# PBIC Webinar

## Pedestrian and Bicycle Count Data
## Part I – Programs, Data and Metrics

**Krista Nordback**
UNC Highway Safety Research Center

**Scott Brady**
Delaware Valley Regional Planning Commission

**Jeremy Raw**
Federal Highway Administration

**Kelly Laustsen**
Kittelson and Associates, Inc.

**Pedestrian and Bicycle Information Center**

THE UNIVERSITY OF NORTH CAROLINA
**HIGHWAY SAFETY RESEARCH CENTER**

# Today's Presentation

⇨ **Introduction and housekeeping**

⇨ **Presentations**

⇨ **Questions at the end**

# Webinar Issues

⇨ **Audio issues?**
Dial into the phone line instead of using "mic & speakers."

⇨ **Webinar issues?**
Re-Load the webpage and log back into the webinar. Or send note of an issue through the Question box.

⇨ **Questions?**
Submit your questions at any time in the Questions box.

# CM Credits and Email

⇨ **Certificate of Attendance**
You will receive a certificate of attendance by email from the UNC Highway Safety Research Center



Pedestrian and Bicycle Information Center

Dear James,

Thank you for registering for "A Resident's Guide for Creating Safer Communities for Walking and Biking".

The Federal Highway Administration just released "A Resident's Guide for Creating Safer Communities for Walking and Bicycling," a free guide offering step-by-step instructions for residents and community groups looking to improve pedestrian and bicyclist safety, access, and comfort. This webinar offers an overview of the guide and will review how two communities used the principles outlined within it to make their communities more walkable and bikeable.

Tamara Redmon, with FHWA's Office of Safety, will introduce the guide and discuss how it fits within the US Department of Transportation's Safer People, Safer Streets Initiative.

Laura Sandt, with the Pedestrian and Bicycle Information Center, will discuss the content of the new guide and how residents can use it,

**Pedestrian and Bicycle Information Center**

# PBIC Webinars and News

⇨ **Find PBIC webinars and webinar archives**
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# Upcoming Webinars

⇨ **Two upcoming sessions on counts:**

⇨ Count Series Continues February 23:
Part 2 - Equipment

⇨ APBP Webinar on June 21:
Beyond Counting - Putting the Data to Work for Better Planning and Evaluation (visit www.apbp.org)

⇨ **PBIC's next webinar:**

⇨ March 14 session co-sponsored with GHSA:
Laying the Groundwork for Successful Safety Education and Enforcement Activities

# Pedestrian and Bicycle Count Programs

**Krista Nordback, P.E., Ph.D.**

THE UNIVERSITY OF NORTH CAROLINA
**HIGHWAY SAFETY RESEARCH CENTER**

www.hsrc.unc.edu

*Tuesday, February 21, 2017*

# Agenda

- Why count?
- Lessons from motor vehicle count programs
  - Permanent
  - Short Duration
- Evolution of nonmotorized counting
- State of the practice
- Recommendations

# Why measure walking & biking?

- Funding & policy decisions
- To show change over time
- Facility design
- Planning (short-term, long-term, regional…)
- Economic impact
- Public health
- Safety

# How many bike and walk?

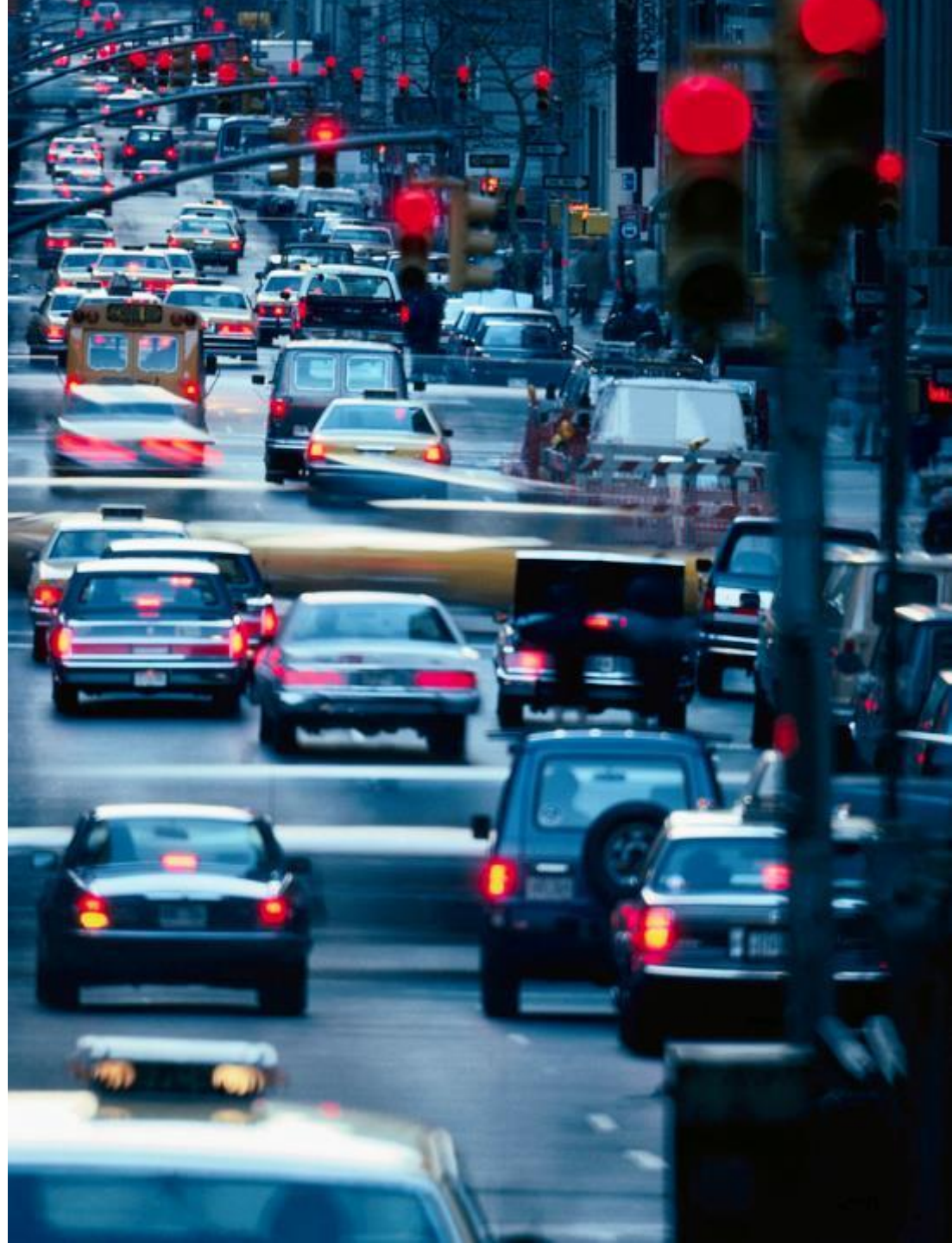- Surveys
  - National
  - Regional
  - Local

GPS

- Counts
  - Permanent
  - Short duration
    - Project Counts
    - Cyclical Counts



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# Traffic Monitoring Programs

# State Traffic Monitoring

## Permanent Counters

Commonly inductive loops



Metro Count Accessed 6/13/13 http://mtehelp.tech-metrocount.com/article.aspx?key=mc5805

## Short Duration Counters

Commonly pneumatic tubes

# Oregon's Continuous Counters

About 180



N

| 0 | 75 | 150 | 300 Miles |

● Permanent Traffic Recorders
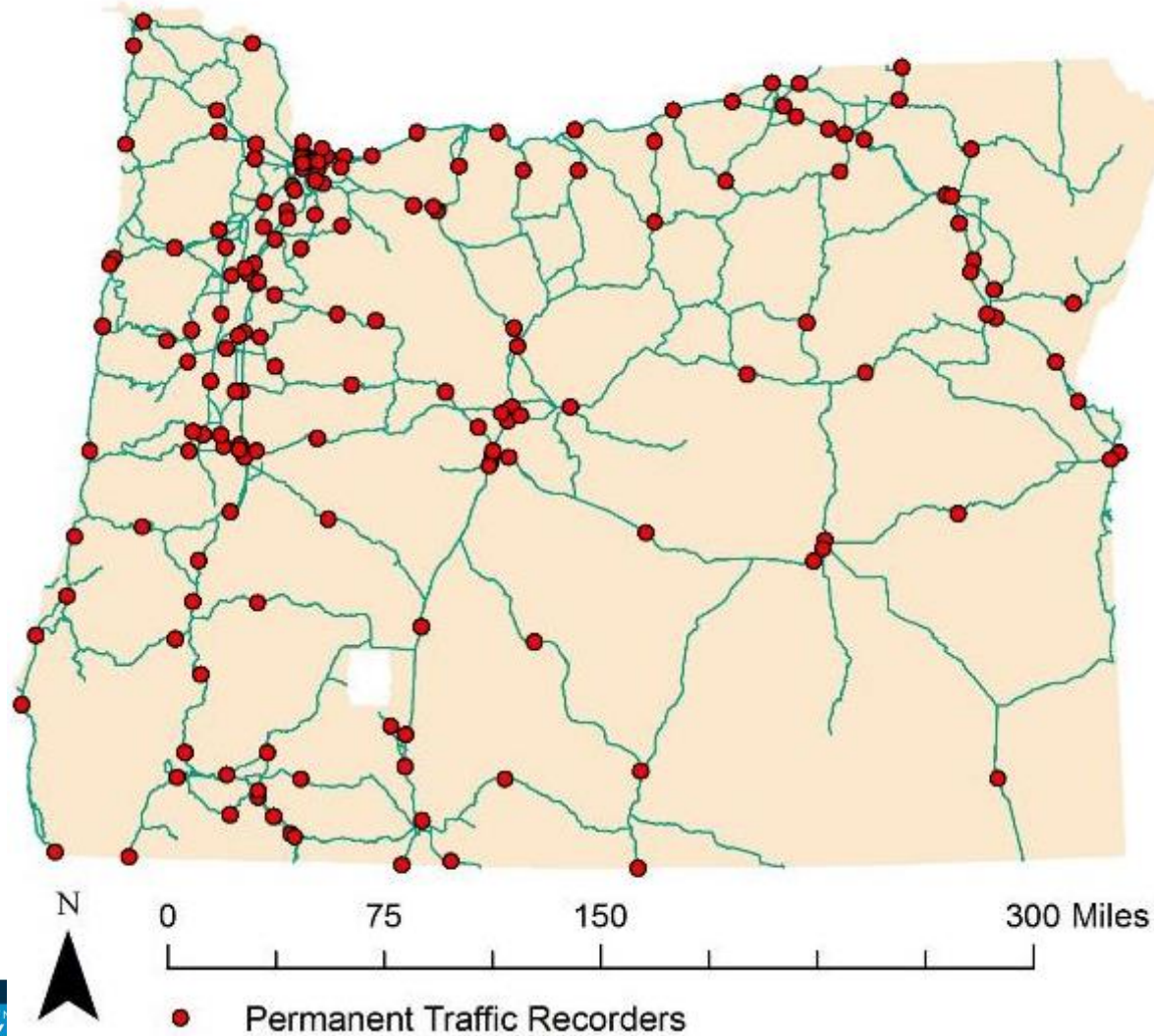
# Oregon's Short Duration Counts

