Summary of Existing Conditions & Challenges

Pedestrian Plan and All Ages & Abilities Bikeways

August 2025

Let's Talk Streets

CITY OF MADISON

DRAFT

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Introduction

Purpose

The Summary of Existing Conditions and Challenges explains how well Madison's current walking and bicycling infrastructure is serving the public based on connectivity, demand, known high-need areas, and other relevant criteria. It also:

- Informs decision-making and identifies gaps and barriers in the network.
- Helps determine future network recommendations and prioritize them.
- Guides the development of a new Pedestrian Plan for the City, and completion of the City's All Ages and Abilities (AAA) Bike Network.

Vision

Make walking and biking safe, comfortable, convenient, and enjoyable for people of all ages, abilities, and identities.

In this vision and throughout this document:

"**Walking**" means walking and using a wheelchair or other mobility device.

"**Biking**" means using a bicycle, electric bicycle (e-bike), skateboard, scooter, or other small electrified devices that operate similarly to bicycles.

Guiding Two Plans

Pedestrian Plan

The City of Madison is launching an update to its 1997 Pedestrian Plan. The plan will provide direction for policy, programs and safety improvements that will increase safety, accessibility and walking connections throughout the City.

AAA Bike Network

The City is finalizing the All Ages and Abilities (AAA) Bike Network map. AAA bikeways include protected bike lanes, shared use paths, and low-stress bike boulevards. The City will prioritize projects to fill gaps when the AAA bike network map is finalized.

Draft Goals

Four draft goals shape the evaluation of existing conditions and identification of challenges, which will guide the development of the Pedestrian Plan and finalization of the AAA Bike Network. Equity is an underlying theme that is embedded into each goal.

- **Safe**: Ensure that walking, biking, and rolling are safe for individuals of all ages, abilities, and identities.
- **Comfortable**: Provide places to walk and bike that are comfortable, low-stress, and accessible for individuals of all ages, abilities, and identities.
- **Convenient**: Build continuous, interconnected bicycle and pedestrian networks that easily get people of all ages, abilities, and identities to daily destinations.
- **Enjoyable**: Make places to walk and bike welcoming and interesting, ensuring that people of all ages, abilities, and identities feel that they belong and are legitimate users of the transportation system.

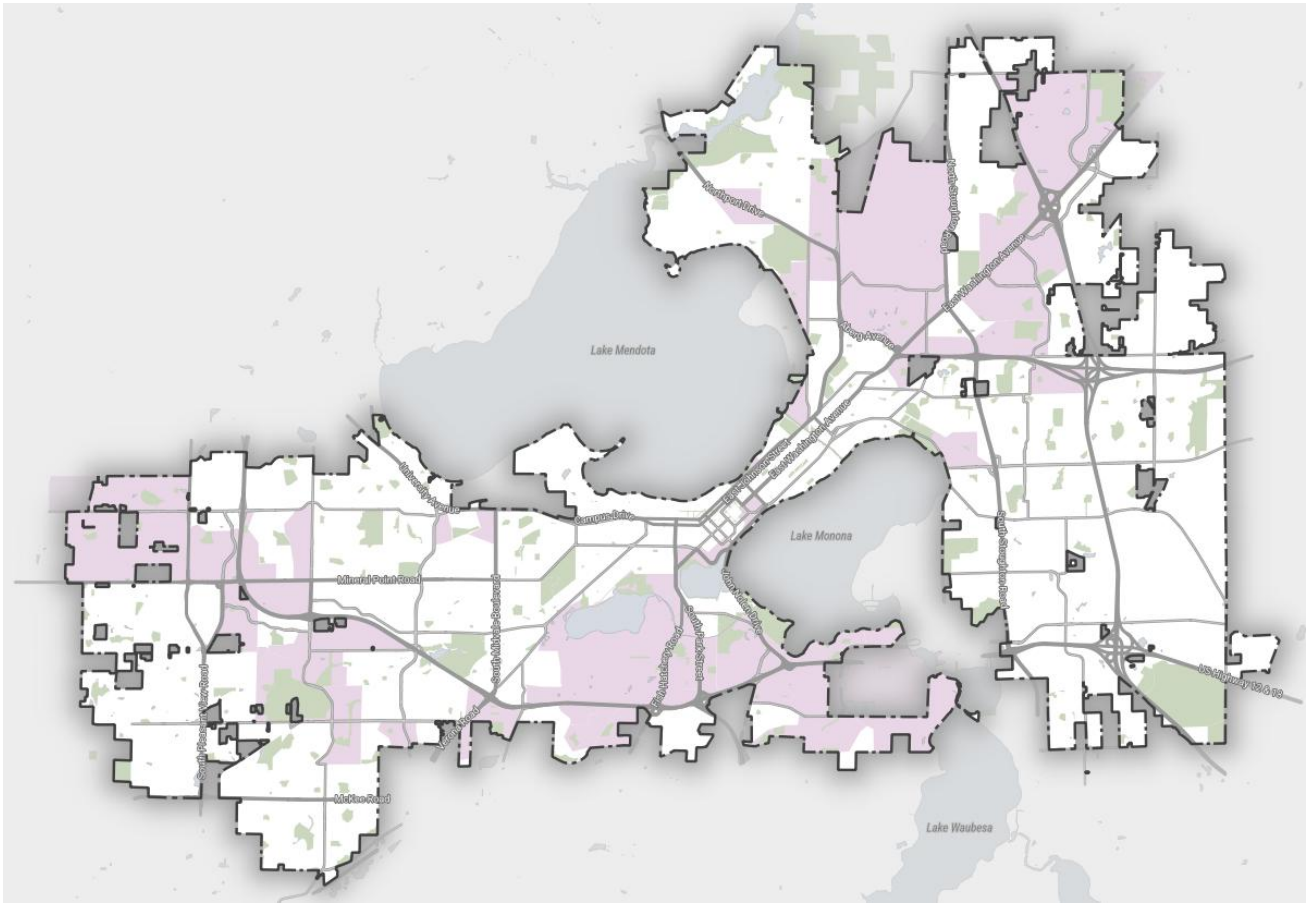
What is in the Network Assessment?

Analysis	Purpose and Relevance
Walk/Bike Trip Potential	Identifies where people are more likely to walk or bike. This uses destination data and population data to estimate current activity levels and to model opportunities for short trip mode shifts.
Pedestrian Crossing Level of Traffic Stress (PxLTS) and Gap Analysis	Assigns intersection crossing legs a score based on how comfortable they currently are for pedestrians crossing the street. Then gaps between comfortable ("low stress") crossings are calculated to measure and illustrate barriers to walkability.
Bicycle Level of Traffic Stress (BLTS) Analysis	Assigns streets a score based on how comfortable they currently are for a novice or casual bicyclist. This determination is based on the amount and speed of car traffic, presence and type of bike lane, and roadway configuration.
Pedestrian Access Analysis and Bicycle Access Analysis	This analysis builds upon the crossing stress analysis to evaluate walksheds and bikesheds to essential destinations (such as transit stops, schools, and grocery stores).
Equity Analysis	Compares levels of traffic stress and access experienced in Equity Priority Areas (defined and identified previously by the City of Madison) to the rest of the city.

Equity Priority Areas

The City of Madison has identified Equity Priority Areas (EPA). EPAs include neighborhoods with higher densities of people with low incomes and people of color. They are often neighborhoods that have historically received less investment, which has compounded into continued and ongoing disparities.

EPAs are overlayed on several maps in this document to help identify disparities in service or coverage.



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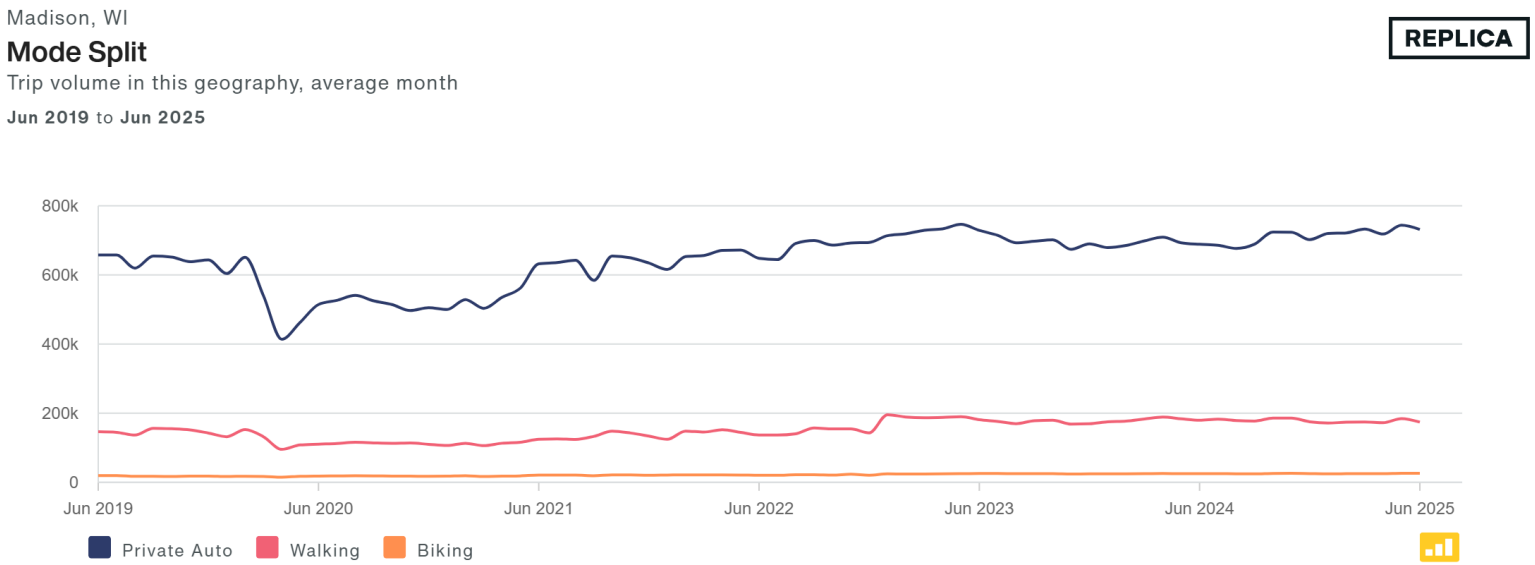
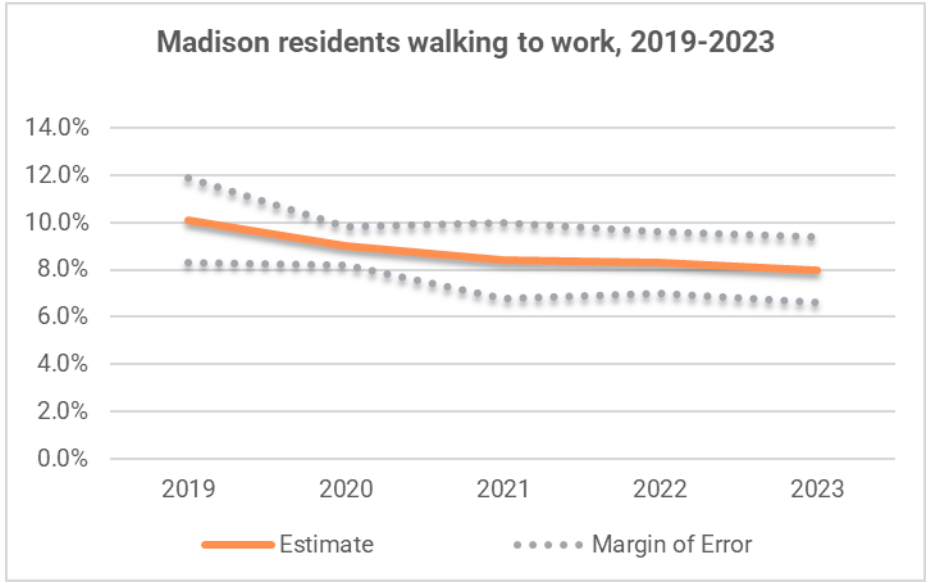
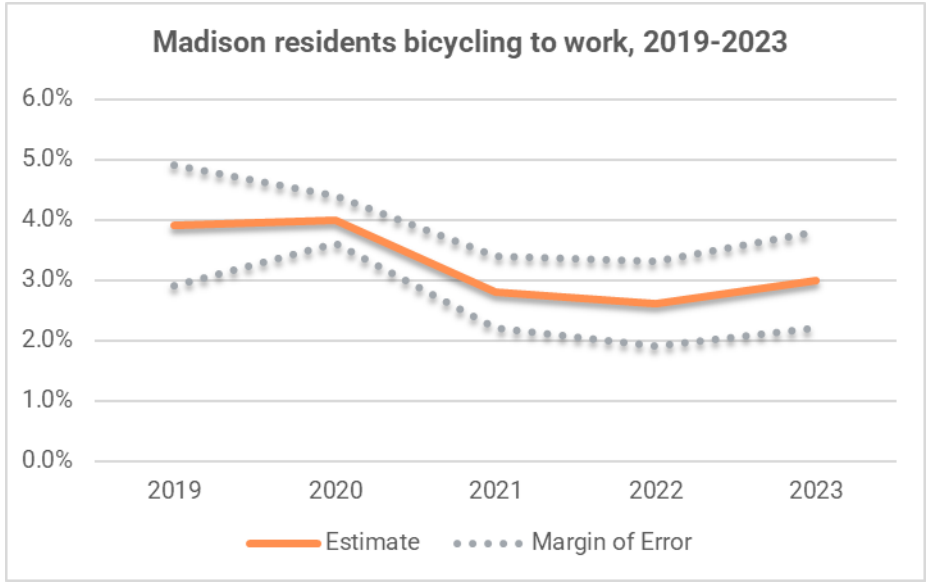
Existing Network and Walk/Bike Trends

Mode Share

Many people walk and bike in Madison. Per the Census Bureau, approximately 11% of people walk or bike to work. Replica, a Big Data source, estimates that of all trips in Madison (shopping, school, work, etc.), 15% are made by walking and 2% by bike.







Replica; US Census Bureau

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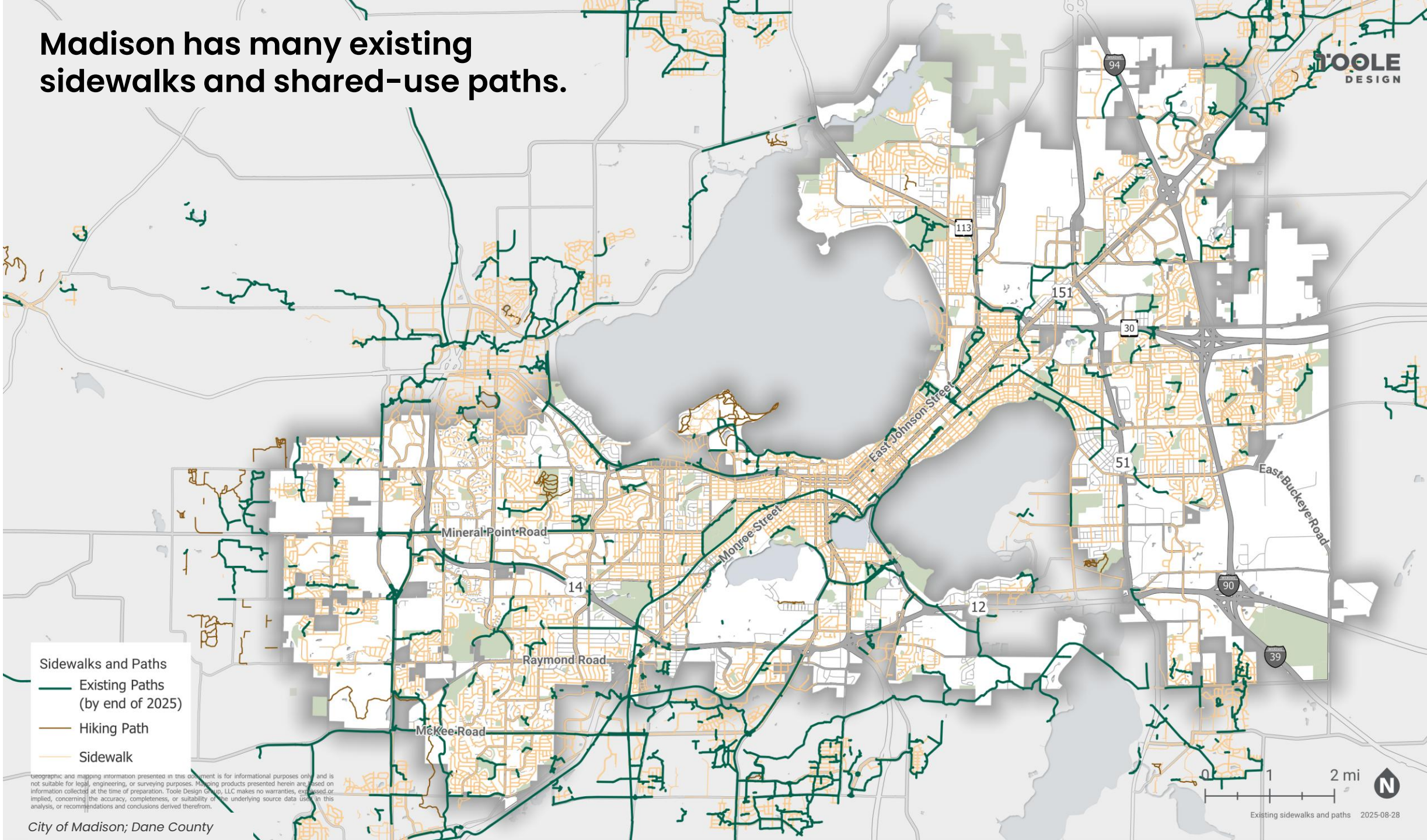
Madison has many existing sidewalks and shared-use paths.



