Everything You Wanted to Know About Bicyclist and Pedestrian Count Data

Module 1: COLLECT

Online Training Presented by:

TxDOT Bicycle and Pedestrian Program & Texas A&M Transportation Institute (TTI)

July 23, 2020
WELCOME to Module #1: Collecting Pedestrian and Bicyclist Count Data

- Moderator: Shawn Turner, TTI
- TxDOT Program: Bonnie Sherman, TxDOT

MODULE 1, COLLECTING THE DATA
- Introduction & Overview
- Collection Basics & Equipment
- Site Selection
- Equipment Installation
  - Infrared pedestrian counter
  - Pneumatic tube counter
- On-Site Inventory
Module #1: Collecting Pedestrian and Bicyclist Count Data

Everything You Wanted To Know About Bicyclist And Pedestrian Count Data

TODAY

July 29
Registration

August 4
Registration
Best Practices for Virtual Meetings

- Please stay muted unless you are speaking

- Remove all other distractions (work email, instant messenger, etc.)

- Actively participate in training
  - Take notes on slide handouts
  - Use Q&A panel for questions or comments (not chat)
  - Respond to polls

- Webcam not necessary
  - Turn off outgoing video to conserve WiFi bandwidth
Introduction Poll

- Please respond to poll at this time

- Any questions before we get started?
  - Feel free to test question box now
TxDOT Bicycle and Pedestrian Count Program

Bonnie Sherman, TxDOT
Statewide efforts addressing bicycle & pedestrian transportation

- Texas Transportation Plan 2050
- Bikeway Design Effort
- Project Development Enhancements
- Road to Zero
- Economic Impact of Bicycling in Texas
- ADA Transition Plan Update
- Pedestrian/Bicycle Facility Inventory
- Bicycle Tourism Trails Study
Better decision-making requires good data

Safety
- Exposure for crash rates
- Behavior (contra-flow riding)

Planning
- Demand estimation
- Travel patterns

Design
- Facility type and design
- Barriers
- High activity areas

Performance Measurement
- Before and after studies
- Long-term trends from areawide improvements
- Mode shift

Understand problems
Anticipate future needs
Identify solutions
Track trends

We need to know about bicycle and pedestrian usage on our roadways.
- Texas Bicycle and Pedestrian Count Exchange
- Crowdsourced bicycle data (StravaMetro)
- Counter equipment loan program
- Upcoming procurement of bike/ped counts
- Data collection and analysis guidance
- Virtual training in Summer 2020
Thank you!

Bonnie Sherman, AICP
TxDOT – Public Transportation Division
Bicycle/Pedestrian Program Manager
Bonnie.Sherman@txdot.gov
(512) 486-5972

Noah Heath, AICP
TxDOT – Public Transportation Division
Bicycle/Pedestrian Program Planner
Noah.Heath@txdot.gov
(512) 486-5973


Questions?
Why Am I Collecting Bicyclist and Pedestrian Counts?

Shawn Turner, TTI
Why are you collecting bicyclist and pedestrian counts?

- “...that’s what our program plan lists...”
- “...that’s what my boss said to do...”
- “...that’s what others are doing...”
- Unless your job is ONLY data collection...
- ...THOSE ARE NOT VERY GOOD REASONS.
"Plan your destination before you start your trip"

The uses (Module 3) inform many decisions made in these first 2 modules

How will you use count data??
How will you (and others) use count data?

- Most likely will have multiple uses
- Will have to balance the requirements for multiple uses
- Will be used for more things than what you planned

Most common uses:

1. Trend monitoring
2. Before/after study or funding justification
3. Identifying/prioritizing/selecting projects
4. Safety analysis

Let’s look at a few examples
  - Will mention these during Module 1 and 2
North Central Texas Council of Governments (NCTCOG)

- Annual benchmarking report

### Year-to-year Trends

**Exhibit 5:**
Total October Traffic by Count Station

### Special Event Analysis

Comparison of the Daily Average Bicycle and Pedestrian Counts in the Last Week of March 2019 and March 2020

- **82% Increase**
  - Dallas: Katy Trail at Fitzhugh
  - Fort Worth: Trinity Trails (Cleawfork Food Park)

