Exhibit 53: Keele Street Bus Terminal – Option 1 On-Street Route 32C Left Turn

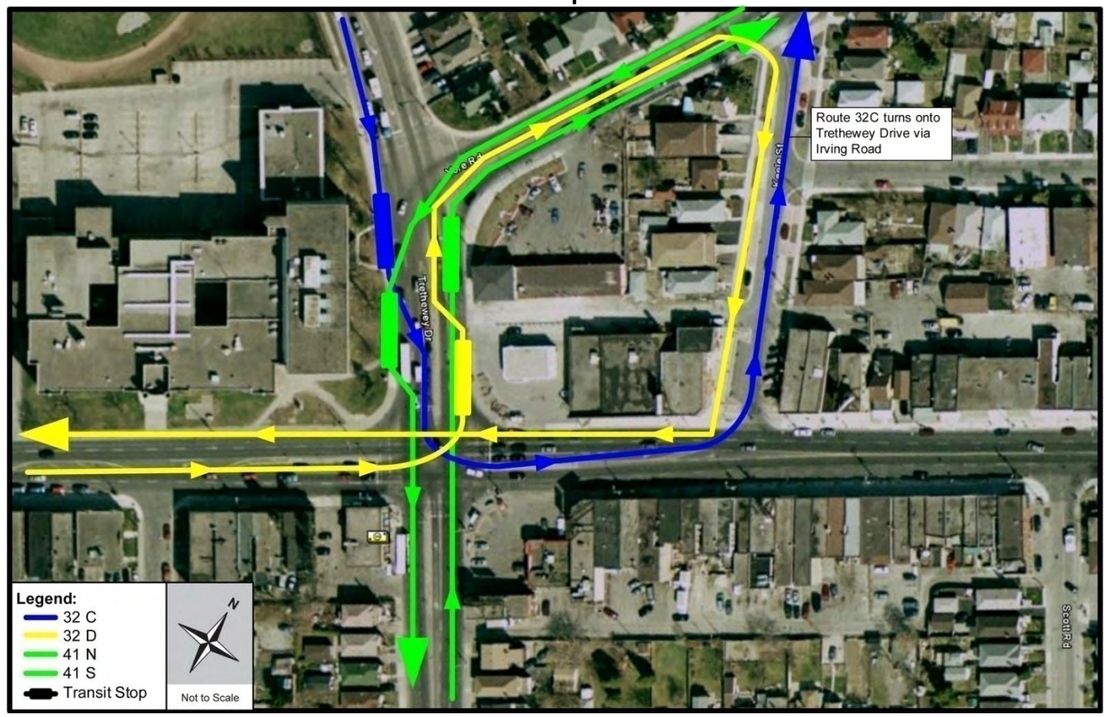


Exhibit 54: Keele Street Bus Terminal – Option 2 On-Street Route 32C Right Turn

2.8.2.2 Option 2 - On-Street Route 32C Right Turn

This scenario is very similar to Option 1 with respect to bus routing, with the exception of Route 32C. At the signalized intersection of Eglinton Avenue at Trethewey Drive/ Keele Street, Route 32C would perform a southbound right turn to travel westbound on Eglinton Avenue where it would return to Trethewey Drive via Municipal Drive and Yorktown Drive.

Route 32D and Route 41 northbound and southbound would remain the same as Option 1 with respect to routing and transit stop locations.

Comments from TTC staff suggested that the routing plan for Option 2 is also problematic because of the circuitous routing and would direct buses through a busy mixed traffic area that is subject to congestion and high delays.

The EMS station would remain at its current location.

2.8.2.3 Option 3 - Off-Street Bus Terminal A

Under this option, the transit terminal would operate with both clockwise and counter-clockwise transit operation. With bi-directional bus operations and two bus bays per direction, a bus passing lane is required for each direction. Hence, the transit terminal location to access the LRT is required to be north of the Trethewey Drive terminal access. The entrance/exits accesses of the terminal will be located on Trethewey Drive between Eglinton Avenue and Yore Road, and on Yore Road. The Trethewey Drive access will accommodate northbound Route 32D buses right turning inbound and westbound Route 32C buses right turning outbound. The Yore Road access will accommodate Route 32C buses right turning inbound and northbound Route 32D buses left turning outbound. To facilitate the movement of the Route 32D left turn vehicles out of the terminal, a westbound left turn reserved for buses only have to be provided for the Trethewey Drive and Yore Road intersection. A westbound left turn bus only phase will be used to progress the bus through the signalized intersection.

Based on existing traffic volumes on Yore Road, it would be difficult for a transit vehicle to exit the terminal at the unsignalized Yore Road terminal access by performing a northbound left turn movement to head westbound. The estimated queues on Yore Road are expected to extend beyond the Yore Road terminal access providing no gap for a bus to merge with traffic without blocking the eastbound lanes. This would result in high delays and is unfavourable from a transit operations perspective. As a result, the terminal access on Yore Road was analyzed with a signalized access and is coordinated with the Trethewey Drive and Yore Road intersection to safely merge transit vehicles onto Yore Road. For safety reasons, the

northbound right turn on red at Trethewey Drive and Yore Road will be prohibited to limit the number of vehicles stopped on Yore Road when the Yore Road terminal access signal is activated. In addition, a westbound left turn transit only lane is feasible and proposed for the Trethewey Drive and Yore Road intersection with a priority phase to allow access to the right turn on Trethewey. The transit only lane is proposed to have sufficient storage length for at least two buses. Lastly, there is also an exclusive southbound right turn lane proposed for the Eglinton Avenue and Trethewey Drive/ Keele Street intersection to serve southbound right turning vehicles and to act as a transit queue jump lane.

Route 41N and Route 41S would remain the same as Options 1 and 2 with respect to routing and transit stop locations.

Exhibit 55: Keele Street Bus Terminal – Option 3 Off-Street Bus Terminal A (Preferred Option)

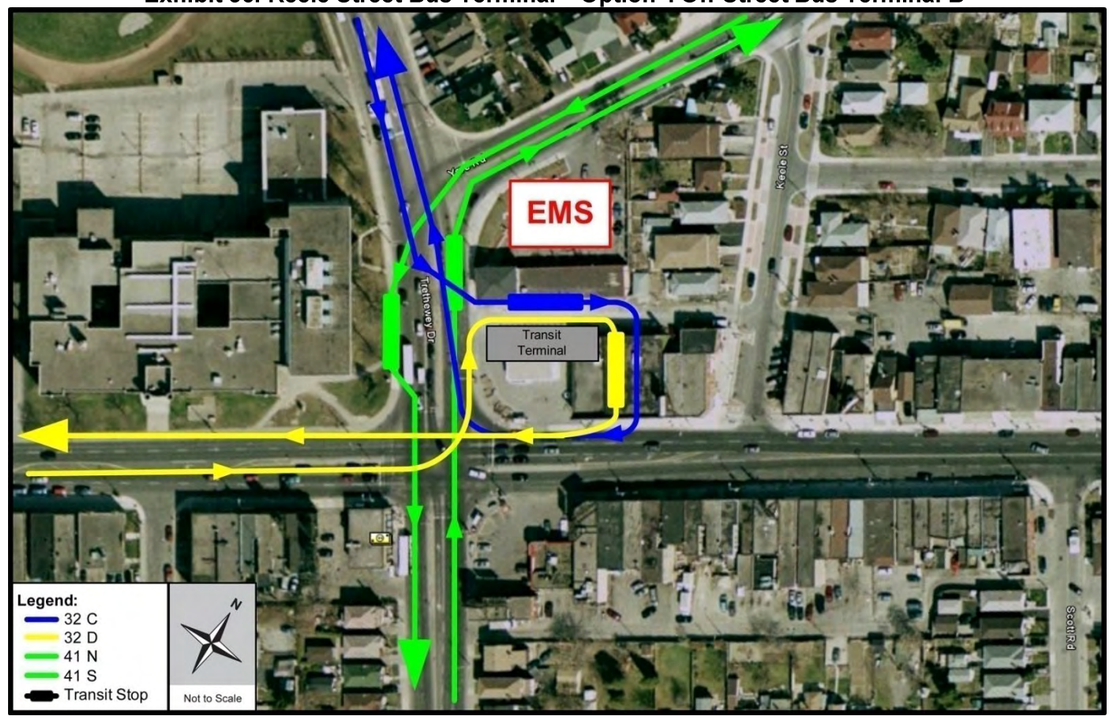
2.8.2.4 Option 4 - Off-Street Bus Terminal B

The transit terminal is proposed to be midway between Yore Road and Eglinton Avenue on Trethewey Drive. Route 41 buses would operate similar to the other options without using the transit terminal while Route 32C would be required to perform a southbound left turn into the transit terminal via the Trethewey Drive terminal access, then it would then enter Eglinton Avenue via a southbound right turn and then onto Trethewey Drive via a westbound right turn to continue on its normal route. Route 32D will also use the transit terminal proposed under this option circulating clockwise around the terminal.

According to the proposed transit routings, the current EMS station location is problematic since emergency vehicles will likely conflict with circulating transit vehicles exiting the terminal onto either Eglinton Avenue or on Trethewey Drive. For this scenario, the EMS station is recommended to be relocated to the southeast quadrant of Trethewey Drive and Yore Road.

It should be noted that this option has significant property impact to the buildings located on Eglinton Avenue.

Exhibit 56: Keele Street Bus Terminal – Option 4 Off-Street Bus Terminal B



2.8.2.5 Option 5 - Off-Street Bus Terminal C

The Option 5 terminal location is similar to Option 3 but all buses would circulate in a clockwise direction in the transit terminal. The underground LRT passage would be extended to the transit terminal. The Route 32C transit vehicle would perform a southbound left turn at the Trethewey Drive and Yore Road intersection onto Yore Road, and then proceed into the terminal via an eastbound right turn from Yore Road.

