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Transportation Impact Study Update

PROPOSED MIXED-USE DEVELOPMENT

109 Garden Drive
OAKVILLE, ONTARIO

November 2024
Project No: NT-24-100

520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

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nexTrans CONSULTING ENGINEERS
NextEng Consulting Group Inc.

November 21, 2024

Attention: Noah Shechtman

Oakville Garden Residences Corp.
10 Wanless Avenue, Suite 201
Toronto, ON M4N 1V6

Re: Transportation Impact Study Update
Proposed Residential Mixed-Use Development
109 Garden Drive, Town of Oakville
Our Project No. NT-24-100

NexTrans Consulting Engineers (a Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Transportation Impact Study Update for the above noted site in support of proposed Official Plan Amendment, Zoning By-law Amendment and Site Plan applications for a proposed residential mixed-use development.

The subject site is located at 109 Garden Drive, east of Garden Drive, between Lakeshore Road W and Rebecca Street, in the Town of Oakville. Currently, the existing site is vacant. The proposed residential mixed-use development consists of 4 blocks, with a total of 42 back-to-back townhouse units and 6 apartment dwelling units above the proposed 171.15 m^2 of ground related retail gross floor area. The proposed development provides a total of 76 vehicle parking spaces (65 resident spaces and 11 visitor spaces), as well as a total of 68 bicycle parking spaces (48 long-term and 20 short-term spaces). The proposed development full moves accesses are provided via 109 Garden Drive, similar to other existing developments in the area.

The transportation impact study is prepared in accordance with the Town of Oakville and the Region of Halton Transportation Impact Study guidelines, and consistent with background transportation studies conducted in the area. The Study concludes that the proposed development can adequately be accommodated by the existing and future transportation network, future transit services for the area, as well as the recommended measures identified in this report.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

Nextrans Consulting Engineers
A Division of NextEng Consulting Group Inc.

Prepared by:

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Transportation Analyst

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Report Submission Record

Identification	Date	Description of issued and/or revision
Final Report	November 21, 2024	For Final Submission

PREVIOUS SUBMISSION COMMENTS

The project team has received the comments below and appropriate responses are provided below:

1. **OPA/ZBA Comment** – A Traffic Impact Study (TIS) is required to evaluate the potential impacts of the proposed development on the adjacent roadway network and access points to the proposed subdivision. Applicant's traffic consultant should provide TOR's to Town and Region Transportation planning staff for approval before commencing the study.

   Response: Noted. We have submitted the study terms of reference in May 2024, however, we did not receive the comments in time for the completion of the first Transportation Impact Study. In discussion with the Town staff, we will fully address the Town staff comments in Study Update.

2. **OPA/ZBA Comment** – A parking justification Study in order to provide details of parking required as per zoning by law and parking spaces to be provided at site.

   Response: Noted. Based on the applicable Zoning By-law, the proposed development would be required to provide a total of 76 vehicle parking spaces, inclusive of residential, visitor and retail uses. The proposed development generally meets the Zoning By-law parking requirements of 76 vehicle parking spaces. However, based on the recommendations of this Study, there is a slight re-balancing where some "residential" spaces are being allocated as "visitor" spaces. Therefore, it is acceptable from overall parking requirement perspective with a total 76 spaces, including 65 residential and 11 visitor spaces.

3. **Site Plan Comment** – Site plan showing parking layout plan at all levels must be submitted for review and feedback by the relevant staff.

   Response: Noted. The site plan showing parking layout plan is provided in **Appendix A** of this Study Update.

4. **Site Plan Comment** – A traffic control and pavement marking and signage plan to be submitted for review and comments by Transportation staff.

   Response: Noted. A pavement marking and signage plan has been prepared and provided in this Study Update.

5. **Site Plan Comment** – A pedestrian/sidewalk plan, including connections to adjacent roadway sidewalks, must be submitted for review and comments by the active transportation staff.

   Response: Noted. A pedestrian/sidewalk plan has been prepared and provided as part of the submission package.

6. **OPA/ZBA Comment** – include the zoning requirements for bike racks, as well as the type of bike rack and dimension for installation. A guideline for these measures are included in the Ontario Traffic Manual Book 18 page 298.

   Response: Noted. It has been provided in **Section 9.2** of this Study Update.

7. **Site Plan Comment** – Please include TDM measures with this application to be implemented at site plan approval stage. This could include the town's TDM program, Smart Commute promoting more travel options for visitors and employees to the site. Please consult with Town Staff on this issue.

   Response: Noted. TDM measures have been provided in **Section 10** of this Study Update.

8. **OPA/ZBA Comment** – TIS section 2.4 – Please change "Routes 15 & 14A Lakeshore West" to "Routes 14 & 14A…"

   Response: Noted. This has been changed in this Study Update.

9. **OPA/ZBA Comment** – For information - Oakville Transit provides door-to-door paratransit service called care-A-van for persons with disabilities. Service is provided by low-floor, fully accessible 26ft buses supplemented in partnership with local taxi providers. Drivers will leave the vehicle on Garden Drive and escort the customer to the first accessible entrance of the unit.

   Response: Noted and acknowledged in this Study Update.

10. **OPA/ZBA Comment** – The current site plan drawings submitted in the TIS report are illegible, particularly concerning the driveway dimensions at the property line, aisle widths, and parking area specifications. The applicant should provide high-resolution, clearly annotated site plans to facilitate a comprehensive review by Transportation Planning staff.

    Response: Noted and has been provided in **Appendix A** of this Study Update.

11. **OPA/ZBA Comment** – The Traffic Impact Study (TIS) report prepared by NexTrans (dated June 2024) lacks a signal warrant analysis for the study area intersections (Lakeshore Road and Rebecca Street). The traffic consultant should update the TIS to include a signal warrant analysis for future horizon years and resubmit the report for further review and comments.

    Response: Noted. The traffic signal warrant analysis for the Lakeshore Road/Garden Drive and Rebecca Street/Garden Drive intersections are provided in **Section 6.3** and **Appendix H** of this Study Update.

12. **OPA/ZBA Comment** – The design vehicle information is missing from the AutoTURN analysis provided. Please submit a separate site plan with a higher resolution of the turning movement analysis for review and feedback by the staff.

    Response: Noted and has been provided in this Study Update.

13. **OPA/ZBA Comment** – There is inconsistent information regarding parking provisions for the three residential blocks. Section 1.6 of the Urban Design Brief indicates parking is on the ground floor, whereas plan on page 13 shows access to underground parking via three access doors. Please clarify and ensure consistency in the documentation.

    Response: Noted. The parking garages are located on the ground level with access from Garden Drive. They are enclosed by the buildings; however, they are not located underground. We will remove the word "underground" form the figures of the proposed site plan package.

14. **OPA/ZBA Comment** – The current proposal indicates a shortfall of 16 parking spaces compared to the requirements stipulated in the Town of Oakville's zoning by-law. The justification provided for the reduced parking relies on data from U.S. cities and locations outside Oakville. The applicant is advised to adhere to the parking requirements as per the town's zoning by-law. If a deviation from the by-law is sought, a comprehensive parking justification study, based on approved Terms of Reference (TOR), should be conducted and submitted for review for the Transportation staff. The selection of proxy sites for this study must be pre-approved before conducting the parking surveys.

    Response: The proposed development now meets the Zoning By-law requirements by providing an additional 17 vehicle parking stackers for certain units. The Zoning By-law requirements for vehicle parking has been updated in this Study Update. The proposed development provides a total of 76 vehicle parking spaces, including 65 resident spaces and 11 visitor spaces, which generally meets the overall Zoning By-law requirements.

15. **Site Plan Comment** – Please submit a Preliminary Construction Traffic Control Management Plan Memo, outlining the proposed mitigative measures for pre-construction, during construction, and post-construction phases, in accordance with the Ontario Traffic Manual (OTM) Book 7.

    Response: Noted. A preliminary Construction Traffic Control Management Plan will be provided at the site plan stage of the proposed development.

EXECUTIVE SUMMARY

NexTrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Oakville Garden Residences Corp. (the 'Client') to undertake a Transportation Impact Study Update in support of proposed Official Plan Amendment, Zoning By-law Amendment and Site Plan applications for a proposed residential mixed-use development. The subject site is located at 109 Garden Drive, east of Garden Drive, between Lakeshore Road W and Rebecca Street, in the Town of Oakville.

It should be noted that NexTrans has sent a study terms of reference to the Town of Oakville on May 30, 2024. Through discussions with the Town staff, it is indicated that all of the Town comments will be fully addressed in this Study Update. In addition, this transportation impact study update is prepared in accordance with the Town of Oakville and the Region of Halton Transportation Impact Study guidelines, and consistent with previous submission and background transportation studies conducted in the area.

It should also be noted that, a Transportation Impact Study was prepared by HDR dated September 20, 2021 on behalf of Smart Centres Inc. & Revera entitled "Garden Drive Retirement Residence" in support of different types of land uses.

Proposed Development

The subject site is located at 109 Garden Drive, northwest corner of Garden Drive and Lakeshore Road West in the Town of Oakville. Currently, the existing site is vacant. The area is surrounded by existing low-rise and mid-rise residential developments. The proposed residential mixed-use development consists of 4 blocks, with a total of 42 back-to-back townhouse units and 6 apartment dwelling units above the proposed 171.15 m^2 of ground related retail gross floor area.

The proposed development is expected to generate 48 total two-way vehicle trips (15 inbound and 33 outbound) and 67 total two-way vehicle trips (39 inbound and 28 outbound) during the morning and afternoon peak hours, respectively.

Proposed Development Access

A full moves access will be provided for each proposed townhouse block, with a total of 4 full moves access onto Garden Drive. This is consistent with the existing conditions on the west side of Garden Drive.

The assessment and intersection capacity analysis indicates that the proposed accesses are expected to operate at acceptable levels of service with minimum delay or queue. The corner clearance and throat length corner are also appropriate and meet the Transportation Association of Canada Guidelines (TAC). The recommended lane configurations include for each proposed full moves access:

- One inbound lane (minimum 3.0 m width);
- One outbound lane (minimum 3.0 min width); and
- One shared southbound through/left lane and one northbound shared through/right on Garden Drive

Transportation Analysis

Auto Mode Assessment

Based on the intersection capacity analysis, under the existing, future background and future total traffic conditions, all intersections considered in the analysis are expected to operate at acceptable levels of service, from overall intersection operational perspective, during both the morning and afternoon peak hours. The estimated queues can be accommodated within the available storage length. No critical movements have been identified and therefore no improvements are required to accommodate the proposed development.

The proposed site accesses are expected to operate at acceptable levels of service with maximum of one vehicle every 8 minutes during the peak hours. No long delays or queues are expected under the future total conditions.

It should also be noted that, a Transportation Impact Study was prepared by HDR dated September 20. 2021 on behalf of Smart Centres Inc. & Revera entitled "Garden Drive Retirement Residence" for the same site as part of the previous application. In this Study, HDR has analyzed several more intersections east and west of the proposed development intersections. The analysis indicates that these intersections are expected to operate at acceptable levels of service with no physical improvements at the intersections considered in the analysis.

Given that the proposed development is very small and is expected to have negligible impact on the surrounding intersections, the inclusion of the two immediately adjacent intersections to the proposed development is appropriate as the proposed development can improve these intersections if required. It should be noted that the proposed development has no control over the improvements at the other intersections are these intersections are located further from the proposed development and are mostly impacted by the background traffic growth and background development traffic.

Traffic Signal Warrant Analysis

NexTrans has conducted traffic signal warrant analyses for the Lakeshore Road/Garden Drive and Rebecca Street/Garden Drive intersections based on Ontario Traffic Manual Book 12 for Justification 7 (Projected Volumes) for the major internal intersections (**Appendix H**). The analysis indicates that these intersections are not numerically warranted for traffic signals based on Justification 7 due to low turning movement volumes under the study horizon year considered. Typically, traffic signals should only be installed when warranted to avoid traffic congestion and unnecessary queues.

Walking Mode Assessment

Under the existing conditions, sidewalks are available on both sides of Rebecca Street and Lakeshore Road W. However, sidewalk is only available on the west side of Garden Drive from Rebecca Street to the southerly limit of the Wyndham Place Condominium. Between the condo access and Lakeshore Road W, there is an existing curb-face paved asphalt area acting a continuous sidewalk to Lakeshore Road W. A proper sidewalk can be provided once these existing properties are redeveloped in the future.

As part of the proposed development, sidewalk will be provided on the east side of Garden Drive along the entire frontage of the site. Sidewalk will be designed and provided as per the Town of Oakville standards.

In addition, sidewalks will be provided on both sides of each block that connect each unit to the sidewalk on Garden Drive. This provision is sufficient to provide mobility for each unit.

Cycling Mode Assessment

Currently, there are dedicated cycling lanes along Lakeshore Road W between Dorval Drive and Kerr Street, and Rebecca Street between Southview Road and Navy Street. There is also a multi-use trail along Dorval Drive from Lakeshore Road W to Upper Middle Road W.

NexTrans has reviewed the Town's 2017 Active Transportation Master Plan (ATMP). Based on this review, it is indicated that the Town of Oakville is actively planning and building additional cycling infrastructure in the area such as cycling facilities on Keer Street and Stewart Street. With the completion of these network, the residents from the proposed development can use these facilities as an alternate mode of transportation instead of driving private vehicles to work or to school.

As part of the proposed development, a total of 48 long-term and 20 short-term bicycle parking spaces will be provided, for a total of 68 bicycle parking spaces. This provision will encourage residents to use active transportation modes to work, school and discretionary trips instead of single-occupant-vehicle trips.

Transit Mode Assessment

As the existing transit modal split based on 2016 TTS data is about 10% during both morning and afternoon peak hours, if 10% modal split is applied, the proposed development is expected to generate 5 total two-way transit trips (2 inbound

and 3 outbound) and 7 total two-way transit trips (4 inbound and 3 outbound) during the morning and afternoon peak hours, respectively.

As the estimated transit ridership for the proposed development is very low, the two existing transit routes (Oakville Transit Bus Routes 14 & 14A Lakeshore West and 15 Bridge) can accommodate these trips. It is anticipated that no additional transit improvements in the area are required to accommodate the proposed development.

Vehicle Parking Assessment

Based on the applicable Zoning By-law, the proposed development would be required to provide a total of 76 vehicle parking spaces, inclusive of residential, visitor and retail uses. The proposed development generally meets the Zoning By-law parking requirements of 76 vehicle parking spaces. However, based on the recommendations of this Study, there is a slight re-balancing where some "residential" spaces are being allocated as "visitor" spaces. Therefore, it is acceptable from overall parking requirement perspective with a total 76 spaces, including 65 residential and 11 visitor spaces.

Bicycle Parking Assessment

Based on the assessment provided in this Study, the proposed development is required to provide a total of 48 bicycle parking spaces for residential and 12 for visitor, for a total of 60 bicycle parking spaces. However, the proposed development will provide a total of 68 bicycle parking spaces, including 48 long-term and 20 short-term spaces. The long bicycle parking spaces will be provided within the residential units and short-term/visitor bicycle parking spaces will be provided at a convenient location on-site, as illustrated in the proposed site plan.

Transportation Demand Management Measures and Incentives

The Report identifies and recommends appropriate Transportation Demand Management measures and incentives to support active transportation and transit, to meet the objectives and requirements of the Town and the Region. These potential measures are included in Section 11 of this Study.

Study Conclusions and Recommendations

Based on the findings of this Study, the following recommendations are provided:

- The Town and the Region approve the proposed residential mixed-use development;
- The proposed development provides direct shared pedestrian/bicycle connections from the proposed development to Garden Drive and Lakeshore Road W, where appropriate;
- Provide only a total of 76 vehicle parking spaces, with 65 residential and 11 visitor spaces;
- Provide a total of 68 bicycle parking spaces on-site, including 48 long-term and 20 short-term spaces; and
- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development

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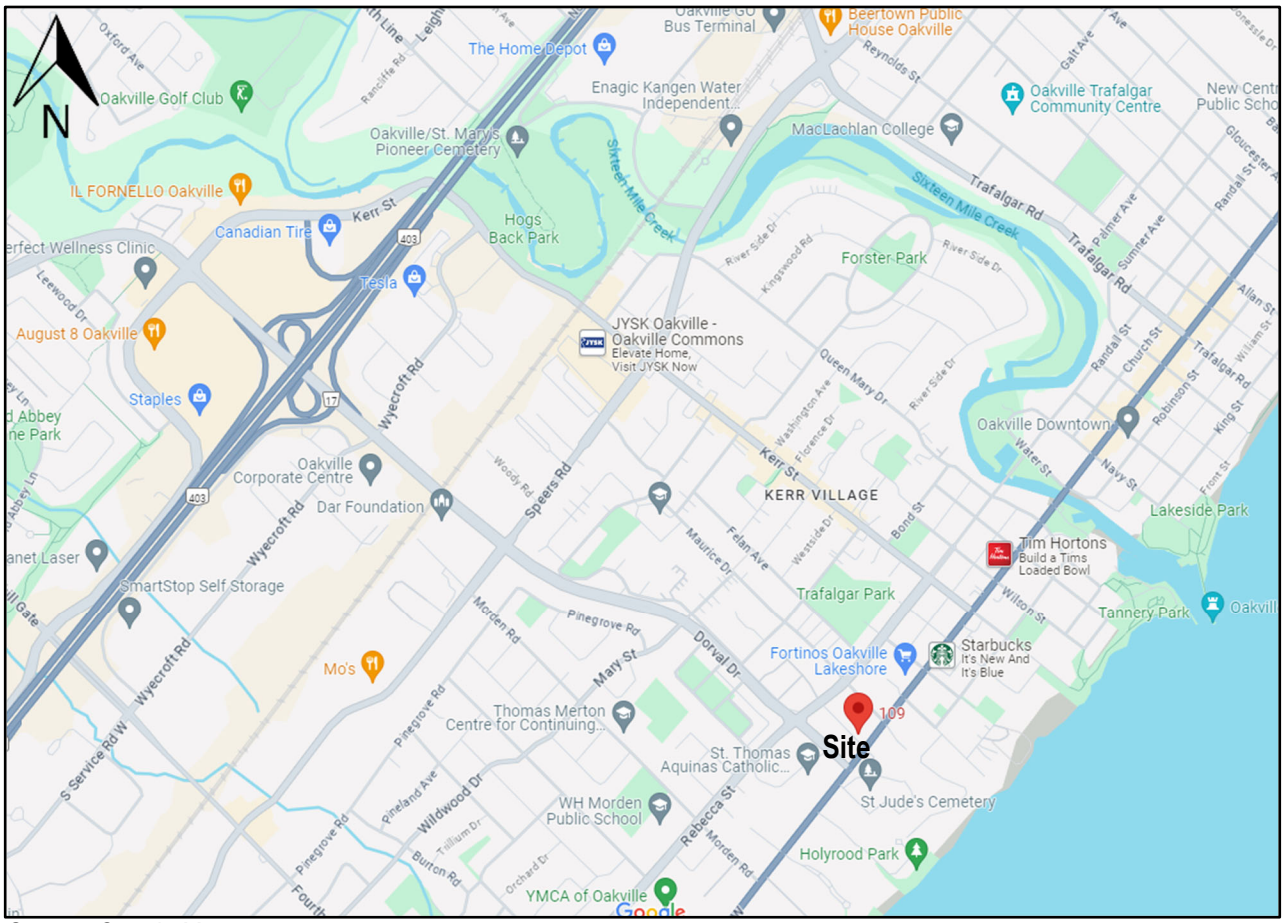
1.0 INTRODUCTION

NexTrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) was retained by Oakville Garden Residences Corp. (the 'Client') to undertake a Transportation Impact Study in support of proposed Official Plan Amendment, Zoning By-law Amendment and Site Plan applications for a proposed residential mixed-use development. The subject site is located at 109 Garden Drive, east of Garden Drive, between Lakeshore Road W and Rebecca Street, in the Town of Oakville. The location of the proposed development is illustrated in **Figure 1**.

The transportation impact study is prepared in accordance with the Town of Oakville and the Region of Halton Transportation Impact Study guidelines, and consistent with background transportation studies conducted in the area. It should be noted that NexTrans has sent a study terms of reference to the Town of Oakville on May 30, 2024. However, NexTrans has not received any comments or feedback in time for the preparation of this Traffic Impact Study. Therefore, the Town comments, if any, will be fully addressed as part of the future submission for the proposed development. It should also be noted that, a Transportation Impact Study was prepared by HDR dated September 20. 2021 on behalf of Smart Centres Inc. & Revera entitled "Garden Drive Retirement Residence" in support of different types of land uses.

Figure 1 – Proposed Development Location

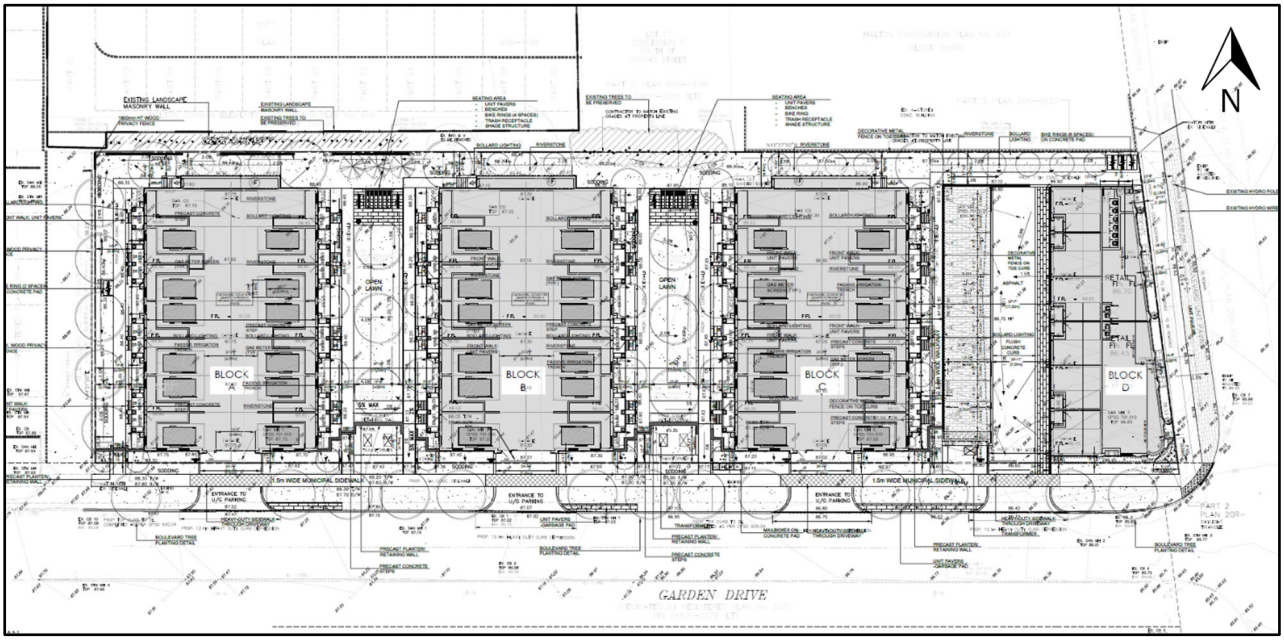


Source: Google Map

The proposed residential mixed-use development consists of 4 blocks, with a total of 42 back-to-back townhouse units and 6 apartment dwelling units above the proposed 171.15 m^2 of ground related retail gross floor area. The proposed development provides a total of 76 vehicle parking spaces (65 residential and 11 visitor spaces), as well as 68 bicycle parking spaces, including 48 long-term and 20 visitor spaces.

The proposed development full moves accesses are provided via 109 Garden Drive, similar to other existing developments in the area. **Figure 2** illustrates the proposed development site plan.

Figure 2 – Proposed Site Plan



2.0 EXISTING CONDITION ASSESSMENT

2.1. Existing Road Network

As indicated, the subject site is located at 109 Garden Drive, east of Garden Drive, between Lakeshore Road W and Rebecca Street, in the Town of Oakville. The description of the existing road network in the study area is summarizes in **Table 1** below.

Table 1 – Summary of the Existing Road Network in the Study Area

Road Name	Jurisdiction	No. of Lanes	Speed	Road Type	Sidewalk	Cycling
Lakeshore Road W	Town of Oakville	2 lanes	50 km/h	Major Arterial	Sidewalk on both sides	Yes Dorval Dr to Kerr St
Rebecca Street	Town of Oakville	2 lanes	50 km/h	Major Arterial	Sidewalk on both sides	Yes Southview Rd to Navy St
Garden Drive	Town of Oakville	2 lanes	40 km/h	Local Road	Sidewalk on the west side only	None

Figure 3 illustrates the existing lane configurations and traffic control devices for the intersections considered in the analysis.

2.2. Walking Mode Assessment

Under the existing conditions, sidewalks are available on both sides of Rebecca Street and Lakeshore Road W. However, sidewalk is only available on the west side of Garden Drive from Rebecca Street to the southerly limit of the Wyndham Place Condominium. Between the condo access and Lakeshore Road W, there is an existing curb-face paved asphalt area acting a continuous sidewalk to Lakeshore Road W. A proper sidewalk can be provided once these existing properties are redeveloped in the future.

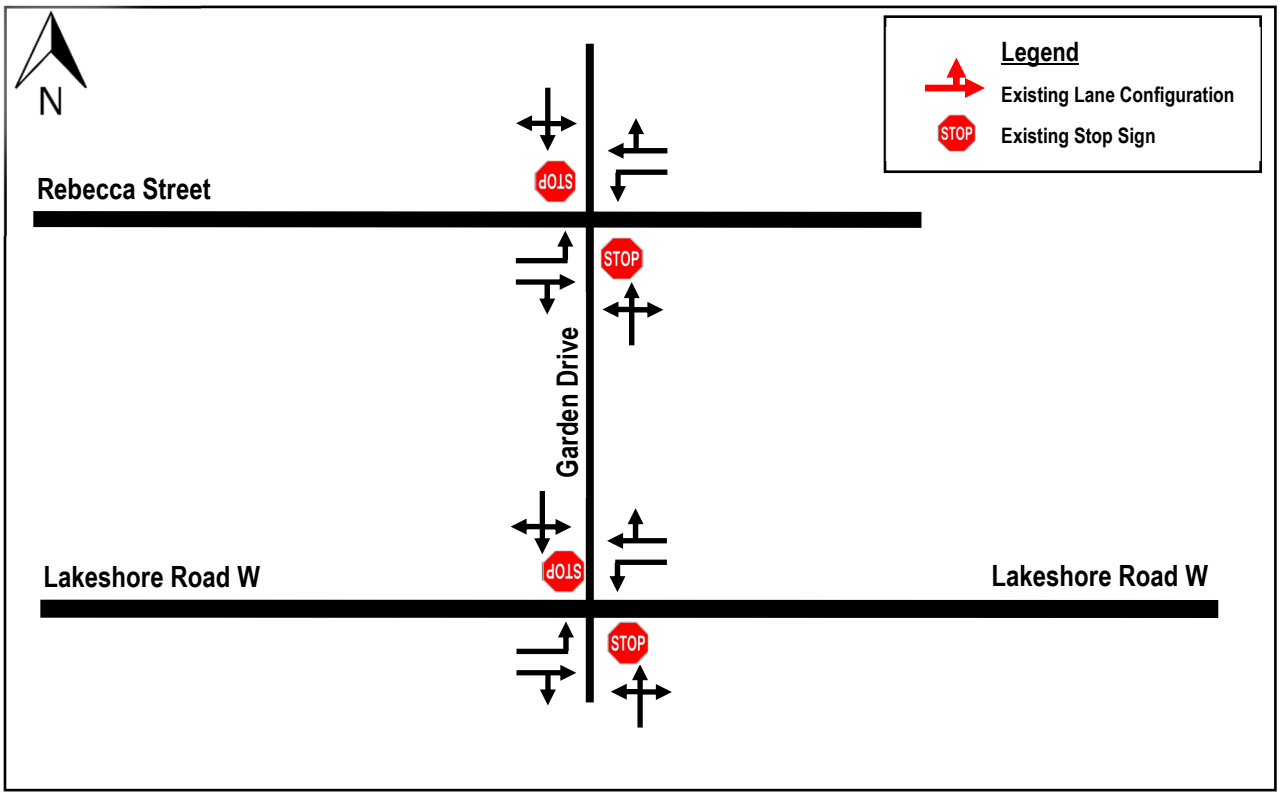
2.3. Cycling Mode Assessment

NexTrans has reviewed the existing active transportation network in the area based on site visit and review of the Town of Oakville Information Map, as well as the Town's 2017 Active Transportation Master Plan (ATMP). It should be noted

that the Town's 2017 Active Transportation Master Plan (ATMP) will be reviewed in more detail under the future total conditions as part of this Study. **Figure 4** illustrates the existing cycling network in the study area.