About 7000



N

| 0 | 75 | 150 | 300 Miles |

• Short Duration Counts
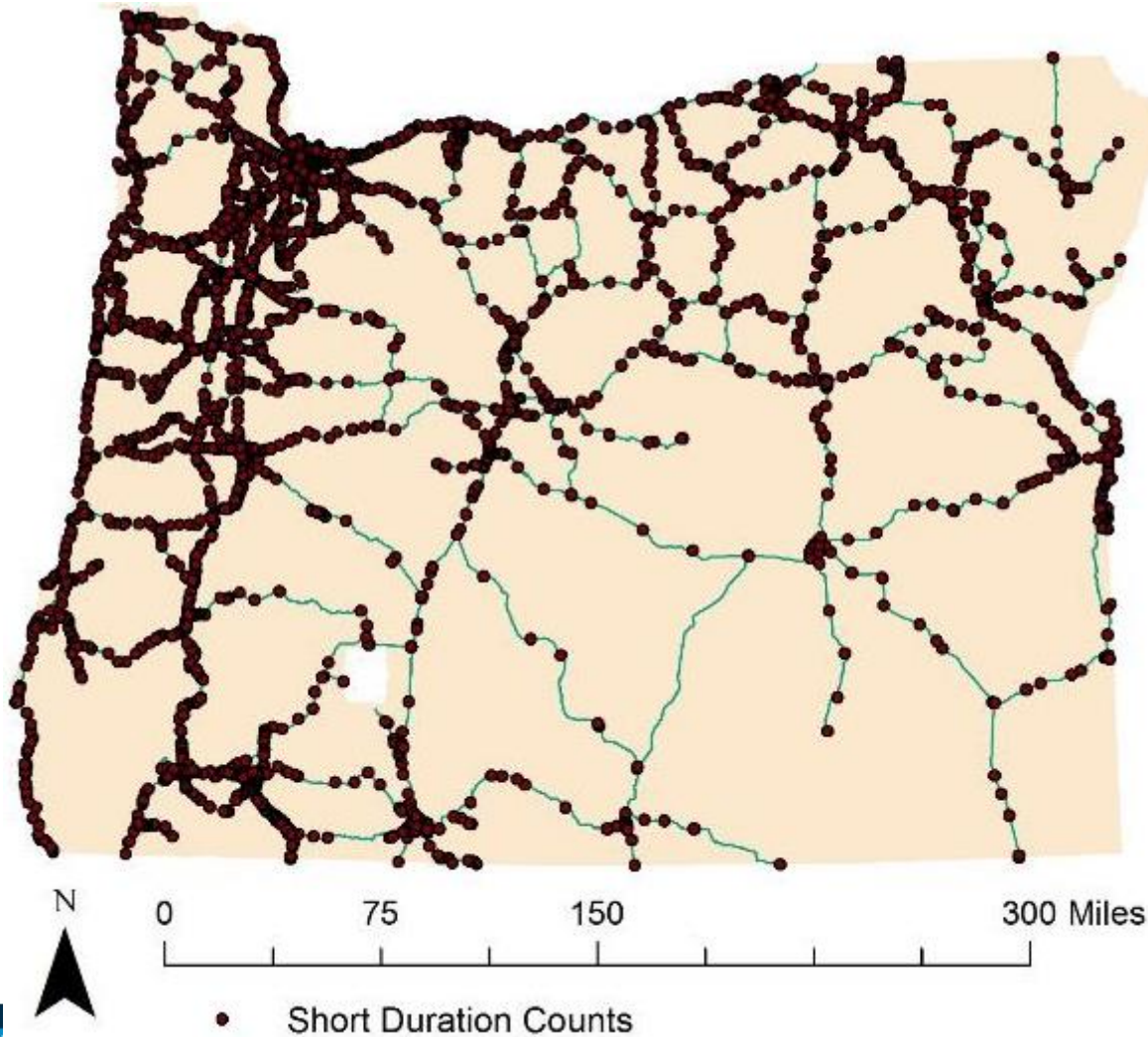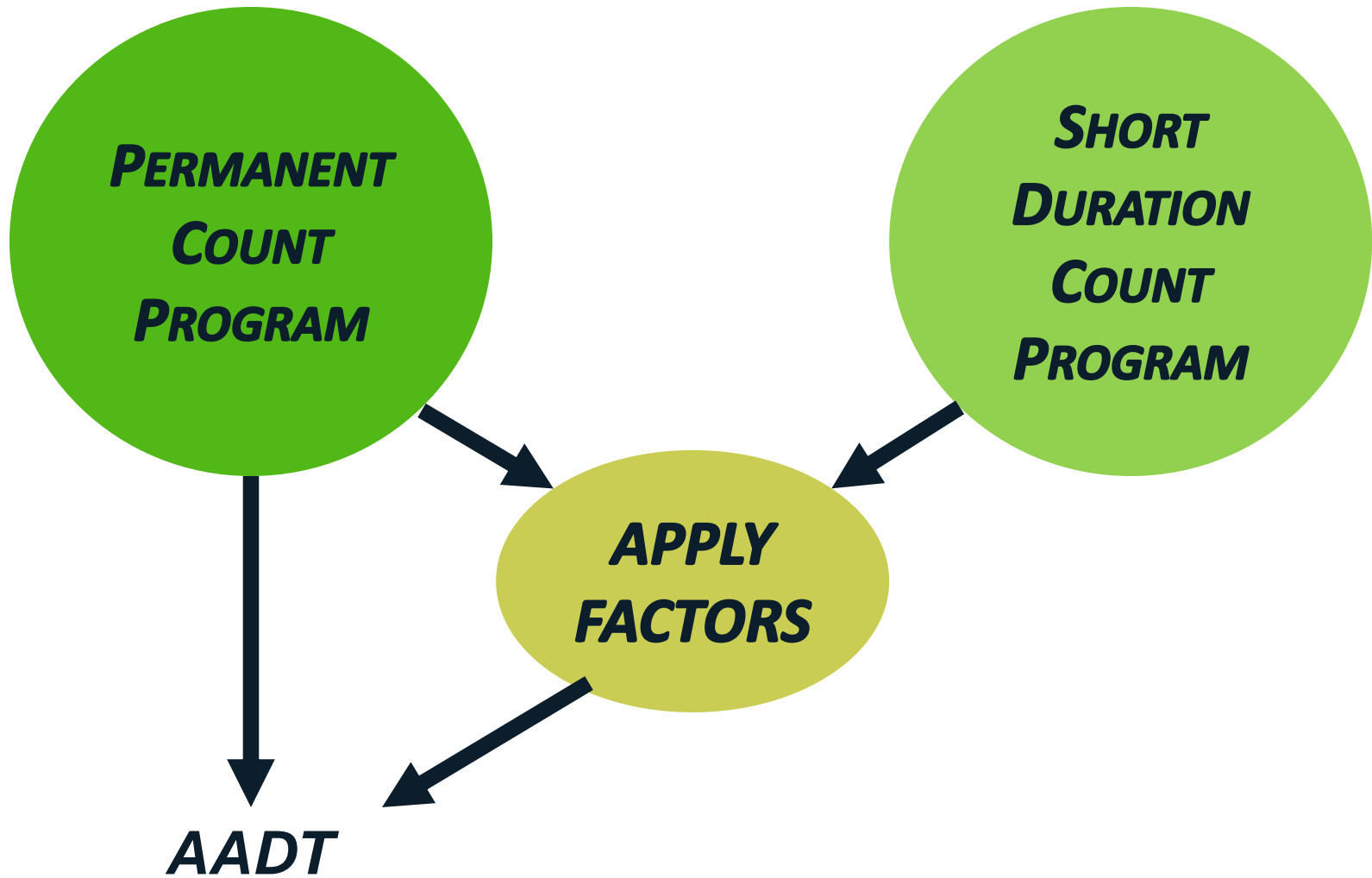
Can we apply these methods to biking and walking?

# AADPT & AADBT:
# Annual Average Daily Pedestrian and Bicycle Traffic

## *AADT for walking and cycling!*

# Evolution of Nonmotorized traffic counting



Short duration: Manual

Permanent and Short Duration: Automated

# National Bicycle and Pedestrian Documentation Project

Short duration counts
(project or cyclic)

Manual
2 hours
5 to 7pm
Tues, Wed, or Thurs in
mid-September

# *Traffic Monitoring Guide 2016:* Chapter 4 for Non-motorized Traffic

- Permanent
- Short duration:
  - o Project Counts
  - o Cyclical Counts

**Federal Highway Administration Traffic Monitoring Guide**
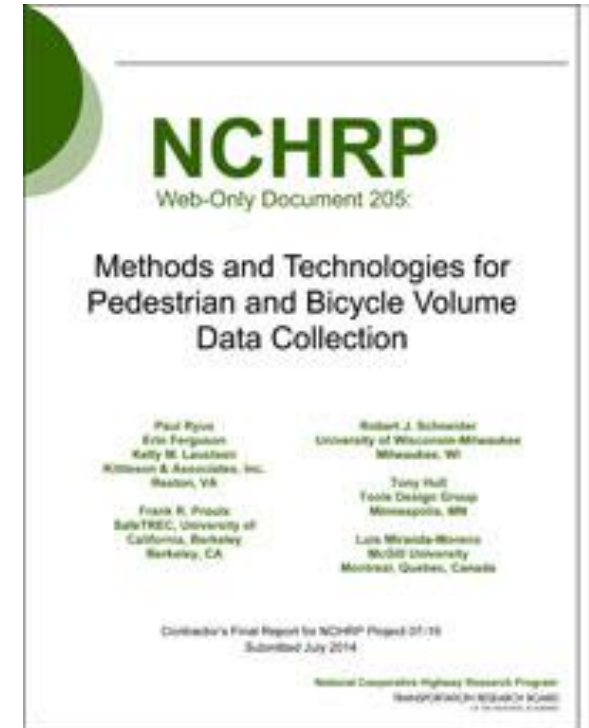
# Traffic Monitoring Guide

Updated: October 2016

U.S. Department of Transportation
Federal Highway Administration
Office of Highway Policy Information

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# Guidebook NCHRP 797

**NCHRP REPORT 797**

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

**Guidebook on Pedestrian and Bicycle Volume Data Collection**

TRANSPORTATION RESEARCH BOARD

**NCHRP**
Web-Only Document 205:

**Methods and Technologies for Pedestrian and Bicycle Volume Data Collection**

Paul Ryus
Erin Ferguson
Kelly M. Laustsen
Kittelson & Associates, Inc.
Reston, VA

Frank R. Proulx
SafeTREC, University of
California, Berkeley
Berkeley, CA

Robert J. Schneider
University of Wisconsin-Milwaukee
Milwaukee, WI

Tony Hull
Toole Design Group
Minneapolis, MN

Luis Miranda-Moreno
McGill University
Montreal, Quebec, Canada

Contractor's Final Report for NCHRP Project 07-19
Submitted July 2014

National Cooperative Highway Research Program
TRANSPORTATION RESEARCH BOARD

More on Thursday!
***Webinar Part 2 –Equipment***
Features latest NCHRP 797 research update from Frank Proulx

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# State of the Practice: Nonmotorized Count Programs

# State Programs

- Washington: Manual short duration counting, with permanent counters.

- Colorado & North Carolina: Permanent counters with short duration automated counts (infrared and tube)

- Other programs: Minnesota, Oregon, Florida, Vermont …
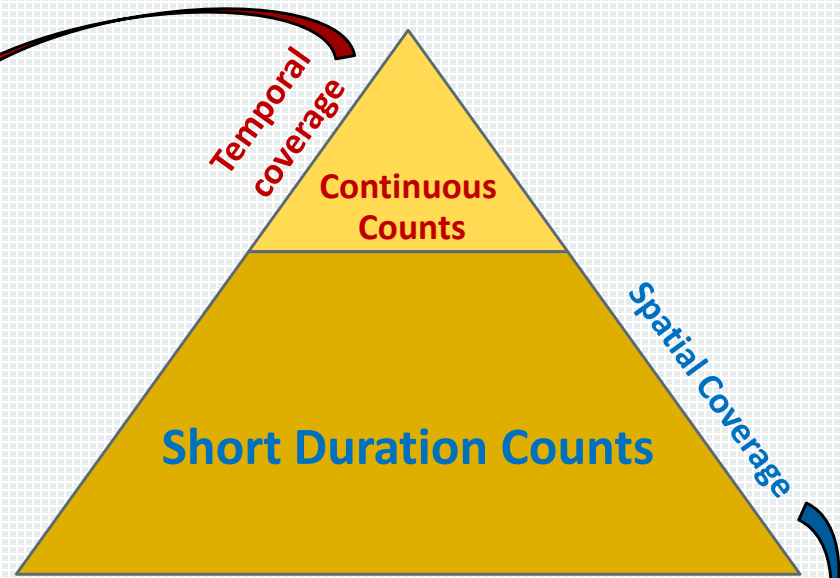
*Photo from Ken Brubaker, Colorado DOT*

