JANUARY 11, 2023

PROJECT NO: 1767-5311

SENT VIA: EMAIL C/O
EMMA.STUCKE@IBIGROUP.COM

Hilden Homes
393 Sidney Street
Belleville, ON K8P 3Z9

Attention: **Eric DenOuden**
President

RE: **TRAFFIC ADDENDUM LETTER**
TULIP ESTATES (12697 LOYALIST PARKWAY)
PICTON, PRINCE EDWARD COUNTY, ON

Dear Eric,

In support of the Draft Plan for the residential development situated at 12697 Loyalist Parkway in Picton, Prince Edward County, the following Traffic Addendum Letter has been composed to address the comments provided by the Ministry of Transportation (MTO) on March 16, 2021, and the peer review conducted by Paradigm Traffic Inc. (Paradigm) on behalf of Prince Edward County (County) on February 25, 2021.

A Transportation Impact Study (TIS) was previously submitted in June 2019 in support of the proposed development. All analyses and conclusions not updated within this letter would remain consistent in the original TIS report.

1.0 Comment Response

The following section outlines the comments presented by the MTO and the Peer Review conducted by Paradigm, and Crozier's responses to these comments.

1.1 Tulip Estates – Peer Review Cover Letter

a. *Additional localized site traffic impacts need to be reviewed, specifically the intersection with Street 'A' and Bridge Street for driveway setbacks and sightlines and what operational/safety concerns are based on their proximity.*

   This review may identify requirements for tapering lanes or improvements may encroach onto Loyalist Parkway which is an MTO road and will require their consultation. Furthermore, they identify further monitoring of the Bridge Street & Union Street intersection for higher traffic controls (signalization) in the future.

The proposed site access off Bridge Street was analyzed from a sight line perspective in the Traffic Addendum Letter (Section 6.1), and sight lines were determined to be sufficient.

Left-turn lane warrants conducted in Section 5.1.2 of the Traffic Addendum Letter found that an auxiliary left turn lane would be warranted for the westbound approach on Loyalist Parkway intersecting with the proposed site access. The MTO will be circulated on this addendum letter and is expected to be involved in the future design work for the intersection improvements.

b. *It is recommended that engineering for this new intersection be completed to determine if additional study or consultation with MTO is required.*

Engineering for the new intersection would be outside the scope of the Traffic Impact Study at this stage. The MTO will be involved in the engineering design of this intersection and will also be circulated this TIS Addendum.

c. *It is recommended that cost contributions be required for intersection improvements at Bridge Street and Union Street.*

It is recommended in the Traffic Addendum Letter that all-way stop control be implemented at this intersection. As such, stop signs and proper pavement markings would be required at the approaches along Bridge Street. The cost contributions for this improvement by the developer is outside the scope of this study.

1.2 MTO Comments

a. *The Ministry of Transportation (MTO) notes the new subdivision is technically outside of MTO's permit control. The ministry's interest is with the proposed subdivision's new road connection onto Highway 33 (Loyalist Parkway) as the proposed road is only 30 to 40 metres within the link. The ministry is also interested in the drainage for the proposed subdivision as a centreline crossing culvert is located 5 metres from the connecting link. You & the proponent should also be aware that there is a utility station and what appears to be possibly a historic wall located on the north side of Highway 33 in proximity to the proposed new road. I want to bring this to your attention as in the event that the traffic impact study determines a left-hand turn lane or other geometric features are required to facilitate this subdivision proposal, the road works will impact the centreline culvert, utility station and possibly a historic wall. Any road works needed on Highway 33 that extend outside the connecting link onto the provincial highway will be within the jurisdiction of MTO under the Public Highway Transportation Improvement Act RSO 1990, which will require permit from MTO.*

These concerns are noted but they are mostly outside the scope of the TIS.

The TIS does recommend a westbound Left-turn lane at the site access onto Bridge Street/Loyalist Parkway. Most of the issues identified are expected to be addressed as part of the design work for the intersection improvements.

b. *MTO would like to be involved in the review of the traffic impact study of the proposed subdivision. You should also be aware the ministry will require you to follow the MTO supplement manuals to the TAC Manual when preparing the traffic study, if a left-hand turn lane is required as the left-hand turn lane will extend into the ministry's jurisdiction.*

Left-turn lane warrants were conducted for the intersection of Bridge Street/Loyalist Parkway with the proposed site access in Section 5.1.2 of the Traffic Addendum Letter. The warrants were met and were conducted in accordance with the MTO Supplement to the TAC GDGCR. The MTO will be circulated on this addendum and future design work for the intersection improvements.

c. *Please be aware the ministry has a paving project on Highway 33 that is programmed in 2020 from Glenora to Picton. Regarding growth rates and background developments please contact the municipality.*

The background developments identified in the original TIS were agreed upon per discussions with the County. Any additional developments would be expected to be counted in the conservative 2% growth rate applied to traffic movements.

1.3 Paradigm Peer Review Comments (Detailed Commentary, February 21, 2022)

a. *Introduction/Study Scope*

a.1. The consultant provides the municipal address for the subject property, a description of the size of the property, and the proposed use. An omission, as related to the content of a typical TIS, is that no separate Figure has been included to illustrate the site location within the local context. Later in the report, the consultant includes a small key plan within each traffic volume Figure. This key plan is illegible when printed on typical report-sized pages and is only legible if viewed and enlarged in a digital format.

Figure 1 of the Traffic Addendum Letter provides a site location figure.

a.2. The consultant states the study is in support of a draft plan of subdivision application. Based on this, we assume that the proposed development is compliant with Zoning regulations and Official Plan policies. The proposed development is identified in the Executive Summary as single detached, semi-detached, and townhouse residential units.

See Section 2.1 and 2.2 of the Traffic Addendum.

a.3. The consultant states that consultation was undertaken with Prince Edward County staff to establish the scope of the study for traffic forecasting and analyses. Another omission is that there is no record of this consultation provided in the report or a basic description of the agreed-to scope (i.e. study area, analysis time periods, horizon years for traffic forecasting, etc.)

We note that there is no record of this initial consultation. The study was conducted according to typical standards in absence of initial consultation.

a.4. The consultant states that consultation was also attempted with the Ministry of Transportation of Ontario (MTO), but that MTO staff provided no response. It is not clear in the introduction of the report as to what MTO's interest may be in the study. We assume that if MTO has an interest, the TIS as submitted will be circulated to MTO staff for their consideration.

MTO will be included for this and any subsequent submissions.

Additionally, this study has addressed MTO's comments to date.

b. Existing Conditions:

b.1. The consultant describes the development property as being located within a residential area comprising open lots and a few residential units. Another omission is that this description does not identify how those existing residential units access Loyalist Parkway or how the proposed site access would be situated in relation to existing driveways.

Residential properties along Loyalist Parkway are accessed through private driveways and the new proposed full-moves access to Loyalist Parkway will not interfere with existing driveways.

b.2. The consultant refers to Figure 1, which is a Draft Plan prepared by the IBI Group, to note that the intensity of development will correspond to the maximum density of 27.5 dwelling units/net hectare as identified in an unnamed Secondary Plan. Clarification is required for this reference.

The Secondary Plan referenced was the Picton Urban Center Secondary Plan.

b.3. While it is not clear why these details of the development proposal are presented under "Existing Conditions", the consultant states the proposed development would comprise 240 single-family units and 147 townhouses and would have full movement accesses on Bridge Street and Owen Street.

The development statistics of the proposal have changed as noted in Table 1 of the Addendum Letter.

b.4. Figure 1 does not specifically identify the Owen Street connection, or label Owen Street, but it is presumed to be the one new east-west street that is "open" at its west end. The proposed development statistics are presented in more detail by block later in the report (Section 5.0) where the 240 "Singles" are described as a mix of "Singles/Townhomes/Semi" and the 147 "Townhomes" are simply described as "Townhomes"

The assumption is correct, an updated Draft Plan of Subdivision has been provided in Figure 3 that clearly labels the Owen Street extension. The Draft Plan of Subdivision is still conceptual and in block form. As the plan progresses it will become more detailed and replace the blocks with specific units. Crozier has assumed the worst-case scenario for all the blocks (i.e. max density and single detached units for blocks 1-2, 4-9. 14-18, 20-21, and 23-24).

b.5. The consultant provides a description of the boundary road network in terms of basic lanes, posted maximum speed limit, and jurisdiction. Another omission is that the functional classification for each of the five boundary roads is not identified (i.e. arterial, collector, or local). Bridge Street-Loyalist Parkway (also known as Highway 33) is identified as being under MTO jurisdiction, which if accurate for the section of road along the site frontage, would explain where MTO's interest would lie. Specifically, the proposed development would require approval of the proposed site access from MTO

Section 2.3.1 of the Addendum Letter provides discussion on road classifications. It is generally assumed that the site frontage is under Prince Edward County jurisdiction but changes to MTO jurisdiction just east of the proposed site access based on the location of the existing roadway joint. This will be confirmed as part of the design of the site access on Loyalist Parkway but in either case, MTO approval will be required.

b.6. The consultant established 2019 base year traffic conditions based on July 2019 traffic counts (pre-pandemic) that were undertaken from 7:00 to 9:00 AM and 4:00 to 6:00 PM at the "study intersections". The counts were used to identify the AM and PM peak hours within these time periods. The consultant notes that construction was ongoing at the Church Street/Union Street intersection with the south leg of Church Street reduced to one lane of travel with directional control by flaggers. The consultant reasoned that since all traffic movements were being accommodated, it was unnecessary to make any volume adjustments at this or nearby intersections. Given the low traffic volumes using Church Street as shown in Figure 2, we agree with this approach

Noted.

b.7. The consultant does not document field observations of traffic operations during the traffic counts or at any other time. In general, it is good practice to observe traffic conditions in the field to assist in verifying intersection traffic demands and analyses and to identify potential traffic concerns or issues that may be unique within a study area. Another omission is that the consultant does not describe or illustrate the lane arrangements and traffic control for each of the study intersections

Figure 4 and Section 2.3.2 of the Traffic Addendum discuss lane arrangements and traffic control for the study intersections. No significant issues were identified during the traffic counts outside of the construction activity as noted above.

b.8. The consultant conducts the analysis of peak hour traffic operations for the study intersections using acceptable software, methodology, and assumptions. The analysis results as presented in Table 2 indicate no operational concerns since these intersections operate at good levels of service (low delay values for traffic movements under stop control) and well within capacity.

