

# Transportation Performance Management Webinar Series

## System Performance Management – Focus on Accessibility

Sponsored by the TPM Pooled Fund  
with Support from AASHTO CPBM Leadership and FHWA

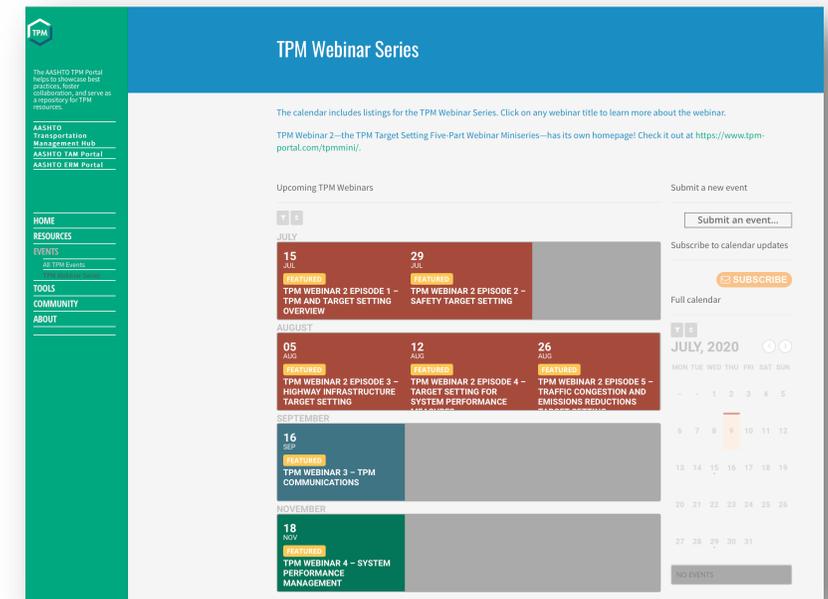


**November 18, 2020**

**TPM Webinar 4**

# Transportation Performance Management Webinar Series

- Our regular webinar series is held every two months, on topics such as communications, system performance management, data sources, and many more to come!
- Today is the 4<sup>th</sup> webinar in the bi-monthly series
- We welcome ideas for future webinar topics and presentations
- Use the webinar Q&A panel during the webinar
  - Submit questions for today’s presenters
  - Submit ideas for future webinar topics



# Welcome

The TPM Pooled Fund, the AASHTO Committee on Performance Based Management, and FHWA are pleased to sponsor this webinar series!

- Sharing knowledge is a critical component of advancing performance management practice



# Webinar Agenda

---

**2:00 Welcome and Introduction**

Christos Xenophontos (Rhode Island DOT), Matt Hardy (AASHTO) and Lori Richter (Spy Pond Partners, LLC)

**2:10 FHWA Perspective on Accessibility**

Jeremy Raw (FHWA)

**2:25 Accessibility Studies Underway**

Deanna Belden (Minnesota DOT)

**2:45 Partnerships and Case Examples in Florida**

Monica Zhong (Florida DOT)

**3:05 Applications of Accessibility Tools and Data**

Derek Krevat (Massachusetts DOT)

**3:25 Q&A and Wrap Up**



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

# **FHWA Accessibility Activities**

Jeremy Raw  
Office of Planning, Environment and Realty  
November 18, 2020

# Defining Transportation Accessibility

- **Ease of Reaching Destinations:**

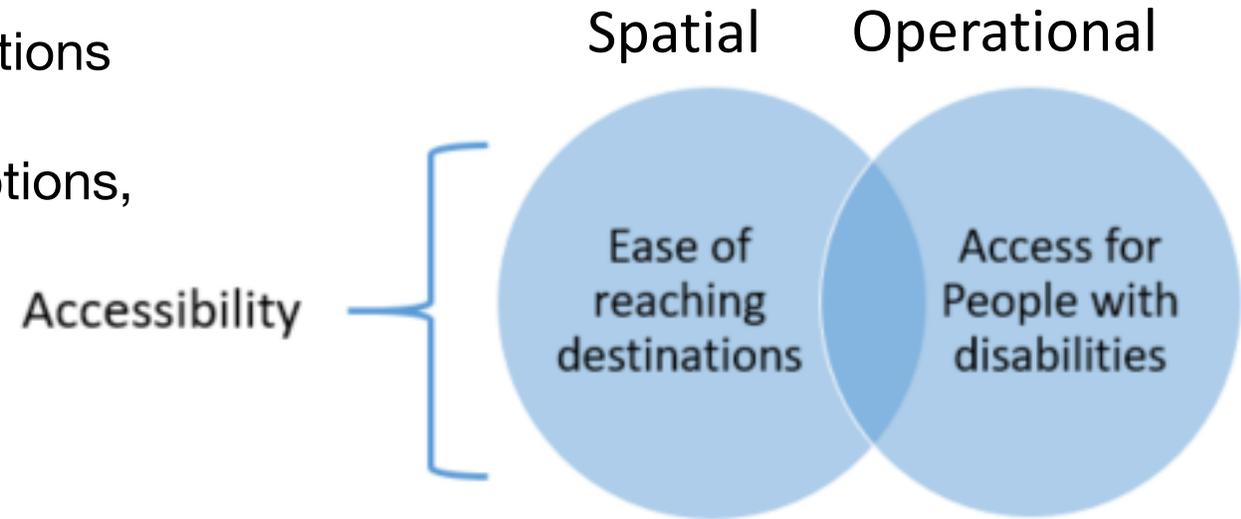
- Spatial concept

- Measures the ease of reaching destinations distributed geographically
- Focus on multimodal transportation options, intermodal transfers, and connectivity

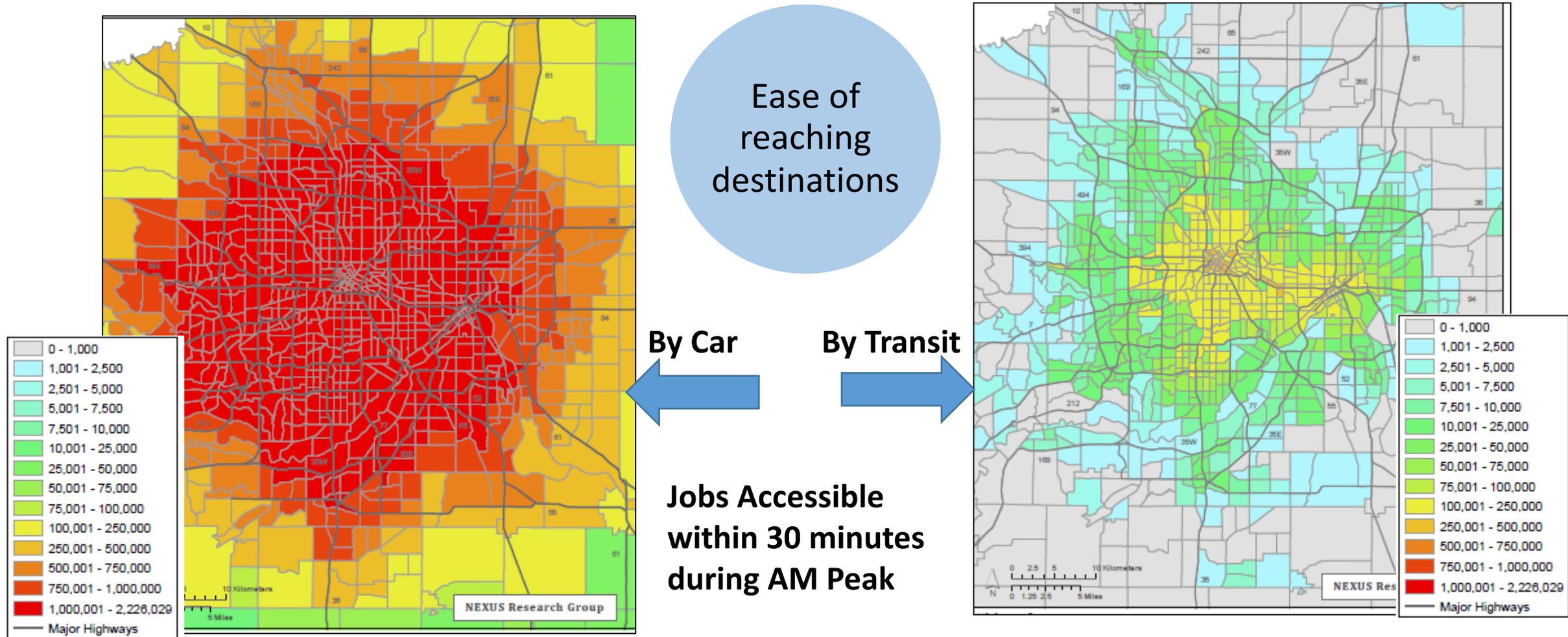
- **Accessibility for People with Disabilities:**

- Mobility/Operational concept

- In transportation context, focus on providing mobility to people with disabilities.



# Visualizing Spatial Access by Mode



# Mobility Performance - Complete Trips

## Accessibility Operationalized



Accessibility



# FHWA Accessibility Performance Resources

## National Research and Evaluation

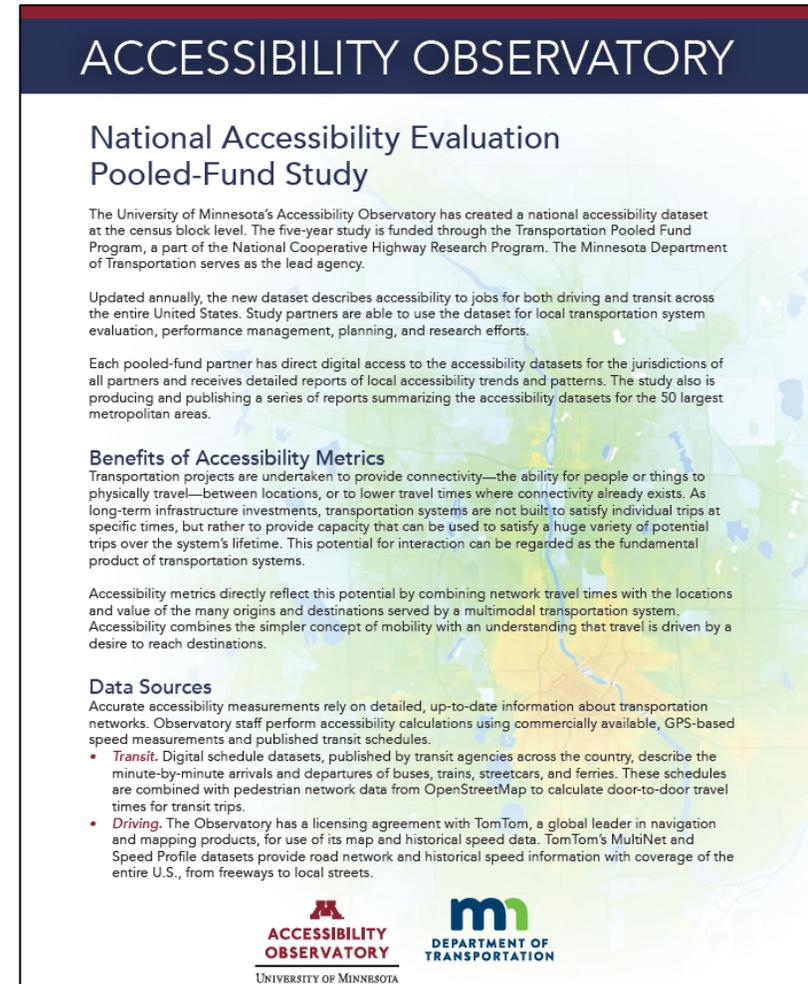
National Accessibility Evaluation – Pooled Fund Study (2015-2020)  
Emerging Technologies and Opportunities for Improved Mobility and Safety in Rural Areas (2018-2021)  
Geo-Economics System Modeling (2018-2021)

## State and Regional Technical Assistance/Capacity Building

Health in Transportation Corridor Planning Framework (2016)  
The Why and How of Measuring Access to Opportunity (2017)  
Integrating Shared Mobility in Multimodal Planning (2018)  
Guidebook for Measuring Multimodal Network Connectivity (2018)  
Community Connections Innovations Handbook and Toolkit (2019)

# Research: National Accessibility Policy and Evaluation

- National Accessibility Evaluation – Pooled Fund Study (2015-2020)  
<http://access.umn.edu/research/pooledfund/index.html>
- Emerging Technologies and Opportunities for Improved Mobility and Safety in Rural Areas (2018-2021)
- Geo-Economics Modeling System (2018-2021)



**ACCESSIBILITY OBSERVATORY**

## National Accessibility Evaluation Pooled-Fund Study

The University of Minnesota's Accessibility Observatory has created a national accessibility dataset at the census block level. The five-year study is funded through the Transportation Pooled Fund Program, a part of the National Cooperative Highway Research Program. The Minnesota Department of Transportation serves as the lead agency.

Updated annually, the new dataset describes accessibility to jobs for both driving and transit across the entire United States. Study partners are able to use the dataset for local transportation system evaluation, performance management, planning, and research efforts.

Each pooled-fund partner has direct digital access to the accessibility datasets for the jurisdictions of all partners and receives detailed reports of local accessibility trends and patterns. The study also is producing and publishing a series of reports summarizing the accessibility datasets for the 50 largest metropolitan areas.

### Benefits of Accessibility Metrics

Transportation projects are undertaken to provide connectivity—the ability for people or things to physically travel—between locations, or to lower travel times where connectivity already exists. As long-term infrastructure investments, transportation systems are not built to satisfy individual trips at specific times, but rather to provide capacity that can be used to satisfy a huge variety of potential trips over the system's lifetime. This potential for interaction can be regarded as the fundamental product of transportation systems.

Accessibility metrics directly reflect this potential by combining network travel times with the locations and value of the many origins and destinations served by a multimodal transportation system. Accessibility combines the simpler concept of mobility with an understanding that travel is driven by a desire to reach destinations.

### Data Sources

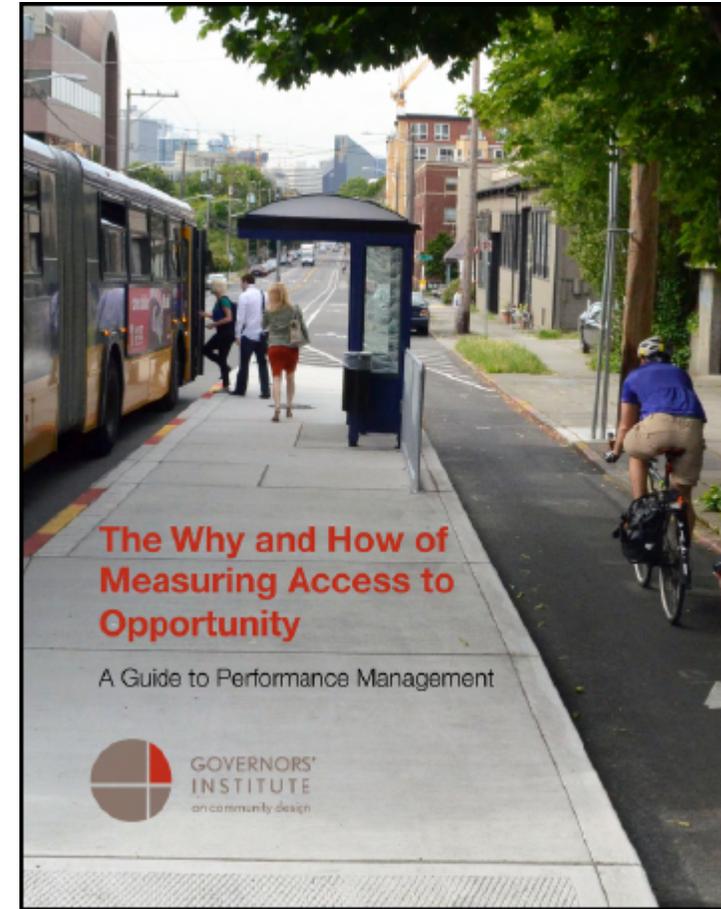
Accurate accessibility measurements rely on detailed, up-to-date information about transportation networks. Observatory staff perform accessibility calculations using commercially available, GPS-based speed measurements and published transit schedules.

- **Transit.** Digital schedule datasets, published by transit agencies across the country, describe the minute-by-minute arrivals and departures of buses, trains, streetcars, and ferries. These schedules are combined with pedestrian network data from OpenStreetMap to calculate door-to-door travel times for transit trips.
- **Driving.** The Observatory has a licensing agreement with TomTom, a global leader in navigation and mapping products, for use of its map and historical speed data. TomTom's MultiNet and Speed Profile datasets provide road network and historical speed information with coverage of the entire U.S., from freeways to local streets.

   
UNIVERSITY OF MINNESOTA DEPARTMENT OF TRANSPORTATION

# Technical Assistance: Capacity Building Resources

- **Health in Transportation Corridor Planning Framework (2016)**  
[https://www.fhwa.dot.gov/planning/health\\_in\\_transportation/planning\\_framework/](https://www.fhwa.dot.gov/planning/health_in_transportation/planning_framework/)
- **The Why and How of Measuring Access to Opportunity: A Guide to Performance Management (2017)**  
<https://smartgrowthamerica.org/resources/measuring-access-to-opportunity/>
- **Guidebook for Measuring Multimodal Network Connectivity (2018)**  
[https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/multimodal\\_connectivity/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_connectivity/)
- **Integrating Shared Mobility in Multimodal Planning: Improving Regional Performance Goals to Meet Public Goals (2018)**  
[https://www.planning.dot.gov/documents/SharedMobility\\_Whitepaper\\_02-2018.pdf](https://www.planning.dot.gov/documents/SharedMobility_Whitepaper_02-2018.pdf)
- **Community Connections Innovations Handbook and Toolkit (2019)**  
[https://www.fhwa.dot.gov/planning/community\\_connections/handbook/](https://www.fhwa.dot.gov/planning/community_connections/handbook/)



# Research: FTA Accessibility Metrics

## “Mobility Performance Metrics for Integrated Mobility and Beyond” Report (2020)

- TransitCenter, Applied Predictive Technologies (a Mastercard Company), and Texas A&M Transportation Institute
- This report presents traveler-centric mobility performance strategies and metrics.
- The report discusses data sources and data integration strategies for the application of the new mobility performance measures.



# Accessibility Studies Underway

Deanna Belden

Director of Performance, Risk & Investment Analysis

- National accessibility studies underway
  - National Accessibility Evaluation
  - NCHRP 08-121 Accessibility Measures in Practice
- MnDOT studies/implementation efforts
  - Rethinking I-94
  - Accessibility Pilot Project

# National Accessibility Evaluation/Access Across America

- Pooled fund project measuring multimodal accessibility nationwide
- Wrapping up phase I (data for 2015-2019); beginning phase II

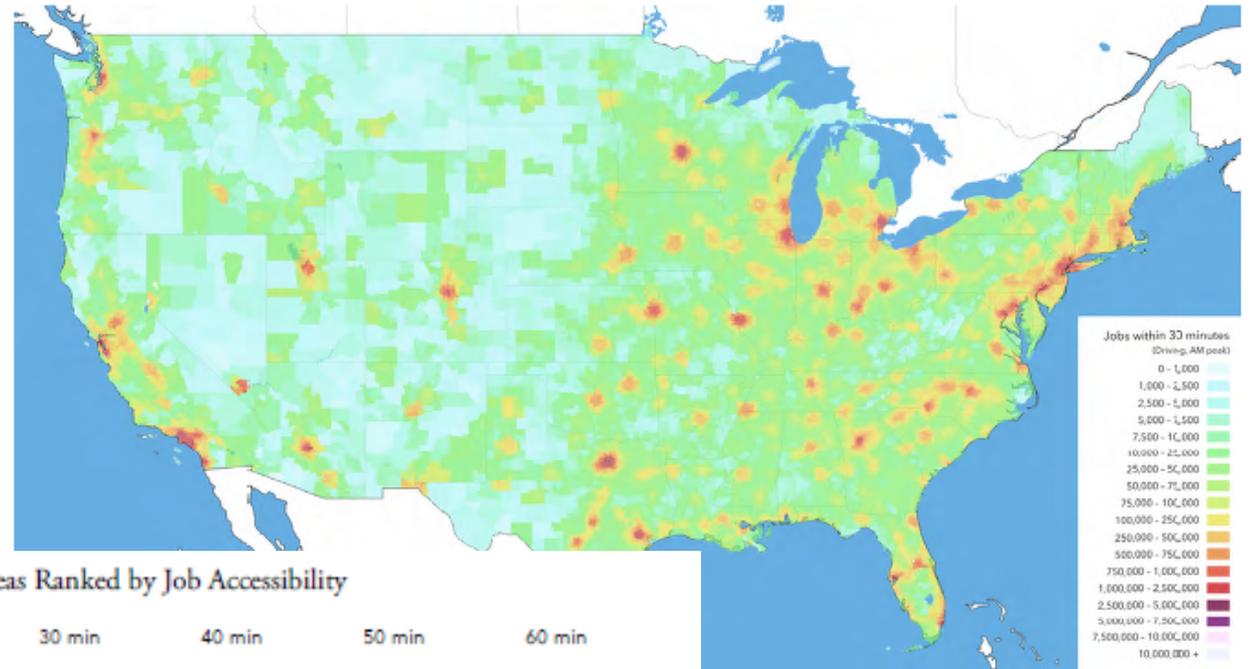


Table 3: Metropolitan Areas Ranked by Job Accessibility

Rank	Weighted Average	10 min	20 min	30 min	40 min	50 min	60 min
1	<b>Los Angeles</b>	New York	Los Angeles				
2	<b>New York</b>	Los Angeles	New York				
3	<b>Dallas</b>	San Francisco	San Jose	San Jose	San Jose	Dallas	Dallas
4	<b>San Jose</b>	Milwaukee	Milwaukee	Salt Lake City	Las Vegas	Las Vegas	Minneapolis
5	<b>Chicago</b>	San Jose	Salt Lake City	Las Vegas	Dallas	San Jose	San Jose
6	<b>Minneapolis</b>	Salt Lake City	San Francisco	Milwaukee	Salt Lake City	Minneapolis	Las Vegas
7	<b>Houston</b>	Chicago	Phoenix	Dallas	Minneapolis	Denver	Denver
8	<b>Denver</b>	Phoenix	Dallas	Minneapolis	Milwaukee	Salt Lake City	Chicago
9	<b>Detroit</b>	Denver	Las Vegas	Phoenix	Denver	Detroit	Detroit
10	<b>San Francisco</b>	Dallas	Denver	Denver	Phoenix	Chicago	Houston
11	<b>Phoenix</b>	Seattle	Minneapolis	San Francisco	Detroit	Phoenix	Phoenix
12	<b>Las Vegas</b>	Minneapolis	Chicago	San Diego	Houston	Houston	Salt Lake City
13	<b>Philadelphia</b>	Las Vegas	San Diego	Detroit	Chicago	Milwaukee	San Francisco
14	<b>Salt Lake City</b>	Portland	Detroit	Chicago	San Diego	Kansas City	Kansas City
15	<b>Milwaukee</b>	Boston	Houston	Houston	Kansas City	San Diego	Milwaukee

Jobs by auto in 30 minutes.