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RESEARCH CENTER

Winston-Salem, NC

**CCS**

**Continuous Counts**

**Short Duration Counts**

*Temporal coverage*

*Spatial Coverage*

**SDC**

Charlotte, NC

***Continuous Count Stations*** *– Permanent counting sites that provide data continuously (24 hours per day, 7 days per week).*
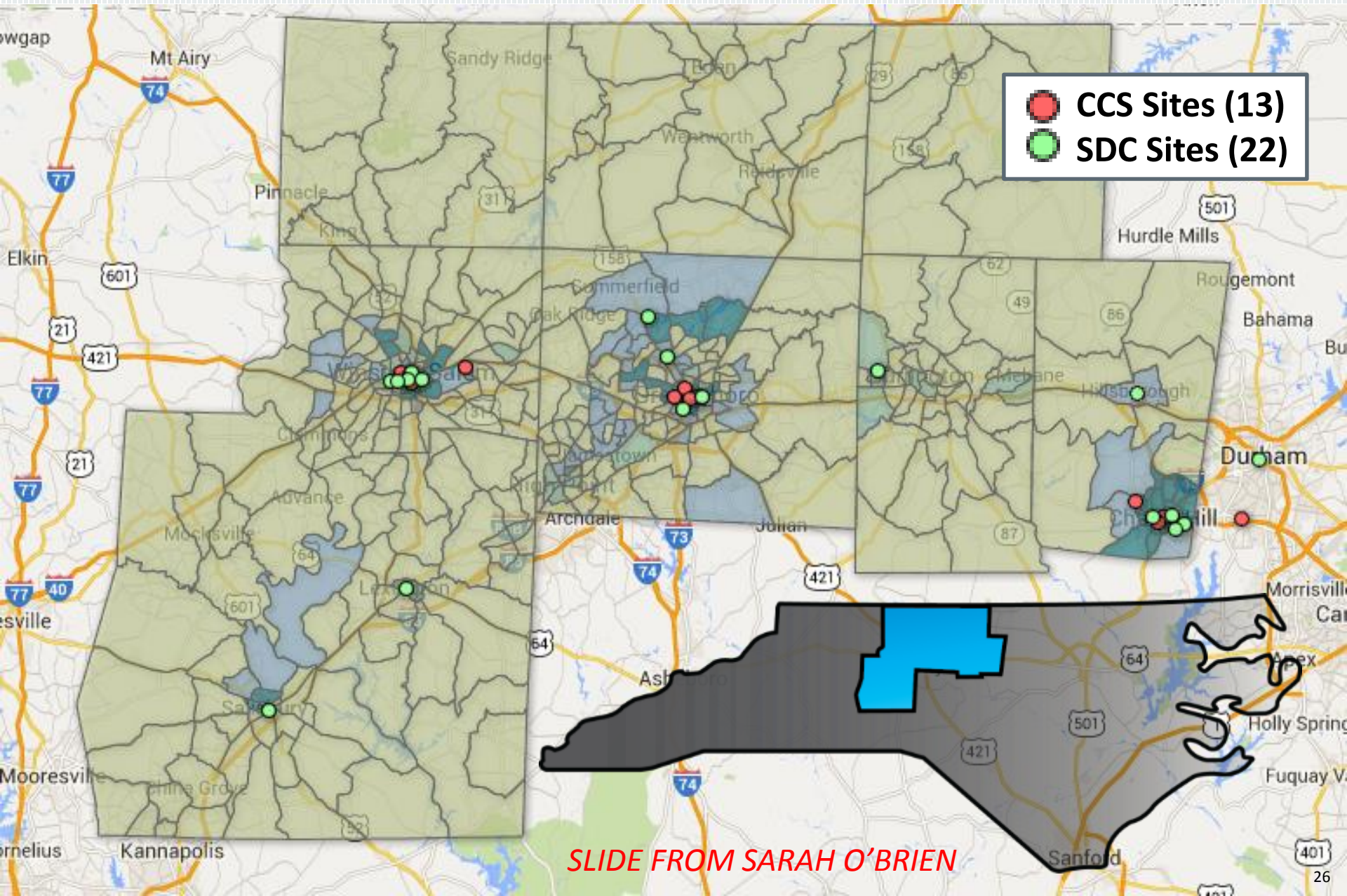
Annual Average Daily Pedestrian Traffic **(AADP)**

Annual Average Daily Bicycle Traffic **(AADB)**

*Enough data should be collected to allow calculation of accurate adjustment factors (Time of Day, Day of Week, Monthly) to apply to **Short Duration Counts**.*

ITRE

*SLIDE FROM SARAH O'BRIEN*

NC STATE UNIVERSITY

25

# Phase I: Pilot Region



CCS Sites (13)
SDC Sites (22)

*SLIDE FROM SARAH O'BRIEN*

# Example Local/Regional


Blacksburg, Virginia

Others: Minneapolis, Arlington, Austin, San Francisco, Boulder, San Diego, Vancouver, Philadelphia, Burlington, New York City, Fort Collins, Portland, and many, many, more…

# Local Programs

- ## Blacksburg (Lu et al., 2017)
  - 4 permanent count sites
  - 97 short duration (cyclic)

Lu, T., Buehler, R., Mondschein, A., and Hankey, S. (2017). "Designing a Bicycle and Pedestrian Traffic Monitoring Program to Estimate Annual Average Daily Traffic in a Small Rural College Town." 96th Annual Meeting of the Transportation Research Board, Transportation Research Board of the National Academies, Washington, DC.
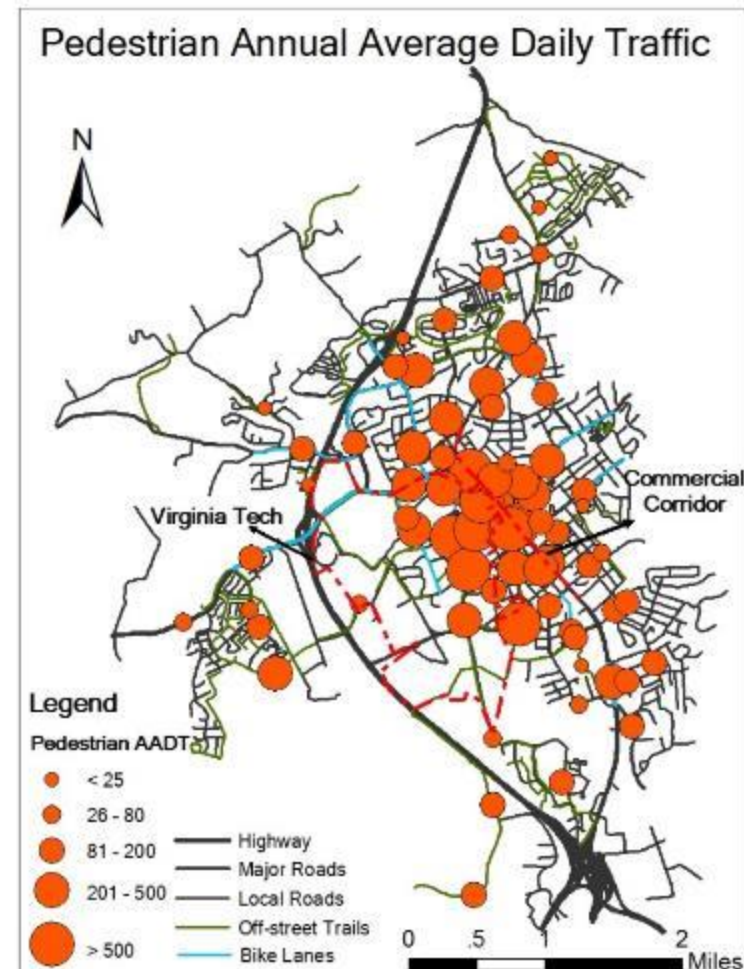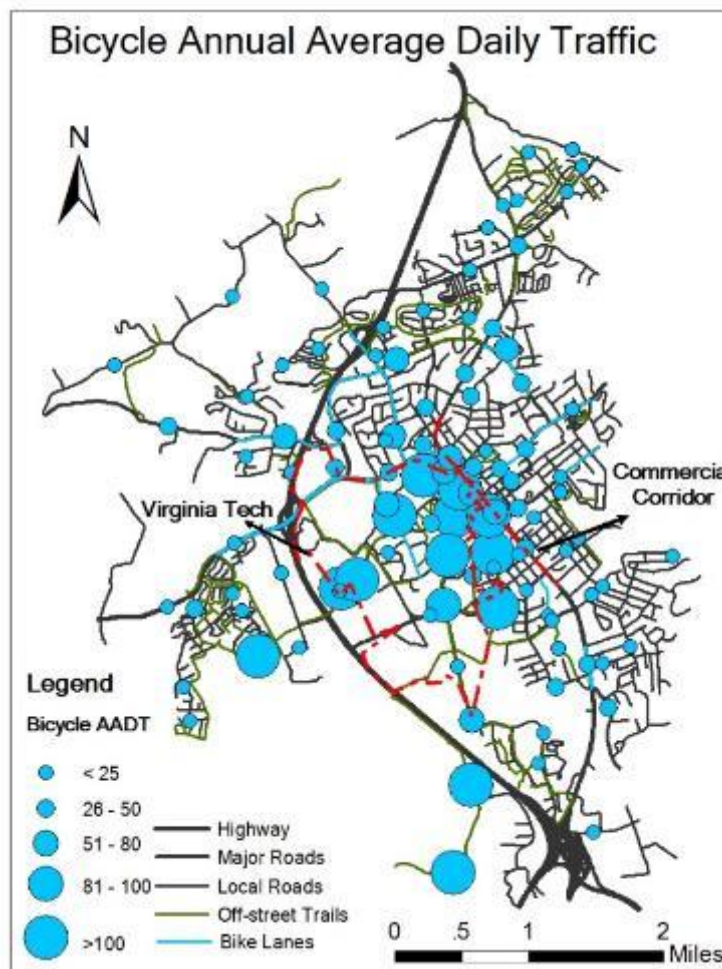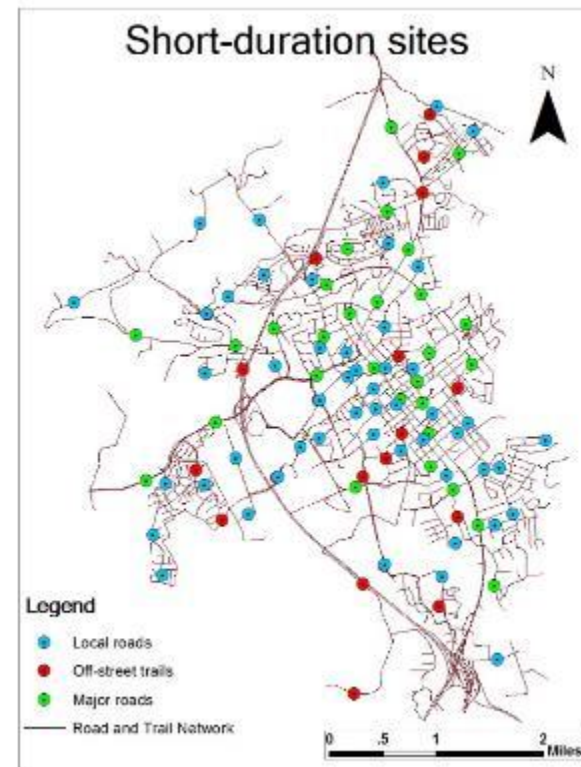
# Site selection
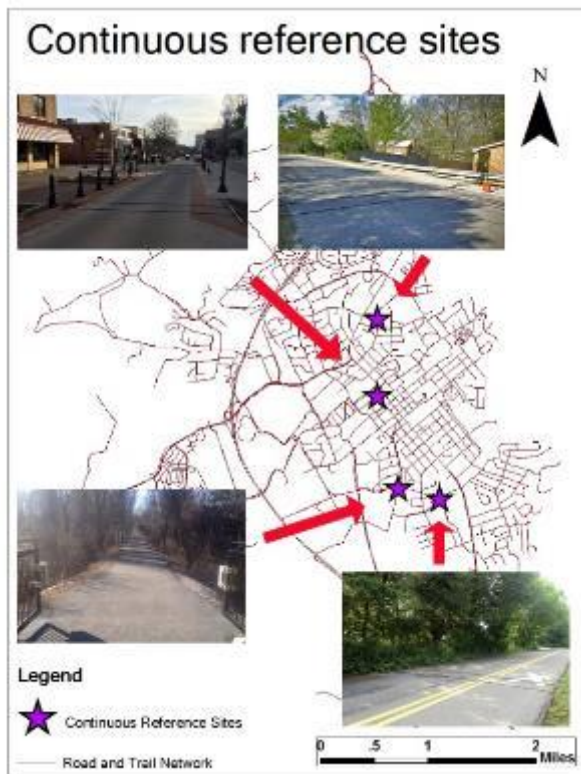
- Full year of data
- Seasonal and daily patterns
- Variety of location types

- 1 week of data
- Good spatial coverage
- Systematic selection

# Summary of sampling campaign

- 1-week short duration counts (n=97)

