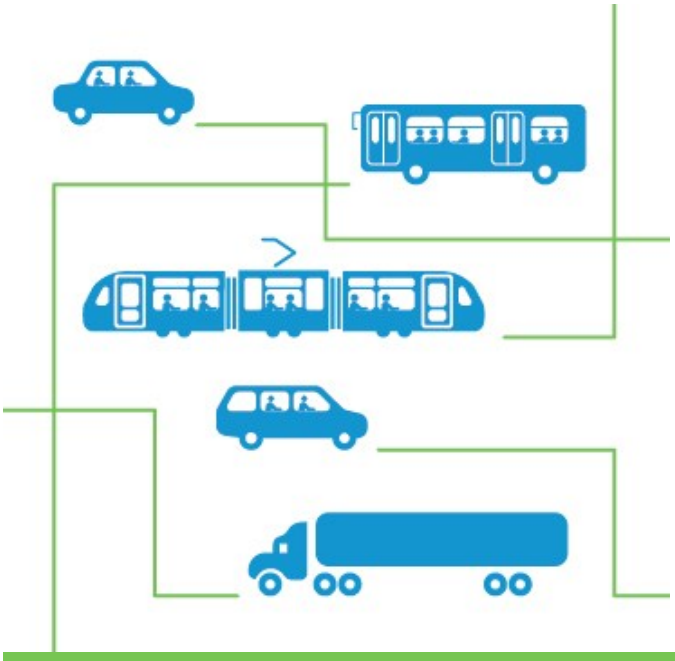


Grade Separation Review Technical Memo

City of Mississauga **Transit and Road Infrastructure Plan**

November 2022

Contents

1 Introduction

In 2019, the City of Mississauga completed its first Transportation Master Plan to guide policy planning and to direct investment in the City's transportation system. The Transit and Road Infrastructure Plan (TRIP) was initiated to address two action items identified in the Mississauga Transportation Master Plan: develop a long-term transit network plan and develop a long-term road network plan.

Anticipated growth in passenger rail, freight rail traffic, and forecasts for higher roadway demands at at-grade rail crossing locations increases exposure between trains and road users of all modes and raises safety concerns. This memo documents a planning-level assessment of the need and justification for grade separation at existing at-grade rail crossings, considering both existing and future exposure indices, other risk and safety criteria, and impacts to adjacent properties and accesses. We noted that this work is not an assessment of whether existing crossings are compliant with Transport Canada's Grade Crossing Regulations and Grade Crossing Standards.

2 Background Context

Trains crossing roadways are a barrier to road users of all modes. Future expansion of GO rail passenger service will result in more frequent delays to road users, specifically with the anticipated 15-minute all-day two-way service along Lakeshore West and Kitchener Lines and, potentially, Milton Line. Increased train frequencies also increase potential conflict between trains and road users at at-grade crossing locations across the rail network and is considered in this evaluation.

In summer 2022, there were two rail-related pedestrian fatalities in Mississauga. These collisions occurred at locations that were not intended for pedestrian crossings (not at a road or designated trail/path). While this assessment evaluates at-grade road-rail crossing locations only, it is important to recognize the impact of rail corridors throughout the municipality. Rail can be an efficient option for moving large volumes of people and goods across long distances. Rail can also act as a barrier that limits the number of crossing opportunities between neighbourhoods resulting in potentially longer and less convenient routes between destinations. The recommendations from this assessment will need to balance regional rail interests with safe, convenient crossing opportunities for all road users in Mississauga.

3 Existing Conditions

3.1 Freight Rail

The City of Mississauga is located at one of Canada's most important goods movement hubs and strategic location for national distribution. Goods movement affects the economy, employment, and transportation. In 2014, it was estimated that the movement of commodities by truck and rail in Peel Region, which includes Mississauga, Brampton and Caledon, was valued at $1.8 billion per day.

A map of all rail lines and key terminals and yards in and around Mississauga is shown in **Figure 3.1**. Rail lines serving goods movement are owned by Canadian National Railway (CNR), Canadian Pacific Railway (CPR), and Orangeville-Brampton Railway (OBRY). CPR operates intermodal terminals in Vaughan and Milton (with a yard in Toronto) while CNR operates an intermodal terminal in Brampton (with a yard in Vaughan).

As a result of Mississauga's geographical location within the strategic goods movement rail network, heavy freight trains regularly pass through the city. The interaction of freight trains and road users at at-grade crossing locations continues to be a safety concern due to potential conflicts between industrial goods and the growing number of road network users.

Figure 3.1. Greater Toronto Area Core Rail Strategic Goods Movement Network

Source: GTHA Strategic Goods Movement Network (2018)

3.2 Passenger Rail

There are three main rail lines in Mississauga that serve passenger trains – Lakeshore West, Milton, and Kitchener Lines. The Lakeshore West and Kitchener Lines are owned and operated by GO Transit and offer bi-directional all-day passenger rail service. The Milton Line shares a corridor with CPR and offers peak direction (towards/away from Toronto's Union Station depending on time of day) passenger rail service.

The future expansion of GO rail service to provide two-way all day-service at 15-minute frequencies across most passenger rail corridors will increase the frequency of train crossings and traffic delays at each at-grade rail crossing location.

3.3 At-Grade Rail Crossing Locations

At present, there are 27 at-grade rail crossings in Mississauga, with 19 crossings located on corridors with GO Transit passenger rail service. A summary of the rail lines, including ownership and number of at-grade rail crossings on each line, is provided in **Table 3-1** and shown in **Figure 3.2**. The proposed Drew Road extension and grade separation on the Kitchener Line, included in the City's current capital program, will be reconfirmed in this assessment.

The characteristics of each at-grade rail crossings in Mississauga are shown in **Table 3-2**. Each of these locations will be further assessed to identify potential need and justification for grade separation.

