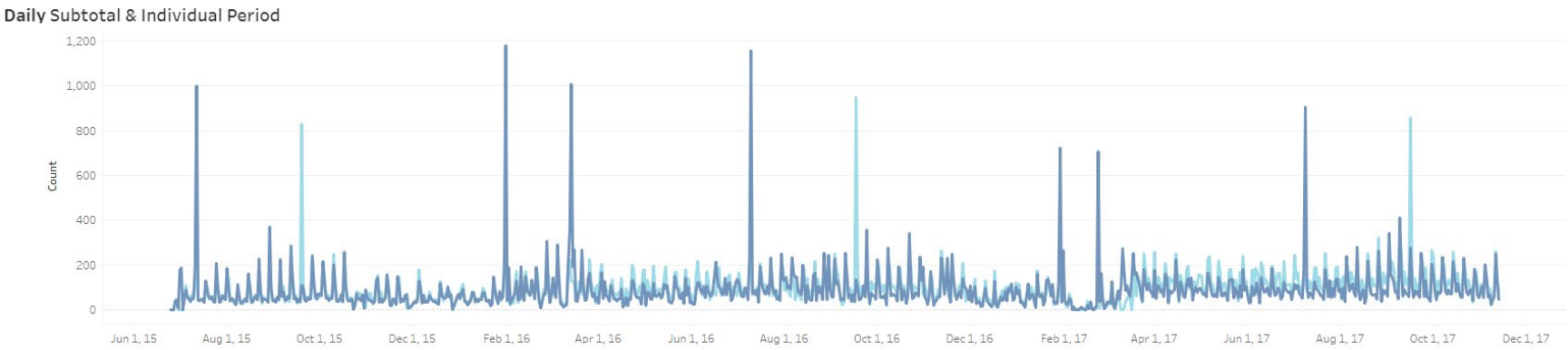


Figure 4-8. Good Pedestrian Counts—Multiple Years with Seasonal Variations.

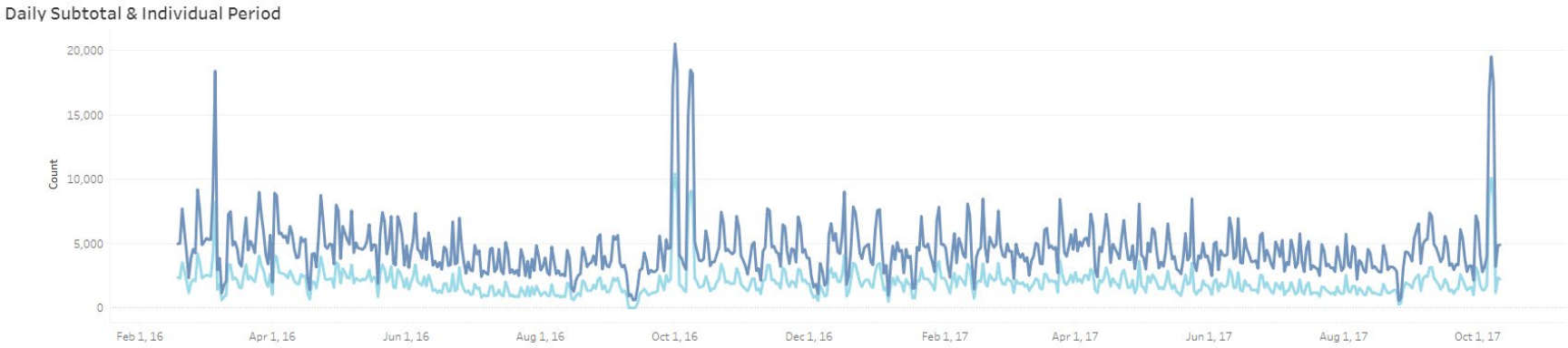


Figure 4-9. Good Pedestrian Counts—Typical Year with Seasonal Variation.

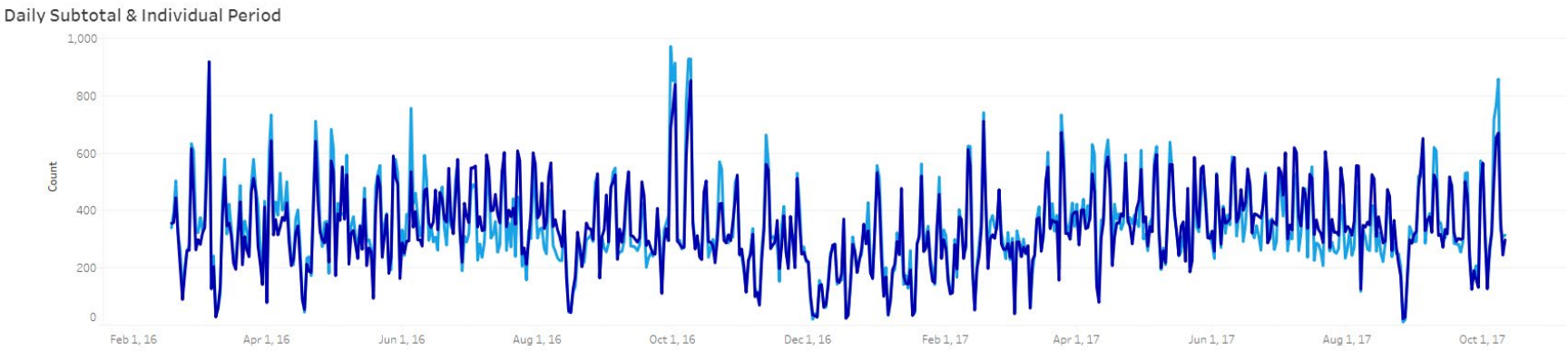


Figure 4-10. Good Bicycle Counts with Seasonal Variation.

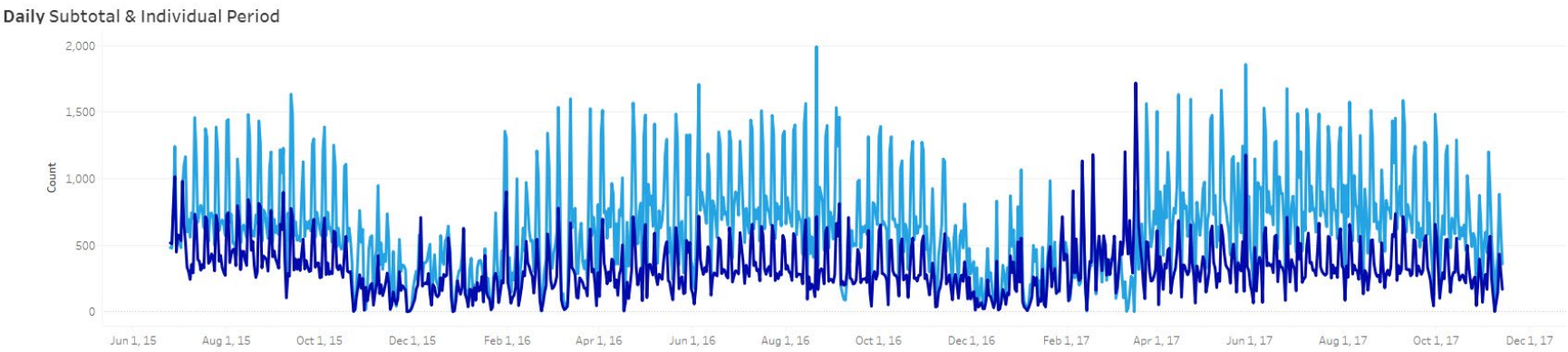


Figure 4-11. Good Bicycle Counts with High Directionality.

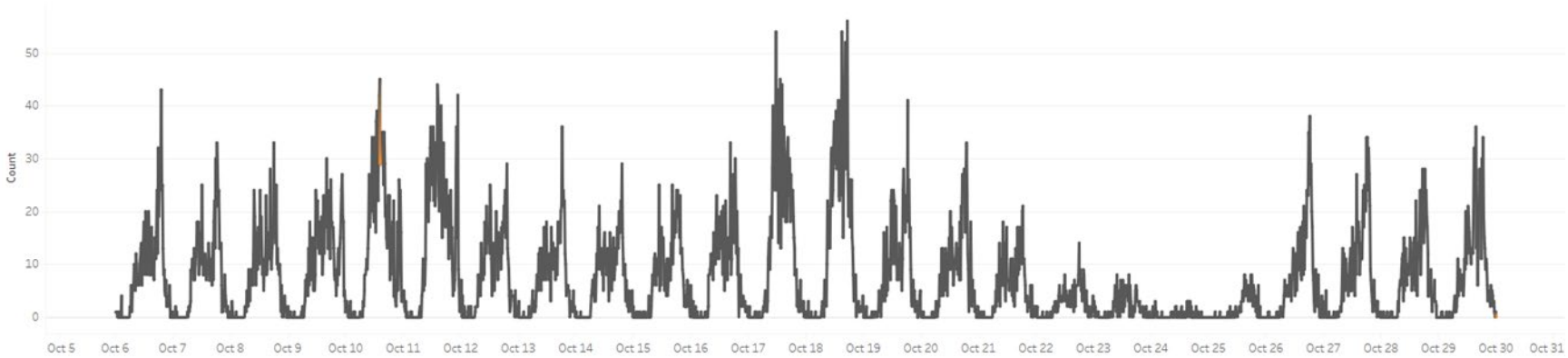


Figure 4-12. Good All-Nonmotorized Traffic Data for Short-Duration Counts.

Figure 4-13. Good All-Nonmotorized Traffic Data for Short-Duration Counts with Strong Weekend Pattern.

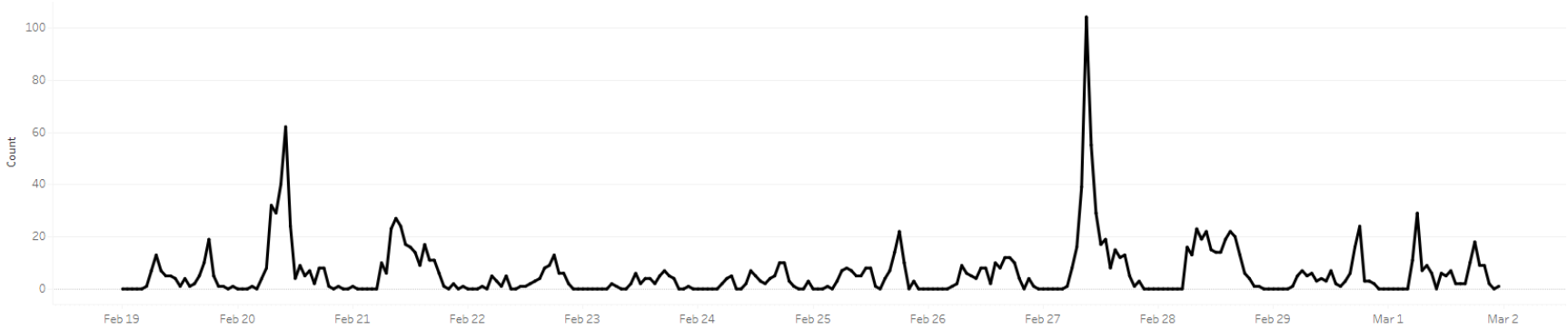


Figure 4-14. Good All-Nonmotorized Traffic Data for Short-Duration Counts with Atypical Use.

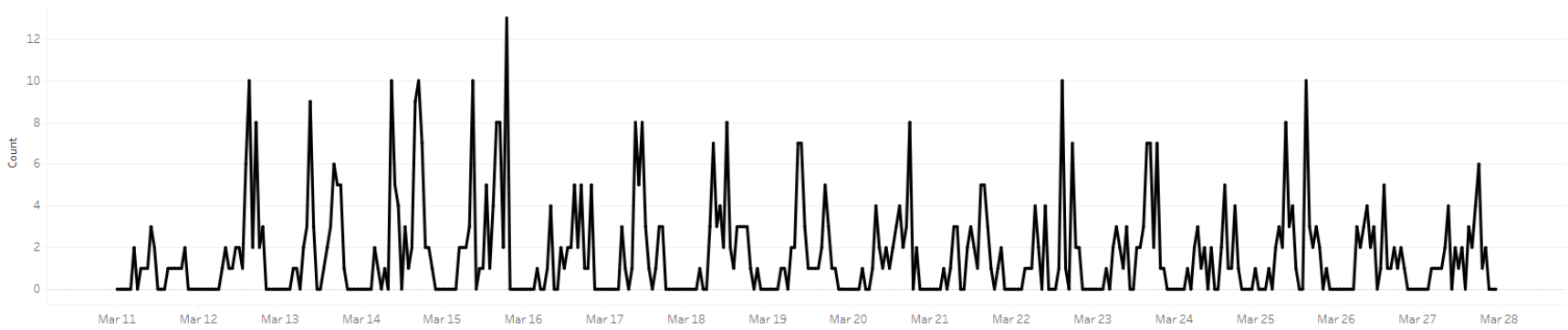


Figure 4-15. Good All-Nonmotorized Traffic Data for Short-Duration Counts with Low Use.

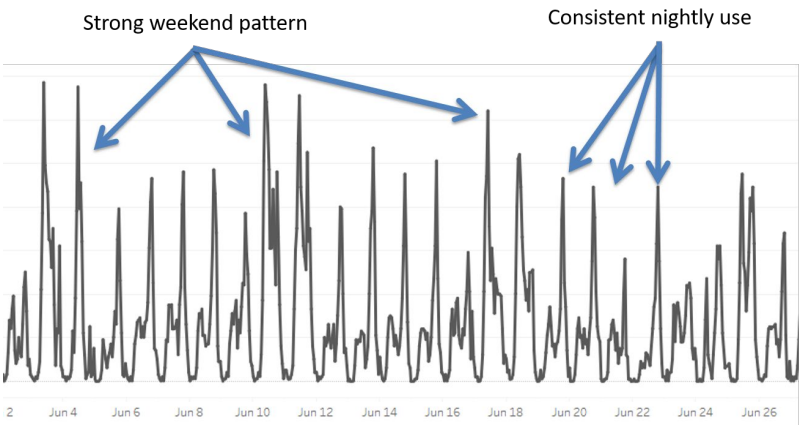


Figure 4-16. Normal Patterns within Daily Count Data.

4.4.3. What Bad Data Look Like

Bad data come in many forms. In some cases, bad data may be very simple and easy to identify. In other cases, bad data may be more nuanced and difficult to spot. Training an eye to detect errors and anomalies in data will ensure high-quality data reviews and therefore high-quality performance measures. This section illustrates common data errors in nonmotorized count data.

Figure 4-17 through Figure 4-19 represent bad data that are relatively simple to spot. When a counter is not deployed (not supposed to be counting) and is either sitting in an office while still on or has only collected a partial day, the count data should be flagged as a general counter error or deleted and not included in the database at all. These data will cause confusion to other users or introduce potential errors in performance measure calculation.

Figure 4-17. Bad Data Example: Partial Day Count with Spike When Counter Retrieved.

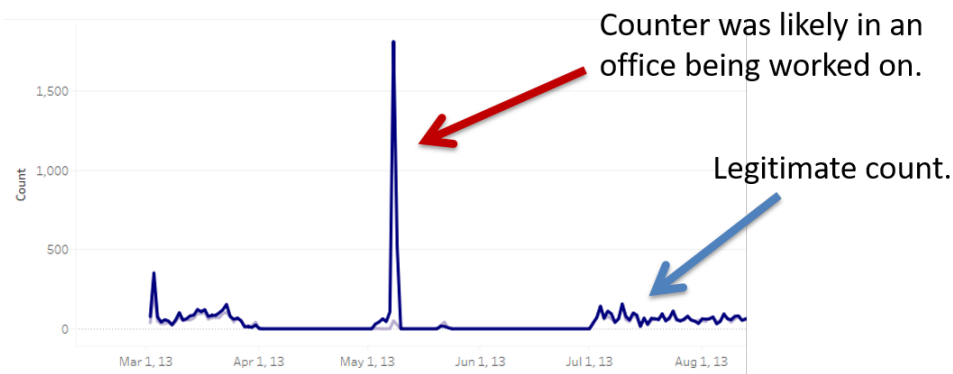


Figure 4-18. Bad Data Example: Counts When Equipment Was Not in Use.