- April – October

- 10% random re-sample of locations

- Event log and statistical check used to clean data

# Recommendations

- Permanent counters and short duration counters
- Short duration counts:
  - 7 days
  - Count in high volume months
- Validate equipment
- Site Selection
  - Carefully choose <u>permanent counts sites</u> to capture different travel patterns: commute, school, recreational
  - Short duration count sites
    - Project: before and after, specific to study
    - Cyclic: If you can't count it all, stratify roads/paths based on facility type and randomly sample within that road/path type
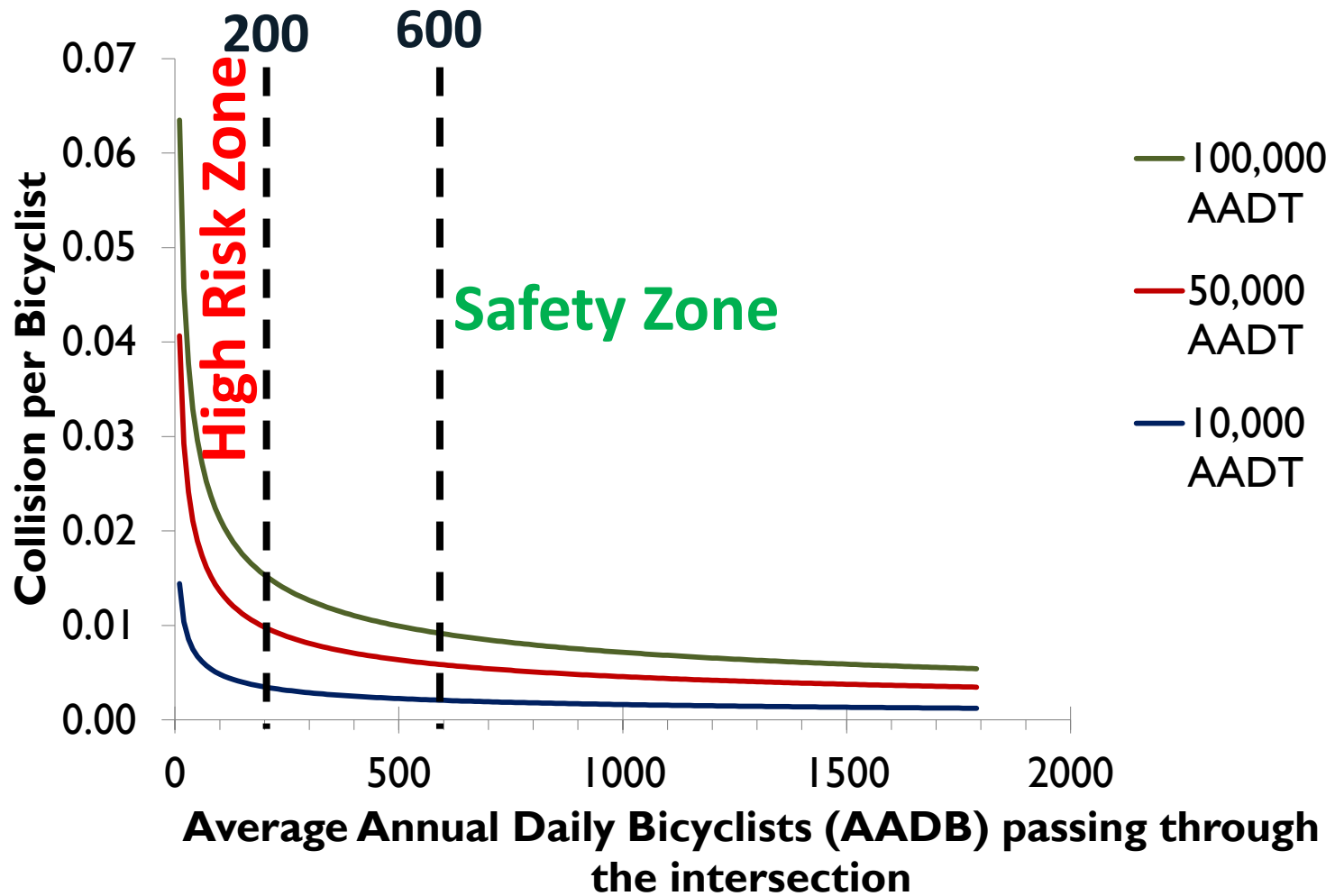
# Thanks!

**Krista Nordback, P.E., Ph.D.**
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919-962-3493

# Extra Slides

# Individual Bicyclist Risk

# DVRPC

# Counting Pedestrians & Bicyclists
# ** Factoring **

dvrpc

Pedestrian and Bicycle Information Center  □□  February  21, 2017

# Factors Translate SDCs to AADB / AADP

- Similar to AADT on the motorized side of travel monitoring, the AADB / AADP is used for trend analysis & planning purposes.

- Factoring allows the results of a Short Duration Count (SDC) (7 Day) to be mathematically transformed into an annual average volume to be used in planning applications.

# DVRPC - Pedestrian Count

TAKEN BY  JH                    DATE:  5/11/2016      PROJECT  15-CBD-045        STATION ID:  P0088

ROAD:  PA 611   BROAD ST                                    ROAD ID:    0611/0020/1101

FROM:  CALLOWHILL ST                      TO: HAMILTON ST

STATE:  PA        COUNTY: PHILADELPHIA         MCD:  4210160103 - CENTRAL

SIDEWALK:   W         FC: 14   TYPE:  PEDESTRIAN

DVRPC FILE #:  128701        COUNTER #:   11-018      WEATHER:  FAIR        DATA SOURCE:  INTERNAL

COMMENTS:

| Hour Beginning | Wed 05/11/16 | Thu 05/12/16 | Fri 05/13/16 | Sat 05/14/16 | Sun 05/15/16 | Mon 05/16/16 | Tue 05/17/16 |
|---|---|---|---|---|---|---|---|
| High Temp | 66 | 76 | 70 | 76 | 59 | 67 | 62 |
| Low Temp | 52 | 56 | 60 | 54 | 46 | 42 | 52 |
| Weather | CLOUDY | PTCLDY | RAIN | PTCLDY | PTCLDY | CLEAR | CLOUDY |
| 12 AM | 12 | 10 | 3 | 17 | 7 | 7 | 3 |
| 1 AM | 7 | 2 | 12 | 16 | 10 | 11 | 9 |
| 2 AM | 1 | 3 | 2 | 18 | 4 | 6 | 3 |
| 3 AM | 3 | 1 | 7 | 3 | 1 | 2 | 4 |
| 4 AM | 7 | 14 | 5 | 3 | 2 | 5 | 11 |
| 5 AM | 49 | 19 | 19 | 4 | 3 | 26 | 16 |
| 6 AM | 47 | 34 | 31 | 18 | 4 | 51 | 36 |
| 7 AM | 63 | 95 | 58 | 20 | 25 | 65 | 67 |
| 8 AM | 128 | 101 | 100 | 45 | 45 | 115 | 130 |
| 9 AM | 104 | 100 | 61 | 80 | 48 | 120 | 120 |
| 10 AM | 99 | 126 | 80 | 73 | 31 | 86 | 106 |
| 11 AM | 159 | 100 | 99 | 76 | 25 | 111 | 121 |
| 12 PM | 142 | 121 | 86 | 60 | 34 | 117 | 118 |
| 1 PM | 139 | 60 | 68 | 34 | 23 | 104 | 95 |
| 2 PM | 127 | 41 | 63 | 31 | 24 | 94 | 76 |
| 3 PM | 202 | 58 | 68 | 19 | 30 | 115 | 126 |
| 4 PM | 234 | 69 | 83 | 33 | 42 | 85 | 128 |
| 5 PM | 186 | 70 | 100 | 22 | 32 | 83 | 78 |
| 6 PM | 100 | 30 | 66 | 15 | 19 | 62 | 44 |
| 7 PM | 75 | 45 | 60 | 17 | 25 | 38 | 46 |
| 8 PM | 50 | 39 | 60 | 19 | 21 | 32 | 44 |
| 9 PM | 21 | 18 | 38 | 22 | 14 | 36 | 28 |
| 10 PM | 22 | 15 | 45 | 14 | 14 | 22 | 31 |
| 11 PM | 14 | 11 | 33 | 15 | 4 | 14 | 14 |
| TOTAL | 1,991 | 1,182 | 1,247 | 674 | 487 | 1,407 | 1,454 |

PEDESTRIAN SEASONAL FACTOR:      0.962    EQUIPMENT FACTOR:      1.0622        AADP:   1,232

# Equipment Factoring

Validation of Automated Pedestrian Counting Equipment:  50 Hours;  25,000 Observations;  6.22% Error

| | 10th St, Chestnut to Market Sts (W) | | | | | | | Market St, 10th to 11th Sts (S) | | | | | | |
| | 8/16/2010 | | | | | | | 8/27/2010 | | | | | | |
| Time Period | Eco-Counter | | | Manual Count | | | Total Variance* | | Eco-Counter | | | Manual Count | | | Total Variance* |
| (Start) | NB | SB | TOTAL | NB | SB | TOTAL | # | % | EB | WB | TOTAL | EB | WB | TOTAL | # | % |
| 6:00:00 AM | 4 | 18 | 22 | 5 | 16 | 21 | 1 | 4.55% | 9 | 6 | 15 | 8 | 3 | 11 | 4 | 26.67% |
| 6:15:00 AM | 9 | 45 | 54 | 6 | 44 | 50 | 4 | 7.41% | 25 | 4 | 29 | 23 | 7 | 30 | -1 | -3.45% |
| 6:30:00 AM | 11 | 67 | 78 | 11 | 65 | 76 | 2 | 2.56% | 21 | 8 | 29 | 24 | 7 | 31 | -2 | -6.90% |
| 6:45:00 AM | 6 | 111 | 117 | 5 | 103 | 108 | 9 | 7.69% | 32 | 7 | 39 | 36 | 9 | 45 | -6 | -15.38% |
| 7:00 AM - 2:45PM (Not Shown) | | | | | | | | | | | | | | | |
| 3:00:00 PM | 76 | 38 | 114 | 64 | 37 | 101 | 13 | 11.40% | 133 | 138 | 271 | 184 | 143 | 327 | -56 | -20.66% |
| 3:15:00 PM | 64 | 42 | 106 | 54 | 38 | 92 | 14 | 13.21% | 158 | 191 | 349 | 213 | 157 | 370 | -21 | -6.02% |
| 3:30:00 PM | 74 | 57 | 131 | 59 | 63 | 122 | 9 | 6.87% | 180 | 142 | 322 | 216 | 166 | 382 | -60 | -18.63% |
| 3:45:00 PM | 96 | 41 | 137 | 93 | 37 | 130 | 7 | 5.11% | 146 | 117 | 263 | 168 | 144 | 312 | -49 | -18.63% |
| | | | 3,902 | | | 3,530 | 372 | 9.53% | | | 7,698 | | | 8,937 | -1,239 | -16.10% |

Care should be taken not to rely on the 15 minute variation as error is introduced if the automated and manual counter clocks are not perfectly synchronized.  This error is minimized by examining the 10 hour totals.

| Cumulative Variance: | | | | | | | | | | | 11,600 | | | 12,467 | 867 | -7.47% |

**Attributes:**

| | 10th St | | Market St |
| Weather: | Fair | | Fair |
| Temp. Range: | 74-93 | | 64-81 |
| Sidewalk Width: | 5 feet | | 15 feet |
| Facing Material: | Window w/ railing in front | | Masonry |
| Site Characteristics: | Across from Jefferson University Hospital Rothman Institute main entrance | | Main east - west arterial (spine) in Center City, Philadelphia |
| | Just south of Market Frankford Subway and Market East Commuter Rail Station | | Major retail corridor (The Gallery is across the street) |
| | | | Market Frankford Subway runs beneath and Market East Commuter Rail Station is across street |

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| 1 AM | 7 | 2 | 12 | 16 | 10 | 11 | 9 |
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| 9 PM | 21 | 18 | 38 | 22 | 14 | 36 | 28 |
| 10 PM | 22 | 15 | 45 | 14 | 14 | 22 | 31 |
| 11 PM | 14 | 11 | 33 | 15 | 4 | 14 | 14 |
| TOTAL | 1,991 | 1,182 | 1,247 | 674 | 487 | 1,407 | 1,454 |

PEDESTRIAN SEASONAL FACTOR:  0.962     EQUIPMENT FACTOR:  1.0622     AADP:  1,232

# A Multi-Pronged Approach to Cyclist and Pedestrian Counting



- **The FHWA Traffic Monitoring Guide identifies three main types of count programs**

**Permanent Count Program**

**Project Counts**

**Cyclical Count Program**

# Permanent Count Program

- Consists of sites where data is collected 24 hours a day, 365 days a year.

- These sites are organized into "factor groups" whose locations have similar travel characteristics.

- Data is used to develop seasonal correction factors, which when applied to short term counts yield AADB & AADP, the correlative to AADT.