# Outputs – Datasets

- Produces a national accessibility dataset at the census block level:  
auto, transit, bike
  - Block-level, segmented by travel time
  - Jobs categorized by wage level, industry, etc.

GEOID	Travel Time	C000	CA01	CA02	CA03	CE01	...
123456789123456	30	12345	5678	4567	3456	5678	...

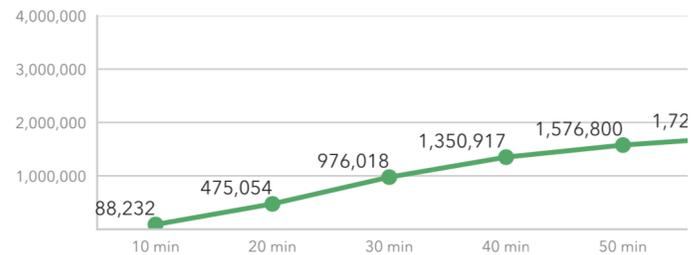
# Minneapolis

Minneapolis-St. Paul-Bloomington, MN-WI

Rank by Weighted Accessibility	10
Rank by Weighted Congestion Impact	26
Rank by Total Employment	14
Total Jobs	1,792,445
Average Job Density (per mi <sup>2</sup> )	297
Total Workers	1,745,960
Average Worker Density (per mi <sup>2</sup> )	289

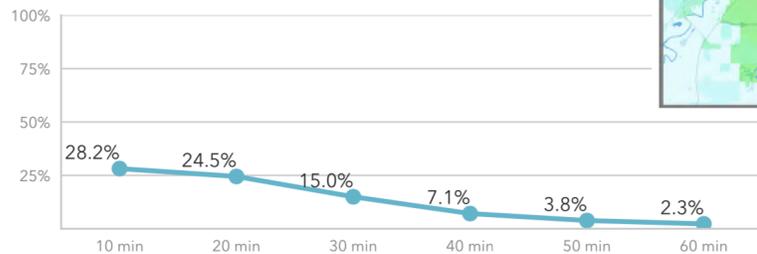
*Job and worker totals are based on LEHD estimates and may not match other sources.*

## Average Job Accessibility by Travel Time Threshold (worker-weighted)



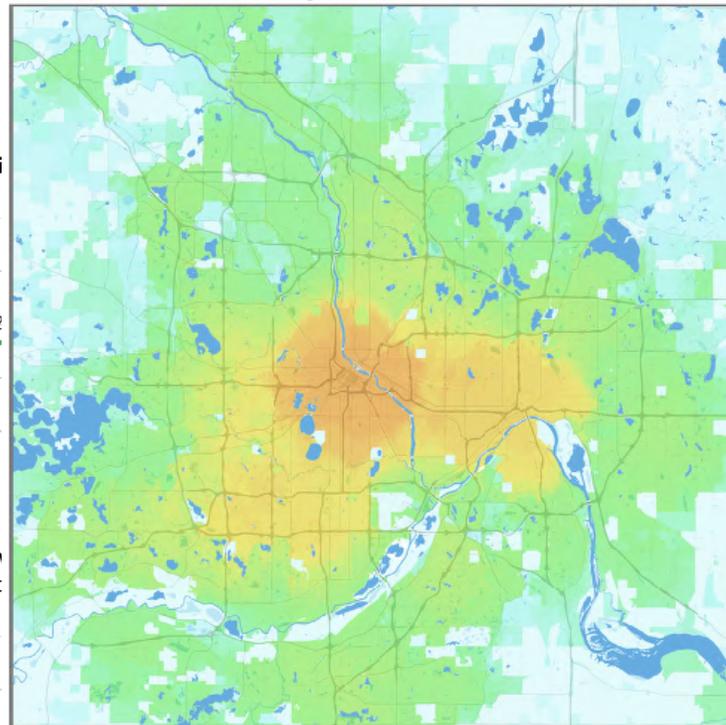
## Average Congestion Impact by Travel Time Threshold (worker-weighted)

Higher numbers indicate greater job access loss due to congestion



# Minneapolis

Minneapolis-St. Paul-Bloomington, MN-WI



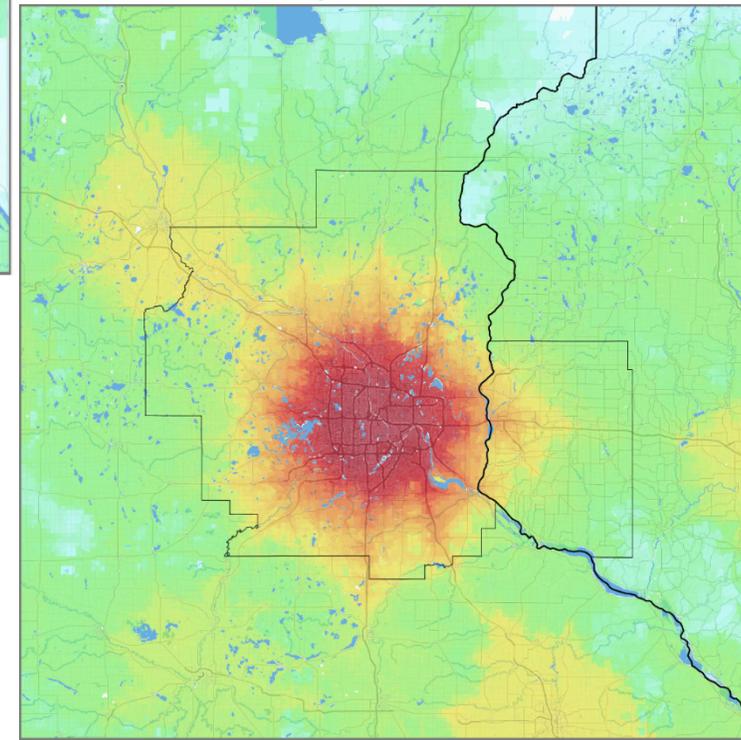
## Jobs within 30 minutes

(Biking, medium stress)



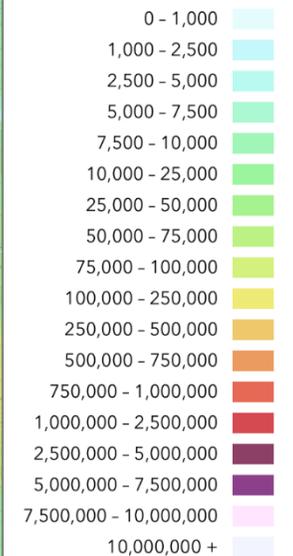
# Minneapolis

Minneapolis-St. Paul-Bloomington, MN-WI



## Jobs within 30 minutes

(Driving, AM peak)

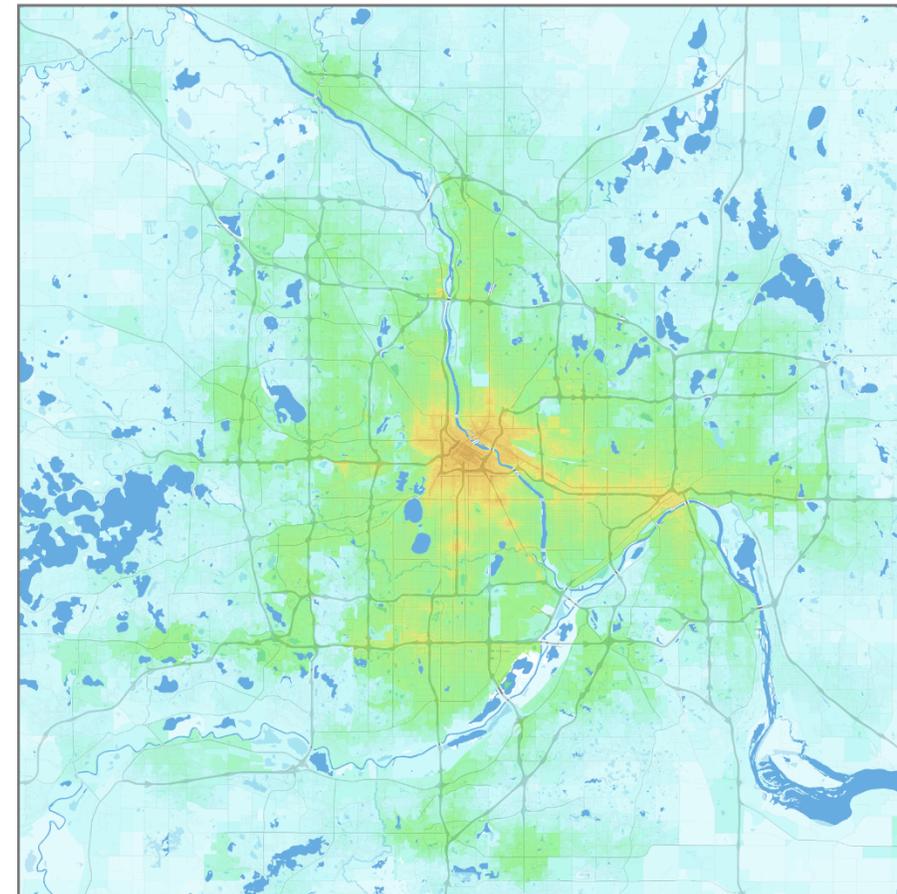


State border —  
CBSA boundary —

- Travel Time
  - Auto: TomTom GPS speed data
  - Transit: GTFS, Open Street Map network
  - Bike: Open Street Map
    - Assumed constant speed: 11.2 mph
- Destinations/Employment
  - LEHD/LODES
  - Federal jobs measurement (2018)

## Minneapolis

Minneapolis-St. Paul-Bloomington, MN-WI



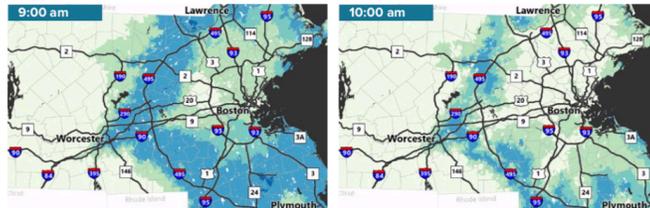
Jobs within 30 minutes  
(Transit, AM peak)



# Applications using this data

## CONGESTION IN THE COMMONWEALTH

REPORT TO THE GOVERNOR 2019



**ACCESS to JOBS AM Peak Period**  
Freeflow vs. Peak  
Jobs within 45 mins

0
< -250,000
< -500,000
< -750,000
< -1,250,000

within 45 minutes vs. Free Flow (2AM)



## District Mobility: Multimodal Transportation in the District

**Accessibility to Jobs**

Opportunities for jobs increase if a person can get to job by a mode in a reasonable amount of time. Use the buttons to adjust the travel mode and length of time to see how many jobs a person can get to from an area.

MODES  
DRIVE **PUBLIC TRANSIT** BICYCLE

- 10 minutes
- 20 minutes
- 30 minutes**
- 40 minutes
- 50 minutes
- 60 minutes

FEW JOBS TRANSIT ACCESS TO JOBS (DATA BASED ON AM PEAK) MANY JOBS

# NCHRP 08-121 Accessibility Measures in Practice Background

- Two year project: May 2019 – September 2021
- Research agency: University of Texas at Austin
- Identifying and implementing meaningful accessibility measures can be challenging; no standard practice for the selection and use of accessibility measures from among the wide array of accessibility metrics, methods, and tools
- Research needed to characterize and evaluate existing accessibility measures and identify valid and feasible measures for a range of decision-making contexts; coupled with guidance and support for implementation

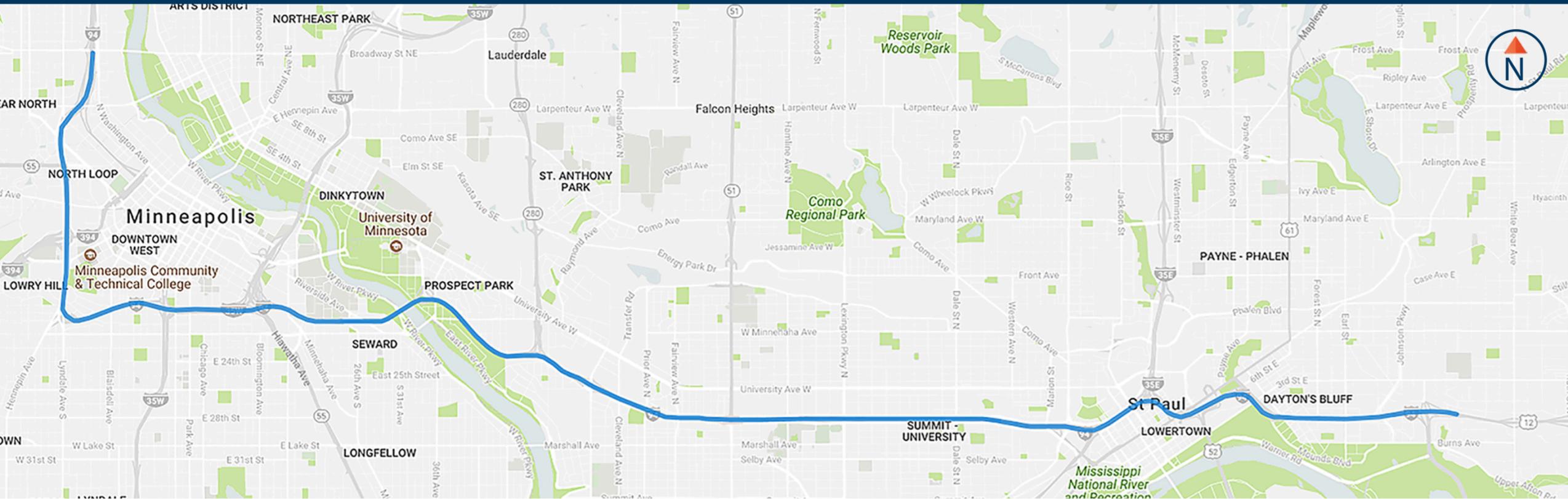
# NCHRP 08-121 Accessibility Measures in Practice Objective & Progress to date

- Develop a practitioner-ready resource for transportation agencies on how to select and apply accessibility measures for different decision-making contexts
- Background research is complete – literature review, surveys, interviews
- Working up content of guidebook – pilot early 2021
  - \*\*\*Still looking for non-user agencies to participate; please contact me and I'll connect you with TRB staff for more information\*\*\*

Rethinking



**m** DEPARTMENT OF  
TRANSPORTATION



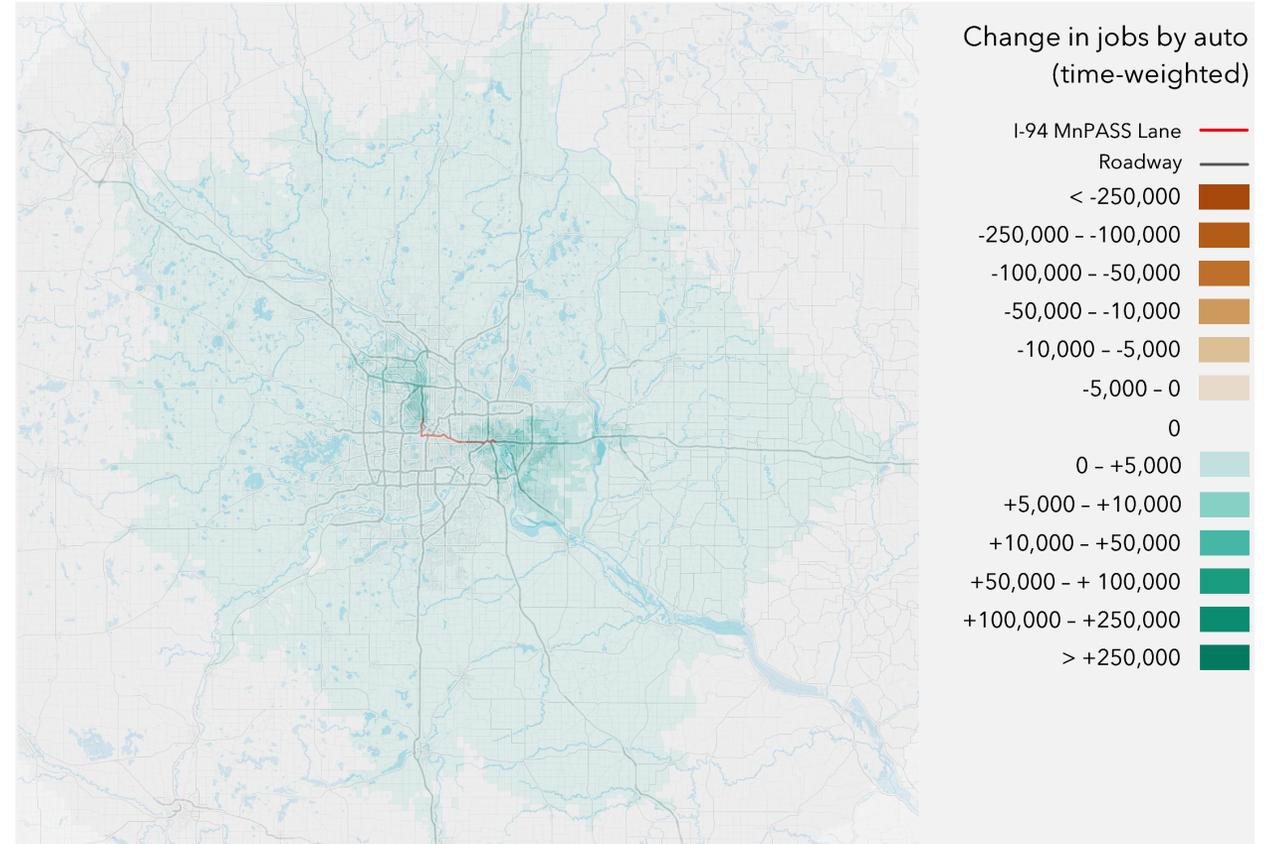
# Rethinking I-94 purpose

## Rethinking I-94 has three main purposes

- Make it easier to travel to, along and across the I-94 corridor and establish a sense of place for the communities that live, work and play there.
- Enhance safety and mobility for people walking, biking, driving and using transit.
- Develop a community-based approach focused on reconnecting neighborhoods, revitalizing communities and ensuring residents have a meaningful voice in transportation decisions that affect their lives.