- **255% Increase**
  - Denton: Denton Branch Rail Trail (S of Morse Street)

- **219% Increase**
  - Plano: Chisholm Trail (Orlando Drive)

- **270% Increase**
  - Dallas: Katy Trail at Fitzhugh

Before/after study

Corpus Christi MPO

- Before and after-construction bike counts for projects around the area
- Data collection separates anecdotal information from the facts

http://www.coastalbendinmotion.org/counts.html
### Houston-Galveston Area Council (HGAC)

- TxDOT Houston District response to HGAC TIP call for projects
- Selection based on the benefit-cost ratio (safety and reduction of SOV)
- Estimate of non-motorized users per project required

<table>
<thead>
<tr>
<th>#</th>
<th>Project Name</th>
<th>Project Length</th>
<th>Stava Compts</th>
<th>Strava Vol</th>
<th>Step Increase</th>
<th>Step Vol</th>
<th>Distance Factor</th>
<th>2040 Vol</th>
<th>Distance Factor</th>
<th>Existing Count Estimate</th>
<th>Distance Factor</th>
<th>2040 Vol</th>
<th>Consit Est</th>
<th>Consit 2025</th>
<th>Consit 2045</th>
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<tr>
<td>1</td>
<td>US 290 FR to Post Oak Transit Center</td>
<td>0.933722</td>
<td>30</td>
<td>30</td>
<td>1.3</td>
<td>39</td>
<td>72.8</td>
<td>108</td>
<td>35</td>
<td>65.1</td>
<td>97</td>
<td>2090</td>
<td>4,187</td>
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<td>2</td>
<td>Memorial Connection White Oak to IH 10</td>
<td>0.584328</td>
<td>135+175</td>
<td>187.5</td>
<td>1.1</td>
<td>225</td>
<td>262.9</td>
<td>306</td>
<td>150</td>
<td>178.6</td>
<td>260</td>
<td>237</td>
<td>3,009</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>White Oak Bayou MKT Trail</td>
<td>0.751143</td>
<td>35+35</td>
<td>70</td>
<td>1.2</td>
<td>84</td>
<td>132.9</td>
<td>159</td>
<td>114</td>
<td>180.2</td>
<td>258</td>
<td>3,009</td>
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<td></td>
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<tr>
<td>4</td>
<td>US 59 Grausta Street to Wheeler Station</td>
<td>0.980035</td>
<td>125</td>
<td>125</td>
<td>1.2</td>
<td>150</td>
<td>294.0</td>
<td>437</td>
<td>94</td>
<td>184.1</td>
<td>274</td>
<td>3,009</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Hillcroft PNR Connector via Westpark</td>
<td>1.127508</td>
<td>50</td>
<td>50</td>
<td>1.2</td>
<td>60</td>
<td>135.6</td>
<td>204</td>
<td>32</td>
<td>172.9</td>
<td>107</td>
<td>2,604</td>
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<tr>
<td>6</td>
<td>SH 6, SH249 to IH 45N</td>
<td>8.80699</td>
<td>55-95</td>
<td>75</td>
<td>1.2</td>
<td>90</td>
<td>1385.1</td>
<td>2355</td>
<td>20</td>
<td>352.2</td>
<td>523</td>
<td>2210</td>
<td>2,604</td>
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<td>7</td>
<td>SH3 @ Sims Bayou Bridge</td>
<td>0.05107</td>
<td>90</td>
<td>90</td>
<td>1.5</td>
<td>45</td>
<td>45.0</td>
<td>67</td>
<td>45</td>
<td>45.0</td>
<td>67</td>
<td>2,234</td>
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<td></td>
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<td>8</td>
<td>West Belfort PNR to Kegans Bayou</td>
<td>0.108252</td>
<td>40</td>
<td>40</td>
<td>1.2</td>
<td>48</td>
<td>48.0</td>
<td>71</td>
<td>30</td>
<td>30.0</td>
<td>45</td>
<td>2,347</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>NASA 1 (both sides of bridge)</td>
<td>2.079713</td>
<td>75</td>
<td>75</td>
<td>1</td>
<td>75</td>
<td>312.0</td>
<td>454</td>
<td>70</td>
<td>291.0</td>
<td>433</td>
<td>2339</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>FM 1876 both sides</td>
<td>2.203266</td>
<td>(35+25)</td>
<td>60</td>
<td>1.2</td>
<td>72</td>
<td>317.3</td>
<td>471</td>
<td>50</td>
<td>220.9</td>
<td>327</td>
<td>469</td>
<td>552</td>
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</tr>
</tbody>
</table>
Safety Analysis

