10 Recommended Ten Year Cycling Network Implementation Plan

The recommended Ten Year Cycling Network Implementation Plan identifies approximately 525 centreline kilometers (km) of new infrastructure (if counted in each lane direction, more than 1000 lane km). This new network includes:

- 280 centreline km of bicycle lanes or cycle tracks on Fast Busy Streets;
- 55 road km of sidewalk-level boulevard trails along Fast Busy Streets; and,
- 190 centreline km of cycling routes along Quiet Streets.

Included within this proposed network are approximately 100 centreline km along eight arterial roadways for which Major Corridor Studies would be undertaken to evaluate the feasibility of cycling facilities.

Five (5) major grade separations (bridges or tunnels) have been identified in order to provide cycling facilities that cross major highways, railways or ravines.

A summary of the proposed network length by facility types is provided in Exhibit 10-2.

The recommended 10-year Capital Plan scenario is the $16 M per year scenario ($140 M from 2017 to 2025). This scenario would provide the resources necessary to initiate the design and delivery of the vast majority (85%) of the proposed network projects. The program would allow for sixteen of the seventeen Major Corridor Studies identified to be initiated, so as to complete impact analysis, design and consultation. However, insufficient funding would be available to fund the construction of the proposed cycling infrastructure that may be recommended in four of the studies within the ten year period (namely cycling facilities along Midland Avenue and a Highway 401 crossing of Yonge Street would be unfunded). Four additional Full-time Equivalent (FTE) staff starting in year 2017 and two starting in year 2018 would be needed to deliver the projects.

In addition to new projects identified to connect and grow the Cycling Network, part of the mandate of the Cycling Network Implementation Plan will be to renew existing Cycling Network routes, to improve their quality. Existing bike lanes may be "renewed" by updating or improving the quality of their signs and markings. In some cases this may include the addition of new markings to intersections or the addition of painted buffers. In some cases bike lanes may be upgraded to cycle tracks if it is feasible to add separation. Signed routes on Quiet Streets may be upgraded with the addition of wayfinding, shared-lane pavement markings, or with additional traffic calming or traffic operational interventions to slow down or reduce the motor vehicle traffic. The Renew component of the Cycling Network Implementation Plan includes funding for this work as well as intersection safety improvements and the expansion of the City's new wayfinding signage strategy (refer to Section 9.1.1).

EXHIBIT 10-1
Map of Ten Year Cycling Network Implementation Plan
Recommended Routes

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

CITY OF BRAMPTON

CITY OF MISSISSAUGA

LAKE ONTARIO

Legend

Cycling Network and Trails Plan

- *Bike Lane / Cycle Track*
- *Trail / Boulevard Trail*
- *Quiet Street Route*
- *Tunnel or Bridge*
- *Major Corridor Study*

Existing Cycling Network

- *Bike Lane / Cycle Track*
- *Trail / Boulevard Trail*
- *Quiet Street Route*

- *Rail Line*
- *Freeway*
- *Major Road Arterial*
- *Road Network*
- *Green Space*

N

0 3 6 km

Data source: City of Toronto / IBI Group, 2016
Projection: NAD 1927 MTM 3

Date: April 2016
Cartography: Vélo Québec

10.1 Integration of 2012 Trail Plan Recommendations

The Ten Year Cycling Network Plan incorporates the projects identified in the *2012 Bikeway Trails Implementation Plan*[xxiv]. Approximately 17 km of trails were installed between 2012 and 2016 as part of this Plan. The remaining projects have been incorporated in the Ten Year Cycling Network Implementation Plan with the exception of the two trail segments as part of the Finch Corridor Trail (connection in west to Humber Trail and in the east to the Scarborough Railpath), and the northern limit of the proposed trail project along Black Creek was revised. These routes were identified as infeasible because they require large structures across highway and rail corridors and were replaced with the following on-street routing:

- Finch Street West installation as per the Finch LRT project (multi-use trail and cycle track) to connect the western limits of the Finch Corridor Trail (at Norfinch) with the Humber Trail. This avoids the challenging Hwy 400 crossing;
- McNicoll Avenue (between Pharmacy Avenue and Brahms Avenue) instead of the Finch Hydro Corridor to avoid the challenging Hwy 404 crossing;
- Finch Street East and Middlefield Road to connect to Scarborough Railpath, which avoids the challenging rail crossing required with the Finch Corridor Trail; and,
- Culford Road, between Black Creek Drive and Rustic Road, instead of following the boulevard for this northern segment of Black Creek Drive, which was found to be infeasible.

10.2 Implementation Plan Approval Process

The proposed Cycling Network Implementation Plan identifies and recommends on-street cycling routes that are well integrated with the bikeway trail routes to provide a cohesive system of cycling routes across the city. If approved by Council, the Cycling Network would be implemented as follows:

- Consider the capital funding required to implement the proposed Ten-Year Cycling Network Implementation Plan at a rate of $16 million dollars annually in the annual capital and operating budget process, as well as the operating budget required to fund the maintenance costs of newly constructed cycling infrastructure;
- Undertake the detailed design and public consultation required to deliver cycling infrastructure projects contained within the Ten-Year Cycling Network Implementation Plan;
- Undertake and manage the Major Corridor Studies identified for new cycling infrastructure contained within the Ten-Year Cycling Network Implementation Plan and report back to Public Works and Infrastructure Committee on each study's recommendations; and,
- Provide a two year update to the Public Works and Infrastructure Committee on implementation progress of the Ten Year Cycling Network Implementation Plan, and future updates as appropriate.

10.3 Exploring the Impacts of the Recommended Network

This discussion focuses on the impacts of providing a connected network. As the network plan outlined in this report is implemented, the quality and coverage of the Cycling Network will expand faster than it has ever before across the City of Toronto.

To clarify the terminology used in this section:

- The existing network refers to all of the network links that were installed as of December 2015;
- The recommended network refers to the full $16M network scenario identified through this plan, which includes all of the Major Corridor Studies; and,
- The approved network refers to the plan approved by council in June 2016 which excludes several major corridor studies identified in the recommended plan.

10.3.1 Summary of Recommended Network by District

The recommended network put forward in this plan provides a comprehensive network comprised of attractive and context-sensitive facilities throughout the four districts of the city. A summary of the types and length of facilities recommended to be implemented over the ten-year period is as follows, and as summarized in Exhibit 10-2 and Exhibit 10-3:

- In Etobicoke York District, the recommended network consists of 59 km of cycling facilities on Fast Busy Streets, 47 km on Quiet Street facilities, 23 km of multi-use trails including boulevard trails and off-street trails for a total of 129 km. This will increase the existing cycling network by about 80% from 156 km to a total of 285 km;
- In North York District, the recommended network consists of 64 km of cycling facilities on Fast Busy Streets, 67 km of Quiet Street facilities, and 28 km of multi-use trails. Added to the 122 km of existing cycling facilities, this will increase the network by about 130% to a total of 281 km in North York District;
- In Scarborough District, the recommended network consists of 79 km of cycling facilities on Fast Busy Streets, 17 km of Quiet Street facilities, and 42 km of trails for a total of 138 km. Added to the 134 km of existing cycling facilities, this will double the cycling network length to 252 km; and,
- In Toronto-East York District, the recommended network consists of 78 km of cycling facilities on Fast Busy Streets, 60 km on Quiet Streets, and 17 km of trails for a total of 155 km. Added to the 198 km of existing network, this will grow the cycling network by almost 80% to 353 km.

