Steeles Corridor Study
Final Report

Transportation Assessment

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16-02124

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1.0 Introduction

The transportation network, both roads and transit, present both opportunities and constraints related to intensification of uses along the Steeles Avenue corridor between Keele Street and Jane Street. Over the shorter term the transportation network is more of a constraint than an opportunity. Over the mid to longer term the substantial enhancements, particularly related to transit, along with the configuration and intensity of the proposed development, tip the balance in favour of a more balanced transportation network including transit, walking and cycling.

The existing and future transportation related opportunities and constraints, and their related implications on the proposed intensification of land uses, are discussed herein.

2.0 Existing Transportation Facilities and Services

2.1 Road Network

The subject lands are bounded by major arterials on three sides. These include Keele Street on the east, Steeles Avenue on the south and Jane Street on the west. A hydro corridor and rail line bound the lands on the north.

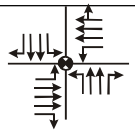
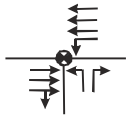
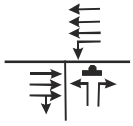
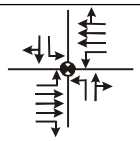
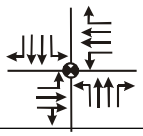
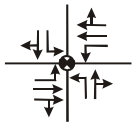
The Steeles Avenue/Keele Street and Steeles Avenue/Jane Street intersections are pivotal to the traffic operations in this area in that there are no other continuous east-west public streets between Finch Avenue and Highway 407 and no other continuous north-south roads between Jane Street and Keele Street. Both Jane Street and Keele Street accommodate commuter traffic, as well as local traffic destined to uses in the area. The Steeles Avenue/Keele Street and Steeles Avenue/Jane Street intersections also have a high percentage of truck traffic, in part generated by the industrial uses in the area.

An accident or some other incident at either of these two intersections can result in significant traffic delays for the area.

The operations of these two intersections, as well as the other minor intersections between these two, were analyzed on the basis of the most current available traffic counts. These counts were undertaken by the City of Toronto at various times between 1993 and 2002. **Figure 1** illustrates the a.m. peak hour counts, with **Figure 2** illustrating the p.m. peak hour counts, and **Figure 3** the existing lane configurations.

Analysis of the intersection operations on the basis of these counts indicates that the Steeles/Keele intersection operates reasonably well during the a.m. peak hour, but near capacity during the p.m. peak hour, with the Steeles/Jane intersection operating over capacity during the a.m. peak hour and near capacity during the p.m. peak hour. **Table 1** details the existing levels of service for the various intersections in the area.

Table 1
Base Traffic Conditions

Intersection	Lane Configurations	Levels of Service [volume-to-capacity ratio] / (delay in seconds)	
		AM Peak Hour	PM Peak Hour
Steeles Avenue/Keele Street (1)		D [0.82]	E [0.96]
Steeles Avenue/Founders Road (1)		A [0.46]	A [0.47]
Steeles Avenue/Northwest Gate (2)		C (16.3 sec/veh) NB-L	C (20.6 sec/veh) NB-L
Steeles Avenue/Murray Ross Parkway (1)		A [0.44]	A [0.48]
Steeles Avenue/Jane Street (1)		F [1.07] (3)	E [0.97]
Steeles Avenue/Peter Kaiser Gate (1)		D [0.81]	B [0.64]

(1) *For the signalized intersections, the levels of service are based on the overall intersection operations.*

(2) *For two-way stop controlled intersections, the levels of service are based on delay associated with the critical movements.*

(3) *It is not possible for any intersection to operate over-capacity under existing conditions since the volume of traffic identified in the traffic count is in fact getting through the intersection. The over-capacity operation at Steeles/Jane implies that the actual saturation flow values could be higher than those used in our analysis which reflect standard practice.*

2.2 Transit Network/Services

York University is well served by public transit including a relatively new York University GO station just east of the University at Canarctic Drive, and a very successful GO bus service, via Highway 407 between the Pickering GO Station to the east and Hamilton GO Centre to the west. This 407 GO bus route links the University with many other key destinations in the vicinity of the 407 corridor, including Oakville GO Station, Mississauga City Centre, Unionville GO Station and Scarborough Town Centre, etc., to

name a few. Based on discussions with GO Transit, currently, approximately 80 percent of the ridership along this route is destined to/from York University.

The subject area is also well served by the TTC bus routes along Steeles Avenue, Keele Street and Jane Street. However, for the lands north of Steeles Avenue, the transit services are more limited. Limited bus services are provided by the TTC along the Keele and Jane corridors, to the north of Steeles. York Region Transit (YRT) also provides a bus route running between the University and Thornhill, with another one between the University and Woodbridge, only during peak periods. **Table 2** details the existing transit services in the broader area including York University, with the routings shown in **Figure 4**.

Table 2
Existing Transit Services

Transit Route		Weekday Frequency of Service (minutes)		
		AM Peak Period	PM Peak Period	Off Peak Period
Toronto Transit Commission (TTC)				
Jane	35A: Jane Station ↔ Steeles via Hullmar	11	17 – 18	-
	35B: Jane Station ↔ Steeles via Pioneer Village	-	17 – 18	12 –15
	35C: Jane Station ↔ Steeles	11	17 –18	12 – 30
	35D: Jane Station ↔ Langstaff Road	11	17 – 18	24 – 30
	35E: Jane Station ↔ York University Express	20	16 – 17	-
Steeles West	60B: Finch Station ↔ Martin Grove	-	-	11 – 24
	60C/F: Finch Station ↔ York University	6 – 7	7	11 – 24
	60D/E: Finch Station ↔ Highway 27	6 – 7	7	-
Keele	41: Keele Station ↔ York University & Steeles	-	-	15
	41B: Keele Station ↔ Steeles & Petrolia via York University	6 – 7	6 – 7	10
	41C: Keele Station ↔ York University & Steeles via Murray Ross	-	-	24
Keele North	107B: Downsview Station ↔ Rutherford GO Station via Chesswood	16 – 17	18	40
	107C: Downsview Station ↔ Teston Road	16 – 17	18	30 – 40
York University	106: Downsview Station ↔ York University	9 – 10	11 – 12	15 – 30

