Overview of 2019 Statewide Bicycle and Pedestrian Transportation Plans

apbp CONFERENCE 2019

massDOT
Massachusetts Department of Transportation

Peter Sutton, *Bicycle and Pedestrian Program Coordinator, MassDOT*

Today's Topics

1. Overview of MassDOT Pedestrian Plan and Bicycle Plan

2. Statewide Demand Analyses

3. Project Prioritization and Selection

4. Project Implementation and Performance Measures

Overview of MassDOT Pedestrian Plan and Bicycle Plan

Bicycle Plan

Vision

Biking in Massachusetts will be a **safe, comfortable, and convenient** option for everyday travel.

Pedestrian Plan

Vision

All people in Massachusetts have a **safe and comfortable** option to walk for short trips.

Overview

Two separate plans
- Statewide Bicycle Plan
- Statewide Pedestrian Plan

2016	Request for Proposals
2016-2018	Planning Process
2018	Draft Plans Released
2019	Release Final Plans

$60 million Bicycle and Pedestrian Capital Program to support implementation (2019-2023)

Companion documents:

Municipal Resource Guide for Walkability

Municipal Resource Guide for Bikeability

Go to www.mass.gov > search for guides

Planning Process

Vision

All people in Massachusetts will have a **safe, comfortable, and convenient** option to walk for short trips.

Goal 1

Eliminate pedestrian fatalities and serious injuries.

Goal 2

Increase the percentage of short trips made by walking.

Principle 1

Value people walking and their travel needs, especially the most vulnerable – children, elderly, people with disabilities – to ensure they can walk safely.

Principle 2

Prioritize improvements for people walking by proactively addressing gaps and barriers that discourage walking and are known to increase the likelihood of crashes.

Principle 3

Lead the Commonwealth in meeting the pedestrian plan goals by supporting local municipalities and other agencies to increase everyday walking.

Initiatives

- **Initiative 1:** Promote pedestrian safety, accessibility, and connectivity in investment decision-making and project development processes.
- **Initiative 2:** Establish a set of prioritized pedestrian projects on MassDOT-owned roadways and bridges that address safety, equity, accessibility, and critical gaps in connectivity.
- **Initiative 3:** Slow vehicle speeds and improve visibility of people walking.
- **Initiative 4:** Improve pedestrian accessible paths of travel to transit.
- **Initiative 5:** Launch a year-round maintenance and operations plan for MassDOT-owned pedestrian facilities and support municipalities to do the same.
- **Initiative 6:** Invest in data collection to inform Initiatives 1-5 and to track progress.

https://www.mass.gov/service-details/pedestrian-plan

Vision

Biking in Massachusetts will be a **safe, comfortable, and convenient** option for everyday travel.

MASSACHUSETTS BICYCLE TRANSPORTATION PLAN

#MABIKEPLAN

massDOT

Goal 1

Eliminate bicyclist fatalities and serious injuries.

Goal 2

Increase the percentage of everyday trips made by bicycling.

MASSACHUSETTS
BICYCLE TRANSPORTATION PLAN

#MABIKEPLAN

massDOT

Principle 1

Value people bicycling and their travel needs, especially the most vulnerable - children, elderly, and people with disabilities - to ensure they can bicycle safely.

Principle 2

Prioritize improvements for people bicycling by proactively addressing gaps and barriers that discourage bicycling and are known to increase the likelihood of crashes

Principle 3

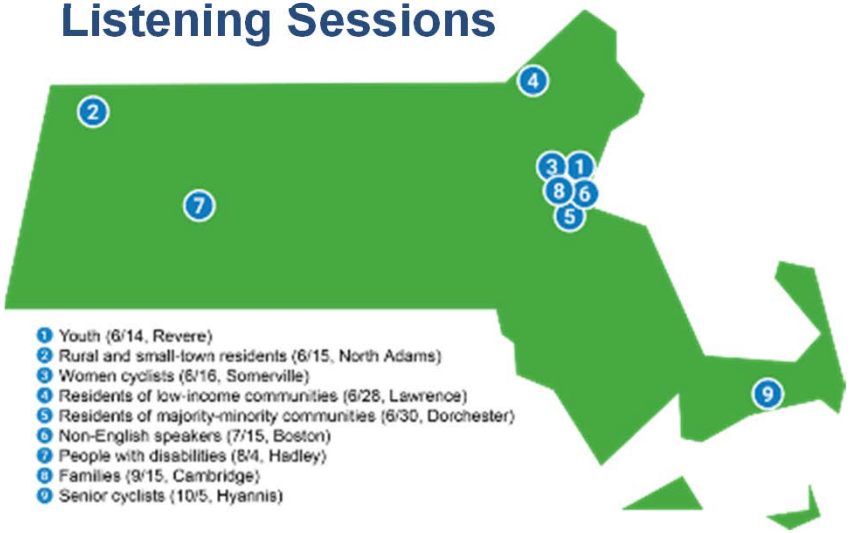
Lead the Commonwealth in meeting the bicycle plan goals by supporting municipalities and other agencies to advance everyday biking.

Initiatives

- **Initiative 1:** Build connected bicycle and trail networks with local, regional, and state partners and close critical gaps.
- **Initiative 2:** Integrate and promote the safety, comfort, and convenience of people biking in transportation and development projects.
- **Initiative 3:** Advance roadway safety through education and programs for people driving, people bicycling, and potential everyday bicyclists.
- **Initiative 4:** Increase the convenience of biking as an everyday travel option for people of all ages and abilities.
- **Initiative 5:** Launch the development of a year-round maintenance and operations plan for MassDOT-owned bikeways and support municipalities to do the same.
- **Initiative 6:** Invest in data collection and evaluation to inform Initiatives 1-5 and to track progress.

Public Outreach

Listening Sessions

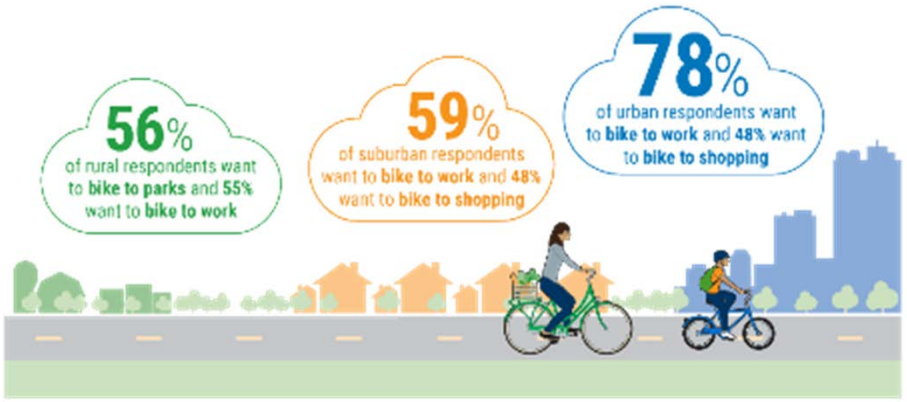


Attending public events

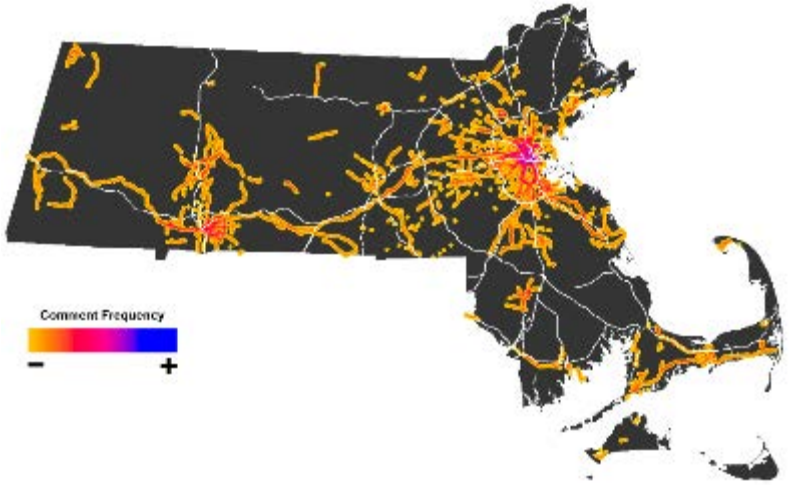
Online and In-Person Surveys

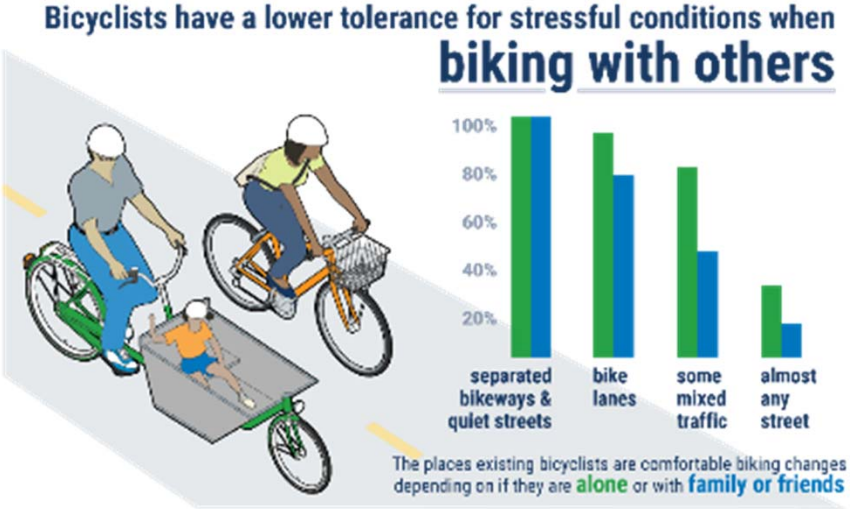
Engaging on Social Media

Key Results

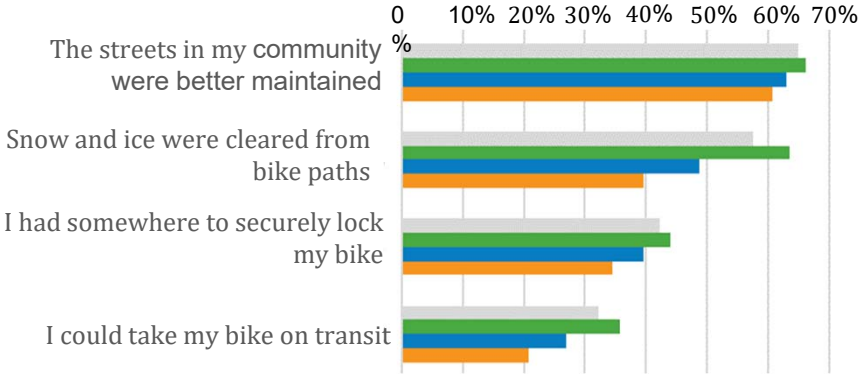


Frequency of "Needs Improvement" Comments on Online Map





"I would bike if…" Survey Results



Go to www.mass.gov > search for 'bike plan public engagement results'

Statewide Demand Analyses

Demand Analyses

1. **Overview**

2. **Potential for Everyday Biking Analysis**
   - Methodology
   - Analysis
   - Visualization

3. **Potential for Everyday Walking Analysis**
   - Methodology
   - Analysis
   - Visualization

Overview

Why?

- To quantify **potential demand** for biking and walking
  - We don't have an objective understanding of where people bike and walk today. Existing count data very limited and inconsistent statewide.
  - Data on where people bike and walk today only tells part of the story.
  - More people would bike if they felt safe and comfortable. Confirmed in national research/surveys and MA Bike Plan outreach.

Overview

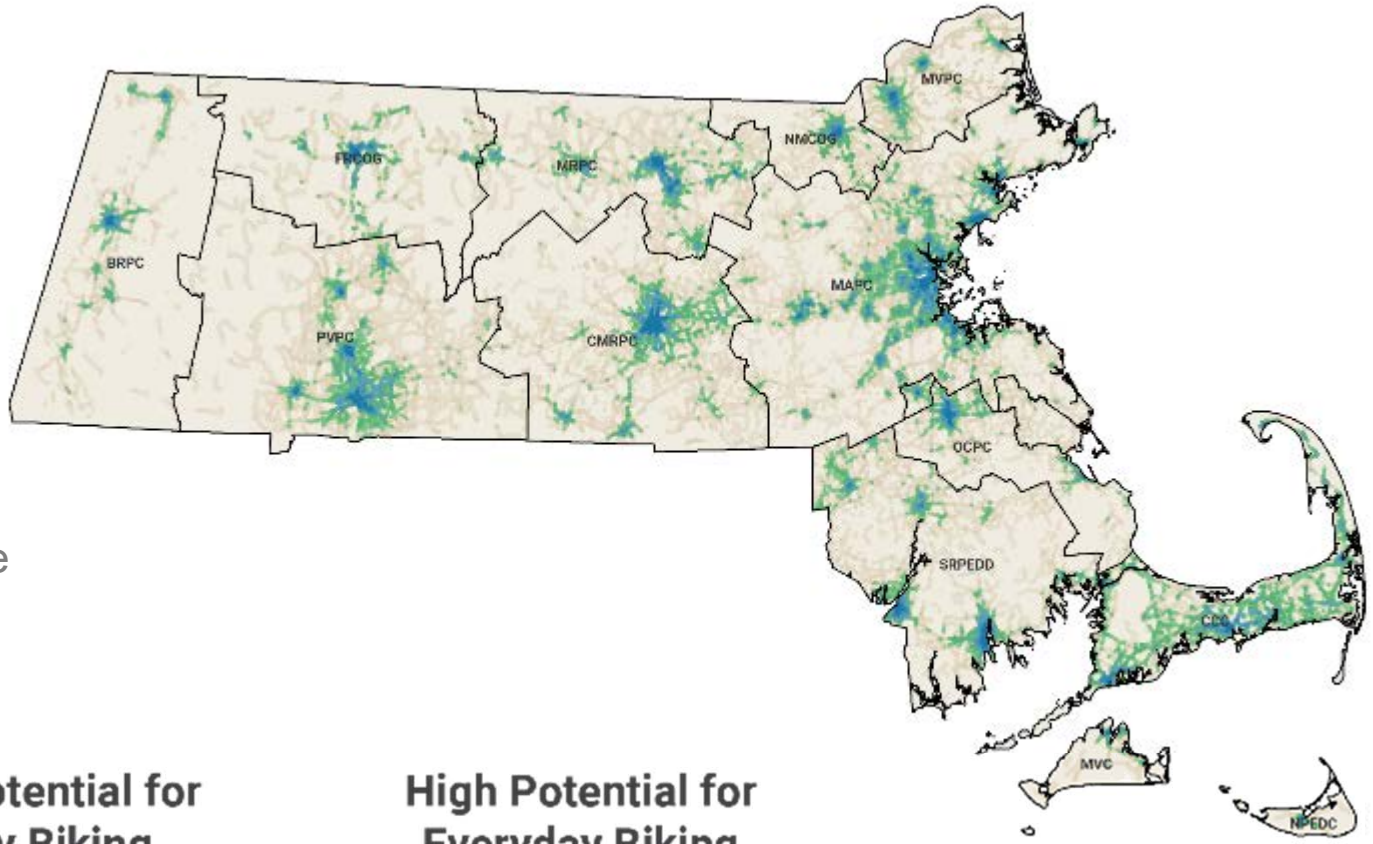
Methodology overview:

- Focused on available data for analysis:
  - Where **walkable or bikeable trips** generally occur (CTPS statewide travel demand model, MAPC Local Access Score)
  - Where **transit** is nearby (transit stations and stops from MassGIS)
  - Where **crashes** are nearby (MassDOT crash portal)
  - Where **Environmental Justice populations** reside (US Census American Community Survey)
- Performed geospatial analysis to more easily visualize and compare potential for everyday biking and walking.
- Scaled scores to each region so that Boston does not dominate the entire state. This gives each region its own relative scale.
- Symbolized scores using heads/tails breaks to focus on areas with high potential.

Potential for Everyday Biking Analysis

What is it?

Potential for Everyday Biking shows where to implement bicycle infrastructure to best match where short trips are made today and where there is the greatest need for infrastructure



Highest Potential for Everyday Biking
3% of land area

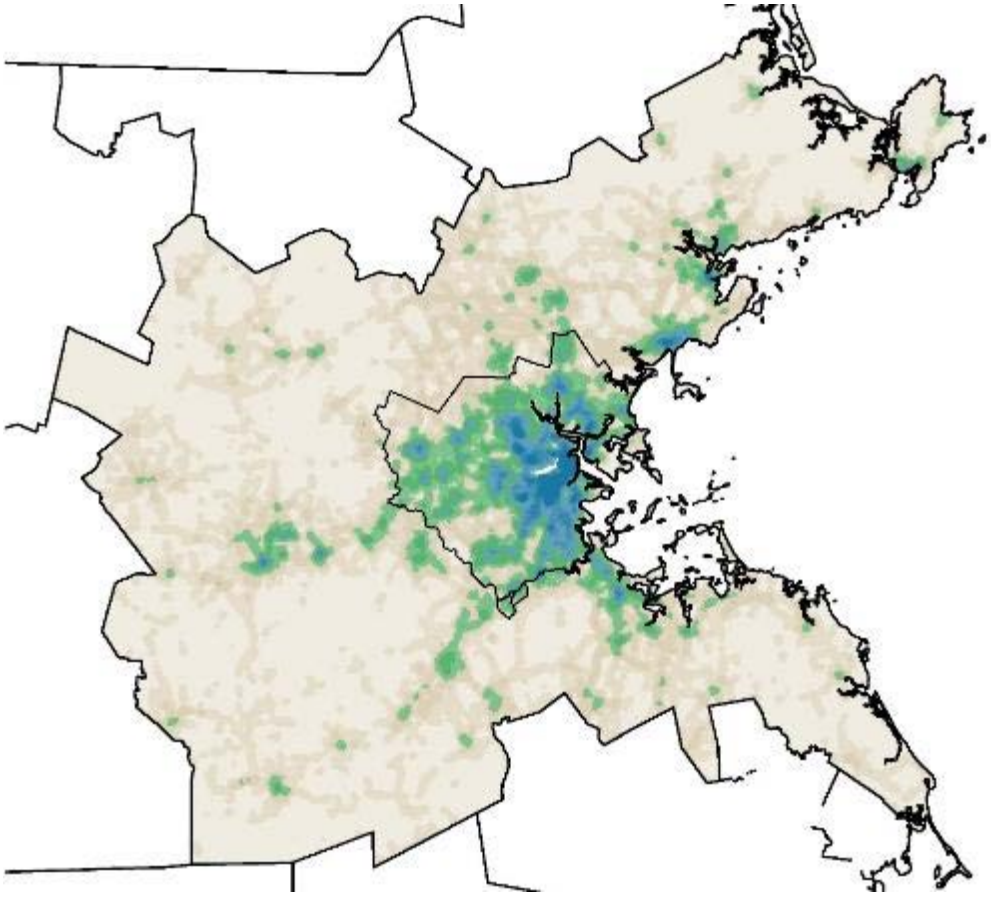
High Potential for Everyday Biking
10% of land area

Remaining **87%** of land area

Methodology

How is it displayed?

- Potential for Everyday Biking scores are rescaled to each region to ensure geographic equity and align with regional transportation planning and programming processes
- This regional scale helps identify best candidates for local connected bike networks (blue) and regional connecting corridors (green)



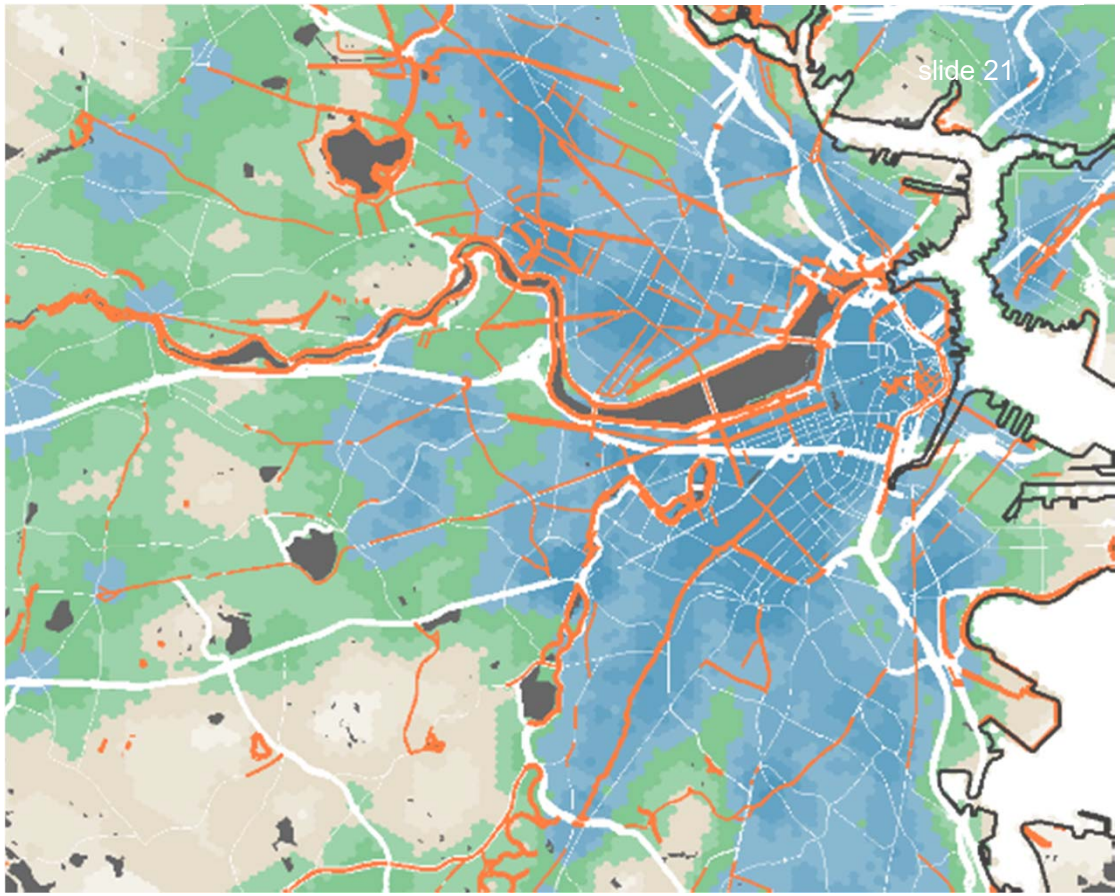
Methodology

How can it help?