As related to the analysis results, the consultant states that the boundary road network is operating at level of service "C" (within a range of "A" representing

lower delays and "F" representing higher and generally unacceptable delays). This finding appears to be based on the worst level of service on a stop-controlled approach at one of the study intersections. While not critical to the understanding of the TIS, the technical basis of this statement does not support the consultant's conclusion or contribute meaningful information to the study. The boundary road network is essentially represented by the two main roads – Bridge Street-Loyalist Parkway and Union Street – and each of those roads has existing directional traffic volumes that are well within their planning level capacities, and both operate as free flow (except for the stop-controlled approach of Union Street at Bridge Street), which means minimal delay for travel on the boundary road network. Within an urban road network, the key measures of traffic operations and development traffic impacts are related to the individual intersections not to the broader boundary road network. The consultant's general conclusions on "boundary road network operations" in the assessment of future horizon year conditions has been disregarded in the remainder of this review.

The term "boundary road network" in the original TIS was intended to refer to the study road network within the identified boundaries (i.e. inclusive of both the boundary and internal intersections within the study area). To avoid confusion, the Addendum removes this terminology and refers to the study road network and intersections as such.

c. Background Traffic Forecasts:

c.1. The consultant states that full development would occur by 2024, and therefore, this represents the first study horizon year. A second horizon year of 2029 (five years after opening) has also been considered. The consultant notes that these are the horizon years agreed to with County staff, and as previously noted MTO had not provided any input on study requirements prior to the TIS being completed. We note that the MTO TIS Guideline would require a third horizon year of 2034 (10 years after opening)

As the MTO's comments contained herein have not referred to expanding the horizon years for the study, it is assumed the horizon years of 2024 and 2029 are acceptable at this time.

c.2. The consultant properly estimated general growth in background traffic for the horizon years, which was based on a two per cent per annum growth rate and stated to be a growth rate agreed to with County staff.

Noted.

c.3. The consultant properly accounted for the traffic that will be generated by two other new developments that would also impact the study intersections, namely Port Picton Homes (approximately 250 residential units and an 18-unit motel)[2] and Picton Harbour Lofts (25-unit condominium development). Both developments were assumed to be completed by 2024

Noted.

c.4. The resultant background forecasts shown in Figure 3 (2024) and Figure 4 (2029) were spot checked and appear to be correct.

Noted.

d. Site Traffic Forecasts:

d.1. The site trip generation has been estimated using the appropriate reference material and land uses, i.e. 10th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual, "Single-Family Detached Housing" for the 240 units of single detached homes (understood to include "Singles/Townhomes/Semi" types) and "Multifamily Housing (Low-Rise)" for the 147 townhomes. Since the trip rates for single family detached housing are higher than those for other residential housing types, it is conservative (erring on the higher side) to use this ITE land use category to cover the range of housing types noted.

Noted.

d.2. The site trip distribution is based on existing travel patterns, which is a reasonable method. Figure 5 shows the percentages of site trips assigned to each intersection turning movement at the previously identified study intersections as well as at the proposed new site access intersection with Loyalist Parkway.[3] We note that the site trip distribution does not show the second access point via Owens Street, however, it apparently is used for access to John Street since site trip distribution percentages are shown for traffic movements to/from John Street at its intersection with Union Street.

Figure 5 and Figure 6 within this report have been updated to demonstrate the trips distributed from the south site access taking the Owen Street connection to John Street.

d.3. Based on Figure 5, we have determined that the site trip distribution can be generalized as approximately 20% oriented to/from the northeast via Loyalist Parkway, 25% to/from east via Union Street, and 55% to/from the west via Bridge Street. This appears to be a reasonable directional distribution considering the base year traffic volumes and patterns. Another omission is that this information is typically provided in a table for ease of review and understanding by agency staff reviewing the report as well as for others who may have an interest in the proposed development and its traffic impact.

Table 4 of the Addendum Letter provides a trip distribution table outlining the percentages assigned to each of the gateways.

d.4. In reviewing the site generated trip assignment shown in Figure 6, we find that the number of trips assigned to the road network matches with the trip generation shown in Table 5 (Site Generated Trips). We also note that the site trips have been split approximately 60% to/from the Loyalist Parkway access and 40% to/from the Owen Street access (and the Owen Street-John Street route). There is no commentary in the TIS regarding the decision-making used

for this split of site trips, which can be considered another omission in the reporting.

An explanation has been provided in Section 4.2 of the Traffic Addendum letter. The trips were distributed in a logical manner based on the existing trip distribution patterns and the location of dwellings proposed within the site plan.

e. Total Traffic Forecasts

e.1. The total AM and PM peak hour traffic forecasts illustrated in Figure 7 (2024) and Figure 8 (2029) represent the sum of the base year (2019) traffic, trip assignments for other new local area developments, the general background growth rate, and the subject site trip assignment. A spot check of several of the traffic movements confirms that the forecasts are correctly presented.

Noted.

f. Operational Analysis of Future Conditions

f.1. The analysis of the 2024 and 2029 AM and PM peak hour background traffic forecasts (Table 3) shows that there is little change in study area intersection traffic operations compared with the base year (2019) analysis except for the northbound left turn movement at the Bridge Street/Union Street intersection experiencing longer delays in 2029 (level of service F) and approaching capacity (within 2% of the theoretical capacity). The other study intersections are shown to operate at good levels of service and well within capacity.

The analysis of the 2024 and 2029 AM and PM peak hour total traffic forecasts (Table 6) shows similar results compared with the background traffic conditions. Once again, the one critical movement identified is the northbound left turn movement at the Bridge Street/Union Street intersection, which would have longer delays in both 2024 and 2029 (level of service F), near capacity conditions in 2024, and over capacity conditions in 2029 (PM peak hour). The additional traffic generated by the subject site contributes to the future operating conditions at the Bridge Street/Union Street intersection by adding traffic to the east-west flow along Bridge Street (as related to site trips to/from the proposed site access on Loyalist Parkway) and by adding traffic to the northbound left turn on the Union Street approach to Bridge Street (as related to the site trips to/from the Owen Street access and the Owen Street-John Street route to Union Street.

The consultant does not recommend a specific improvement to the Bridge Street/Union Street intersection to address the operational concerns outlined above. Rather, the consultant reasons that these types of delays at stop-controlled approaches to major streets in an urban setting should be expected and that operations during off peak hours will be better. Regarding the off peak hour conditions, the consultant provides an additional analysis in which it is assumed that the hourly traffic volume in the off peak is approximately half of either the AM or PM peak hour volume (i.e. AM plus PM peak hour volume divided by four), and this shows that an acceptable level of service could be expected outside of the peak hour conditions. In general, this is a reasonable

conclusion, however, the methodology used by the consultant does not necessarily reflect average off peak hour traffic volumes.[4]

Per the updated future total analysis contained in Table 5 of the Addendum Letter, implementing All-Way Stop Control (AWSC) at the intersection of Union Street and Bridge Street would alleviate capacity concerns. Additionally, AWSC warrants were conducted for the intersection of Union Street and Bridge Street using the Ontario Traffic Manual (OTM) Book 5, and all-way stop control was found to be warranted at this intersection.

f.2. *For future reference, the consultant may wish to consider collecting eight-hour traffic data rather than limiting the data collection period to the typical morning and afternoon peaks. With this task typically being conducted by data collection contractors (as done for the subject TIS), it is not usually cost-prohibitive to expand the data collection hours. The consultant does recommend that "the city" (i.e. the County) monitor traffic operations at this intersection in the future to consider the need for a higher form of traffic control such as a traffic signal. This is a reasonable approach given the uncertainties associated with the actual levels of background traffic growth that may be achieved, the pace of future development over the next five to 10 years, and that the traffic forecasts for the subject development and the other background developments can be considered reasonably accurate but not necessarily precise.*

Noted.

f.3. *In summary, the consultant concludes that no road or traffic control improvements would be required to accommodate either the background or total traffic forecasts, which essentially means that the proposed development would have a negligible impact on the study intersections. We agree with this conclusion with the qualifier that the Bridge Street/Union Street intersection should be monitored for the potential need for a higher form of traffic control (likely traffic signals at some time in the future).*

Per the results of the Traffic Addendum Letter, AWSC has been recommended at the Bridge Street/Union Street intersection as an interim measure until possibly signals are warranted, however it is noted that AWSC would be sufficient to improve traffic operations for the 2029 horizon.

f.4. *In addition to the above, there are some notable omissions related to more localized site traffic impacts that the consultant has not considered in the study, which include:*

f.4.1. *While Figure 7 and Figure 8 show total traffic intersection volumes for the proposed Loyalist Parkway/Site Access intersection, there is no operational analysis of this intersection. This should have been undertaken to report on the required form of traffic control and the potential need for auxiliary turn lanes on Loyalist Parkway. As well, we note that while approximately 40% of the site trips from the proposed development were assigned to the Owen Street access and its connection to John Street within the existing*

residential development to the south, there is no commentary or estimate regarding the potential for traffic from the latter subdivision to use the new connection to Owen Street for access to Loyalist Parkway (i.e. existing subdivision traffic traveling through the proposed new subdivision)

Table 6 of the original TIS outline the future total operations of the study road network, which includes the Site Access at Loyalist Street.