Transit Route		Weekday Frequency of Service (minutes)		
		AM Peak Period	**PM Peak Period**	**Off Peak Period**
York Region Transit (YRT)				
3: Thornhill ↔ York University		10 – 20	20	20 – 40
10: Woodbridge ↔York University		45	45	-
GO Transit				
Highway 407 GO Bus [(1)]	Eastbound: Hamilton GO Centre → Pickering GO Station [(2)]	5 – 30	5 – 30	30
	Westbound: Pickering GO Station → Hamilton GO Centre [(2)]	3 – 20	5 - 39	5 – 60
Bradford GO Train	Southbound: Bradford GO Station → Union GO Station	32 – 50	-	-
	Northbound: Union GO Station → Bradford GO Station	-	33 – 40	-

[(1)] *The frequency of service noted here reflects the frequency of service at the York University Bus Stop.*

[(2)] *The major bus stops for this route and its sub-routes include Oakville GO Station, Mississauga Square One, Bramalea GO Station, York University, Unionville GO Station, Scarborough Town Centre.*

3.0 Proposed/Planned Transportation Facilities and Services

3.1 Road Network

As noted, the two boundary road intersections are pivotal to the transportation network in this area, with some movements currently operating close to or at capacity.

Also as noted, no roadway currently bounds these lands to the north. If this was going to continue to be the case, any new development or transit related traffic would place greater pressure on Steeles Avenue, in particular the Steeles/Keele and Steeles/Jane intersections.

However, previous studies for this area have identified the need for a new east-west road along the edge of the Hydro corridor, to serve the proposed transit terminal and associated substantial commuter parking lot. With most of the commuter traffic oriented at least initially to/from the north, the Steeles/Jane and Steeles/Keele intersections would be overburdened without such an east-west linkage, for example the southbound left turn from Jane Street onto Steeles Avenue in the a.m. peak and the eastbound left turn from Steeles Avenue onto northbound Keele Street in the p.m. peak period. This road is critical to not only accommodate commuters, but also to:

- Accommodate buses destined to/from the bus rapid transit/subway station
- Facilitate new development related traffic to access specific development blocks
- Provide an alternative routing to Steeles Avenue in the event of an accident or other incident blocking traffic on Steeles Avenue
- Provide an opportunity for through traffic to use this route and potentially reduce pressure on some of the critical movements at the two key intersections.

In order to maximize routing flexibility and the capacity benefits, this roadway needs to be continuous from Keele Street through to Jane Street.

Physical limitations exist as to where this new east-west road can intersect with Jane Street and Keele Street. Keele Street bridges over the CN rail line, whereas Jane Street passes under the CN line. In both cases the new road must be situated sufficiently away from the respective grade-separations such that sight lines do not present a constraint, yet sufficiently north from Steeles Avenue to allow for reasonable signal spacing and queuing distance. At Jane Street, OPA No. 529 (Schedule '4C') indicates the road alignment and intersection location with Jane Street, which is reproduced as **Figure 5**.

UPS currently has one access point onto Jane Street, with another one onto Steeles Avenue at the signalized intersection opposite to Murray Ross Parkway. With the implementation of a new east-west road along the edge of the Hydro corridor, the UPS Jane Street driveway will need to be reconfigured such that UPS related vehicles would access Jane Street via the new east-west road. This implies that the traffic related to UPS will need to share this roadway with other traffic, including commuter traffic. However, the UPS related vehicles will benefit from having traffic signals at the Jane/new east-west road intersection, thus off-setting the loss of an exclusive driveway onto Jane Street**.**

Over the fullness of time, consideration should also be given to providing a road connection north of the Hydro and rail corridor, to provide a linkage with Snidercroft Road, if at all possible. This again would provide for network flexibility and connectivity, particularly if the industrial land uses to the north are redeveloped or intensified.

At Keele Street the grade-separation over the rail corridor presents a challenge as to an appropriate intersection location which achieves reasonable sight distances, while providing appropriate separation between this new intersection and Steeles Avenue. At minimum, the centreline of the new roadway should be 215 metres south of the centreline of the rail corridor. This is based on the minimum required stopping sight distance on the vertical curve. This new intersection will also require the installation of traffic signals so as to facilitate eastbound left turns onto northbound Keele Street.

As indicated in Table 1, the minor intersections with Steeles Avenue between Jane Street and Keele Street currently operate well, in part because two of the three are 'T' intersections, only serving York University. Future plans for York University call for a more evenly located grid network of roads as outlined in the York University Secondary

Plan (Map 10-2 Roads Plan). The plan notes that the road locations are conceptual only. The relocation of roads south of Steeles Avenue on the York University campus is being co-ordinated with the identification of new roads to the north of Steeles Avenue, so that off-set intersections or other conflicts do not result. It is also desirable to extend the grid network north of Steeles Avenue to provide for routing flexibility in the area, and to better integrate the uses north and south of Steeles Avenue.

Given that Steeles Avenue is under the jurisdiction of the City of Toronto, any future access to Steeles Avenue and signalization of any intersections on Steeles Avenue will have to be coordinated with and approved by the City of Toronto.

York University is continuing to work closely with the Smart Commute Association of Black Creek (SC-BC) to promote environment-friendly initiatives so as to reduce the percentage of single occupant vehicles (SOV) coming on Campus. York University also continues to be a strong supporter of and advocate for transit improvements, including the subway extension and BRT. Thus, even with increases in enrolment, the expectation is that traffic related to York University will not be increased, or increased only minimally. New uses north of Steeles Avenue should also be encouraged to participate in the Smart Commute Association of Black Creek.