Table 3-1. Summary of Existing At-Grade Rail Crossings per Line

GO Transit / Subdivision Name	Owner	Location	Passenger Service	Freight Service	# of At-Grade Crossings
Lakeshore West Line	Metrolinx	Parallel and north of Lakeshore Road	✓		7
Milton Line	CPR	Diagonally across Mississauga (northwest to southeast)	✓	✓	11
Kitchener Line	Metrolinx	Diagonally across Mississauga (near Pearson Airport)	✓	✓	1
Halton Subdivision	CNR	On northern Mississauga border (parallel and north of Derry Road)		✓	1
OBRY / Owen Sound (Spur)	CPR	Diagonally northeast towards Brampton (diverges from Milton Line near Streetsville)		✓	4
Owen Sound Subdivision	Cando	Diagonally northeast into Brampton (connects Owen Sound Spur to Brampton)		✓	2
Oakville Subdivision (Petro Canada-Clarkson Spur)	CNR	Parallel and east of Southdown Road (diverges from Lakeshore West)		✓	1
				Total	**27**

Green shaded cells indicate lines with GO transit passenger service

Figure 3.2. Existing at-grade rail crossings in Mississauga

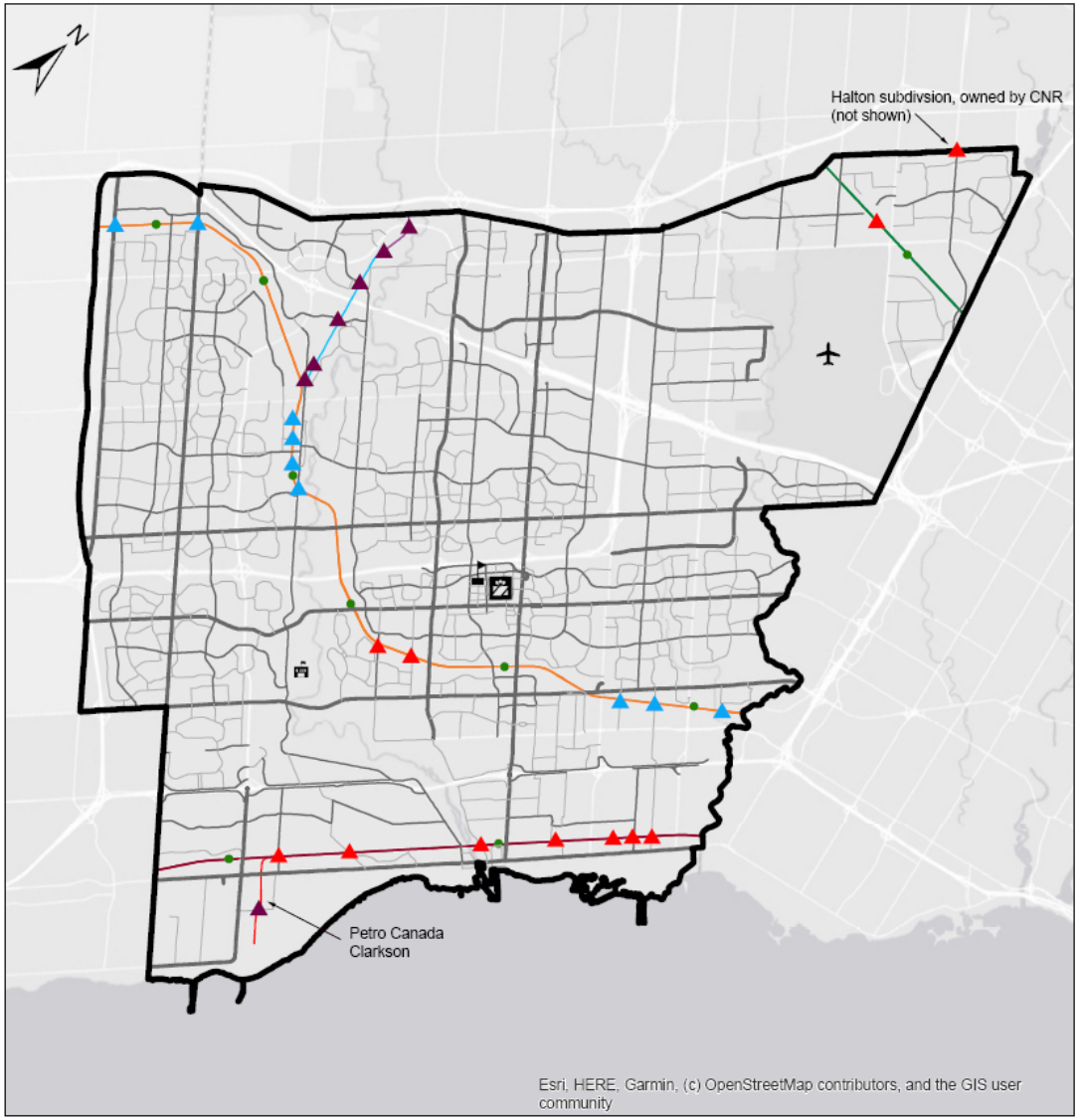


Table 3-2. List of Existing At-Grade Crossing Locations in Mississauga

GO Transit / Subdivision Name	Intersecting Street	Passenger Service	Freight Service	Number of Tracks at Crossing
Lakeshore West Line	Clarkson Road	✓		3
	Lorne Park Road	✓		3
	Stavebank Road	✓		3
	Revus Avenue	✓		3
	Alexandra Avenue	✓		3
	Ogden Avenue	✓		3
	Haig Boulevard	✓		3
Milton Line	Ninth Line	✓	✓	2
	Tenth Line	✓	✓	2
	Ontario Street	✓	✓	2
	Tannery Street	✓	✓	2
	Thomas Street	✓	✓	2
	Mississauga Road	✓	✓	2
	Erindale Station Road	✓	✓	3
	Wolfedale Road	✓	✓	3
	Haines Road	✓	✓	2
	Stanfield Road	✓	✓	2
	Loreland Avenue	✓	✓	2
Kitchener Line	Scarboro Street	✓	✓	3
Halton Subdivision	Goreway Drive		✓	3
OBRY / Owen Sound (Spur)	Creditview Road		✓	1
	Argentia Road		✓	1
	Alpha Mills Road		✓	1
	Queen Street		✓	1
Owen Sound Subdivision	Derry Road		✓	1
	Atwood Lane		✓	1
Oakville Subdivision (Petro Canada-Clarkson Spur)	Orr Road		✓	1