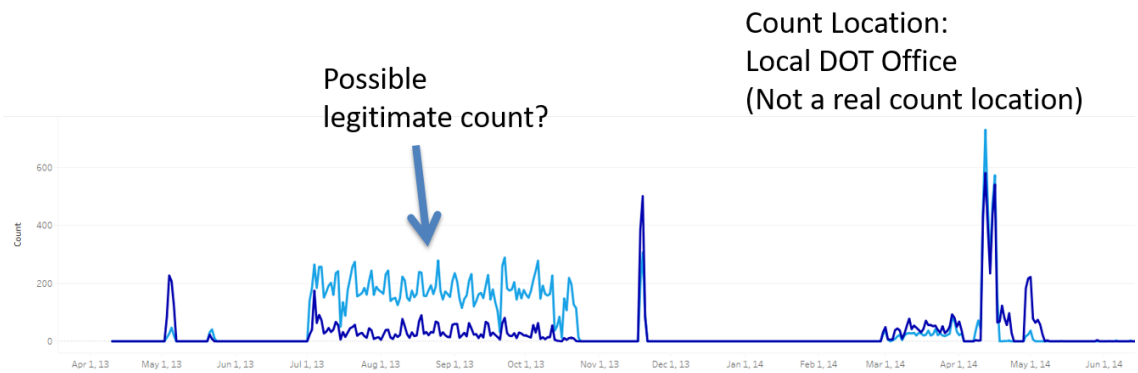


Figure 4-19. Bad Data Example: Counter Not at a Counting Location.

In other cases, errors are more nuanced and hidden among valid data. In such cases, reviewers must refer to an event log or research community activities, such as festivals, races, or other events, to decipher if a specific count is the result of an event or if the count is indeed due to a malfunction of the equipment. Figure 4-20 through Figure 4-25 illustrate bad data intermixed with good that may be more difficult to spot.

Figure 4-20. Bad Data Example: Consecutive Zeros.

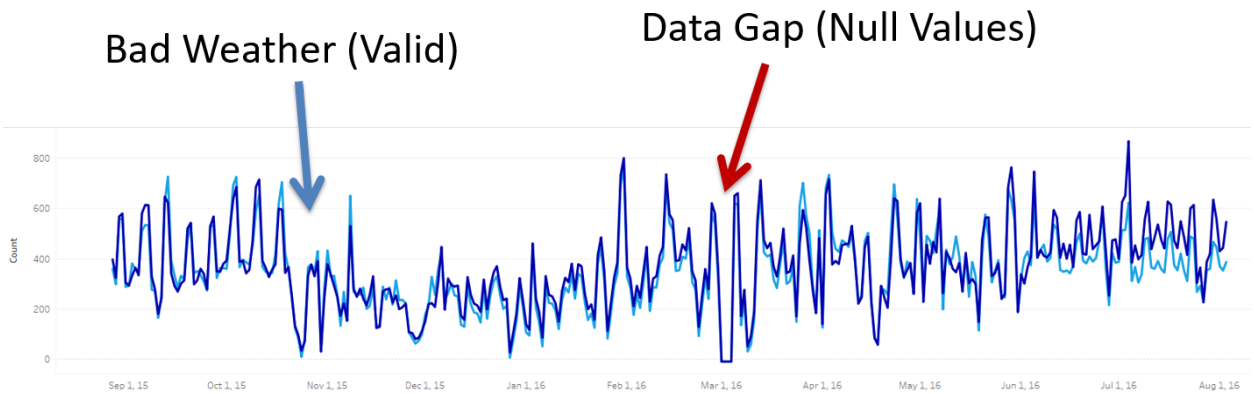


Figure 4-21. Bad Data Example: Null Values.

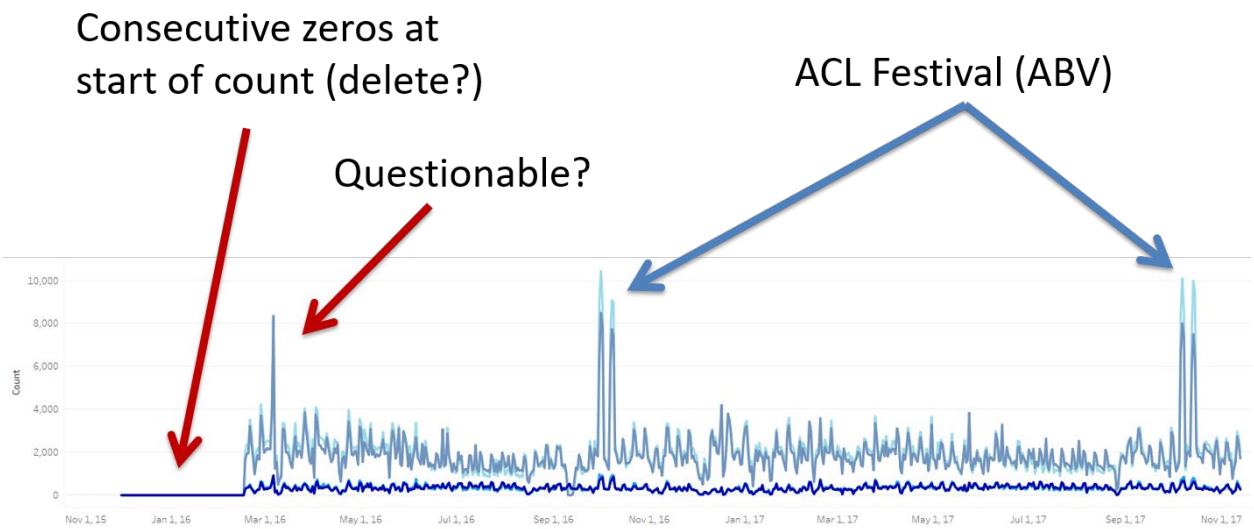


Figure 4-22. Bad Data Example: Counter Lag at Installation.

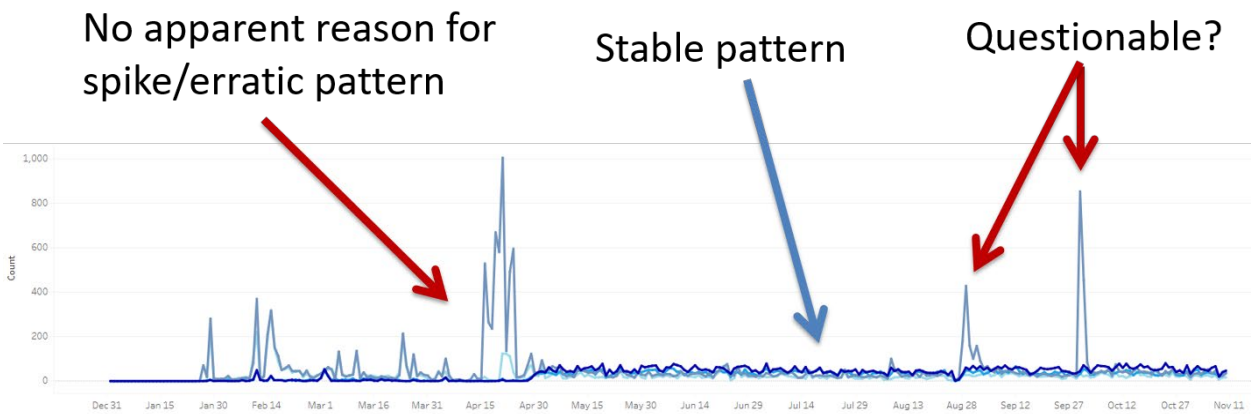


Figure 4-23. Bad Data Example: Counter Malfunction or Construction Interference.

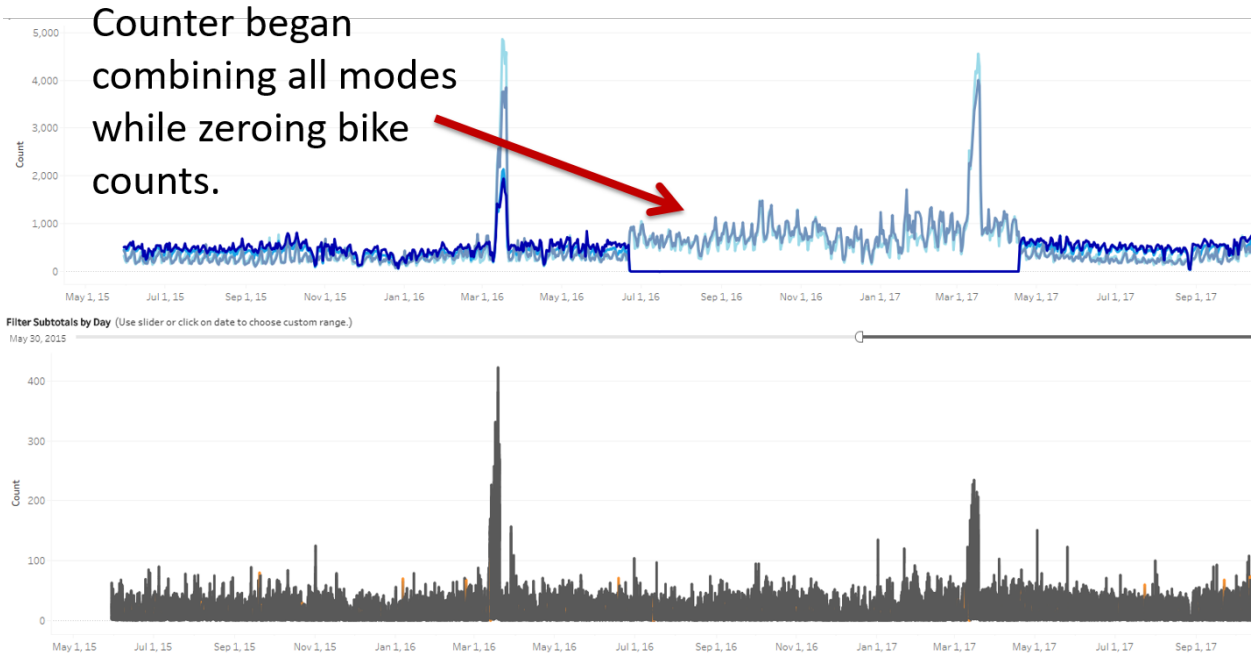


Figure 4-24. Bad Data Example: Counter Mode Split Malfunction.

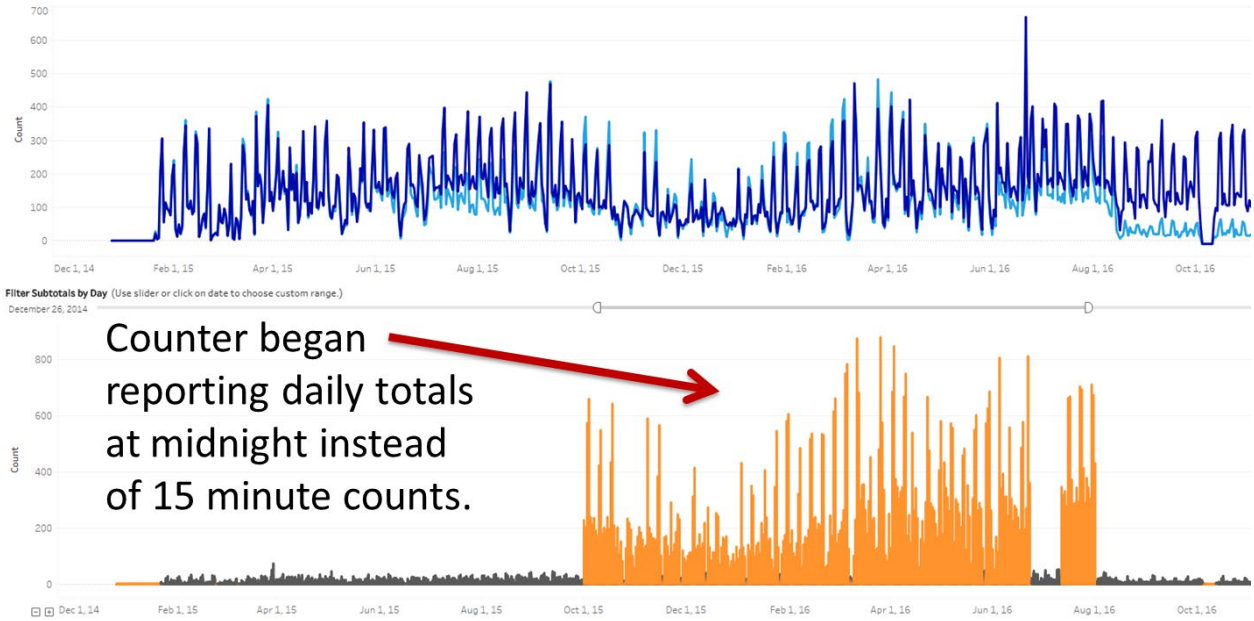
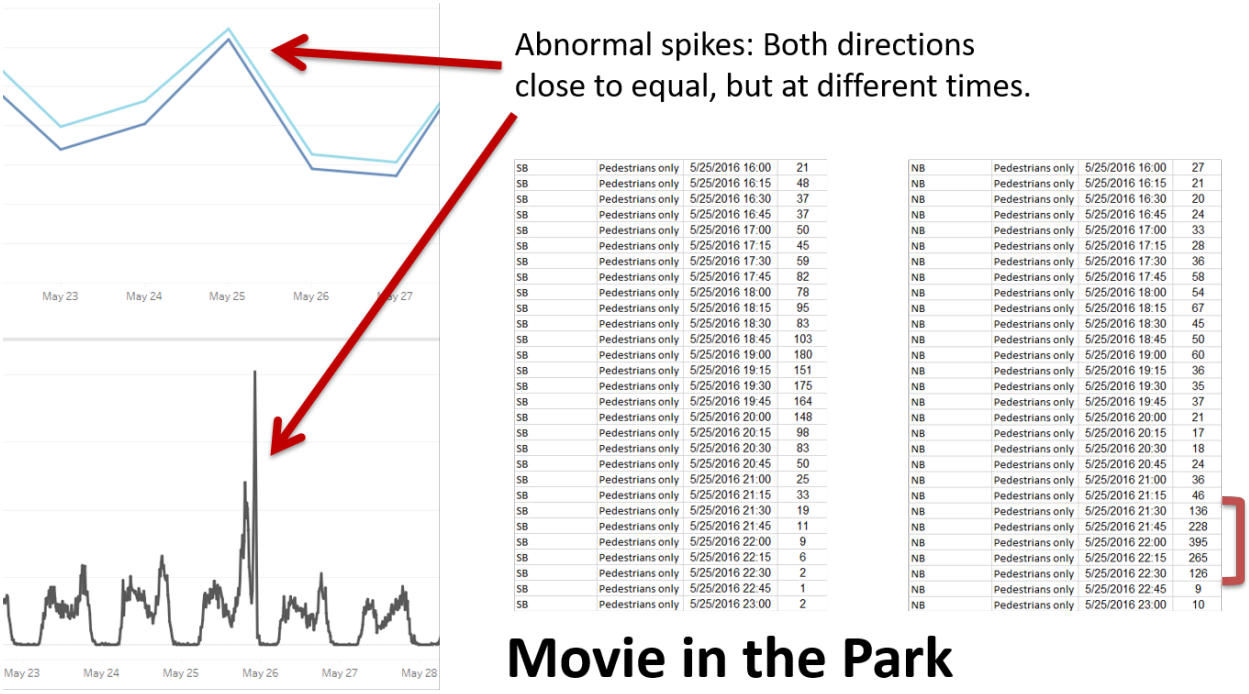


Figure 4-25. Bad Data Example: Counter Began to Report Daily Totals Instead of 15-Minute Intervals.

4.4.4. What Abnormal but Valid Data Look Like

In some cases, it may be difficult to determine the validity of count data that appear abnormal or inconsistent. An event may have occurred that does not fit the normal count pattern but definitely occurred and is identified in the event log by the reporting agency. Alternately, there will be counts that appear unusual but are not outside the realm of possibility. In these cases, these data should be marked ABV. These data will be excluded from performance measure calculations such as monthly averages but included in totals and subtotals. Ultimately, local users know their community best, and it is up to local users to correctly identify what is happening to cause unusual counts. Figure 4-26 through Figure 4-29 show not only the data visualization but also a glimpse of common data patterns in ABV situations.