TxDOT/TTI 402 Safety Program

- Crash rate = crashes / EXPOSURE
- Pedestrian counts at high-crash locations
  - 625 signalized intersections, 64 midblock locations
Summary -

- Understand uses BEFORE collecting

- Balance requirements for multiple uses

- Most common uses:
  1. Trend monitoring
  2. Before/after study or funding justification
  3. Identifying/prioritizing/selecting projects
  4. Safety analysis
Collecting Bicyclist and Pedestrian Count Data

Robert Benz and Shawn Turner, TTI
Traffic Monitoring Fundamentals

- Can’t count everywhere all the time, so we must sample
  1. Continuous counts at permanent locations
     - Collect 365 days of data at representative locations
     - TEMPORAL COVERAGE
  2. Short-duration counts with portable equipment
     - Collect 7-14 days of data at many more locations
     - SPATIAL COVERAGE

- Data uses affect approach
  - Citywide activity
  - Before-and-after at selected sites
Continuous counts at permanent locations

- Continuous counts at representative locations in 3 pattern groups:
  1. Commuting to work/school routes
  2. Recreational/utilitarian routes
  3. Hybrid/mix of commuting and recreation

- FHWA TMG recommends 3-5 permanent locations in each group

- Phased approach
  - Not all 9-15 permanent locations at once

- Use short-duration counts
  - Test/confirm ideal permanent site

- Plan for long-term maintenance
  - E.g., batteries, cleaning, modem fees
Short-duration counts with portable equipment

- Available resources usually determine how long and how many sites

- What is short-duration?
  - Automated equipment: min. 7 days, preferred 14 days
  - Manual counts: minimum 4 hours, preferred 12 hours

- How many sites?
  - Depends mostly on data uses
  - 30 locations per traffic pattern group, but often less

- Coordinate among multiple agencies, pool resources
  - Parks & recreation
  - Utility/waterway districts
  - Commercial/business districts
  - Ped/bike counts as part of motor vehicle special counts
Short-duration site selection

- First decision – intersection vs. screenline counts
- Intersection more complicated, different collection equipment
- Based on planned data uses

- Intersection counts
  - Safety and conflicts
  - Detail of turning movements

- Screenline counts
  - Overall activity levels
  - Big picture corridor movement

Source: NCHRP Report 797
Short-duration site selection

- Typically focused on certain types of locations, not random
  - Planned improvements
  - Moderate to high activity levels (also growth potential)
  - Area and land use types
    - Commercial
    - Residential
    - Mixed use
    - Recreational
  - Bicyclist/pedestrian facility types
- Typically “more art than science”
Short-duration site selection

- Not just the highest-volume locations (unless that is your goal)

- Interplay between sites and technology – one affects the other

- Counter positioning (especially automatic counters):
  - READ THE MANUAL!
  - Where flow always moving – no pacing or waiting areas
  - Where flow likely to be single file – prevent occlusion
  - Bicyclists on sidewalks or against traffic
## Bicyclist and Pedestrian Counting Technology