Some observations about the type of facilities that are recommended to be implemented over the ten-year period in each District are as follows:

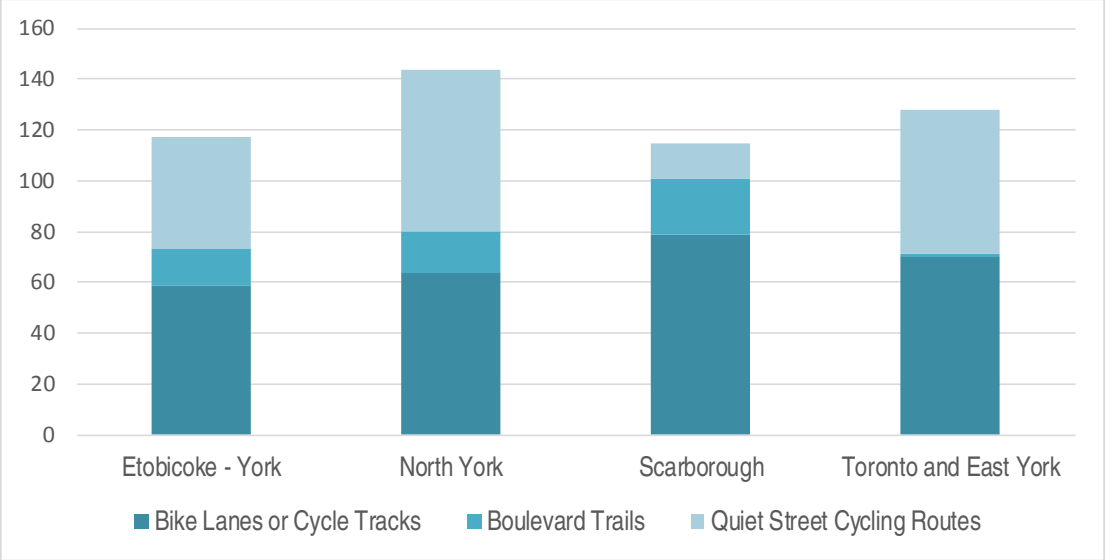
- The grid network of local streets in the Etobicoke District, Toronto and East York District and North York District allows for the development of direct routes using Quiet Streets. The predominantly curvilinear design of local streets in Scarborough District provides fewer opportunities for direct travel by Quiet Streets; and,
- There are fewer opportunities for boulevard trails along arterial roads in the Toronto and East York District due to the type of development fronting the streets.

The cycling network in Toronto and East York District will be more extensive than the other Districts when the recommended Ten Year Cycling Network Plan routes are complete. The greater route coverage is due to a number of factors in this District, including more cyclists and cycling trips, higher population and employment density, more short trips, and a longer existing cycling network (by 20 to 40%).

Exhibit 10-2: Summary Table – Centreline Kilometres of Existing and Recommended Network for Scenario 3 (Uplift to $16M Annual Budget)

Cycling Network Facility Type (Centreline km)	Total All Districts	Etobicoke - York	North York	Scarborough	Toronto and East York	Total All Districts	Total All Districts
	Existing	Recommended	Recommended	Recommended	Recommended	Recommended	Existing + Recommended
Fast Busy Streets							
Bike lanes	104 km	31 km	40 km	27 km	23 km	120 km	224 km
Buffered bike lanes	2 km	9 km	3 km	13 km	9 km	34 km	36 km
Cycle tracks	19 km	20 km	21 km	39 km	46 km	126 km	145 km
On-Street Facilities Subtotal	**125 km**	**59 km**	**64 km**	**79 km**	**78 km**	**280 km**	**405 km**
Trails	**Existing**						
Boulevard multi-use trail	33 km	13 km	15 km	21 km	1 km	49 km	82 km
Multi-use trail	264 km	2 km	2 km	2 km	0 km	6 km	270 km
Trails previously approved for constrcution by City Council (2012 Bikeway Trails Plan)	12 km	8 km	11 km	19 km	16 km	n/a	66 km
Trail Subtotal	**309 km**	**23 km**	**28 km**	**42 km**	**17 km**	**55 km**	**418 km**
Quiet Street Cycling Routes	**Existing**						
Quiet Streets Facilities Subtotal	**159 km**	**47 km**	**67 km**	**17 km**	**60 km**	**190 km**	**337 km**
Existing Network	**593 km**	**156 km**	**122 km**	**134 km**	**198 km**		
Recommended Network	**579 km**	**128 km**	**159 km**	**138 km**	**154 km**		
Total (Existing + Recommended) Network	**1,172 km**	**285 km**	**281 km**	**272 km**	**352 km**		

