5 Mapping the Potential to Impact Cycling in Toronto

Potential new cycling routes were analyzed for how well the addition of cycling infrastructure would serve the public at that location, based on current demand, potential demand and how well the route would serve areas of high population and employment density. An analysis was undertaken of coverage, safety, crossing barriers, how well the route would serve trip generators, and connectivity. For detailed information regarding the weighting of each analysis area, please see Section 7.3.

The city was divided into two context areas, recognizing that levels of cycling activity and demand differ in each, as follows:

- **Area 1:** consisting of the more compact central area of the city, where there is further evolution of a maturing cycling network and culture. There are opportunities to "connect" and "renew" the network by completing missing links and improving the quality of cycling routes;
- **Area 2:** consisting of the more suburban built environment surrounding the central area. The existing cycling network is less extensive, with more opportunities to "grow" into new parts of the city not served by the network.

These areas are shown on the maps illustrating the potential cycling impact analysis. The boundary between the two is intended to provide guidance only in the application of some of the cycling impact criteria.

5.1 Current Demand

Measuring existing rates of bicycle use in different parts of Toronto:

This analysis highlights areas of the city where there are currently high volumes of cycling traffic, to determine where the greatest number of existing cyclists could benefit from new or upgraded Cycling Network routes, as shown in Exhibit 5-1.

The Cycling Impact Analysis considers the number of cycling trips currently being taken near the proposed Cycling Network route.

5.2 Potential Demand

Measuring where people are making a lot of short trips (under 5 km) by car or transit:

This analysis highlights areas where there is currently a high demand for short trips not currently being made by bicycle, which could potentially be completed by bicycle in future, as shown in Exhibit 5-2.

The Cycling Impact Analysis considers the number of short trips by motorized modes of transportation currently being taken near each of the proposed cycling projects. Short trips, with a distance less than 5 km, are considered as having a high potential for being shifted from motorized modes to cycling. Transit trips were included, as more short trips by bicycle could help to address transit crowding on the TTC.

5.3 Population and Employment Density

Identifying where short trips are viable:

This analysis maps the number of residents and jobs per square kilometre to determine the extent to which the network as a whole is serving the areas of the city where the greatest number of people could access the Cycling Network, as shown in Exhibit 5-3.

The Cycling Impact Analysis measures the density of residents and employees along the cycling project. Population is the origin of trips and employment is the destination of many trips. The more of both there are in an area, the more trips will likely be made in the area, including trips by bicycle if adequate conditions exist.

5.4 Coverage

Identifying parts of the city that currently lack a cycling network:

This analysis applies a buffer (500 m) around the existing cycling network to quantify the number of new residents and / or employees that could be served, if a proposed new cycling route were added to the existing network, as shown in Exhibit 5-4.

The Cycling Impact Analysis assesses whether the cycling project is passing through areas that are not covered by existing cycling facilities. These are areas that are more than 500 m from the nearest cycling facility. For this coverage exercise, the existing network includes all facility types: bike lanes, cycle tracks, trails, and Quiet Streets.

5.5 Barriers

Identifying which barriers need to be crossed and the potential cost for these crossings:

This analysis identifies opportunities to provide safe crossings where none exist, within one kilomtre in either direction from a barrier, including highways, railways, rivers, ravines, etc., as shown in Exhibit 5-5. It also considers opportunities to improve existing crossings.

The Cycling Impact Analysis considers whether the cycling project crosses natural barriers such as ravines and rivers, and built barriers such as freeways, rail corridors, and at-grade portions of light-rail lines with restricted side-street crossings. Crossings over ravines, rivers, freeways, and rail corridors are considered twice as valuable as crossings over light-rail lines since the former require a bridge or underpass to be crossed whereas the latter type may be crossed by nearby signalized intersections.

5.6 Safety

Identifying where vehicle-bicycle collisions have occurred:

The maps depict the locations of reported collisions involving cyclists. The intensity of the coloration on the heat map reflects the relative number of collisions that were reported at each location from 2009 to 2013. Collision frequency is often directly related to the number of trips made. Area 1 and Area 2 were analyzed separately to account for the higher proportion of bicycle traffic in Area 1, as shown in Exhibit 5-6 and Exhibit 5-7. In terms of collision frequencies, the lightest coloration represents one collision on both maps, whereas the locations with the highest frequency of collisions for Area 2 and Area 1 were nine and 18, respectively, represented by the darkest areas on each map.