### 1. What Are You Counting?

<table>
<thead>
<tr>
<th>Technology</th>
<th>Bicyclists Only</th>
<th>Pedestrians Only</th>
<th>Pedestrians &amp; Bicyclist Combined</th>
<th>Pedestrians &amp; Bicyclist Separately</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Permanent</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inductance Loops&lt;sup&gt;1&lt;/sup&gt;</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td>$$</td>
</tr>
<tr>
<td>Magnetometer&lt;sup&gt;2&lt;/sup&gt;</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>$$</td>
</tr>
<tr>
<td>Pressure Sensor&lt;sup&gt;2&lt;/sup&gt;</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td></td>
<td>$$</td>
</tr>
<tr>
<td>Radar Sensor</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
<td>$$-$$</td>
</tr>
<tr>
<td>Seismic Sensor</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
<td>$$-$$</td>
</tr>
<tr>
<td>Video Imaging: Automated</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
<td>$$</td>
</tr>
<tr>
<td>Infrared Sensor (Active or Passive)</td>
<td>○&lt;sup&gt;3&lt;/sup&gt;</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>$$-$$</td>
</tr>
<tr>
<td>Pneumatic Tubes</td>
<td>●</td>
<td></td>
<td>○</td>
<td>○</td>
<td>$$-$$</td>
</tr>
<tr>
<td>Video Imaging: Manual</td>
<td>○</td>
<td>○</td>
<td>●</td>
<td></td>
<td>$$-$$</td>
</tr>
<tr>
<td>Manual Observers</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>$$-$$</td>
</tr>
<tr>
<td><strong>Temporary/Short Term</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$$-$$</td>
</tr>
</tbody>
</table>

- ○ Indicates what is technologically possible.
- ● Indicates a common practice.
- ○ Indicates a common practice, but must be combined with another technology to classify pedestrians and bicyclists separately.
- $$, $$, $$$: Indicates relative cost per data point.

1. Typically requires a unique loop configuration separate from motor vehicle loops, especially in a traffic lane shared by bicyclists and motor vehicles.
2. Permanent installation is typical for asphalt or concrete pavements; temporary installation is possible for unpaved, natural surface trails.
3. Requires specific mounting configuration to avoid counting cars in main traffic lanes or counting pedestrians on the sidewalk.
Common pedestrian counting technology

- **Infrared**
  - Most common automated tech
  - Several vendors
  - Passive vs. active infrared
  - Occlusion (blocking) a problem, overcome with overhead mount

- **Video**
  - Also common, several vendors
  - Manual vs. automatic reduction
  - Capture pedestrian behavior and demographics

- **Manual (human observer)**
  - Clipboard or tablet computer
  - Simple and low-tech
  - Limited to short time intervals
Common bicyclist counting technology

- **Inductance loops**
  - Most common (permanent)
  - Specific loop shapes
  - Requires pavement cuts

- **Pneumatic tubes**
  - Most common (portable)
  - Specific tube size
  - Hazard issues

- **Video**
  - Common (esp. intersections)
  - Capture behavior

- **Manual**
  - Use in complex situations
  - Limited to short time intervals
Emerging video analytics

Intersection signal system analytics

Other video system analytics
TxDOT counter equipment loan program

- Portable equipment for loan
  - 10 infrared counters
  - 8 pneumatic tube counters (bikes)

- Available for use by:
  - TxDOT districts
  - Local agencies
  - Others as available

- Contact TxDOT
  - BikePed@txdot.gov
NCTCOG mobile counter loan program

- Off-Street Counters (trails)
  - Two Sets of Off-Street Counters
  - Each set contains one tube counter and one infrared sensor

- On-Street Counters
  - Two Sets of On-Street Counters
  - Each set contains two tube counters

- Available to agencies located in the 12-county North Central Texas Region (Dallas-Fort Worth)

- If interested, contact Daniel Snyder at dsnyder@nctcog.org.
**HGAC counter loan program**

- Houston-Galveston Area Council (HGAC)
  - 4 infrared counters
  - Susan Jaworski
  - Susan.Jaworski@h-gac.com
Seasonal variation and adjustment

Pedestrian and Bicyclist Monthly Activity Levels in Texas (17 permanent locations)

Annual average for that month

Typical non-motorized data collection in Texas: March through October
**Monthly adjustment factors**

**Pedestrian and Bicyclist Month-of-Year Count Adjustment Factors in Texas**

- **Daily ped count of 300 in April**
  - Annual Average = 300 X 87% = 261

- **Daily bike count of 200 in Nov**
  - Annual Average = 200 X 109% = 218

**Typical non-motorized data collection in Texas:**
- March through October
Crowdsourced data

- Crowdsourced = location of a person walking or biking
- Strava Metro – user-prompted data collection (active)
- StreetLight Data and others – background data collection (passive)

