York Region Rapid Transit Corporation

NORTH YONGE STREET CORRIDOR PUBLIC TRANSIT AND ASSOCIATED ROAD IMPROVEMENTS TRANSIT CLASS ENVIRONMENTAL ASSESSMENT

TRANSPORTATION ASSESSMENT

AUGUST 2008

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1. INTRODUCTION

On August 8, 2005, the Regional Municipality of York (Region), the Proponent of the York Region Rapid Transit Plan (YRTP), obtained approval of the Terms of Reference (ToR) for an Environmental Assessment (EA) of the proposed Public Transit and associated road improvements in the North Yonge Street Corridor, the primary north-south corridor of the Plan. In accordance with Clause 6.2 of the *Ontario Environmental Assessment Act*, the Region initiated the EA to fulfil its obligations under Clause 3 of the Act.

The purpose of this report is to describe the transportation analyses undertaken to support the development of the preferred transportation solution for the corridor, and to document the effects of the preferred design. This report was developed through an iterative process where various roadway and transit alternatives were examined in conjunction with other components of the overall Environmental Assessment.

This Transportation Assessment Report is intended to be read in conjunction with the comprehensive Environmental Study Report, which contains a fuller description of the preferred transportation solution and the assessment of alternatives.

1.1 Study Area and Rapid Transit Corridor

As shown on Exhibit 1-1 the study area for the North Yonge Corridor is generally centred along the Yonge Street Corridor and bounded by Bathurst Street to the west, and Highway 404 to the east. The southern limit of the study area is 19th Avenue/Gamble Road across the Town of Richmond Hill while the northern limit is Green Lane in the Town of East Gwillimbury. For the purpose of this Transportation Assessment, the Study Area includes all road sections, intersections and adjacent neighbourhood roadway networks that may be directly impacted by any transit system or road network changes within the North Yonge Street corridor.

As discussed in more detail in Section 5.1, the preferred rapid transit routing is continuous along Yonge Street to Newmarket, at which point the service splits into two branches, one following Davis Drive and the other continuing along Yonge Street to Green Lane and then eastward to the East Gwillimbury GO station. A discussion of the selection of this preferred routing, and the evaluation of alternatives, is provided in Section 4.1. Exhibit 1-2 illustrates the alternative routes investigated as part of this EA.

1.2 Approach

The transportation assessment process for the North Yonge Street Corridor EA was developed to be consistent with the processes utilized for the other York Region Rapid Transit transportation assessments conducted for South Yonge, Highway 7 and the Markham North-South Link. This process recognizes that:

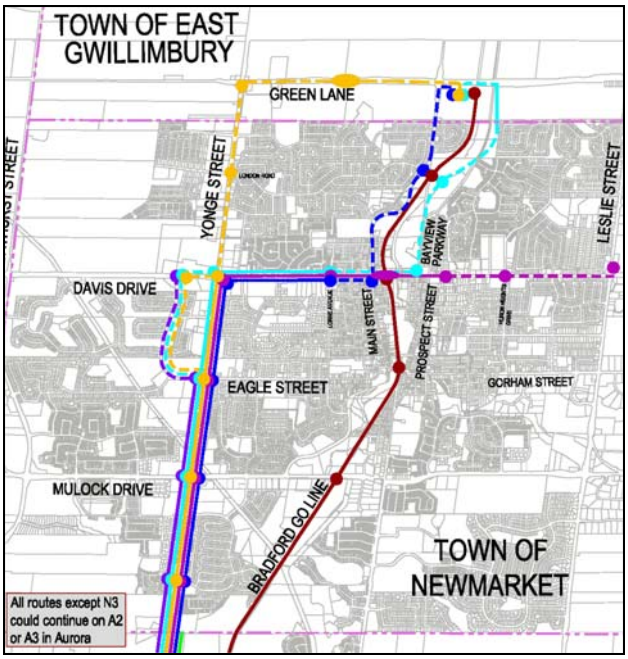
- The Rapid Transit System will have immediate physical and operational effects on the Yonge Street/Davis Drive/Green Lane corridors due to major changes in roadway cross-sections, access provisions and intersection operations; and
- The preferred alternative will need to account, as best as possible, the aggressive development aspirations throughout the study area, which will place additional demands along the subject route and intersecting arterial roadway facilities.

Our approach has been structured to best identify the effects of the preferred alternative on roadway capacity and transit service operations, while recognizing that in some locations (i.e. Newmarket Centre), the future land use and transportation conditions will be significantly different than the current situation. **Accordingly, any transportation performance measures presented in this report should be considered to be approximate, and for the purposes of relative comparisons only.**

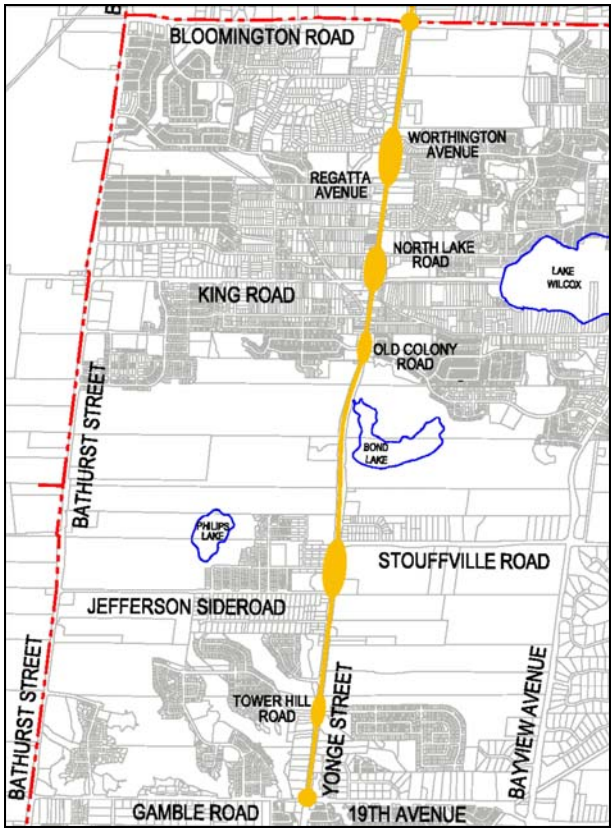
Exhibit 1.1: Primary Study Area and Recommended Route

Exhibit 1.2: Short-listed Transit Routing Alternatives

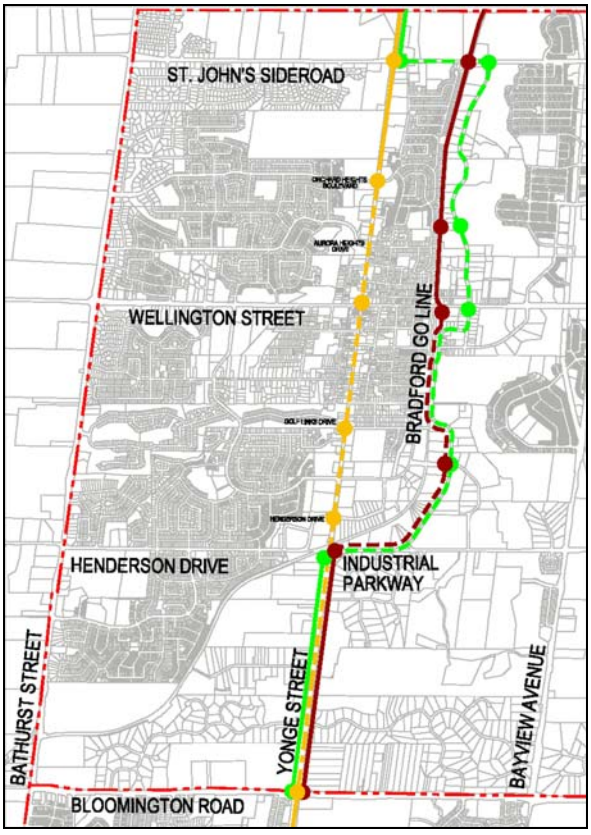
Short-listed Routes – Newmarket/East Gwillimbury



Short-listed Routes – Richmond Hill



Short-listed Routes – Aurora



1.3 Relationship to Other Studies

1.3.1 DAVIS DRIVE CLASS EA - YONGE STREET TO HIGHWAY 404

In parallel with the North Yonge Street Corridor Public Transit and Associated Road Improvements EA, a separate EA was initiated for Davis Drive between Yonge Street and Highway 404. The purpose of this EA was to identify the need for operation and safety improvements within the corridor. As part of this EA, National Capital Engineering (NCE) prepared a comprehensive Traffic Operations Review to assess the need for transportation improvements within the Davis Drive corridor. The scope of this review was primarily related to minor road improvements that could be made within the existing Right-of-Way in the near term.

Since the initiation of the Davis Drive EA, the two EAs have been proceeding in parallel. Ultimately, one preferred undertaking will be presented to the public, though suggested roadway improvements identified in the NCE report may be implemented as short term improvements.

While every effort has been made to coordinate assumptions between the Davis Drive Class EA and the North Yonge EA, it is noted that there may be differences in the transportation analysis and results presented in each report due to the differences in the focus of each study. Specifically, the North Yonge EA has focused on the longer term solution involving public transit improvements.

1.3.2 SOUTH YONGE STREET CORRIDOR PUBLIC TRANSIT IMPROVEMENTS REPORT

In 2007, The Regional Municipality of York completed the Yonge Street Corridor Public Transit Improvements Environmental Assessment (EA) which addresses public transit improvements in the south Yonge Street Corridor extending from Steeles Avenue to 19th Avenue. The preferred alternative consists of a 12.5 km two-lane, median rapidway in the Yonge Street Corridor between Steeles Avenue and 19th Avenue approved for both BRT and LRT vehicle technologies. A one kilometre section of transit operation in mixed traffic is proposed for the Richmond Hill Central Business District.

The North Yonge Street Corridor EA assumes that rapid transit will operate in a seamless fashion in the Yonge Street corridor between the City of Toronto and Newmarket.

1.4 Organization of Report

Following this introduction, this report is organized into six chapters as follows:

- Chapter 2 provides an assessment of existing transportation conditions including traffic operations, transit service operations and pedestrian and cycling conditions.
- Chapter 3 provides an assessment of the future Base Case transportation operations corresponding to the scenario involving current travel behaviour and committed transportation improvements. Chapter 3 also documents land use assumptions for the base case.
- Chapter 4 summarizes the analysis of rapid transit alternatives including alternative routing options and physical infrastructure alternatives.

- Chapter 5 presents the results of the transportation assessment for the preferred design, and its effects. This chapter also outlines various mitigation options to address residual transportation effects.

2. EXISTING CONDITIONS

2.1 Transportation Network

2.1.1 ROAD NETWORK

Within the North Yonge Street Corridor study area, Yonge Street is an arterial roadway operated under the jurisdiction of the Regional Municipality of York. Throughout the majority of the Study Area, Yonge Street consists of four general purpose lanes with a centre left turn lane. In the area between Aurora Heights Drive and Gold Links Drive in the Town of Aurora, Yonge Street is narrower and does not have a centre left turn lane. Yonge Street has a posted speed limit of 60 km/hr in most areas, with the exception of the downtown areas of Richmond Hill and Aurora.

Davis Drive (formerly known as Highway 9) is an east/west arterial roadway under the jurisdiction of York Region. The section of Davis Drive under review lies entirely within the Town of Newmarket and extends from Eagle Street to west of Highway 404, a distance of approximately 5.1 km. Davis Drive generally consists of four lanes, with left turn lanes provided at some major intersections. Davis Drive has a posted speed of 50 km/hr.

Green Lane is a four lane arterial roadway in the Town of East Gwillimbury, operated under the jurisdiction of the York Region. Green lane currently functions as a major by-pass route connecting Highway 404 and Yonge Street.

Arterial and major collector east-west roadways on **Yonge Street** and within the study area include from north to south:

- Green Lane;
- Green Lane Centre;
- Aspenwood Drive/ Bristol Road;
- Bonshaw Avenue/ London Road;
- Dawson Manor Boulevard/ Kingston Road;
- Upper Canada Mall Driveway;
- Davis Drive;
- Chapters Access/ KFC Access;
- Millard Avenue;
- Administration Centre Access/ Gladman Avenue;
- Eagle Street;
- Cleanmeadow Boulevard/ William Roe Boulevard;
- Mulock Drive;
- Sawmill Valley Drive/ Savage Road;
- Joe Persechini Drive/ Savage Road;
- Aurora Heights Drive/ Mark Street;
- Wellington Street;
- Kennedy Street;
- St. John's Sideroad;
- Batson Drive/ Orchard Heights Boulevard;
- Golf Links Drive/ Dunning Avenue;
- Brookland Avenue;
- Henderson Drive/ Allaura Boulevard;
- Industrial Parkway South;
- Bloomington Road;
- Blackforest Drive/ Worthington Avenue;
- Maple Grove Avenue/ Ashfield Drive;
- Aubrey Avenue/ North Lake Road;
- King Road;
- Estate Garden Drive/ Old Colony Road;
- Stouffville Road;
- Jefferson Sideroad;
- Gamble Road/19th Avenue

Arterial and major collector north-south roadways on **Davis Drive** and within the study area include from west to east:

- Eagle Street;
- Yonge Street;
- Main Street;
- Charles Street;

- George Street;
- Wilstead Drive;
- Barbara Road;
- Parkside Drive;
- Longford Road;
- Lorne Street;
- Vincent Street/Niagara Street;
- Prospect Street;
- Patterson Street/Roxborough Road;
- Huron Heights Drive/Alexander Road;
- Ashton Road/Carlson Drive;
- Leslie Street;
- Forhan Drive;
- Harry Walker Drive

2.1.2 TRANSIT NETWORK

York Region Transit (YRT) provides a network of local bus service through a large portion of the study area. Exhibit 2.1 provides a map of the YRT local routes serving the study area. Key routes operating within the study area are as follows:

- **YRT Route 22** - operates from the Maple Community Centre to the Seneca King Campus. As part of this route, the buses travel on Yonge Street from south of King Road (Bond Crescent) to Bloomington Road.

- **YRT Route 44** - operates from the Newmarket Terminal to the Newmarket GO Station. As part of this route, the buses with full service travel on Yonge Street from Upper Canada Mall Driveway to Bristol Road. During weekday AM peak hour, the buses travel on Yonge Street from Davis Drive to Bristol Road.

- **YRT Route 52** - operates from the Newmarket Terminal to the intersection of Yonge Street and Queensville Sideroad. As part of this route, the buses with full service travel on Yonge Street from Upper Canada Mall Driveway to Green Lane. During the weekday AM peak hour, the buses travel on Yonge Street from Davis Drive to Green Lane.

- **YRT Route 98** - operates between the Upper Yonge Place to the intersection of Yonge Street and Green Lane. As part of this route, the buses travel on Yonge Street from Gamble Road to Green Lane.

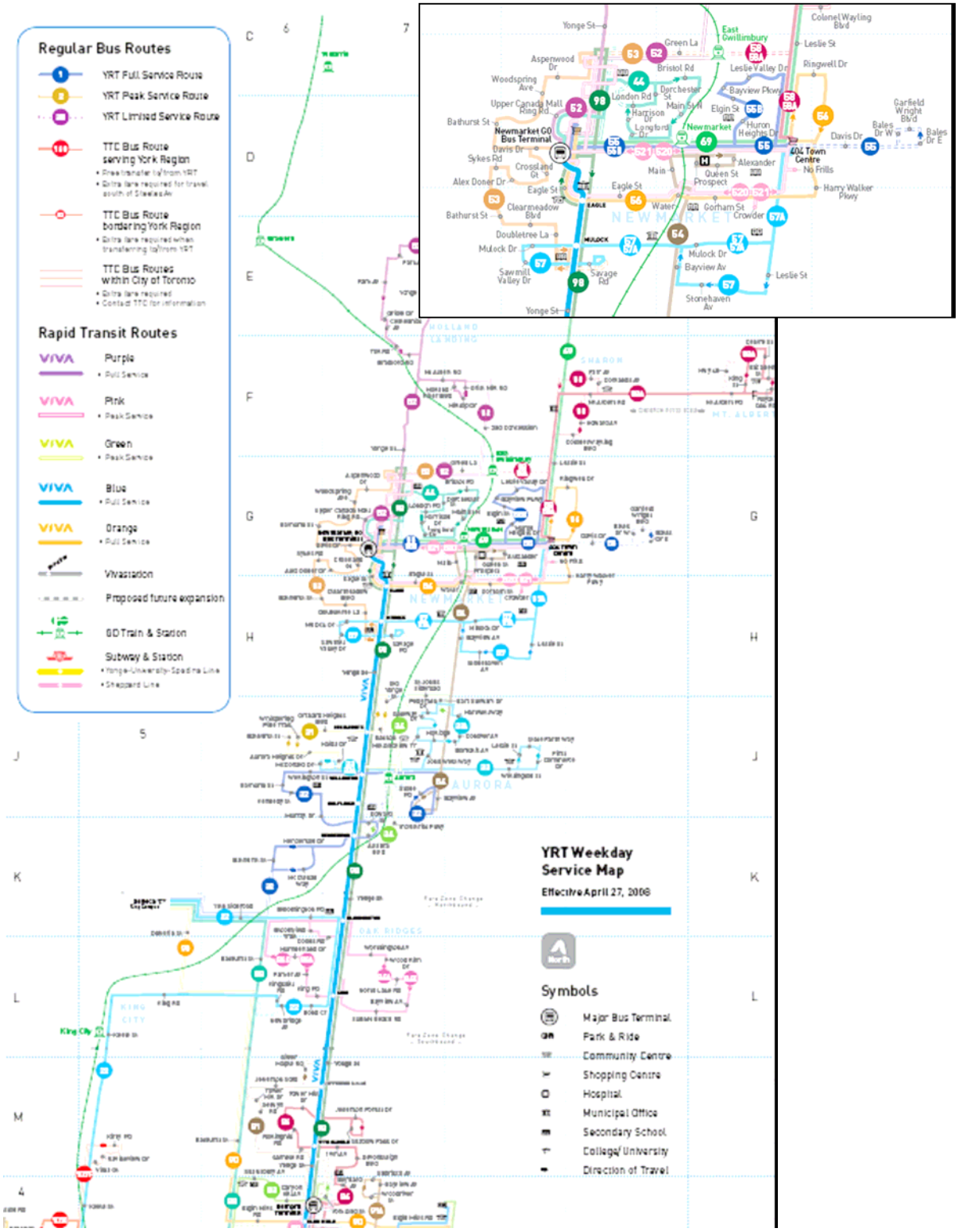
- **YRT Route 520** – serves as a community transit route in the Town of Newmarket. The buses start and end at the Upper Canada Mall on every run. As part of this route, the buses travel on Yonge Street from Davis Drive to South of Green Lane.

- **YRT Route 521** - serves as a community transit route in the Town of Newmarket. The buses start and end at the Upper Canada Mall on every run. As part of this route, the buses travel on Yonge Street from Davis Drive to South of Green Lane.

- **YRT Route 55** - operates from Newmarket GO Bus Terminal to 404 Town Centre. As part of this route, the buses will full service travel on Davis Drive from Eagle Street to Leslie Street.

In addition to these YRT services, York Region has been operating Rapid Transit services along Yonge Street since 2005. The Viva Blue route travels along Yonge Street from Finch Station in the City of Toronto northward to the Newmarket Terminal at Eagle Street and Davis Drive. Along Yonge Street, there are ten stops within the study area. The headway of the Viva Blue route within the study area is 10 minutes during the weekday a.m. and p.m. peak periods and 15 minutes in the off-peak periods.

Exhibit 2.1: Existing Transit Network



In addition to YRT/VIVA bus services, GO Transit operates the Newmarket 'B', Newmarket 'B' Express, and Newmarket-York University bus routes along Yonge Street within the study area. The frequency of the Newmarket 'B' bus service has been reduced significantly with the introduction of the Viva service in the Fall of 2005.

All existing bus routes operate in mixed traffic on Yonge Street within the study area. Currently, there are no Toronto Transit Commission routes operating on Yonge Street within the study area.

An express bus service on Highway 404 introduced by GO Transit was discontinued in 2006.

2.1.3 GO TRANSIT TERMINALS

There are three GO Transit Terminals in proximity to Yonge Street and Davis Drive within the study area:

- Newmarket GO Bus Terminal - Located on Davis Drive, west of Yonge Street in Newmarket. This terminal serves the GO bus services on Bradford Line throughout the day. This is a shared terminal with the York Region Transit.
- Newmarket GO Train Terminal - Located on Main Street, which is north of Davis Street and east of Yonge Street. This terminal serves the train services on Barrie Line (formerly Bradford GO Line). Go Trains operates on 30 minute headways during the weekday AM and PM peak periods. There is no off-peak train service to this station but GO Bus Service to the station throughout the day.
- Aurora GO Train Terminal - Located on Wellington Street, which is east of the intersection of Yonge Street and Wellington Street in Aurora. This terminal serves the train services on Barrie Line. Go Trains operates on 30 minute headways during the weekday AM and PM peak periods. There is no off-peak train service to this station. There is GO Bus Service to the terminal throughout the day.
- East Gwillimbury GO Rail Station on Green Lane – Located on Green Lane at Main Street. This terminal also serves the train services on Barrie Line. Go Trains operates on 30 minute headways during the weekday AM and PM peak periods. There is no off-peak train service to this station. There is GO Bus Service to the terminal throughout the day.

2.1.4 PARK AND RIDE LOTS

The park and ride lots within the subject sections of Yonge Street and Davis Drive are located sporadically throughout the study area. All of the lots offer free parking to transit patrons. The following park and ride lots and their location are summarized as follows:

- Aurora Community Centre - Aurora Heights Dr., one block north of Wellington Street
- Aurora GO Station – Located at Wellington Street and Yonge Street, provides 570 parking spaces;
- Newmarket GO Bus Terminal – Located at Davis Drive and Main Street at the Tannery Mall, with 331 parking spaces;

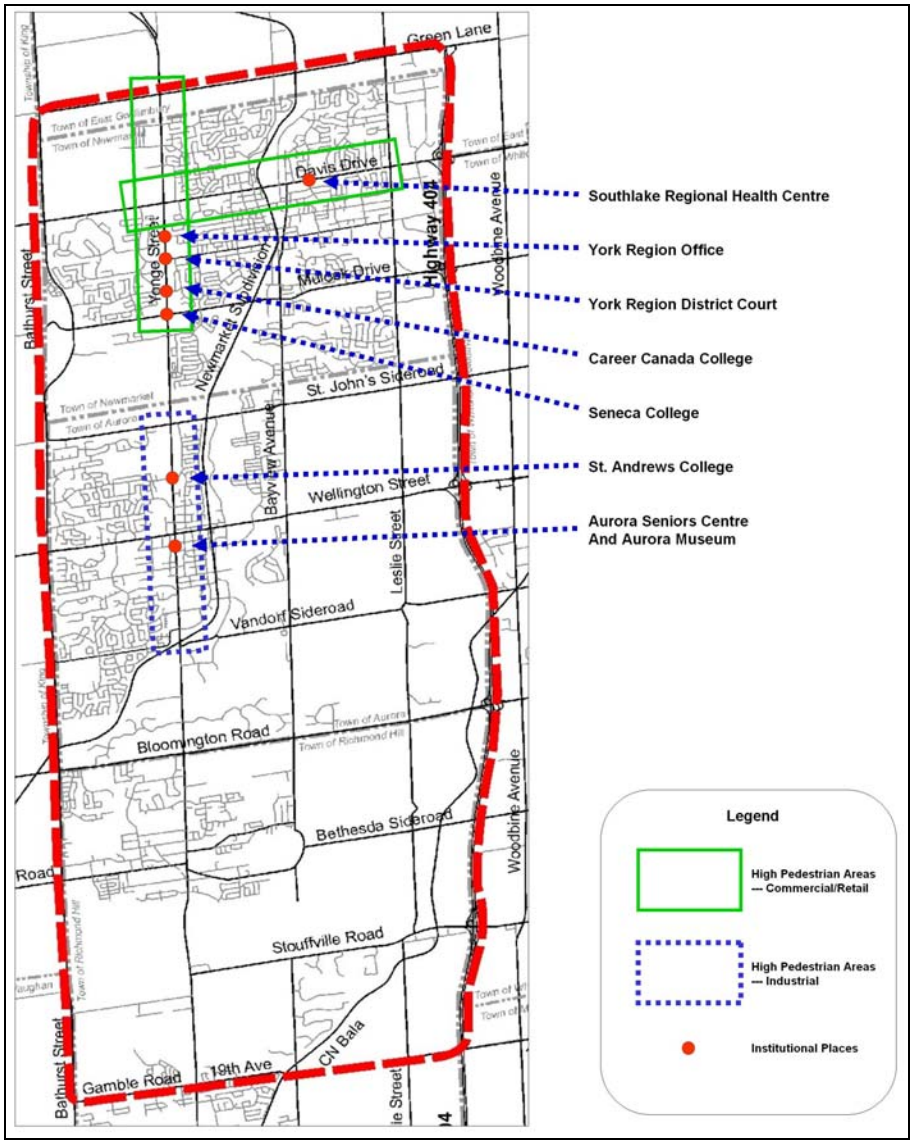
- Newmarket GO Station – Located at Davis Drive and Main Street, accommodates 265 parking spaces;
- Newmarket GO Agency – Located at Davis Drive and Eagle Street, with 331 parking spaces, and
- East Gwillimbury GO Station – Located at Green Lane and Main Street, with 637 parking spaces.

There is also a carpool lot located on Davis Drive at Highway 404.

2.1.5 PEDESTRIAN AND CYCLING NETWORK

The functioning of the transit system is contingent on a well-developed pedestrian and cycling network. Exhibit 2.2 illustrates the high pedestrian areas on Yonge Street and Davis Drive according to commercial/retail, institutional and industrial land uses. Several sections of the Yonge Street corridor (e.g. north of Bloomington Road) are not developed and therefore do not generate pedestrian or cycling traffic. Other areas north of St. John's Sideroad and north and south of Stouffville Road are also currently undeveloped.

Exhibit 2.2 – High Pedestrian Areas



Sidewalk exists for a majority of the Yonge Street North corridor on one or both sides of the street. Exhibit 2.3 summarizes where sidewalks are provided and not provided along the Yonge Street North corridor.

Exhibit 2.3 Sidewalk Provisions

Yonge Street		**Sidewalk Provisions**
From (north)	**To (south)**	
Green Lane	Aspenwood Dr/Bristol Road	Both sides
Aspenwood Dr/Bristol Road	Upper Canada Mall	Both sides
Upper Canada Mall	South of Davis Drive	Both sides
South of Davis Drive	Mulock Drive	Both sides
Mulock Drive	Savage Road	Both sides
Savage Road	St. John's Sideroad	None
St. John's Sideroad	North of Orchard Heights	West side
North of Orchard Heights	Bloomington Road	None
Bloomington Road	Coon's Road	Both sides
Coon's Road	North Lake Road	Both sides
North Lake Road	Old Colony Road	Both sides
Old Colony Road	Gamble	None – proposed new pedestrian route
Davis Drive		**Sidewalk Provisions**
From (west)	**To (east)**	
Eagle Street	Yonge Street	South side
Yonge Street	George Street	Both sides
George Street	Barbara Road	Both sides
Barbara Road	Parkside Drive	Both sides
Parkside Drive	Longford Road	Both sides
Longford Road	Lindsay Avenue	Both sides
Lindsay Avenue	Lorne Street	Both sides
Lorne Street	Main Street	Both sides
Main Street	CNR Line	Both sides
CNR Line	Seniors	Both sides
Seniors	Prospect Street	Both sides
Prospect Street	Roxborough Road	Both sides
Roxborough Road	Alexander Road	Both sides
Alexander Road	Carlson Drive	Both sides
Carlson Drive	Leslie Street	Both sides
Leslie Street	Forhan Drive	Both sides
Forhan Drive	Harry Walker Drive	Both sides

The Region of York has recently completed a pedestrian and cycling master plan study in which Yonge Street had been identified as a candidate cycling route within the road right-of-way. The proposed new pedestrian routes shown in the above exhibit are also indicated in the study. The

following candidate cycling routes, existing and previously proposed cycling routes are illustrated in Exhibit 2.4 have been identified for the various municipalities.

