



# TRB Tools of the Trade Conference Summary of Presentations

Josh Corrigan (MAPA) and Jason Carbee (HDR)

# OVERVIEW

- Transportation Research Board ADA30:  
Transportation Planning In Small & Medium Sized  
Communities
- Charleston, SC
- September 12-14, 2016
- **NOTE: Material presented is from other  
presenters' work. Please cite / copyright as  
appropriate.**



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Transportation Research Board ADA30

## TRANSPORTATION PLANNING IN SMALL & MEDIUM SIZED COMMUNITIES

As a committee of the National Academies' Transportation Research Board, our mission is to disseminate information on the factors related to the planning, development, programming and implementation of multi-modal transportation facilities for small and medium sized communities.

**Tools of the Trade  
Conference**

[Register & Learn More](#)

# Workshop: Data Needs for Long Range Planning

**Penelope Weinberger**

**Charlynn Burd**

**Jeremy Raw**

**Jasmy Methipara**

# Penelope Weinberger – CTPP Program

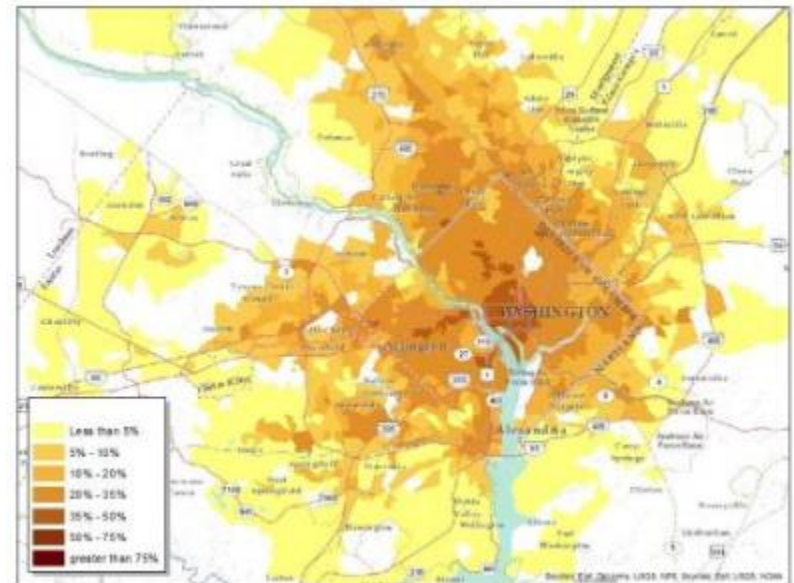
- Expect next CTPP (2012-2016) in 2018
- Training Materials:
  - AASHTO CTPP Website
    - <http://ctpp.transportation.org/Pages/trainingresources.aspx>
  - E-Learning
    - <http://ctpp.transportation.org/Pages/elearningmodules.aspx>
  - Recorded Webinars
    - <http://ctpp.transportation.org/Pages/webinardirectory.aspx>

# Charlynn Burd – ACS Program

- County-to-County Commuting Flows
  - [www.census.gov/hhes/commuting/data/commutingflows.html](http://www.census.gov/hhes/commuting/data/commutingflows.html)
  - For years: 1990, 2000, 2006-10, 2009-13
- 2014 ACS Supplemental Tables released on FactFinder in late July
  - Available for selected geographies of at least 20K
  - Tables use prefix “K” for basic commuting tables:
    - K200801 Means of transportation to work
    - K200801 Travel time to work
- Shapefiles with Pre-Joined ACS Data
  - <https://www.census.gov/geo/maps-data/data/tiger-data.html>

# Jeremy Raw – FHWA Data Resources

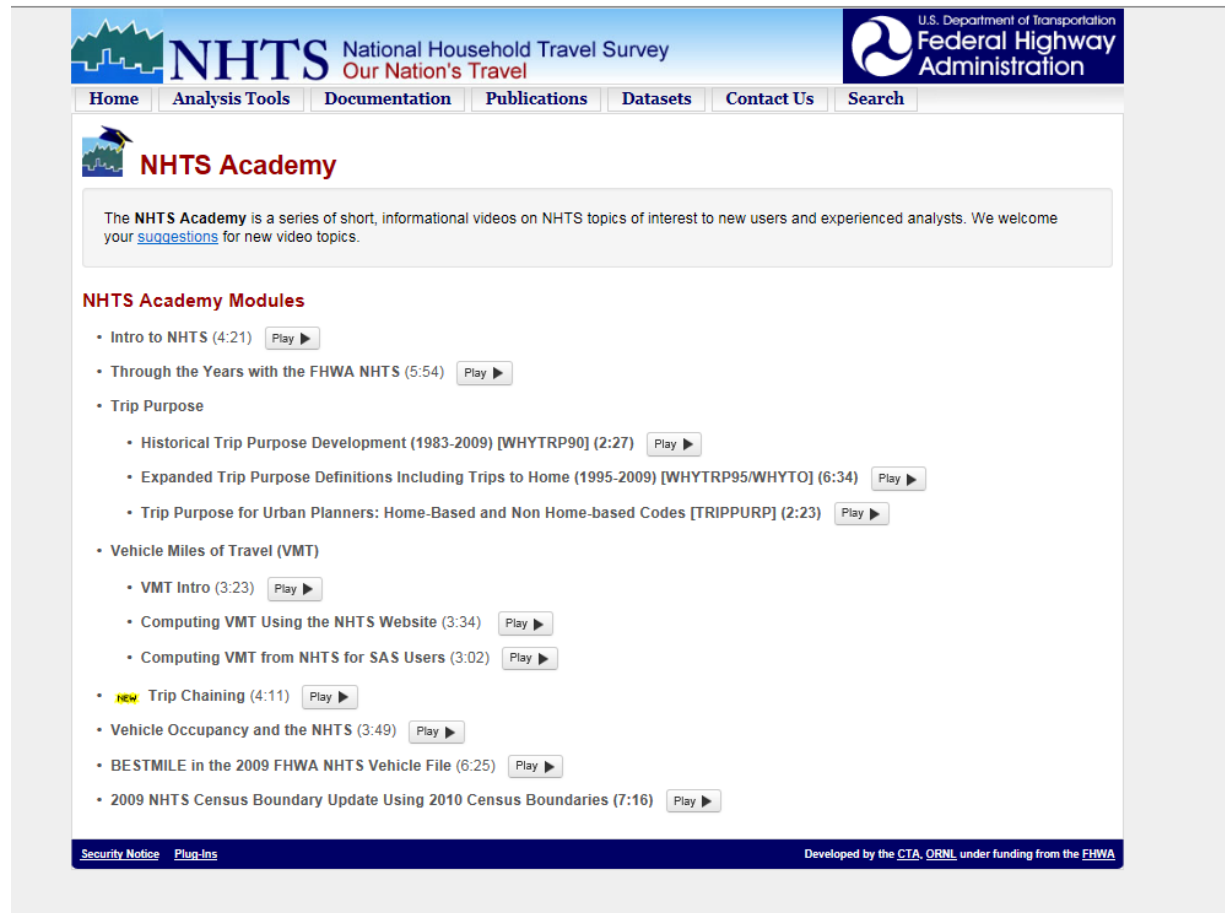
- Topics Included:
  - National Performance Management Research Data Set (NPMRDS)
  - Highway Performance Monitoring System (HPMS)
  - Freight Analysis Framework (FAF):
    - Disaggregation of FAF data – Standard Methodology
  - HEP GIS (Web Portal for Planning Data)
  - Smart Location Database (from EPA)
    - <https://www.epa.gov/smartgrowth/smart-location-mapping>





# Jasmy Methipara – NHTS

- NHTS Academy
  - <http://nhts.ornl.gov/academy.shtml>



The screenshot shows the NHTS Academy website. At the top, there is a header with the NHTS logo (a green mountain and blue sky) and the text "NHTS National Household Travel Survey Our Nation's Travel". To the right of the header is the U.S. Department of Transportation Federal Highway Administration logo. Below the header is a navigation bar with links: Home, Analysis Tools, Documentation, Publications, Datasets, Contact Us, and Search. The main content area features the NHTS Academy logo and a description: "The NHTS Academy is a series of short, informational videos on NHTS topics of interest to new users and experienced analysts. We welcome your [suggestions](#) for new video topics." Below this is a section titled "NHTS Academy Modules" with a list of video topics and their durations, each with a "Play" button. The topics are: Intro to NHTS (4:21), Through the Years with the FHWA NHTS (5:54), Trip Purpose (with sub-topics: Historical Trip Purpose Development (1983-2009) [WHYTRP90] (2:27), Expanded Trip Purpose Definitions Including Trips to Home (1995-2009) [WHYTRP95/WHYTO] (6:34), and Trip Purpose for Urban Planners: Home-Based and Non Home-based Codes [TRIPPURP] (2:23)), Vehicle Miles of Travel (VMT) (with sub-topics: VMT Intro (3:23), Computing VMT Using the NHTS Website (3:34), and Computing VMT from NHTS for SAS Users (3:02)), Trip Chaining (4:11), Vehicle Occupancy and the NHTS (3:49), BESTMILE in the 2009 FHWA NHTS Vehicle File (6:25), and 2009 NHTS Census Boundary Update Using 2010 Census Boundaries (7:16). At the bottom of the page, there is a footer with links for "Security Notice" and "Plug-Ins", and a note that the website was developed by the CTA, ORNL, under funding from the FHWA.

**NHTS** National Household Travel Survey  
Our Nation's Travel

U.S. Department of Transportation  
Federal Highway Administration

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**NHTS Academy**

The NHTS Academy is a series of short, informational videos on NHTS topics of interest to new users and experienced analysts. We welcome your [suggestions](#) for new video topics.

