

Attachment 5 – Cycling Impact Analysis

The Council-approved prioritization framework for the Near-Term Cycling Implementation Program uses a data-driven approach balanced with information from stakeholders to select candidate bikeway projects for study, design, and implementation. This attachment provides a detailed overview of the Cycling Impact Analysis component of the overall prioritization framework outlined in Attachment 4.

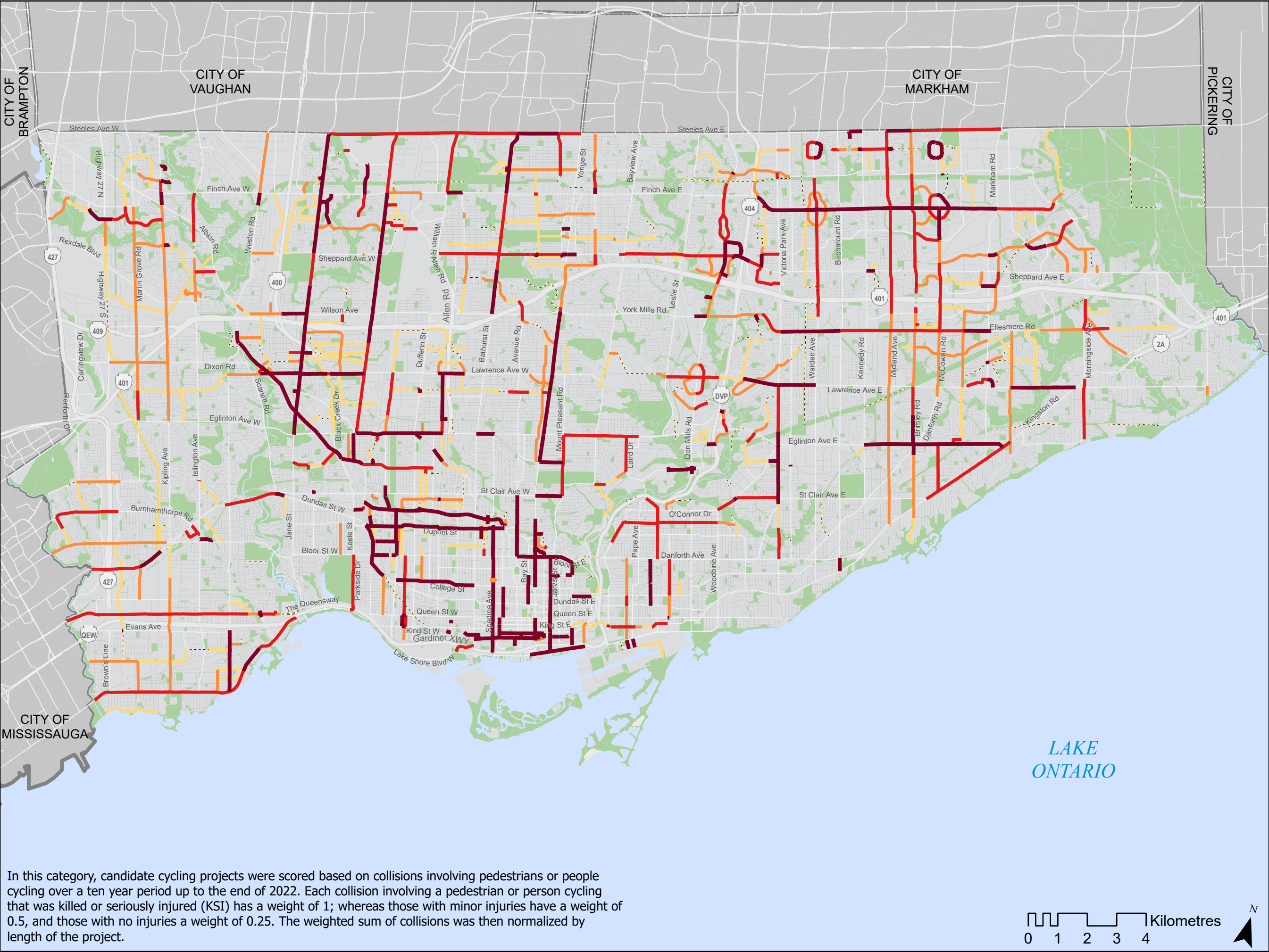
The candidate cycling projects included in this analysis were from the "long list" of routes for 2025 - 2027 compiled for the public consultation process, as well as major streets with upcoming road work tentatively scheduled in 2028 - 2030.