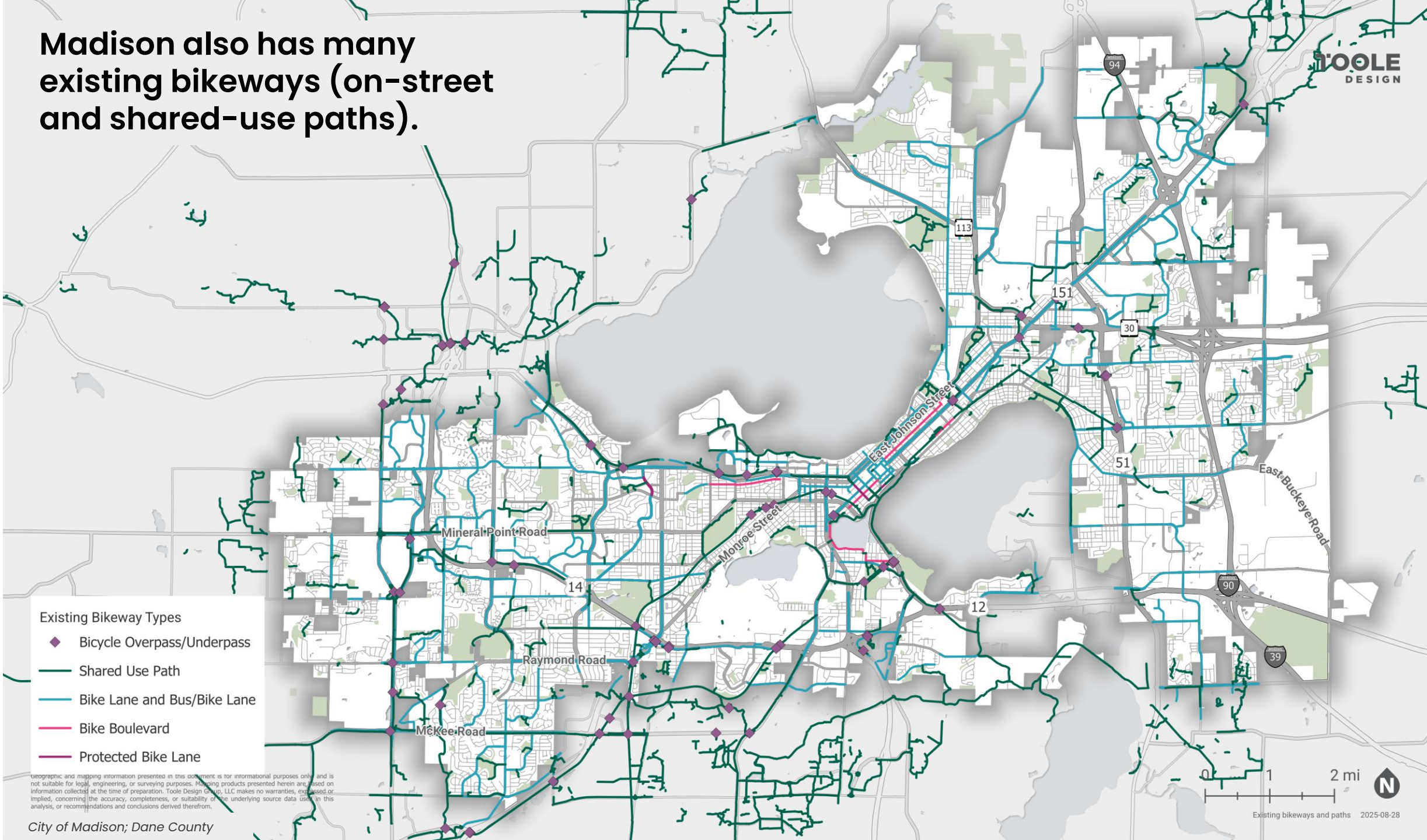
City of Madison; Dane County

There are crossing enhancements in key areas, such as path crossings and near schools.

A rectangular rapid flashing beacon (RRFB) is a set of lights attached to a pedestrian warning sign that may be activated to make pedestrians more visible to drivers.

City of Madison; Dane County

Madison also has many existing bikeways (on-street and shared-use paths).



City of Madison; Dane County

Mileage of Existing Infrastructure

Bikeways & Paths

Type	Miles
Bike Lanes (striped)	150
Protected Bike Lanes	3
Bike Boulevards	5
Shared use paths	114
Total	**272**

The mileage of bike lanes, protected bike lanes, and bike boulevards are based on street centerline mileage, not lane mileage. In other words, 1 mile of street with bike lanes on both sides is counted as 1 mile, not 2 miles.

Sidewalks

(Percent of Street Type Mileage by Sidewalk Presence)

Street Type	No Sidewalk	Sidewalk One Side	Sidewalk Both Sides
Local	26%	10%	64%
Collector	14%	21%	65%
Arterial	14%	20%	66%
All Types	**22%**	**14%**	**65%**

The above percentages are based on streets that should have sidewalks (in other words, the Beltline and Interstate main lanes are excluded from calculations). The City of Madison's policy is to have sidewalk on both sides of all collector and arterial streets. Some local streets are allowed to have sidewalk on only one side.

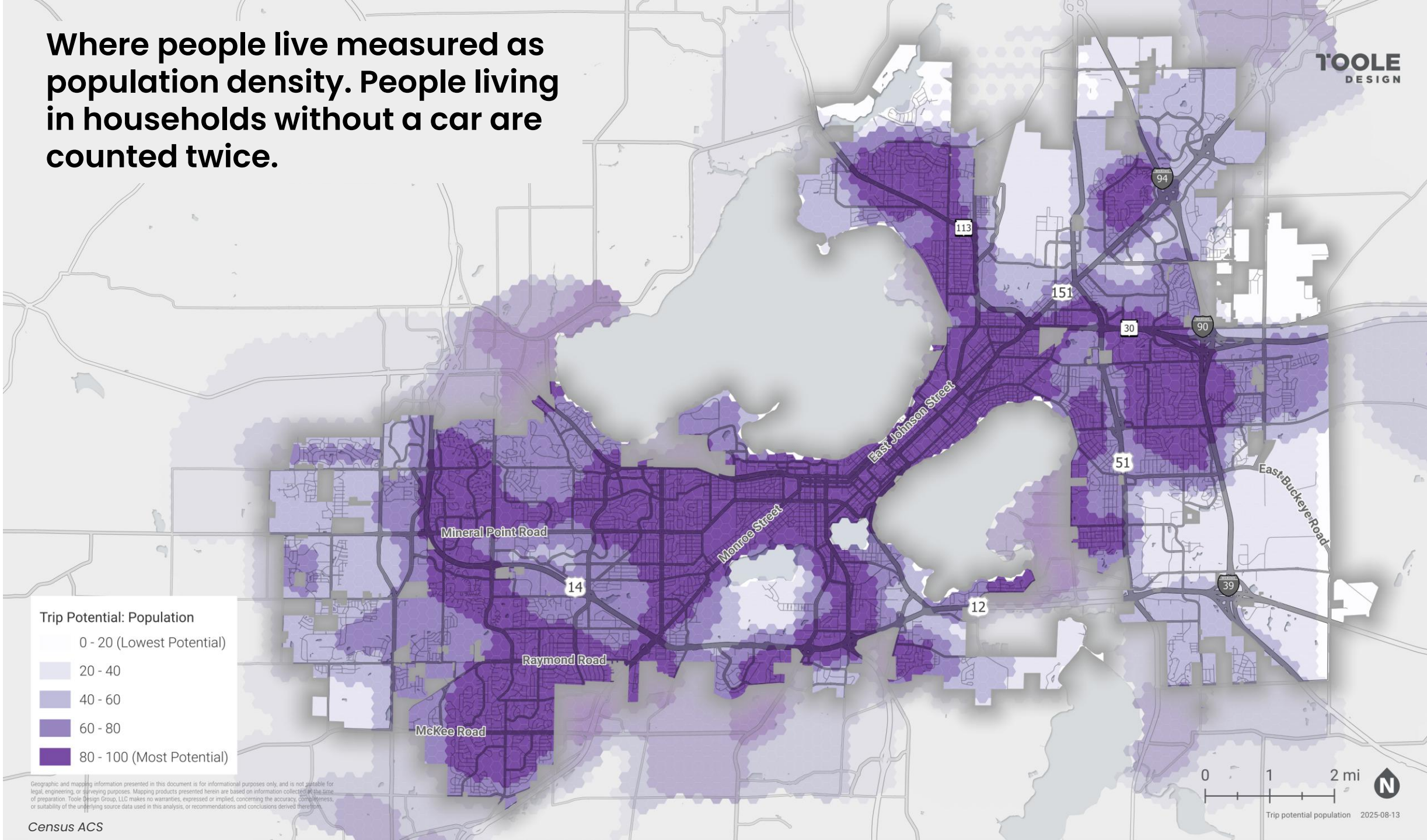
Walk/Bike Trip Potential

Methodology

The Trip Potential Analysis uses data to identify the areas where walking and biking activity is high—or would be high if more safe places to walk or bike were provided. This can help identify priorities for investment. The analysis includes seven layers, described below, and a composite.

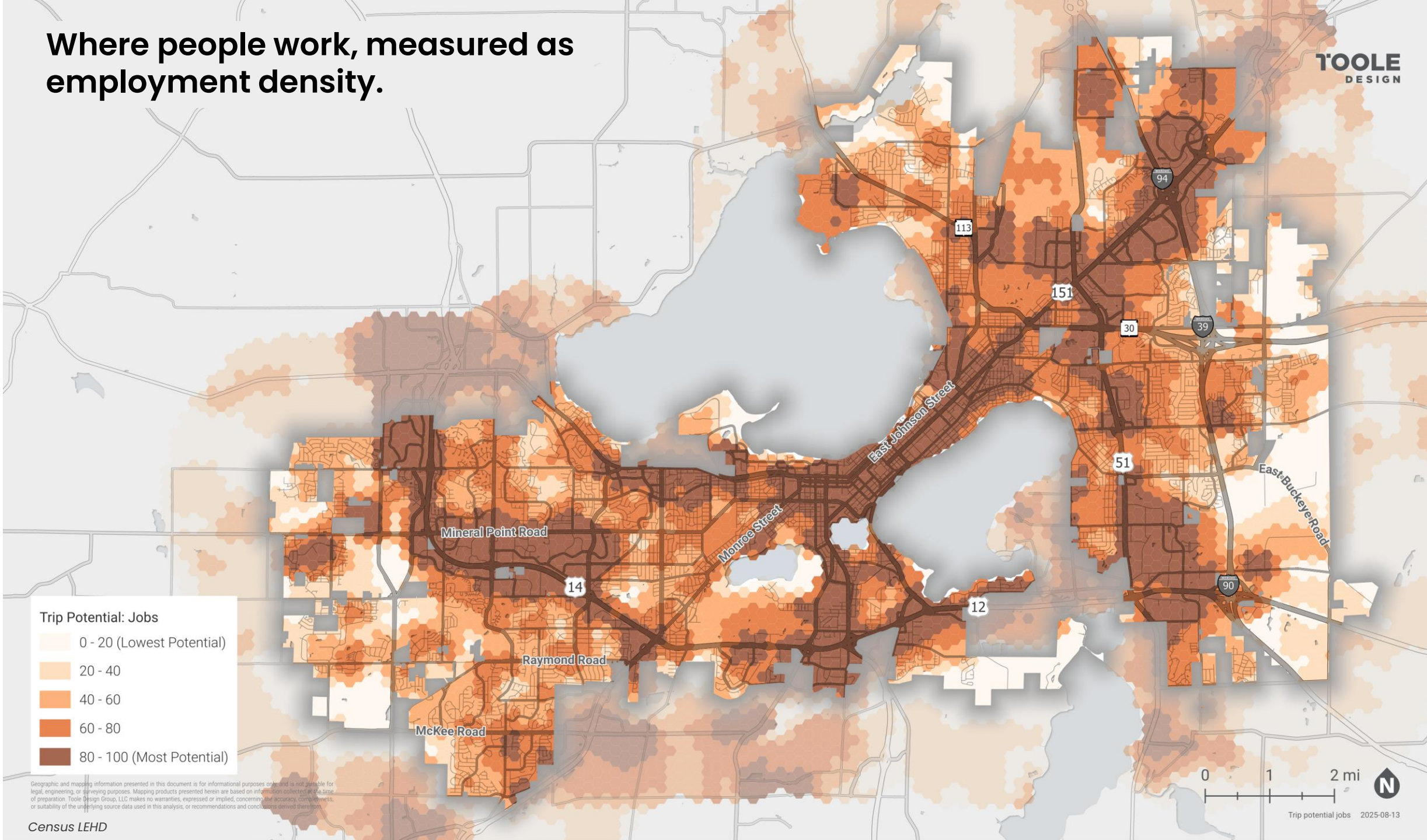
Factor	Description
Population	Where people live, measured as population density. People living in households without a car are counted twice to prioritize their mobility options.
Jobs	Where people work, measured as employment density.
Urban Form	Where the built environment encourages more walking and biking, measured by the density of the street grid.
Transit	Where transit stop density is highest, with Bus Rapid Transit lines receiving extra weighting to reflect higher use than local routes.
Destinations	Where daily destinations are located. Includes grocery stores, retail stores, libraries, parks, restaurants, cafes, and bars.
Education	Where K-12 schools, colleges, and universities are located.
Mobility	Where trips under 2 miles in length (according to Replica, a Big Data traffic model) are most likely to occur. These are trips that could happen by walking or biking.

Where people live measured as population density. People living in households without a car are counted twice.