Currently, there are dedicated cycling lanes along Lakeshore Road W between Dorval Drive and Kerr Street, and Rebecca Street between Southview Road and Navy Street. There is also a multi-use trail along Dorval Drive from Lakeshore Road W to Upper Middle Road W. NexTrans will review the future plan proposed by the Town of Oakville in the subsequent sections of this Study.

Figure 3 – Existing Lane Configuration and Traffic Control



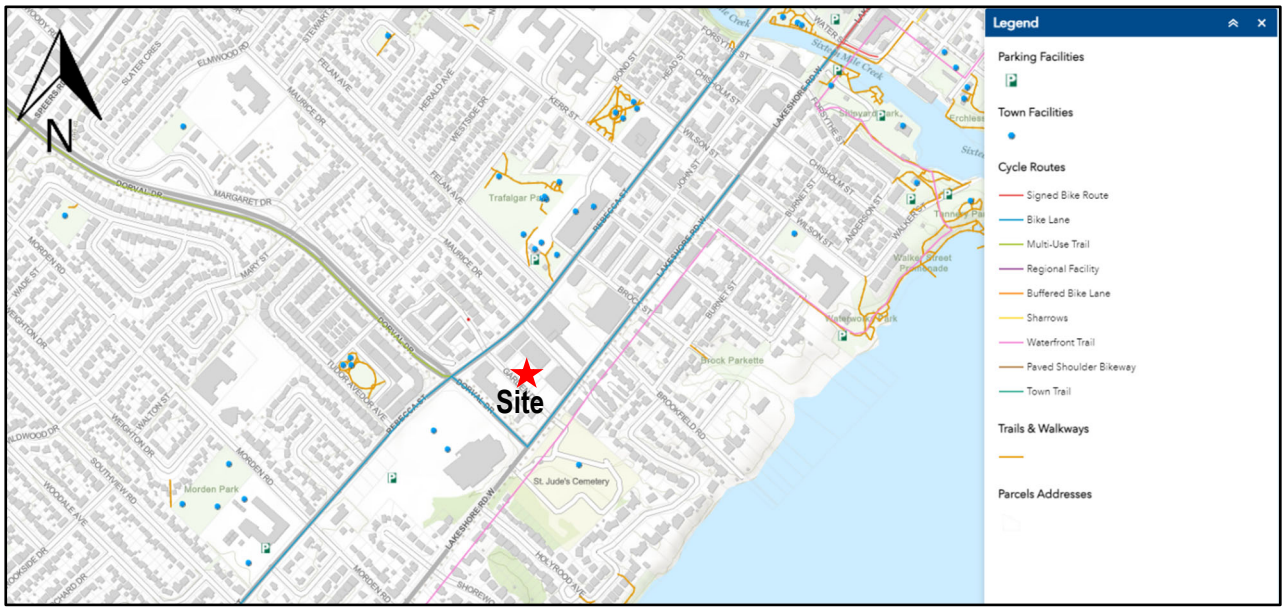
2.4. Transit Mode Assessment

The area is current serviced by two existing Oakville Transit Bus Routes 14 & 14A Lakeshore West and 15 Bridge. The subject site is located approximately 3 km from the Oakville GO Train Station on the Lakeshore West GO Line. **Figure 5** illustrates the existing Oakville Transit System. Below is the bus route description based on the information provided on the Oakville Transit Website (https://www.oakvilletransit.ca/schedules-and-maps.html). We also acknowledge the Care-A-Van service provided by Oakville Transit.

- **Routes 14 & 14A Lakeshore West** – The Lakeshore West Route travels generally in the east-west direction from Appleby GO Train Station to Oakville GO Train Station via Lakeshore Road East and Rebecca Street. This service runs early in the morning (6:05 AM) until after midnight during the weekday. The service frequency is approximately 15-minute during the peak periods.
- **Route 15 Bridge** – The Bridge route travels generally in the east-west direction, from South Oakville Centre to Oakville GO Train Station. This service runs Monday to Sunday from the early morning (6:10 AM) until after 8 PM. The service frequency is approximately 30-minute during the peak periods.
- **Care-A-Van Service**: Oakville Transit provides door-to-door paratransit service called care-A-van for persons with disabilities. Service is provided by low-floor, fully accessible 26ft buses supplemented in partnership with local taxi providers. Drivers will leave the vehicle on Garden Drive and escort the customer to the first accessible entrance of the unit.

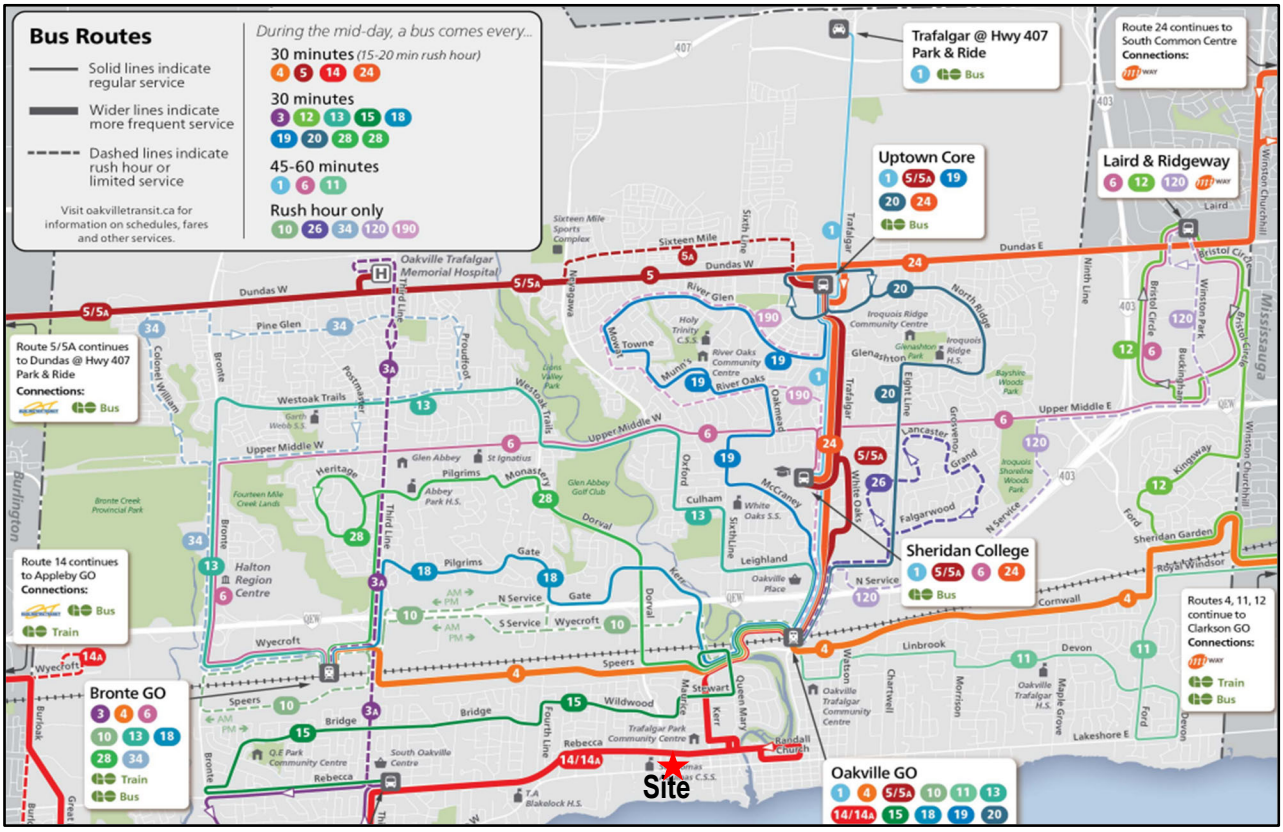
- **Lakeshore West GO Line** – is a GO Train route that operates generally in the east-west direction between Niagara Falls GO Station to Union Station in downtown Toronto, with further connections available east to Oshawa GO Station. This GO Line operates during Monday to Friday, from 6:00 AM to 8:00 PM; weekends from 6:30AM to 8:00PM.

Figure 4 – Existing Cycling Routes



Source: Town of Oakville Information Map

Figure 5 – Existing Oakville Transit



Source: www.oakvilletransit.ca

2.3. Existing Area Context

NexTrans has conducted a comprehensive review of the area with both site visit and desktop review. The subject site is surrounded by some recent mid-rise development with 3-4 storeys. The areas located immediately to the north and south of the proposed development are existing low-rise developments. The existing St. Thomas Aquinas Catholic Secondary School is located on the west side of Dorval Drive, with Trafalgar Park Community Centre and Fortinos Grocery Store are located to the east of the site. There are several schools in the area such as Elementary School Catholic Sainte-Marie and Oakwood Public School. Oakville Downtown is only located approximately 1.0 km east of the proposed development. As indicated in the previous sections of this Study, the area has a complete network of sidewalk, cycling facilities and sufficient transit services. Therefore, the analysis indicates that the proposed development is consistent and appropriate from a transportation planning perspective.

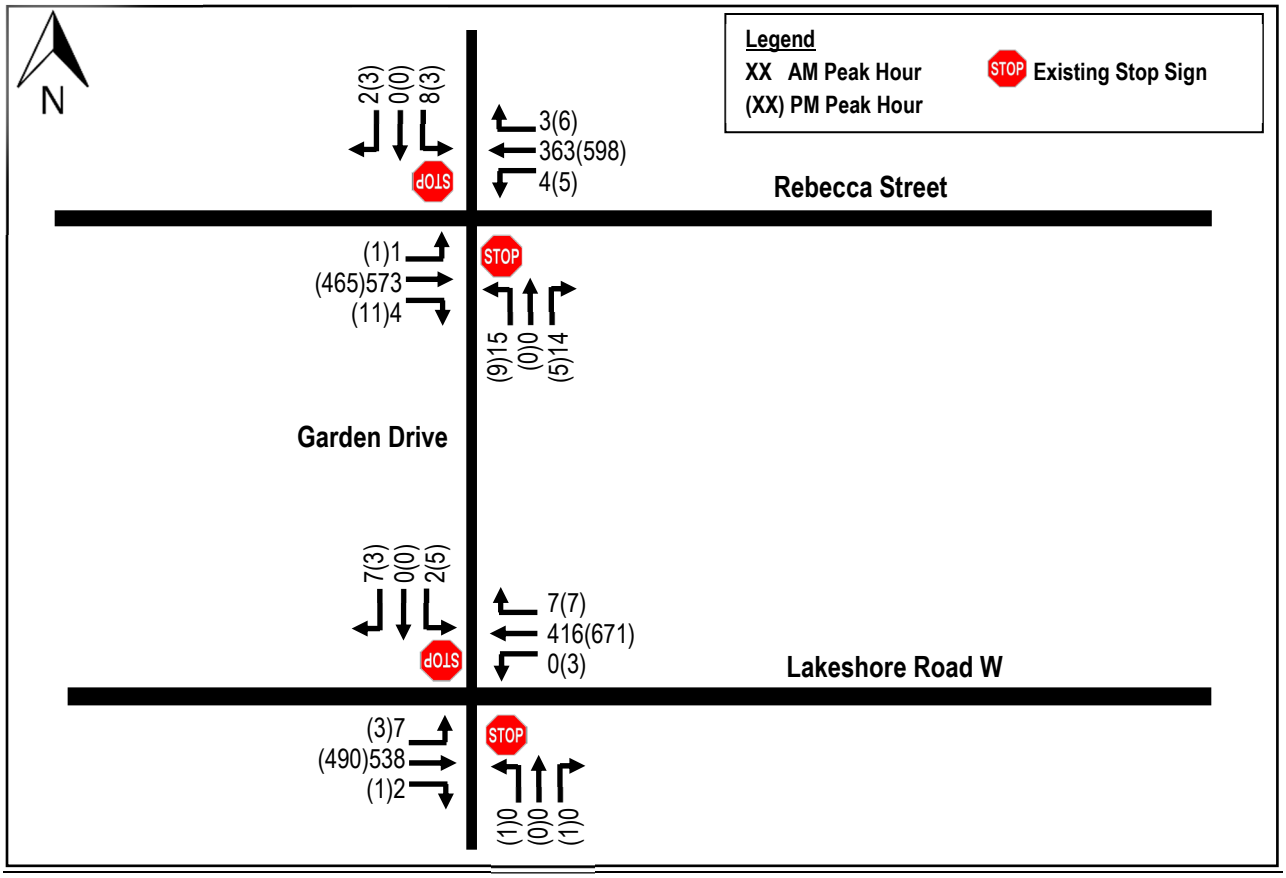
2.4. Existing Traffic Volumes

The turning movement counts were undertaken by Spectrum for the four intersections considered in the study area. The turning movement counts were conducted on June 4th, 2024. The existing traffic volumes were undertaken during the morning (7:00 a.m. to 10:00 a.m.) and afternoon (4:00 p.m. to 7:00 p.m.) peak periods for all area intersections. **Figure 6** illustrates the existing traffic volumes for the study area intersections, with the detailed turning movement counts are included in **Appendix A**.

2.5. Auto Mode Assessment

The existing volumes in **Figure 6** were analyzed using Synchro Version 11 software. The methodology of the software follows the procedures described and outlined in the Highway Capacity Manual, HCM 2000, published by the Transportation Research Board. It should be noted that the printouts for unsignalized intersections are based on HCM outputs. The results are provided in **Appendix C** and summarized in **Table 2**.

Figure 6 – Existing Traffic Volumes



It should also be noted that, a Transportation Impact Study was prepared by HDR dated September 20. 2021 on behalf of Smart Centres Inc. & Revera entitled "Garden Drive Retirement Residence" for the same site as part of the previous application. In this Study, HDR has analyzed several more intersections east and west of the proposed development intersections. The analysis indicates that these intersections are expected to operate at acceptable levels of service with no physical improvements at the intersections considered in the analysis.

Given that the proposed development is very small and is expected to have negligible impact on the surrounding intersections, the inclusion of the two immediately adjacent intersections to the proposed development is appropriate as the proposed development can improve these intersections if required. It should be noted that the proposed development has no control over the improvements at the other intersections are these intersections are located further from the proposed development and are mostly impacted by the background traffic growth and background development traffic.

Table 2 – Existing Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Lakeshore Road W/ Garden Drive (unsignalized)	EB – L	A (0.01)	8	0	A (0.00)	9	0	~20
	EB – TR	A (0.35)	0	0	A (0.31)	0	0	~60
	WB – L	A (0.00)	0	0	A (0.00)	9	0	~20
	WB – TR	A (0.28)	0	0	A (0.43)	0	0	~83
	NB – LTR	A (0.00)	0	0	C (0.01)	22	0	~15
	SB – LTR	B (0.02)	14	1	D (0.04)	25	1	~173
Rebecca Street Garden Drive (unsignalized)	EB – L	A (0.00)	8	0	B (0.00)	11	0	~15
	EB – TR	A (0.40)	0	0	A (0.29)	0	0	~70
	WB – L	A (0.01)	9	0	A (0.00)	8	0	~30
	WB – TR	A (0.26)	0	0	A (0.37)	0	0	~80
	NB – LTR	C (0.15)	23	4	C (0.06)	22	2	~173
	SB – LTR	D (0.07)	26	2	C (0.02)	20	1	~83

2.6. Finding Summary

Based on the intersection capacity analysis, under the existing traffic conditions, all intersections considered in the analysis are operating at acceptable levels of service, from overall intersection operational perspective, during both the morning and afternoon peak hours. The estimated queues can be accommodated within the available storage length. No critical movements have been identified and therefore no improvements are required at this time.

3.0 TRANSPORTATION PLANNING CONTEXT IN THE AREA

3.1. Existing Land Use Context and Amenities

As indicated previously, NexTrans has conducted a comprehensive review of the area with both site visit and desktop review. The subject site is surrounded by some recent mid-rise development with 3-4 storeys. The areas located immediately to the north and south of the proposed development are existing low-rise developments.

The existing St. Thomas Aquinas Catholic Secondary School is located on the west side of Dorval Drive, with Trafalgar Park Community Centre and Fortinos Grocery Store are located to the east of the site. There are several schools in the area such as Elementary School Catholic Sainte-Marie and Oakwood Public School. Oakville Downtown is only located approximately 1.0 km east of the proposed development.

As indicated in the previous sections of this Study, the area has a complete network of sidewalk, cycling facilities and sufficient transit services. Therefore, the analysis indicates that the proposed development is consistent and appropriate from a transportation planning perspective.

3.2. Transportation Planning Context

As indicated, the area is currently well-serviced by a complete network of sidewalk and cycling facilities along Lakeshore Road W and Rebecca Street. There are some missing sidewalks on the east side of Garden Drive that will be provided by the proposed development and a missing south portion on the west side that can be completed by the future redevelopment of the existing residential lots. Therefore, this proposed infill development will utilize the existing infrastructures that existing today, and will enhance the missing sidewalk where appropriate.

4.0 FUTURE BACKGROUND CONDITIONS

4.1. Analysis Horizon

For the purposes of this assessment, a 5-year horizon (2029) has been carried out for the study analysis. This provision is consistent with the Town of Oakville Traffic Impact Study Guidelines and other background transportation studies conducted in the area.

4.2. Future Transportation Improvements

Based on our review, currently, there are no planned infrastructure improvements are identified in the area. Therefore, the existing transportation network will be assessed under the future background and future total conditions.

4.3. Future Background Corridor Growth

Based on the Town of Oakville's requirement and to be consistent with other background studies in the area, a 2% per annum compounded growth rate will be applied to the 2024 traffic volumes to estimate the 2029 projected traffic volumes. This is equivalent to approximately 10% total growth from 2024 to 2029. **Figure 7** illustrates the background corridor through traffic growth.

4.4. Background Development Applications

Based on NexTrans' review of the proposed active development applications in the area, using the Town's development application website for Ward 2 (https://www.oakville.ca/business/planning-applications-ward-7.html), the following background developments have been identified and will be included in the analysis:

- 42 Lakeshore Road W – LEA Consulting TIS dated August 2023
- 550 Kerr Street – GHD TIS dated June 2019
- Upper Kerr Village – BA Group TIS dated February 2022

For the purposes of this assessment, the proposed background development site trip generation and trip assignment are extracted from the background transportation impact studies noted above. Other smaller background development traffic will be capture through the 2% corridor growth. **Figure 8** illustrates background development traffic volumes. The detailed TIS traffic volume information is included in **Appendix D**.

4.5. Future Background Condition Assessment

The estimated future background traffic volumes are illustrated in **Figure 9** (future background traffic growth traffic volumes + background development traffic volumes) and were analyzed using Synchro Version 11 software. The detailed calculations are provided in **Appendix E** and summarized in **Table 3**.

Figure 7 – 2029 Background Corridor Through Traffic Growth

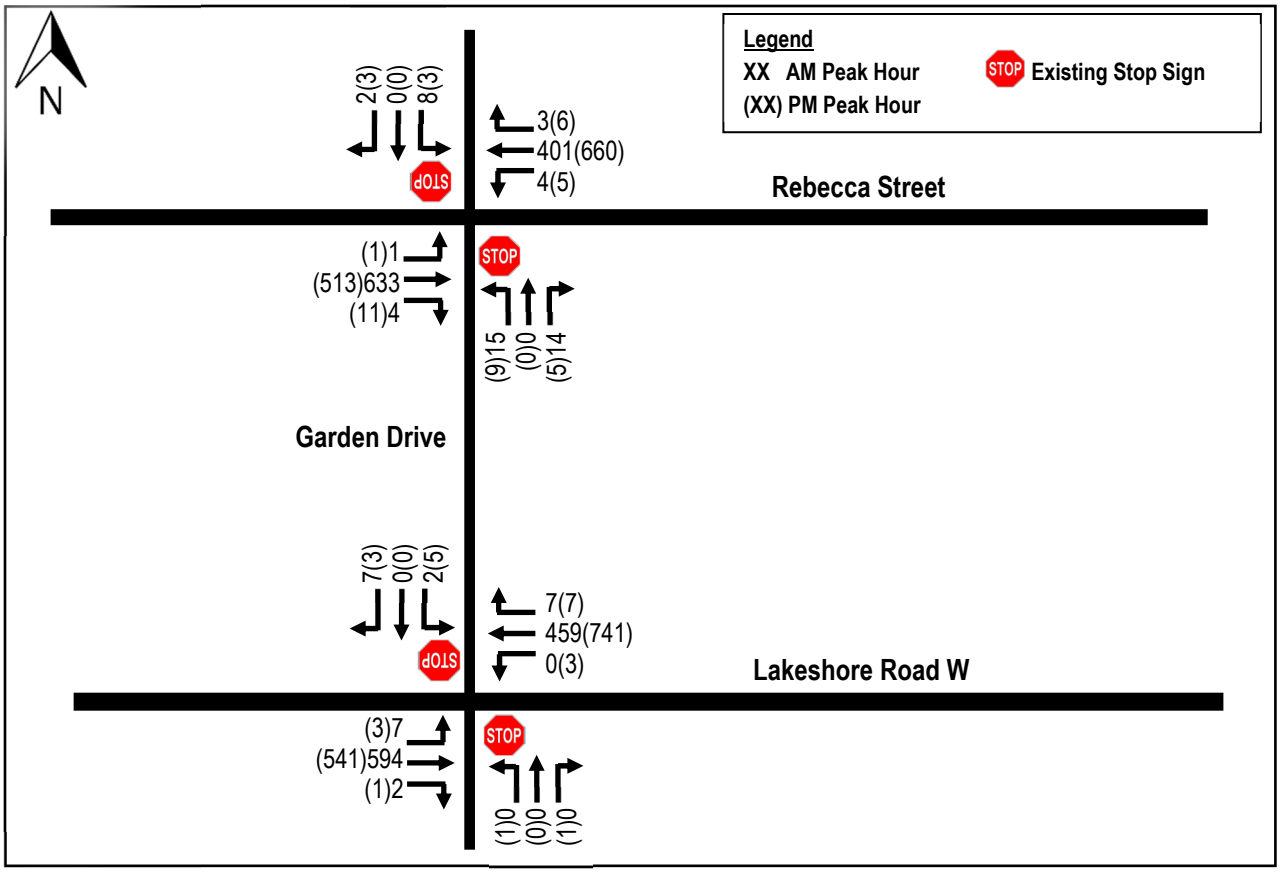


Figure 8 – Background Development Traffic Volumes

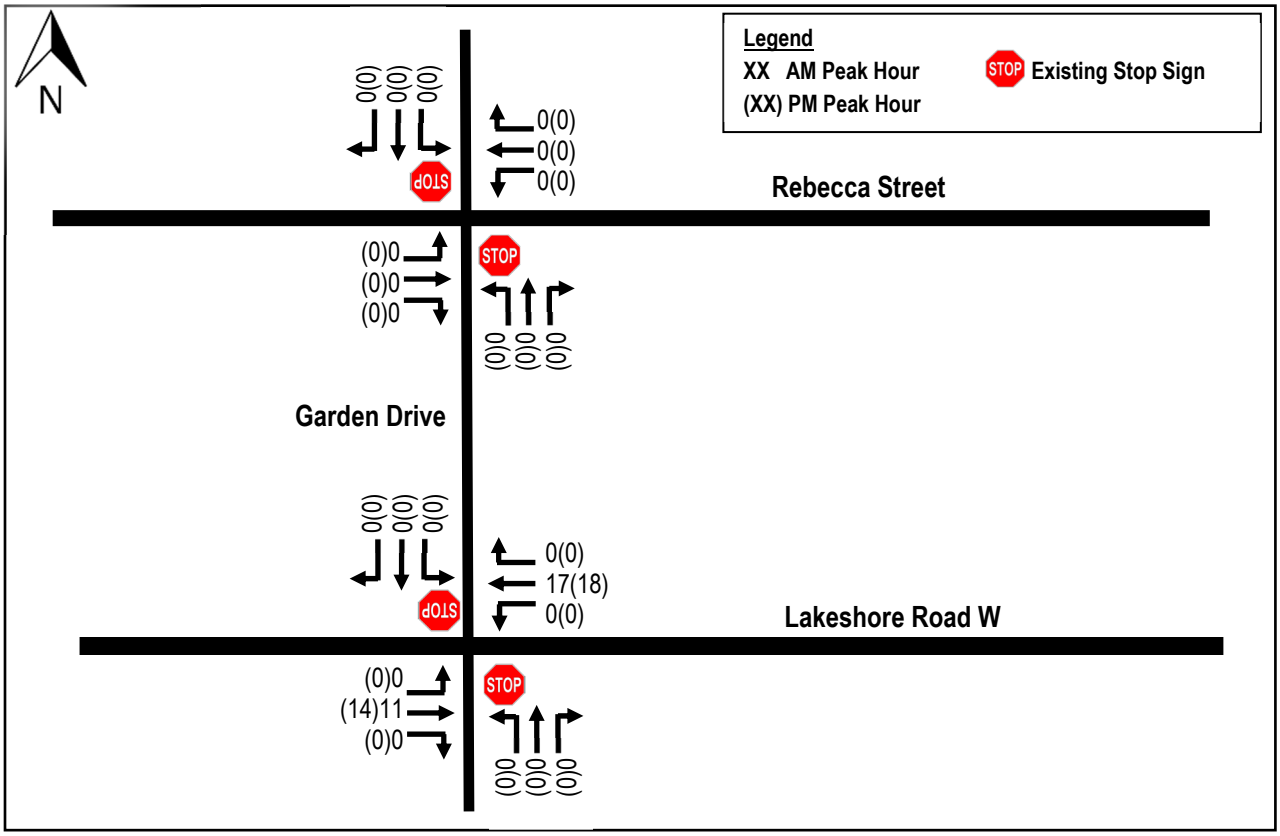
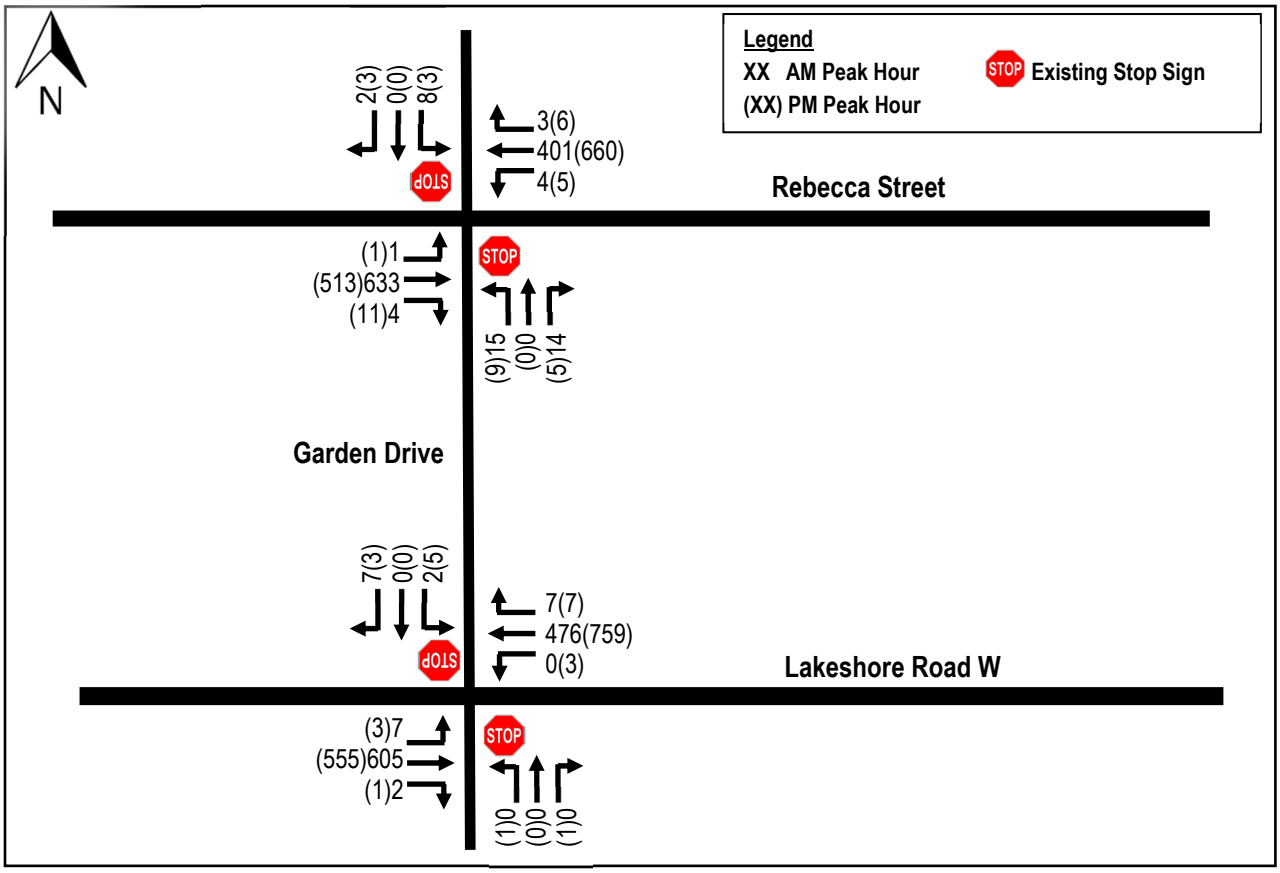


Table 3 – 2029 Future Background Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Lakeshore Road W/ Garden Drive (unsignalized)	EB – L	A (0.01)	9	0	A (0.00)	10	0	~20
	EB – TR	A (0.40)	0	0	A (0.35)	0	0	~60
	WB – L	A (0.00)	0	0	A (0.00)	9	0	~20
	WB – TR	A (0.32)	0	0	A (0.48)	0	0	~83
	NB – LTR	A (0.00)	0	0	D (0.01)	26	0	~15
	SB – LTR	C (0.03)	15	1	D (0.05)	31	1	~173
Rebecca Street Garden Drive (unsignalized)	EB – L	A (0.00)	8	0	B (0.00)	11	0	~15
	EB – TR	A (0.45)	0	0	A (0.32)	0	0	~70
	WB – L	A (0.01)	9	0	A (0.00)	9	0	~30
	WB – TR	A (0.28)	0	0	A (0.41)	0	0	~80
	NB – LTR	D (0.17)	27	5	D (0.07)	25	2	~173
	SB – LTR	D (0.08)	31	2	C (0.03)	23	1	~83

Figure 9 – 2029 Future Background Traffic Volumes



4.6. Finding Summary

Based on the intersection capacity analysis, under the future background traffic conditions, all intersections considered in the analysis are expected to operate at acceptable levels of service, from overall intersection operational perspective, during both the morning and afternoon peak hours. The estimated queues can be accommodated within the available storage length. No critical movements have been identified and therefore no improvements are required under this horizon year.