There are nine categories of cycling impact analysis:

1. **Safety:** based on vulnerable road user collisions and motor vehicle speeds.
2. **Connectivity:** based on links and gaps in the existing cycling network and an accessibility measure based on level of traffic stress data.
3. **Equity:** based on priority populations and cycling access to employment.
4. **Current Cycling Demand:** based on cycling trip data from the 2016 Transportation Tomorrow Survey.
5. **Potential Cycling Demand:** based on non-cycling trip data from the 2016 Transportation Tomorrow Survey (under 5 km for motor vehicle and transit, and over 1 km for walking).
6. **Transit Access:** primary focus is supporting multi-modal trips, based on commuter demand, proximity to transit stations, and availability of bike parking and Bike Share at stations. Secondary focus is providing alternatives to transit, based on headway and weekday coverage data from Toronto Transit Commission (TTC).
7. **Barrier Crossings:** based on crossings of highways, railway lines, and waterways.
8. **Network Coverage:** based on a 250 m buffer around existing cycling routes, prioritizing areas beyond the buffer.
9. **Trip Generators:** based on density of destinations serving daily needs, counting those within 250 m of proposed routes

The nine categories consist of 12 analyses depicted in the following 12 maps:

1. Safety: Collision Data Analysis
2. Safety: Speeding Analysis
3. Connectivity: Links and Gaps
4. Connectivity: Low-Stress Cycling Accessibility
5. Equity: Cycling Access to Employment
6. Equity: Priority Populations
7. Current Cycling Demand
8. Potential Cycling Demand
9. Transit Access
10. Barriers Crossings
11. Cycling Network Coverage
12. Trip Generators