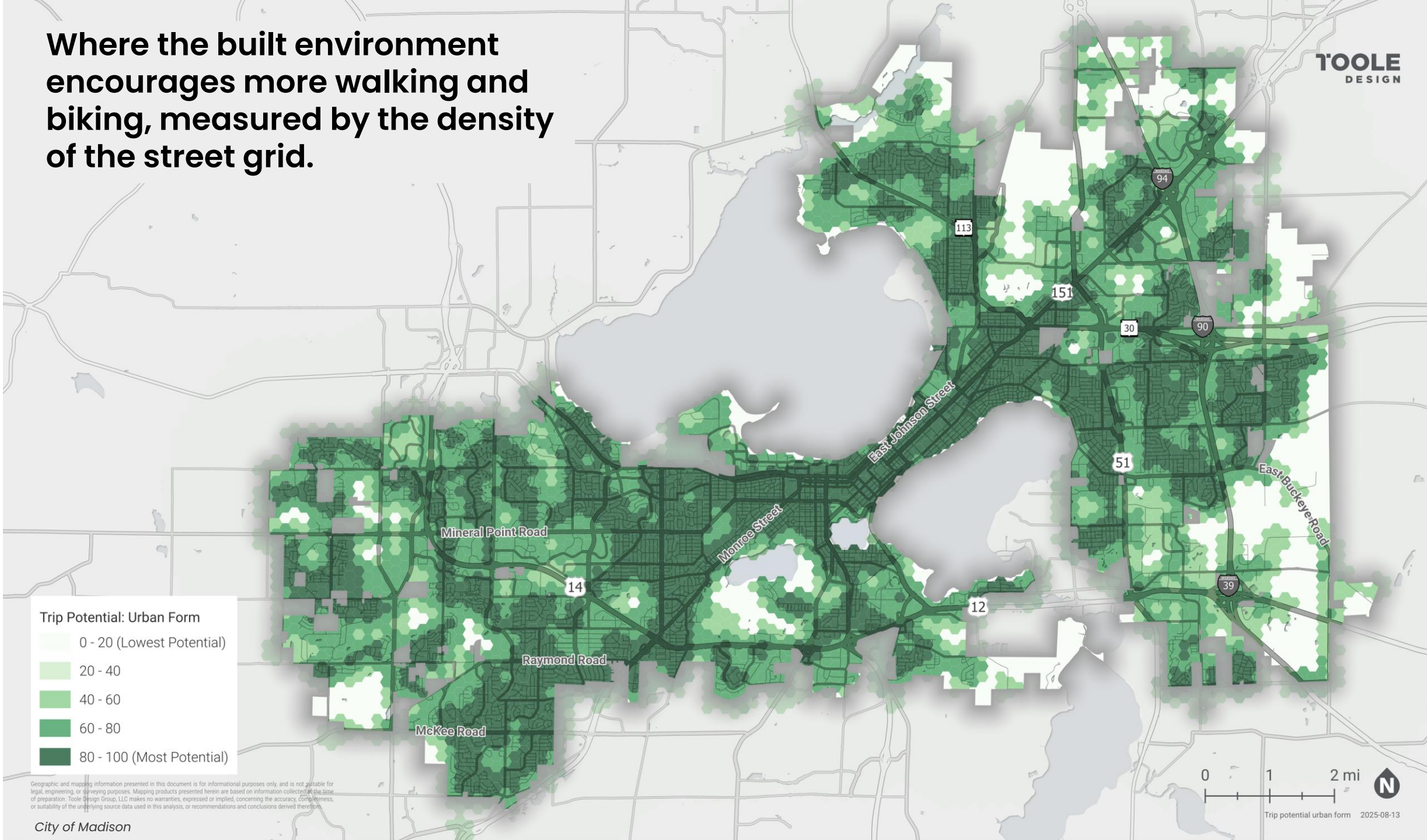
Census ACS

Where people work, measured as employment density.



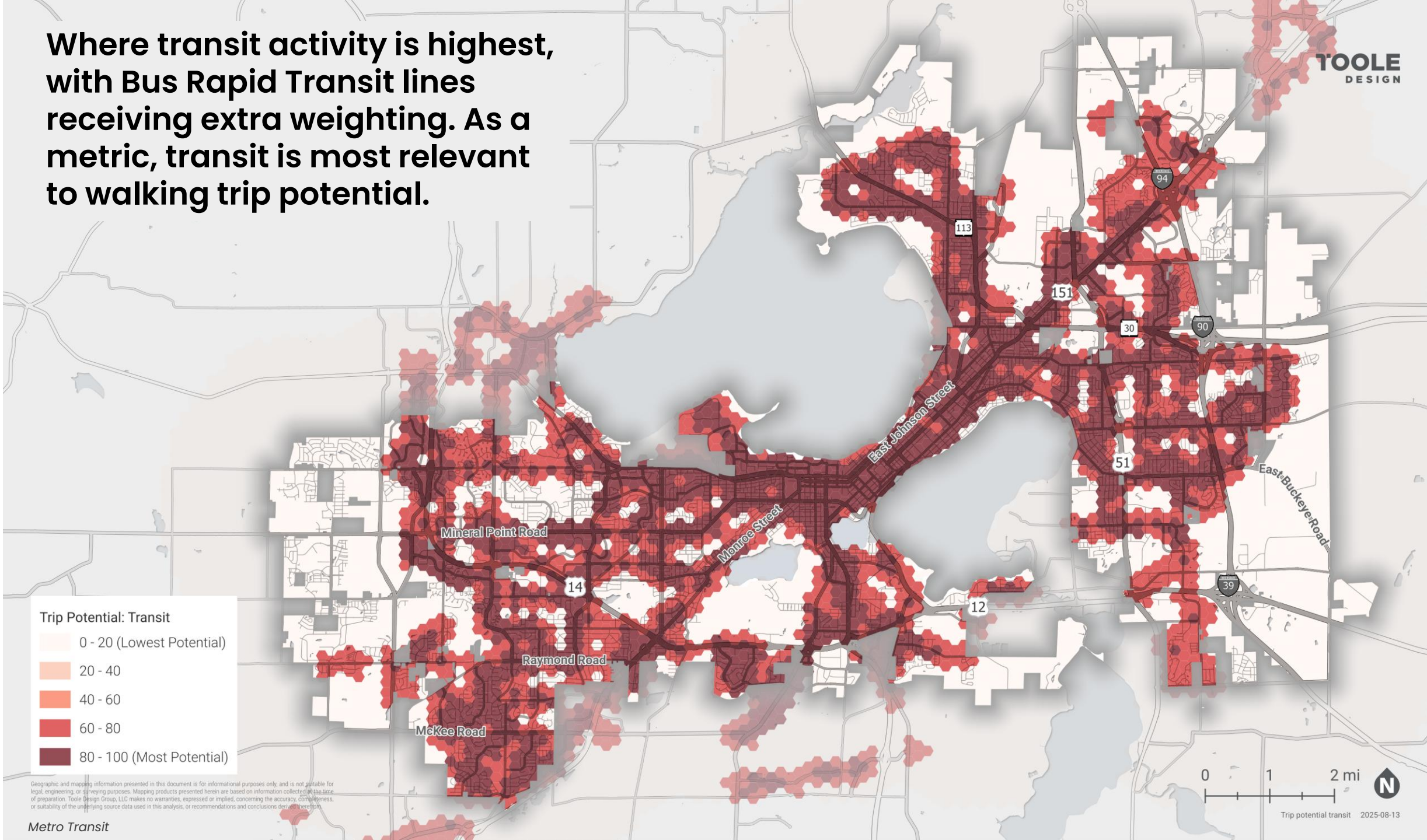
Census LEHD

Where the built environment encourages more walking and biking, measured by the density of the street grid.



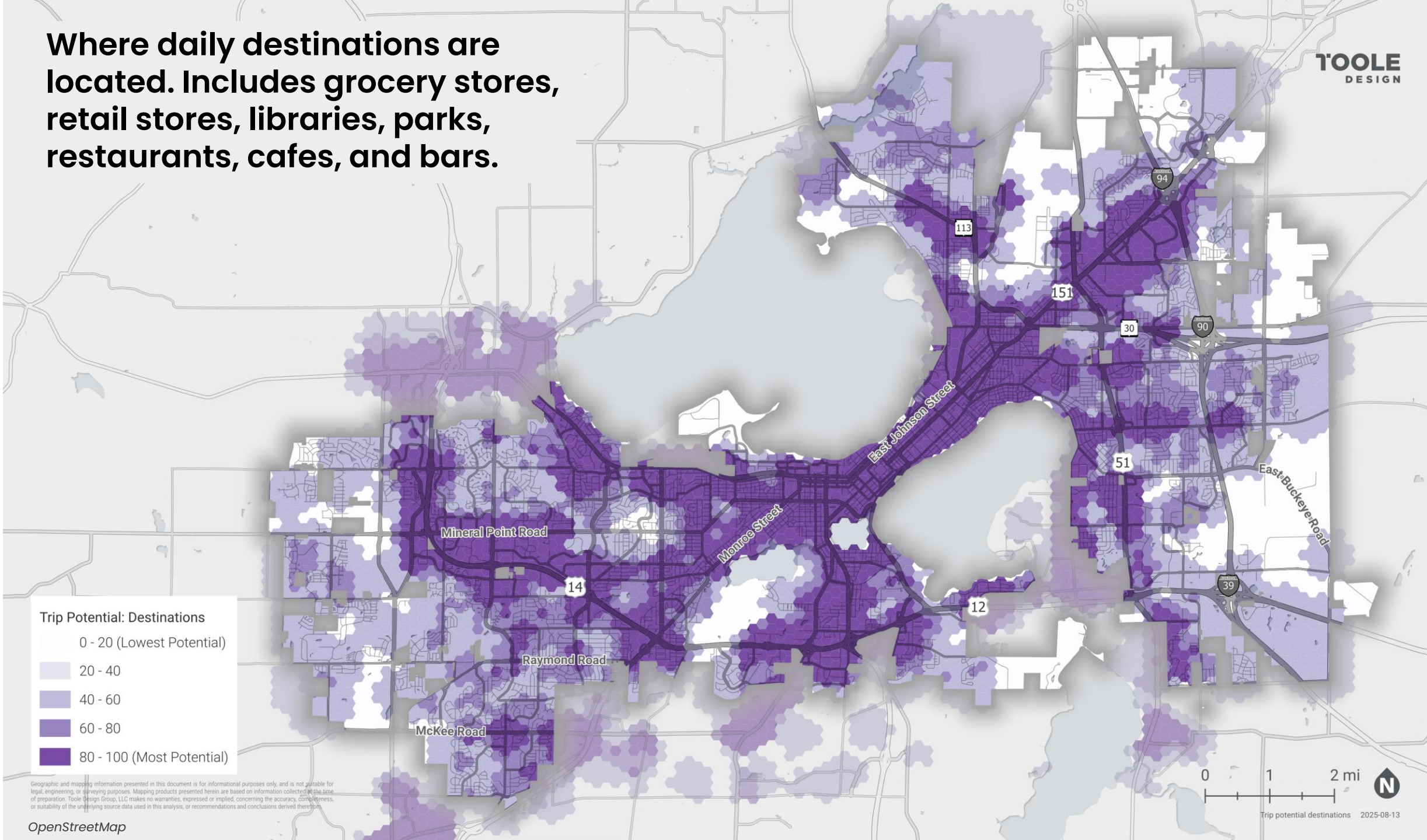
City of Madison

Where transit activity is highest, with Bus Rapid Transit lines receiving extra weighting. As a metric, transit is most relevant to walking trip potential.

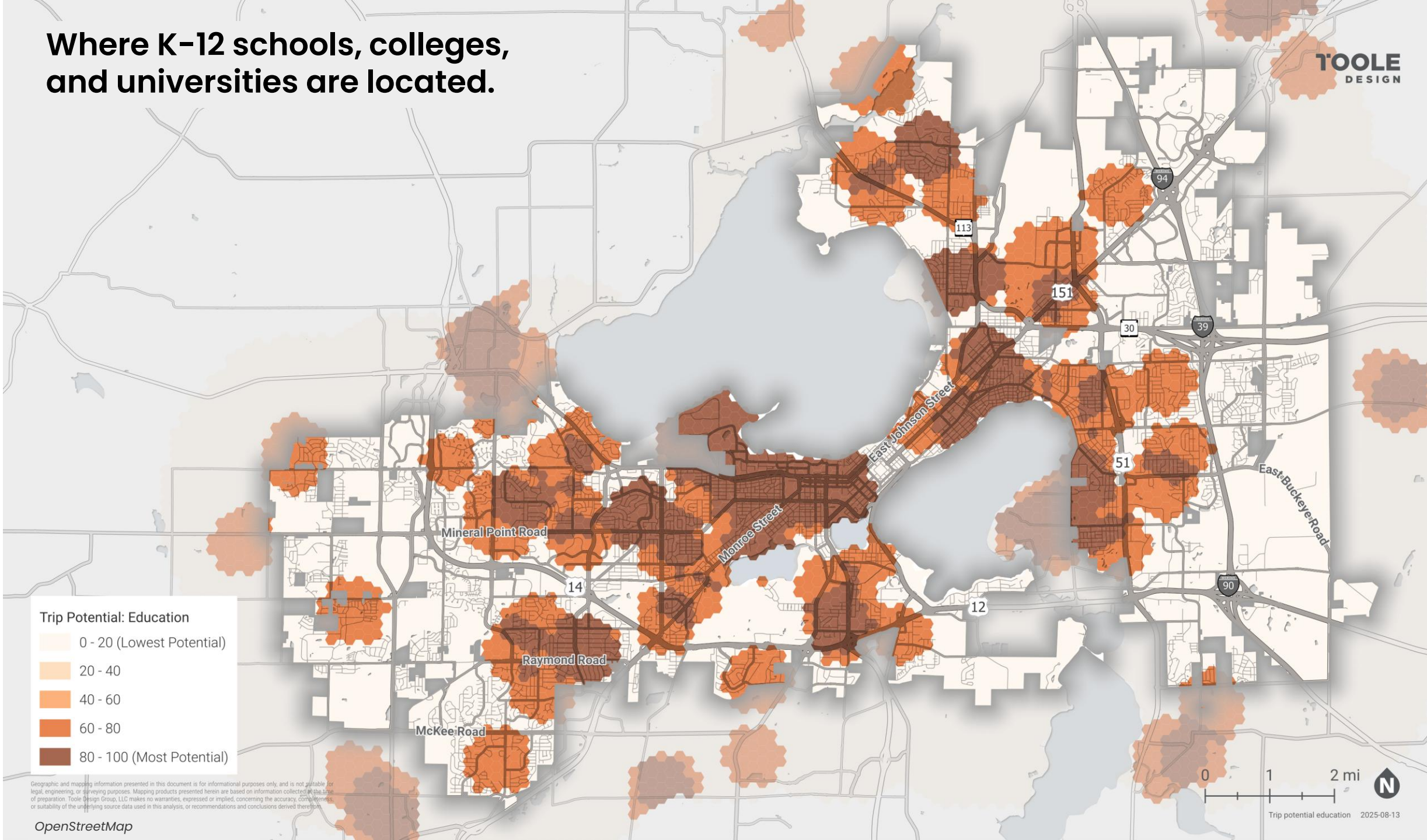


Metro Transit

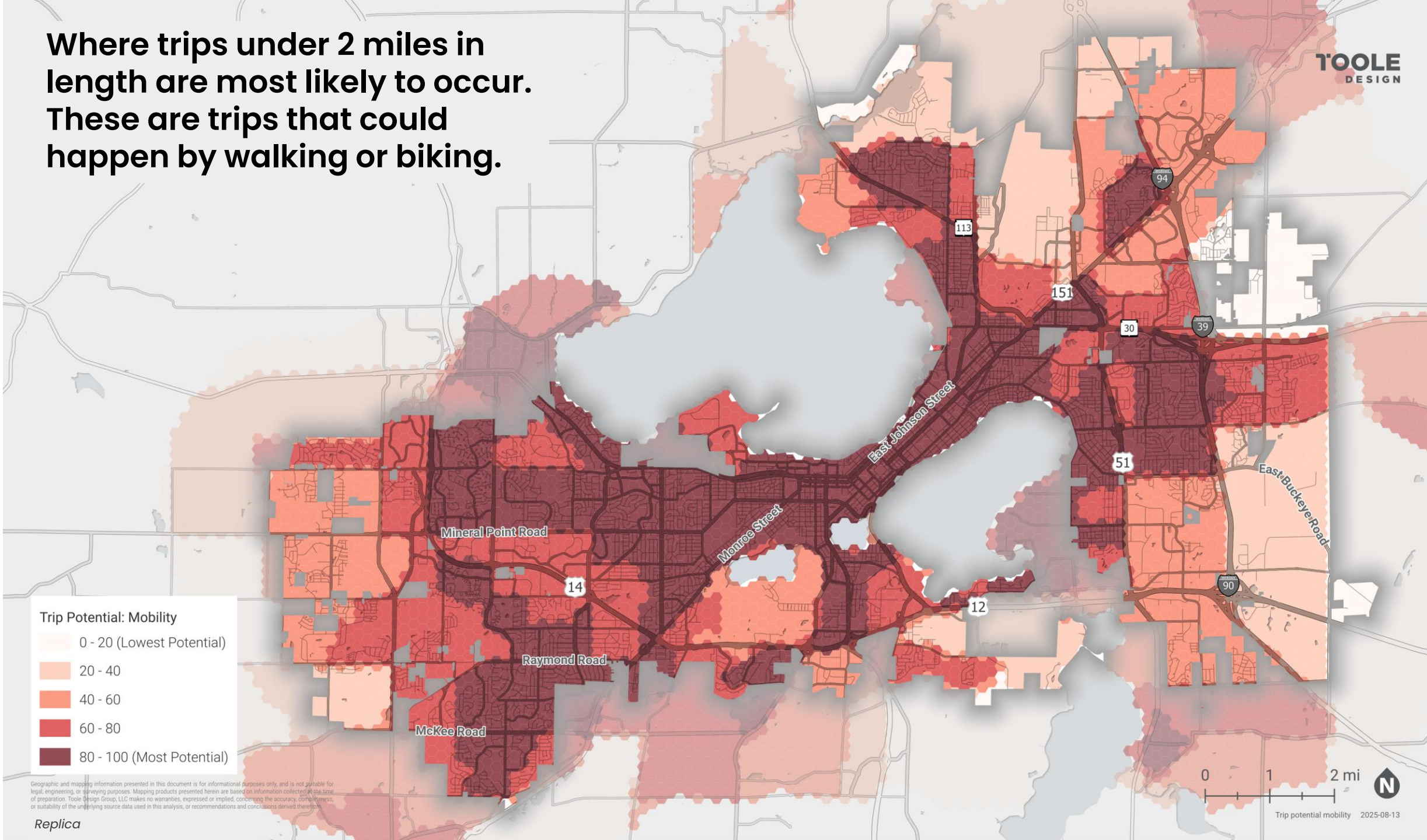
Where daily destinations are located. Includes grocery stores, retail stores, libraries, parks, restaurants, cafes, and bars.