- Locate investment areas
- Prioritize gaps in bike networks
- Encourage municipal and regional investment
- Prioritize maintenance activities

Existing bikeways (orange)

MassDOT & DCR (white)

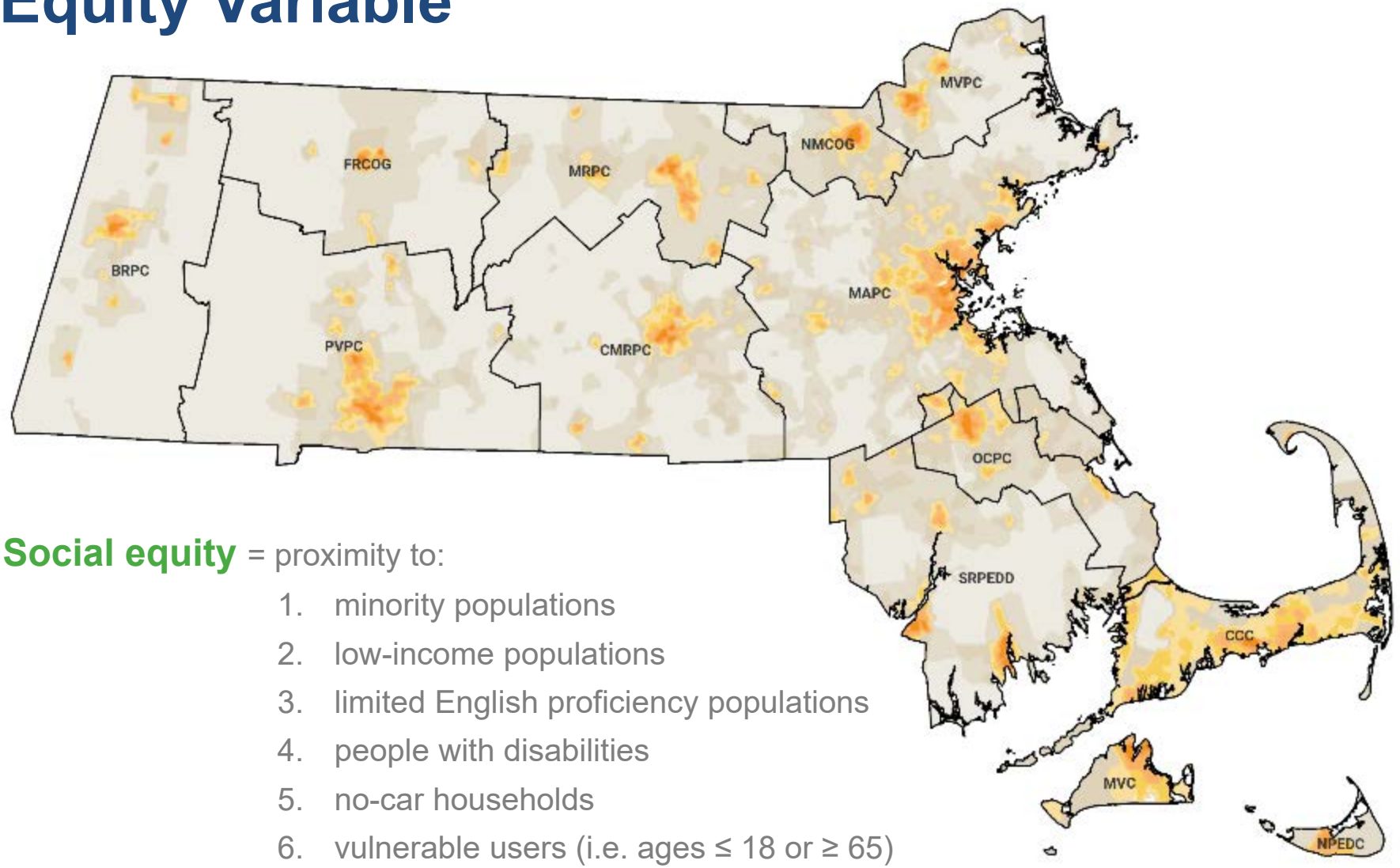


Analysis

Variables

- **Short trip activity** = number and location of work trips ≤ 6 miles and non-work trips ≤ 3 miles occurring today
- **Transit access** = proximity to stations and stops within a 10-minute bike ride at 10 mph (1.67 miles)
- **Crashes** = proximity to reported bike crashes between 2001 and 2014
- **Social equity** = proximity to:
    1. minority populations
    2. low-income populations
    3. limited English proficiency populations
    4. people with disabilities
    5. no-car households
    6. vulnerable users (i.e. ages ≤ 18 or ≥ 65)

Equity Variable



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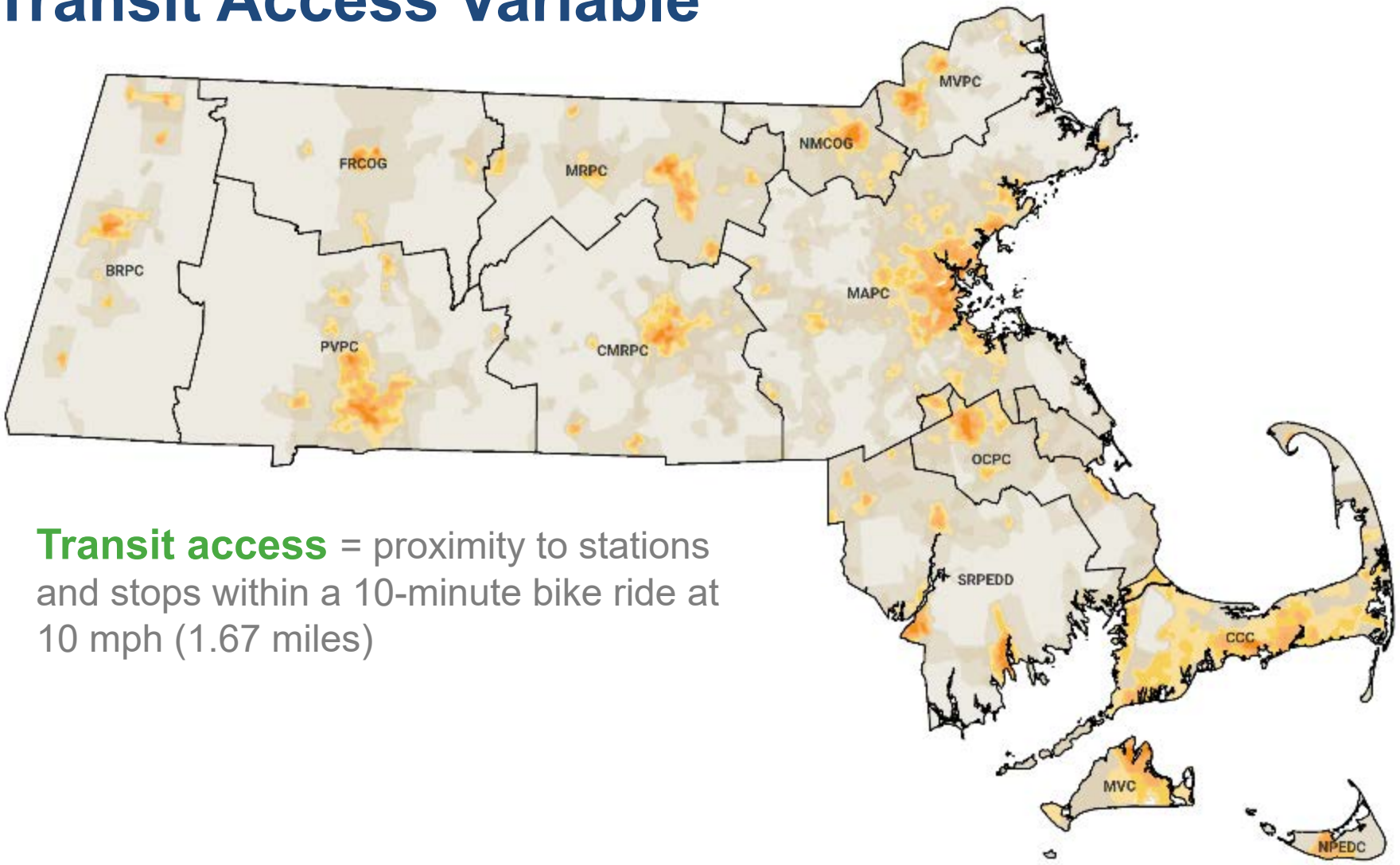
Transit Access Variable



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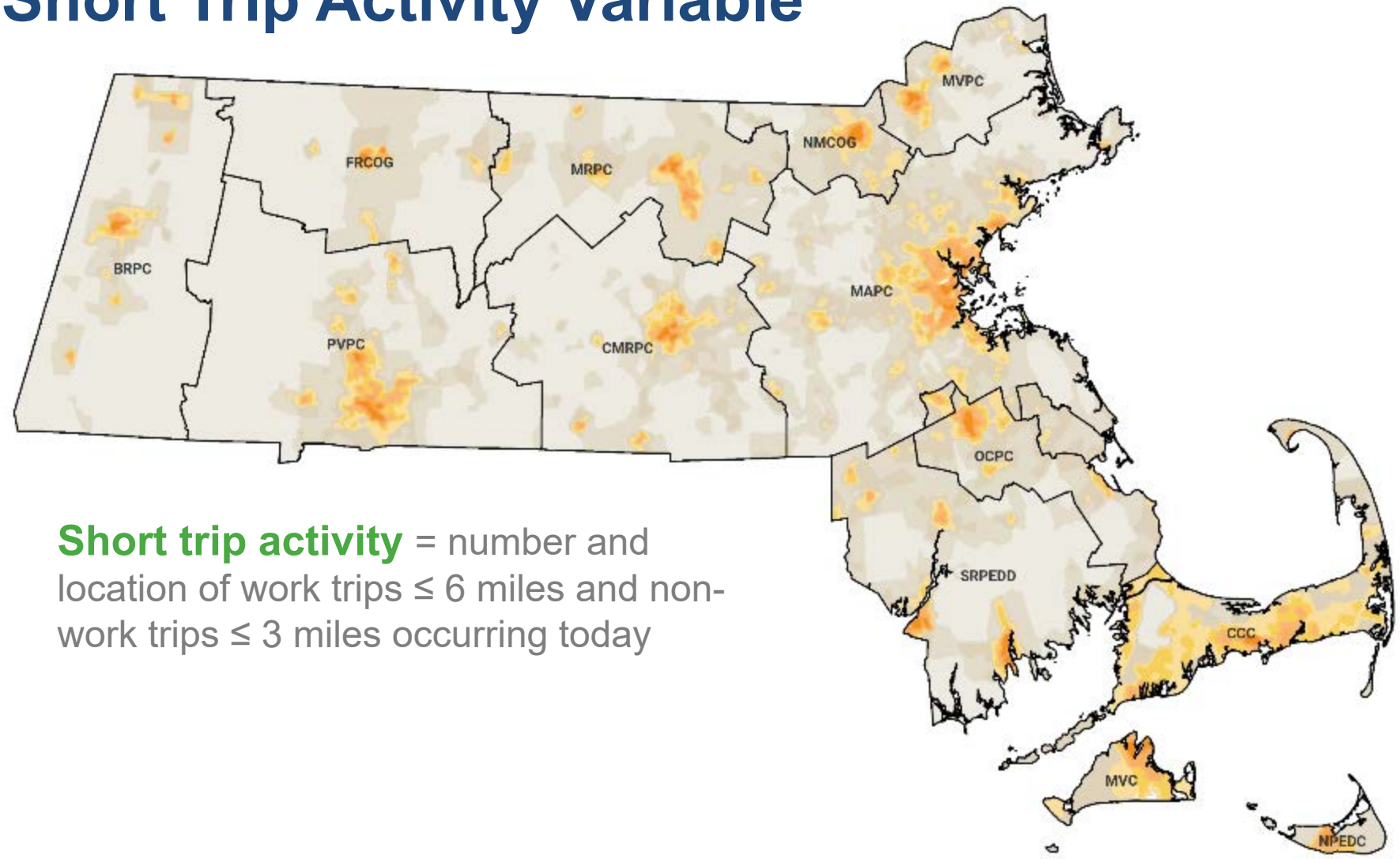
Short Trip Activity Variable



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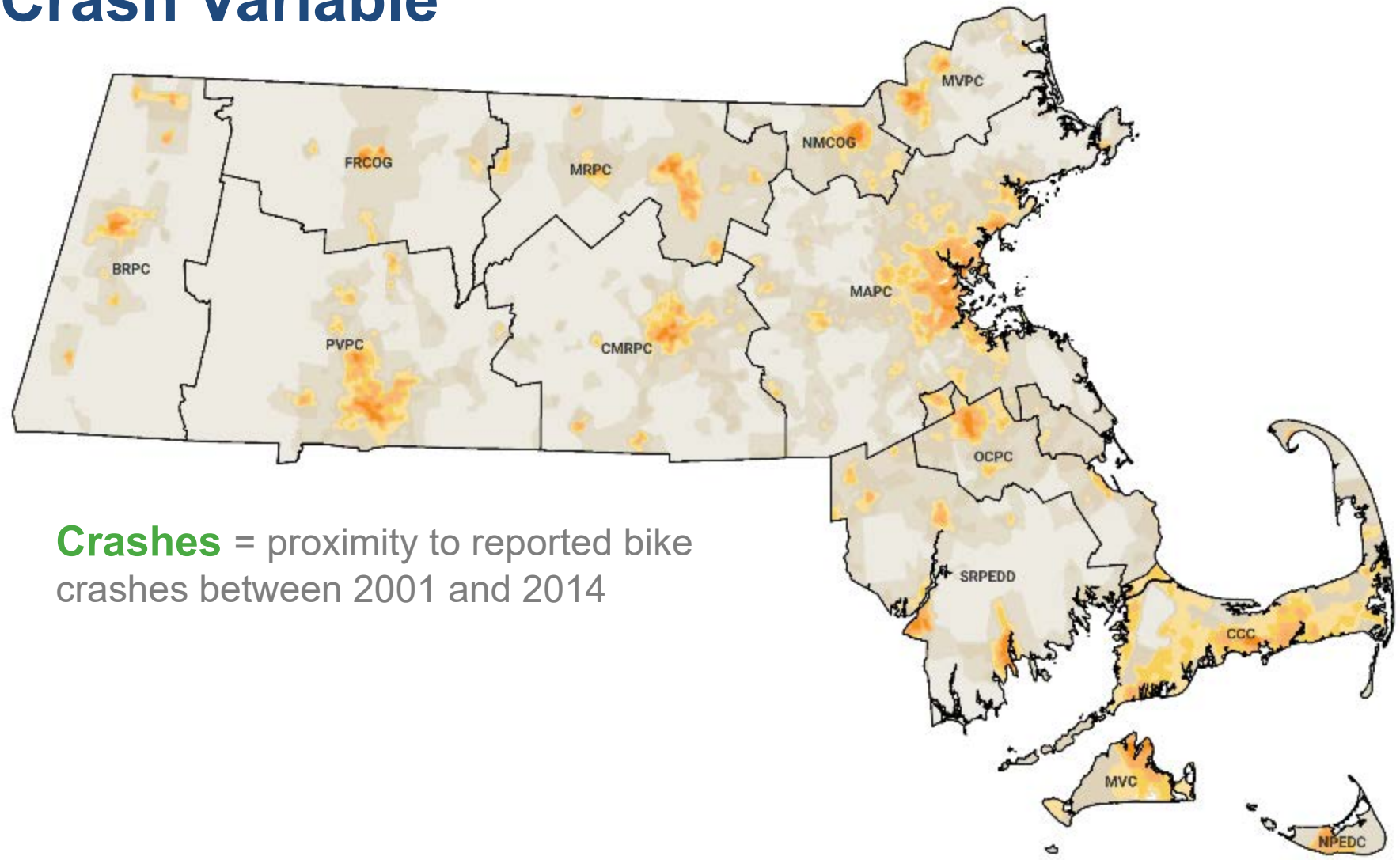
Crash Variable

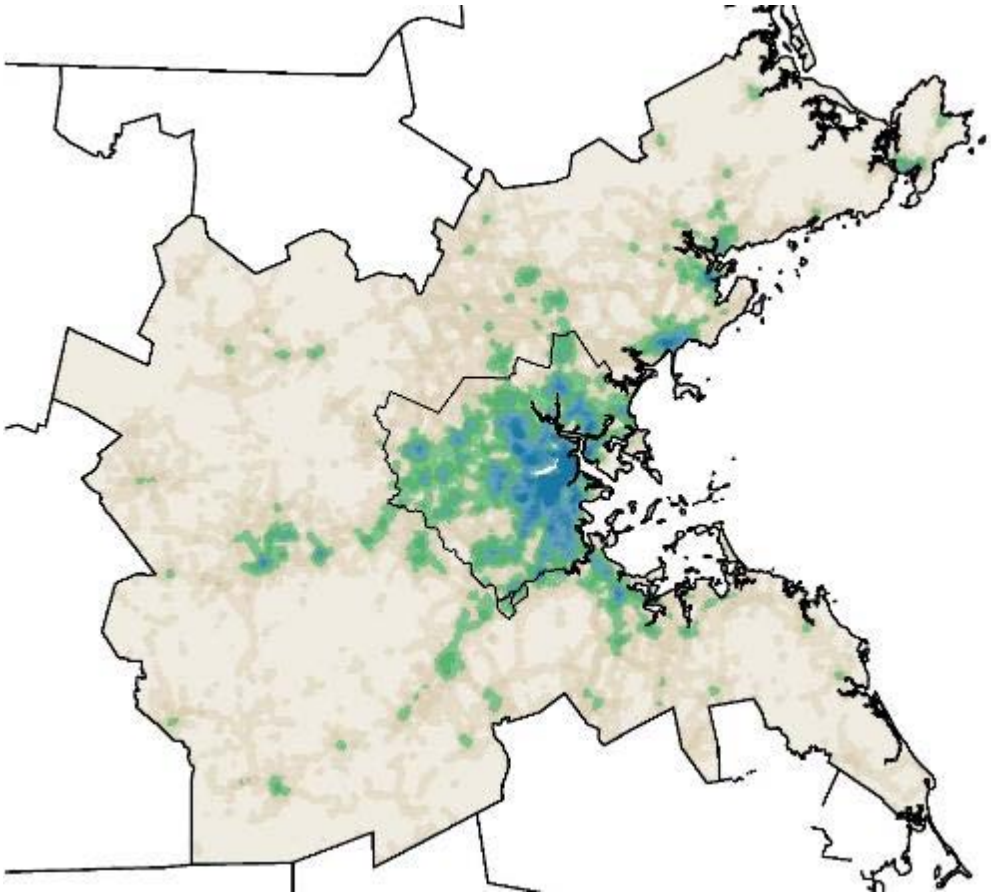


Crashes = proximity to reported bike crashes between 2001 and 2014

Analysis

Geospatial analysis overview:

- Divided MA into uniform cells (hexagons with 250’ sides) to visualize at the block scale
- Buffered 0.25-miles around each cell to capture parallel routes, emphasize nodes
- Aggregated short trip activity, transit access, and crashes variables within the buffer for each cell.
- Aggregated EJ population within buffer for each cell.



