Session Description

Transportation models predict the traffic volume of a given bridge, highway, or train and allow decision-makers to make more informed decisions about transportation projects and funding allocations that have major implications on the current and future landscape. However, transportation models are an unfamiliar concept to most people outside of the industry.

What if transportation advocates better understood how to use this tool to advocate for a more sustainable future and better transportation options?

“What Counts in Mobility” attempts to demystify some of the technical aspects of transportation modeling by breaking down the relationship between modeling and decision-making and presenting recommendations on improvements to the model and the transportation planning process.

Event Link
Time: 30 minutes
Questions: 15 minutes

LivableStreets
Connecting People + Places
Overview

1. LivableStreets Intro
   a. Program
   b. Mission + Vision
   c. Emerald Network Intro

2. Report Project Team
   a. Why we pursued this project
      i. Longfellow Bridge
   b. What We are focusing On Today
   c. Goal to Shift Process Together

3. Brief History of Modeling

4. How 4 Step Works

5. Challenges
   a. Missing Factors We Found
   b. Bias in Building/Data
   c. Goal Setting for Future
      i. GoBoston 2030

6. Recommendations
   a. Bridging Predictions + Future Goals
   b. Assessing the Field
   c. Desired Outcomes
   d. COVID Integration
   e. Community Input

7. Ending
   a. Takeaways
   b. Questions to continue to ask
   c. Find Report Here
   d. Thank You

Created by Yingran Li
Questions

1. How does someone begin a project like this?
2. What is your advice to state + transit agencies who might be interested in this kind of project?
3. You all mentioned integrating different data into the model. How does your organization use this tool for that kind of advocacy?

Feel free to add more questions here!
What Counts in Mobility? Rethinking Transportation Modeling

2:00-2:45pm ET

Speaker: Ambar Johnson
Moderator: Brianne Eby
What Counts in Mobility?
Rethinking Transportation Modeling

Ambar Johnson, LivableStreets Alliance
Objectives for Today’s Discussion

- **Provide an overview** of our transportation modeling report - *What Counts in Mobility*
- **Explore gaps and areas for improvements** for transportation models
- **Share how findings can inform better decision-making** for multi-modal projects
**Vision:** LivableStreets Alliance envisions a world where streets are safe, vibrant public spaces that connect people to the places where they live, work, and play.

**Mission:** We advocate for innovative and equitable transportation solutions that create safe, affordable, and convenient options for everyone in Metro Boston.
Program Areas

Vision Zero

Emerald Network

Better Buses
## Case Study

### Data Download

<table>
<thead>
<tr>
<th></th>
<th>Pre-Construction</th>
<th>During Construction</th>
<th>Anticipated Post-Construction as of 2012 (CRB Model)</th>
<th>Anticipated Post-Construction as of 2018 (CTPS Model)</th>
<th>Actual Post Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inbound Vehicle Counts</strong></td>
<td>2008 – 816 AM peak 8,840 per day</td>
<td>2016 – 895 AM peak 8,440 per day</td>
<td>2017 720 AM peak 1,380 PM peak</td>
<td>2019 – 1,584 peak AM 2019 – 1,131 peak PM</td>
<td>580 AM peak 1,063 PM peak</td>
</tr>
<tr>
<td></td>
<td>2008 – 1,331 PM peak 13,020 ADT</td>
<td>2017 – 882 PM peak 9,246 per day</td>
<td>2018 – 1,400 AM peak 1,800 PM peak</td>
<td>2019 – 1,212 peak AM 2019 – 1,019 peak PM</td>
<td>10,880 ADT</td>
</tr>
<tr>
<td><strong>Outbound Vehicle Counts</strong></td>
<td>2012 – 2,775 peak AM 12,985 per day</td>
<td>N/A – Outbound lanes closed to vehicular travel</td>
<td>2017 780 AM peak 700 PM peak</td>
<td>2018 – 2,121 peak AM 2018 – 1,019 peak PM</td>
<td>442 AM peak 311 PM Peak</td>
</tr>
<tr>
<td></td>
<td>2012 – 2,080 peak PM</td>
<td>2017 – 900 PM peak</td>
<td>2018 – 2,080 peak PM</td>
<td>2019 – 1,019 peak PM</td>
<td>7,612 ADT</td>
</tr>
</tbody>
</table>

*Source: ATR counts taken week of September 17, 2018.*

**Notes:**
- Inbound: Counts are for morning peak (6-9 AM) and PM peak (4-6 PM).
- Outbound: Counts are for morning peak (6-9 AM) and PM peak (4-6 PM).
- N/A: Counts not available.

**Sources:**
- CRB Model: Counts taken in 2012.
- CTPS Model: Counts taken in 2018.

**Images:**
- MassDOT logo
- Livable Streets logo

**Connecting People + Places**
Project Goals

What if everyday people better understood travel demand models to advocate for a sustainable, multimodal future?

- **Assess** how the model is experienced by practitioners + advocates

- **Assess** the inner workings, or process of modeling

- **Provide** recommendations for
  - Advocates to understand how it works for mobilization
  - Practitioners, Engineers, and Policymakers to build a more accurate planning tool to inform projects
Project Team

Andrew Schloss
Hoai Tran
Jess Wilson

Sarah Saydun
Yingran Li
Ambar Johnson
Ari Ofsevit

Senior Associate, ITDP
Volunteer, LivableStreets

LivableStreets
Connecting People + Places
Strengthen the link between model and policy decision making

Transportation planning

- Make CTPS model more accessible/understandable
- What is traffic modeling?
  - History
  - How it works?
  - Assumptions
- What role does model play in transportation planning?
  - Goals and visions for the future
  - Maps of actors in metro Boston
  - Break down of planning process, start to finish
- Goals and visions for the future
- Interview experts and stakeholders about model's values and priorities
- Planning for the future
  - Research the trends in transportation planning and unpredictable consequences
  - Suggestion for future project.