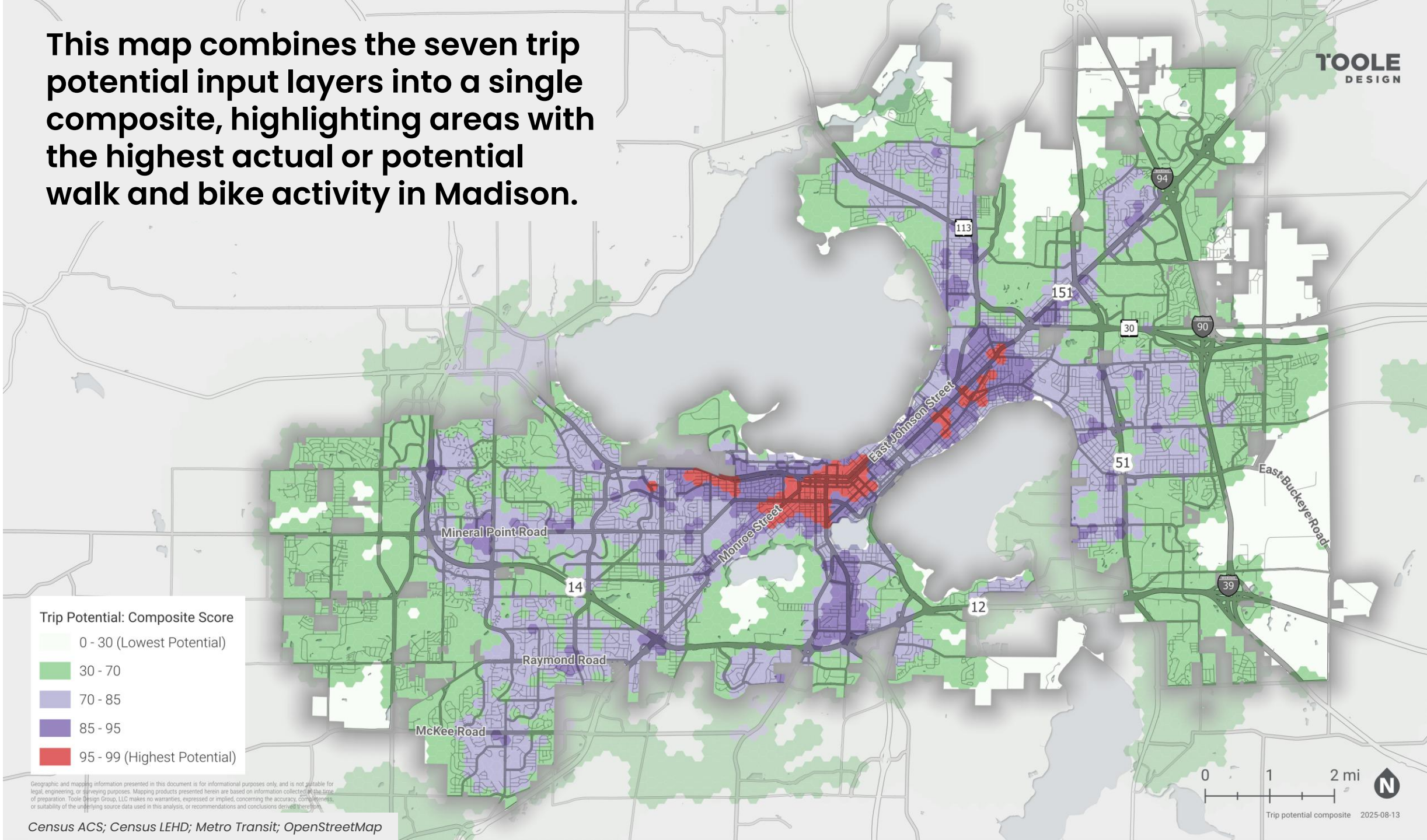
Where K-12 schools, colleges, and universities are located.



Where trips under 2 miles in length are most likely to occur. These are trips that could happen by walking or biking.



This map combines the seven trip potential input layers into a single composite, highlighting areas with the highest actual or potential walk and bike activity in Madison.



Census ACS; Census LEHD; Metro Transit; OpenStreetMap

Takeaways

There are significant areas of overlap between several pairs of factors (e.g., population and mobility are very similar). However, some of the factors highlight unique areas important to walking and biking. The composite trip potential map identifies the **highest trip potential** in areas already known as walkable and bikeable:

- State Street, UW campus, eastern Regent Street, upper Monroe Street, and upper Park Street
- University Avenue near UW Hospital and VA Hospital
- Eastern Williamson Street, Schenk's Corners, Union Corners
- Hilldale Mall

In addition, the map highlights several other areas in the **close-second tier of walk and bike potential** that have historically not been prioritized as areas for walking and biking, including:

- West Towne Mall
- Raymond Road at Whitney Way
- South Park Street
- North Sherman Avenue
- East Washington Avenue at Stoughton Road
- Sandberg Woods / Independence Lane
- Cottage Grove Road at Dempsey Road
- Pflaum Road

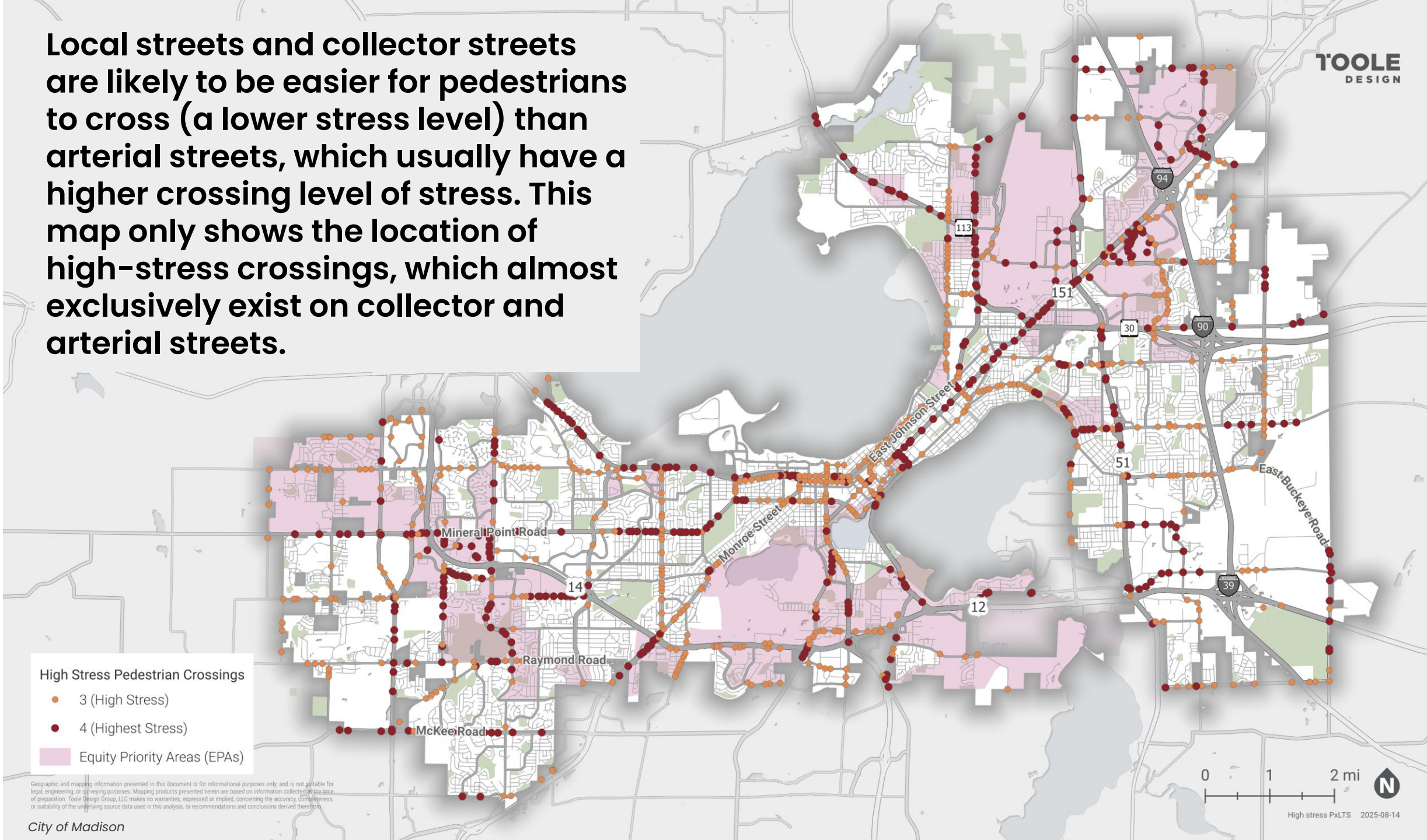
Pedestrian Network Analysis

Pedestrian Crossing Level of Traffic Stress

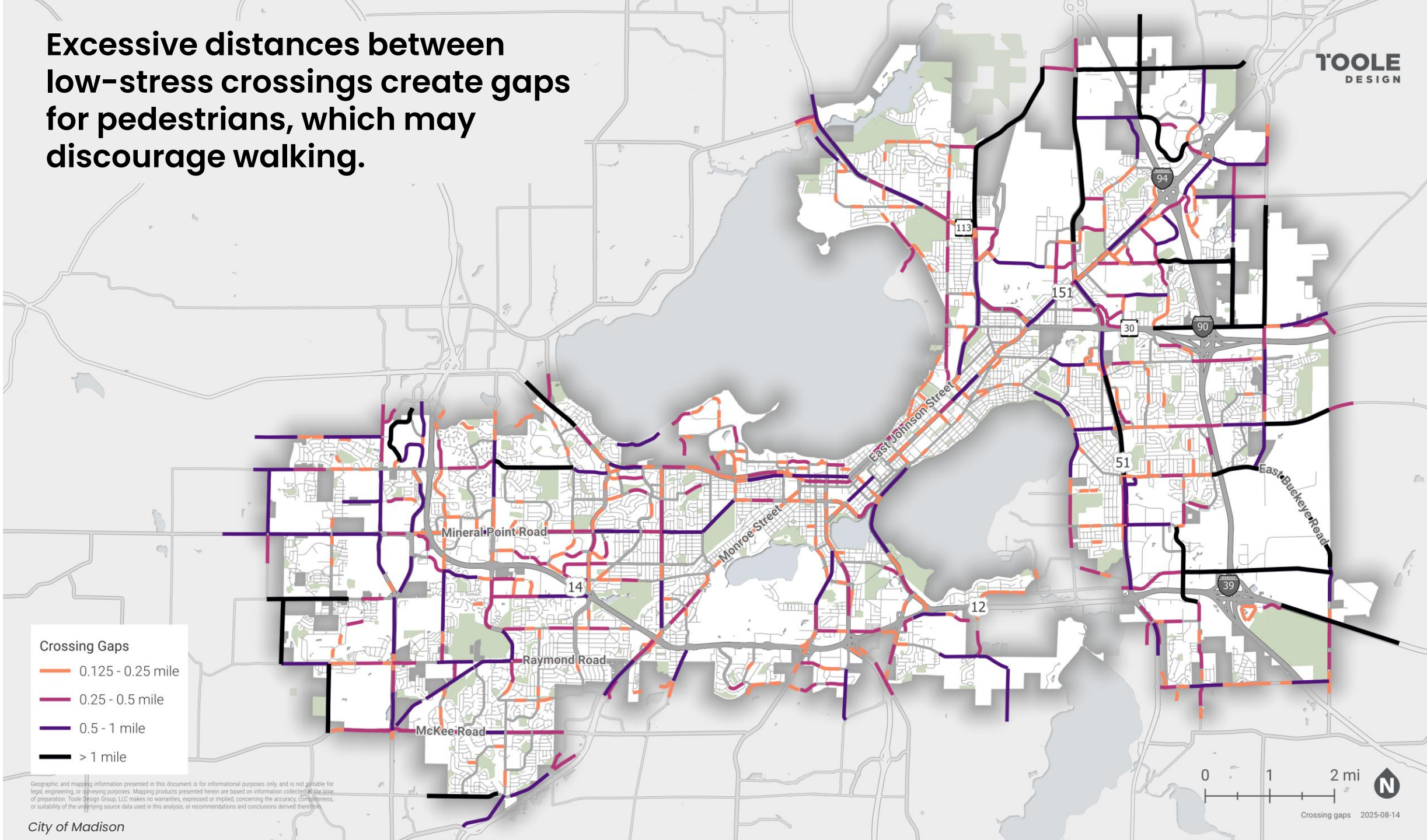
- A Pedestrian Crossing LTS (PxLTS) assigns intersection crossings a score based on how comfortable they are for pedestrians crossing the street.
- The analysis considers traffic volume, prevailing speed, number of lanes, and if a median refuge or crossing island is present.

	PxLTS Level	Description
Low Stress	1	Represents little to no traffic stress and requires little attention [by the pedestrian] to the traffic situation.
	2	Represents little traffic stress for most adults but requires more attention to the traffic situation than young children [defined as ages 10 and younger] may be capable of.
High Stress	3	Represents moderate stress; a higher level of attention to traffic is needed, and adults may feel some discomfort using this facility
	4	Represents high traffic stress. Only pedestrians with limited route choices would use this facility.

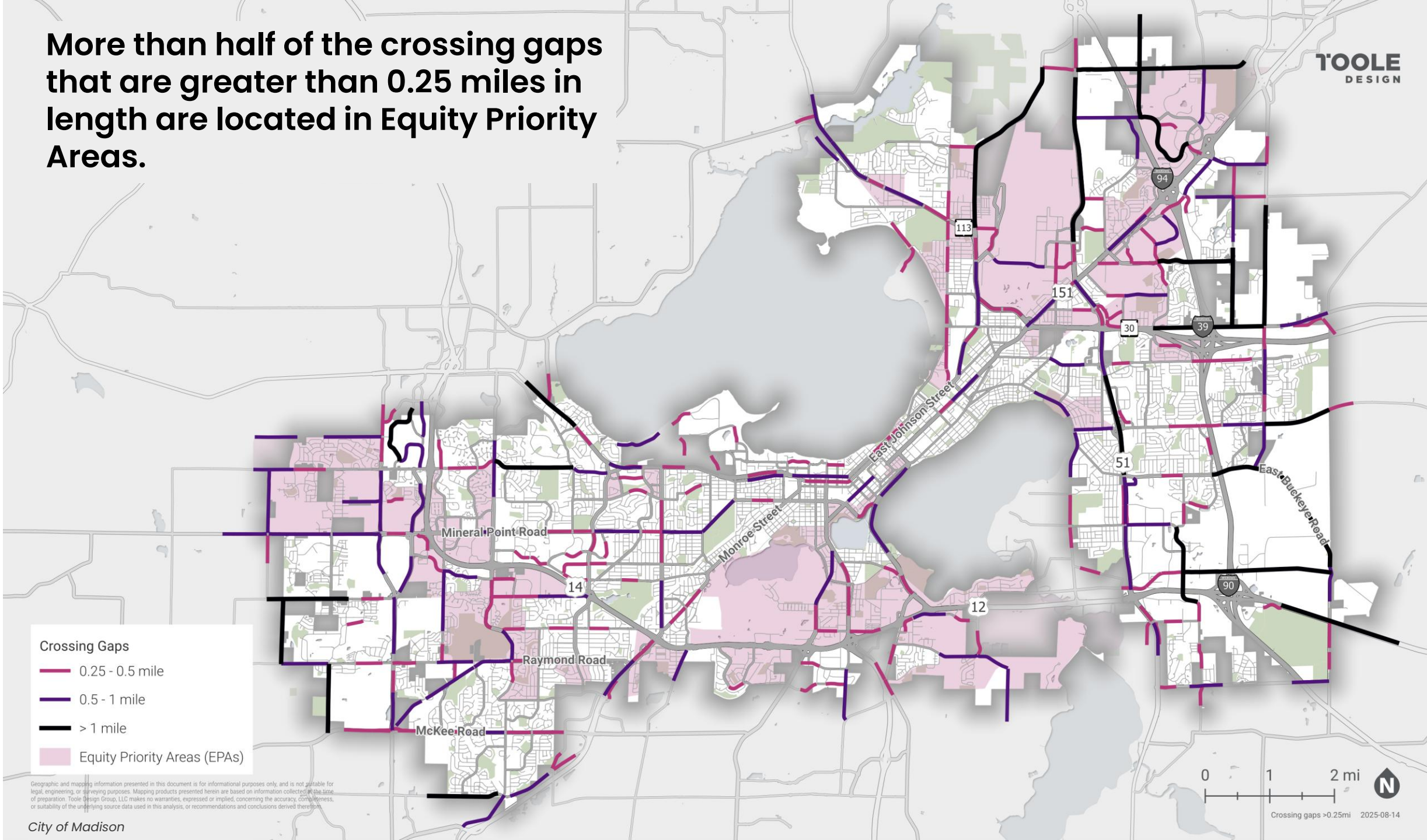
Local streets and collector streets are likely to be easier for pedestrians to cross (a lower stress level) than arterial streets, which usually have a higher crossing level of stress. This map only shows the location of high-stress crossings, which almost exclusively exist on collector and arterial streets.