The cycling impact analysis considers whether the cycling project creates opportunities to improve cycling safety by its proximity to where reportable collisions involving cyclists are currently occurring. The implementation of a cycling facility provides an opportunity to identify and mitigate safety issues through changes to the infrastructure.

5.7 Trip Generators

Identifying attractions, destinations and opportunities for multi-modal travel:

This analysis measures the number of key trip generators served by a cycling network project, including: secondary and post-secondary schools, GO and TTC stations and major attractions such as community centres, malls and museums / galleries. These are illustrated in Exhibit 5-8.

The Cycling Impact Analysis measures whether the cycling project improves access to major trip generators, i.e. a place that many people would like to travel to. They include schools, universities, and higher-priority public transit stations. Additional information on identifying higher-priority public transit stations is provided in Section 5.9.

5.8 Connectivity

Identifying areas of high and low network cohesion:

This analysis highlights Cycling Network projects that can close gaps in the existing network, by providing cycling-friendly connections between nearby routes, as illustrated in Exhibit 5-9. The result will be a tighter web of routes and more routing options for cycling.

The Cycling Impact Analysis considers whether the cycling project connects with and closes gaps in the current Cycling Network and whether it increases routing options along the Cycling Network. Existing and planned cycling routes in adjacent municipalities were also included in this analysis. Additional information on the methodology for measuring connectivity is provided in Section 7.3.

EXHIBIT 5-1
CURRENT CYCLING DEMAND

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

AREA 2

AREA 1

LAKE ONTARIO

CITY OF MISSISSAUGA

Legend

- On-street Cycling Facility
- Trail
- Major Road
- Area 1 - Area 2 Boundary

Daily Cycling Trips (Originating & Ending)

- 0 - 68
- 69 - 136
- 137 - 205
- 206 - 341
- 342 - 545
- 546 - 886
- 887 - 1 363
- 1 364 - 2 795
- 2 796 - 17 383

N

0 3 6 km

1 cm = 1 km

CURRENT CYCLING DEMAND
This analysis highlights areas of the city where there are currently high volumes of cycling traffic, to visualize where the greatest number of existing cyclists could benefit from new or upgraded bikeways.
Data source: 2011 Toronto Transportation Tomorrow Survey (TTS) - total cycling trips.

Data source: IBI - 2015
Projection: NAD 1927 MTM 3

Date: March 2015
Cartography: Vélo Québec

EXHIBIT 5-2
POTENTIAL CYCLING DEMAND

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

AREA 2

AREA 1

CITY OF MISSISSAUGA

LAKE ONTARIO

Legend

- On-street Cycling Facility
- Trail
- Major Road
- Area 1 - Area 2 Boundary

Daily Non-cycling Trips 5 km or Less (Originating & Ending)

- 0 - 3 000
- 3 000 - 4 000
- 4 000 - 5 000
- 5 000 - 6 000
- 6 000 - 7 000
- 7 000 - 8 500
- 8 500 - 10 500
- 10 500 - 14 500
- 14 500 - 126 000

POTENTIAL CYCLING DEMAND
This analysis hhighlights areas where there is currently a high demand for short trips not currently being made by bicycle that coucld potentially be completed by bicycle in future..
Data Source: 2011 TTS non-cycling and non-walking trips of 5 km or less.

N

0 3 6 km

1 cm = 1 km

TORONTO IBI

Data source: IBI - 2015
Projection: NAD 1927 MTM 3

Date: March 2015
Cartography: Vélo Québec

Vélo Québec

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

AREA 2

AREA 1

LAKE ONTARIO

CITY OF MISSISSAUGA

Density
This analysis maps the number of residents and jobs per square km to visualize the extent to which the network as a whole is serving the areas of the city where the greatest number of people could access the cycling network.
Data source: Toronto City Planning - population and employment distributions

N

0 3 6 km

1 cm = 1 km

EXHIBIT 5-3
POPULATION AND EMPLOYMENT DENSITY

Legend

- On-street Cycling Facility
- Trail
- Major Road
- Area 1 - Area 2 Boundary

Population & Employment (2011)

- 0 - 2 000
- 2 000 - 4 000
- 4 000 - 6 000
- 6 000 - 8 000
- 8 000 - 10 000
- 10 000 - 12 000
- 12 000 - 14 000
- 14 000 - 16 000
- 16 000 and more

TORONTO IBI

Data source: IBI - 2015
Projection: NAD 1927 MTM 3

Date: May 2015
Cartography: Vélo Québec

VQ Vélo Québec

EXHIBIT 5-4
COVERAGE OF EXISTING BIKEWAY NETWORK

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

AREA 2

AREA 1

CITY OF MISSISSAUGA

LAKE ONTARIO

Legend

- On-street Cycling Facility
- Trail
- On-street Facility Buffer - 500 m
- Ttrail Access Point Buffer - 500 m
- Major road
- Area 1 - Area 2 Boundary

N

0 3 6 km

1 cm = 1 km

Coverage
This analysis will examine new cycling routes for parts of the City that currently lack bikeways. This analysis applies a buffer (up to 500m) around each bikeway project to measure the number of residents and employees that could be served, if a proposed bikeway were added to the existing network.