Analysis

Formula overview:

Score = (Short trip activity + Transit access + Crashes) * Social equity

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These three variables are added together as they are attributes assigned to the surface transportation network

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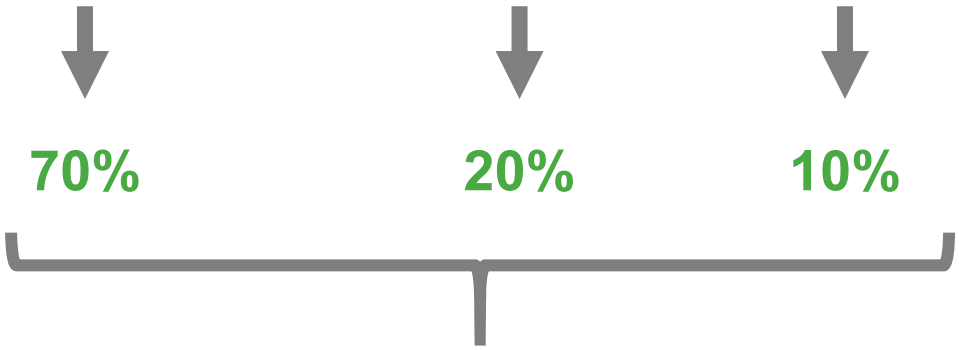

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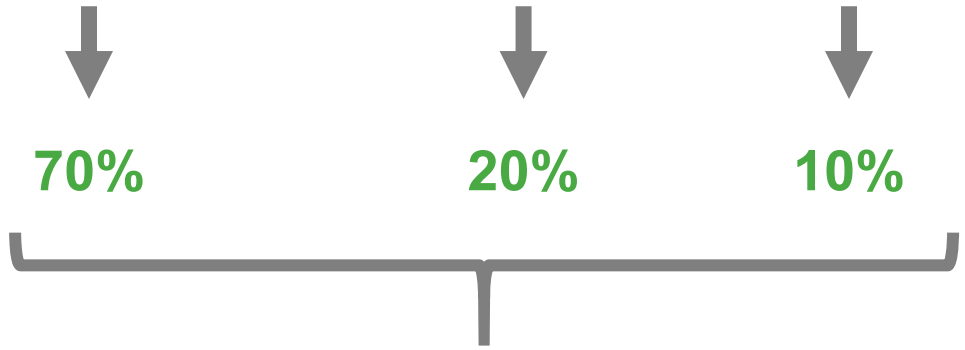

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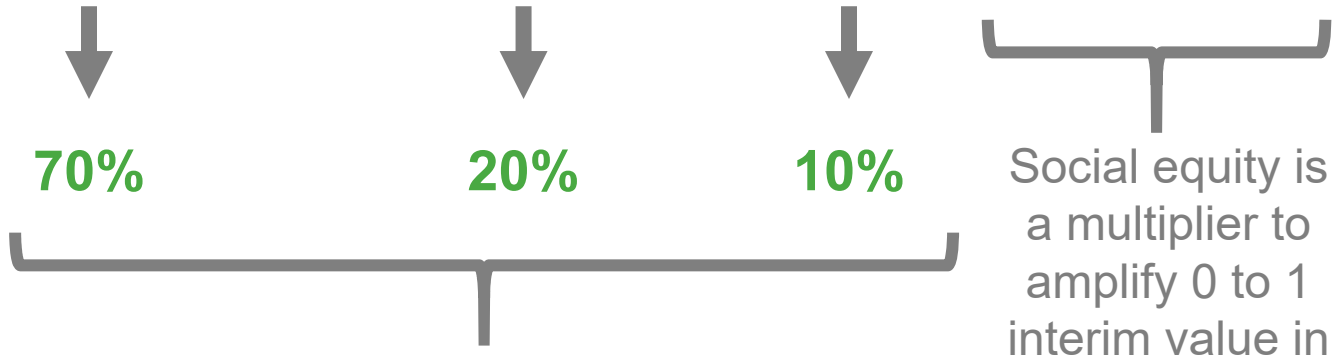

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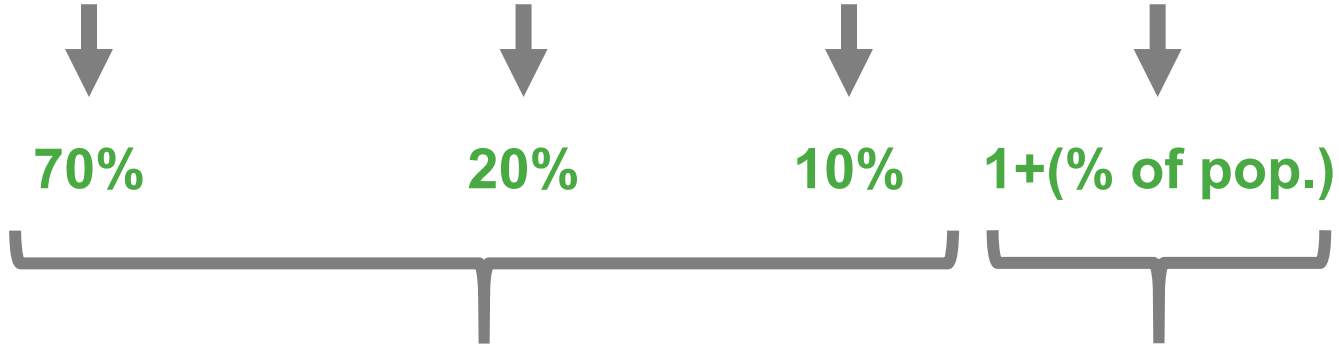

Multiplier ranges from 1 to 2.
If 0% of population is EJ, multiplier of 1 does not change interim value.
If 100% EJ, multiplier of 2 doubles interim value.

Analysis

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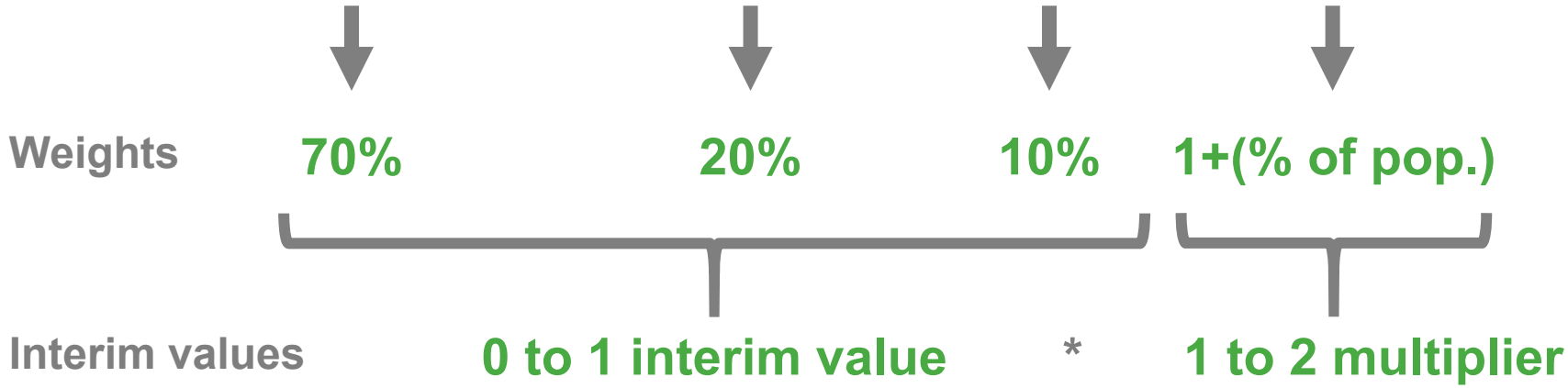

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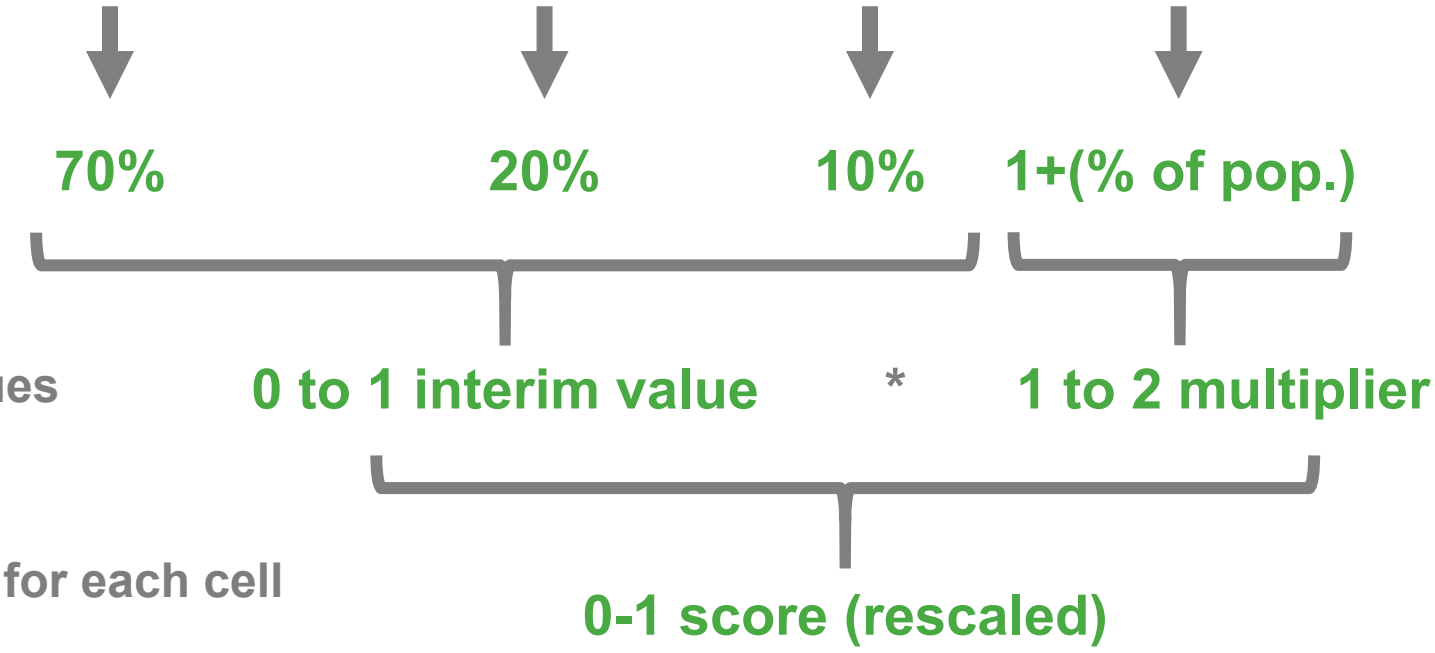
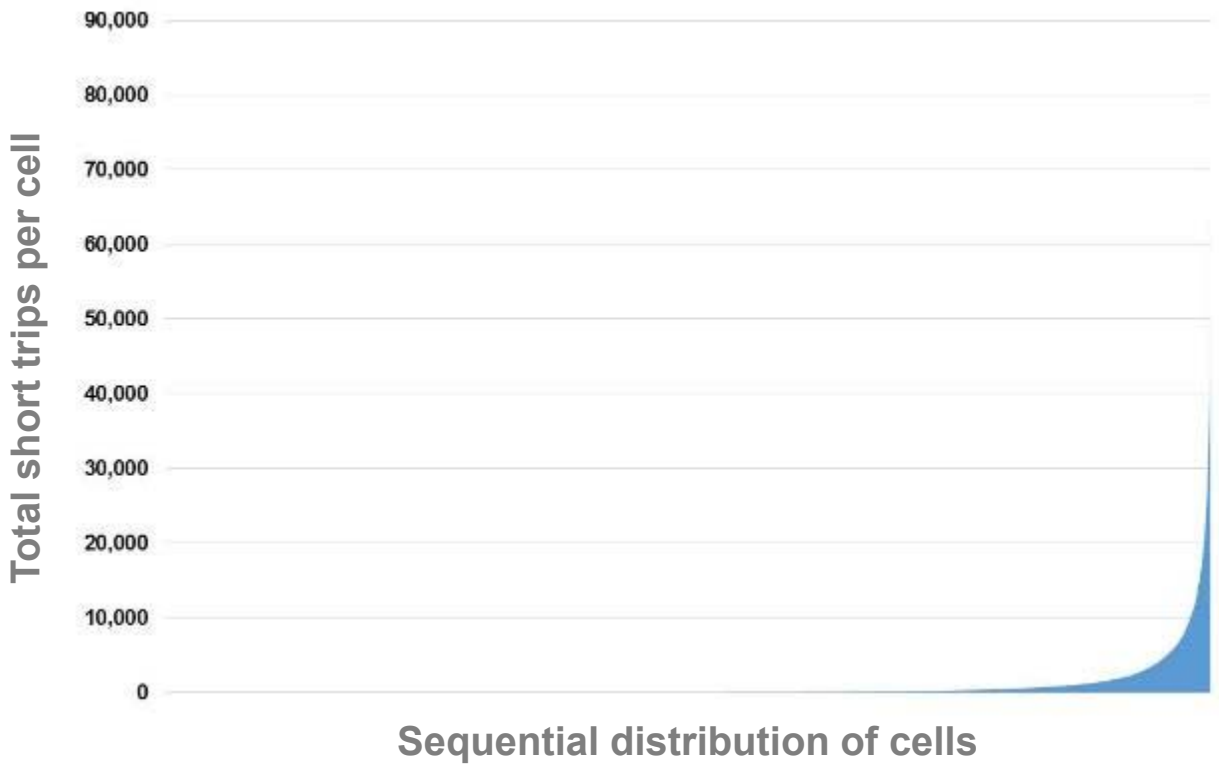


Visualization

How to visualize?

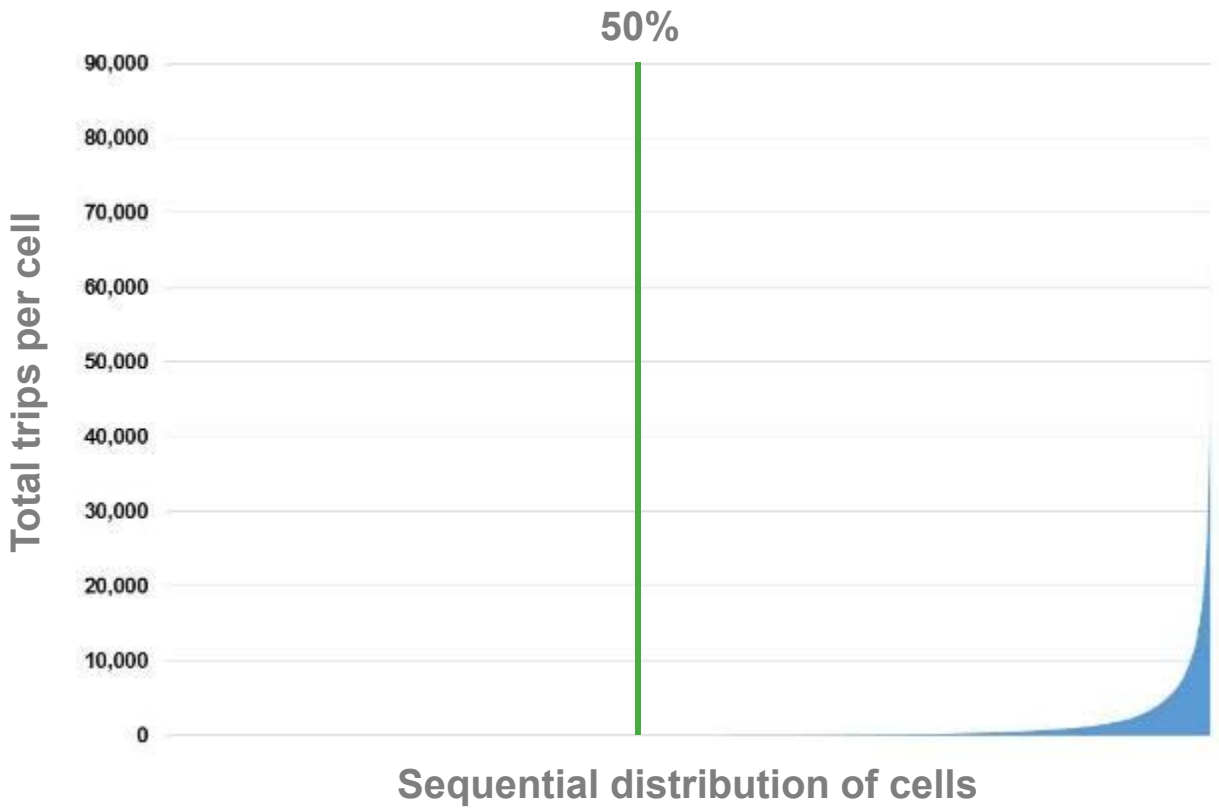
- Scores are unevenly distributed leading to a long-tail distribution (short trip activity example to the right)
- We're interested in the "high potential" areas
- **Median heads/tails break** designed for this situation.



Visualization

Categories:

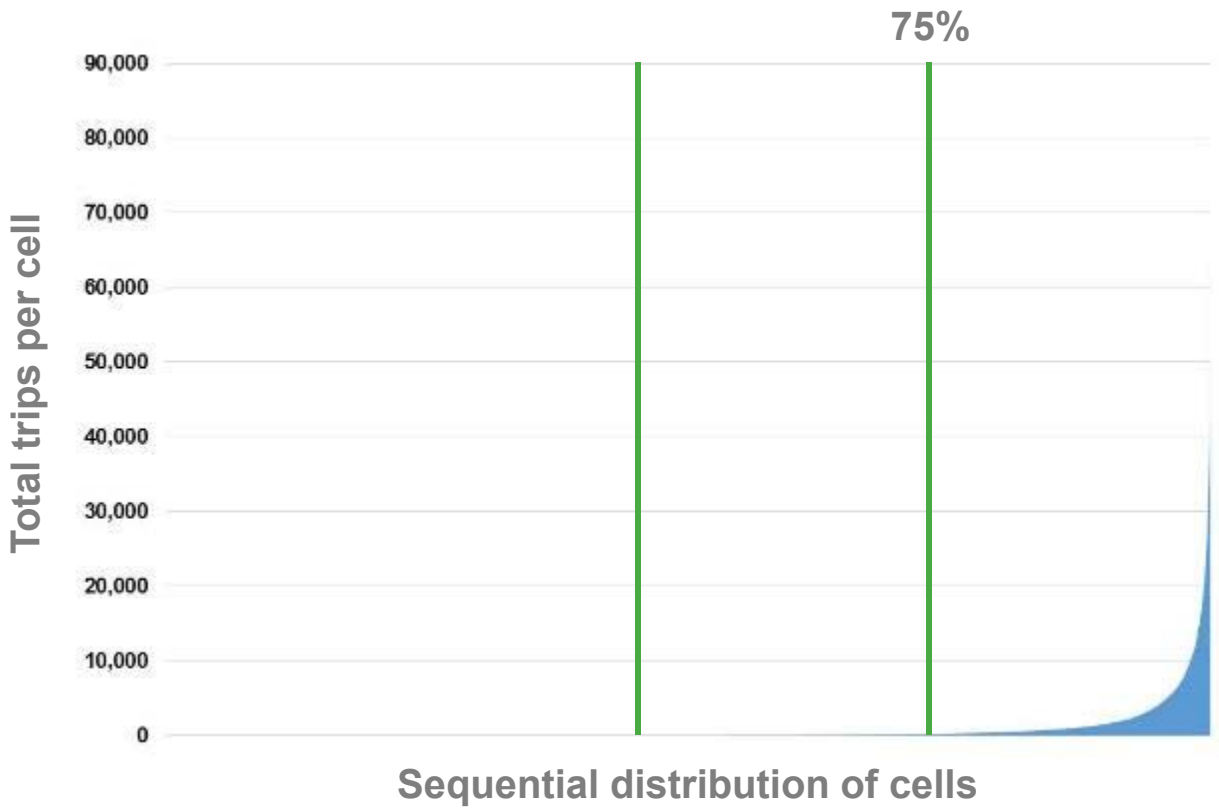
1. 0-50%



Visualization

Categories:

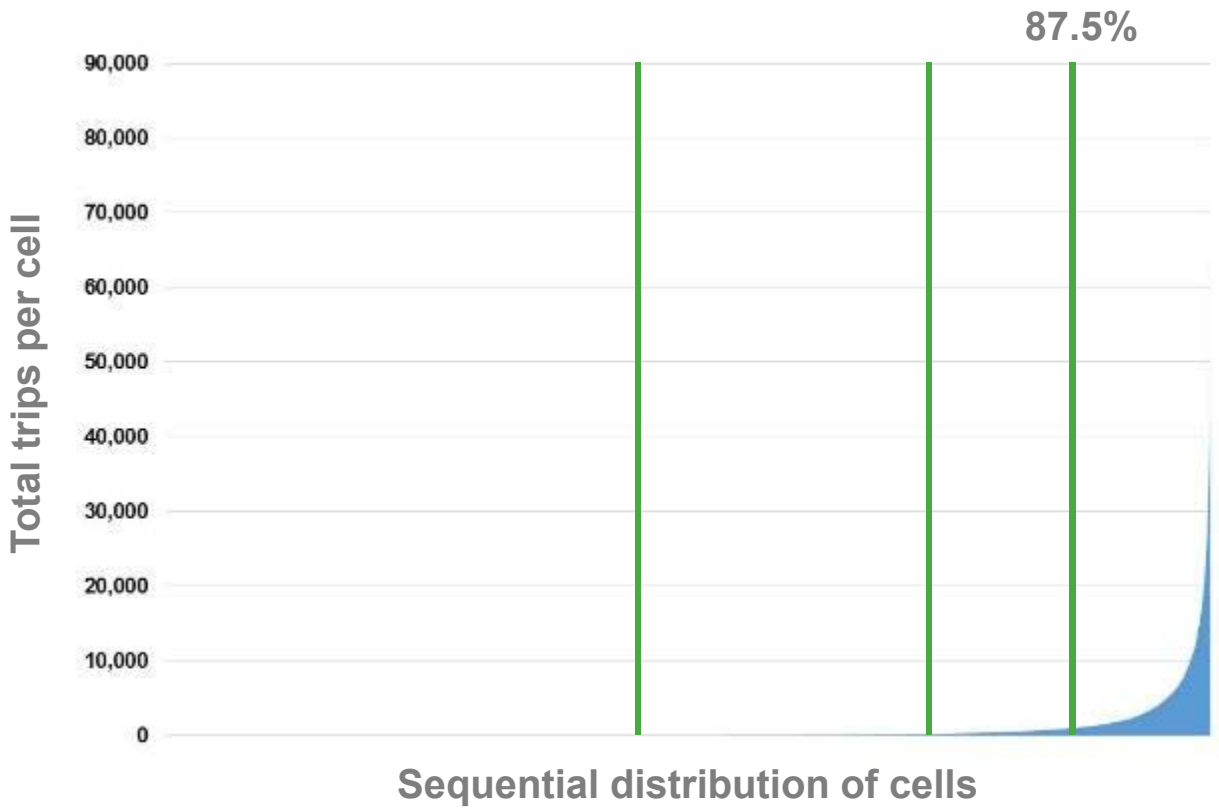
1. 0-50%
2. 50-75%



Visualization

Categories:

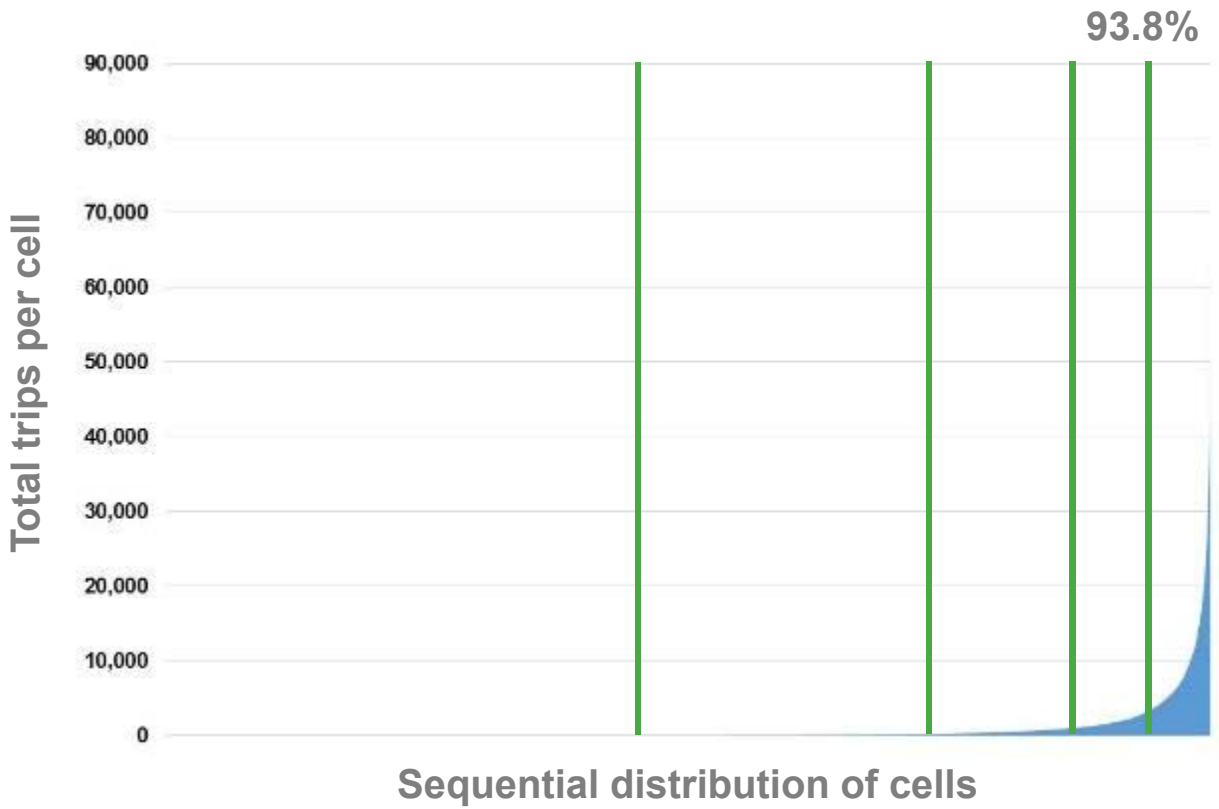
1. 0-50%
2. 50-75%
3. 75-87.5%



Visualization

Categories:

1. 0-50%
2. 50-75%
3. 75-87.5%
4. 87.5-93.8%



Visualization

Categories:

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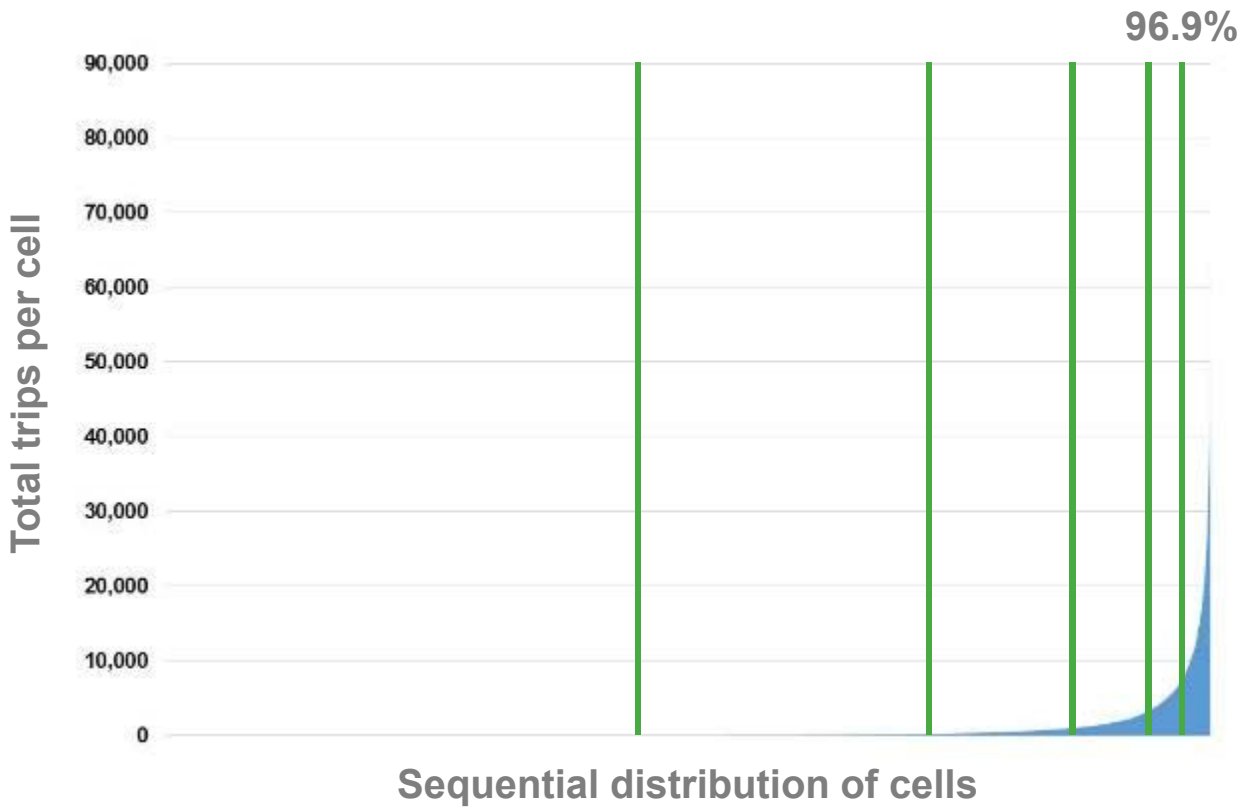
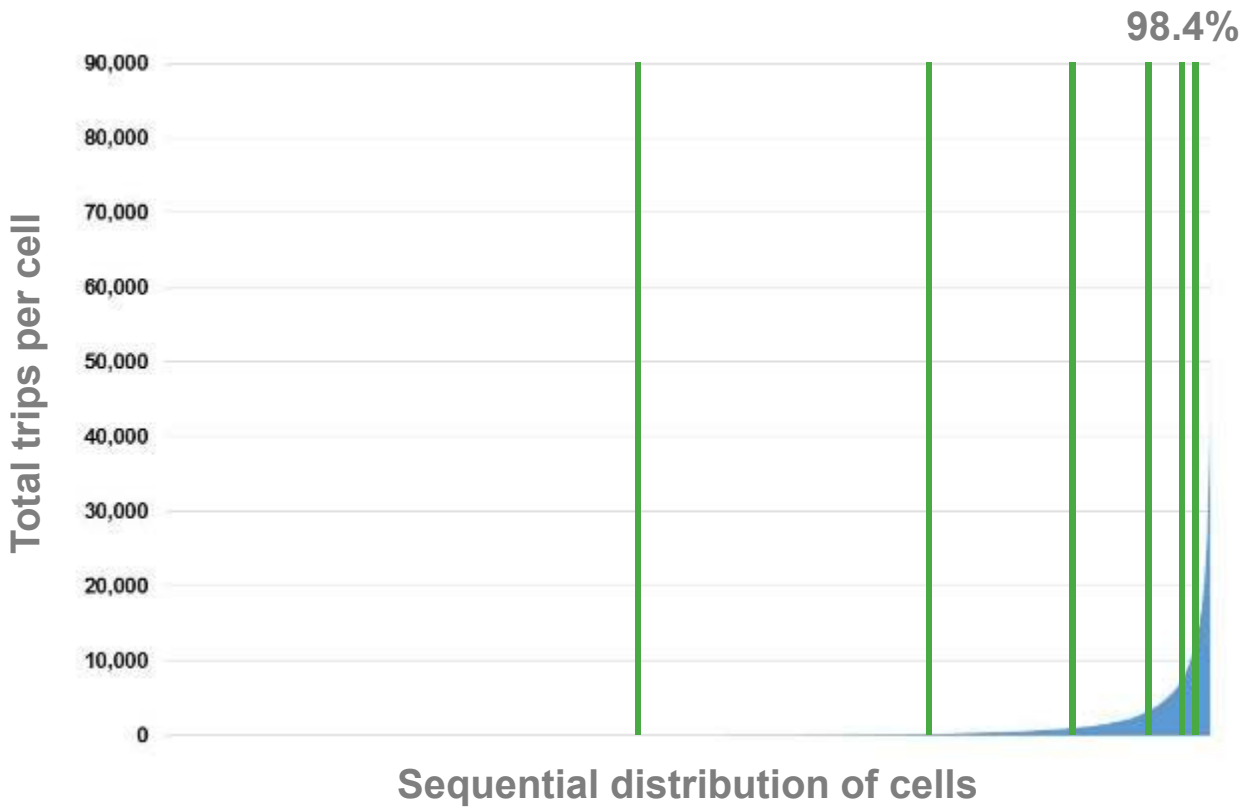
2. 50-75%
3. 75-87.5%
4. 87.5-93.8%
5. 93.8-96.9%



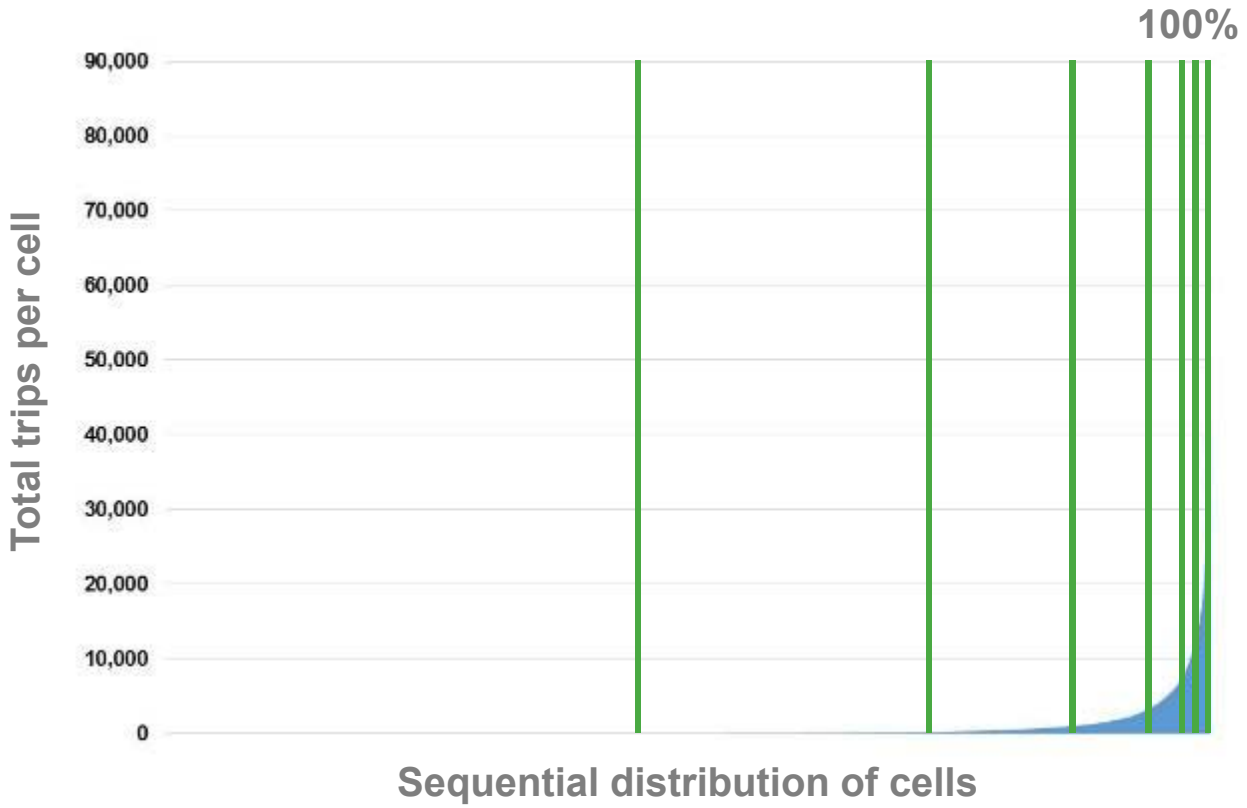
Categories:

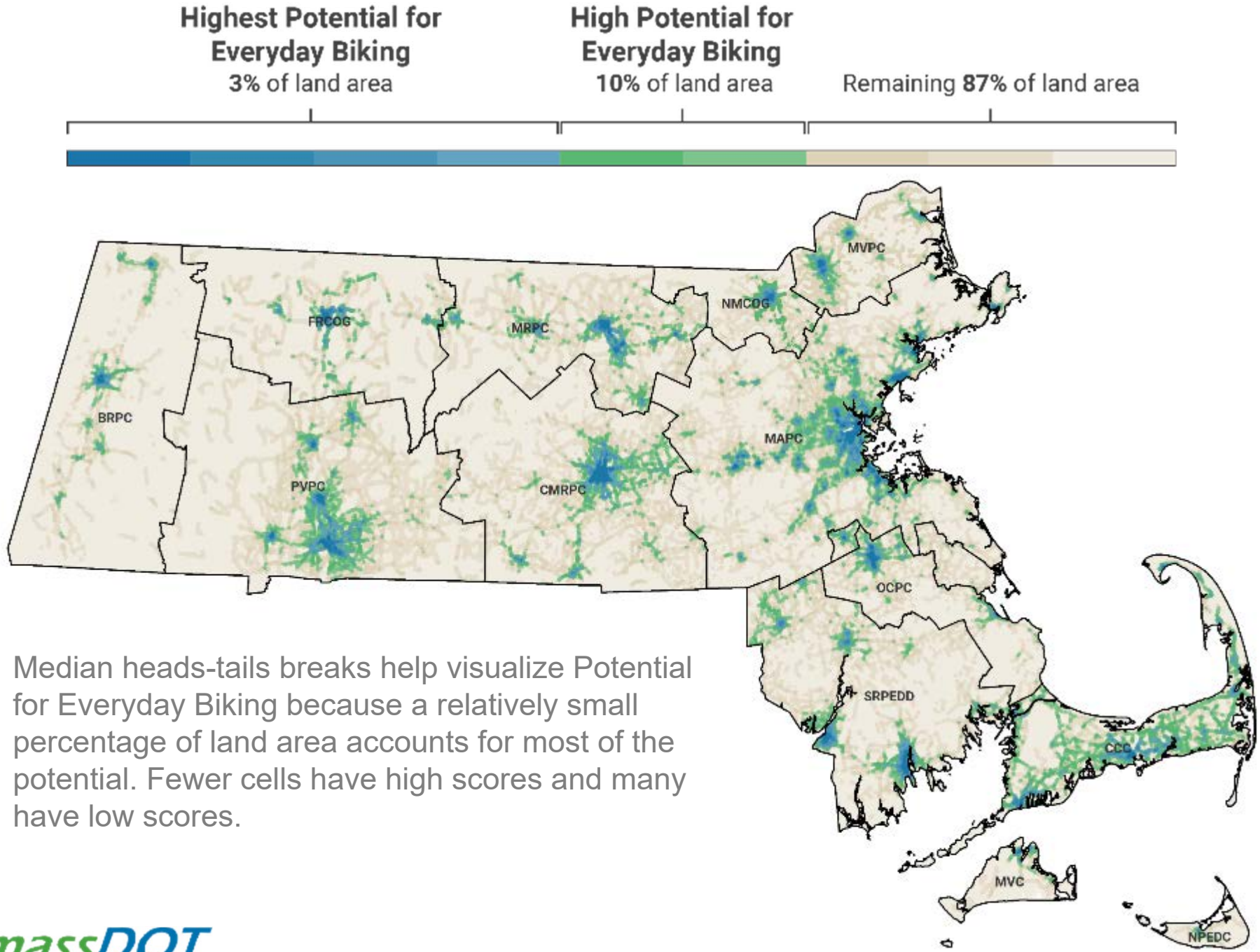
1. 0-50%
2. 50-75%
3. 75-87.5%
4. 87.5-93.8%
5. 93.8-96.9%
6. 96.9-98.4%



Categories:

1. 0-50%
2. 50-75%
3. 75-87.5%
4. 87.5-93.8%
5. 93.8-96.9%
6. 96.9-98.4%
7. 98.4-100%





Median heads-tails breaks help visualize Potential for Everyday Biking because a relatively small percentage of land area accounts for most of the potential. Fewer cells have high scores and many have low scores.

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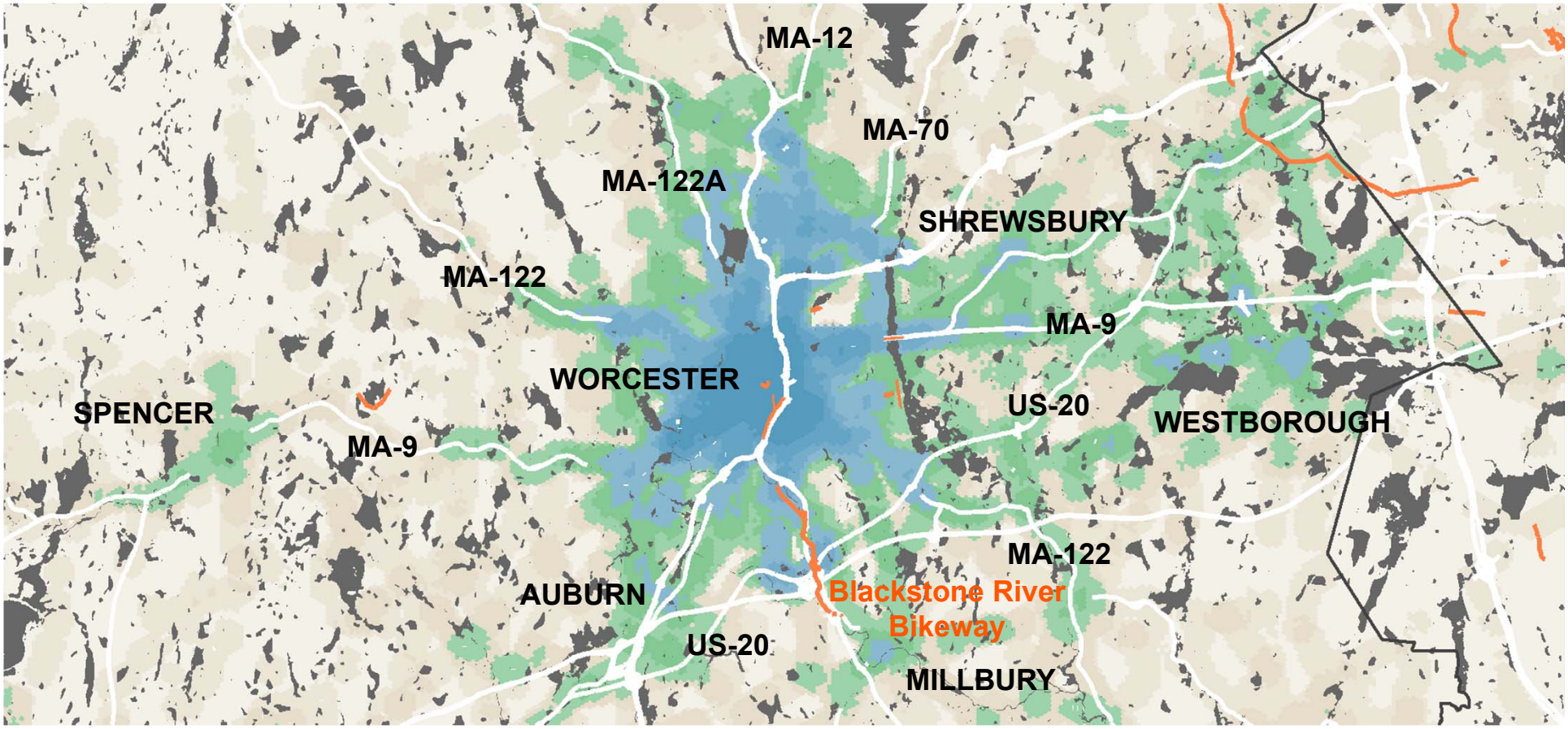
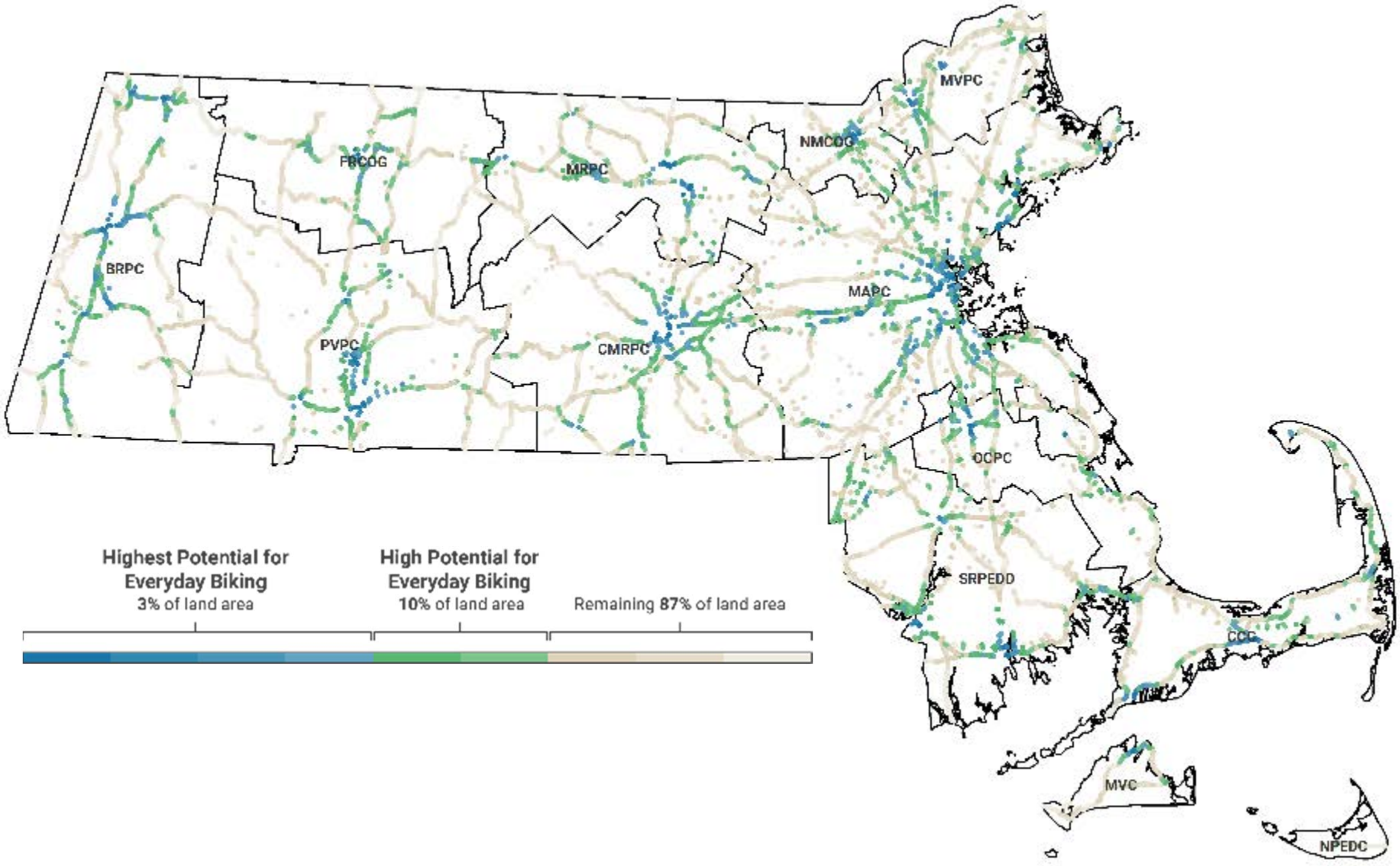
Visualization