- TxDOT licensed 4 years of statewide Strava Metro
  - 2016-2019
- Local entities have free access through sublicense
- New online analytic interface!

https://metroview.strava.com/application
Expanding Strava samples to estimate total bicyclists

- Different Strava sample rates on different types of routes
  - Non-recreational routes: <1% of all bicyclists
  - Highly recreational routes: 50%+ of all bicyclists

- Estimate total bicyclists based on readily-available and most influential prediction variables:
  - Open Street map (OSM) functional road class
  - High-income households
  - 30% mean absolute error, $R^2=70\%$

### Functional Classification (CLAZZ in Strava Metro's network data from Open Street Map)

<table>
<thead>
<tr>
<th>Type</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway, primary (15)</td>
<td>$AADB_i = 63 \times (\exp(\text{AADB}_\text{Strava}_i))^{0.038} (\exp(\text{Household} &gt; 200K_i))^{0.002}$</td>
</tr>
<tr>
<td>Highway, secondary (21)</td>
<td>$AADB_i = 13 \times (\exp(\text{AADB}_\text{Strava}_i))^{0.038} (\exp(\text{Household} &gt; 200K_i))^{0.002}$</td>
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<tr>
<td>Highway, tertiary (31)</td>
<td>$AADB_i = 22 \times (\exp(\text{AADB}_\text{Strava}_i))^{0.038} (\exp(\text{Household} &gt; 200K_i))^{0.002}$</td>
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<tr>
<td>Highway, residential (32)</td>
<td>$AADB_i = 17 \times (\exp(\text{AADB}_\text{Strava}_i))^{0.038} (\exp(\text{Household} &gt; 200K_i))^{0.002}$</td>
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<tr>
<td>Highway, path (72)</td>
<td>$AADB_i = 72 \times (\exp(\text{AADB}_\text{Strava}_i))^{0.038} (\exp(\text{Household} &gt; 200K_i))^{0.002}$</td>
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<tr>
<td>Cycleway (81)</td>
<td>$AADB_i = 62 \times (\exp(\text{AADB}_\text{Strava}_i))^{0.038} (\exp(\text{Household} &gt; 200K_i))^{0.002}$</td>
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<tr>
<td>Footway (91)</td>
<td>$AADB_i = 28 \times (\exp(\text{AADB}_\text{Strava}_i))^{0.038} (\exp(\text{Household} &gt; 200K_i))^{0.002}$</td>
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Report 6927-P6
For more information

- TxDOT 6927 Reports, 2018-2019

- PBIC Infobrief, 2018

  - [https://www.fhwa.dot.gov/policyinformation/tmguide/](https://www.fhwa.dot.gov/policyinformation/tmguide/)

- NCHRP Report 797, 2014
  - [http://www.trb.org/Main/Blurbs/171973.aspx](http://www.trb.org/Main/Blurbs/171973.aspx)
Research Interest:
- Transportation Data Analysis
- Transportation Data Collection
- HOV and HOT
- Bicycle and Pedestrian
- The Economics of Transportation

Using data to improve decisions and understanding (data geek!)

Research for TxDOT, FHWA, MPOs, and other agencies

28 years at TTI  30+ years of experience
Overview

- Site Selection
- Equipment Preparation
- Deployment Preparation
- Inventory
- Installation
- Supplemental Mounting
- Pedestrian Counter Installation
- Road tube Installation
Site Selection
Site Selection

- What is the objective of your data collection?
  - Before and after study
  - Corridor study
  - Trend analysis (year over year, facility types, seasonal patterns)
  - Project
    - Project Identification (OD patterns, exiting path, other)
    - Project Selection and Prioritization
    - New non-motorized facility?
    - New roadway project – Identify potential connections with NM Network
    - CMP – Congestion Management Process
Site Selection Cont.