# Permanent Bicycle and Pedestrian Counters

- **DVRPC installed 15 permanent counters on multi-use trails**

- **Counters use an infrared sensor and inductive loop to detect and distinguish bicycles from pedestrians**

- **Counters collect data continuously 365 days a year, 24 hours a day and wirelessly report data in 15 minute increments by direction and by mode**

# Trail Permanent Count Stations
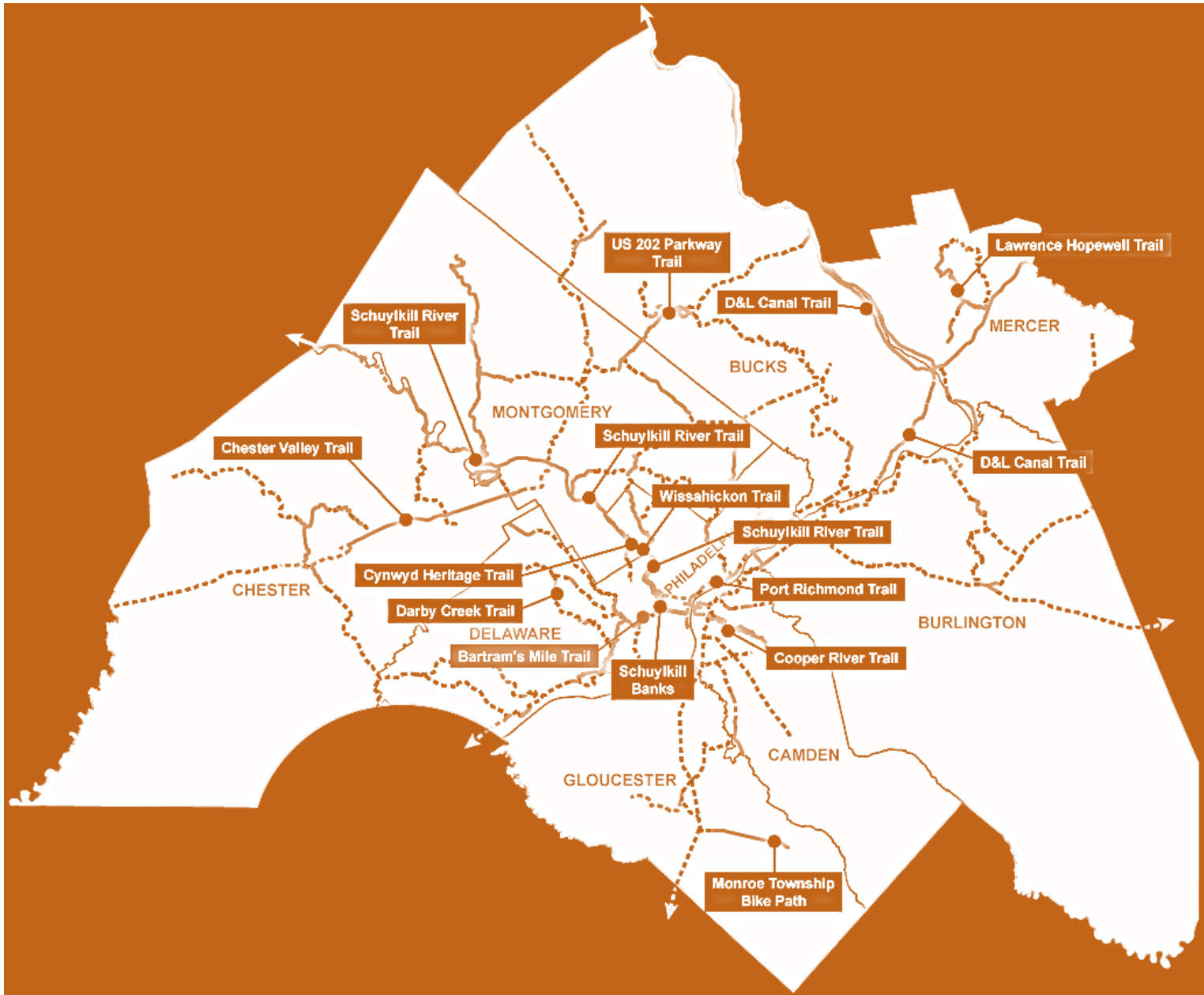
# Permanent Count Program

- When considering a site for a permanent installation, it is best to conduct a Short Duration Count (SDC) and graph the data to determine the travel pattern.

- Locations should be chosen not based on the highest volumes, but to achieve a mix of travel patterns which will aid in the development of seasonal correction factors.

# Permanent Station Factor Group Analysis

| Schuylkill River Trail @ Kelly Dr | | | | | | |
|---|---|---|---|---|---|---|
| | Weekday 04/15/15 | | Saturday 04/18/2015 | | Sunday 04/19/2015 | |
| | EB | WB | EB | WB | EB | WB |
| 12:00 AM | 0 | 0 | 1 | 3 | 0 | 1 |
| 12:15 AM | 0 | 1 | 0 | 0 | 1 | 5 |
| 12:30 AM | 0 | 0 | 0 | 2 | 1 | 1 |
| 12:45 AM | 0 | 0 | 0 | 1 | 0 | 0 |
| 1:00 AM - 11:45 PM (Not Shown) | | | | | | |
| 12:00 PM | 9 | 7 | 25 | 38 | 31 | 23 |
| 12:15 PM | 17 | 11 | 33 | 62 | 25 | 32 |
| 12:30 PM | 6 | 13 | 32 | 44 | 41 | 38 |
| 12:45 PM | 8 | 15 | 35 | 45 | 38 | 40 |
| 1:00 PM - 10:45 PM (Not Shown) | | | | | | |
| 11:00 PM | 0 | 0 | 0 | 1 | 0 | 0 |
| 11:15 PM | 0 | 1 | 1 | 1 | 1 | 1 |
| 11:30 PM | 0 | 0 | 2 | 4 | 0 | 0 |
| 11:45 PM | 0 | 0 | 1 | 2 | 0 | 2 |



Saturday
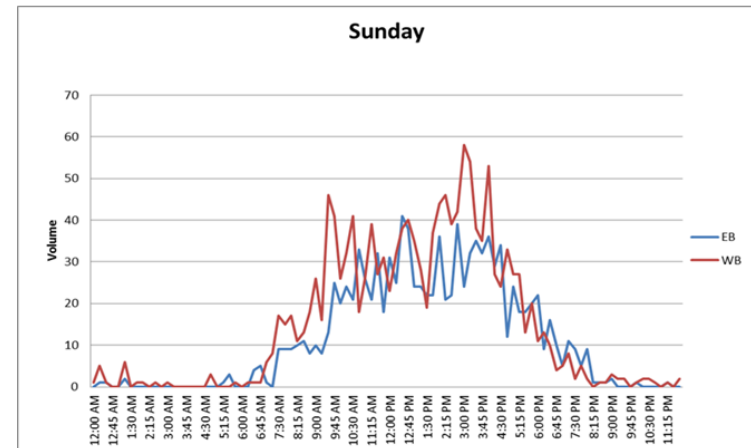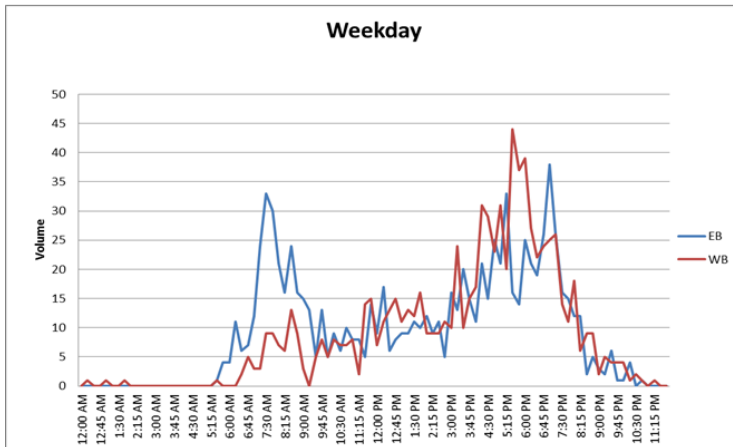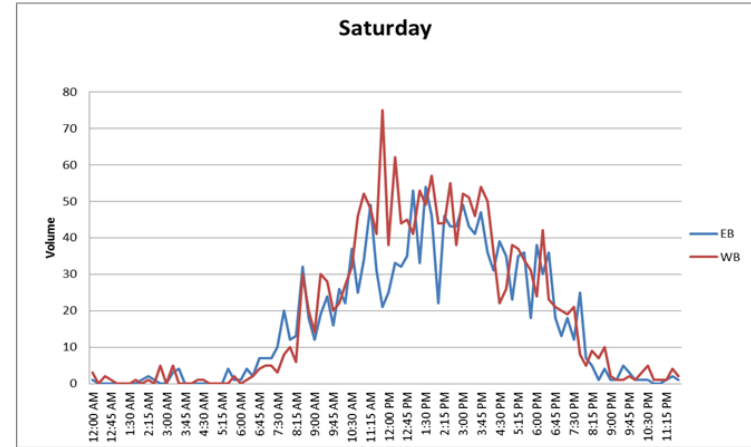


Weekday



Sunday

Conclusion: Mixed Utilitarian & Recreation Pattern Group

# Permanent Station Factor Group Analysis

| | Chester Valley Trail | | | | | |
|---|---|---|---|---|---|---|
| | Weekday 04/15/15 | | Saturday 04/18/2015 | | Sunday 04/19/2015 | |
| | EB | WB | EB | WB | EB | WB |
| 12:00 AM | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:15 AM | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 AM | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 AM | 0 | 0 | 0 | 0 | 0 | 0 |
| 1:00 AM - 11:45 PM (Not Shown) | | | | | | |
| 12:00 PM | 1 | 2 | 21 | 27 | 27 | 22 |
| 12:15 PM | 3 | 0 | 26 | 16 | 17 | 14 |
| 12:30 PM | 1 | 0 | 31 | 16 | 28 | 13 |
| 12:45 PM | 4 | 2 | 30 | 19 | 6 | 21 |
| 1:00 PM - 10:45 PM (Not Shown) | | | | | | |
| 11:00 PM | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:15 PM | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:30 PM | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 PM | 0 | 0 | 0 | 0 | 0 | 0 |
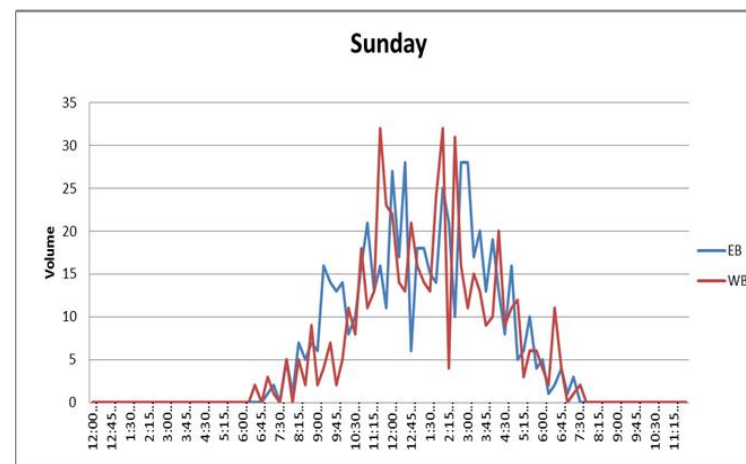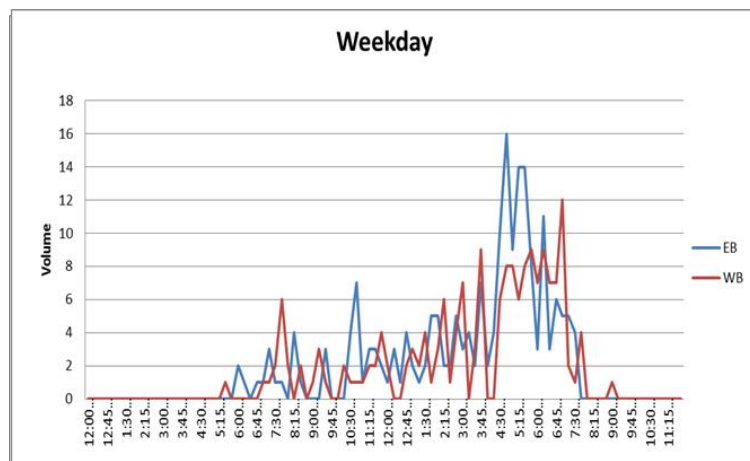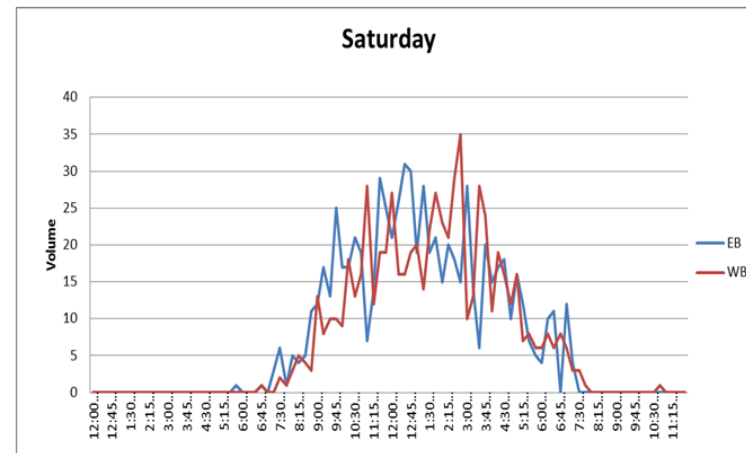