# Accessibility impact analysis of managed lanes

- Conducted accessibility impact analysis of managed lanes by auto and transit
- Accessibility benefits found – increase in job accessibility for auto and transit when operating on managed lanes in the Rethinking I-94 corridor



## Schedule

- **Completed:** Phase 1 (2016-2018)
- **We are here:** Phase 2 (2018-2021)
  - **2020:** Government agency engagement
  - **2021:** Public engagement on draft scoping decision document
- **2022:** Select preferred alternative
- **2023:** Environmental approvals and prepare for construction projects as funding becomes available

# Rethinking I-94 current status

- Environmental documentation phase
  - Following the federal NEPA and state MEPA processes
- Specific alternatives have not been identified
- Access to jobs proposed as a consideration in evaluation criteria (criteria currently in draft form)

# Measuring accessibility – a pilot project

- State Smart Transportation Initiative (SSTI) is supporting MnDOT to evaluate the accessibility of communities in Minnesota
- Pilot includes accessibility analysis on transportation projects and on siting of land uses
- Goals to test available platforms, serve as proof of concept, and demonstrate how accessibility analysis can be implemented in practical decision-making
- Project kicked off in January 2020 and is wrapping up

# Project location – Hwy 316 in Hastings



## THE CORRIDOR EVALUATION RECOMMENDS



Improved safety for all users



Speed reduction measures



Improved highway access



Street access and crossings



Pedestrian and bicycle facilities & connections

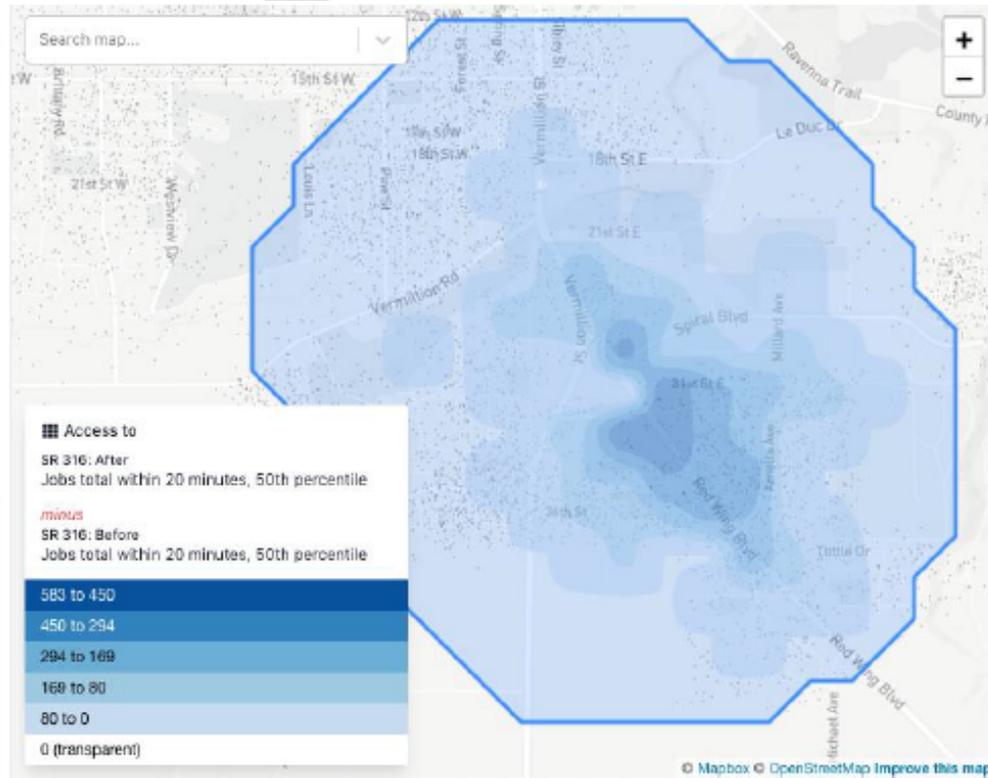
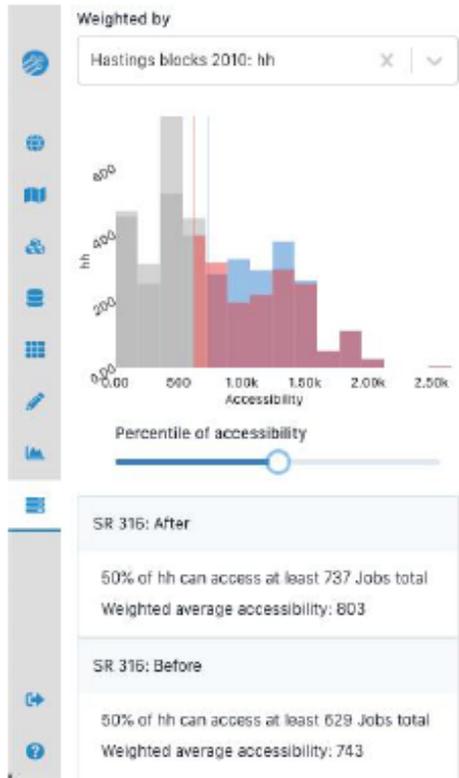
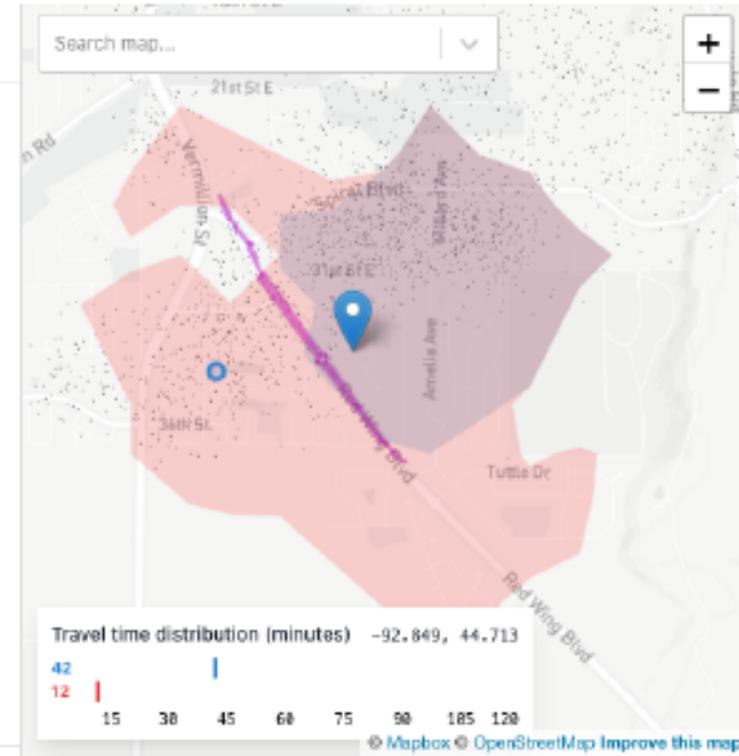
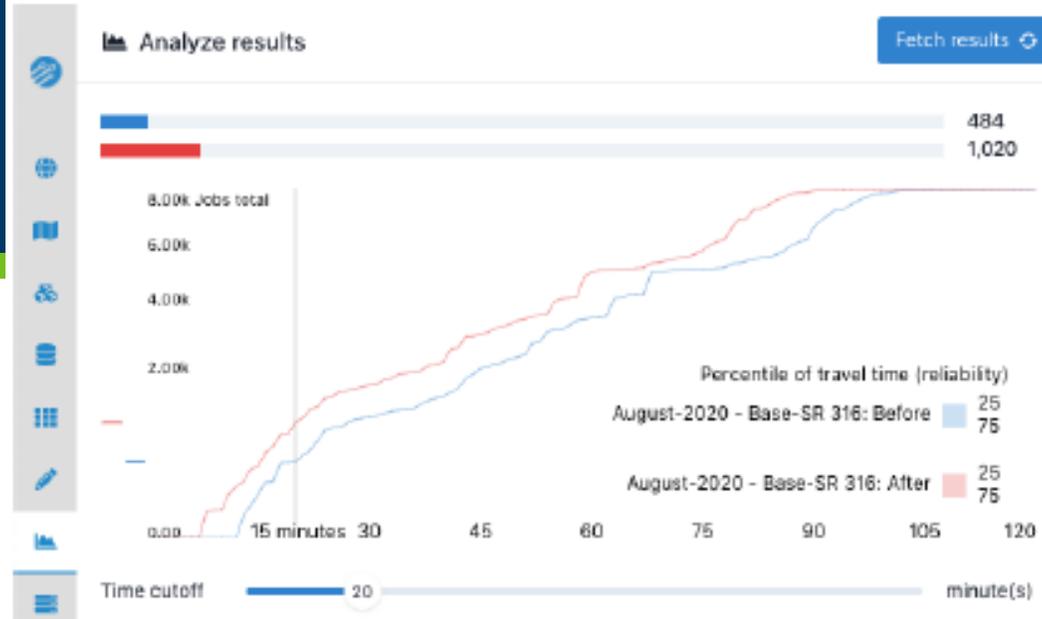
Project area is 25 miles southeast of MnDOT's Central office in St. Paul



# Highway 316 in Hastings

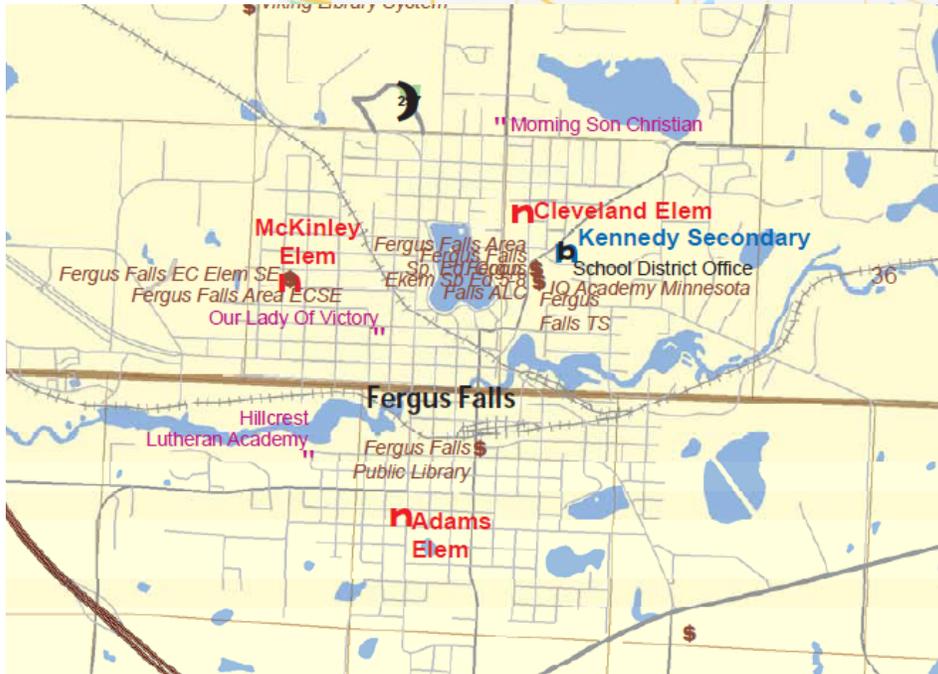
- Modeled proposed improvements along Highway 316 (Red Wing Boulevard) in Hastings using Conveyal. Road networks are based on data from OSM, modified using an OSM editor called JOSM to reflect current traffic speeds and proposed alignments.
- Study area is characterized by a mix of residential and commercial land uses within close proximity, but there are no bicycle or pedestrian facilities, no marked crossings, and frequent speeding issues.
- Improvements will add a separated bicycle and pedestrian facility, several marked crossings with streetlights and refuge islands, and several roundabouts to calm traffic.

# Highway 316 in Hastings



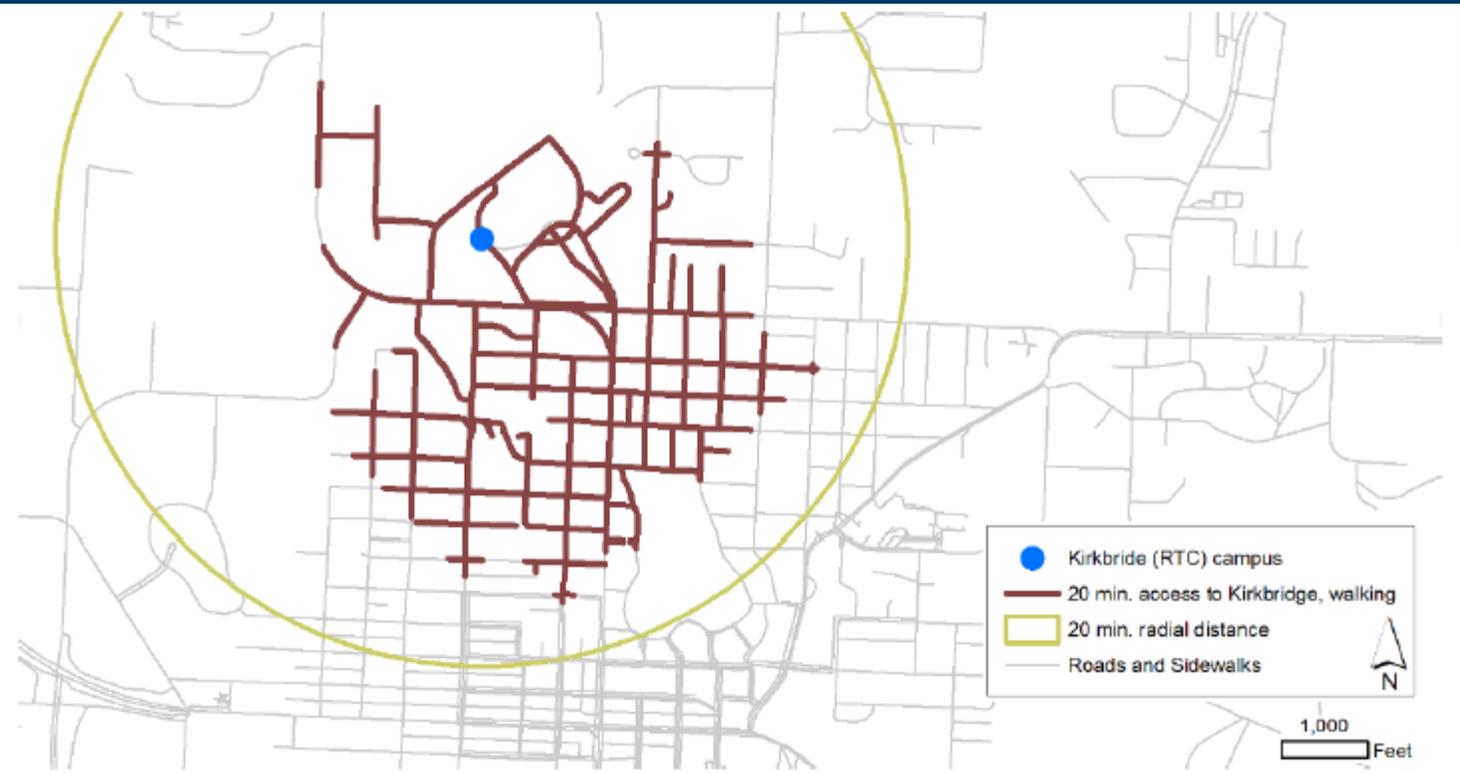
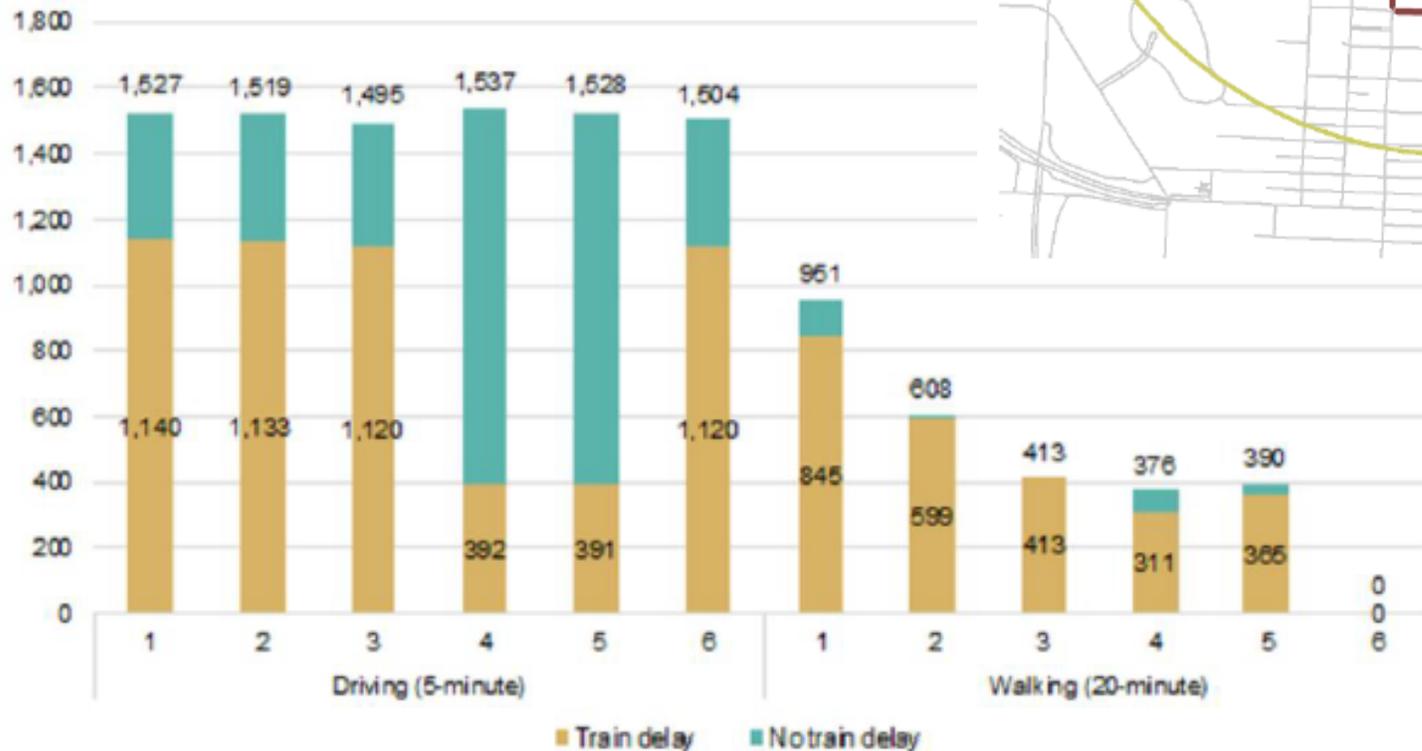
- 20-minute walksheds before and after road improvements from nearby location
- Access to jobs within 20-minute walk before and after road improvements

# Project locations – Fergus Falls/Breckenridge School Districts



- Fergus Falls is about 185 miles NW of St. Paul; Breckenridge is 26 miles east
- Evaluated the relative accessibility of potential school sites using an open source accessibility toolbox that leverages ArcMap Network Analyst. Road networks are based on data from OpenStreetMap (OSM).

# Fergus Falls



- 20-minute walking access from Kirkbride site in Fergus Falls, measured using the street network versus radially
- Access to households from sites in Breckenridge, with and without train delay

# Other examples and future

- Other research and implementation examples
  - State DOTs are prioritizing investments with criteria including accessibility impacts (Virginia DOT Smart Scale)
  - FTA Multimodal Connectivity Measures
  - MPOs are setting planning goals based on accessibility (Salt Lake, Twin Cities, others)
- Looking toward accessibility metrics to estimate travel behavior and by extension GHG emissions



# Thank you!

[deanna.belden@state.mn.us](mailto:deanna.belden@state.mn.us)

# System Performance Management - Focus on Accessibility

## Partnerships and Case Examples in Florida

Monica Zhong  
November 18, 2020



# Topics

---

Partnerships

---

Accessibility Measures

---

Florida Use Cases

# Partnership

# Florida Transportation Plan

**Choices Station** Leave a Comment

**Goal: Transportation Choices that Improve Equity and Accessibility.**

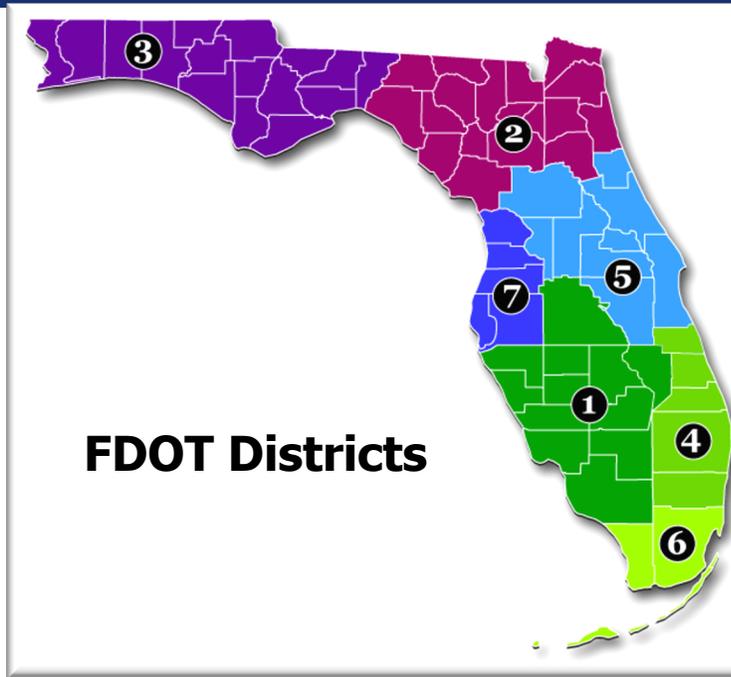
We've learned that the range of choices is more than just cars, bicycles, and buses. As innovation empowers new options like e-scooters and air taxis, we've learned it is not enough to simply provide more choices. Instead, we need to provide **universal accessibility** to all Floridians; safe, affordable, and convenient ways for everyone to access jobs, education, and health care, regardless of age, income, or ability.