- Work with agency partners (parks department, MPO, development district)
- Local advocacy groups (AARP, pedestrian & cycling)
- Identify the origins & destinations
  - Places of interest
  - Employment, Living (single & multi-family), Entertainment
- Identify existing and proposed routes
  - Sidewalks
  - Trails
  - Bike facilities
  - Training routes
  - Low volume roads
Locate Site(s)

- Identify target area(s)
  - Employment Centers (Downtown, Hospital complex, Retail areas, Etc.)
  - Schools and Universities
  - Housing areas (Single-family, Multi-family, Mixed-use)
  - Recreational (Parks, Sports fields,

- Identify corridors of non motorized activity (Bayous, Rails to Trails, Utility)

- Determine logical paths to destinations

- Use Google Earth and Street view to identify exact deployment locations
  - Need something to mount equipment on
  - Point away from vehicle traffic or other visual noise
Locate Site(s)

- What is the focus (pedestrian, cyclists, both?)
- Site size – 1 to 5 square miles
- Corridor length 5 to 15+ miles
- Typical pedestrian travelshed \( \frac{1}{4} \) to \( \frac{1}{2} \) mile
- Typical cyclist travelshed \( \frac{1}{4} \) to 5 miles
- Corridors \( \frac{1}{4} \) to \( \frac{1}{2} \) mile from either side (pedestrian)
- Corridors \( \frac{1}{4} \) to 1 \( \frac{1}{2} \) mile from either side (cyclist)
Identify Land Use
Facility Identification
Count Location Guidance

- Typically do screen line counts
  - Both sidewalks
  - Both bike lanes
- Repeat the site selection along the corridor or area
- Zoom out and review the count sites
  - Overall coverage
  - Coverage of land use; facility types; or direction
- Consistency
- Do you need to split the corridor or area for better coverage?
What are the objectives?
- Corridor? Area? Facility type?

Through routine safety monitoring TxDOT identified an area with a high number of pedestrian crashes.

Identify the vehicle and pedestrian exposure rates of crashes to determine if the area is higher than the regional average.

Site selection was limited to TxDOT facilities.
- Distribution of counters along the corridor.
- EB and WB travel or north and south of IH 10
Corridor Map Example
Area Map Example
Count Location Guidance

- Identify locations along routes where people are walking or cycling to and from destinations (home to work; work to lunch; etc.)
- Along the path (people moving in a straight path)
- Not an open area (courtyard, plaza, etc.)
- Not near entrance/exit OR path to parking
- Static background
- Mounting location (dependent on technology)
Mounting Location Detail

- Mounting location
  - Sign post, tree, railing, utility pole, etc.
- Static background
  - Preferred
    - Wall, fence, open field
  - Avoid
    - Roadways, bus stops, parking lots, trashcans, etc.
    - Things that move – bushes, trees, advertising signs
    - Construction site, playground,
Google Earth (GE) Example

- This could be done in a GIS system
- Set **Google Earth Pins** - label the location and counter number
- Examples
  - T21 – IH-10 EBFR@W of Gessner
  - T22 – IH-10 EBFR@E of Gessner
Count Preparations
Equipment
Safe and Efficient Deployment

- Organize the deployment taking into account where to park, mounting location, etc.

- The **Efficient** route is the **Safe** route.
  - Least amount of time in the ROW – lowers exposure rate
  - Avoids having to double back
  - Goal – In and out of the vehicle in less than 5 minutes

- Organize counters and equipment in the vehicle before you leave the office
  - Quick access to counters, chains, and locks

- Divide the work
  - Driver/Installer
  - Navigator/Spotter/inventory

- Develop Rhythm
Equipment Preparation

- Bins
- Label Clamps
- Mounting Assistance
- Tools
Equipment Preparation

- Survey nails
- Fasteners for tubes
- Offset bracket for pedestrian counters
Equipment Preparation

- Pool noodles for pedestrian counters
- Center traffic barrier mount for pedestrian counter
Equipment Preparation

- Had tools
- Urban pedestrian boxes
- Insecticide
- Cordless drill
- Band clamps
- Locks (keyed the same)
- Chains
Equipment Preparation

- Label Clamps
- Consistent width size
- Quick release
- Continuous teeth for infinite adjustment