Data source: IBI - 2015
Projection: NAD 1927 MTM 3

Date: May 2015
Cartography: Vélo Québec

EXHIBIT 5-5
BARRIERS: FREEWAYS, RAILWAYS, RIVERS AND RAVINES

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

AREA 2

AREA 1

LAKE ONTARIO

CITY OF MISSISSAUGA

Legend

- On-street Cycling Facility
- Trail
- Planned LRT Route
- St. Clair Streetcar
- Ravine and Watercourse Barrier
- Freeway
- Major Road
- Railway
- Area 1 - Area 2 Boundary

Crossing Barriers
This analysis identifies opportunities to provide safer crossings where none exists within 1 km in either direction from a barrier, including highways, railways, rivers, ravines, etc. It will also consider opportunities to improve existing crossings.

0 3 6 km

1 cm = 1 km

Data source: IBI - 2015
Projection: NAD 1927 MTM 3

Date: May 2015
Cartography: Vélo Québec

EXHIBIT 5-6
VEHICLE-BICYCLE COLLISIONS: AREA 1

AREA 2

AREA 1

LAKE ONTARIO

Legend

- On-street Cycling Facility
- Trail
- Major Road
- Secondary Road
- Area 1 - Area 2 Boundary

Vehicle-Bicycle Collision Density

high

low

N

0 2 4 km

1 cm = 305 m

Safety
This analysis maps reported vehicle-bicycle collision locations along streets to assess the extent to which a proposed bikeway project could reduce cycling collisions and injuries. Data source: City of Toronto Transportation Services - police reported collisions involving bicycles from 2009 to 2013.

Data source: IBI - 2015
Projection: NAD 1927 MTM 3

Date: May 2015
Cartography: Vélo Québec

EXHIBIT 5-7
VEHICLE-BICYCLE COLLISIONS: AREA 2

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

AREA 2

AREA 1

CITY OF MISSISSAUGA

LAKE ONTARIO

Legend

- On-street Cycling Facility
- Trail
- Major Road
- Secondary Road
- Area 1 - Area 2 Boundary

Vehicle-Bicycle Collision Density

high

low

N

0 3 6 km

1 cm = 1 km

Safety
This analysis maps reported vehicle-cyclist collision locations along streets to assess the extent to which a proposed bikeway project could reduce cycling collisions and injuries. Data source: City of Toronto Transportation Services - police reported collisions involving bicycles from 2009 to 2013.

Data source: IBI - 2015
Projection: NAD 1927 MTM 3

Date: May 2015
Cartography: Vélo Québec

EXHIBIT 5-8
TRIP GENERATORS

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

AREA 2

AREA 1

CITY OF MISSISSAUGA

LAKE ONTARIO

Legend

- On-street Cycling Facility
- Trail

Toronto Transit Stations

- mobility hub
- rapid transit
- regional bus
- regional rail

- Secondary and Post-secondary Schools
- Major Road
- Area 1 - Area 2 Boundary

N

0 3 6 km

1 cm = 1 km

Trip Generators
This analysis measures the number of key trip generators served by a bikeway project, including: secondary and post-secondary schools, GO and TTC stations, and major attractions such as community centres, malls and museums/galleries.

Data source: IBI - 2015
Projection: NAD 1927 MTM 3

Date: May 2015
Cartography: Vélo Québec

EXHIBIT 5-9
CYCLING NETWORK CONNECTIVITY

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

AREA 2

AREA 1

LAKE ONTARIO

CITY OF MISSISSAUGA

Legend

- On-street Cycling Facility
- Trail
- Connection
- Terminus
- Major Road
- Area 1 - Area 2 Boundary

N

0 3 6 km

1 cm = 1 km

Connectivity
This analysis will highlight bikeway projects that can close gaps in the existing network by providing cycling-friendly connections between nearby routes. The result will be more routing options for cyclists using those facilties.