5.0 SITE TRAFFIC

5.1. Proposed Development

As indicated, the proposed residential mixed-use development consists of 4 blocks, with a total of 42 back-to-back townhouse units and 6 apartment dwelling units above the proposed 171.15 m^2 (or 1,842 ft^2) of ground related retail gross floor area. It should be noted that for the purposes of this assessment, we use slightly higher commercial gross floor area of 2,092 ft^2, which is more conservative than the currently proposed 1,842 ft^2 of commercial gross floor area.

For the purposes of this assessment and consistent with other background traffic impact studies prepared for other developments in the area, the *Trip Generation Manual, 11th Edition* published by the Institute of Transportation Engineers (ITE) and 2016 TTS information will be utilized in this Study.

5.2. Non-auto Modal Split

Table 4 summarizes the travel mode split information based on the review of the 2016 Transportation Tomorrow Survey data for Traffic Zones 4006, 4007, 4010, 4012, 4013, 4015 and 4016. The 2016 TTS data extraction is included in **Appendix F**.

Table 4 – Modal Split based on 2016 TTS Data for Traffic Zones

Time	Trips Made by Traffic Zones				
	Auto Driver	Auto Passenger	Transit	Cycle	Walk
AM Peak Period (6:00Am – 9:00AM)	72%	12%	10%	1%	4
PM Peak Period (4:00PM – 7:00PM)	73%	13%	10%	2%	3%

Based on the information above, the non-auto mode of transportation (transit + walking + carpooling) accounts for near 28% during the morning peak period and 27% during the afternoon peak period. Although this is a great trend, however, the auto driver mode is still very high, which is not sustainable and does not meet the sustainable objective of the Town Official Plan policies and directions.

To be conservative, no modal split will be applied to the trip generation. The modal split will be used for vehicle parking and to support TDM measures, where appropriate.

5.3. Site Trip Generation

The ITE Trip Generation Manual 11th Edition Land Use Codes (LUC) 220 "Multifamily Housing Low-Rise General Urban/Suburban" and LUC 821 "Strip Retail Plaza (<40K) General Urban/Suburban" fitted curve equations have been utilized for the proposed development. The site trip generation is summarized in **Table 5**.

Table 5 – Site Traffic Trip Generation Based on ITE Trip Rates

ITE Land Use	Magnitude (units/ft^2)	Parameters	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise) LUC 220	48 units	Vehicle Trip Rates AM - T = 0.31(X) + 22.85 PM - T = 0.43(X) + 20.55	0.19	0.60	0.79	0.54	0.31	0.85
		Vehicle Trips	**9**	**29**	**38**	**26**	**15**	**41**
Strip Retail Plaza (<40k) LUC 822 General Urban/Suburban	2,092 ft^2	Vehicle Trip Rates AM - Ln(T) = 0.66*Ln(X) + 1.84 PM - Ln(T) = 0.71*Ln(X) + 2.72	0.50	0.34	0.84	1.70	1.70	3.40
		Vehicle Trips	**6**	**4**	**10**	**13**	**13**	**26**
Total New Vehicle Trips			***15***	***33***	***48***	***39***	***28***	***67***

Based on the analysis noted above, the proposed development is expected to generate 48 total two-way vehicle trips (15 inbound and 33 outbound) and 67 total two-way vehicle trips (39 inbound and 28 outbound) during the morning and afternoon peak hours, respectively.

5.4. Site Trip Distribution Based on Existing Site

The 2016 Transportation Tomorrow Survey (TTS) data was reviewed for Traffic Zones 4006, 4007, 4010, 4012, 4013, 4015 and 4016 in order to estimate the general trip distribution for the proposed development. **Table 6** summarizes the planning district/traffic zones distribution based on the 2016 TTS data, with **Table 7** summarizing the site trip assignment based on the 2016 TTS data and the existing traffic turning movement counts in the area.

Table 6 – General Trip Distribution for the Proposed Development

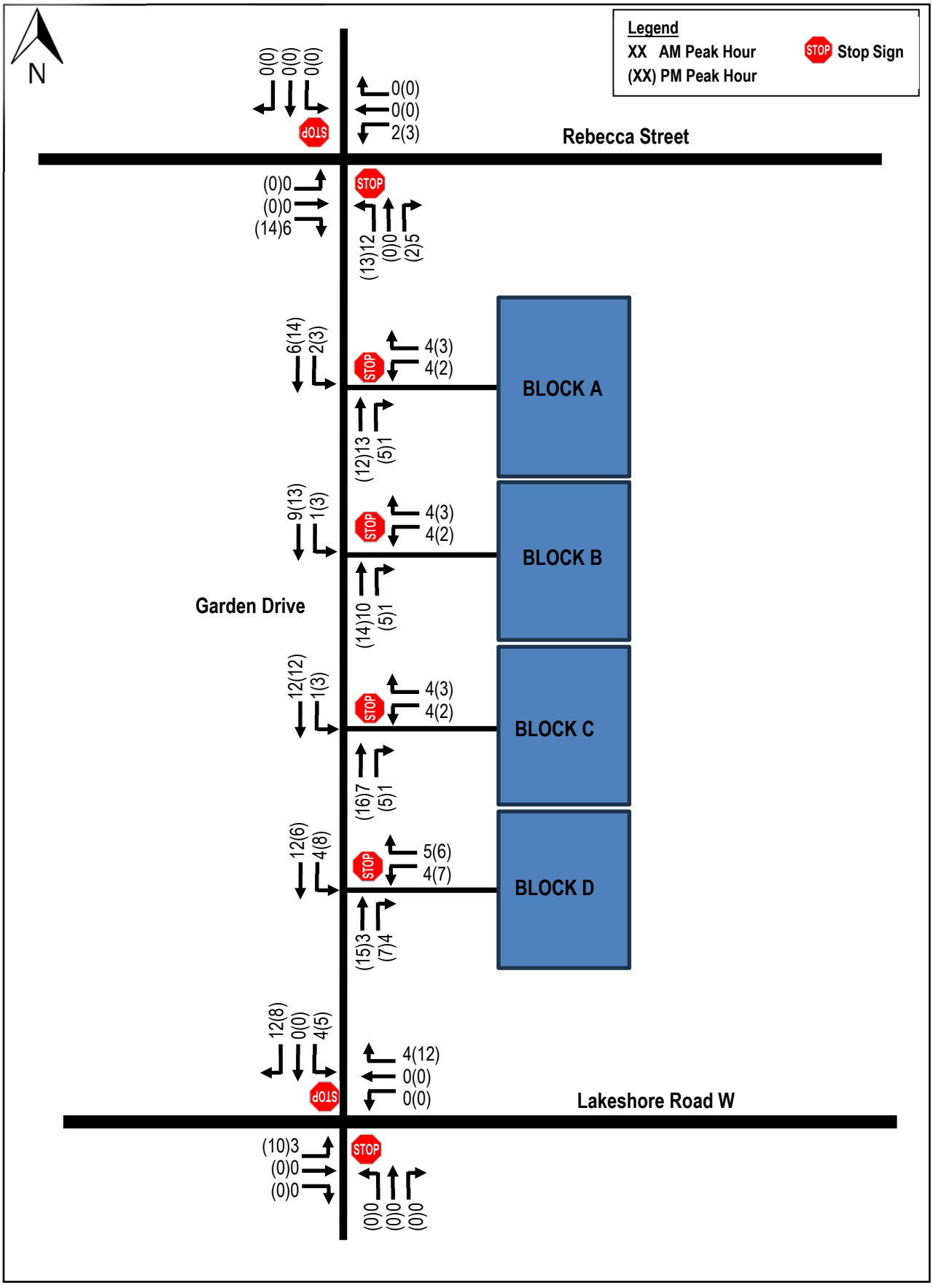
Oakville	Peel Region	Burlington	Milton/ Halton Hills	Toronto	Durham Region	York Region	Hamilton Area	Niagara Region	Total
Auto Trips									
58%	13%	14%	4%	3%	0%	1%	2%	4%	100%
Transit Trips									
90%	1%	0%	0%	9%	0%	0%	0%	0%	100%

Table 7 – Site Trip Assignment for the Proposed Development

General Direction (To/From)	Auto Trips	Transit Trips
East	50%	40%
West	25%	30%
North	25%	30%
Total	100%	100%

Figure 10 illustrates the proposed development generated traffic volumes. It should be noted that the auto site trip distribution and assignment have been taken into consideration the 2016 TTS information above, existing turning movements and available road network in the study area.

Figure 10 – Site Traffic Volumes

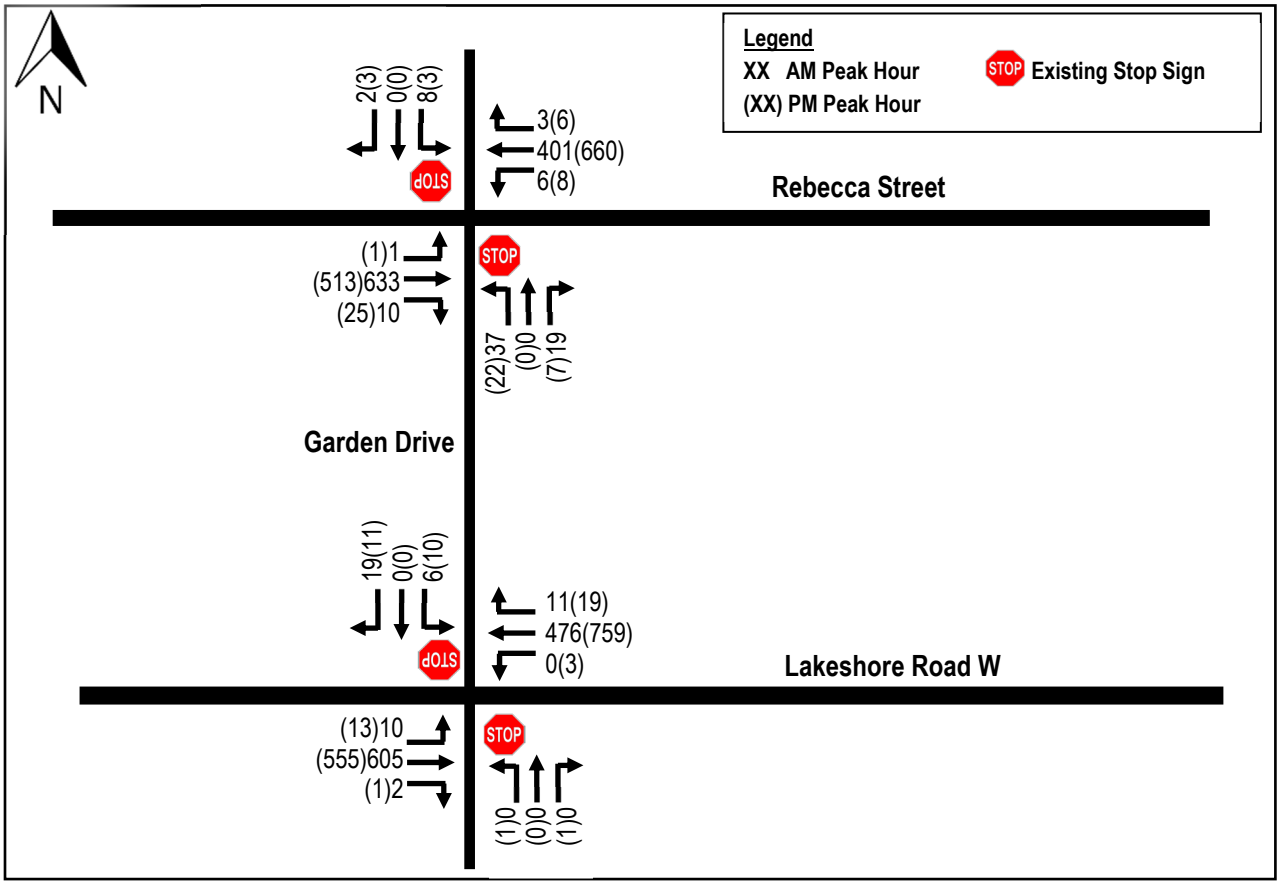


6.0 FUTURE TOTAL TRAFFIC CONDITIONS

6.1. Future Total Traffic Assessment for Auto Mode

The estimated future total traffic volumes (future background traffic volumes + site generated traffic volumes) are illustrated in **Figure 11**, and were analyzed using Synchro Version 11 software. The detailed calculations are provided in **Appendix G** and summarized in **Table 8**.

Figure 11 – 2029 Future Total Traffic Volumes



6.2. Finding Summary

Based on the intersection capacity analysis, under the future total traffic conditions, all intersections considered in the analysis are expected to operate at acceptable levels of service, from overall intersection operational perspective, during both the morning and afternoon peak hours. The estimated queues can be accommodated within the available storage length. No critical movements have been identified and therefore no improvements are required at this time.

The proposed site accesses are expected to operate at acceptable levels of service with maximum of one vehicle every 8 minutes during the peak hours. No long delays or queues are expected under the future total conditions.

As previously indicated, a Transportation Impact Study was prepared by HDR dated September 20. 2021 on behalf of Smart Centres Inc. & Revera entitled “Garden Drive Retirement Residence” for the same site as part of the previous application. In this Study, HDR has analyzed several more intersections east and west of the proposed development intersections. The analysis indicates that these intersections are expected to operate at acceptable levels of service with no physical improvements at the intersections considered in the analysis.

Given that the proposed development is very small and is expected to have negligible impact on the surrounding intersections, the inclusion of the two immediately adjacent intersections to the proposed development is appropriate as the proposed development can improve these intersections if required. It should be noted that the proposed development has no control over the improvements at the other intersections are these intersections are located further from the proposed development and are mostly impacted by the background traffic growth and background development traffic.

Table 8 – 2029 Future Total Levels of Service

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour			Available Storage Length (m)
		LOS (v/c)	Delay (s)	95th Queue (m)	LOS (v/c)	Delay (s)	95th Queue (m)	
Lakeshore Road W/ Garden Drive (unsignalized)	EB – L	A (0.01)	9	0	A (0.02)	10	0	~20
	EB – TR	A (0.40)	0	0	A (0.35)	0	0	~60
	WB – L	A (0.00)	0	0	A (0.00)	9	0	~20
	WB – TR	A (0.32)	0	0	A (0.49)	0	0	~83
	NB – LTR	A (0.00)	0	0	D (0.01)	28	0	~15
	SB – LTR	C (0.09)	17	2	D (0.14)	30	4	~173
Rebecca Street Garden Drive (unsignalized)	EB – L	A (0.00)	8	0	B (0.00)	11	0	~15
	EB – TR	A (0.45)	0	0	A (0.33)	0	0	~70
	WB – L	A (0.01)	9	0	A (0.01)	9	0	~30
	WB – TR	A (0.28)	0	0	A (0.41)	0	0	~80
	NB – LTR	E (0.38)	37	13	D (0.18)	31	5	~173
	SB – LTR	D (0.08)	32	2	C (0.03)	23	1	~83

6.3. Traffic Signal Warrant Analysis

NexTrans has conducted traffic signal warrant analyses for the Lakeshore Road/Garden Drive and Rebecca Street/Garden Drive intersections based on Ontario Traffic Manual Book 12 for Justification 7 (Projected Volumes) for the major internal intersections (**Appendix H**). The analysis indicates that these intersections are not numerically warranted for traffic signals based on Justification 7 due to low turning movement volumes under the study horizon year considered. Typically, traffic signals should only be installed when warranted to avoid traffic congestion and unnecessary queues.

6.4. Walking Mode Assessment

As indicated, under the existing conditions, sidewalks are available on both sides of Rebecca Street and Lakeshore Road W. However, sidewalk is only available on the west side of Garden Drive from Rebecca Street to the southerly limit of the Wyndham Place Condominium. Between the condo access and Lakeshore Road W, there is an existing curb-face paved asphalt area acting a continuous sidewalk to Lakeshore Road W. A proper sidewalk can be provided once these existing properties are redeveloped in the future.

As part of the proposed development, sidewalk will be provided on the east side of Garden Drive along the entire frontage of the site. Sidewalk will be designed and provided as per the Town of Oakville standards.

In addition, sidewalks will be provided on both sides of each block that connect each unit to the sidewalk on Garden Drive. This provision is sufficient to provide mobility for each unit.

6.5. Cycling Mode Assessment

Currently, there are dedicated cycling lanes along Lakeshore Road W between Dorval Drive and Kerr Street, and Rebecca Street between Southview Road and Navy Street. There is also a multi-use trail along Dorval Drive from Lakeshore Road W to Upper Middle Road W.

NexTrans has reviewed the Town's 2017 Active Transportation Master Plan (ATMP). **Figure 12** illustrates the existing and proposed cycling network in the study area.

Based on this review, it is indicated that the Town of Oakville is actively planning and building additional cycling infrastructure in the area such as cycling facilities on Keer Street and Stewart Street. With the completion of these network, the residents from the proposed development can use these facilities as an alternate mode of transportation instead of driving private vehicles to work or to school.

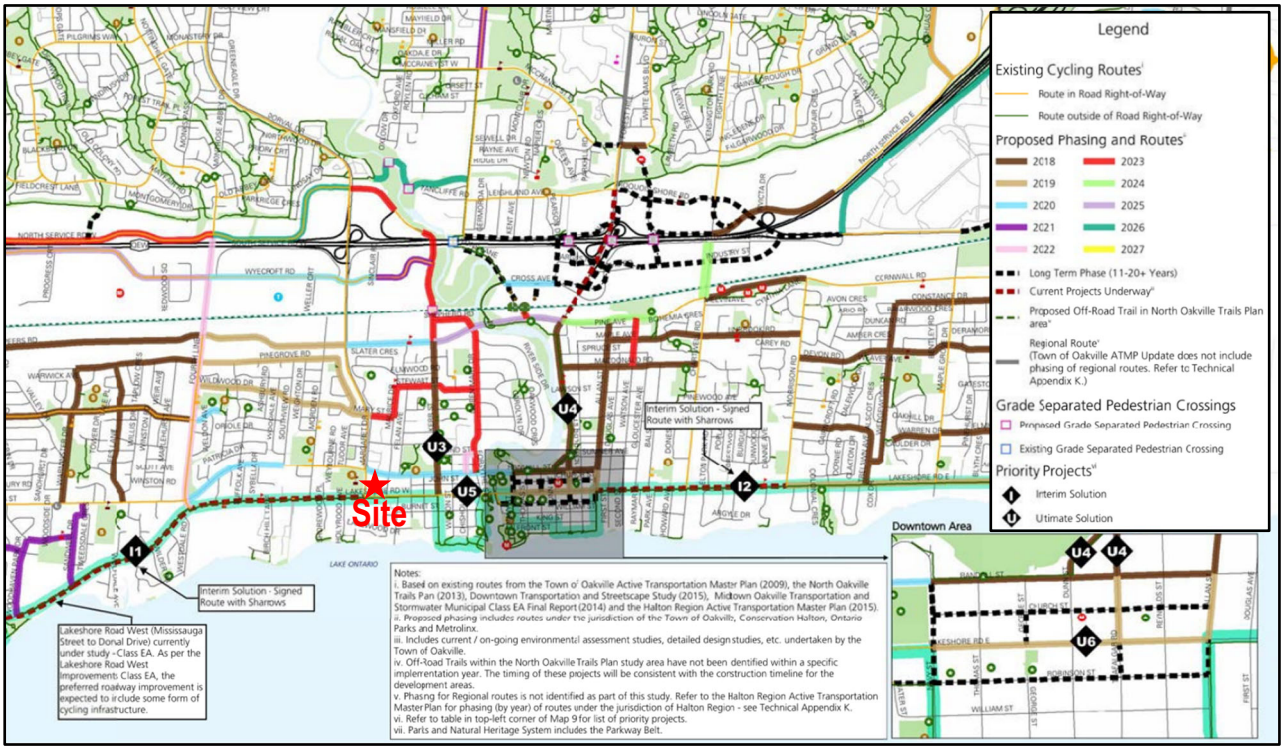
As part of the proposed development, a total of 48 long-term and 20 short-term bicycle parking spaces will be proposed, for a total of 68 bicycle parking spaces. This provision will encourage residents to use active transportation modes to work, school and discretionary trips instead of single-occupant-vehicle trips.

6.6. Transit Mode Assessment

As indicated in Table 4 of Section 5.2 of this Study, the existing transit modal split based on 2016 TTS data is about 10% during both morning and afternoon peak hours. If 10% modal split is applied, the proposed development is expected to generate 5 total two-way transit trips (2 inbound and 3 outbound) and 7 total two-way transit trips (4 inbound and 3 outbound) during the morning and afternoon peak hours, respectively.

As the estimated transit ridership for the proposed development is very low, the two existing transit routes (Oakville Transit Bus Routes 14 & 14A Lakeshore West and 15 Bridge) can accommodate these trips. It is anticipated that no additional transit improvements in the area are required to accommodate the proposed development.

Figure 12 – Town of Oakville Proposed Pedestrian Network Phasing



7.0 SITE PLAN REVIEW

7.1. Proposed Development Access

A full moves access will be provided for each proposed townhouse block, with a total of 4 full moves access onto Garden Drive. This is consistent with the existing conditions on the west side of Garden Drive.

The assessment and intersection capacity analysis indicates that the proposed accesses are expected to operate at acceptable levels of service with minimum delay or queue. The corner clearance and throat length corner are also appropriate and meet the Transportation Association of Canada Guidelines (TAC). The recommended lane configurations include for each proposed full moves access:

- One inbound lane (minimum 3.0 m width);
- One outbound lane (minimum 3.0 min width); and
- One shared southbound through/left lane and one northbound shared through/right on Garden Drive

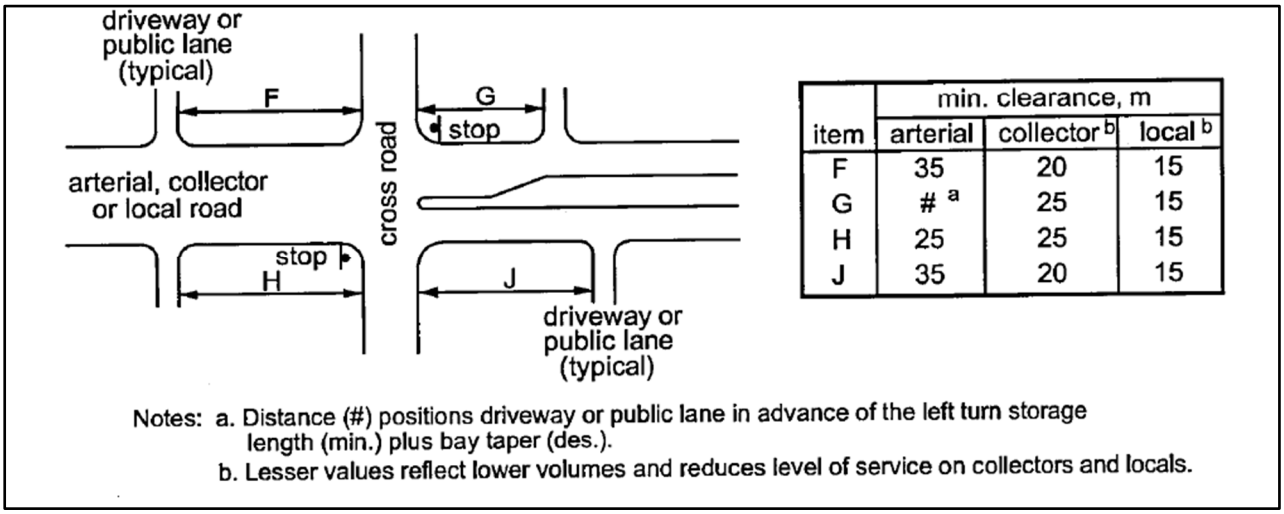
7.2. Vehicle Turning Movement Analysis

Passenger car turning movement analysis is provided in **Figures 20** through **22** of this Study. The analysis is provided to demonstrate that passenger cars can enter and exit the proposed parking spaces and the proposed accesses onto Garden Drive.

7.2.1. Corner Clearance

In accordance with Section 8.8.1 and Figure 8.8.2 of the TAC 2017 (as illustrated in **Figure 13** below), the minimum corner clearance at an intersection is 15m for a local road. It should be noted that all corner clearances provided by the development exceed 21m from Lakeshore Road W and 13m from the adjacent existing development (as illustrated in **Figure 14**). Therefore, the proposed site access corner clearances exceed the minimum TAC 2017 *suggested* corner clearance guideline of 15m from a public roadway such as Lakeshore Road W.

Figure 13 – Corner Clearance at Major Intersection



item	min. clearance, m		
	arterial	collector [b]	local [b]
F	35	20	15
G	# [a]	25	15
H	25	25	15
J	35	20	15

Notes: a. Distance (#) positions driveway or public lane in advance of the left turn storage length (min.) plus bay taper (des.).
b. Lesser values reflect lower volumes and reduces level of service on collectors and locals.

Source: TAC 2017 Figure 8.9.2

7.2.2. Sightline

Based on Table 9.9.4 of the 2017 Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads, a stopping sight distance of 50-65m is required for a 40-50km design speed. This is the design speed for Garden Drive as a local road. Our analysis indicates that the existing Garden Drive is relative flat and straight with no horizontal curves or slopes. Therefore, the proposed site accesses can achieve this required stopping sight distance of 50-65m. **Figure 15** illustrates the sightlines.

7.2.3. Daylight Triangle

The proposed development will provide approximately 3m x 3m daylight triangle at the north-east corner of the Lakeshore Road W/Garden Drive intersection. This has been illustrated in the proposed site plan.

7.3. Solid Waste Management

The solid waste will be pick-up on the curb side along Garden Drive. This is consistent with other existing developments along Rebecca Street, Garden Drive, Margeret Drive.

7.4. Proposed Pavement Marking and Signage Plan

The proposed signage and pavement marking plan is illustrated in **Figure 18**. This plan will be finalized as part of the final site plan submission if approved by the Town in principle.