Worcester area detail



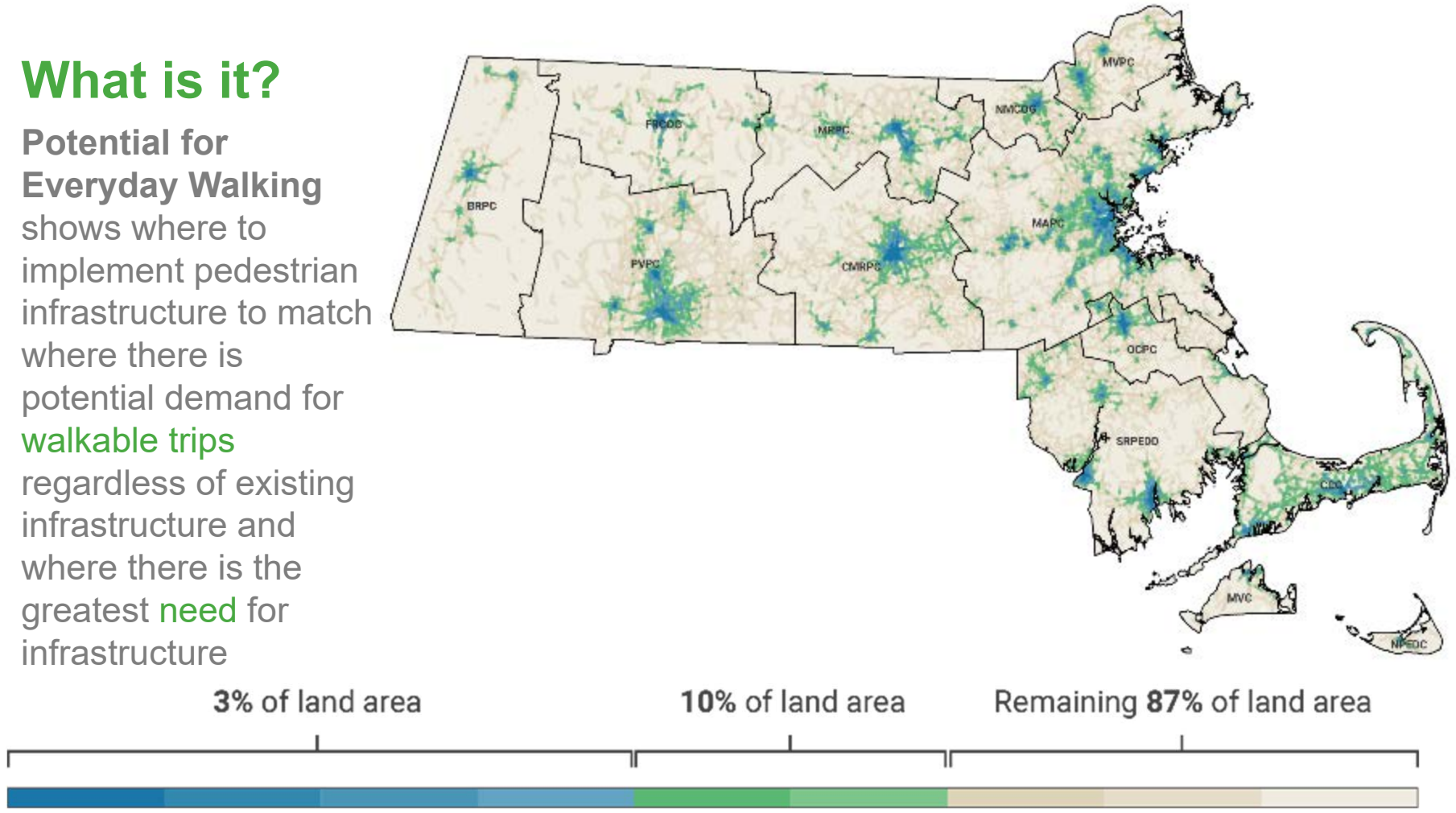
Bike Score on MassDOT Roads



Potential for Everyday Walking Analysis

What is it?

Potential for Everyday Walking shows where to implement pedestrian infrastructure to match where there is potential demand for walkable trips regardless of existing infrastructure and where there is the greatest need for infrastructure



Analysis

Variables

- **Walking trip demand** = **MAPC Local Access Score** (access to schools, parks, transit, shopping within .25 and .5 miles)
- **Crashes** = proximity to reported pedestrian crashes between 2001 and 2014
- **Social equity** = proximity to:
    1. minority populations
    2. low-income populations
    3. limited English proficiency populations
    4. people with disabilities
    5. no-car households
    6. vulnerable users (i.e. ages ≤ 18 or ≥ 65)

Analysis

Formula overview:

Score = (Walking trip demand + Crashes) * Social equity

These two variables are added together as they are attributes assigned to the surface transportation network

Analysis

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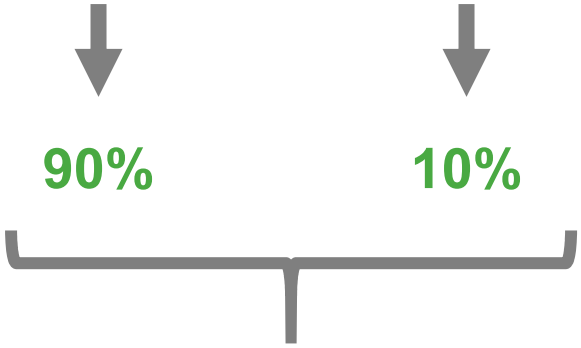

Weights **90%** **10%**

Each variable is weighted to result in a 0 to 1 value. Weights based on testing, national scan of best practice, and review of data limitations.

Analysis

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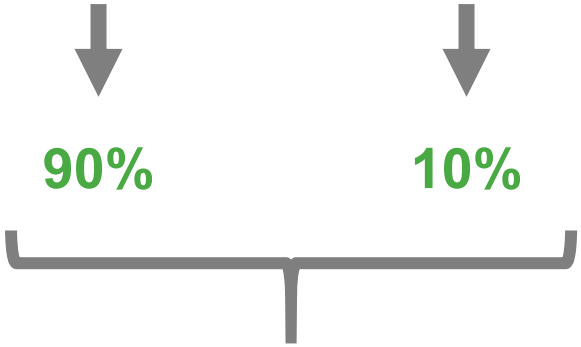

Weights 90% 10%

Interim values 0 to 1 interim value

Analysis

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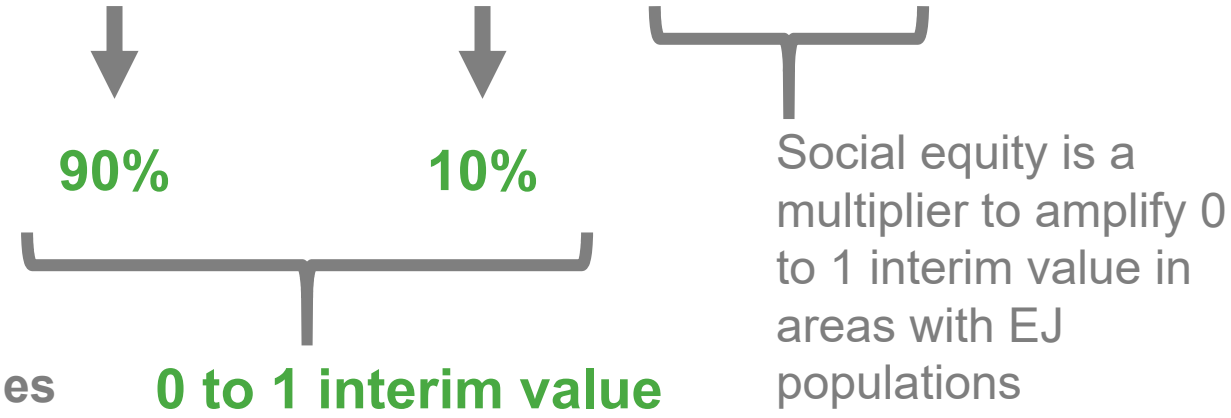

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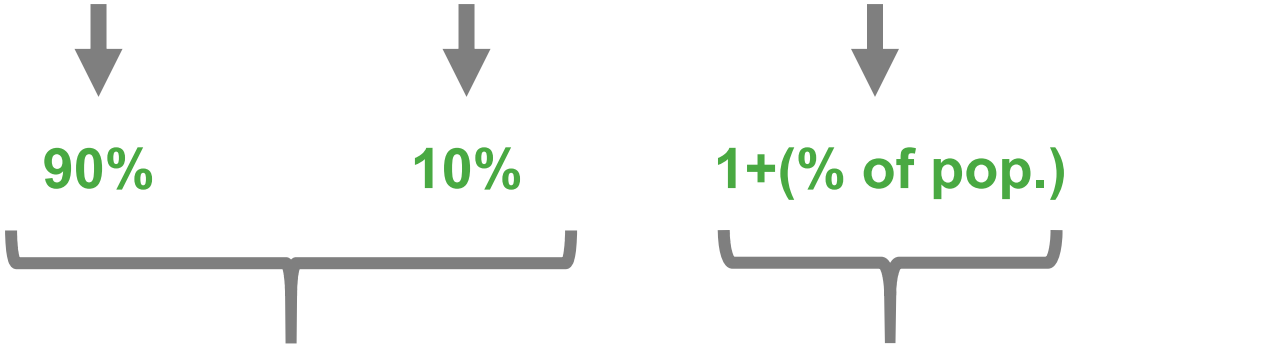

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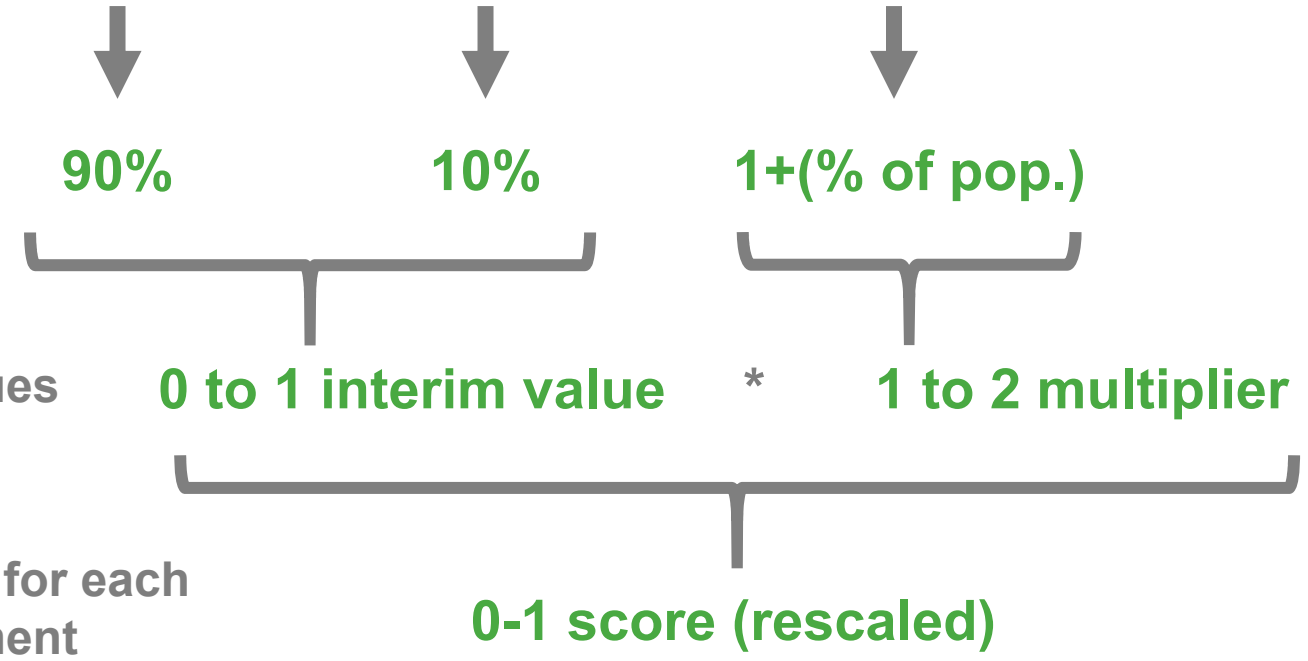
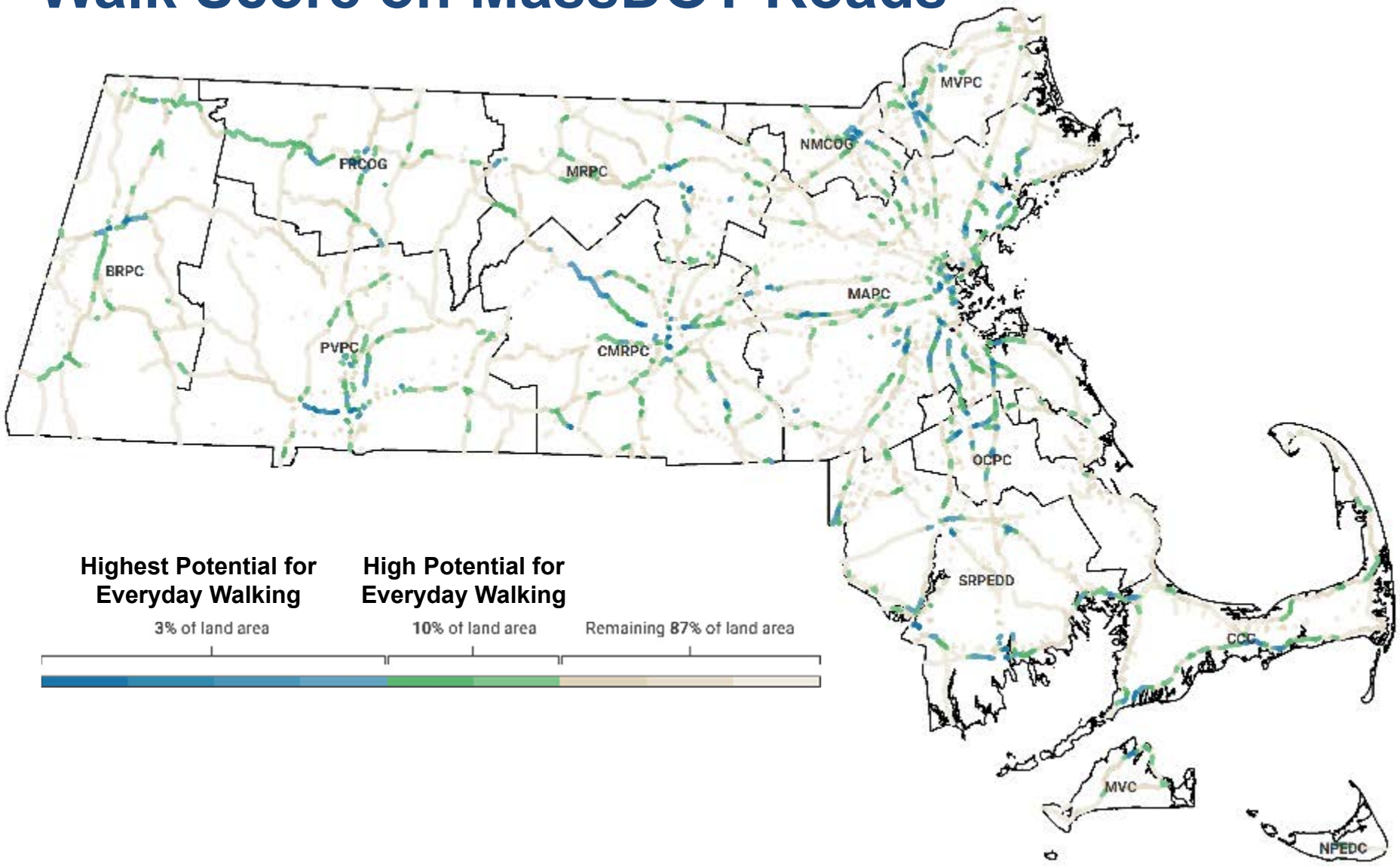
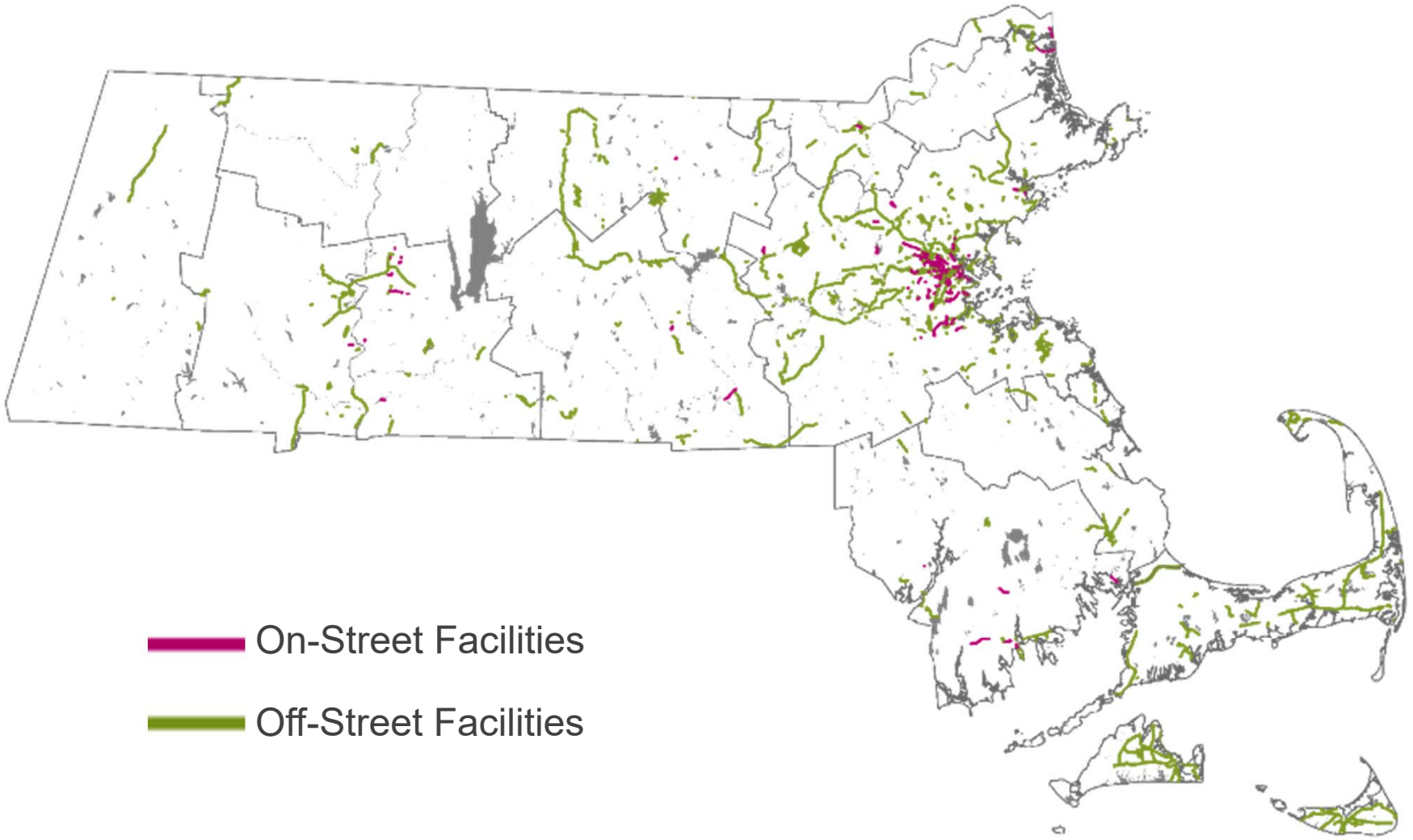