Florida's longstanding emphasis on the automobile as the dominant form of transportation is a barrier to residents who cannot operate a motor vehicle due to age or disability. Other Floridians face choices between devoting a large share of their household budget to owning and operating a vehicle or spending a large portion of their waking hours taking circuitous transit routes to access work or other daily needs. Recognizing the value of access for all residents- and that better access for one socioeconomic group often have systemwide benefits.

To learn more about accessibility of transportation in Florida, visit the [FDOT Accessibility Reports](#).

**\*\*Input needed: [Click here](#) to review draft strategies that help get us closer to this goal. Leave a Comment in the box above and let us know your thoughts.\*\***

# Statewide Mobility Measures Program Team



**FDOT** Florida Department of **TRANSPORTATION**

E-Updates | FL511 | Mobile | Site Map

Search FDOT...

Home About FDOT Contact Us Maps & Data Offices Performance Projects

Freight, Logistics and Passenger Operations Office

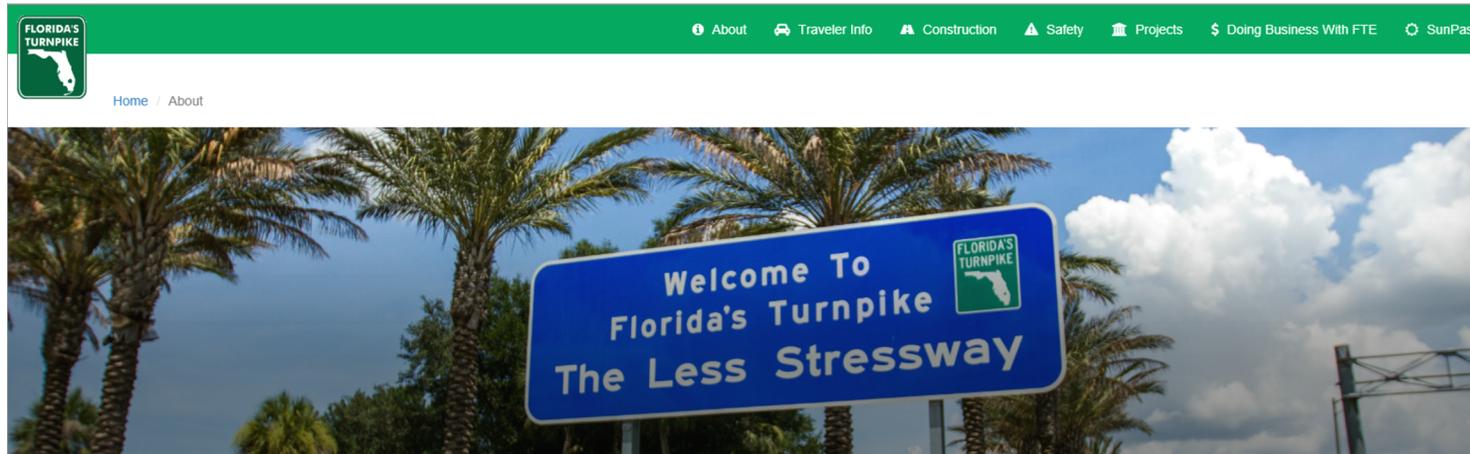
Transportation Data & Analytics Office

Planning Offices

Traffic Engineering and Operations Office

TEO / Divisions / TSMO

**Transportation Systems Management and Operations**



Florida MPOs

Florida Metropolitan Planning Organization Advisory Council

A forum for transportation decision-making

# Supporting MPOs/Counties

- MAP 21/FAST Act Target Setting and Reporting
- MPO Mobility Profiles
- County Mobility Profiles

# Supporting MPOs

## BROWARD MPO MOBILITY PERFORMANCE PROFILE 2017



### Travel Time Reliability



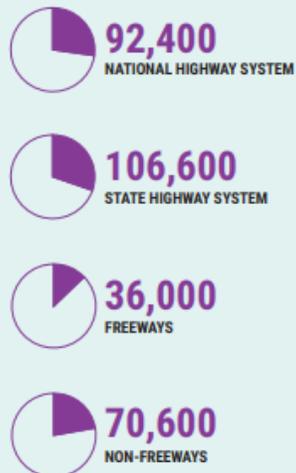
**% Pedestrian Facility Coverage**  
90.2%

**Average Job Accessibility by Automobile**  
660.3 (thousands) Within 30 Minutes

**% Bicycle Facility Coverage**  
50.0%

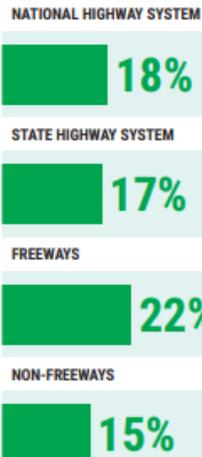
**Average Job Accessibility by Transit**  
10.1 (thousands) Within 30 Minutes

### Daily Vehicle Hours of Delay



NOTE: Profile is based on MPO Boundary

### Percent Miles Heavily Congested



### Daily Truck Miles Traveled / Daily Vehicle Miles Traveled



# Baker County Transportation Profile 2018

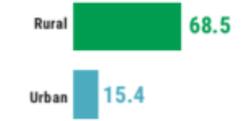
## Supporting Counties

**Population Density**  
48 Per Square Mile

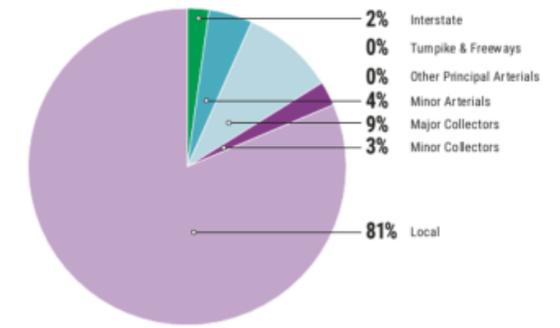
**Average Commute to Work**  
30 Minutes

**Average Travel Time**  
11 Minutes to Hospital  
46 Minutes to Airport  
11 Minutes to Urban Center

Centerline Miles on SHS for Rural and Urban Areas



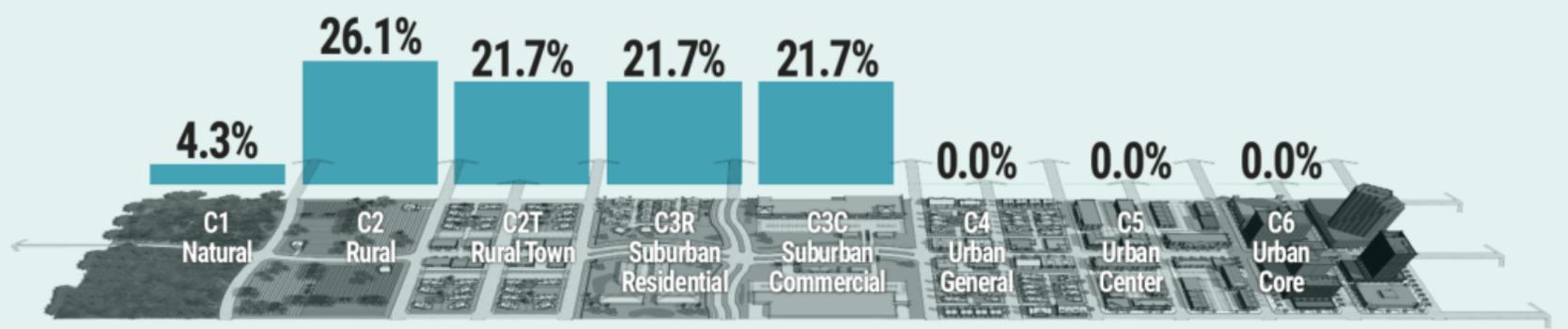
Centerline Miles by Functional Classification



Centerline Miles of Paved and Unpaved Roads



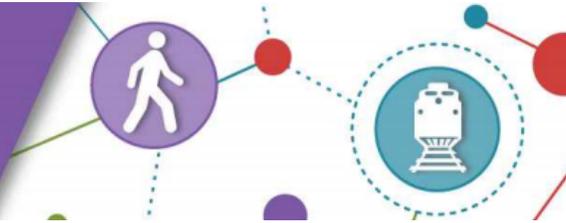
Percentage of Roadways by Context Classification



# Accessibility Measures

# FDOT Accessibility Measures

## THE FDOT SOURCE BOOK

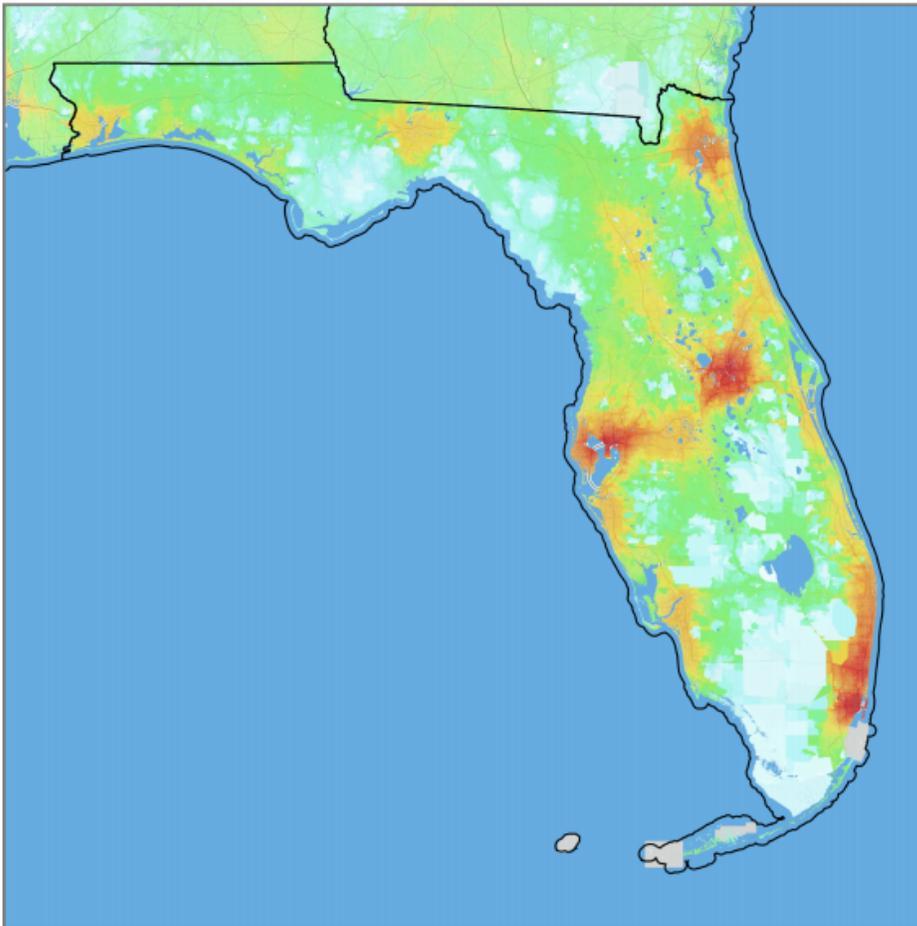


- % pedestrian facility coverage
- % bicycle facility coverage
- Job accessibility by auto within 40 minutes
- Job accessibility by transit within 40 minutes
- % population within 1 mile of bicycle facilities
- Resident access to transit (within ½ mile of a fixed route transit)

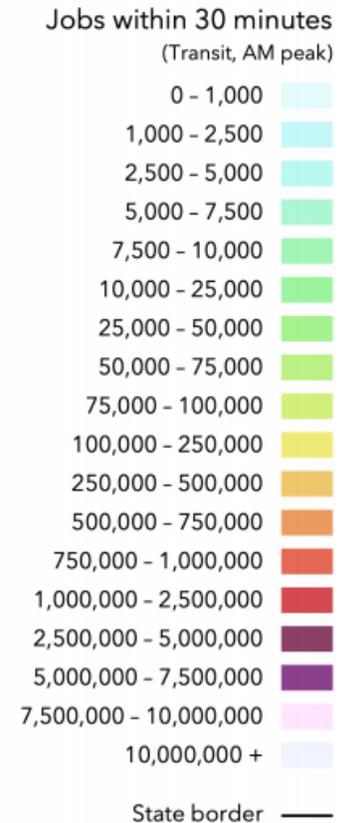
# National Accessibility Evaluation

## -- Pooled Fund Study

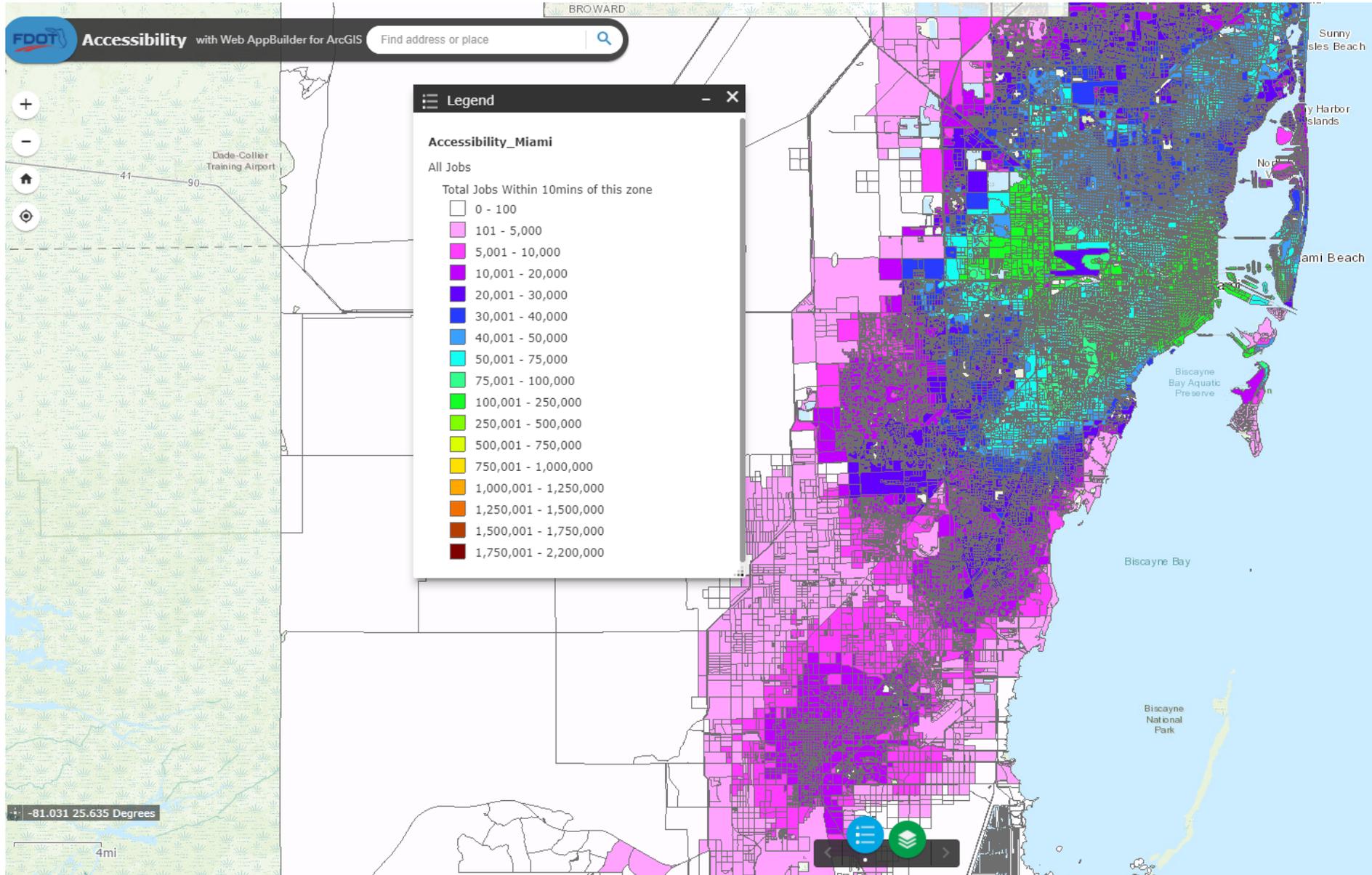
Florida 2018 Auto Accessibility



Florida 2018 Transit Accessibility



# Mapping Accessibility



Applying National Accessibility  
Evaluation Pooled Fund Study Data

# Florida Use Cases

# Florida Use Cases



# FDOT District 4 Use Cases

- 2045 SIS Cost Feasible Plan Project Prioritization
- Systemwide Provisional Context Classification
- I-95 Corridor Mobility Planning Project (CMPP) Pilot Study



# Project Prioritization

Table 2 Measures for D4 2045 SIS Cost Feasible Plan Project Prioritization

Goal	Measures
Safety and Security	Crash Rate
	Fatal Crash Frequency
	Serious Injury Frequency
Agile, Resilient, and Quality	Preservation of Existing Transportation System
	Continuity
Transportation Choices	Multimodalism
	ROW Costs
Economic Competitiveness	Benefit/Cost (B/C) Ratio
	Supports Economic Vitality
	Job Accessibility by Auto
	Job Accessibility by Transit

- **Job Accessibility by Auto**

The job accessibility by auto was calculated using *Access Across America* data from the University of Minnesota. The data provides the number of jobs by automobiles within 30 minutes for each census block. A weighted average method was used to calculate the number of accessible jobs for each project corridor. For a project that is intersected by census block  $i$ , the formula is:

$$\begin{aligned} & \text{Number of Jobs Accessible by Automobiles} \\ &= \left( \sum_i \text{Jobs by Automobiles}_i \times \text{Block Size}_i \right) / \sum_i \text{Block Size}_i \end{aligned}$$

Scores were given based on the quantile classification of number of jobs accessible by auto for all projects, as shown in Table 13.

*Table 13 Job Accessibility by Auto Score – Quantile Classification*

Quantile	Score
1 <sup>st</sup>	1
2 <sup>nd</sup>	2
3 <sup>rd</sup>	3
4 <sup>th</sup>	4



# Project Prioritization

- **Job Accessibility by Transit**

Similar to job accessibility by auto, the job accessibility by transit measure was calculated using *Access Across America* data. The data provides the number of jobs by transit within 30 minutes for each census block. A weighted average method was used to calculate the number of accessible jobs for each project corridor. For a project that is intersected by census block  $i$ , the formula is:

$$\begin{aligned} & \text{Number of Jobs Accessible by Transit} \\ &= \left( \sum_i \text{Jobs by Transit}_i \times \text{Block Size}_i \right) / \sum_i \text{Block Size}_i \end{aligned}$$

Scores were given based on the quantile classification of the number of jobs accessible by transit for all projects as shown in Table 14.