Safety: Collision Data Analysis

Legend

Score

- 4 points
- 3 points
- 2 points
- 1 points
- 0 points

GTA Road

- Major Road
- Local Road

GTA

- GTA Boundaries
- Toronto

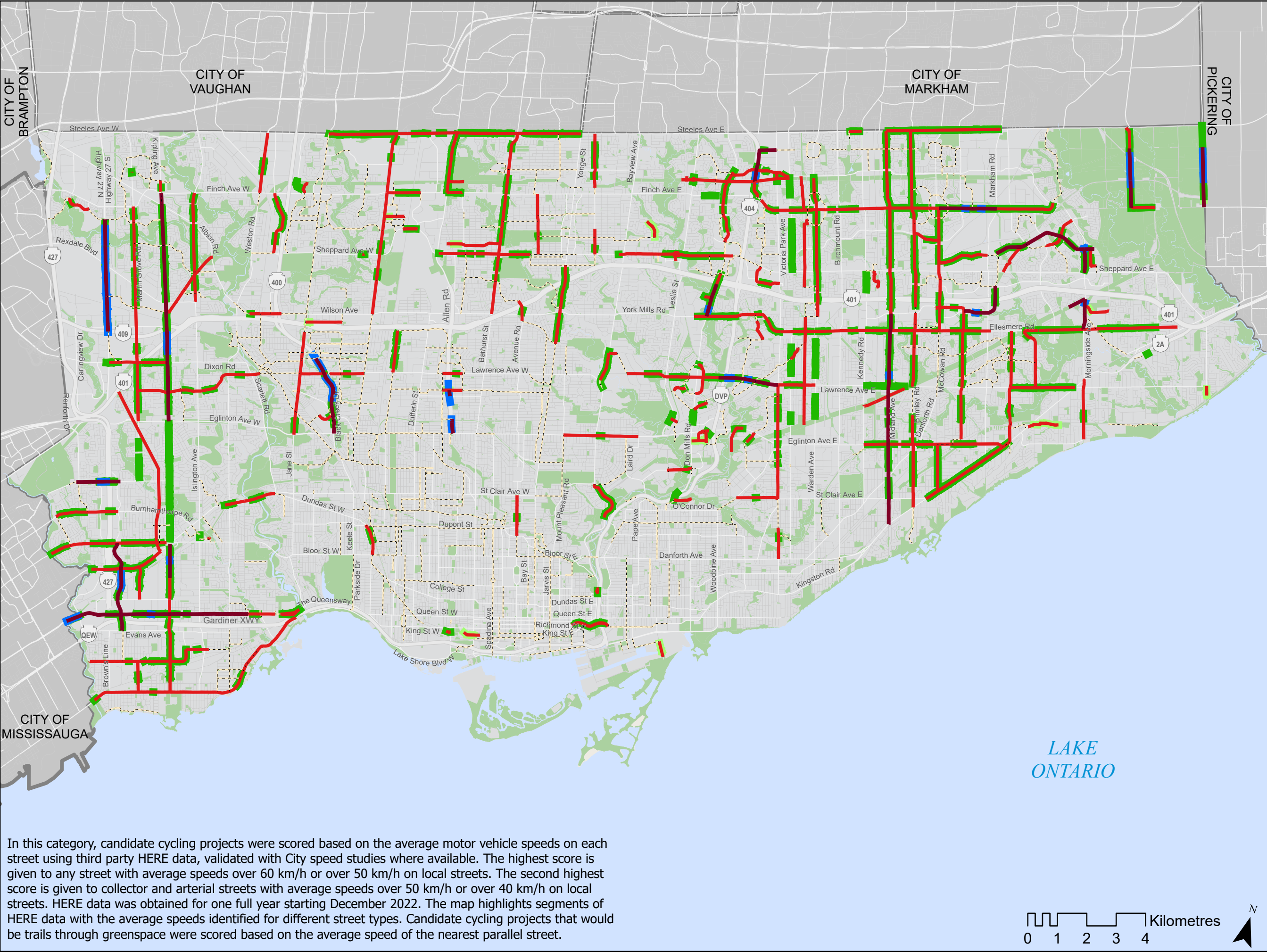
Waterway

Parks and Recreation Areas

Data Sources: Contains information licensed under the Open Government License - Toronto

Projection: NAD 1983 CSRS MTM 10
Cartography: Transportation Services, City of Toronto
Date: May 2024

In this category, candidate cycling projects were scored based on collisions involving pedestrians or people cycling over a ten year period up to the end of 2022. Each collision involving a pedestrian or person cycling that was killed or seriously injured (KSI) has a weight of 1; whereas those with minor injuries have a weight of 0.5, and those with no injuries a weight of 0.25. The weighted sum of collisions was then normalized by length of the project.