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Deployment Preparation

- Check List
- Locks keyed alike
- Put Google Earth Pins on Phone
- Retriever Sheet and Inventory Sheets
- Program Counters
Required Count Site/Location Documentation

- Need General Information About the Location
  - Non-Motorized Facility Type
  - Functional Class of Adjacent Roadway
  - Roadway Speed Limit
  - Land Use

- Excel Counter Deployment Template
  - Instructions
  - Definitions
  - Retriever Sheet
  - Station Data Entry
    - (Agency, Jurisdiction, Etc.)
  - Individual Location Sheets
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Traf-X Connection to the “Dock” for Programming and Downloading

Can insert either side of the board into the Dock
Type the letter from the menu to perform the task.
Enter start time be sure if is in the future also notice the date format YY-MM-DD

Typically replace if less than 4.0 Volts

Period
001 = Hourly Totals
024 = Daily Totals
000 = Timestamp 14000 max

Delay
020 = 1.0 sec
025 = 1.0 sec
Review all setting times and start times

Make sure start time is after current time. Check the date format

Erases records to free up memory for new study.
Load Google Pins to Phone

- Include the mounting location in the description if you want it to show up on your phone.
- File should contain the H# (H-GAC) or T# (TTI) so that it is easy to deploy counters.
- Save the KMZ file as a KML in **Google Earth**.
- Open **Google Maps** on your desktop and click “My Places” at the top of the left column.
- Create a new map, select the “Import” option at the top, and then import the KMZ file into that map (you can drag it into the website).
- NAME THE MAP
- After you have saved it you can open **Google Maps** on your device (phone) and choose the “Layers” or “Your Places” button (top left).

**Google Earth** = downloaded version
**Google Maps** = Internet web browser format (usually have a gmail account to access features)
Personal Protection Equipment (PPE)

- Hard hat
- Vest (Type III preferred or night)
- Steel toe shoes
- Other
  - Sun glasses
  - Sunscreen
  - Insect repellent
- Hydration
Vehicle Organization Video

https://youtu.be/ZgF2_UsaBDs
Field Installation Tips

- Bins for Counters
- Bins for band clamps
- Color code band clamps
- Bag to carry to individual sites
  - Drill
  - Band clamp one of each size
  - Chain (estimate size) and lock
  - Insecticide (granules)
  - WD 40 for locks (can also be used to kill ants)
Field Installation Tips

- Prepare Equipment in Office
  - Tubes Rigged
  - Counters in Numeric Order
- Have Vehicle Organized
  - Bins Open and Accessible
  - Easy Access to Most Used Items
- Park Off-Street if Possible
- Don’t overtighten band clamps
- Set drill chuck to 1
- Sprinkle ant bait on visible ant hills
Installation

- Safety and Efficiency
- Two Person Team
- Density of Count Area (limit to a couple of square miles)
- Equipment / Checklists
- Inventory Each Site
- Supplemental Mounting Equipment
Pedestrian Counter Installation Video

https://youtu.be/M6fnEmbfffdM
Supplemental Mounting Equipment

- Pool noodles for angled or T-posts
- Offset bracket for bridge mounts
- CTB mount
- Bridge Column
Pool Noodles
Bridge Rail Offset
CTB Mount and Bridge Column
Eco Counter Pyro (Pedestrian) Installation

- Use hex extension or flex shaft to mount back plate
- Use hex security bit to secure
- Band clamps and chain
Pyro Installation
Facility Inventory Video