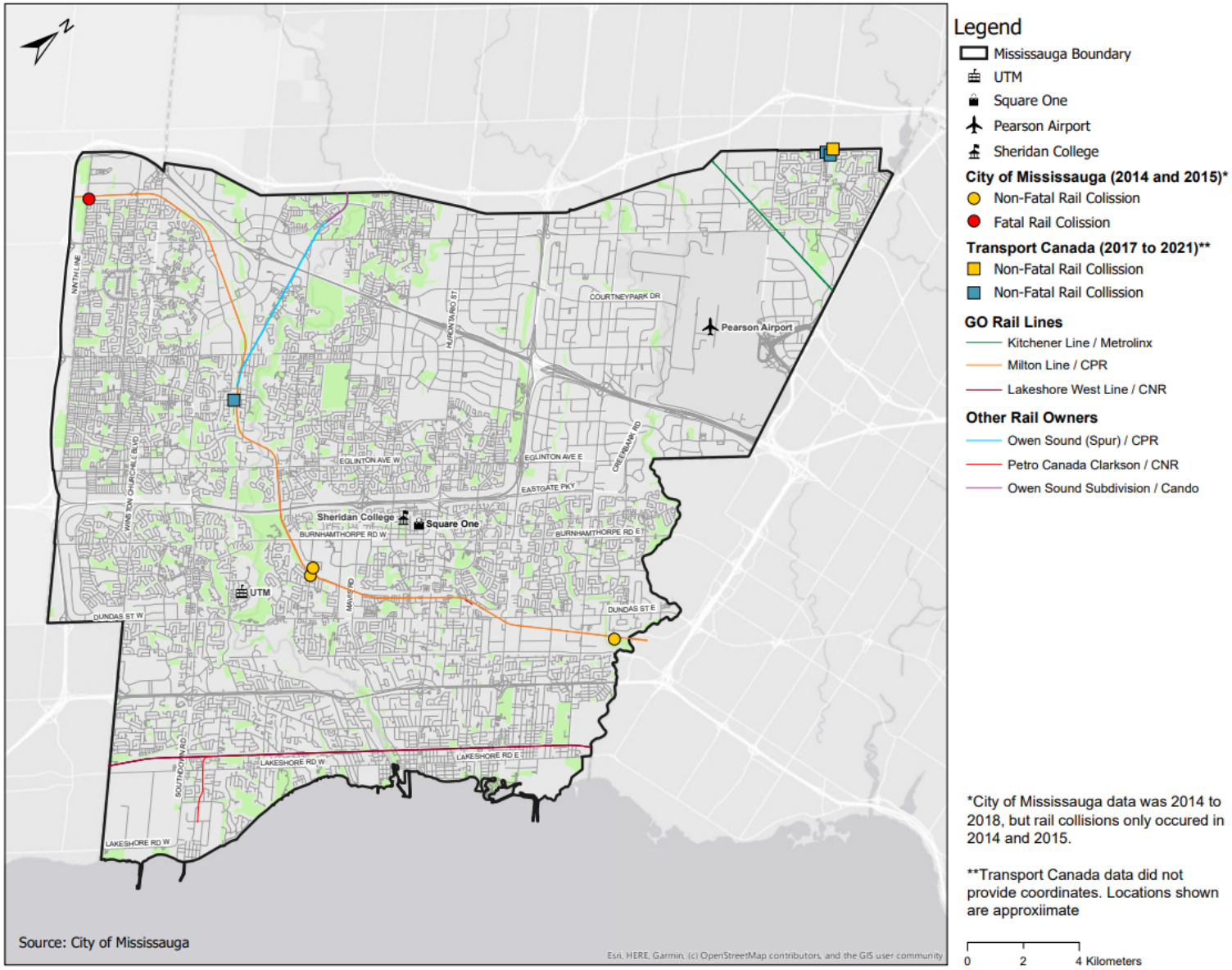
Green shaded cells indicate lines with GO rail passenger service

3.4 Collisions

Traffic collision data was provided by the City of Mississauga for the years 2014 to 2018 and are categorized as either fatal or non-fatal. In the 5-year period from 2014 to 2018, there have been four rail-related collisions on roadways and all occurred in 2014 or 2015. One collision was fatal and occurred in 2015 at Ninth Line. The three other rail/road collisions at Loreland Avenue and at Erindale Station Road (two instances) were non-fatal. Transport Canada data (dated November 2021) provides collision data at at-grade rail crossing locations for the years 2017 to 2021 and are categorized as accident, fatality, or injury. The data indicates one injury collision occurred at the crossing on Goreway Drive and three accident collisions at Thomas Street and at Goreway Drive (two instances). A map of all reported rail/road collisions is shown in **Figure 3.3**.

The data used in this assessment does not include two recent fatalities that occurred in 2022 at non-road crossing locations near Dundas Street and Cawthra Road. The two tragic collisions with pedestrians at un-marked crossings are being investigated by the Transportation Safety Board, Metrolinx and Peel Regional Police.

Figure 3.3. Collisions at Road-Rail Crossings in Mississauga (2014 to 2021)



4 Methodology

4.1 Evaluation Criteria

Transport Canada developed Grade Separation Assessment Guidelines to help railway companies and road authorities assess the need for grade separation improvements to remove road/rail conflicts at crossing locations. The grade separation assessment considers several criteria as noted in **Table 4-1**, including quantitative traffic and safety related criteria (with thresholds) as well as other qualitative criteria. It is noted Transport Canada also uses these criteria in an internal risk assessment tool to rank grade crossings relative to each other; however, the ranking is not comprehensive. Other important factors such as sightline visibility, road grades, crossing angle and proximity to nearby intersections are not considered.

For this assessment, criteria such as Annual Average Daily Traffic (AADT) volumes, train volumes, and a cross product of AADT and train volumes (commonly referred to as an 'exposure index') are considered primary indicators for potential grade separation. Where applicable, additional criteria (including any physical constraints) will be considered in the evaluation and final assessment. The evaluation approach is consistent with other high-level planning prioritization procedures for proposed road-rail grade separation assessments considered in Peel Region (2014)[1] and the United States (2019)[2]. It is noted that Transport Canada criteria such as queuing, vehicle delay, and level-of-service (LOS) were not considered in this assessment due to limited data. Recommendations will be cross referenced with Transport Canada's ranking for consistency.

[2] https://nap.nationalacademies.org/catalog/25460/prioritization-procedure-for-proposed-road-rail-grade-separation-projects-along-specific-rail-corridors

Table 4-1. Transport Canada Criteria for Grade Crossing Assessment for Grade Separation

Criteria	Threshold (if applicable)
Quantitative Criteria	
Daily Traffic Volume [Annual Average Daily Traffic (AADT)]	100,000
Daily Train Volume	150
Cross Product *(AADT x Daily Train Volume)* (also known as Exposure Index)	1,000,000
Vehicle Speed (km / h)	90
Queuing (m)	30
Maximum Train Speed (km / h)	177
Vehicle Delay (h/day)	40
Level of Service (LOS)	Performing at LOS below intended minimum design level >10% of the time
Qualitative Criteria	
Collision history Blocked crossing issues Number of highway/roadway lanes Number of railway tracks Types of railway traffic Highway functional classification Road surface type Environmental impacts Air quality / emissions Noise disruptions in community	n/a

Shaded grey cells indicate primary indicators used for potential grade separation in this assessment.