The proposed site access connection via an extension of Owen Street is expected to keep traffic to the periphery of the existing subdivision and significant changes in delay would not be expected at the intersection of Owen Street and John Street given that traffic on Owen is free-flow and the only traffic added to the stop-controlled approaches on John Street would be right-turns.

f.4.2. *Also related to the proposed Loyalist Parkway/Site Access intersection, the intersection location relative to existing driveways should have been reviewed to assess whether there may be operational and/or safety concerns related to their proximity. It should also be confirmed that there are no sight line concerns. Based on Google street imagery, none are anticipated since it appears that the proposed intersection may be replacing existing driveway(s), but this should all be clarified.*

Sight line analysis has been included in Section 6.1.1 of the Addendum Letter.

f.4.3. *There is no commentary or assessment of the expected changes in the existing traffic volume on Owen Street and John Street, and whether the resultant longer term traffic forecasts represent volumes that are appropriate for the functional classifications of these streets. We note that the consultant's site traffic assignments would result in an increase of approximately 100 to 120 trips (two-way) in each of the AM and PM peak hours on some sections of both streets, which would typically represent an increase of approximately 1,000 vehicles per day. These local traffic concerns may have been addressed previously in a Secondary Plan study, but if so, it was not mentioned in the TIS.*

See comment f.4.1.

g. Conclusions:

g.1. *Traffic forecasting and operational analyses are generally acceptable as presented, however, there are many omissions as related to background planning and engineering information, typical traffic impact study content, and the absence of some relevant technical work.*

It's not clear from the comment what specifically was omitted and therefore we cannot provide a response to this comment. However, additional information has been provided as part of this TIS Addendum as per the more detailed comments.

g.2. The key study conclusion is that the proposed development could be accommodated by the study intersections with no road or traffic control improvements.

The recommendations of the original TIS have been amended per this Traffic Addendum Letter pertaining to the results of the Left-turn lane warrants (Section 5.1.2) warranting an auxiliary Left-turn lane on the westbound approach on Loyalist Parkway, which is considered a necessary improvement. Further design work is still necessary to determine upgraded road alignment and width requirements.

g.3. The key study recommendation is that the County monitor future traffic conditions at the Bridge Street/Union Street intersection to confirm the need for and type of improvement that may be required (possibly traffic signals). This recommendation relates to the study finding that the northbound left turn from Union Street to Bridge Street would experience unacceptable delays and have traffic demands at or exceeding capacity during peak hour periods in the future.

Signal warrants were conducted in Section 5.1.1 of the Traffic Addendum Letter and were not found to be warranted for the intersection of Bridge Street and Union Street. All-Way Stop Control warrants (AWSC) were also conducted in Section 5.1.1 and were found to be warranted. After analysis of the intersection with the addition of stop signs on all approaches, the intersection operations of the intersection were found to have significantly improved.

As such, the recommendation going forward is to implement all-way stop control at the intersection to mitigate capacity and delay concerns while still monitoring for potential signalization in the beyond the analyzed horizon years.

g.4. An addendum should be prepared to address the following:

g.4.1. Identify the Secondary Plan that is referenced in the report and confirm that the proposed development is compliant with Zoning regulations and Official Plan policies.

See Section 2.1 and 2.2 of the Traffic Addendum. The Secondary Plan referenced was the Picton Urban Center Secondary Plan.

g.4.2. Address MTO requirements where applicable (subject to direction from MTO).

Per the MTO comments, Left-turn lane warrants for the study intersection of Loyalist Parkway and the proposed site access were conducted with respect to the MTO Design Supplement to the TAC GDGCR. Further design work is considered outside the scope of this TIS.

g.4.3. Identify the functional classifications of the study area roads, and the lane configurations and traffic control at the intersections.

Section 2.3.1 of this Addendum Letter contains a description of the study area roads which include the functional classifications of the boundary road network.

Section 2.3.2 includes a description of the study intersections, including lane configurations and traffic control(s).

g.4.4. Confirm that the proposed new site access intersection on Loyalist Parkway could operate efficiently and safely at the proposed intersection location (considering traffic operations/capacity, auxiliary turn lanes, sight lines, and proximity to existing private driveways).

The original TIS demonstrated that the proposed site access to Loyalist Parkway/Bridge Street operates with minimal delays and well under capacity under 2029 future total conditions.

Additionally, the Traffic Addendum Letter (Section 6.1) analyzed the sight lines and access spacing of the Loyalist site access. The access meets sight line requirements and would be expected to have no spacing issues.

g.4.5. Explain the rationale used in splitting site trips between the Loyalist Parkway and Owen Street accesses.

An explanation has been provided in Section 4.2 of the Traffic Addendum letter. The trips were distributed in a logical manner based on the existing trip distribution patterns and the location of dwellings proposed within the site plan.

Provide commentary and an assessment of the potential traffic impact on the adjacent existing residential subdivision to the south with the proposed site access connection to Owen Street, and the potential for traffic from the existing subdivision to travel through the proposed new subdivision.

The only intersection expected to be affected within the existing subdivision is Owen Street and John Street, which currently operates as stop controlled along John Street. The proposed site access connection via an extension of Owen Street will keep traffic to the periphery of the existing subdivision and significant changes in delay would not be expected at the intersection of Owen Street and John Street given that traffic on Owen is free-flow and the only traffic added to the stop-controlled approaches on John Street would be right-turns.

g.5. The Traffic Impact Study follows a typical technical approach but has the following notable omissions:

g.5.1. A legible Figure to show the Site Location.

Figure 1 of the Traffic Addendum provides a legible figure illustrating the site location.

g.5.2. A clear and concise description of the study area, scope, and methodology that was agreed to with County staff.

We note that there is no record of the agreed methodology for the study agreed upon with County staff.

The study was conducted according to typical standards in absence of initial consultation, as the following:

The study area included the following study intersections:

- Union Street at Bridge Street
- Church Street at Bridge Street
- Eyre Street at Bridge Street
- Union Street at John Street
- Union Street at Church Street

The horizon years analyzed were the five-year (2024) and 10-year (2029) horizon.

A 2% growth rate per annum was applied to traffic movements to reflect background growth rate not included in the background developments identified.

The ITE Trip Generation Manual 10th Edition was used to forecast the site-generated trips, and existing traffic patterns (from traffic movement counts) were used to derive the trip distribution characteristics.

Synchro 10 was used to analyze the existing, future background and future total traffic operations of the study intersections.

g.5.3. A complete description of the key study area roads and traffic control.

See comment 1.3.(d.3.)

g.5.4. Field observations of existing traffic Operations.

Analysis of existing traffic operations were completed in the original TIS (Section 3.5) with field observed traffic counts collected on July 19, 2019. No issues were identified in the field outside of the construction observations as previously noted.

g.5.5. A site trip distribution table.

Provided in Table 4 of the Traffic Addendum Letter.

g.5.6. A clear description and illustration of the site trip assignment as related to the Owen Street access.

See Section 4.2 of the Traffic Addendum Letter.

g.5.7. An assessment of traffic operations and safety considerations for the primary site access intersection on the public road system (i.e., Loyalist Parkway).

The original TIS analyzed the traffic operations of the proposed site accesses and determined that both accesses will operate with minimal delays and well under capacity for the 2029 horizon year.

The Traffic Addendum analyzed the sight lines for the Loyalist Parkway site access and determined that sight lines are sufficient. This site access can be supported from a safety perspective.

The Owen Street Access is an extension of the existing roadway, and thus wouldn't be expected to face safety concerns.

2.0 Introduction

2.1 Development Lands

The subject lands encompass an area of approximately 21.9 ha and is currently occupied by open lands and some existing residential properties. As indicated by Figure 1, the development property is bounded by Loyalist Parkway to the east, residential units to the south, and greenfield lands to the north and east.

Per the County's Public GIS Viewer as of January 4, 2022, the subject lands are primarily zoned as FD (Future Development), with segments zoned as OS (Open Space), I-28-H and R3-30-H to the north of the property. Figure 2 illustrates the zoning map for the subject property. Additionally, per the Picton Urban Centre Secondary Plan (Secondary Plan) Schedule 'A', the subject property is designated as a "Town Residential Area". Excerpts from the Secondary Plan are included in Appendix A.

2.2 Development Proposal

The most recent Draft Plan prepared by IBI Group (revised date May 2022) envisions the following elements, compared to the Draft Plan (dated December 2018) used in the original TIS:

Table 1: Development Statistics

Development Proposal	Park	Stormwater Facility	Single-Detached, Semi-Detached, Street Townhouse	Townhouses
Previous (Dec 2018)	0.69 ha	2.12 ha	8.75 ha 240 units (max)[1]	5.36 ha 147 units (max)[1]
Current (May 2022)	1.064 ha	1.317 ha	10.17 ha 285 units (max)[2]	1.789 ha 40 units (max)[2]

Note 1: The previous TIS cited a maximum density of 27.5 du/net ha from the Secondary Plan.
Note 2: The most recent Draft Plan provides a range of residential units. The maximum is presented in this report.

The most recent Draft Plan is provided in Figure 3.

Upon review of the Secondary Plan, for a Town Residential Area, a maximum residential density of 37 units per net hectare is permitted for new neighbourhood developments. As the maximum proposed residential density proposed at the subject site is 28.02 units per ha (for single-family housing), the proposed development can be supported with respect to official plan and policies within the County. Relevant excerpts from the Secondary Plan are provided in Appendix A.