The York Region's Road Capital Projects program currently has Keele Street scheduled for widening from four to six lanes, from Steeles Avenue to Highway 7, in 2009. Also, Jane Street is scheduled for widening from four to six lanes between Steeles Avenue and Highway 7 in 2012. No improvements to Steeles Avenue in proximity to Jane Street and Keele Street are currently planned by the City of Toronto.

3.2 Transit Network Services

Substantial improvements in transit services are proposed for this area. They include the extension of the Spadina Subway, with two new stations in this vicinity, one at York University and the second north of Steeles Avenue in the study area. However, the timing for the subway extension is not known as yet. The precursor to these will be bus rapid transit which is expected to be implemented over the shorter term. The TTC is moving toward the implementation of a BRT link between Downsview Station and Steeles Avenue, with a subway/bus RT station and commuter parking to the north of Steeles Avenue. The construction of the parking will likely be staged, with less parking required for the bus rapid transit than the subway.

In addition to the TTC initiative, York Region and GO Transit are also looking at other transit initiatives in this area. In the York Region Transportation Master Plan, the rapid transit network proposal indicates a potential rapid transit line which links the future rapid transit services along Highway 7 via the Jane corridor and York University to the Downsview Station. Also, GO Transit is proposing its extensive inter-regional BRT network along a circumferential corridor in the "905" belt around Toronto. This BRT network in the subject area may include an exclusive right-of-way transit corridor in the Hydro corridor.

Figure 6 illustrates the proposed transit network for this area.

These substantial improvements in transit services are anticipated to significantly increase the transit modal split in the subject area and reduce the dependence on auto travel. Some existing trips by automobile are expected to shift to public transit when these high order transit services are in operation, with transit stations within walking distance of the work place. This should result in some reduction in traffic along the major roadways and therefore alleviate some of the congestion problems at the major intersections in the area, although new development related traffic may replace this.

The key to all of these transit initiatives will be co-ordination to ensure that the services are complementary and that together they best maximize the service area and potential ridership, without duplication. The various proposed rapid transit initiatives are all competing for funding from senior levels of government such that the time frames for implementation may be accelerated in some cases, and delayed in others.

The various transit improvements will attract some additional commuter traffic to the area to the new commuter parking lot, but the transit improvements should decrease other traffic destined to this area, for example, to York University. It should be noted that with BRT, the commuter traffic entering and leaving the station will be more dispersed than in the case of a GO train service, since the number of riders on a train is substantially higher than on a bus.

4.0 Traffic Implications Related to the Commuter Parking Facilities and Proposed Development

Currently the predominant commuter flows are southbound in the a.m. peak period and northbound in the p.m. peak period, although with the construction of Highway 407 and employment opportunities to the north, they are becoming increasingly more balanced. A commuter parking lot of 2,000 or 3,000 parking spaces in the hydro corridor can attract a substantial number of vehicle trips to the area, which for the most part are expected to correspond to the peak directional flows. The advantage is that most of these trips will be oriented to/from the north and therefore should reduce some of the commuter related traffic at the Keele/Steeles and Jane/Steeles intersections. The downside is that a 1,000 space parking lot can generate in the order of 600 inbound vehicle trips in the a.m. peak hour, with a 3,000 space parking facility generating three times that (i.e. 1,800 inbound vehicle trips in the a.m. peak hour). This is a large number of vehicles turning primarily at the intersections of the new street with Keele Street and Jane Street. The actual number of parking spaces required and therefore the resulting traffic will be dependent upon several factors including whether this is a BRT or subway station and on whether this is the terminus for the line, or whether there are one or more other stations/commuter parking lots to the north. For example, a BRT station parking lot will attract fewer commuters than a subway station parking lot. A station which is a temporarily terminus for the line will attract more commuters than a station which has other stations with commuter parking further to the north.

The proposed land use plan has been structured so that the highest land use densities are located closest to the transit station, with the densities decreasing away from the station. This will ensure that the highest numbers of potential transit uses are situated within walking distance of the station. The actual levels of transit usage which can be achieved will depend on several factors including:

- Whether this is a BRT or subway station. The higher order transit will tend to attract more users.
- The amount of parking which is available on-site and whether there are charges for this parking. It is difficult to encourage transit usage where abundant parking is available free of charge.
- The level of congestion. Transit, particularly rapid transit, becomes an attractive alternative when compared to sitting in traffic.
- Whether this is a terminus for the BRT or subway line, or whether those working to the north can also take advantage of it.

The mix of residential and employment based uses is another important consideration in assessing the potential amount of traffic that may be generated by the proposed land uses. From a transportation perspective, residential uses are preferred over employment based uses for the following reasons:

- Complementary peak directional flows to the commuter flows (e.g. inbound commuter flows into the parking lot in the a.m. peak whereas the residential traffic is primarily outbound). Similarly, residential traffic is complementary to the traffic flows related to York University.
- Substantially lower trip generation rates on an equivalent floor area basis as compared to employment based uses.
- Opportunity to walk, or cycle, or use a shuttle bus to travel to work or school, recognizing that York University is situated immediately south of Steeles Avenue.

A mix of residential and employment based uses also allows for Vaughan residents to live and work in the same area, thereby negating the need for commuting in those cases.

In examining the traffic implications of the various changes in this area including intensification of uses on the Vaughan side of Steeles Avenue and the proposed transit station and commuter parking lots, consideration also needs to be given to changes on the south side of Steeles Avenue, at York University. In the last few years York University and its partners have experienced notable success in its travel demand management endeavours. The extension of rapid transit through to York University and beyond into Vaughan, should result in even more substantial auto travel savings. In part, these savings will be off-set by traffic increases related to further increases in enrolment and other uses on the campus. In particular, the lands immediately south of Steeles Avenue are being freed up for intensification from their current uses (e.g. Tennis Canada complex).