*Table 14 Job Accessibility by Transit Score – Quantile Classification*

Quantile	Score
1 <sup>st</sup>	1
2 <sup>nd</sup>	2
3 <sup>rd</sup>	3
4 <sup>th</sup>	4

# Project Prioritization

# Context Classification Case

## Systemwide Provisional Context Classification

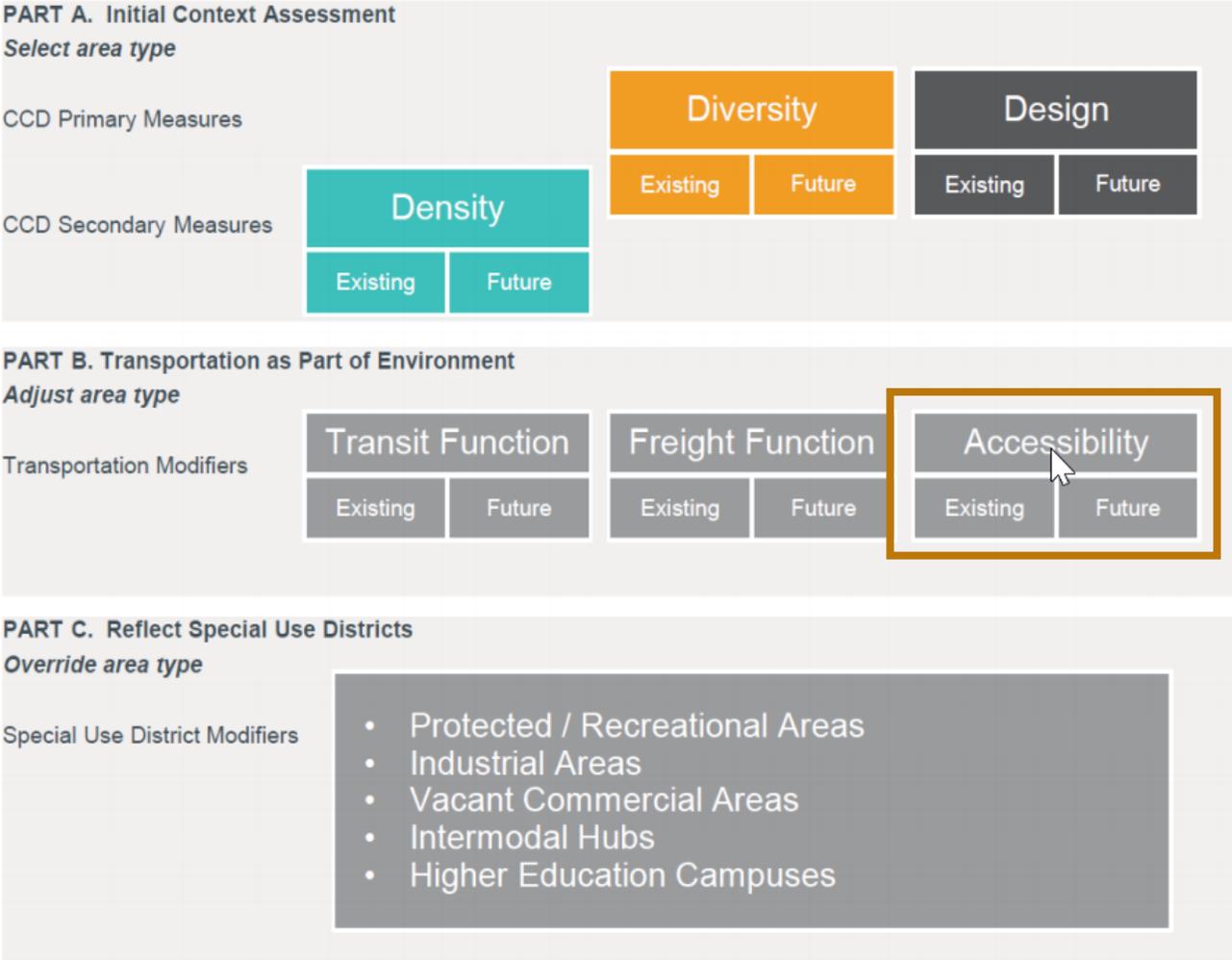


Figure 2. Hierarchical Approach to Systemwide Context Classification/Detailed Analytic Land Use Mapping

# Context Classification Case

Table 3: SPCC Variable Values

Dimension	Dimension weight	Indicator	Scale (for existing conditions)	Indicator weight
<b>Baseline classification</b>				
Density	50	Gross FAR (total building area within ¼ mile radius)	0 = 1 ≤0.05 = 2 ≤0.4 = 3 ≤0.85 = 4 ≤1.25 = 5 >1.25 = 6	100
Diversity	25	Number of different uses within 1/4 mile	0 = 1 1 = 3 ≤3 = 4 >3 = 6	100
Design	25	Building placement (estimated)	No buildings = 1 >50 feet = 2 >24 feet = 3 >10 feet = 4 >10 feet = 6	33

## Transportation modifiers

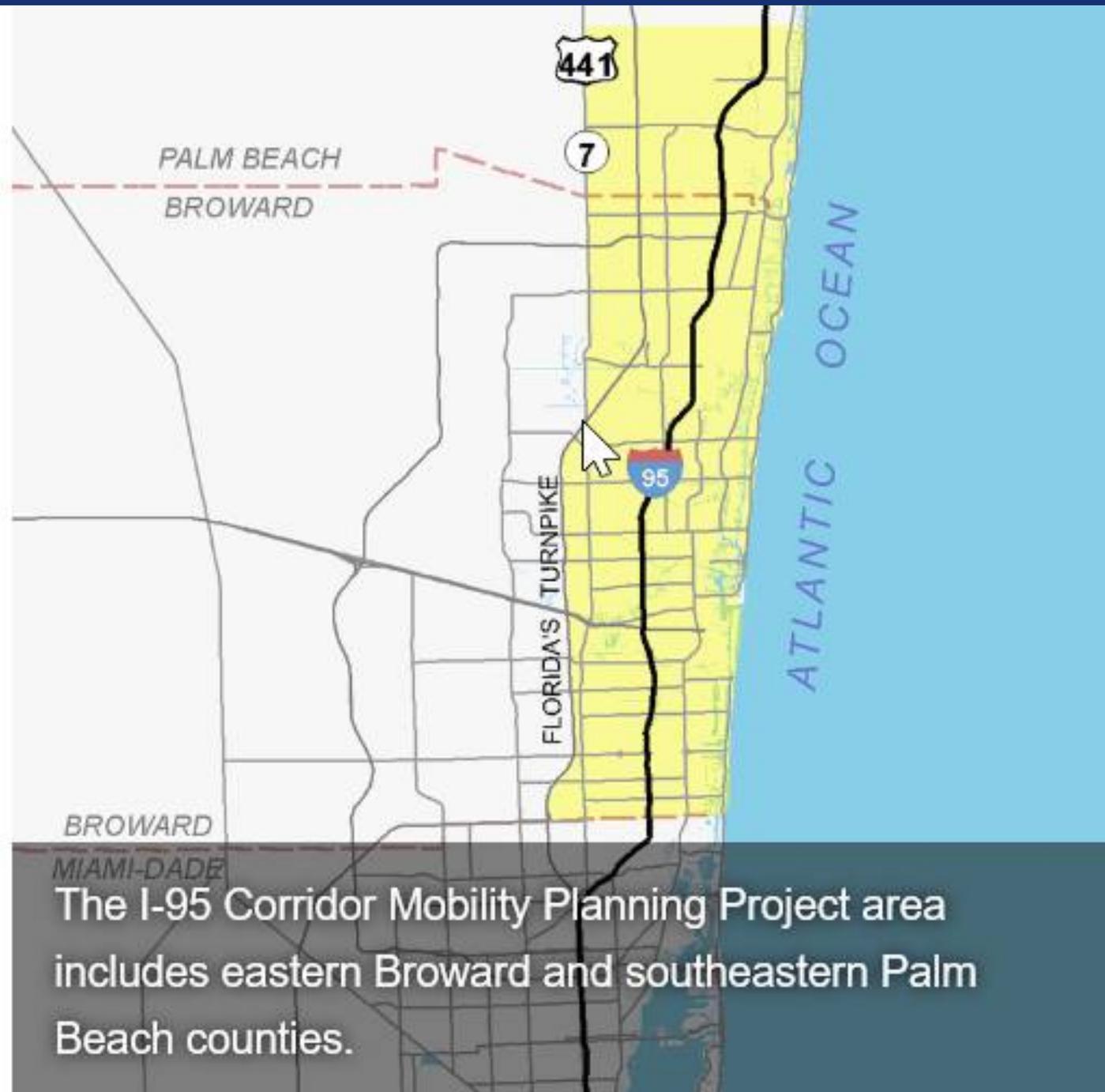
Multimodalism	100	Transit accessibility (jobs reachable)	≥ 150,000 = +1.00 ≥ 100,000 = +0.67 ≥ 50,000 = +0.33	33
		Transit service frequency (departures per hour)	≥ 24 = +1.00 ≥ 12 = +0.67 ≥ 8 = +0.33	33
		Walk accessibility (jobs reachable)	≥ 30,000 = +1.00 ≥ 20,000 = +0.67 ≥ 10,000 = +0.33	34

Percent truck traffic	≥5% = -0.33 ≥10% = -0.67 ≥15% = -1.00	50
-----------------------	---	----

# I-95 CMPP Pilot Study



# I-95 CMPP Pilot Study



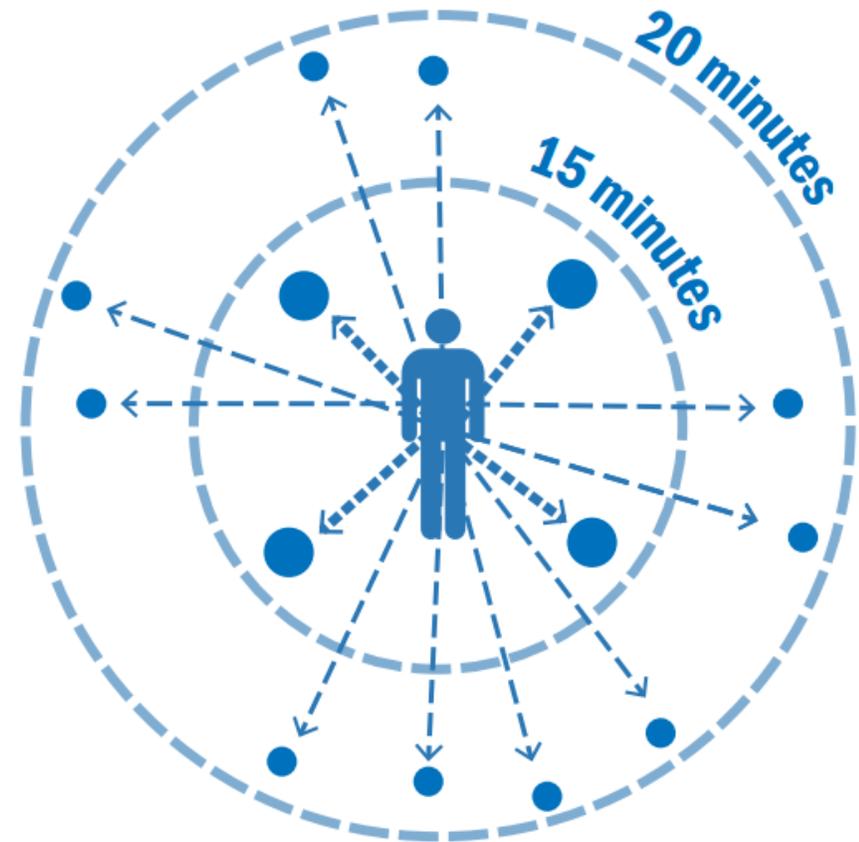
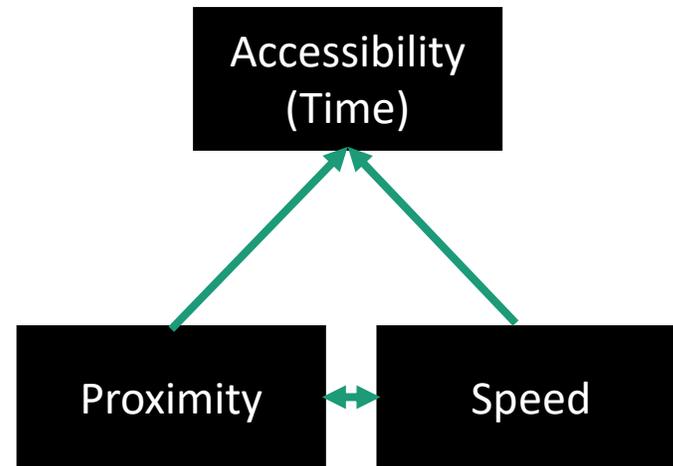
# I-95 CMPP Pilot Study Performance Measures

- Multimodal accessibility (MMA)
- Multimodal system productivity (MSP)

Both measures focus on travel time accessibility to destinations

# Measuring Accessibility

Where do I need to go, and how can I get there?



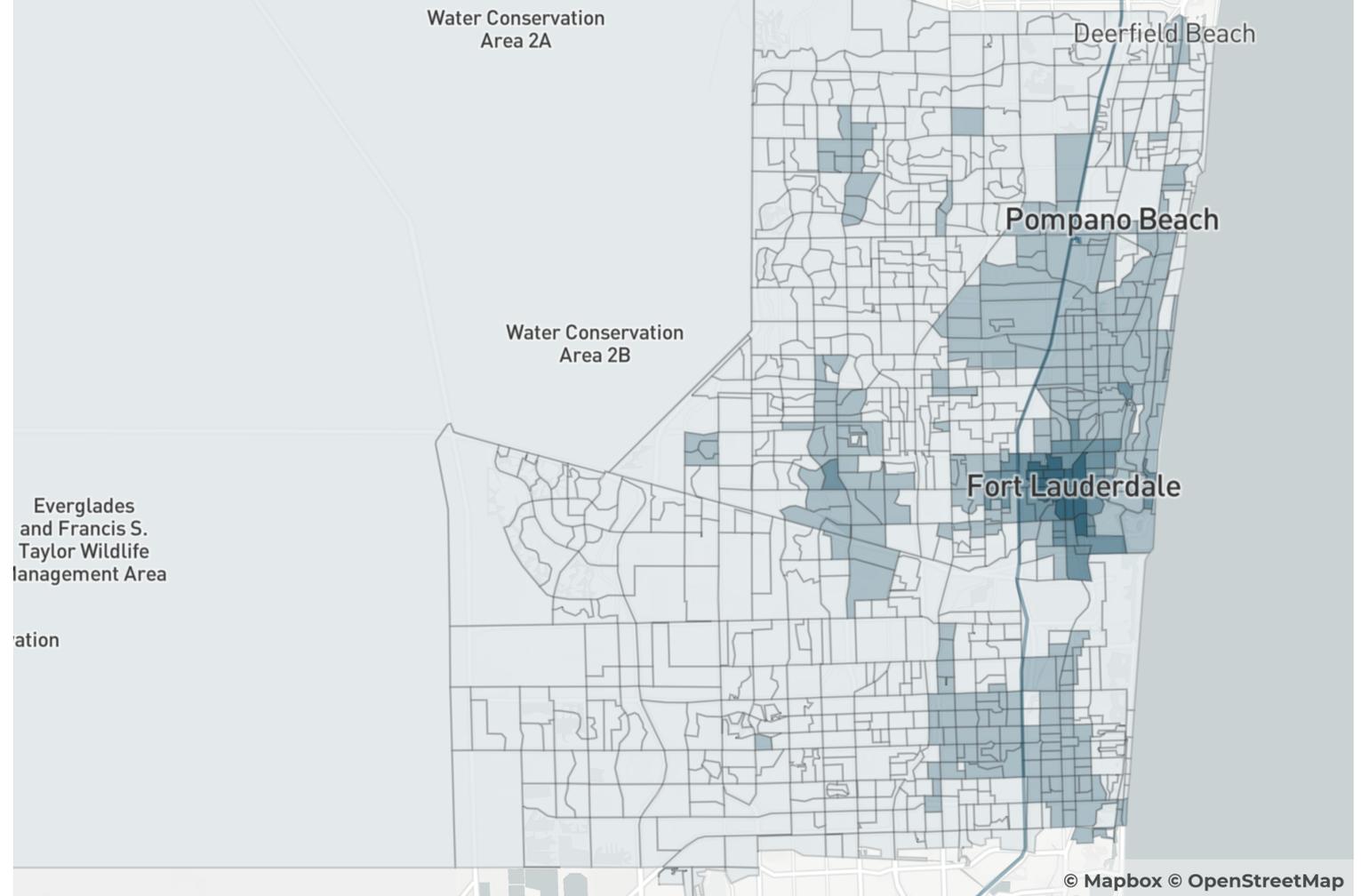
# Accessibility under Different Scenarios

Travel Mode	Existing Scores	Future Scores no strategy	Future Scores with strategy
Auto accessibility score	20,000	40,000	35,000
Transit accessibility score	2,000	6,000	11,000
Bicycle accessibility score	2,000	5,000	6,000
Walk accessibility score	1,000	1,500	3,000

# Broward MPO

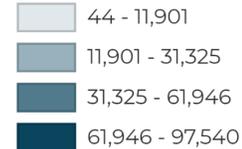
## The State of Broward's Transportation System

### Jobs within a 30 Minute Transit Trip



— Tri-Rail

#### Average Number of Jobs within a 30 Minute Public Transit



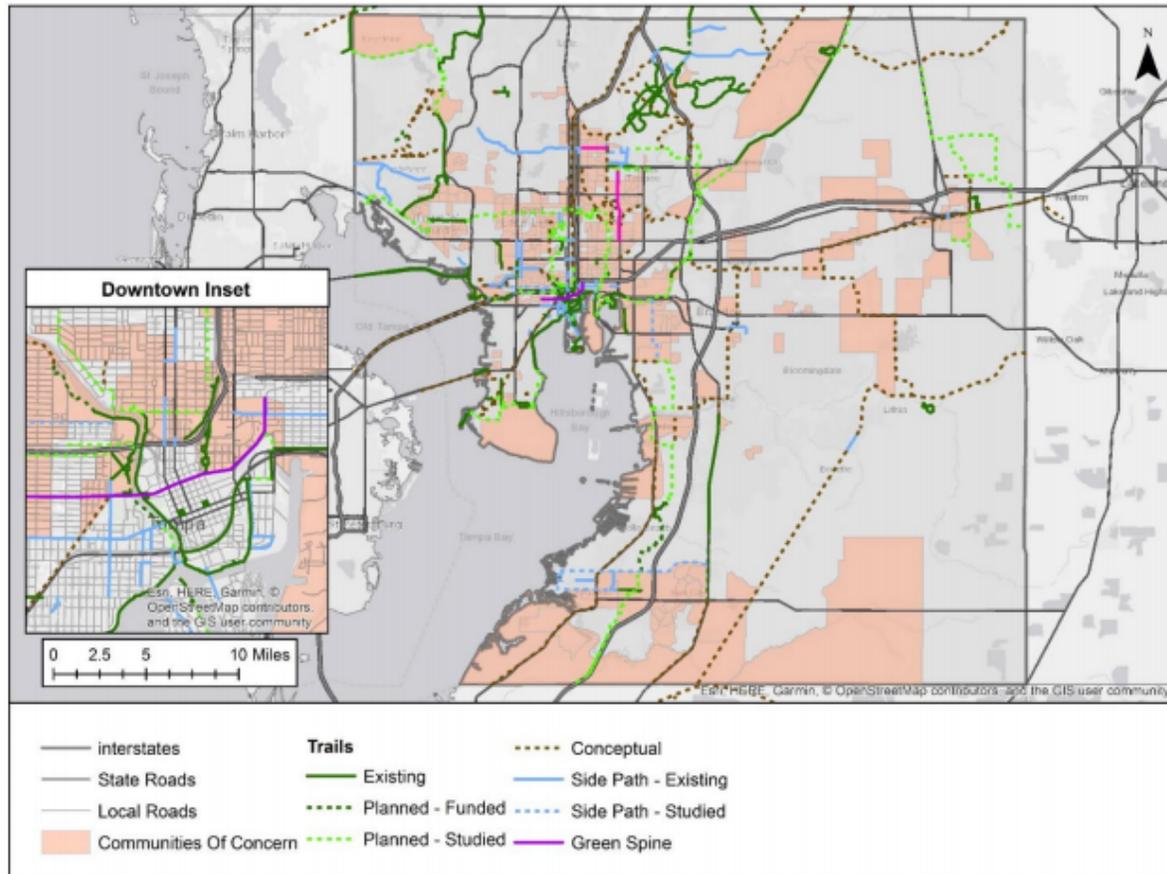
<https://dashboards.mysidewalk.com/broward-mpo-performance-dashboard/system-overview>