**NHTS Academy Modules**

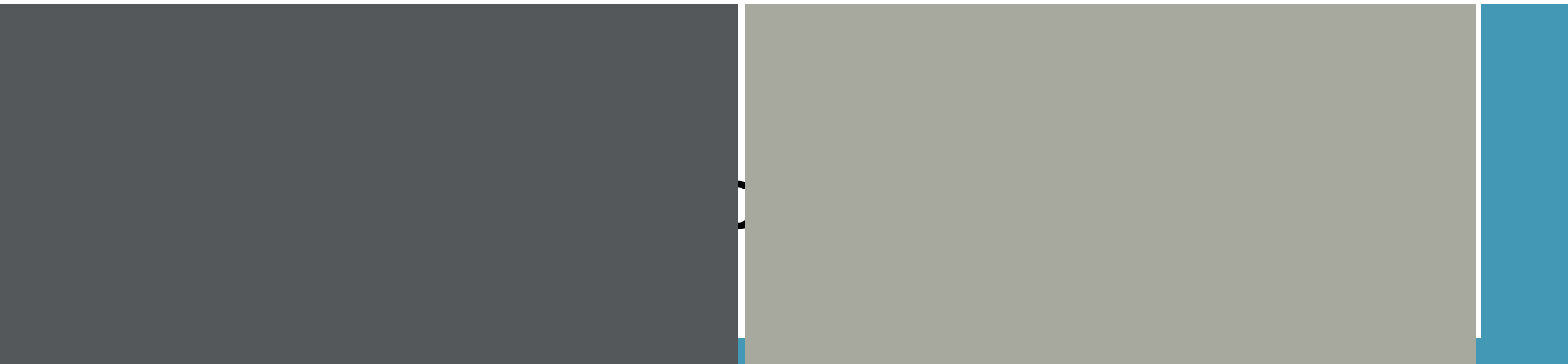
- Intro to NHTS (4:21) [Play ▶](#)
- Through the Years with the FHWA NHTS (5:54) [Play ▶](#)
- Trip Purpose
  - Historical Trip Purpose Development (1983-2009) [WHYTRP90] (2:27) [Play ▶](#)
  - Expanded Trip Purpose Definitions Including Trips to Home (1995-2009) [WHYTRP95/WHYTO] (6:34) [Play ▶](#)
  - Trip Purpose for Urban Planners: Home-Based and Non Home-based Codes [TRIPPURP] (2:23) [Play ▶](#)
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  - Computing VMT from NHTS for SAS Users (3:02) [Play ▶](#)
- **new** Trip Chaining (4:11) [Play ▶](#)
- Vehicle Occupancy and the NHTS (3:49) [Play ▶](#)
- BESTMILE in the 2009 FHWA NHTS Vehicle File (6:25) [Play ▶](#)
- 2009 NHTS Census Boundary Update Using 2010 Census Boundaries (7:16) [Play ▶](#)

[Security Notice](#) [Plug-Ins](#)

Developed by the CTA, ORNL, under funding from the FHWA



## C2: Advances in Data Collection & Analytics



# **Innovative Analysis Methods of Mobile Phone Data in the Best Travel Demand Modeling Practice in Kentucky**

Yang Han, PhD, PE (The Corradino Group)

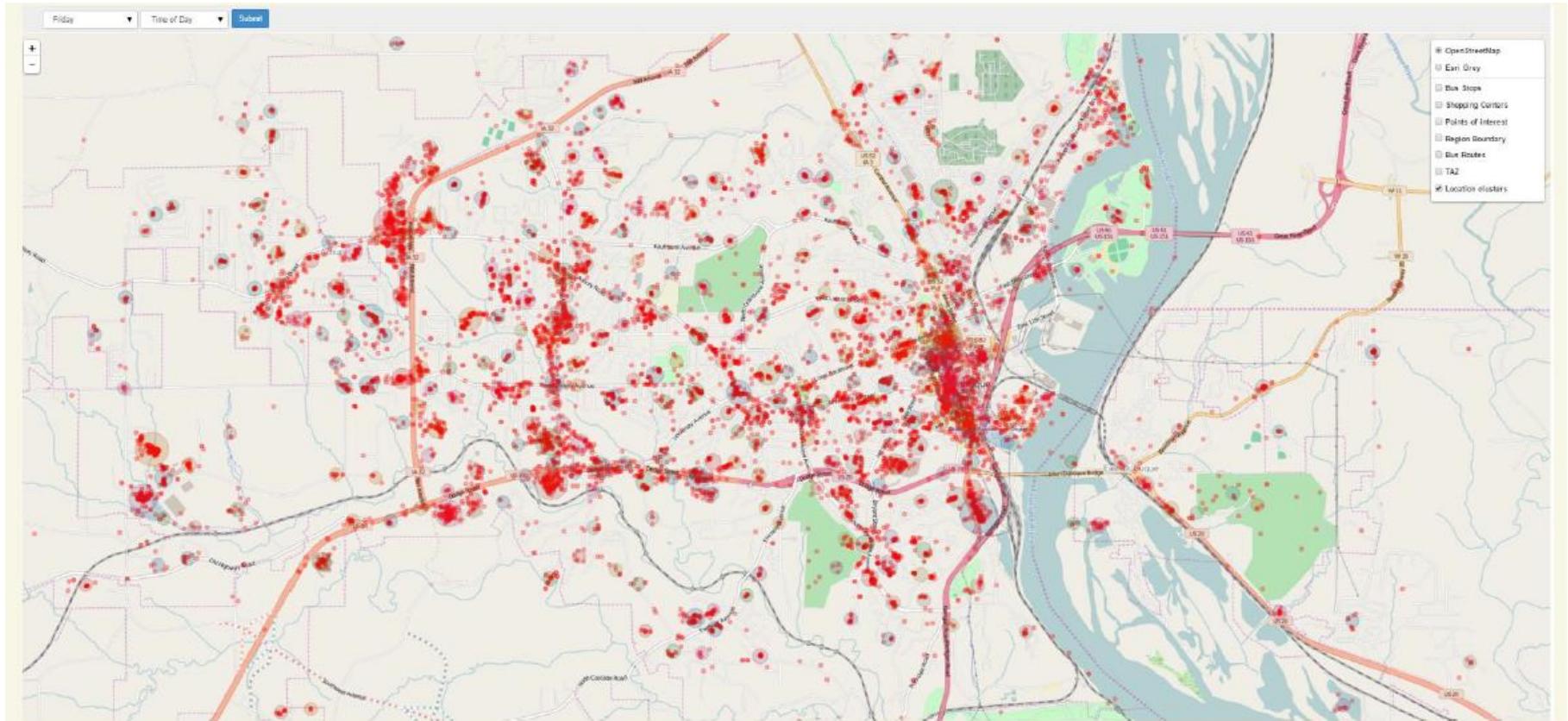
- AirSage Data to Support All 3 Steps of Regional Models
- Subarea Assessment of Data Completeness
- Findings:
  - Intrazonal Trip Generation was High
  - Trip Rate results “choppy” by Region – Factor by Purpose and Area Type to Correct
  - Trip Distribution – Gravity Model Calibration Function and ODME
  - Time-of-Day / Directional Factors – AirSage seemed reasonable
- Note: AirSage assumes Trip Purpose by pattern only. Some HBW trips might be “habitual” HBO trips.