Because all of these various considerations can vary, depending on the time frame considered and funding commitments (e.g. BRT versus subway), it is difficult at this stage to prepare a comprehensive transportation impact assessment for this area. However, sufficient testing has been undertaken to determine that the mixed land use concept that is being brought forward is a reasonable one, with higher densities closer to the transit station and lower densities farther away. In any assessment it is recognized that not all lands will develop to their maximum permitted density. It is also recognized that road capacity will be freed up through the multitude of transit initiatives which are being proposed and that drivers who do not need to be on these particular roadways and who do not shift to public transit, may consider alternative routings.

5.0 Traffic Impact Study Requirements

In view of the fact that site specific development applications will likely be made over a period of time, traffic impact studies should accompany these applications. These traffic impact studies should reflect the circumstances at the time of the applications and include consideration of a 5 year horizon of that date. Other considerations should include:

- Modal split assumptions that reflect the transit services that are placed at that time and which are committed to be in place within the 5 year horizon.
- The proximity of the site to the transit station.
- The proposed approach and associated commitments to travel demand management.
- The current traffic volumes and associated traffic operations.
- Future background traffic increases related to the proposed or approved but not built developments, including those generated by York University.
- The local street network connections to outside the study area.
- Status of the proposed east-west road linking Keele Street with Jane Street.

The latter point is discussed in further detail below.

6.0 Proposed East-West Road

As noted, the proposed east-west road is viewed as being critical to the intensification of uses in this corridor. Not only is it needed to accommodate access to the new transit station and commuter parking lot, but also to allow new development to proceed without relying so heavily on Steeles Avenue and the Jane/Steeles and Keele/Steeles intersections. It also can provide an alternative routing for through traffic and emergency vehicles in the event of congestion or other delays on Steeles Avenue.

Up to a 26 metre right-of-way is proposed, which would accommodate a 4 lane cross-section, along with a sidewalk along the south side and landscaping along both sides. Provision has also been made for a narrow utility corridor along one side. A 4 lane cross-section would allow for 2 lanes to be set aside for buses and 2 lanes for mixed

traffic, within the same roadway. The right-of-way requirements would need to be confirmed through the EA process.

To maximize the development potential on lands to the south of the Hydro corridor it would be desirable to have the roadway encroach onto the Hydro corridor. However, this has not been resolved as yet. To ensure that the roadway can be achieved, a 26 metre right-of-way should be preserved on the development lands. If encroachment onto the Hydro right-of-way is agreed upon, the surplus lands not required for the east-west roadway on private property, can be returned to the respective landowners.

In the event that one or more of the transit authorities wish to have an exclusive east-west transit corridor which is distinct from the east-west roadway, this would need to be negotiated by them, through the hydro corridor. Also, the means of achieving connections to/from Keele and Jane Streets would also need to be considered (e.g. a grade-separation to facilitate left turns to/from Jane Street and Keele Street or connections back to the east-west roadway east of Keele Street and west of Jane Street, with a shared east-west road connection to Jane Street and Keele Street). It would be difficult to achieve a second at-grade intersection with Keele Street due to the proximity of the rail overpass. A similar challenge exists at Jane Street.

It likely will not be possible to construct the east-west in its entirety in one piece because of the property requirements, if using private properties. However, if the necessary right-of-way can be achieved along the Hydro corridor, then construction can proceed in one stage. In the former scenario at minimum a connection from the commuter parking lots through to Jane Street is required so that commuter related traffic does not add southbound left turns to the Jane/Steeles intersection which currently has capacity constraints. The balance of the segments would then be achieved as the adjacent sites are developed. Because of the proposed north-south grid system, logical segments of roadway can be addressed in stages. However, the preferred solution is to construct the entire length of roadway in one phase, so as to achieve the desired goals. It is also preferred that transit be included within the same right-of-way, rather than as a separate corridor.

7.0 North-South Roadways

A total of six north-south roadways are proposed between Jane Street and Keele Street. These are intended to serve several functions including:

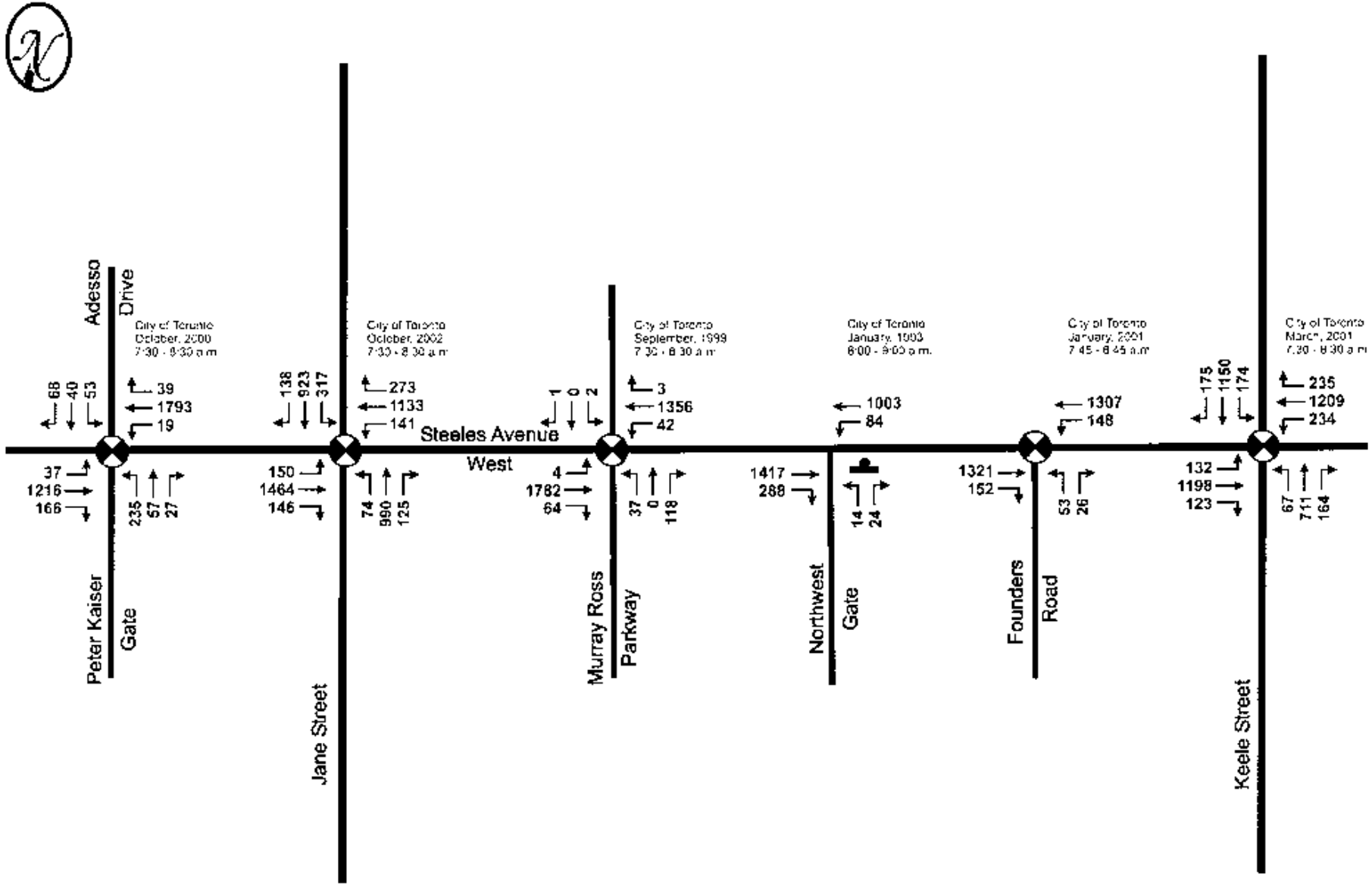
- Creating more reasonable development blocks.
- Integrating the lands north of Steeles Avenue with the York University lands to the south. These linkages are intended to serve a variety of modes including pedestrians, cyclists, buses, service vehicles and automobiles.
- Providing routing options for emergency and other vehicles in the event of an accident or other incident.
- Redirecting traffic away from the Jane/Steeles and Keele/Steeles intersections for local trips between uses in this immediate area.