Data source: IBI - 2015
Projection: NAD 1927 MTM 3

Date: May 2015
Cartography: Vélo Québec

5.9 Higher-priority Transit Stations

Area 1 transit stations were not included since the Cycling Network is intended to be denser in this area where there is higher cycling demand, and population and employment density. Transit stations will not likely distinguish differences in the draft network.

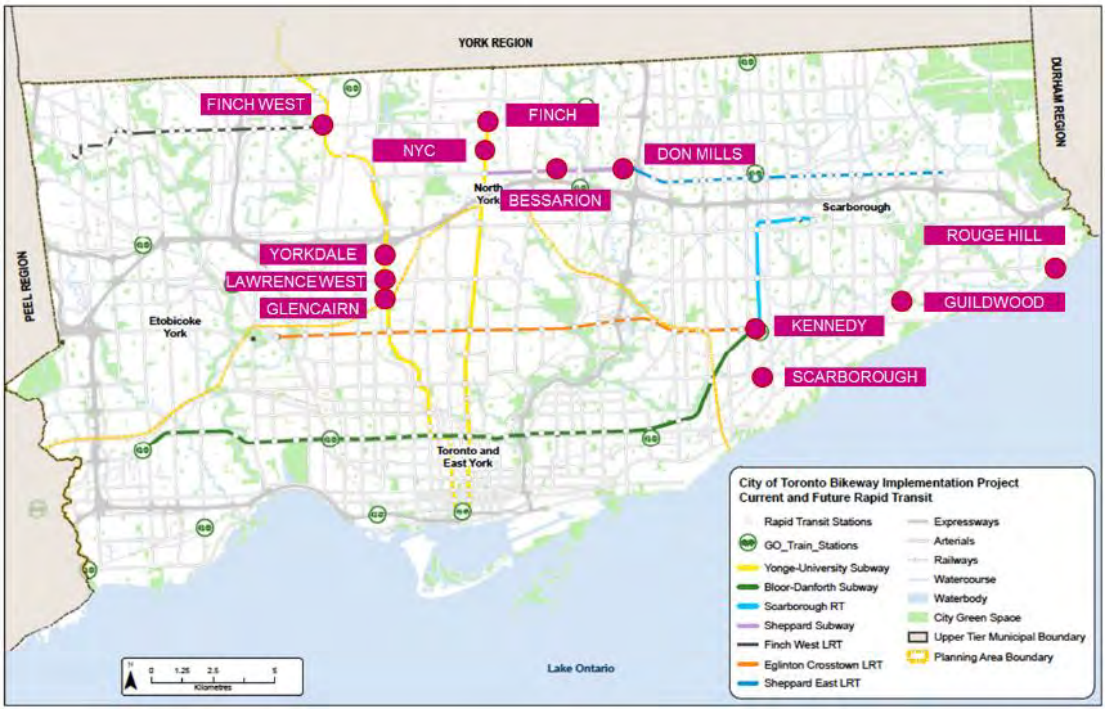
In Area 2, higher-priority TTC rapid transit (subway, LRT and SmartTrack) and GO Transit stations (with all day service) were identified as follows:

- How many people are currently accessing the station by walking or cycling; for future stations, how many trips are being made by walking or cycling near the transit station location (based on Transportation for Tomorrow Survey 2011 data);
- How many people are currently traveling to the station from a distance that could be easily traveled by bicycle (500 m to 2 km) (based on GO Transit and TTC Station Ridership Data);
- At what stations are there gaps in the existing Cycling Network;
- Are long-term bicycle parking facilities ("bicycle stations") planned for the transit station location; and,
- Priority is also given to those stations that are identified as mobility hubs with planning underway (from Metrolinx).

The transit stations identified in Area 2 of higher priority to connect to the Cycling Network are as follows and illustrated in Exhibit 5-10:

- Glencairn, Lawrence West, Yorkdale, Finch West, North York Centre and Finch stations on the Yonge-University Subway;
- Bessarion and Don Mills stations on the Sheppard Subway;
- Kennedy station on the Bloor-Danforth Subway, Eglinton Crosstown LRT and planned SmartTrack line;
- Scarborough station on the SmartTrack and GO Transit Lakeshore East line; and,
- Guildwood and Rouge Hill stations on the GO Transit Lakeshore East line.

Exhibit 5-10: Higher-priority Transit Stations in Area 2 Identified as Bicycle Trip Generators



These higher-priority transit stations guided network planning in the initial route identification phase. For example, where several candidate routes through a neighbourhood were identified, the route that best serviced the higher-priority transit station was considered to be a more desirable connection.