Exhibit 2.4- Cycling Routes in the Study Corridor

Municipality	Candidate Cycling Routes	Existing and Previously Proposed Cycling Routes
Town of East Gwillimbury		Green Lane (east of Yonge St)
Town of Newmarket	Davis Drive Mulock Drive Ontario Hydro Corridor (north of Mulock Drive)	Bonshaw Avenue/London Road Milliard Avenue Mulock Drive Savage Road
Town of Aurora	Wellington Street	Orchard Heights Blvd/Batson Drive Aurora Heights Drive/Mark St Kennedy Street Dunning Avenue/Golf Links Road Edward Street Allaura Boulevard/Henderson Dr Industrial Parkway (Trail) Hunters Glen Road/Elderberry Trail
Town of Richmond Hill	Bloomington Road King Road Sunset Beach Road Stouffville Road Gamble Road	Coon's Road Blackforest/Worthington Maple Grove Ave/Ashfield Drive North lake Road/Aubrey Avenue Estate Garden/Old Colony Road Tower Hill Road

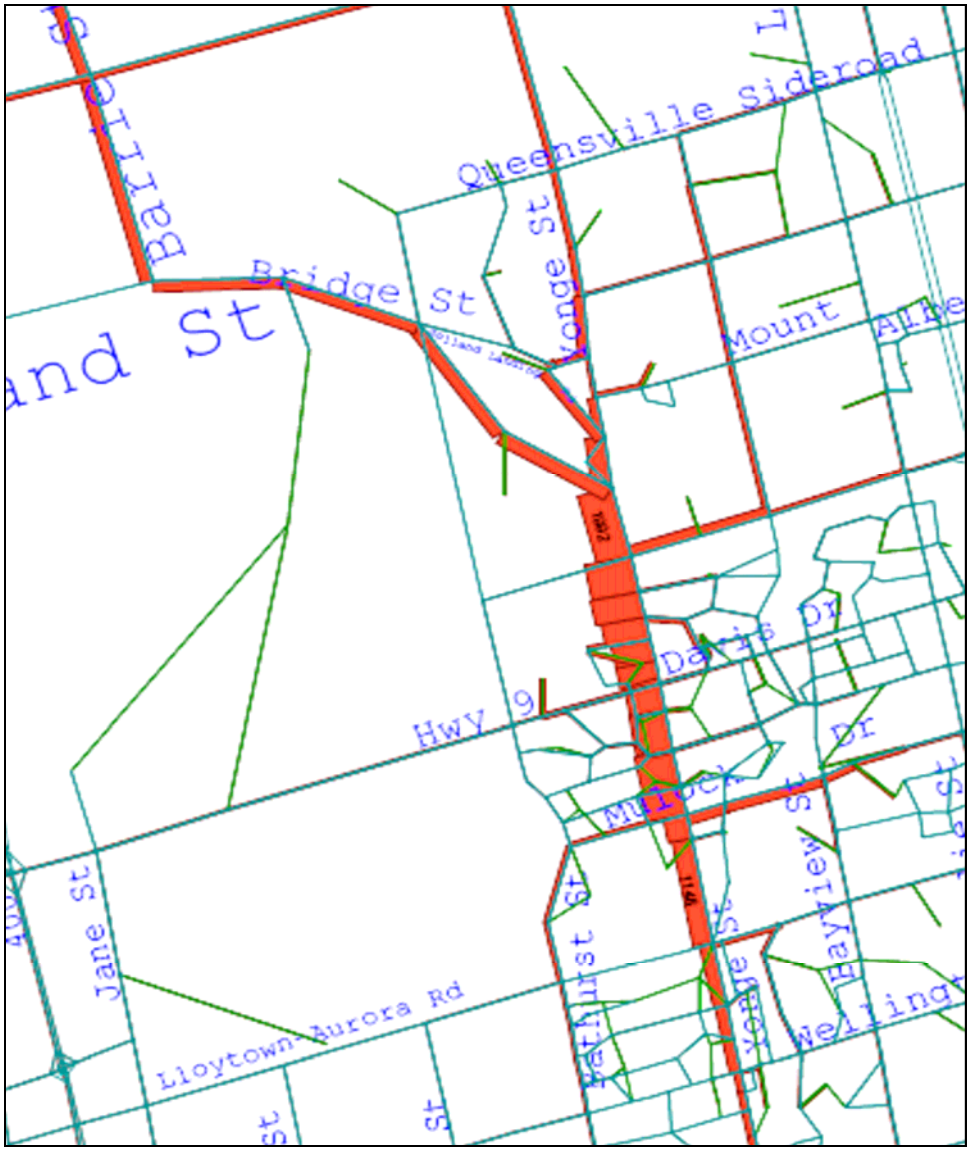
2.2 Traffic Volumes and Travel Patterns

This section presents an assessment of the existing conditions for the primary corridors in the study area consisting of Yonge Street and Davis Drive. It is noted that some of the preliminary routing options included roads such as Industrial Parkway and Main Street and Eagle Street. While the intersections of these routes with the primary corridors were assessed, traffic conditions on these alternative routes were evaluated in less detail. Generally, traffic volumes are lighter on these alternative routes.

2.2.1 EXISTING TRAFFIC PATTERNS

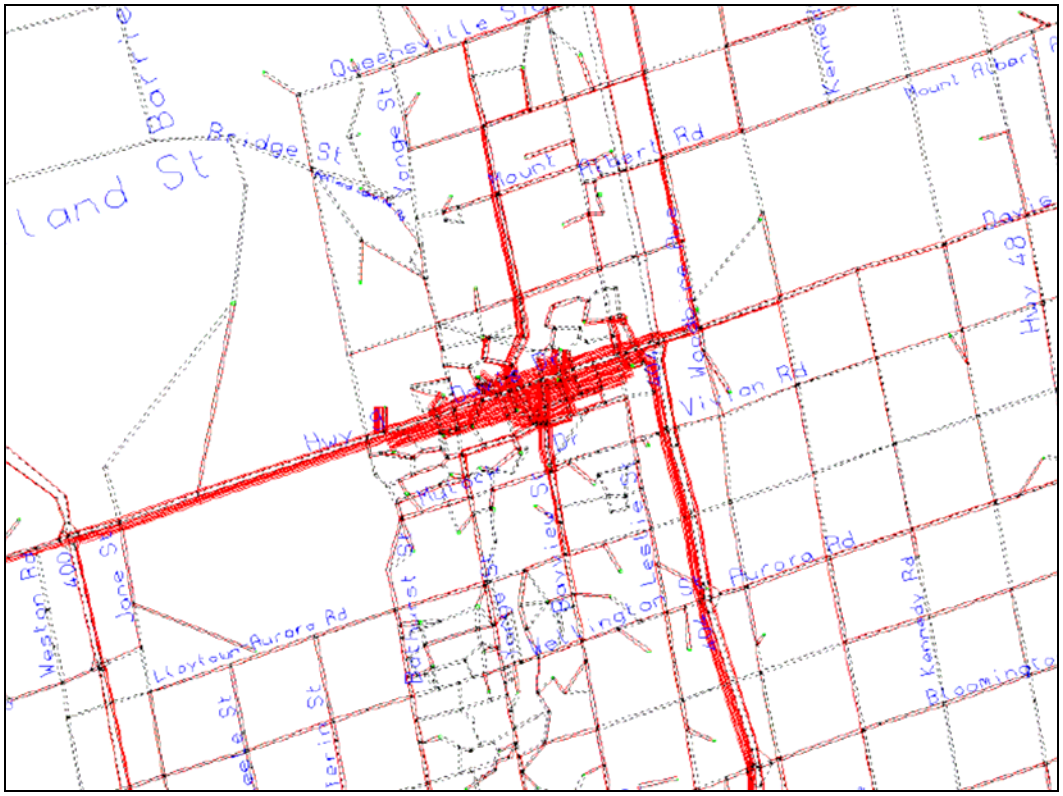
Exhibits 2.5 and 2.6 illustrate the general orientation of traffic using Yonge Street (between Mulock Drive and Green Lane) and Davis Drive, the two sections where several alternatives for future rapid transit were analysed. For the northern portion of Yonge Street, a large portion of the traffic is local in nature, due to the high concentration of employment in this area. Similarly, much of the traffic on Davis Drive is contained within the Bathurst to Leslie Street segments, though there are significant volumes of trips on Davis Drive that have origins or destinations in the west and south. Both Yonge Street and Davis Drive could be considered to have a "regional" transportation function.

Exhibit 2.5: Select Link Analysis for Trips Using Yonge Street (Green Lane-Mulock)



Note: Based on assignment of AM Peak Period auto volumes using EMME/2 Model

Exhibit 2.6: Select Link Analysis for Trips Using Davis Drive (Yonge Street to Leslie Street)



Note: Based on assignment of AM Peak Period auto volumes using EMME/2 Model

2.2.2 EXISTING TRAFFIC VOLUMES AND RELATIONSHIP TO CAPACITY

Traffic volumes and corresponding operations were examined for three primary time periods, Weekday AM Peak Hour, Weekday PM Peak Hour and a Saturday Peak Hour. In some locations (e.g. Yonge Street in Newmarket), the Saturday peak hour volumes are higher than weekday volumes and were therefore included in the analysis. For the majority of the corridor, however, the PM peak period represents the worst case conditions, as shown on Exhibit 2.7. There are a few movements where the mid-day weekday volumes are higher than the peak hour volumes (e.g. Yonge Street southbound, south of Davis Drive), but in most cases the total intersection volumes are highest in the peak hours.

Exhibit 2.7: Profile of Typical Weekday Traffic Volumes on Yonge Street and Davis Drive

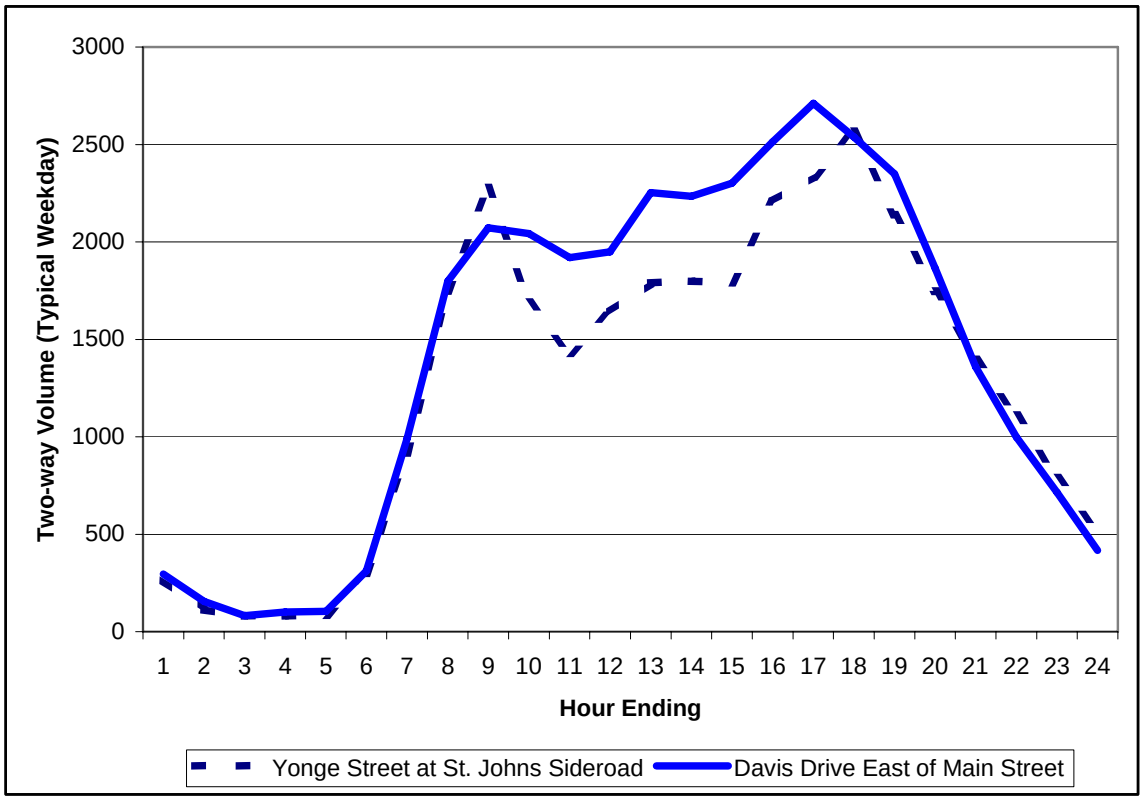


Exhibit 2.8 summarizes the existing weekday peak directional traffic volumes along with an indication of the theoretical volume to capacity ratio (based on nominal road capacities). These volumes represent existing conditions based on traffic counts taken mostly between 2004 and 2006, though counts for some intersections in low growth areas are based on counts taken in 2003. Appendix A provides an index of when counts for each intersection/segment were taken.

Exhibit 2.8: Existing Weekday Peak Directional Volume to Capacity Ratios

Yonge Street	Northbound (PM)			Southbound (AM)		
	Hourly Volume	Capacity	v/c Ratio	Hourly Volume	Capacity	v/c Ratio
North of Green Lane	2,324	1,800	1.29	2,041	1,800	1.13
South of Green Lane	1,558	1,800	0.87	1,299	1,800	0.72
North of Bristol/Aspenwood	1,987	1,800	1.10	1,415	1,800	0.79
North of Bonshaw/London	1,970	1,800	1.09	1,425	1,800	0.79
North of Dawson Manor/Kingston	1,853	1,800	1.02	1,555	1,800	0.86
North of Upper Canada	1,680	1,800	1.02	1,446	1,800	0.80
North of Davis Drive	1,540	1,800	0.91	1,355	1,800	0.75
North of Millard Ave	1,530	1,800	0.94	1,274	1,800	0.71
North of Eagle Street	1,777	1,800	0.96	1,127	1,800	0.63
North of Mulock Drive	2,014	1,800	1.12	1,471	1,800	0.82
North of St. John's Sideroad	1,472	1,800	0.82	1,275	1,800	0.71
North of Wellington Street	874	1,800	0.49	918	1,800	0.51
North of Industrial Parkway	1,193	1,800	0.66	1,135	1,800	0.63
North of Bloomington Rd	1,172	1,800	0.65	1,262	1,800	0.70
North of North Lake Road	1,258	1,800	0.70	1,266	1,800	0.70
North of Stouffville Road	1,348	1,800	0.75	1,472	1,800	0.82
South of Jefferson Sideroad	1,029	1,800	0.57	1,229	1,800	0.68
North of Gamble Road	1,116	1,800	0.62	1150	1,800	0.64
Davis Drive	**Eastbound (PM)**			**Westbound (PM)**		
	Hourly Volume	Capacity	v/c Ratio	Hourly Volume	Capacity	v/c Ratio
West of Eagle Street W	1,108	1,600	0.69	1,318	1,600	0.82
West of Yonge Street	1,072	1,600	0.67	1,045	1,600	0.65
East of Yonge Street	768	1,600	0.48	1,283	1,600	0.80
West of Prospect Street	1,127	1,600	0.70	1,299	1,600	0.81
West of Leslie	1,074	1,600	0.67	1,115	1,600	0.70
East of Leslie	1,323	1,600	0.83	1,040	1,600	0.65

Note: Capacity of one lane is assumed as 900 vehicles per hour per lane for Yonge Street
Capacity of one lane is assumed as 800 vehicles per hour per lane for Davis Drive

From the above table, the following weekday peak direction operating conditions are noted:

- It is evident that Yonge Street operates at capacity and in some cases beyond the existing capacity vehicles per hour per lane mainly during the PM peak hour in the northbound direction between Dawson Manor and Green Lane;
- North of Green Lane, Yonge Street operates above capacity in both peak directions at hourly traffic volumes exceeding 2,000 vehicles;
- Volumes to capacity ratios (v/c ratios) of 0.85 and higher are evident during the PM peak northbound direction from Mulock Drive northwards. South of Mulock Drive the traffic volume decreases significantly during the PM peak hour to volumes less than 1,600 vehicles; and
- In the southbound direction during the AM peak hour, Yonge Street south of Green Lane operates below capacity at v/c ratios averaging 0.72.
- In the eastbound and westbound directions during the PM peak hour, Davis Drive within the study area operates below capacity at v/c ratios averaging 0.63.

The Saturday peak hour volume to capacity ratios are summarized in Exhibit 2.9 similar to the above exhibit.

Exhibit 2.9- Existing Saturday Peak Hour Volume to Capacity Ratios on Yonge Street

Location	Northbound			Southbound		
	Volume	Capacity	v/c Ratio	Volume	Capacity	v/c Ratio
North of Green Lane	1,570	1,800	0.87	1,654	1,800	0.92
South of Green Lane	1,571	1,800	0.87	1,335	1,800	0.74
North of Bristol/Aspenwood	2,377	1,800	1.32	1,946	1,800	1.08
North of Bonshaw/London	2,308	1,800	1.28	2,014	1,800	1.12
North of Dawson Manor/Kingston	2,024	1,800	1.12	2,057	1,800	1.14
North of Upper Canada	2,299	1,800	1.28	2,091	1,800	1.16
North of Davis Drive	1,521	1,800	0.84	1,621	1,800	0.90
North of Millard Drive	1,529	1,800	0.85	1,541	1,800	0.86
North of Eagle Street	1,413	1,800	0.78	1,342	1,800	0.75
North of Mulock Drive	1,494	1,800	0.83	1,539	1,800	0.83
Note: Capacity of one lane is assumed as 900 vehicles per hour per lane						

Operating conditions between Millard Drive and Green Lane show capacity constraints between Upper Canada and Bristol Road/Aspenwood Drive in both the northbound and southbound

directions. This is a direct result of the high traffic volumes generated by Upper Canada Mall and other shopping centres along Yonge Street.

2.3 Existing Intersection Operations

Intersection capacity analysis was undertaken using the Highway Capacity Manual (HCM) methodology and in particular, the Synchro 6.0 software package. Synchro 6 can analyze both signalized and unsignalized intersections in a road corridor or network taking into account the spacing, interaction, queues and operations between intersections.

The signalized intersection analysis considers two separate measures of performance:

- the capacity of the intersection movements, which is based on a volume to capacity ratio; and
- the level of service which is based on the control delay per vehicle for the various movements through the intersection and overall.

The unsignalized intersection analysis considers two separate measures of performance:

- the capacity of the critical intersection movements, which is based on a volume to capacity ratio; and
- the level of service for the critical movements which is based on the average control delay per vehicle for the various critical movements within the intersection.

The analysis reflects the existing base traffic counts, current signal timings, and existing lane configurations. Exhibit 2.10 provides an illustration of the existing intersection operations in graphical form for the AM peak hour, PM peak hour and Saturday peak (Mulock to Green Lane). More detailed summaries of delay and level of service by intersection, and an indication of critical movements, is provided in Appendix B. For the purpose of the detailed summaries, critical movements are defined as turning movements approaching a v/c of 1.0 and/or Level of Service “E” or “F” (LOS).

Based on a review of the above analysis during the AM, PM and Saturday peak hours, the following capacity constraints/critical movements were noted:

Green Lane/Yonge Street

The intersection at Green Lane/Yonge Street operates close to capacity during the AM peak hours. During the PM and Saturday peak hours, the intersection is operating at capacity.

During the AM peak hour, the single westbound left turn lane operates very close to capacity at a v/c of 0.99. The dual southbound left turn movement accommodates approximately 750 vehicles during the morning peak hour and requires a significant amount of green time from the 120 second cycle timing plan.

During the PM peak hour, the westbound left turn and right turn movements are operating at capacity. The westbound right turn movement operates at capacity carrying approximately 880 vehicles during the PM peak hour. The northbound through and eastbound left turn movement are operating close to capacity. During this peak period, this intersection operates at a cycle length of 140 seconds.

During the Saturday peak hour, both the north and south through movements operate at capacity with v/c ratios of 1.05 and 1.02, respectively. The westbound left turn lane operates above capacity with volumes of 350 vehicles per hour. The southbound and eastbound left turn movements are approaching capacity at v/c ratios of 0.95.

Green Lane Centre/Yonge Street

This intersection provides signalized access to the retail developments on both sides of Yonge Street. During the Saturday peak hour, the northbound left turn and eastbound right turn movements are operating over capacity.

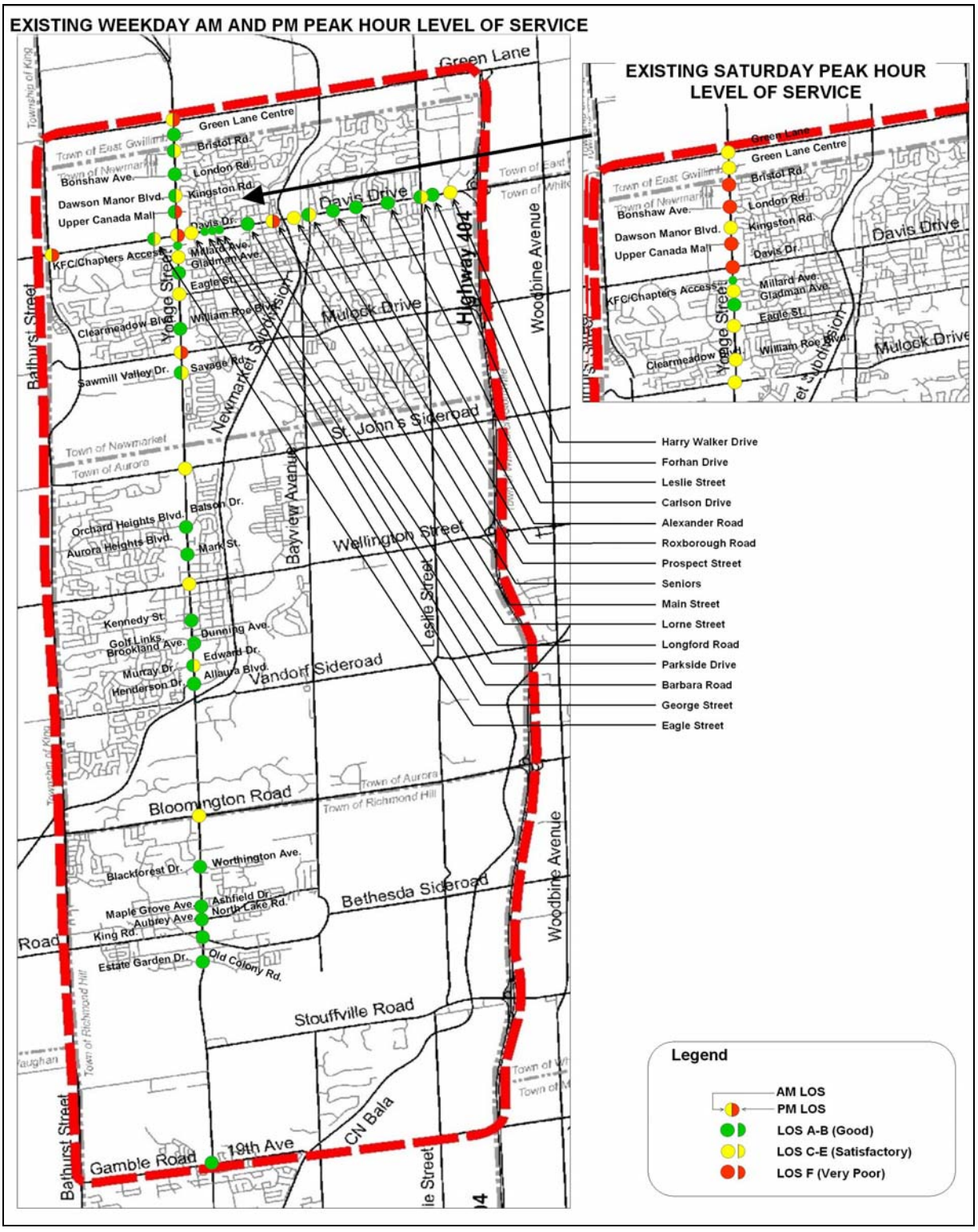
Aspenwood Drive/Bristol Road/Yonge Street

In addition to this intersection serving the commercial areas adjacent to Yonge Street, it also provides access to the residential areas of Woodland Hill (west) and a large residential area on the east side.

During the PM and Saturday peak hour this intersection operates at capacity. The northbound through lanes and the eastbound left turn lane operate at v/c ratios of more than 1.10 and 1.07, respectively, during the PM peak hour. The 1,900 vehicles exceed the capacity of the northbound lanes and the lack of an eastbound advance phase results in capacity constraints for the eastbound left turn movement.

During Saturday conditions, several movements operate at capacity including the northbound left turn, northbound through, southbound through, eastbound left turn, and westbound left turn movements. The southbound left is approaching capacity.

Exhibit 2.10: Existing Intersection Operations



Bonshaw Avenue/Bristol Road/Yonge Street

The commercial development fronting Yonge Street on the west side of the road continues to generate a significant amount of vehicles via Bonshaw Avenue and Aspenwood Drive.

This intersection operates at capacity during the Saturday peak hour conditions. The northbound left turn movement which service both residential and commercial land uses, operate at capacity. The southbound through movement is also operating at capacity. The eastbound left turn movement is operating close to capacity at a v/c ratio of 0.99.

Dawson Manor Blvd/Kingston Road/Yonge Street

This intersection operates at capacity only during the Saturday peak hour with capacity constraints in the northbound, southbound and westbound directions. The northbound left turn, southbound left turn, southbound through, and westbound left turn movements are all operating at capacity. The northbound left turn movement is approaching capacity at a v/c ratio of 0.9.

Upper Canada Mall/Yonge Street

The eastbound dual left exiting the Upper Canada Mall operates at capacity during both the PM and Saturday peak hours. During the PM peak hour this movement carries approximately 490 vehicles per hour and doubles to 880 vehicles per hour on a typical Saturday peak hour.

This signalized access provides the only access to/from the Upper Canada Mall on Yonge Street. A secondary full moves signalized access is provided on Davis Drive.

Davis Drive/Yonge Street

This intersection operates at capacity during all of the peak hour conditions as a result of the heavy north to south and east to west volumes. The left turn movements operate as protected and permitted.

During the AM peak hour, the westbound left turn operates at capacity with a v/c ratio of 1.08 and the eastbound left is operating close to capacity.

During the PM peak hour, the northbound through, southbound left turn, eastbound left turn, and westbound left turn movements are operating at capacity whereas the northbound left turn, eastbound through, and westbound through movements are operating close to capacity.

Lastly, during the Saturday peak hour, the northbound left, southbound left, southbound through, eastbound left, and westbound left are operating at capacity. The northbound through and westbound through are operating close to capacity.

Millard Avenue/Yonge Street

During the PM peak hour, the southbound left turn movement operates at capacity due to the heavy opposing volumes. On a typical Saturday peak hour, the southbound through movement operates close to capacity.

Eagle Street/Yonge Street

During the PM peak hour the northbound left turn movement operates at capacity. The northbound through and westbound left turn movements operate close to capacity. During the Saturday peak hour, the southbound through movement is close to approaching capacity.

Mulock Drive/Yonge Street

The AM and PM peak hour volumes on Mulock Drive range from 1150 to 1,300 vehicles per hour. As a result, the westbound left turn movement operates close to capacity during the AM peak hour and the eastbound left and westbound right turn movements operate at capacity during the PM peak hour. In the north/south direction, the southbound left is operating close to capacity during the AM peak hour. During the PM peak hour, the northbound through, southbound left movements are operating at capacity and the westbound through is operating close to capacity. In addition, the southbound left turn movement is approaching capacity during the Saturday peak hour.

Wellington Street/Yonge Street

The lane configurations on of a shared left-through lane and shared through-right lane are on all approaches of this intersection. As a result of this and a heavy southbound left turn volume of 187 vehicles per hour, the southbound approach is operating close to capacity during the AM peak. During the PM peak, the eastbound and northbound approaches are operating close to capacity.

Bloomington Road/Yonge Street

During the AM peak hour, the westbound through and eastbound left turn movements are operating close to capacity.

King Road/Yonge Street

During the PM peak hour, the northbound left turn movement is operating close to capacity with a v/c ratio of 0.91 and carrying approximately 440 vehicles per hour.

Davis Drive/Bathurst Street

The northbound left operates at capacity during the AM peak hour. During the PM peak hour, the northbound left and eastbound left carries approximately 600 and 550 vehicles per hour per lane, respectively. As a result these movements in addition to the westbound through movement operate at capacity. The eastbound through and westbound left turn movements operate close to capacity.

Davis Drive/Prospect Street

During the PM peak hour, the westbound approach operates at capacity although an advanced left turn phase is available.

Davis Drive/Leslie Street

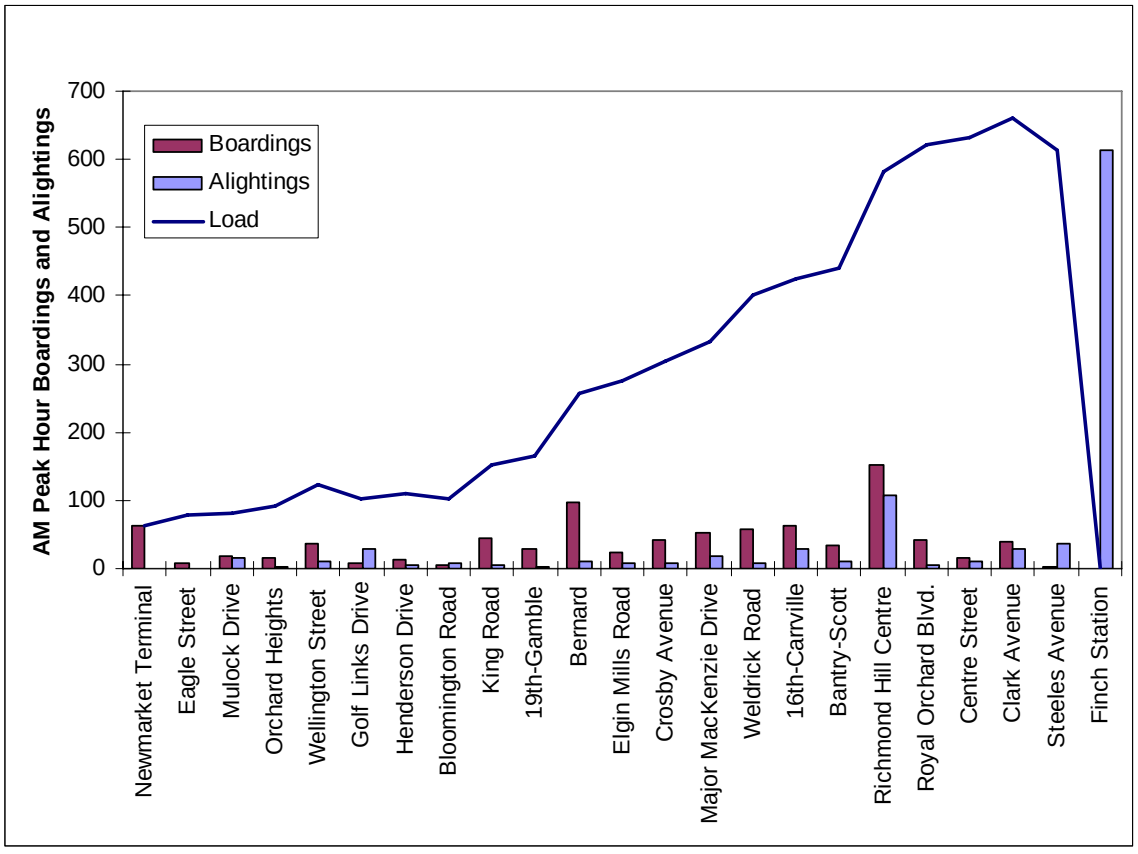
During the PM peak hour, the southbound left turn, eastbound left turn, and westbound left turn movements are approaching capacity.

2.4 Existing Transit Volumes and Performance Levels

2.4.1 EXISTING TRANSIT VOLUMES

The Viva Blue route is a limited stop express type transit service and is primarily used by commuters travelling south in the morning and north in the evening. As of Spring 2008, this route carried an average of 2,000 passengers in the morning peak (3hr) period. As shown on Exhibit 2.11, ridership on this route is higher in the south part of the Region than the north part, with the peak demand occurring between Highway 7 (where there are a large number of transfers from the main east-west VIVA service) to the Finch subway station. Within the study area, the peak hour southbound ridership at Wellington Street is approximately 142 passengers.