# Dubuque Smarter Travel

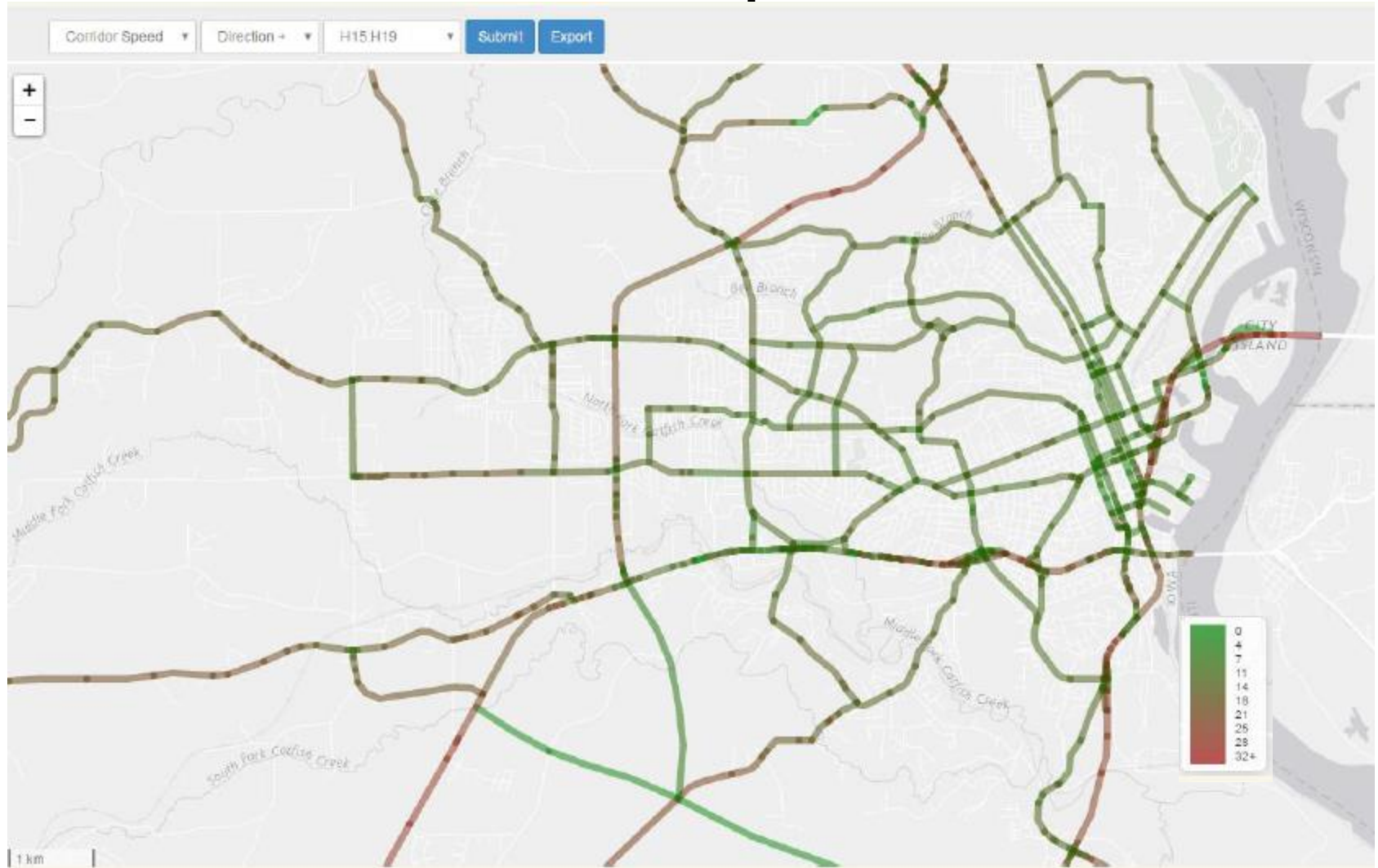
Chandra Ravada

- IBM / MPO Collaboration on Integrated Survey Approach
  - Smart Phone + Travel Diary = Better Data
- Project Outcomes: 1) Transit Route Optimization, 2) Adjust Signal Timing, Reduce Accidents, Resource Planning, etc.
- 750 Participants: 2015 – 2017
  - 14 days of Smart Phone App
  - 3 days of travel survey
  - \$50 compensation
  - Survey Tied to Land Use Mapping

# Dubuque Smarter Travel Trip Locations



# Dubuque Smarter Travel Corridor Speeds

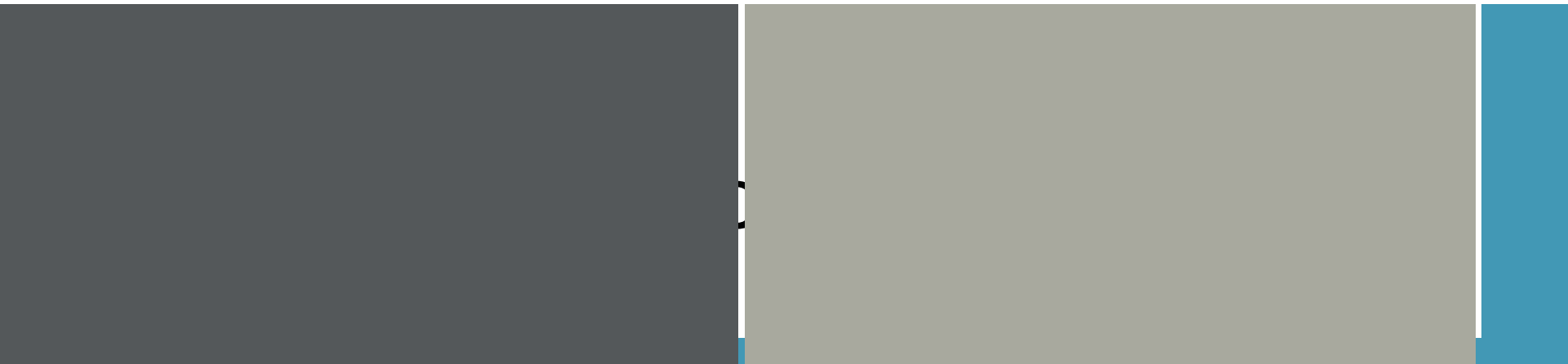


# **Alternate Methodologies for Origin-Destination Data Collection**

Robert Schiffer, Stantec

- Polk County FL TPO
- Pros and Cons of Various Methods:
  - Tag Matching with High Speed Videotaping of License Plates
  - Positioning of Bluetooth Readers to Match Devices
  - Tracking of Anonymous Cellular Data (AirSage)
  - Truck GPS Tracking (ATRI)
  - Aerial Tracking of Vehicles (SkyComp)
  - GPS Data Extraction (StreetLight)
- Approach Selected for Polk County:
  - AirSage for Passenger Vehicle Flows
  - ATRI for Commercial Truck Flows
  - \$35,000 budget

## A2: Performance-based & Scenario Planning





- Slides were a good overview of scenario planning
- Scenario planning basics
  - Considers and analyzes alternative possibilities or futures
  - Considers a range of options to identify a path forward
  - Can be:
    - Predictive – in response to trends
    - Normative – seeking a desirable future condition
    - Exploratory – what if? scenarios (automated vehicles, scarce resources, etc)
- Presentation set the stage for a number of detailed scenario planning presentations at the conference

# Integrating Public Priorities and Project Prioritization

- Integrate 8 planning factors (14 criteria) into your visioning

## EXERCISE: THE RANKING AND SCORING CRITERIA

**Task 2.** Please use the following chart to score each individual criterion once again – based solely on your personal preferences. Circle the appropriate number for every criterion based on the following scale:

- 5 Extremely Important
- 4 Very Important
- 3 Important
- 2 Not Very Important
- 1 Unimportant

CRITERIA	5	4	3	2	1
Improve Safety					
Improve Security					
Protect the Environment					
Reduce Congestion					
Promote Efficiency					
Support Economic Development Goals					
Support Land Use Goals					
Increase Connections					
Improve Access					
Connect Modes of Travel					
Conserve Energy					
Improve Quality of Life					
Increase Multi-modal Options					
Preserve Right of Ways					

Table 2  
Task 2

CRITERIA	RANKING DOTS	COUNT
Improve Safety		21
Improve Security		7
Protect Environment		22
Reduce Congestion		14
Promote Efficiency		13
Support Economic Goals		12
Support Land Use Goals		8
Increase Connections		5
Improve Access		13
Connect Modes of Travel		3
Conserve Energy		9
Improve Quality of Life		22
Increase Multi-modal Options		1
Preserve Right of Ways		12

# Scenario Planning Application of Models

## What can be considered using models?

### ☐ Land Development

- *Population grows in areas that are not anticipated*
- *Employment happens in unexpected ways (e.g., location, size or type)*

### ☐ Project development

- *ROW acquisition*
- *Environmental clearance*
- *Funding availability*

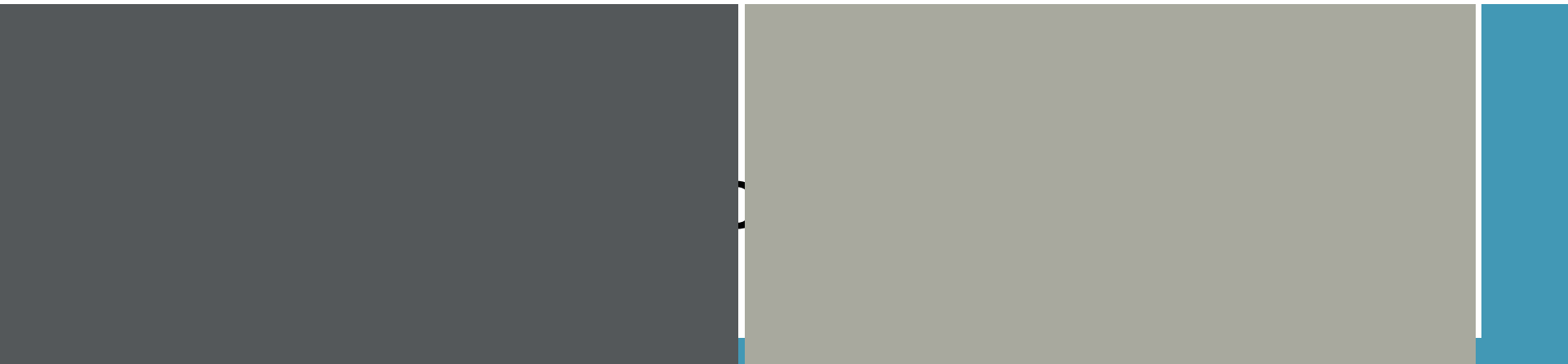
### ☐ Externalities

- *Bridge failure*
- *Regularly occurring, non-recurring congestion*
- *Construction happens*

### ☐ Project Types/Characteristics

- *Added capacity (lanes, C/Ds, Managed Lanes)*
- *Modify intersections*
- *Modify transit characteristics (headways, stop locations, rail/bus, park & ride locations, etc.)*

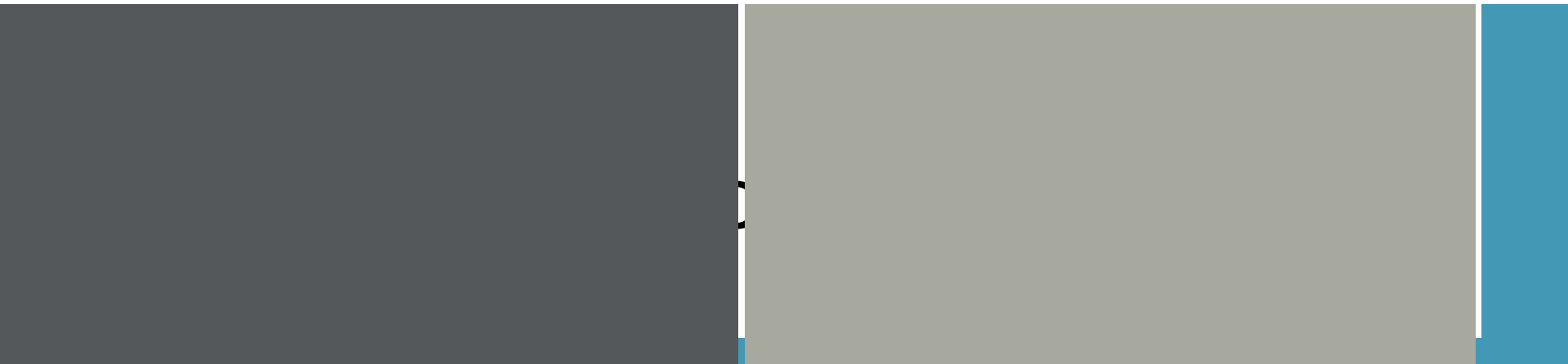
## C3: MPO Caucus



- Mostly concerned with rules proposed by FHWA concerning boundary consolidation between adjacent MPOs
  - Additional issues for bi-state MPOs