Figure 14 – Proposed Site Access Corner Clearance

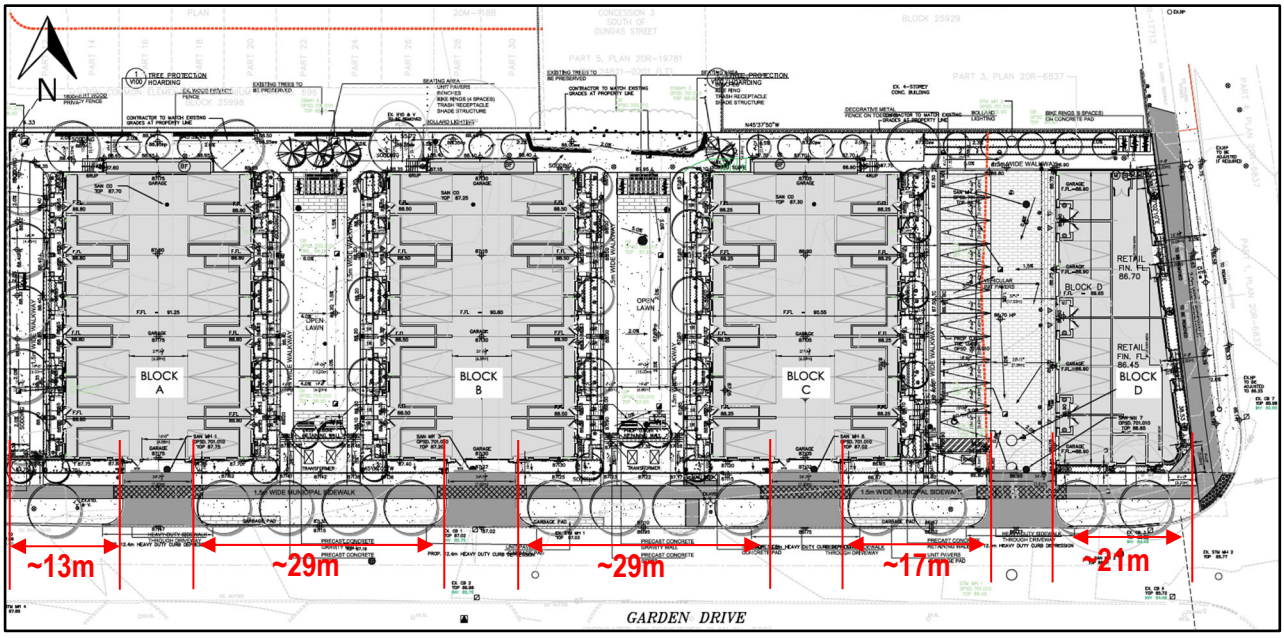
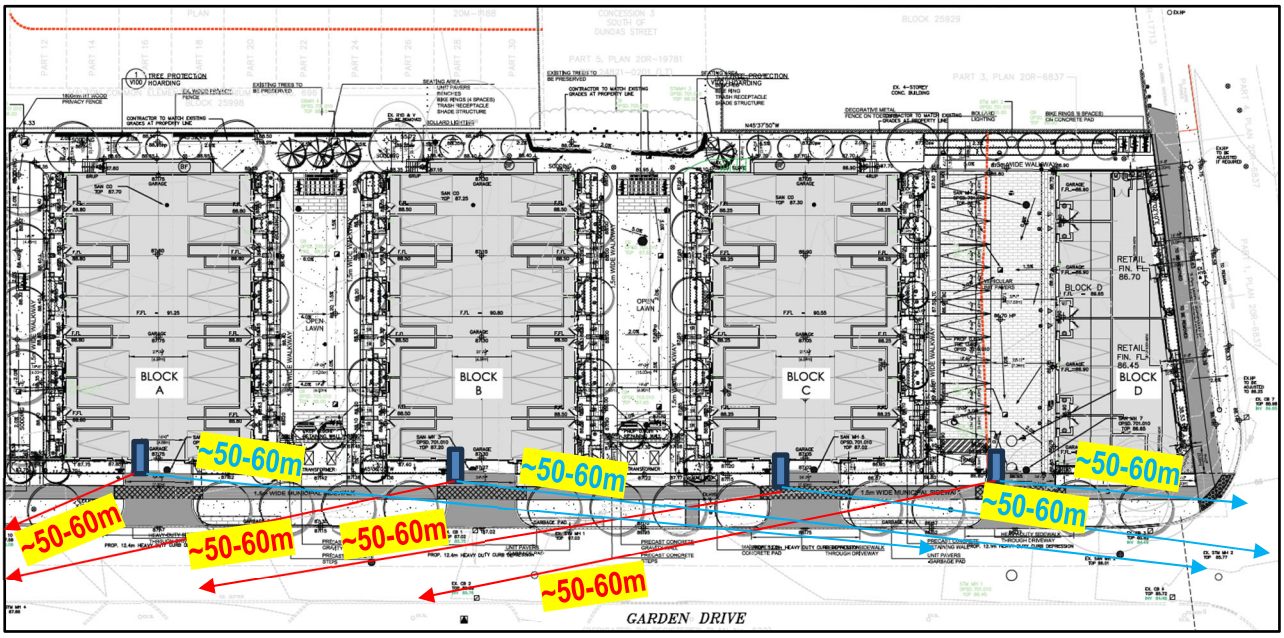


Figure 15 – Proposed Site Access Sightlines



7.5. Traffic Calming

Given that Garden Drive has a short segment between Lakeshore Road W and Rebecca Street, there is very limited chance for speeding through this road. In addition, with the proposed development accesses and existing accesses on both sides of Garden Drive that will create more frictions, it is anticipated that speeding will not be an issue and therefore no traffic calming is required under this horizon year or as part of this proposed development.

8.0 VEHICLE PARKING ASSESSMENT

8.1. Zoning By-law Vehicle Parking Requirement

The Town of Oakville Zoning By-law No. 2014-014 (Consolidated to December 12, 2023) has been reviewed for vehicle parking requirements. **Table 9** below summarizes the vehicle parking requirements based on the noted Zoning By-law requirements.

Table 9 – Town of Oakville Zoning By-law Vehicle Parking Requirements

Unit Type	No. of Unit/GFA	Parking Rates	Parking Requirement
Back-to-back Townhouse	42 units	1.50 spaces/unit	63 spaces
Multiple Dwelling/Apartment	6 units	1.05 spaces/unit	7 spaces
Visitor	6 units	0.20 spaces/unit	1 space
Retail	171.15 m^2	1.00 space/40m^2	5 spaces
Total			***76 spaces***

Based on the assessment noted above, the proposed development would be required to provide a total of 76 vehicle parking spaces, inclusive of residential, visitor and retail uses.

8.2. Recommended Vehicle Parking Requirement for the Proposed Development

Table 10 summarizes the recommended parking requirements for the proposed development, based on the context of the proposed development.

Table 10 – Recommended Vehicle Parking Rates for the Proposed Development

Unit Type	No. of Unit/GFA	Maximum Parking Rates	Parking Requirement
Back-to-back Townhouse	48 townhouse units	1.40 spaces/unit	59 spaces
Multiple Dwelling/Apartment	6 apartment units	1.00 spaces/unit	6 spaces
Visitor and Commercial Use	6 apartment units 171.15 m^2	0.20 spaces/unit 1.00 spaces/40m^2	11 spaces
Total			***76 spaces***

Based on the recommended parking rates noted above, the proposed development generally meets the Zoning By-law parking requirements of 76 vehicle parking spaces. However, there is a slight re-balancing where some "residential" spaces are being allocated as "visitor" spaces. Therefore, it is acceptable from overall parking requirement perspective with a total 76 spaces, including 65 residential and 11 visitor spaces

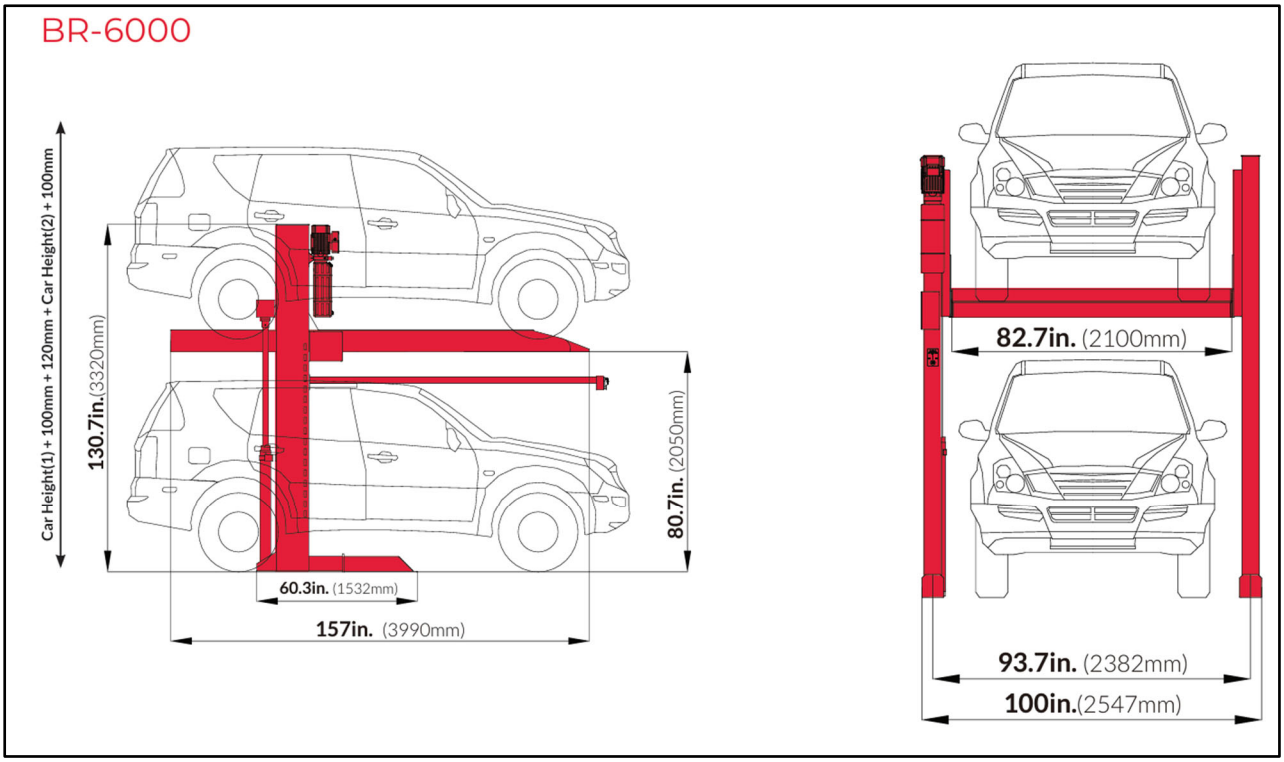
8.3. Proposed Vehicle Parking Stacker

8.3.1. Model and Dimensions

The proposed development will use the vehicle parking stacker product from Babcopark (https://babcopark.ca) model BR-6000. It should be noted that the parking stacker model may change dependent on manufacturing and supply availability at the time of construction. However, if this is the case, a parking stacker system with comparable specifications to the Babco product would be selected.

Figure 16 below illustrates the model dimensions. The sale brochure for this model is included in **Appendix I**.

Figure 16 – Vehicle Parking Stacker Model and Dimensions



8.3.2. Operations

The following is a summary of the vehicle parking stacker operations. It should be noted that a demonstration video can be found in the following link (https://babcopark.ca/products/2-post-double-stacker/#single/0). The entire operation takes approximately 30 seconds to complete.

- Drive vehicle backward onto appropriate position of platform. Collision with the control arm and side beams should be avoided.
- Put brake on after vehicle is parked on targeted position to avoid any accidental movement.
- Open the car door carefully to avoid collision, paying attention to waving plates and side beams.
- Raise lift to appropriate position and platform will lock automatically.
- Before another vehicle is parked under platform, please check and make sure vehicle is lower than platform height to avoid damage.

All safety procedures and installation requirements are included in **Appendix I** of this Study Update.

Figure 19 illustrates the vehicle movement diagrams to demonstrate the maneuverability of the passenger vehicles in and out of the vehicle parking garage and vehicle parking stackers. The vehicle movement diagram also illustrates the functionality of all parking spaces in the proposed garage. However, it should be noted the most eastern (last) space in each garage cannot accommodate a parking stacker as the vehicle movement diagram demonstrates that for functionality of that space the entire width of the parking space is needed. Accordingly, stackers have not been shown in the eastern (last) spaces in the parking garage on the Site Plan.

8.3.3. Queueing

It is our understanding that the Town staff has some concerns with potential queuing due to the operation of the vehicle parking stackers. As indicated above, based on the video demonstration related to the operations of the vehicle parking stacker model use in this project (https://babcopark.ca/products/2-post-double-stacker/#single/0), the entire operation takes approximately 30 seconds to complete. Therefore, no queues will be expected for the following reasons:

- The expected operation of the stacker only takes about 30 seconds to complete; and
- There are only three driveways that will be equipped with parking stackers. Under the worst-case scenario, it is expected that there will be only 20 vehicles that will be entering and exiting these stackers (one vehicle every three minutes). Therefore, there are sufficient time for vehicle to access these stackers without any queueing issue. This is a highly unlikely scenario.

8.3.4. Existing Applications

Based on our research, there are several locations in the GTA that are currently using vehicle parking stackers:

- 763 Woodbine Ave, Toronto, ON M4E 2J4 – currently using Klaus parking stacker system (https://klausparking.com)
- 2000 Queen St E, Toronto, ON M4L 1J2
- NOBU hotel downtown Toronto – 12 units Babco parking stacker system
- 79 Elder Avenue in the City of Toronto – Using the same Babco parking stacker system

9.0 BICYCLE PARKING ASSESSMENT

9.1. Bicycle Parking Requirement

Table 11 summarizes the Town of Oakville Zoning By-law No. 2014-014 bicycle parking requirement for the proposed development.

Table 11 – Bicycle Parking Space Requirements

Land Use	No. of Unit / GFA	Short-term		Long-term		Total
		Rates	Spaces	Rates	Spaces	
Residential	48 units	0.25 spaces/unit	12	1.0 spaces/unit	48	48
Retail	171.15 m^2	1.0 spaces/1000 m^2	0	NA	0	0

Based on the assessment provided above, the proposed development is required to provide a total of 48 bicycle parking spaces for residential and 12 for visitor, for a total of 60 bicycle parking spaces. However, the proposed development will provide a total of 68 bicycle parking spaces, including 48 long-term and 20 short-term spaces. The long bicycle parking spaces will be provided within the residential units and short-term/visitor bicycle parking spaces will be provided at a convenient location on-site, as illustrated in the proposed site plan.

9.2. Outdoor Bicycle Parking

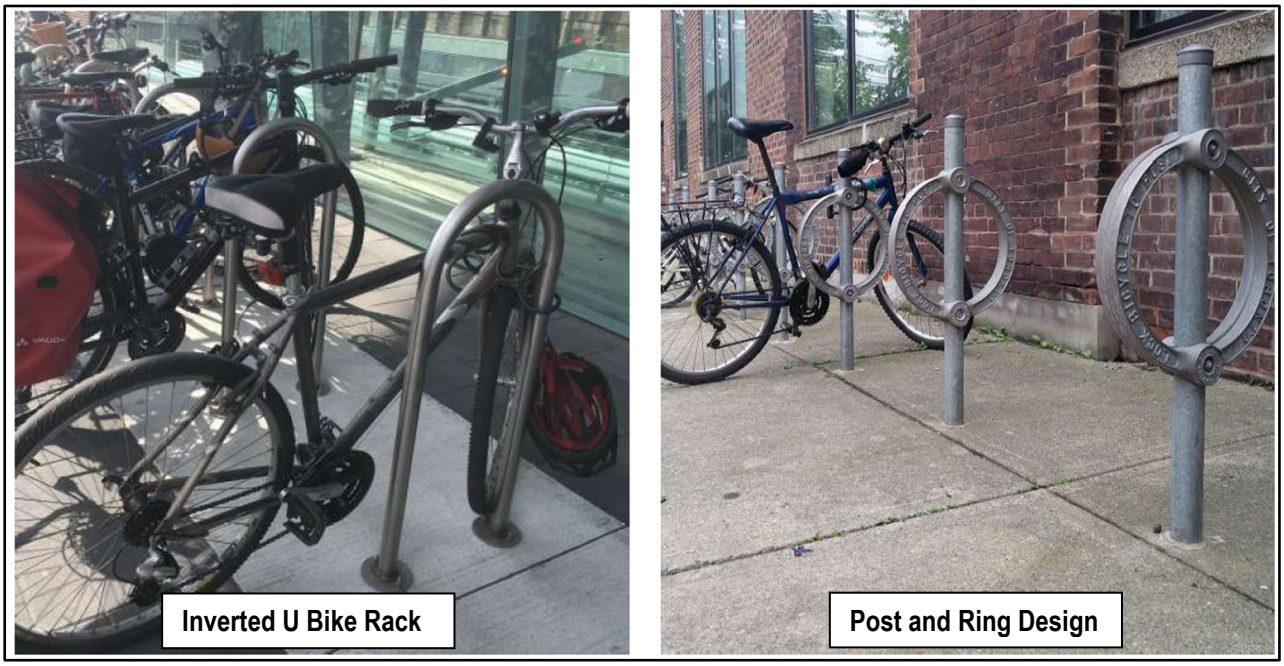
Based on our review of the proposed development context and Ontario Traffic Manual Book 18, the following recommendations and requirements are provided when choosing outdoor bicycle parking:

- Be installed on a hard surface and be held firmly in place
- Support the bicycle upright by its frame in two places
- Prevent the bicycle from tipping over

- Be made of industrial grade materials or galvanized steel
- Enable the bicycle frame and one or both wheels to be secured
- Allow front-in parking so that a 'U-lock' may be used to secure the front wheel and the down tube of an upright bicycle
- Allow back-in parking so that a 'U-lock' may be used to secure the rear wheel and seat tube of the bicycle
- Allow use of a variety of 'U-lock' sizes by avoiding tubes with cross sections larger than 50 mm; and
- Be space efficient, allowing many bicycles to be parked in a small area without appearing cluttered or protruding into the accessible pedestrian route

To meet the requirements and recommendations noted above, we recommend that the proposed development use simple post and ring or inverted U bike rack design. **Figure 17** illustrates the recommended design.

Figure 17 – Recommended Bicycle Parking Design



10.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a co-ordinated series of actions aimed at maximizing the people moving capability of the transportation system. Intended to reduce single-occupant auto use, potential TDM measures include: TDM supportive land use, bicycle and pedestrian programs and facilities, public transit improvements, preferential treatments for buses and ridesharing, where appropriate.

As the gas price is record high, along with increasing inflation, the residents will automatically find ways to conduct hybrid working as noted in Section 9 of this Study, carpool or taking transit to curb the costs of living. It is the responsibility of the Region and the Town to provide these major infrastructure options for residents, such as providing public transit and active transportation facilities, which are beyond the scope and ability of the proposed development.

The following TDM incentives are recommended for the proposed residential development, based on NexTrans' review of the development area context:

- Given that parking management is the best TDM measures, the proposed development should implement the recommended parking rates provided in this Study based on the comprehensive parking justifications to support TDM and minimize the numbers of single-occupant-vehicle trips;
- The proposed development only provides the recommended vehicle parking rates outlined in this Study;
- Provide direct shared pedestrian/bicycle connections from the proposed development to Garden Drive as illustrated in the proposed site plan, where appropriate;
- Provide a total of 68 bicycle parking spaces on-site, including 48 long-term and 20 short-term spaces; and
- Provide information package for new residents in a form of an electronic letter or email. The information package will include Oakville Transit schedules, GO Transit schedules, and community and cycling maps

These measures will be implemented through site plan submission, agreement and prior to unit occupancy.

11.0 CONCLUSIONS / FINDINGS

11.1. Study Conclusions

The findings and conclusions of the analysis are as follows:

- The proposed development is expected to generate 48 total two-way vehicle trips (15 inbound and 33 outbound) and 67 total two-way vehicle trips (39 inbound and 28 outbound) during the morning and afternoon peak hours, respectively.

- Based on the intersection capacity analysis, under the existing, future background and future total traffic conditions, all intersections considered in the analysis are expected to operate at acceptable levels of service, from overall intersection operational perspective, during both the morning and afternoon peak hours. The estimated queues can be accommodated within the available storage length. No critical movements have been identified and therefore no improvements are required to accommodate the proposed development.

  The proposed site accesses are expected to operate at acceptable levels of service with maximum of one vehicle every 8 minutes during the peak hours. No long delays or queues are expected under the future total conditions.

- As the existing transit modal split based on 2016 TTS data is about 10% during both morning and afternoon peak hours, if 10% modal split is applied, the proposed development is expected to generate 5 total two-way transit trips (2 inbound and 3 outbound) and 7 total two-way transit trips (4 inbound and 3 outbound) during the morning and afternoon peak hours, respectively.

  As the estimated transit ridership for the proposed development is very low, the two existing transit routes (Oakville Transit Bus Routes 14 & 14A Lakeshore West and 15 Bridge) can accommodate these trips. It is anticipated that no additional transit improvements in the area are required to accommodate the proposed development.

- The area will also have a complete network of active transportation facility in the future as identified in the Town of Oakville Active Transportation Master Plan. Therefore, no improvements are required beyond the identified plans to accommodate the proposed development.

- Based on the applicable Zoning By-law, the proposed development would be required to provide a total of 76 vehicle parking spaces, inclusive of residential, visitor and retail uses. The proposed development generally meets the Zoning By-law parking requirements of 76 vehicle parking spaces. However, based on the recommendations of this Study, there is a slight re-balancing where some "residential" spaces are being allocated as "visitor" spaces. Therefore, it is acceptable from overall parking requirement perspective with a total 76 spaces, including 65 residential and 11 visitor spaces.

- Based on the assessment provided in this Study, the proposed development is required to provide a total of 48 bicycle parking spaces for residential and 12 for visitor, for a total of 60 bicycle parking spaces. However, the proposed development will provide a total of 68 bicycle parking spaces, including 48 long-term and 20 short-term spaces. The long bicycle parking spaces will be provided within the residential units and short-term/visitor bicycle parking spaces will be provided at a convenient location on-site, as illustrated in the proposed site plan.

- Solid waste pick-up will be conducted along Garden Drive, similar to the existing developments in the area.

11.2. Study Recommendations

Based on the findings of this Study, the following recommendations are provided:

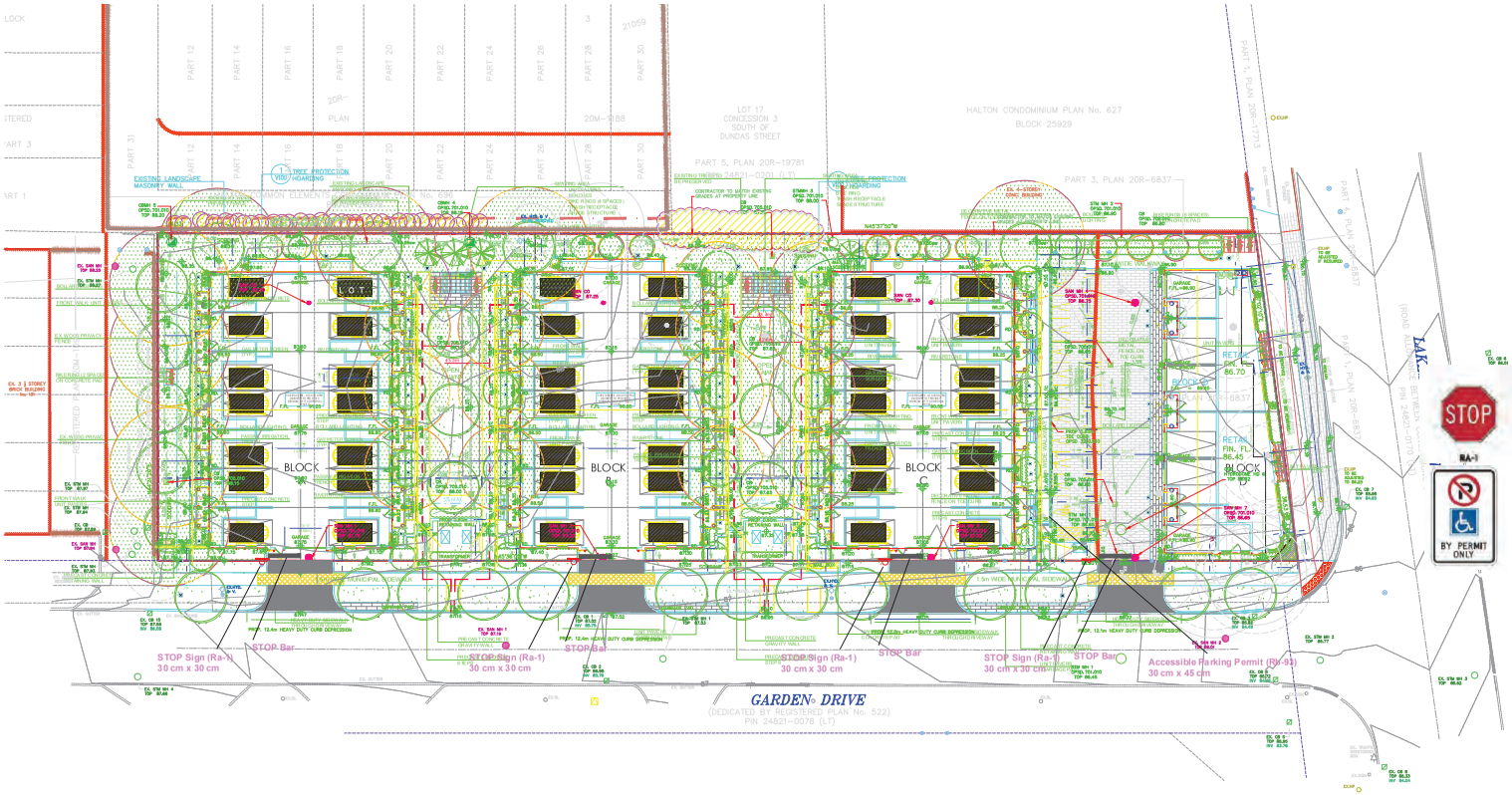
- The Town and the Region approve the proposed residential mixed-use development;

- The proposed development provides direct shared pedestrian/bicycle connections from the proposed development to Garden Drive and Lakeshore Road W, where appropriate;

- Only provide a total of 76 vehicle parking spaces, including 65 residential spaces and 11 visitor spaces;

- Provide a total of 68 bicycle parking spaces on-site, including 48 long-term and 12 short-term spaces; and

- The proposed development implements the TDM measures and incentives identified in this report to support active transportation and transit and to reduce the numbers of single-occupant-vehicle trips to and from the proposed development



KEY PLAN

BENCHMARK

REVISIONS

NO.	REVISION	DATE	BY

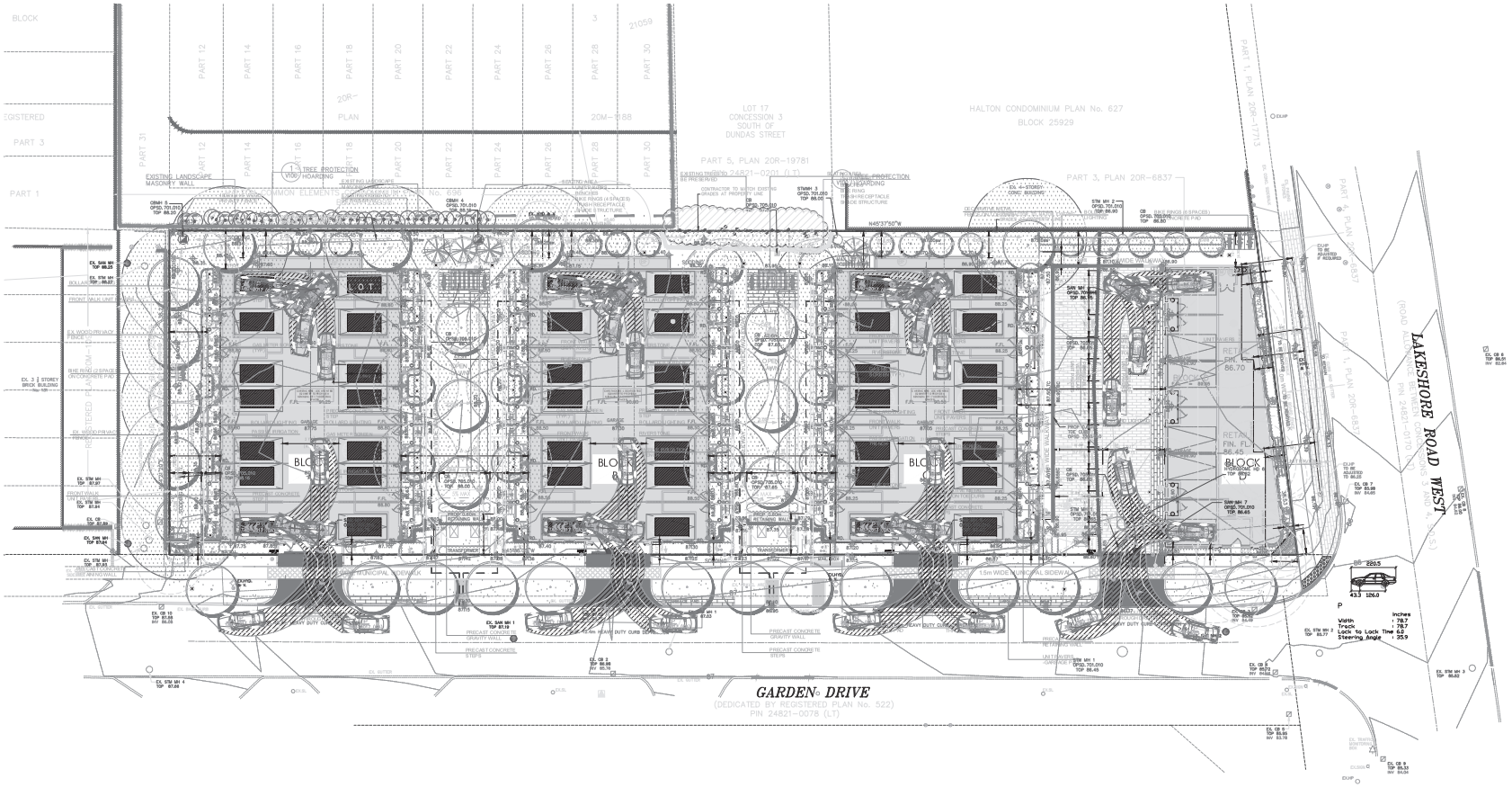
STAMP

nexTrans CONSULTING ENGINEERS
Suite 201, 920 Industrial Parkway South
Aurora ON L4G 6W8
Tel: 905-503-2563
Web: www.nextrans.ca