Two travel lanes along, with on-street parking and sidewalks along both sides of the street are proposed within a ± 20 metre right-of-way for most of these north-south roadways. For the main north-south spine which provides the primary transit connection, a 4 lane cross-section is proposed within a ± 23 metre right-of-way. Two lanes would be dedicated for transit, with two for mixed traffic. Again, sidewalks would be provided along both sides, however the on-street parking would be displaced by the transit lanes. The other unique application would be the roadway immediately abutting the transit station on the east. The cross-section for this roadway will need to be resolved with the transit authorities to ensure that their requirements are met. The blocks may also be subdivided in smaller sub-blocks through the use of other more minor local roadways or laneways.

8.0 Summary

Recognizing the road capacity constraints in the area and transit infrastructure which is proposed, this presents an unprecedented opportunity to co-ordinate development in a manner which capitalizes on the transit investments. This also presents a unique opportunity to encourage development which is complementary to York University on the south side of Steeles Avenue and which facilities alternative modes to the automobile, such as walking, cycling and shuttle bus to/from the University campus. Also key to this are development density allocations which allow the greatest numbers of people to walk to the transit station and uses which favour non-peak directional flows. Travel demand management strategies are also critical to this success, recognizing the advantages of having the Black Creek Regional Transportation Management Association at the doorstep. Traffic impact studies will need to be submitted with respect to all applications and these will need to include considerations of TDM measures.

However, the plan also recognizes that new road infrastructure is required, in particular a new east-west road linking Jane Street with Keele Street. This balanced transportation network also relies on a grid network of north-south roadways that allow for the integration of uses north of Steeles Avenue with the University and for alternative routings for cyclists, pedestrians and buses, in addition to cars and trucks.