5 Data and Assumptions

5.1 Daily Traffic Volumes

Annual Average Daily Traffic (AADT) data was available through both Transport Canada (dated September 2020) and the City's inventory of traffic data. The cross product was conservatively calculated using the higher AADT from the two sources; it is noted that at more than 80% of at-grade locations, the City's traffic data are more than 5 years old and a 2% annual growth was used to adjust to 2022 conditions. For locations where the City did not have counts, daily traffic volumes were estimated using the City's 2016 AM peak hour travel demand model (with a peak hour to daily adjustment factor of 10).

Future AADT was estimated using existing AADT with growth rates from the City's travel demand model (EMME) between 2016 and 2041 horizons, where applicable. The 2041 model assumes the draft preferred network presented to the City in Spring 2022.

5.2 Train Frequencies

The existing and future number of daily train assumptions are shown in **Table 5-1** and are based on both Transport Canada data (dated September 2020) and pre-pandemic GO service (2019). It is noted that rail services have been terminated on the OBRY / Owen Sound spur and subdivision effective December 2021 and will not have any future train service [3]. There is also no information regarding future train frequencies for other freight rail service.

Table 5-1. Number of Existing and Future Daily Trains

Count	Lakeshore West	Milton	Kitchener	Halton	Owen Sound Spur	Owen Sound	Oakville
Existing							
# of Daily GO Trains	114	20	36	-	-	-	-
# of Daily Other Trains	48	5	16	36	9	9	9
# of Daily Trains*	162	25	52	36	9	9	9
Future (2041)							
# of Daily GO Trains**	160	24	160	-	-	-	-
# of Daily Other Trains^	48	5	16	36	0	0	5
# of Daily Trains	208	29	176	36	0	0	5

*Current number of daily trains based on Transport Canada information

**Assumed GO Expansion with 15-minute frequencies both ways for 20 hours of the day along Lakeshore West and Kitchener Lines. Milton Line assumed to have 2 more trains per peak direction.

^Future estimated daily freight trains assumed to be the same as existing conditions

[3] https://www.orangeville.ca/en/news/orangeville-brampton-rail-access-group-to-terminate-agreement.aspx

5.3 Transport Canada Ranking

Transport Canada ranked over 25,000 existing at-grade crossing locations throughout Canada based on relative risk based on the following factors:

- Transportation Safety Board (TSB) data on rail occurrences
- volume of road and railway traffic
- maximum train and vehicle speeds
- number of tracks and lanes
- urban or rural environment
- warning systems in place at the crossing (i.e., gates, bells, lights)

The risk ranking of at-grade crossing locations in Mississauga relative to all other crossings in Canada and relative to other crossings in Mississauga only are shown in **Table 5-2**.

Table 5-2. Risk Ranking of At-Grade Rail Crossing Locations in Mississauga

Location	Transport Canada Canada-wide Ranking	Ranking relative to other Mississauga Crossings
Lakeshore West Line		
Clarkson Road	41	5
Lorne Park Road	21	1
Stavebank Road	44	6
Revus Avenue	32	3
Alexandra Avenue	40	4
Ogden Avenue	30	2
Haig Boulevard	47	7
Milton Line		
Ninth Line	2,736	19
Tenth Line	1,332	11
Ontario Street	3,582	21
Tannery Street	2,978	20
Thomas Street	443	10
Mississauga Road	1,495	13
Erindale Station Road	1,496	14
Wolfedale Road	1,408	12
Haines Road	1,837	17
Stanfield Road	1,748	16
Loreland Avenue	6,169	24
Kitchener Line		
Scarboro Street	399	9
Halton Subdivision		
Goreway Drive	62	8

Location	Transport Canada Canada-wide Ranking	Ranking relative to other Mississauga Crossings
Owen Sound Spur Subdivision		
Creditview Road	4,239	23
Argentia Road	10,951	26
Alpha Mills Road	10,025	25
Queen Street	2,125	18
OBRY / Owen Sound Subdivision		
Derry Road	1,585	15
Atwood Lane	20,084	27
Oakville Subdivision (Petro Canada-Clarkson Spur)		
Orr Road	3,617	22

6 Assessment

6.1 Existing Conditions Review

A summary of existing train volumes, traffic volumes, and resulting cross product is provided in **Table 6-1**.

All at-grade rail crossings on Lakeshore West currently exceed the 150 daily trains threshold for consideration of grade separation with 162 trains using the corridor daily. In addition, the cross product threshold of 1 million is exceeded at Lorne Park Road (1.1 million) and at Clarkson Road (2.2 million).

6.2 Future Conditions Review

A summary of future trains, traffic volumes, and cross product is also provided in **Table 6-1**. All at-grade rail crossings along both Lakeshore West and Kitchener West Lines are expected to exceed the 150 daily trains threshold, with at least 176 trains using the corridor daily. In addition, the cross product for many at-grade rail crossings will exceed 1 million. These include crossings at Clarkson Road, Lorne Park Road, Stavebank Road, Alexandra Avenue, and Ogden Avenue.

It is noted that, due to lack of data, no changes to freight train frequencies have been assumed. Increases in daily freight trains would result in a cross product greater than 1 million at Goreway Drive, Scarboro Street, and Wolfedale Road, where the future cross product is currently estimated between 700,000 and 900,000.

The future GO train frequency on the Milton Line assumes only two additional trains per peak direction due to current shared corridor restrictions with CPR. If GO train service on the Milton Line is expanded to have similar service that is currently provided on the Kitchener Line (52 daily trains), then the cross product at Tenth Line, Wolfedale Road, and Mississauga Road (Queen Street) will also exceed the 1 million threshold. Other locations nearing the cross product threshold (more than 900,000) include Ninth Line and Thomas Street.

Table 6-1. Summary of Daily Trains, AADT, and Cross Product for Existing and Future Conditions

Location	Existing Daily Trains	Existing AADT	Existing Cross Product	Future Daily Trains	Future AADT	Future Cross Product
Threshold	**150**	**100,000**	**1,000,000**	**150**	**100,000**	**1,000,000**
Lakeshore West Line						
Clarkson Road	162	13,578	2,200,000	208	13,600	2,828,800
Lorne Park Road	162	7,000	1,134,000	208	7,000	1,456,000
Stavebank Road	162	5,400	875,000	208	5,400	1,123,200
Revus Avenue	162	2,930	475,000	208	2,900	603,200
Alexandra Avenue	162	2,053	333,000	208	6,500	1,352,000
Ogden Avenue	162	4,157	673,000	208	15,300	3,182,400
Haig Boulevard	162	3,100	502,000	208	3,700	769,600
Milton Line						
Ninth Line	25	6,894	172,000	29	18,100	524,900
Tenth Line	25	8,000	200,000	29	20,100	582,900
Ontario Street	25	750	19,000	29	800	23,200
Tannery Street	25	6,000	150,000	29	6,000	174,000
Thomas Street	25	14,952	374,000	29	17,400	504,600
Mississauga Road	25	16,888	422,000	29	21,800	632,200
Erindale Station Road	25	15,700	393,000	29	16,700	484,300
Wolfedale Road	25	11,880	297,000	29	25,200	730,800
Haines Road	25	9,700	243,000	29	9,700	281,300
Stanfield Road	25	8,000	200,000	29	9,400	272,600
Loreland Avenue	25	125	3,000	29	100	2,900
Kitchener Line						
Scarboro Street	52	1,500	78,000	176	1,800	316,800
Drew Road Extension*	n/a	n/a	n/a	176	19,400	3,414,400
Halton Subdivision						
Goreway Drive	36	19,400	698,000	36	22,300	802,800