PROJECT NAME:
Residential Development
109 Garden Drive
Town of Oakville

DRAWING TITLE:
Signage and Pavement Marking Plan

DESIGN BY: K.A.	DATE: November 6, 2024
CHECKED BY: R.P.	PROJECT NO. NT-24-100
DRAWN BY: K.A.	
SCALE: NTS	DRAWING NO. Figure 18



KEY PLAN

BENCHMARK

REVISIONS

NO.	REVISION	DATE	BY

STAMP

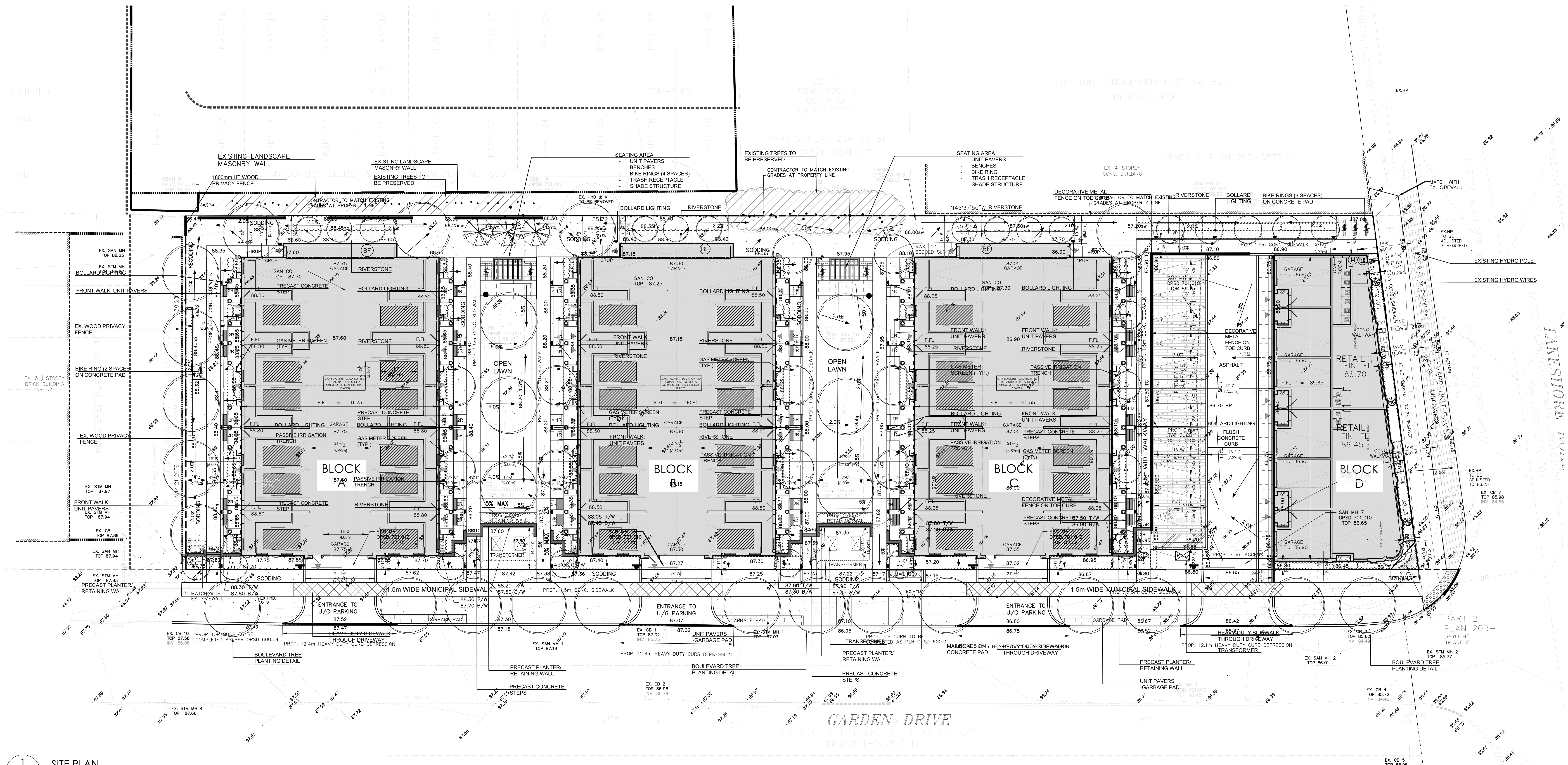
nexTrans CONSULTING ENGINEERS
Suite 201, 920 Industrial Parkway South
Aurora ON L4G 6W8
Tel: 905-503-3363
Web: www.nextrans.ca

PROJECT NAME:
Residential Development
109 Garden Drive
Town of Oakville

DRAWING TITLE:
AutoTURN Analysis
P TAC-2017

DESIGN BY: K.A.	DATE: November 6, 2024
CHECKED BY: R.P.	PROJECT NO. NT-24-100
DRAWN BY: K.A.	
SCALE: NTS	DRAWING NO. Figure 19

Appendix A
Submitted Study Terms of Reference



1 A1.1 SITE PLAN
SCALE : 1/16"= 1'-0"

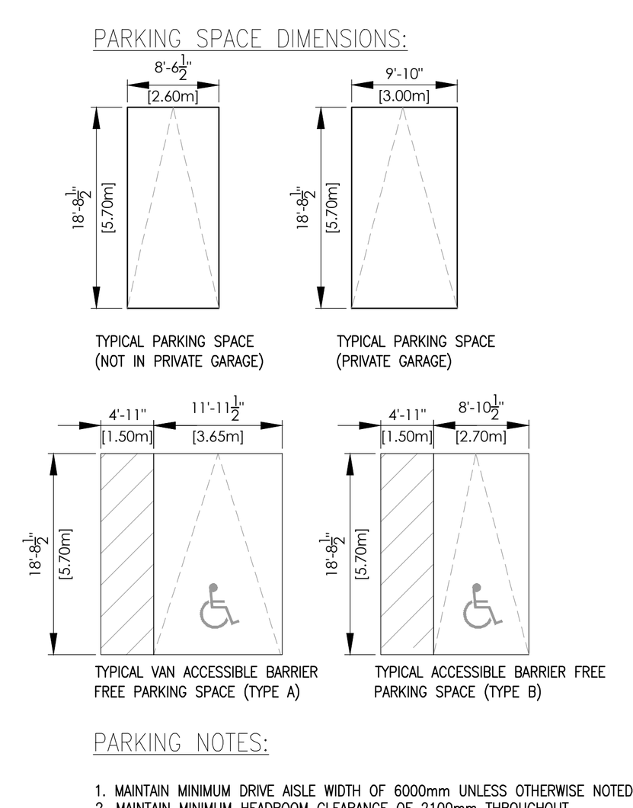
	BLOCK A	BLOCK B	BLOCK C	BLOCK D	TOTAL
SITE AREA					
GROSS (sm)					4988.73
NET (LESS ROAD WIDENING) (sm)					4984.27
LOT COVERAGE (sm)	706.54	706.54	706.54	398.14	2517.76
					51%
GFA					
RESIDENTIAL (sm)	2368.43	2368.43	2368.43	1111.16	8216.44
COMMERCIAL (sm)				171.15	171.15
TOTAL GFA (sm)					8387.59
NET FSI					1.68
UNITS					
RESIDENTIAL	14	14	14	6	48
COMMERCIAL				2	2
HEIGHT (m) (FROM AVERAGE GRADE [87.04] @GARDEN DRIVE)	15.87	15.42	15.17	15.02	
ROOF AREA (sm)	719.28	719.28	719.28	371.58	2529.42
MECH PENTHOUSE AREA (sm)	184.12	184.12	184.12	68.47	620.82
MECH PENTHOUSE AREA (% OF ROOF AREA)	25.6%	25.6%	25.6%	18.4%	24.5%
STOREYS (PLUS ROOF TERRACE ACCESS)	4	4	4	4	
SETBACKS (m)					
SOUTH	1.19	1.19	1.19	0.9	
NORTH -1st STOREY	3.03	2.99	2.99	4.3	
NORTH-2nd-4th STOREY	4.5	4.5	4.49	4.3	
EAST-1st STOREY				1.2	
EAST-2nd-4th STOREY				2.12	
WEST	6				
BETWEEN BLOCK A AND B					15
BETWEEN BLOCK B AND C					15
BETWEEN BLOCK C AND D					17.55
PARKING					
RESIDENTIAL	14	14	14	6	48
RESIDENTAIL (STACKERS)	TBD	TBD	TBD		17
COMMERCIAL/VISITOR				11	11
TOTAL PARKING					76
BARRIER FREE (VISITOR/COMMERCIAL)					
TYPE A				1	1
TYPE B				0	0
BICYCLE PARKING					
LONG TERM	14	14	14	6	48
SHORT TERM					20
DRIVEWAY WIDTH (PROPERTY ACCESS) (m)	7.5	7.5	7.5	7.5	
LANDSCAPE AREA (sm)					2011.74
%					40.4%
COMMUNAL OUTDOOR AMENITY SPACE (sm)					344.50
%					6.9%
SURFACE PARKING AREA (sm)					427.88
%					8.6%

2 A1.1 PROJECT STATS
SCALE : NTS

METRIC	BLOCK A, B, C			BLOCK D						Total residential GFA
	UNIT 1/14	TYP. INTERIOR UNITS	UNIT 7/8	UNIT 43	UNIT 44	UNIT 45	UNIT 46	UNIT 47	UNIT 48	
GFA (sq.m)										
Garage Entry Area	12.58	12.58	12.58	9.92	9.92	9.92	9.92	9.92	9.92	
Ground Floor	51.24	48.53	50.25	66.24	64.33	56.66	56.66	49.04	50.49	
Second Floor	51.24	48.53	50.25	66.24	64.33	56.66	56.66	49.04	50.49	
Third Floor	44.01	45.52	44.01	55.61	57.23	50.48	49.57	42.85	40.57	
Roof terrace	12.48	13.29	13.29	13.00	13.00	13.00	13.00	8.23	8.23	
Total GFA (sq.m)	171.56	168.45	170.40	211.02	208.82	186.72	185.81	159.08	159.71	
Total block GFA	2368.43			1111.16						8216.44

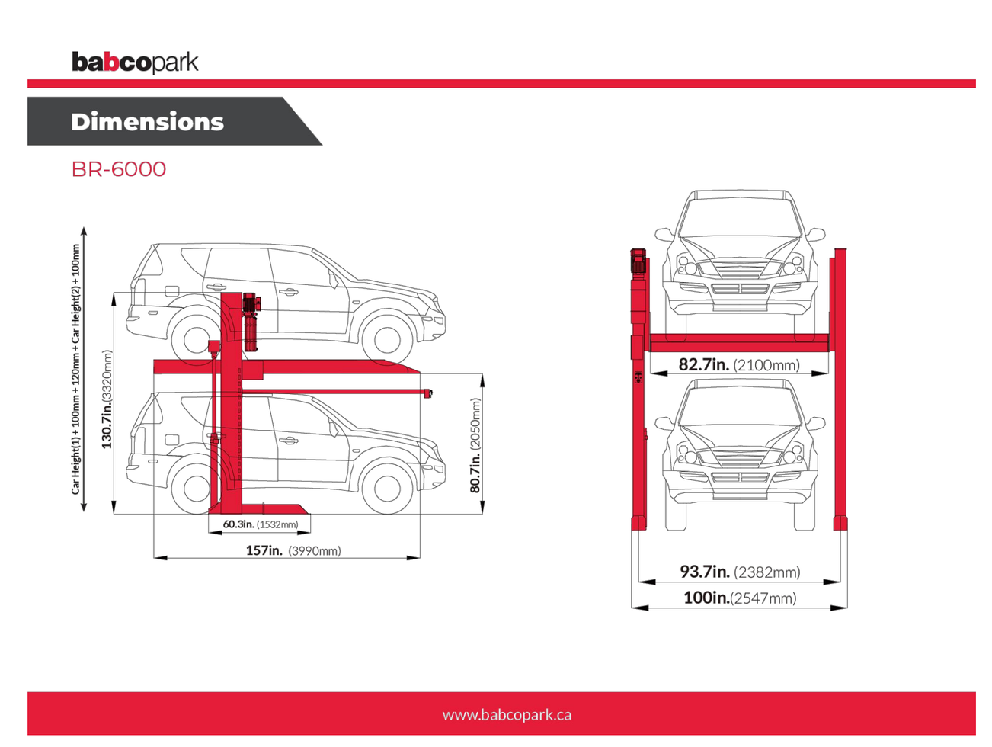
COMMERCIAL UNIT 1	COMMERCIAL UNIT 2	Total Commerical GFA (sq.m)
58.13	113.02	171.15

3 A1.1 GFA CALCS
SCALE : NTS

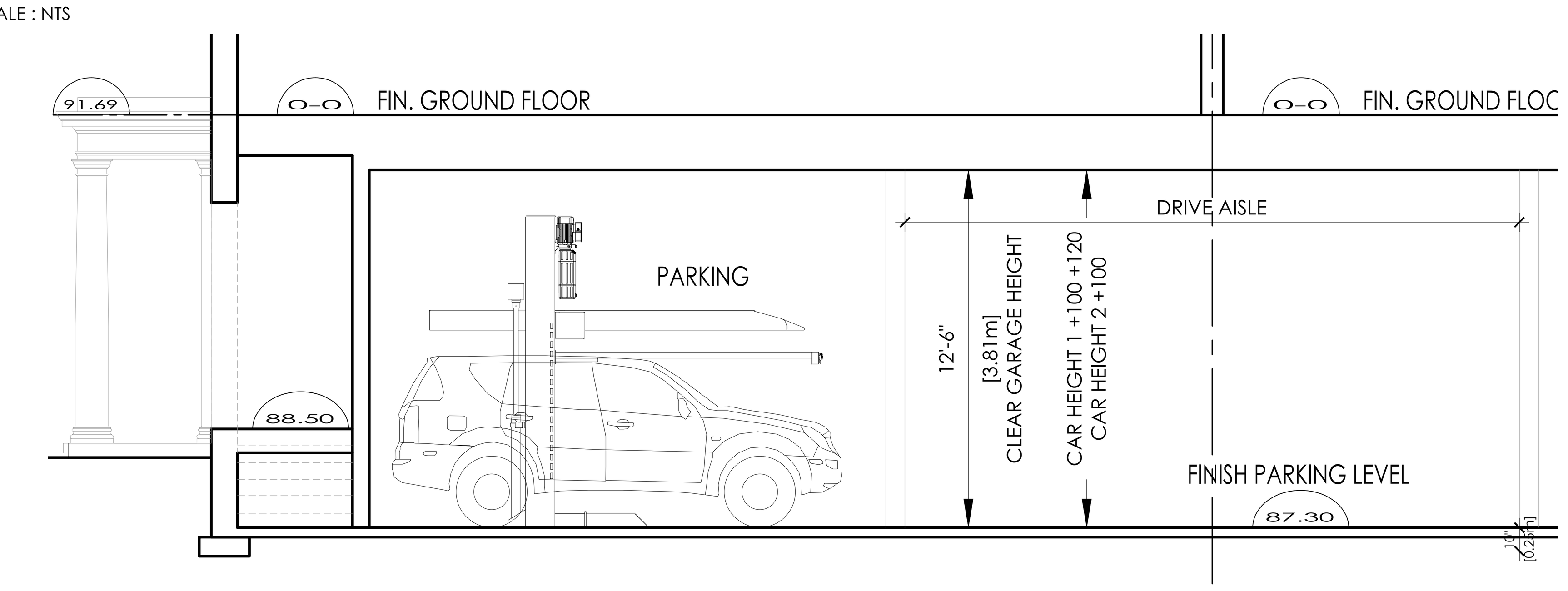


5 A1.1 TYP CAR PARKING SPACE DIMENSIONS
SCALE : NTS

4 A1.1 CAR STACKER DETAILS
SCALE : NTS



CAR STACKERS - LOCATION TBD (QUANTITY TO PROVIDE A MINIMUM OF 17 ADDITIONAL SPACES)



6 A1.1 TYP SECTION THROUGH CAR STACKER
SCALE : NTS

Issued for Construction

Signature:

Date:

No.	Revision	Date

No.	Issued For	Date d/m/y
03	ISSUED FOR REV ZBA/SPA	08/11/24
02	PARKING CHANGES	16/10/24
01	ZBA SUBMISSION	08/07/24

Drawing Title

SITE PLAN

Project

OAKVILLE GARDEN RESIDENCES CORP.

GARDEN DRIVE
OAKVILLE, ONTARIO

RICHARD WENGLE
ARCHITECT INC.

102 Avenue Road
Toronto, Ontario M5R 2H3
T: (416) 787-7575/F: (416) 787-0635
e-mail: mail@rwainc.ca

N

Scale: AS SHOWN
Drawn by: JZ/NT
Checked by: RW
Project No.: 2417

A1.1

Plotting Date: JULY 08 2024

Cad File Name: F:\CurrentProjectFiles\2024\2417

From: Sam Nguyen
Sent: May 30, 2024 11:49 AM
To: Syed Rizvi
Cc:
Subject: 109 Garden Drive, Oakville - Proposed TIS Terms of Reference
Attachments: 2417-Site plan 2024.05.23-.pdf

Hi Syed,

We have been retained to undertake a TIS to support a proposed mixed-use development located at 109 Garden Drive, in the Town of Oakville. Please find the attached conceptual plan, without prejudice, for your information and reference. The following is a proposed scope of the TIS that takes into consideration both the Town's Traffic Impact Study Guidelines (January 2015):

1. Study Area intersection:
    a. Garden Drive / Rebecca Street (unsignalized)
    b. Garden Drive / Lakeshore Road West (unsignalized)
2. Horizon Year
    a. Anticipated project completion by 2026-2027
    b. Analysis horizon year 2029 (*five-year horizon from 2024)*
3. Background Developments and Growth Rate
    a. Background corridor through traffic growth – assumed 2.0%or based on background studies
    b. To follow this link for active background applications Active Development Applications
4. Trip Generation
    a. ITE Trip Generation Manual 11th Edition
    b. Use engineering judgement, local knowledge, trip generation parameters and other data, where appropriate
5. Trip Distribution
    a. Extract 2016 TTS data based on the surrounding traffic zones or use existing trip distribution, where appropriate
    b. Use engineering judgement, catchment area or marketing information, where appropriate
6. Transportation Assessment
    a. Existing conditions
    b. Future background conditions; and
    c. Future total conditions
    d. The following tasks will be conducted:
        i. Intersection operation assessment for Auto Mode (using existing signal timing and optimize as necessary) *(use existing signal timings. If optimized timings are provided, they are to be provided in addition to the existing signal timings)*
        ii. Non-auto mode assessment (walking, cycling and public transit)
        iii. Proposed development access assessment
        iv. Vehicular and Bicycle Parking Assessment
        v. Internal Site Circulation and loading assessment
7. Transit, Active Transportation and TDM
    a. Conduct a review of the existing and proposed future transit network in the area. Based on these findings, appropriate recommendations will be provided to ensure adequate walking distances to/from the proposed development to transit stations/stops.
    b. Review the existing and proposed future active transportation network in the area. Based on these findings, NexTrans will identify missing gaps and additional interconnections and connections

from the proposed development to adjacent land uses, the Town's facilities, as well as to transit stations/stops.

c. A Transportation Demand Management (TDM) assessment will be undertaken to identify specific measures and programs to reduce single-occupant-vehicle trips to/from the proposed development. These TDM measures and programs may include but not limited to, Carpooling, Auto Share, Bike racks, Parking management strategies, etc. The TDM report will be completed and included as part of this Study for submission purposes submitted in accordance with the Town's requirements. *(The Applicant does not have to do a TDM report, but Transportation Planning requires:*
   - *Short-term bicycle parking within the property limits as per applicable Zoning Bylaw;*
   - *Long-term bicycle parking that is secure and shielded from the elements as per applicable Zoning Bylaw;*

d. *Transportation Planning recommends that the Applicant provides*
   - *Transit incentives;*
   - *Carshare spaces;*
   - *Bike repair station*

8. Parking Justification Study based on:
   - Policies
   - TDM
   - Proposed land use contexts

Thanks

Trang Nguyen (Sam)
Transportation Analyst

o: 905-503-2563 ext. 207
e: sam@nextrans.ca
w: www.nextrans.ca

NexTrans Consulting Engineers
A Division of NextEng Consulting Group Inc.
520 Industrial Parkway South, Suite 201
Aurora ON L4G 6W8

Appendix B
Existing Traffic Data and Signal Timing Plans

NexTrans
SUITE 201 520 INDUSTRIAL PARKWAY SOUTH
AURORA ONTARIO, L4G 6W8
CANADA

Turning Movement Count (2 . GARDEN DR & LAKESHORE RD W)

Start Time	Southbound GARDEN DR						Westbound LAKESHORE RD W						Northbound SOUTH ENTRANCE						Eastbound LAKESHORE RD W						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
07:00:00	0	0	0	0	1	0	0	25	0	0	0	25	0	0	0	0	2	0	0	46	2	0	0	48	73	
07:15:00	1	0	0	0	0	1	1	36	0	0	0	37	0	0	0	0	2	0	0	65	1	0	0	66	104	
07:30:00	1	0	0	0	2	1	0	37	0	0	1	37	0	0	0	0	0	0	0	69	1	0	1	70	108	
07:45:00	0	0	0	0	4	0	0	50	0	0	0	50	0	0	0	0	4	0	0	96	1	1	0	98	148	433
08:00:00	2	0	0	0	5	2	2	74	0	0	0	76	0	0	0	0	4	0	0	117	2	0	0	119	197	557
08:15:00	3	0	1	0	3	4	1	116	0	0	0	117	0	0	0	0	7	0	1	133	4	0	0	138	259	712
08:30:00	3	0	1	0	1	4	1	115	0	0	0	116	0	0	0	0	6	0	0	150	2	0	0	152	272	876
08:45:00	0	0	0	0	2	0	3	98	0	0	0	101	0	0	0	0	5	0	1	138	1	0	0	140	241	969
09:00:00	1	0	0	0	0	1	2	87	0	0	0	89	0	0	0	0	2	0	0	117	0	0	0	117	207	979
09:15:00	3	0	0	0	2	3	1	76	0	0	1	77	0	0	0	0	5	0	0	103	1	0	0	104	184	904
09:30:00	0	0	0	0	2	0	3	87	1	0	0	91	0	0	0	0	7	0	1	111	0	0	1	112	203	835
09:45:00	1	0	1	0	4	2	2	91	0	0	0	93	0	0	0	0	11	0	0	119	0	0	0	119	214	808
BREAK																										
16:00:00	1	0	0	0	2	1	1	177	1	0	0	179	0	0	1	0	3	1	1	136	1	0	0	138	319	
16:15:00	1	0	1	0	4	2	2	181	1	0	0	184	1	0	0	0	11	1	0	123	1	0	0	124	311	
16:30:00	0	0	1	0	2	1	2	146	0	1	0	149	0	0	0	0	4	0	0	124	0	0	0	124	274	
16:45:00	1	0	3	0	0	4	2	167	0	0	0	169	0	0	0	0	1	0	0	107	1	0	0	108	281	1185
17:00:00	1	0	0	0	2	1	1	163	0	0	0	164	0	0	0	0	4	0	0	132	2	0	0	134	299	1165
17:15:00	0	0	0	0	5	0	0	163	0	0	0	163	0	0	0	0	5	0	0	125	1	0	0	126	289	1143
17:30:00	1	0	1	0	3	2	2	129	0	0	0	131	0	0	0	0	5	0	0	119	0	0	0	119	252	1121
17:45:00	3	0	0	0	0	3	0	111	0	0	0	111	1	0	0	0	3	1	2	111	0	0	1	113	228	1068
18:00:00	1	0	1	0	2	2	3	140	0	0	0	143	0	0	0	0	6	0	0	115	2	0	0	117	262	1031
18:15:00	2	0	0	0	0	2	0	101	0	0	0	101	0	0	0	0	8	0	0	104	2	0	0	106	209	951
18:30:00	2	0	1	0	1	3	1	113	0	0	0	114	0	0	0	0	2	0	0	94	0	0	0	94	211	910
18:45:00	1	0	0	0	5	1	3	111	0	0	0	114	0	0	0	0	4	0	0	91	0	0	0	91	206	888
Grand Total	29	0	11	0	52	40	33	2594	3	1	2	2631	2	0	1	0	111	3	6	2645	25	1	3	2677	**5351**	-
Approach%	72.5%	0%	27.5%	0%		-	1.3%	98.6%	0.1%	0%		-	66.7%	0%	33.3%	0%		-	0.2%	98.8%	0.9%	0%		-	-	-
Totals %	0.5%	0%	0.2%	0%		0.7%	0.6%	48.5%	0.1%	0%		49.2%	0%	0%	0%	0%		0.1%	0.1%	49.4%	0.5%	0%		50%	-	-
Heavy	0	0	0	0		-	1	35	0	0		-	0	0	0	0		-	0	36	0	0		-	-	-
Heavy %	0%	0%	0%	0%		-	3%	1.3%	0%	0%		-	0%	0%	0%	0%		-	0%	1.4%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

NexTrans
SUITE 201 520 INDUSTRIAL PARKWAY
SOUTH
AURORA ONTARIO, L4G 6W8
CANADA

Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (15.6 °C)