Exhibit 10-3: Scenario 3 Recommended Infrastructure - Centreline Kilometres by District



10.3.2 Improving Access to Transit

The proposed Cycling Network will dramatically improve access to both existing and proposed transit stations. For this analysis, the length of the existing, approved and recommended Cycling Networks that fall within 800m and 2000m of existing and future transit stations were summarized to provide a sense of the overall servicing of these stations, as illustrated in Exhibit 10-5.

A summary was also developed to calculate the total number of stations that are served in each scenario. Presently, 15 GO stations and 62 TTC stations are located within 800m of a Cycling Network route. If approved and constructed, the Cycling Network Implementation Plan Routes would be built in proximity to 4 additional GO Transit stations and 12 TTC Stations.

There are currently no Cycling Network routes in proximity to the following GO Transit and TTC Stations, but routes recommended as part of the Ten-Year Cycling Network Implementation Plan may be designed to serve these routes.

Exhibit 10-4: Existing Cycling Network and Transit Stations

GO STATION Underserved By Existing Cycling Network	TTC STATION Underserved By Existing Cycling Network		
Scarborough Station - GO	Sheppard-Yonge - TTC	Wilson - TTC	York Mills - TTC
Kipling - GO	Kipling - TTC	Bayview - TTC	Downsview - TTC
	Sheppard-Yonge - TTC	Ellesmere - TTC	Bessarion - TTC
	North York Centre - TTC	McCowan - TTC	Scarborough Centre - TTC

EXHIBIT 10-5
TRANSIT INTEGRATION WITH THE EXISTING CYCLING NETWORK

TOWN OF RICHMOND HILL

CITY OF MARKHAM

CITY OF PICKERING

CITY OF VAUGHAN

CITY OF BRAMPTON

CITY OF MISSISSAUGA

LAKE ONTARIO

Legend

Existing Cycling Network

- Bike Lane / Cycle Track
- Trail / Boulevard Trail
- Quiet Street Route

Transit Facilities

- GO Station
- Line 1 (Yonge - University)
- Line 2 (Bloor - Danforth) Line
- 3 (Scarborough) Line 4
- (Sheppard)
- 800 m Station Buffer
- 2000 m Station Buffer
- Rail Line
- Freeway
- Major Road
- Green Space

0 3 6 km

N

Data source: City of Toronto / IBI Group, 2016
Projection: NAD 1927 MTM 3

Date: July 2016
Cartography: Vélo Québec

10.3.3 Crossing Barriers

There were many comments received throughout plan consultation about the importance of crossing barriers, and the recommended network has the potential to dramatically improve access across some of the notable barriers throughout the city of Toronto, including Highway 401, Highway 427, Highway 400, the Humber River, the Don River and Don Valley Parkway, and the many rail lines bisecting the city.