Location	Existing Daily Trains	Existing AADT	Existing Cross Product	Future Daily Trains	Future AADT	Future Cross Product
Owen Sound Spur Subdivision						
Creditview Road	9	11,700	105,000	0	19,800	0
Argentia Road	9	14,971	135,000	0	27,000	0
Alpha Mills Road	9	1,500	14,000	0	3,500	0
Queen Street	9	13,000	117,000	0	14,100	0
OBRY / Owen Sound Subdivision						
Derry Road	9	46,700	420,000	0	46,700	0
Atwood Lane	9	1	-	0	-	0
Oakville Subdivision (Petro Canada-Clarkson Spur)						
Orr Road	5	8,500	43,000	5	8,500	42,500

Values in red indicate values that exceed Transport Canada criteria thresholds.
*Future crossing location included to reconfirm capital program recommendation for grade separation.

6.3 Built Environment Review

A desktop review of the surrounding area at each at-grade rail crossing location was conducted to evaluate site specific conditions that may impact the feasibility of future grade separation. Factors considered in the review include the urban structure surrounding the at-grade rail crossing and any nearby driveway accesses or intersections. Further description of each factor is provided below.

- **Community Node** character areas in Mississauga are defined as areas with a mix of population and employment uses at densities and heights less than the Downtown or Major Nodes[4]. These areas are generally older, established communities with historical features and restrictions such as maximum building heights of four storeys (with exceptions). Building a grade separation structure at crossings in Community Nodes may be challenging due to the surrounding built environment. Community nodes in Mississauga include Streetsville, Port Credit, and Clarkson Village. An example of an at-grade rail crossing location within a community node is at Tannery Street in Streetsville, as shown in **Figure 6.1**.

  Figure 6.1. Rail Crossing in Community Node: Tannery Street in Streetsville, west of Milton Line (facing east)

  Source: Google Streetview

- **Neighbourhoods** primarily feature residential dwellings with supporting community and commercial land uses. Rail lines often bisect neighbourhoods and can act as a barrier that constrains local access between neighbourhoods. At-grade rail crossings accommodate active modes by providing convenient, direct connections between neighbourhoods; however, this also presents safety concerns for road users, especially

[4] https://www.mississauga.ca/wp-content/uploads/2021/12/20112802/Chapter14-Community-Nodes-April8-2021.pdf

vulnerable road users. Future increases in train frequencies will continue to challenge safe operations of at-grade rail crossings in neighbourhoods with high pedestrian and cycling activity and will need to be taken into consideration. An example of an at-grade crossing in a neighbourhood area is shown in **Figure 6.2**.

Figure 6.2. Rail Crossing in Neighbourhood Area: Revus Avenue at Lakeshore West Line

Source: Google Maps

- **Employment** areas feature businesses and economic activities. These locations are expected to be more industrial in nature and thus generate more truck traffic for goods movement. Mississauga and the rest of Peel Region will continue to be a strategic location for goods movement in Canada. It will be important to consider safety and congestion concerns due to higher truck volumes in employment areas, especially with anticipated growth in daily train frequencies resulting in more frequent traffic delays. An example of an at-grade rail crossing location in an employment area is at Wolfedale Road on the Milton Line as shown in **Figure 6.3**.

Figure 6.3. Rail Crossing in Employment area: Wolfedale Road south of Milton Line (facing north)

Source: Google Streetview

- **Nearby accesses** are driveways or side streets that would be difficult or impossible to accommodate if a grade separation were proposed due to grade differentials and impacts to property. Generally, these access locations are less than 50 m from the rail crossing location and do not appear to have reasonable alternative accesses. An example of an at-grade rail crossing location with an access nearby that would be severely impacted by grade separation is on Alexandra Avenue as shown in **Figure 6.4**.

Figure 6.4. Rail Crossing with Nearby Driveways: Alexandra Ave south of Lakeshore West Line (looking north)

Source: Google Streetview

- Alternative routes across the railway line may be available on parallel roadways or via active transportation structures for pedestrians and cyclists. Where rail crosses closely spaced parallel roads, providing a road-rail grade separation at just one location could divert traffic to address traffic delay concerns at the remaining at-grade crossing.

A summary of the built environment results by at-grade rail crossing location is shown in **Table 6-2**. Some notable observations of the assessment include the following:

- All at-grade rail crossing locations along the Lakeshore West Line are in Neighbourhood areas with nearby access points that will make it challenging to implement a grade separation without significant property impacts. In addition, Clarkson Road and Stavebank Road are located along the boundaries of Clarkson Village and Port Credit Community Nodes, respectively. Proposed increases in GO passenger rail service on the Lakeshore West corridor will mean frequent traffic delays.
- The Milton Line traverses several employment areas east of Creditview Road. It also bisects the Streetsville Community Node where there are several at-grade rail crossing locations.
- At-grade rail crossing locations at Scarboro Street and Derry Road are close to existing structures over creeks and would require additional structures to accommodate rail grade separation
- Some crossing locations appear to have reasonable alternative routes for roadway users. Active transportation structures may be considered as a lower cost option to road-rail grade separation. Standalone examples include Atwood Lane, Alpha Mills Road, and Scarboro Street. Location pairs where one crossing can remain open while the other closes include Alexandra Avenue and Ogden Avenue.