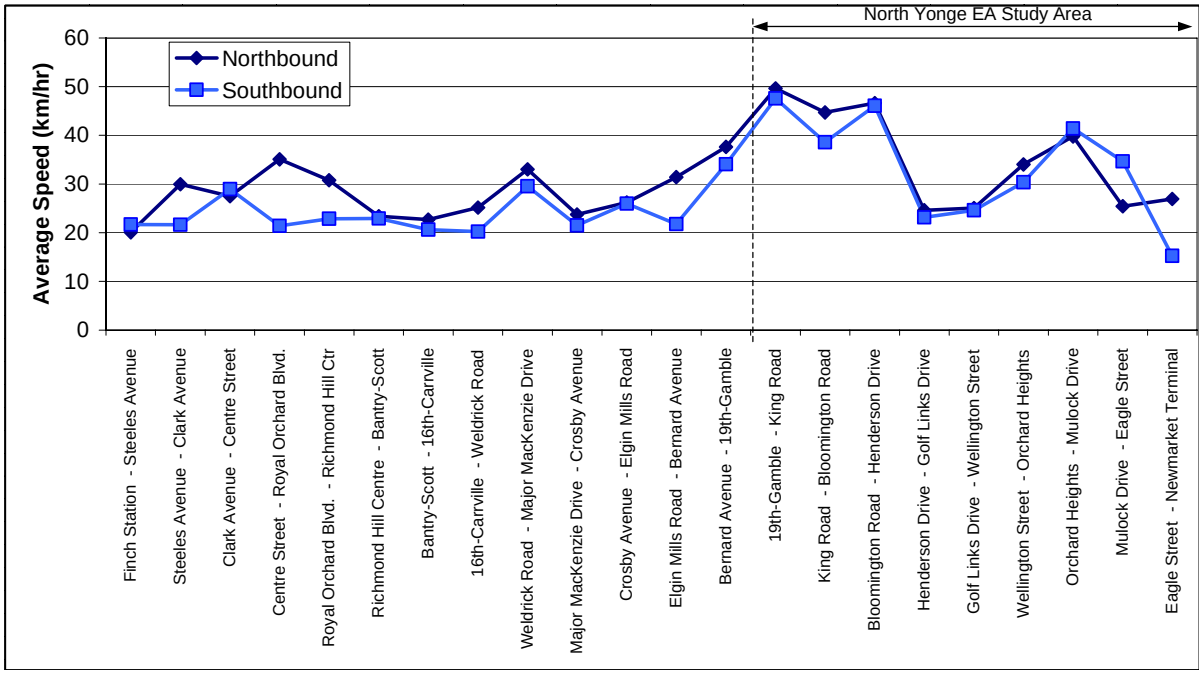
Exhibit 2.11: Existing (2008) Viva Blue Southbound AM Peak Hour Ridership Patterns



2.4.2 EXISTING TRANSIT PERFORMANCE

Existing transit performance can be quantified by looking at transit speeds for the current VIVA service which operates on Yonge Street. Exhibit 2.12 below plots the average AM Peak Period speed by location along the VIVA Blue service (including dwell times at the upstream station). Within the North Yonge study area, average speeds range from 20 km/hr to 50 km/hr. Speeds are slowest through Aurora where Yonge Street is four lanes with no exclusive turning lanes.

Exhibit 2.12: Average Speed for Existing VIVA Blue Service



3. FUTURE BASE CASE TRANSPORTATION CONDITIONS

3.1 Future Land Use Projections

Much of the initial travel demand modelling work for the North Yonge EA relied on land use forecasts originally supplied by York Region in 2003 as part of the Travel Demand Forecasting Model. An update to these forecasts was received in 2006 and included some adjustments at the traffic zone level, but the control totals at the local municipality and region level remained the same. These updated forecasts were used to develop the ridership estimates and are summarized on Exhibit 3.1 and Exhibit 3.2. Exhibit 3.3 and Exhibit 3.4 illustrate how these forecasts are allocated on a traffic zone basis while Exhibit 3.5 and Exhibit 3.6 highlight the growth portion only between 2006 and 2031.

These forecasts are consistent with the intent of the Places to Grow legislation, but may not reflect the most recent updates provided by local municipalities. It is noted that, while the forecasts take into account the impacts of Places to Grow, no modifications were made to concentrate future development in nodes and corridors served by rapid transit, which typically occurs with the introduction of new rapid transit facilities. This reflects a conservative assumption for the development of YRTP ridership forecasts.

It is also noted that the employment forecasts for East Gwillimbury are lower than the most recent projections, but this should not affect the peak direction (AM peak hour southbound) ridership estimates significantly.

Exhibit 3.1: Population Projections by Municipality *

Municipality	2001	2006	2011	2016	2021	2026	2031	
Aurora	42,000	49,000	56,000	62,000	66,000	69,000	69,000	
East Gwillimbury	21,000	22,000	27,000	35,000	49,000	65,000	87,000	
Georgina	41,000	45,000	49,000	53,000	57,000	62,000	65,000	
King	19,000	20,000	23,000	26,000	29,000	29,000	29,000	
Markham	217,000	273,000	306,000	342,000	378,000	412,000	447,000	
Newmarket	68,000	78,000	85,000	89,000	93,000	94,000	95,000	
Richmond Hill	138,000	174,000	196,000	215,000	221,000	226,000	227,000	
Vaughan	191,000	244,000	290,000	327,000	364,000	398,000	422,000	
Whitchurch-Stouffville	23,000	26,000	34,000	42,000	50,000	55,000	56,000	
York Region	**759,000**	**930,000**	**1,066,000**	**1,191,000**	**1,305,000**	**1,409,000**	**1,498,000**	

* Forecasts used for base transportation modelling. These differ slightly from current projections.

Exhibit 3.2: Employment Projections by Municipality *

Municipality	2001	2006	2011	2016	2021	2026	2031	
Aurora	15,000	20,000	24,000	27,000	31,000	33,000	33,000	
East Gwillimbury	4,000	7,000	8,000	12,000	17,000	25,000	38,000	
Georgina	7,000	8,000	9,000	12,000	14,000	18,000	22,000	
King	5,000	8,000	8,000	9,000	11,000	12,000	13,000	
Markham	124,000	151,000	174,000	204,000	220,000	245,000	266,000	
Newmarket	33,000	42,000	46,000	48,000	50,000	50,000	50,000	
Richmond Hill	52,000	64,000	74,000	80,000	83,000	84,000	85,000	
Vaughan	131,000	156,000	184,000	211,000	234,000	256,000	272,000	
Whitchurch-Stouffville	7,000	11,000	15,000	18,000	22,000	24,000	25,000	
York Region	**379,000**	**466,000**	**541,000**	**622,000**	**681,000**	**748,000**	**803,000**	

* Forecasts used for base transportation modelling. These differ slightly from current projections.

Exhibit 3.3: 2031 Population Forecasts by Traffic Zone (Current Forecasts)

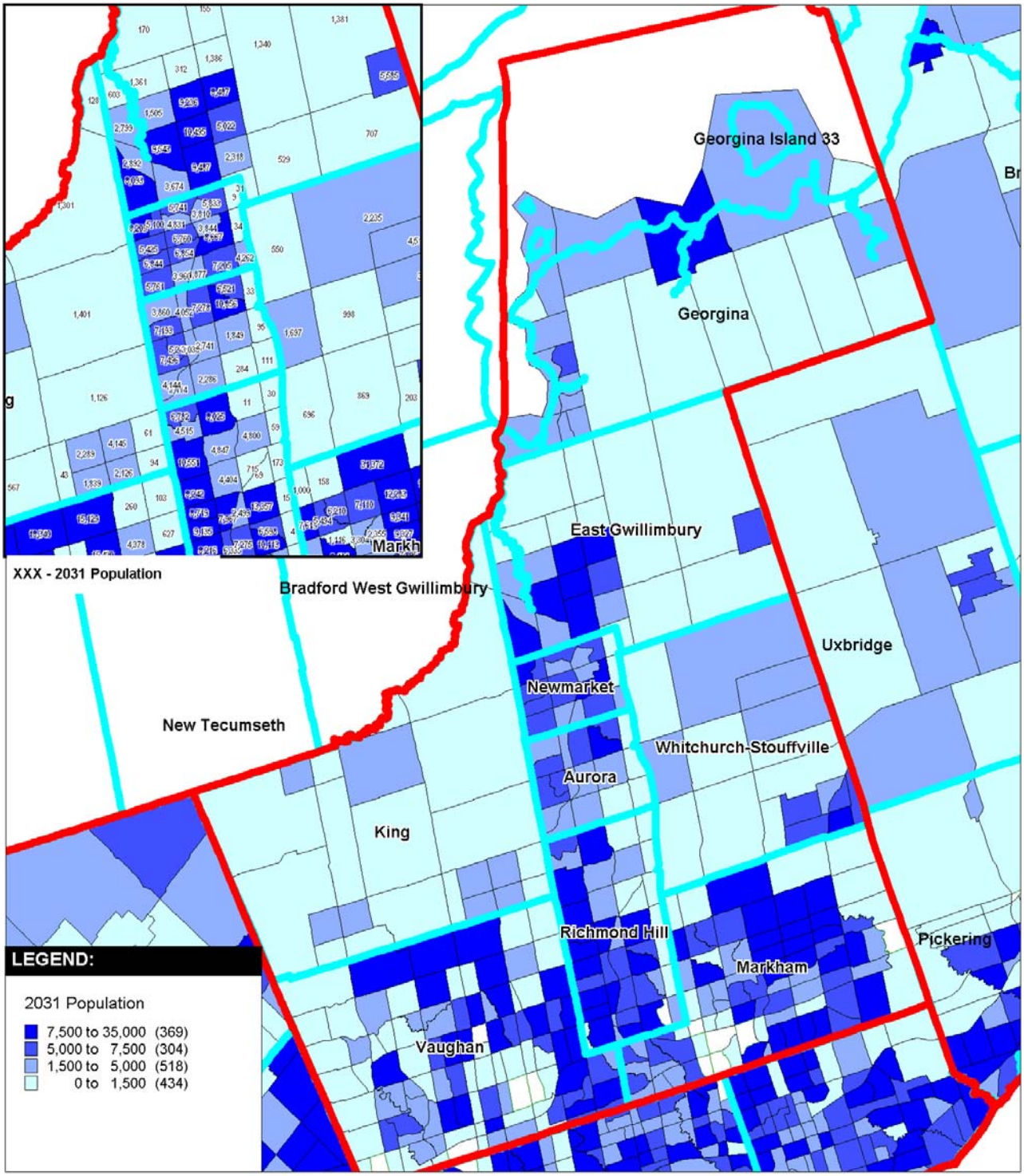


Exhibit 3.4: 2031 Employment Forecasts by Traffic Zone (Current Forecasts)

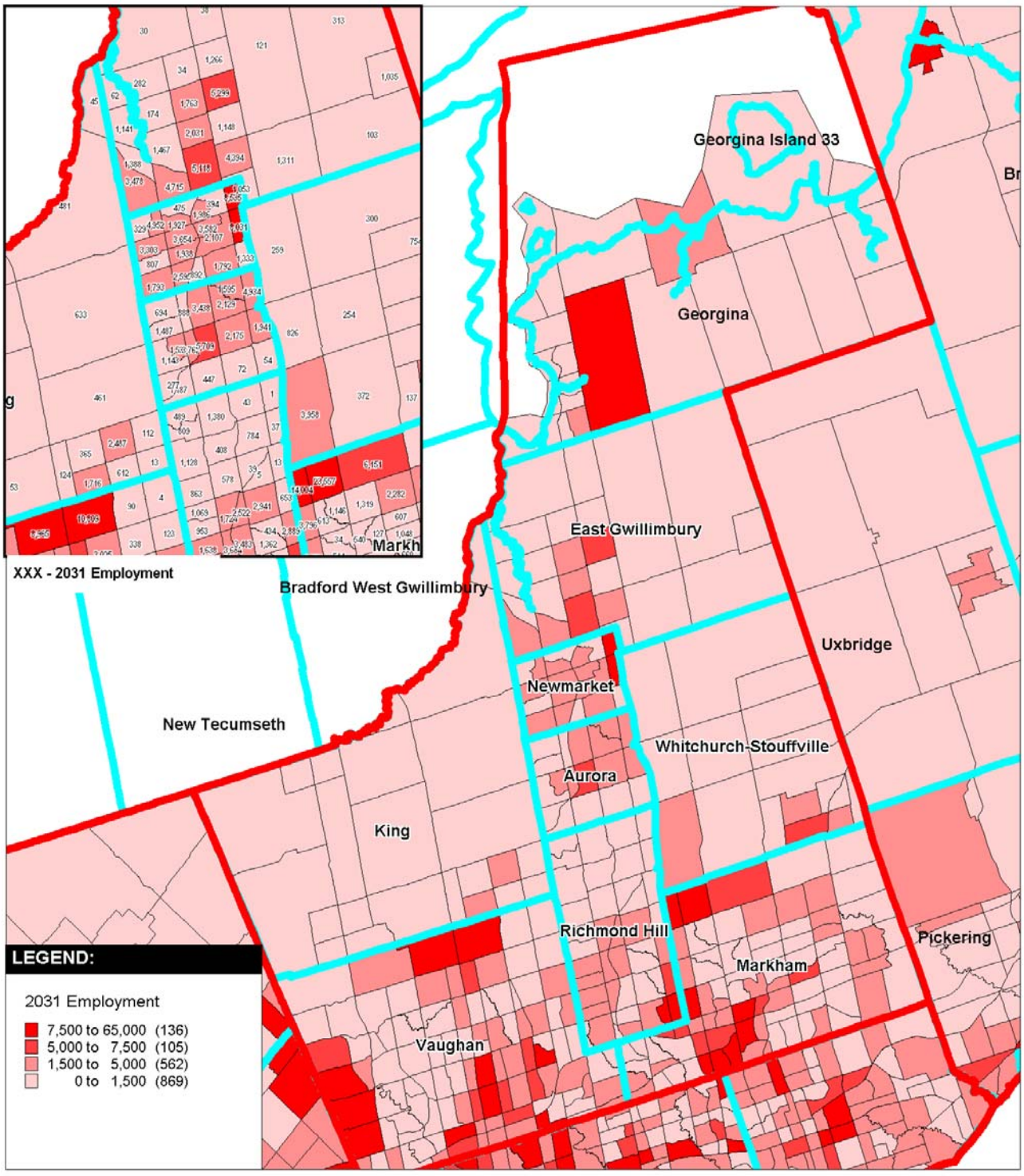


Exhibit 3.5: Population Growth (2001 – 2031)

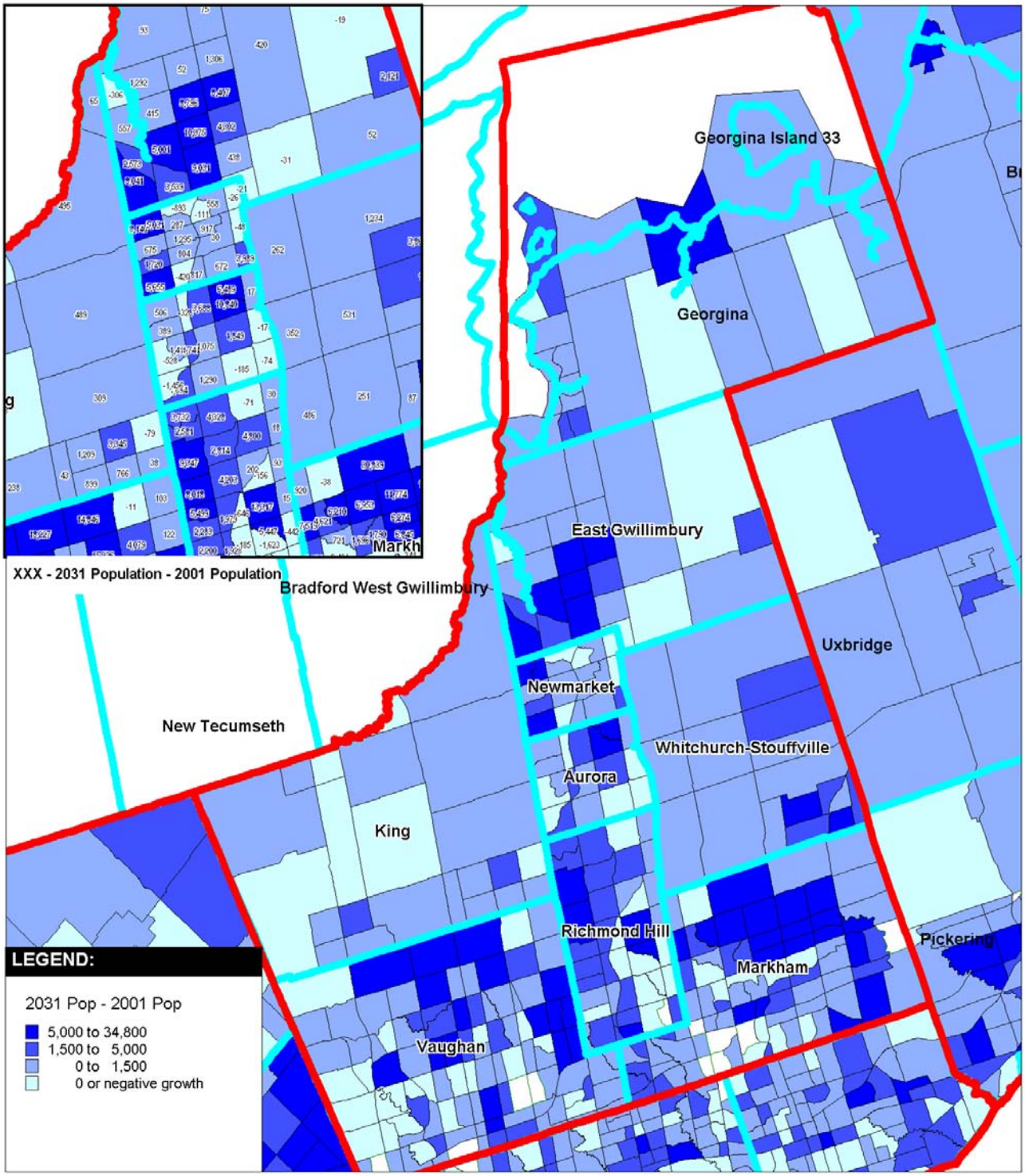
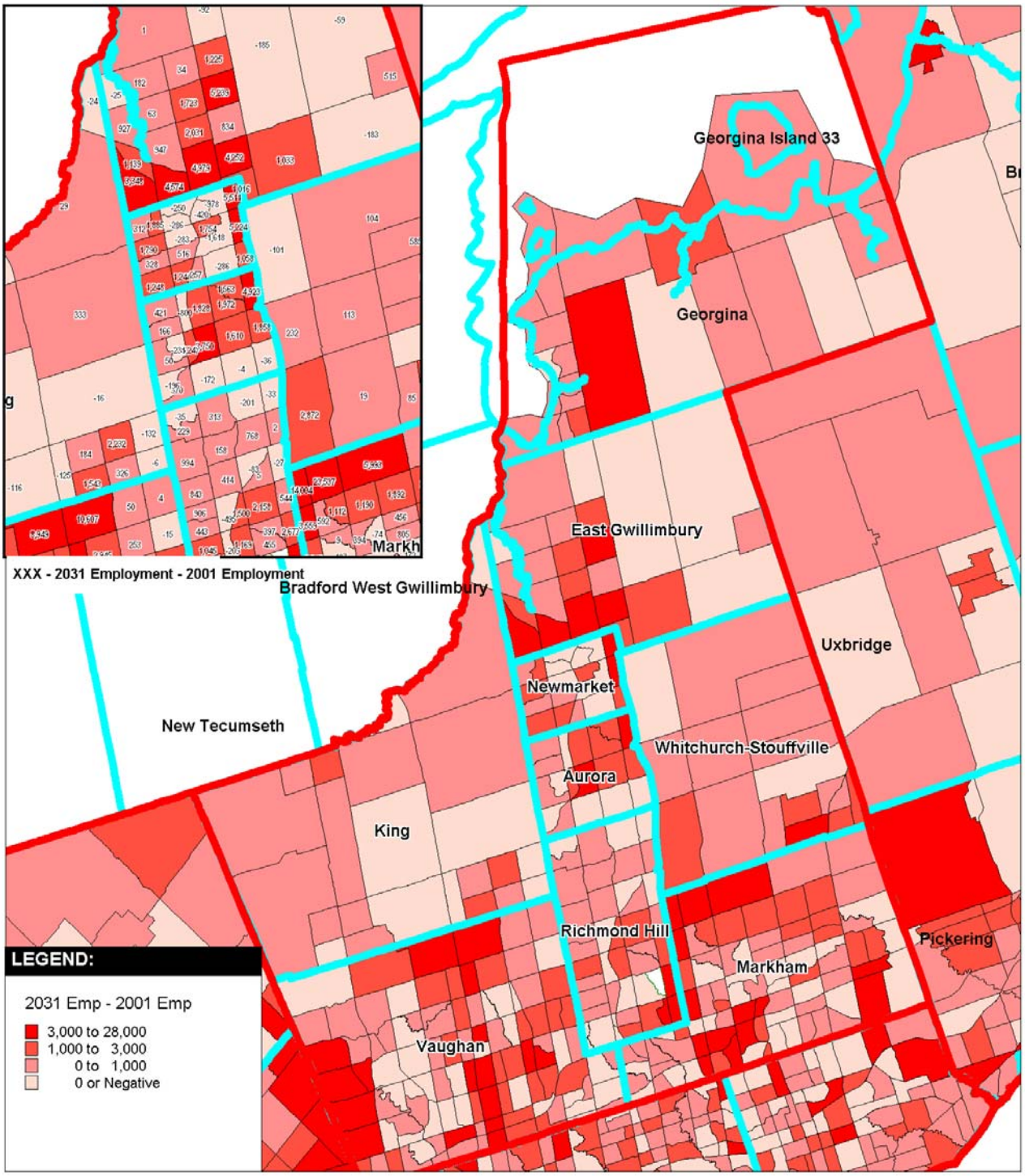


Exhibit 3.6: Employment Growth (2001 – 2031)

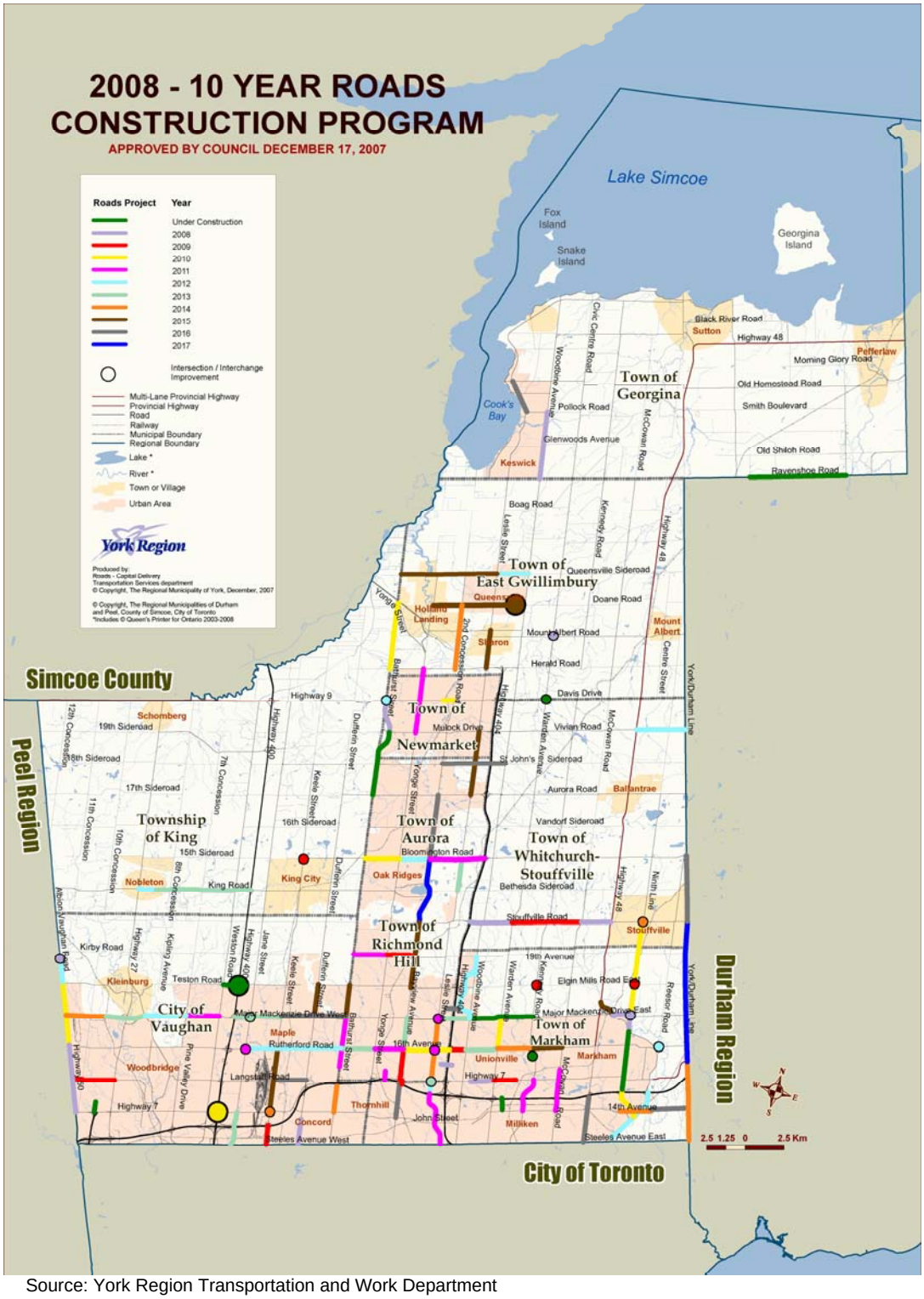


3.2 Future Road Improvements

The Region's 2008 - 10 Year Roads Construction Program identifies several road expansion projects which are shown in Exhibit 3.7. As noted in the Capital Plan, the construction of roads in urban areas also includes the implementation of streetscaping and tree planting. The road expansion projects within the study area are described in detail below:

- Potential widening of 19th Avenue/Gamble Road to five lanes from Bayview Avenue to Bathurst Street in 2009;
- Proposed widening of Bathurst Street to four lanes from Wellington Street to Davis Drive in 2008;
- Widening of Bloomington Road to four lanes from Bayview Avenue to Highway 404 in 2011;
- Widening of Bloomington Road to four lanes with a continuous left turn lane from Yonge Street to Bayview Avenue in 2012;
- Potential widening of Bayview Avenue to four lanes from 19th Avenue to Stouffville Road in 2015;
- **Potential widening of Yonge Street to six lanes from Mulock Drive to Green Lane in 2011 to be determined as part of this EA study;**
- **Possible addition of right and left turn lanes on Davis Drive between Prospect Street to west of Main Street in 2010;**
- Widening of Bloomington Road to four lanes with a continuous left turn lane from Yonge Street to Bathurst Street in 2010;
- Potential widening of Bayview Avenue to four lanes from Bloomington Road to Wellington Street in 2016;
- Possible widening of Leslie Street to four lanes from Wellington Street to Mulock Drive in 20115;
- Potential widening of Bayview Avenue to four lanes from Stouffville Road to Bloomington Road in 2017;
-
- Proposed widening of Leslie Street to four lanes from Wellington Street to 500m northerly in 2015; and
- Widening of St. John's Sideroad to four lanes from Highway 404 to Bayview Avenue in 2016.

Exhibit 3.7: York Region 2008 - 10 Year Roads Construction Program



Source: York Region Transportation and Work Department

3.3 Future Transit Improvements

In May 2006, YRT published the Five-Year Service Plan 2006-2010 which includes the improvements and planning initiatives discussed in this section.

For 2006, a number of YRT routes within the study area will include Sunday service as a new period of operation. Route 98, Yonge North will be extended to the East Gwillimbury GO Station. The Aurora North Route 31 will have weekday service extended into the late evening.

In the medium term, three to five years, the Aurora North route will be reconfigured with improved connections to Viva service.

GO service expansion in the study area is based on the GO 10 Year Capital Plan. Specific improvements are outlined in the main EA document.

3.4 Future Travel Demand Projections

The York Region Travel Demand Model was used to establish future traffic growth rates. This model includes the effect of committed road and transit improvements described above. Auto volume growth rates for the base case vary by location depending on location, but are generally in the range of 1-3% per year. Growth rates from the model were also compared to historical AADT counts from 1993 to 2005. In general, the growth rates projected by the model for the future are lower than historical growth rates, which were over 5% per year for some locations.

It is recognized that the level of commercial activity growth in the immediate study area may be slowing. It is also recognized that traffic congestion on Yonge Street may also have the effect of distributing traffic to other routes.

Future growth rates will also be a function of how quickly some of the major parcels of land are redeveloped. All indications are that significant growth and intensification will occur in the Newmarket Centre as this has been identified as an Urban Growth Centre in the Province's Growth Management Strategy (Places to Grow) and the Newmarket Official Plan Update.

Exhibit 3.8 provides an indication of future traffic levels on Yonge Street for the Base Case, assuming Yonge Street is widen to six lanes (three-lane per direction) between Mulock Drive and Green Lane. Exhibit 3.9 provides an indication of future traffic levels on Davis Drive assuming no major road capacity improvements and current transit services.

As shown on Exhibit 3.8, both northbound and southbound directions on Yonge Street will utilize or exceed the realistic theoretical capacity range (1400-1800vph for two-lane per direction, 2100-2700vph for three-lane per direction) in the most segments of Yonge Street within the study area. In the northern portion of the study area (i.e. North of Davis Drive), traffic volumes will far exceed the capacity of a four lane facility, and the PM peak hour and Saturday volumes will exceed even the capacity of a six lane facility. This is an indication that solutions other than just road capacity enhancements are required, as discussed in the following chapter.

As shown in Exhibit 3.9, both eastbound and westbound directions on Davis Drive will utilize or exceed the realistic theoretical capacity range (1200-1600vph) in the most segments of Davis Drive within the study area. It is noted that this assessment does not reflect some of the localized traffic effects caused by a lack of left turn lanes and operations in and around the Newmarket GO Rail Station.

Under a base case scenario, growth in traffic will undoubtedly exacerbate current traffic operational issues and translate into additional delay for road users.