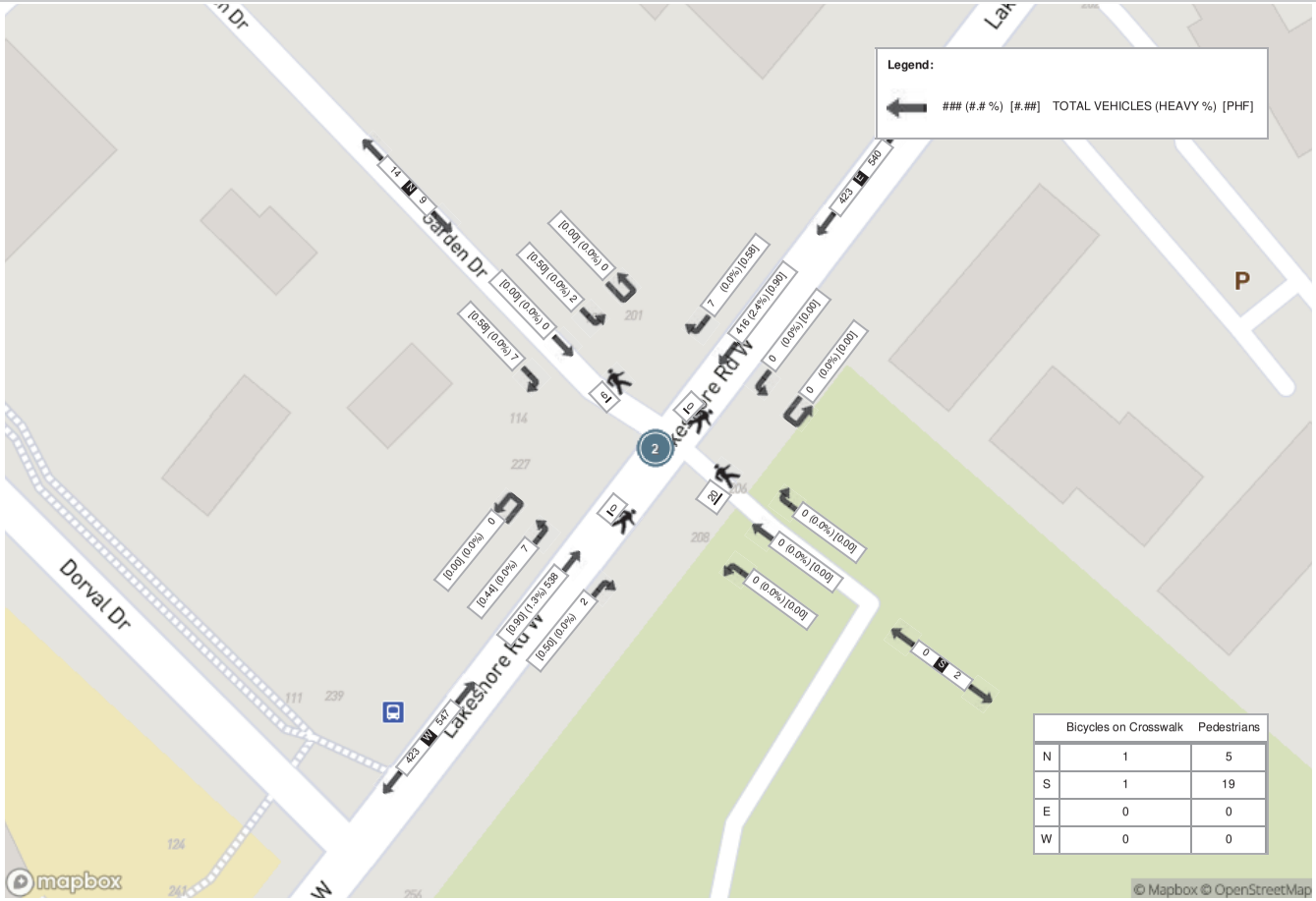
Start Time	Southbound GARDEN DR						Westbound LAKESHORE RD W						Northbound SOUTH ENTRANCE						Eastbound LAKESHORE RD W						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:15:00	3	0	1	0	3	4	1	116	0	0	0	117	0	0	0	0	7	0	1	133	4	0	0	138	259
08:30:00	3	0	1	0	1	4	1	115	0	0	0	116	0	0	0	0	6	0	0	150	2	0	0	152	272
08:45:00	0	0	0	0	2	0	3	98	0	0	0	101	0	0	0	0	5	0	1	138	1	0	0	140	241
09:00:00	1	0	0	0	0	1	2	87	0	0	0	89	0	0	0	0	2	0	0	117	0	0	0	117	207
Grand Total	7	0	2	0	6	9	7	416	0	0	0	423	0	0	0	0	20	0	2	538	7	0	0	547	**979**
Approach%	77.8%	0%	22.2%	0%		-	1.7%	98.3%	0%	0%		-	0%	0%	0%	0%		-	0.4%	98.4%	1.3%	0%		-	**-**
Totals %	0.7%	0%	0.2%	0%		0.9%	0.7%	42.5%	0%	0%		43.2%	0%	0%	0%	0%		0%	0.2%	55%	0.7%	0%		55.9%	**-**
PHF	0.58	0	0.5	0		0.56	0.58	0.9	0	0		0.9	0	0	0	0		0	0.5	0.9	0.44	0		0.9	**-**
Heavy	0	0	0	0		0	0	10	0	0		10	0	0	0	0		0	0	7	0	0		7	**-**
Heavy %	0%	0%	0%	0%		0%	0%	2.4%	0%	0%		2.4%	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		1.3%	**-**
Lights	7	0	2	0		9	7	403	0	0		410	0	0	0	0		0	2	527	7	0		536	**-**
Lights %	100%	0%	100%	0%		100%	100%	96.9%	0%	0%		96.9%	0%	0%	0%	0%		0%	100%	98%	100%	0%		98%	**-**
Single-Unit Trucks	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	0	4	0	0		4	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1.2%	0%	0%		1.2%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.7%	**-**
Buses	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	2	0	0		2	**-**
Buses %	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	**-**
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	**-**
Bicycles on Road	0	0	0	0		0	0	3	0	0		3	0	0	0	0		0	0	4	0	0		4	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.7%	**-**
Pedestrians	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	19	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	19.2%		-	-	-	-	0%		-	-	-	-	73.1%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	3.8%		-	-	-	-	0%		-	-	-	-	3.8%		-	-	-	-	0%		**-**

Peak Hour: 04:00 PM - 05:00 PM Weather: Overcast Clouds (25.02 °C)

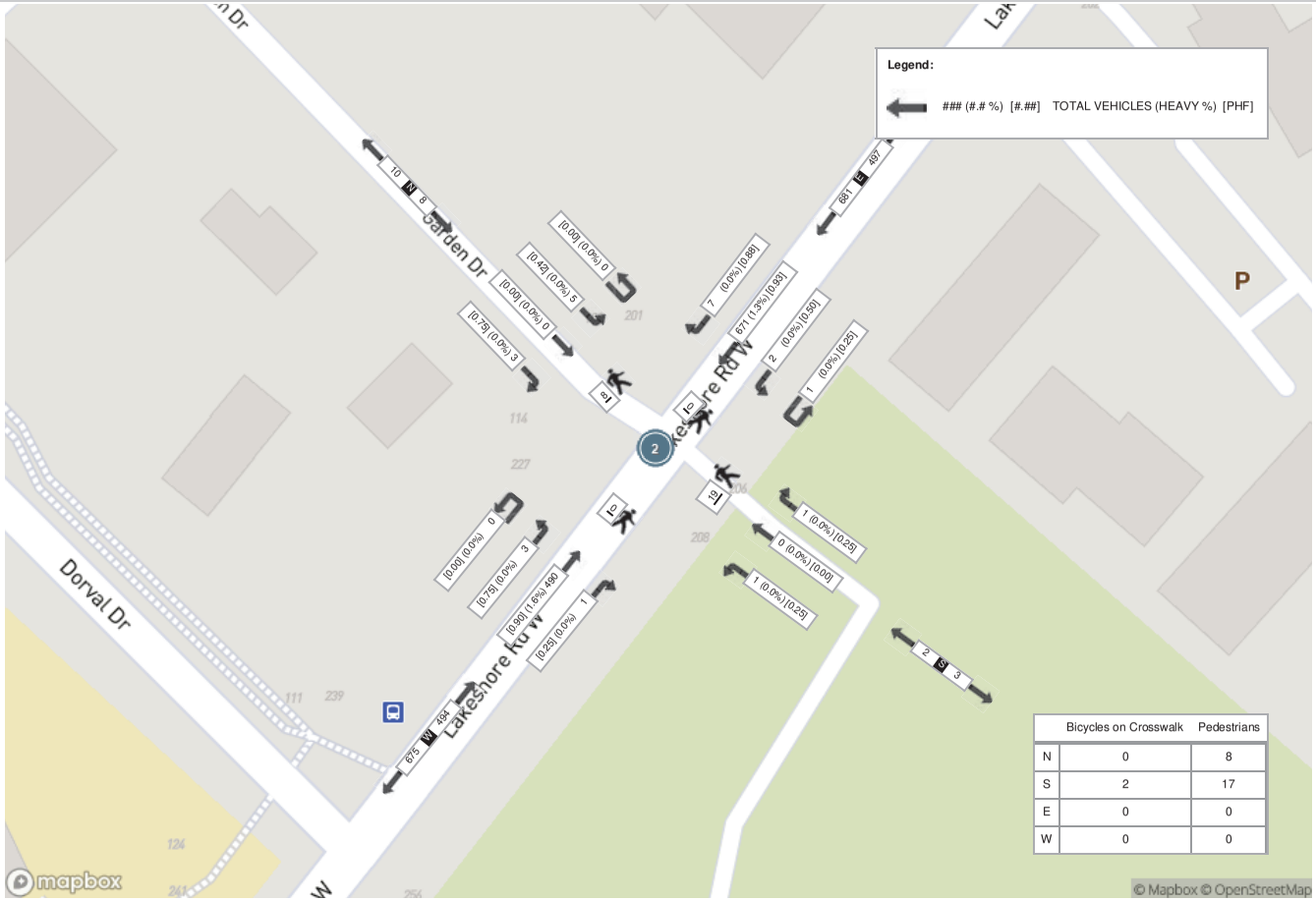
Start Time	Southbound GARDEN DR						Westbound LAKESHORE RD W						Northbound SOUTH ENTRANCE						Eastbound LAKESHORE RD W						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:00:00	1	0	0	0	2	1	1	177	1	0	0	179	0	0	1	0	3	1	1	136	1	0	0	138	319
16:15:00	1	0	1	0	4	2	2	181	1	0	0	184	1	0	0	0	11	1	0	123	1	0	0	124	311
16:30:00	0	0	1	0	2	1	2	146	0	1	0	149	0	0	0	0	4	0	0	124	0	0	0	124	274
16:45:00	1	0	3	0	0	4	2	167	0	0	0	169	0	0	0	0	1	0	0	107	1	0	0	108	281
Grand Total	3	0	5	0	8	8	7	671	2	1	0	681	1	0	1	0	19	2	1	490	3	0	0	494	**1185**
Approach%	37.5%	0%	62.5%	0%		-	1%	98.5%	0.3%	0.1%		-	50%	0%	50%	0%		-	0.2%	99.2%	0.6%	0%		-	**-**
Totals %	0.3%	0%	0.4%	0%		0.7%	0.6%	56.6%	0.2%	0.1%		57.5%	0.1%	0%	0.1%	0%		0.2%	0.1%	41.4%	0.3%	0%		41.7%	**-**
PHF	0.75	0	0.42	0		0.5	0.88	0.93	0.5	0.25		0.93	0.25	0	0.25	0		0.5	0.25	0.9	0.75	0		0.89	**-**
Heavy	0	0	0	0		0	0	9	0	0		9	0	0	0	0		0	0	8	0	0		8	**-**
Heavy %	0%	0%	0%	0%		0%	0%	1.3%	0%	0%		1.3%	0%	0%	0%	0%		0%	0%	1.6%	0%	0%		1.6%	**-**
Lights	3	0	5	0		8	7	656	2	1		666	1	0	1	0		2	1	472	3	0		476	**-**
Lights %	100%	0%	100%	0%		100%	100%	97.8%	100%	100%		97.8%	100%	0%	100%	0%		100%	100%	96.3%	100%	0%		96.4%	**-**
Single-Unit Trucks	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	4	0	0		4	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.6%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.8%	**-**
Buses	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	0	4	0	0		4	**-**
Buses %	0%	0%	0%	0%		0%	0%	0.7%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.8%	**-**
Articulated Trucks	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0	0		0	0	6	0	0		6	0	0	0	0		0	0	10	0	0		10	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	2%	0%	0%		2%	**-**
Pedestrians	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	17	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	29.6%		-	-	-	-	0%		-	-	-	-	63%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	7.4%		-	-	-	-	0%		**-**

NexTrans
SUITE 201 520 INDUSTRIAL PARKWAY SOUTH
AURORA ONTARIO, L4G 6W8
CANADA

Peak Hour: 08:15 AM - 09:15 AM **Weather: Overcast Clouds (15.6 °C)**



Peak Hour: 04:00 PM - 05:00 PM **Weather: Overcast Clouds (25.02 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	8
S	2	17
E	0	0
W	0	0

Turning Movement Count (1 . GARDEN DR & REBECCA ST)

Start Time	Southbound GARDEN DR						Westbound RELEKKA SH						Northbound GARDEN DR						Eastbound RELEKKA SH						Int. Total (15 min)	Int. Total (1 hr)
	R@WUT N@	HUgh N@S	t :rT N@E	u Hhge N@N	f :nP NC	AddgspoUHsTpa	R@WUT E@N	HUgh E@	t :rT E@S	u Hhge E@E	f :nP EC	AddgspoUHsTpa	R@WUT S@E	HUgh S@N	t :rT S@	u Hhge S@S	f :nP SC	AddgspoUHsTpa	R@WUT i @S	HUgh i @E	t :rT i @N	u Hhge i @	f :nP i C	AddgspoUHsTpa		
cl Q2c@c	c	c	c	c	c	c	c	07	1	c	c	2c	0	c	1	c	c	2	c	52	c	c	c	52	I 4	
cl C6@c	c	c	0	c	0	0	c	28	1	c	c	27	5	c	4	c	c	1c	c	52	c	c	c	52	75	
cl Q2c@c	c	c	1	c	1	1	c	57	c	c	c	57	1	c	5	c	2	6	1	47	c	c	1	I c	106	
cl C56@c	0	c	c	c	I	0	c	40	1	c	0	42	5	c	0	c	1	4	1	72	c	c	c	75	146	54c
c8Q2c@c	1	c	c	c	7	1	c	1c7	0	c	c	111	5	c	0	c	11	4	c	85	c	c	c	85	0c0	684
c8C6@c	c	c	0	c	6	0	c	1cc	0	c	1	1c0	4	c	5	c	7	1c	c	165	c	c	1	165	048	I 4c
c8Q2c@c	1	c	0	c	8	2	0	116	c	c	c	11I	5	c	6	c	4	7	1	121	c	c	c	120	041	874
c8C56@c	1	c	0	c	2	2	1	47	c	c	c	I c	1	c	0	c	6	2	0	147	1	c	c	1I 0	058	7I 7
c7Q2c@c	c	c	0	c	c	0	c	I 7	0	c	c	81	2	c	5	c	1	I	1	117	c	c	1	10c	01c	78I
c7C6@c	c	c	1	c	1	1	1	I 0	1	c	c	I 5	0	c	2	c	6	6	0	1c4	0	c	c	11c	17c	7c7
c7Q2c@c	c	c	1	c	c	1	1	4I	0	c	c	I c	2	1	2	c	5	I	0	118	c	c	c	10c	178	854
c7C56@c	1	c	2	c	0	5	1	I 1	c	c	c	I 0	1	c	5	c	5	6	2	11c	1	c	c	115	176	I 72
339LREA9333																										
14Q2c@c	c	c	c	c	2	c	c	154	1	c	c	15I	1	c	0	c	0	2	0	81	1	c	c	85	025	
14C6@c	c	c	c	c	2	c	c	16I	2	c	1	14c	1	1	c	c	0	0	2	74	c	c	c	77	041	
14Q2c@c	c	c	c	c	4	c	1	122	1	c	c	126	0	c	1	c	4	2	c	87	1	c	c	7c	008	
14C56@c	1	c	1	c	1	0	1	124	1	c	c	128	0	c	c	c	5	0	5	11c	c	c	c	115	064	7I 7
1I Q2c@c	1	c	1	c	1	0	1	164	1	c	c	168	0	c	5	c	2	4	2	116	c	c	c	118	085	1c07
1I C6@c	1	c	1	c	2	0	2	180	0	c	1	18I	1	c	2	c	4	5	1	102	c	c	c	105	21I	1c86
1I Q2c@c	c	c	c	c	4	c	1	105	1	c	1	104	c	c	0	c	2	0	2	11I	1	c	c	101	057	11c4
1I C56@c	c	c	1	c	6	1	c	115	4	c	c	10c	2	c	0	c	1	6	2	74	c	c	c	77	006	1cI 6
18Q2c@c	c	1	c	c	1	1	0	1c4	5	c	c	110	5	c	5	c	1	8	1	76	c	c	1	74	01I	1cc8
18C6@c	1	c	c	c	0	1	0	77	0	c	c	1c2	0	c	2	c	1	6	2	7I	1	c	c	1c1	01c	7c1
18Q2c@c	c	c	0	c	4	0	1	85	2	c	c	88	c	c	0	c	1	0	6	7I	1	c	c	1c2	176	85I
18C56@c	c	1	1	c	c	0	1	I 4	2	c	c	8c	c	c	0	c	2	0	2	76	1	c	c	77	182	8c6
Grand Total	1c	0	02	c	I 6	26	17	02I 2	5c	c	4	0520	62	0	46	c	80	10c	55	056c	1c	c	5	06c5	**5091**	*
Approach%	08B4-	6B -	46B -	c-		*	cBB-	7I B4-	1B4-	c-		*	55BD-	1B -	65BD-	c-		*	1BB-	7I BB-	cB5-	c-		*	-	*
Totals %	cBD-	c-	cBB-	c-		cBB -	cB5-	54B4-	cBB-	c-		5I BB-	1-	c-	1B2-	c-		0B5-	cB7-	58B1-	cBD-	c-		57BD-	-	*
Heavy	1	c	c	c		*	c	40	c	c		*	1	c	c	c		*	c	4c	0	c		*	-	*
Heavy %	1c-	c-	c-	c-		*	c-	0B4-	c-	c-		*	1B7-	c-	c-	c-		*	c-	0B5-	0c-	c-		*	-	*
Bicycles	*	*	*	*		*	*	*	*	*		*	*	*	*	*		*	*	*	*	*		*	-	*
Bicycle %	*	*	*	*		*	*	*	*	*		*	*	*	*	*		*	*	*	*	*		*	-	*

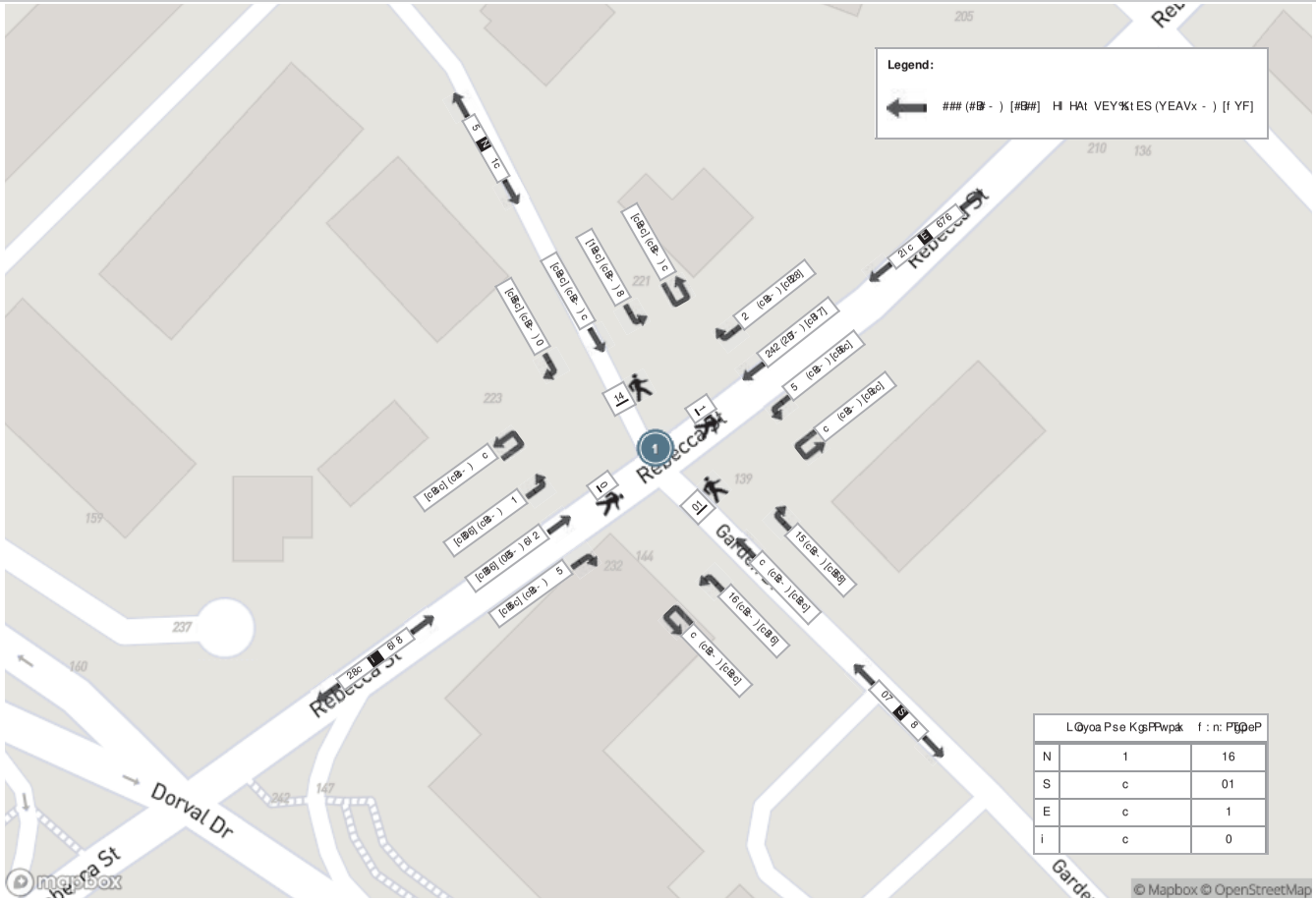
Peak Hour: 08:15 AM - 09:15 AM Weather: Overcast Clouds (15.6 °C)

Start Time	Southbound GARDEN DR						Westbound RELEKKA SH						Northbound GARDEN DR						Eastbound RELEKKA SH						Int. Total (15 min)
	R@WUT	HUgh	t : rT	u Hhge	f : nP	AddgspoUHsTpa	R@WUT	HUgh	t : rT	u Hhge	f : nP	AddgspoUHsTpa	R@WUT	HUgh	t : rT	u Hhge	f : nP	AddgspoUHsTpa	R@WUT	HUgh	t : rT	u Hhge	f : nP	AddgspoUHsTpa	
c8O16@2c	c	c	0	c	6	0	c	1cc	0	c	1	1c0	4	c	5	c	7	1c	c	165	c	c	1	165	048
c8@2c@2c	1	c	0	c	8	2	0	116	c	c	c	11l	5	c	6	c	4	7	1	121	c	c	c	120	041
c8O56@2c	1	c	0	c	2	2	1	47	c	c	c	l c	1	c	0	c	6	2	0	147	1	c	c	1l 0	058
c7@2c@2c	c	c	0	c	c	0	c	l 7	0	c	c	81	2	c	5	c	1	l	1	117	c	c	1	10c	01c
Grand Total	0	c	8	c	14	1c	2	242	5	c	1	2l c	15	c	16	c	01	07	5	6l 2	1	c	0	6l 8	**987**
Approach%	0c-	c-	8c-	c-		*	c%-	78%-	1%-	c-		*	58%-	c-	61%-	c-		*	c%-	77%-	c%-	c-		*	-
Totals %	c%-	c-	c%-	c-		1-	c%-	24%-	c%-	c-		2l %-	1%-	c-	1%-	c-		0%-	c%-	68%-	c%-	c-		68%-	-
PHF	c%5	c	1	c		c%2	c%8	c%7	c%5	c		c%7	c%8	c	c%6	c		c%2	c%5	c%6	c%6	c		c%5	-
Heavy	c	c	c	c		c	c	15	c	c		15	c	c	c	c		c	c	15	c	c		15	-
Heavy %	c-	c-	c-	c-		c-	c-	2%-	c-	c-		2%-	c-	c-	c-	c-		c-	c-	0%-	c-	c-		0%-	-
Lights	0	c	8	c		1c	2	251	5	c		258	15	c	16	c		07	5	665	1	c		667	-
Lights %	1cc-	c-	1cc-	c-		1cc-	1cc-	72%-	1cc-	c-		75%-	1cc-	c-	1cc-	c-		1cc-	1cc-	74%-	1cc-	c-		74%-	-
Single-Unit Trucks	c	c	c	c		c	c	l	c	c		l	c	c	c	c		c	c	4	c	c		4	-
Single-Unit Trucks %	c-	c-	c-	c-		c-	c-	1%-	c-	c-		1%-	c-	c-	c-	c-		c-	c-	1-	c-	c-		1-	-
Buses	c	c	c	c		c	c	l	c	c		l	c	c	c	c		c	c	8	c	c		8	-
Buses %	c-	c-	c-	c-		c-	c-	1%-	c-	c-		1%-	c-	c-	c-	c-		c-	c-	1%-	c-	c-		1%-	-
Articulated Trucks	c	c	c	c		c	c	c	c	c		c	c	c	c	c		c	c	c	c	c		c	-
Articulated Trucks %	c-	c-	c-	c-		c-	c-	c-	c-	c-		c-	c-	c-	c-	c-		c-	c-	c-	c-	c-		c-	-
Bicycles on Road	c	c	c	c		c	c	8	c	c		8	c	c	c	c		c	c	6	c	c		6	-
Bicycles on Road %	c-	c-	c-	c-		c-	c-	0%-	c-	c-		0%-	c-	c-	c-	c-		c-	c-	c%-	c-	c-		c%-	-
Pedestrians	*	*	*	*	16	*	*	*	*	*	1	*	*	*	*	*	01	*	*	*	*	*	0	*	-
Pedestrians%	*	*	*	*	2l %-		*	*	*	*	0%-		*	*	*	*	60%-		*	*	*	*	6-		-
Bicycles on Crosswalk	*	*	*	*	1	*	*	*	*	*	c	*	*	*	*	*	c	*	*	*	*	*	c	*	-
Bicycles on Crosswalk%	*	*	*	*	0%-		*	*	*	*	c-		*	*	*	*	c-		*	*	*	*	c-		-

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (25.02 °C)