Safety: Speeding Analysis

Legend

Score

- 4 points
- 3 points
- 0 points

HERE average speeds 60km/h or over

HERE average speeds 50km/h - 59km/h

HERE average speeds 40km/h - 49km/h

GTA Road

- Major Road
- Local Road

GTA

- GTA Boundaries
- Toronto

Waterway

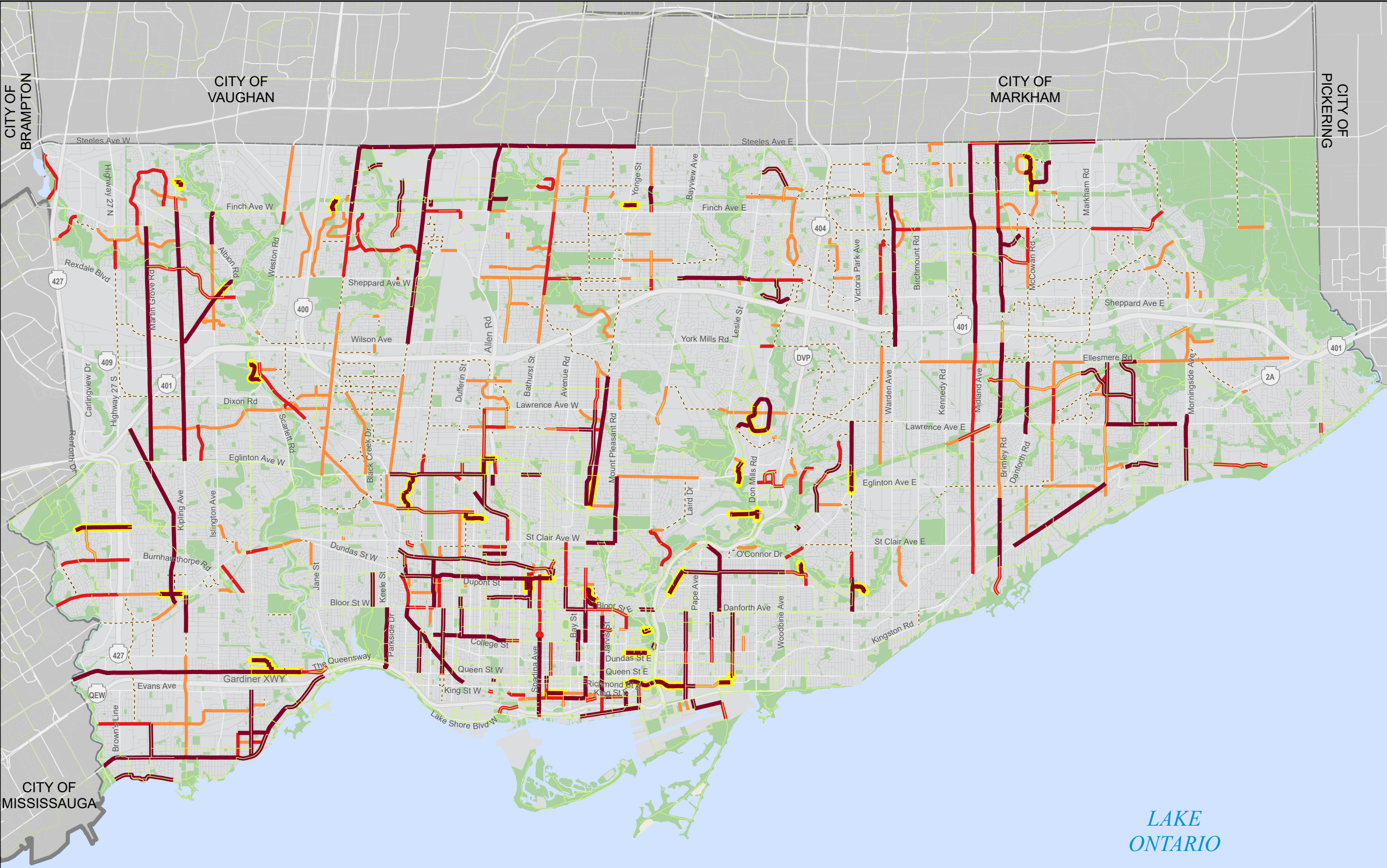
Parks and Recreation Areas

Data Source: HERE data, 2022.
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Projection: NAD 1983 CSRS MTM 10
Cartography: Transportation Services, City of Toronto
Date: May 2024

The logo for the City of Toronto, featuring a stylized building icon and the word 'TORONTO' in a bold, sans-serif font.

In this category, candidate cycling projects were scored based on the average motor vehicle speeds on each street using third party HERE data, validated with City speed studies where available. The highest score is given to any street with average speeds over 60 km/h or over 50 km/h on local streets. The second highest score is given to collector and arterial streets with average speeds over 50 km/h or over 40 km/h on local streets. HERE data was obtained for one full year starting December 2022. The map highlights segments of HERE data with the average speeds identified for different street types. Candidate cycling projects that would be trails through greenspace were scored based on the average speed of the nearest parallel street.