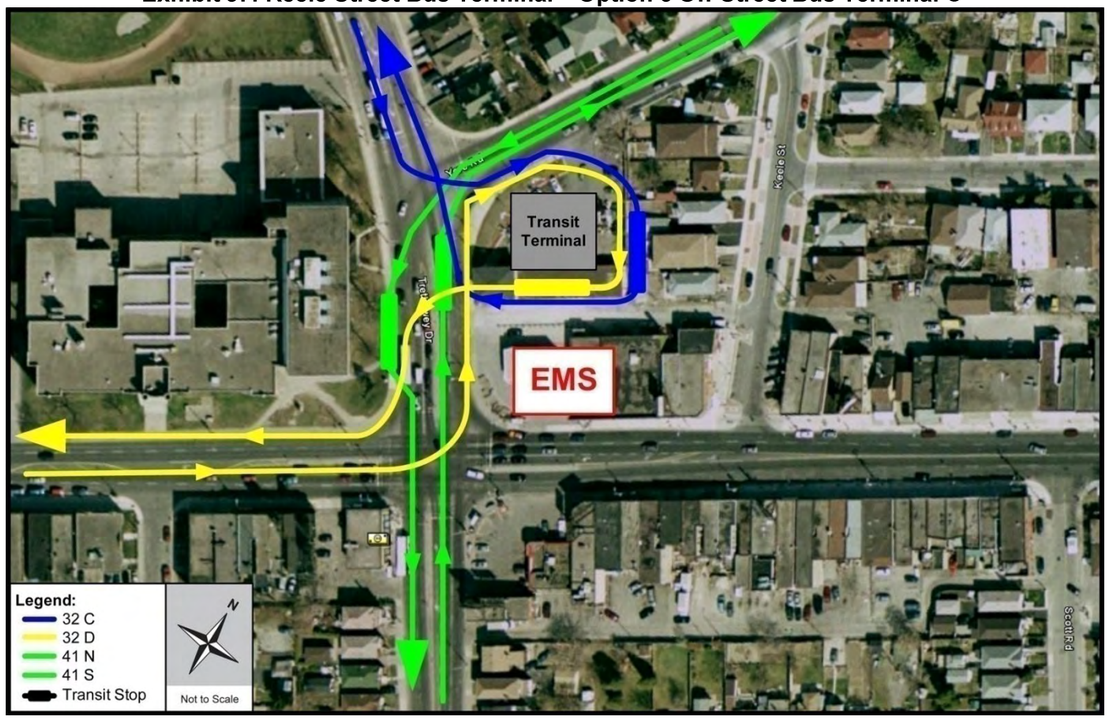
Route 32D will circulate around the proposed transit terminal, use the proposed terminal stops, and exit the terminal via a westbound left turn onto Trethewey Drive. Based on the existing traffic volumes, it would be difficult for a transit vehicle to perform this left turn manoeuvre at an unsignalized access. The estimated southbound queue lengths are expected to extend to the upstream intersection and provide little to no gap for a bus to merge with southbound traffic without blocking the northbound lanes. This would result in

significantly high delays and is problematic from a transit operations perspective. As a result, the Trethewey Drive terminal access is modelled as a signalized access, and coordinated with the Trethewey Drive and Eglinton Avenue intersection to safely merge transit vehicles onto Trethewey Drive. It should be noted that even with the signal access, merging of the transit vehicle into the far west lane to make a southbound right turn at Eglinton Avenue and Trethewey Drive/ Keele Street could still be problematic.

Route 41 buses will continue to use on-street transit stops similar to the other options.

The EMS station would remain at its existing location.

Exhibit 57: Keele Street Bus Terminal – Option 5 Off-Street Bus Terminal C



2.8.3 Evaluation

The criteria used to assess functional design options included:

- Intersection level of service and/or any critical turning movements;
- Transit vehicle study area delay;
- The possible need or requirement for a left turn lane and/or signalizing an access;
- Impact to the EMS station; and
- Bus and LRT passenger transfer.

To determine the overall traffic impact of each scenario, the Synchro traffic analysis software was used to review the overall intersection level of service and any critical turning movements during both peak periods. This analysis highlights any movements or changes in level of service to provide an overall understanding of how the intersections are affected with the rerouting of the transit vehicles.

It should be noted that the existing signal phasing was adjusted to improve the intersection operations. For all options, the signal timings at Eglinton Avenue and Trethewey Drive/Keele Street and at Trethewey Drive and Yore Road remained consistent for comparison sake and were not influenced by the rerouting of transit vehicles for each scenario.

A summary table of evaluation results for the five options is presented in **Exhibit 58.**

Exhibit 58: Keele Street Bus Terminal Configuration – Summary of Traffic Evaluation Results

Factor/ Scenario	Option 1	Option 2	Option 3	Option 4	Option 5
Bus Routing	Circuitous/ Unfavourable	Circuitous/ Unfavourable	Requires Northbound left turn out of terminal for one route Bi-directional terminal circulation	Requires Southbound left turn into terminal for one route One directional terminal circulation	Requires Westbound left turn out of terminal for one route One directional terminal circulation
Level of Service and Volume to Capacity Ratio	Slightly increased v/c ratios for a couple of movements and intersections	Almost identical to other scenarios	Both decreased and increased v/c ratios for a couple of movements and intersections	Almost identical to other scenarios	Almost identical to other scenarios
Transit Delay	Moderate transit delays	Moderate transit delays	Lowest Route 32D delay during AM peak Fairly low Route 32C delays for AM and PM peak periods.	Lowest Route 32D delay during PM peak	Lowest Route 32C delay during AM and PM peak periods

Factor/ Scenario	Option 1	Option 2	Option 3	Option 4	Option 5
Left Turn/ Signalization	No additional lanes or signalization required	No additional lanes or signalization required	Traffic signal at Yore Road terminal access recommended Westbound left turn transit only lane and phase recommended at Trethewey Drive and Yore Road Southbound right turn lane recommended at Eglinton Avenue and Trethewey Drive/ Keele Street	Southbound left turn lane recommended on Trethewey Drive	Traffic signal at Trethewey Drive terminal access recommended
Impact to EMS	No direct impact to EMS Station	No direct impact to EMS Station	No direct impact to EMS Station	EMS station recommended to be relocated	No direct impact to EMS Station
Bus/LRT Transfer	Passengers can enter a LRT access at any corner of Eglinton Avenue and Trethewey Drive/ Keele Street, except the southwest corner.	Passengers can enter a LRT access at any corner of Eglinton Avenue and Trethewey Drive/ Keele Street, except the southwest corner.	Passengers can enter a LRT access at any corner of Eglinton Avenue and Trethewey Drive/ Keele Street, except the southwest corner. Underground recommended to extend into terminal	Passengers can enter a LRT access at any corner of Eglinton Avenue and Trethewey Drive/ Keele Street, except the southwest corner	Passengers can enter a LRT access at any corner of Eglinton Avenue and Trethewey Drive/ Keele Street, except the southwest corner. Underground recommended to extend into terminal

2.8.4 Recommendation

The preferred configuration is Option 3 - Off-street Bus Terminal A. This configuration resulted in a low transit delay and improved operations at the Eglinton Avenue/Trethewey Drive intersection compared to other options. This option allows the bus terminal to operate with both clockwise and counter-clockwise transit operation. The bus terminal will be located at the southeast corner of the Trethewey Drive/Yore Road intersection. The entrance/exits of the terminal will be located on Trethewey Drive between Eglinton Avenue and Yore Road, and on Yore Road.

The terminal access on Yore Road will be signalized and coordinated with the Trethewey Drive/Yore Road intersection to safely merge transit vehicles onto Yore Road. For safety reasons, the northbound right turn on red traffic light at the Trethewey Drive/Yore Road intersection will be prohibited to limit the number of vehicles stopped on Yore Road when the Yore Road terminal access signal is activated. In addition, a westbound left turn transit only lane is proposed for the Trethewey Drive/Yore Road intersection. The transit only lane is proposed to have sufficient storage length for at least two buses. There is also an exclusive southbound right turn lane proposed for the Eglinton Avenue/Trethewey Drive intersection to serve southbound right turning vehicles and to act as a transit queue jump lane. The passenger transfers between bus and LRT will occur with a combination of on-street level connection and underground pedestrian passage.

2.9 Brentcliffe/Laird Station

An investigation was conducted to identify the preferred location for the last station on the east end of the underground section at Laird Drive or Brentcliffe Road.

2.9.1 Key Challenges and Constraints

The key challenges and constraints were:

- The need to maintain equalized and consistent station/stop spacing to balance transit service speed with accessibility for the local community; and
- The need to provide special trackwork beyond the last underground station.

2.9.2 Options

The options were to locate the last station on the east end of the underground section at:

- Laird Drive; or
- Brentcliffe Road.

2.9.3 Evaluation

TTC staff investigated the population and employment surrounding the two possible stop locations. An estimate was prepared of the 2031 population and employment within 500 metres of the Laird and Brentcliffe alternative station locations.

The catchment areas are shown on **Exhibit 59.**

Exhibit 59: Distances from Station Location Options

Exhibit 60: Population and Employment Within 500m of Station Location

2031 Total Population and Employment	
Laird	7984
Brentcliffe	7982

Source: TTC, 2009

For the year 2031, the total population and employment levels for the catchment areas are projected to be virtually identical.