SB	Pedestrians only	5/25/2016 16:00	21
SB	Pedestrians only	5/25/2016 16:15	48
SB	Pedestrians only	5/25/2016 16:30	37
SB	Pedestrians only	5/25/2016 16:45	37
SB	Pedestrians only	5/25/2016 17:00	50
SB	Pedestrians only	5/25/2016 17:15	45
SB	Pedestrians only	5/25/2016 17:30	59
SB	Pedestrians only	5/25/2016 17:45	82
SB	Pedestrians only	5/25/2016 18:00	78
SB	Pedestrians only	5/25/2016 18:15	95
SB	Pedestrians only	5/25/2016 18:30	83
SB	Pedestrians only	5/25/2016 18:45	103
SB	Pedestrians only	5/25/2016 19:00	180
SB	Pedestrians only	5/25/2016 19:15	151
SB	Pedestrians only	5/25/2016 19:30	175
SB	Pedestrians only	5/25/2016 19:45	164
SB	Pedestrians only	5/25/2016 20:00	148
SB	Pedestrians only	5/25/2016 20:15	98
SB	Pedestrians only	5/25/2016 20:30	83
SB	Pedestrians only	5/25/2016 20:45	50
SB	Pedestrians only	5/25/2016 21:00	25
SB	Pedestrians only	5/25/2016 21:15	33
SB	Pedestrians only	5/25/2016 21:30	19
SB	Pedestrians only	5/25/2016 21:45	11
SB	Pedestrians only	5/25/2016 22:00	9
SB	Pedestrians only	5/25/2016 22:15	6
SB	Pedestrians only	5/25/2016 22:30	2
SB	Pedestrians only	5/25/2016 22:45	1
SB	Pedestrians only	5/25/2016 23:00	2

NB	Pedestrians only	5/25/2016 16:00	27
NB	Pedestrians only	5/25/2016 16:15	21
NB	Pedestrians only	5/25/2016 16:30	20
NB	Pedestrians only	5/25/2016 16:45	24
NB	Pedestrians only	5/25/2016 17:00	33
NB	Pedestrians only	5/25/2016 17:15	28
NB	Pedestrians only	5/25/2016 17:30	36
NB	Pedestrians only	5/25/2016 17:45	58
NB	Pedestrians only	5/25/2016 18:00	54
NB	Pedestrians only	5/25/2016 18:15	67
NB	Pedestrians only	5/25/2016 18:30	45
NB	Pedestrians only	5/25/2016 18:45	50
NB	Pedestrians only	5/25/2016 19:00	60
NB	Pedestrians only	5/25/2016 19:15	36
NB	Pedestrians only	5/25/2016 19:30	35
NB	Pedestrians only	5/25/2016 19:45	37
NB	Pedestrians only	5/25/2016 20:00	21
NB	Pedestrians only	5/25/2016 20:15	17
NB	Pedestrians only	5/25/2016 20:30	18
NB	Pedestrians only	5/25/2016 20:45	24
NB	Pedestrians only	5/25/2016 21:00	36
NB	Pedestrians only	5/25/2016 21:15	46
NB	Pedestrians only	5/25/2016 21:30	136
NB	Pedestrians only	5/25/2016 21:45	228
NB	Pedestrians only	5/25/2016 22:00	395
NB	Pedestrians only	5/25/2016 22:15	265
NB	Pedestrians only	5/25/2016 22:30	126
NB	Pedestrians only	5/25/2016 22:45	9
NB	Pedestrians only	5/25/2016 23:00	10

Figure 4-26. Abnormal Event Pattern: Movie in the Park.

Abnormal two-way spike usually on a weekend morning around 6:30 a.m. to 10:00 a.m.

NB	Pedestrians only	12/7/2013 6:30	1
NB	Pedestrians only	12/7/2013 6:45	70
NB	Pedestrians only	12/7/2013 7:00	16
NB	Pedestrians only	12/7/2013 7:15	5
NB	Pedestrians only	12/7/2013 7:30	0
NB	Pedestrians only	12/7/2013 7:45	0
NB	Pedestrians only	12/7/2013 8:00	1
NB	Pedestrians only	12/7/2013 8:15	0
NB	Pedestrians only	12/7/2013 8:30	1
NB	Pedestrians only	12/7/2013 8:45	1
NB	Pedestrians only	12/7/2013 9:00	0

SB	Pedestrians only	12/7/2013 6:30	1
SB	Pedestrians only	12/7/2013 6:45	0
SB	Pedestrians only	12/7/2013 7:00	1
SB	Pedestrians only	12/7/2013 7:15	4
SB	Pedestrians only	12/7/2013 7:30	8
SB	Pedestrians only	12/7/2013 7:45	1
SB	Pedestrians only	12/7/2013 8:00	8
SB	Pedestrians only	12/7/2013 8:15	20
SB	Pedestrians only	12/7/2013 8:30	32
SB	Pedestrians only	12/7/2013 8:45	18
SB	Pedestrians only	12/7/2013 9:00	7

This is usually characterized by a concentration of counts within a 15-minute interval followed by high counts spread out.

Figure 4-27. Abnormal Event Pattern: Morning Organized Cycling or Running Event.

Abnormal one-way spike with ridiculously high count.

SB	Bicycles only	4/19/2015 11:00	4
	Bicycles only	4/19/2015 11:15	9
SB	Bicycles only	4/19/2015 11:30	2
SB	Bicycles only	4/19/2015 11:45	5
SB	Bicycles only	4/19/2015 12:00	7
SB	Bicycles only	4/19/2015 12:15	10
SB	Bicycles only	4/19/2015 12:30	13
SB	Bicycles only	4/19/2015 12:45	7
SB	Bicycles only	4/19/2015 13:00	10
SB	Bicycles only	4/19/2015 13:15	4
SB	Bicycles only	4/19/2015 13:30	9
SB	Bicycles only	4/19/2015 13:45	3
SB	Bicycles only	4/19/2015 14:00	6
SB	Bicycles only	4/19/2015 14:15	6
SB	Bicycles only	4/19/2015 14:30	7
SB	Bicycles only	4/19/2015 14:45	2
SB	Bicycles only	4/19/2015 15:00	4
SB	Bicycles only	4/19/2015 15:15	6
SB	Bicycles only	4/19/2015 15:30	7
SB	Bicycles only	4/19/2015 15:45	6
SB	Bicycles only	4/19/2015 16:00	1
SB	Bicycles only	4/19/2015 16:15	5
SB	Bicycles only	4/19/2015 16:30	6
SB	Bicycles only	4/19/2015 16:45	4
SB	Bicycles only	4/19/2015 17:00	3
SB	Bicycles only	4/19/2015 17:15	4
SB	Bicycles only	4/19/2015 17:30	5
SB	Bicycles only	4/19/2015 17:45	6
SB	Bicycles only	4/19/2015 18:00	2
SB	Bicycles only	4/19/2015 18:15	5
SB	Bicycles only	4/19/2015 18:30	3
SB	Bicycles only	4/19/2015 18:45	6
SB	Bicycles only	4/19/2015 19:00	9

NB	Bicycles only	4/19/2015 9:30	2
NB	Bicycles only	4/19/2015 9:45	6
NB	Bicycles only	4/19/2015 10:00	4
NB	Bicycles only	4/19/2015 10:15	21
NB	Bicycles only	4/19/2015 10:30	31
NB	Bicycles only	4/19/2015 10:45	49
NB	Bicycles only	4/19/2015 11:00	87
NB	Bicycles only	4/19/2015 11:15	119
NB	Bicycles only	4/19/2015 11:30	168
NB	Bicycles only	4/19/2015 11:45	198
NB	Bicycles only	4/19/2015 12:00	258
NB	Bicycles only	4/19/2015 12:15	229
NB	Bicycles only	4/19/2015 12:30	258
NB	Bicycles only	4/19/2015 12:45	269
NB	Bicycles only	4/19/2015 13:00	239
NB	Bicycles only	4/19/2015 13:15	253
NB	Bicycles only	4/19/2015 13:30	255
NB	Bicycles only	4/19/2015 13:45	309
NB	Bicycles only	4/19/2015 14:00	298
NB	Bicycles only	4/19/2015 14:15	311
NB	Bicycles only	4/19/2015 14:30	275
NB	Bicycles only	4/19/2015 14:45	280
NB	Bicycles only	4/19/2015 15:00	271
NB	Bicycles only	4/19/2015 15:15	279
NB	Bicycles only	4/19/2015 15:30	251
NB	Bicycles only	4/19/2015 15:45	216
NB	Bicycles only	4/19/2015 16:00	226
NB	Bicycles only	4/19/2015 16:15	205
NB	Bicycles only	4/19/2015 16:30	232
NB	Bicycles only	4/19/2015 16:45	188
NB	Bicycles only	4/19/2015 17:00	173
NB	Bicycles only	4/19/2015 17:15	190
NB	Bicycles only	4/19/2015 17:30	145
NB	Bicycles only	4/19/2015 17:45	138
NB	Bicycles only	4/19/2015 18:00	96
NB	Bicycles only	4/19/2015 18:15	44
NB	Bicycles only	4/19/2015 18:30	24
NB	Bicycles only	4/19/2015 18:45	2
NB	Bicycles only	4/19/2015 19:00	1

MS 150 Bike Race

Figure 4-28. Abnormal Event Pattern: Large-Scale Bicycle Event.

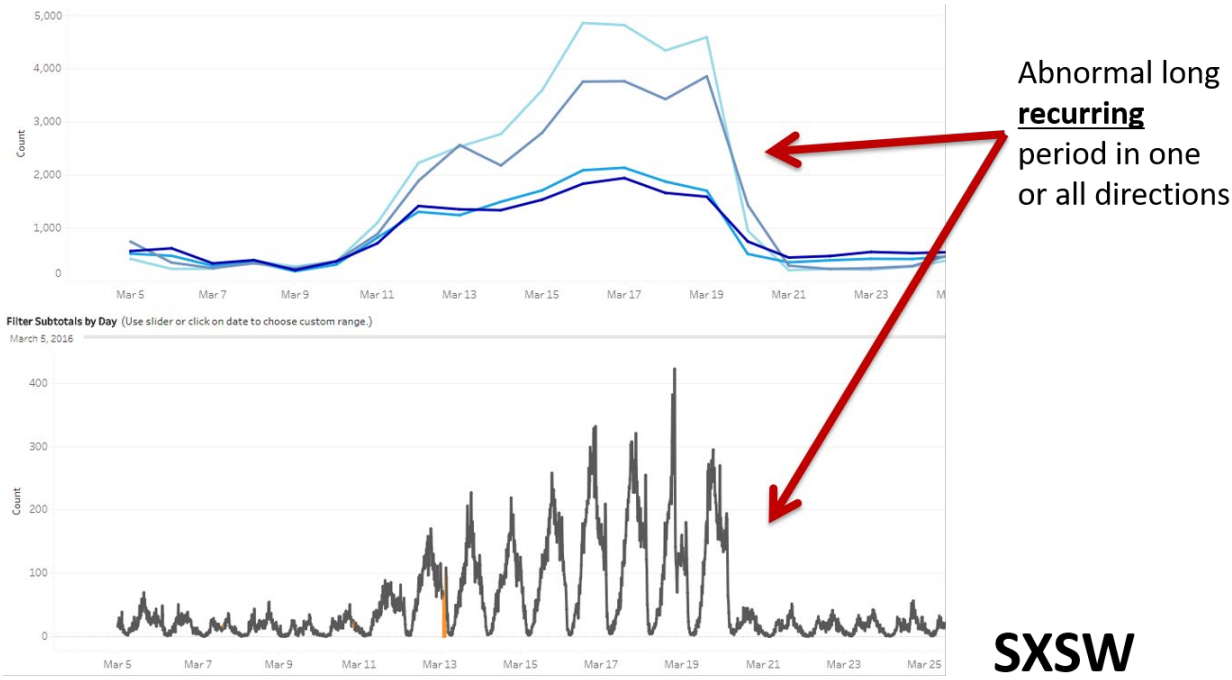


Figure 4-29. Abnormal Event Pattern: Multiday Festival.

4.4.5. Logging Comments in the Notes Field

Keeping a detailed log (maintained by the agency that collected the data, outside the formal data submittal process) is a critical element of the quality review process. Simply flagging data as invalid or ABV does not allow a user of the data to spot trends that are more difficult to identify. For example, several of the ABV patterns discussed earlier are commonly discovered only after reviewing several anomalous periods in a log and identifying them as a specific event or user group. The BP|CX "Notes" field automatically creates a log for users as they review data, but **users are encouraged to keep their own log of races, festivals, and events to quickly reference for future quality review processes.**

As a general rule, every change made to count data or every flagged value should be logged in some way to identify the following key elements:

- The timestamp of the count(s) flagged.[2]
- What flag was used/which quality control test was failed.[2]
- The direction and mode of the count flagged.[2]
- The actual or suspected reason for the error.
- Any commentary addressing the flag (if any).
- Some identifier of the person entering the log with a date.[2]

[2] Logged automatically by the BP|CX.

Additionally, changes made to metadata or other anomalous happenings should be logged following similar guidelines. These logs should include mass counter malfunctions where something physically happened to the counter that would explain months or years of bad data. For example, log when an inductive loop wire is cut (and subsequently repaired) or if a counter displays zero values for months immediately after being installed.

Other elements that could and should be logged include any pattern information such as:

- Judgments on the stability and apparent seasonality of the counts.
- Noticeable and recurring spikes in counts that were ultimately not flagged as invalid or ABV but are still worth noting.

Another habitual practice for reporting agencies to develop is to create and maintain an **event log** (not uploaded to BP|CX). This log dramatically reduces the amount of time spent evaluating whether a count is invalid or ABV. Every time there is some event, rare weather occurrence, or festival, simply record the date and time, name, and locations impacted.

Ultimately, log everything and keep the logs organized. The logs should be maintained by the agency that collected the count data and are not required to be submitted to TxDOT. These data review logs can be used if/when questions arise about nonmotorized count data.

5. Exporting Data from BP|CX

5.1. Overview

Users have two primary ways to export data from the BP|CX:

- **The public-facing data visualization (https://mobility.tamu.edu/bikepeddata/):** allows only the download of a single counter at a time. This method is primarily intended for use by policy makers, advocacy groups, and the general public. Agencies are encouraged to direct requests for data to this method.

- **The BP|CX authorized user's interface in the *Exports* module:** allows authorized users to download multiple stations at a time in a bulk method. The primary intended use is for intra-agency planning activities, research, and other types of analyses requiring data from numerous stations.

The following sections describe the steps for each method. The second method is listed first because it can be performed in the BP|CX data manager and will be most beneficial to agency users.

5.2. Downloading Bulk Data from the BP|CX Data Manager

Users must first **request that the BP|CX prepare data** in the master count database for bulk download. To do so, the user should follow these steps:

1. **Select "Exports"** from the Navigation menu on the left side of the screen (Figure 5-1). This displays the *Exports* module where data can be prepared for export.

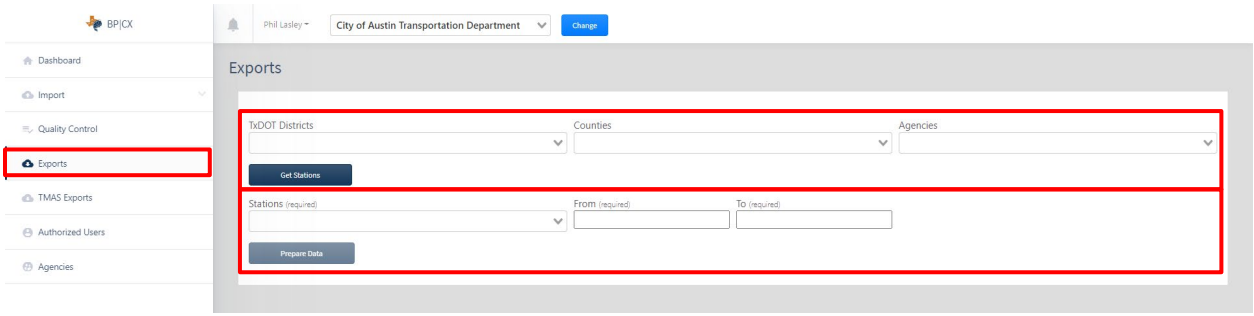


Figure 5-1. BP|CX Exports Window.

2. **Select qualifying characteristics** from the dropdown menus. This feature is mainly needed for larger agencies that operate in multiple counties or districts. Additionally, authorized super administrators may filter by agency. **When regions are selected, click "Get Stations."**

3. **Select the stations for export** from the dropdown menu. From the dropdown menu, users may only select stations that are owned by that agency; other stations in the area under another agencies' control will not be shown.