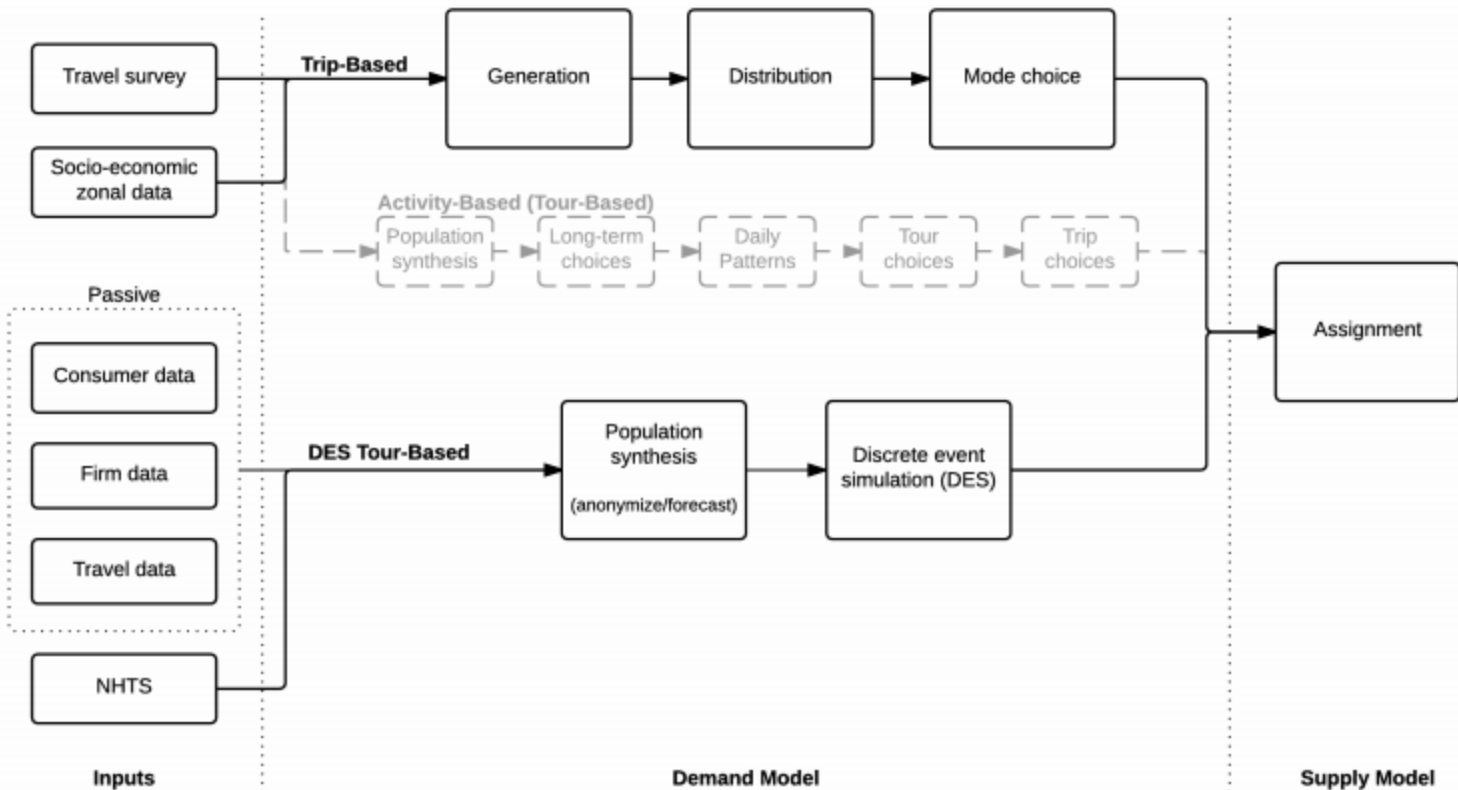
# C4: Doing More with Limited Data Collection Budgets

**Sept 13 AM**



# An Agile Tour-Based Model Built from Passive Data: A Case Study in Asheville, NC

Josie Kressner, Transport Foundry

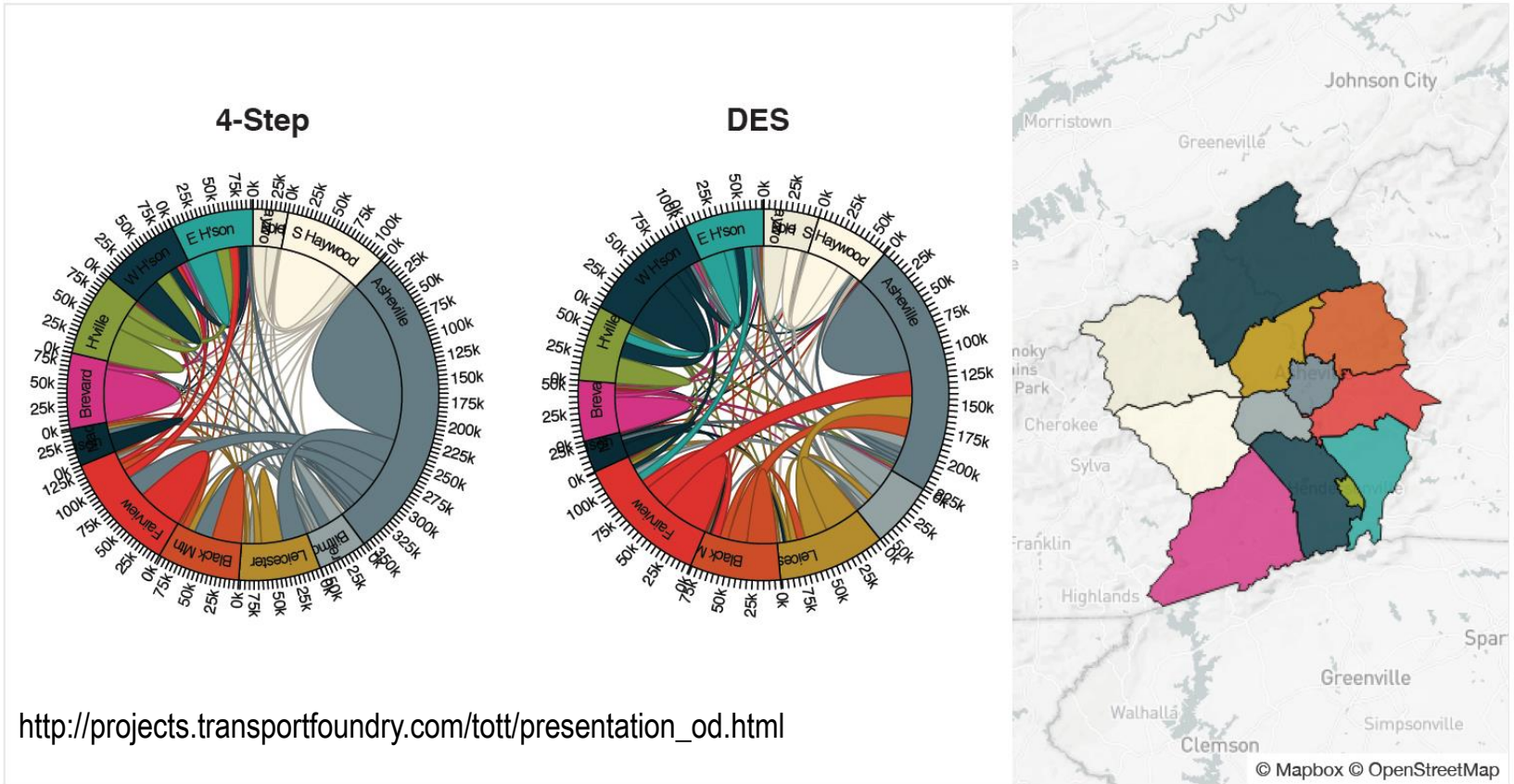




# An Agile Tour-Based Model Built from Passive Data: A Case Study in Asheville, NC

Josie Kressner, Transport Foundry

## Trip Flows



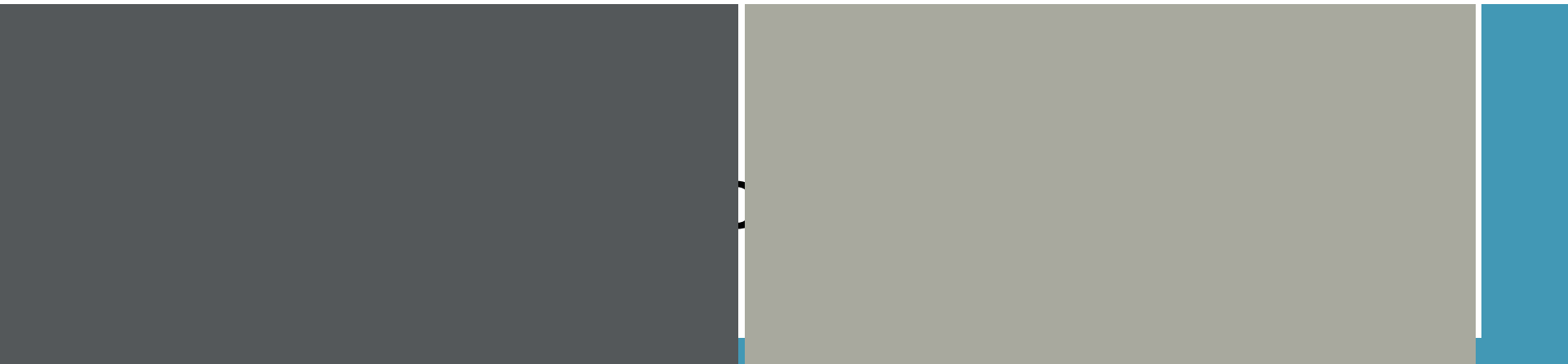
# Big Data and Advanced Models on a Mid-Sized City's Budget: The Chattanooga Experience