Table 6-2. Summary of Built Environment Surrounding At-Grade Rail Crossings

Location	Community Node	Neighbourhood Area	Employment Area	Nearby Access / Property Constraints	Road Class	Other Remarks
Lakeshore West Line						
Clarkson Road	Clarkson	✓		✓	Major Collector	
Lorne Park Road		✓		✓	Minor Collector	
Stavebank Road	Port Credit	✓		✓	Minor Collector (Scenic)	Stavebank Road is currently elevated to meet railway at-grade.
Revus Avenue		✓		✓	Minor Collector and Local	No sidewalk warning gate (crosses 3 rail lines)
Alexandra Avenue		✓		✓	Local	
Ogden Avenue		✓		✓	Major Collector	MiWay Route 5 - Dixie crosses this location.
Haig Boulevard		✓		✓	Minor Collector	No sidewalk warning gate (crosses 3 rail lines)
Milton Line						
Ninth Line					Arterial Road	
Tenth Line					Major Collector	
Ontario Street	Streetsville	✓		✓	Local	Nearby retirement residence. No sidewalk warning gate (crosses 2 rail lines).
Tannery Street	Streetsville	✓		✓	Minor Collector	
Thomas Street	Streetsville	✓	✓	✓	Major Collector	MiWay Route 9 - Rathburn/Thomas crosses this location. No sidewalk warning gate (crosses 2 rail lines).
Mississauga Road	Streetsville	✓		✓	Major Collector (Scenic)	MiWay Route 9 - Rathburn/Thomas crosses this location.
Erindale Station Road		✓	✓		Major Collector	No sidewalk warning gate (crosses 3 rail lines).
Wolfedale Road		✓	✓		Minor Collector	MiWay Route 38 - Creditview crosses this location. No sidewalk warning gate (crosses 3 rail lines).
Haines Road			✓		Minor Collector	MiWay Route 51 - Tomken crosses this location. No sidewalk warning gate (crosses 2 rail lines).
Stanfield Road			✓		Minor Collector	MiWay Route 51 - Tomken crosses this location. No sidewalk warning gate (crosses 2 rail lines).
Loreland Avenue			✓		Local	Road serves a single land parcel for industrial purposes. No sidewalk warning gate (crosses 2 rail lines).
Kitchener Line						
Scarboro Street		✓			Local	Grade separation would likely require consideration of nearby creek. Scarboro Street is currently elevated to meet railway at-grade. No sidewalk warning gate (crosses 3 rail lines). MiWay Routes 24 - Northwest and 30 - Rexdale crosses this crossing.
Drew Road			✓		Major Collector	Included in City's capital program as grade separation.
Halton Subdivision						
Goreway Drive		✓	✓		Major Collector	Planned grade separation (included in City's capital program for 2023-2025).

Location	Community Node	Neighbourhood Area	Employment Area	Nearby Access / Property Constraints	Road Class	Other Remarks
Owen Sound Spur Subdivision						
Creditview Road			✓		Minor Collector	No sidewalk warning gate.
Argentia Road		✓	✓		Minor Collector	No sidewalk warning gate.
Alpha Mills Road	Streetsville			✓	Minor Collector	No sidewalk warning gate.
Queen Street	Streetsville		✓		Minor Collector	No sidewalk warning gate.
OBRY / Owen Sound Subdivision						
Derry Road					Arterial Road	Grade separation would likely require consideration of nearby creek. MiWay Route 42 - Derry crosses this location. No sidewalk warning gate.
Atwood Lane		✓			Local	No sidewalk warning gate.
Oakville Subdivision (Petro Canada-Clarkson Spur)						
Orr Road		✓		✓	Minor Collector	Road serves a single land parcel for industrial purposes No sidewalk warning gate.

6.4 Alternatives to Road-Rail Grade Separation

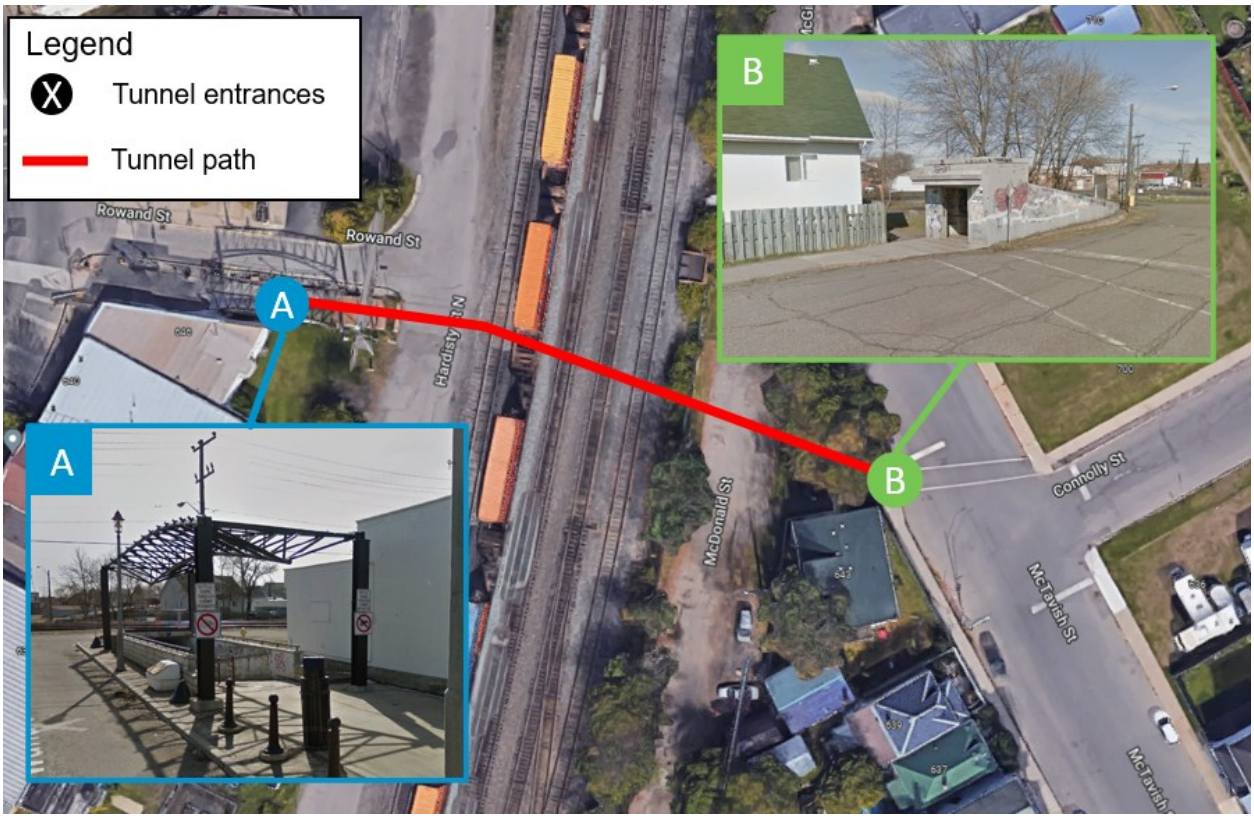
Road-rail grade separation is one approach to removing the conflict between train traffic and roadway users. Other alternatives to remove conflicts that could be considered are:

- Closing the roadway to all road users.
- Closing the roadway but providing an active transportation bridge or tunnel for pedestrians and cyclists. It is noted that these structures may be perceived as inconvenient due to stairs or long ramps, or unsafe due to poor natural surveillance and isolated areas if not properly designed. An example of an active transportation bridge is shown in **Figure 6.5** and an example of an active transportation tunnel is shown in **Figure 6.6**.