2.9.3.1 Station Spacing

The comparative travel distance is summarized as follows:

Bayview Ave. to Laird Dr. – 1030 metres

Laird Dr. to Leslie St. – 1250 metres

Bayview Ave. to Brentcliffe Rd. – 1440 metres

Brentcliffe Rd. to Leslie St. – 840 metres

Therefore, the Laird Station alternative provides a more equalized spacing between adjacent stations and offers balanced accessibility for the local community.

2.9.3.2 Horizontal and Vertical Alignment

In terms of technical design considerations, both station locations can be accommodated as theyprovide sufficient distance between the end of the station box and the tunnel portal to enable the track profile to return to surface grade while maintaining full moves vehicular access to the development on the south side of Eglinton Avenue, east of Brentcliffe Road. However, the limitation to the Brentcliffe Station alternative is that it does not provide enough distance between the end of the station box and the development access road to accommodate special trackwork (storage tracks) within the tunnel, outside the station. For the Brentcliffe Station option, the storage (pocket) tracks will have to be located west of the station, thus reducing TTC's operational flexibility for the LRT. The Laird Station option does provide sufficient distance to locate the storage (pocket) tracks in TTC's preferred location to the east of the station box.

2.9.4 Recommendation

Laird Drive is the preferred location for the last underground station because it provides a more equalized travel distance between adjacent stations in the area from Bayview Avenue and Leslie Street, and also provides sufficient flexibility to locate the required special track work within the tunnel but outside the last station.

2.10 Don Mills Road LRT Interface and Bus Terminal Configuration

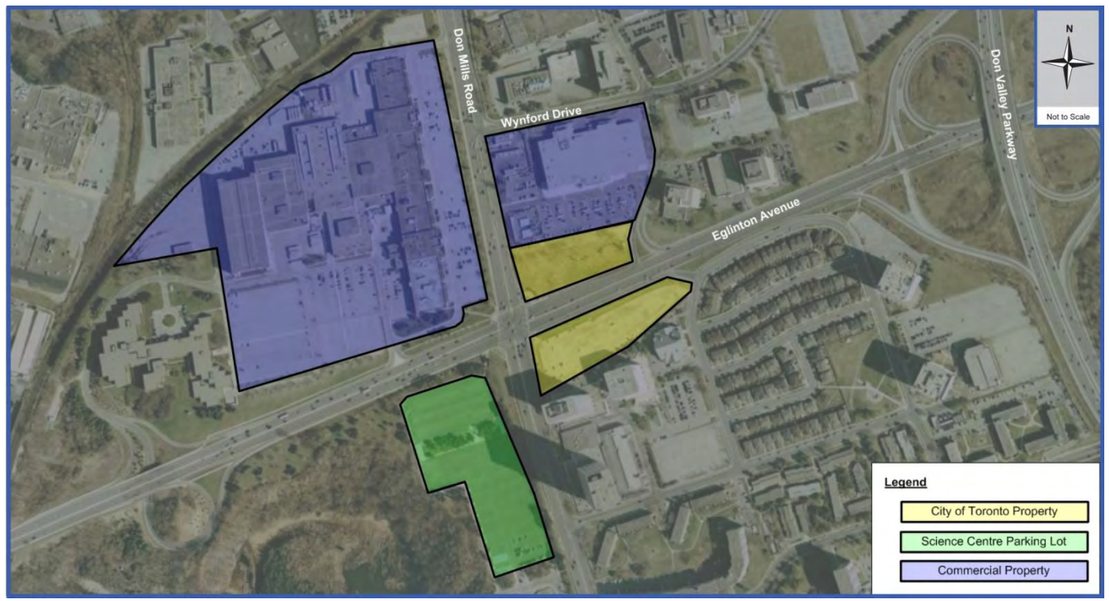
A study was conducted for the Eglinton Avenue and Don Mills Road intersection area to develop and evaluate transportation options, conduct traffic analyses for the options and make recommendations for the area surrounding the Eglinton Avenue and Don Mills Road intersection. The Eglinton Avenue/Don Mills Road intersection is the point of interface between the Eglinton Crosstown LRT and the Don Mills Road LRT (Don Mills LRT). The report documenting this study is provided in **Appendix L**.

This study was completed with direct input from key stakeholders including divisions of the TTC and the City of Toronto. Sixteen different alignment configuration options were assessed and evaluated.

The study area included the signalized intersection of Eglinton Avenue and Don Mills Road and the surrounding area. The area around the intersection is a major employment district, with neighbouring pockets of residential land use, and is located less than a kilometre away from a major north-south expressway that reaches the City of Toronto's downtown core, the Don Valley Parkway (DVP). This proximity to the DVP makes the intersection a gateway for traffic entering and exiting the expressway and a convenient relief route for north-south commuter traffic in the event of heavy congestion on the expressway. The mixture of commercial, residential and commuter traffic makes the Eglinton Avenue and Don Mills Road intersection one of the busiest areas in the City of Toronto.

The intersection and surrounding property ownership is illustrated in **Exhibit 58**. The exhibit shows that property owned by the City of Toronto is located at the northeast and southeast corners of the intersection.

Exhibit 61: Study Area for Don Mills Road LRT Interface



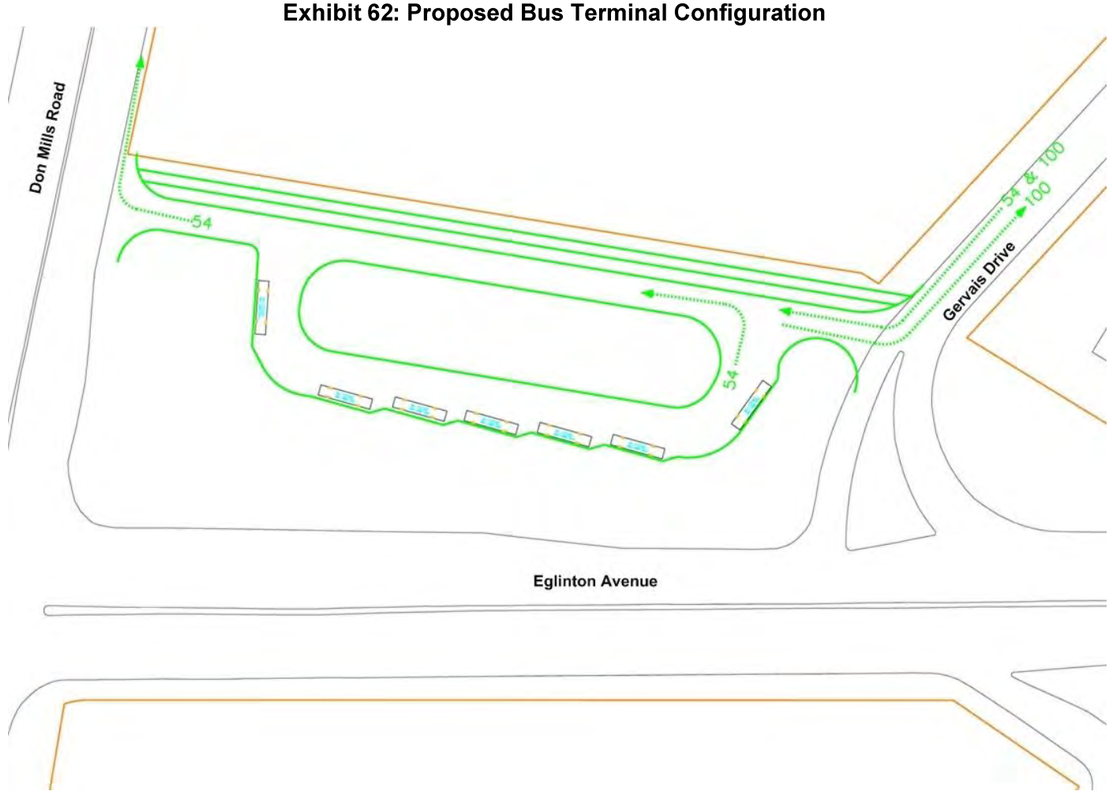
Given that the two Transit City LRT lines will intersect within a major employment district, there is potential for this to be a catalyst for development and urban design initiatives consistent with the City of Toronto's Official Plan and policies. Under future conditions, the vision of the City of Toronto Planning Division is for a transit and pedestrian friendly area with high density residential and commercial development so that the public could potentially work and live in the same area. This area will serve as a transit hub for passenger transfers.

2.10.1 Key Challenges and Constraints

The challenges at this intersection are to provide a high quality connection between the two LRT lines that allows for the safe and efficient transfer of passengers while maintaining traffic flow at this extremely busy intersection. The Eglinton Avenue and Don Mills Road intersection currently accommodates some of the heaviest traffic volumes in the City of Toronto. The intersection is very wide and must serve high traffic volumes while accommodating pedestrians. With proposed bike lanes along Eglinton Avenue, the intersection will also serve a high volume of cyclists.

The projected transfers between the LRT lines as well as the major bus routes connecting at this intersection will make it one of the highest transfer locations on the Eglinton corridor. A bus terminal is required at the Eglinton Avenue and Don Mills Road intersection to prevent on-street bus stopping from negatively affecting already constrained traffic flow. In addition, a dedicated area is required for passengers to board/alight, due to the high number of passenger transfers expected. TTC Service Planning determined that seven bus bays would be required with the implementation of only the Eglinton Crosstown LRT, prior to the full implementation of the Don Mills LRT, since the Route 25 Don Mills bus route would still be operating. With the full build out of the Eglinton Crosstown LRT and the Don Mills LRT, only five bus bays would be required as Route 25 would no longer be operating. Up to three feeder buses routes would continue to operate: Route 54 Lawrence East, Route 100 Flemingdon Park, and possibly an Eglinton Avenue local service route. The proposed bus terminal configuration is shown in **Exhibit 62**.