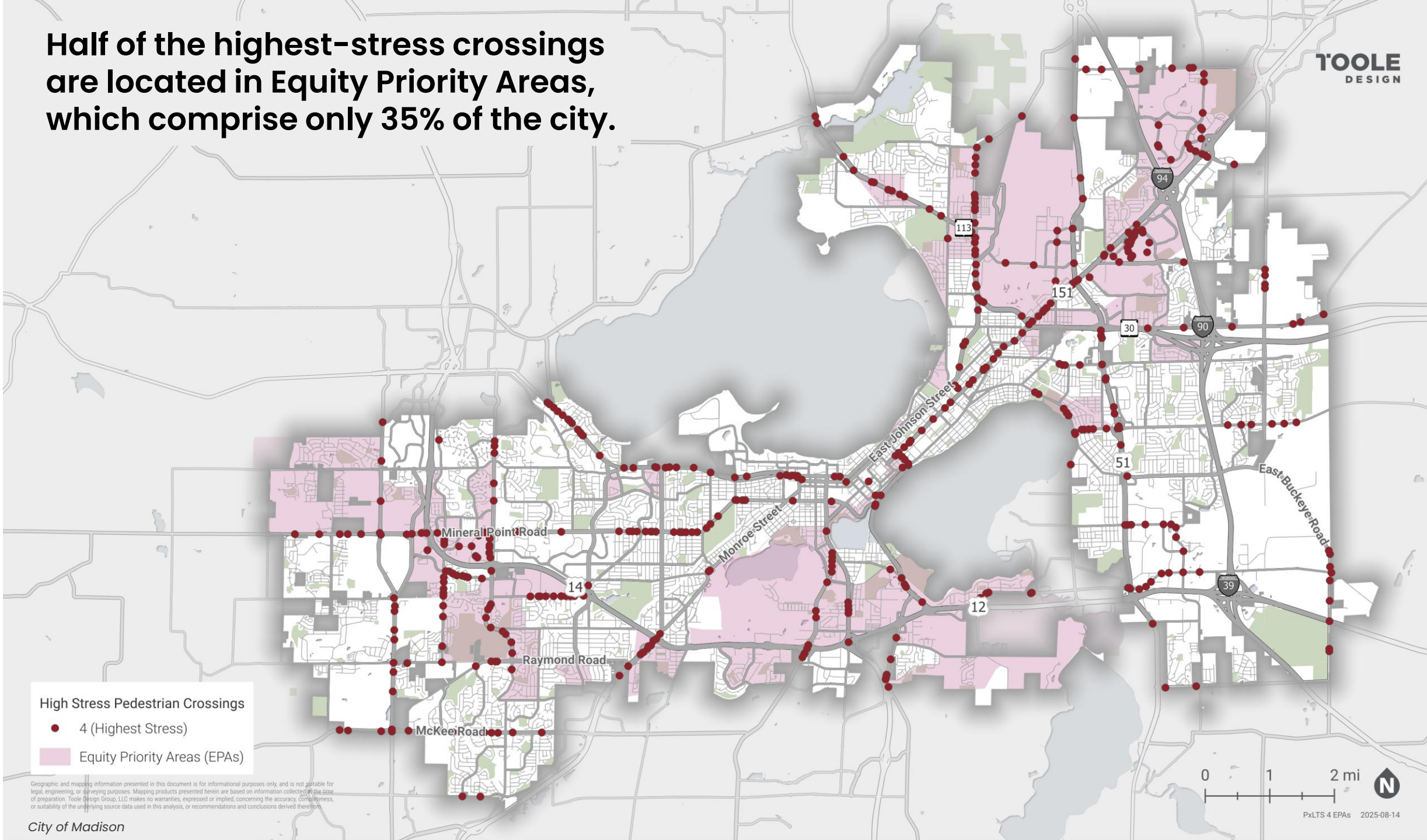
Excessive distances between low-stress crossings create gaps for pedestrians, which may discourage walking.



More than half of the crossing gaps that are greater than 0.25 miles in length are located in Equity Priority Areas.

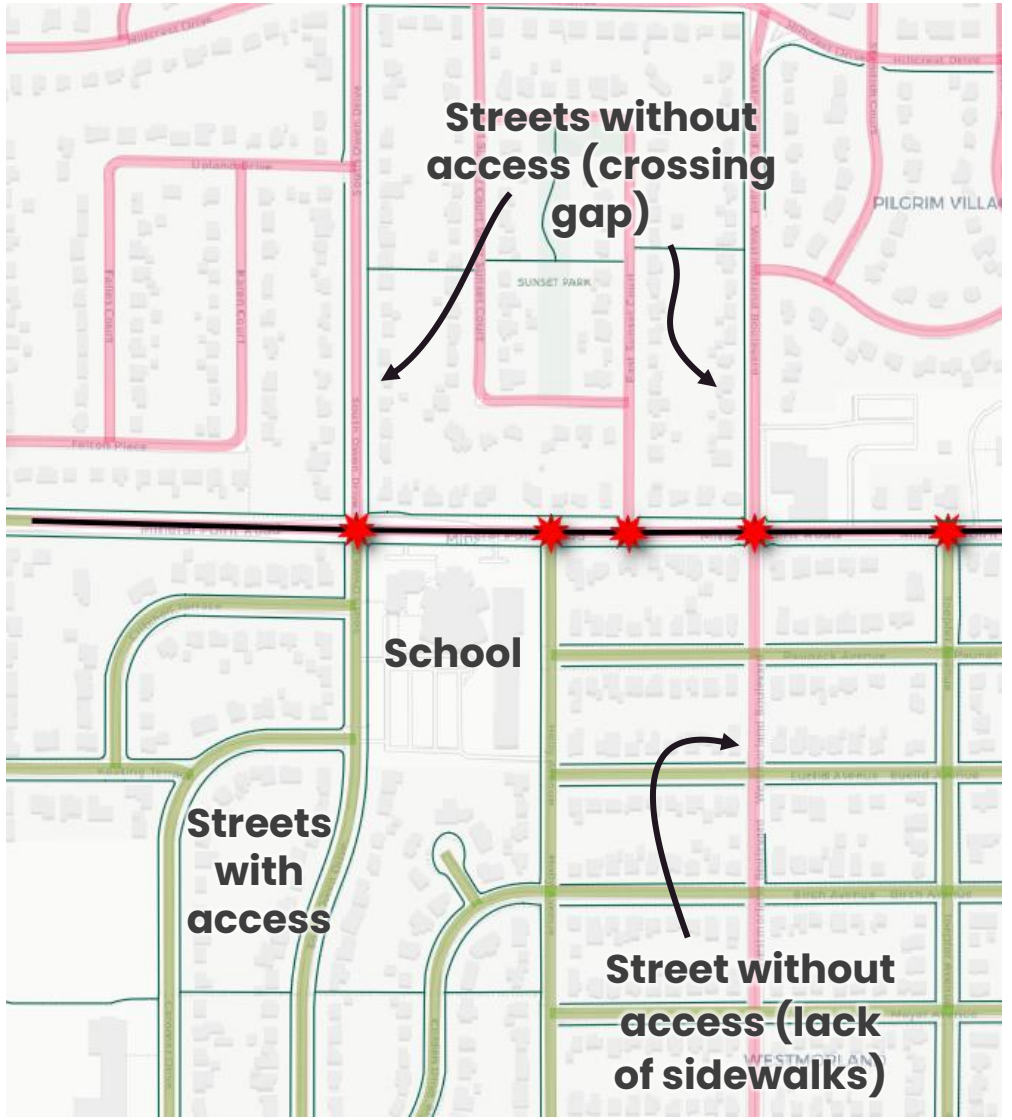


Half of the highest-stress crossings are located in Equity Priority Areas, which comprise only 35% of the city.

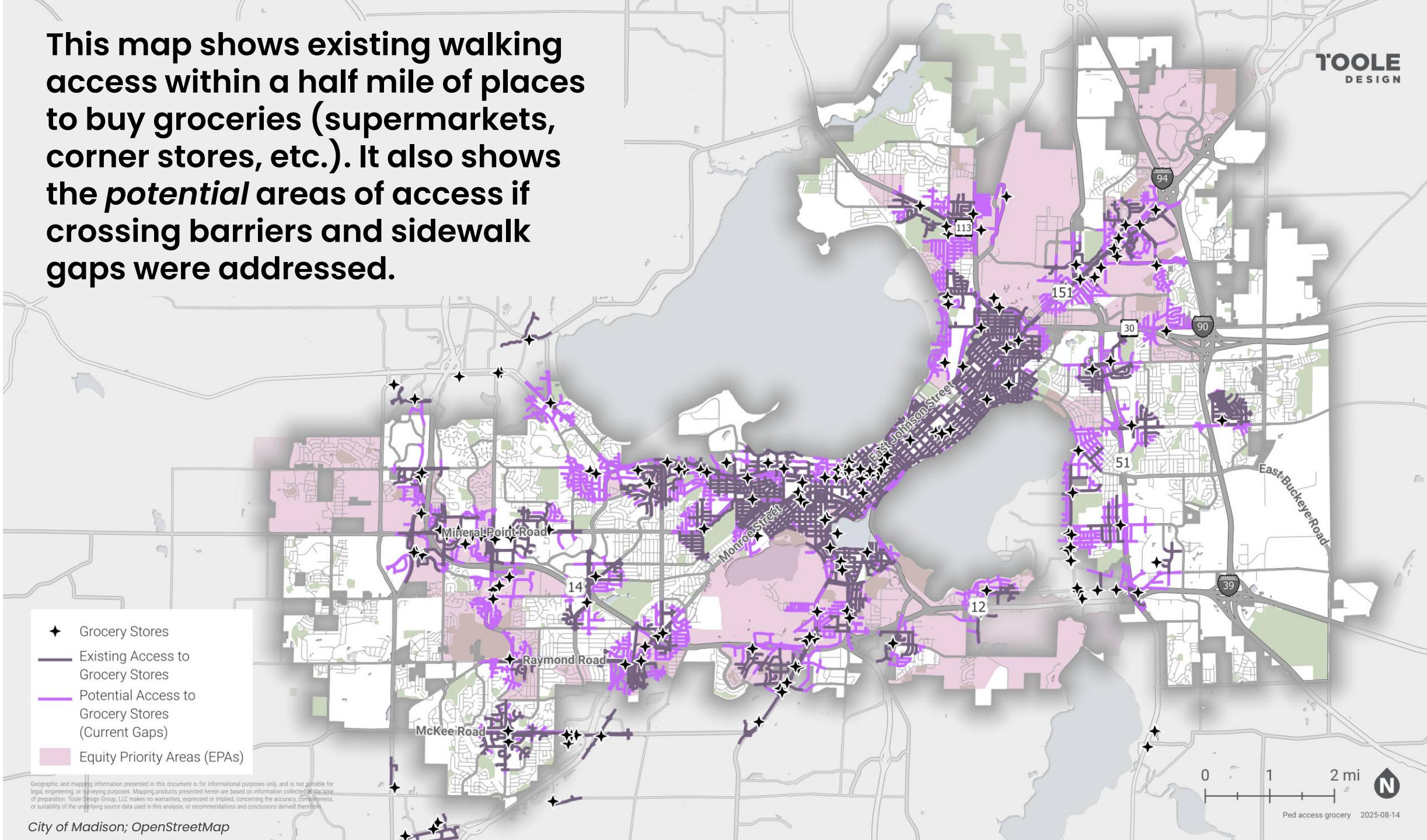


Pedestrian Access

- This analysis identifies how well people can currently access important destinations by walking. Crossing gaps (excessive distances between low-stress crossings, identified on the previous pages) and absence of complete sidewalks influence the outcomes of this analysis.
- For each destination type, the maps show the current accessible areas (within one-half mile), and the potential access areas. The potential access areas identify places that would have access if sidewalks were complete, and crossing gaps were addressed.

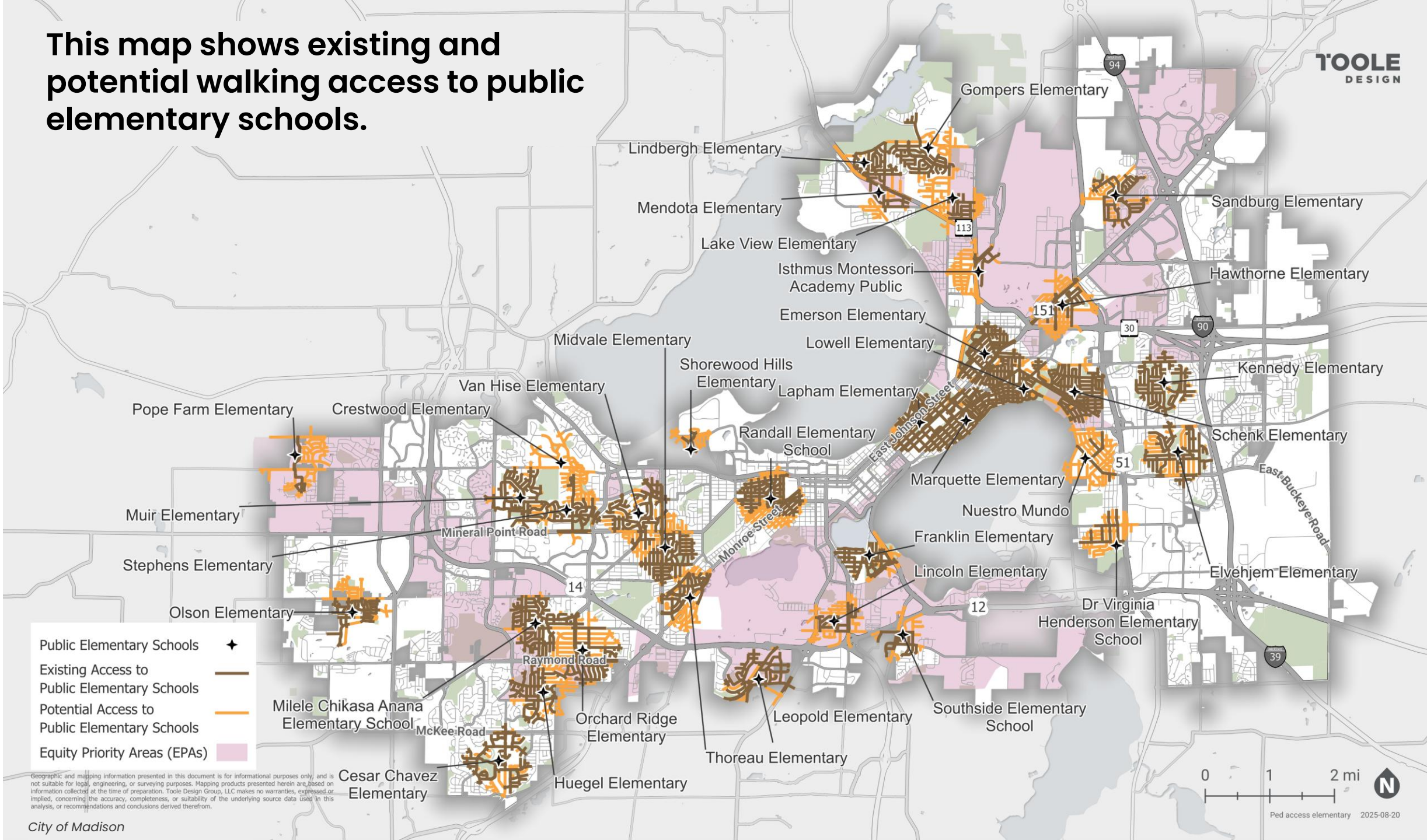


This map shows existing walking access within a half mile of places to buy groceries (supermarkets, corner stores, etc.). It also shows the *potential* areas of access if crossing barriers and sidewalk gaps were addressed.