4. **Choose the dates for data export.**

5. **Click "Prepare Data."** This will signal the BP|CX data engine to begin compiling and packaging the selected data for download as a .csv file. A note will appear at the top of the window informing the authorized user that an email will be sent with a link to the data file when the export process has completed. This process may take several minutes to hours to perform, depending upon the amount of data being requested. Do not repeat this process multiple times in a row.

5.3. Downloading Station Data from Public Visualization

The public or other non-BP|CX users may **download cleaned and certified data** from the BP|CX via the public-facing data visualization. In many cases, this may suffice for public inquiry or casual data needs. The user should follow these steps:

1. **Navigate to the public portal** at https://mobility.tamu.edu/bikepeddata/. See Chapter 7, "Public BP|CX Data Visualization" for help navigating to the views in the visualization.

2. **Navigate to the appropriate county or district.** From the *State View* visualization, select either county or TxDOT district from the dropdown menu next to the logo at the top of the screen. Click on the colored geography from the statewide map.

3. **Click the desired count location.** Once in the *County View* visualization, click on the count location for the desired data. Hovering over each location displays the count location's name, station ID number, and type of count. Additionally, use the dropdown menus in the top of the visualization to refine your search.

4. **Select the data to be downloaded.** In the *Station Statistics* view, determine what data are needed to be downloaded and **click in any white space in that chart or table area**. For example, for daily subtotal counts, click in any white space in the chart on the upper-right portion of the visualization.

   For this particular chart, you may select a different **count total aggregation** (e.g., hourly, monthly, quarterly, etc.) by clicking on the "+" or "−" signs that appear near the gray arrow at the bottom left corner of the Daily Subtotals chart.

5. **Click "Download"** at the bottom of the data visualization and then **select "Data."** You may also download other elements from the visualization from this menu, including images, though the data have not been formatted for crosstab downloads. Figure 5-2 highlights where to aggregate or disaggregate the Daily Subtotals chart and where to download data.

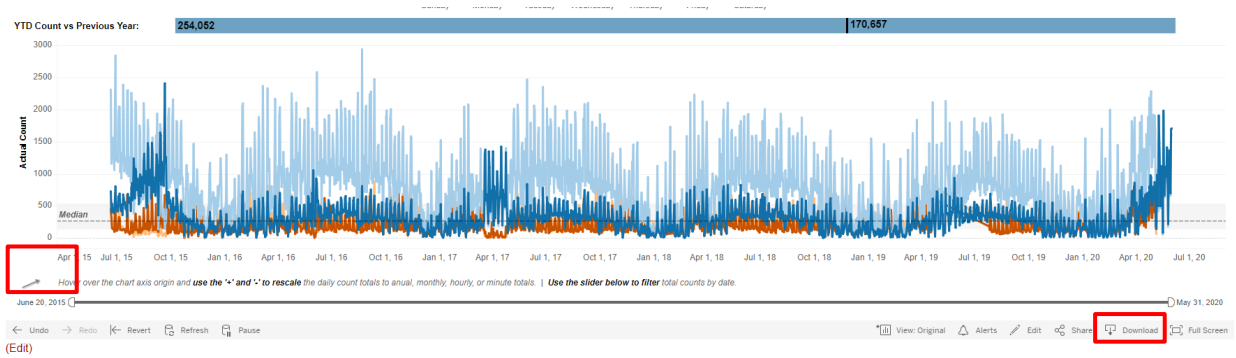


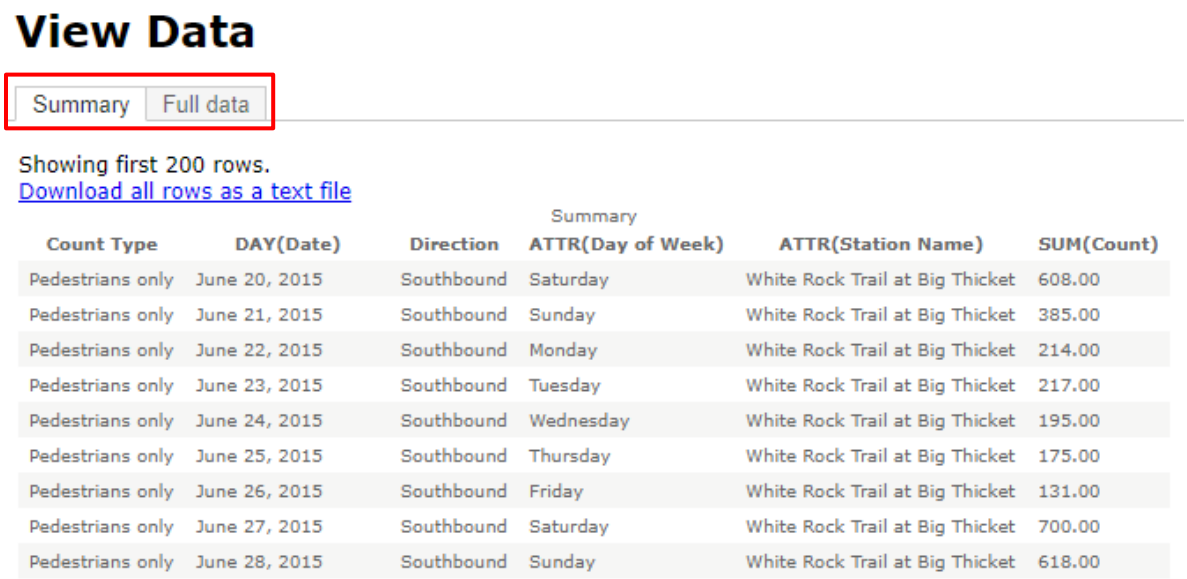
Figure 5-2. Download Count Data or Aggregate/Disaggregate views in the Public Visualization.

6. **Download the data.** A new window will appear (Figure 5-3) with two tabs:

   - The "Summary" tab displays the data as they appear in the view with the current aggregation and helpful metadata.

   - The "Full Data" tab displays the raw data that are aggregated to create the summary view. Depending upon the size of the data being downloaded, this view may take several minutes to produce.

   Filters from the visualization will impact both download tabs; use filters to export only the required data and improve performance.



View Data

Summary | Full data

Showing first 200 rows.
Download all rows as a text file

Count Type	DAY(Date)	Direction	Summary ATTR(Day of Week)	ATTR(Station Name)	SUM(Count)
Pedestrians only	June 20, 2015	Southbound	Saturday	White Rock Trail at Big Thicket	608.00
Pedestrians only	June 21, 2015	Southbound	Sunday	White Rock Trail at Big Thicket	385.00
Pedestrians only	June 22, 2015	Southbound	Monday	White Rock Trail at Big Thicket	214.00
Pedestrians only	June 23, 2015	Southbound	Tuesday	White Rock Trail at Big Thicket	217.00
Pedestrians only	June 24, 2015	Southbound	Wednesday	White Rock Trail at Big Thicket	195.00
Pedestrians only	June 25, 2015	Southbound	Thursday	White Rock Trail at Big Thicket	175.00
Pedestrians only	June 26, 2015	Southbound	Friday	White Rock Trail at Big Thicket	131.00
Pedestrians only	June 27, 2015	Southbound	Saturday	White Rock Trail at Big Thicket	700.00
Pedestrians only	June 28, 2015	Southbound	Sunday	White Rock Trail at Big Thicket	618.00

Figure 5-3. Example Data Download from the Daily Subtotals Chart.

This process can be repeated for any view, chart, or map in the BP|CX data visualization. If a user desires a list of count locations in a region along with basic metadata from each location, omit step 3 and repeat the process from the *County View* map after clicking on empty space on the map.

6. Exporting Data to TMAS

6.1. Overview

This chapter discusses the steps required to prepare data for submittal to FHWA's TMAS from the BP|CX.

Due to the quality control process built into the BP|CX, only nonmotorized count data that are first certified for quality by the agency responsible for the data are prepared for export to TMAS. Any uncertified data are not placed in the master count database but instead placed in a holding pen or quarantine until the proper quality control process has been performed and the data are deemed fit for use.

Upon certification, all valid and ABV data are released into the master count database and can be submitted to TMAS, subject to the agency's agreed use of the data to be submitted to FHWA.

6.2. Preparing Data

To **prepare the data** in the master count database for submission, the user should follow these steps:

1. **Select "TMAS Export"** from the Navigation menu on the left side of the screen. This displays the *TMAS Exports* module where data can be prepared for export (Figure 6-1). Only authorized super administrators can view this menu option in the Navigation menu.

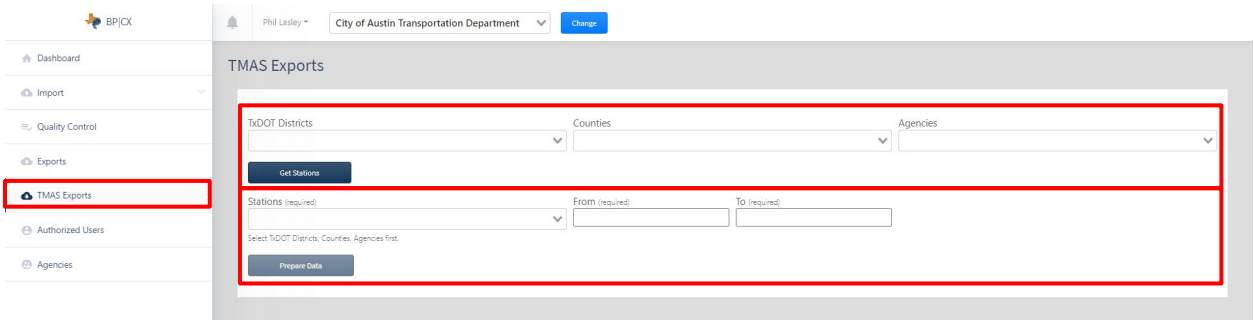


Figure 6-1. TMAS Export Window in the BP|CX.

2. **Select the TxDOT districts, counties, or agencies** that contain the stations needing to be exported. This process can export all or one station at a time.

3. **Click "Get Stations."** This action will then populate the dropdown "Stations" menu below the button with the station names available for export.

4. **Select the stations for export.** Upon region selection, the user will now be presented with a list of count locations available for TMAS submission. From the dropdown menu, select all stations that should be prepared for TMAS submission.

5. **Choose the dates for data export.** TMAS requires multiple years of data to be separated into annualized files. The BP|CX will automatically do this task for you, so the system will output a single file for each year to comply with TMAS data upload standards. There is no need to repeat this process for different years.

6. **Click "Prepare Data."** This signals the BP|CX data engine to begin compiling and packaging the selected data for TMAS. A note will appear at the top of the window informing the authorized super administrator that an email will be sent with a link to the data file when the export process has completed. This process may take several minutes to hours to perform.

6.3. FHWA TMAS Upload

The output files generated from the previous step will be pre-formatted to TMAS guidelines for ease of use and upload. The TxDOT registered user for TMAS (generally someone in the Transportation Planning and Programming office) will be responsible for uploading the files to TMAS. This designee will log into TMAS using the User Profile and Access Control System/Operational Research Consultants Process (UPACS/ORC) credentials and upload nonmotorized count data.

While the process may vary, TMAS will conduct two primary data quality checks:

1. Verify that the metadata to be uploaded conforms to TMAS parameters.
2. Verify that the counts are free of invalid or questionable data.

The BP|CX system automatically formats the counts' metadata to conform to TMAS guidelines and should therefore give no flags or errors. However, if an error should occur, consult the TMAS documentation for assistance.

Because of the extensive quality control process built into the BP|CX system, the count data submitted to TMAS should be free of errors or questionable data. Therefore, any flags that appear from TMAS about count quality can generally be ignored. However, do review these flags to ensure a final step of quality control with the count data. Errors resulting from station metadata cannot be ignored and must be resolved before that location's count data can be uploaded to TMAS. Contact BP|CX Support (Support@txbpcx.org) to resolve this issue.

FHWA is still tweaking the nonmotorized module of TMAS over time. Questions about quality control flag thresholds are still being debated within the industry; therefore, TMAS allows for a dynamic range of threshold values for each count location or region (this is still being determined). If the system asks for threshold values, they will have to be retrieved from the quality control notes for that count location (or region) in the *Quality Control* module of the BP|CX system. If this is the case, system developers will build in an export file that lists these values for ease of use.

Once the data are uploaded, submit the data to TMAS.

Data from the BP|CX should be uploaded to TMAS annually at the discretion of the bicycle and pedestrian coordinator and the TxDOT registered TMAS user.

7. Public BP|CX Data Visualization

7.1. BP|CX Visualization Purpose

The public-facing data visualization (https://mobility.tamu.edu/bikepeddata/) serves as the public data portal to summarize and disseminate quality-reviewed and certified nonmotorized count data. The visualization is meant for both practitioners and other public users of the data not affiliated with the collecting agency (including other agencies that collect nonmotorized data).

The visualization is the only place where the BP|CX displays count statistics, averages, and other information in an effort to encourage collecting agencies to quality-review and certify their data. Additionally, this supports the broad dissemination of information without burdening the collecting agency. If there are views or performance measures that would be helpful to planning, practice, or research, please contact BP|CX Support (Support@txbpcx.org) with the suggestions or feedback.

7.2. BP|CX Visualization Navigation

The following sections describe the three primary views of the public-facing visualization and discuss their navigation and use. Information about downloading data or data summaries from these views can be found in Chapter 5, "Exporting Data from BP|CX."

The three primary views of the public-facing visualization are:

- State View.
- County View.
- Station Statistics.

7.2.1. State View

The *State View* is the first view of the public visualization. This view shows statewide statistics about nonmotorized counting efforts in Texas as well as where counts are happening. Figure 7.1 displays a sample of this view and highlights specific areas for users to maximize the features of this visualization.

The *State View* map displays where nonmotorized counts have been collected in Texas according to the following filters:

- **Counties:** The map shows counties by default. Counties are shaded from light to dark blue based on the number of count locations relative to other counties in Texas.

- **TxDOT districts:** Users can easily toggle between county and TxDOT district using the dropdown menu at the top of the screen to the right of the logo. This alters the map to ranking TxDOT districts by the number of count locations.

- **Count type (mode):** Users may also filter by count type (mode) that is being counted at that location, such as bicyclists, pedestrians, both combined, or both separately. Choosing "bicycles only" or "pedestrians only" displays locations where both bicycles and pedestrians are being counted

separately by the same equipment at the same location, in addition to locations they may only be counting one type of mode.

Clicking on a county or TxDOT district displays a view of count locations in that area, taking the user to the *County View*.

Hovering over a county or TxDOT district displays a popup window (also called a tooltip) that displays statistics about that specific region. In the *State View*, hovering displays the total number of count locations in that region and provides a split of permanent and short-duration count locations.

Finally, text at the bottom of the screen provides an up-to-date count of the state's total number of permanent and short-duration count locations.