Exhibit 62: Proposed Bus Terminal Configuration



It should be noted that an existing underground snow melting system, located in the northwest corner of the Gervais and Eglinton intersection, was identified after this study. This system is used by the City of Toronto to dispose of snow which has been collected from major City of Toronto roads. The need to design around this facility will be investigated further in the design phase.

2.10.2 Options

Sixteen options were identified based on alignment configuration, platform location and type (far side, nearside, or centre platform), and type of passenger transfer (surface or underground). Each option was considered with the possible bus terminal location in the northeast or southeast quadrant. In all options, bike lanes on Eglinton Avenue were considered.

For the purpose of evaluating the options and organizing them, these sixteen options were categorized into five different classifications based on the configuration of the Eglinton Crosstown LRT and Don Mills LRT. The configuration categories were as follows:

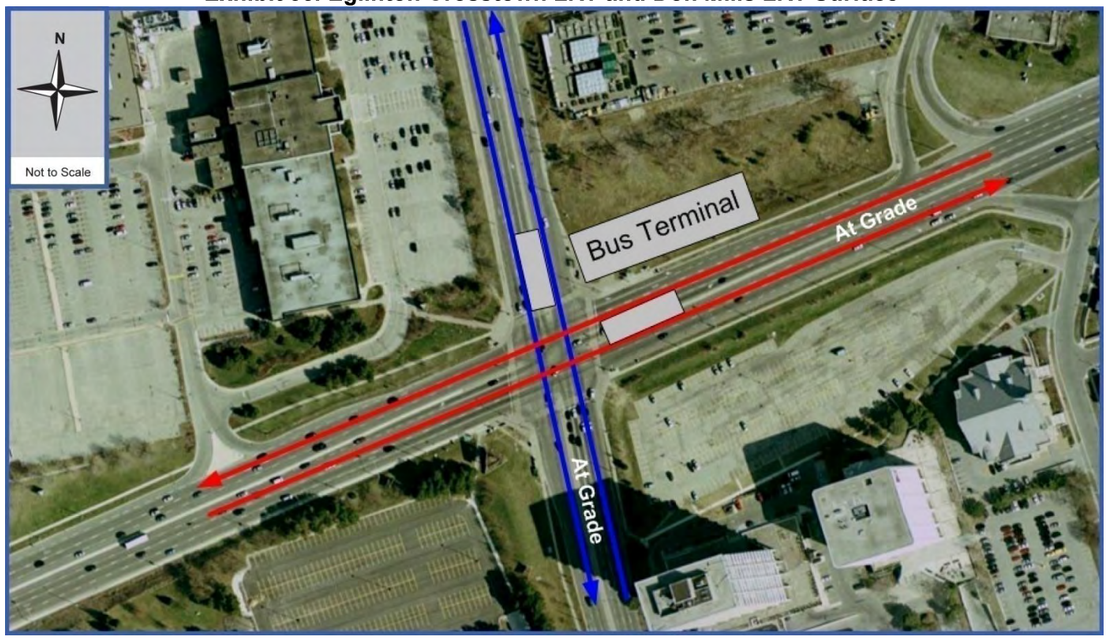
- Option 1 - Eglinton Crosstown LRT and Don Mills LRT surface (**Exhibit 63**);
- Option 2 - Eglinton Crosstown LRT underground and Don Mills LRT surface (**Exhibit 64**);
- Option 3 - Eglinton Crosstown LRT and Don Mills LRT underground without concourse level (**Exhibit 65**);
- Option 4 - Eglinton Crosstown LRT and Don Mills LRT underground with concourse level (**Exhibit 66**); and
- Option 5 - Eglinton Crosstown LRT and Don Mills LRT special options.(Exhibits provided in **Appendix L**)

In each of the options where the Eglinton Crosstown LRT is underground, there was an alternative where the Eglinton Crosstown LRT alignment is located to the south of the Eglinton Avenue roadway. This concept was considered so that traffic impacts during construction could be minimized. At the final workshop, where the recommended alternative was presented, it was decided that because traffic impacts would be temporary, the neighbouring properties would be much better served in the long run with the Eglinton Crosstown LRT in the centre of the alignment. Additionally, traffic management plans implemented during construction could route traffic south of the roadway temporarily and significantly reduce the impact to traffic.

2.10.2.1 Option 1 – Eglinton Crosstown LRT and Don Mills LRT Surface

In this option, both the Eglinton Crosstown LRT and Don Mills LRTs operate in the centre median transit right-of-way along with the current traffic movements. Both the Eglinton Crosstown and Don Mills LRTs operate with the east-west and north-south through phases, respectively. The alignment configuration is shown in **Exhibit 63**.

Exhibit 63: Eglinton Crosstown LRT and Don Mills LRT Surface



Four sub-options were considered in the surface category, as shown in **Exhibit 64**.

Exhibit 64: Summary of Surface Sub-Options

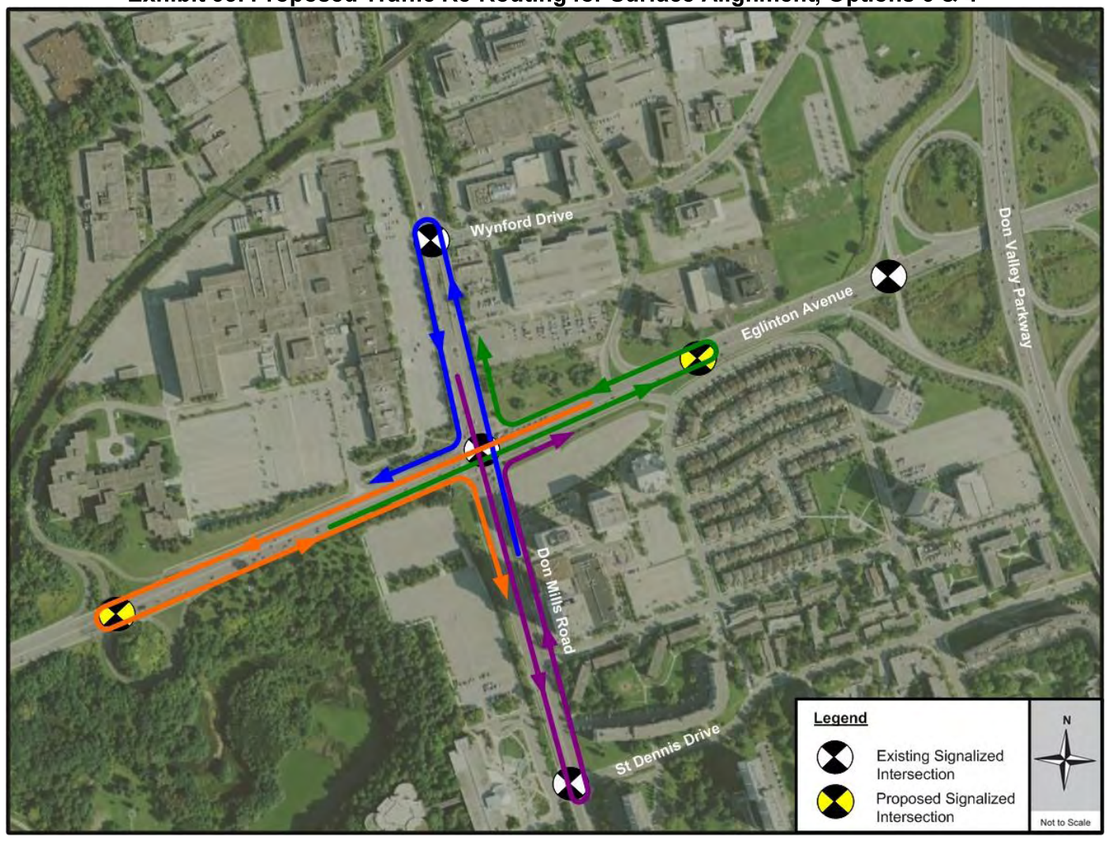
Sub-Option	Don Mills LRT Platform		Eglinton Crosstown LRT Platform		Location of Bus Terminal	Passenger Transfer	Traffic Scenarios
	Configuration	Platform Location	Configuration	Platform Location			
1	Surface	Far Side	Surface	Far Side	South-East Corner	Surface	Left Turn Protected Only
2	Surface	Far Side	Surface	Far Side	North-East Corner	Surface	Left Turn Protected Only
3	Surface	Centre (North)[1]	Surface	Centre (East)[1]	North-East Corner	Surface	Left Turn Prohibited
4	Surface	Centre (South)[1]	Surface	Centre (East)[1]	South-East Corner	Surface	Left Turn Prohibited

[1] Direction in relation to the Don Mills/Eglinton intersection.

Under Sub-options 1 and 2, the majority of the characteristics are the same with the exception of the bus terminal location. For both of these options, left turns are restricted to protected-only movements at the Eglinton Avenue and Don Mills Road intersection.

Under Sub-options 3 and 4, the platforms are centre platforms for bi-directional LRTs to share. The two options for bus terminal locations are also considered under these options. For these two options, left turns are prohibited in all directions at the Eglinton Avenue and Don Mills Road intersection. On Eglinton Avenue, two new u-turn intersections are considered, and east-west left turning traffic are reassigned to make u-turns at these new signals. In the north-south direction, left turning vehicles are rerouted to make U-turns on Don Mills Road at Wynford Drive to the north, and Don Mills Road at St. Dennis Drive to the south. **Exhibit 61** presents the proposed rerouting and new u-turn signals.