Exhibit 3.8: Base Case Future (2021) Traffic Levels on Yonge Street

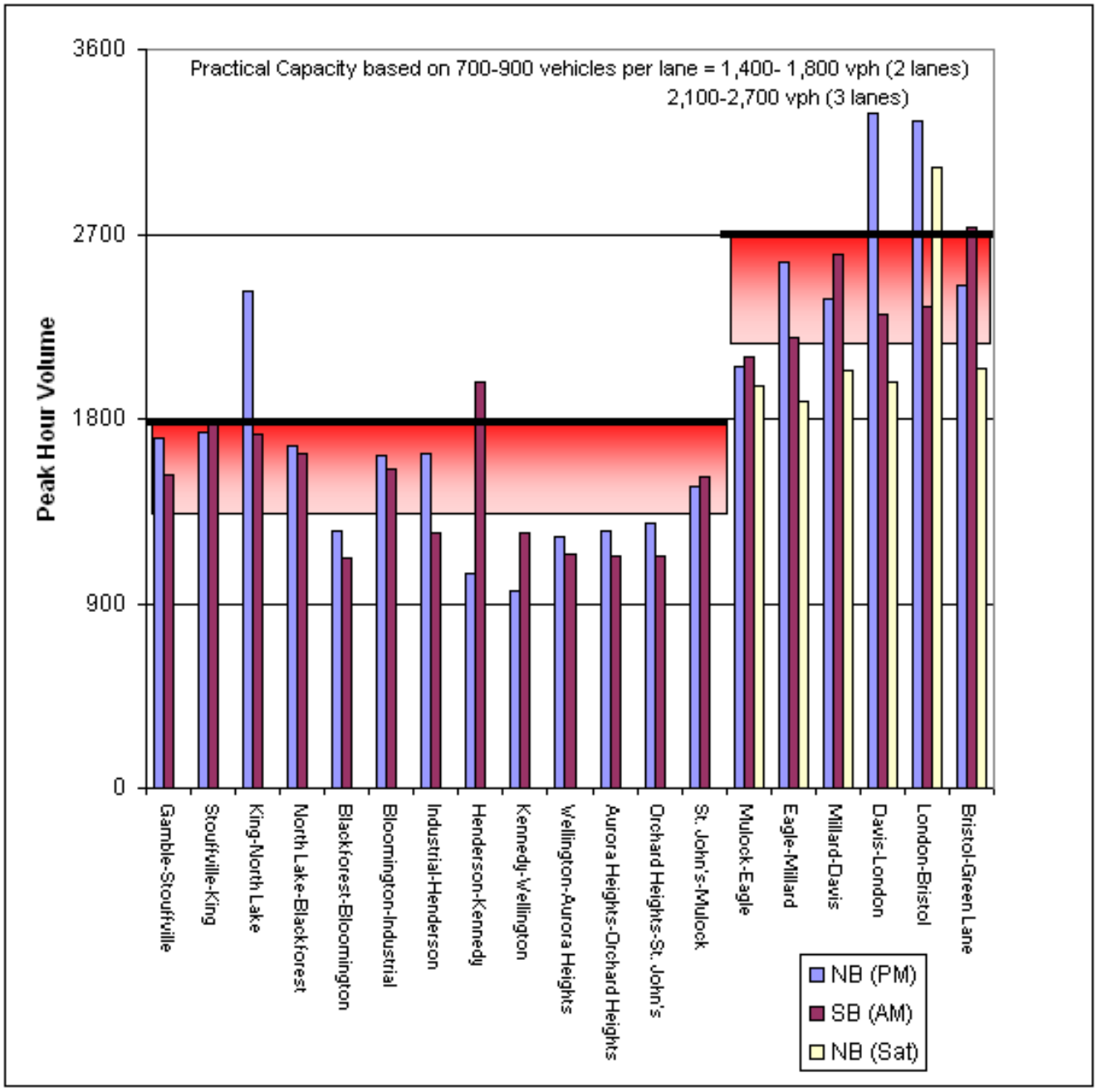


Exhibit 3.9: Future (2021) Traffic Levels on Davis Drive

3.4.1 FUTURE BASE CASE INTERSECTION OPERATIONS

Future intersection operations corresponding to the base case scenario are detailed in Appendix C. Consistent with the above graphs, some intersections on Yonge Street and Davis Drive in the northern part of the study area are projected to operate at a poor level of service.

4. TRANSPORTATION ASSESSMENT OF RAPID TRANSIT ALTERANTIVES

Throughout the various stages of the Environmental Assessment, several alternatives where examined to respond to the preferred transportation solution involving public transit improvements and road capacity enhancements. The purpose of this section is to document the transportation assessment that was undertaken to support the selection of the preferred design alternative. A description of the actual preferred design is provided in the following chapter.

4.1 Routing Alternatives

During the initial stages of the Environmental Assessment, several routing alternatives were evaluated. An initial screening of routing alternatives was conducted and presented at the September 2006 Public Open House. Routing alternatives retained for further evaluation are as follows (See Exhibit 1.2 for Map of Alternatives):

Richmond Hill	Aurora	Newmarket/East Gillimbury
RH2 - Yonge Street	A2 – Yonge Street	N2 – Yonge Street/Green Lane
	A3 - Yonge Street/Industrial Parkway/St. John's Sideroad	N3 – GO Bradford/Barrie ROW
	A4 – Yonge Street/Industrial Parkway/adjacent to GO Bradford/Barrie	N5 – Yonge Street/Eagle Street West/Newmarket GO Bus Terminal
		N6- Yonge Street/Davis Drive/Main Street/Green Lane
		N7 - Yonge Street/Davis Drive to Leslie Street
		N8 - Yonge Street/Davis Drive/Bayview Parkway/Green Lane

From a transportation perspective, five indicators were developed as follows:

- Projected travel time along each alternative
- AM Peak Hour Passenger volume in 2031
- AM Peak Period Boardings
- Existing and future residents within 500 m walking distance of station
- Existing and future employment within a 500 m walking distance of a station

Each of these indicators is quantified below.

4.1.1 TRAVEL TIME ALONG EACH ROUTE

Transit travel times depend on the length of route, number of stops, number of signalized intersections that must be traversed, presence of tight turns and level of congestion. The impact of congestion on transit travel times is dependent on the degree of segregation from regular traffic. For the purpose of this evaluation, it was assumed that all routing options would have the capability of fully dedicated transit lanes, except as noted below.

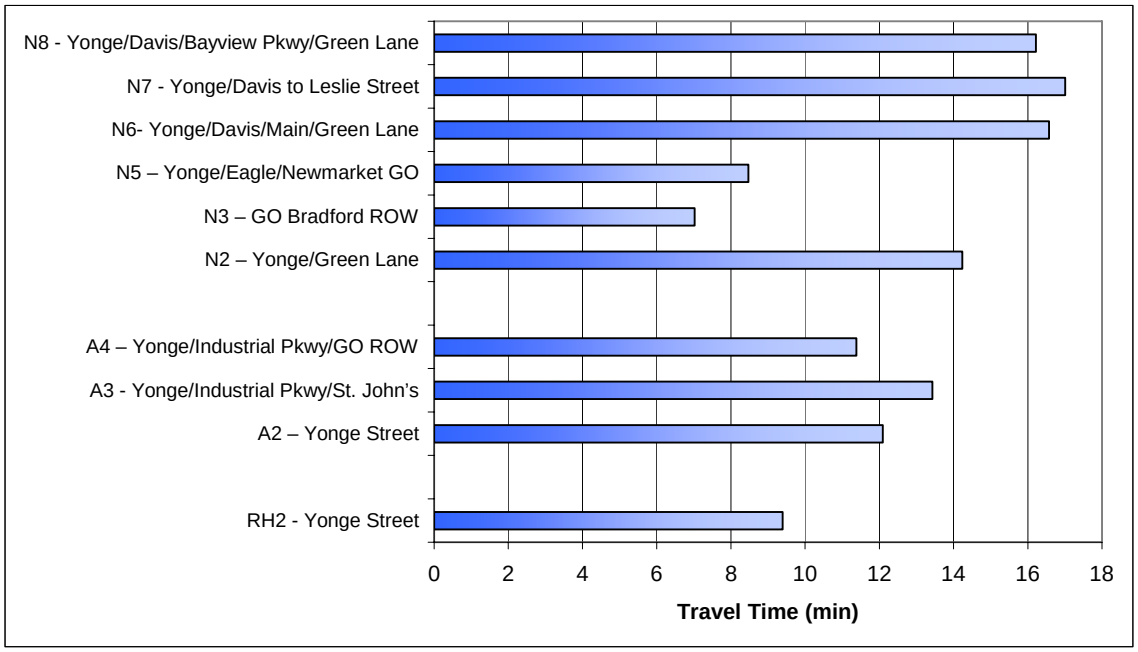
Exhibit 4.1 provides a summary of the assumed link speeds and resulting travel times for each option. Link speeds are based on previous work carried out for the York Region Travel Demand Model, with adjustments to reflect experience with the existing VIVA Phase 1 service. Link travel times factor in time at stops, but the number of stops is not considered in the evaluation since the average stop spacing is similar for all routes.

Alternatives within Richmond Hill (one alternative) and Aurora are similar in terms of travel times (See Exhibit 4.2). In Aurora, the extra distance for the Industrial Parkway alternative essentially balances out the potential for faster travel speeds. In Newmarket, the GO line alternative has potential to provide the lowest travel times followed by the Yonge Street to Newmarket GO Bus Terminal option, which is a short route. In Newmarket, it was initially assumed that rapid transit on Davis Drive will be primarily in mixed traffic, hence slower travel speeds. Alternatives for the Davis Drive corridor are considered in the next section.

Exhibit 4.1: Travel Time Input Assumptions

Route Alternative	Segment	Length (km)	Speed (km/h)	Travel Time (min)	Route Total
RH2 - Yonge Street	19th Ave - Bloomington	6.26	40	9.39	9.39
A2 – Yonge Street	Bloomington - Industrial Pkwy	2.05	40	3.08	12.10
	Industrial Pkwy - Wellington	2.05	25	4.92	
	Wellington - St. John's Sideroad	2.05	30	4.10	
A3 - Yonge Street/Industrial Parkway/St. John's Sideroad	Bloomington - Industrial Pkwy	2.05	40	3.08	13.43
	Industrial Pkwy - Yonge St	6.04	35	10.35	
A4 – Yonge Street/Industrial Parkway/adjacent to GO Bradford	Bloomington - Industrial Pkwy	2.05	40	3.08	11.39
	Industrial Pkwy/GO Line	5.54	40	8.31	
N2 – Yonge Street/Green Lane	St. John's Sideroad - Green Lane	6.25	35	10.71	14.24
	Yonge Street - GO Station	2.35	40	3.53	
N3 – GO Bradford ROW	St. John's - Green Lane	7.02	60	7.02	7.02
N5 – Yonge Street/Eagle Street West/Newmarket GO Bus Terminal	St. John's Sideroad - Davis via Eagle	4.94	35	8.47	8.47
N6- Yonge Street/Davis Drive/Main Street/Green Lane	St. John's Sideroad - Davis	4.18	35	7.17	16.57
	Yonge St - Main St	1.67	25	4.01	
	Main St - GO Station	2.7	30	5.40	
N7 - Yonge Street/Davis Drive to Leslie Street	St. John's Sideroad - Davis	4.18	35	7.17	17.01
	Yonge Street - Leslie Street	4.10	25	9.84	
N7 - Yonge Street/Davis Drive/Bayview Parkway/Green Lane	St. John's Sideroad - Davis	4.18	35	7.17	16.22
	Yonge St - Bayview Pkwy	1.79	25	4.30	
	Bayview Pkwy - GO Station	2.38	30	4.76	

Exhibit 4.2: Estimated Travel Time by Route Alternative



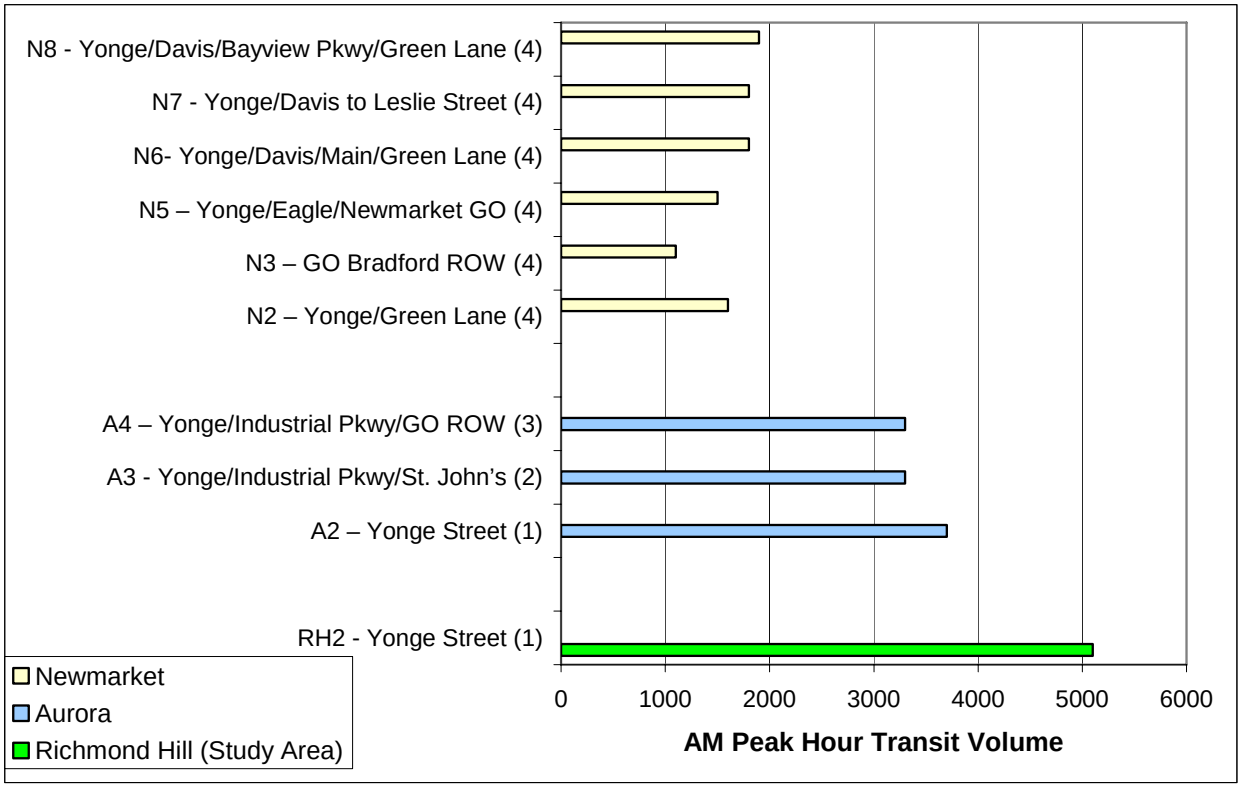
4.1.2 TRANSIT PASSENGER VOLUMES

Transit volumes are a measure of the attractiveness of rapid transit service alternatives. For evaluation purposes, transit volumes are measured as the AM Peak hour southbound volumes on the rapid transit system. Volumes represent the peak volume in the municipality, which is generally the southbound volume at the southern boundary of the municipality.

Transit volumes were estimated using the York Region Travel Demand Model (EMME/2 Model) and reflect a 2031 horizon year. All routes are assumed to have the same headway, which for route comparison purposes, is 1 minute. This is corresponds to a capacity of about 4,200 passengers per hour, which may be excessive for the north part of the corridor. However, assumptions on headway do not affect the relative comparisons of each route.

Exhibit 4.3 provides a summary of the transit volumes by segment for each routing alternative. In Aurora, the Yonge Street routing achieves the highest peak volume. Whereas the GO Bradford/Barrie routing and Industrial Parkway routing are similar by the time the rapid transit system reaches the southern boundary of Aurora. In Newmarket, the most attractive alternatives are those that serve some or all of Davis Drive.

Exhibit 4.3: AM Peak Hour Southbound Transit Volumes in 2031



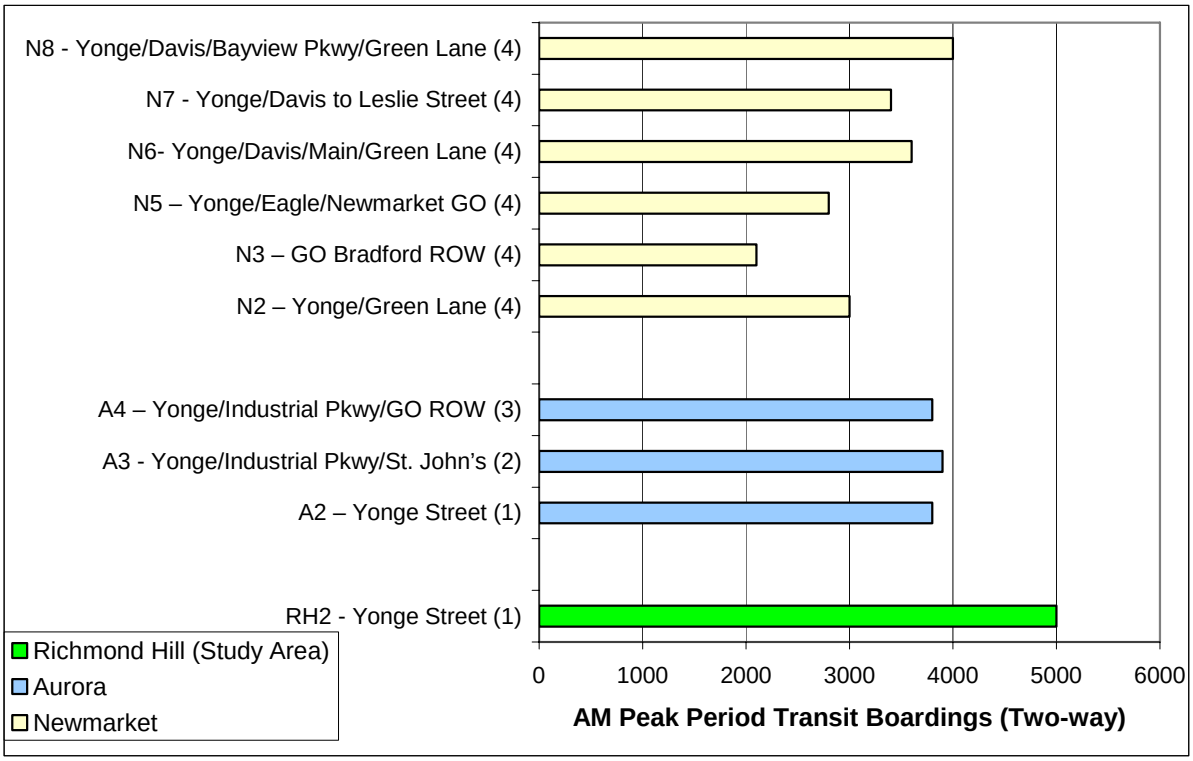
(1) Assumes Davis Drive to Leslie Street routing in Newmarket
(2) Assumes Davis Drive to Leslie Street routing in Newmarket
(3) Assumes GO ROW routing to Newmarket
(4) Assumes Yonge Street routing through Aurora and Richmond Hill

4.1.3 TRANSIT BOARDINGS

In addition to transit volumes, transit boardings are used as a measure of the attractiveness of rapid transit service alternatives. Transit boardings are taken as the two-way boardings on the rapid transit system in the AM Peak (3 hr) Period. An examination of alightings was also conducted; however, the relative differences between routing alternatives was similar to that produced using boardings.

A total of five rapid transit route combinations were modelled using EMME/2 and used to develop an estimate of the boardings for the ten specific route alternatives. The resulting estimates are shown on Exhibit 4.4. Boardings represent the total boardings in each municipality based on stop location. Boardings for Green Lane, which is in East Gwillumbury, are included in the Newmarket totals. Boardings for Richmond Hill include boardings for stations in the study area only (i.e. Gamble Road and northward).

Exhibit 4.4: AM Peak Period Two-way Transit Boardings in 2031



(1) Assumes Davis Drive to Leslie Street routing in Newmarket
(2) Assumes Davis Drive to Leslie Street routing in Newmarket
(3) Assumes GO ROW routing to Newmarket
(4) Assumes Yonge Street routing through Aurora and Richmond Hill

As shown on the Exhibit, transit boardings in Richmond Hill and Aurora do not vary significantly by routing alternative. The only difference in alternative in Aurora is the Industrial parkway option; an interesting alternative in that it generates slightly higher two-way boardings. This appears to be a result of higher number of local boardings and transfers from other services compared to the Yonge Street alternatives, since the peak volume does not increase as shown previously in Exhibit 4. Further investigation is required to explore the reasons for this, although it appears to be due to residents

The most significant differences in the routing alternatives can be seen in Newmarket. Similar to the transit volumes criterion, alternatives that use some access some portion of Davis Drive have the highest number of boardings. The GO ROW alternative is the least attractive option, likely a result of the fact that it competes with the existing GO Rail service.

4.1.4 PROXIMITY TO RESIDENTS AND JOBS

The final transportation related indicators considered in the routing evaluation relate to the number of residents and workers (jobs) that are in proximity to the rapid transit route alternatives, and specifically:

- Existing and future residents within 500 m walking distance of station

- Existing and future employment within a 500 m walking distance of a station

These indicators are similar to the ridership indicators, but provide a finer resolution in terms of ridership potential. Values for these indicators were developed using a GIS and population and employment forecasts provided by the Region of York at the traffic zone level. The population and employment forecasts reflect the effect of the Oakridges Moraine and Greenbelt legislation, which has had a dampening effect on the population and employment growth in sections of Richmond Hill and Aurora adjacent to the rapid transit routes.

A procedure was developed to calculate population and employment within a 500 m radius of a station based on average densities for surrounding traffic zones. Adjustments were made to take into account traffic zones where land use was concentrated in one location, or where there were large amounts of undevelopable land. Despite the adjustments, figures should be considered very approximate.

Exhibit 4.5 summarizes the number of residents within 500 m of stations for each rapid transit alternative. Figures include only the population within the municipality corresponding to the alternative, as opposed to the entire line. Preliminary stations have been identified by others and generally correspond to major arterials.

The results are fairly self explanatory. For example, the Industrial Parkway and GO ROW alternatives have the fewest residents within 500 m of their station. In Newmarket, the GO Line is abutted by two parks and two conservation areas.

Figures corresponding to access to employment are shown on Exhibit 4.6. Within Aurora, the Industrial Parkway alternative performs as well as the Yonge Street alternative. In both Aurora and Newmarket, the GO ROW option has the least amount of employment in proximity to the potential stations. In Aurora, the GO line routing only has employment on one side whereas the Industrial Parkway routing generally has employment on both sides.

Exhibit 4.5: Residents within 500 m of Rapid Transit Stations

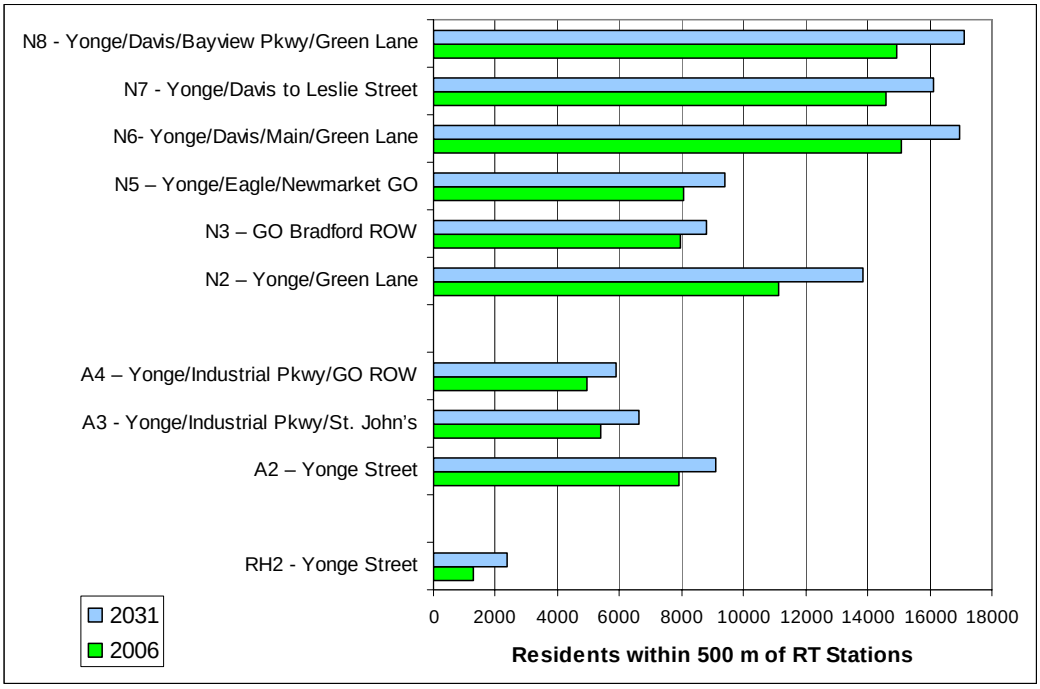
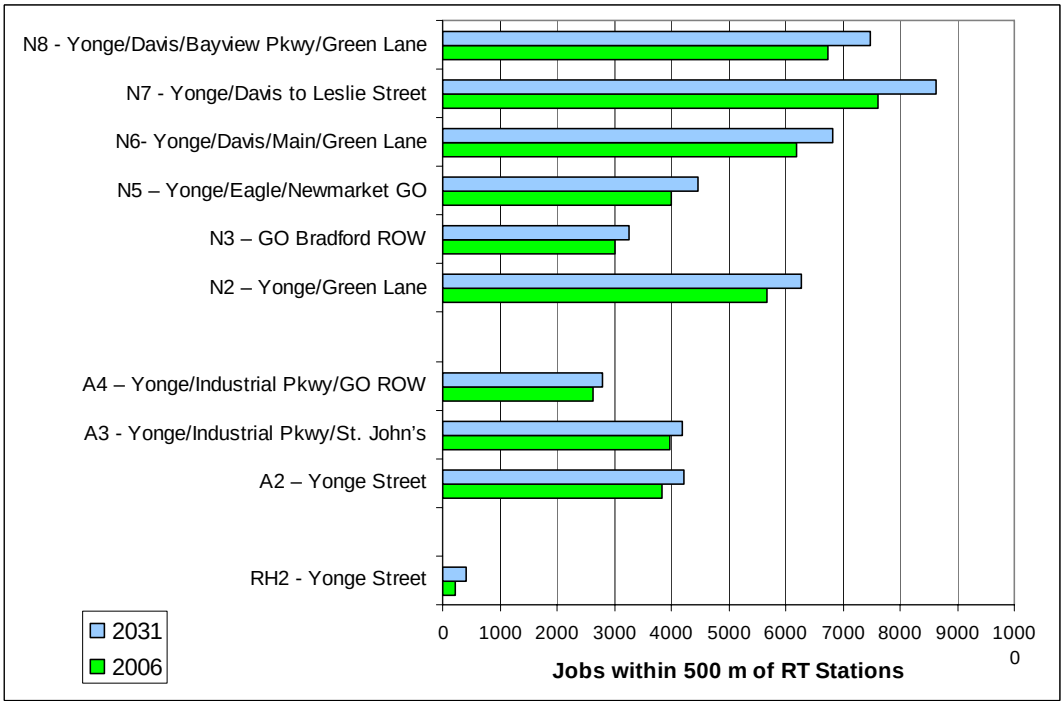


Exhibit 4.6: Jobs within 500 m of Rapid Transit Stations



4.1.5 SUMMARY

Overall, the Yonge Street route, in conjunction with either a Davis Drive routing or Green Lane routing (or both) has the greatest potential for attracting new transit riders and improving overall transit service in the study area.

4.2 Physical Infrastructure Alternatives

Physical infrastructure alternatives consisted of various combinations of roadway capacity enhancements and rapidway alternatives. **In the assessment of traffic operations and intersection capacities, 2021 was chosen as the horizon year for comparing the alternatives. This is consistent with other Rapid Transit EAs and provides a more meaningful comparison of traffic operations. It is not generally considered appropriate(or reliable) to predict traffic operations beyond a 15 year horizon period.**

4.2.1 YONGE STREET – MULOCK TO DAVIS DRIVE

The following five design alternatives were evaluated for this specific portion of the corridor:

- Alternative 1: Existing road configuration with rapid transit operating in mixed traffic
- Alternative 2: Existing road configuration with some intersection improvements and rapid transit operating in mixed traffic
- Alternative 3: Widening of Yonge Street to 6 lanes with rapid transit operating in mixed traffic curb HOV lanes
- Alternative 4: Widening of Yonge Street to accommodate rapid transit operating in a dedicated median rapidway
- Alternative 5: Widening of Yonge Street to 6 lanes with rapid transit operating in a dedicated median rapidway

Alternatives 4 and 5 could be developed as median dedicated rapidway or curb-side rapidway. For the purpose of comparing design options, all traffic analysis has been prepared assuming a median rapidway configuration.

It was considered beneficial to perform the evaluation of the alternatives by splitting the corridor at Davis Drive into a southern and northern portion. This was done because the land use characteristics and traffic patterns differ enough between portions and the rapid transit network will branch into two routes at Davis Drive, with one continuing north on Yonge Street and the other turning east on Davis Drive. Also, transit ridership is projected to be significantly higher south of Davis Drive (1200 passengers per hour) compared to the volumes to be carried in the northern portion (~300passengers per hour).

As a primary indicator of the traffic impact of each of the alternatives, an intersection capacity analysis was carried out. The findings are summarized in Exhibit 4.7 with a discussion of the results provided below.