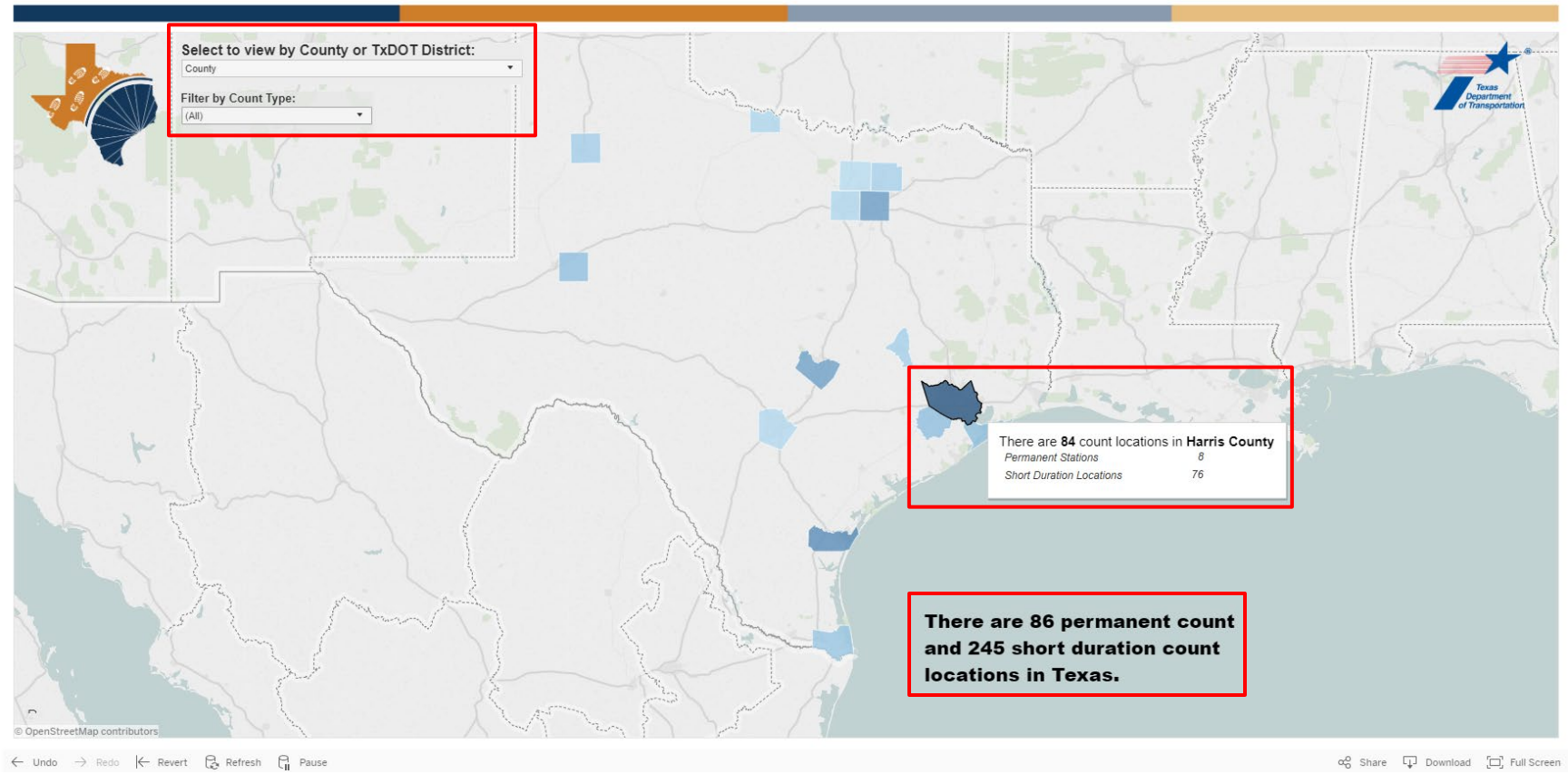


Figure 7-1. BP|CX State View.

7.2.2. County View

The *County View* is the second view of the public visualization, accessed from the *State View* by clicking on a county or TxDOT district. This view shows specific locations for all nonmotorized counts within that region. Whereas the previous view primarily displayed basic measures, this view is more informational. Figure 7.2 displays a sample of this view and highlights specific areas for users to maximize the features of this visualization.

The *County View* map displays a mark for every count location within the BP|CX and notes by color whether the location is a permanent station (blue) or a short-duration location (orange). The map displays all locations regardless of collecting agency. Clicking on a location directs the user to the final visualization, *Station Statistics*. Use the map navigation tools in the upper left corner to zoom, pan, or select stations.

Users can filter the map based on the agency that collected and owns the data from the dropdown menu in the top right corner of the map. Users may again filter by count type (mode) that is being counted at that location, such as bicyclists, pedestrians, both combined, or both separately. Choosing “bicycles only” or “pedestrians only” displays locations where both bicycles and pedestrians are being counted separately by the same equipment at the same location, in addition to locations they may only be counting one type of mode.

Hovering over a station displays a popup window that displays the station’s descriptive name, the type of station it is, and the station ID number for easy database reference.

Text in the upper left corner of the map displays a basic count of the number of permanent and short-duration count locations. This count is sensitive to the filters located elsewhere on the map, so it always displays an accurate count of what is being shown on the map.

Click the home icon in the top right corner of the view to return to the *State View*.

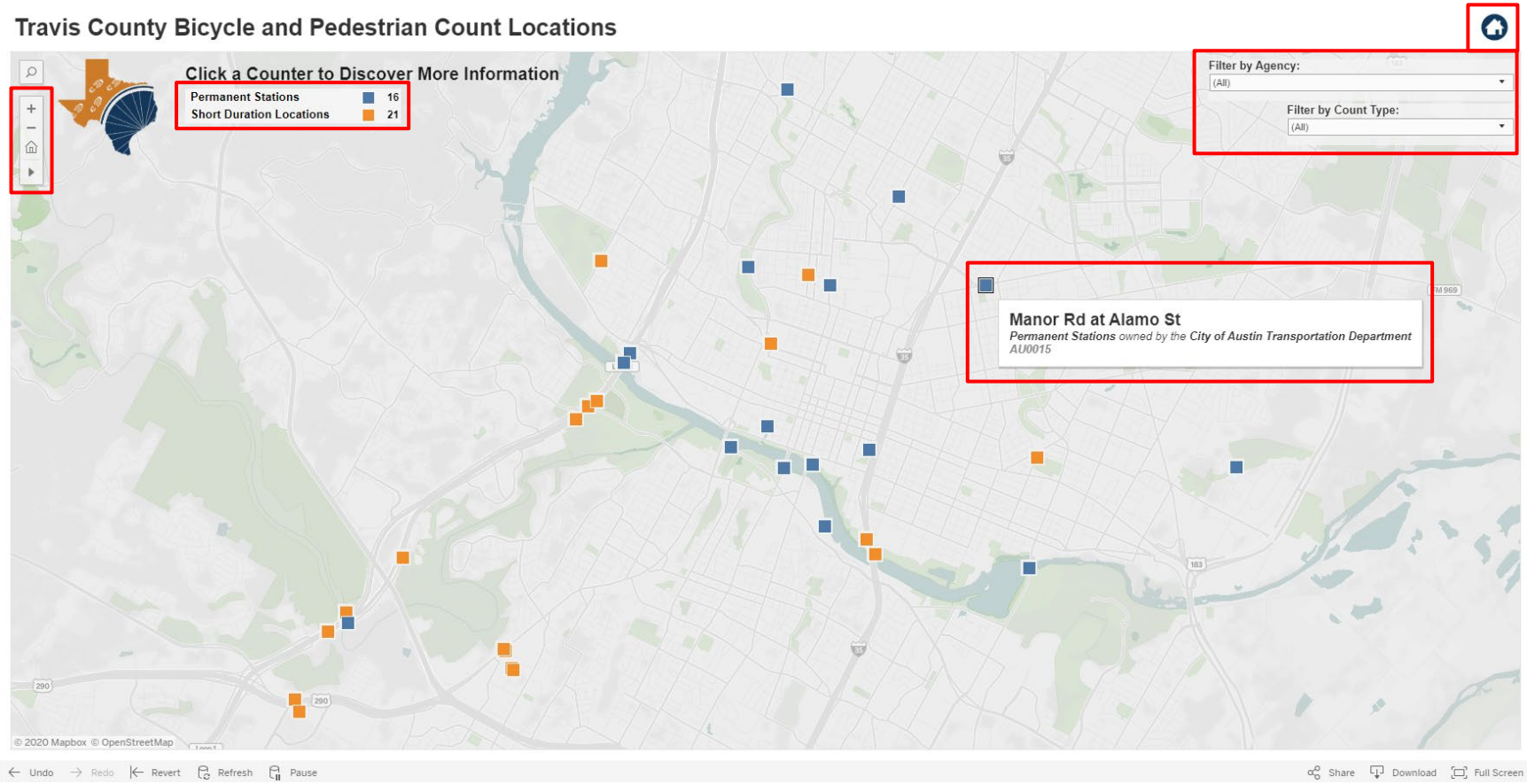


Figure 7-2. BP|CX County View.

7.2.3. Station Statistics

Station Statistics is the final and most detailed view of the public visualization, accessed from the *County View* by clicking on a count location. This view displays valuable statistics about each count location, including average daily traffic (or average annual daily traffic [AADT] where possible), daily totals, year-to-date versus past year count totals, day-of-week averages, time-of-day averages, and other helpful statistics or metadata. The view is broken into four primary sections:

- Average daily counts (AADT or ADT).
- Aggregate averages.
- Historical count totals.

Figure 7-3 displays a sample of this view and highlights specific areas for users to maximize the features of this visualization.

The first section, **average daily counts**, located in the top left of the view, includes:

- AADT broken out by mode (but combined directions) for pedestrians (AADP), bicyclists (AADB), or all nonmotorized traffic (AADNMT) for permanent count locations with at least one year of good data. For all others, ADT is displayed.
- Counter information, such as the type of station, the functional classification of the facility being measured, the facility type, and vendor.
- Ownership information, though no direct contact information is given.

The second section contains two charts located in the top half of the visualization and provides the **average count** by mode and direction of each **day of the week** (i.e., an average Monday) **or** during **each hour of the day** (i.e., an average 9:00 a.m.). All filters impact these charts, except that the Day of Week filter will not impact the Day of Week Average.

The **historical count totals** chart is the most predominant portion of the view, occupying the bottom half of the visualization. Here, counts are displayed by default as daily subtotals (total counts for a single day), split by mode and direction, for the entire history of the counts in the database. While all historical counts are displayed, future data limitations may limit this view to 3 years of historical data.

The historical count totals chart may be manipulated in numerous ways to provide several helpful views of **aggregate averages**. These views offer insightful views of trends that are normally difficult to create. The gray arrow to the lower left of the chart point to a pair of menu options for count subtotal aggregation: hovering over the area will make a "−" and "+" appear:

- Clicking on the minus sign zooms out by aggregating daily totals to weekly, monthly, quarterly, and annual totals.

- Clicking on the plus sign disaggregates daily count totals to hourly and, if available, a lower level of detail—usually at the 15-minute or raw level of detail.

The historical count totals chart may also be filtered using any one of the filters under and to the right of the chart:

- The date slider bar narrows or broadens the view over time.
- The Count Type and Travel Direction dropdown menus filter by mode and direction.
- The Day of Week filter displays only selected days.
- The Invalid or Abnormal Data filter can toggle data flagged as abnormal or invalid during the quality review process.

Directly above this chart in the middle of the visualization lies a bar chart that displays the total year-to-date count compared to the count during the same time in the previous year. Note that this is subject to the Abnormal or Invalid Count filter. Hovering over the bar will display similar counts but broken out by mode and direction.

Click the home icon in the top right corner of the view to return to the *State View* or the orange back arrow to return to the *County View*. Click on the map icon to see the Google Map location, and street view where available, of the count location. This provides context for the statics given at each count location.

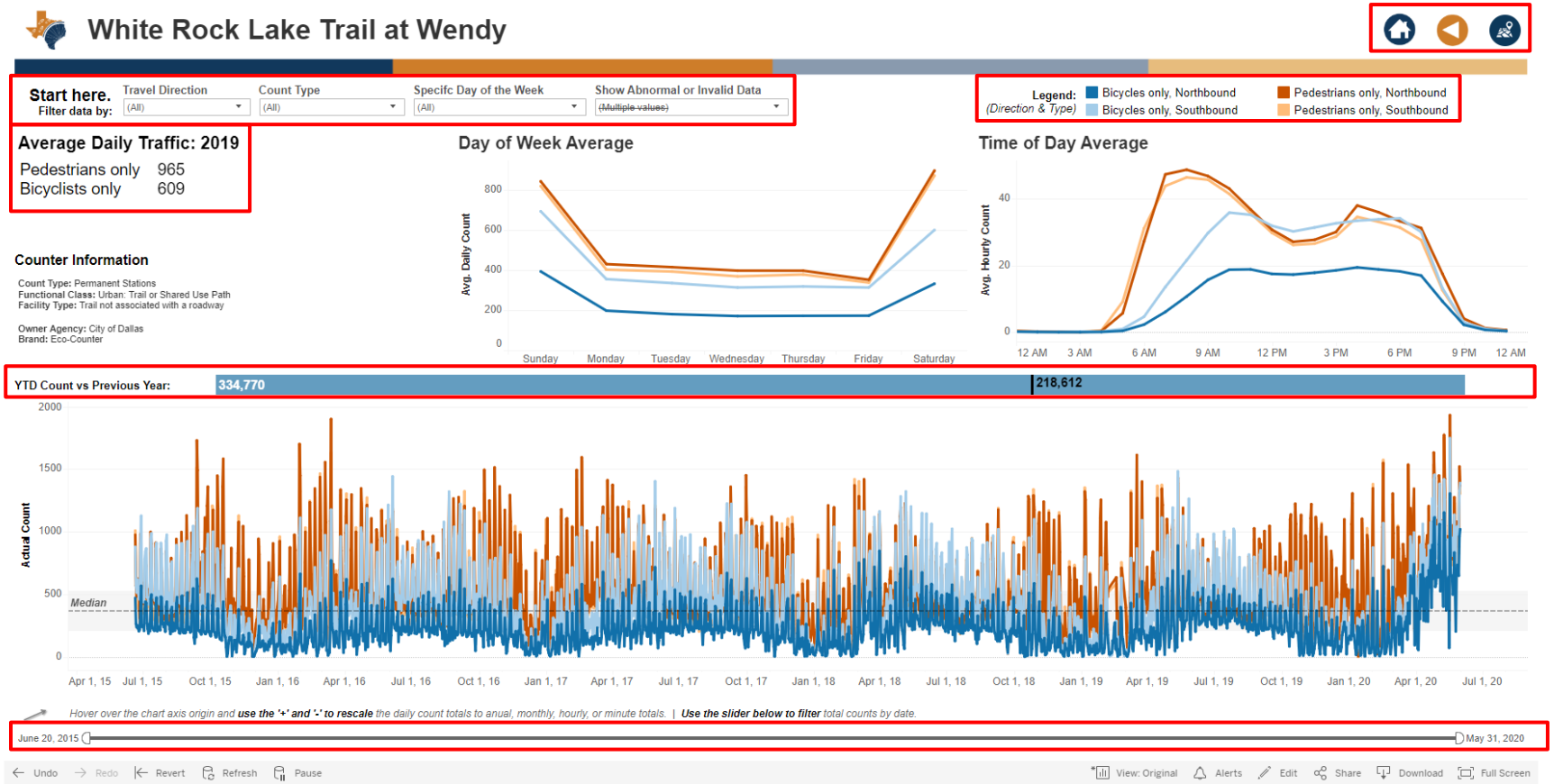


Figure 7-3. BP|CX Station Statistics.

8. Support and Resources

8.1. Technical Support

The BP|CX offers two types of support for issues while working with and reviewing data:

- Support for errors within the BP|CX, count import, review, factoring, and exporting procedures.
- Support for nonmotorized count program processes.

8.1.1. Support for Errors within the BP|CX, including Count Import, Review, Factoring, and Exporting Procedures

Errors with the BP|CX should be directed to BP|CX Support (Support@txbpcx.org) with a description of the error and screenshots if possible. Once the error notice has been received, you will be contacted soon after to discuss further details of the error and a timeline for resolving the issue. Other questions regarding BP|CX processes not covered in this user manual or requested features may also be directed here.

In addition to errors, any mistakes or revisions needing to be addressed within the data review process or after counts have been certified can also be directed to the same email address. Current BP|CX capabilities limit the post-certification editing of counts by authorized users and authorized administrators; only authorized super administrators can edit counts post-certification.

Click "Help and Feedback" at the bottom of the navigation pane to email BP|CX Support.

8.1.2. Support for Nonmotorized Count Program Processes

User questions concerning count program processes, such as the TxDOT counter loan program, how to install and conduct nonmotorized counts, or how to use counts once they are collected, should be directed to the TxDOT Bicycle and Pedestrian Program (BikePed@txdot.gov).

8.2. Resources

More resources discussing nonmotorized counting; count equipment; data review, factoring, and validation; data use in policy and planning; and other topics may be found at:

- The Resources tab of the BP|CX webpage (https://mobility.tamu.edu/bikepeddata/).
- TxDOT's Bicycle and Pedestrian Program–Count Program webpage (https://www.txdot.gov/inside-txdot/division/public-transportation/bicycle-pedestrian/bicycle-pedestrian-program.html).