# Hillsborough MPO

## Hillsborough MPO 2045 LRTP – Needs Assessment

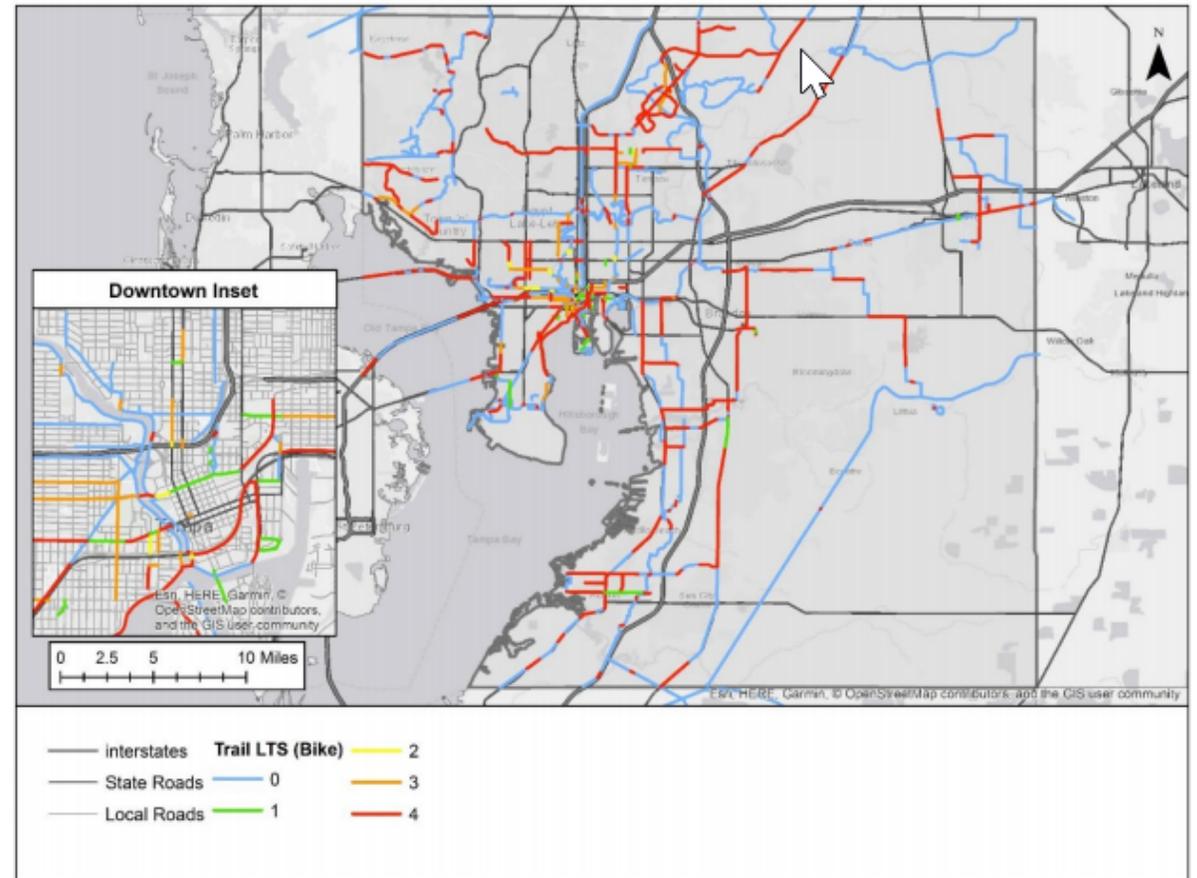


Figure 8: Communities of Concern and Trails/Sidepaths



Access to/from  
Communities of Concern

Figure 9: Level of Traffic Stress and Trails/Sidepaths



Bicycle  
Level of Traffic Stress

## Appendix A: Transit Performance Measures, Investment Impacts and Costs

### Countywide Statistics

Transit LOS	Population within ¼ mile	Jobs within ¼ mile	People & Jobs within ¼ mile	% of countywide population	% of countywide jobs	% of countywide population & jobs	Roadway Centerline Miles*
<b>Existing Service</b>							
A	121,527	186,456	307,983	10%	22%	15%	35
B	66,545	61,681	128,226	5%	7%	6%	17
<b>A-B</b>	<b>188,072</b>	<b>248,137</b>	<b>436,209</b>	<b>15%</b>	<b>30%</b>	<b>21%</b>	<b>52</b>
C	93,290	83,515	176,806	7%	10%	8%	60
D	84,958	73,290	158,248	7%	9%	8%	132
<b>C-D</b>	<b>178,249</b>	<b>156,805</b>	<b>335,054</b>	<b>14%</b>	<b>19%</b>	<b>16%</b>	<b>192</b>
E	46,465	25,670	72,135	4%	3%	3%	69
F	858,828	401,688	1,260,516	68%	48%	60%	87
<b>Trend Investment</b>							
A	438,166	513,989	952,155	22%	42%	30%	83
B	24,817	17,675	42,492	1%	1%	1%	13
<b>A-B</b>	<b>462,983</b>	<b>531,664</b>	<b>994,647</b>	<b>23%</b>	<b>43%</b>	<b>31%</b>	<b>96</b>
C	160,195	119,734	279,929	8%	10%	9%	176
D	43,357	22,479	65,836	2%	2%	2%	44
<b>C-D</b>	<b>203,552</b>	<b>142,213</b>	<b>345,765</b>	<b>10%</b>	<b>12%</b>	<b>11%</b>	<b>220</b>
E	0	0	0	0%	0%	0%	0
F	1,304,447	562,273	1,866,720	66%	45%	58%	59
<b>Trend + Sales Tax Revenue Investment</b>							
A	701,574	688,676	1,390,247	36%	56%	43%	258
B	25,205	27,391	52,596	1%	2%	2%	48
<b>A-B</b>	<b>726,779</b>	<b>716,064</b>	<b>1,442,843</b>	<b>37%</b>	<b>58%</b>	<b>45%</b>	<b>306</b>
C	95,317	66,380	161,697	5%	5%	5%	393
D	14,209	8,287	22,496	1%	1%	1%	77
<b>C-D</b>	<b>109,526</b>	<b>74,667</b>	<b>184,193</b>	<b>6%</b>	<b>6%</b>	<b>6%</b>	<b>470</b>
E	0	0	0	0%	0%	0%	0
F	1,134,677	445,419	1,580,096	58%	36%	49%	280

\*Number of miles in LOS F does not include roadways without bus service

2015 Countywide Population: 1,271,613  
 2015 Countywide Employment: 1,112,573  
 2045 Countywide Population: 1,970,982  
 2045 Countywide Employment: 1,236,150

Population/Jobs within  
 1/4 Miles of Transit Services



**EQUITY/LIVABILITY**

**Regional Accessibility**

**Analysis**

Metrics Report

April 2018



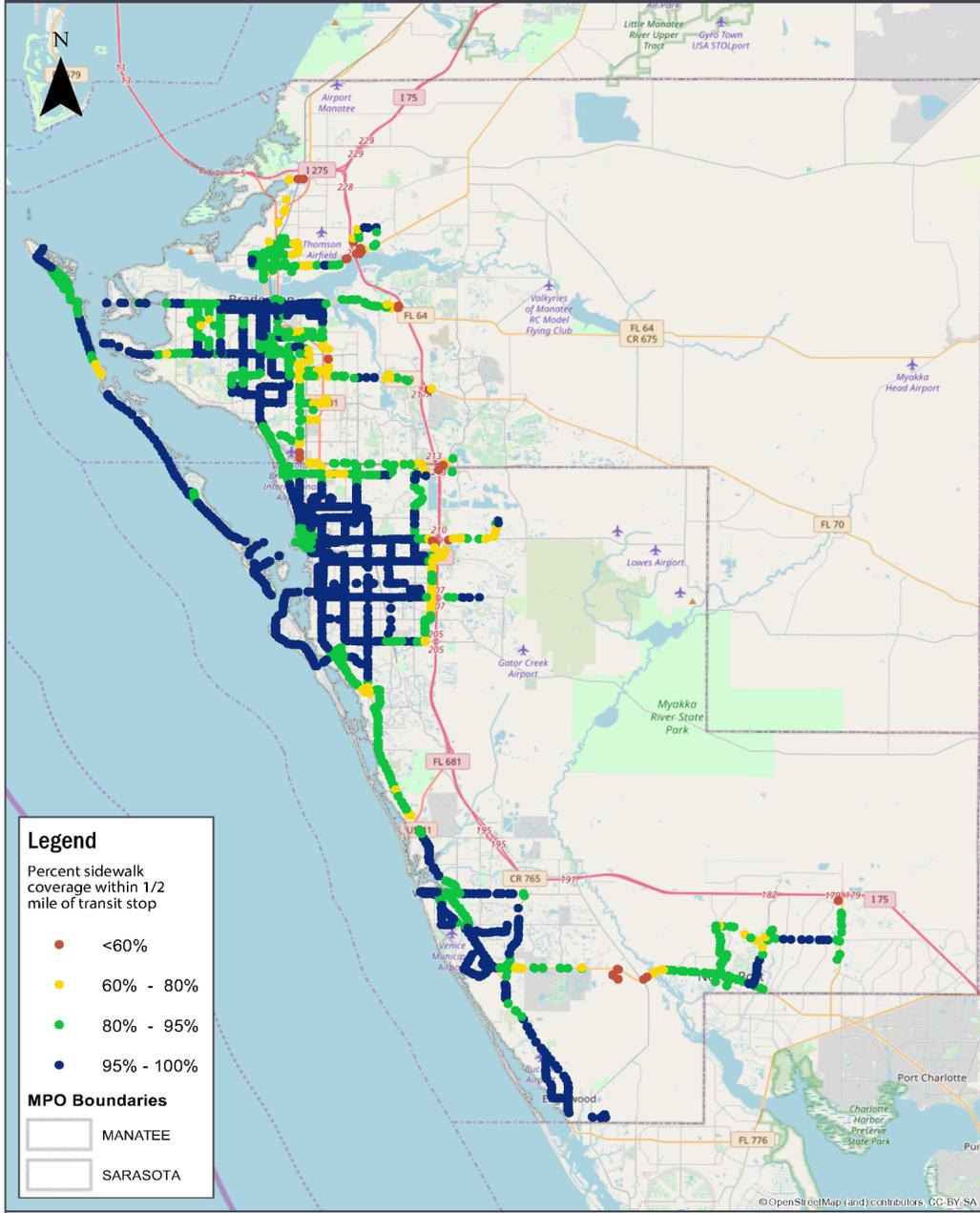
# Sarasota/Manatee MPO

Active Transportation Plan (2019)

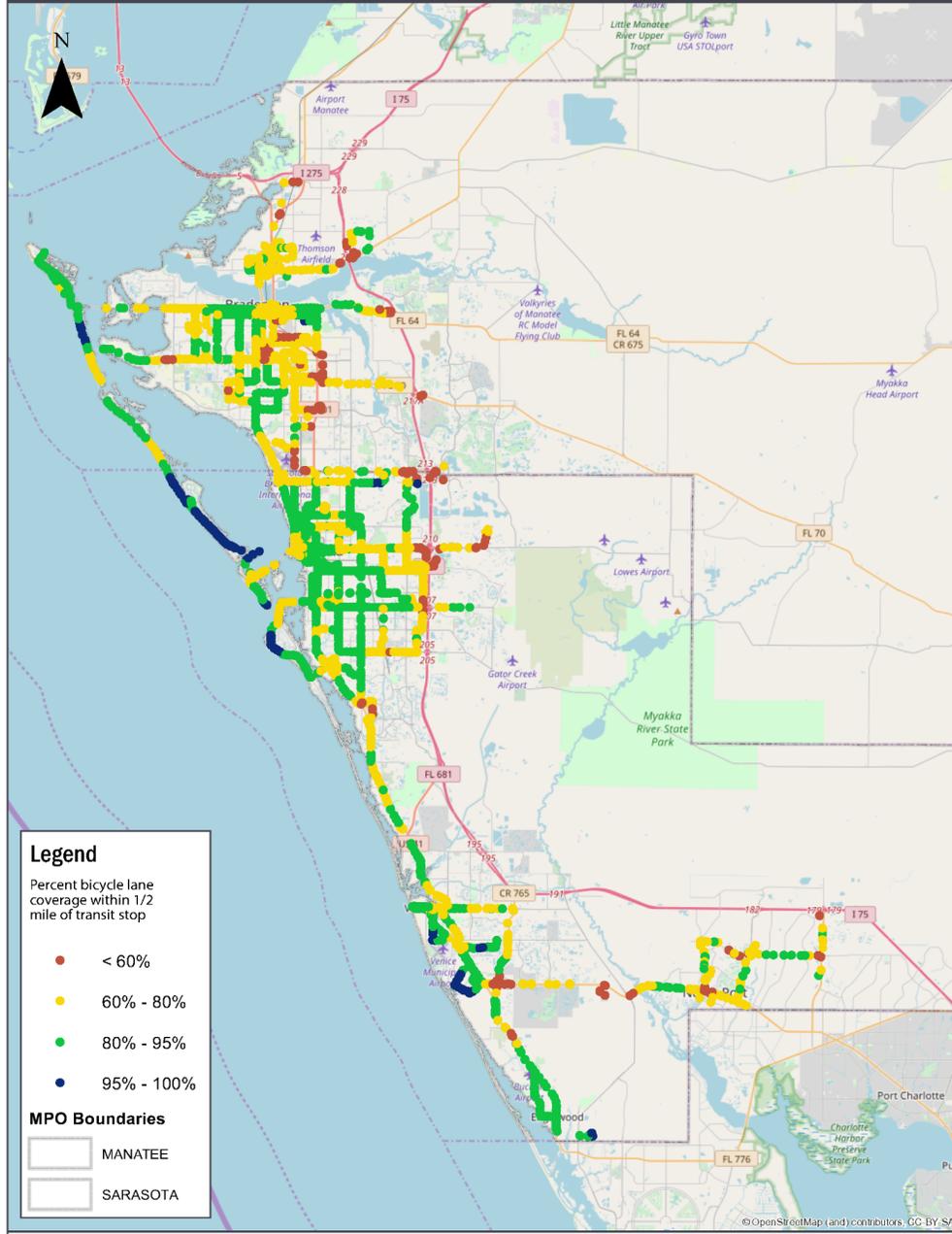
Transit Development Plans

2045 Long Range Transportation  
Plan (2020)

**Figure 20. Pedestrian Access to Transit**



**Figure 21. Bicycle Access to Transit**



Bike/Pedestrian Access to Transit

**SOUTHEAST FLORIDA**  
REGIONAL TRANSPORTATION PLAN  
Miami-Dade • Broward • Palm Beach



**2045**

## Southeast Florida Use Cases

# Planning for Different Future Scenarios



## 1. HIGH-CAPACITY TRANSIT NEEDS:

What regional-scale transit services are needed to accommodate the future growth anticipated for the region?



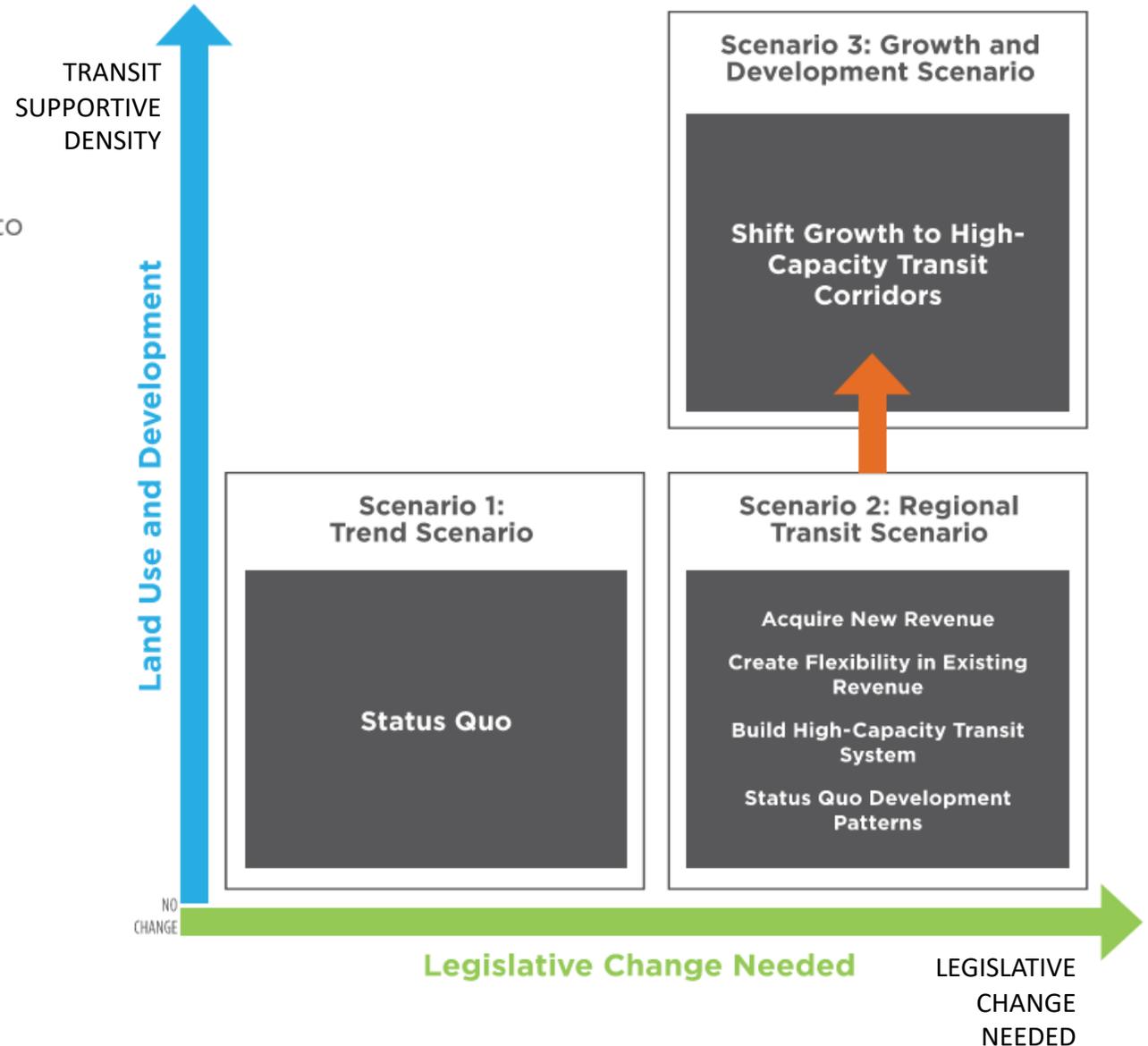
## 2. GROWTH AND DEVELOPMENT:

Are changes in development patterns necessary to complement regional high-capacity transit investments?



## 3. FINANCIAL AND LEGISLATIVE:

What changes to policy and legislation will allow for greater flexibility in how existing revenue sources are used? What new revenue sources can feasibly generate revenue for regional transportation infrastructure?



# Unchanged Future

# Alternative Future



High-capacity transit system ridership

~190,000 Daily riders

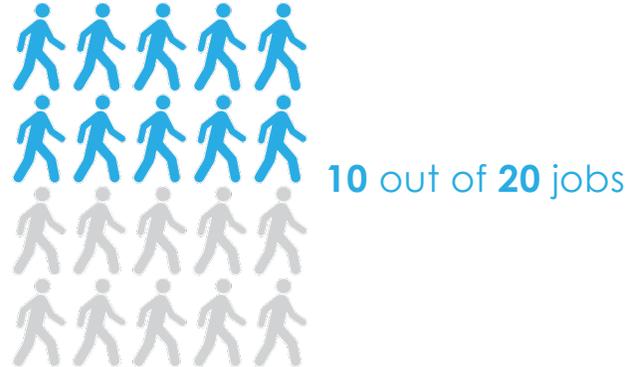
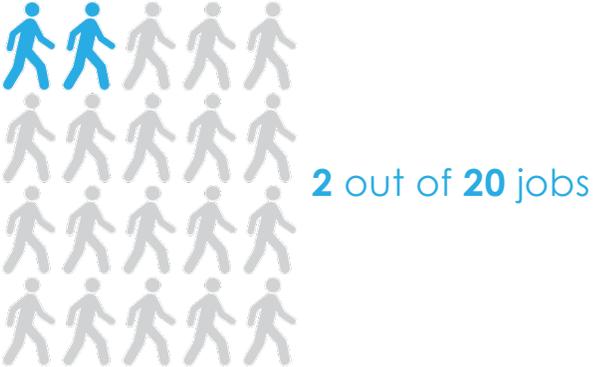
~665,000 Daily riders



Walkable access to high-capacity transit from home



Walkable access to jobs from high-capacity transit



# Florida Transportation Plan

**Choices Station** Leave a Comment

**Goal: Transportation Choices that Improve Equity and Accessibility.**

We've learned that the range of choices is more than just cars, bicycles, and buses. As innovation empowers new options like e-scooters and air taxis, we've learned it is not enough to simply provide more choices. Instead, we need to provide **universal accessibility** to all Floridians; safe, affordable, and convenient ways for everyone to access jobs, education, and health care, regardless of age, income, or ability.

Florida's longstanding emphasis on the automobile as the dominant form of transportation is a barrier to residents who cannot operate a motor vehicle due to age or disability. Other Floridians face choices between devoting a large share of their household budget to owning and operating a vehicle or spending a large portion of their waking hours taking circuitous transit routes to access work or other daily needs. Recognizing the value of access for all residents- and that better access for one socioeconomic group often have systemwide benefits.

To learn more about accessibility of transportation in Florida, visit the [FDOT Accessibility Reports](#).

**\*\*Input needed: [Click here](#) to review draft strategies that help get us closer to this goal. Leave a Comment in the box above and let us know your thoughts.\*\***

**Thank  
You!**

## Contact

Monica Zhong

850-414-4808

[Monica.Zhong@dot.state.fl.us](mailto:Monica.Zhong@dot.state.fl.us)

[https://www.fdot.gov/planning/fto/  
accessibility/](https://www.fdot.gov/planning/fto/accessibility/)



# Applications of Accessibility Tools and Data

Derek Krevat

MassDOT Office of Transportation Planning

TPM Webinar - System Performance Management - Focus on Accessibility

November 18, 2020

# Outline of Presentation

---

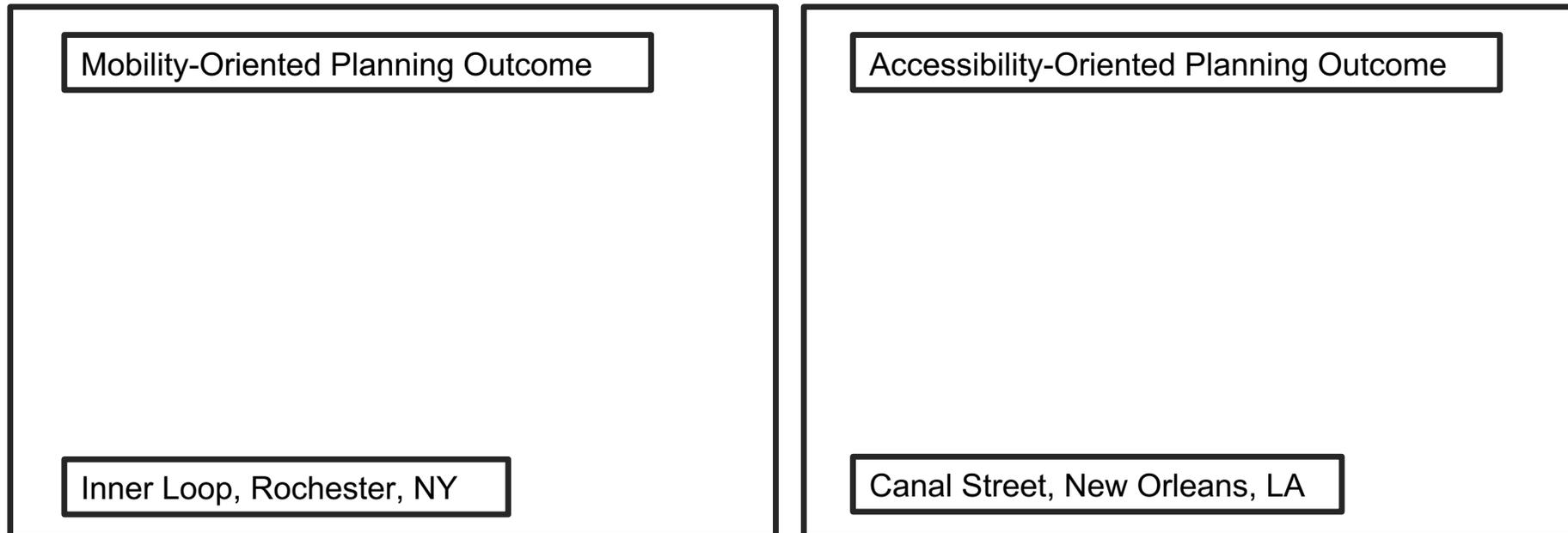
- Accessibility Definition
- Three Applications of Accessibility Data
  - Congestion Management Planning
  - Project Scoring
  - Transit Service Planning



# Defining Accessibility

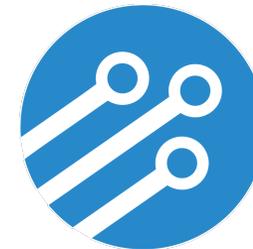
# Accessibility Definition

- **Accessibility Observatory:** The ability of people to reach the destinations that they need to visit in order to meet their needs.
- **David Levinson:** The measurement of how much stuff (jobs, workers, etc.) someone can reach from a specific point in a given travel time (say 30 minutes) by a particular mode at a certain time of day.