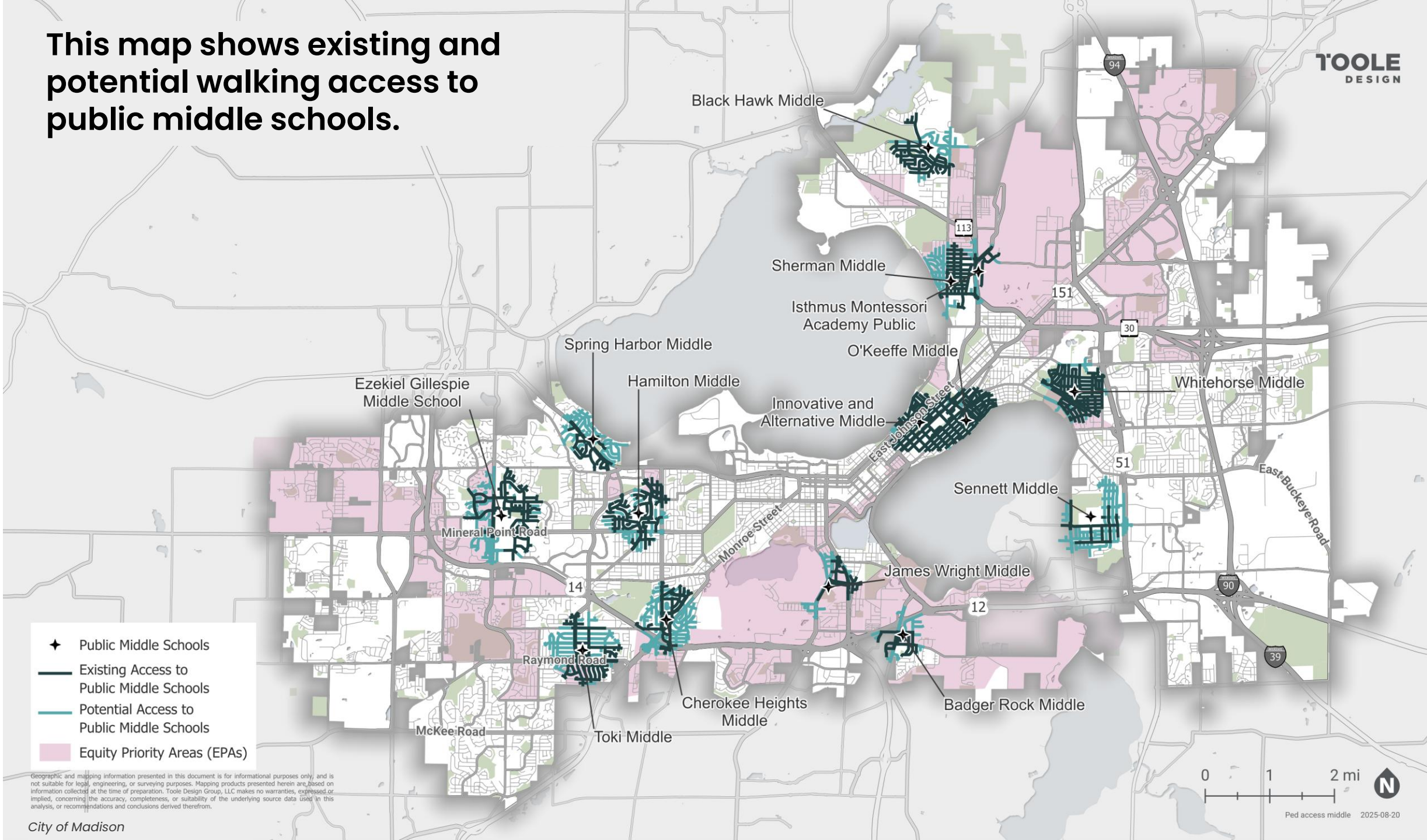


City of Madison; OpenStreetMap

This map shows existing and potential walking access to public elementary schools.

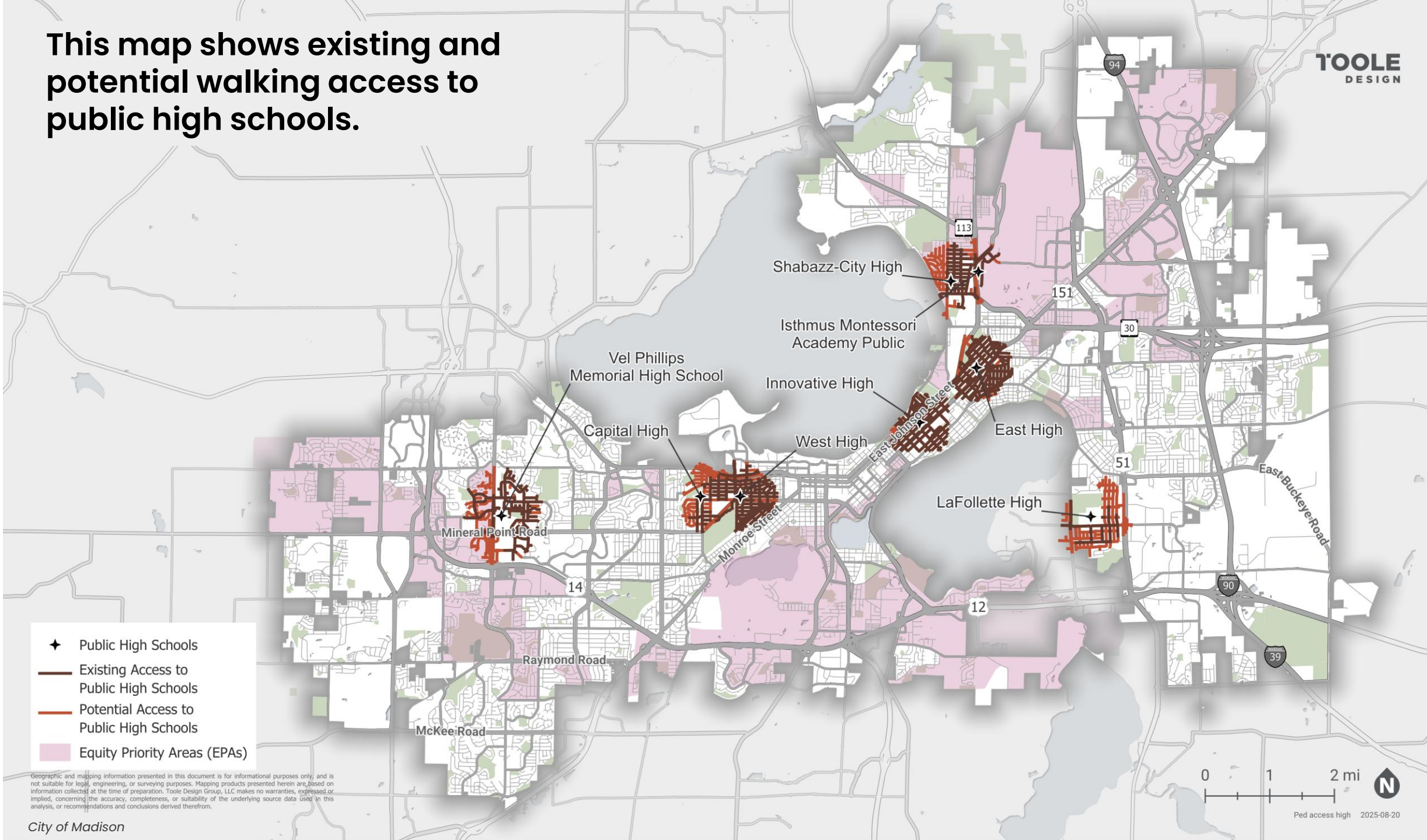


This map shows existing and potential walking access to public middle schools.

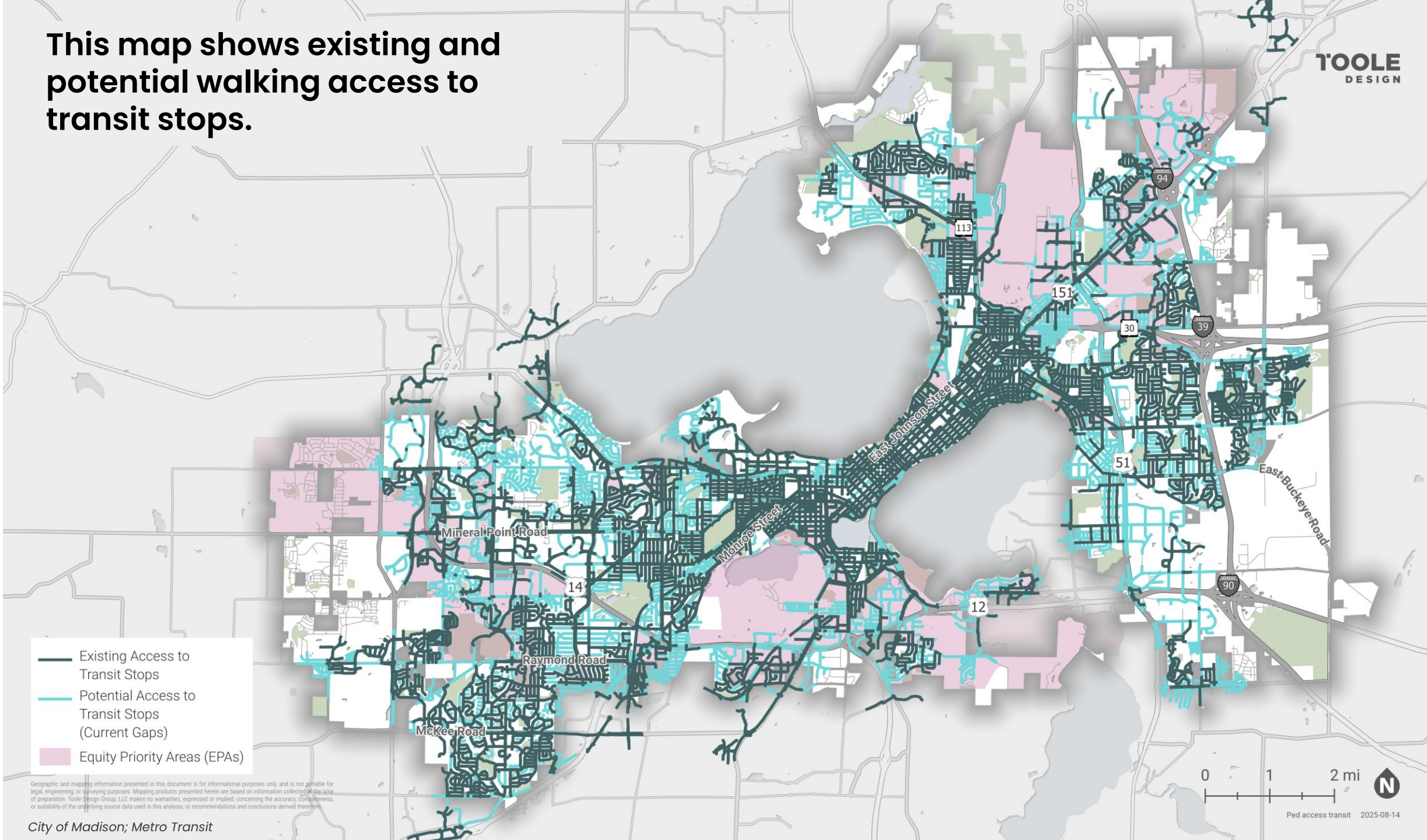


TOOLE DESIGN

This map shows existing and potential walking access to public high schools.



This map shows existing and potential walking access to transit stops.



City of Madison; Metro Transit

Takeaways

Only about 12% of crossings in Madison are high stress. However, these high-stress crossings tend to occur near each other along a small subset of busier streets. These result in gaps between comfortable crossings, making walking less appealing in these areas.

The longest gaps between comfortable crossings are often in Equity Priority Areas, along streets like Fish Hatchery Road, East Washington Avenue, and Northport Drive.

These crossing gaps, combined with missing sidewalk segments, result in lack of walkable access to daily destinations in many parts of Madison.

Areas further from downtown tend to have worse access, in part because of the post-1940s development patterns that have large blocks and many neighborhoods without sidewalks.

AAA* Bicycle Network Analysis

*All Ages and Abilities

Bicycle Level of Stress Analysis

- Bicycle Level of Traffic Stress (BLTS) estimates the amount of stress a person riding a bike faces on a given street segment.
- A street's BLTS value depends on the number of traffic lanes, traffic volume, speed, presence of bike facility, parking lane, and width of bike lanes.

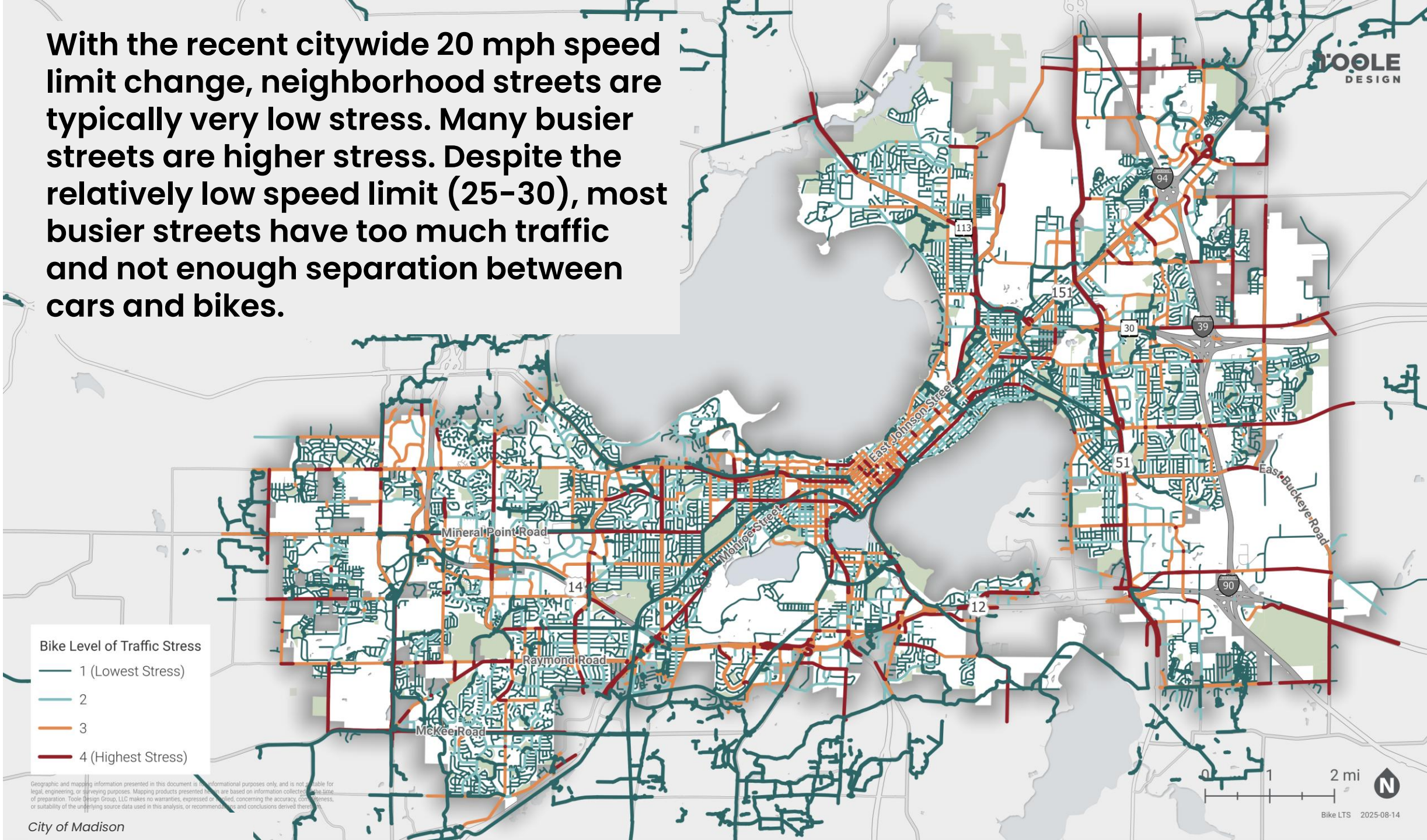
	BLTS Level	Description
Low Stress	1	Represents little to no traffic stress and requires little attention [by the bicyclist] to the traffic situation.
	2	Represents little traffic stress for most adults but requires more attention to the traffic situation than young children [defined as ages 10 and younger] may be capable of.
High Stress	3	Represents moderate stress; a higher level of attention to traffic is needed, and adults may feel some discomfort using this facility
	4	Represents high traffic stress. Only bicyclists with limited route choices would use this facility.