9. Appendix A: Station Location Fields

9.1. Overview

This appendix provides an overview of the required and recommended attributes to be supplied for each count station and count file. It also provides detailed descriptions of each standardized data attribute as indicated on the station input form in Section 3.3.1, "Setting Up a New Count Location" and in the data upload process. The exact contents required in each of these is described in this chapter. An example is provided to illustrate application of these standardized data definitions.

9.2. Required Station Attributes

Table 1 lists the attributes captured by the BP|CX in the station creation process, sorted by input screen. Cells highlighted in green denote attributes that are required by FHWA in the Traffic Monitoring Guide (TMG) while blue cells denote attributes only required by TxDOT. Both are required fields in the BP|CX when entering station information. Some attributes are required, but not directly entered, because the BP|CX auto-generates the responses based on other information.

Table 1: Station Attributes.

#	Attribute Name	TxDOT Required?	FHWA TMG Required?	Maximum Length in BP|CX	System Generated?
	Name and Location				
1	*State (Hidden)*	*Yes*	*Yes*	*Enumerated values*	*Yes*
2	*TxDOT District (Hidden)*	*Yes*	*N.A.*	*Enumerated values*	*Yes*
3	Station ID TMG	Yes	Yes	6 characters	Yes
4	Station Name	Yes	N.A.	None	No
5	Agency Station ID	No	N.A.	None	No
6	County	Yes	Yes	Enumerated values	No
7	City	Yes	N.A.	None	No
8	City/Area	Yes	N.A.	None	No
9	Latitude	Yes	Yes	None	Maybe
10	Longitude	Yes	Yes	None	Maybe
11	Year Station Established	Yes	Yes	4 characters	Maybe
12	Year Station Discontinued	No	No	4 characters	No
	Direction and Types				
13	*Flow ID TxDOT (Hidden)*	*Yes*	*N.A.*	*14 characters*	*Yes*
14	Channel Name	Yes	N.A.	None	No
15	Channel ID	Yes	N.A.	None	No
16	Type of Count	Yes	Yes	Enumerated values	No
17	Travel Direction	Yes	N.A.	Enumerated values	No
18	Type of Sensor	Yes	No	Enumerated values	No

#	Attribute Name	TxDOT Required?	FHWA TMG Required?	Maximum Length in BP|CX	System Generated?
	Count Information				
19	Method of Counting	Yes	Yes	Enumerated values	No
20	Vendor	No	N.A.	Enumerated values	No
21	Primary Count Purpose	No	No	Enumerated values	No
22	Other Notes	No	No	51 characters	No
	Station and Facility Details				
23	Station Location	No	No	50 characters	No
24	Facility Type	Yes	Yes	Enumerated values	No
25	Functional Classification	Yes	Yes	Enumerated values	No
	Count Direction and Orientation				
26	Direction of Route	Yes	Yes	Enumerated values	No
27	Direction of Movement	Yes	Yes	Enumerated values	No
28	Location of Count Relative to Roadway	Yes	Yes	Enumerated values	No
29	Intersection	No	No	Enumerated values	No
30	Mounting Object	No	N.A.	None	No
	Roadway Characteristics				
31	Roadway Width	No	N.A.	Enumerated values	No
32	Posted Speed Limit	No	No	2 characters	No
33	National Highway System	No	No	Enumerated values	No
34	Posted Route Signing	No	No	Enumerated values	No
35	Posted Signed Route Number	No	No	8 characters	No
	Nonmotorized Facility Design				
36	Nonmotorized Facility Width	No	N.A.	Enumerated values	No
37	Nonmotorized Facility Buffer Width	No	N.A.	Enumerated values	No
38	Surface Type	No	N.A.	Enumerated values	No
39	Surface Condition	No	N.A.	Enumerated values	No
	Additional Route Features				
40	Parking	No	N.A.	Enumerated values	No
41	ADA Ramps	No	N.A.	Enumerated values	No
42	Street Lighting	No	N.A.	Enumerated values	No
43	Transit	No	N.A.	Enumerated values	No

#	Attribute Name	TxDOT Required?	FHWA TMG Required?	Maximum Length in BP|CX	System Generated?
44	Shade	No	N.A.	Enumerated values	No
45	Surrounding Land Uses	No	N.A.	Enumerated values	No
46	Street Traffic Volume (ADT)	No	N.A.	None	No
	Contact Details				
47	*Owner Agency (Hidden)*	*Yes*	*N.A.*	*None*	*Yes*
48	*Owner Name (Hidden)*	*Yes*	*N.A.*	*None*	*Yes*
49	*Owner Phone (Hidden)*	*Yes*	*N.A.*	*12 characters*	*Yes*
50	*Owner Email (Hidden)*	*Yes*	*N.A.*	*None*	*Yes*
51	Provider Agency	Yes	N.A.	None	No
52	Provider Name	Yes	N.A.	None	No
53	Provider Phone	Yes	N.A.	12 characters	No
54	Provider Email	Yes	N.A.	None	No
55	Requester Agency	No	N.A.	None	No
56	Requester Name	No	N.A.	None	No
57	Requester Phone	No	N.A.	12 characters	No
58	Requester Email	No	N.A.	None	No
	Other Attributes Collected Elsewhere in the BP|CX				
19	*Year of Data (Hidden)*	*Yes*	*Yes*	*4 characters*	*Yes*
20	Factor Group 1	No	No	1 character	No
21	Factor Group 2	No	No	1 character	No
22	Factor Group 3	No	No	1 character	No
23	Factor Group 4	No	No	1 character	No
24	Factor Group 5	No	No	1 character	No
34	LRS Route ID	No	No	60 characters	No
35	LRS Location Point	No	No	8 characters	No

Green cells indicate attributes required by both TMG and TxDOT.

Blue cells indicate attributes required only by TxDOT.

Uncolored cells indicate attributes that are not required by either TMG or TxDOT.

N.A. indicates that the attribute is not required by TMG, nor is it included in the TMG data dictionary.

OSM = Open Street Map; LRS = Linear Referencing System; ADA = Americans with Disabilities Act; ADT = Average Daily Traffic.

The following provides details about each attribute listed in Table 1.

1. **Name:** **State (Hidden Field)**
   TxDOT Required? Yes
   TMG Required? Yes
   Maximum Length: Enumerated values
   Description: State in which count station is located. Use actual text value but note that TMG requires a 2-digit Federal Information Processing Standard (FIPS) state code.
   Example: "Texas"

2. **Name:** **TxDOT District (Hidden Field)**
   TxDOT Required? Yes
   TMG Required? No (not included in TMG)
   Maximum Length: Enumerated values
   Description: TxDOT district in which count station is located. See http://www.txdot.gov/inside-txdot/district.html for listing of TxDOT districts.
   Example: "Corpus Christi"

3. **Name:** **Station ID TMG**
   TxDOT Required? Yes
   TMG Required? Yes
   Maximum Length: 6 characters
   Description: A unique alphanumeric identifier for the count station. FHWA's TMG limits this to six alphanumeric characters. For TxDOT purposes, the first two characters should be an abbreviation of the city/area name, and the remaining four characters should be a sequential numeric identifier.
   Example: "CC0001"

4. **Name:** **Station Name**
   TxDOT Required? Yes
   TMG Required? No (not included in TMG)
   Maximum Length: None
   Description: A unique name for the count station that is to be used in tabular reports and charts. The name and approximate location should be understood by laypersons, and the approximate location should be able to be determined by the station name. Elements to include in this attribute are street/road/facility name, cardinal direction of travel (if station is limited to one direction of travel), and nearest cross street(s) or landmark.
   Example: "18th St: Fig to McKenzie"

5. **Name:** **Agency Station ID**
   TxDOT Required? No
   TMG Required? No (not included in TMG)
   Maximum Length: None
   Description: The unique alphanumeric identifier for the count station as originally assigned by the agency collecting the data. This attribute does not have a character limit.
   Example: "18FM-31610-CNT14-042417-1102"

6. **Name:** **County**
   TxDOT Required? Yes
   TMG Required? Yes
   Maximum Length: Enumerated values
   Description: County in which count station is located. Use actual text value but note that TMG requires a 3-digit FIPS county code.
   Example: "Nueces"

7. **Name:** **City**
   TxDOT Required? Yes
   TMG Required? No (not included in TMG)
   Maximum Length: None
   Description: City in which count station is located.
   Example: "Ft. Worth"

8. **Name:** **City/Area**
   TxDOT Required? Yes
   TMG Required? No (not included in TMG)
   Maximum Length: None
   Description: City, jurisdiction, or distinct area within a city in which count station is located. May be the same as the City attribute but may also include districts or other areas within a city.
   Example: "Corpus Christi"

9. **Name:** **Latitude**
   TxDOT Required? Yes
   TMG Required? Yes
   Maximum Length: None
   Description: Latitude of the count station.
   Example: "27.771738598356"

10. **Name:** **Longitude**
    TxDOT Required? Yes
    TMG Required? Yes
    Maximum Length: None
    Description: Longitude of the count station.
    Example: "−97.408085982875"

11. **Name:** **Year Station Established**
    TxDOT Required? Yes
    TMG Required? Yes
    Maximum Length: 4 characters
    Description: The year in which the count station was established.
    Example: "2016"

12. **Name:** **Year Station Discontinued**
    TxDOT Required? No
    TMG Required? No
    Maximum Length: 4 characters
    Description: The year in which the count station was discontinued (if applicable).
    Example: "2017"

13. **Name:** **Flow ID TxDOT (Hidden Field)**
    TxDOT Required? Yes
    TMG Required? No (not included in TMG)
    Maximum Length: 14 characters maximum
    Description: A unique alphanumeric identifier for specific user mode flows at the count station. This attribute is a combination (concatenation) of three separate attribute values, each separated by a hyphen:
    - Station ID TMG (#3 in station description file; six characters).
    - Travel Direction (#17; three characters max). Add a "W" suffix for wrong-way traffic.
    - Type of Count (#16; three characters max).

    Example: "CC0001-NB-Bic" (represents count station CC0001, northbound travel direction, bicyclist-only counts)

14. **Name:** **Channel Name**
    TxDOT Required? Yes
    TMG Required? No (not included in TMG)
    Maximum Length: None
    Description: The name of the channel or flow given by the count equipment or owner.
    Example: "Bic-Westbound"

15. **Name:** **Channel ID**
    TxDOT Required? Yes
    TMG Required? No (not included in TMG)
    Maximum Length: None
    Description: The ID number given by the count equipment or owner to uniquely identify a channel of flow for a specific counter. Eco-Counters usually assign this number.
    Example: "100003245"

16. **Name:** **Type of Count**
    TxDOT Required? Yes
    TMG Required? Yes
    Maximum Length: Enumerated values
    Description: Possible values are:
    - 1 = pedestrians (only).
    - 2 = bicycles (only).
    - 3 = equestrians (only).
    - 4 = persons in wheelchairs.
    - 5 = persons using other pedestrian assistive devices (skates, skateboards, Segway®, hoverboards, etc.).
    - 6 = motorized vehicles on a trail (e.g., snowmobiles, all-terrain vehicles; specify in "other notes" attribute).
    - 7 = all bicycles and pedestrians (sum of Codes 1 and 2).

- 8 = all nonmotorized traffic on the facility (sum of Codes 1–5).
- 9 = all traffic on a trail (sum of Codes 1 through 6).
- 0 = other animals (e.g., pack mules, deer, or migrating caribou; specify in "other notes" attribute).

Example: "Bicycles only (2)"

17. **Name:** **Travel Direction**

TxDOT Required? Yes

TMG Required? No (not included in TMG)

Maximum Length: Enumerated values (3 characters max)

Description: The cardinal travel direction being counted at the station. The closest approximation should be provided if travel is not exactly in a cardinal direction. If more than one direction is counted, separate records/rows should be included for each direction. Wrong way directions indicate if the count is measuring wrong way traffic. Possible values are:

- EB = eastbound.
- NB = northbound.
- SB = southbound.
- WB = westbound.
- EBW = eastbound wrong way.
- NBW = northbound wrong way.
- SBW = southbound wrong way.
- WBW = westbound wrong way.
- All = all directions combined (travel direction is unknown, or sensor is not capable of measuring travel direction).

Example: "NB"

18. **Name:** **Type of Sensor**

TxDOT Required? Yes

TMG Required? No

Maximum Length: Enumerated values

Description: Indicate the type of sensor used for detection. Possible values are:

- 9 = multiple types of sensors used at this location; different counts may use different sensors (see the individual count records for the sensors used for specific counts). Note: if a more specific type is indicated in the station description file, the implication is that all counts reported for the station were collected with that type of sensor. Counts will be required to have the same sensor type.
- H = human observation (manual).
- I = infrared (passive).
- 2 = active infrared (requires a target on other side of facility being monitored).
- K = laser/lidar.
- L = inductive loop.
- M = magnetometer.
- P = piezoelectric.
- Q = quartz piezoelectric.
- R = air/pneumatic tube.
- S = sonic/acoustic.
- T = tape switch.

- 3 = other pressure sensor/mat.
- U = ultrasonic.
- V = video image (with automated or semi-automated conversion of images to counts).
- 1 = video image with manual reduction of images to counts performed at a later time.
- W = microwave (radar).
- X = radio wave (radar).
- Z = other.

Example: "Air tube (R)"

19. **Name:** **Method of Counting**
TxDOT Required? Yes
TMG Required? Yes
Maximum Length: Enumerated values
Description: Possible values are:
- 1 = human observation (manual), including human-analyzed video.
- 2 = portable traffic recording device.
- 3 = permanent continuous count station.

Example: "Portable recording device (2)"

20. **Name:** **Vendor**
TxDOT Required? No
TMG Required? N.A.
Maximum Length: Enumerated values
Description: The manufacturer of the equipment used to produce the count.

21. **Name:** **Primary Count Purpose**
TxDOT Required? No
TMG Required? No
Maximum Length: Enumerated values
Description: Indicates the primary purpose for installing the count station, and hence which organization is responsible for it and supplies the data. Possible values are:
- O = operations and facility management purposes.
- P = planning or statistical reporting purposes.
- R = research purposes.
- S = count taken as part of a safe-route-to-school data collection effort.
- L = facility design purposes.
- E = enforcement purposes.

Example: "Planning or reporting (P)"

22. **Name:** **Other Notes**
TxDOT Required? No
TMG Required? No
Maximum Length: 51 characters
Description: An English text field that can be used to provide notes to other users of data from this location. For example, it can be used to describe the specific use of Factor Groups 1 through 5. Also, if type of count is coded as 8 (other animals), indicate the type(s) of animals in this field. In addition, this field should be used to indicate whether the trail or facility being counted is open to nonmotorized traffic

for only part of the year. For example, a trail in the mountains may be closed because of snow accumulation for four months of each year. Including a note such as “Open April to October” will help users understand nonmotorized travel at this location.

23. **Name:** **Station Location**
TxDOT Required? No
TMG Required? No
Maximum Length: 50 characters
Description: An English text entry field. For stations located on a numbered route, enter the name of the nearest major intersecting route, state border, or landmark on state road maps and the distance and direction of the station from that landmark to the station (e.g., “12 miles south of the Kentucky border”). If the station is located on a city street, enter the city and street name. Abbreviate if necessary.

24. **Name:** **Facility Type**
TxDOT Required? Yes
TMG Required? Yes
Maximum Length: Enumerated values
Description: Indicates where the count was taken relative to the primary right of way. Possible values are:

- 0 = on a trail not intended for on-road motor vehicles (may accommodate snowmobiles or other off-road motorized vehicles) and not within the right of way of an adjacent road.
- 1 = in a shared roadway lane. Note that this option refers to locations where nonmotorized users share the space with vehicles—like a sharrow or wide curb lane shared by cars and bicycles, a facility where pedestrians or bicyclists use the street rather than the roadside, or a forest road that is maintained, even if rarely used, for motor vehicles. Note that if “perpendicular to traffic” (4) is selected in the “location of count relative to roadway” variable and the “facility type” variable is coded as “in roadway right of way” (1), then the count includes ALL people crossing a roadway.
- 2 = exclusively in a crosswalk. If this option is chosen, then only those in the crosswalk (or directly next to the crosswalk) are being counted. This coding differentiation is designed to indicate if all pedestrians crossing a street within a given block (including jaywalkers) are being counted or whether only pedestrians actually using a marked crosswalk are being counted.
- 3 = on a sidewalk intended primarily or exclusively for pedestrians.
- 4 = in a striped (painted) bicycle lane (with no physical barrier separating adjacent motorized traffic). Note that this category also includes shoulder facilities used by bicyclists and/or pedestrians and buffered bicycle lanes with no vertical separation between motor vehicles and cyclists.
- 5 = on an overpass intended to allow nonmotorized traffic to pass over a roadway.
- 6 = in an underpass intended to allow nonmotorized traffic to pass under a roadway.
- 7 = in a physically separated bicycle lane or cycle track (separated by a curb, bollards, or other vertical element from an immediately adjacent motorized roadway lane).