Conclusion: Recreation Pattern Group

# Cynwyd Heritage Trail Oct 19 – Nov 8, 2015

Manayunk Bridge Trail Opens
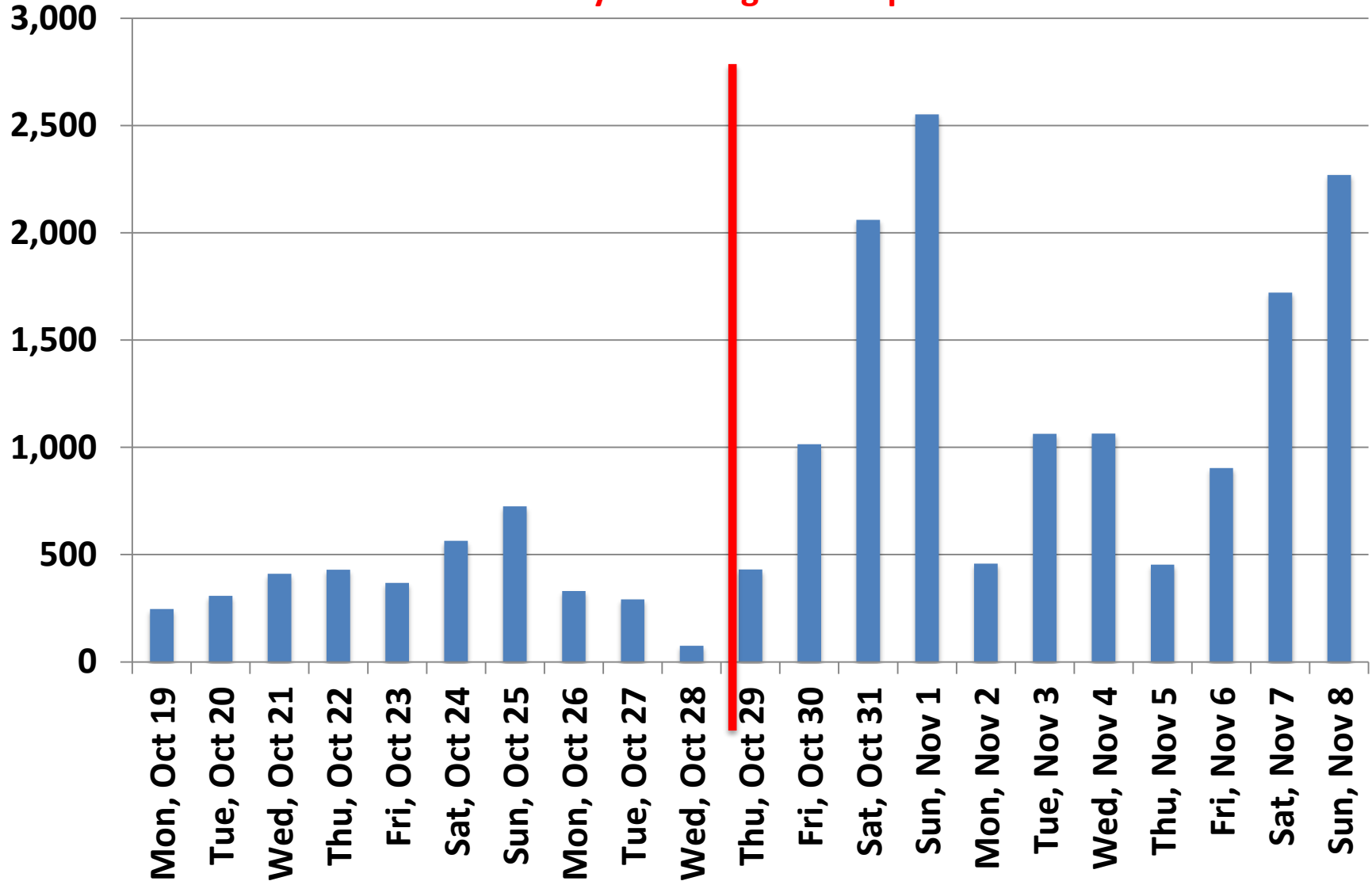
# Calculating the Seasonal Factors

## 2015 Mixed Utilitarian & Recreation Factor Group Seasonal Factor Calculation

| Month | Day | Day of Week | High Temp. | Low Temp. | Prevailing Conditions | SRT @ Kelly Dr | Wissahickon Trail | Daily Total | Seasonal Factor |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Date Components | Weather Information | Locations | Daily Total | Seasonal Factor |
| January | 1 | Thursday | 42 | 28 | CLEAR | 301 | 98 | 399 | 4.113 |
| | 2 | Friday | 44 | 29 | PTCLDY | 433 | 142 | 575 | 2.854 |
| | 3 | Saturday | 44 | 28 | RAIN | 123 | 67 | 190 | 8.638 |
| | | | | | January 4 - December 28 (Not Shown) | | | | |
| | 29 | Tuesday | 52 | 41 | RAIN | 228 | 46 | 274 | 5.990 |
| | 30 | Wednesday | 52 | 46 | CLOUDY | 555 | 155 | 710 | 2.312 |
| | 31 | Thursday | 52 | 42 | CLOUDY | 693 | 195 | 888 | 1.848 |
| Total: | | | | | | 457480 | 141554 | 599034 | |
| | | | | | | Factor Group Average Daily: | | 1641.19 | |

## 2015 Recreation Factor Group Seasonal Factor Calculation

| Month | Day | Day of Week | High Temp. | Low Temp. | Prevailing Conditions | Cooper River Trail | SRT @ Pawlings Rd | Daily Total | Seasonal Factor |
|---|---|---|---|---|---|---|---|---|---|
| January | 1 | Thursday | 42 | 28 | CLEAR | 16 | 62 | 78 | 6.716 |
| | 2 | Friday | 44 | 29 | PTCLDY | 21 | 108 | 129 | 4.061 |
| | 3 | Saturday | 44 | 28 | RAIN | 4 | 35 | 39 | 13.432 |
| | | | | | January 4 - December 28 (Not Shown) | | | | |
| | 29 | Tuesday | 52 | 41 | RAIN | 7 | 37 | 44 | 11.906 |
| | 30 | Wednesday | 52 | 46 | CLOUDY | 32 | 99 | 131 | 3.999 |
| | 31 | Thursday | 52 | 42 | CLOUDY | 27 | 189 | 216 | 2.425 |
| Total: | | | | | | 25720 | 165478 | 191203 | |
| | | | | | | Factor Group Average Daily: | | 523.84 | |

## 2015 Low Volume Evenly Distributed Factor Group Seasonal Factor Calculation

| Month | Day | Day of Week | High Temp. | Low Temp. | Prevailing Conditions | Cynwyd Heritage Trail | Lawrence Hopewell Trail | Port Richmond Trail | Daily Total | Seasonal Factor |
|---|---|---|---|---|---|---|---|---|---|---|
| January | 1 | Thursday | 42 | 28 | CLEAR | 25 | 4 | 2 | 31 | 6.989 |
| | 2 | Friday | 44 | 29 | PTCLDY | 30 | 22 | 5 | 57 | 3.801 |
| | 3 | Saturday | 44 | 28 | RAIN | 6 | 7 | 0 | 13 | 16.665 |
| | | | | | January 4 - December 28 (Not Shown) | | | | | |
| | 29 | Tuesday | 52 | 41 | RAIN | 10 | 5 | 1 | 16 | 13.540 |
| | 30 | Wednesday | 52 | 46 | CLOUDY | 48 | 11 | 17 | 76 | 2.851 |
| | 31 | Thursday | 52 | 42 | CLOUDY | 104 | 17 | 5 | 126 | 1.719 |
| Total: | | | | | | 55142 | 16713 | 7210 | 79076 | |
| | | | | | | Factor Group Average Daily: | | | 216.65 | |

# Weather & the Seasonal Factors

| Date Components | | | Weather Information | | | | | Locations | | | Daily Total | | Seasonal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | High | Low | Prevailing | | | SRT @ | Wissahickon | | | | Factor |
| Month | Day | Day of Week | Temp. | Temp. | Conditions | | | Kelly Dr | Trail | | | | |
| February | 1 | Sunday | 39 | 21 | SNOW | | | 268 | 100 | | 368 | | 4.460 |
| | 2 | Monday | 41 | 23 | RAIN | | | 64 | 9 | | 73 | | 22.482 |
| | 3 | Tuesday | 30 | 20 | CLEAR | | | 154 | 31 | | 185 | | 8.871 |
| | 4 | Wednesday | 47 | 23 | CLOUDY | | | 408 | 83 | | 491 | | 3.343 |
| | 5 | Thursday | 41 | 17 | PTCLDY | | | 169 | 47 | | 216 | | 7.598 |
| | 6 | Friday | 32 | 14 | PTCLDY | | | 156 | 30 | | 186 | | 8.824 |
| | 7 | Saturday | 44 | 21 | CLOUDY | | | 531 | 127 | | 658 | | 2.494 |
| | 8 | Sunday | 51 | 33 | CLOUDY | | | 859 | 208 | | 1067 | | 1.538 |
| | 9 | Monday | 37 | 28 | CLOUDY | | | 94 | 19 | | 113 | | 14.524 |
| | 10 | Tuesday | 42 | 28 | PTCLDY | | | 189 | 30 | | 219 | | 7.494 |
| | 11 | Wednesday | 39 | 26 | CLEAR | | | 284 | 67 | | 351 | | 4.676 |
| | 12 | Thursday | 41 | 20 | CLOUDY | | | 250 | 64 | | 314 | | 5.227 |
| | 13 | Friday | 24 | 10 | CLEAR | | | 89 | 26 | | 115 | | 14.271 |
| | 14 | Saturday | 32 | 18 | SNOW | | | 111 | 37 | | 148 | | 11.089 |
| | 15 | Sunday | 21 | 9 | CLEAR | | | 5 | 6 | | 11 | | 149.199 |
| | 16 | Monday | 17 | 3 | PTCLDY | | | 50 | 11 | | 61 | | 26.905 |
| | 17 | Tuesday | 28 | 13 | PTCLDY | | | 65 | 13 | | 78 | | 21.041 |
| | 18 | Wednesday | 32 | 11 | PTCLDY | | | 122 | 16 | | 138 | | 11.893 |
| | 19 | Thursday | 23 | 8 | PTCLDY | | | 71 | 15 | | 86 | | 19.084 |
| | 20 | Friday | 18 | 2 | CLEAR | | | 50 | 5 | | 55 | | 29.840 |
| | 21 | Saturday | 34 | 9 | SNOW | | | 38 | 13 | | 51 | | 32.180 |
| | 22 | Sunday | 47 | 33 | RAIN | | | 42 | 4 | | 46 | | 35.678 |
| | 23 | Monday | 37 | 13 | PTCLDY | | | 70 | 1 | | 71 | | 23.115 |
| | 24 | Tuesday | 25 | 7 | PTCLDY | | | 81 | 4 | | 85 | | 19.308 |
| | 25 | Wednesday | 38 | 15 | PTCLDY | | | 157 | 7 | | 164 | | 10.007 |
| | 26 | Thursday | 32 | 26 | CLOUDY | | | 116 | 6 | | 122 | | 13.452 |
| | 27 | Friday | 31 | 22 | PTCLDY | | | 115 | 1 | | 116 | | 14.148 |
| | 28 | Saturday | 32 | 16 | CLEAR | | | 152 | 14 | | 166 | | 9.887 |

# Locations – Cyclical Count Program

# Determining a SDC Factor Pattern Group

## Schuylkill River Trail  Schuylkill River Park - Locust St

| TIME | Weekday 09/09/15 EB | Weekday 09/09/15 WB | Saturday 09/05/2015 EB | Saturday 09/05/2015 WB | Sunday 09/06/2015 EB | Sunday 09/06/2015 WB |
|---|---|---|---|---|---|---|
| 10:00 AM | 7 | 4 | 13 | 9 | 30 | 15 |
| 10:15 AM | 12 | 11 | 16 | 26 | 14 | 25 |
| 10:30 AM | 10 | 10 | 26 | 35 | 12 | 30 |
| 10:45 AM | 7 | 7 | 24 | 43 | 28 | 20 |
| 11:00 AM | 11 | 5 | 42 | 25 | 17 | 24 |
| 11:15 AM | 9 | 11 | 24 | 31 | 26 | 18 |
| 11:30 AM | 11 | 7 | 12 | 25 | 17 | 34 |
| 11:45 AM | 3 | 3 | 6 | 13 | 16 | 17 |
| 12:00 PM | 6 | 4 | 20 | 8 | 14 | 13 |
| 12:15 PM | 7 | 11 | 37 | 29 | 19 | 25 |
| 12:30 PM | 9 | 7 | 9 | 15 | 12 | 15 |
| 12:45 PM | 9 | 4 | 16 | 9 | 12 | 16 |
| 1:00 PM | 9 | 4 | 12 | 28 | 29 | 18 |
| 1:15 PM | 9 | 7 | 15 | 15 | 13 | 13 |
| 1:30 PM | 7 | 4 | 17 | 13 | 12 | 11 |
| 1:45 PM | 9 | 10 | 30 | 16 | 14 | 15 |
| 2:00 PM | 10 | 6 | 19 | 17 | 9 | 12 |