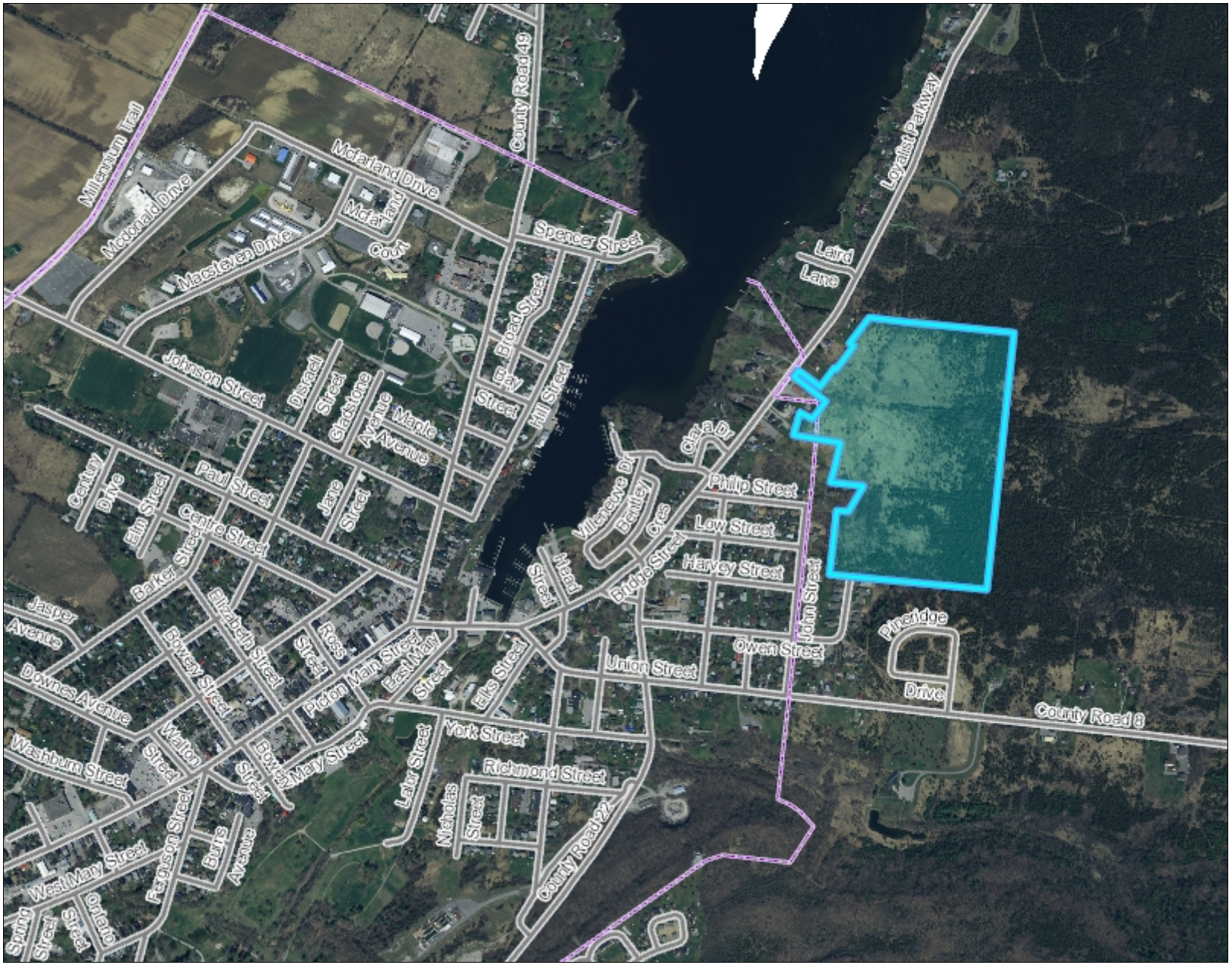
2.3 Boundary Road Network

The original TIS reviewed the following study intersections:

- Union Street at Bridge Street
- Church Street at Bridge Street
- Eyre Street at Bridge Street
- Union Street at John Street
- Union Street at Church Street

Figure 1 - Site Location

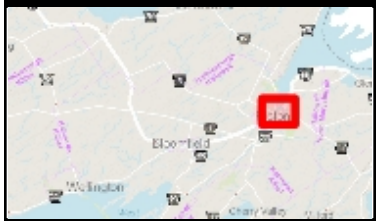
THIS MAP IS NOT TO BE USED FOR NAVIGATION



Legend

- Administrative Area Boundary
  - County
  - Municipal Ward
- Road Centerlines
- Airport Runway

Overview Map



Notes

Prince Edward County

TheCounty
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332 Picton Main St.
Picton, ON
K0K2T0
www.pecounty.on.ca

Map Scale 1: 12,988

659.81 0 329.9 659.81

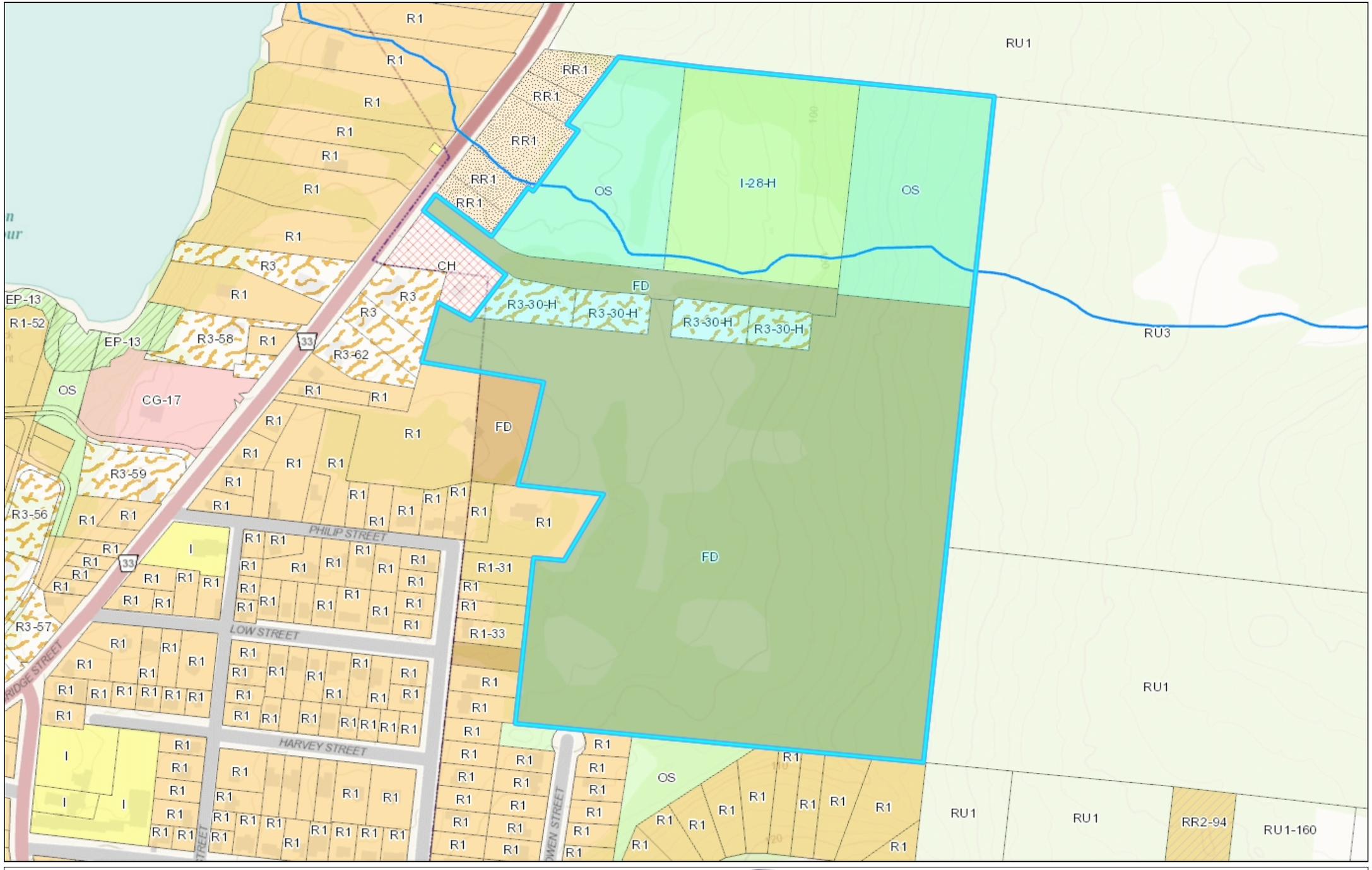
Meters

N

Prince Edward County GIS

Figure 2 - Zoning Information

THIS MAP IS NOT TO BE USED FOR NAVIGATION



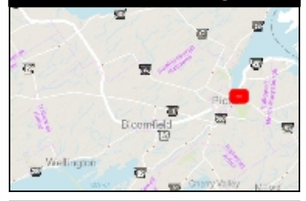
Legend

- Watercourse (EP Zone applies side)

Zoning (By-law No. 1816-2006

- RU1 - RURAL 1
- RU3 - RURAL 3
- RU2 - RURAL 2
- R1 - URBAN RESIDENTIAL TYPE
- R2 - URBAN RESIDENTIAL TYPE
- R3 - URBAN RESIDENTIAL TYPE
- HR - HAMLET RESIDENTIAL
- LSR - LIMITED SERVICE RESIDEI
- MHR - MOBILE HOME RESIDENT
- RR1 - RURAL RESIDENTIAL 1
- RR2 - RURAL RESIDENTIAL 2
- CC - CORE COMMERCIAL
- CG - GENERAL COMMERCIAL
- CL - LOCAL COMMERCIAL
- CH - HIGHWAY COMMERCIAL
- TC - TOURIST COMMERCIAL
- TPC - TRAILER PARK COMMERC
- MG - GENERAL INDUSTRIAL
- MH - HEAVY INDUSTRIAL
- MR - RURAL INDUSTRIAL
- MX - EXTRACTIVE INDUSTRIAL
- MD - WASTE DISPOSAL INDUSTF
- I - INSTITUTIONAL
- OS - OPEN SPACE
- EP - ENVIRONMENTAL PROTECT
- EP-W - ENVIROMENTAL PROTEC
- FD - FUTURE DEVELOPMENT

Overview Map



Notes

Map Scale 1: 3,246

164.9 0 82.44 164.9 Meters

N

Prince Edward County GIS

Prince Edward County

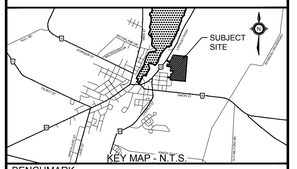
TheCounty

332 Picton Main St.
Picton, ON
K0K2T0
www.pecounty.on.ca

DRAFT PLAN OF SUBDIVISION

TULIP ESTATES

PART OF LOTS 1080 AND 1081,
REGISTERED PLAN 24,
TOWN OF PICTON,
PART OF LOTS 19 AND 20
CONCESSION SOUTH EAST OF CARRYING PLACE
TOWNSHIP OF HALLOWELL
NOW IN THE MUNICIPALITY OF THE COUNTY OF PRINCE EDWARD



BENCHMARK

INFORMATION REQUIRED

UNDER SECTION 51 (17) OF THE PLANNING ACT, R.S.O. 1990, c.P.13 AS AMENDED

(a) - AS SHOWN
(b) - AS SHOWN
(c) - AS SHOWN
(d) - AS LISTED BELOW
(e) - AS SHOWN
(f) - AS SHOWN
(g) - AS SHOWN
(h) - MUNICIPAL WATER
(i) - SILTY SAND
(j) - AS SHOWN
(k) - MUNICIPAL SANITARY AND STORM SEWERS
(l) - NONE

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

SIGNED _____
KEITH WATSON, O.L.S.
WATSON LAND SURVEYORS LTD., Ontario Land Surveyors

DATE _____

OWNER'S CERTIFICATE

I HEREBY CONSENT TO THE FILING OF THIS PLAN BY IBI GROUP, IN DRAFT FORM.