Vince Bernardin Jr., RSG

- Selected Activity Based Model (New to Region)
- No HH Survey until 2020
  - AirSage Data
  - Travel Time Data
  - Truck GPS / O-D Data
  - Traffic / Bike Counts
- AirSage Calibration Approaches:
  - ODME
  - Iterative Screenline Fitting
  - Shadow Pricing
- Limitations:
  - AirSage Not Good at Trip Purpose
  - Counts for ODME used for Validation

	Trip-based	Hybrid	Activity-based
Spatial Resolution	zone	zone	block
Temporal Resolution	AM/PM/MD/NT	AM/PM/MD/NT	minute-by-minute
Demographic Resolution	zone	household	person
Randomness	analytic	analytic	simulation
Behavior			
Urban Form	no	yes	yes
Trip-chaining	no	yes	yes
Tours/Physically Possible	maybe	yes	yes
Inter-personal Interactions	no	no	maybe
Re-scheduling	no	no	some
Output	matrix	matrix	table
Software	TransCAD	TransCAD	TransCAD & Daysim
Programming	GISDK	GISDK	GISDK & C#
Runtimes	~2 hrs	~4 hrs	~5 hrs
Hardware	any desktop	high end desktop	high end desktop
Calibration Effort	least	intermediate	most
Cost (resident demand ONLY)	~\$175k	~\$225k	~\$275k

## B5: Data and Bicycle/Pedestrian Demand



# A GIS Based Bicycle Facility Demand-Suitability Prioritization Tool

Jeff LaMondia, Auburn University

- ▶ “Shortest Path” Between Origin and Destination Census Tract Centroids
- ▶ Based on Normalized Cycling Impedance for Each Road/ Path Segment:

*Developed from cycling suitability survey, collected in Auburn AL (n=326)*

$$\text{Impedance} = \beta_d \frac{(d - d_{\min})}{(d_{\max} - d_{\min})} + \beta_l \frac{(l - l_{\min})}{(l_{\max} - l_{\min})} + \beta_v \frac{(v - v_{\min})}{(v_{\max} - v_{\min})} + \beta_s \frac{(s - s_{\min})}{(s_{\max} - s_{\min})}$$

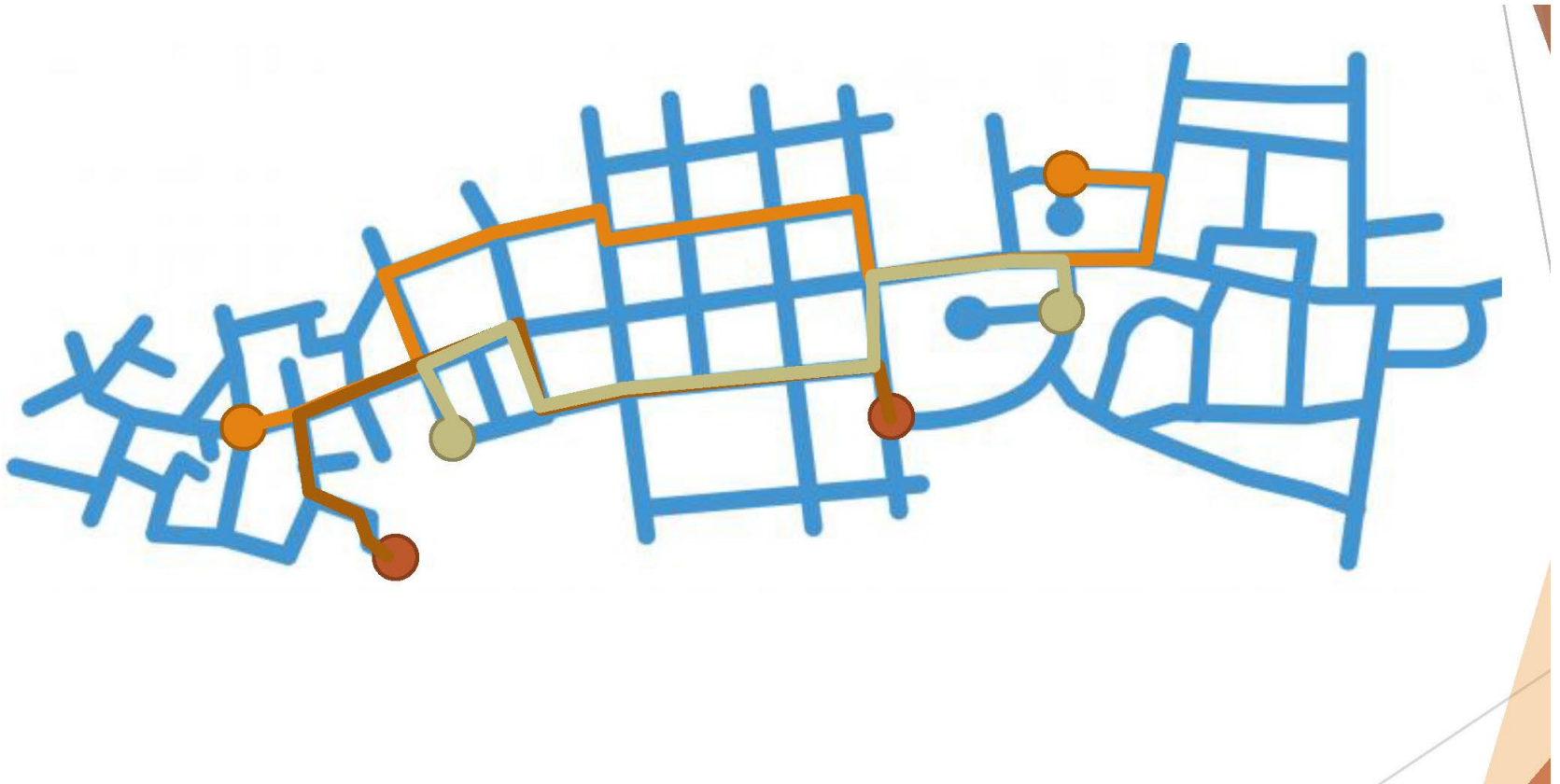
Where  $d$  = distance traveled,  
 $l$  = number of lanes,  
 $v$  = traffic volume,  
 $s$  = posted speed



Lower  
Impedance  
=  
More Preferred  
by Cyclists

# A GIS Based Bicycle Facility Demand-Suitability Prioritization Tool

Jeff LaMondia, Auburn University



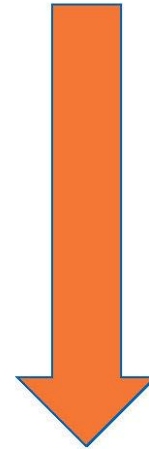
# An Interim Synthetic Approach for Estimating Pedestrian Volumes in Smaller Communities

P. Ohlms & Z. Herrman, Virginia DOT

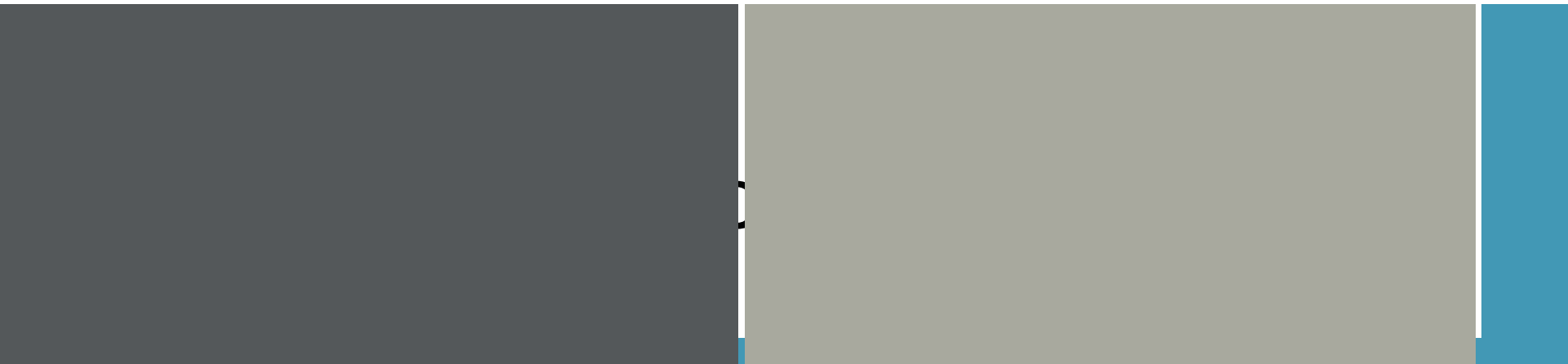
## Methods

- ❑ Preliminary Stage: Data acquisition and synthesis
- ❑ Stage 1: Estimate pedestrian volume based on ADT alone
- ❑ Stage 2: Incorporate population density
- ❑ Stage 3: Incorporate speed limit, and number of lanes

Increasing  
accuracy!