Compare model's forecast with actual transportation outcomes.

Compare model's assumptions with transportation planning goals.
Assess Planning of Region

Understanding the system and relationships at play for transportation, development, and other intersections
How Does Modeling Work?

**Trip Generation**

\[ \text{Trip Generation} = \text{Trip Production} \times \text{Trip Attraction} \]

Build the quantitative relationship between the trip generation volume of TAZ residents and the socio-economic characteristics, population characteristics to predict the amount of trip production and attraction of TAZ.

**Trip Distribution**

Convert the amount of production and attraction in each TAZ into the trip amount among every TAZ.

**Mode Choice**

Allocate the total traffic volume to various modes of transportation.

- **Private Cars**
- **Motorcycle**
- **Car (taxi)**
- **Public Transit**
- **Bus/Rail**
- **Walking**
- **Biking**

**Trip Assignment**

Distribute the traffic volume of the different modes among each TAZ to concrete road network.

Created by Yingran Li
However Modeling Data is Often Incomplete

Created by Yingran Li
“Models assume that population growth occurs spatially in a certain way, that income and household size will follow specific trends, or that income or household size impacts decision making in a certain way. But they cannot plan for unpredictable consequences of new trends that affect the way people travel, such as changes in technology, natural disasters, or a large employer opening up in a specific part of town” (Parthasarathi & Levinson, 2010).
Bias

The idea that models are technical, and therefore objective and correct, is misleading.
Additionally, transportation models are developed by people who -- consciously or unconsciously -- embed their own assumptions and ideas about future conditions. Models are inherently limited by the assumptions that engineers, planners, or policy makers include in the transportation modeling process.
Feedback from Interviews

– LivableStreets Alliance volunteer

“[Agencies] could have a public meeting before running the model and say “**We’re going to run this model to answer this question.** Here are our inputs and assumptions. **What do you think is missing?**”. Then, they could come back after the model has been run and say: “**Does this match your version of reality?**”
## How We Get to Work Today and Aspire to in 2030

<table>
<thead>
<tr>
<th>Mode for Bostonian Commutes</th>
<th>Today*</th>
<th>2030 Aspirational Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Transit</td>
<td>34%</td>
<td>Up by a third</td>
</tr>
<tr>
<td>Walk</td>
<td>14%</td>
<td>Up by almost a half</td>
</tr>
<tr>
<td>Bike</td>
<td>2%</td>
<td>Increases fourfold</td>
</tr>
<tr>
<td>Carpool</td>
<td>6%</td>
<td>Declines marginally</td>
</tr>
<tr>
<td>Drive Alone</td>
<td>39%</td>
<td>Down by half</td>
</tr>
<tr>
<td>Other/Work from Home</td>
<td>5%</td>
<td>Slight increase in Work from Home</td>
</tr>
</tbody>
</table>
Factors That Are Incorporated in

Conventional transportation models tend to be useful for analyzing current conditions, forecasting the effect of future ‘business as usual’ strategies and for testing the performance of network improvement options (Furnish and Wignall, 2009). They are not, however, good at predicting the future if the goal is to change behavior or plan for a different future.

Scholars and advocates are calling on transportation professionals to adapt transportation models to reflect the wider range of needs and goals (Furnish and Wignall, 2009).
Summary + Recommendations

- **Before and After Counts**
  - An imperfect but important transportation planning tool
  - Results often overrepresent automobiles

- **Expanding Data**
  - There is a deficiency of robust urban and human scale data
  - Need for better and more comprehensive data inputs

- **Uncovering Bias**
  - Decentralize dependability on the model
  - Include community feedback at more stages of planning process

- **Calibrating Goals**
  - Additional tools to complement model for multi-modal goals
  - Align State Plans Goals to the Modeling Reality
  - Collaborate Across Sectors + Communities for Reality Checks
WHAT COUNTS IN MOBILITY
Improving Planning Tools for a Multi-Modal Future

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Ambar Johnson
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emeraldnetwork.info/resources
Thank you!

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emeraldnetwork.info/resources
Questions?
Incorporating Health in Modeling

Figure 23. Health & Transportation. Source: Metroplan Orlando
<table>
<thead>
<tr>
<th><strong>Challenge</strong></th>
<th><strong>Suggestion</strong></th>
<th><strong>Desired Outcome</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Insufficient data for accurate predictions</td>
<td>Invest in better data collection</td>
<td>Better understanding of how people move, and why, leads to more accurate predictions. Can reduce possibility of over or underpredicting for specific modes.</td>
</tr>
<tr>
<td>2. Results are dependent on the quality of inputs</td>
<td>Increase transparency and improve community engagement processes</td>
<td>Community members have a say in which inputs are used, leading to outputs more representative of current travel patterns and community needs.</td>
</tr>
<tr>
<td>3. Inability of modeling process to see a different future</td>
<td>Incorporate iterative planning practices</td>
<td>Allows for more course correction and leads to more accurate predictions</td>
</tr>
<tr>
<td>4. Limited scope of outputs</td>
<td>Integrate a process to review forecasts: build in room for questioning results, and use feedback loops</td>
<td>Results are not taken at face value, which ultimately improves accuracy of output</td>
</tr>
</tbody>
</table>
Further Questions to Ask

● How can we get cleaner, more inclusive data sources?

● How modeling to be more recursive and dynamic to incorporate state + regional goals?

● What measures can we take to bridge aspects of transportation such public health and safety?
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