SIGNED _____
Eric DenOuden
Hilden Homes

DATE _____

LAND USE SCHEDULE

LOTS/BLKS	LAND USE	AREA (Ha)	NO. OF UNITS MIN/MAX	
RESIDENTIAL				
BLOCKS 2-9, 4-9, 14-18, 20-21, 23-24	SINGLE DETACHED, SEMI-DETACHED, STREET TOWNHOUSE RESIDENTIAL	10.170	169	285
BLOCK 22	WALKWAY	0.051	n/a	n/a
BLOCK 13	TOWNHOUSE RESIDENTIAL	1.789	30	40
BLOCKS 11, 19	PARK	1.064	n/a	n/a
BLOCK 12	STORMWATER MANAGEMENT FACILITY	1.317	n/a	n/a
BLOCK 10	WATER BOOSTER STATION / LIFT STATION	0.115	n/a	n/a
BLOCK 26	0.3 METRE RESERVE	0.001	n/a	n/a
BLOCK 25	FUTURE RESIDENTIAL	0.071	n/a	n/a
BLOCK 22	AREA OF ROADS	3.802	n/a	n/a
TOTAL		18.373	199	325

#	DATE	BY	DESCRIPTION
5	2022-05	BT	REMOVE APT BLOCK AND REVISE SWM AREA
4	2021-11	CA	REVISE BLOCKS 7, 11, 12, 25
3	2021-09	CA	FOR CLIENT REVIEW / DISCUSSION
2	2020-11	CA	UPDATED BLOCKS 23-26, ADDED BLOCK 29
1	2020-08	CA	MODIFIED TO ADDRESS COMMENTS RECEIVED

REVISIONS

APPROVALS

APPROVED: DATE:

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED UNDER THE SUPERVISION OF A REGISTERED PROFESSIONAL PLANNER WITHIN THE MEANING OF THE ONTARIO PROFESSIONAL PLANNERS INSTITUTE ACT, 1994

DESIGNED BY:	DWS	DATE:	2019-08-09
DRAWN BY:	NBA	FILE NUMBER:	115791
CHECKED BY:	DWS	SHEET NUMBER:	01

IBI GROUP
650 Dalton Ave #110
Kingston ON K7M 8N7 Canada
tel 613 531 4440
ibigroup.com

LEGEND:

BLOCK 1 — Denotes Block Number
(1,03 Ha) — Denotes Block's Area in hectares
20 (min) / 30 (max) — Denotes minimum/maximum allowable units per block

- SINGLE DETACHED, SEMI-DETACHED AND STREET TOWNHOUSE
- TOWNHOUSE
- STORMWATER MANAGEMENT FACILITY
- PARK / WALKWAY
- WATER BOOSTER STATION / LIFT STATION
- FUTURE RESIDENTIAL DEVELOPMENT
- DENOTES AREA SUBJECT TO PLAN OF SUBDIVISION

1:1000

10 0 10 20 30 40 50 60 70 m

2.3.1 Study Roadways

As outlined for consistency with the original TIS, the orientations of the study roadways are as the following:

- Bridge Street/Loyalist Parkway and Union Street have been assigned an east-west orientation.
- Eyre Street, Church Street and John Street have been assigned a north-south orientation.

Note, that although Union Street has been assigned an east west alignment, the section intersecting Bridge Street/Loyalist Parkway is aligned a north-south direction.

The following section elaborates on Table 1 of the original TIS describing the boundary road network.

Union Street (County Road 8) is an east-west roadway with one lane in each direction. Per the County's Official Plan Schedule 'E', Union Street is under the jurisdiction of Prince Edward County, and is designated as a County Road (which is assumed to be equivalent to a collector road). Union Street has a posted speed limit of 50 km/h and has sidewalks on both sides of the roadway. It is noted that while Union Street is designated to be an east-west roadway, only at the intersection with Bridge Street, Union Street is assumed to be oriented in the north-south direction.

Bridge Street/Loyalist Parkway (ON-33) is an east-west roadway with one lane in each direction. The segment of Bridge Street approximately 585 meters northeast of the intersection with Church Street is designated as Loyalist Parkway. Bridge Street is classified as a County Road (under the jurisdiction of the County), and Loyalist Parkway is classified as a Municipal Highway (under the jurisdiction of the MTO), per the County's Official Plan, Schedule 'E'. Bridge Street has a posted speed limit of 50 km/h, whereas Loyalist Parkway has a posted speed limit of 60 km/h. Bridge Street has sidewalks available at least on one side of the road. The segment of Loyalist Street northeast of Bridge Street has no sidewalks available.

Church Street (County Road 22) is a north-south roadway with one lane in each direction. Per the County's Official Plan Schedule 'E', Church Street is under the jurisdiction of Prince Edward County, and is designated as a County Road. The roadway has a posted speed limit of 50 km/h and has sidewalks available on one side of the street in the study area that terminate approximately 50 meters south of the intersection with Union Street.

Eyre Street is a north-south roadway with one lane in each direction. Eyre Street is classified as a Local Road under the jurisdiction of the County and is assumed to have a speed limit of 50 km/h. Eyre Street has sidewalks available on both sides of the road.

John Street is a north-south roadway with one lane in each direction. Eyre Street is classified as a Local Road under the jurisdiction of the County, and is assumed to have a speed limit of 50 km/h.

Appendix A contains relevant Official Plan Excerpts.

2.3.2 Study Intersections

The following section describes the lane configurations and traffic controls used at the intersections of study.

The intersection of **Union Street at Bridge Street** is a three-legged intersection with stop-control on the minor-road approach (Union Street). The northbound approach on Union Street consists of a single right-turn lane and a single right-turn lane. The westbound approach on Bridge Street consists of a single through/left-turn lane. The eastbound approach on Bridge Street consists of a single right-turn lane and a single through lane.

The intersection of **Church Street at Bridge Street** is a three-legged intersection with stop-control on the minor road approach (Church Street). The northbound approach on Church Street consists of a single left/right turning lane. The eastbound and westbound approaches on Bridge Street consist of a single shared through/turning lane (left for westbound, right for eastbound).

The intersection of **Eyre Street at Bridge Street** is a three-legged intersection with stop-control on the minor road approach (Church Street). The northbound approach on Church Street consists of a single left/right turning lane. The eastbound and westbound approaches on Bridge Street consist of a single shared through/turning lane (left for westbound, right for eastbound).

The intersection of **Union Street at Church Street** is a four-legged intersection with two-way stop control on the minor road approach (Church Street). All approaches consist of a single shared through/left/right-turning lane.

The intersection of **Union Street at John Street** is a three-legged intersection with stop control on the minor road approach (John Street). The southbound approach on John Street consists of a single shared left/right-turn lane. The eastbound and westbound approaches on Union Street consist of a single shared through/turning lane (left for westbound, right for eastbound).

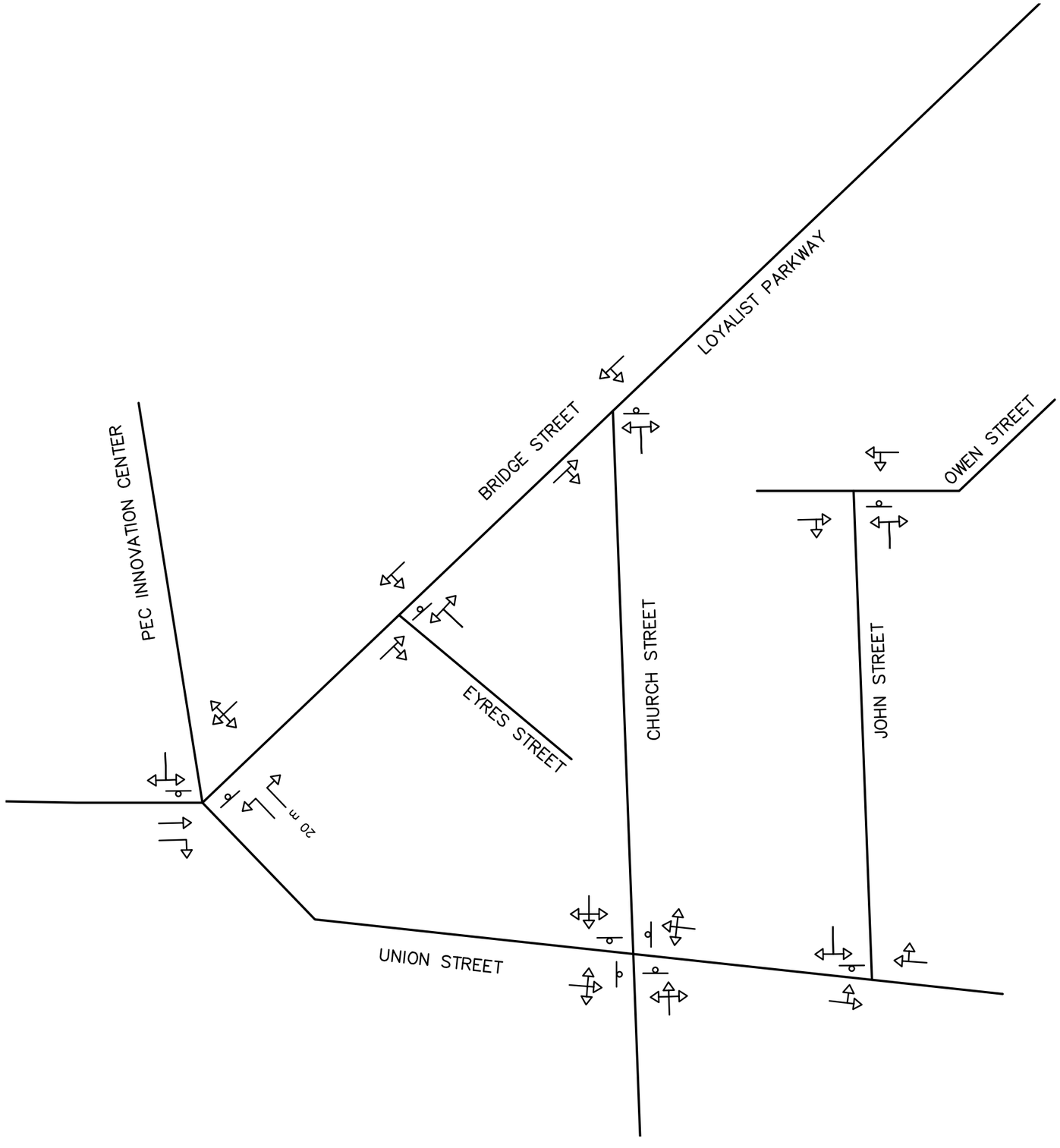
Figure 4 illustrates the study intersections, including the lane configurations and traffic controls at the intersections.