Bicycle Level of Stress Visualized

Fully-separated bikeways are usually lower stress, but BLTS is context dependent and shared lanes and standard bike lanes can be low stress in some situations.

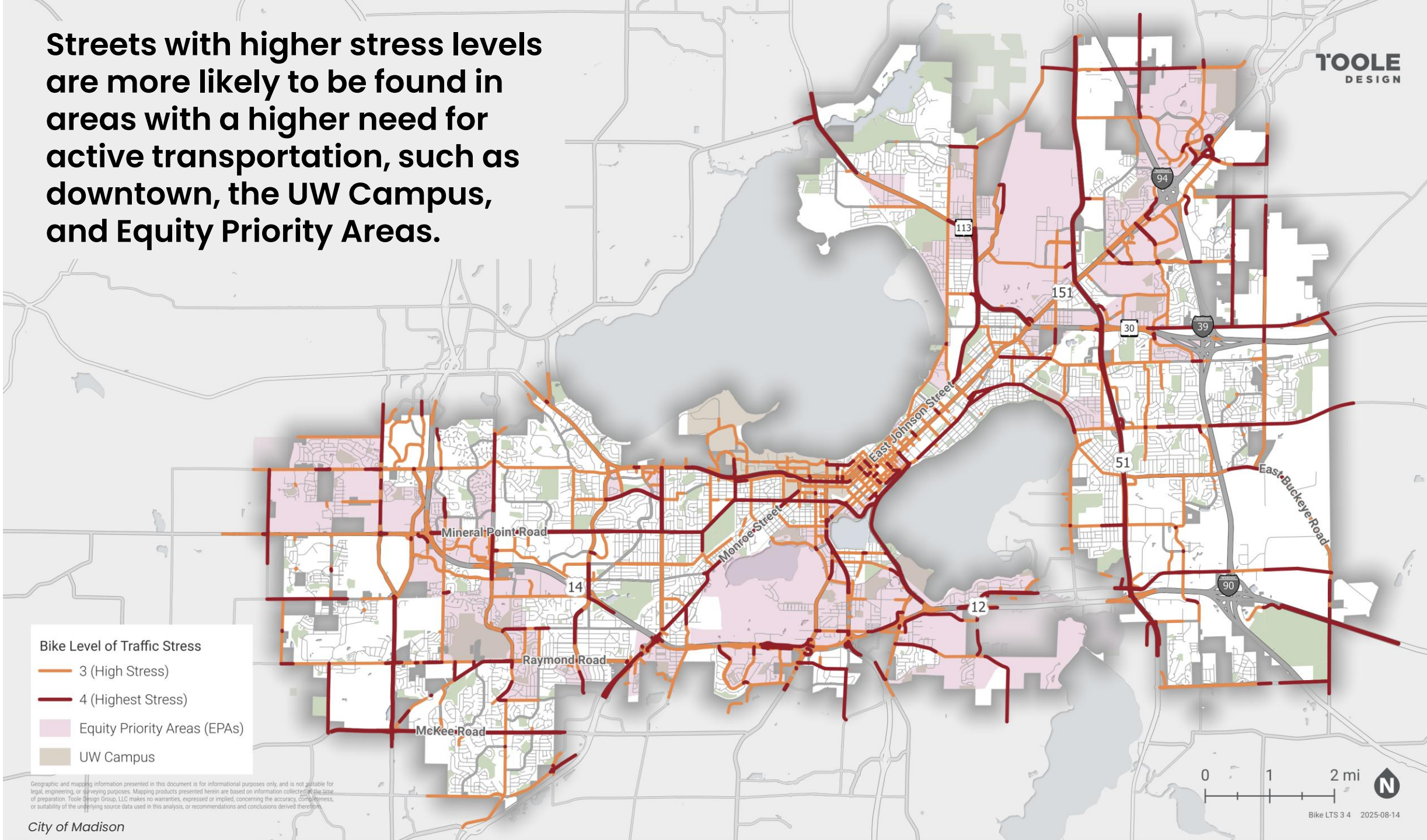
Similarly, shared-use paths can be higher stress occasionally.

With the recent citywide 20 mph speed limit change, neighborhood streets are typically very low stress. Many busier streets are higher stress. Despite the relatively low speed limit (25-30), most busier streets have too much traffic and not enough separation between cars and bikes.

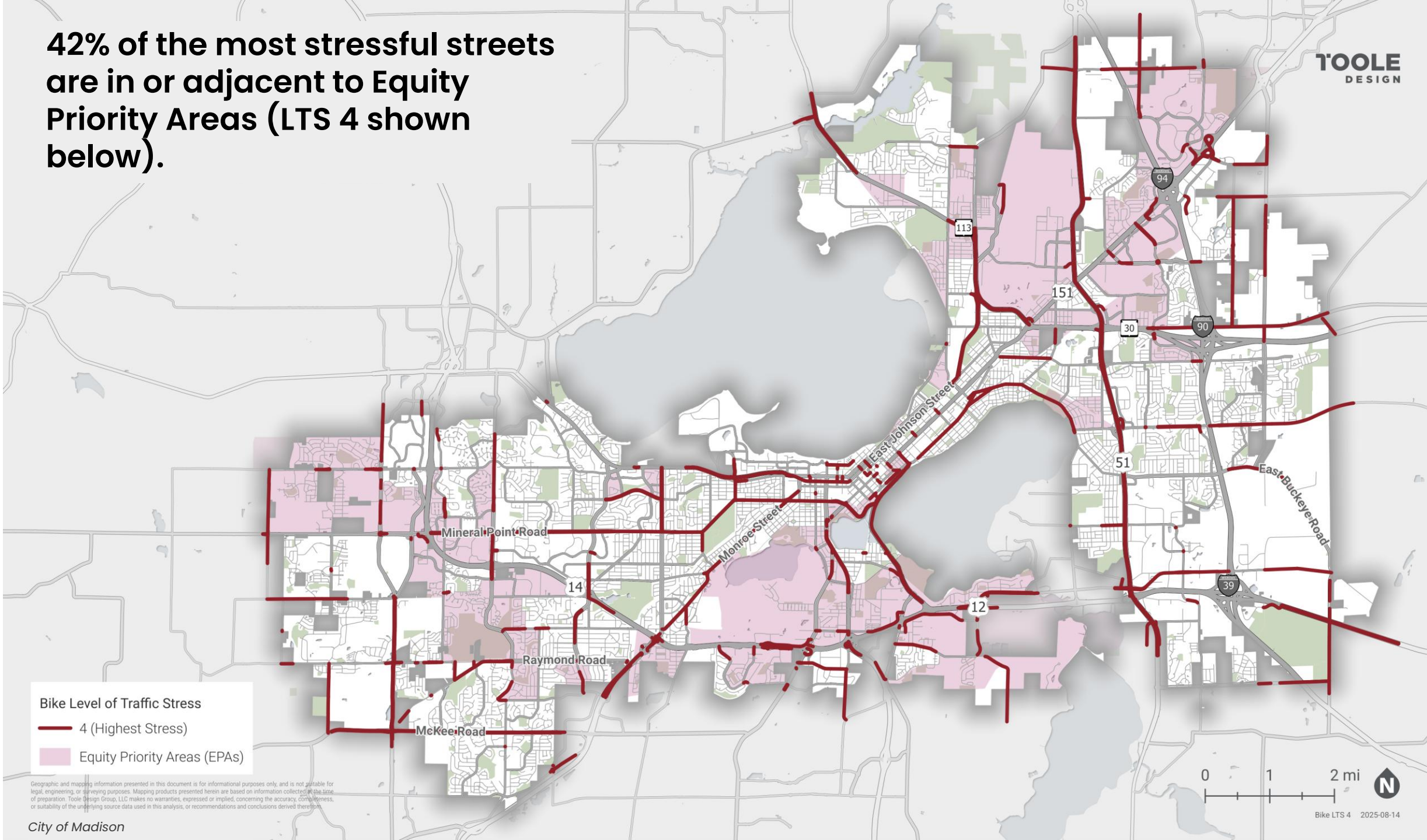


City of Madison

Streets with higher stress levels are more likely to be found in areas with a higher need for active transportation, such as downtown, the UW Campus, and Equity Priority Areas.



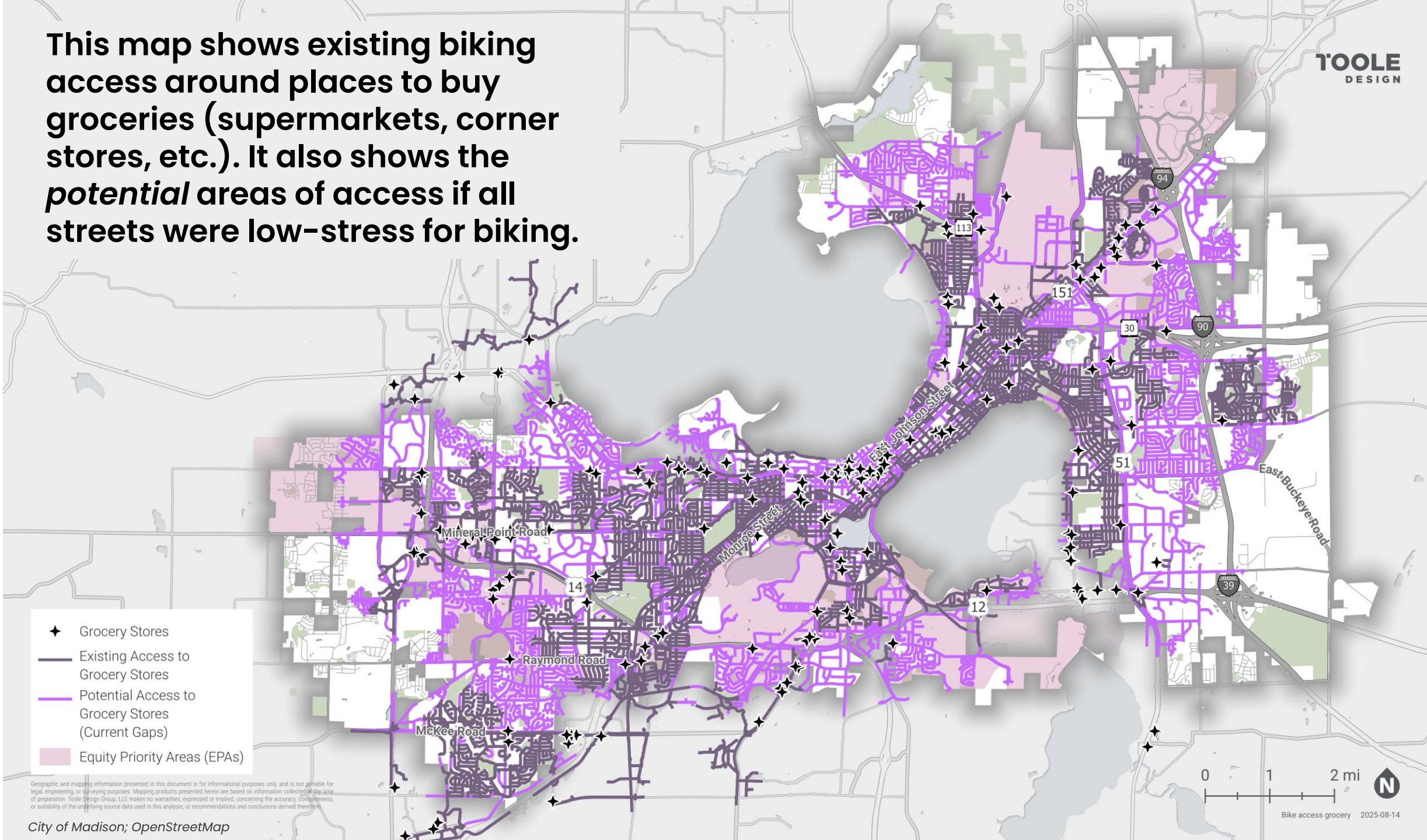
42% of the most stressful streets are in or adjacent to Equity Priority Areas (LTS 4 shown below).



Bicycle Access

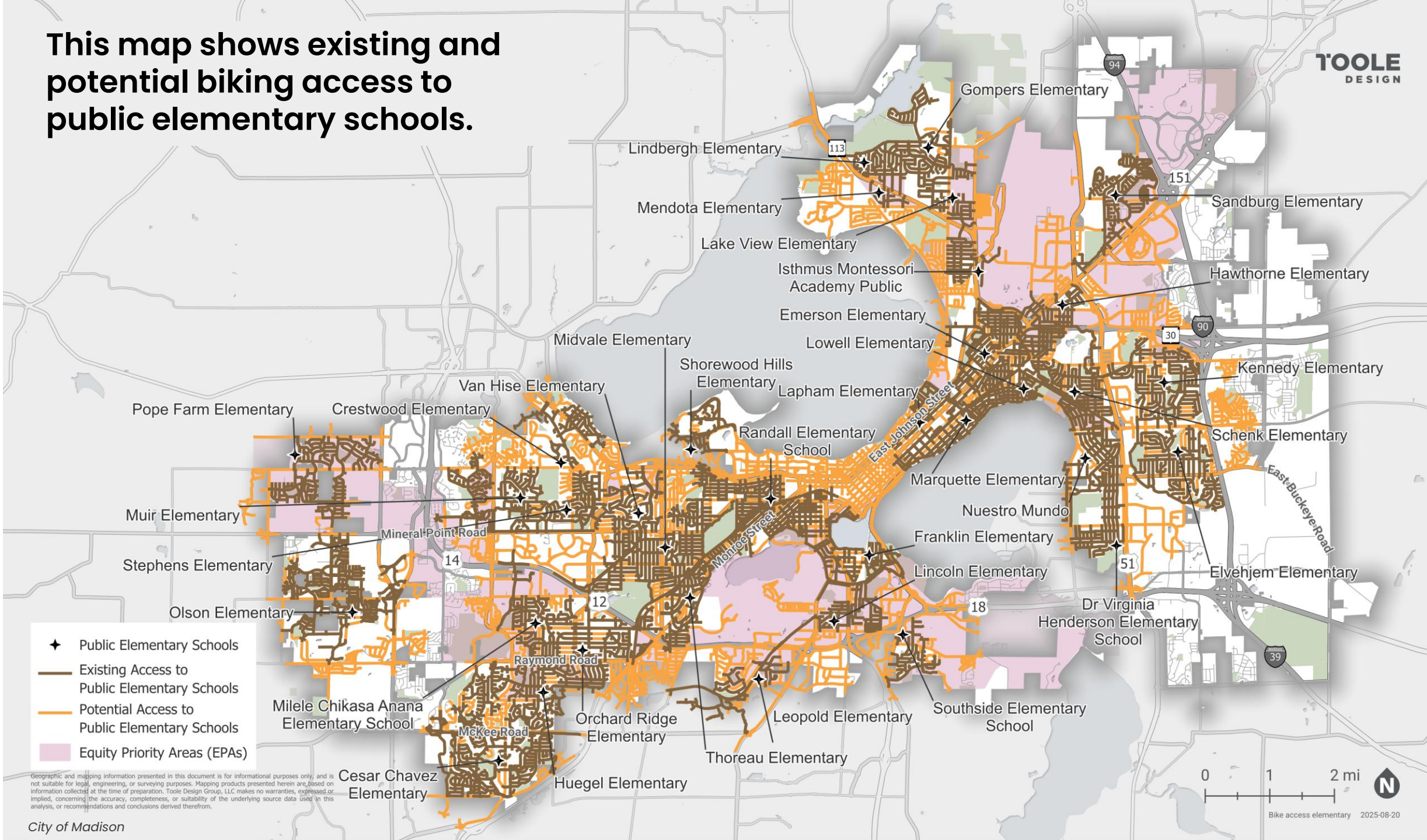
- This analysis identifies how well people can currently access important destinations by biking, using only low-stress routes (Bicycle Level of Traffic Stress 1 or 2). Although designed for pedestrians, the crossing gaps also influence bike access because they can identify hard-to-cross streets.
- For each destination type, the maps show the current accessible areas (within one and a half miles), and the potential access areas. The potential access areas identify places that would have access if high-stress streets were made to be low-stress.