Exhibit 4.7: Intersection Capacity Analysis of Design Alternatives (PM Peak Hour) for Mulock Drive to Davis Drive

	Alternatives in 2021											
Intersection Reference: Yonge Street at	Existing (2005)		Alternative 1 4 lanes mixed traffic		Alternative 2 4 lanes mixed traffic + Improvements		Alternative 3 6 lanes mixed traffic		Alternative 4 4 lanes + 2 lanes BRT		Alternative 5 6 lanes + 2 lanes BRT	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Davis Drive	>100	F	>100	F	>100	F	92	F	>100	F	>100	F
KFC/Chapters Access	7	A	7	A	7	A	5	A	10	B	7	A
Millard Avenue	27	C	60	E	39	D	25	C	90	F	27	C
Gladman /York Admin Access	9	A	31	C	17	B	6	A	41	D	7	A
Eagle Street	46	D	86	F	78	E	44	D	100	F	51	D
William Roe/ Clearmeadow	11	B	14	B	10	A	7	A	14	B	10	A
Mulock Drive	>100	F	>100	F	>100	F	>100	F	>100	F	>100	F

Alternative 1: Existing Road Configuration with Rapid Transit Operating in Mixed Traffic: As shown previously on Exhibit 4.1, the unconstrained peak period volumes on Yonge Street will exceed the practical road capacity of a four lane roadway (e.g. 1,800 vehicles per direction) by 40% in some locations. This results in a degradation of level of service at most of the major intersections. Motorists would experience fairly significant delays under this scenario, particularly at Davis Drive and Mulock Drive.

Transit mixed with these traffic conditions would experience considerable delays, therefore making the rapid transit service slow and unreliable and consequently, less attractive.

Alternative 2: Existing Road Configuration with Some Intersection Improvements and Transit Operating in Mixed Traffic: This design alternative involves improvements to signal timing and selected addition of turning lanes to address critical movements. Major physical improvements include:

- Addition of dual eastbound, westbound and southbound left turn lanes at Davis Drive;
- Addition of a dual northbound left turn lane at Eagle Street; and
- Addition of a dual southbound left turn lane and a channelized westbound right turn lane at Mulock Drive.

With these improvements, there are marginal reductions in delay at intersections where improvements are implemented, as shown in Exhibit 4.7. However, since volumes for most through movements still exceed capacity by a significant amount, most intersections would continue to fail in 2021. As with Alternative 1, transit running times would be severely degraded under this alternative.

Alternative 3: Widening of Yonge Street to 6 Lanes with Rapid Transit Operating in Mixed Traffic: This alternative provides the highest levels of auto service, although delays would still exist during peak times at the major intersections (i.e. Davis Drive and Mulock Drive).

Transit vehicles would benefit from the improved level of service; however, it is likely that over time available through capacity would be absorbed by vehicles using Yonge Street as an alternative to other congested routes.

A variation of this alternative could be to widen Yonge Street to six lanes, but operate the curb lane as a dedicated HOV/transit lane during the peak periods.

Alternative 4: Widening of Yonge Street to Accommodate Rapid Transit Operating in a Dedicated Median Rapidway: Under this alternative, level of service for regular traffic would be similar to Alternative 1. The median transit configuration would permit higher service speed thus attracting higher transit ridership, and hence mitigating traffic growth. However, the reductions in traffic volumes are somewhat off-set by the impact of adding a dedicated signal phase to allow for protected left and U-turn movements. A U-turn phase is required to provide access to properties that currently have direct access from Yonge Street but are not served by a signalized intersection.

Alternative 5: Widening of Yonge Street to 6 Lanes with Rapid Transit Operating in a Dedicated Median Rapidway: This alternative maximizes level of service for both automobiles and transit vehicles. Level of service for regular traffic would be similar to Alternative 3, with the exception of the above noted requirements for left and U-turns in Alternative 4. Transit vehicles would receive some priority at certain intersections.

Aside from property impacts, one of the primary drawbacks of this alternative is that the width of the cross-section at intersections (10 lanes including turn lanes) makes two-stage pedestrian crossing almost mandatory.

4.2.1.1 Summary

From an improved mobility for both modes perspective, Alternative 4 offers an optimum solution as it maximizes operational benefits and the attractiveness of rapid transit while accommodating projected traffic growth with existing enhancements of the four lane roadway. Some intersection improvements identified in Alternative 2 could be considered as part of the preferred solution.

4.2.2 YONGE STREET– DAVIS DRIVE TO GREEN LANE

The same five design alternatives that were analysed for the Mulock to Davis Drive segment were examined for the Davis Drive to Green Lane segment.

As a primary indicator of the response of the alternatives to this objective an intersection capacity analysis was carried out. The findings are summarized in Exhibit 4.8.

Exhibit 4.8: Intersection Capacity Analysis of Design Alternatives (PM Peak Hour)

for Davis Drive to Green Lane

Intersection Reference: Yonge Street at	Alternatives in 2021											
	Existing (2005)		Alternative 1 4 lanes mixed traffic		Alternative 2 4 lanes mixed traffic + Improvements		Alternative 3 6 lanes mixed traffic		Alternative 4 4 lanes + 2 lanes BRT		Alternative 5 6 lanes + 2 lanes BRT	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Green Lane	>100	F	>100	F	>100	F	85	F	>100	F	>100	F
Green Lane Centre	11	B	14	B	29	B	13	B	21	C	19	B
Aspenwood/Bristol	70	E	>100	F	>100	F	38	D	>100	F	48	D
Bonshaw/London	16	B	34	C	20	B	15	B	48	D	24	C
Dawson Manor/Kingston	21	C	37	D	26	C	25	C	35	C	31	C
Upper Canada Mall	89	F	93	F	34	C	30	C	50	D	36	D
Davis Drive	>100	F	>100	F	>100	F	92	F	>100	F	93	F

As with the southern segment, the comparison of traffic demand and capacity illustrated in Exhibit 4.7 also been considered in the evaluation below.

Alternative 1 Existing Road Configuration with Rapid Transit Operating in Mixed Traffic: Assuming traffic volumes grow by an average of 2% per year and no improvements are made to road capacity, the unconstrained peak period volumes on Yonge Street will exceed road capacity by 60% in some locations. This results in most of the major intersections operating at level of service F (i.e. failure). Delays experienced by motorists under this scenario would be considered unacceptable.

Transit mixed with these traffic conditions would experience considerable delays, therefore making the rapid transit service slow and unreliable and consequently, less attractive.

Alternative 2: Existing Road Configuration with Some Intersection Improvements and Transit Operating in Mixed Traffic This design alternative assumes improvements to signal timing and selective addition of turning lanes to address critical movements. Major physical improvements include:

- Addition of a second westbound channelized right turn at Green Lane
- Addition of dual eastbound, westbound and southbound left turn lanes at Davis Drive

With these improvements, there are marginal reductions in delay at intersections where improvements are implemented, as shown in Exhibit 4.8. However, since volumes for most through movements still exceed capacity by a significant amount, most intersections would continue to fail in 2021. As with Alternative 1, transit running times would be severely degraded under this alternative.

Alternative 3: Widening of Yonge Street to 6 Lanes with Rapid Transit Operating in Mixed Traffic: This alternative provides the highest levels of auto service, although some delay would still occur during peak periods at the major intersections (i.e. Green Lane and Davis Drive). Transit vehicles would benefit from the improved level of service; however, it is likely that over time available through capacity would be absorbed by vehicles using Yonge Street as an alternative to other congested routes.

A variation of this alternative could be to widen Yonge Street to six lanes, but operate the curb lane as a dedicated HOV/transit lane during the peak periods. ***This alternative is considered as part of the preferred design outlined in Chapter 5.***

Alternative 4 Widening of Yonge Street to Accommodate Rapid Transit Operating in a Dedicated Median Rapidway: Under this alternative, level of service for regular traffic would be similar to Alternative 1. The median transit configuration would permit higher service speed thus attracting higher transit ridership, and hence mitigating traffic growth. However, the reductions in traffic volumes are somewhat off-set by the impact of adding a dedicated signal phase to allow for protected left and U-turn movements. A U-turn phase is required to provide access to properties that currently have direct access from Yonge Street but are not served by a signalized intersection.

Alternative 5 Widening of Yonge Street to 6 Lanes with Rapid Transit Operating in a Dedicated Median Rapidway: This alternative maximizes level of service for both automobiles and transit vehicles. Level of service for regular traffic would be similar to Alternative 3, with the

exception of the above noted requirements for left and U-turns. Transit vehicles would receive some priority at certain intersections.

Aside from property impacts, one of the primary drawbacks of this alternative is that the width of the cross-section at intersections (10 lanes including turn lanes) makes two-stage pedestrian crossing almost mandatory.

4.2.2.1 Summary

A dedicated rapidway (Alternatives 4 and 5) is difficult to justify at the 2021 horizon given that the transit ridership is well below the person capacity of a general purpose lane. Consequently, for this segment, rapid transit operation in an HOV lane added to the existing 4 lanes (Alternative 3) would provide the necessary improvements for both modes. Some intersection improvements identified in Alternative 2 could be considered as part of the preferred solution.

4.2.3 YONGE STREET - AURORA HEIGHTS DRIVE TO SAVAGE ROAD SOUTH

An assessment of the need for dedicated rapid transit lanes was undertaken for the segment of Yonge Street between Aurora Heights and Savage Road South. As shown on Exhibit 4.9, much of the land use in adjacent to Yonge Street in this segment is undeveloped and is not slated for development. Additionally, intersections are widely spaced and there are minimal driveways fronting onto Yonge Street. Accordingly, dedicated rapid transit lanes will likely provide minimal travel time benefits.

A comparison of future volume to capacity ratios is provided on Exhibit 4.10 (using 2031 volume projections to be conservative). As shown, volumes are well below theoretical capacity. This is confirmed by the detailed signalized intersection results for the Base Case (Appendix C), which generally indicates a good level of service through this section on Yonge Street. Therefore, operation in mixed traffic in this section would be acceptable.

Exhibit 4.9: Existing Land Uses – Yonge Street between Aurora Heights and Savage

Exhibit 4.10 Projected Future Volumes and Capacity - Yonge Street between Aurora Heights and Savage

Segment on Yonge Street	Projected 2031 Volumes (PM Peak Hour)		Projected Volume to Capacity Ratio based on 900 vehicles per lane = 1800 vph (2 lanes)	
	NB	SB	NB	SB
Aurora Heights - St. John's Sideroad	1462	1456	0.81	0.81
St. John's Sideroad - Savage Road South	1670	1698	0.93	0.94

4.2.4 DAVIS DRIVE – YONGE STREET TO HIGHWAY 404

As discussed previously, the preferred routing for transit services in the North Yonge Corridor involves splitting rapid transit services at Davis Drive, with one service extending north on Yonge Street to Green Lane and then east to East Gwillimbury GO Station and the other extending east along Davis Drive.

The following four design alternatives were evaluated for the Davis Drive corridor:

- Alternative 1: Rapid Transit Operation in Mixed Traffic in Existing Road Configuration (Do Nothing)
- Alternative 2: Rapid Transit Operation in Mixed Traffic With Some Intersection Improvements and Transit Priority Measures
- Alternative 3: Rapid Transit Operation in Dedicated Median Rapidway from Yonge Street to a proposed Lindsay Avenue Extension
- Alternative 4: Rapid Transit Operation in Dedicated Median Rapidway from Yonge Street to Southlake Regional Health Centre

Alternatives 2-4 are based on the provision of four through lanes of traffic for regular vehicles with widening to accommodate turning movements at certain intersections. In addition, Alternatives 3 and 4 would involve further road widening to provide for the median Rapidway.

As a primary indicator of the traffic impact of each of the alternatives, an intersection capacity analysis was carried out. The findings are summarized on Exhibit 4.11. Findings are presented for the 2021 horizon period and for the PM peak hour (worst case scenario).

Exhibit 4.11: Intersection Capacity Analysis of Design Alternatives (PM Peak Hour) for Davis Drive

Intersection Reference: Davis Dr. at	Existing	2021 Existing Condition	2021 Alternative 2	2021 Alternative 3	2021 Alternative 4
Eagle Street	D	F	F	F	F
Yonge Street	E	F	F	F	F
George Street	C	D	D	D	D
Barbara Road	C	D	B	B	B
Parkside Drive	B	E	C	C	C
Longford Road	A	B	-	-	-
Lindsay Avenue	-	-	A	A	A
Lorne Street	B	C	C	C	C
Main Street S.	F	F	F	F	F
CNR Line	F	F	F	F	F
Seniors	D	F	E	E	E
Prospect Street	D	F	D	D	D
Roxborough	B	B	B	B	B
Alexander	B	C	C	C	C
Carlson Drive	C	C	C	C	C
Leslie Street	D	E	E	E	E
Forhan Drive	B	B	B	B	B
Harry Walker Drive	D	D	D	D	D

Alternative 1: Rapid Transit Operation in Mixed Traffic in Existing Road Configuration (Do Nothing): If no improvements are made to road capacity, several intersections along Davis Drive will be operating at a very poor level of service by 2021 or before. Transit mixed with these traffic conditions would experience considerable delays, therefore making the rapid transit service slow and unreliable and consequently, unattractive as an alternative to auto use.

Alternative 2: Existing Road Configuration with Some Intersection Improvements and Transit Operating in Mixed Traffic: For Alternative 2, intersection improvements would include the addition of left turn lanes at several locations as well as some consolidation of access points. Transit priority would be applied through the application of Transit Signal Priority (TSP).

Major physical improvements include:

- realigned George Street to the east, lining up with Wilstead Dr
- extension of wb and eb left turn lanes at Wilstead Dr/George St
- wb left turn lane at Parkside Dr
- cul-de-sac Longford Dr
- extension of Lindsay Ave to Davis Dr, eb left turn lane
- eb left turn lane at Hill St
- wb left turn lane at Lorne Ave
- wb and eb left turn lanes at Vincent St and Niagara St
- wb and eb left turn lanes at Main St
- cul-de-sac of Superior St
- wb and eb left turn lanes at Newmarket GO Station
- eb and wb left turn lanes at Charles St and Bayview Pkwy
- wb and eb left turn lanes at Prospect St/Lundy's Lane
- right-in/right-out at Bolton Ave
- wb and eb left turn lanes at Huron Heights Dr and Alexander Rd

- eb and wb three lanes from Leslie St to Harry Walker Pkwy (addition of one continuous lane in each direction acting as a right turn lane)

These improvements help to improve traffic operations fairly significantly, as shown on Exhibit 4.11. However, several locations would still be operating at LOS F and a large portion of the through movement capacity would be utilized by 2021. These localized capacity restrictions have the effect of reducing the reliability, and hence attractiveness, of transit services along Davis Drive. Beyond 2021, mixed traffic rapid transit operations would progressively deteriorate as general traffic volumes approach the through capacity of the largely 5-lane cross-section. Since the rapid transit services on Davis Drive would be continuous with services on Yonge Street, delays on Davis Drive would affect the performance and attractiveness of the entire north-south rapid transit spine.

Alternative 3: Rapid Transit Operation in Dedicated Median Rapidway from Yonge Street to Proposed Lindsay Avenue Extension: This alternative would involve the extension of the proposed dedicated median transit lanes from Yonge Street to a proposed new extension of Lindsay Avenue, a distance of approximately 800 m eastward along Davis Drive. Effectively, this would provide segregated transit through the highest density portions of the Newmarket Regional Centre. Median transit lanes would be accommodated by widening the Davis Drive right-of-way. All geometric improvements in Alternative 2 would still be applied, and as a result level of service for general traffic would be similar to Alternative 2. The only difference would be that U-turn movements would be required at major signalized intersections as the median rapidway would prevent left-turn access/egress between intersections. This has the effect of increasing intersection delays slightly. Conversely, transit vehicles would benefit increasingly over time from the improved level of service afforded by the dedicated lanes. It is estimated that with dedicated lanes between Yonge Street and Lindsay Avenue, transit vehicles could save up to 2.8 minutes compared to the mixed traffic option in 2021 and implicitly more as congestion increases further into the future.

Alternative 4: Rapid Transit Operation in Dedicated Median Rapidway from Yonge Street to Southlake Regional Health Centre: This alternative further improves mobility for transit riders in that it would allow rapid transit vehicles to also by-pass congestion between Main Street and Prospect Street around the Newmarket GO Station. In this alternative at 2021 traffic levels, it is projected that the median rapidway will save transit riders up to 4 minutes compared to the mixed traffic option, Alternative 2. Also, the extent of dedicated lanes will achieve segregation for rapid transit for the full length of the proposed Davis Drive urban centre proposed in Newmarket's recently updated Official Plan. Similar to Alternative 3, this alternative maintains the same level of capacity for regular vehicles. However, due to the increased attractiveness of transit, the growth in auto demand will potentially reduce when compared to Alternatives 1 and 2.

Response Summary:

From the perspective of improving mobility for both modes, Alternative 4 offers an optimum solution as it maximizes operational benefits and the attractiveness of rapid transit while incorporating projected traffic growth with enhancements of the existing four lane roadway.

As shown on Exhibit 4.12, the total person-carrying capacity of Davis Drive is significantly higher under the alternative with dedicated rapid transit lanes.

Exhibit 4.12: Summary of Total Transit + Auto Capacity for Davis Drive Alternatives

	Existing Roadway	*Improved Roadway*	*Improved Roadway with Dedicated Transit*
Nominal Capacity per lane	600	800	800
Total Capacity @ 2 lanes	1200	1600	1600
Projected Auto Volumes in 2021	1600	1600	1200
Road Capacity Shortfall (Surplus)	400	0	(200)
Projected Peak Transit Volume in 2021	300	300	900
Supported Transit Headway (min)	15	15	4
Transit Capacity	280	280	1050
Total Person Capacity (@1.1 persons/auto)	1600	2040	2810

4.3 Detailed Alignment Options for Davis Drive

As input to the development of the final preferred alignment for Davis Drive, several options were evaluated as discussed below.

4.3.1 UPPER CANADA MALL OPTIONS

Several options were considered which would potentially route some or all of the rapid transit services through Upper Canada Mall. These options are detailed in the main EA Report. As input to the selection of the final option, existing traffic and transit volumes were assembled, as well as projected future transit volumes.

Existing Transit Volumes

2006 ridership statistics showed 71 people boarding the VIVA Blue Service at the Newmarket Terminal in the AM Peak Hour. 10 people boarded at the Eagle Street station. (2008 ridership figures are being assembled).

Existing Traffic Volumes

Existing traffic counts provide an indication of total vehicle trips generated by the mall:

	Inbound - AM	Outbound - AM	Inbound - PM	Outbound - PM
Yonge Street Entrance	91	46	348	665
Eagle Street Entrance	81	28	420	406
Combined	172	74	768	1071
Potential Boardings/Alightings assuming 10% of auto trips are	17	7	77	107

shifted to rapid transit				

Assuming that the addition of dedicated rapid transit could attract 10% of existing auto users to transit, the potential boardings on transit would be in the order of 100 persons in the PM Peak Hour, assuming existing mall activities remain the same.

YRTP Model (Future Volumes)

The YRTP Model estimates transit ridership in for the AM Peak time period. The 2031 Model projects 290 boardings and 125 alightings at the Davis Drive Station in the AM Peak hour. These figures would include ridership from Upper Canada Mall as well as the surrounding area. It can be assumed that 125 alightings in the AM peak would be due to employees working at this zone.

It should be noted that these figures also exclude local transit ridership.

Conclusion

Based on the above, it is estimated that the total potential usage of the Mall station would be in the order of 100 alightings in the morning peak hour and 100 boardings in the PM hour. This compares to a total of 900 alightings for the entire North Yonge Corridor in the AM Peak Hour, based on model projections.

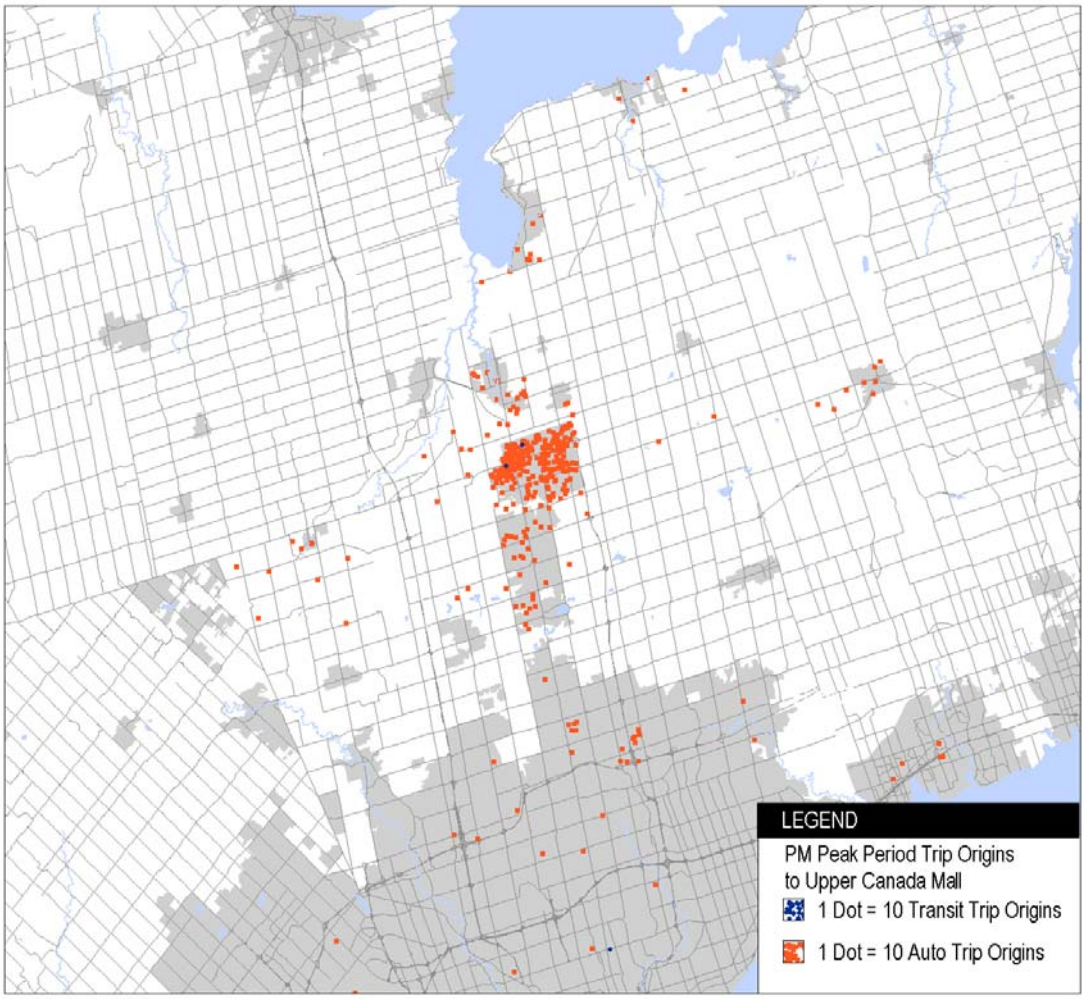
In comparison to these estimates, the total AM peak hour boardings for the entire North Yonge Corridor is approximately 5,000 persons. ***Assuming this translates into an equal or greater number of PM peak hour alightings, the potential Upper Canada generated ridership would be about 2% of the total corridor demands.***

4.3.1.1 Orientation of Ridership

Detailed information on the O-D pairs for a potential mall service is not readily available and would need to involve surveys of existing mall patrons and employees. However, the Transportation Tomorrow Survey does include information on the travel patterns of persons originating and destined to the traffic zone comprising Upper Canada Mall. Exhibit 4.13 provides a plot of the origins of travellers going to the Upper Canada Mall traffic zone in the PM peak period. This would include both employees and mall customers, though it is noted that TTS tends to under-estimate non-discretionary trips. As shown, most trips are generated from within Newmarket, and from east of Yonge Street.

It can be expected that mall customers who use transit would be most concerned with minimizing transfers and having services close to their point of origin, and less concerned about travel times. ***Accordingly, given the distribution of potential passengers destined to Upper Canada Mall, local services may well be as attractive as Rapid Transit.***

Exhibit 4.13: Orientation of Trips to Upper Canada Mall Area



4.3.1.2 Effect of Additional Trip Times on Ridership

The YRTP model is based on estimated average rapid transit speeds by link. Average speeds depend on number of stations, station dwell times, and congestion levels (where the service runs in mixed traffic). It is estimated that the travel time between Newmarket Terminal and 19th Avenue in 2031 will be approximately 35 minutes. Estimated travel time for the Davis Drive Segment is 7 minutes assuming dedicated lanes to Prospect Street, for a total corridor time of 42 minutes.

It is estimated that the option whereby the Davis Drive rapid transit service is routed through Upper Canada Mall would add between 2.5 and 3.0 minutes to the run time. This translates into a 6% increase in journey times for someone travelling from Leslie Street to 19th Avenue. The relative percentage impacts would increase for shorter trips.

It is noted that previous analysis indicated that the addition of dedicated rapid transit lane on Davis Drive would provide a travel time savings of approximately 3.5 minutes over the mixed traffic option. ***Therefore, the travel time added by diverting into Upper Canada mall would effectively cancel any savings provided by the construction of dedicated rapid transit lanes on Davis Drive.***

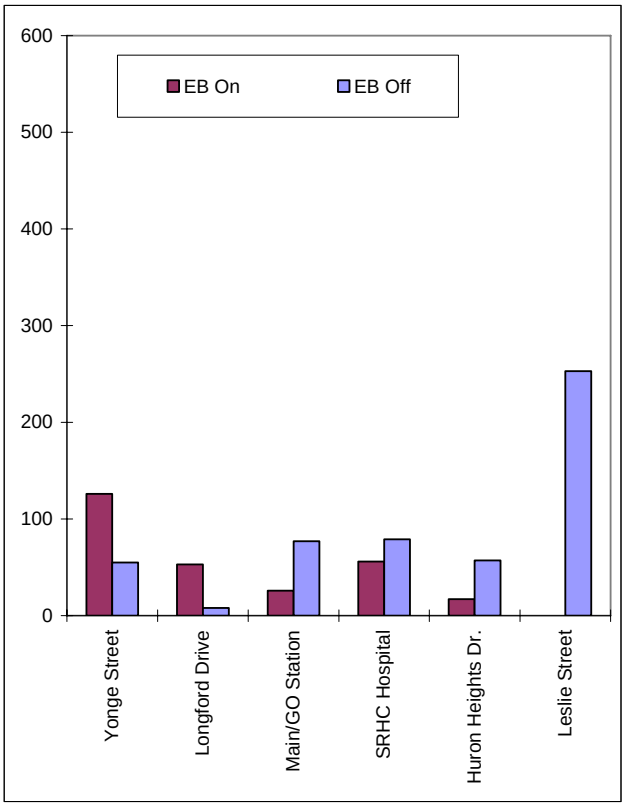
4.3.2 SITING OF STATIONS ON DAVIS DRIVE

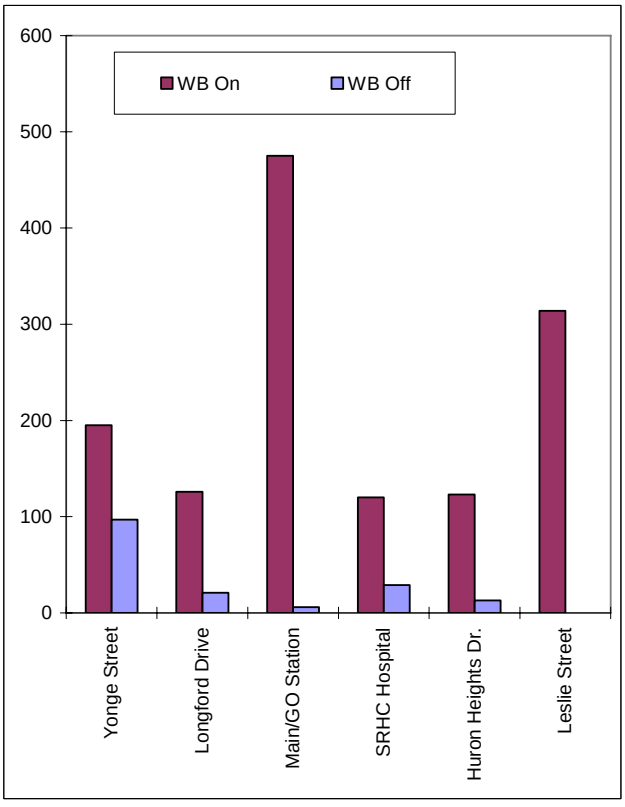
For the purpose of assign general rapid transit alternatives, ridership forecasting for the Davis Drive Rapid Transit Service has assumed the following stations:

- Yonge Street
- Longford Drive
- Main Street/GO Station
- Southlake Regional Health Centre
- West of Huron Heights
- Leslie Street

Projected AM Peak Period Boardings and Alightings are shown below for the base option.

Exhibit 4.14: Projected Volume for Davis Drive Stations

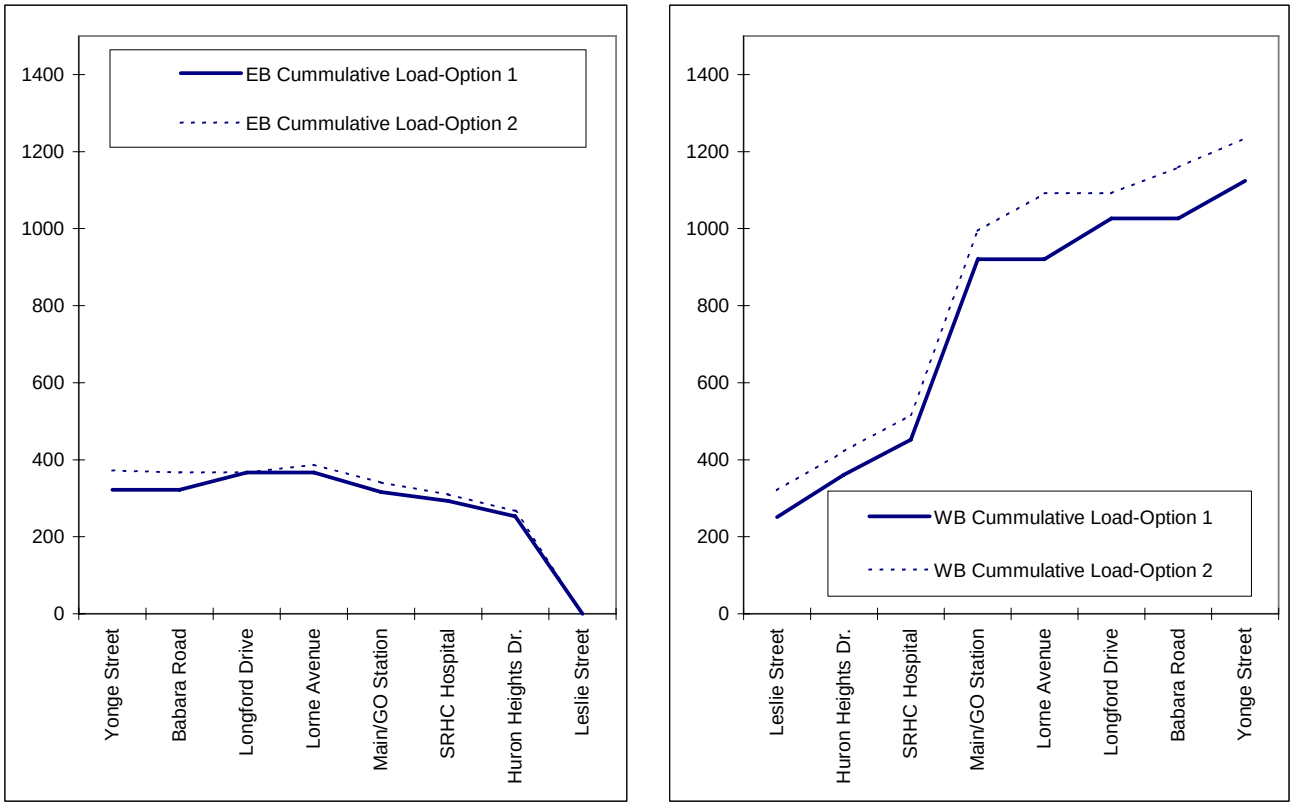




Recognizing that there are limitations to the ability of the EMME/2 model to project ridership at a fine detail, a model run was carried out to compare the impacts on ridership of replacing the Longford station with two stations: one at Barbara Road and the other at Lorne Avenue. The results are shown on Exhibit 4.14, in which Option 1 reflects the route including Longford Station and Option 2 reflects the route including Barbara Road Station and Lorne Avenue Station.