2.4 Existing Intersection Operations

Sections 3.3 to 3.5 of the original TIS report outline traffic data collection and analysis methodology used to analyze the existing (2019) operations of the study intersections. The results of the existing operations in the report remain unchanged.

3.0 Future Background Conditions

Section 4.0 of the original TIS outlines the assumptions regarding background developments and background growth rates confirmed with County staff. As such, the results of the future background analysis remain unchanged.



KEY PLAN
SCALE: N.T.S.

NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.

LEGEND:

AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

STOP CONTROL

12697 LOYALIST PARKWAY PICTON

EXISTING BOUNDARY ROAD NETWORK

CROZIER & ASSOCIATES Consulting Engineers
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
www.cfcrozier.ca

Drawn	Design	Project No.	
A.K.	K.S.		1767-5311
Check	Check	Scale	Dwg.
	K.S.	N.T.S	FIG. 04

4.0 Site Generated Traffic

4.1 ITE Trip Generation

Site generated traffic generated using the maximum unit counts presented in the most recent Draft Plan were updated in Table 2, using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition.

The same land use codes were used to recalculate the trips generated by single-family dwellings and townhouse dwellings as the original TIS.

Table 2: Site Generated Trips for Current Draft Plan

Use	Peak Hour	Trip Calculation Methodology	Number of Trips		
			Inbound	Outbound	Total
Single-Family Detached Housing (LUC 210) 285 units	A.M.	T = 0.71(X) + 4.80	53	157	210
	P.M.	Ln(T) = 0.96 Ln(X) + 0.20	178	103	281
Multifamily Housing (Low-Rise) (LUC 220) 40 units	A.M.	Ln(T) = 0.95 Ln(X) -0.51	5	15	20
	P.M.	Ln(T) = 0.89 Ln(X) – 0.02	16	10	26
Net Generated Trips	A.M.		**58**	**172**	**230**
	P.M.		**194**	**113**	**307**

Additionally, Table 3 summarizes the difference in net generated trips from the current proposed Draft Plan and the previous Draft Plan (per the previous TIS).

Table 3: Change in Trip Generation

Development Proposal	Previous Draft Plan (Dec 2018)	Current Draft Plan (Aug 2019)	Net Change
Total A.M. Peak Hour Trips	244	230	-14 trips
Total P.M. Peak Hour Trips	318	307	-11 trips

As provided in Table 2 and Table 3, the new Draft Plan proposal would result in a total of 230 two-way trips during the A.M. peak period, and 307 two-way trips during the P.M. peak period, which results in a reduction of 14 trips and 11 trips (respectively) compared to the estimates presented in the original TIS.

Therefore, the analysis and results presented in the original TIS remain conservative compared to the trips generated using the site statistics presented in the current Draft Plan due to a net

reduction of approximately 6% in the trips generated at the proposed development. As a result, the analysis from the original TIS has not been updated with this addendum.

4.2 Trip Distribution and Assignment

The trip distribution, as noted in Section 6.2 of the original TIS, was completed using existing traffic patterns.

For further clarification, the ratio of trips entering and exiting the study area via a particular gateway were taken as a percentage of the total number of trips entering and exiting the study area during the morning and afternoon peak periods.

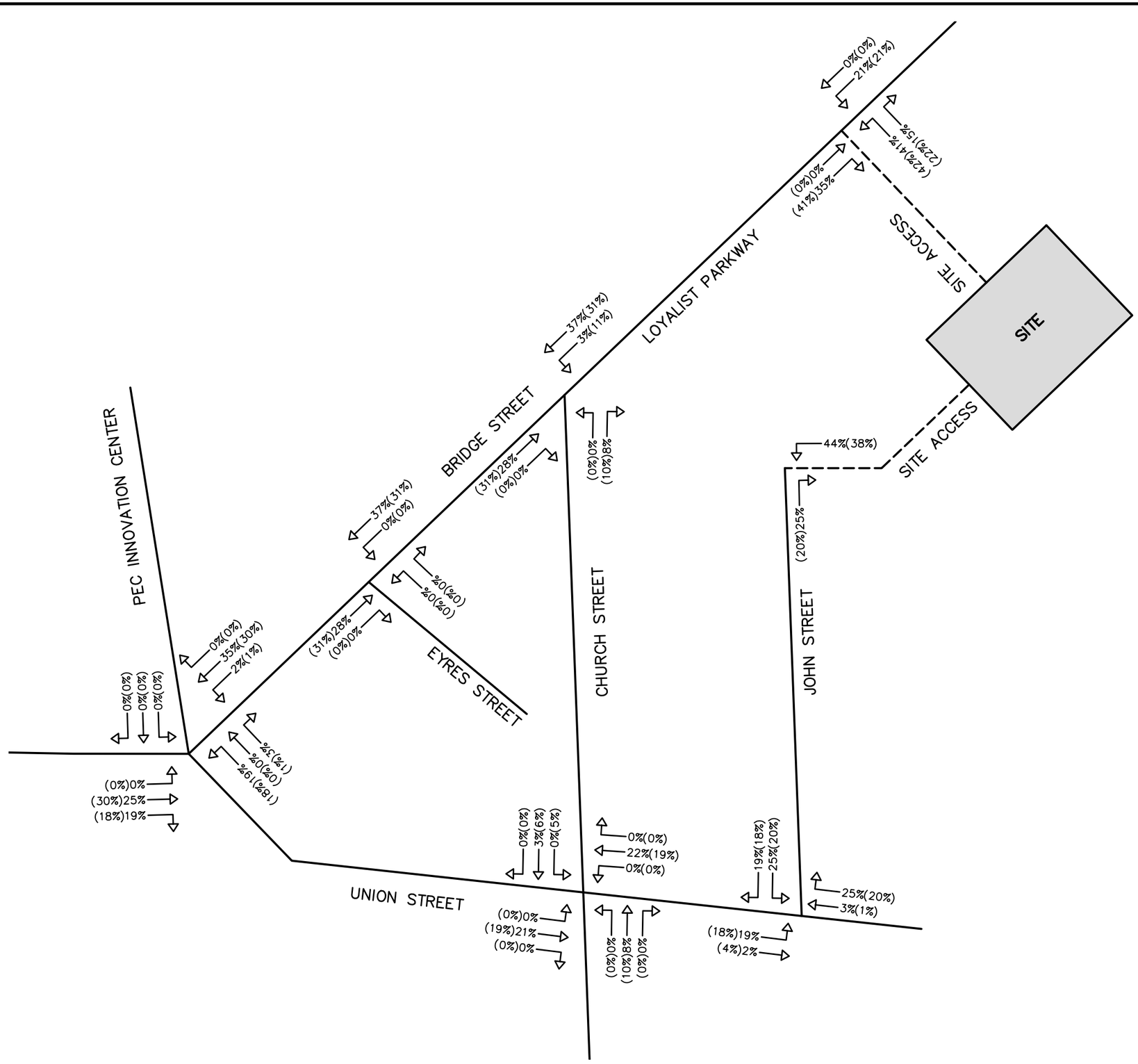
Turning movement ratios and logical judgement were used to determine the routes that traffic would take from the gateways to one of the two site entrances (i.e., via the Loyalist Parkway Access or the Owen Street Access).

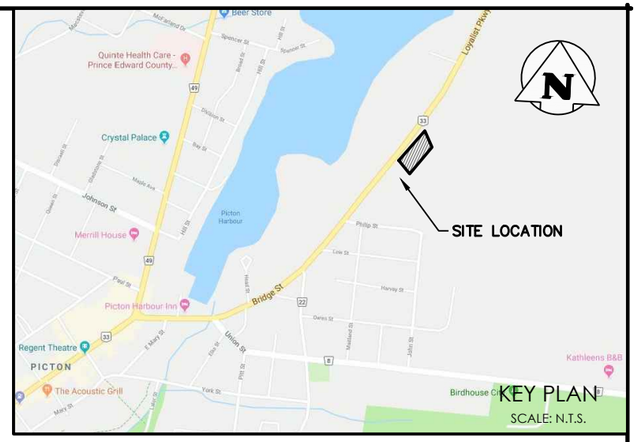
Note, the figures contained in the original TIS implied that trips travelling north on John Street are destined for the Owen Street access. All traffic figures, including the trip distribution and site traffic figures have been updated to reflect the connection from John Street to the site via Owen Street. These updated traffic figures are provided in Figure 5 and Figure 6 below.