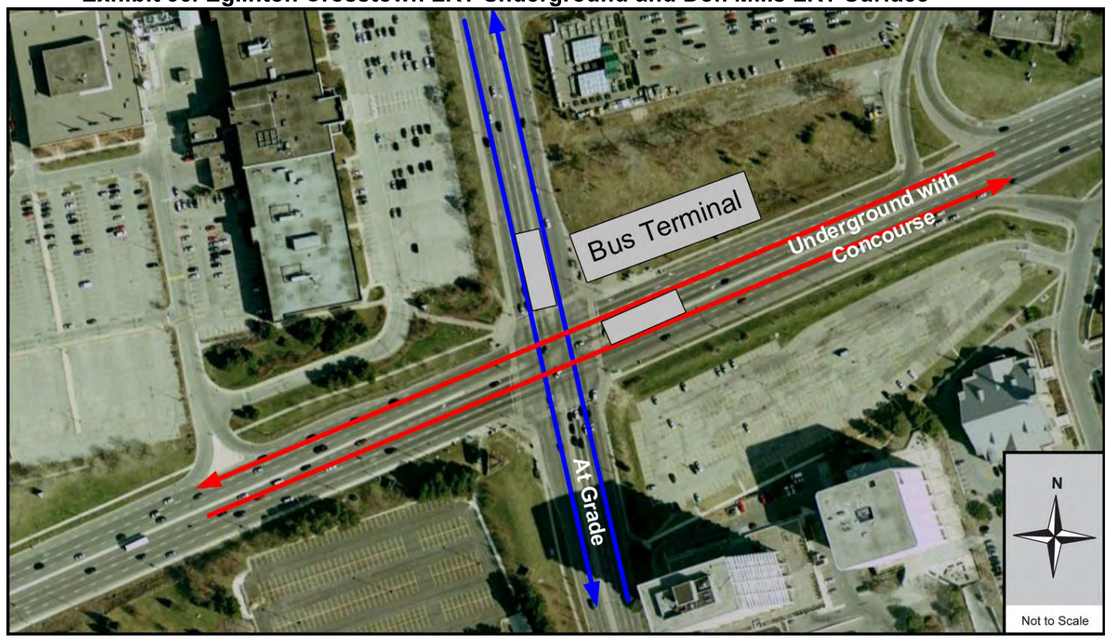
Exhibit 65: Proposed Traffic Re-Routing for Surface Alignment, Options 3 & 4



2.10.2.2 Option 2 - Eglinton Crosstown LRT Underground and Don Mills LRT Surface

Under this category of options, the Eglinton Crosstown LRT transit right-of-way is proposed to be depressed before reaching the Eglinton Avenue at Don Mills Road intersection and re-surface beyond the intersection. The Don Mills LRT will remain on the centre median transit right-of-way surface on Don Mills Road, as shown in **Exhibit 66**.

Exhibit 66: Eglinton Crosstown LRT Underground and Don Mills LRT Surface



Three sub-options were considered in the surface category, as shown in **Exhibit 67**.

Exhibit 67: Summary of Underground and Surface Sub-Options

Sub-Option	Don Mills LRT Platform		Eglinton Crosstown LRT Platform		Location of Bus Terminal	Passenger Transfer	Traffic Scenarios
	Configuration	Platform Location	Configuration	Platform Location			
5	Surface	Centre (South)[1]	Underground w/ Concourse (South of Road)	Centre (East)[1]	South-East Corner	Underground	North/S Left Turn Prot, E/W Left Turn Prot/Perm
6	Surface	Centre (North)[1]	Underground w/ Concourse	Centre (East)[1]	North-East Corner	Underground	N/S Left Turn Prot, E/W Left Turn Prot/Perm
7	Surface	Centre (South)[1]	Underground w/Concourse	Centre (East)[1]	South-East Corner	Underground	N/S Left Turn Prot, E/W Left Turn Prot/Perm

[1] Direction in relation to the Don Mills/Eglinton intersection.

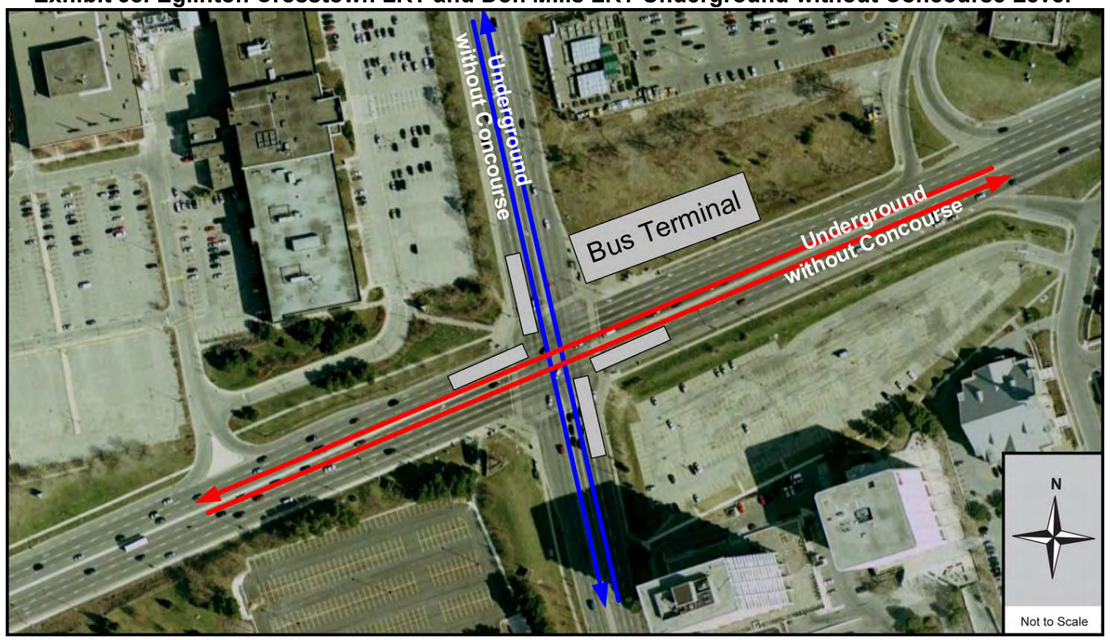
The location of the Don Mills LRT centre platforms and the bus terminal location vary depending on the sub-options. The Eglinton Crosstown LRT centre platform is consistently located underground with a concourse level on the east side of the intersection. The Eglinton Crosstown LRT underground alignment for Sub-option 5 differs from Sub-options 6 and 7 since it is proposed to be south of the centre of the Eglinton Avenue alignment.

For all three sub-options, left turns are permitted at the Eglinton Avenue and Don Mills Road intersection. Left turns from Don Mills Road are restricted to protected-only movements and left turns from Eglinton Avenue can be protected-permissive movements.

2.10.2.3 Option 3 – Eglinton Crosstown LRT and Don Mills LRT Underground Without Concourse Level

For the underground option without a concourse level, both the Eglinton Crosstown and Don Mills LRTs transit right-of-ways are proposed to operate underground through the Eglinton Avenue and Don Mills Road intersection. With this operation, a underground transit signal operating is required. The alignment configuration is shown in **Exhibit 68**.

Exhibit 68: Eglinton Crosstown LRT and Don Mills LRT Underground without Concourse Level



Three sub-options were considered for this configuration with both LRT lines underground and with no concourse level between the surface and the platforms, as shown in **Exhibit 69**.

Exhibit 69: Summary of Underground Sub-Options, Without Concourse Level

Sub-Option	Don Mills LRT Platform		Eglinton Crosstown LRT Platform		Location of Bus Terminal	Passenger Transfer	Traffic Scenarios
	Configuration	Platform Location	Configuration	Platform Location			
8	Underground w/o Concourse	Far Side	Underground w/o Concourse (S of Road)	Near Side	South-East Corner	Underground / Surface	Left Turn Prot/Perm
9	Underground w/o Concourse	Near Side	Underground w/o Concourse	Far Side	South-East Corner	Underground / Surface	Left Turn Prot/Perm
10	Underground w/o Concourse	Near Side	Underground w/o Concourse	Far Side	North-East Corner	Underground / Surface	Left Turn Prot/Perm

[1] Direction in relation to the Don Mills / Eglinton intersection.

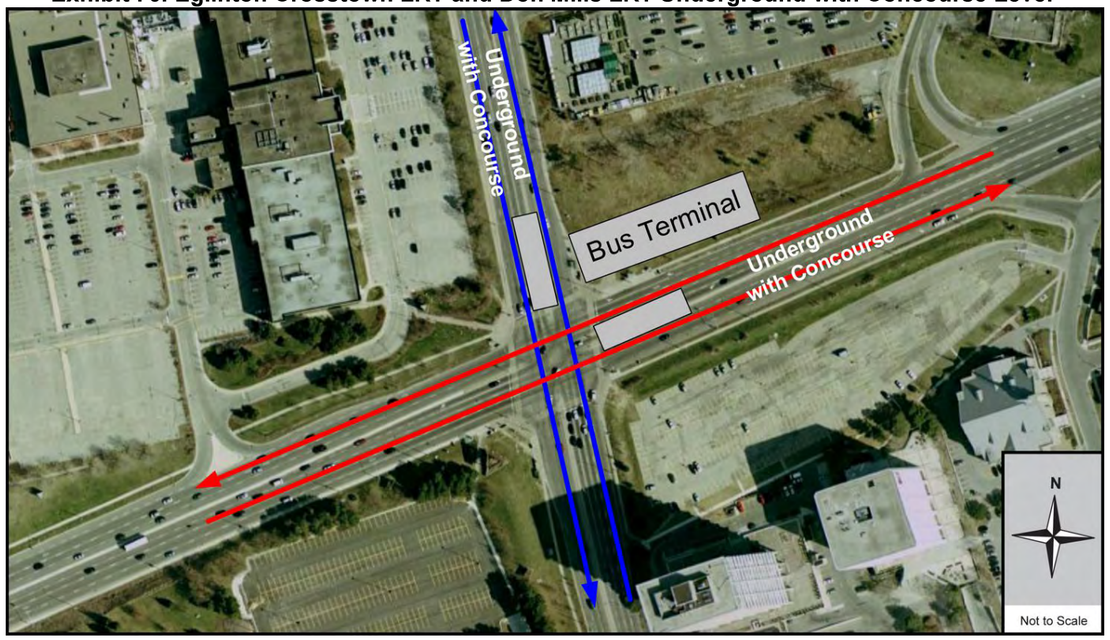
In general, the platform locations for Don Mills LRT and Eglinton Crosstown LRT (near side or far side) and the bus terminal locations vary depending on the options. A concourse level for passenger transfer is not proposed under these three options. Similar to Sub-option 5, the Eglinton Crosstown LRT underground alignment for Sub-option 8 is proposed to be south of the Eglinton Avenue roadway. Fundamentally, the characteristics under Sub-options 9 and 10 are the same with the exception of the bus terminal location.