Based on the analysis, it would appear that either configuration for stations on Davis Drive would be acceptable. The fact that local YRT services are retained on Davis Drive tend to mitigate some of the impacts of providing fewer or more stations.

Exhibit 4.14: Ridership Impacts for Alternative Davis Drive Station locations



4.3.3 IMPACT OF EXTENDING SERVICE TO HIGHWAY 404

A final option for Davis Drive consisted of whether or not to extend the rapid transit service to Highway 404, as opposed to terminating it at Leslie Street. The ridership impacts of extending the Davis Drive Rapid Transit Service to Highway 404 depend on several factors:

- Number of park and ride stations (existing lot is currently at capacity)
- Potential for a Highway 404 GO bus service (currently none are included in the model)
- Development levels east of Highway 404

Based on the EMME/2 model projections, ridership levels for a proposed station at Highway 404 would be in the order of 25 passengers in the peak hour. Therefore, from a cost-benefit perspective, it is unlikely that dedicated rapid transit lanes would be justified in this location. From a transit service design perspective, it is reasonable to assume that the Davis Drive service would be extended as and when justified based on the above factors.

4.4 Requirement for Exclusive Turn Lanes

A key consideration in the roadway/rapidway design is to ensure that proper storage lengths are provided. In the assessment of left turn and right turn lane storage requirements, the following have been considered:

- Existing turn requirements;
- Future growth associated with demand to/from side street roadways and east-west arterials; and
- Redistributed traffic volumes resulting from rapid transit operations.

The assessment was performed using procedures outlined in the Transportation Association of Canada's Geometric Design Guide for Canadian Roads. The results are presented in Appendix D.

It is noted that for the section of Yonge Street between Davis Drive and Green Lane, it is not proposed that right turn lanes be provided as the widening to six lanes will result in a third lane which can be used for right turns. A further widening would increase the width of the intersections beyond to the point where the pedestrian environment would suffer.

4.5 Transition Areas

Through an assessment of alternative design methods, a number of sections within the Yonge Street and Davis Drive transit systems would have the transit vehicles operating within the general traffic lanes to avoid major cost or property impacts associated with the provision of dedicated rapidway lanes.

A preliminary review of the general transition options indicated that the transition of transit vehicles to/from exclusive Rapid Transit median lanes to mixed traffic, in most case, must occur at signalized intersections to provide the transit vehicle a dedicated phase to make a safe transition. This determination was based on the following:

- In some cases, the transit vehicle would be required to merge to the right into general traffic lanes to leave the dedicated median rapidway to enter the adjacent travel lane. This manoeuvre is undertaken by transit and tour buses on freeway facilities or major arterial roadways; however, they typically have greater merge distances and are travelling from one general traffic lane to another; and
- In general, one cannot rely on the motoring public to yield to a transit vehicle in the merge areas even though a new provincial law effective January 2004 stipulates that drivers must yield the right-of-way to buses leaving bus bays to merge with traffic.

The transition areas will include a combination of physical and operational functional components.

Diverge from rapidway to mixed traffic - Approaching the transition intersection in the dedicated transit right-of-way, a short taper area will be provided for the rapidway on the far side of the intersection. Transit vehicles will use the taper area to merge into the median lane where it will remain until it re-enters the rapidway. The diverge manoeuvre from the dedicated rapidway lanes to mixed traffic will function by stopping the adjacent general traffic lanes travelling in the same direction.

Merge from mixed traffic to dedicated rapidway – Approaching the transition intersection; a taper to the rapidway will be provided on the near side of the intersection. As the transit vehicle approaches, the operator will merge to the left and, cross the rumble strip and enter the rapidway.

5. ASSESSMENT OF PREFERRED RAPID TRANSIT ALTERNATIVE AND MITIGATION MEASURES

5.1 Description of Preferred Rapid Transit Alternative

Based on the above assessment of the transportation impacts of design alternatives, in conjunction with input from other environmental disciplines, the preferred rapid transit alternative was selected. The general road and rapidway arrangements are summarized below on Exhibit 5.1.

The transit system will operate for the most part in its own right-of-way down the centre of Yonge Street and the western portion of Davis Drive. In the longer term, it is also proposed that there would be dedicated BRT lanes on Green Lane between Yonge Street and the GO Station. It is noted that it is likely that rapid transit on Yonge Street will be developed in a phased approach between Davis Drive and Green Lane, initially consisting of HOV lanes and ultimately allowing for median BRT lanes. The traffic impacts herein have been assessed for the HOV condition.

In general, the opposing transit lanes or division of the right-of-way will be delineated or protected by some form of a physical concrete barrier or landscaped area such that motorists will not traverse the transit right-of-way, with the exception of signalized intersections. The transit right-of-way lanes will consist of a different colour of pavement and will be separated from the general traffic lanes by a rumble strip.

Exhibit 5.1: Preferred Rapid Transit Alternative

Locations on Yonge Street	Northbound	Southbound
Green LN & Davis Dr.	2 Lanes + HOV Lane (Stage 1) 2 Lanes + BRT Lane (Stage 2)	2 Lanes + HOV Lane (Stage1) 2 Lanes + BRT Lane (Stage 2)
Davis Dr. & Millard Ave.	2 Lanes + BRT Lane	2 Lanes + BRT Lane
Millard Ave. & Mulock Dr.	2 Lanes + BRT Lane	2 Lanes + BRT Lane
Mulock Dr. & Orchard Height Blvd.	2 Lanes + BRT Lane	2 Lanes + BRT Lane
Orchard Height Blvd. & Golf Links Dr.	Mix Traffic (2 Lanes)	Mix Traffic (2 Lanes)
Golf Links Dr. & Gamble Rd.	2 Lanes + BRT Lane	2 Lanes + BRT Lane
Locations on Davis Drive	**Eastbound**	**Westbound**
Yonge St. & Roxborough Rd.	2 Lanes + BRT Lane	2 Lanes + BRT Lane
Roxborough Rd. & Harry Walker Parkway	Mixed Traffic (2 Lanes)	Mixed Traffic (2 Lanes)
Locations on Green Lane	**Eastbound**	**Westbound**
Yonge St. & GO Station.	2 Lanes + BRT Lane	2 Lanes + BRT Lane

5.2 Future Traffic Operations

Exhibits 5.2-5.4 summarize the projected link volumes for the future (2021) base case and future full rapid transit case on Yonge Street for the AM, PM and Saturday Peak hours while the AM Peak Hour projections for Davis Drive are shown on Exhibit 5.5.

Exhibit 5.2: Comparison of 2021 Auto Volume Forecasts for Yonge Street – AM Peak Hour

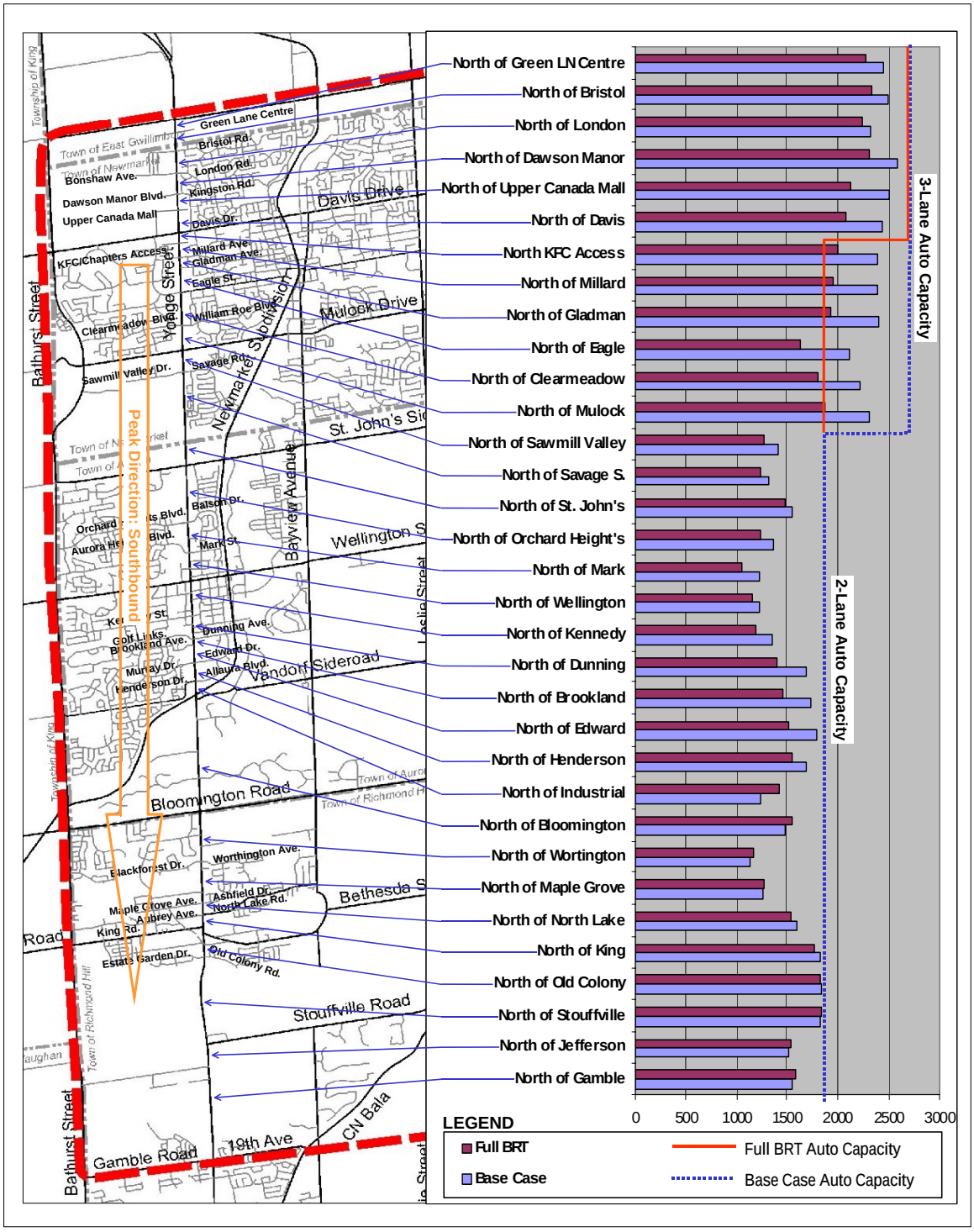


Exhibit 5.3: Comparison of 2021 Auto Volume Forecasts for Yonge Street – PM Peak Hour

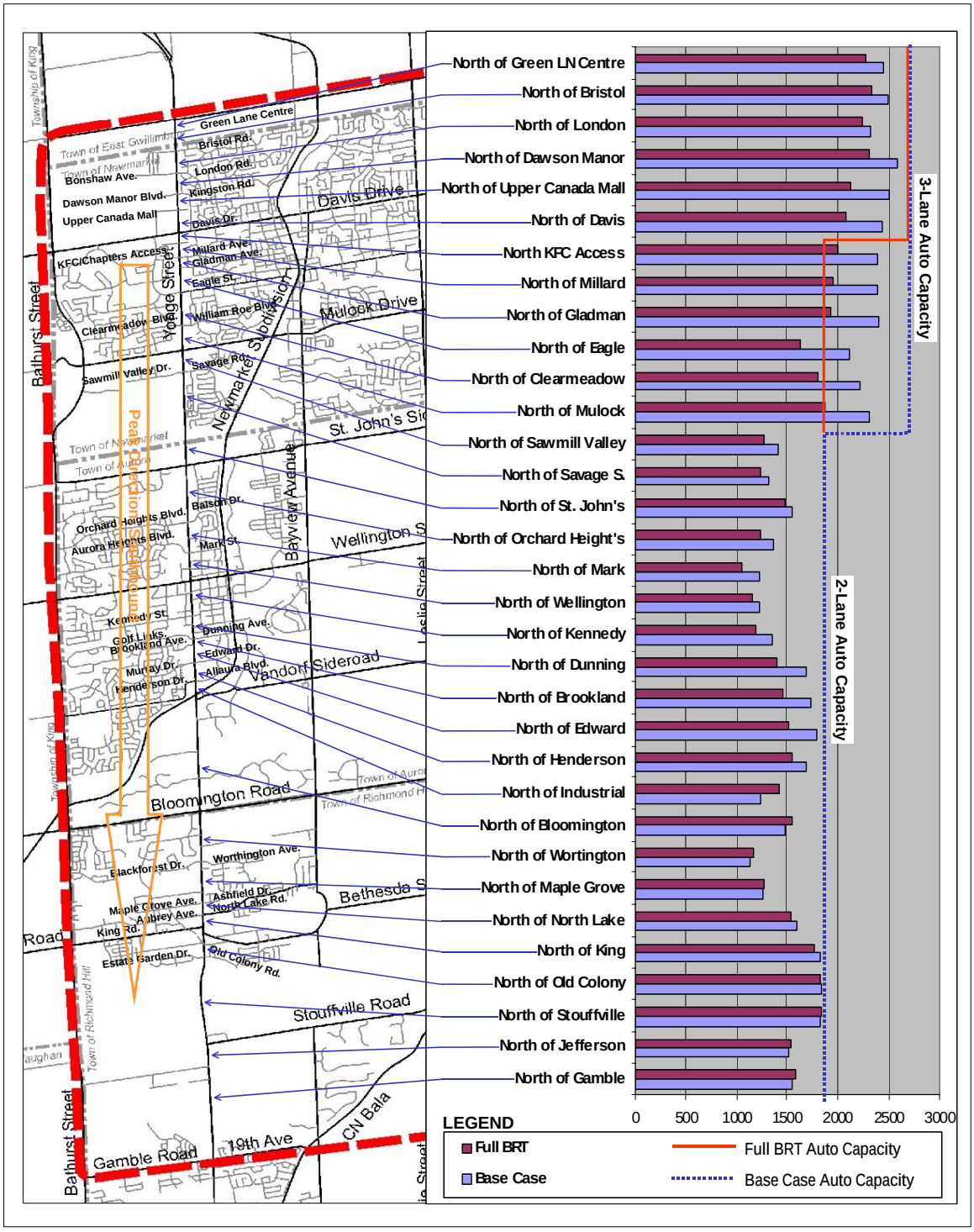


Exhibit 5.4: Comparison of 2021 Auto Volume Forecasts for Yonge Street – Saturday Peak Hour

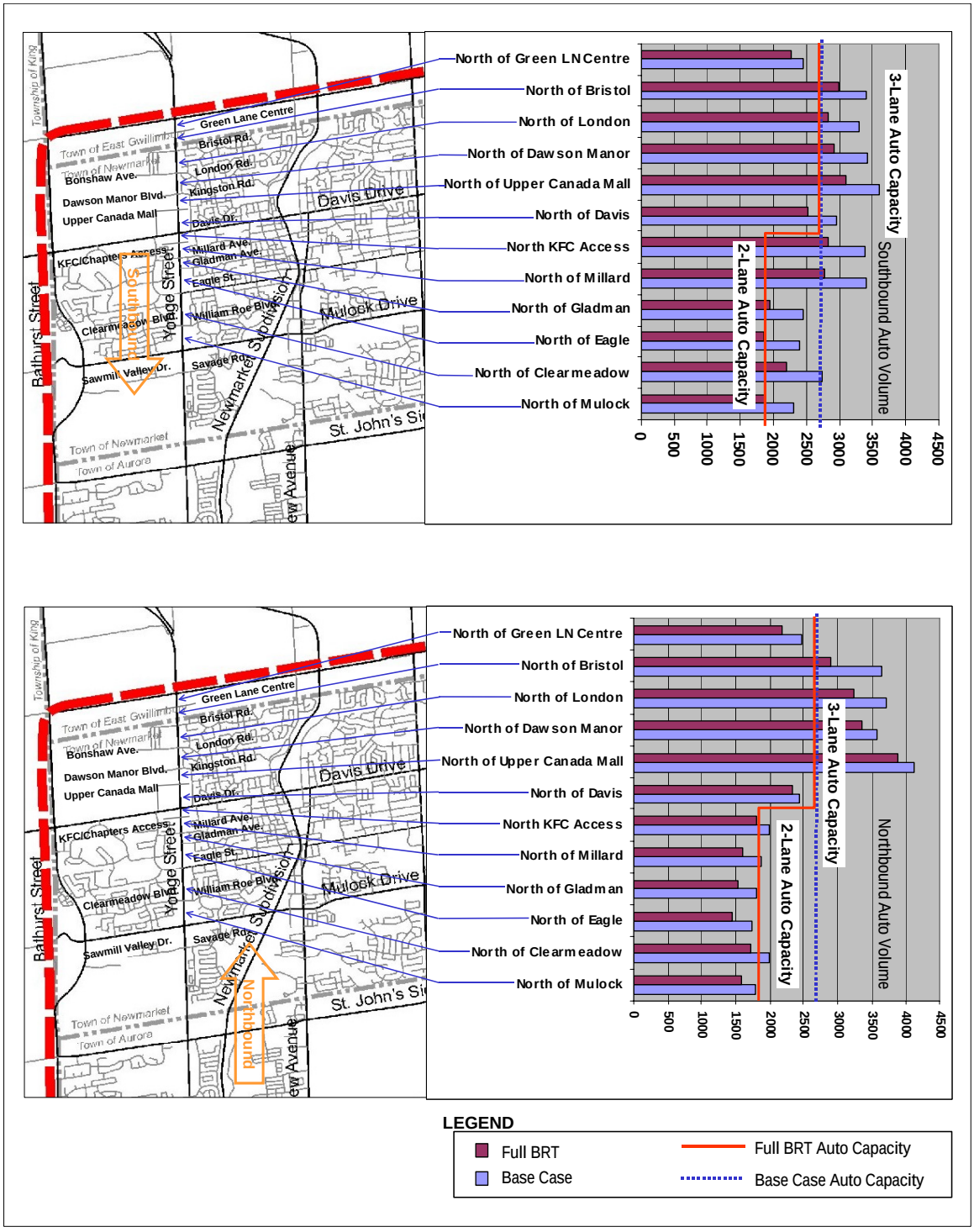
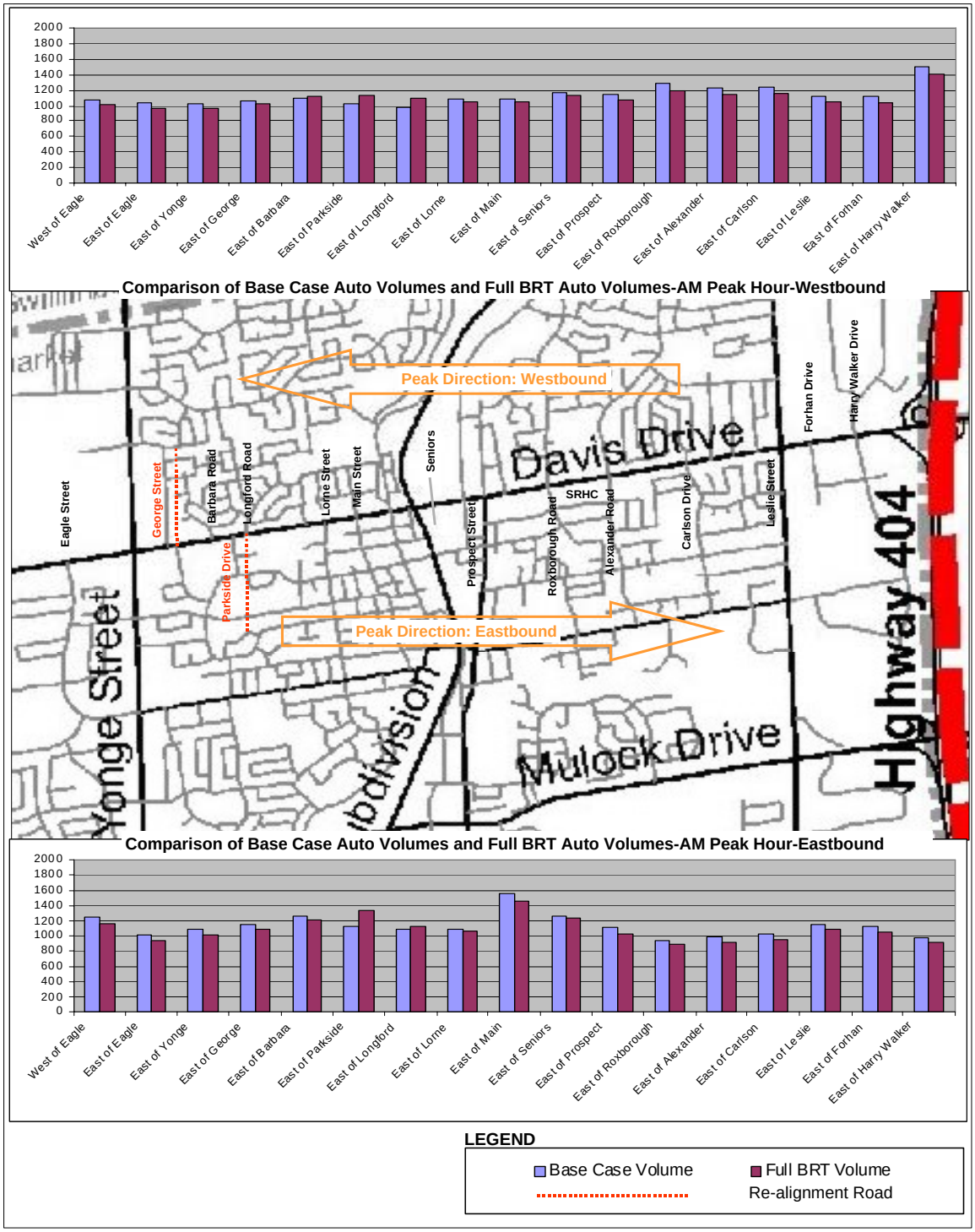


Exhibit 5.5: Comparison of 2021 Auto Volume Forecasts for Davis Drive– AM Peak Hour



Based on the 2021 auto vehicle link volume forecasts for preferred alternative, 2021 turning movement volumes on the Yonge Street and Davis Drive were calculated to assess the intersection operation conditions for the future year. In the preferred alternative case, to incorporate the Rapid Transit system into the full BRT case road network, traffic volumes and median transit lanesthe following inputs/assumptions were made in the intersection operation analyses:

- Redistribution of current traffic volumes associated with the access modifications at unsignalized intersections and accesses to other commercial/retail establishments;
- Implementation of fully protected left turn phase and u-turn operation at the signalized intersections;
- Addition of two dedicated median rapidway lanes along the preferred route in sections noted in Exhibit 5.1 above;
- Incorporation of transition areas required to facilitate the transfer of transit vehicles between the dedicated right-of-way and mixed-traffic conditions, along with revisions to right turn and left turn storage lengths; and
- Adequate pedestrian crossing times at all signalized intersections.

Similar to the existing and base case scenarios, intersection capacity analysis was undertaken using the Highway Capacity Manual (HCM) methodology and in particular, the Synchro 6.0 software package. The AM and PM peak hour analysis results for the signalized intersections for the entire corridor are provided in Appendix E. Results for the Saturday peak hour are also provided for the segment of Yonge Street between Mulock Drive and Green Lane.

5.3 Assessment of Effects of Preferred Design and Proposed Mitigation Measures

Exhibit 5.6 provides a summary of the effects of the preferred design on the ability to provide an effective transportation service, which is the primary focus of this report. Generally, the undertaking has the ability to improve mobility within the region and provide good connectivity with inter-regional transit services, all while maintaining an acceptable level of service for general traffic. From this point of view, the proposed rapid transit system will have an overall positive effect on transit ridership in the region.

The planned alignment characteristics and geometry will provide a fast, convenient and reliable service in most respects. Stations are located in areas with existing or planned moderate residential density, high employment density (e.g York Region Headquarters, Southlake Regional Hospital) or a mixture of the two to capitalize on the effectiveness of implementing the improved public transit system. The strategic locations of stations generally achieve the goal of increasing the attractiveness of the rapid transit service and make a positive contribution towards maximizing ridership. In order for all members of society to have access to the system, all stations, shelters and the transit system itself will be accessible for the mobility impaired by providing ramps, elevators, etc. Attractiveness of the rapid transit service is implicit in the design of the undertaking, however, achieving the desired transit speed may affect the capacity for general traffic movements at certain intersections. In this respect, the effect on traffic may be moderately significant.

Exhibit 5.6: Assessment of Transportation Service Effects and Mitigation Measures for the Preferred Design

GOAL	Environmental Value/ Criterion	Project Activity/ Issue	Project Phase[1] P	C	O	Location	Assessment of Effect on the Environment	Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation	Level of Significance after Mitigation	Monitoring and Recommendation
OBJECTIVE D: To provide an effective transportation service												
D1	Maximize Inter-regional and local transit connectivity	Connections to inter-regional services and future gateways	✓		✓	Newmarket GO Bus Terminal	Direct rapid transit connection is not provided to Newmarket GO Bus terminal on Davis Drive west of Yonge Street.	Local transit services will continue to be provided along Davis Drive. Inter-regional connections may also be made at East Gwillimbury GO Station	Level of transit service at Newmarket bus terminal may be reduced	None	Positive effect	Monitor ridership and the performance of the connection to Newmarket bus terminal.
			✓		✓	East Gwillimbury GO Station	Improved transit connections to East Gwillimbury GO Station	North Yonge transit service will provide a direct connection to the GO Rail network at the Green Lane Station.	Increased potential for intensified development around this transfer point.	None	Positive effect	Monitor ridership and the performance of the connection to the East Gwillimbury GO Station.
			✓		✓	Newmarket GO Rail Station	Improved transit connections to Newmarket GO Station	North Yonge transit service will provide a direct connection to the GO Rail network at the Davis Drive Station.	Increased potential for traffic congestion around this station due to bus and pedestrian activity	Improve signage and intersection geometry	Positive effect	Monitor traffic performance and pedestrian-vehicle safety
			✓		✓	Aurora GO Station	Direct rapid transit connection is not provided to Aurora GO Station	Local transit services will continue to be provided along Wellington Street	Increased potential for commuters to use Aurora GO Station Parking lot to access rapid transit	Improve pedestrian conditions between Yonge Street and Industrial Drive Parkway	Positive effect	Monitor ridership and the performance of the connection to the Aurora GO Station; monitor parking demand at GO Station
		Compatibility with proposed local network	✓		✓	Entire Corridor	Inconvenient transfer between local transit and North Yonge Transit may discourage transit ridership	Stations generally located on local transit routes ensuring convenient transfers between services. Integrated fare system proposed.	Project may change the configuration of local transit.	Local services configured as grid where practical, to provide both community coverage and feeder roles	Positive effect	Regular review of effectiveness of local service plans.
D2	Maximizes speed and ride comfort and minimizes safety risks and maintenance costs with an optimized alignment geometry	Grades at station in excess of standards	✓		✓	Refer to EA report	Refer to EA Report	Refer to EA Report	None expected.	None	Insignificant	Review situation if LRT is considered
D3	Increase attractiveness of rapid transit service	Travel time and service reliability	✓		✓	Entire Corridor	Adjustments to signal timing to achieve progression and minimize delay to rapid transit.	Micro-simulation of rapid transit operation and general traffic movements during detailed design will be used to optimize signal timing. Transit speed will be increased to maximum achievable with reasonable intersection operation.	Delay to transit or intersecting traffic may be unacceptable. May affect intersection capacity for general traffic movements.	Modification of inter-section signal timing.	Moderately significant	Pursue an on-going intersection performance monitoring program
						Yonge Street (Davis Drive to Green Lane)	Dedicated median transit lanes are not proposed for this segment	Curb-lane High-Occupancy Vehicle (HOV) lanes will improve transit speeds; increased road capacity will minimize congestion.	Some delays may occur due to right turning traffic in HOV lanes	Ensure HOV lanes are enforced	Positive effect	Monitor use of HOV lanes and impacts on transit speeds
D4	Locate stations to maximize ridership potential and convenience of access for all users	Residents or employees within walking distance of stations. Accessibility for mobility impaired	✓		✓	Entire Corridor	Stations at locations without transit-oriented land use and convenient access could discourage rapid transit use.	Station locations selected to serve supportive land use. Facilities designed with weather protection, direct barrier free access and attractive streetscapes within surrounding residential neighbourhoods.	Continued dependence on automobile if land use objectives not achieved	Implement transit-supportive land use and parking policies through Official Plans	Positive effect	Regular review of land use and new or infill development potential during detailed design phases for rapidway and stations.
D5	Maintain or improve road traffic and pedestrian circulation	Reduction in main street intersection capacities due to rapid transit operations			✓	Davis Drive	Implementation dedicated transit lanes reduces the intersection capacity after future growth.	A dedicated left turn lanes are provided at key intersections where a capacity deficiency has been identified.	Capacity conditions resulting from high projected traffic volumes are projected at several intersections.	None.	Moderately significant	Monitor intersection operations.
					✓	Yonge Street (Mulock Drive to Davis Drive)	Yonge Street to be widened for transit only resulting in a potential deficiency in road capacity for general traffic	Left turn lanes are maintained at major intersections	Mainline traffic will experience delays during PM peak period	None.	Moderately Significant	Monitor intersection operations.