A table of trip distribution percentages (based on the gateway location(s)) are included in Table 4 below.

Table 4: Trip Distribution

Gateway	A.M. IN	A.M. OUT	P.M. IN	P.M. OUT
West via Bridge Street	44%	54%	48%	48%
East via Loyalist Parkway	21%	15%	21%	22%
East via Union Street	28%	27%	21%	24%
South via Church Street	8%	3%	10%	6%
Total	100%	100%	100%	100%





KEY PLAN
SCALE: N.T.S.

NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.

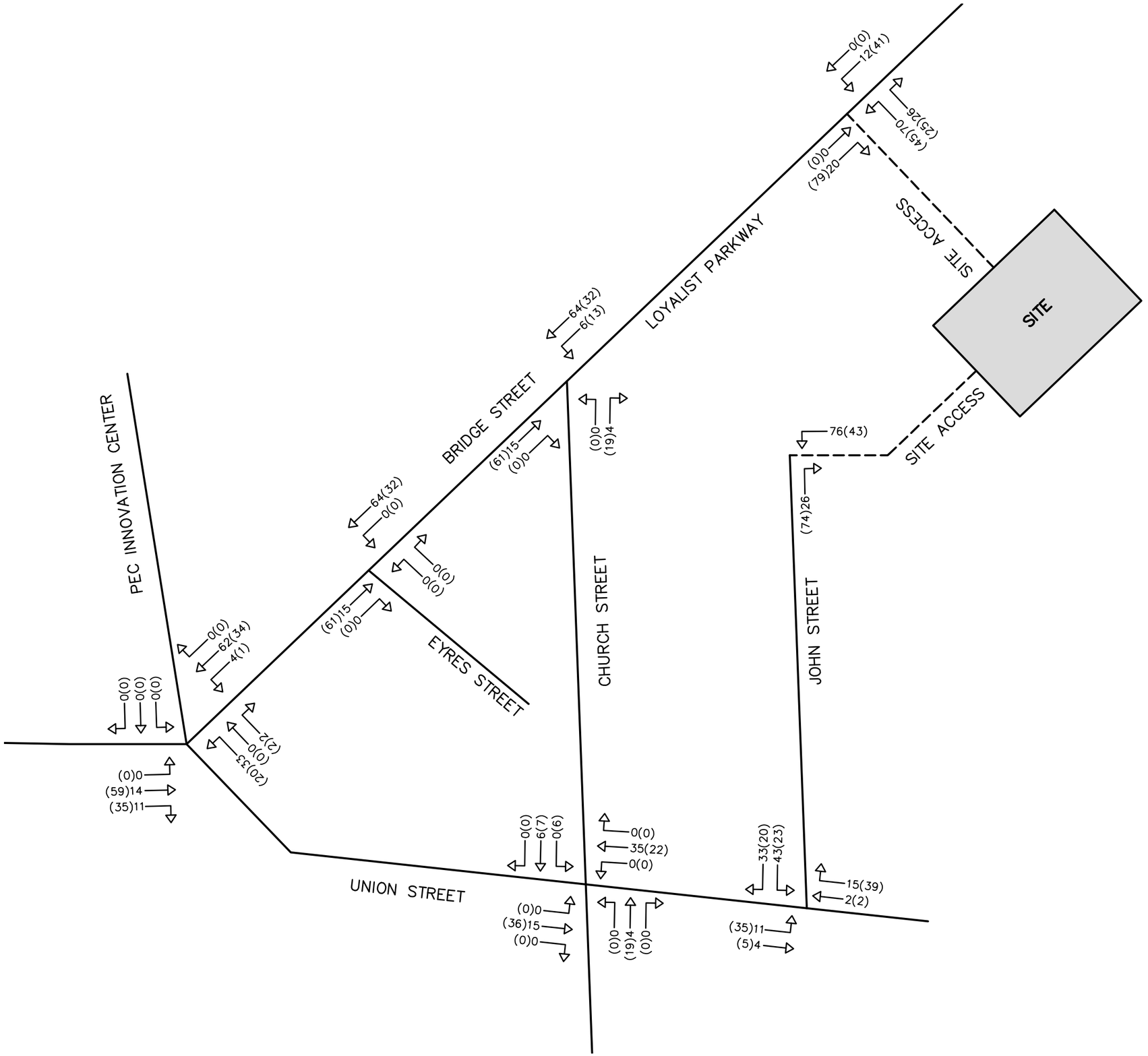
LEGEND:
AM(PM) WEEKDAY AM(PM) TRAFFIC DISTRIBUTION

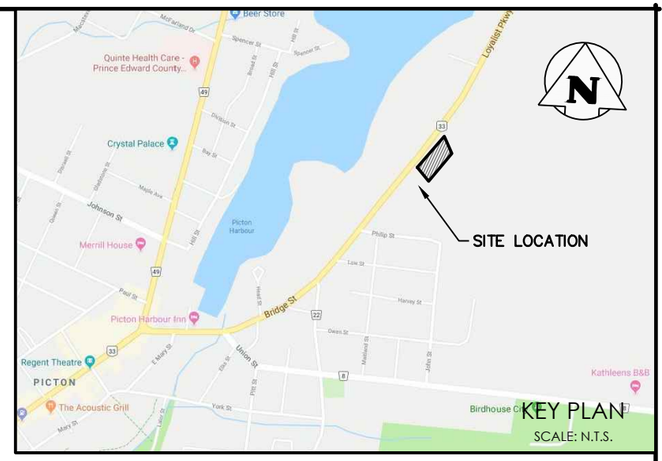
12697 LOYALIST PARKWAY PICTON

SITE TRIP DISTRIBUTION

CROZIER & ASSOCIATES Consulting Engineers
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
A.K.	K.S.		1767-5311
Check	Check	Scale	Dwg.
	K.S.	N.T.S	FIG. 05





NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.

LEGEND:

AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

12697 LOYALIST PARKWAY PICTON

SITE GENERATED TRIPS

CROZIER & ASSOCIATES Consulting Engineers
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
www.cfcrozier.ca

Drawn	Design	Project No.	
A.K.	K.S.		1767-5311
Check	Check	Scale	Dwg.
	K.S.	N.T.S	FIG. 06

5.0 Future Total Traffic Conditions

The 2024 and 2029 horizon years were analyzed using the addition of site generated traffic, in Section 7.0 of the original TIS report. The findings of the original analysis are not expected to materially change.

The following section outlines additional analysis to supplement the findings of the original TIS using volumes illustrated in Figure 7 and Figure 8 containing the 2024 and 2029 future total traffic volumes from the original TIS, respectively.

5.1 Warrants

5.1.1 Union Street and Bridge Street – Signal Warrant

It is noted that under 2029 future total traffic conditions, the intersection of Union Street and Bridge Street pose operational concerns with a Level of Service "F" during the weekday P.M. peak period. As such, a signal warrant for this intersection was conducted per the methods outlined in the Ontario Traffic Manual (OTM) Book 12, Justification 7. The results are included in Appendix B. Per the results of the signal warrant, signals would not be warranted at the intersection of Union Street and Bridge Street under 2029 future total traffic conditions.

5.1.2 Union Street and Bridge Street – AWSC Warrant

As noted in the previous section, operational concerns were identified for the intersection of Union Street and Bridge Street under 2029 future total traffic conditions. An All-Way Stop Control (AWSC) warrant using the methodology outlined in the OTM Book 5 were conducted for the intersection. The results are included **in Appendix C.**

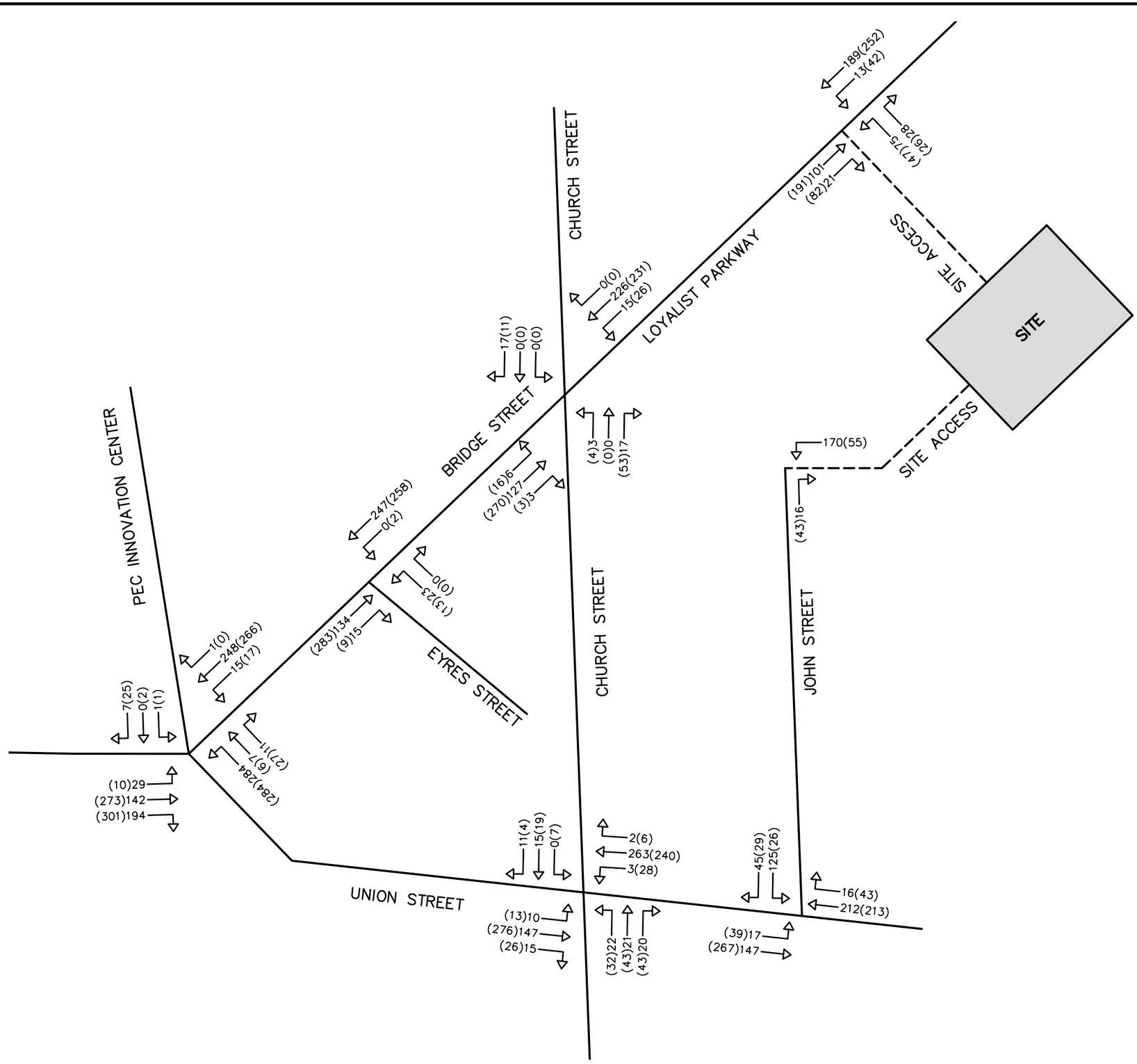
Per the results of the AWSC warrant, all-way stop control would be warranted for 2024 future total traffic conditions (and by extension, also for the 2029 horizon).