For all three options, left turn traffic movements surface will operate under protected-permissive operation, which is the same as the existing operations.

2.10.2.4 Option 4 - Eglinton Crosstown LRT and Don Mills LRT Underground With Concourse Level

For the underground with concourse level category, both the Eglinton Crosstown and Don Mills LRTs transit right-of-ways are proposed to operate underground through the Eglinton Avenue and Don Mills Road intersection. In addition, a concourse level is proposed for passenger transfer. Similar to Option 3 (underground, no concourse level category), a underground transit signal operating with free mode of control is required. The alignment configuration is shown in **Exhibit 70**.

Exhibit 70: Eglinton Crosstown LRT and Don Mills LRT Underground with Concourse Level



Three options were considered in the underground, with concourse level category, as shown in **Exhibit 71**.

Exhibit 71: Summary of Underground Sub-Options with Concourse Level

Sub-Option	Don Mills LRT Platform		Eglinton Crosstown LRT Platform		Location of Bus Terminal	Passenger Transfer	Traffic Scenarios
	Configuration	Platform Location	Configuration	Platform Location			
11	Underground w/Concourse	Centre (South)[1]	Underground w/ Concourse (S of Road)	Centre (East)[1]	South-East Corner	Underground	Left Turn Prot/Perm
12	Underground w/ Concourse	Centre (North)[1]	Underground w/ Concourse	Centre (East)[1]	North-East Corner	Underground	Left Turn Prot/Perm
13	Underground w/ Concourse	Centre (South)[1]	Underground w/ Concourse	Centre (East)[1]	South-East Corner	Underground	Left Turn Prot/Perm

[1] Direction in relation to the Don Mills/Eglinton intersection.

In general, the Don Mills LRT centre platforms and the bus terminal location vary depending on the sub-options. The Eglinton Crosstown LRT centre platform is consistently located underground on the east side of the intersection. A concourse level is available for passenger transfers in these three sub-options. Lastly under Sub-option 11, the Eglinton Crosstown LRT underground alignment is proposed to be south of the Eglinton Avenue roadway.

For all three sub-options, left turn traffic movements on the surface will be under protected-permissive operation, which is the same as existing signal operations.

2.10.2.5 Option 5 - Eglinton Crosstown LRT and Don Mills LRT Special Options

The last three sub-options 14, 15, and 16, were evaluated at a high level to determine feasibility. For all three options both the Eglinton Crosstown and Don Mills LRTs centre median transit right-of-ways are proposed to operate on the surface through the Eglinton Avenue and Don Mills Road intersection. Cost estimates were not developed for these alternatives since they did not provide effective solutions to the constraints of the study.

The three sub-options developed are summarized in **Exhibit 72**. Drawings for these options are provided in the report "ECLRT – Don Mills LRT Special Study Area – Detailed Assessment" provided in **Appendix L**.

Exhibit 72 Summary of Special Sub-Options

Sub-Option	Don Mills LRT Platform		Eglinton Crosstown LRT Platform		Location of Bus Terminal	Passenger Transfer	Traffic Scenarios
	Configuration	Platform Location	Configuration	Platform Location			
14	Surface	Centre (North)[1]	Surface	Centre (East)[1]	North-East Corner	Surface	Ring Road
15	Surface	Centre (North)[1]	Surface	Centre (East)[1]	North-East Corner	Surface	Roundabout
16	Surface	Centre (North)[1]	Surface	Centre (East)[1]	North-East Corner	Surface	Underground Left Turn Lanes

[1] Direction in relation to the Don Mills/Eglinton intersection.

A ring road operation is considered under Sub-option 14. The new ring road is proposed to be located on the commercial property in the northwest quadrant connecting with Wynford Drive and on the public property in the southwest quadrant connecting with Rochefort Drive. Left turns are prohibited at the Eglinton Avenue and Don Mills intersection and will be re-routed onto the new ring road.

Under Sub-option 15, a roundabout operation is considered. Under this operation, transit and traffic signals are required to control the two intersecting LRT movements and the circulating traffic in the roundabout, to allow the LRTs to cross the roundabout. Left turns under this alternative will operate as right turns in the roundabout.

For Sub-option 16, underground tunnels are considered for the vehicular left turning movements at the Eglinton Avenue and Don Mills Road intersection.

For all three sub-options 14, 15, and 16, centre platforms are proposed for Don Mills LRT and Eglinton Crosstown LRT, and the bus terminal is proposed for the northeast quadrant.

2.10.3 Evaluation

The alignment options were evaluated based on the following criteria:

- Ensure an attractive transit service relative to the private auto: transit operations performance for the 2031 forecast ridership and beyond; quality of transfer between Eglinton CLRT, Don Mills LRT, and the local bus network; and potential effects on existing bus operations;
- Ensure safe and reasonable traffic operations: potential effects on traffic operations; and ability to provide safe pedestrian movement in the area.
- Impact to the environment and adjacent properties: potential effects on natural heritage, property waste and contamination, cultural heritage, utilities and municipal infrastructure, and the community.
- Support the City's urban structure: convenient access from other travel types; impact on walking distances; maximize redevelopment potential of adjacent properties; and potential impacts on adjacent stops.
- Ensure affordability: cost effective transit service for both LRT corridors.

To simplify the evaluation process, the options were organized in a stratigic manor. The process applied to the evaluation of the sixteen (16) sub-options included:

- Grouping the options into logical subcategories based on operating characteristics;
- Evaluating each of the options based on the evaluation criteria;
- Determine a preferred option under each of the configuration subcategories; and
- Determine from the preferred options for each subcategory, the final preferred alternative.

From the sixteen different options in the five groupings, one preferred option from each classification was selected, with the exception of the special options (Option 5). None of the concepts in this category were considered to have sufficient technical merit to be carried forward. A final evaluation was performed on the four preferred options to identify the final recommended alternative based on benefits and disbenefits. The four preferred options were identified as:

- Sub-Option 3;
- Sub-Option 6;
- Sub-Option 10; and
- Sub-Option 12.

A summary of the preferred options are shown in **Exhibit 73**.

Exhibit 73: Summary of Sub-Options from Each Configuration Category

Sub-Option	Don Mills LRT Platform		Eglinton Crosstown LRT Platform		Location of Bus Terminal	Passenger Transfer	Traffic Scenarios
	Configuration	Platform Location	Configuration	Platform Location			
3	Surface	Centre (North)[1]	Surface	Centre (East)[1]	North-East Corner	Surface	Left Turn Prohibited
6	Surface	Centre (North)[1]	Underground w/ Mezz.	Centre (East)[1]	North-East Corner	Underground	N/S Left Turn Prot, E/W Left Turn Prot/Perm
10	Underground w/o Mezz.	Near Side	Underground w/o Mezz.	Far Side	North-East Corner	Underground / Surface	Left Turn Prot/Perm
12	Underground w/ Mezz.	Centre (North)[1]	Underground w/ Mezz.	Centre (East)[1]	North-East Corner	Underground	Left Turn Prot/Perm

[1] Direction in relation to the Don Mills/Eglinton intersection.

The preferred options were evaluated to determine the final recommendation. A summary of the detailed evaluation is shown in **Exhibit 74**.

Exhibit 74: Summary of Detailed Evaluation of Preferred Options

Option	Eglinton Crosstown LRT Benefits	Don Mills LRT Benefits	Passenger Transfer Benefits	Traffic	Construction Impact	Construction Cost	Total Score
3	4	4	4	4	1	1	18
6	1	3	2	3	2	2	13
10	2	2	3	2	3	3	15
12	3	1	1	1	4	4	14

Legend: 1=Good; 4=Poor

From the results of the detailed evaluation, the following was determined:

- Sub-Option 6 provides the highest quality of Eglinton Crosstown LRT performance incurring little delay at the Eglinton Avenue and Don Mills Road intersection since Eglinton Crosstown LRT is operating underground without any signal delay due to general traffic or Don Mills LRT.
- Sub-Option 12 provides the highest quality Don Mills LRT performance since the LRT is underground incurring less signal delay than the surface operation.