- 8 = on a side path intended for bicycles or for bicycles and pedestrians, occurring in a roadway right of way or immediately adjacent to a roadway (distinguished from 3 by explicitly allowing bicycles; distinguished from 0 by being associated with a roadway; distinguished from 7 by being separated by landscaping or an unpaved area from the adjacent roadway).
- 9 = general area (for general area count, with no facility explicitly designated).

Example: "Shared roadway lane (1)"

Additional guidance for coding the facility type is provided on the following pages, which have been extracted directly from pages 18 through 21 of FHWA's *Coding Nonmotorized Station Location Information in the 2016 Traffic Monitoring Guide Format* available at https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/tmg_coding/.

9. FACILITY TYPE (FIELD 9/COLUMN 18) – CRITICAL

- Indicates the facility type on which the count was taken, using one of the codes in Table 5.
- Note that bike lanes, sidewalks and other facilities associated with a motorized roadway are coded as their own facility types. A facility type of "1" (in the roadway) would be the right choice for bicyclists riding in a shared lane, or pedestrians walking in the street rather than on the roadside (or either type of user on a forest road that is maintained, even if rarely used, for motor vehicles).
- Some facilities may be represented by different facility types depending on the purpose for which the count is being collected. For example, a shared use path may cross over a roadway and fit both code "0" (on a trail) and code "5" (on an overpass). If the reason for counting traffic on the overpass is to understand what is happening on the trail, code "0" should be used. If the reason for counting the overpass is to understand how travelers are crossing the road under the overpass (for example, to compare traffic on the overpass to the number of people crossing the roadway at ground level), then code "5" is appropriate.
- If code "5" (underpass) or code "6" (overpass) is used, then the Location of Count Relative to Roadway should always be "4" (Travel perpendicular to the roadway). Other characteristics of the station location such as Direction of Route and Functional Classification should describe the road that is being crossed, not the overpass.

- The values in other fields should be consistent with these choices: the Functional Classification should be "8" (trail) if code "0" is used here, and it should be the Functional Classification of the roadway the overpass crosses if code "5" is used here. Likewise, the Direction of Route should be selected based on the direction of the trail if "0" is used here, and selected based on the roadway which the overpass crosses if "5" is used here (the correct direction of the roadway under the overpass is especially important if you are tracking which direction the traffic on the overpass is moving: "left-to-right" or "right-to-left").
- The crosswalk field is intended to apply to all legal crosswalks, including those that are not marked (as might be the case at a residential intersection, where crossing is permitted without special striping).
- If "perpendicular to traffic" is selected in "Location of Count Relative to Roadway" variable and the "Facility Type" variable is coded as "in roadway right of way," then the count includes ALL people crossing a roadway. If "exclusively in a crosswalk" is indicated, then only those in the crosswalk (or directly next to the crosswalk) are being counted. This coding differentiation is designed to indicate if all pedestrians crossing a street within a given block (including those who crossed mid-block outside a crosswalk) are being counted, or whether only pedestrians actually using a marked crosswalk are being counted.
- Further guidance for selecting the appropriate facility type is provided in Table 5 and illustrated in the examples in Exhibit 9.
- *Example: 0*

TABLE 5. FACILITY TYPE COUNT CODES

Code	Facility Type
0	On a trail not intended for on-road motor vehicles (may accommodate snowmobiles or other off-road motorized vehicles) and not within the right of way of an adjacent road *Note: intended for trails that are not associated with a roadway and do not run adjacent to a roadway, with the exception of limited access roadways. Trails adjacent to limited access roadways (like urban highways) fit this category. If this field is used, the Functional Classification should be coded as an "8" (trail or shared use path)*
1	In roadway right of way (the roadway may designate a trail potentially open to motor vehicles such as a fire road in a national forest) *Note: refers to locations where users share the space with vehicles (like a festival street or neighborhood bikeway).*
2	Exclusively in a crosswalk *Note: refers to both mid-block crossings and crosswalks associated with an intersection. Includes all legal crosswalks, even those not striped (such as at a residential intersection). The Functional Classification refers to the road being crossed.*
3	On a sidewalk intended primarily or exclusively for pedestrians *Note: indicates facility is intended for pedestrians, even if cyclists or other users are present.*
4	In a striped (painted) bicycle lane (with no physical barrier separating adjacent motorized traffic) *Note: also includes shoulder facilities used by bicyclists and/or pedestrians and buffered bicycle lanes with no vertical separation or barrier between vehicles and cyclists.*

Code	Facility Type
5	On an overpass intended to allow nonmotorized traffic to pass over a roadway *Note: intended to be used when an overpass is available as an option for multimodal users. The Functional Classification and Direction of Route refer to the roadway the overpass crosses.*
6	In an underpass intended to allow nonmotorized traffic to pass under a roadway *Note: intended to be used when an underpass is available as an option for multimodal users. The Functional Classification and Direction of Route refer to the roadway the underpass is under.*
7	In a physically separated bicycle lane (separated by curb, bollards or other structure from an immediately adjacent motorized roadway lane) *Note: includes cycle tracks and other facilities vertically separated from vehicular traffic.*
8	On a sidepath intended for bicycles or bicycles and pedestrians, occurring in a roadway right of way or immediately adjacent to a roadway (distinguished from "3" by explicitly allowing bicycles; distinguished from "0" by being associated with a roadway; distinguished from "7" by being separated by landscaping or unpaved area from the adjacent roadway) *Note: used for bicycle or shared use facilities adjacent to a roadway and typically considered an alternative to the roadway (where cyclists could realistically ride on the roadway). If the roadway is a limited access roadway (like an urban highway), this is likely not the best choice. The Functional Classification and other related fields refer to the roadway the facility runs adjacent to.*
9	General area (for general area count, with no facility explicitly designated) *Note: will typically be used for plazas or intersections.*

Exhibit 9. FACILITY TYPE EXAMPLES

Code	Short Description	Examples
0	Trail not associated with a roadway	
1	In roadway right of way (shared space)	
2	Crosswalk (legal crossing)	
3	Sidewalk (for pedestrians)	
4	Striped bike lane	

Code	Short Description	Examples
5	Overpass	
6	Underpass	
7	Separated bicycle lane	
8	Sidepath adjacent to roadway	
9	General area count	

25. **Name:** **Functional Classification**

TxDOT Required? Yes

TMG Required? Yes

Maximum Length: Enumerated values

Description: The functional class of the street or highway on which the count station is located. This attribute also indicates whether the count location is in an area classified as urban or rural. The functional class and standardized urban/rural designation for some streets and highways in Texas is at http://www.txdot.gov/apps/statewide_mapping/StatewidePlanningMap.html. Possible values are:

- Urban: Interstate (TMG Code 1U).
- Urban: Principal Arterial—Other Freeways and Expressways (TMG Code 2U).
- Urban: Principal Arterial—Other (TMG Code 3U).
- Urban: Minor Arterial (TMG Code 4U).
- Urban: Major Collector (TMG Code 5U).
- Urban: Minor Collector (TMG Code 6U).
- Urban: Local (TMG Code 7U).
- Urban: Trail or Shared Use Path (TMG Code 8U).
- Urban: General Activity Count (TMG Code 9U).
- Rural: Interstate (TMG Code 1R).
- Rural: Principal Arterial—Other Freeways and Expressways (TMG Code 2R).
- Rural: Principal Arterial—Other (TMG Code 3R).
- Rural: Minor Arterial (TMG Code 4R).
- Rural: Major Collector (TMG Code 5R).
- Rural: Minor Collector (TMG Code 6R).
- Rural: Local (TMG Code 7R).
- Rural: Trail or Shared Use Path (TMG Code 8R).
- Rural: General Activity Count (TMG Code 9R).

The list above includes the current U.S. DOT functional classification system but also adds categories for trail or shared use path, as well as general activity count (i.e., for pedestrian counts in an open area like the Mall in Washington, D.C.). It is used in association with a second attribute (facility type) that indicates whether the count was made on the main roadway, on a sidewalk, or on a special lane intended for use exclusively by nonmotorized vehicles (e.g., bike lane).

Example: "Urban: Local (7U)"

26. **Name:** **Direction of Route**

TxDOT Required? Yes

TMG Required? Yes

Maximum Length: Enumerated values

Description: This is the geographic orientation of the main roadway. Note that a north/south roadway can be coded as either an "N" or an "S," but the selection of the direction affects how the "location of count relative to roadway" variable is coded in order to effectively define the location and direction of the nonmotorized count. Direction of route should be chosen carefully so that field collectors and users of the count data can easily comprehend where and in what direction counts are collected at this station. Note: For a general activity count (functional class coded as 9), direction of route may be coded as either 0 or 9. Possible values are:

- East-west or southeast-northwest combined (TMG Code 0).
- North (TMG Code 1).
- Northeast (TMG Code 2).
- East (TMG Code 3).
- Southeast (TMG Code 4).
- South (TMG Code 5).
- Southwest (TMG Code 6).
- West (TMG Code 7).
- Northwest (TMG Code 8).
- North-south or northeast-southwest combined (TMG Code 9).

Example: "Northwest (8)"

27. Name: Direction of Movement

TxDOT Required? Yes

TMG Required? Yes

Maximum Length: Enumerated values

Description: Possible values are:

- 1 = travel monitored only occurring in the direction of route.
- 2 = travel monitored only occurring opposite to the direction of route.
- 3 = travel in both (all) directions.
- 4 = travel at an intersection that includes all movements (e.g., the sum of movements on all four crosswalks, or all movements occurring during a pedestrian scramble [or "Barnes Dance"] phase). Note: The "intersection" variable should also be coded as a 1 or 2 if this variable is coded as a 4. For a general activity count that includes all movements in all directions (functional class coded as 9, direction of route coded as 0 or 9), direction of movement should be coded as a 3, "all directions."
- 5 = travel monitored perpendicular to direction of route, crossing from left to right (facing direction of route).
- 6 = travel monitored perpendicular to direction of route, crossing from right to left (facing direction of route).

Note: To understand where a count is being taken (what side of the road, and which directions of movement are being counted), it is necessary to look at all three variables: direction of route, location of count relative to roadway, and direction of movement. It may also be necessary to look at the facility type variable immediately below.

Note: If this field is set to either of the perpendicular codes (5 or 6), then location of count relative to roadway must be set to 4 (perpendicular to roadway).

Example: "Only in Direction of Route (1)"

28. Name: Location of Count Relative to Roadway

TxDOT Required? Yes

TMG Required? Yes

Maximum Length: Enumerated values

Description: Possible values are:

- 1 = the count is taken on the side of the road for the listed direction of route.
- 2 = the count is taken on the opposite side of the road from the listed direction (i.e., the side with oncoming traffic, given the listed direction of route).

- 3 = both sides of the road combined (appropriate, for example, if counting a trail or other shared use path or for a general activity count where functional class is coded as 9).
- 4 = traffic moving perpendicular to the roadway (that is, crossing the street).

Note: If this attribute value is set to 4 (traffic moving perpendicular to the roadway), then the "direction of movement" attribute must have a value of 3 (both ways), 5 (left to right), or 6 (right to left).

Example: If you code the direction of route as "north" and are in fact facing in that northbound direction, a 1 for this variable would indicate that you are counting on the right (eastern) side of the road; a 2 would indicate you are counting nonmotorized traffic on the left (western) side of the road; a 3 would indicate that you are counting all nonmotorized traffic, regardless of which side of the road (which would be appropriate, for example, on a trail or other shared use path). For that same facility, if direction of route were coded as "south," then a count performed on the eastern side of the road would be coded as a 2 since it would be on the opposite side of the road for vehicles traveling southbound.

Example: "Both sides of the route combined (3)"

29. **Name:** **Intersection**
TxDOT Required? No
TMG Required? No
Maximum Length: Enumerated values
Description: Possible values are:
- 0 = count is NOT taken at an intersection.
- 1 = count is taken at an intersection (but not an intersection with a roundabout or traffic circle).
- 2 = count is taken at an intersection with a roundabout or traffic circle.

Example: "Not at intersection (0)"

30. **Name:** **Mounting Object**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: None
Description: The object (signpost, pole, etc.) to which the counting device was mounted.
Example: "No Parking sign"

31. **Name:** **Roadway Width**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: Enumerated values
Description: The prevailing street width at the count location. Possible values are:
- 1 lane.
- 2 lanes.
- 4 lanes.
- 5 lanes.
- 6 lanes.
- 7 lanes.
- 8 lanes.

- Trail.

Example: "2 lanes"

32. Name: Posted Speed Limit
TxDOT Required? No
TMG Required? No
Maximum Length: 2 characters
Description: If count is taken on a facility with a posted speed limit, indicate that limit in miles per hour. Otherwise, leave blank.
Example: "30"

33. Name: National Highway System
TxDOT Required? No
TMG Required? No
Maximum Length: Enumerated values
Description: Is count station on National Highway System? Possible values are:
- NO = no, not on National Highway System.
- YES = yes, on National Highway System.

Example: "NO"

34. Name: Posted Route Signing
TxDOT Required? No
TMG Required? No
Maximum Length: Enumerated values
Description: Based on route signing codes in the 2012 Highway Performance Monitoring System (HPMS) Field Manual (Data Item 18 in HPMS sections data set) with extensions for bicycle routes. These codes are shown below.

Posted Route Signing	TMG Code
Not signed	1
Interstate	2
U.S.	3
State (includes FM, RR, RM designations in Texas)	4
Off-interstate business marker	5
County	6
Township	7
Municipal	8
Parkway marker or forest route marker	9
U.S. bicycle route	10
State or local bicycle route	11
None of the above	12

Example: "None of the above (12)"

35. **Name:** **Posted Signed Route Number**
TxDOT Required? No
TMG Required? No
Maximum Length: 8 characters
Description: Leave this field blank if posted route signing is not assigned. Zero-fill this field if posted route signing is "none of the above."
Example: "00000000"

36. **Name:** **Nonmotorized Facility Width**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: None
Description: The prevailing nonmotorized facility width at the count location, if applicable.
Example: "6 ft"

37. **Name:** **Nonmotorized Facility Buffer Width**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: None
Description: The prevailing nonmotorized facility buffer width at the count location, if applicable. For sidewalks, this is the buffer between the sidewalk and street. For bicycle facilities, it is the buffer between the bicycle travel lane and motor vehicle traffic lane.
Example: "3 ft"

38. **Name:** **Surface Type**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: Enumerated values
Description: Prevailing surface type on nonmotorized route at count location. Possible values are:
- Asphalt.
- Bricks and pavers.
- Concrete.
- Crushed granite/gravel.
- Natural ground.

Example: "Asphalt"

39. **Name:** **Surface Condition**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: Enumerated values
Description: Prevailing surface condition in vicinity of count location. Possible values are:
- Excellent.
- Good.
- Fair.
- Poor.
- No pavement.

Example: "Good"

40. **Name:** **Parking**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: Enumerated values
Description: Prevailing type of on-street parking in vicinity of count location. Possible values are:
- Parallel parking.
- Front-in angle or perpendicular parking.
- Back-in angle parking.
- No on-street parking.

Example: "Parallel parking"

41. **Name:** **ADA Ramps**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: Enumerated values
Description: Prevailing presence of ADA ramps in vicinity of count location. Possible values are:
- Yes.
- No.
- Some.

Example: "Some"

42. **Name:** **Street Lighting**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: Enumerated values
Description: Prevailing street lighting in vicinity of count location. Possible values are:
- One side.
- Both sides.
- None.
- Partial.

Example: "Both sides"

43. **Name:** **Transit**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: Enumerated values
Description: Transit presence in vicinity of count location. Possible values are:
- Yes.
- No.
- Multiple routes.

Example: "No"

44. **Name:** **Shade**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: Enumerated values
Description: Prevailing shade level in vicinity of count location. Possible values are:
- Full shade.

- Partial shade.
- No shade.