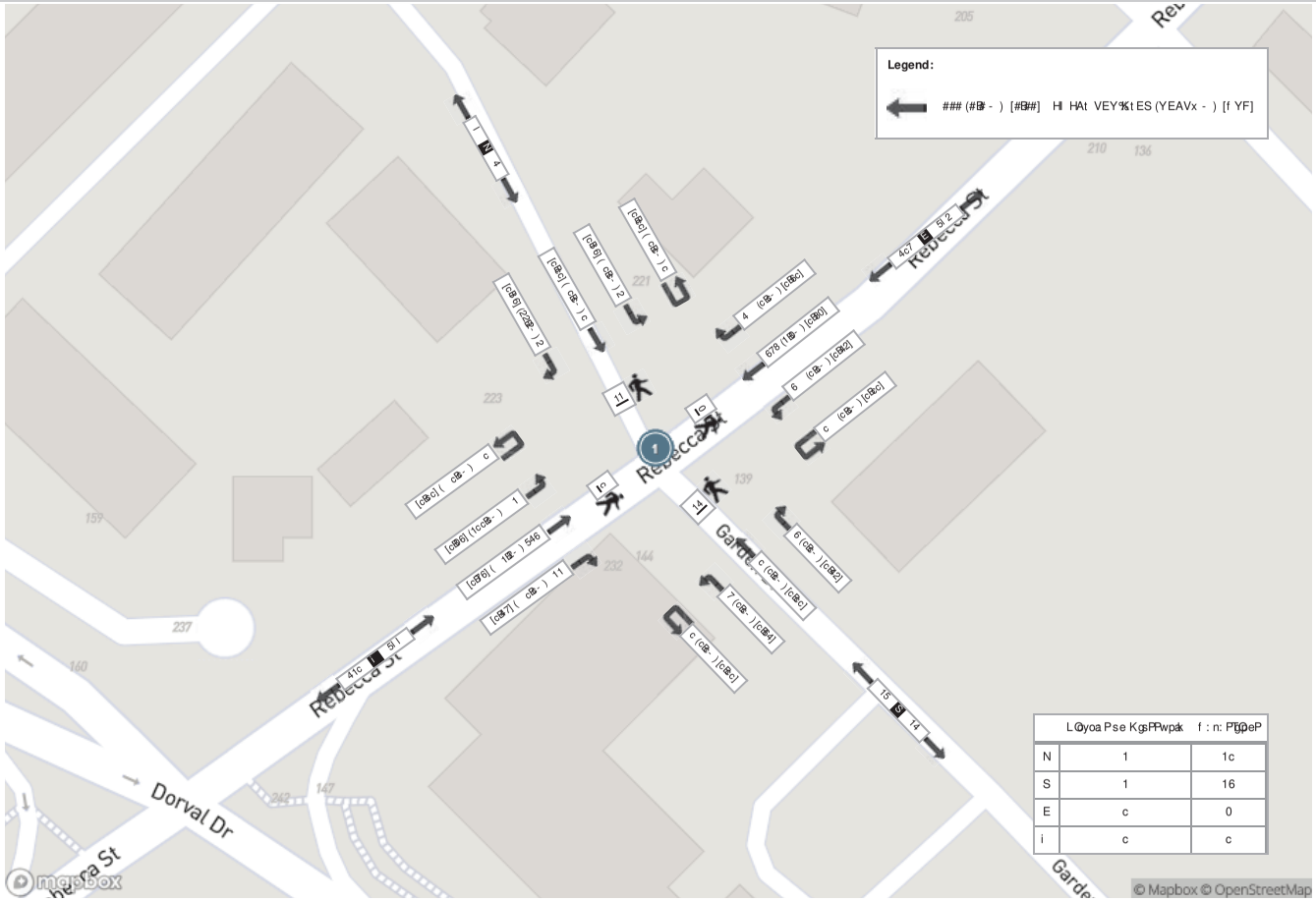
Start Time	Southbound GARDEN DR						Westbound RELEKKA SH						Northbound GARDEN DR						Eastbound RELEKKA SH						Int. Total (15 min)
	R@WUT	HUgh	t : rT	u Hhge	f : nP	AddgspoUHsTpa	R@WUT	HUgh	t : rT	u Hhge	f : nP	AddgspoUHsTpa	R@WUT	HUgh	t : rT	u Hhge	f : nP	AddgspoUHsTpa	R@WUT	HUgh	t : rT	u Hhge	f : nP	AddgspoUHsTpa	
14C56@c	1	c	1	c	1	0	1	124	1	c	c	128	0	c	c	5	c	0	5	11c	c	c	c	115	064
1l @cc@c	1	c	1	c	1	0	1	164	1	c	c	168	0	c	5	c	2	4	2	116	c	c	c	118	085
1l C6@c	1	c	1	c	2	0	2	180	0	c	1	18l	1	c	2	c	4	5	1	102	c	c	c	105	21l
1l @cc@c	c	c	c	c	4	c	1	105	1	c	1	104	c	c	0	c	2	0	2	11l	1	c	c	101	057
Grand Total	2	c	2	c	11	4	4	678	6	c	0	4c7	6	c	7	c	14	15	11	546	1	c	c	5l l	**1106**
Approach%	6c-	c-	6c-	c-		*	1-	78E0-	c6-	c-		*	26B-	c-	45E2-	c-		*	0E2-	7l E6-	c6-	c-		*	-
Totals %	c2-	c-	c2-	c-		c6-	c6-	65B-	c6-	c-		66B-	c6-	c-	c6-	c-		12-	1-	50-	cB-	c-		52B-	-
PHF	cB6	c	cB6	c		cB6	c6	cB0	cB2	c		cB1	cB2	c	c64	c		c68	c67	cE6	cB6	c		cE4	-
Heavy	1	c	c	c		1	c	l	c	c		l	c	c	c	c		c	c	4	1	c		l	-
Heavy %	22E2-	c-	c-	c-		14B-	c-	1E0-	c-	c-		1B-	c-	c-	c-	c-		c-	c-	1E2-	1cc-	c-		1E6-	-
Lights	0	c	2	c		6	4	685	6	c		676	6	c	7	c		15	11	565	c	c		546	-
Lights %	44B-	c-	1cc-	c-		82E2-	1cc-	7l B-	1cc-	c-		7l B-	1cc-	c-	1cc-	c-		1cc-	1cc-	7l B4-	c-	c-		7l E6-	-
Single-Unit Trucks	1	c	c	c		1	c	1	c	c		1	c	c	c	c		c	c	0	1	c		2	-
Single-Unit Trucks %	22E2-	c-	c-	c-		14B-	c-	c60-	c-	c-		c60-	c-	c-	c-	c-		c-	c-	c65-	1cc-	c-		c64-	-
Buses	c	c	c	c		c	c	6	c	c		6	c	c	c	c		c	c	2	c	c		2	-
Buses %	c-	c-	c-	c-		c-	c-	c6E-	c-	c-		c6B-	c-	c-	c-	c-		c-	c-	c64-	c-	c-		c64-	-
Articulated Trucks	c	c	c	c		c	c	1	c	c		1	c	c	c	c		c	c	1	c	c		1	-
Articulated Trucks %	c-	c-	c-	c-		c-	c-	c60-	c-	c-		c60-	c-	c-	c-	c-		c-	c-	c60-	c-	c-		c60-	-
Bicycles on Road	c	c	c	c		c	c	l	c	c		l	c	c	c	c		c	c	6	c	c		6	-
Bicycles on Road %	c-	c-	c-	c-		c-	c-	1E0-	c-	c-		1B-	c-	c-	c-	c-		c-	c-	1E-	c-	c-		1-	-
Pedestrians	*	*	*	*	1c	*	*	*	*	*	0	*	*	*	*	*	16	*	*	*	*	*	c	*	-
Pedestrians%	*	*	*	*	256E-		*	*	*	*	4B7-		*	*	*	*	61B-		*	*	*	*	c-		-
Bicycles on Crosswalk	*	*	*	*	1	*	*	*	*	*	c	*	*	*	*	*	1	*	*	*	*	*	c	*	-
Bicycles on Crosswalk%	*	*	*	*	2E5-		*	*	*	*	c-		*	*	*	*	2E5-		*	*	*	*	c-		-

Peak Hour: 08:15 AM - 09:15 AM **Weather: Overcast Clouds (15.6 °C)**



L@yoa Pse KgsPPwpak	f : n: PTgpeP	
N	1	16
S	c	01
E	c	1
i	c	0

Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (25.02 °C)



L@yoa Pse KgsPPwpak	f : n: PTgpeP	
N	1	1c
S	1	16
E	c	0
i	c	c

Appendix C
Existing Traffic Level of Service Calculations

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	538	2	0	416	7	0	0	0	2	0	7
Future Volume (Veh/h)	7	538	2	0	416	7	0	0	0	2	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	598	2	0	462	8	0	0	0	2	0	8
Pedestrians								20			6	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								2			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	476			620			1105	1111	619	1086	1108	472
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	476			620			1105	1111	619	1086	1108	472
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	99
cM capacity (veh/h)	1091			955			180	205	484	190	206	593

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	600	0	470	0	10
Volume Left	8	0	0	0	0	2
Volume Right	0	2	0	8	0	8
cSH	1091	1700	1700	1700	1700	417
Volume to Capacity	0.01	0.35	0.00	0.28	0.00	0.02
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	0.6
Control Delay (s)	8.3	0.0	0.0	0.0	0.0	13.8
Lane LOS	A				A	B
Approach Delay (s)	0.1		0.0		0.0	13.8
Approach LOS					A	B

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	38.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	573	4	4	363	3	15	0	14	8	0	2
Future Volume (Veh/h)	1	573	4	4	363	3	15	0	14	8	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	1	682	5	5	432	4	18	0	17	10	0	2
Pedestrians		2			1			21			16	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	452			708			1154	1170	706	1162	1170	452
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	452			708			1154	1170	706	1162	1170	452
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			89	100	96	94	100	100
cM capacity (veh/h)	1105			885			167	188	431	160	187	603

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	1	687	5	436	35	12
Volume Left	1	0	5	0	18	10
Volume Right	0	5	0	4	17	2
cSH	1105	1700	885	1700	238	182
Volume to Capacity	0.00	0.40	0.01	0.26	0.15	0.07
Queue Length 95th (m)	0.0	0.0	0.1	0.0	4.1	1.7
Control Delay (s)	8.3	0.0	9.1	0.0	22.7	26.1
Lane LOS	A		A		C	D
Approach Delay (s)	0.0		0.1		22.7	26.1
Approach LOS					C	D

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	490	1	3	671	7	1	0	1	5	0	3
Future Volume (Veh/h)	3	490	1	3	671	7	1	0	1	5	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	3	527	1	3	722	8	1	0	1	5	0	3
Pedestrians								19			8	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	738			547			1284	1296	546	1274	1293	734
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	738			547			1284	1296	546	1274	1293	734
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	96	100	99
cM capacity (veh/h)	872			1017			137	159	533	141	160	421

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	3	528	3	730	2	8
Volume Left	3	0	3	0	1	5
Volume Right	0	1	0	8	1	3
cSH	872	1700	1017	1700	218	188
Volume to Capacity	0.00	0.31	0.00	0.43	0.01	0.04
Queue Length 95th (m)	0.1	0.0	0.1	0.0	0.2	1.1
Control Delay (s)	9.1	0.0	8.6	0.0	21.7	25.0
Lane LOS	A		A		C	D
Approach Delay (s)	0.1		0.0		21.7	25.0
Approach LOS					C	D

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	45.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	465	11	5	598	6	9	0	5	3	0	3
Future Volume (Veh/h)	1	465	11	5	598	6	9	0	5	3	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	484	11	5	623	6	9	0	5	3	0	3
Pedestrians					2			16			11	
Lane Width (m)					3.5			3.5			3.5	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	640			511			1144	1158	508	1140	1160	637
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	640			511			1144	1158	508	1140	1160	637
tC, single (s)	5.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.3	3.5	4.0	3.6
p0 queue free %	100			100			95	100	99	98	100	99
cM capacity (veh/h)	605			1051			171	192	561	172	192	422

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	1	495	5	629	14	6
Volume Left	1	0	5	0	9	3
Volume Right	0	11	0	6	5	3
cSH	605	1700	1051	1700	228	245
Volume to Capacity	0.00	0.29	0.00	0.37	0.06	0.02
Queue Length 95th (m)	0.0	0.0	0.1	0.0	1.6	0.6
Control Delay (s)	11.0	0.0	8.4	0.0	21.8	20.1
Lane LOS	B		A		C	C
Approach Delay (s)	0.0		0.1		21.8	20.1
Approach LOS					C	C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	42.5%	ICU Level of Service		A
Analysis Period (min)	15			

Appendix D
Background Development Traffic Volumes

Format Lakeshore LP

TRANSPORTATION IMPACT STUDY

Proposed Mixed-Use Development

42 Lakeshore Road West,
Town of Oakville

August 2023

23129

Trip distribution was determined based on apartment dwelling and retail trip distributions during AM and PM peak hours. Trip assignment was based on the local road network, turn restrictions, changes in future network (i.e., assumed none for this analysis), logical routing and type of access proposed for the site.

The distribution of residential and retail site trips is summarized in **Table 4-4**. Detailed TTS calculations are provided in **Appendix D.**

Table 4-4: Subject Site Trip Distribution

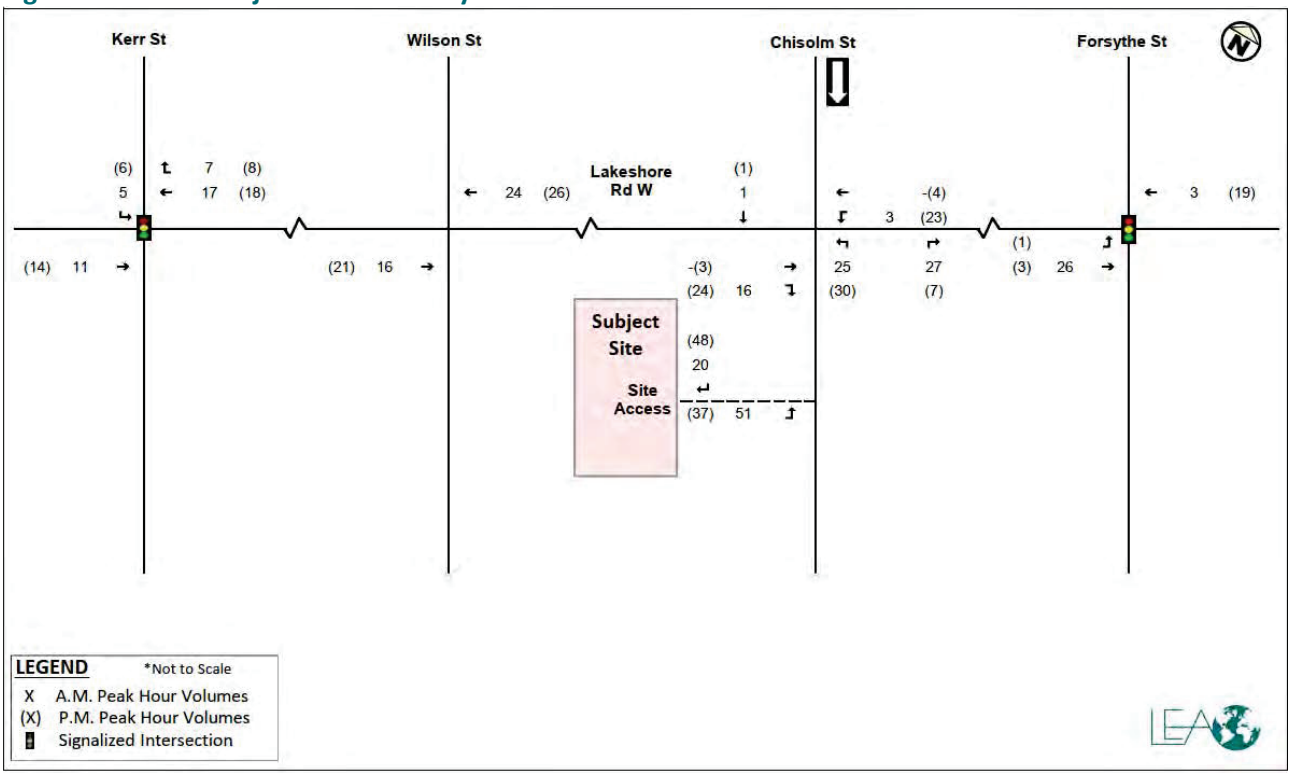
Path	Residential				Retail			
	AM		PM		AM		PM	
	In	Out	In	Out	In	Out	In	Out
Kerr North	27%	14%	14%	27%	26%	21%	21%	26%
Kerr South	0%	0%	0%	0%	1%	0%	0%	1%
Chisolm North	0%	0%	0%	0%	0%	0%	0%	0%
Chisolm South	0%	0%	0%	0%	0%	3%	3%	0%
Forsythe North	2%	0%	0%	2%	6%	3%	3%	6%
Lakeshore West	56%	31%	31%	56%	55%	40%	40%	55%
Lakeshore East	15%	55%	55%	15%	12%	33%	33%	12%
Total	100%	100%	100%	100%	100%	100%	100%	100%

4.3.1 Subject Site Traffic Volumes and Access Assumptions

The subject development will introduce a new site access that will intersect with Chisolm Street. The site access will facilitate one lane of traffic in each direction and will be a full-moves access accommodate left- and right-turns into and out of the site.

The total site-generated traffic volumes for the weekday AM and PM peak hours on the study area road network, including the proposed site access, are illustrated in **Figure 4-1.**

Figure 4-1: Total Subject Site Weekday Peak Hour Traffic Volumes



Traffic Impact Study

Proposed Residential Development
550 Kerr Street

Zelinka Priamo Ltd.

GHD | 6705 Millcreek Drive Mississauga Ontario L5N 5M4 Canada

11192948 | 800 | June 2019

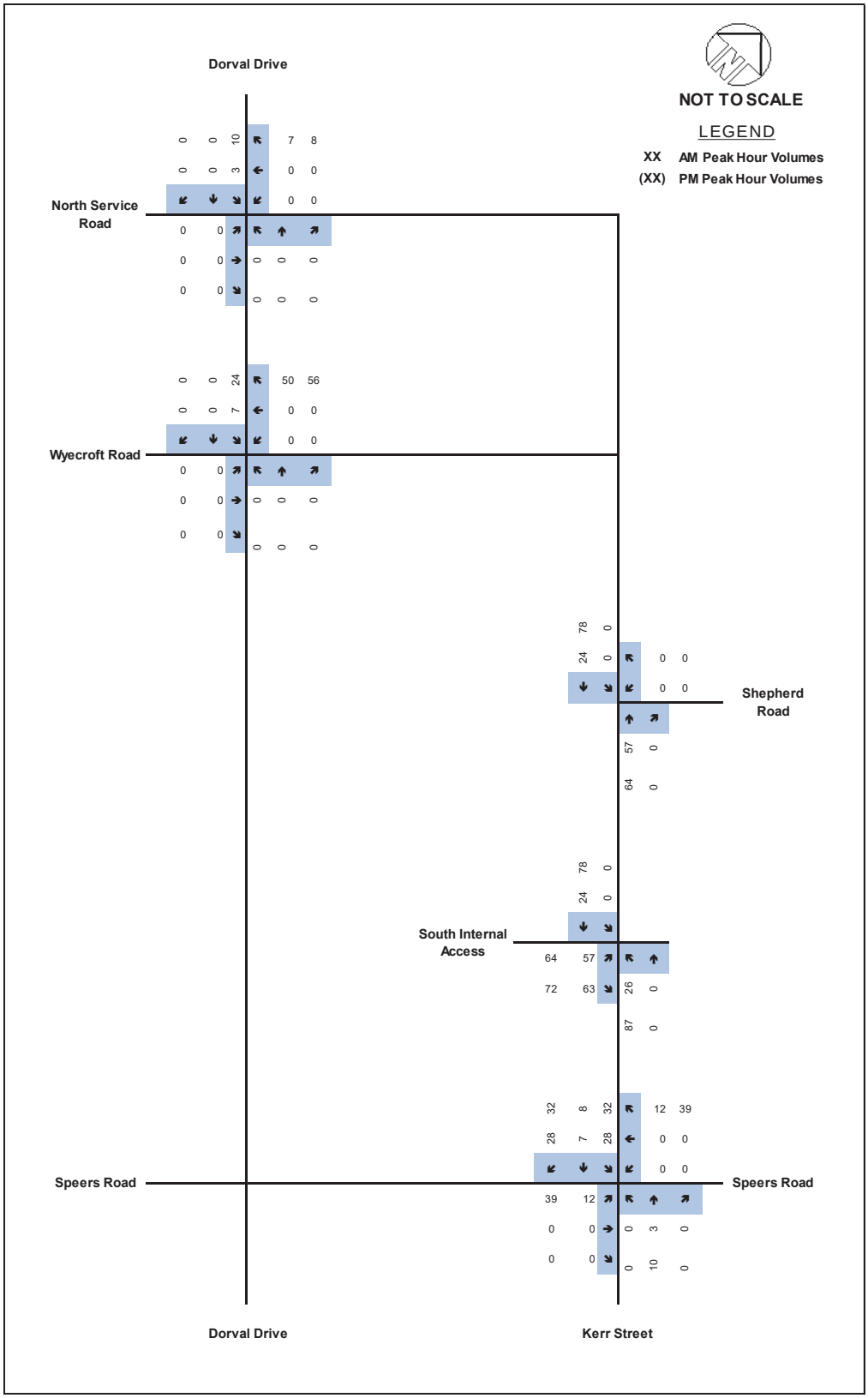


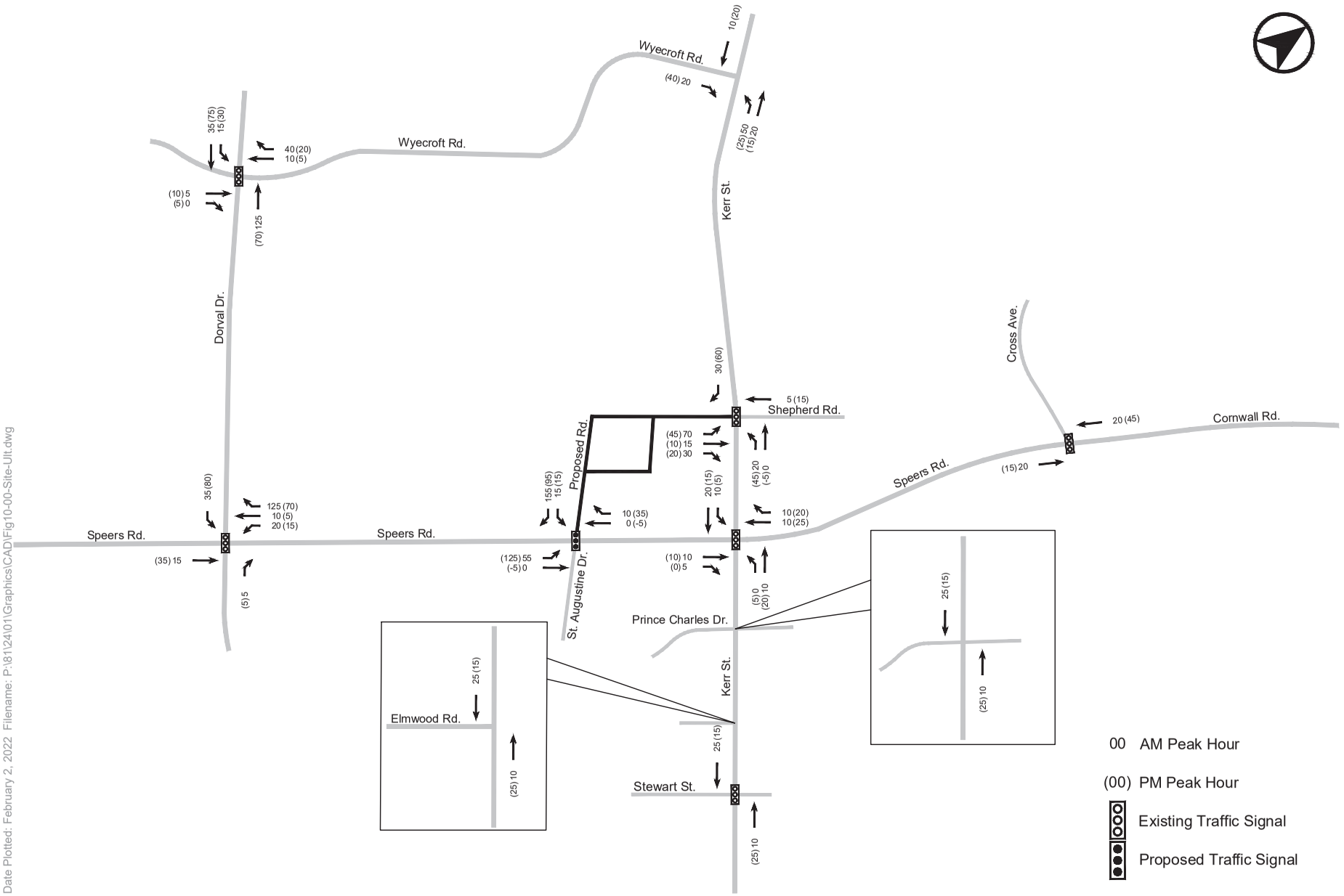
Figure 9 Site Trip Assignment

UPPER KERR VILLAGE
PART 2 TRANSPORTATION ASSESSMENT - OFFICIAL PLAN AMENDMENT

Transportation Considerations Report

Prepared For: Urban Strategies Inc.

February 2, 2022



Date Plotted: February 2, 2022 Filename: P:\81\24\01\Graphics\CAD\Fig10-00-Site-Ult.dwg

FIGURE 10 NEW SITE TRAFFIC VOLUMES (ULTIMATE)

Appendix E
Future Background Level of Service Calculations

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	605	2	0	476	7	0	0	0	2	0	7
Future Volume (Veh/h)	7	605	2	0	476	7	0	0	0	2	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	672	2	0	529	8	0	0	0	2	0	8
Pedestrians								20			6	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								2			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	543			694			1246	1252	693	1227	1249	539
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	543			694			1246	1252	693	1227	1249	539
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	99
cM capacity (veh/h)	1031			896			144	169	440	152	170	544

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	8	674	0	537	0	10
Volume Left	8	0	0	0	0	2
Volume Right	0	2	0	8	0	8
cSH	1031	1700	1700	1700	1700	359
Volume to Capacity	0.01	0.40	0.00	0.32	0.00	0.03
Queue Length 95th (m)	0.2	0.0	0.0	0.0	0.0	0.7
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	15.3
Lane LOS	A				A	C
Approach Delay (s)	0.1		0.0		0.0	15.3
Approach LOS					A	C

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	42.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	633	4	4	401	3	15	0	14	8	0	2
Future Volume (Veh/h)	1	633	4	4	401	3	15	0	14	8	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	1	754	5	5	477	4	18	0	17	10	0	2
Pedestrians		2			1			21			16	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	497			780			1270	1286	778	1279	1287	497
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	497			780			1270	1286	778	1279	1287	497
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			87	100	96	92	100	100
cM capacity (veh/h)	1063			832			139	160	392	132	160	569

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	1	759	5	481	35	12
Volume Left	1	0	5	0	18	10
Volume Right	0	5	0	4	17	2
cSH	1063	1700	832	1700	202	152
Volume to Capacity	0.00	0.45	0.01	0.28	0.17	0.08
Queue Length 95th (m)	0.0	0.0	0.1	0.0	4.9	2.0
Control Delay (s)	8.4	0.0	9.4	0.0	26.5	30.8
Lane LOS	A		A		D	D
Approach Delay (s)	0.0		0.1		26.5	30.8
Approach LOS					D	D

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	44.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	555	1	3	759	7	1	0	1	5	0	3
Future Volume (Veh/h)	3	555	1	3	759	7	1	0	1	5	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	3	597	1	3	816	8	1	0	1	5	0	3
Pedestrians								19			8	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	832			617			1448	1460	616	1438	1457	828
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	832			617			1448	1460	616	1438	1457	828
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	95	100	99
cM capacity (veh/h)	804			958			105	127	486	109	127	372

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	3	598	3	824	2	8
Volume Left	3	0	3	0	1	5
Volume Right	0	1	0	8	1	3
cSH	804	1700	958	1700	173	148
Volume to Capacity	0.00	0.35	0.00	0.48	0.01	0.05
Queue Length 95th (m)	0.1	0.0	0.1	0.0	0.3	1.4
Control Delay (s)	9.5	0.0	8.8	0.0	26.0	30.7
Lane LOS	A		A		D	D
Approach Delay (s)	0.0		0.0		26.0	30.7
Approach LOS					D	D

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	50.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	513	11	5	660	6	9	0	5	3	0	3
Future Volume (Veh/h)	1	513	11	5	660	6	9	0	5	3	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	534	11	5	688	6	9	0	5	3	0	3
Pedestrians					2			16			11	
Lane Width (m)					3.5			3.5			3.5	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	705			561			1258	1272	558	1255	1275	702
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	705			561			1258	1272	558	1255	1275	702
tC, single (s)	5.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.3	3.5	4.0	3.6
p0 queue free %	100			100			94	100	99	98	100	99
cM capacity (veh/h)	566			1007			143	164	526	144	164	386

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	1	545	5	694	14	6
Volume Left	1	0	5	0	9	3
Volume Right	0	11	0	6	5	3
cSH	566	1700	1007	1700	193	209
Volume to Capacity	0.00	0.32	0.00	0.41	0.07	0.03
Queue Length 95th (m)	0.0	0.0	0.1	0.0	1.9	0.7
Control Delay (s)	11.4	0.0	8.6	0.0	25.1	22.7
Lane LOS	B		A		D	C
Approach Delay (s)	0.0		0.1		25.1	22.7
Approach LOS					D	C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	45.8%	ICU Level of Service		A
Analysis Period (min)	15			

Appendix F
2016 Transportation Tomorrow Survey (TTS) Data Analysis

Mode of Transportation - AM Peak Period

Cross Tabulation Query Form - Trip - 2016

Row: Primary travel mode of trip - mode_prime
Column: 2006 GTA zone of household - gta06_hhld

Filters:
Primary travel mode of trip - mode_prime In B C D G J M P T U W
and
2006 GTA zone of household - gta06_hhld In 4006 4007 4010 4012 4013 4015 4016
and
Start time of trip - start_time In 600-900

Trip 2016
Table:

Mode of Transportation/Traffic Zones	4006	4007	4010	4012	4013	4015	4016	Total	Percentage
Transit excluding GO rail	0	0	52	114	0	0	0	166	2%
Cycle	57	19	35	0	21	0	0	132	1%
Auto driver	613	2490	559	1632	462	509	308	6573	72%
GO rail only	138	161	64	87	56	12	60	578	6%
Joint GO rail and local transit	0	0	61	118	22	0	0	201	2%
Motorcycle	0	0	0	6	0	0	0	6	0%
Auto passenger	97	480	74	329	74	9	20	1083	12%
Walk	57	101	35	178	21	0	0	392	4%
Total	962	3251	880	2464	656	530	388	9131	100%

Mode of Transportation - PM Peak Period

Cross Tabulation Query Form - Trip - 2016

Row: Primary travel mode of trip - mode_prime
Column: 2006 GTA zone of household - gta06_hhld

Filters:
Primary travel mode of trip - mode_prime In B C D G J M P T U W
and
2006 GTA zone of household - gta06_hhld In 4006 4007 4010 4012 4013 4015 4016
and
Start time of trip - start_time In 1600-1900

Trip 2016
Table:

Mode of Transportation/Traffic Zones	4006	4007	4010	4012	4013	4015	4016	Total	Percentage
Transit excluding GO rail	10	80	0	67	0	0	0	157	2%
Cycle	0	37	0	98	21	0	9	165	2%
Auto driver	922	2161	529	1861	538	440	353	6804	73%
GO rail only	146	130	76	101	22	0	60	535	6%
Joint GO rail and local transit	0	0	50	82	8	0	14	154	2%
Auto passenger	189	522	104	250	64	9	52	1190	13%
Taxi passenger	0	0	0	0	0	8	0	8	0%
Walk	18	26	15	172	5	68	0	304	3%
Total	1285	2956	774	2631	658	525	488	9317	100%