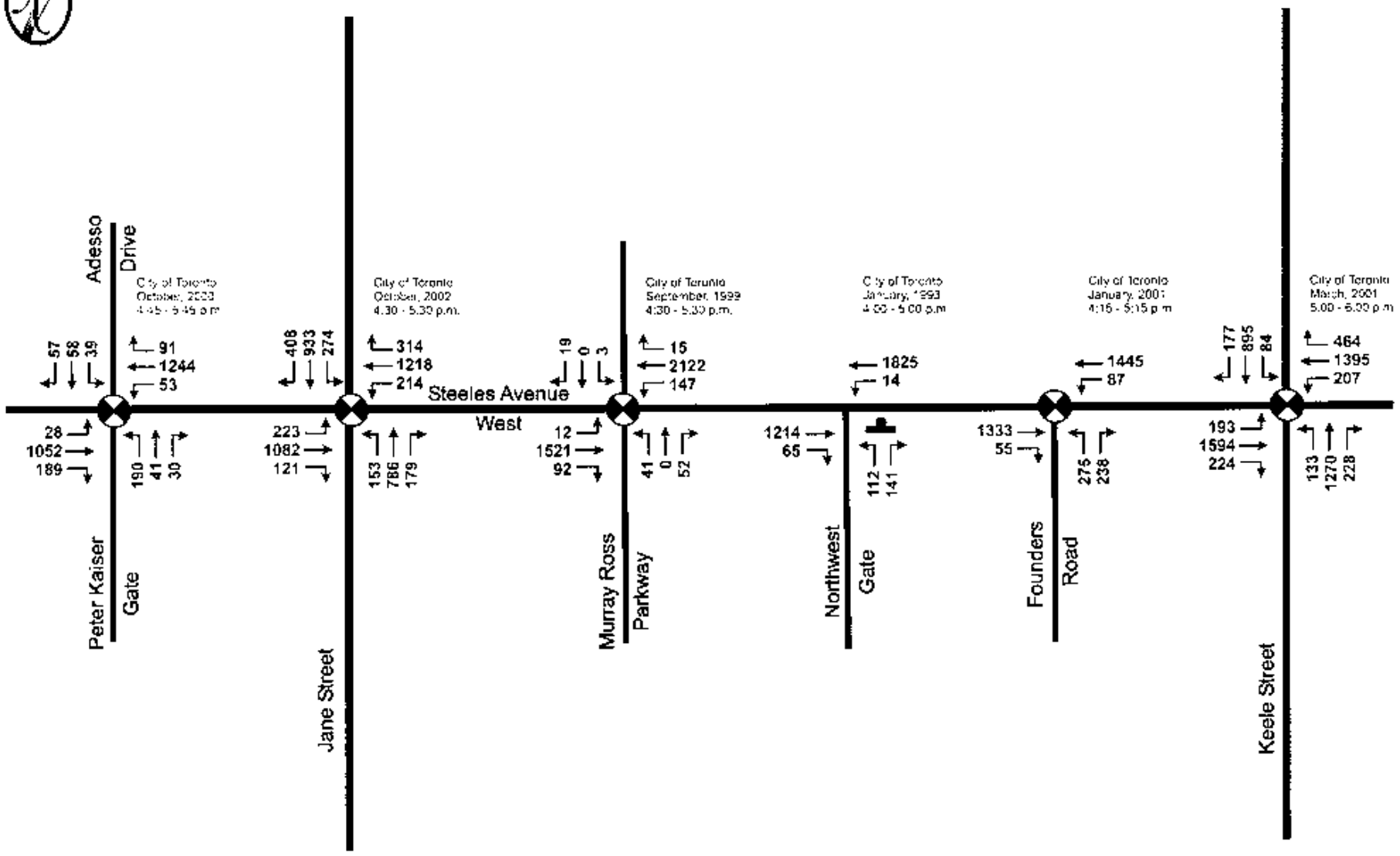
Not to Scale

Marshall Macklin Monaghan

Signalized Intersection

Stop Control

Figure 1
Base Traffic Volumes
AM Peak Hour



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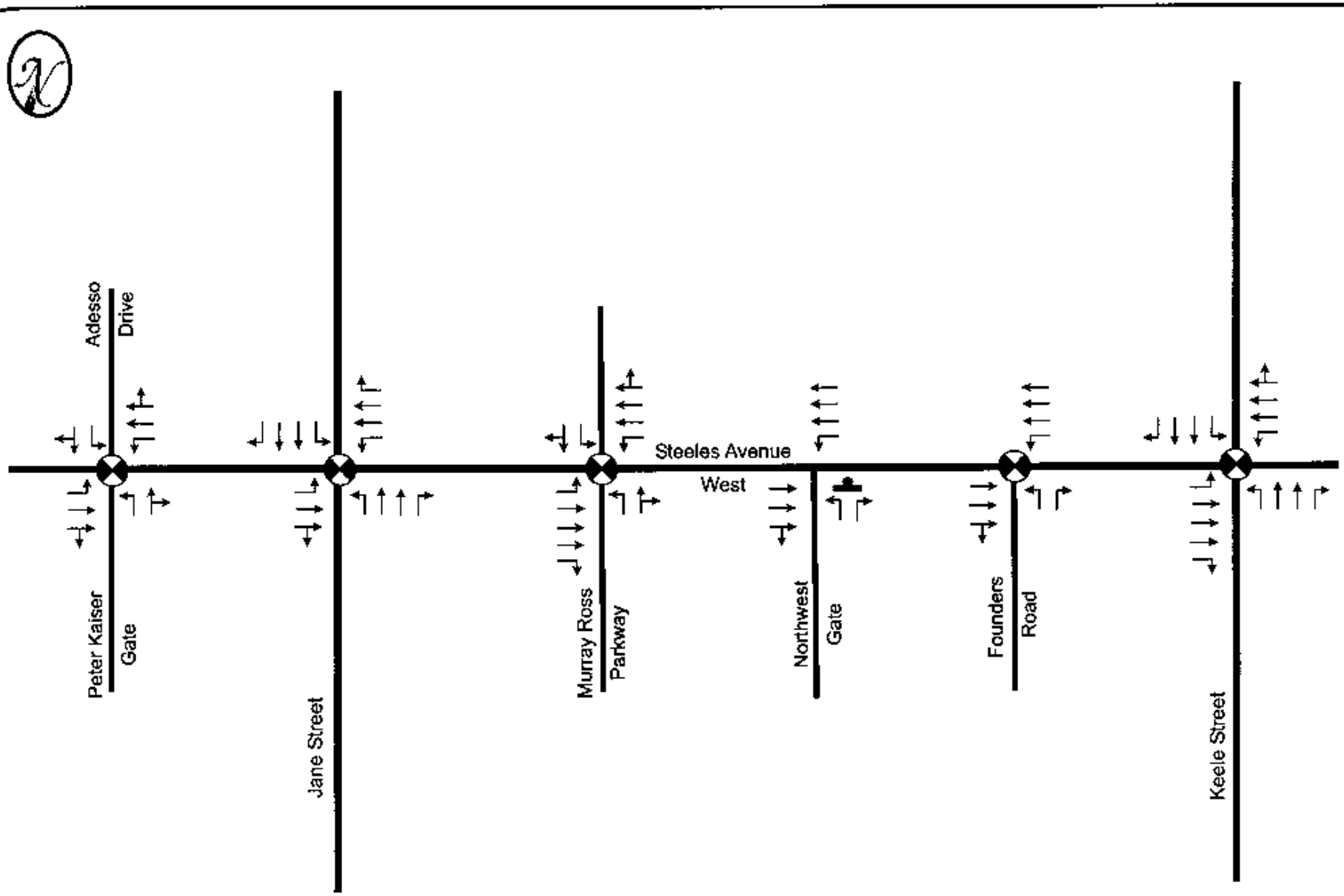
Signalized Intersection