Figure 6.5. Active Transportation Structure over the QEW (east of Ogden Avenue and South Service Road, looking west)

Source: Google Streetview

Figure 6.6. Active Transportation Tunnel connecting Simpson Street and McTavish Street under a rail line in Thunder Bay



Source: Google Maps / Google Streetview

6.5 Recommendations

Recommendations for the at-grade rail crossings in Mississauga are summarized in **Table 6-3**.

All at-grade rail crossings along Lakeshore West and Kitchener Lines have been identified for modifications or monitoring due to anticipated increases to passenger rail services along those corridors.

Lakeshore West Line

- Grade separation should be further explored at Clarkson Road, Lorne Park Road, Stavebank Road, and Ogden Avenue locations due to high cross product from both high train frequencies and moderate traffic volumes. A feasibility study is needed to determine constructability and property/access impacts at each location.
- Revus Avenue is recommended for continued monitoring due to low traffic volumes, with road closure considered as a next step to address potential safety concerns. It is noted Revus Avenue is the only road crossing within the 2 km span between Hurontario Street and Cawthra Road. An active transportation structure should be explored for Revus Avenue to provide for continued pedestrian and cyclist access across the rail line if a road closure is implemented.

- A traffic study to determine the feasibility of a road closure at Alexandra Avenue should be conducted. The recommended grade separation at Ogden Avenue, less than 300 m to the east, would maintain connectivity across the rail line in the area.
- Haig Boulevard is recommended for continued monitoring due to proposed development in the area that may result in additional traffic diverted to this corridor. Grade separation should be considered as a next step to address potential safety concerns.

Kitchener Line

- A road closure should be considered at Scarboro Street. A grade-separated crossing is provided on Airport Road approximately 350 m to the east. An active transportation structure should be considered to maintain a pedestrian and cycling connection between the neighbourhoods on both sides of the rail corridor.
- The future Drew Road extension should be grade separated at the rail line. High train volumes and high future traffic volumes, including truck traffic generated in the industrial areas on both sides of rail line, meet the criteria for grade separation.

Milton Line

- No changes are recommended for crossings along the Milton Line if train traffic is maintained at current levels; however, if GO rail service is expanded with more frequent service throughout the day, grade separation should be considered at several locations along the rail corridor. Based on GO expansion projects on other corridors, it is expected that Metrolinx would explore grade separations or road closures as part of a Milton GO expansion study.
- Grade separation at crossing locations near Streetsville may be difficult to implement given the surrounding Community Node context.

No changes are recommended at the remaining at-grade crossing locations with freight rail lines. Planning and design for a new grade separation structure at Goreway Drive is underway, rail services have been terminated on the OBRY/Owen Sound spur and subdivision, and very low train and traffic volumes are anticipated at the Orr Road crossing.

The recommendations are consistent with the Transport Canada (TC) rankings outlined in **Section 5.3**.

A map of the recommendation is shown in **Figure 6.7**.