# Accessibility Data Sources and Software

- National Accessibility Evaluation Pooled-Fund Study
  - Accessibility is calculated as a **cumulative opportunity index** by computing the travel time from each block to surrounding blocks, and then adding up the total number of jobs that can be reached within different travel time thresholds.
- Conveyal
  - Web-based software allowing users to evaluate changes to transportation networks and public transportation systems using accessibility indicators.





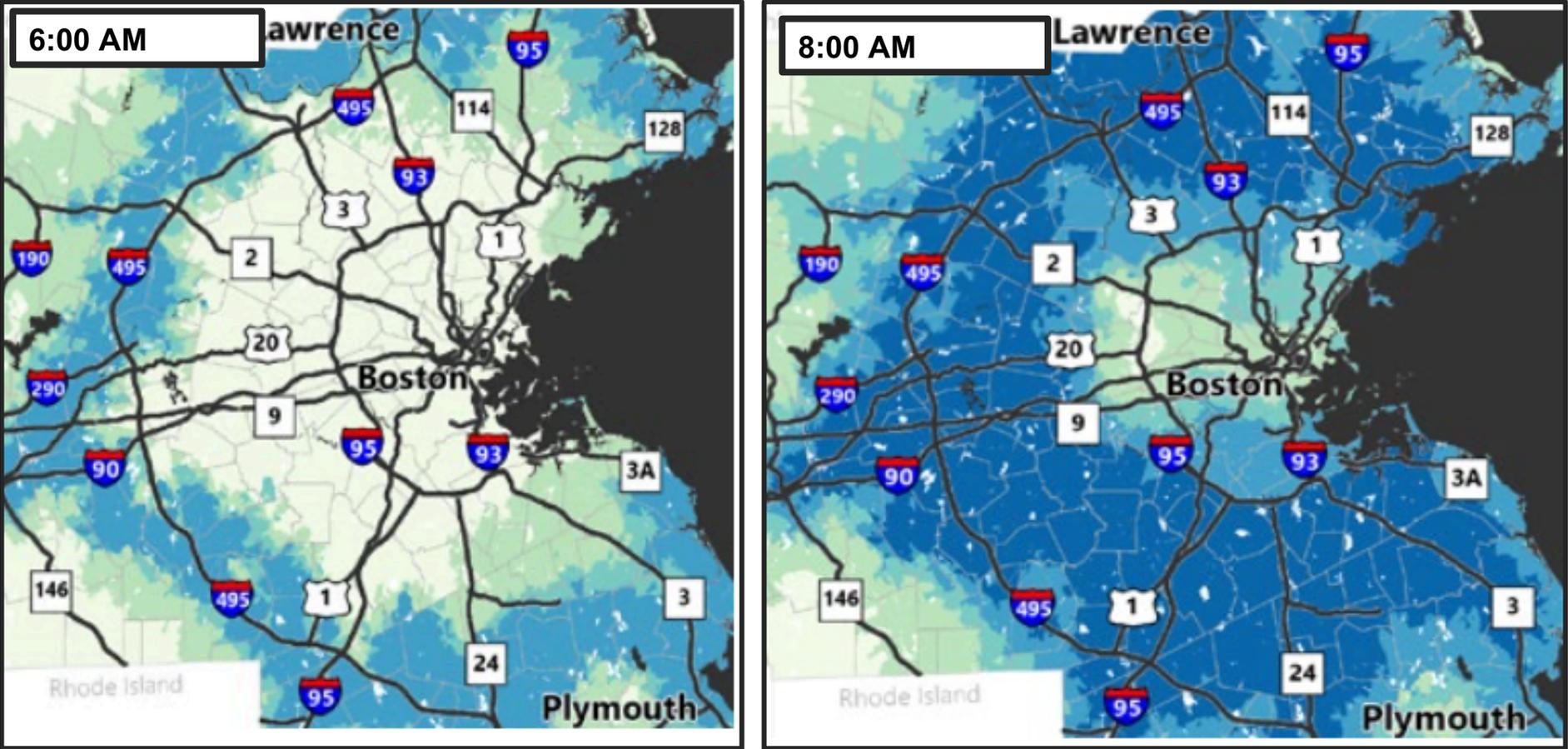
# Application of Accessibility Data to Congestion Management Planning

# MassDOT Congestion in the Commonwealth Report

- The 2019 “Congestion in the Commonwealth” report presented a data-driven analysis and set of next steps for how to respond to congestion in Massachusetts.
- The report documented the most severely congested corridors in Massachusetts, identified the causes and implications of congestion, and made recommendations across modes.



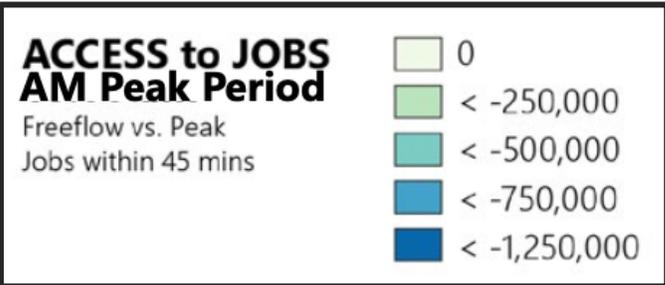
# The Impact of Congestion on Access to Jobs in Greater Boston



**Source:** Accessibility Observatory, June 2018.

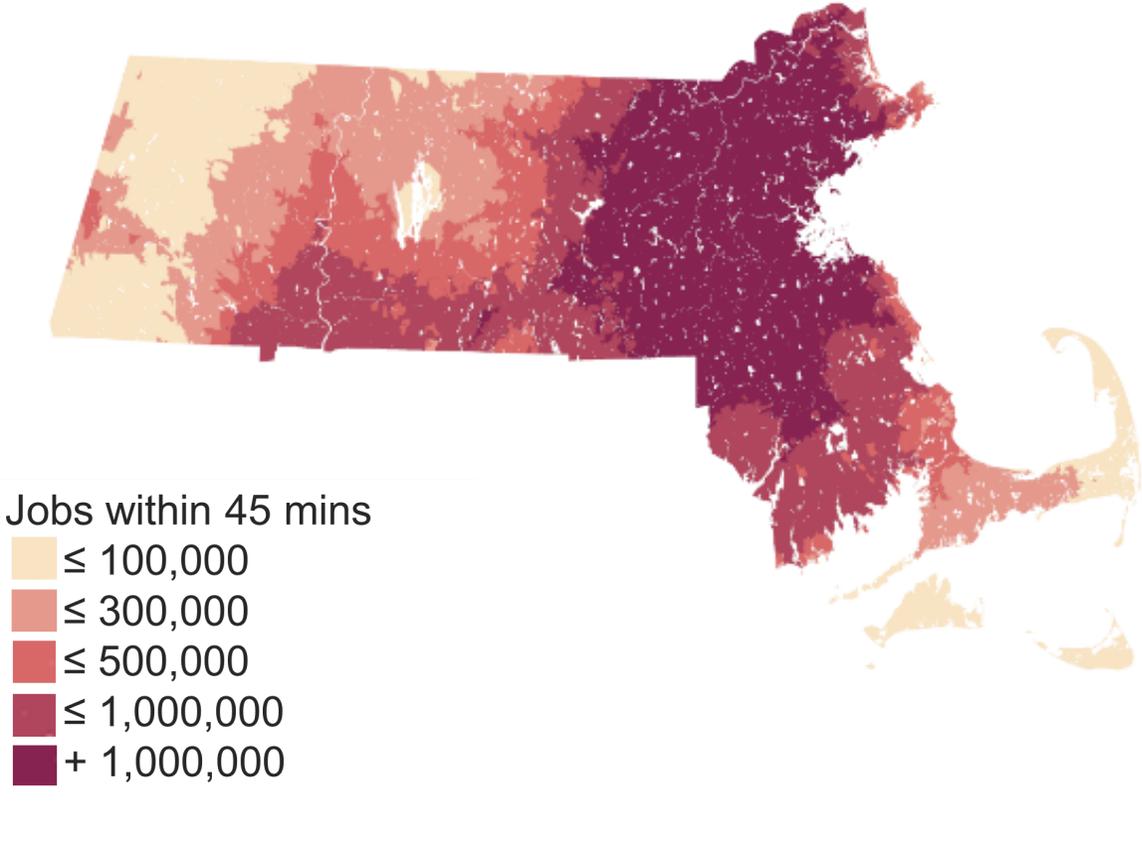
<http://ao.umn.edu/research/america/>

**Note:** Rankings are for access to jobs within 45 minutes travel time.



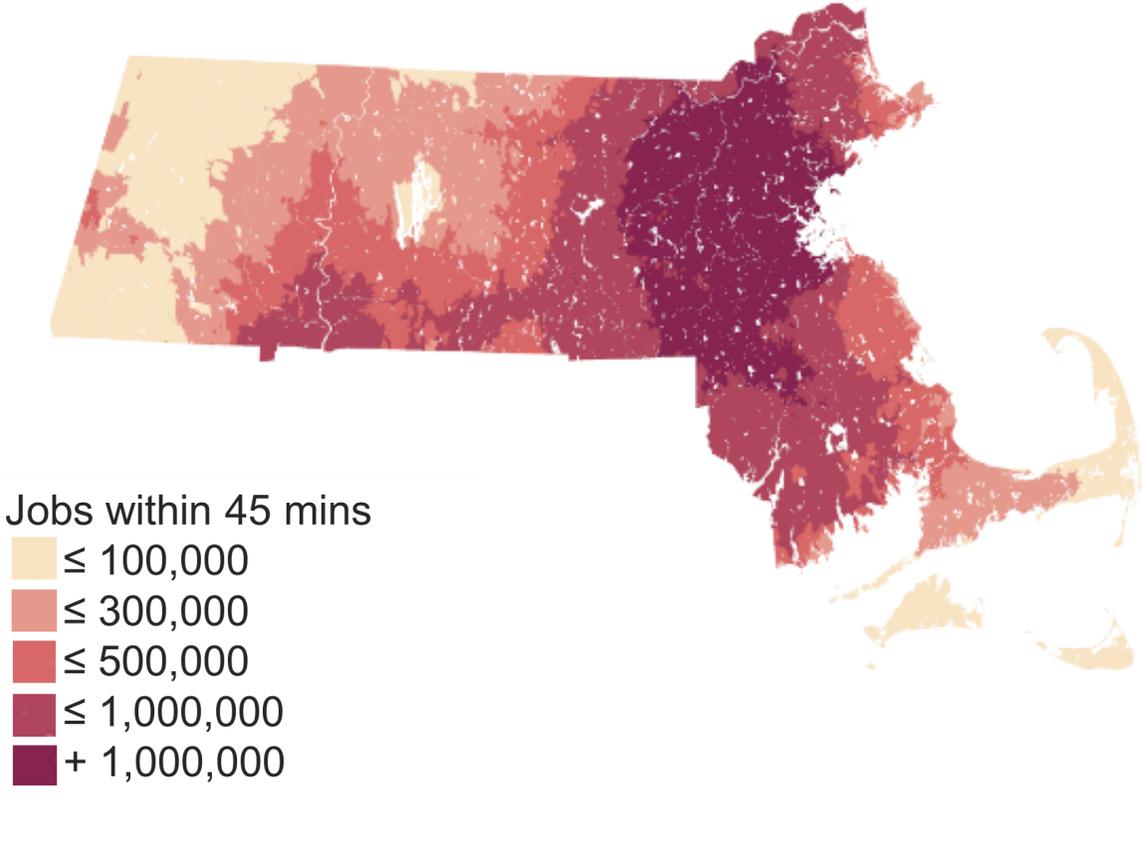
# The Impact of Congestion on Access to Jobs Statewide

6 AM



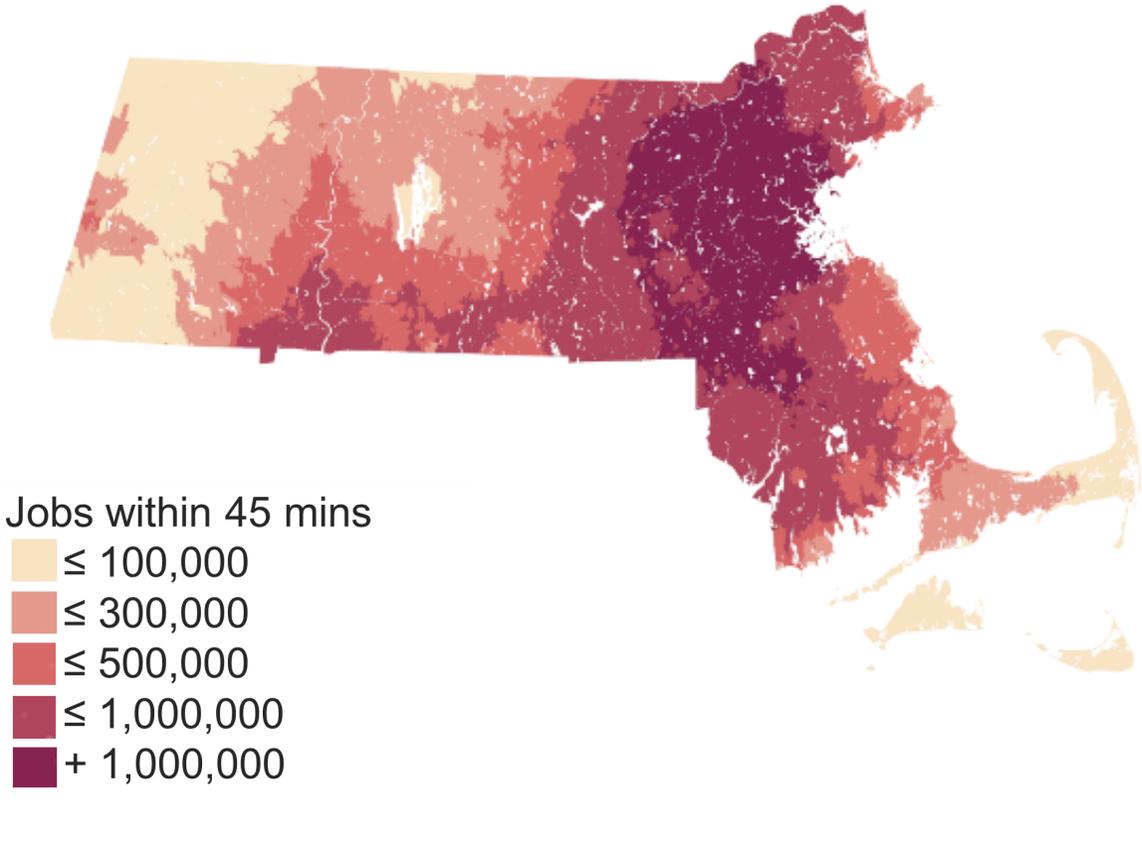
# The Impact of Congestion on Access to Jobs Statewide

7 AM



# The Impact of Congestion on Access to Jobs Statewide

8 AM





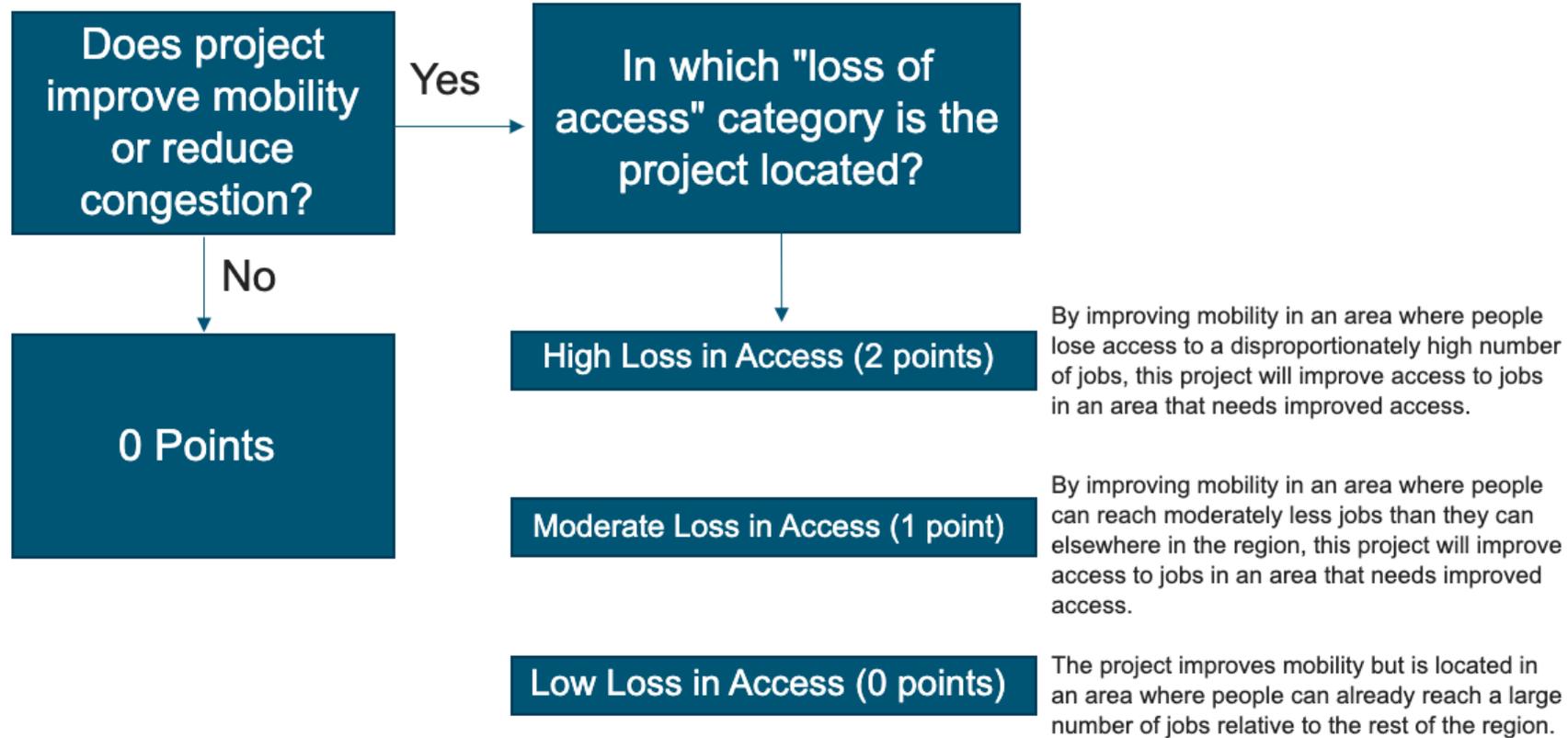
# Application of Accessibility Data to Project Scoring