Table 5.6 (Cont'd)
Assessment of Transportation Service Effects and Mitigation Measures for the Preferred Design

GOAL	Environmental Value/ Criterion	Project Activity/ Issue	Project Phase[1] P	C	O	Location	Assessment of Effect on the Environment	Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation	Level of Significance after Mitigation	Monitoring and Recommendation
OBJECTIVE D: To provide an effective transportation service												
D5 Cont'd	Maintain or improve road traffic and pedestrian circulation	Right turn lanes			✓	Mulock Drive to Green Lane	Existing right turn lanes at minor intersections will not be replaced after road widening in order to minimize roadway width and to avoid the need for regular YRT buses to transition from right turn lanes into general traffic lanes.	Six lane configuration north of Davis Drive reduced need for right turn lanes	Minor delays for right turning vehicles at some locations.	None required.	Moderately significant	Review need for right turn lanes during detailed design phase.
		NB/SB U-turn movements and the corresponding side street right-turn-on-red (RTOR) movements	✓	✓	✓	Entire Corridor	Median rapidway will eliminate random left turns into one development on east side alternative access route	U-turns provided at adjacent intersections for safe manoeuvres into side streets and to properties. Random permissive left turns eliminated thus increasing safety. Develop traffic management plans for construction.	Conflict with U-turns and Right Turns on Red from side streets	None required.	Insignificant	Monitor the intersection operations and conflict potential. If necessary, prohibit NB u-turns and SB and WB right turn on reds at subject intersections.
		Pedestrian Crossings			✓	Yonge Street/Davis Drive intersection; various locations	The required pedestrian crossing times at this location cannot be accommodated in a single crossing. A two-stage crossing is required.	A centre median refuge will allow for a two-stage pedestrian crossing decreasing the green time loss for transit and regular vehicles.	Reduction in pedestrian level of service	None necessary	Moderately significant	Monitor pedestrian crossing times and adjust signal timing if required

Notes:

1. P – Pre construction, C – Construction, O – Operation
2. Criteria – "convenient service connections to maintenance facility and storage yard" was considered initially but removed due to the fact that there will be no maintenance/storage yard in study area.

APPENDIX A

INVENTORY OF TRAFFIC COUNTS

Intersections on Yonge Street (From north to south)	Date of Count	
	Weekday Count	Saturday Count
Green Lane	March 2, 2005	January 28, 2006
Green Lane Centre	February 28. 2006	January 28, 2006
Aspenwood Drive/ Bristol Road	January 18, 2005	January 8, 2005
Bonshaw Avenue/ London Road	January 18, 2005	January 8, 2005
Dawson Manor Boulevard/ Kingston Road	January 18, 2005	January 8, 2005
Upper Canada Mall Driveway	January 18, 2005	January 8, 2005
Davis Drive	March 3, 2005	January 28, 2006
Chapters Access/ KFC Access	January 18, 2005	January 8, 2005
Millard Avenue	January 18, 2005	January 8, 2005
Administration Centre Access/ Gladman Avenue	January 18, 2005	January 8, 2005
Eagle Street	March 1, 2005	January 28, 2006
Clearmeadow Boulevard/ William Roe Boulevard	January 18, 2005	January 8, 2005
Mulock Drive	January 18, 2005	January 28, 2006
Sawmill Valley Drive/ Savage Road	January 18, 2005	January 8, 2005
Joe Persechini Drive/ Savage Road	January 18, 2005	-
St. John's Sideroad	January 23, 2005	-
Batson Drive/ Orchard Heights Boulevard	January 18, 2004	-
Aurora Heights Drive/ Mark Street	January 18, 2004	-
Wellington Street	September 23, 2004	-
Kennedy Street	January 18, 2004	-
Golf Links Drive/ Dunning Avenue	January 18, 2004	-
Brookland Avenue	January 18, 2004	-
Edward Street/ Murry Drive	January 18, 2004	-
Henderson Drive/ Allaura Boulevard	January 18, 2004	-
Industrial Parkway South	August 22, 2001	-
Bloomington Road	January 28. 2003	-
Blackforest Drive/ Worthington Avenue	January 16, 2003	-
Maple Grove Avenue/ Ashfield Drive	September 23, 2003	-
Aubrey Avenue/ North Lake Road	September 9, 2003	-
King Road	September 9, 2003	-

Estate Garden Drive/ Old Colony Road	September 9, 2003	-
Stouffville Road	January 23, 2003	-
Jefferson Sideroad	November 2, 2005	-
Gamble Road/ 19th Avenue	July 3, 2001	-

Intersections on Davis Drive	**Date of Count**	
(From west to east)	**Weekday Count**	**Saturday Count**
Eagle Street	June 21, 2005	
Yonge Street	March 3, 2005	
George Sreet	2005 *	
Barbara Road	2005 *	
Parkside Drive	2005 *	
Longford Road	2005 *	
Lorne Street	2005 *	
Main Street	October 12, 2006	
Superior Street	2005 *	
Prospect Street	2005 *	
Roxborough Road	2005 *	
Alexander Road	2005 *	
Carlson Drive	2005 *	
Leslie Street	2005 *	
Forhan Drive	2005 *	
Harry Walker Drive	2005 *	

* From NCE Davis Drive EA Study Traffic Operations Review.

APPENDIX B

EXISTING SIGNALIZED INTERSECTION OPERATIONS

Existing AM Peak Intersection Operations

Signalized Intersection Operations Existing AM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Green Lane	32	C	90	F	0.99	WB left is approaching capacity.
Green Lane Centre	3	A	-	-	-	No capacity constraints
Aspenwood Drive/Bristol Road	16	B	-	-	-	No capacity constraints
Bonshaw Avenue/London Road	15	B	-	-	-	No capacity constraints
Dawson Manor Blvd/Kingston Road	8	A	-	-	-	No capacity constraints
Upper Canada Mall	3	A	-	-	-	No capacity constraints
Davis Drive	41	D	116	F	1.08	WB left is operating at capacity. EB left is approaching capacity.
KFC/Chapters Access	10	A	-	-	-	No capacity constraints
Millard Avenue	18	B	-	-	-	No capacity constraints
Gladman Avenue/York Admin Access	3	A	-	-	-	No capacity constraints
Eagle Street	27	C	-	-	-	No capacity constraints
William Roe Blvd/Clearmeadow Blvd	10	A	-	-	-	No capacity constraints
Mulock Drive	36	D	97	F	1.00	WB left is operating at capacity and SB left is approaching capacity.
Sawmill Valley Dr./Savage Rd.	19	B	-	-	-	No capacity constraints
Joe Persechini Dr./Savage Rd.	11	B	-	-	-	No capacity constraints
St. John's Sideroad	20	C	-	-	-	No capacity constraints
Orchard Heights Blvd/Batson Dr.	12	B	-	-	-	No capacity constraints
Aurora Heights Dr./Mark St.	16	B	-	-	-	No capacity constraints
Wellington Street	27	C	38	D	0.88	SB left-through-right is approaching capacity.
Kennedy Street	8	A	-	-	-	No capacity constraints
Golf Links Dr./Dunning Ave.	12	B	-	-	-	No capacity constraints
Brookland Ave.	4	A	-	-	-	No capacity constraints
Murray Dr./Edward St.	12	B	-	-	-	No capacity constraints
Allaura Blvd./Henderson Dr.	12	B	-	-	-	No capacity constraints
Industrial Parkway South	8	A	-	-	-	No capacity constraints
Bloomington Rd.	34	C	62	E	0.91	WB through nd EB left are approaching capacity.
Worthington Ave./Blackforest Dr.	6	A	-	-	-	No capacity constraints
Maple Grove Ave./Ashfield Dr.	9	A	-	-	-	No capacity constraints
Aubrey Ave./North Lake Rd.	8	A	-	-	-	No capacity constraints
King Rd.	21	C	-	-	-	No capacity constraints
Old Colony Rd./Estate Garden Dr.	6	A	-	-	-	No capacity constraints
Stouffville Road	19	B	-	-	-	No capacity constraints
Jefferson Sideroad	3	A	-	-	-	No capacity constraints
Gamble Rd.	8	A	-	-	-	No capacity constraints
Intersection Davis Drive @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Bathurst Street	39	D	118	F	>1.10	NB left operates at capacity.
Prospect Street	27	C	49	-	-	No capacity constraints
Leslie Street	31	C	53	-	-	No capacity constraints

Signalized Intersection Operations Existing AM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Note: Total delay in Synchro takes into account signal control and queue delay. Please use caution in interpreting delay greater than 100 seconds.						

Existing PM Peak Intersection Operations

Signalized Intersection Operations Existing PM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Green Lane	104	F	365	F	> 1.10	WB left and WB right are operating at capacity. NB through and EB left are approaching capacity.
Green Lane Centre	11	B	-	-	-	No capacity constraints
Aspenwood Drive/Bristol Road	70	E	123	F	> 1.10	NB through and EB left are operating at capacity
Bonshaw Avenue/London Road	16	B	-	-	-	No capacity constraints
Dawson Manor Blvd/Kingston Road	21	C	-	-	-	No capacity constraints
Upper Canada Mall	89	F	580	F	> 1.10	EB dual left is operating at capacity.
Davis Drive	101	F	371	F	> 1.10	NB through, SB left, EB left, and WB left are operating at capacity. NB left, EB through, and WB through are approaching capacity.
KFC/Chapters Access	7	A	-	-	-	No capacity constraints
Millard Avenue	27	C	189	F	> 1.10	SB left is operating at capacity.
Gladman Avenue/York Admin Access	9	A	-	-	-	No capacity constraints
Eagle Street	46	D	133	F	> 1.10	NB left is operating at capacity. NB through and WB left are approaching capacity.
William Roe Blvd/Clearmeadow Blvd	11	B	-	-	-	No capacity constraints
Mulock Drive	142	F	649	F	> 1.10	NB through, SB left, EB left, and WB right are operating at capacity. WB through is approaching capacity.
Sawmill Valley Dr./Savage Rd.	23	C	-	-	-	No capacity constraints
Joe Persechini Dr./Savage Rd.	4	A	-	-	-	No capacity constraints
St. John's Sideroad	23	C	-	-	-	No capacity constraints
Orchard Heights Blvd/Batson Dr.	10	B	-	-	-	No capacity constraints
Aurora Heights Dr./Mark St.	14	B	-	-	-	No capacity constraints
Wellington Street	30	C	45	D	0.89	EB left-through-right and NB left-through-right are approaching capacity.
Kennedy Street	10	A	-	-	-	No capacity constraints
Golf Links Dr./Dunning Ave.	10	B	-	-	-	No capacity constraints
Brookland Ave.	8	A	-	-	-	No capacity constraints
Murray Dr./Edward St.	21	C	-	-	-	No capacity constraints
Allaura Blvd./Henderson Dr.	19	B	-	-	-	No capacity constraints

Signalized Intersection Operations Existing PM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Industrial Parkway South	12	B	-	-	-	No capacity constraints
Bloomington Rd.	26	C	-	-	-	No capacity constraints
Worthington Ave./Blackforest Dr.	4	A	-	-	-	No capacity constraints
Maple Grove Ave./Ashfield Dr.	6	A	-	-	-	No capacity constraints
Aubrey Ave./North Lake Rd.	6	A	-	-	-	No capacity constraints
King Rd.	65	E	205	F	0.91	NB left is approaching capacity.
Old Colony Rd./Estate Garden Dr.	4	A	-	-	-	No capacity constraints
Stouffville Rd.	18	B	-	-	-	No capacity constraints
Jefferson Sideroad	7	A	-	-	-	No capacity constraints
Gamble Rd.	9	A	-	-	-	No capacity constraints
Intersection Reference Davis Drive @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Bathurst Street	123	F	568	F	>1.10	NB left, EB left, WB through are operating at capacity. EB through and WB left are approaching capacity.
Prospect Street	47	D	79	E	1.05	WB left-through-right is operating at capacity.
Leslie Street	41	D	76	E	0.92	SB left, EB left, and WB left are approaching capacity.
Note: Total delay in Synchro takes into account signal control and queue delay. Please use caution in interpreting delay greater than 100 seconds.						

Existing Saturday Peak Intersection Operations

Signalized Intersection Operations Existing Saturday Peak Hour						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Green Lane	61	E	160	F	> 1.10	NB through, SB through, and WB left are operating at capacity. SB dual left and EB left are approaching capacity.
Green Lane Centre	35	C	96	F	> 1.10	NB left and EB right are operating at capacity
Aspenwood Drive/Bristol Road	204	F	953	F	> 1.10	NB left, NB through, SB through, EB left, and WB left are operating at capacity. SB left is approaching capacity.
Bonshaw Avenue/London Road	81	F	148	F	> 1.10	NB left and SB through are operating at capacity. EB left is approaching capacity.
Dawson Manor Blvd/Kingston Road	74	E	120	F	> 1.10	NB through, SB left, SB through, WB left are operating at capacity. NB left is approaching capacity.
Upper Canada Mall	134	F	676	F	> 1.10	EB dual left is operating at capacity.
Davis Drive	96	F	272	F	> 1.10	NB left, SB left, SB through, EB left, and WB left are operating at capacity. NB through and WB through are approaching capacity.
KFC/Chapters Access	21	C	-	-	-	No capacity constraints
Millard Avenue	58	E	95	F	0.95	SB through is approaching capacity.
Gladman Avenue/York Admin Access	6	A	-	-	-	No capacity constraints
Eagle Street	35	C	57	E	0.94	SB through is approaching capacity
William Roe Blvd/Clearmeadow Blvd	10	A	-	-	-	No capacity constraints
Mulock Drive	30	C	64	E	0.86	SB left is approaching capacity.
Note: Total delay in Synchro takes into account signal control and queue delay. Please use caution in interpreting delay greater than 100 seconds.						

APPENDIX C

FUTURE BASE CASE SIGNALIZED INTERSECTION OPERATIONS

2021 Base Case BRT AM Peak Intersection Operations

Signalized Intersection Operations 2021 Base Case AM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Green Lane	67	E	117 136 136	F F F	0.91 1.18 1.19	EBL is approaching capacity WBL is over capacity SBL is over capacity
Green Lane Centre	5	A	-	-	-	No capacity constraints
Aspenwood Drive/Bristol Road	26	C	70	E	0.94	WBL is approaching capacity
Bonshaw Avenue/London Road	23	C	57	E	0.83	NBL is approaching capacity
Dawson Manor Blvd/Kingston Road	16	B	-	-	-	No capacity constraints
Upper Canada Mall	6	A	-	-	-	No capacity constraints
Davis Drive	67	E	81 131 206 83 84	F F F F F	0.86 1.12 1.20 0.85 1.07	EBL is approaching capacity WBL is at capacity NBL is over capacity SBL is approaching capacity SBT is at capacity
KFC/Chapters Access	12	B	-	-	-	No capacity constraints
Millard Avenue	27	C	-	-	-	No capacity constraints
Gladman Avenue/York Admin Access	5	A	-	-	-	No capacity constraints
Eagle Street	37	D	59	E	1.02	SBT is at capacity
William Roe Blvd/Clearmeadow Blvd	11	B	-	-	-	No capacity constraints
Mulock Drive	78	E	62 96 360	E F F	0.86 0.86 1.73	WBL is approaching capacity NBL is approaching capacity SBL is over capacity
Sawmill Valley Dr./Savage Rd.	19	B	-	-	-	No capacity constraints
Joe Persechini Dr./Savage Rd.	14	B	-	-	-	No capacity constraints
St. John's Sideroad	62	E	471	F	1.96	WBL is over capacity
Orchard Heights Blvd/Batson Dr.	11	B	-	-	-	No capacity constraints
Aurora Heights Dr./Mark St.	16	B	-	-	-	No capacity constraints
Wellington Street	78	E	85 79 92 71 110	F E F E F	0.93 1.06 0.78 1.00 1.16	EBL is approaching capacity EBT is at capacity WBL is under capacity WBT is at capacity SBT is over capacity
Kennedy Street	14	B	-	-	-	No capacity constraints
Golf Links Dr./Dunning Ave.	13	B	-	-	-	No capacity constraints
Brookland Ave.	5	A	-	-	-	No capacity constraints
Murray Dr./Edward St.	16	B	-	-	-	No capacity constraints
Allaura Blvd./Henderson Dr.	26	C	162	F	1.2	EBL is at capacity
Industrial Parkway South	18	B	-	-	-	No capacity constraints
Bloomington Rd.	48	D	95 74 115 56	F E F E	1.03 1.02 1.04 0.89	EBL is at capacity WBT is at capacity NBL is at capacity SBT is approaching capacity
Worthington Ave./Blackforest Dr.	6	A	-	-	-	No capacity constraints
Maple Grove Ave./Ashfield Dr.	9	A	-	-	-	No capacity constraints
Aubrey Ave./North Lake Rd.	9	A	-	-	-	No capacity constraints
King Rd.	37	D	55 55	E E	0.96 0.99	NBL is at capacity SBT is at capacity
Old Colony Rd./Estate Garden Dr.	9	A	-	-	-	No capacity constraints
Stouffville Road	19	B	-	-	-	No capacity constraints
Jefferson Sideroad	4	A	-	-	-	No capacity constraints

Signalized Intersection Operations 2021 Base Case AM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Gamble Rd.	12	B	-	-	-	No capacity constraints
Intersection Reference Davis Drive @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Eagle Street	21	C	-	-	-	No capacity constraints
Yonge Street	42	D	91 130 61 60	F F E E	0.92 1.1 0.59 0.68	EBL is approaching capacity WBL is at capacity NBL is under capacity SBL is under capacity
George Street	26	C	-	-	-	No capacity constraints
Barbara Road	17	B	-	-	-	No capacity constraints
Parkside Drive	29	C	-	-	-	No capacity constraints
Longford Road	14	B	-	-	-	No capacity constraints
Lorne Street	14	B	-	-	-	No capacity constraints
Main Street	63	E	58 74 169	E E F	0.94 0.69 1.19	WBT is approaching capacity NBL is under capacity SBL is over capacity
Seniors	56	E	98 61	F E	1.09 0.16	EBT is at capacity SBL is under capacity
Prospect Street	27	C	68	E	0.87	NBL is approaching capacity
Roxborough Road	20	C	-	-	-	No capacity constraints
Alexander Road	32	C	-	-	-	No capacity constraints
Carlson Drive	22	C	-	-	-	No capacity constraints
Leslie Street	28	C	60	E	0.88	SBL is approaching capacity
Forhan Drive	11	B	-	-	-	No capacity constraints
Harry Walker Drive	27	C	126 61 56	F E E	1.16 0.54 0.66	EBL is over capacity NBL is under capacity SBL is under capacity
Note: Total delay in Synchro takes into account signal control and queue delay. Please use caution in interpreting delay greater than 100 seconds.						

2021 Base Case PM Peak Intersection Operations

Signalized Intersection Operations 2021 Base Case PM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Green Lane	201	F	479 90 79 373 229 478	F F E F F F	1.99 1.04 0.99 1.76 1.42 1.95	EBL is over capacity EBT is at capacity WBL is at capacity WBR is over capacity NBT is over capacity SBL is over capacity
Green Lane Centre	25	C	69 64	E E	0.75 0.93	EBL is under capacity NBL is approaching capacity
Aspenwood Drive/Bristol Road	89	F	172 64 136 179	F E F F	1.25 0.84 1.23 1.26	EBL is over capacity WBL is under capacity NBT is over capacity SBL is over capacity
Bonshaw Avenue/London Road	49	D	252 228 320	F F F	1.43 1.42 1.46	EBL is over capacity NBL is over capacity SBL is over capacity

Signalized Intersection Operations 2021 Base Case PM Peak						
Intersection Reference Yonge Street @	Overall		Critical			Comments
	Delay	LOS	Delay	LOS	V/C	
Dawson Manor Blvd/Kingston Road	58	E	109 63 76 56	F E E E	1.03 1.02 1.11 0.88	EBL is at capacity NBL is at capacity NBT is at capacity SBL is approaching capacity
Upper Canada Mall	60	F	183 64 67 66	F E E E	1.29 0.34 0.52 0.52	EBL is over capacity
Davis Drive	143	F	284 159 257 85 145 139 315	F F F F F F F	1.5 1.23 1.41 0.99 1.04 1.20 1.57	EBL is over capacity EBT is over capacity WBL is over capacity WBT is at capacity NBL is at capacity NBT is over capacity SBL is over capacity
KFC/Chapters Access	15	B	-	-	-	No capacity constraints
Millard Avenue	41	D	103 57 77 111 469	F E E F F	1 0.86 0.69 1.05 1.86	EBL is at capacity EBT is approaching capacity WBL is under capacity NBL is at capacity SBL is over capacity
Gladman Avenue/York Admin Access	13	B	-	-	-	No capacity constraints
Eagle Street	109	F	64 98 66 75 131 131 213	E F E E F F F	0.67 0.99 0.98 0.87 1.15 1.12 1.38	EBL is under capacity EBT is at capacity EBR is at capacity WBL is approaching capacity NBL is over capacity SBL is over capacity SBT is over capacity
William Roe Blvd/Clearmeadow Blvd	11	B	-	-	-	No capacity constraints
Mulock Drive	190	F	215 59 70 60 202 738	F E E E F F	1.34 0.75 0.93 1.01 1.36 2.58	EBL is over capacity WBL is under capacity WBT is approaching capacity WBR is at capacity NBT is over capacity SBL is over capacity
Sawmill Valley Dr./Savage Rd.	25	C	-	-	-	No capacity constraints
Joe Persechini Dr./Savage Rd.	5	A	-	-	-	No capacity constraints
St. John's Sideroad	23	C	-	-	-	No capacity constraints
Orchard Heights Blvd/Batson Dr.	10	B	-	-	-	No capacity constraints
Aurora Heights Dr./Mark St.	16	B	-	-	-	No capacity constraints
Wellington Street	84	F	337 113 209 95	F F F F	1.63 1.15 1.20 1.09	EBL is over capacity EBT is over capacity WBL is over capacity WBT is at capacity
Kennedy Street	11	B	-	-	-	No capacity constraints
Golf Links Dr./Dunning Ave.	10	B	59	E	0.59	No capacity constraints
Brookland Ave.	8	A	56	E	0.47	No capacity constraints
Murray Dr./Edward St.	29	C	59	E	0.74	No capacity constraints
Allaura Blvd./Henderson Dr.	43	D	264	F	1.48	EBL is over capacity

Signalized Intersection Operations 2021 Base Case PM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Industrial Parkway South	114	F	130 219 174	F F F	1.06 1.39 1.30	No capacity constraints
Bloomington Rd.	44	D	61 70 69	E E E	1.02 1.00 1.88	WBR is at capacity NBT is at capacity SBL is over capacity
Worthington Ave./Blackforest Dr.	4	A	-	-	-	No capacity constraints
Maple Grove Ave./Ashfield Dr.	8	A	-	-	-	No capacity constraints
Aubrey Ave./North Lake Rd.	8	A	-	-	-	No capacity constraints
King Rd.	33	C	65 58	E E	1 1	EBL is at capacity NBL is at capacity
Old Colony Rd./Estate Garden Dr.	5	A	-	-	-	No capacity constraints
Stouffville Rd.	18	B	-	-	-	No capacity constraints
Jefferson Sideroad	8	A	-	-	-	No capacity constraints
Gamble Rd.	15	B	-	-	-	No capacity constraints
Intersection Reference Davis Drive @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Eagle Street	124	F	292 183 55 77	F F E E	1.57 1.28 0.66 0.84	EBT is over capacity NBL is over capacity NBT is under capacity SBT is under capacity
Yonge Street	128	F	238 128 272 107 96 150 41	F F F F F F F	1.38 1.15 1.47 1.08 0.83 1.23 1.46	EBL is under capacity EBT is under capacity WBL is under capacity WBT is at capacity NBL is approaching capacity NBT is under capacity SBL is under capacity
George Street	38	D	84	F	0.99	SBT is at capacity
Barbara Road	47	D	109 65	F E	0.93 0.82	EBL is approaching capacity EBT is approaching capacity
Parkside Drive	75	E	112 75 55	F E E	0.91 0.82 0.63	EBT is approaching capacity WBL is under capacity NBL is under capacity
Longford Road	16	B	-	-	-	No capacity constraints
Lorne Street	28	C	-	-	-	No capacity constraints
Main Street	234	F	227 230 67 367 358	F F E F F	1.17 1.39 1.65 1.40 1.35	EBT is over capacity WBT is over capacity NBL is over capacity NBT is over capacity SBL is over capacity
Seniors	68	E	132	F	1.1	EBT is at capacity
Prospect Street	106	F	174 205 160 68	F F F E	1.37 1.31 1.07 0.70	WBT is over capacity NBL is over capacity SBL is at capacity SBT is under capacity
Roxborough Road	25	C	-	-	-	No capacity constraints
Alexander Road	32	C	-	-	-	No capacity constraints
Carlson Drive	22	C	152	F	1.11	WBL is at capacity

Signalized Intersection Operations 2021 Base Case PM Peak						
Intersection Reference Yonge Street @	Overall		Critical			Comments
	Delay	LOS	Delay	LOS	V/C	
Leslie Street	61	E	100 75 78 111 80 94	F E E F E F	1.07 0.97 1.04 1.08 1.04 1.00	EBL is at capacity WBL is at capacity WBT is at capacity NBL is at capacity NBT is at capacity SBL is at capacity
Forhan Drive	19	B	-	-	-	No capacity constraints
Harry Walker Drive	40	D	279 179	F F	1.46 1.26	EBL is over capacity SBL is over capacity
Note: Total delay in Synchro takes into account signal control and queue delay. Please use caution in interpreting delay greater than 100 seconds.						

2021 Base Case Saturday Peak Intersection Operations

Signalized Intersection Operations 2021 Base Case Saturday Peak Hour						
Intersection Reference Yonge Street @	Overall		Critical			Comments
	Delay	LOS	Delay	LOS	V/C	
Green Lane	168	F	257 251 367 185 86 114 329 126	F F F F F F F F	1.49 1.47 1.73 1.29 1.08 1.19 1.64 1.18	EBL is over capacity EBT is over capacity WBL is over capacity NBL is over capacity NBT is at capacity NBR is over capacity SBL is over capacity SBT is over capacity
Green Lane Centre	93	F	282 207 77 131	F F E F	1.49 1.39 0.91 1.23	EBL is over capacity EBR is over capacity WBL is at capacity SBT is over capacity
Aspenwood Drive/Bristol Road	386	F	878 100 493 333 499 331	F F F F F F	> 2.00 > 2.00 > 2.00 1.68 > 2.00 1.68	EBL is over capacity WBL is over capacity NBL is over capacity NBT is over capacity SBL is over capacity SBT is over capacity
Bonshaw Avenue/London Road	128	F	500 358 78 166	F F E F	2.00 1.73 1.07 1.33	EBL is over capacity NBL is over capacity SBL is at capacity SBT is over capacity
Dawson Manor Blvd/Kingston Road	156	F	67 393 285 184 312 133	E F F F F F	0.82 1.77 1.57 1.35 1.62 1.24	EBL is approaching capacity WBL is over capacity NBL is over capacity NBT is over capacity SBL is over capacity SBT is over capacity
Upper Canada Mall	123	F	308 148 81	F F F	1.61 1.24 1.13	EBL is over capacity SBT is over capacity SBR is over capacity

Signalized Intersection Operations 2021 Base Case Saturday Peak Hour						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Davis Drive	245	F	272	F	1.48	EBL is over capacity
			82	F	0.99	EBT is at capacity
			516	F	1.98	WBL is over capacity
			361	F	1.69	NBL is over capacity
			89	F	1.08	NBT is over capacity
			425	F	1.88	SBL is over capacity
			481	F	1.54	SBT is over capacity
KFC/Chapters Access	168	F	59	E	0.74	EBL is under capacity
			55	E	0.70	NBL is under capacity
			265	F	1.44	SBT is over capacity
Millard Avenue	23	C	65	E	0.77	EBL is under capacity
			55	E	0.45	WBL is under capacity
			58	E	0.66	NBL is under capacity
Gladman Avenue/York Admin Access	6	A	-	-	-	No capacity constraints
Eagle Street	78	E	64	E	0.81	NBL is under capacity
			58	E	0.87	SBL is approaching capacity
			151	F	1.26	SBT is over capacity
William Roe Blvd/Clearmeadow Blvd	12	B	-	-	-	No capacity constraints
Mulock Drive	46	D	146	F	1.22	SBL is over capacity
Note: Total delay in Synchro takes into account signal control and queue delay. Please use caution in interpreting delay greater than 100 seconds.						