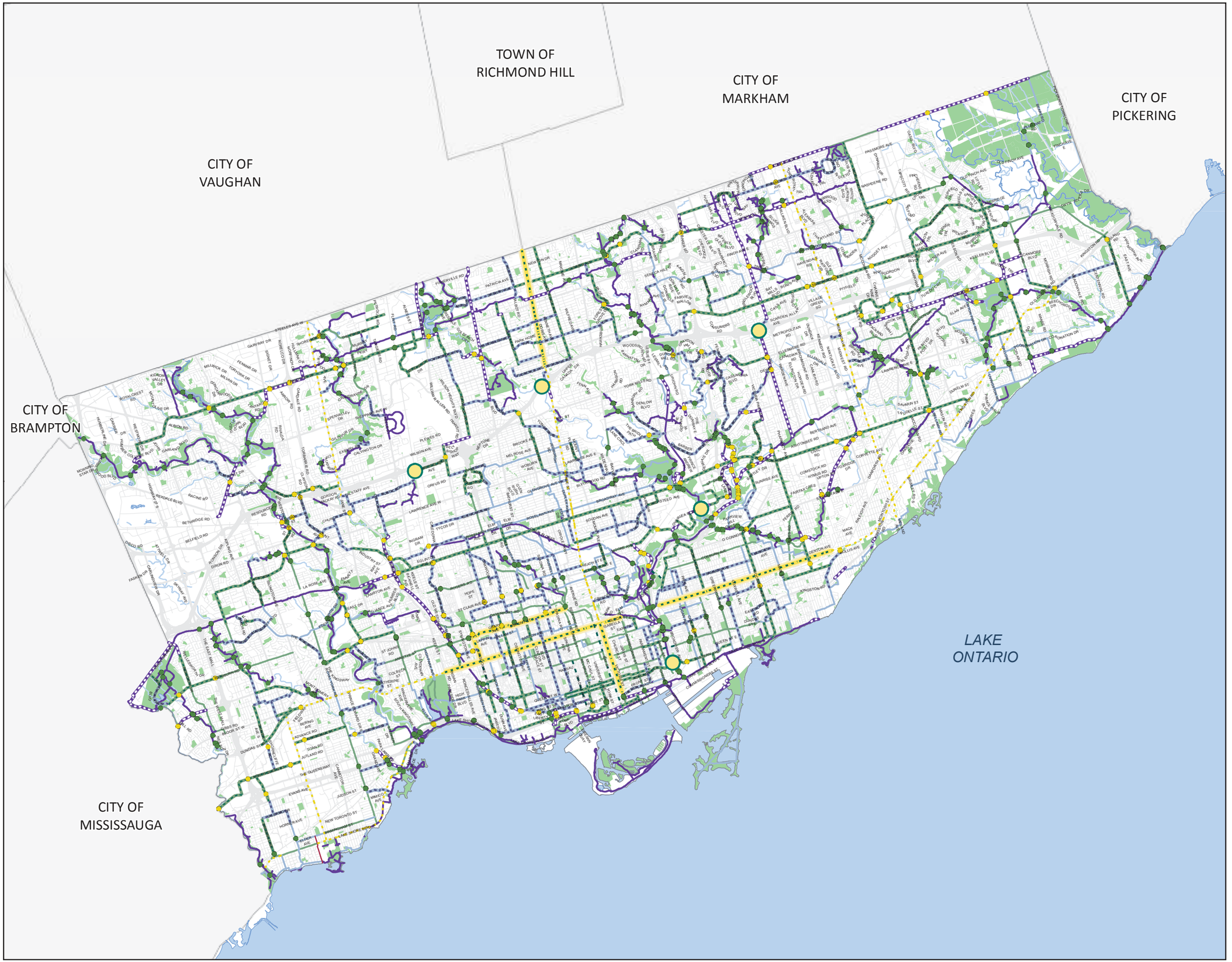
In order to illustrate the potential impact of the network, a geographic analysis of barriers was carried out. For this analysis, various barriers were identified and mapped using ArcGIS (including watercourses, freeways, rail lanes and median-running transit). The existing, approved and recommended Cycling Networks were analyzed for intersections with these barriers to give a sense of the impact of these routes.

As depicted in Exhibit 10-6, several types of barrier crossings are identified throughout the network.

Proposed Tunnels and Bridges:

Five (5) major grade separations (bridges or tunnels) have been identified in order to provide cycling facilities that cross major highways, railways or ravines. These grade separations would provide important links to cross significant barriers to Cycling Network connectivity and studies are recommended to further assess their feasibility and cost.