## C6: Freight & Logistics



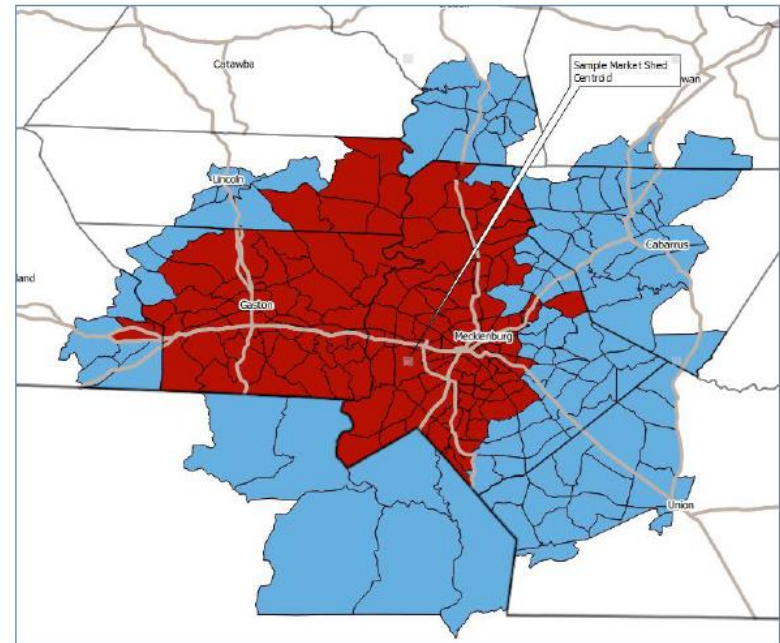


# Measuring Freight Accessibility in Small & Medium-Sized Communities

Chandler Duncan, Economic Development Research Group

- Identified Performance Measures for Regional Freight:

- Delivery Radius (180 Minutes)
- Workforce Accessibility (40 Minutes)



**Shading:**

**Red:** Existing Labor Market (40 minute drive) in 2040

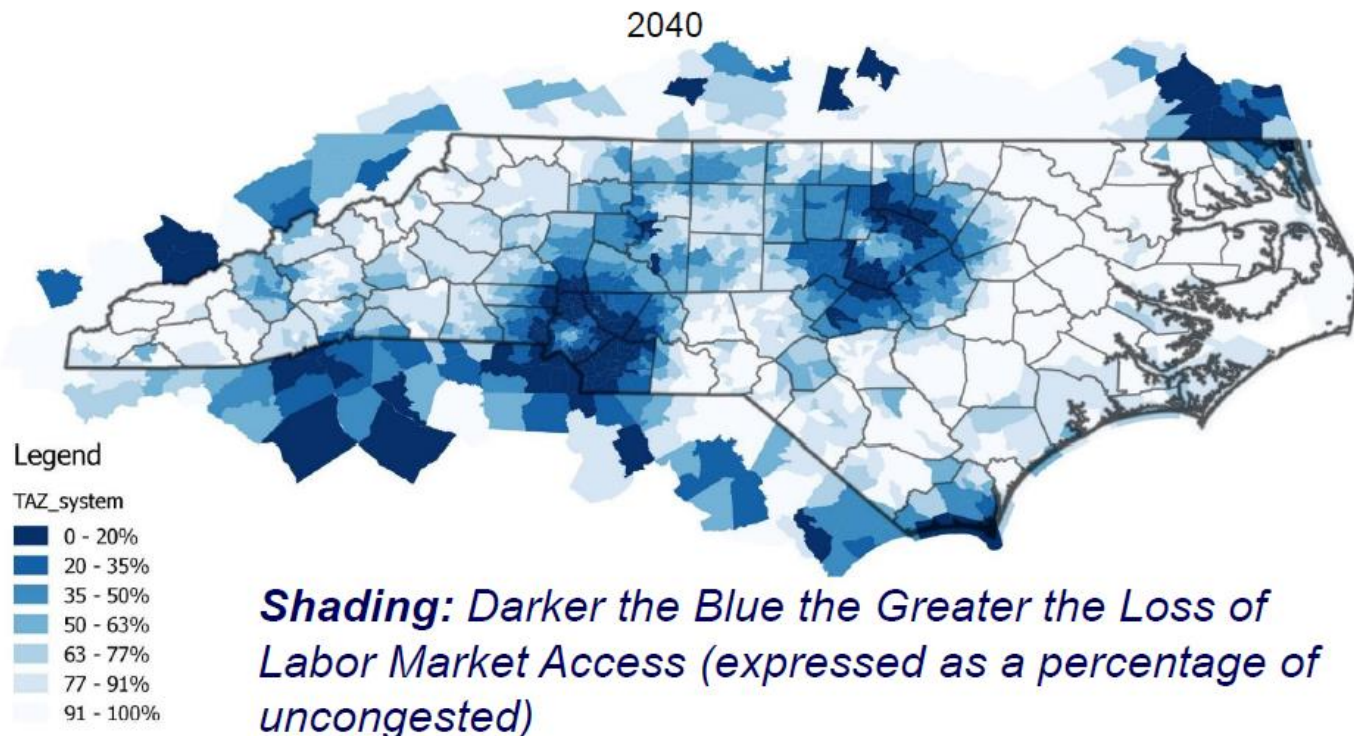
**Blue:** Forfeited Labor Market (40 minute drive) in 2040 due to congestion

**Lines:** Major highways

# Measuring Freight Accessibility in Small & Medium-Sized Communities

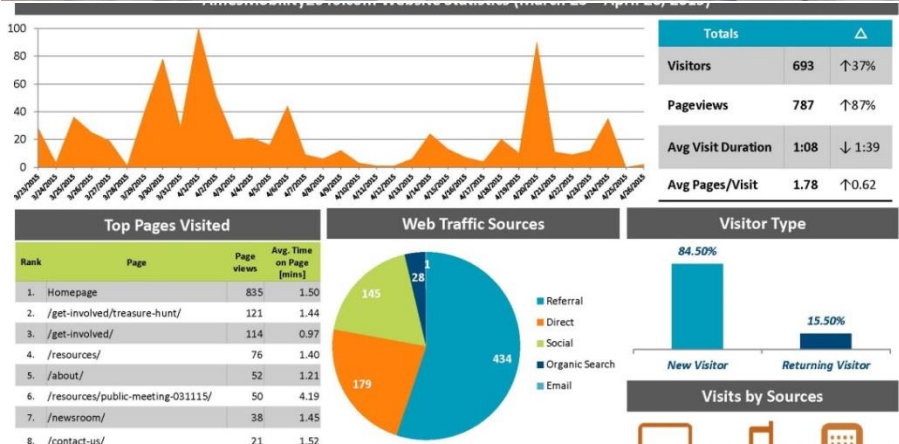
Chandler Duncan, Economic Development Research Group

3) Where Is Congestion Likely to Have the Most Effects on Labor Markets?



# Performance-Based Assessment of Community Engagement Techniques for Long Range Transportation Plans

## Jason Carbee and Theresa McClure, HDR



# HOW TO MEASURE?



**Benefits**

**Costs**

**Interaction  
Value**



# OVERALL INTERACTION VALUE ASSESSMENT

## TOOLS OF THE TRADE

Key

Interactive Value



>\$1,000



\$1,001-\$5,000



\$5,001-\$10,000



\$10,000<



## Interaction Value Index (IVI):

is value assigned to a communication tool to measure it's effectiveness at soliciting public engagement with a project. Each tool is evaluated on the quality and quantity of participation.

$$ECT \div B = IC$$

ECT = Estimated Cost of Tool

B = Benefits

IC = Interaction Cost

IV = Interaction Value

\*IV is subjectively assigned

### PROJECT WEBSITE



\$ \$ \$ \$



### ONLINE COMMENT MAPPING TOOL



\$ \$ \$ \$



### INFORMATIONAL KIOSKS



\$ \$ \$ \$



### SOCIAL MEDIA



\$ \$ \$ \$



### FOCUS GROUP / PUBLIC OPEN HOUSE MEETINGS



\$ \$ \$ \$



### PROJECT NEWSLETTERS



\$ \$ \$ \$



### STAKEHOLDER / AGENCY MAILINGS



\$ \$ \$ \$



### EMAIL CAMPAIGNS



\$ \$ \$ \$



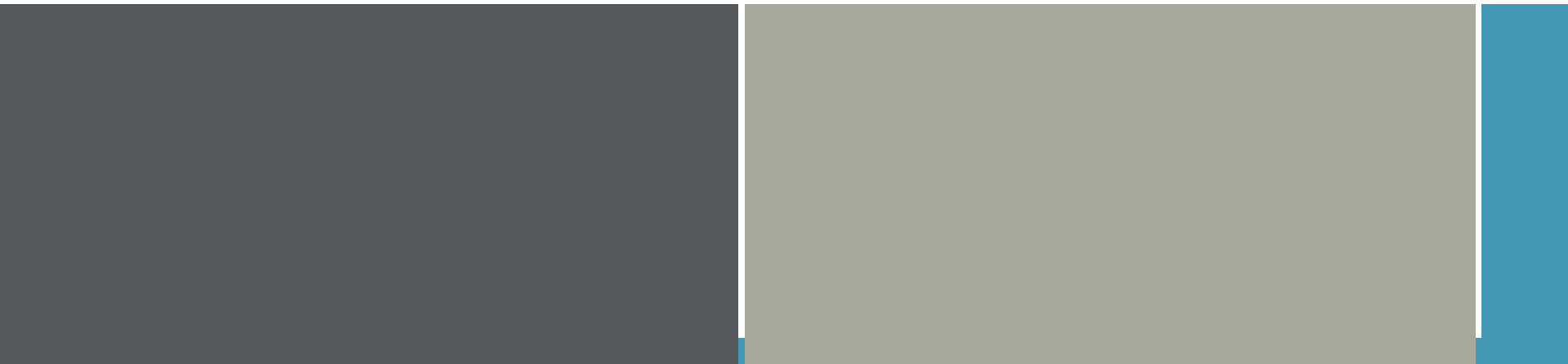
### CONTACT & COMMENT MANAGEMENT (CCM)