Walk Score on MassDOT Roads

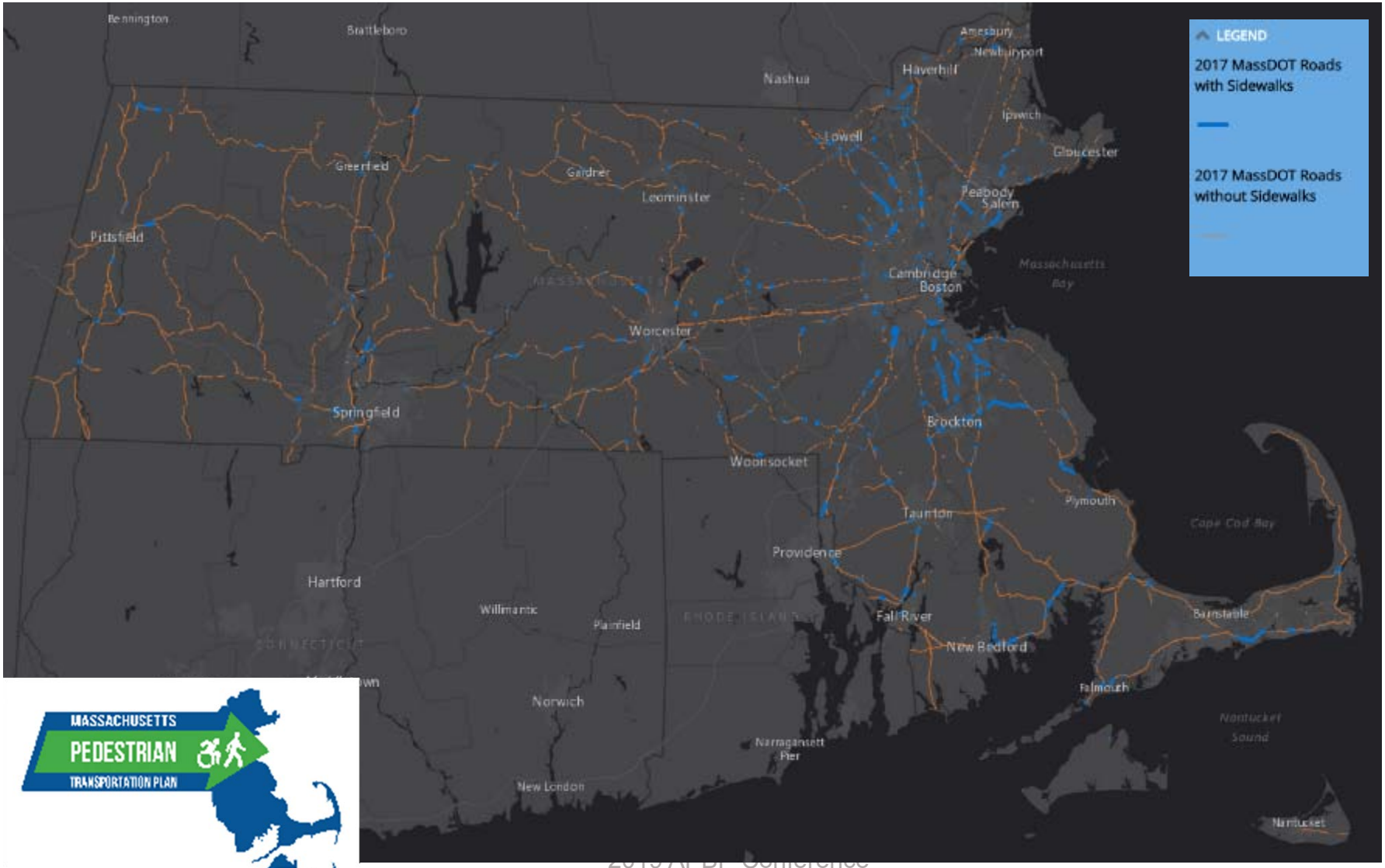


Project Prioritization and Selection

Existing Bicycle Facilities

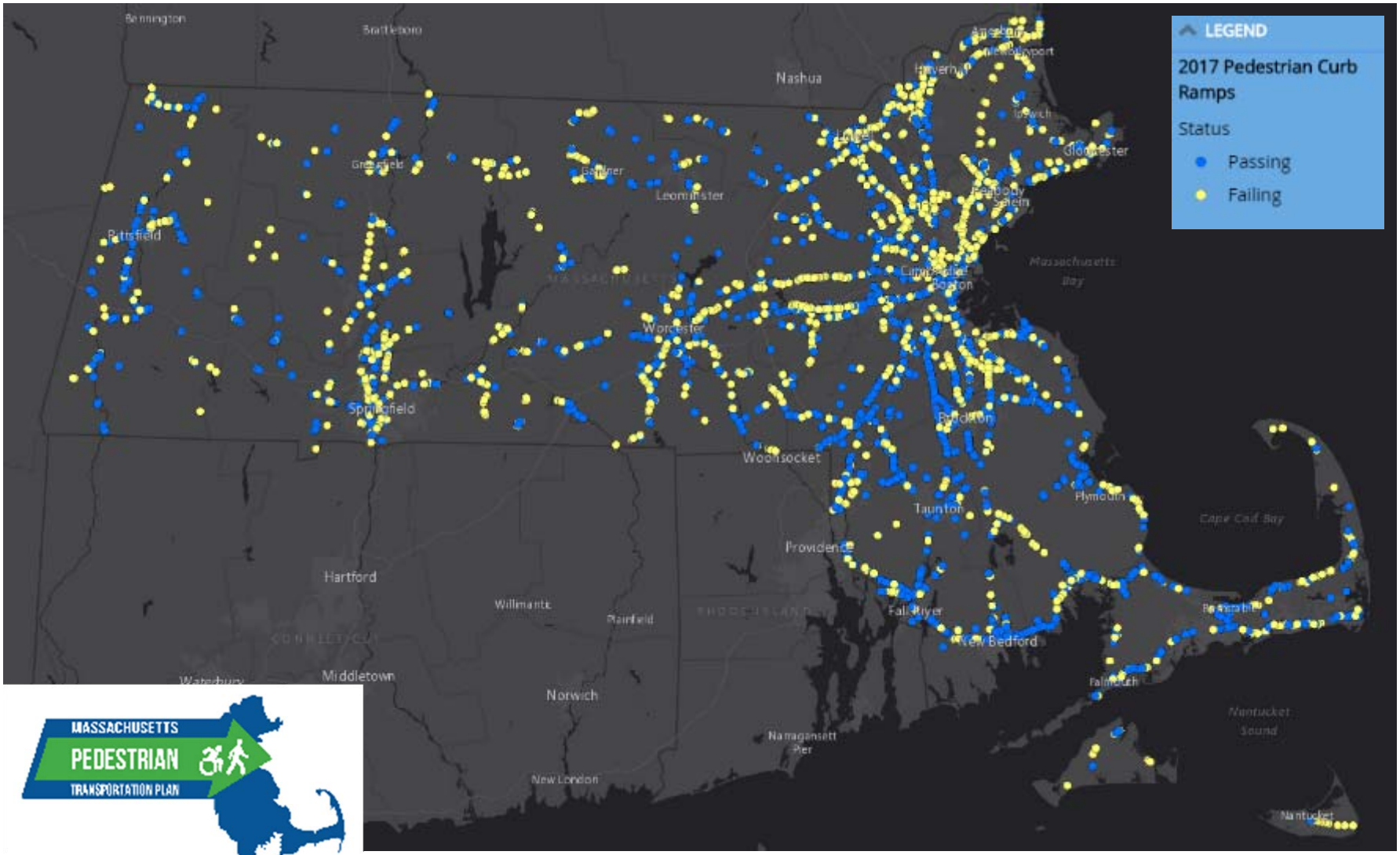


Sidewalk Inventory

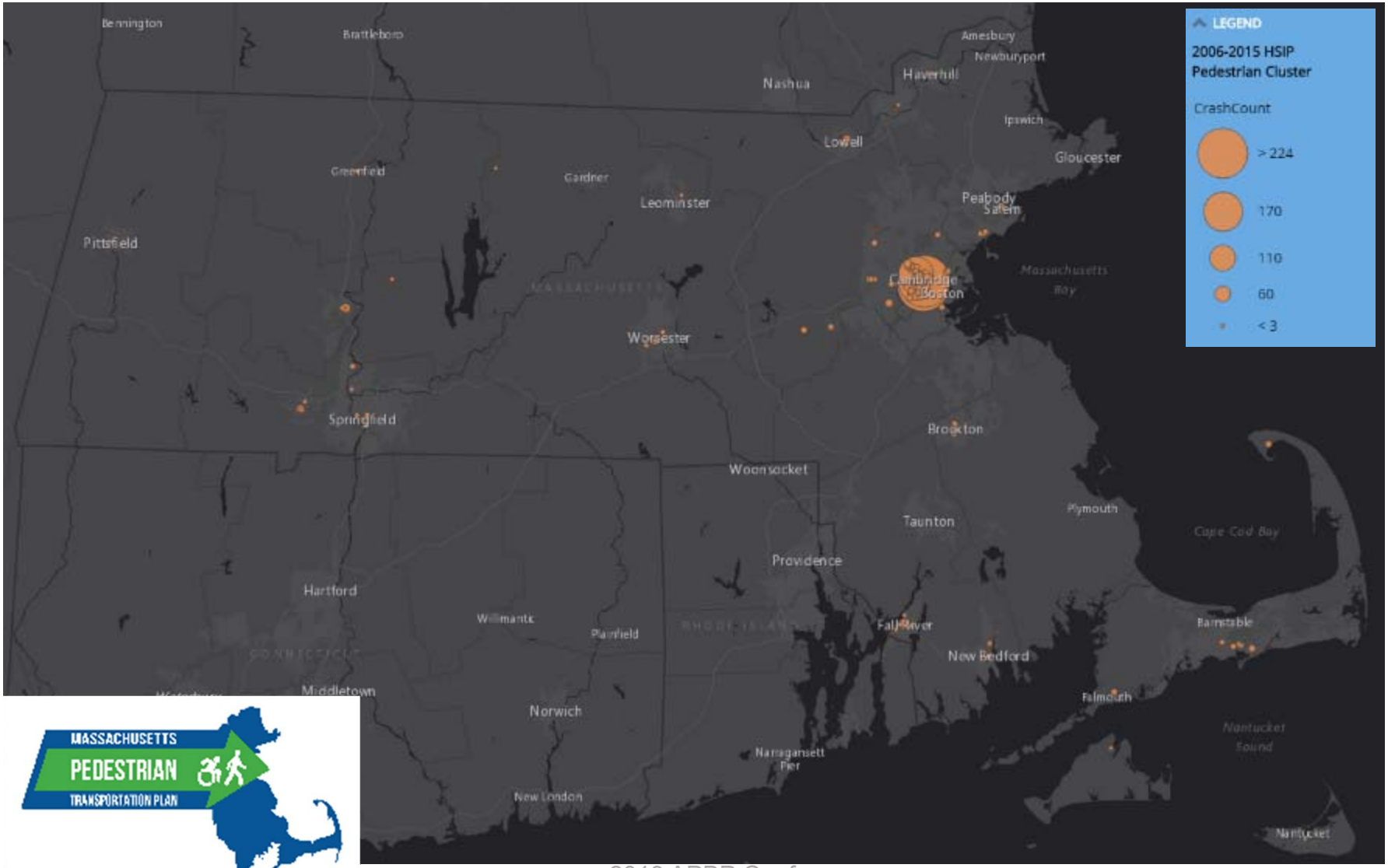


MASSACHUSETTS PEDESTRIAN TRANSPORTATION PLAN

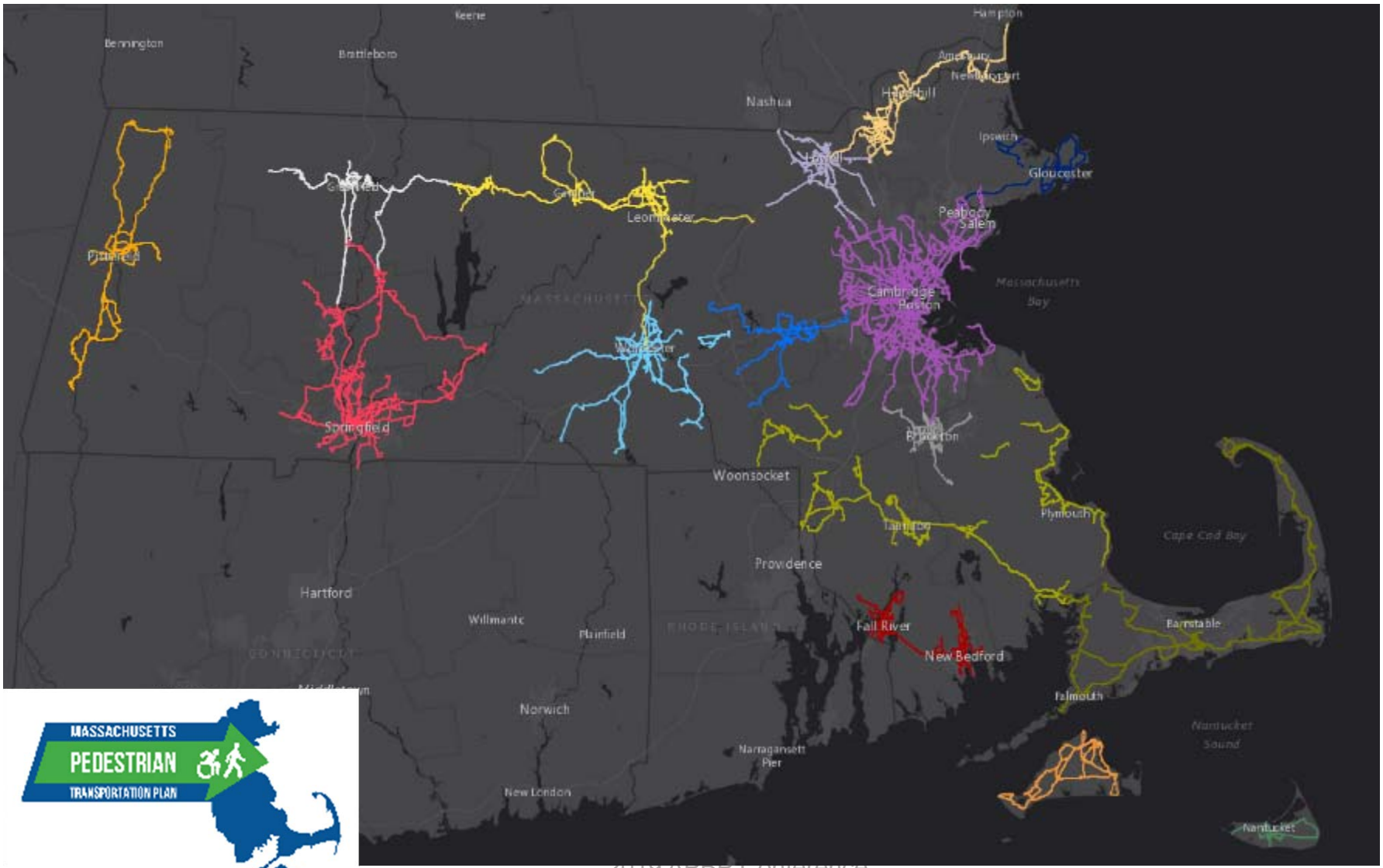
Curb Ramps


LEGEND
2017 Pedestrian Curb Ramps
Status
Passing
Failing
Bennington
Brattleboro
Nashua
Greenfield
Leominster
Pittsfield
Worcester
Springfield
Woonsocket
Taunton
Plymouth
Providence
Hartford
Willimantic
Fall River
New Bedford
Middletown
Norwich
New London
Massachusetts Bay
Cape Cod Bay
Nantucket Sound
MASSACHUSETTS
PEDESTRIAN
TRANSPORTATION PLAN