APPENDIX D

STORAGE LENGTH ANALYSIS

Storage Length Analysis - Queue Length Summary

Future 2021

UNIT: Metre

INTERSECTION (ALONG YONGE ST.)	MVMT	LANES	EXIST. STOR-AGE	METHOD 1-SYNCHRO ANALYSIS BASED ON HCM										METHOD 2-SIMPLIFIED TAC EQUATION			SUGGESTED LENGTH [1]/ COMMENTS
				AM Peak Hour			PM Peak Hour			SAT Peak Hour							
				VOL	50TH QUEUE LENGTH	95TH QUEUE LENGTH	VOL	50TH QUEUE LENGTH	95TH QUEUE LENGTH	VOL	50TH QUEUE LENGTH	95TH QUEUE LENGTH	LONGEST LENGTH	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH	
Green Lane	EBL	1	60	114	35	74	580	284	360	676	301	339	360	203	63	266	Extend to > 200m
	EBR	1	60	60	0	13	186	10	29	228	21	48	48	68	63	131	No change
	WBL	1	60	483	220	292	465	250	321	548	197	266	321	164	63	227	Extend to > 200m
	WBR	1	60	310	20	30	1392	593	679	458	44	65	679	418	63	481	Extend to > 280m
	NBL	1	80	46	14	28	71	21	38	219	62	73	73	66	63	129	No change
	NBR	1	60	384	93	134	592	186	263	599	87	132	263	180	63	243	Extend to > 200m
	SBL	2	80	1352	265	309	434	70	105	820	139	179	309	203	63	266	Extend to > 250m or double-LTL
	SBR	1	60	471	73	119	196	14	38	280	38	68	119	141	63	204	Extend to > 100m
Green Lane Centre	EBL	1	20	16	5	12	170	32	50	262	101	160	160	79	63	142	Extend to > 100m
	EBR	1	20	71	18	29	541	70	108	1116	469	555	555	335	63	398	Extend to > 280m
	WBL	1	20	13	4	11	102	18	31	294	86	133	133	88	63	151	Improve inner roads
	WBR	0	0	3	NA	NA	71	NA	NA	106	NA	NA	NA	32	63	95	No change
	NBL	1	85	69	19	35	385	68	132	521	204	278	278	156	63	219	Extend to > 200m or double-LTL
	NBR	1	85	3	0	1	149	1	12	346	13	34	34	104	63	167	No change
	SBL	1	60	25	7	17	57	11	24	55	17	42	42	17	63	80	No change
	SBR	1	60	52	1	6	146	6	19	191	25	45	45	57	63	120	No change
Aspenwood Dr. - Bristol Rd.	EBL	1	50	123	34	59	382	157	224	651	298	373	373	195	63	258	Extend to > 200m or double-LTL
	EBR	0	0	42	NA	NA	94	NA	NA	204	NA	NA	NA	61	63	124	RTL should be provided
	WBL	1	50	320	116	179	235	72	127	447	207	273	273	134	63	197	Extend to > 150m
	WBR	0	0	168	NA	NA	75	NA	NA	203	NA	NA	NA	61	63	124	RTL should be provided
	NBL	1	60	66	21	54	158	54	102	465	221	156	156	140	63	203	Extend to >120m
	NBR	1	60	109	1	14	263	32	53	418	57	33	53	125	63	188	No change
	SBL	1	60	259	79	107	260	113	172	335	97	157	172	101	63	164	Extend to 150m
	SBR	1	60	134	9	19	171	13	28	405	30	56	56	122	63	185	No change
Bonshaw Ave.	EBL	1	50	139	40	65	353	141	207	486	196	264	264	146	63	209	Extend to > 200m
	EBR	1	50	290	35	71	253	0	22	428	84	151	151	128	63	191	Extend to > 120m
	WBL	1	50	205	62	104	101	24	42	107	22	40	104	62	63	125	Extend to > 100m
	WBR	0	0	50	NA	NA	96	NA	NA	85	NA	NA	NA	29	63	92	RTL should be considered
	NBL	1	60	221	81	137	415	180	249	590	283	179	249	177	63	240	Extend to > 200m
	NBR	1	60	30	0	4	192	18	32	37	4	2	32	58	63	121	No change
	SBL	1	60	35	12	10	74	25	28	62	16	10	28	22	63	85	No change
	SBR	1	60	72	1	0	127	11	13	371	9	1	13	111	63	174	No change
Dawson Manor Blvd.	EBL	1	50	43	12	23	304	107	168	199	47	91	168	91	63	154	Extend to > 120m
	EBR	1	50	83	0	15	206	0	21	363	62	110	110	109	63	172	Extend to > 100m
	WBL	1	50	132	40	61	113	29	51	373	140	201	201	112	63	175	Extend to > 150m
	WBR	1	50	101	0	17	196	7	30	291	42	75	75	87	63	150	Extend to > 80m
	NBL	1	60	74	22	60	223	63	105	373	171	85	105	112	63	175	Extend to > 100m
	NBR	1	60	19	0	5	61	5	11	400	81	NA	100	120	63	183	Extend to > 90m
	SBL	1	60	208	65	61	209	82	135	441	205	148	148	132	63	195	Extend to > 120m
	SBR	1	60	150	9	9	127	8	20	69	2	NA	20	45	63	108	No change
Upper Canada Mall	EBL	2	>100	52	8	16	890	206	249	1593	403	447	447	239	63	302	Extend to > 280m
	EBR	0	0	31	NA	NA	304	NA	NA	696	NA	NA	NA	209	63	272	Add right turn lane
	WBL	1	0	8	2	9	39	12	24	16	3	11	24	12	63	75	Improve inner roads
	WBR	0	0	14	NA	NA	91	NA	NA	61	NA	NA	NA	NA	63	NA	Improve inner roads
	NBL	1	90	20	6	15	135	40	62	272	118	174	174	82	63	145	Extend to 120m
	NBR	1	20	12	1	3	13	1	5	29	3	8	8	9	63	72	No change
	SBL	1	20	59	19	21	27	8	19	30	7	m4.8	21	18	63	81	No change
	SBR	1	140	133	1	1	452	2	25	1253	308	m6.6	>308	376	63	439	Extend to 280m
Hwy 9 - Davis Dr.	EBL	1	140	225	81	136	389	171	238	342	108	157	238	117	63	180	No change
	EBR	1	85	168	11	34	169	11	32	201	14	17	34	60	63	123	No change
	WBL	2	50	383	67	102	284	54	86	259	27	46	102	57	63	120	Extend to 100m
	WBR	1	50	141	4	25	370	53	111	328	31	63	111	111	63	174	Extend to 100m
	NBL	1	120	131	47	93	314	142	205	514	196	260	260	154	63	217	Extend to > 200m or to limit
	NBR	1	120	282	0	17	409	52	89	376	16	47	89	123	63	186	No change
	SBL	2	60	199	34	44	501	109	140	549	84	118	140	82	63	145	Extend to 120m
	SBR	1	>100	476	35	49	388	12	38	343	18	45	49	143	63	206	No change
Chapter Access - KFC Access	EBL	1	30	93	27	45	118	34	53	214	49	71	71	64	63	127	Improve inner roads
	EBR	0	0	73	NA	NA	168	NA	NA	185	NA	NA	NA	NA	63	NA	Improve inner roads
	WBL	1	30	0	0	0	6	2	6	10	2	6	6	3	63	66	Improve inner roads
	WBR	0	0	2	NA	NA	4	NA	NA	11	NA	NA	NA	NA	63	NA	Improve inner roads
	NBL	1	0	100	29	50	101	29	68	198	50	m42.3	68	59	63	122	Extend to 60m
	NBR	0	0	10	NA	NA	14	NA	NA	24	NA	NA	NA	7	63	70	RTL should be considered
	SBL	1	75	11	3	10	21	6	16	29	7	17	17	9	63	72	No change
	SBR	1	75	61	2	8	99	4	11	139	9	22	22	42	63	105	No change

Cont'd

Future 2021

UNIT: Metre

INTERSECTION (ALONG YONGE ST.)	MVMT	LANES	EXIST. STOR-AGE	METHOD 1-SYNCHRO ANALYSIS BASED ON HCM										METHOD 2-SIMPLIFIED TAC EQUATION			SUGGESTED LENGTH [(1)]/ COMMENTS
				AM Peak Hour			PM Peak Hour			SAT Peak Hour			LONGEST LENGTH	STORAGE LENGTH	TAPER LENGTH	TOTAL LENGTH	
				VOL	50TH QUEUE LENGTH	95TH QUEUE LENGTH	VOL	50TH QUEUE LENGTH	95TH QUEUE LENGTH	VOL	50TH QUEUE LENGTH	95TH QUEUE LENGTH					
Millard Ave.	EBL	1	30	78	20	38	212	78	132	165	37	72	132	64	63	127	Extend to 120m
	EBR	0	0	204	NA	NA	187	NA	NA	145	NA	NA	NA	61	63	124	RTL should be considered
	WBL	1	30	71	21	55	71	28	63	63	13	28	63	21	63	84	Extend to > 60m
	WBR	0	0	20	NA	NA	47	NA	NA	68	NA	NA	NA	20	63	83	RTL should be considered
	NBL	1	50	242	86	143	205	79	132	143	34	66	143	73	63	136	Extend to > 120m
	NBR	0	0	57	NA	NA	26	NA	NA	44	NA	NA	NA	17	63	80	RTL should be considered
	SBL	1	40	48	15	15	101	36	33	80	21	22	33	30	63	93	No change
	SBR	1	30	169	10	10	110	8	7	152	14	14	14	51	63	114	No change
Admin Cntre Access - Gladman Ave	EBL	1	30	19	5	13	179	51	80	10	2	8	80	54	63	117	Extend to 60m
	EBR	0	0	16	NA	NA	40	NA	NA	4	NA	NA	NA	12	63	75	No change
	WBL	1	30	5	1	6	6	2	6	13	3	10	10	4	63	67	No change
	WBR	0	0	10	NA	NA	6	NA	NA	13	NA	NA	NA	4	63	67	No change
	NBL	1	50	47	12	24	11	3	10	6	2	6	24	14	63	77	No change
	NBR	0	0	11	NA	NA	27	NA	NA	29	NA	NA	NA	9	63	72	RTL should be considered
	SBL	1	50	26	7	16	40	13	10	28	7	m5.2	16	12	63	75	No change
	SBR	1	30	356	16	36	40	0	0	30	0	0	36	107	63	170	No change
Eagle St.	EBL	1	30	53	14	27	165	47	78	26	6	14	78	50	63	113	Extend to > 60m
	EBR	1	30	235	20	48	474	105	177	242	5	29	177	142	63	205	Extend to > 150m
	WBL	1	30	174	45	87	166	53	104	195	46	76	104	59	63	122	Extend to > 100m
	WBR	1	30	84	2	15	110	4	19	171	0	17	19	51	63	114	No change
	NBL	1	>100	276	84	160	535	230	304	348	88	164	304	161	63	224	Extend to > 200m
	NBR	1	50	241	11	31	247	24	44	247	18	37	44	74	63	137	No change
	SBL	1	60	151	45	68	221	74	95	294	88	173	173	88	63	151	Extend to > 120m
	SBR	1	>100	165	12	26	161	22	26	56	5	15	26	50	63	113	No change
Cleameadow Blvd. - William Roe Blvd.	EBL	1	30	163	49	71	138	41	62	149	35	53	71	49	63	112	Extend to > 60m
	EBR	1	30	90	0	15	37	0	10	44	0	9	15	27	63	90	No change
	WBL	1	30	90	25	40	65	18	31	104	23	37	40	31	63	94	Extend to > 50m
	WBR	0	0	42	NA	NA	38	NA	NA	98	NA	NA	NA	29	63	92	RTL should be considered
	NBL	1	30	13	4	12	62	19	36	23	6	m5.7	36	19	63	82	No change
	NBR	1	>100	70	1	8	171	4	16	132	0	0	16	51	63	114	No change
	SBL	1	40	38	12	25	58	18	33	84	20	37	37	25	63	88	No change
	SBR	1	110	74	1	8	249	4	17	187	4	17	17	75	63	138	No change
Mulock Dr.	EBL	1	70	153	36	73	235	99	157	100	20	33	157	71	63	134	Extend to > 120m
	EBR	1	60	139	9	29	46	3	14	89	0	14	29	42	63	105	No change
	WBL	1	60	193	64	118	138	35	82	143	29	45	118	58	63	121	Extend to > 100m
	WBR	1	90	424	0	33	630	70	155	402	0	30	155	189	63	252	Extend to > 140m
	NBL	1	110	99	30	51	152	47	71	115	27	47	71	46	63	109	No change
	NBR	1	90	434	97	169	681	238	318	579	96	175	318	204	63	267	Extend to > 220m
	SBL	1	0	804	337	420	987	506	547	714	230	240	547	296	63	359	Extend to > 280m
	SBR	1	70	384	22	79	354	36	53	141	12	17	79	115	63	178	No change
Sawmill Valley Dr. - Savage Rd. N.	EBL	1	30	262	40	59	207	36	54				59	79	63	142	Extend to > 60m
	EBR	0	0	182	NA	NA	140	NA	NA				NA	55	63	118	RTL should be considered
	WBL	1	30	96	13	23	126	21	35				35	38	63	101	No change
	WBR	0	0	54	NA	NA	55	NA	NA				NA	17	63	80	RTL should be considered
	NBL	1	>100	95	15	38	12	2	8				38	29	63	92	No change
	NBR	1	55	43	0	7	130	6	18				18	39	63	102	No change
	SBL	1	150	173	27	69	279	48	112				112	84	63	147	No change
	SBR	1	>50	147	0	12	126	0	10				12	44	63	107	No change

[(1)] Includes taper

Suggested length reduced where obvious land constrints exist

Simplied TAC Equation:
Total Length = Storage Length + Taper Length
Where:
*Storage Length = [1.5 * (Hourly Volume * Vehicle Length)] / 30
Taper Length = 63 (Design Speed = 60, Land Width = 3.5m, Taper Ratio = 18:1)
Where:
Vehicle Length = 6 m

**According to Equation 2.3.3 on Page 2.3.5.4 of TAC Geometric Design Guide for Canadian Roads.*

APPENDIX E

FUTURE SIGNALIZED INTERSECTION OPERATIONS FOR PREFERRED DESIGN

Signalized Intersection Operations 2021 Full BRT AM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Green Lane	82	F	115 63 136 79 120 93	F E F E F F	0.90 0.64 1.18 1.10 1.15 1.10	EBL is approaching capacity EBT is under capacity WBL is over capacity NBT is at capacity SBL is over capacity SBT is at capacity
Green Lane Centre	5	A	-	-	-	No capacity constraints
Aspenwood Drive/Bristol Road	25	C	-	-	-	No capacity constraints
Bonshaw Avenue/London Road	23	C	-	-	-	No capacity constraints
Dawson Manor Blvd/Kingston Road	18	B	-	-	-	No capacity constraints
Upper Canada Mall	8	A	-	-	-	No capacity constraints
Davis Drive	81	F	154 105 266 65 149 74 77	F F F E F E E	1.11 1.05 1.05 0.75 0.99 0.59 0.94	EBL is at capacity EBT is at capacity WBL is at capacity WBT is under capacity NBL is at capacity SBL is under capacity SBT is at capacity
KFC/Chapters Access	35	D	72 94 70	E F E	0.57 0.56 0.14	EBL is under capacity NBL is under capacity SBL is under capacity
Millard Avenue	38	D	68 156 113 75	E F F E	0.85 0.95 0.96 0.44	EBT is under capacity WBL is approaching capacity NBL is approaching capacity SBL is under capacity
Gladman Avenue/York Admin Access	9	A	57 64 61	E E E	0.19 0.38 0.22	EBL is under capacity NBL is under capacity SBL is under capacity
Eagle Street	44	D	70 117 84 82	E F F F	0.73 0.99 0.86 0.70	EBT is under capacity WBL is at capacity NBL is under capacity SBL is under capacity
William Roe Blvd/Clearmeadow Blvd	20	B	76 57 73 78	E E E E	0.73 0.40 0.17 0.35	EBL is under capacity WBL is under capacity NBL is under capacity SBL is under capacity
Mulock Drive	72	E	102 65 251 58 81 88 151	F E F E F F F	0.96 1.4 0.66 1.06 1.46	EBL is approaching capacity WBL is over capacity NBL is approaching capacity NBT is at capacity SBL is over capacity
Sawmill Valley Dr./Savage Rd.	24	C	-	-	-	No capacity constraints
Joe Persechini Dr./Savage Rd.	25	C	73 60 59	E E E	0.94 0.29 0.27	WBT is approaching capacity NBL is under capacity SBL is under capacity
St. John's Sideroad	93	F	56 718 59 67	E F E E	0.77 >2.00 0.34 0.91	EBL is under capacity WBL is over capacity NBL is under capacity SBL is approaching capacity

Signalized Intersection Operations 2021 Full BRT AM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Orchard Heights Blvd/Batson Dr.	20	B	56	E	0.50	NBL is under capacity
Aurora Heights Dr./Mark St.	15	B	-	-	-	No capacity constraints
Wellington Street	30	C	59	E	0.59	NBL is under capacity
Kennedy Street	12	B	-	-	-	No capacity constraints
Golf Links Dr./Dunning Ave.	12	B	-	-	-	No capacity constraints
Brookland Ave.	6	A	-	-	-	No capacity constraints
Murray Dr./Edward St.	16	B	-	-	-	No capacity constraints
Allaura Blvd./Henderson Dr.	23	C	92	F	1.02	EBL is at capacity
Industrial Parkway South	33	C	94 61	F E	1.08 0.99	SBL is at capacity SWL is at capacity
Bloomington Rd.	83	F	167 153 198 120 81	F F F F F	1.23 1.24 1.23 0.94 1.00	EBL is over capacity WBT is over capacity NBL is over capacity SBL is approaching capacity SBT is at capacity
Worthington Ave./Blackforest Dr.	9	A	-	-	-	No capacity constraints
Maple Grove Ave./Ashfield Dr.	15	B	-	-	-	No capacity constraints
Aubrey Ave./North Lake Rd.	12	B	57	E	0.18	NBL is under capacity
King Rd.	66	E	322	F	1.63	NBL is over capacity
Old Colony Rd./Estate Garden Dr.	13	B	-	-	-	No capacity constraints
Stouffville Road	25	C	-	-	-	No capacity constraints
Jefferson Sideroad	7	A	61	E	0.38	NBL is under capacity
Gamble Rd.	21	C	56 62 75	E E E	0.69 0.47 0.72	EBT is under capacity NBL is under capacity SBL is under capacity
Intersection Davis Drive @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Eagle Street	22	C	-	-	-	No capacity constraints
Yonge Street	38	D	74 111 57 58	E F E E	0.83 1.03 0.53 0.64	EBL is approaching capacity WBL is at capacity NBL is under capacity SBL is under capacity
George Street	23	C	-	-	-	No capacity constraints
Barbara Road	15	B	-	-	-	No capacity constraints
Parkside Drive	19	B	-	-	-	No capacity constraints
Lorne Street	62	E	106 144	F F	>2.00 0.98	EBT is over capacity WBL is at capacity
Main Street	47	D	56 122 69	E F E	0.51 0.98 0.96	EBL is under capacity WBL is at capacity SBL is at capacity
Seniors	120	F	116 214	F F	0.76 0.78	EBL is under capacity EBT is under capacity
Prospect Street	34	C	88 80	F E	0.92 0.86	EBL is approaching capacity WBL under capacity
SRHC Entrance	40	D	-	-	-	No capacity constraints
Roxborough Road	35	C	61	E	0.81	EBL is under capacity
Alexander Road	14	B	-	-	-	No capacity constraints
Carlson Drive	20	B	-	-	-	No capacity constraints
Leslie Street	27	C	-	-	-	No capacity constraints
Forhan Drive	11	B	-	-	-	No capacity constraints
Harry Walker Drive	22	C	74	E	1.00	EBL is at capacity

Signalized Intersection Operations 2021 Full BRT AM Peak						
Intersection Reference Yonge Street @	Overall		Critical			Comments
	Delay	LOS	Delay	LOS	V/C	
Note: Total delay in Synchro takes into account signal control and queue delay. Please use caution in interpreting delay greater than 100 seconds.						

2021 Full BRT PM Peak Intersection Operations

Signalized Intersection Operations 2021 Full BRT PM Peak						
Intersection Reference Yonge Street @	Overall		Critical			Comments
	Delay	LOS	Delay	LOS	V/C	
Green Lane	248	F	371 71 93 460 322 440	F E F F F F	1.74 0.96 1.04 1.96 1.64 1.86	EBL is over capacity EBT is at capacity WBL is at capacity WBR is over capacity NBT is over capacity SBL is over capacity
Green Lane Centre	21	C	-	-	-	No capacity constraints
Aspenwood Drive/Bristol Road	150	F	166 71 152 186	F E F F	1.22 0.82 1.26 1.25	EBL is over capacity WBL is under capacity NBT is over capacity SBL is over capacity
Bonshaw Avenue/London Road	53	D	125 123 166	F F F	1.13 1.15 1.06	EBL is over capacity NBL is over capacity SBL is at capacity
Dawson Manor Blvd/Kingston Road	52	D	125 68 92	F E F	1.10 1.07 0.98	EBL is at capacity NBT is at capacity SBL is at capacity
Upper Canada Mall	50	D	112 69 69 61	F E E E	1.10 0.34 0.51 0.42	EBL is at capacity WBL is under capacity WBT is under capacity SBL is under capacity
Davis Drive	129	F	303 118 376 118 279 137 159	F F F F F F F	1.54 1.12 1.16 1.09 1.46 1.13 1.15	EBL is over capacity EBT is at capacity WBL is over capacity WBT is at capacity NBL is over capacity NBT is over capacity SBL is over capacity
KFC/Chapters Access	49	D	74 70 73 69	E E E E	0.63 0.57 0.22 0.90	EBL is under capacity NBL is under capacity SBL is under capacity SBT is approaching capacity
Millard Avenue	87	F	180 90 291 136 87 186 67	F F F F F F E	1.20 0.98 1.37 1.08 1.12 1.18 1.07	EBL is under capacity EBT is at capacity WBL is over capacity NBL is at capacity NBT is at capacity SBL is over capacity SBT is at capacity
Gladman Avenue/York Admin Access	22	C	80 80 77	E E E	0.79 0.14 0.41	EBL is under capacity NBL is under capacity SBL is under capacity

Signalized Intersection Operations 2021 Full BRT PM Peak						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Eagle Street	86	F	70	E	0.70	EBL is under capacity
			111	F	1.03	EBT is at capacity
			82	F	1.03	EBR is at capacity
			275	F	1.44	WBL is over capacity
			235	F	1.39	NBL is over capacity
			77	E	0.88	SBL is under capacity
			89	F	1.07	SBT is at capacity
William Roe Blvd/Clearmeadow Blvd	19	B	77	E	0.71	EBL is under capacity
			57	E	0.32	WBL is under capacity
			73	E	0.48	NBL is under capacity
			80	F	0.45	SBL is under capacity
Mulock Drive	191	F	408	F	1.78	EBL is over capacity
			73	E	0.90	EBT is approaching capacity
			131	F	1.04	WBL is at capacity
			96	F	1.02	WBT is at capacity
			87	F	0.76	NBL is under capacity
			299	F	1.58	NBT is over capacity
			388	F	1.77	SBL is over capacity
Sawmill Valley Dr./Savage Rd.	32	C	-	-	-	No capacity constraints
Joe Persechini Dr./Savage Rd.	10	A	-	-	-	No capacity constraints
St. John's Sideroad	25	C	-	-	-	No capacity constraints
Orchard Heights Blvd/Batson Dr.	11	B	-	-	-	No capacity constraints
Aurora Heights Dr./Mark St.	17	B	-	-	-	No capacity constraints
Wellington Street	47	D	60	E	0.91	EBL is approaching capacity
			111	F	0.92	WBL is approaching capacity
			82	F	1.06	WBT is at capacity
Kennedy Street	7	A	-	-	-	No capacity constraints
Golf Links Dr./Dunning Ave.	9	A	-	-	-	No capacity constraints
Brookland Ave.	7	A	-	-	-	No capacity constraints
Murray Dr./Edward St.	20	B	-	-	-	No capacity constraints
Allaura Blvd./Henderson Dr.	45	D	226	F	1.4	EBL is over capacity
			84	F	0.83	SBL is under capacity
Industrial Parkway South	98	F	120	F	1.18	NBT is over capacity
			164	F	1.24	SBL is over capacity
			135	F	1.19	SWL is over capacity
Bloomington Rd.	55	D	66	E	0.96	EBL is at capacity
			83	F	1.08	WBR is at capacity
			67	E	0.44	NBL is under capacity
			73	E	1.01	NBT is at capacity
			149	F	1.09	SBL is at capacity
Worthington Ave./Blackforest Dr.	10	B	-	-	-	No capacity constraints
Maple Grove Ave./Ashfield Dr.	18	B	-	-	-	No capacity constraints
Aubrey Ave./North Lake Rd.	17	B	-	-	-	No capacity constraints
King Rd.	52	D	268	F	1.49	NBL is over capacity
Old Colony Rd./Estate Garden Dr.	13	B	-	-	-	No capacity constraints
Stouffville Rd.	22	C	55	E	0.80	SBL is under capacity
Jefferson Sideroad	9	A	-	-	-	No capacity constraints
Gamble Rd.	23	C	-	-	-	No capacity constraints
Intersection Davis Drive @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	

Signalized Intersection Operations 2021 Full BRT PM Peak						
Intersection Reference Yonge Street @	Overall		Critical			Comments
	Delay	LOS	Delay	LOS	V/C	
Eagle Street	98	F	226	F	1.41	EBT is over capacity
			127	F	1.14	NBL is over capacity
			72	E	0.79	SBT is under capacity
Yonge Street	101	F	215	F	1.33	EBL is over capacity
			106	F	1.09	EBT is at capacity
			219	F	1.34	WBL is over capacity
			81	F	1.00	WBT is at capacity
			74	E	0.70	NBL is under capacity
			123	F	1.16	NBT is over capacity
			236	F	1.39	SBL is over capacity
George Street	31	C	94	F	0.89	EBL is under capacity
			55	E	0.87	SBT is under capacity
Barbara Road	20	B	58	-	-	No capacity constraints
Parkside Drive	39	D	77	E	0.81	EBL is under capacity
			94	F	0.94	WBL is approaching capacity
			80	E	0.95	NBL is approaching capacity
Longford Road	108	F	174	F	1.08	EBL is at capacity
			186	F	>2.00	WBT is over capacity
			60	E	0.63	SBL is under capacity
Penn Avenue	82	F	>2.00	F	>2.00	EBT is over capacity
			1.21	F	1.21	WBL is at capacity
			0.53	E	0.53	NBL is under capacity
Main Street	113	F	74	E	0.76	EBL is under capacity
			51	E	0.95	EBT is approaching capacity
			100	F	0.93	WBL is approaching capacity
			171	F	1.18	WBT is over capacity
			116	F	1.10	NBT is over capacity
			193	F	1.08	SBL is at capacity
Seniors	184	F	184	F	0.69	EBT is under capacity
			222	F	0.95	WBT is approaching capacity
Prospect Street	45	D	58	E	0.63	EBL is under capacity
			110	F	0.99	WBL is at capacity
			56	E	0.88	NBL is under capacity
SRHC Entrance	159	F	256	F	0.97	EBT is at capacity
Roxborough Road	69	E	85	F	0.93	EBL is under capacity
			133	F	0.75	EBT is under capacity
Alexander Road	22	C	-	-	-	No capacity constraints
Carlson Drive	21	C	120	F	1.00	WBL is at capacity
Leslie Street	53	D	72	E	0.97	EBL is at capacity
			58	E	0.88	WBL is under capacity
			74	E	1.01	WBT is at capacity
			65	E	0.90	NBL is approaching capacity
			68	E	0.99	NBT is at capacity
			61	E	0.85	SBL is under capacity
Forhan Drive	18	B	-	-	-	No capacity constraints
Harry Walker Drive	29	C	147	F	1.13	EBL is over capacity
			112	F	1.12	SBL is over capacity
Note: Total delay in Synchro takes into account signal control and queue delay. Please use caution in interpreting delay greater than 100 seconds.						

2021 Full BRT Saturday Peak Intersection Operations

Signalized Intersection Operations 2021 Full BRT Saturday Peak Hour						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
Green Lane	241	F	356	F	1.71	EBL is over capacity
			223	F	1.39	EBT is over capacity
			405	F	1.81	WBL is over capacity
			295	F	1.52	NBL is over capacity
			254	F	1.59	NBT is over capacity
			368	F	1.72	SBL is over capacity
			246	F	1.46	SBT is over capacity
Green Lane Centre	70	E	130	F	1.11	EBL is at capacity
			134	F	1.23	EBR is over capacity
			100	F	1.12	SBT is over capacity
Aspenwood Drive/Bristol Road	294	F	265	F	1.49	EBL is over capacity
			416	F	1.83	WBL is over capacity
			456	F	1.92	NBL is over capacity
			386	F	1.79	NBT is over capacity
			409	F	1.80	SBL is over capacity
			249	F	1.47	SBT is over capacity
Bonshaw Avenue/London Road	163	F	251	F	1.45	EBL is over capacity
			377	F	1.75	NBL is over capacity
			66	E	1.06	NBT is at capacity
			216	F	1.16	SBL is over capacity
			266	F	1.51	SBT is over capacity
Dawson Manor Blvd/Kingston Road	200	F	59	E	0.68	EBL is under capacity
			247	F	1.42	WBL is over capacity
			378	F	1.73	NBL is over capacity
			315	F	1.63	NBT is over capacity
			369	F	1.71	SBL is over capacity
			67	E	1.04	SBT is at capacity
Upper Canada Mall	243	F	476	F	1.98	EBL is over capacity
			57	E	0.17	WBL is under capacity
			59	E	0.29	WBT is under capacity
			66	E	0.86	NBL is under capacity
			348	F	1.87	SBT is over capacity
Davis Drive	268	F	305	F	1.54	EBL is over capacity
			97	F	1.04	EBT is at capacity
			68	E	0.52	EBR is under capacity
			649	F	1.44	WBL is over capacity
			134	F	1.15	WBT is over capacity
			404	F	1.79	NBL is over capacity
			70	E	1.98	NBT is over capacity
			90	F	1.04	SBL is at capacity
			620	F	1.42	SBT is over capacity
KFC/Chapters Access	244	F	58	E	0.74	EBL is under capacity
			80	E	0.76	NBL is under capacity
			59	E	0.24	SBL is under capacity
			391	F	1.79	SBT is over capacity
Millard Avenue	65	E	69	E	0.79	EBL is under capacity
			82	F	0.74	NBL is under capacity
			106	F	1.15	SBT is over capacity
Gladman Avenue/York Admin Access	4	A	56	E	0.07	NBL is under capacity
Eagle Street	82	F	69	E	0.68	EBT is under capacity
			129	F	1.05	WBL is at capacity
			98	F	0.96	NBL is at capacity
			84	F	0.85	SBL is approaching capacity
			136	F	1.21	SBT is over capacity

Signalized Intersection Operations 2021 Full BRT Saturday Peak Hour						
Intersection Reference Yonge Street @	**Overall**		**Critical**			**Comments**
	Delay	**LOS**	**Delay**	**LOS**	**V/C**	
William Roe Blvd/Clearmeadow Blvd	24	C	72 70 76	E E E	0.73 0.24 0.54	EBL is under capacity NBL is under capacity SBL is under capacity
Mulock Drive	94	F	56 185 98	E F F	0.50 1.33 1.07	NBL is under capacity NBT is over capacity SBL is at capacity
Note: Total delay in Synchro takes into account signal control and queue delay. Please use caution in interpreting delay greater than 100 seconds.						