Auto Distribution - External

Cross Tabulation Query Form - Trip - 2016

Row: 2006 GTA zone of origin - gta06_orig
Column: Planning district of destination - pd_dest

Filters:
Primary travel mode of trip - mode_prime In D: M, P, T, U
and
2006 GTA zone of origin - gta06_orig In 4006: 4007, 4010, 4012, 4013, 4015, 4016
and
Start time of trip - start_time In 1600-1900

Trip 2016
Table:

	PD 1 of Toronto	PD 2 of Toronto	PD 3 of Toronto	PD 4 of Toronto	PD 5 of Toronto	PD 7 of Toronto	PD 8 of Toronto	Whitby	Aurora	Vaughan	Brampton	Mississauga	Halton Hills	Milton	Oakville	Burlington	Flamborough	Ancaster	Stoney Creek	Hamilton	Grimsby	Lincoln	Niagara Falls	Fort Erie	Kitchener	City of Guelph	Erin	Orangeville	Bradford-West Gwillimbury	Brant	Severn	External	
4006	0	0	0	0	0	0	0	0	0	0	0	218	0	0	547	158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4007	0	0	0	0	0	0	9	0	0	0	0	43	0	33	863	311	0	0	0	7	0	0	0	11	0	0	0	0	0	8	28	0	
4010	0	0	0	0	0	0	0	0	0	0	0	31	21	42	290	19	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	
4012	9	0	16	0	0	0	0	0	0	30	0	380	0	191	1686	330	21	0	0	56	16	12	73	0	25	14	0	11	0	19	0	52	
4013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4015	10	74	0	0	15	0	0	0	0	0	12	50	0	9	417	82	0	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
4016	7	0	0	24	14	40	37	28	19	0	3	400	16	14	901	303	16	0	27	0	0	18	0	0	46	0	6	0	52	19	0	9	
	26	74	16	24	29	40	46	28	19	30	15	1122	37	289	4863	1203	37	17	27	79	16	30	73	11	71	14	6	11	52	46	28	61	8440
	0%	1%	0%	0%	0%	0%	1%	0%	0%	0%	0%	13%	0%	3%	58%	14%	0%	0%	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	1%	1%	0%	1%	100%

Toronto	3%
Oakville	58%
York Region	1%
Durham Region	0%
Peel Region	13%
Burlington	18%
Hamilton Area	2%
Niagara Region	4%
	100%

Auto Distribution - Oakville

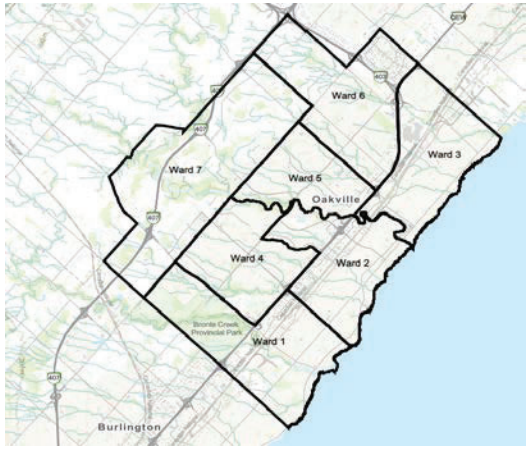
Cross Tabulation Query Form - Trip - 2016

Row: 2006 GTA zone of origin - gta06_orig
Column: Ward number of destination - ward_dest

Filters:
Primary travel mode of trip - mode_prime In D
and
2006 GTA zone of origin - gta06_orig In 4006
and
Start time of trip - start_time In 1600-1900
and
Ward number of destination - ward_dest In 159-164

Trip 2016
Table:

	M	P	T	U			
	4007	4010	4012	4013	4015	4016	
	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	
	159	160	161	162	163	164	
4006	104	284	31	85	30	13	
4007	338	244	86	133	0	62	
4010	27	187	17	59	0	0	
4,012	208	437	219	390	0	0	
4013	0	84	59	16	0	0	
4015	71	76	114	134	12	10	
4016	78	224	160	137	234	67	
	985	1696	847	1116	439	316	5399
	18%	31%	16%	21%	8%	6%	100%
58%	11%	18%	9%	12%	5%	3%	58%



Transit Distribution - External

Cross Tabulation Query Form - Trip - 2016

Row: 2006 GTA zone of origin - gta06_orig
Column: Planning district of destination - pd_dest

Filters:
Primary travel mode of trip - mode_prime In B C G J W
and
2006 GTA zone of origin - gta06_orig In 4006 4007 4010 4012 4013 4015 4016
and
Start time of trip - start_time In 1600-1900

Trip 2016
Table:

	PD 1 of Toronto	PD 2 of Toronto	Mississauga	Oakville	
4006	0	0	0	55	
4007	0	0	0	90	
4010	0	0	0	12	
4012	11	5	8	265	
4015	0	0	0	34	
4016	44	0	0	161	
	55	5	8	617	685
	8%	1%	1%	90%	

Appendix G
Future Total Level of Service Calculations

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	605	2	0	476	11	0	0	0	6	0	19
Future Volume (Veh/h)	10	605	2	0	476	11	0	0	0	6	0	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	672	2	0	529	12	0	0	0	7	0	21
Pedestrians								20			6	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								2			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	547			694			1265	1262	693	1235	1257	541
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	547			694			1265	1262	693	1235	1257	541
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	95	100	96
cM capacity (veh/h)	1027			896			136	166	440	150	167	542

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	11	674	0	541	0	28
Volume Left	11	0	0	0	0	7
Volume Right	0	2	0	12	0	21
cSH	1027	1700	1700	1700	1700	328
Volume to Capacity	0.01	0.40	0.00	0.32	0.00	0.09
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	2.2
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	17.0
Lane LOS	A				A	C
Approach Delay (s)	0.1		0.0		0.0	17.0
Approach LOS					A	C

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	42.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	633	10	6	401	3	37	0	19	8	0	2
Future Volume (Veh/h)	1	633	10	6	401	3	37	0	19	8	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	1	754	12	7	477	4	44	0	23	10	0	2
Pedestrians		2			1			21			16	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	497			787			1278	1294	782	1289	1298	497
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	497			787			1278	1294	782	1289	1298	497
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			68	100	94	92	100	100
cM capacity (veh/h)	1063			827			137	158	390	128	157	569

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	1	766	7	481	67	12
Volume Left	1	0	7	0	44	10
Volume Right	0	12	0	4	23	2
cSH	1063	1700	827	1700	176	147
Volume to Capacity	0.00	0.45	0.01	0.28	0.38	0.08
Queue Length 95th (m)	0.0	0.0	0.2	0.0	13.1	2.1
Control Delay (s)	8.4	0.0	9.4	0.0	37.4	31.7
Lane LOS	A		A		E	D
Approach Delay (s)	0.0		0.1		37.4	31.7
Approach LOS					E	D

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	44.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	555	1	3	759	19	1	0	1	10	0	11
Future Volume (Veh/h)	13	555	1	3	759	19	1	0	1	10	0	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	14	597	1	3	816	20	1	0	1	11	0	12
Pedestrians								19			8	
Lane Width (m)								3.5			3.5	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								2			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	844			617			1478	1494	616	1466	1485	834
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	844			617			1478	1494	616	1466	1485	834
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			99	100	100	89	100	97
cM capacity (veh/h)	796			958			97	119	486	103	121	369

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	14	598	3	836	2	23
Volume Left	14	0	3	0	1	11
Volume Right	0	1	0	20	1	12
cSH	796	1700	958	1700	161	165
Volume to Capacity	0.02	0.35	0.00	0.49	0.01	0.14
Queue Length 95th (m)	0.4	0.0	0.1	0.0	0.3	3.8
Control Delay (s)	9.6	0.0	8.8	0.0	27.6	30.4
Lane LOS	A		A		D	D
Approach Delay (s)	0.2		0.0		27.6	30.4
Approach LOS					D	D

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	51.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	513	25	8	660	6	22	0	7	3	0	3
Future Volume (Veh/h)	1	513	25	8	660	6	22	0	7	3	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	534	26	8	688	6	23	0	7	3	0	3
Pedestrians					2			16			11	
Lane Width (m)					3.5			3.5			3.5	
Walking Speed (m/s)					1.2			1.2			1.2	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	705			576			1272	1286	565	1263	1296	702
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	705			576			1272	1286	565	1263	1296	702
tC, single (s)	5.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	3.1			2.2			3.5	4.0	3.3	3.5	4.0	3.6
p0 queue free %	100			99			84	100	99	98	100	99
cM capacity (veh/h)	566			994			139	161	521	141	158	386

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	1	560	8	694	30	6
Volume Left	1	0	8	0	23	3
Volume Right	0	26	0	6	7	3
cSH	566	1700	994	1700	168	207
Volume to Capacity	0.00	0.33	0.01	0.41	0.18	0.03
Queue Length 95th (m)	0.0	0.0	0.2	0.0	5.0	0.7
Control Delay (s)	11.4	0.0	8.7	0.0	31.0	22.9
Lane LOS	B		A		D	C
Approach Delay (s)	0.0		0.1		31.0	22.9
Approach LOS					D	C

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	45.8%	ICU Level of Service		A
Analysis Period (min)	15			

Appendix H
Traffic Signal Warrant Analysis

Signal Warrant Calculation (OTM Book 12 - Justification 7)

Major Street: Rebecca Street

Minor Street: Garden Drive

Comment Future Total (2029) Traffic Condition

Number of Approaches: 1 [ ] 2 [X]

Tee Intersection Configuration: Yes [ ] No [X]

Flow Condition: Free Fv (Rural) [ ]
Restricted Flow (Urban) [X]

VOLUME	AM	PM	FACTOR *	
1A - All	1,120	1,248	n/a	592
1B - Minor	66	35	25%	25
2A - Major	1,054	1,213	25%	567
2B - Crossi	47	29	25%	19

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT

150% Satisfied:	Yes [ ]	No [X]	Warrant for new intersection with forecast traffic
120% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with forecast traffic
100% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with existing traffic *
COMBO 80% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with existing traffic
80% Satisfied:	Yes [ ]	No [X]	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
ALL APPROACHES	480	720	600	900	592
	% FULFILLED				82%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MINOR STREET APPROACHES	120	170	120	170	25
	% FULFILLED				15%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [ ]	No [X]

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MAJOR STREET APPROACHES	480	720	600	900	567
	% FULFILLED				79%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
TRAFFIC CROSSING MAJOR STREET	50	75	120	170	19
	% FULFILLED				25%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [ ]	No [X]

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.

Signal Warrant Calculation (OTM Book 12 - Justification 7)

Major Street: Lakeshore Road

Minor Street: Garden Drive

Comment Future Total (2029) Traffic Condition

Number of Approaches: 1 [ ] 2 [X]

Tee Intersection Configuration: Yes [ ] No [X]

Flow Condition: Free Fv (Rural) [ ]
Restricted Flow (Urban) [X]

VOLUME	AM	PM	FACTOR *	
1A - All	1,129	1,373	n/a	626
1B - Minor	25	23	25%	12
2A - Major	1,104	1,350	25%	614
2B - Crossi	11	18	25%	7

* This factor relates average of the "peak eight hours" to the average of the "am and pm peak hours"

OVERALL WARRANT

150% Satisfied:	Yes [ ]	No [X]	Warrant for new intersection with forecast traffic
120% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with forecast traffic
100% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with existing traffic *
COMBO 80% Satisfied:	Yes [ ]	No [X]	Warrant for existing intersection with existing traffic
80% Satisfied:	Yes [ ]	No [X]	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
ALL APPROACHES	480	720	600	900	626
	% FULFILLED				87%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MINOR STREET APPROACHES	120	170	120	170	12
	% FULFILLED				7%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [ ]	No [X]

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
MAJOR STREET APPROACHES	480	720	600	900	614
	% FULFILLED				85%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW X	FREE FLOW	REST. FLOW	
TRAFFIC CROSSING MAJOR STREET	50	75	120	170	7
	% FULFILLED				9%

150% Satisfied:	Yes [ ]	No [X]
120% Satisfied:	Yes [ ]	No [X]
100% Satisfied:	Yes [ ]	No [X]
80% Satisfied:	Yes [ ]	No [X]

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day

1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets

2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day

2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street; comprising: (1) lefts from both minor streets, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a) left turn volume >120 and (b) left turn volume plus opposing volume > 720, (4) pedestrians crossing the major street.

Appendix I

Babco Vehicle Parking Stacker System

babcopark

BR-6000

Two-Post Parking Lift

www.babcopark.ca

BR-6000

The most popular and versatile of parking stackers.

Designed to accommodate a vast array of vehicles, including SUVs, sedans, and sports cars, our BR-6000 model offers a minimum footprint and can be installed independent, or in a ganged column design to capitalize on the available space. The BR-6000 operates in both indoor and outdoor environments and is specifically designed to accommodate the needs of real estate developers, architects, engineers, automotive dealers, and commercial parking operators.

- Perfect solution for both indoor and outdoor parking
- Highly adaptable, customizable and cost-efficient car stackers
- Ganged column design allows multiple installations in minimum space
- Can be configured for drive-through and tandem parking applications
- **Lifting capacity:** 5950lbs.(BR-6000)
- Car height on ground up to 80.7 (2050mm)
- Usable platform width up to 82.7 (2100mm)
- Driven by hydraulic cylinder & lifting chain
- Galvanized corrugated platform
- Strong powder coating provides long lasting protection

General Parts

BR-6000

1. Carriage
2. Hydraulic oil reservoir
3. Galvanized waving plate
4. CSA-approved electrical box
5. Key switch & emergency stop button
6. Dynamic anti-fall lock
7. Front footage
8. Limit switch
9. CSA-approved power unit
10. Photocell sensor

FEATURES

- **TUV compliant, which is the most authoritative certification in the world**
  Certification standard 2006/42/EC and EN14010
- **Cost effective system**
  Only uses power when raising the lift - gravity driven descent means there is no electricity consumption for hydraulic power unit
- **New & improved hydraulic system**
  The hydraulic system adopts a German top-level structure design which is stable and reliable with twice the lifetime as older models
- **Newly designed control system**
  User-friendly operation with a 50% reduced failure rate
- **Galvanized, corrugated panels**
  Durable and perfect for indoor/outdoor use
- **Zero accident security system**
  All new upgraded security system to ensure no accidents
- **Dynamic locking device**
  A range of locking positions at every 4in. (100mm) on post for added safety
- **CSA-Approve power unit**
  Meets electrical Canadian standard
- **Newly designed, stronger structure**
  Thicker steel, stronger welds

FEATURES CONT.

- **Metallic powder coated surface**
  After applying AkzoNobel powder the colour saturation, weather resistance and adhesion are significantly enhanced
- **Rich, vibrant colour**
  Great care is taken with the treatment of lacquer in order to improve the quality of the product surface
- **Strong adhesion**
  The weather resistance of the spray powder has better performance and can withstand wear and tear
- **Superior chains**
  20% longer lifespan than that of domestic chains
- **Modular connection, innovative post sharing design**
  The BR-6000 two post parking lifts allows for post sharing. Combine multiple units into one ganged formation
- **Laser cutting + robotic welding**
  Accurate laser cutting improves accuracy of parts and automated robotic welding makes the weld joints stronger
- **Concrete & Asphalt installation**
  Able to accommodate on both concrete and asphalt *(with optional special asphalt surface frame kit)*
- **Galvanized screw bolts**
  Longer life screws with a much higher corrosion resistance

SPECIFICATIONS

General

Model	BR-6000
Vehicles parked per unit	2
Rated Capacity	5950lbs.
Available Car Length	196.8in. *(5000mm)*
Available Car Width	72.8in. *(1850mm)*
Available Car Height	80.7in. *(2050mm)*
Driver Mode	Hydraulic cylinder + chains
Operation	Key Switch
Lifting Speed	<50s
Descending Speed	<35s
Power Supply	220V, 1Ph, 60Hz
Finishing	AkzoNobel powder coating

Hydraulic

Model	BR-6000
Pump Motor Power	2hp/230V/1ph-FLA amp draw @230V is 16.9 amps. A circuit with a 20 amp or higher breaker is required (consult your electrician)
Pump Flow	2.0 gpm
Pump Working Pressure	2850 psi
Hydraulic Oil (outside or non-heated application)	AW22
Hydraulic Oil (indoor applications)	AW32

Dexron ATF hydraulic oil is also acceptable for both indoor and outdoor applications

Safety Devices

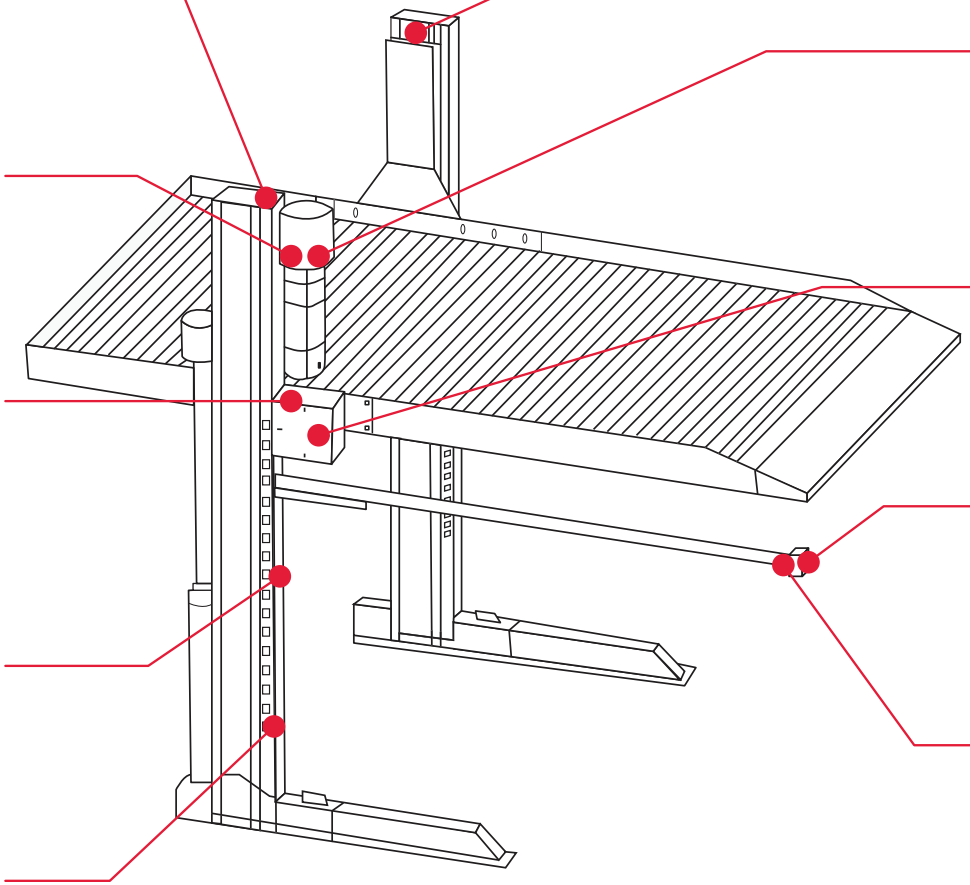
Limit switch on top of post. When the platform goes to the appointed height, lift will auto-stop

Pressure relief valve and pressure compensate flow control valve

Auto locking system in case of electrical failure

Mechanical anti-falling safety lock every 4 in. (100mm) on the post

Photocell sensor provides audible sirens to alert if objects are underneath platform



Synchronization chain

Overload protection device for hydraulic power unit

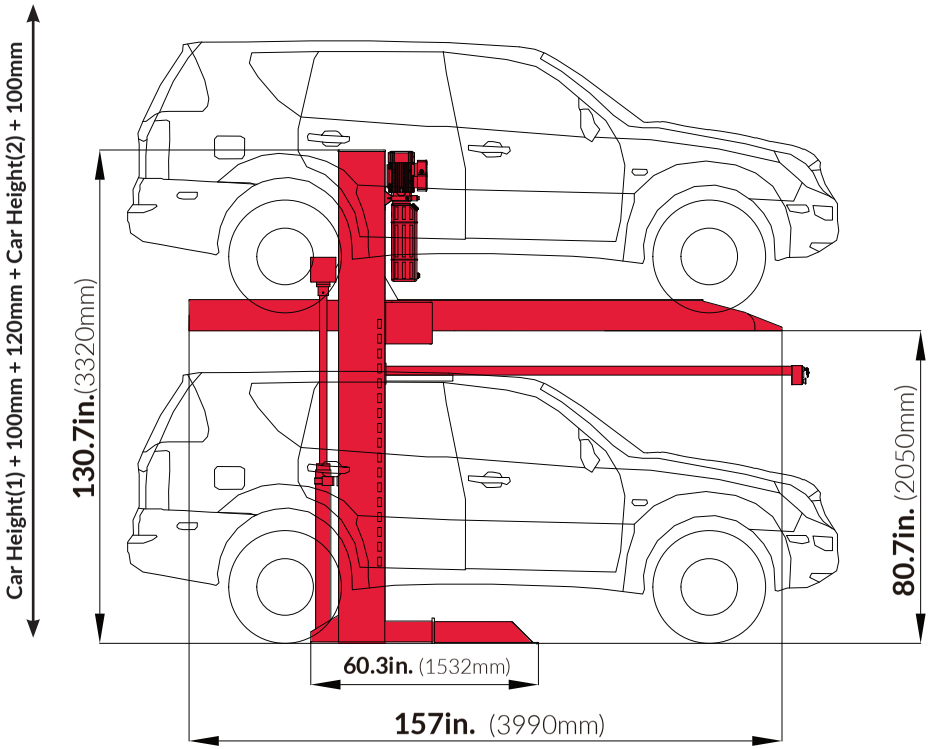
Electric protection for power overload or under voltage

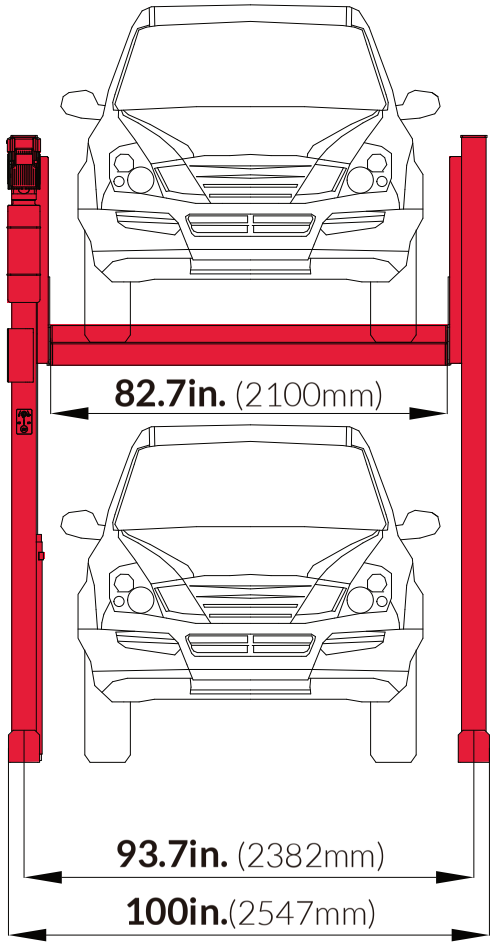
Emergency stop button

24v electric key switch lock release

Dimensions

BR-6000

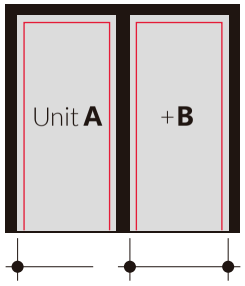




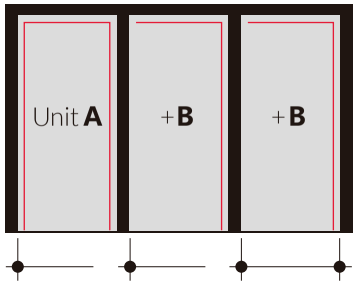
Width Calculation

Width dimensions single unit *(2 cars)*

Total width required	Clear platform width
101in. *(2547mm)*	82.6in. *(2100mm)*
104in. *(2647mm)*	86.6in. *(2200mm)*
108in. *(2747mm)*	90.5in. *(2300mm)*
112in. *(2847mm)*	94.4in. *(2400mm)*
116in. *(2947mm)*	98.4in. *(2500mm)*



Total width required	Clear platform width
194in. *(4929mm)*	82.6in. *(2100mm)*
202in. *(5129mm)*	86.6in. *(2200mm)*
209in. *(5329mm)*	90.5in. *(2300mm)*
217.6in. *(5529mm)*	94.4in. *(2400mm)*
225.5in. *(5729mm)*	98.4in. *(2500mm)*



Total width required	Clear platform width
287.8in. *(7311mm)*	82.6in. *(2100mm)*
299.6in. *(7611mm)*	86.6in. *(2200mm)*
311.4in. *(7911mm)*	90.5in. *(2300mm)*
323.2in. *(8211mm)*	94.4in. *(2400mm)*
335in. *(8511mm)*	98.4in. *(2500mm)*

Notes

Clear platform width of 82.6in. *(2100mm)* for car widths of 72.8in. *(1850mm)*. For large touring sedans we recommend a clear platform width of at least 90.5-98.4in. *(2300-2500mm)*. According to ISO 3864 the floor must be marked with 3.9in. *(100mm)* wide yellow-black at a distance of 19.6in. *(500mm)* from the platform edge by the purchaser (to be performed according to local regulations).

The lowering speed of an empty platform is considerably lower than a loaded one. It is not possible to have channels or undercuts and/or concrete haunches along the floor-t-wall joints. In the event that channels or undercuts are necessary, the system width needs to be reduced or the installation width needs to be wider. The manufacturer reserves the right to construction or model modifications and/or alterations. Furthermore, the right to any subsequent part modification and/or variations and amendments in procedures and standards due to technical and engineering progresses in the art or due to regulation changes, are also hereby reserved.

Notes

Scope of application

Suitable for residential buildings, office buildings and business premises.
Only for use by knowledgable users instructed on how to operate the lift.

For frequently changing users:
(E.g. for office, hotel and business premises or similar)

- Only park on ground level
- Performance on technical system adjustments is necessary
- Consultation with Babco is mandatory

Electrical installation preparation

Cabling preparation to be performed by the customer:

- Up to the main switch to be in place prior to starting the installation operations
- Connection to the main switch during installation operations
- System check to be performed by the electrician provided by the customer

Grounding and potential equalization:

- To be performed by the customer compliant to local regulations
- Connections required every 10 meters

Temperature

The installation is designed to operate between +5° and +40° C. Atmospheric humidity: 50% at +40°C.
If the local circumstances differ from the above please contact Babco.

Parking

- Drive vehicle backward onto appropriate position of platform. Collision with the control arm and side beams should be avoided.
- Put brake on after vehicle is parked on targeted position to avoid any accidental movement.
- Open the car door carefully to avoid collision, paying attention to waving plates and side beams.
- Raise lift to appropriate position and platform will lock automatically.
- Before another vehicle is parked under platform, please check and make sure vehicle is lower than platform height to avoid damage.

Noise Protection

Insulation figure of the construction of min. Rw=57dB. Walls which border parking systems must be done as single wall and deflection resistant with min. m = 300kg / m^2. At differing constructional conditions additional sound absorbing measures are to be provided by the customer. Best results are reached by separated sole plates from construction.

Protection against corrosion

Clean galvanized parts and platforms of dirt and road salt as well as other pollution.

Fire Safety

Each and every fire safety requirement and all possible mandatory item(s) and equipment(s) (fire extinguishing systems and fire alarm systems etc.) are to be provided by the customer.

Railings

If walkways are arranged directly to the side or behind the systems, railings have to be provided acc. EN ISO 13857 by client acc. to local requirements, height min. 78.7in.

babcopark

Maintenance

Do lubrication on guide rail and guide pulley once per month

Do lubrication on balance chain once per month

Change all the hydraulic oil three months after first operation; and change oil every nine months after first changing

Frequently check the screw nuts of bolts affixed to the electromagnet and locking plate, if any screw nut is loose, fasten ASAP

If any noise comes out from the electromagnet, replace ASAP

The seal in the hydraulic cylinder should be replaced every two years

The roller and sliding block should be replaced every two years

The valve element in the solenoid valve and filter in the power unit should be cleaned every 6 months

Before operation, check electromagnet connector, if loose, fasten and test the top limit switch and photocell sensor. Fix if not working or replace