- Sub-Option 12 provides the highest quality of passenger transfer since all transfers can occur underground without any interaction with general traffic. Sub-Option 6 provides high quality for passenger transfers between LRTs since passengers making transfers generally are not required to cross the street. The only time surface transfers could occur is transfers between Don Mills LRT and the bus terminal. Both these passenger transfers provide flexibility to manage increase in ridership without highly affecting general traffic operations.
- Sub-Option 12 provides the most benefit to general traffic with both the LRT lines and passenger transfers underground.
- Sub-Option 3 results in the least property impact because both LRT lines are surface. In contrast, Sub-Options 6, 10, and 12 will result in higher property impact with the LRT lines underground.
- Sub-Option 3 requires the lowest construction cost with the construction of the centre median transit way. The next lowest cost is Sub-Option 6 with construction of only the Eglinton Crosstown LRT underground. With construction of both Eglinton Crosstown LRT and Don Mills LRT underground, the construction cost is the highest, especially with the construction of the passenger transfer concourse level.

2.10.4 Recommendation

The preferred interface with the Don Mills LRT is Sub-Option 6 – Eglinton Crosstown LRT underground and Don Mills LRT surface. The preferred option includes the following components:

- Eglinton LRT underground with centre east side LRT platforms;
- Eglinton LRT underground alignment is directly under the Eglinton Avenue roadway;
- Don Mills LRT at surface with centre north side LRT platforms;
- Bus terminal location in the northeast quadrant of the Eglinton Avenue and Don Mills Road intersection;
- Passenger transfer to occur underground between the Eglinton Crosstown LRT and the bus terminal; and
- Passenger transfer to occur at surface between the Don Mills LRT and bus terminal.

This configuration has the following benefits:

- Provides the highest quality of Eglinton Crosstown LRT performance incurring little delay at the Eglinton Avenue and Don Mills Road signalized intersection since the Eglinton Crosstown LRT is operating underground without any type of signal delay due to general traffic or Don Mills LRT.
- Has the capability to manage further potential increases in Eglinton Crosstown LRT frequency and ridership.
- Provides high quality LRT underground transfers between Don Mills LRT and Eglinton Crosstown LRT.
- Results in less traffic and passenger/ pedestrian interaction surface.
- Results in less construction cost when compared to all options with both LRT lines underground.

Based on this recommendation, further development of the final alternative would include a proposed construction access road south of Eglinton Avenue to minimize the disruption to traffic during construction. Furthermore, with the Eglinton Crosstown LRT underground, the intersection of Eglinton Avenue and Gervais Drive can become signalized.

2.11 Wynford Stop

The existing configuration at Eglinton Avenue and Wynford Drive is a grade separated intersection with ramps to provide accessibility. This configuration does not meet the urban design initiatives of the City of Toronto. In addition, the grade separation does not provide easy access from all surrounding areas to a proposed stop platform on Eglinton Avenue. For these reasons an alternative was developed that created a more urban, transit friendly intersection.

2.11.1 Key Challenges and Constraints

Wynford Drive is grade separated from Eglinton Avenue at this location, with a significant rise from street level on Wynford Drive to street level on Eglinton Avenue. Passengers from Wynford Drive would have to make this level change to access the LRT on Eglinton Avenue. The Transit City program objective is to provide easy accessibility at all stations and stops such that passengers with disabilities are able to access the LRT. An alternative was developed that eliminates the grade difference.

This grade difference would affect passengers coming from north and south on Wynford Drive. However, the major sources of pedestrians and transit passengers in the vicinity of this stop are the large residential condominium buildings on the north and south sides of Eglinton Avenue. The building on the south side was recently completed, and includes a surface access to the sidewalk on the south side of Eglinton Avenue. The building on the north side is under construction. The approved site plan shows a surface access to the sidewalk on the north side of Eglinton Avenue.

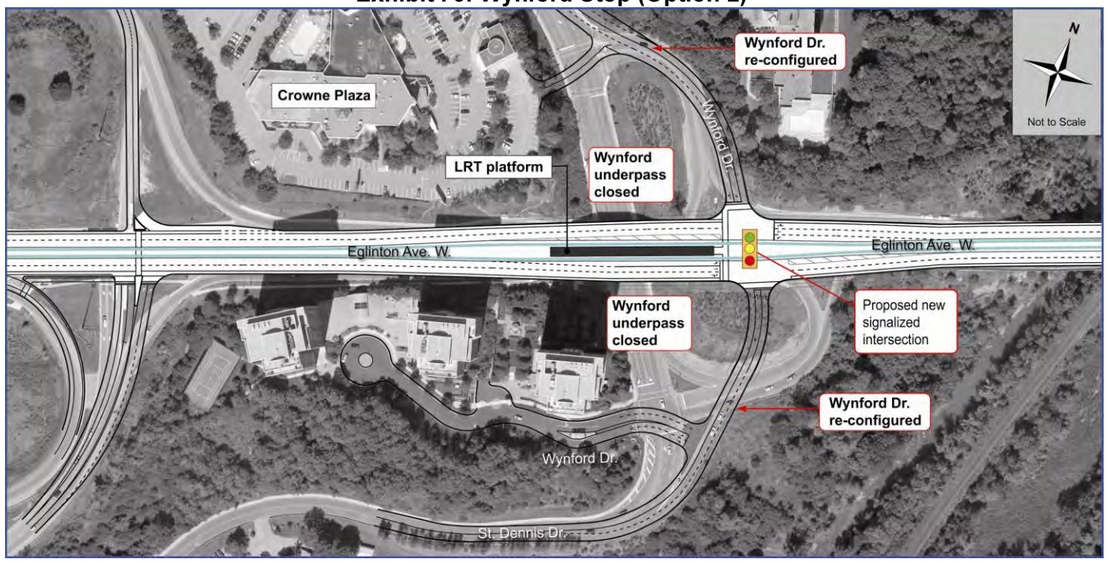
2.11.2 Options

Two options were analyzed. The first option (Option 1) leaves the road network generally unaltered. It provides a centre platform at the stop, and traffic signals serving pedestrians only to provide access from each side of Eglinton Avenue to the centre platform. Wynford Drive remains grade-separated from Eglinton Avenue. There is currently a staircase on Wynford Drive for pedestrians to access Eglinton Avenue and then the platform. Option #1 has the platform located to the west of the bridge, and therefore pedestrian access is adjacent to the existing bus stop location. Option 1 is presented in **Exhibit 75**.

Exhibit 75: Wynford Stop (Option 1)

The second option (Option 2) changes the road network by creating a surface intersection with Eglinton Avenue. This creates a more "traditional" intersection of two roads. Sidewalks would be provided on the new Wynford Drive legs. It also provides a centre platform at the stop. Traffic signals would serve both the vehicular movements and the pedestrian movements. For Option 2, the platform is shifted eastward to accommodate passenger access via crosswalks at the new signalized intersection. This alternative is shown in **Exhibit 76**.

Exhibit 76: Wynford Stop (Option 2)



2.11.3 Evaluation

2.11.3.1 Horizontal and Vertical Alignment

Option 1 provides very little change to the horizontal and vertical alignment. It results in minor vehicular delays at the LRT stop to allow for pedestrian crossings to the stop.

Option 2 provides very little change to the horizontal and vertical alignment of Eglinton Avenue. However, it requires a major change to the alignment of Wynford Drive, and the access driveways for condominium buildings on the north side and south side of Eglinton Avenue. Under this alternative, all through traffic on Wynford Drive would pass through the signalized intersection. This will result in vehicular delays for both Eglinton Avenue and Wynford Drive traffic.

2.11.3.2 Environmental Impacts

The valley lands associated with the East Don River are identified as a ravine by the City of Toronto and are regulated by TRCA. Option 1 results in negligible environmental impact whereas Option 2 results in the removal of natural vegetation. The proposed realignment of Wynford Drive (Option 2) to remove the existing grade separation and create a new at grade intersection to the east will result in an encroachment into the East Don River valleylands. The vegetation community in this area is comprised of a high quality dry fresh sugar maple – beech deciduous forest (FOD5-2) that provides slope stabilization and a natural migration corridor along the East Don River. The proposed encroachment will extend over the top of bank in this location and will require a large retaining wall or fill slope to support the Wynford Drive road platform. Given the significance of impact in this location, including an encroachment into areas regulated by TRCA under Ontario Regulation 166/06 and Toronto Ravine and Natural Feature Protection By-law, the realignment of Wynford Drive will be investigated further during design.

2.11.4 Recommendation

It is recommended that Option 2 be adopted as it supports the urban design and development objectives of the City of Toronto. The principal reasoning for this recommendation is to meet the planning initiatives of the City of Toronto. The realignment of Wynford Drive will be further investigated during the design phase. The use of remnant lands will be determined at future consultations with the City of Toronto.

2.12 Swift Drive Stop

The desirability of locating a stop at the intersection of Swift Drive and Credit Union Drive with Eglinton Avenue (between Wynford Drive and Bermondsey Road) was investigated. The existing topography in this area does not support the ability to construct a stop platform at this location.

2.12.1 Key Challenges and Constraints

The issues associated with providing a platform for this location are related to the existing geometric configuration of Eglinton Avenue between the Don River East Branch and Bermondsey Road. The Eglinton Avenue alignment is on a horizontal curve from west of Swift Drive to just west of Bermondsey Road. In order to provide far side stops at Bermondsey Road, the proposed alignment must be modified to incorporate a tangent section west of Bermondsey Road. Due to the existing alignment geometry in the area, it is not feasible to create a horizontal tangent section on the east side of the Swift Drive intersection, necessitating that a centre platform stop be situated on the west side of the Swift Drive/Credit Union Drive intersection.