\$ \$ \$ \$

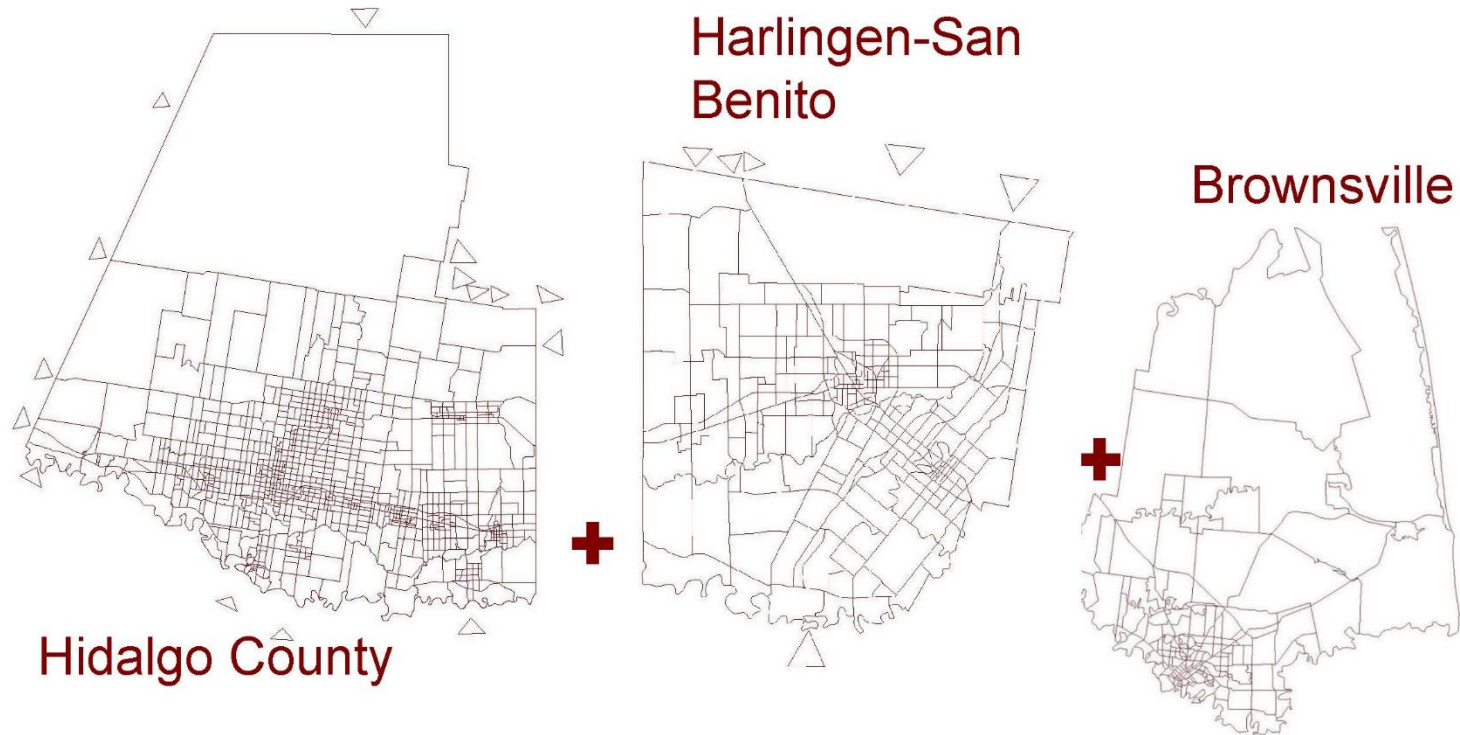


# C7: Travel Demand Modeling



# Challenges Associated with Creating a Combined Regional Model for Three Small-to Medium Sized MPOs

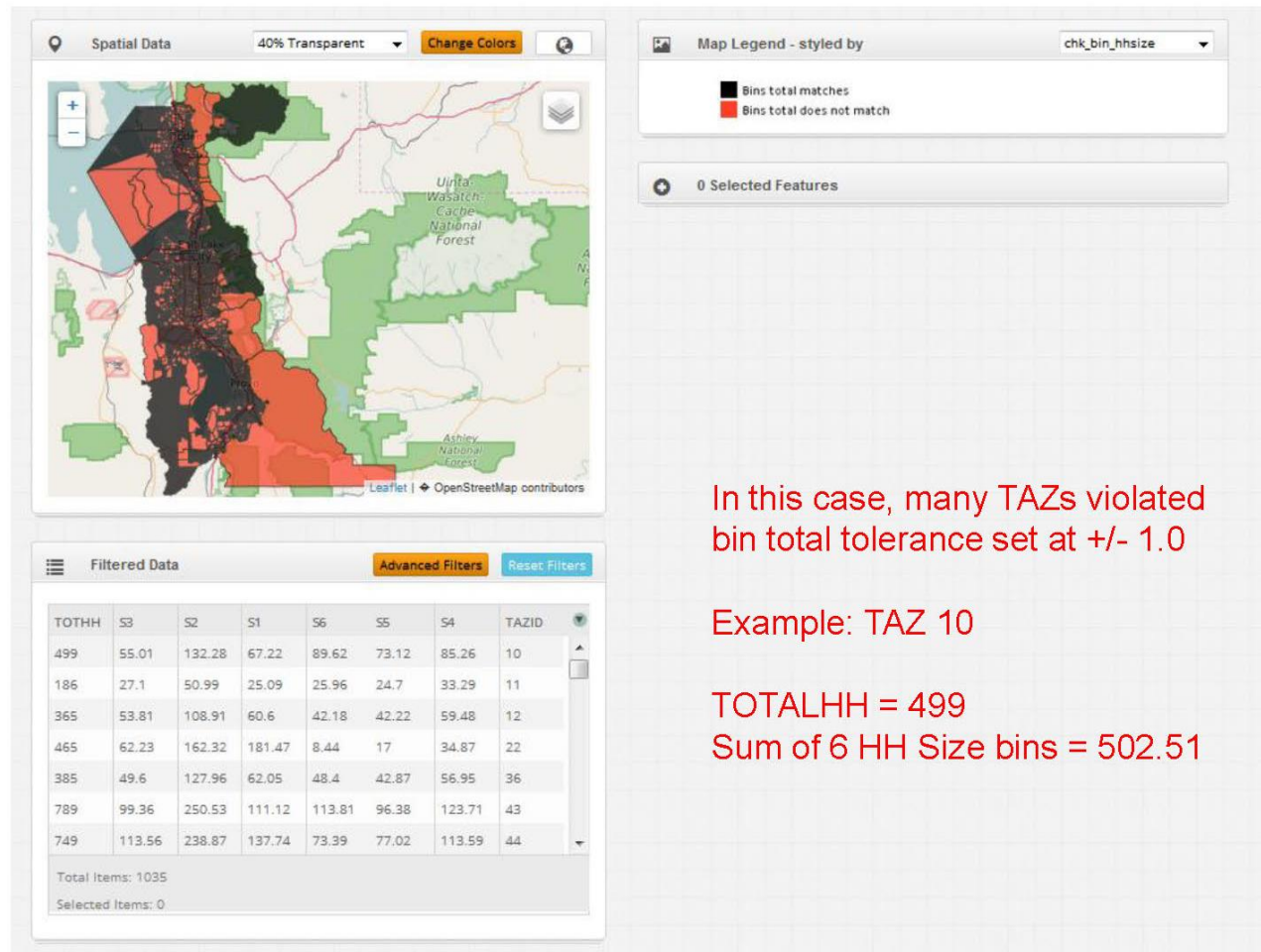
K. Hall, Texas A&M Transportation Institute





# An Online Tool for Checking Travel Model Zone Data Consistency

J. Raw, FHWA



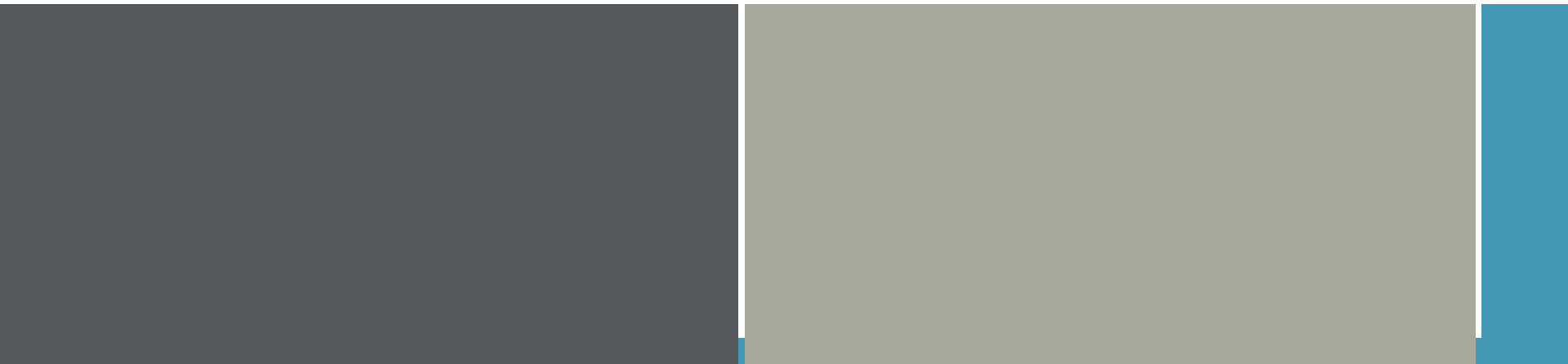
In this case, many TAZs violated bin total tolerance set at  $\pm 1.0$