# Accessibility Criterion within MassDOT Highway Division's Project Score Card: Relative Loss in Access to Jobs (RLAJ)

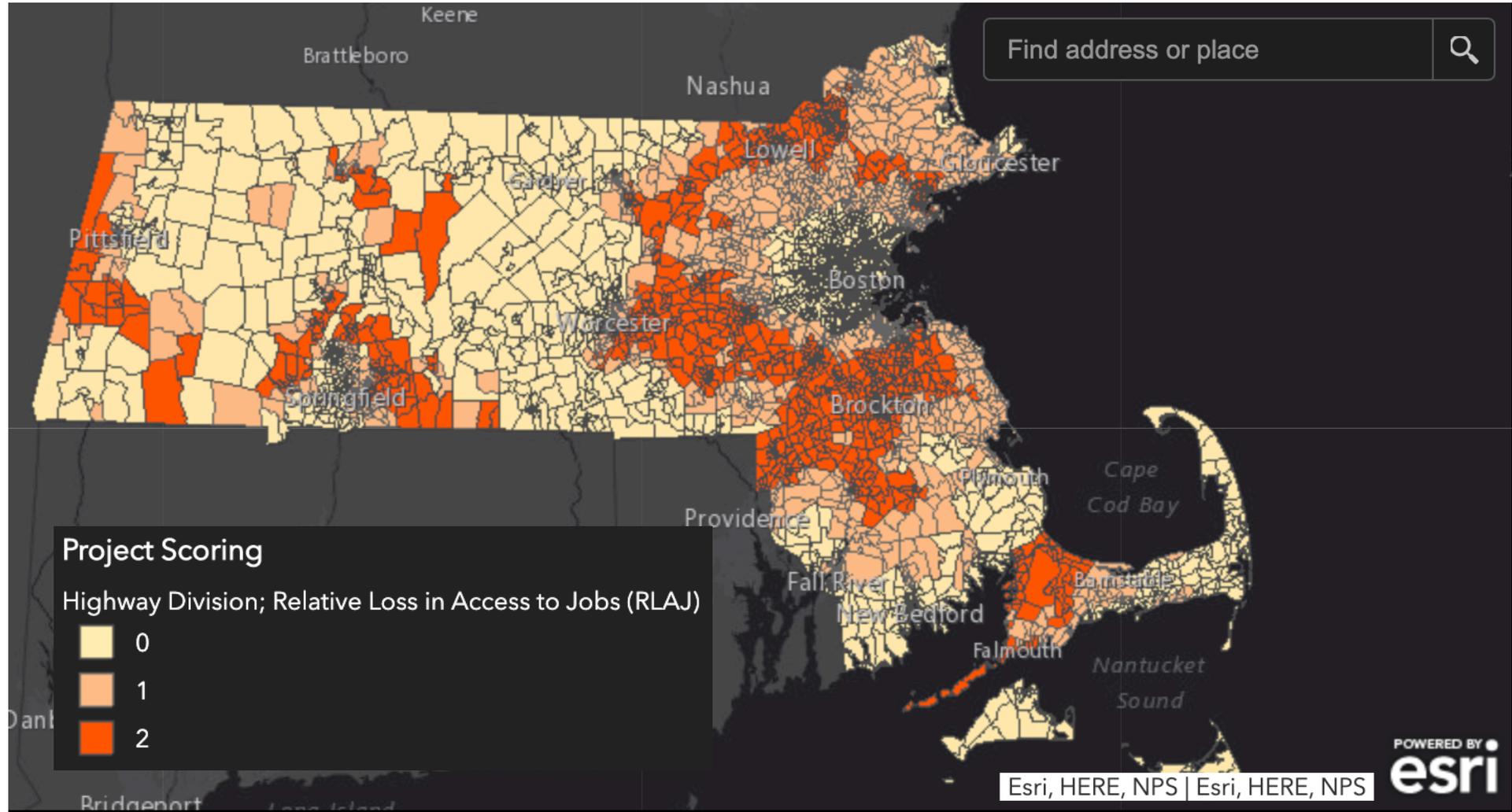
Criterion	Description	Points
<p>Workforce Commuting &amp; Accessibility</p> <p>Score based on data gathered through the Accessibility Observatory Pooled Fund Study</p>	<p>Project is in an area that experiences a relatively high amount of loss in access to jobs during peak periods -OR- Project creates a NEW connection to an area with greater than 2 jobs/acre</p>	2
	<p>Project is in an area that experiences a moderate amount of loss in access to jobs during peak periods and the project will improve access to jobs</p>	1
	<p>Project is in an area that experiences minimal or no loss in access to jobs during peak periods</p>	0



# Flow Chart for Scoring “Loss in Jobs Access” Criterion



# Map Used for Scoring RLAJ Criterion



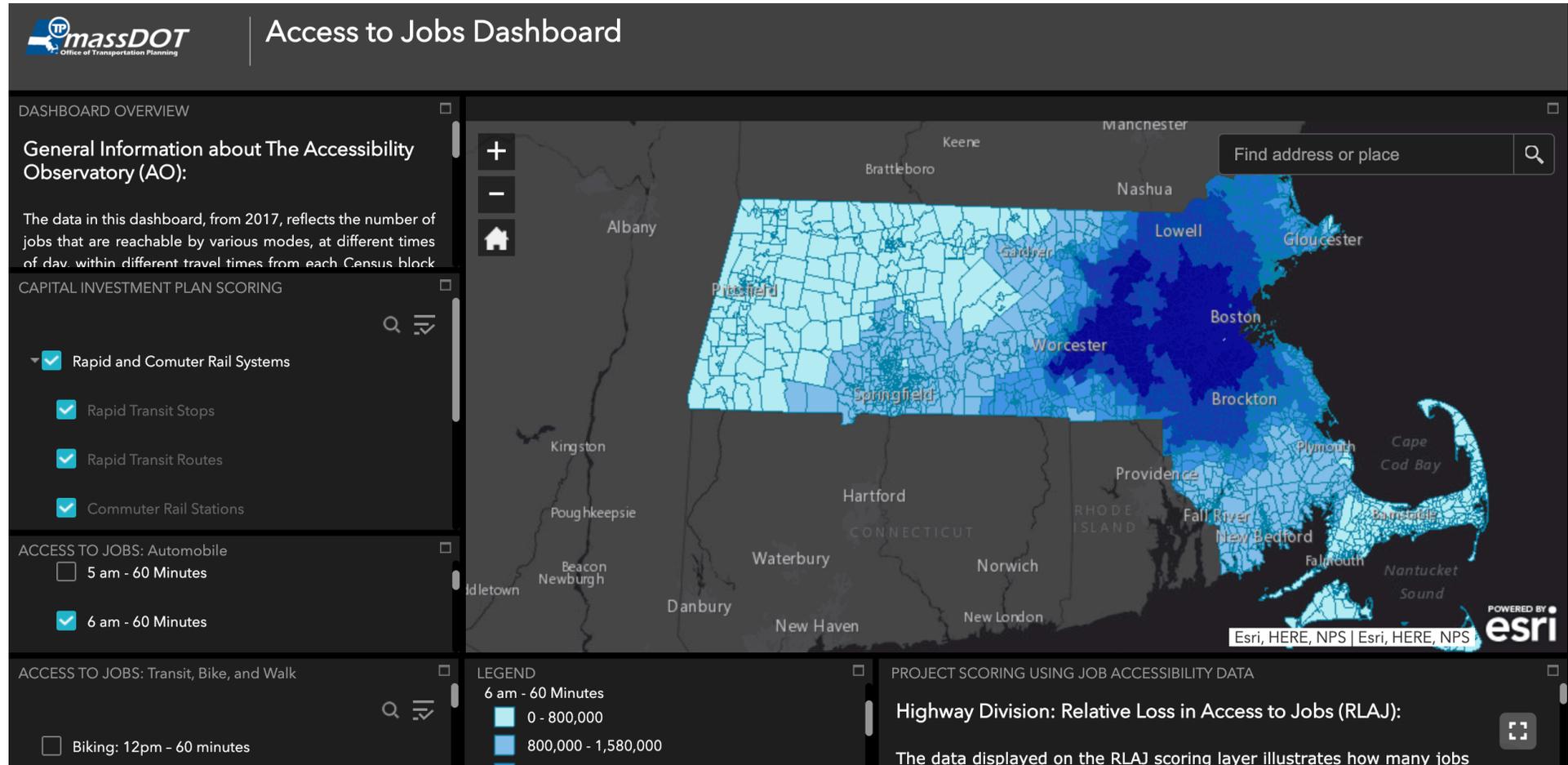
\* Available within the public-facing Massachusetts Access to Jobs Dashboard at the following link:

<https://massdot.maps.arcgis.com/apps/webappviewer/index.html?id=134d560d26464ee6baf7b15c0446e5fd>

\*\* The data used within this dashboard is from the Accessibility Observatory



# Access to Jobs Dashboard



\* Available within the public-facing Massachusetts Access to Jobs Dashboard at the following link:

<https://massdot.maps.arcgis.com/apps/webappviewer/index.html?id=134d560d26464ee6baf7b15c0446e5fd>

\*\* The data used within this dashboard is from the Accessibility Observatory





# Application of Accessibility Data to Transit Service Planning

# Transit Service Planning

- Tools such as Conveyal can be used to estimate the impacts of transit and roadway projects on accessibility indicators (e.g. number of accessible jobs resulting from new transit route).
- The quantification of these impacts can be used for the following activities, among others:
  - Evaluation of alternative transit schedules and/or new routes
  - Analysis of equity impacts on service changes
  - Project prioritization
  - Establishment of buy-in for new projects

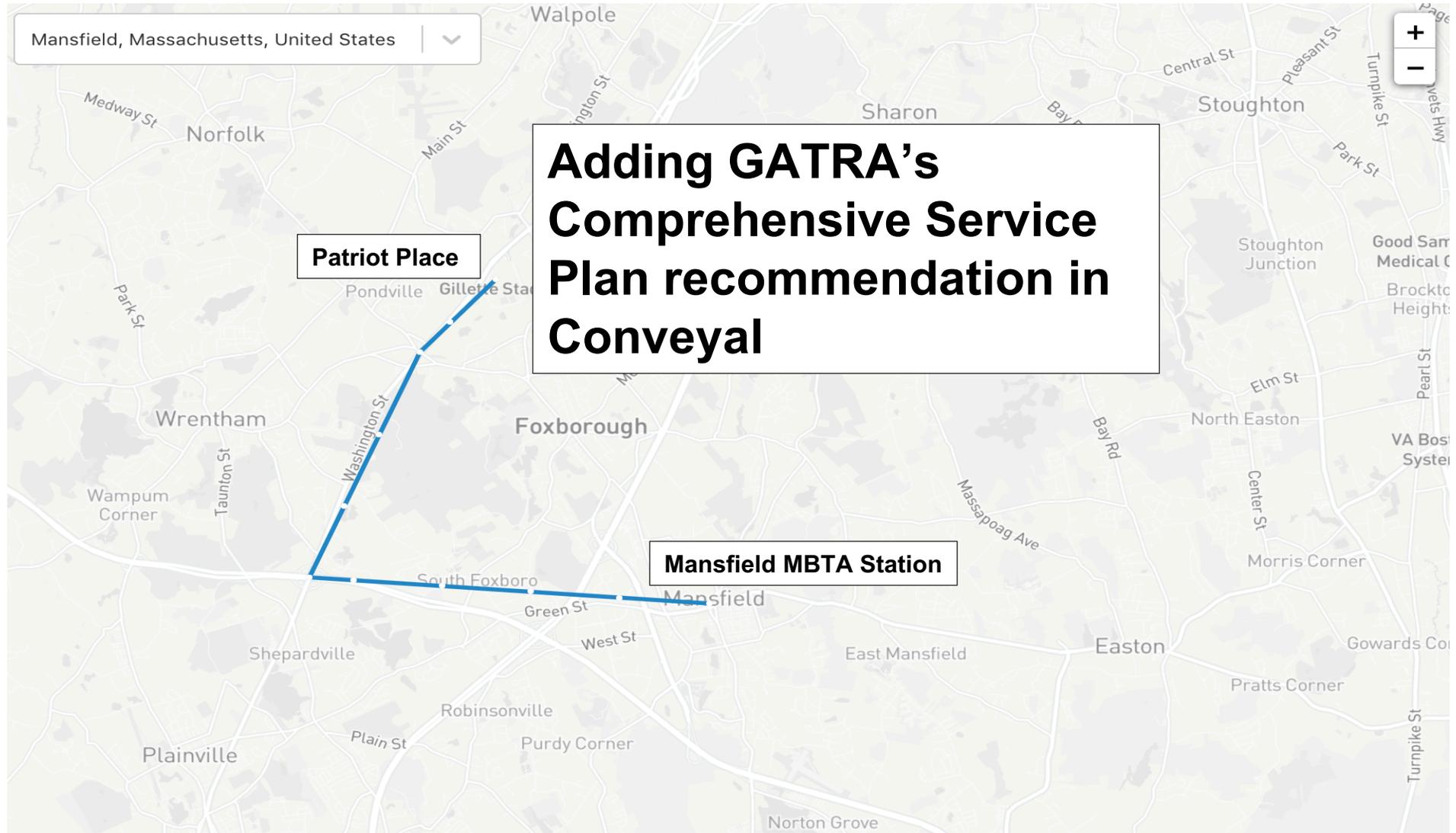


# Transit Service Planning: Example Conveyal Analysis

- The example described in the following slides analyzes the change in the number of accessible jobs within a 60-minute transit trip resulting from a new proposed route with the Greater Attleboro-Taunton Regional Transit Authority's (GATRA) most recent Regional Transit Plan.
- The recommendation was for a new route to be created between the Mansfield MBTA Commuter Rail Station and Patriot Place.



# Transit Service Planning: Example Conveyal Analysis

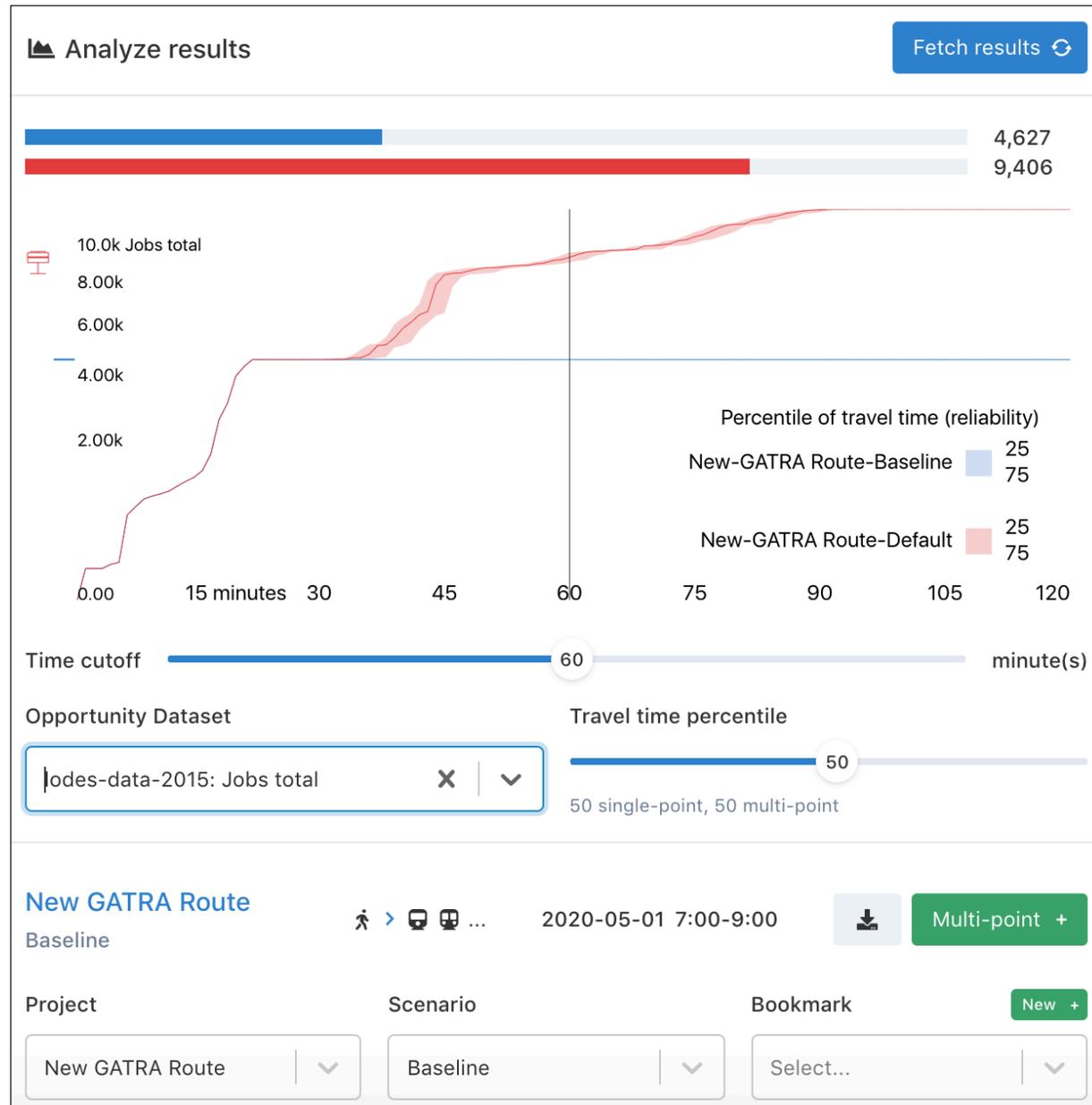


# Transit Service Planning: Example Conveyal Analysis

*Adding GATRA's Comprehensive Service Plan recommendation in Conveyal*

- **Gain access to 4,779 jobs via transit**

- **Blue = Baseline Scenario**
- **Red = New Route Scenario**

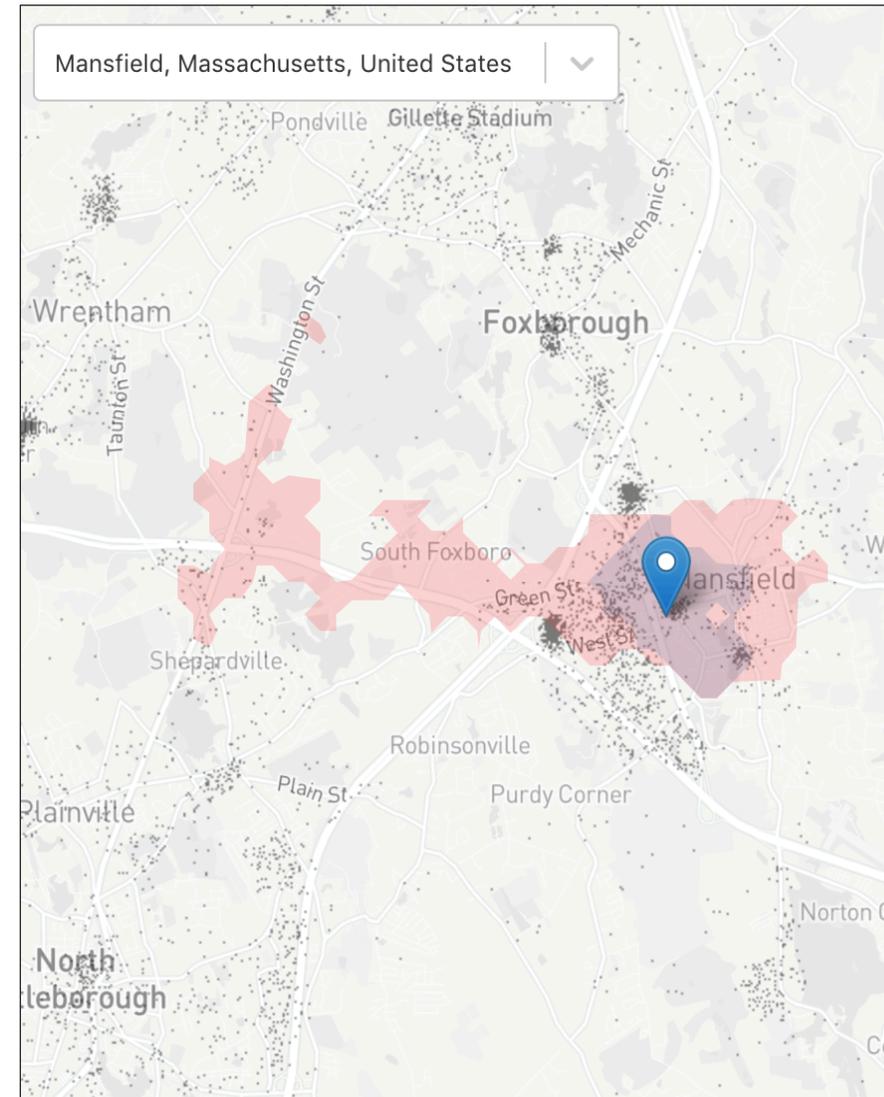


# Transit Service Planning: Example Conveyal Analysis

*Adding GATRA's Comprehensive Service Plan recommendation in Conveyal*

- **Gain access to 4,779 jobs via transit**

- **Blue = Baseline Scenario**
- **Red = New Route Scenario**



---

# Thank you!

Derek Krevat

Massachusetts Department of Transportation

[Derek.Krevat@dot.state.ma.us](mailto:Derek.Krevat@dot.state.ma.us)

# Questions?

Submit your questions using the Webinar's Q&A feature

# Webinar 5: Risk Management and TPM

---

- This webinar focuses on risk management in the context of TPM
- Presentations will address:
  - Highlights of national efforts related to risk and TPM
  - Anticipated benefits, risk and resilience
- When: January 20, 2021 2:00 Eastern Time

All TPM Webinars: <https://www.tpm-portal.com/tpm-webinars/>

Please let us know of any topics you would like featured in 2021:

[tpmpooledfund@tpm-portal.com](mailto:tpmpooledfund@tpm-portal.com)

## Save the Dates!

A bimonthly webinar series, Wednesdays at 2:00 PM EST

- January 20, 2021 2:00 PM Eastern Time
- March 17, 2021 2:00 PM Eastern Time
- May 19, 2021 2:00 PM Eastern Time
- July 21, 2021 2:00 PM Eastern Time
- September 15, 2021 2:00 PM Eastern Time
- November 17, 2021 2:00 PM Eastern Time