Example: "Partial"

45. **Name:** **Surrounding Land Uses**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: Enumerated values
Description: The prevailing type of land use surrounding the count location. Possible values are:
    - Civil/open space.
    - Commercial/industrial.
    - Mixed use.
    - Residential.
    - Special purpose.

Example: "Residential"

46. **Name:** **Street Traffic Volume (ADT)**
TxDOT Required? No
TMG Required? No (not included in TMG)
Maximum Length: None
Description: The motorized traffic volume (average daily total) in vicinity of count location.
Example: "10,000"

47. **Name:** **Owner Agency (Hidden Field)**
TxDOT Required? Yes
TMG Required? No (not included in TMG)
Maximum Length: None
Description: The name of the agency that owns the count data. The owner agency is typically the agency that installed and/or maintains permanent counter equipment or the agency that commissioned the collection of short-duration counts. The owner agency may not be the same agency or company that provided the data or requested the data collection.
Example: "City of Corpus Christi"

48. **Name:** **Owner Name (Hidden Field)**
TxDOT Required? Yes
TMG Required? No (not included in TMG)
Maximum Length: None
Description: A contact name at the owner agency.
Example: "John Smith"

49. **Name:** **Owner Phone (Hidden Field)**
TxDOT Required? Yes
TMG Required? No (not included in TMG)
Maximum Length: 12 characters
Description: A contact phone number at the owner agency.
Example: "361-555-1212"

50. **Name:** **Owner Email (Hidden Field)**
    TxDOT Required? Yes
    TMG Required? No (not included in TMG)
    Maximum Length: None
    Description: A contact email address at the owner agency.
    Example: "jsmith@cctxmpo.us"

51. **Name:** **Provider Agency**
    TxDOT Required? Yes
    TMG Required? No (not included in TMG)
    Maximum Length: None
    Description: The name of the agency that provided the count data to the owner agency. In some cases, the owner agency and provider agency will be the same. In other cases, the owner agency contracted with the provider agency to deploy permanent or portable counters, so the provider agency may be better able to answer specific questions about locations and equipment.
    Example: "City of Corpus Christi"

52. **Name:** **Provider Name**
    TxDOT Required? Yes
    TMG Required? No (not included in TMG)
    Maximum Length: None
    Description: A contact name at the provider agency.
    Example: "John Smith"

53. **Name:** **Provider Phone**
    TxDOT Required? Yes
    TMG Required? No (not included in TMG)
    Maximum Length: 12 characters
    Description: A contact phone number at the provider agency.
    Example: "361-555-1212"

54. **Name:** **Provider Email**
    TxDOT Required? Yes
    TMG Required? No (not included in TMG)
    Maximum Length: None
    Description: A contact email address at the provider agency.
    Example: "jsmith@cctxmpo.us"

55. **Name:** **Requester Agency**
    TxDOT Required? No
    TMG Required? No (not included in TMG)
    Maximum Length: None
    Description: The name of the agency that requested the collection of count data. The requester agency is the agency or group that requests that the owner agency collect data at specific locations. For example, a city (requester agency) may request that the MPO or TxDOT (owner agency) collect count data at specific locations. The owner agency could then collect the count data itself or could contract within another provider agency for the count data collection.
    Example: "City of Corpus Christi"

56. **Name:** **Requester Name**
    TxDOT Required? No
    TMG Required? No (not included in TMG)
    Maximum Length: None
    Description: A contact name at the requester agency.
    Example: "John Smith"

57. **Name:** **Requester Phone**
    TxDOT Required? No
    TMG Required? No (not included in TMG)
    Maximum Length: 12 characters
    Description: A contact phone number at the requester agency.
    Example: "361-555-1212"

58. **Name:** **Requester Email**
    TxDOT Required? No
    TMG Required? No (not included in TMG)
    Maximum Length: None
    Description: A contact email address at the requester agency.
    Example: "jsmith@cctxmpo.us"

59. **Name:** **Year of Data (Hidden Field)**
    TxDOT Required? Yes
    TMG Required? Yes
    Maximum Length: 4 characters
    Description: The four digits of the year in which the data were collected.
    Example: "2017"

A total of five single-digit fields are provided so that states can list the identifiers used to factor the count provided. The values in these records are not the factors themselves but simply identifiers of the factor groups used. The factors are used to convert short-duration counts to estimates of daily travel or annual travel.

In the case of permanent continuous count locations, these identifiers describe which factor group that count location belongs to so that these adjustment factors can be computed. States and other submitting agencies can use the text field in the "other notes" variable at the end of this record to further describe the factor groups to which the site is assigned. Currently, the use of these factor groups is both optional and flexible. A submitting agency may assign each factor identifier to purposes as the agency sees fit.

60. **Name:** **Factor Group 1**
    TxDOT Required? No
    TMG Required? No
    Maximum Length: 1 character
    Description: The first of five allowable (but optional) variables that allow identification of a factor group. For example, this first factor group could be used to identify this site's time-of-day pattern, but it does not have to be used for that purpose.
    Example: "A"

61. **Name:** **Factor Group 2**
    TxDOT Required? No
    TMG Required? No
    Maximum Length: 1 character
    Description: The second of five allowable (but optional) variables that allow identification of a factor group. For example, this second factor group could be used to identify day-of-week (DOW) patterns distinguishing a commuter route or a recreational route, but it does not have to be used for that purpose.
    Example: "B"

62. **Name:** **Factor Group 3**
    TxDOT Required? No
    TMG Required? No
    Maximum Length: 1 character
    Description: The third of five allowable (but optional) variables that allow identification of a factor group. For example, this third factor group could be used to identify monthly or seasonal patterns, but it does not have to be used for that purpose.
    Example: "C"

63. **Name:** **Factor Group 4**
    TxDOT Required? No
    TMG Required? No
    Maximum Length: 1 character
    Description: The fourth of five allowable (but optional) variables that allow identification of a factor group. For example, this factor group could be used to identify equipment adjustment patterns needed because of the specific type of equipment being used, but it does not have to be used for that purpose.
    Example: "D"

64. **Name:** **Factor Group 5**
    TxDOT Required? No
    TMG Required? No
    Maximum Length: 1 character
    Description: The fifth of five allowable (but optional) variables that allow identification of a factor group. For example, this factor group could be used for adjustments due to the type of weather being experienced during the count, but it does not have to be used for that purpose.
    Example: "E"

65. **Name:** **LRS Route ID**
    TxDOT Required? No
    TMG Required? No
    Maximum Length: 60 characters
    Description: The route identification reported in the HPMS database for the section of roadway where the station is located. The linear reference system (LRS) Route_ID field allows for 60 alphanumeric characters, is right justified, and must contain leading zeros. No blanks are allowed unless the entire field is left blank. More information concerning the LRS Route_ID field can be found in the HPMS Field Manual (see Section 4.2 in https://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual/). Note that in

the 2015 HPMS Addendum, states are allowed 120 characters instead of the 60 allowed in the 2010 coding instructions. If your agency uses more than 60 characters in this field, enter the 60 rightmost characters in this field.

Example: " " {Blank field}

66. **Name:** **LRS Location Point**

TxDOT Required? No

TMG Required? No

Maximum Length: 8 characters

Description: The LRS milepoint location for the station on the route named by the Route_ID field, comparable to the LRS beginning point and LRS ending point in the HPMS. The milepost for the station must be within the range of the LRS beginning point and LRS ending point for the HPMS roadway section upon which the station is located. It is coded in miles, to the nearest thousandth of a mile, with an implied decimal in the middle: XXXX.XXX.

Example: "00000000"

Required Count Attributes

Table 2 lists the attributes captured by the BP|CX in the count data import and review processes. Cells highlighted in green denote attributes that are required by FHWA in the TMG while blue cells denote attributes only required by TxDOT. Both are required fields in the BP|CX, though most are generated automatically by the BP|CX when importing count data and exporting to TMAS. Additional guidance for coding TMG-specified attributes can be found in FHWA's *Coding Nonmotorized Station Location Information in the 2016 Traffic Monitoring Guide Format* at https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/tmg_coding/.

Note that the only required fields for count data are the date and time (#2) and the count itself. However, if there are multiple channels, each channel should be in its own column and named descriptively to include the mode and direction.

Table 2. Count Data Attributes.

#	Attribute Name	TxDOT Required?	TMG Required?	Maximum Length in BP|CX	System Generated?
1	*Flow ID TxDOT (Hidden)*	*Yes*	*N.A.*	*14 characters*	*Yes*
2	Date and Time	Yes	Partially	MM/DD/YYYY HH:MM	No
3	Count Interval	Yes	Yes	Enumerated values	No
4	Count	Yes	Yes	None	No
5	Validity	Yes	N.A.	Enumerated values	No
6	Helmet Use	No	No	Enumerated values	No
7	Gender	No	No	Enumerated values	No
8	Age	No	No	Enumerated values	No
9	Precipitation	No	No	Enumerated values	No
10	High Temp	No	No	3 characters	No
11	Low Temp	No	No	3 characters	No
12	*Start Time (Hidden)*	*Yes*	*Yes*	*HH:MM AM/PM*	*Yes*
Green cells indicate attributes required by both TMG and TxDOT.					
Blue cells indicate attributes required only by TxDOT.					
Uncolored cells indicate attributes that are not required by either TMG or TxDOT.					
N.A. indicates that this attribute is not required by TMG, nor is it included in the TMG data dictionary.					

The following provides details about each attribute listed in Table 2.

1. **Name:** **Flow ID TxDOT (Hidden Field)**
   TxDOT Required? Yes
   TMG Required? No (not included in TMG)
   Maximum Length: 14 characters maximum
   Description: A unique alphanumeric identifier for specific user mode flows at the count station. This attribute is a combination (concatenation) of three separate attribute values, each separated by a hyphen:
   - Station ID TMG (#3 in station description file; six characters).
   - Travel Direction (#17; three characters max). Add a "W" suffix for wrong-way traffic.
   - Type of Count (#16; three characters max).

   Example: "CC0001-NB-Bic" (represents count station CC0001, northbound travel direction, bicyclist-only counts)

2. **Name:** **Date and Time**
   TxDOT Required? Yes
   TMG Required? Partially (not included in TMG)
   Maximum Length: 16 characters, MM/DD/YYYY HH:MM
   Description: Date and time on which the count data were collected.
   Example: "09/22/2017 0:15" or "09/22/2017 15:30"

3. **Name:** **Count Interval**
   TxDOT Required? Yes
   TMG Required? Yes
   Maximum Length: Enumerated values, 2 characters
   Description: Duration in minutes of each count interval. Possible values are:
   - 05 = 5 minutes.
   - 10 = 10 minutes.
   - 15 = 15 minutes.
   - 20 = 20 minutes.
   - 30 = 30 minutes.
   - 60 = 60 minutes.

   Example: "15"

4. **Name:** **Count**
   TxDOT Required? Yes
   TMG Required? Yes
   Maximum Length: None
   Description: Number of pedestrians, bicyclists, or other units counted in time interval.
   Example: "69"

5. **Name:** **Validity**
   TxDOT Required? Yes
   TMG Required? N.A.
   Maximum Length: Enumerated values, 3 characters
   Description: An alphanumeric code entered during the quality control (QC) profess in the BP|CX corresponding to the result of a data validity, quality control, or quality assurance process. Possible values are:

Code	Validity Condition
VAL	Count data valid.
ABV	Count is abnormal but valid (ABV).
I00	Data invalid due to multiple inconsistencies.
I01	Data gap: a date stamp exists, but there are no corresponding count data.
I02	Consecutive zeros: there are 15 or more hours of zero-value counts.
I03	Consecutive non-zeros: there are three or more of the same count (only starts at counts of 15 or more).
I04	Maximum count: count exceeds 5,000 for one day or 1,500 for an hour or other time interval.
I05	Interquartile range: the count value is outside the interquartile range (outside the 25th and 75th percentile).
I06	Adjacent interval: a count jumps from zero to 50 or higher.

Example: "I02"

Helmet use, gender, and age may optionally be reported, if counts of these attributes were conducted. If one of these fields is provided, then at least two, and possibly more, count records must be provided for each time interval. In the case of helmet use, the required count records would be divided into three categories: "no helmet," "helmet observed," and the optional "indeterminate." The "indeterminate" record would contain counts where the observer recorded a bicyclist but could not determine whether a helmet was being used (e.g., if the bicyclist had headgear but it might have been only a hat).

If data on helmet use and gender are collected simultaneously, then up to nine count records are needed for each time interval and direction of movement (e.g., males with helmets, males without helmets, males with indeterminate helmet use, females with helmets, females without helmets, females with indeterminate helmet use, indeterminate gender with helmets, indeterminate gender without helmets, indeterminate gender with indeterminate helmet use). Likewise, if age is also collected, then up to 27 count records are needed for each time interval and direction of movement to account for all possible combinations.

If data on these attributes are not collected, then these fields should remain blank.

6. **Name:** **Helmet Use**
   TxDOT Required? No
   TMG Required? No
   Maximum Length: Enumerated values
   Description: Possible values are:
   - Blank = all subjects (no observations were recorded for helmet use).
   - N = no helmet.
   - H = helmet observed.
   - I = indeterminate (helmet was sought for the count, but the observer did not specify).

   Note: If helmet use is not being reported, then submit one record with all counts combined for each time interval and leave this attribute blank. If data on helmet

use are reported, then at least two records must be submitted for each time interval when counts are taken. One record describes the volume of travelers observed using a helmet, and one record reports the volume of travelers observed not using a helmet. A third record may be submitted if some observations could not determine helmet use. Records reporting indeterminate helmet use are optional when helmet use is being reported. If there are no indeterminate records, then helmet use could be determined for all observations in that time interval.

7. **Name:** **Gender**
   TxDOT Required? No
   TMG Required? No
   Maximum Length: Enumerated values
   Description: Possible values are:
   - Blank = all genders (no observations were recorded for gender).
   - M = perceived male.
   - F = perceived female.
   - I = indeterminate (male/female was counted, but the observer was not able to determine the gender).

   Note: If gender is not being reported, then submit one record with all counts combined for each time interval and leave this attribute blank. If data on gender are collected, then at least two records must be submitted for each time interval when counts are taken. One record describes the volume of travelers that are perceived to be female, and one record reports the volume of travelers that are perceived to be male. A third record must be submitted if observers could not determine the gender of some travelers. Records reporting indeterminate gender are optional when gender is being reported. If there are no indeterminate records, then gender could be determined for all observations in that time interval.

8. **Name:** **Age**
   TxDOT Required? No
   TMG Required? No
   Maximum Length: Enumerated values
   Description: Possible values are:
   - Blank = all ages (no observations were recorded for age).
   - C = child (pre-teen).
   - A = adult (teen or older).
   - I = indeterminate (age was counted, but the observer could not determine the appropriate age category of one or more individuals).

   Note: If age is not being reported, then submit one record with all counts combined for each time interval and leave this attribute blank. If data on age are collected, then at least two records must be submitted for each time interval when counts are taken. One record describes the volume of travelers that are perceived to be children, and one record reports the volume of travelers that are perceived to be adults. A third record must be submitted if observers could not determine the appropriate age category for some travelers. Records reporting indeterminate age are optional when age is being reported. If there are no indeterminate records, then age could be determined for all observations in that time interval.

9. **Name:** **Precipitation**
   TxDOT Required? No
   TMG Required? No
   Maximum Length: Enumerated values
   Description: Did precipitation fall during the time interval for the recorded count? Possible values are:
   - 1 = yes, measurable precipitation fell at some time during this record's time interval at this location.
   - 2 = no, measurable precipitation did not fall at some time during this record's time interval at this location.

   Example: "1"

10. **Name:** **High Temp**
    TxDOT Required? No
    TMG Required? No
    Maximum Length: 3 characters
    Description: Approximate high temperature for either the day (if a day or longer count) or during the duration of the count (if the count lasts less than a day). Expressed in Fahrenheit.
    Example: "95"

11. **Name:** **Low Temp**
    TxDOT Required? No
    TMG Required? No
    Maximum Length: 3 characters
    Description: Approximate low temperature for either the day (if a day or longer count) or during the duration of the count (if the count lasts less than a day). Expressed in Fahrenheit.
    Example: "75"

12. **Name:** **Start Time**
    TxDOT Required? Yes
    TMG Required? Yes
    Maximum Length: 8 characters, HH:MM AM/PM
    Description: Starting time at which count data began to be collected.
    Example: "03:00 PM"