Stop Control

Figure 2
Base Traffic Volumes
PM Peak Hour



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Signalized Intersection

Stop Control

Figure 3
Existing Lane Configurations

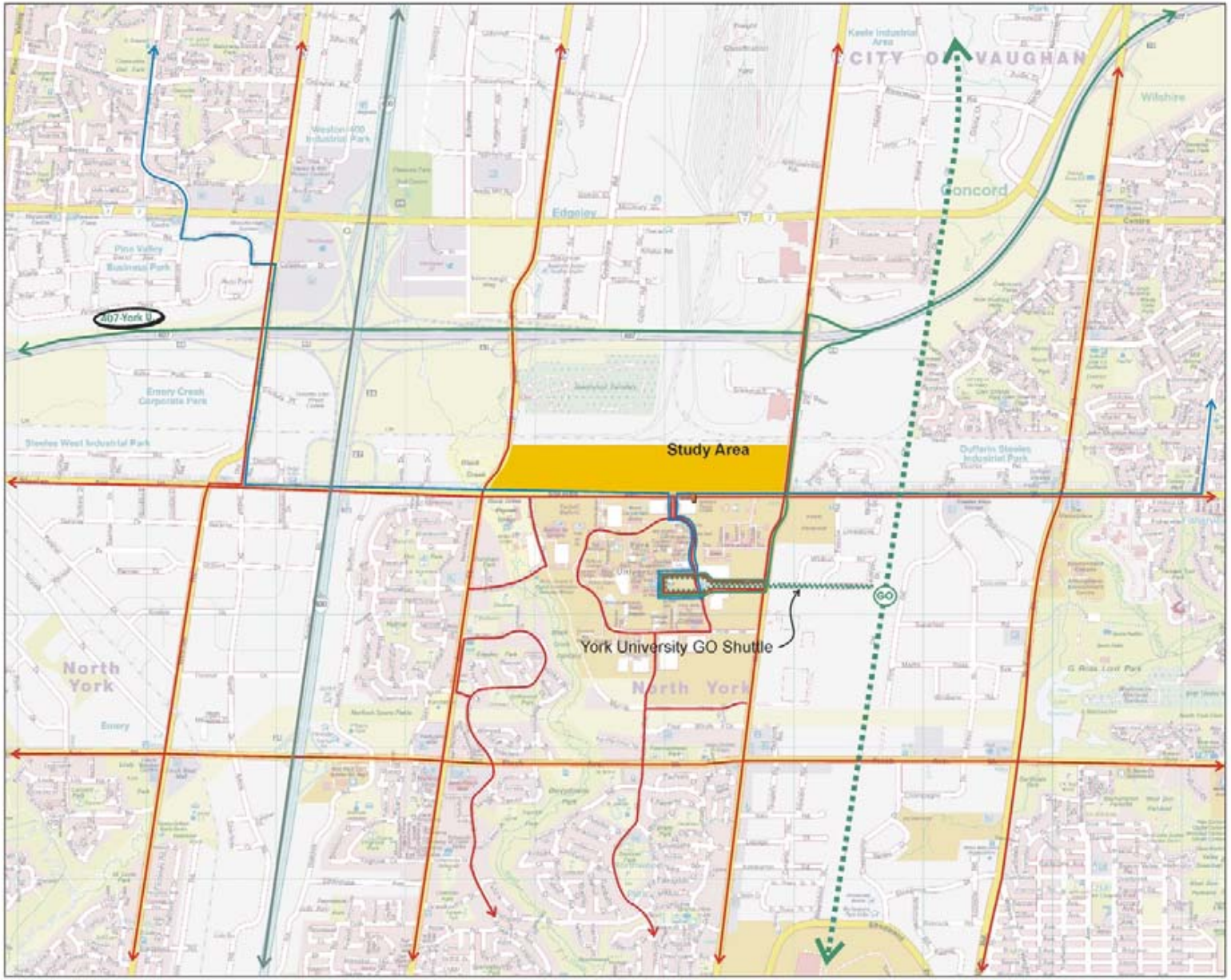

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Figure 4
Existing Transit Services