This map shows existing biking access around places to buy groceries (supermarkets, corner stores, etc.). It also shows the *potential* areas of access if all streets were low-stress for biking.



City of Madison; OpenStreetMap

This map shows existing and potential biking access to public elementary schools.



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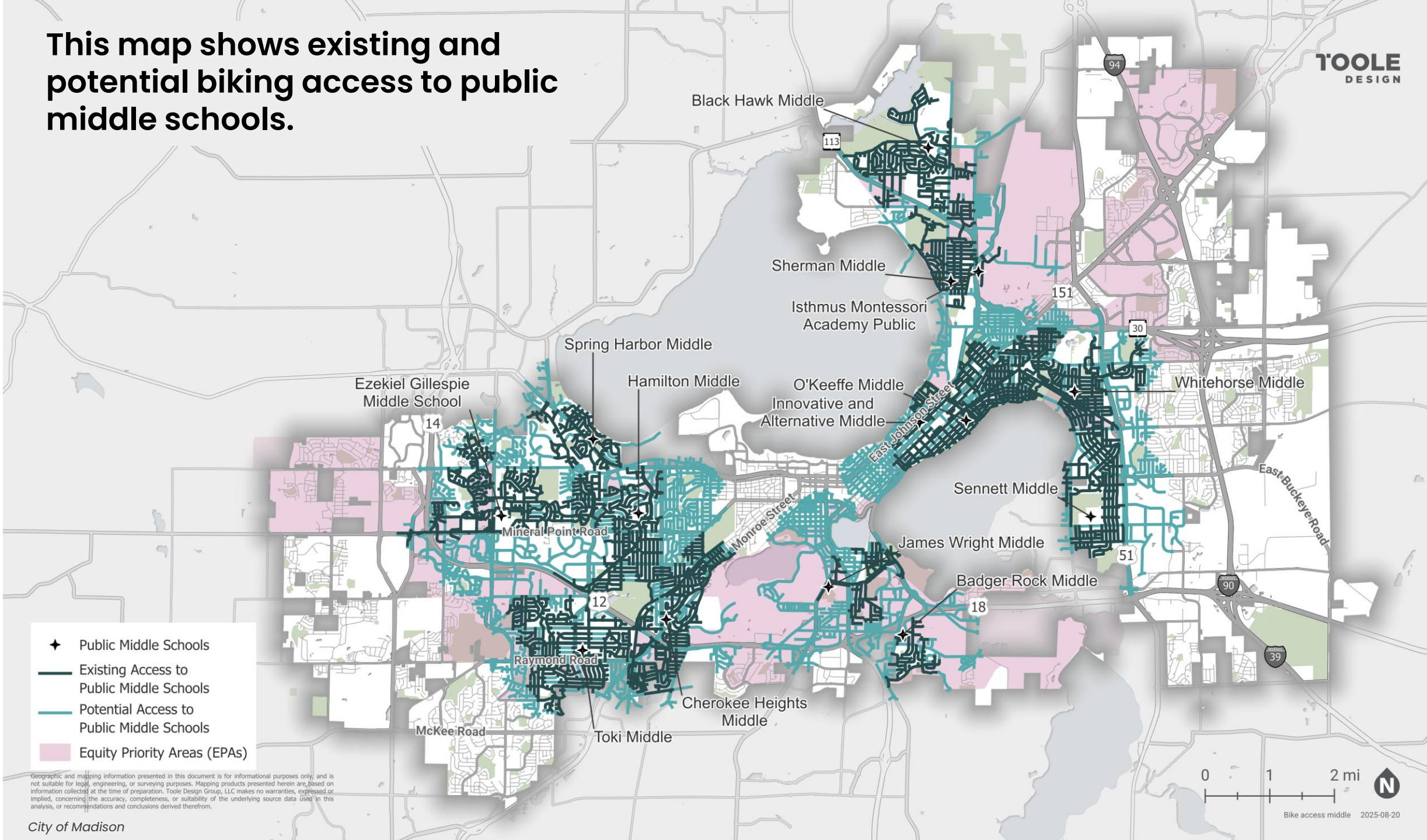
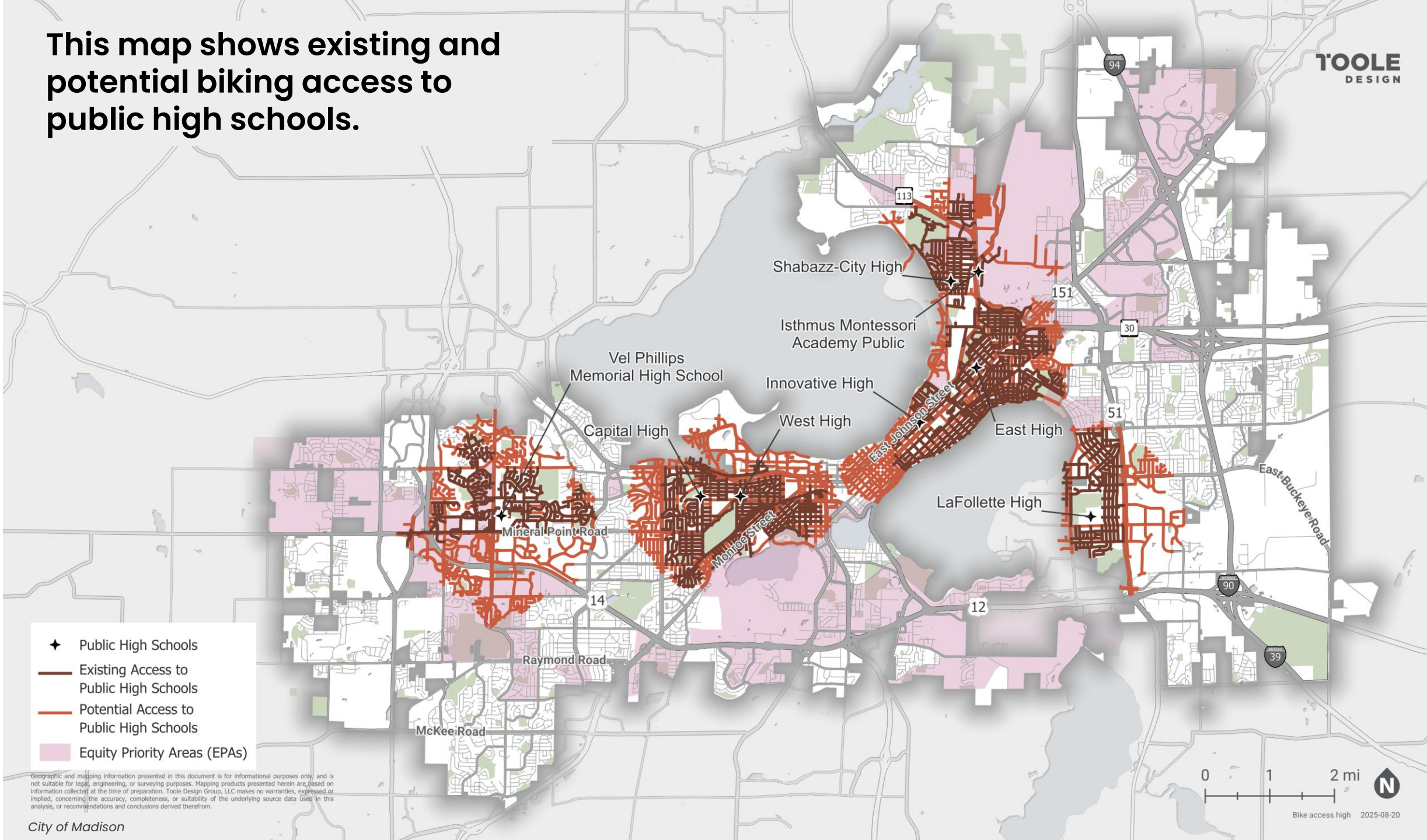


TOOLE DESIGN

Geographic and mapping information presented in this document is for informational purposes only, and is not suitable for legal, engineering, or surveying purposes. Mapping products presented herein are based on information collected at the time of preparation. Toole Design Group, LLC makes no warranties, expressed or implied, concerning the accuracy, completeness, or suitability of the underlying source data used in this analysis, or recommendations and conclusions derived therefrom.

This map shows existing and potential biking access to public high schools.



Takeaways

While the majority of streets in Madison are low stress, most major streets are high stress, which creates barriers to biking longer distances. Ironically, several streets with bike lanes are high stress for biking due to the amount of car traffic on the street.

Many of the streets downtown are high stress, creating a significant barrier to crossing the isthmus. The Capital City Trail (along John Nolan Drive) is one of the few low-stress passages through the isthmus, but is not well-connected to downtown.

High-stress streets result in lack of bikeable access to daily destinations in many parts of Madison. While most neighborhoods are within bikeable distance of places to buy groceries and elementary schools, about half of these areas cannot access those destinations using only low-stress bikeways.

Areas with worse access include downtown (since most streets there are high stress) and neighborhoods built after the 1940s due to the lower degree of connectivity between neighborhood streets.

Equity Analysis

Comparing Trip Potential and Stress

One element of the equity analysis is to compare the traffic stress levels within Equity Priority Areas (EPA) and outside of those areas. The table below shows the results, which indicate that EPAs have more high-stress locations than other areas in Madison.

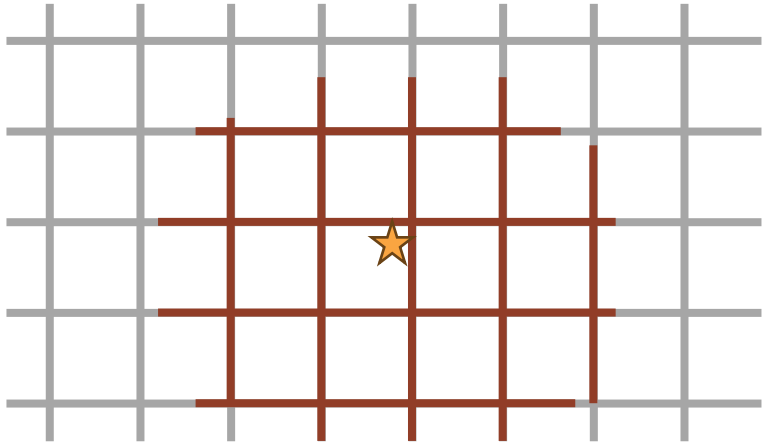
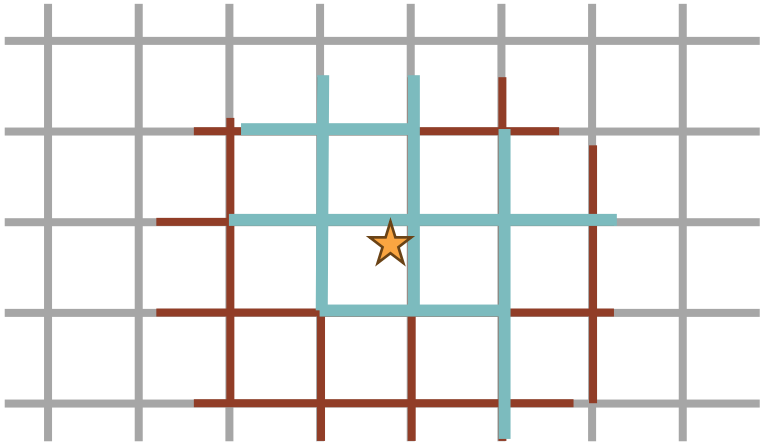
Analysis	In Equity Priority Areas	Outside of Equity Priority Areas	Assessment
Walk/Bike Trip Potential (Average Score – higher indicates more potential)	58 (out of 100)	55 (out of 100)	**EPAs show slightly higher potential for walking and biking**
Percent of Crossings that are High Stress (PxLTS)	16%	10%	**EPAs have disproportionately high crossing stress**
Percent of Non-Local* Streets that are Crossing Gaps > 1/8 mile in length	46%	43%	**EPAs have a disproportionately large amount of crossing gaps**
Percent of Non-Local* Streets that are High Stress for Biking (BLTS)	86%	77%	**EPAs have disproportionately high bicycle stress**

**Non-local streets include higher-traffic streets, often referred to as "arterials" and "collectors."*

Comparing Access

To compare access to daily destinations between EPAs and areas outside of EPAs, we calculated **A) the mileage of all streets** within walking distance (0.5 mile) and biking distance (1.5 miles) of daily destinations. We then calculated **B) the mileage of low-stress routes** that provide access for walking or biking. See the Pedestrian Crossing LTS and Bicycle LTS analyses for more information on traffic stress. The results are shown on the following pages.

Example:

A. All Streets within Walking or Biking Distance of Destination Type	B. Low-Stress Routes within Walking or Biking Distance of Destination Type
	
49% (of all streets)	**21%** (of all streets)

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Comparing Walking Access

Analysis	All Streets within Walking Distance of Destination Type*		Low-Stress Routes within Walking Distance*	
	In Equity Priority Areas	Outside of Equity Priority Areas	In Equity Priority Areas	Outside of Equity Priority Areas
Places to Buy Groceries	**49%**	39%	21%	**24%**
Elementary Schools	25%	**36%**	14%	**24%**
Middle Schools	14%	**18%**	6%	**11%**
High Schools	6%	**11%**	2%	**7%**
Transit Stops	84%	**86%**	45%	**55%**

**Walking distance for this analysis is defined as within 0.5 mile. Percentages are based on the total mileage of streets within each area.*

Key Takeaways: In the table above, the "Low-Stress Routes within Walking Distance" columns indicate the percentage of streets in each area that actually provide low-stress access to each destination type. Overall, places within EPAs have **worse** walking access than areas outside of EPAs for all five destination types evaluated. Furthermore, people living within EPAs are **less likely** to have most of these destination types within walking distance. The exception being that EPAs are often closer to places to buy groceries (including supermarkets and convenience stores).

That said, this analysis was performed on EPAs and the city as a whole. There are individual EPAs with markedly worse access, and non-EPA areas with significantly higher access to various individual destination types.

Comparing Biking Access

Analysis	All Streets within Biking Distance of Destination Type*		Low-Stress Routes within Biking Distance*	
	In Equity Priority Areas	Outside of Equity Priority Areas	In Equity Priority Areas	Outside of Equity Priority Areas
Places to Buy Groceries	**88%**	85%	31%	**40%**
Elementary Schools	**83%**	83%	33%	**48%**
Middle Schools	**59%**	57%	20%	**32%**
High Schools	28%	**36%**	8%	**18%**

**Biking distance for this analysis is defined as within 1.5 miles. Percentages are based on the total mileage of streets within each area. Note that biking access to transit was not evaluated because the proportion of transit riders that bike to transit and the capacity of transit vehicles to carry bikes are both very low. The results of that analysis would be of limited utility for this project.*

Key Takeaways: In the table above, the "Low-Stress Routes within Biking Distance" columns indicate the percentage of streets in each area that actually provide low-stress access to each destination type. Overall, places within EPAs that are near destinations currently have **worse** biking access than areas outside of EPAs for all four destination types evaluated. However, people living within EPAs are **more likely** to have three of the destination types within biking distance (grocery, elementary school, and middle school).

That said, this analysis was performed on EPAs and the city as a whole. There are individual EPAs with markedly worse access, and non-EPA areas with significantly higher access to various individual destination types.

Summary of Challenges

Takeaways

- There is **significant potential**—and likely latent demand—for walking and biking in areas that have not historically been considered hot spots for active transportation.
- Madison has **sidewalks on most streets**. Exceptions include some post-1940s neighborhoods and areas recently annexed.
- Lengthy **gaps between comfortable pedestrian crossings** reduce walkability to key destinations.
- There is an extensive bikeway network, but **several key connections are not suitable for all ages and abilities**, limiting comfortable access to daily destinations for many parts of Madison.
- The highest-stress pedestrian crossings, longest crossing gaps, and highest stress streets for biking **are found in and around Equity Priority Areas**.

Next Steps

Next Steps

- Findings from the Network Assessment will inform the identification of infrastructure recommendations and help prioritize projects.
- Statistics from the network analysis will serve as baseline values for performance measures that can be used to evaluate implementation.