Pedestrian Crashes

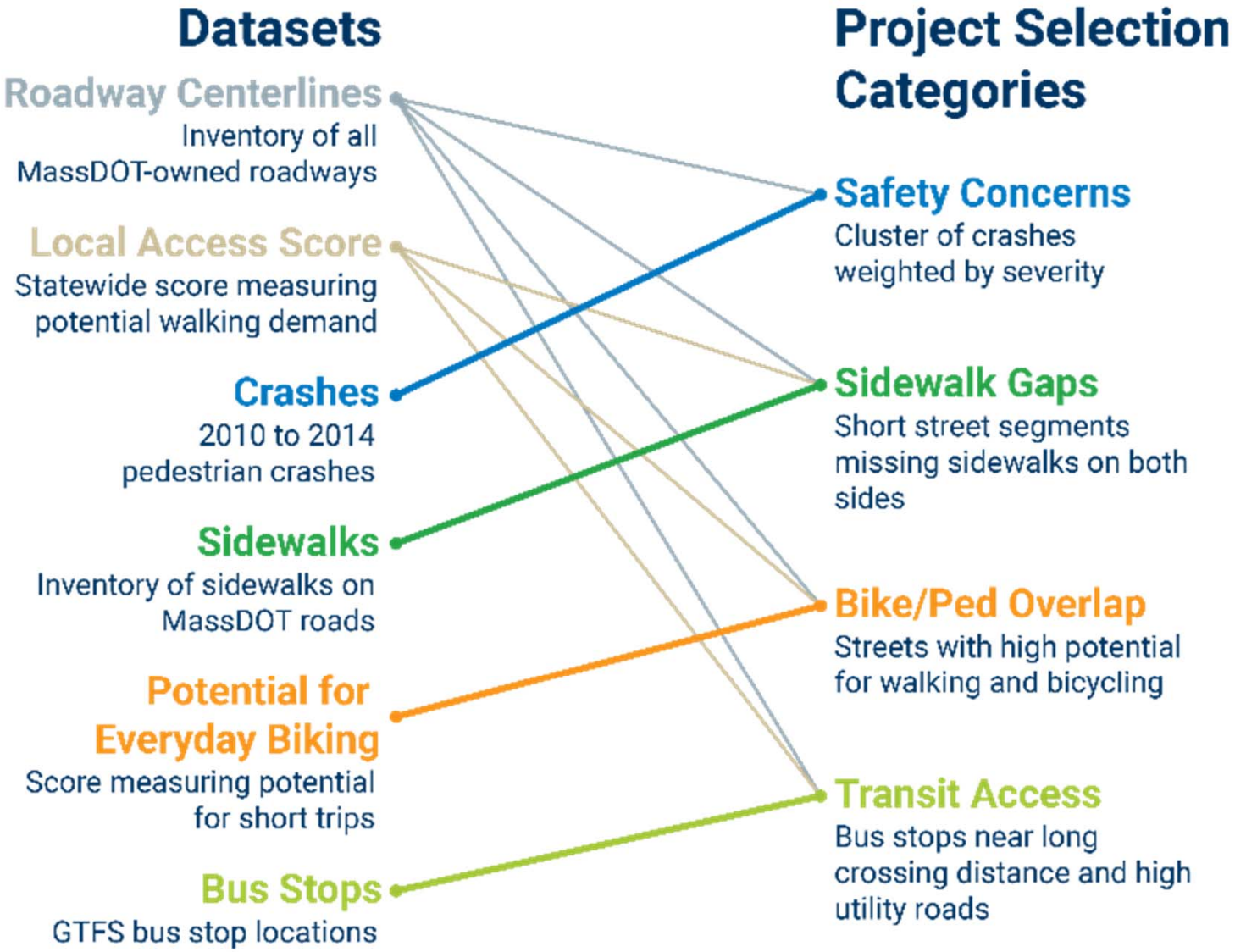


Transit Route Locations

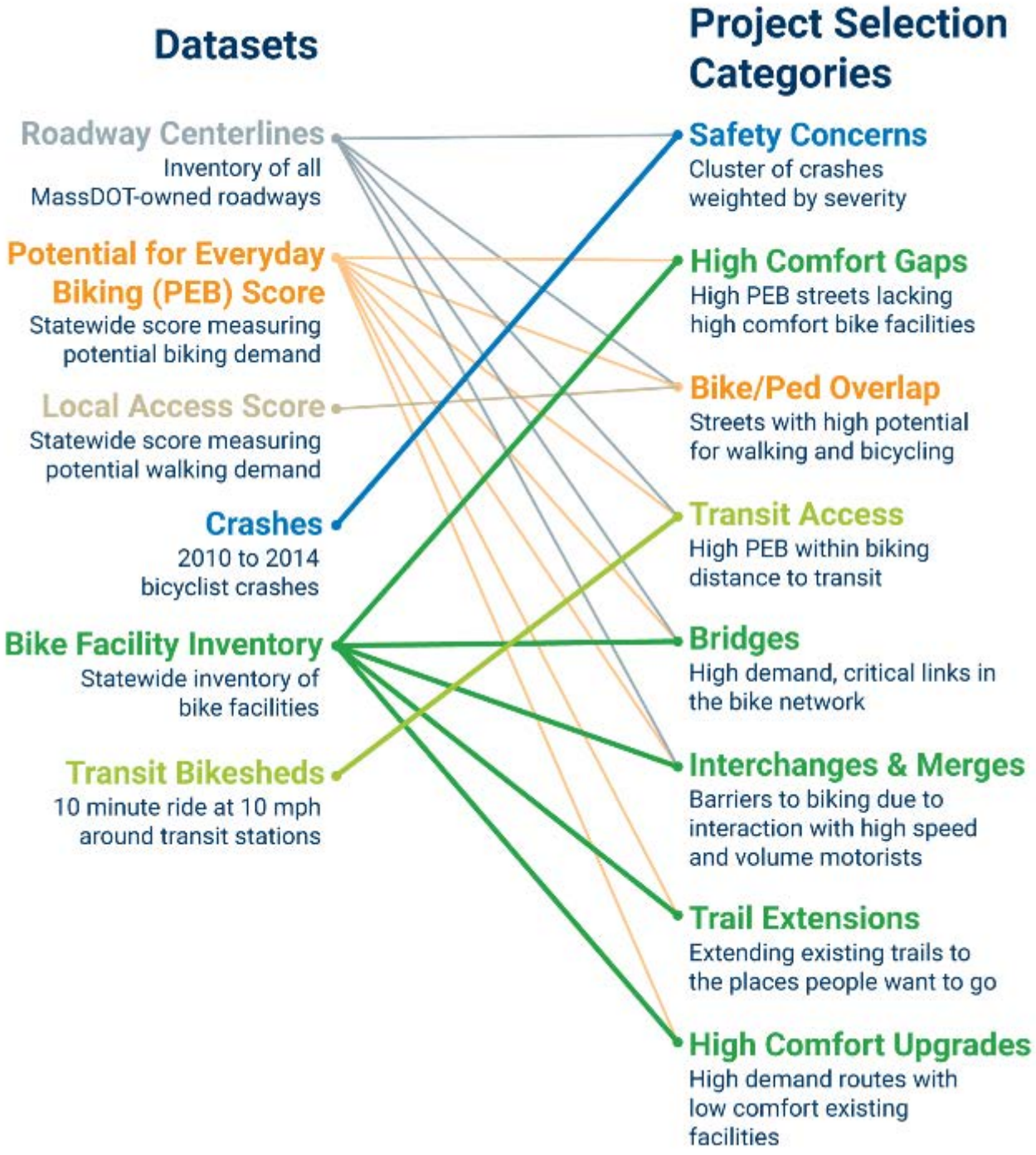


MASSACHUSETTS PEDESTRIAN TRANSPORTATION PLAN

Pedestrian Plan Project Categories



Bicycle Plan Project Categories

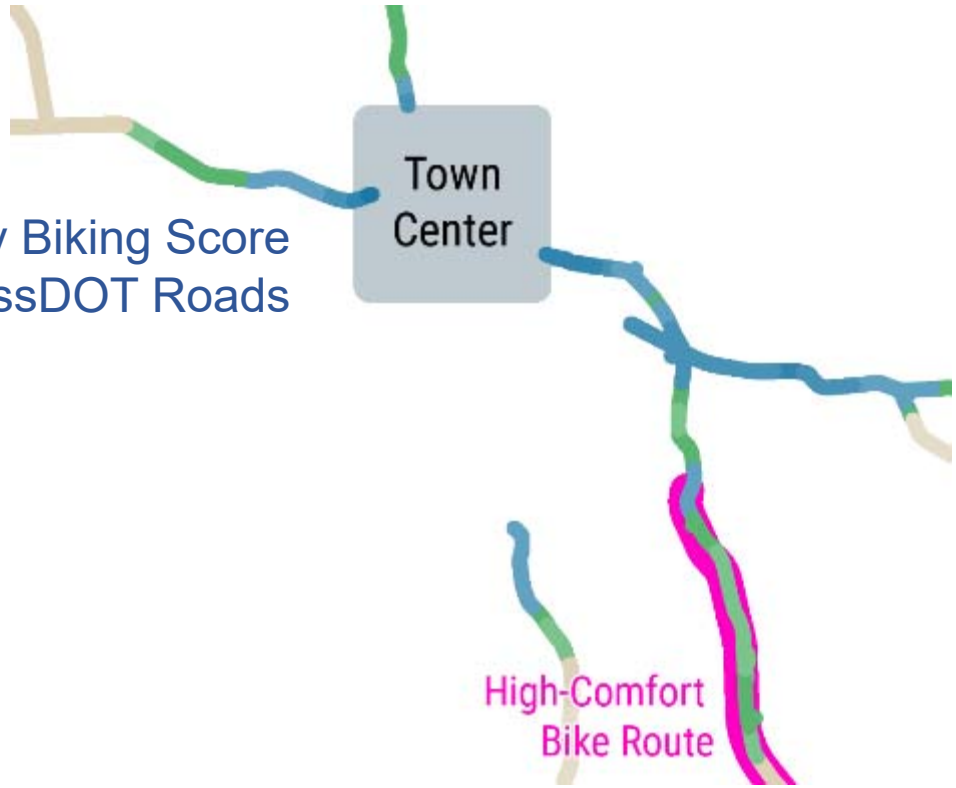


massDOT
Massachusetts Department of Transportation

Project Selection Process

MassDOT will use **data collected** during the Bike Plan process and from the **performance measures** to locate bicycle improvement project locations.

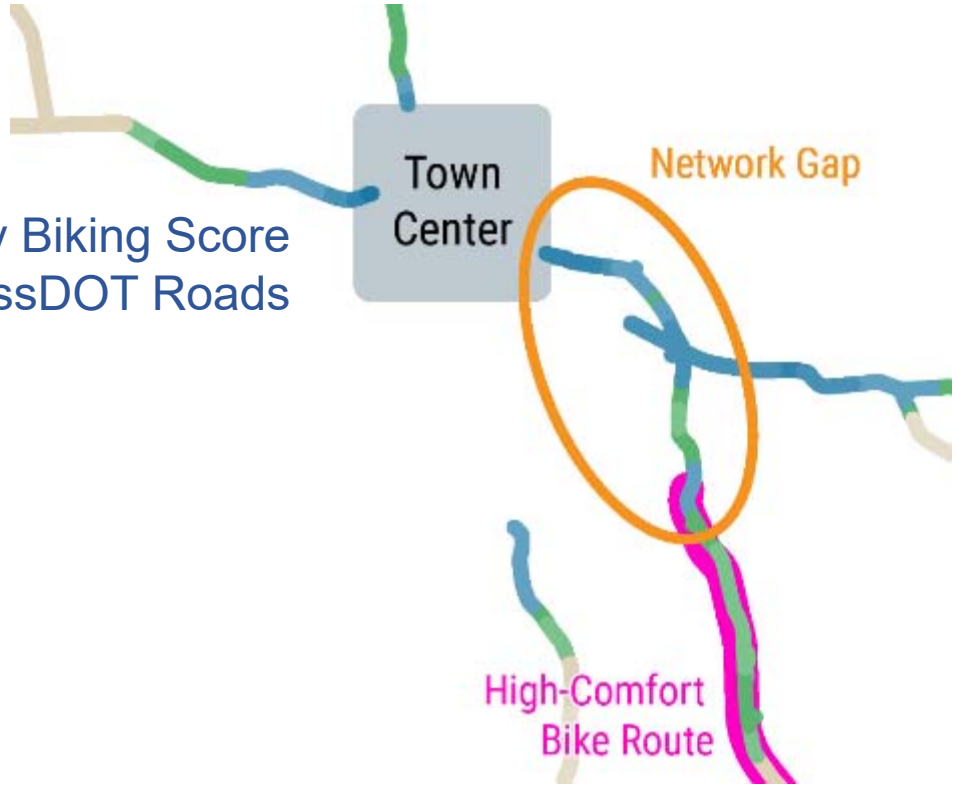
Potential for Everyday Biking Score on MassDOT Roads



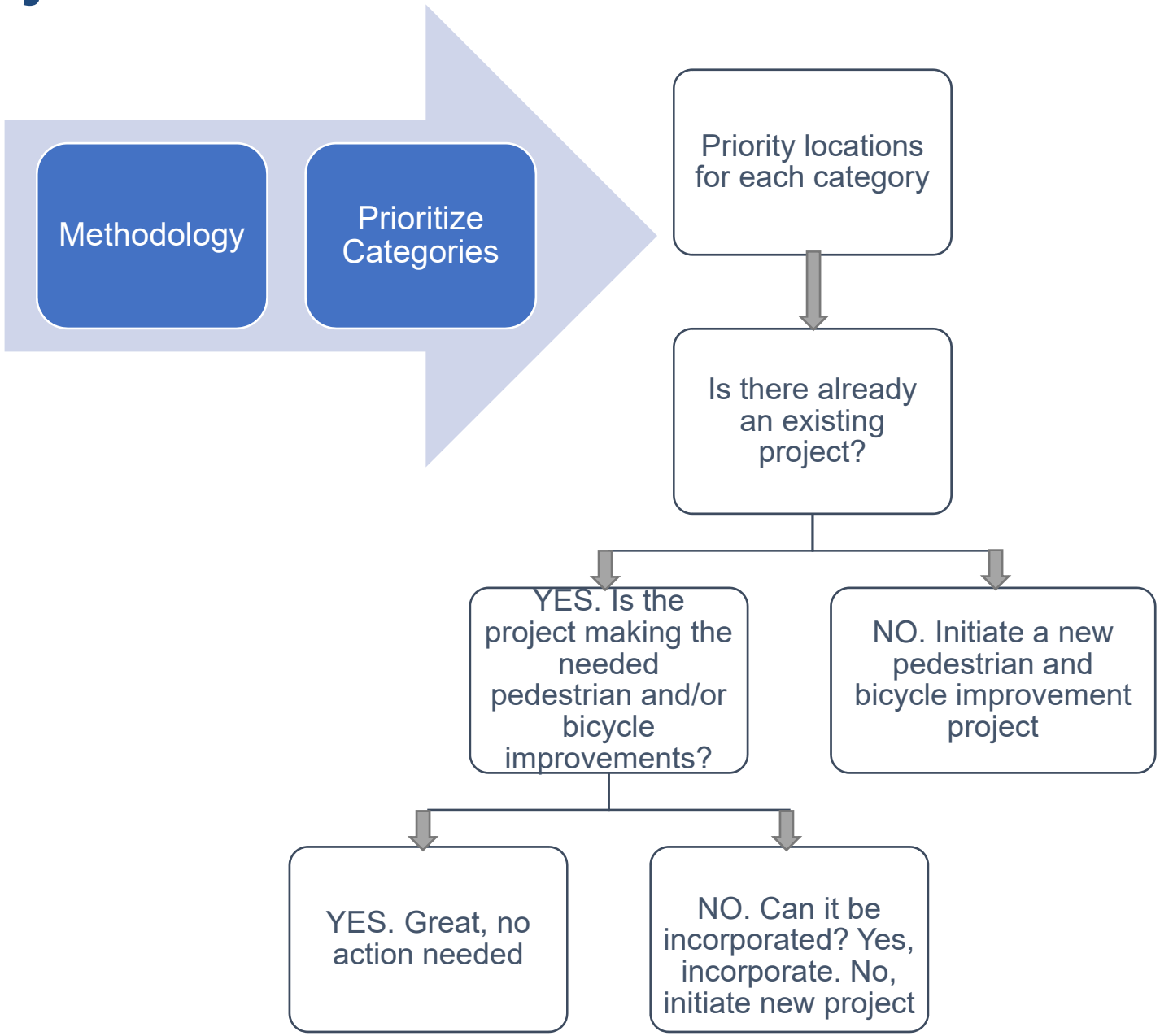
Project Selection Process

Projects that are in **gaps in the High-Comfort bike network** along MassDOT-owned roads with **high Potential for Everyday Biking scores** will have important impacts on the bicycle network connectivity.

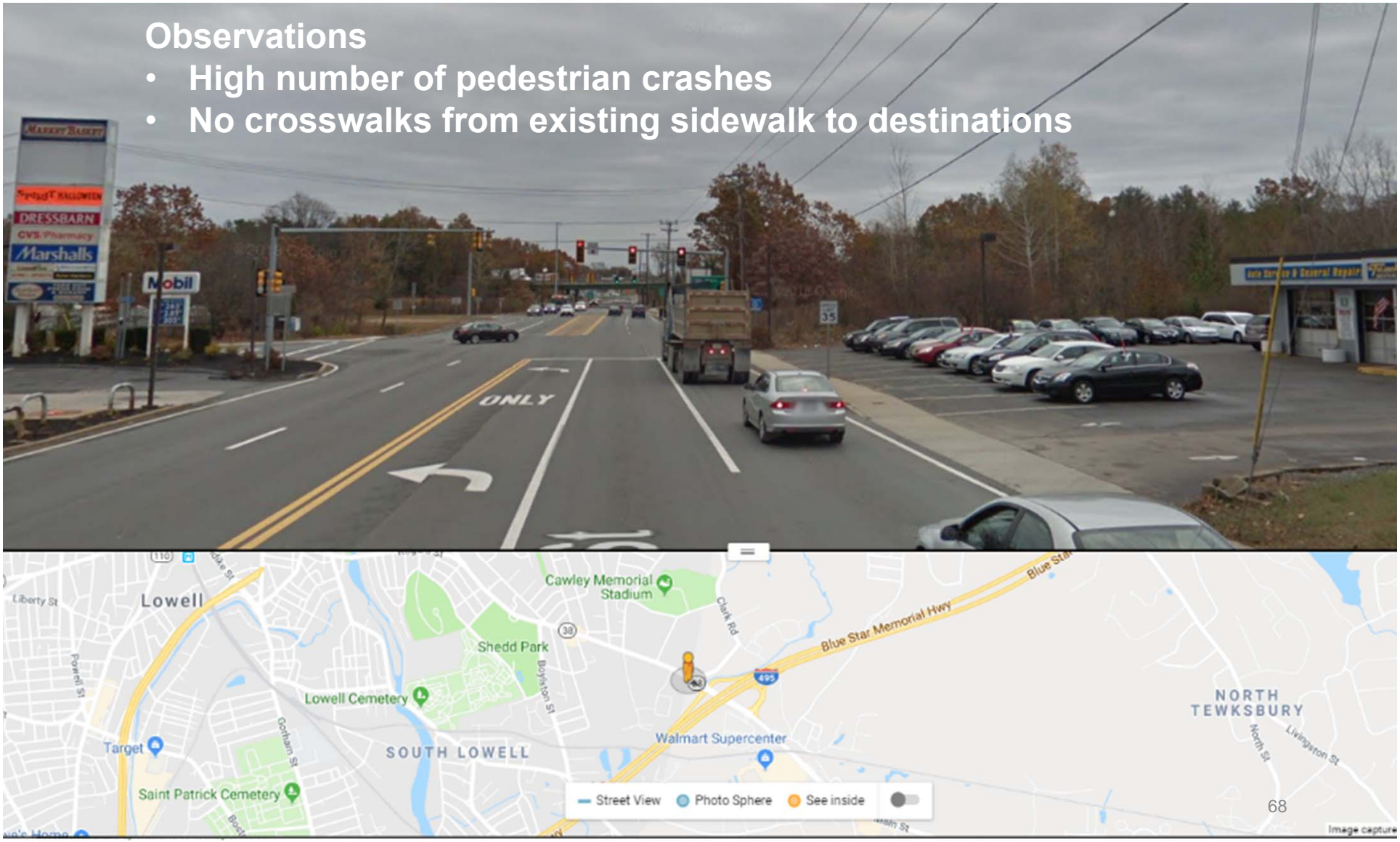
Potential for Everyday Biking Score on MassDOT Roads