Saturday
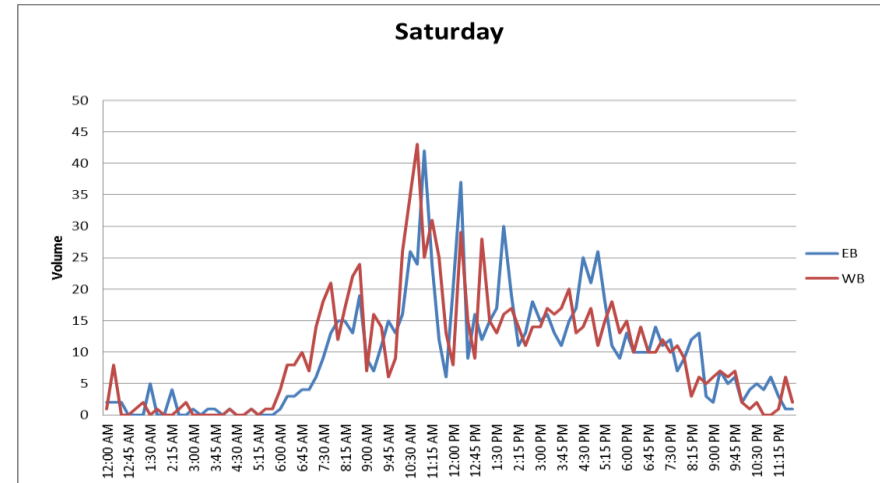


Weekday
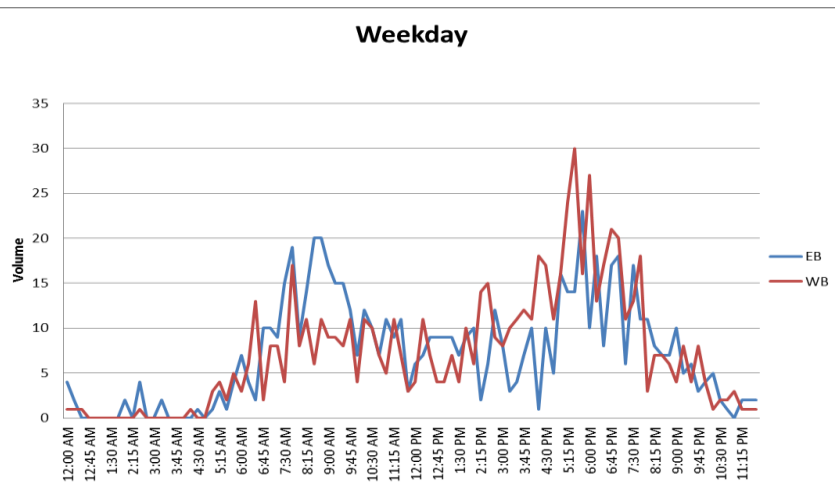


Sunday
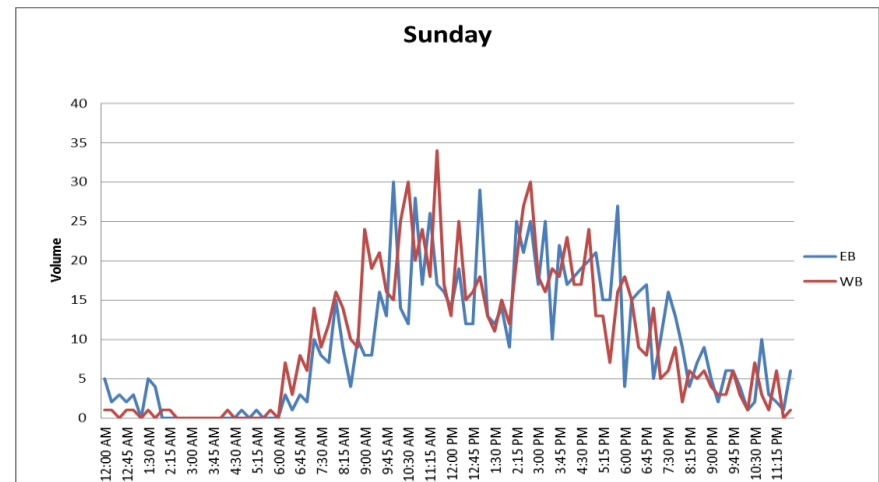
# Summary

- Validate equipment when new and annually thereafter to calculate Equipment Factor.

- Conduct SDC at candidate permanent site to determine travel pattern.  Select sites to get a varied mix.

- Group permanent sites by travel pattern (factor groups) and use volumes to calculate seasonal correction factors for a given year.

- Graph SDC data to assign location to a factor group.

- Apply equipment and seasonal factors to estimate AADB / AADP.

# Thank You



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Delaware Valley Regional
Planning Commission

# FHWA Count Pilot Project & Traffic Monitoring Analysis System

**Jeremy Raw, P.E.**
**Office of Planning**
**Federal Highway Administration**
**February 21, 2017**

New Partners for Smart Growth, St. Louis, MO

U.S. Department of Transportation
**Federal Highway Administration**

# Bike/Ped Count Technology Pilot



U.S. Department of Transportation
**Federal Highway Administration**

**FHWA Bicycle-Pedestrian Count**
Technology Pilot Project

*SUMMARY REPORT*

**DECEMBER 2016**
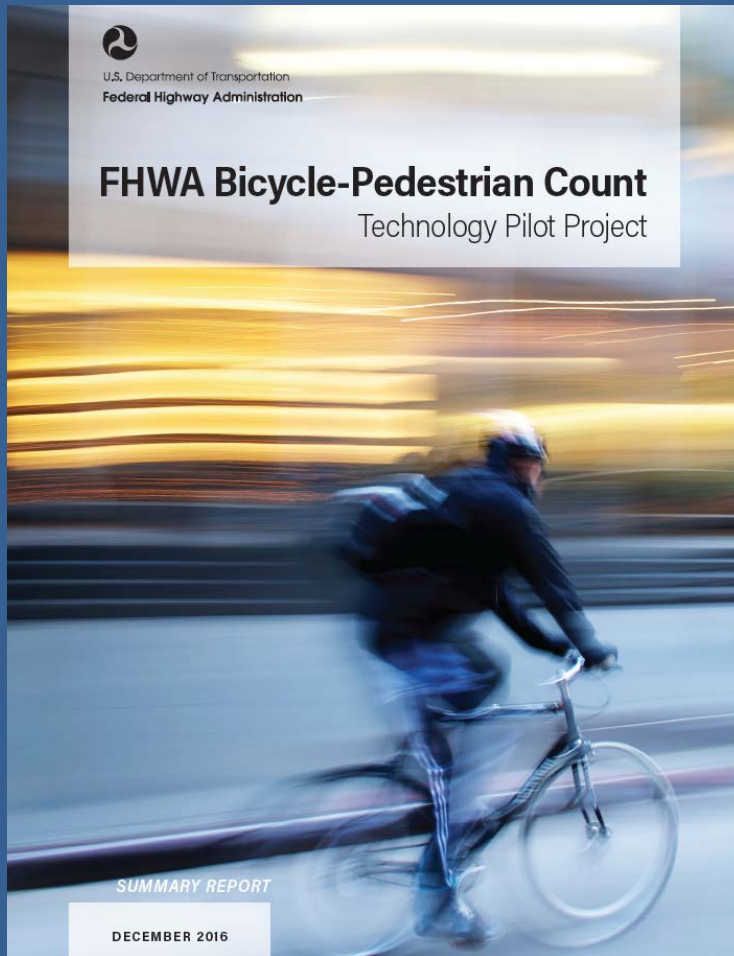
- What does it take to start a program?
- Funded 10 agencies ($20K each)
- Documentation
- Technical support

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/countpilot/

U.S.Department of Transportation
**Federal Highway Administration**

# Bike/Ped Count Pilot Locations

# Traffic Monitoring Analysis System



- National database of counts

- Standard data format

- Consistent quality checks

- Goals:

  - Monitor Trends

  - Support Research (e.g. Forecasting, Safety)

  - Transportation System Performance Management

https://www.fhwa.dot.gov/policyinformation/travelmonitoring.cfm

U.S. Department of Transportation
**Federal Highway Administration**

# TMAS Motorized

- All automated motorized counts across US
- Basis for FHWA Traffic Volume Trends
- Complements Highway Performance Monitoring System (HPMS)
- Data submitted monthly by each State DOT

# TMAS Non-Motorized

- Not (yet) a comprehensive database
- Any agency can submit (not just State DOTs)
- User account required
- Open for submissions within 2017

- Pilot submission projects at several State DOTs

# TMAS Data Submission

- Data in Traffic Monitoring Guide Format
- Quality Checking is comprehensive
  - No garbage allowed!
- Data must pass the checks to get in
  - Initially, err in the direction of allowing data
  - "Questionable" data will be flagged

# TMAS Contacts

- Steven Jessberger (Highway Policy Information)
  steven.jessberger@dot.gov
  202-366-5052


- Jeremy Raw (Office of Planning)
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U.S.Department of Transportation
**Federal Highway Administration**

# TMG Format Guidance

February 21st, 2017



NOVEMBER 2016

CODING NONMOTORIZED STATION LOCATION INFORMATION IN THE 2016 TRAFFIC MONITORING GUIDE FORMAT

U.S. Department of Transportation
**Federal Highway Administration**
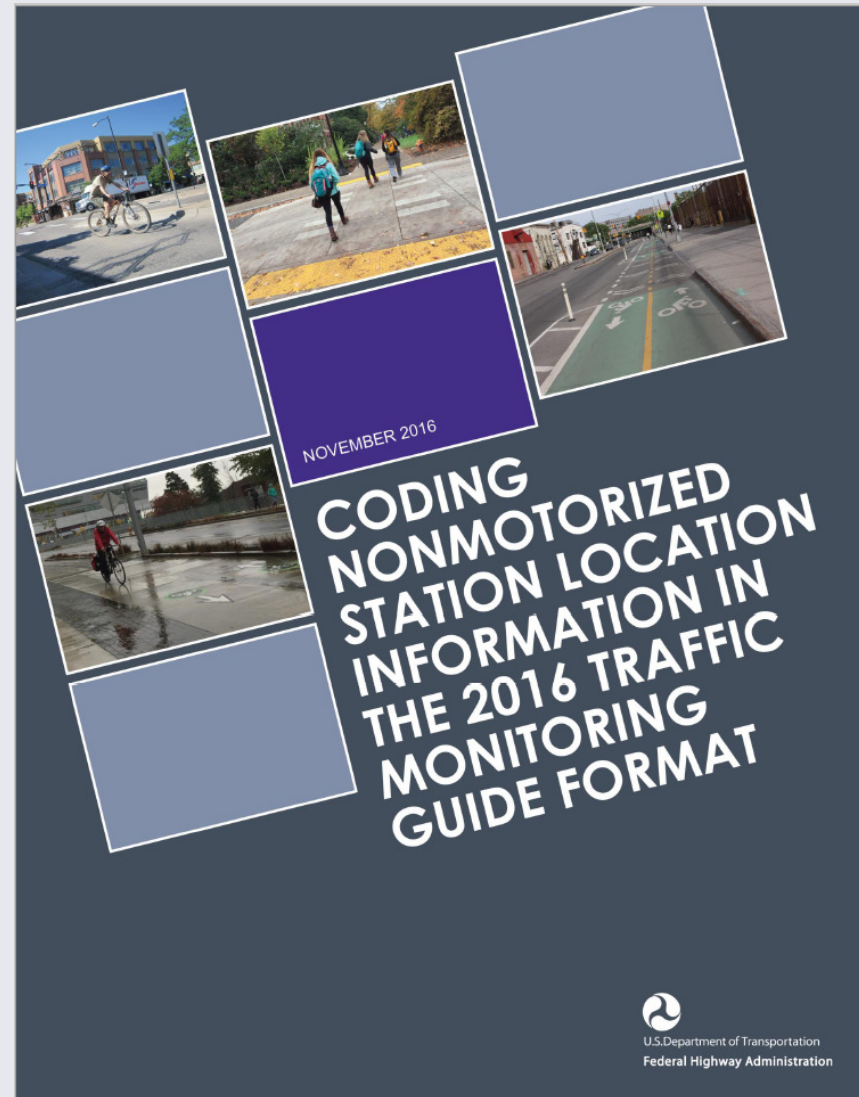
# Guidebook Organization

- TMG format
- Count station description (location)
- Count data
- Collecting multiple counts at single location
- Facility types and counting examples