Connectivity: Links and Gaps

Legend

Score

- 4 points
- 3 points
- 2 points
- 0 points

Existing cycling route

Key Gap

GTA Road

- Major Road
- Local Road

GTA

- GTA Boundaries
- Toronto

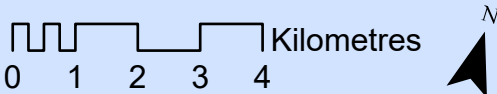
Waterway

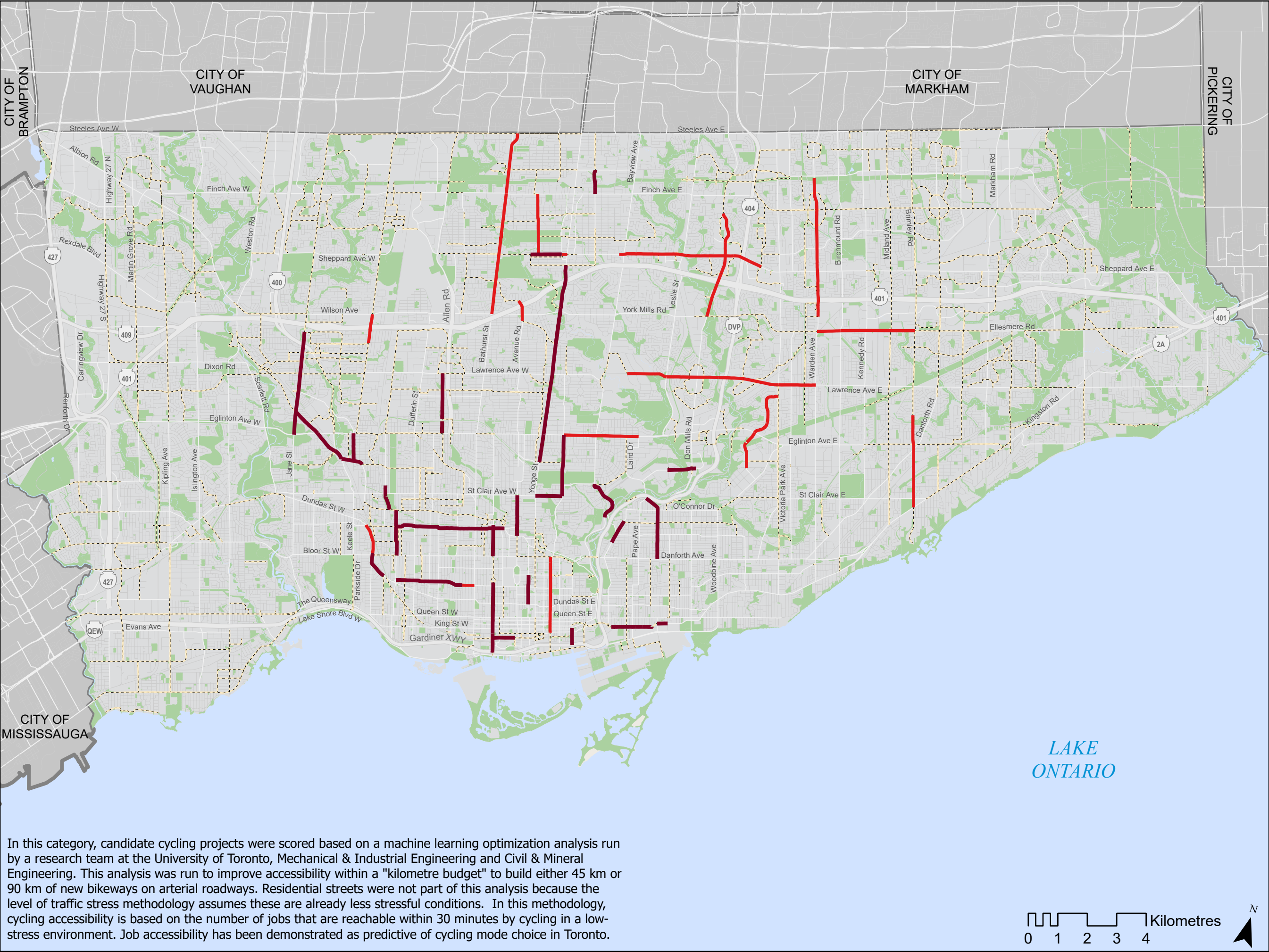
Parks and Recreation Areas

Data Sources: City of Brampton, City of Markham, City of Mississauga, City of Pickering, Durham Region, City of Vaughan, York Region, Region of Peel and Land Information Ontario. And contains information licensed under the Open Government License - Toronto

Projection: NAD 1983 CSRS MTM 10
Cartography: Transportation Services, City of Toronto
Date: May 2024

In this category, candidate cycling projects were scored based on how many existing cycling routes they connect to or if they close a key gap in the cycling network. The highest score is given to candidate bikeways that connect to the existing cycling network in three or more places or close a key gap in the network. The second highest is for those connecting in two places, and the lowest for a single connection. Existing cycling network data for surrounding municipalities was obtained from the City of Brampton, City of Markham, City of Mississauga, City of Pickering, Durham Region, City of Vaughan, York Region, Region of Peel and Land Information Ontario.





Connectivity: Low-Stress Cycling Accessibility

Legend

Score

Optimal expansion for the most low-stress cycling accessibility of candidate bikeways

- 4: Top 45km
- 3: Top 90km
- 0: Not in Top 45 or 90 km

The optimization module was run independently for the top 45 km, and for the top 90 km. The projects in the top 45 km are not guaranteed to be selected in the top 90 km, but in this case, over 97% (43.5 km) did overlap.

GTA Road

- Major Road
- Local Road

GTA

- GTA Boundaries
- Toronto

Waterbody

-

Parks and Recreation Areas

-

Data Sources: Lin, B., Chan, T.C.Y., and Saxe, S (2024), University of Toronto.
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Projection: NAD 1983 CSRS MTM 10
Cartography: Transportation Services, City of Toronto
Date: April 2024



In this category, candidate cycling projects were scored based on a machine learning optimization analysis run by a research team at the University of Toronto, Mechanical & Industrial Engineering and Civil & Mineral Engineering. This analysis was run to improve accessibility within a "kilometre budget" to build either 45 km or 90 km of new bikeways on arterial roadways. Residential streets were not part of this analysis because the level of traffic stress methodology assumes these are already less stressful conditions. In this methodology, cycling accessibility is based on the number of jobs that are reachable within 30 minutes by cycling in a low-stress environment. Job accessibility has been demonstrated as predictive of cycling mode choice in Toronto.