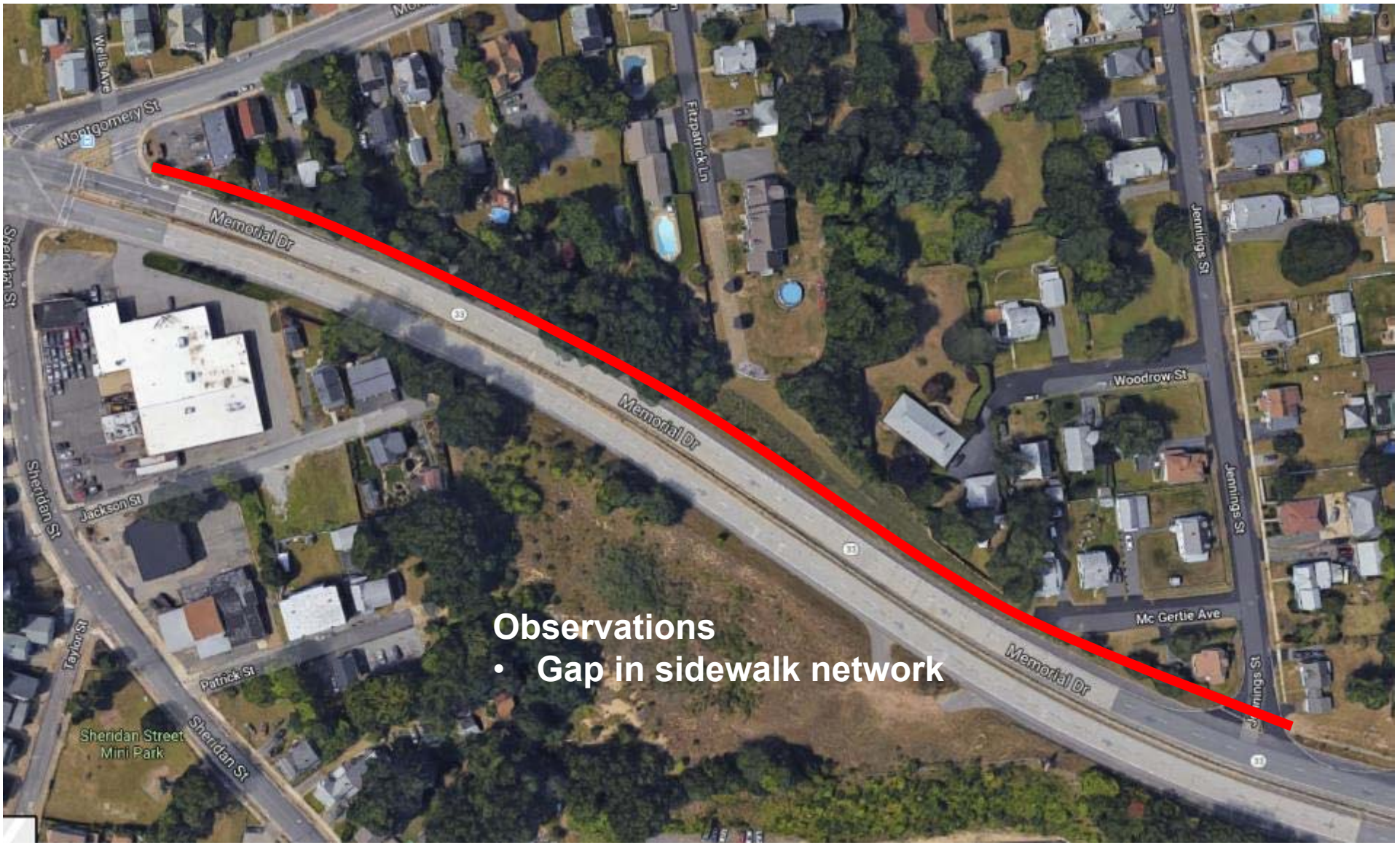
Project Selection Process



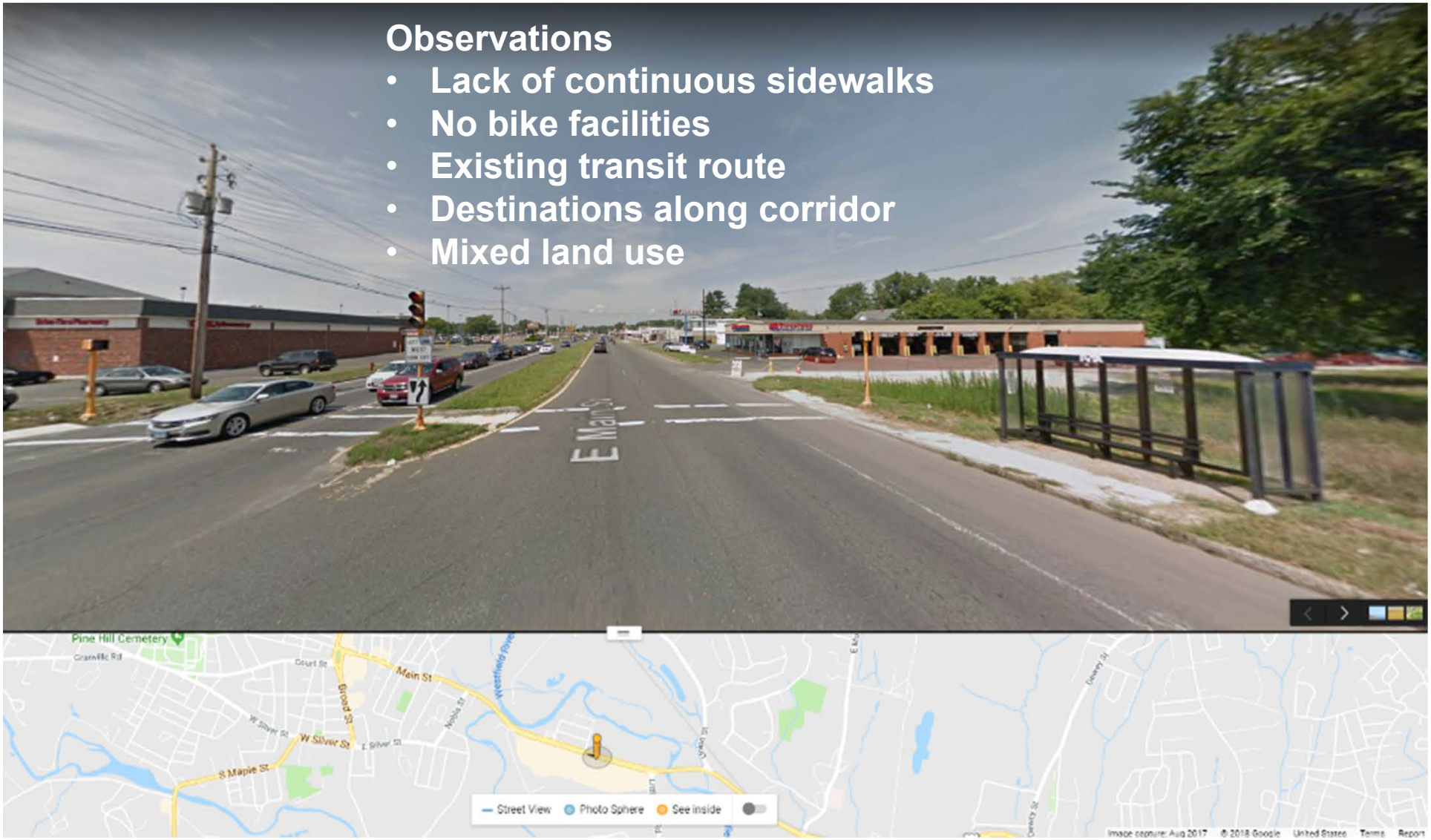
Safety Concerns Example



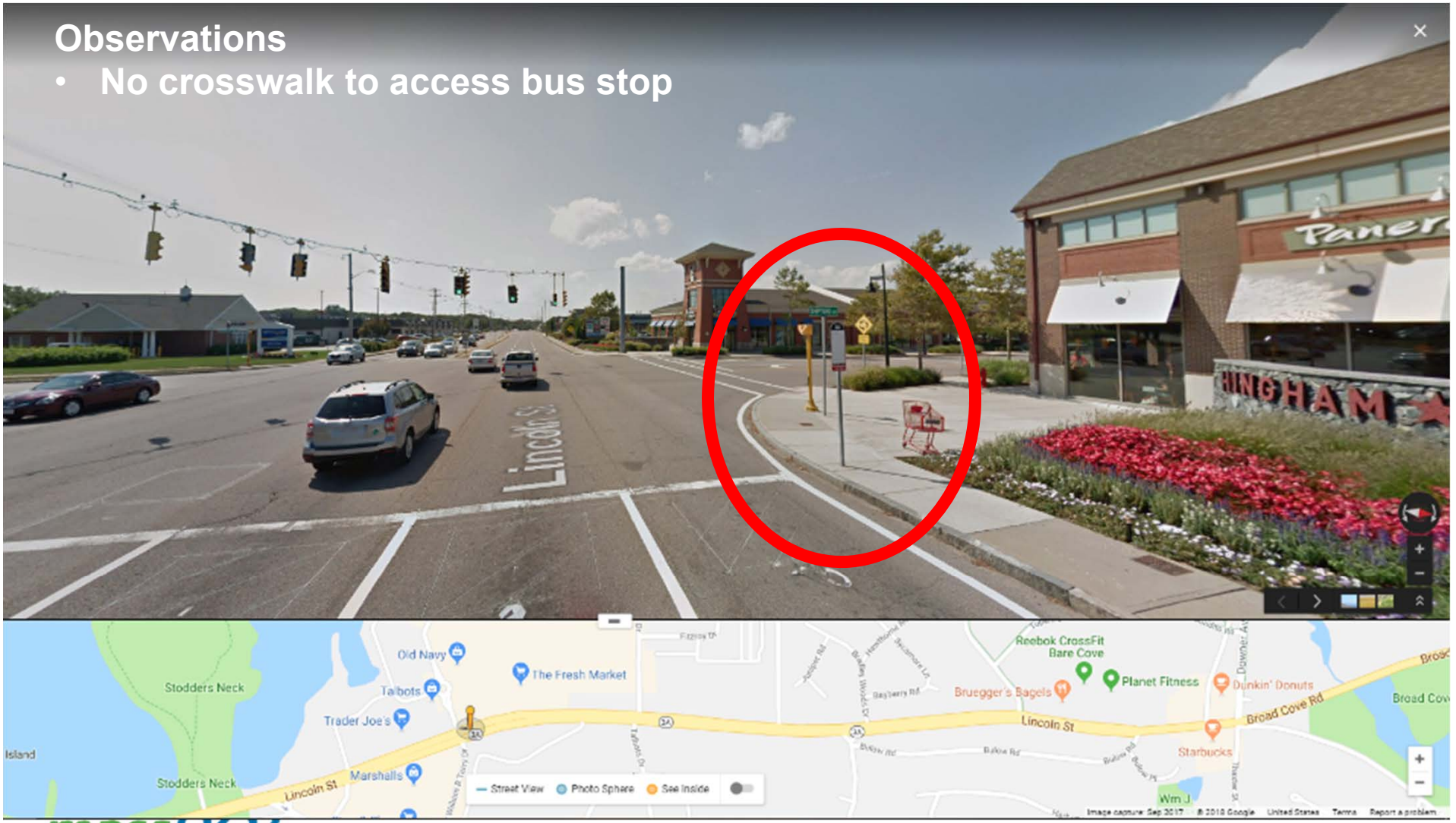
Sidewalk Gaps Example



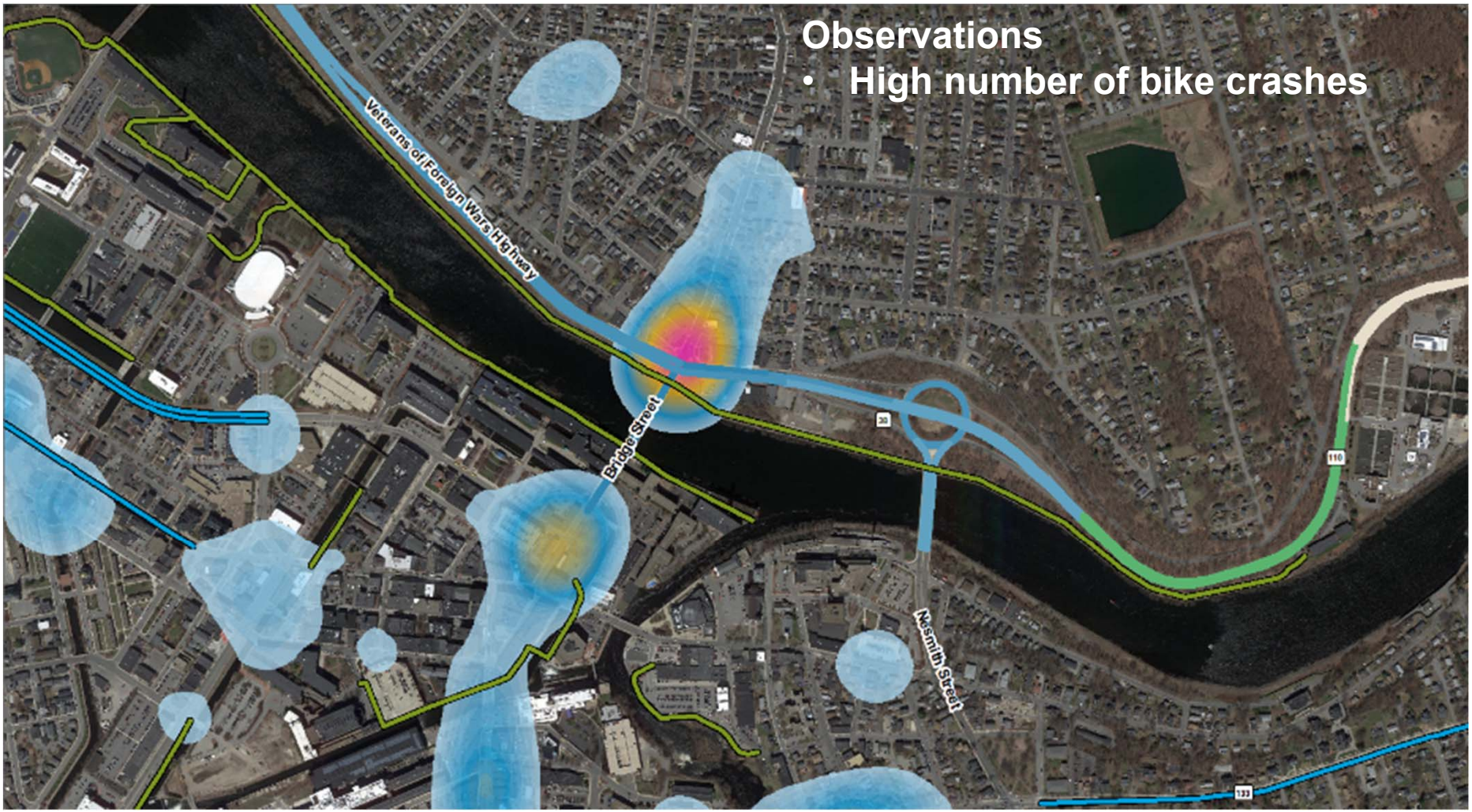
Pedestrian/Bicycle Overlap Example



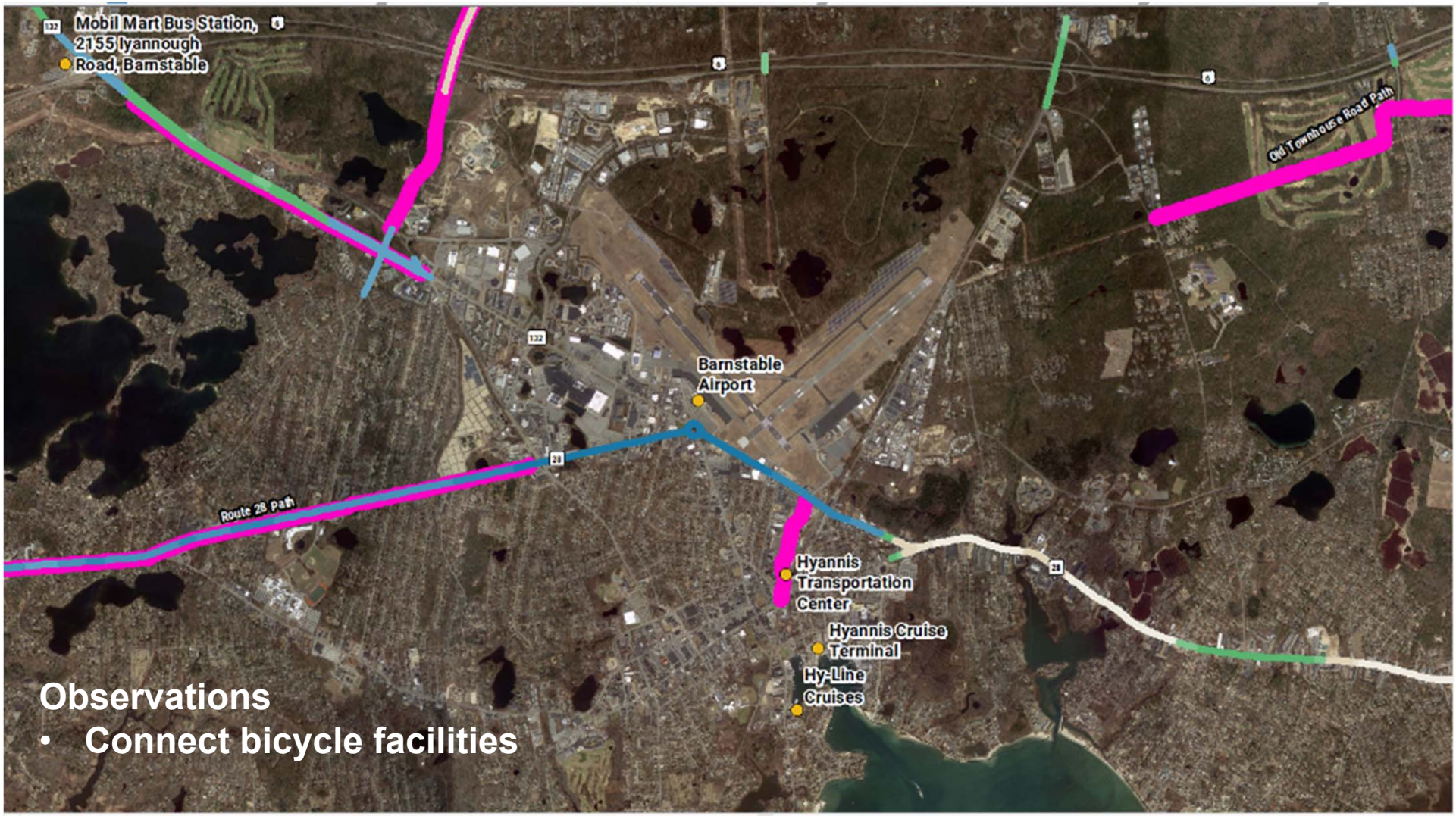
Transit Access Example



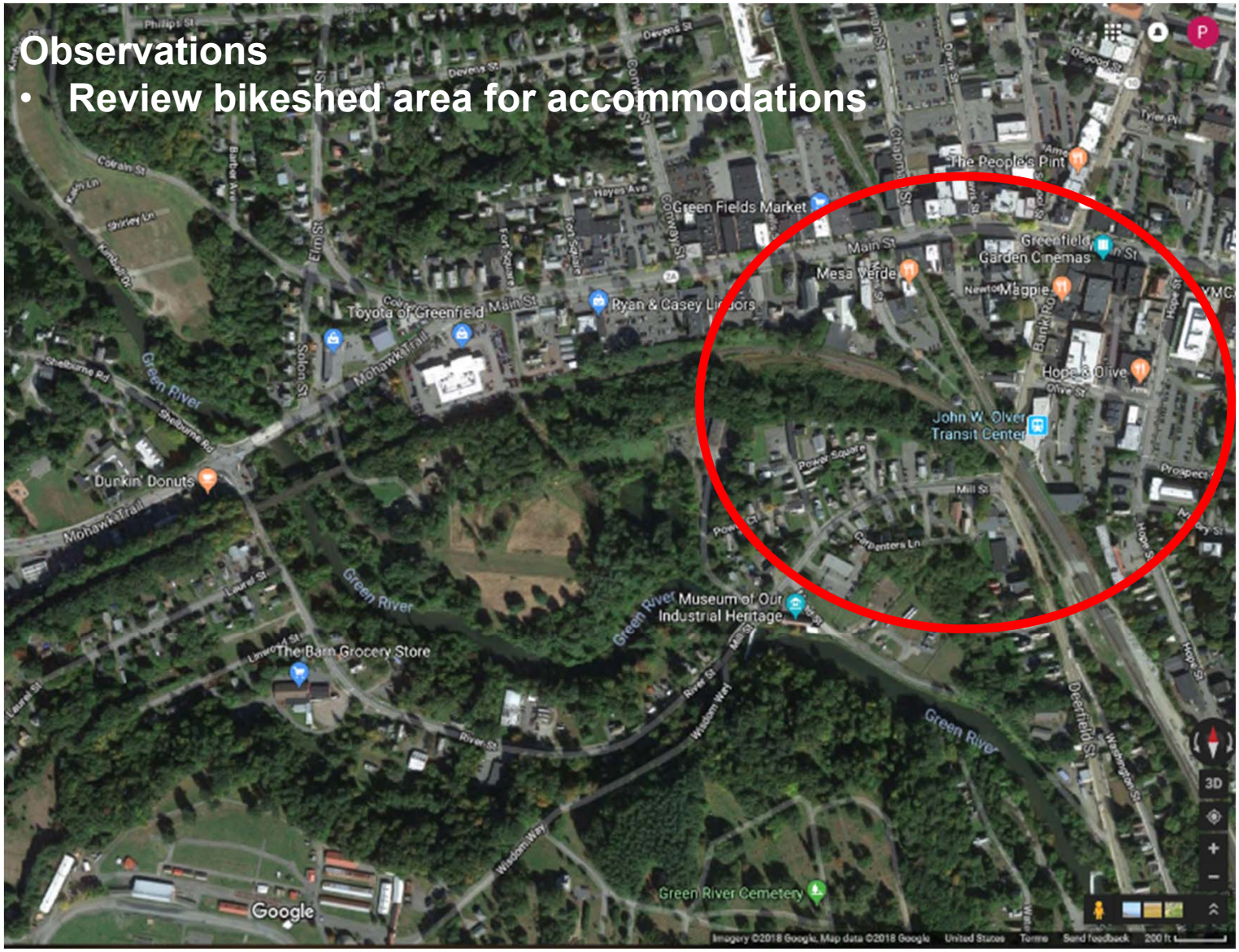
Safety Concerns Example



High Comfort Gaps Example



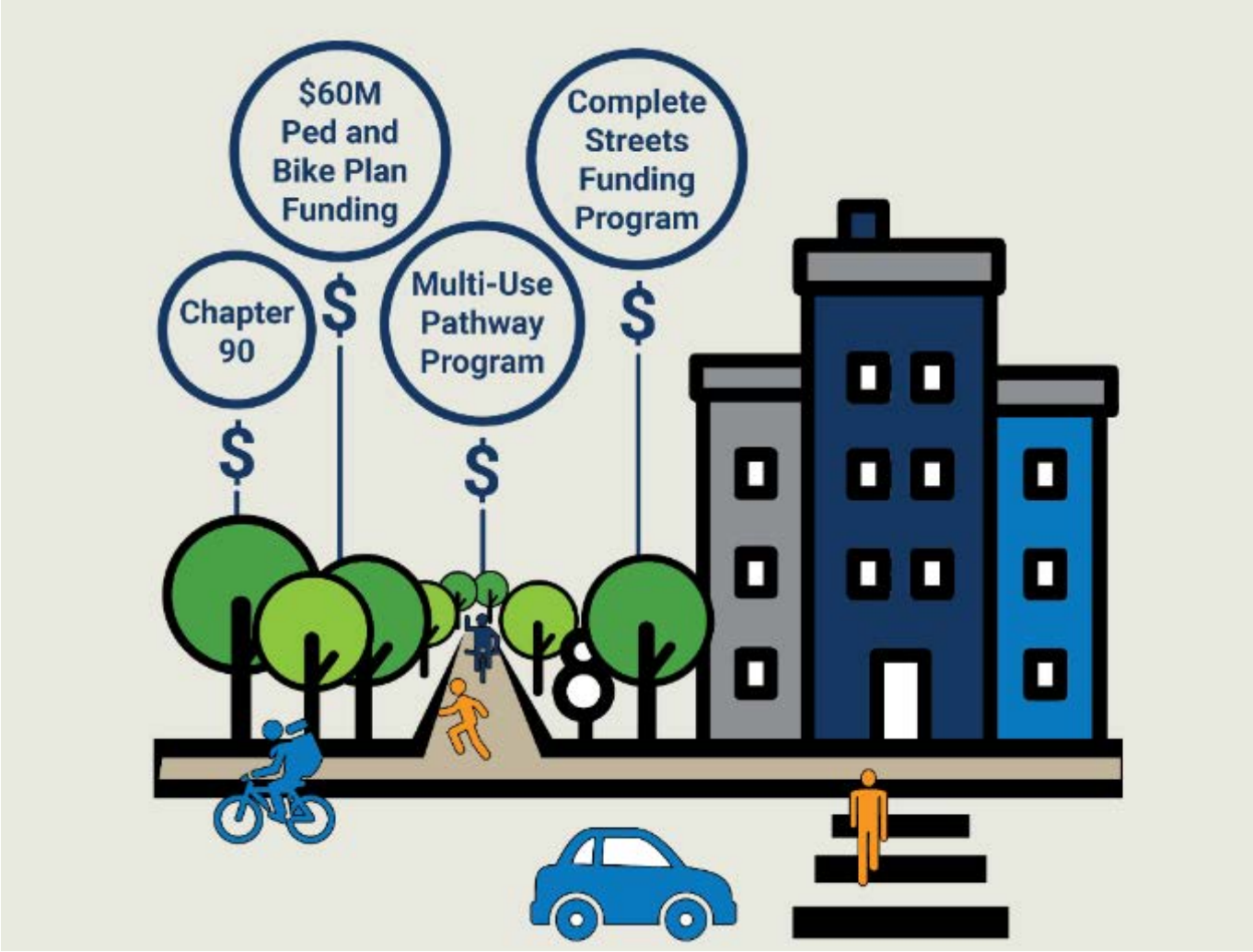
Transit Access Example



High Comfort Upgrades Example

Project Implementation and Performance Measures

Capital Investment Plan



Bicycle and Pedestrian Count Program

- Collecting data informs MassDOT on **what works** and **what can be improved**
- Making **data open** to the public, other agencies, and municipalities helps them promote the plan's vision and goals

Selected Measures for Tracking Initiative Progress

- Percent of MassDOT projects with bikeways that **improve comfort** for people biking
- Number of **miles of high-comfort bikeways** created on state roadways
- Percent of MBTA and RTA **transit stops connected to a high-comfort bikeway**
- Percentage of **municipalities with bike network plans**
- Miles of high-comfort bikeways in **areas with high potential for everyday biking**
- Percent of MassDOT-owned and contracted **trucks equipped with side guards**
- Percent of schools in areas with high potential for everyday biking that participate in **Safe Routes to School**
- Percent of MBTA and RTA **transit stops with bike parking**
- **Snow and/or ice cleared** from percentage of MassDOT bikeways within a specific timeframe of an event (to be informed by the pilot project and determined as part of the comprehensive maintenance plan)
- Percent of MassDOT work zones that **maintain dedicated bike access**
- Percent of bikeways classified as **"high-comfort"**
- Number of permanent **bicycle count locations**