Eglinton Avenue is on an approximately 6% upward gradient from the bridge over the Don River East Branch to east of Swift Drive. To facilitate a stop on the west side of the Swift Drive/Credit Union Drive intersection, the grade of Eglinton Avenue must be decreased (flattened) to 3% at the platform location to meet TTC design criteria. The level of Eglinton Avenue is essentially fixed at the Don River bridge, and therefore the grade changes must be achieved in the section between the bridge and Swift Drive. With the limited distance between these two fixed points, vertical curves cannot be implemented. Therefore, the grade of Eglinton Avenue must be set at 3% beginning at the bridge and continuing to the east end of the platform at Swift Drive. The impact of this change in profile is lowering of the elevation of Eglinton Avenue by 6 metres at the Swift Drive/Credit Union Drive intersection.

2.12.2 Options

The two options assessed were:

- Provide a stop at Swift Drive/Credit Union Drive; or
- Do not provide a stop at this location.

2.12.3 Evaluation

2.12.3.1 Ridership

TTC staff investigated the population and employment surrounding a Swift Drive/Credit Union Drive Stop. An estimate was prepared of the 2031 population and employment within 300 metres, also within 500 metres, of the Swift Drive/Credit Union Drive intersection.

Exhibit 77: Distances from Swift/Credit Union and Bermondsey

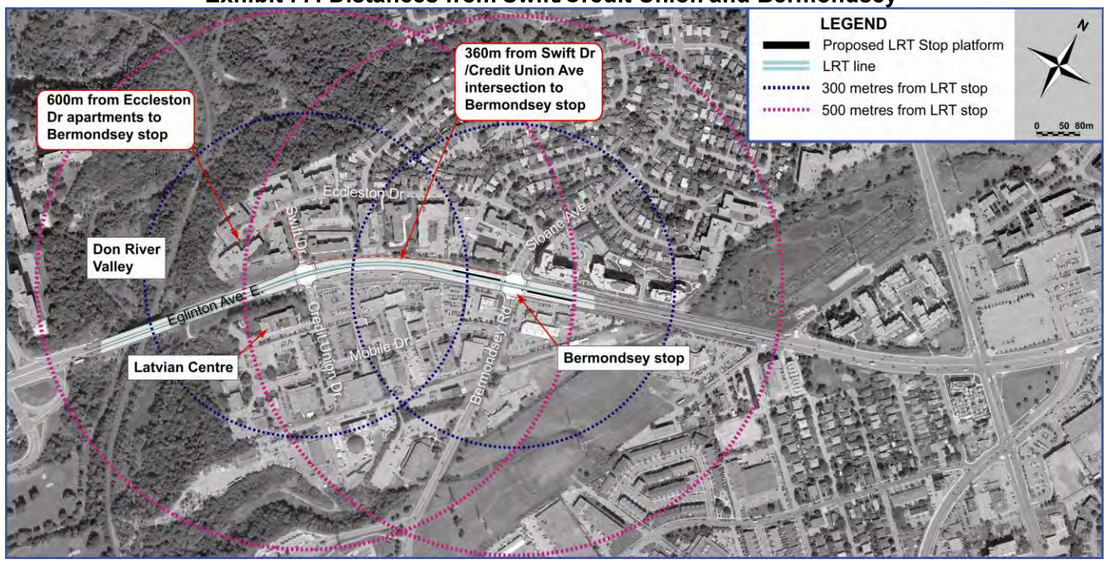


Exhibit 78: Population and Employment Information for a Swift/Credit Union Drive Stop

Location	Within 300m			Within 500m		
	Pop	Emp	Total	Pop	Emp	Total
Swift/Credit Union	925	750	1675	2003	1235	3238

Source: TTC 2009

Locating a centre platform on the west side of Bermondsey results in a spacing of approximately 350 metres between this proposed stop and the stop at Bermondsey Road.

A transit stop at Swift Drive/Credit Union Drive would service the residential development on the north side of Eglinton Avenue in the vicinity of this intersection. The benefit of a stop at this location is a reduction in travel distance for passengers destined to/from the west end of Eccleston Drive and Mobile Drive. However, the majority of density north of Eglinton Avenue is situated north of Eccleston Drive, approximately midway between Swift Drive and Bermondsey Road, while the travel distance for those south of Eglinton Avenue is only marginally reduced by a stop location at Swift Drive/Credit Union Drive.

The alternative to a stop at Swift Dr/Credit Union Dr is for transit patrons to board/alight the LRVs at the stop to be provided at Bermondsey Road. The area that would be served by the Swift Drive/Credit Union Drive Stop is within 500 metres of the Bermondsey Road Stop. Additionally, the walking environment to the Bermondsey Stop is along fairly flat streets. Conversely, providing a stop at Swift Drive/Credit Union Drive would create a “canyon” effect that would be uninviting.

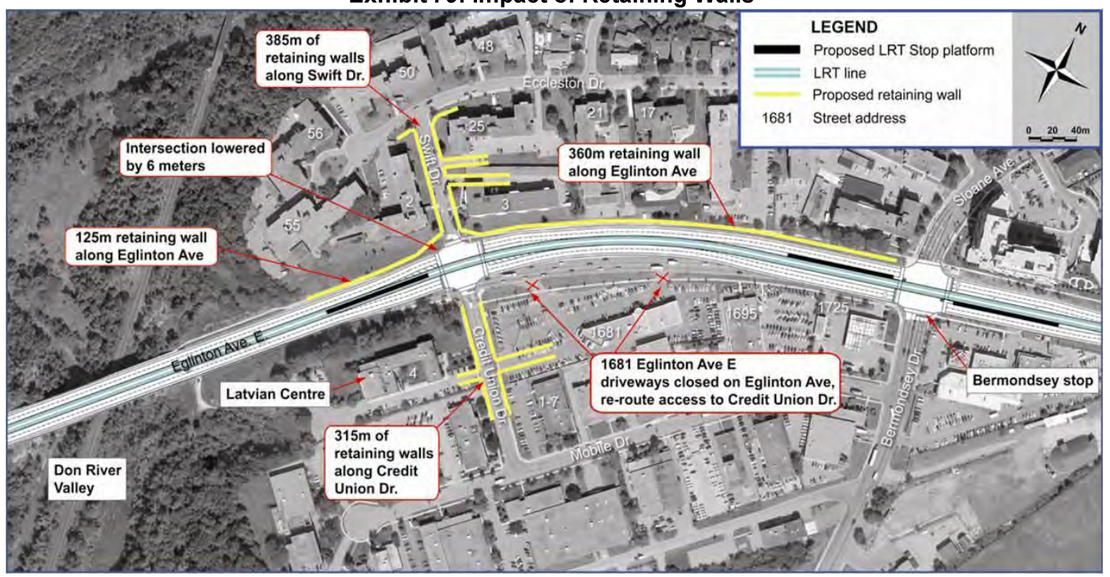
2.12.3.2 Property Impacts/Retaining Walls

The lowering of Eglinton Avenue by 6 metres at the Swift Drive/Credit Union Drive intersection has an impact not only on Eglinton Avenue, but also on the vertical profiles of Swift Drive and Credit Union Drive. There is limited right-of- way width to accommodate this significant elevation change on Eglinton Avenue. Grading of side slopes is feasible on the south side of Eglinton Avenue, although the two driveway accesses at #1681 Eglinton Avenue would have to be closed and replaced with a realigned driveway. Retaining walls would be required on the north side of Eglinton Avenue from approximately 100 metres west of Swift Drive through to Bermondsey Road.

The lowering of the grade at the intersection more significantly impacts upon Swift Drive and Credit Union Drive for two reasons. First, by incorporating the required vertical curve transitions from the crossfall on Eglinton Avenue, and applying a maximum grade of 6% on Swift Drive and Credit Union Drive, the impact of the grade change extends along the full length of Swift Drive and Credit Union Drive. Furthermore, the profile matches back to existing grades at the Mobile Road intersection, whereas on Swift Drive, the impact of the grade change "spills" beyond the full length of Swift Drive, extending 40 metres west and 60 metres east on Eccleston Drive. The impact of the grade change on Swift Drive and Credit Union Drive is exacerbated due to the narrow right of way, driveway accesses and minimal building setbacks. The 20m right of way requires the use of retaining walls along the street line to accommodate the grade change. Retaining walls, 6 metres at their highest point, are required on Swift Drive and Credit Union Drive on both sides of the street and for the full lengths of both roads. Secondly, the existing driveway accesses are also affected. To maintain existing driveways, retaining walls would extend beyond the building faces. This effectively eliminates all access to the property at #3 Swift Drive, landlocking this property unless an access easement agreement could be reached with an adjacent property owner. The driveway to #25 Swift Drive would also have to be closed, restricting access to the property to be solely from Eccleston Drive. Furthermore, the need for high retaining walls on both sides of the street results in a "tunnel effect", presenting an unsafe condition for vehicles accessing the properties on Swift Drive and Credit Union Drive.

The extent of the impact of the retaining walls is shown on **Exhibit 79**.

Exhibit 79: Impact of Retaining Walls



2.12.3.3 Constructability

There would be substantial costs associated with excavation and road construction to lower Eglinton Avenue by 6 metres at the Swift Drive/Credit Union Drive intersection. Furthermore, the staging requirements would be extensive, disruptive and costly. Detours would be needed to stage the road reconstruction, with temporary shoring walls required to maintain reduced traffic lanes adjacent to the 6 metres deep excavation. This shoring and excavation would be carried out in at least two stages with access to and from Swift Drive and Credit Union Drive alternately closed at Eglinton Avenue during the staged construction.

2.12.3.4 Recommendation

The impacts summarized herein are significant and involve both social and economic costs resulting from diminished use of the properties both during and after construction. The construction costs for providing a stop at Swift Drive/Credit Union Drive are substantial. Based on the comparison of the considerable impacts versus the limited benefits, it is recommended that a stop at Swift Drive/Credit Union Drive should not be provided.