Figure 6.7. Summary of Recommendations for At-Grade Rail Crossings

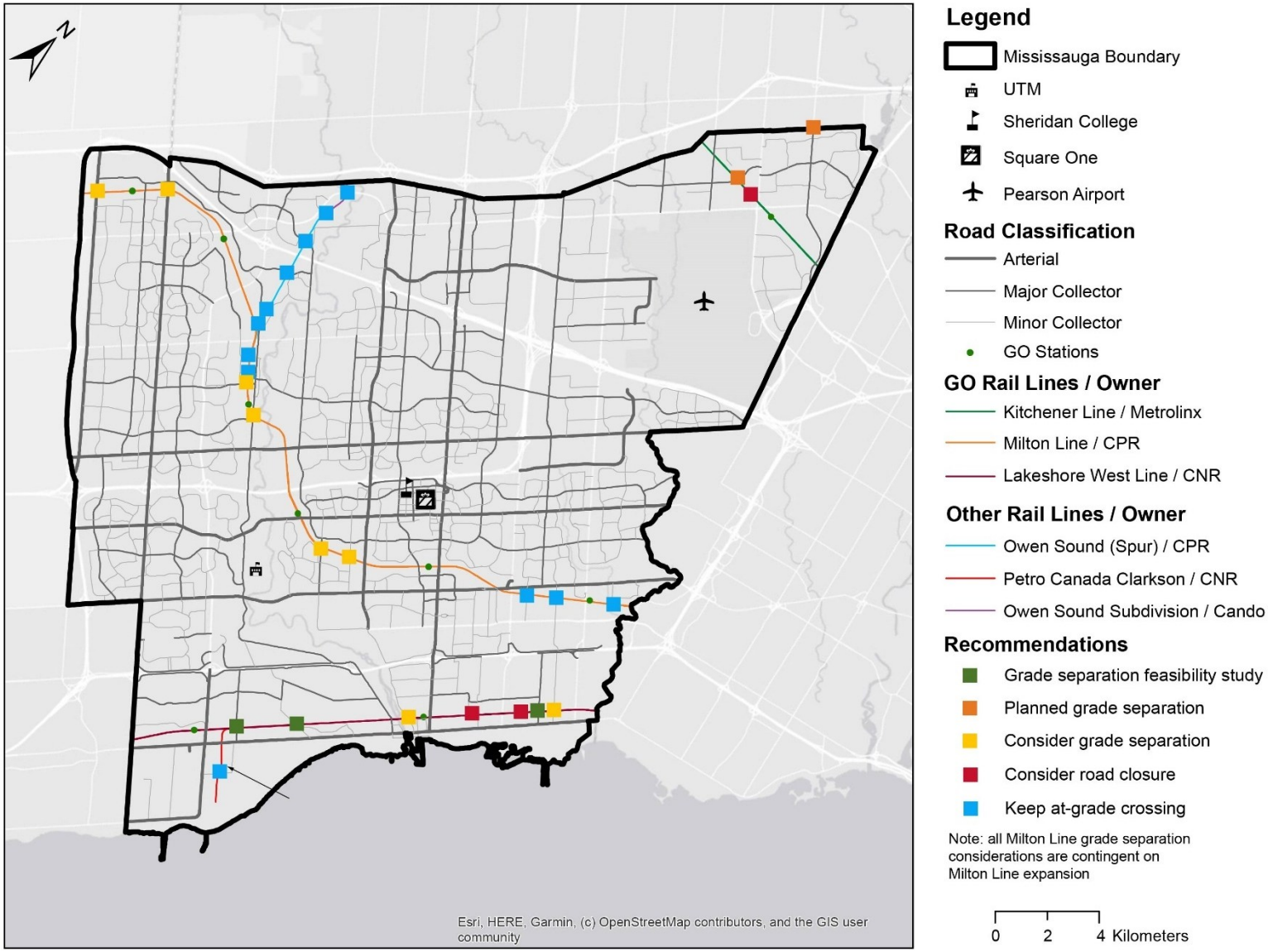


Table 6-3. Overall At-Grade Rail Crossing Recommendation Summary

Location	Recommendation	Additional Remarks	TC Risk Ranking: Mississauga	TC Risk Ranking: Canada
Lakeshore West Line				
Clarkson Road	**Conduct grade separation feasibility study**	Existing and future cross product exceeds threshold. Nearby properties and driveways are likely to be difficult to accommodate – potential for significant property impacts. Active transportation structure may be considered to provide local access. Clarkson Road is a major collector.	5	41
Lorne Park Road	**Conduct grade separation feasibility study**	Existing and future cross product exceeds threshold. Nearby properties and driveways are likely to be difficult to accommodate – potential for significant property impacts. Active transportation structure may be considered to provide local access. Lorne Park Road is a minor collector.	1	21
Stavebank Road	**Conduct grade separation feasibility study**	Future cross product exceeds threshold. Stavebank Road is currently elevated to meet railway at grade and may present favourable conditions for grade separation. Changes to Port Credit GO service and the Hurontario LRT may increase traffic diversion onto local streets. Stavebank Road is a scenic minor collector.	6	44
Revus Avenue	Monitor; consider road closure and AT connection	Traffic volumes are relatively low (<3000 AADT) and increases in future train frequencies will increase potential for conflicts. However, there are no other road crossings of Lakeshore West between Hurontario Street and Cawtha Road (2 km) and a road closure could result in longer detours. Revus Avenue is a minor collector north of Lakeshore West Line and a local street south of Lakeshore West Line.	3	32
Alexandra Avenue	**Conduct traffic study for road closure**	Future cross product exceeds threshold. Ogden Avenue (major collector recommended for grade separation) is located 300 m to the east and provides a reasonable alternative for road users if Alexandra Road is closed. Alexandra Avenue is a local street	4	40
Ogden Avenue	**Conduct grade separation feasibility study**	Future cross product exceeds threshold. A grade-separated crossing would improve network connectivity, especially with proposed Alexandra Avenue closure. Future redevelopment of Dixie Mall and the Lakeview site may increase traffic volumes. Ogden Avenue is a major collector.	2	30
Haig Boulevard	Monitor; consider grade separation	Future redevelopment of Dixie Mall and the Lakeview site may increase traffic volumes. Haig Boulevard is also noted to be missing sidewalk warning gates. Haig Boulevard is a minor collector.	7	47
Milton Line				
Ninth Line	Consider grade separation if Metrolinx implements more frequent trains on Milton Line	The Ninth Line EA study (Derry Road West to Highway 401) protects for a future grade separation at this location. Future cross product approaches threshold if GO train service is expanded. Ninth Line is an arterial road.	19	2,736
Tenth Line	Consider grade separation if Metrolinx implements more frequent trains on Milton Line	Future cross product exceeds threshold if GO train service is expanded. Tenth Line is a major collector.	11	1,332
Ontario Street	No change	Grade separation will have significant property and driveway access impacts. Ontario Street is the only connection to the road network for houses on Ontario Court.	21	3,582
Tannery Street	No change		20	2,978
Thomas Street	Consider grade separation if Metrolinx implements more frequent trains on Milton Line	Future cross product approaches threshold if GO train service is expanded. Nearby properties and driveways in historic Streetsville will be impacted and are likely difficult to accommodate – potential for significant property impacts. Thomas Street is a major collector.	10	443
Mississauga Road	Consider grade separation if Metrolinx implements more frequent trains on Milton Line	Future cross product exceeds threshold if GO train service is expanded. Mississauga Road is a major collector (scenic).	13	1,495

Location	Recommendation	Additional Remarks	TC Risk Ranking: Mississauga	TC Risk Ranking: Canada
Erindale Station Road	Consider grade separation if Metrolinx implements more frequent trains on Milton Line	Potential road diet (TRIP study recommendation) with improved active transportation facilities may increase number of vulnerable users at crossing location. Erindale Station Road is a major collector.	14	1,496
Wolfedale Road	Consider grade separation if Metrolinx implements more frequent trains on Milton Line	Future cross product exceeds threshold if GO train service is expanded. Potential road diet (TRIP study recommendation) with improved active transportation facilities may increase number of vulnerable users at crossing location. Wolfedale Road also directly supports goods movement in the surrounding employment area. Wolfedale Road is a minor collector.	12	1,408
Haines Road	No change		17	1,837
Stanfield Road	No change		16	1,748
Loreland Avenue	No change	Road serves a single industrial land parcel.	24	6,169
Kitchener Line				
Scarboro Street	Consider road closure and providing AT connection	Increases in future train frequencies will increase potential for conflicts. Low traffic volumes on Scarboro Street can be diverted to Airport Road (350 m to the east) which provides a grade-separated crossing. Active transportation structure can be provided to maintain connectivity for pedestrians and cyclists. Scarboro Street is a local street.	9	399
Drew Road	Proceed with grade separation	Future cross product exceeds threshold. Drew Road also directly supports goods movement in the surrounding employment area. Drew Road is a major collector.	n/a	n/a
Halton Subdivision				
Goreway Drive	Planned grade separation	Future cross product exceeds threshold. Planning and design for grade separation underway.	8	62
Owen Sound Spur Subdivision				
Creditview Road	No change	Future train service was terminated in 2021; no anticipated crossing issues.	23	4,239
Argentia Road	No change	Future train service was terminated in 2021; no anticipated crossing issues.	26	10,951
Alpha Mills Road	No change	Future train service was terminated in 2021; no anticipated crossing issues.	25	10,025
Queen Street	No change	Future train service was terminated in 2021; no anticipated crossing issues.	18	2,125
OBRY / Owen Sound Subdivision				
Derry Road	No change	Future train service was terminated in 2021; no anticipated crossing issues.	15	1,585
Atwood Lane	No change	Future train service was terminated in 2021; no anticipated crossing issues.	27	20,084
Oakville Subdivision (Petro Canada-Clarkson Spur)				
Orr Road	No change		22	3,617