EXHIBIT 10-6
TEN YEAR CYCLING NETWORK AND BARRIER CROSSINGS



Legend

Ten Year Cycling Network
Recommended Scenario 3

- Bike Lane / Cycle Track
- Trail / Boulevard Trail
- Quiet Street Route
- Tunnel or Bridge
- Major Corridor Study

  Note: Initiation of a Major Corridor Study on Danforth Avenue subject to Council direction in Fall 2017
- Corridor where future study may be considered as part of the Cycling Network Plan 2 Year Review Report
- Proposed Barrier Crossing

Existing Cycling Network

- Bike Lane / Cycle Track
- Trail / Boulevard Trail
- Quiet Street Route
- Existing Barrier Crossing

- Rail Line
- Freeway
- Major Road
- Green Space

0 3 6 km

N

Data source: City of Toronto / IBI Group, 2016
Projection: NAD 1927 MTM 3

Date: July 2016
Cartography: Vélo Québec

Proposed Network Projects that Cross Barriers:

A number of the Cycling Network Projects also cross major barriers. The type of crossing provided will be worked out in detailed design with the appropriate approval agencies. The summary tables below illustrate the total number of crossings for each barrier type. Exhibit 10-9 also illustrates the additional crossings that make up the recommended network (including the Major Corridor Studies to be reviewed as part of the Cycling Network Implementation Plan Two Year Review Report) compared to the approved network. Of particular note are the four additional freeway crossings and ten additional rail line crossings associated with those corridors.

Exhibit 10-7: Proposed Cycling Network Projects that Cross Barriers

Project Name	Barrier Crossed	Proposed Facility Type(s)
Avenue Road - York Downs / Armour / Bombay / Avenue / Ridley	Hwy. 401	Bike Lanes or Cycle Tracks
Bloor - Keele to Dundas Street West	Humber River	Major Corridor Study
Dundas - Royal York to Scarlett	Humber River	Bike Lanes or Cycle Tracks
Dufferin - Dufferin / Ranee / Flemington / Blossomfield / Varna	Hwy. 401	Bike Lanes or Cycle Tracks
Eglinton - Approved as part of Eglinton Crosstown LRT	Don Valley Parkway	Bike Lanes or Cycle Tracks
Finch - Approved as part of Eglinton Crosstown LRT	Hwy. 400, Black Creek	Bike Lanes or Cycle Tracks
Jane - Steeles to south of Hwy. 401	Hwy. 401	Bike Lanes or Cycle Tracks
Kipling - Bloor to Waterfront Trail	Gardiner Expressway	Bike Lanes, Cycle Tracks or Boulevard Trail
Midland - Lawrence to Sheppard	Hwy. 401	Major Corridor Study
Morningside - Connection over Hwy. 401	Hwy. 401, Highland Creek	Bike Lanes or Cycle Tracks
North Queen - Mississauga to Kipling	Hwy. 427	Bike Lanes or Cycle Tracks
Port Union - Sheppard to Waterfront Trail	Hwy. 401	Bike Lanes or Cycle Tracks
Progress - Midland to Sheppard	Hwy. 401	Bike Lanes or Cycle Tracks
Rathburn - East Mall to Mississauga	Hwy. 427	Bike Lanes or Cycle Tracks
Sheppard - to be undertaken in coordination with Sheppard LRT	Hwy. 404	Bike Lanes or Cycle Tracks
St. Philips – Westway / Martin Grove / Lawrence / St Phillips	Humber River	Bike Lanes or Cycle Tracks

Exhibit 10-8: Proposed Cycling Network Projects that May Require a Grade Separation to Cross a Barrier

Project Name	Barrier Crossed
Overlea Bridge - (Thorncliff Park Drive to Don Mills Road)	Don River
Warden Hydro Corridor Tunnel - (Crocus to Warden Hydro Corridor)	401
Richmond-Adelaide - (Eastern to Power)	Don River
Yonge Street - (Linell - Don Valley Golf Course)	401
Rustic Road Bridge - (Connie Street to Cartwright Avenue)	Railway