NOVEMBER 2016

CODING NONMOTORIZED STATION LOCATION INFORMATION IN THE 2016 TRAFFIC MONITORING GUIDE FORMAT

U.S.Department of Transportation
Federal Highway Administration
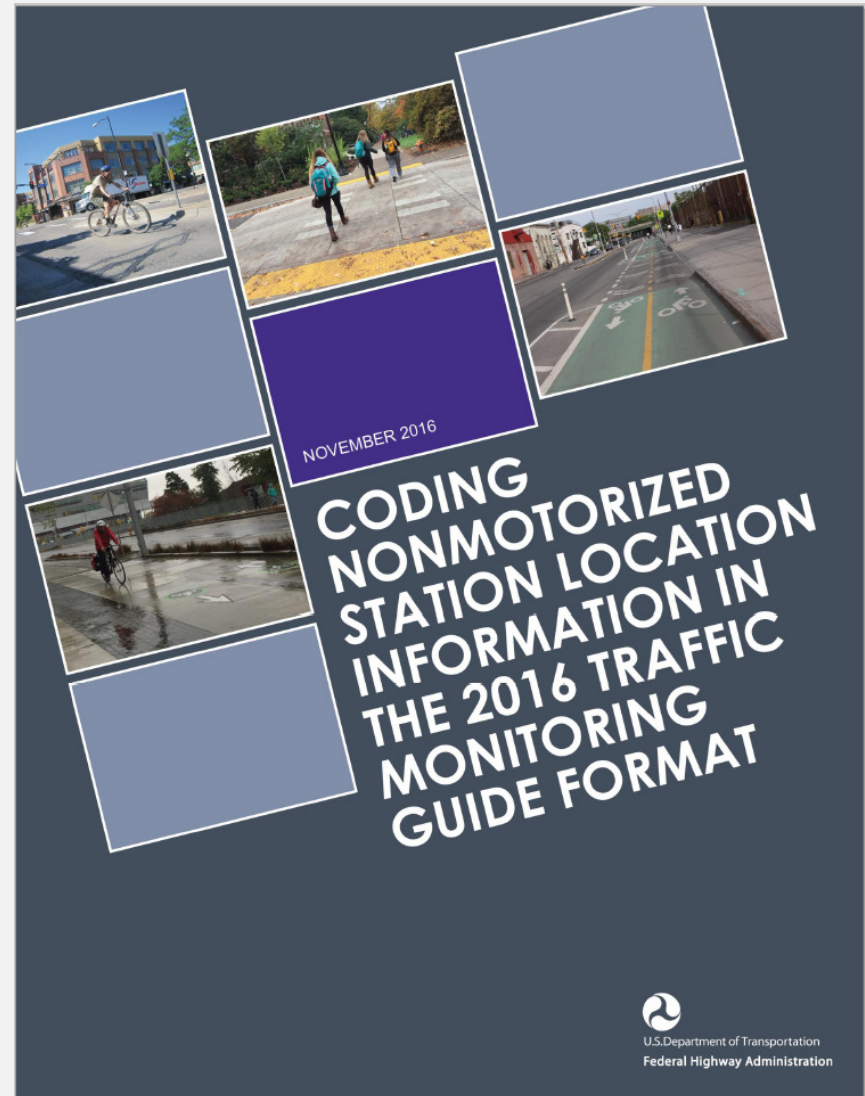
# TMG Format

- Sections 7.9 and 7.10 of the TMG

- Intent to create flexible, comprehensive data format

- This guidebook's goal is to make the format accessible

Federal Highway Administration Traffic Monitoring Guide

**Traffic Monitoring Guide**

Updated: October 2016

U.S. Department of Transportation
**Federal Highway Administration**

# TMG Format



When counts are collected
How many users are counted
→ Nonmotorized count record (N)

Where counts are collected
What is counted
How counts are collected
→ Count station description record (L)

# Count Station Description (Location)

- Describes primarily where the count was collected, as well as what was counted and how it was counted

**Location:** shared use path with pedestrians and cyclists traveling in both directions

**To count:**
→ Total number of multimodal users = **1** station location record
→ Total number of cyclists and total number of pedestrians = **2** station location records
→ Number of pedestrians in each direction = **2** station location records

# Count Station Description (Location)

- Guidebook walks through each field of the station location

- Provides description of the field, graphical explanation, and example

# Count Station Description (Location)

- Guidebook will ... [...] ... finish of the station locat[...]

- Provides des[...] explanation,

| Code | Type of Count | |
|------|---------------|---|
| 0 | Other animals specify in Field 32, Other Notes | |
| 1 | Pedestrians (only) | |
| 2 | Bicycles (only) | |
| 3 | Equestrians (only) | |
| 4 | Person in Wheelchairs | |
| 5 | Persons using other pedestrian assistive devices i.e. skates, skateboards, Segway®, hoverboards, etc. | |
| 6 | Motorized vehicles on a trail e.g. snowmobiles, all-terrain vehicles, etc. | |
| 7 | All pedestrians and bicycles Sum code 1 and 2 | |
| 8 | All nonmotorized traffic Sum codes 1-5 | |
| 9 | All traffic on a trail Sum codes 1-6 | |

*6b*

# Count Station Description (Location)



6c

# Count Data

- Describes the count data collected
- Repeats some fields from the Station Location record
- Describes conditions of count (i.e. weather)
- Option to include additional data about count subject

# Count Data

- Des
- Rep                                                    ocation
  reco
- Des                                          her)
- Opt                                          count
  subj
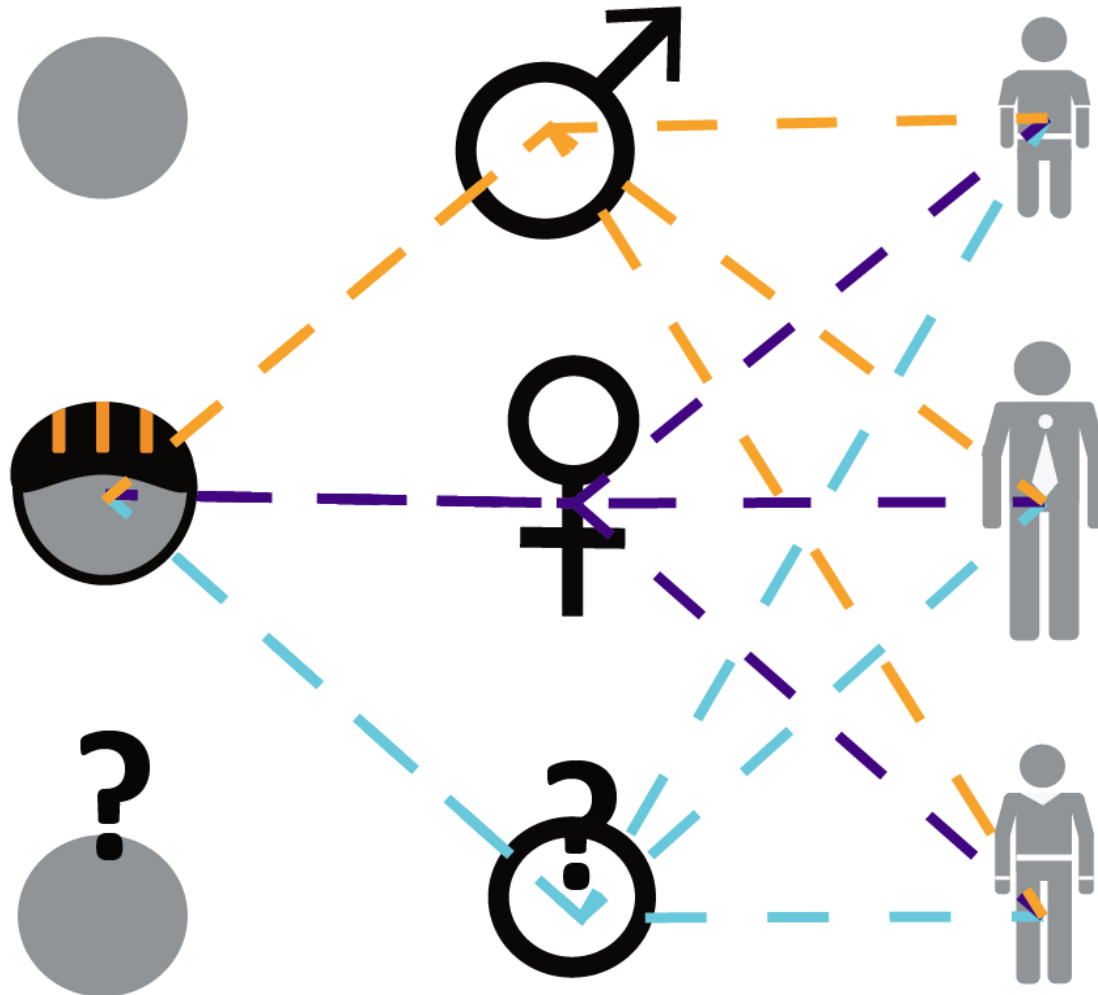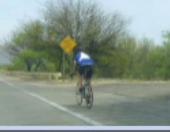
# Station Location Examples

- Guidebook includes 29 examples organized by type

- Provides guidance specific to each example type

# Station Location Examples

Chapter 6 | Facility Types and Counting Examples

## EXAMPLE 1: NE MULTNOMAH STREET BUFFERED BIKE LANE

The example below walks through setting up the station location record for a count collected on NE Multnomah Street, a roadway with buffered bicycle lanes. The roadway generally runs east/west and the direction will be considered east since the building numbers increase heading east. For this example, cyclists traveling in the westbound direction are being counted. A second count station description would be needed to report eastbound riders, with the same station ID used to link the counts to the same place. Exhibit 29 illustrates the location of count relative to the roadway and direction of movement.

Exhibit 29.  **NE MULTNOMAH STREET LOOKING WEST (TOP), GRAPHIC SHOWING AERIAL VIEW (BOTTOM)**
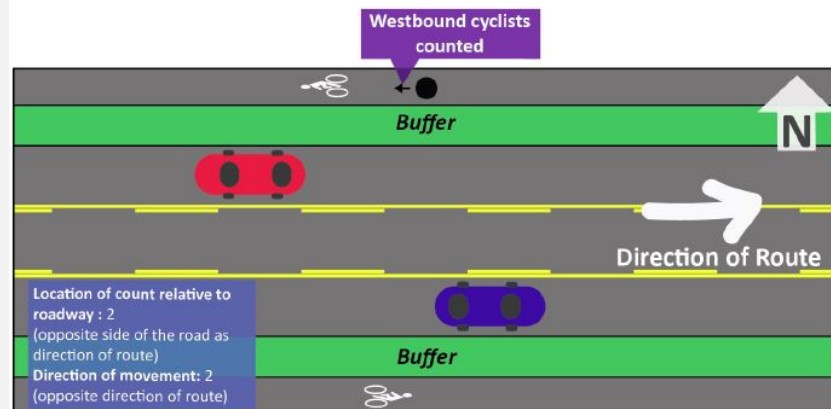
Westbound cyclists counted

Buffer

N

Direction of Route

Buffer

Location of count relative to roadway : 2
(opposite side of the road as direction of route)
Direction of movement: 2
(opposite direction of route)

**TABLE 23.  STATION LOCATION DATA FIELDS – NE MULTNOMAH STREET BUFFERED BIKE LANE**

| Field | Description | Type | Entry | Notes |
|---|---|---|---|---|
| 1 | Nonmotorized station/location record identifier (L) | C | L | L indicates this is a count station/location |
| 2 | State FIPS Code | C | 41 | Oregon's code is 41 |
| 3 | County FIPS Code | C | 051 | Multnomah County's code is 051 |
| 4 | Station ID | C | MULTBB | Indicates count on NE Multnomah Street buffered bike lanes (this ID is used to link other counts taken at the same "place," like eastbound bicyclists) |
| 5 | Functional classification of the roadway | C | 7U | An urban, local roadway |
| 6 | Direction of route | C | 3 | East, to correspond with increasing building numbers |
| 7 | Location of count relative to roadway | C | 2 | Count is taken on the opposite side of the road from the listed direction of route (left side of the road when facing east) |
| 8 | Direction of movement | C | 2 | Travel westbound (occurring opposite the direction of route) is being counted |
| 9 | Facility type | C | 7 | Count is collected in a physically separated bicycle lane |
| 10 | Intersection | O | 0 | Not at an intersection |
| 11 | Type of count | C | 2 | Only bicycles are counted |
| 12 | Method of counting | C | 2 | Portable traffic recording device used for the counts |
| 13 | Type of Sensor | O | R | Air tube is used for the counts |
| 14 | Year of Data | C | 2016 | |
| 15 | Factor Group 1 | O | | |
| 16 | Factor Group 2 | O | | |
| 17 | Factor Group 3 | O | | |
| 18 | Factor Group 4 | O | | |
| 19 | Factor Group 5 | O | | |
| 20 | Primary count purpose | O | P | Count taken to report use of corridor by bicyclists |
| 21 | Posted speed limit | O | 25 | 25 miles per hour posted speed limit |
| 22 | Year station established | C | 2016 | |
| 23 | Year station discontinued | O | | |
| 24 | National highway system | O | N | |
| 25 | Latitude | C | 45531594 | Indicates location of device for data collection |
| 26 | Longitude | C | 122659219 | |
| 27 | Posted route signing | O | _1 | Route is not signed |
| 28 | Posted signed route number | O | | |
| 29 | LRS identification | O | | There is no LRS for this location |
| 30 | LRS location point | O | | |
| 31 | Station location | O | | Multnomah St E. of NE 6th Ave, buffered bike lane |
| 32 | Other notes | O | | Dir of route based on ascending building numbers |

*9*

# Thank you!

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# Questions?

⇨ **Archive at www.pedbikeinfo.org/webinars**
Download a video recording and presentation slides

⇨ **Questions?**

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Pedestrian and Bicycle
Information Center