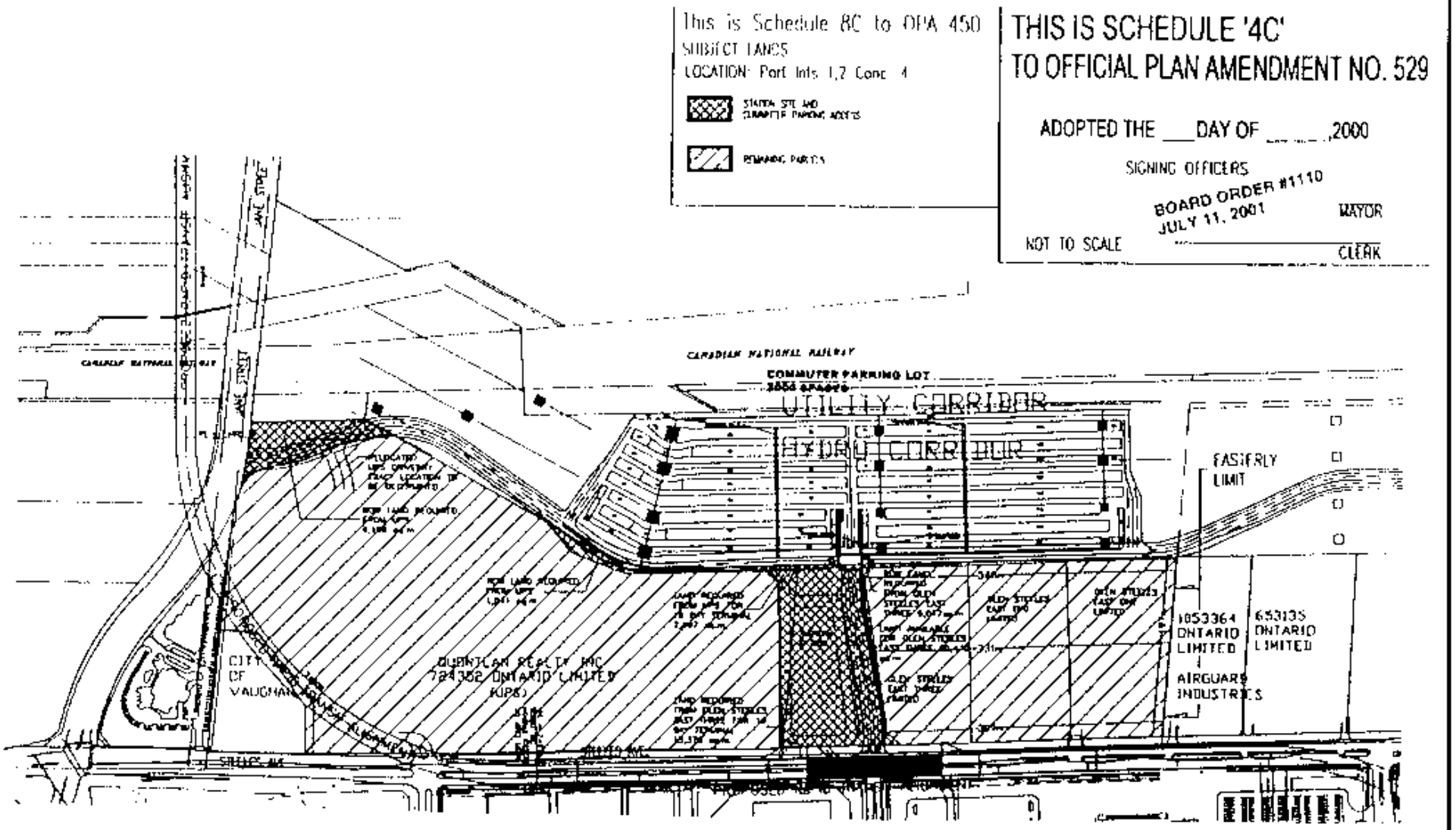

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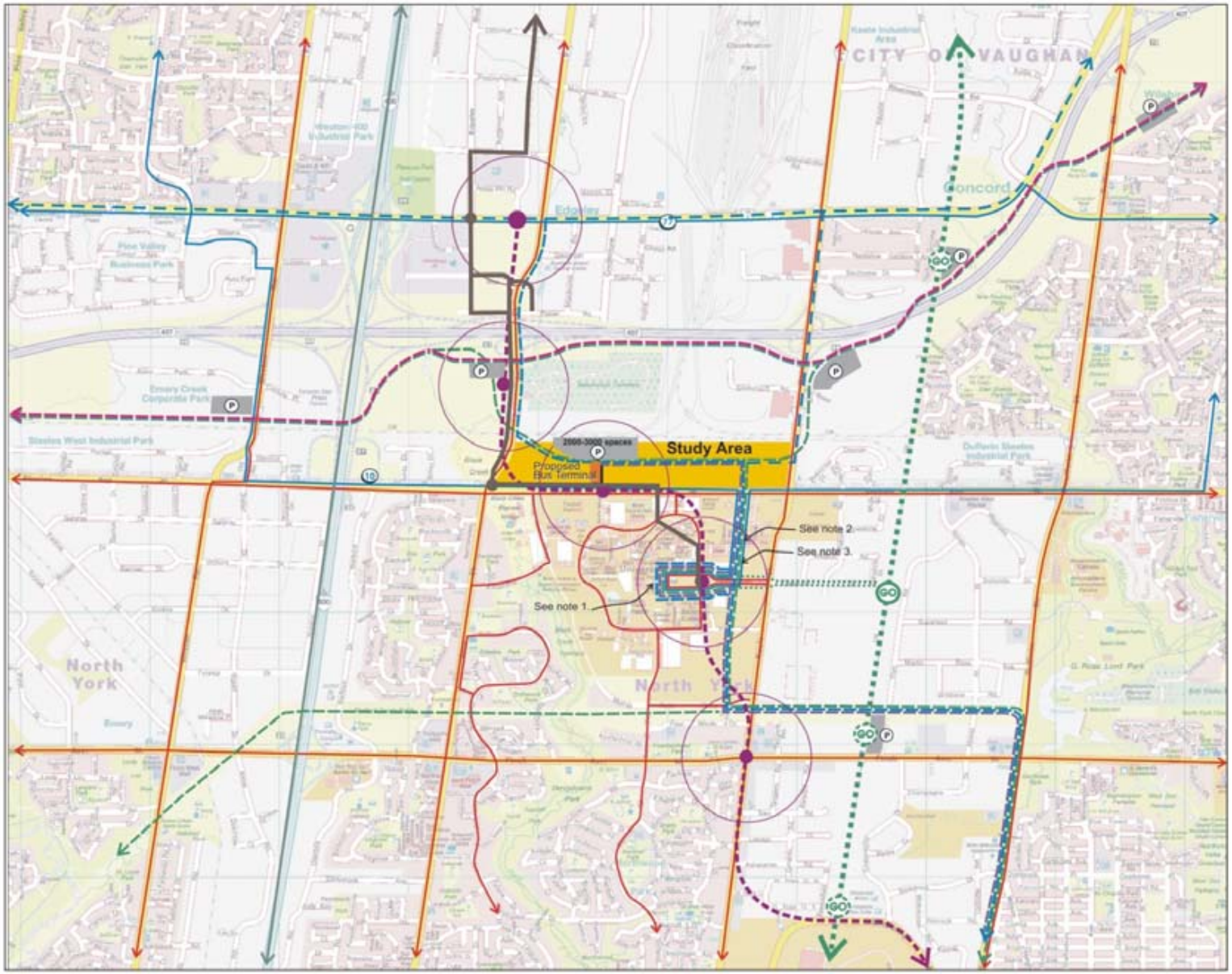
Figure 5
OPA 529 - Schedule 4C



Not to Scale

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Figure 6
Proposed Pre-Subway
Transit Network