https://youtu.be/UcZfMmqrzzI
Inventory

- Field sheets with clipboard
- Know stride and foot size
- Know standard lane widths
- Written define and pictures of area type (consistency)
- Pictures of counter location (get the background)
<table>
<thead>
<tr>
<th>Location Name (Counter T13)</th>
<th>T13 IH 35 SB FR @ Colorado River</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location Description</td>
<td>Separated sidewalk/bridge 60′ wide</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td>0 TXDOT</td>
</tr>
<tr>
<td>Agency Deployed</td>
<td>0 T ITS TXDOT</td>
</tr>
<tr>
<td>Key Map Page and Sq</td>
<td></td>
</tr>
<tr>
<td>GPS coordinates</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td>Holiday Inn</td>
</tr>
<tr>
<td>Surrounding Land Uses</td>
<td>hotel, CBD, lake</td>
</tr>
<tr>
<td>What object was device secured to?</td>
<td>CTB Saddle Mount</td>
</tr>
<tr>
<td>Deployment Period</td>
<td>Thursday May 04, 2017 - Tuesday May 16, 2017</td>
</tr>
<tr>
<td>HGAC Count #</td>
<td></td>
</tr>
<tr>
<td>Count Type Codes</td>
<td></td>
</tr>
<tr>
<td>County Code</td>
<td></td>
</tr>
<tr>
<td>Sidewalk Width</td>
<td>3 10′/2 Continuous Traffic Barrier 8′ wide</td>
</tr>
<tr>
<td>Buffer Width</td>
<td>38′ wide 3 lanes</td>
</tr>
<tr>
<td>Street Width</td>
<td></td>
</tr>
<tr>
<td>Parallel Parking</td>
<td>No</td>
</tr>
<tr>
<td>Landscaping or trees</td>
<td>No</td>
</tr>
<tr>
<td>Sidewalk Pavement Type</td>
<td>exposed aggregate</td>
</tr>
<tr>
<td>ADA Ramps</td>
<td>Yes</td>
</tr>
<tr>
<td>Sidewalk Condition</td>
<td>good</td>
</tr>
<tr>
<td>Speed Limit</td>
<td>55 MPH?</td>
</tr>
<tr>
<td>Street Lighting</td>
<td>Yes</td>
</tr>
<tr>
<td>Street Traffic Volume</td>
<td>High</td>
</tr>
<tr>
<td>Transit?</td>
<td>No, No bus stops but yes transit route</td>
</tr>
<tr>
<td>Shade?</td>
<td>No?</td>
</tr>
<tr>
<td>Have counts been collected by GAC at this location before?</td>
<td>No</td>
</tr>
<tr>
<td>Notes</td>
<td>N 75′ S of One Way Sign</td>
</tr>
</tbody>
</table>
Site Photos from Each Direction
Tube Counter Installation Video

https://youtu.be/qyk-up1gNOc
Road Tube Installation

- Hammer Drill – Concrete Survey Nails
- Use a Premeasured Wire or Rope to Get Fast Consistent Spacing
- Figure 8 and Chinese Fingers
- Shorter Tubes 12 to 25 Feet (same length)
- Change Out Drill Bit Periodically (sharp bit can drill a hole much quicker)
- One Person Drill the Other Person Hooks the Tube
- Both Watch for Traffic
Tube Drill and Mount
TxDOT counter equipment loan program

- Portable equipment for loan
  - 10 infrared counters
  - 8 pneumatic tube counters (bikes)

- Available for use by:
  - TxDOT districts
  - Local agencies
  - Others as available

- Contact TxDOT
  - BikePed@txdot.gov
NCTCOG Mobile Counter Loan Program

- Off-Street Counters (trails)
  - Two Sets of Off-Street Counters
  - Each set contains one tube counter and one infrared sensor

- On-Street Counters
  - Two Sets of On-Street Counters
  - Each set contains two tube counters

- Available to agencies located in the 12-county North Central Texas Region (Dallas-Fort Worth)

- If interested, contact Daniel Snyder at dsnyder@nctcog.org.
HGAC Count Loan Program

- Houston-Galveston Area Council (HGAC)
  - 4 infrared counters
  - Susan Jaworski
  - Susan.Jaworski@h-gac.com
For More Info or Questions

- Robert Benz
  - r-benz@tti.tamu.edu
  - 713-613-9218

- Shawn Turner
  - s-turner@tti.tamu.edu
  - 979-317-2481
Pedestrian and Bicycle Installation Videos

1. Video 1 - Vehicle Organization
   • https://youtu.be/ZgF2_UsaBDs

2. Video 2 – Pedestrian Counter Installation
   • https://youtu.be/M6fnEmbffdM

3. Video 3 – Tube Counter Installation
   • https://youtu.be/qyk-up1gNOc

4. Video 4 – Inventory
   • https://youtu.be/ZgF2_UsaBDs