Exhibit 10-9: Summary of Barrier Crossings

Type of Barrier	Number of New Locations the Barrier is Crossed	
	Approved Network	Recommended Network
St. Clair Streetcar	8	9
Freeways	31	35
Rail Lines	84	94
Rivers and creeks	85	98
Total	**208**	**236**

In addition to the crossings identified as part of the Ten Year Cycling Implementation Plan, additional upgrades to existing crossings and new grade-separated crossings may be implemented as part of Metrolinx or Ministry of Transportation, Ontario projects or other related planned infrastructure work not identified in this Plan.

10.4 Streets Not Identified as Cycling Network Routes

The approved network identifies capital projects for cycling infrastructure to be implemented over the ten years. It does not identify all potential cycling improvements or new infrastructure opportunities that may present themselves in the coming years or plan for a timeframe beyond the ten years. The following City of Toronto strategies will contribute to expansion of the cycling network beyond what has been identified in the Ten Year Cycling Implementation Plan.

10.4.1 Bicycle Friendly Streets

In 2001 Toronto City Council adopted the Toronto Bike Plan, which included Policy direction supporting investments for conceptual goals beyond the routes identified in the Cycling Network Ten Year Plan.

Section 5.2-2 of the Bike Plan states that the City of Toronto will "Develop a two kilometre grid of north-south and east-west routes. The guiding principle for the Cycling Network is that it be accessible within a five minute bike ride from all residences. Assuming a moderate cycling speed of 12 km/h, a five minute ride would cover one kilometre."

10.4.2 Complete Streets Guidelines

The City of Toronto's *Complete Streets Guidelines*[xxv] describe a design process which is inclusive for all modes. When observing the Complete Streets design process, the presence of the Cycling Network Implementation Plan routes means that the appropriate cycling facility type for the road class should be included as part of the scope of the project.

When the Complete Streets Design process is applied to streets where a Cycling Network Route has not been identified, the outcome may be a cycling facility, or modifications to the roadway that will improve conditions for cycling in the absence of dedicated cycling infrastructure.

Through this design process, space is allocated based on a variety of inputs including project objectives and constraints, local context, city-wide priorities and public engagement.

The complete streets design process helps improve conditions for cycling in Toronto in two ways:

- It ensures that cycling facilities are considered as part of the design process; and,
- It ensures that bike friendly streets policies are applied to all streets.

Safety is a fundamental goal of the Complete Streets Design process, and cannot be traded-off for other needs.

10.4.3 Streets Identified in Future Studies

At the time that each proposed Cycling Network project is scheduled, Transportation Services will work with local area councillors and undertake public consultation as part of the detailed design process. This process may result in new routes being identified in a given network, which would change or enhance the original network recommendations.

Finally, this implementation plan recognizes a number of studies being undertaken by other divisions or agencies, which may afford opportunities for additional routes to be added to the network. The studies actively underway at the time that the Ten Year Cycling Network Implementation Plan was being developed are mapped in Appendix F.

10.4.4 Revisions and Updates to the MCIC Projects

Coordinating the implementation of cycling facilities with MCIC projects will require some flexibility in the Cycling Infrastructure Delivery Program. It is anticipated that the Cycling Network can be implemented more efficiently with co-ordination than has been achieved in the past. As discussed in Section 7.2, MCIC projects are reviewed and adjusted quarterly and projects are shifted from year to year based on a variety of changing resources and priorities. The MCIC co-ordinated Cycling Network projects will also need to shift accordingly to match assigned road projects. In addition, new MCIC projects may be added within the ten year timeframe and may provide opportunities to include cycling facilities that have not been identified in this plan or other strategies.

Beyond ten years, continued MCIC co-ordination is recommended to enhance efficiencies of implementation and further expand the cycling network.