Example: TAZ 10

TOTALHH = 499

Sum of 6 HH Size bins = 502.51

# C8: Travel Demand Modeling



# North Carolina Modeling Guidelines: The Next Generation and Beyond

Leta Huntsinger, Parsons Brinkerhoff

- **Reasons for Standardization**

- Changes in scope and responsibility
- Loss of institutional knowledge

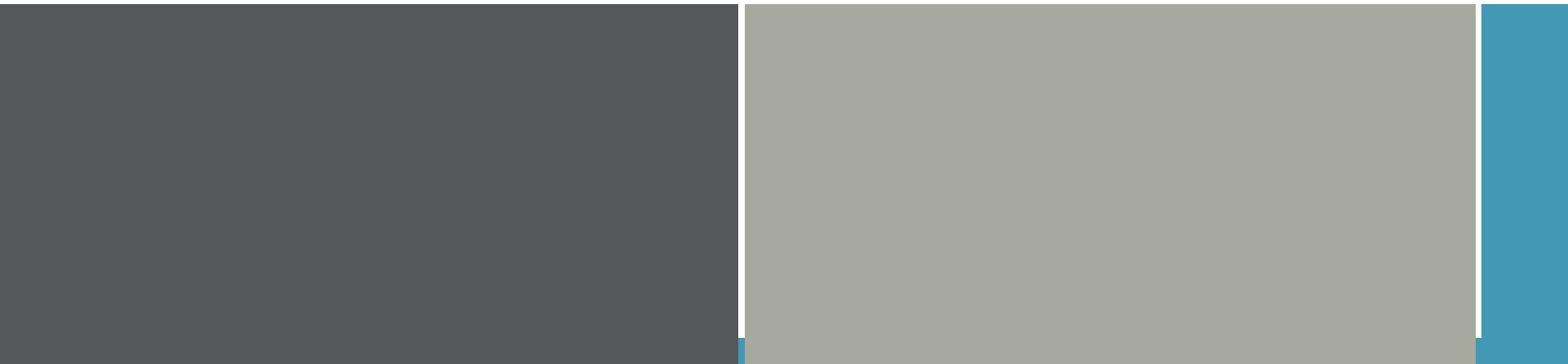
- **Enhancements**

- Updated household classification model
- Special generators and special markets
- Commercial vehicle model
- External trip model
  - **Update to Modlin E-E model**
    - Update Regression Model Based on E-E Results of Statewide Model
- Formula based capacity calculations
- Graphical User Interface and Improved Reporting

- **EE Model**

- Population (S)
- Employment (S)
- Area (S)
- AWDT (L)
- External volume (L)
- Facility type:  
Interstate, Arterial,  
Local (L)

## D8: Planning for Emerging Technology

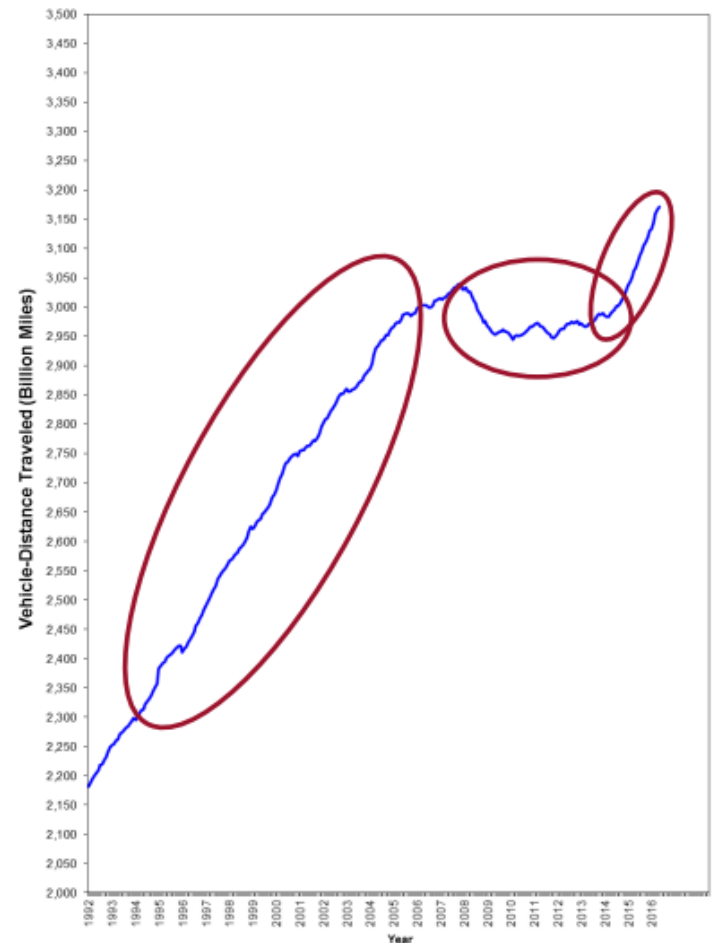


# The “Transportation Revolution” – How Do Planners Grapple with an Uncertain Future?

S. Gayle, RSG

- Changes in travel patterns will have impacts on:
  - Travel Demand
  - Infrastructure asset management
  - Safety
  - Operations
  - Sustainability
- New Tech
  - Mobility as a service
  - Autonomy and connection
  - 3D printing
  - Self healing pavement
- Scenario Planning is key

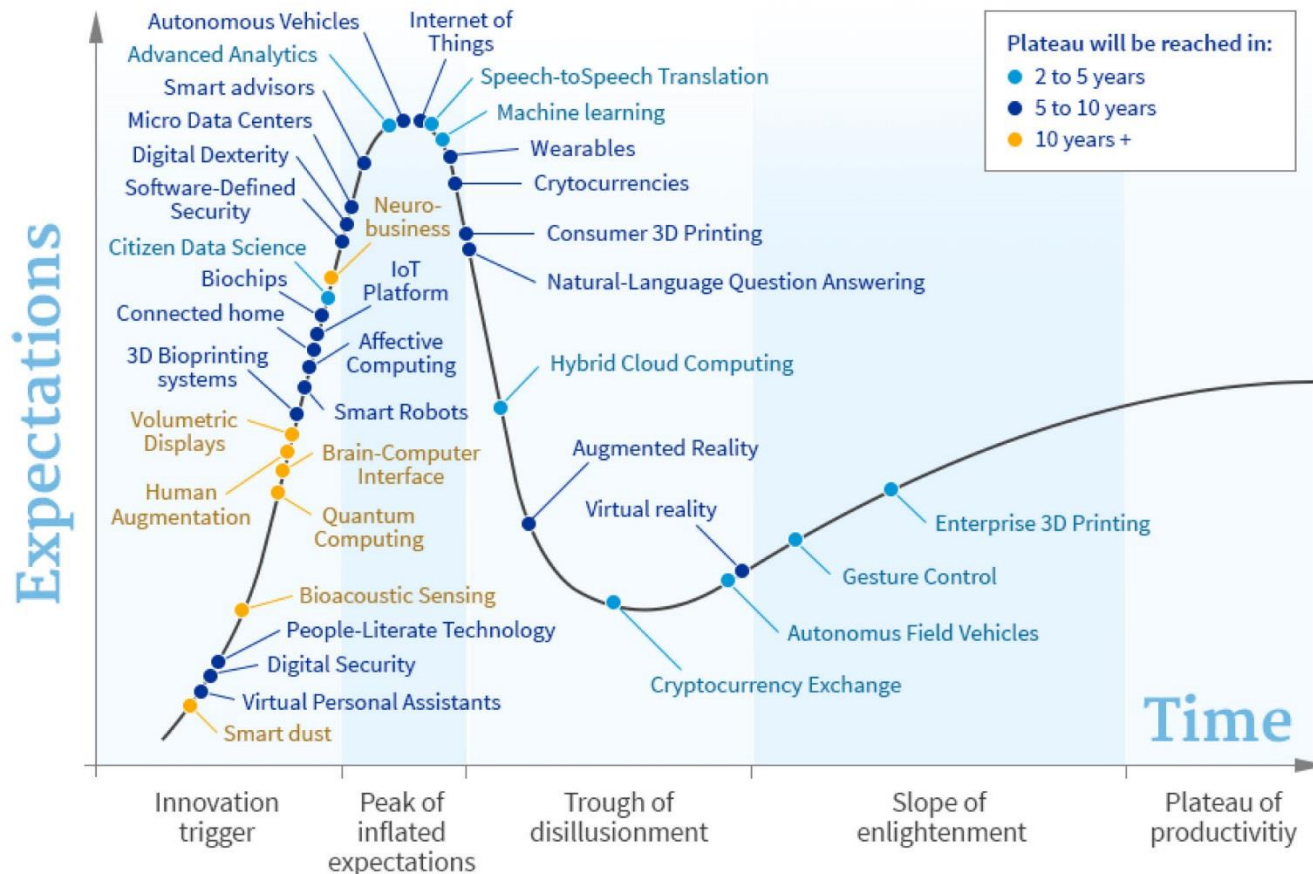
Figure 1 - Moving 12-Month Total on ALL Roads



# The Good and Bad News on Incorporating Automated and Connected Vehicles in Small and Medium-Sized Communities

J. Bittner, Applied Research Associates

## Hype Cycle



# The Good and Bad News on Incorporating Automated and Connected Vehicles in Small and Medium-Sized Communities

J. Bittner, Applied Research Associates

## ➤ **Trucking is going to be first**

- Cost of service
- Driver shortages
- Distance and repetition

## ➤ **Capacity expansion will no longer drive the discussion**

- Ribbon cuttings might be a thing for past

## ➤ **A new vehicle ownership model will emerge**

## ➤ **Transit providers will be disrupted – like taxi services**

- Smart providers should partner now for on-demand services

## ➤ **2020 is the year for all of this**



# **2018 Conference**

Kansas City, MO

September 12-14, 2018