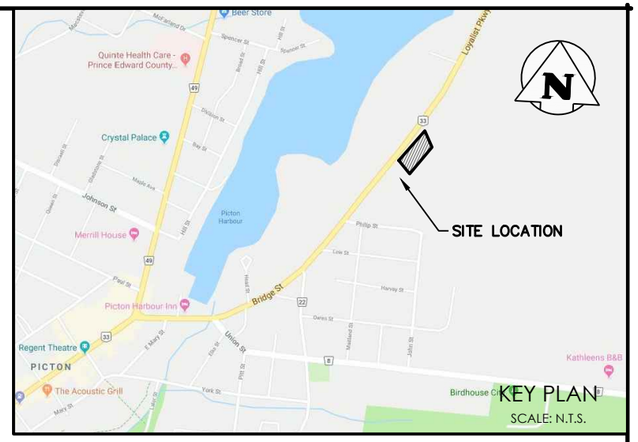
For demonstration purposes, all-way stop control was implemented at the intersection of Union Street and Bridge Street and the intersection was analyzed using 2029 future total volumes. The results of the addition of AWSC compared to the existing signal control under 2029 future total traffic conditions are presented in Table 5. The detailed capacity reports with all-way stop control are provided in Appendix D.

Table 5: 2029 Future Total Level of Service Comparison

Intersection	Control Type	Peak Hour	Level of Service	Average Delay per Vehicle (s)	Maximum V/C Ratio (Approach)
Union Street & Bridge Street	Stop Control (Minor)	A.M.	F	69.8 (NB)	0.95 (NBL)
		P.M.	F	178.2 (NB)	1.25 (NBL)
	All-Way Stop Control	A.M.	C	23.3 (NB)	0.68 (NBL)
		P.M.	D	30.2 (NB)	0.75 (NBL)

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical approach.





KEY PLAN
SCALE: N.T.S.

NOTE:
THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.

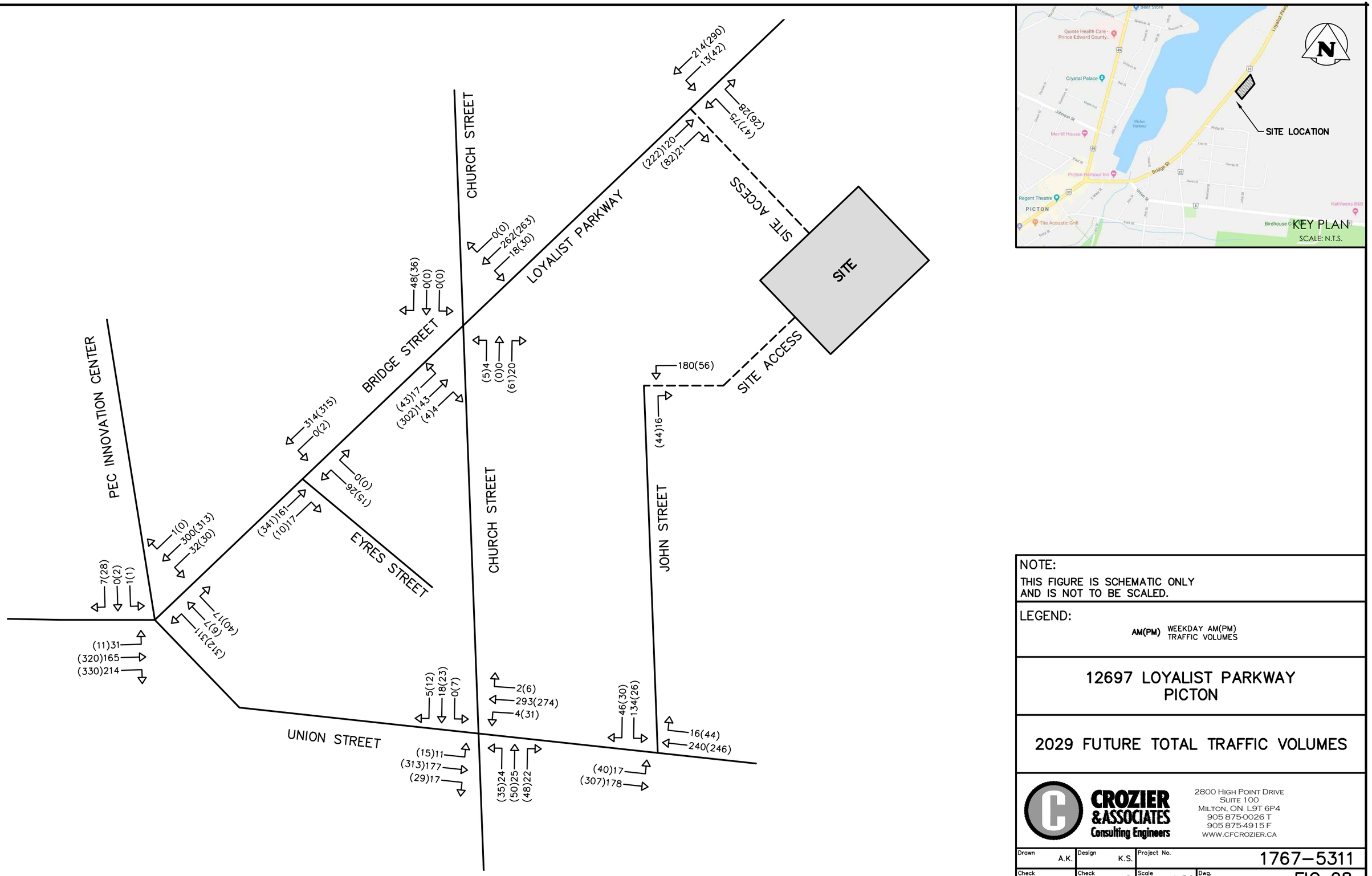
LEGEND:
AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

12697 LOYALIST PARKWAY
PICTON

2024 FUTURE TOTAL TRAFFIC VOLUMES

CROZIER & ASSOCIATES
Consulting Engineers
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
A.K.	K.S.		1767-5311
Check	Check	Scale	Dwg.
	K.S.	N.T.S	FIG. 07



NOTE:
THIS FIGURE IS SCHEMATIC ONLY AND IS NOT TO BE SCALED.

LEGEND:
AM(PM) WEEKDAY AM(PM) TRAFFIC VOLUMES

12697 LOYALIST PARKWAY PICTON

2029 FUTURE TOTAL TRAFFIC VOLUMES

CROZIER & ASSOCIATES Consulting Engineers
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
A.K.	K.S.		1767-5311
Check	Check	Scale	Dwg.
	K.S.	N.T.S	FIG. 08

As demonstrated in Table 5, the implementation of AWSC at the intersection of Union Street and Bridge Street will alleviate capacity concerns and bring operations at the intersection to acceptable levels for the 2029 horizon (and would also benefit capacity concerns during the 2024 horizon by extension).

As such, it is recommended that all-way stop control is implemented at the intersection of Union Street and Bridge Street.

5.1.3 Site Access and Loyalist Parkway - Left-turn lane Warrant

Left-turn lane warrants for the proposed site access on Loyalist Parkway were conducted per the MTO Design Supplement for the TAC GDG for Canadian Roads, dated April 2020. The results are included in Appendix E.

Per the results, left-turn lanes would be warranted only for the westbound left-turn on Loyalist Parkway under 2029 future total traffic conditions. Left-turn lanes would not be warranted for this approach under 2024 future total traffic conditions. Therefore, the site access would not require an auxiliary left-turn lane for either horizon year.

6.0 Site Access Review

6.1 Loyalist Parkway Access

6.1.1 Sight Lines

The available sightlines at the proposed site access were measured and compared to the standards set out in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR), June 2017. Sight distance was measured from the Site access using the following assumptions:

- A standard driver eye height of 1.08 m for a passenger car, and
- A 4.4 m setback from the approximate extension of the outer curb to represent a vehicle waiting to exit the Site.

Intersection sight distance is calculated using Equation 9.9.1 from the GDGCR as outlined below:

$$ISD = 0.278 * V_{major} * tg$$

Where:
ISD = Intersection Sight Distance
V major = design speed of roadway (km/h)
tg = assumed time gap for vehicles to turn from stop onto roadway (s)

Table 6 summarizes the required and available sight lines at the proposed site access. Figure SL-01 illustrates the sight lines at the site.

Note, that the speed limit changes approximately 40 meters north of the site access (at 12996 ON-33), where the speed limit of 50 km/h on Bridge Street changes to 60 km/h on Loyalist Parkway. For a conservative analysis, the design speed limit along the northeastern approach is assumed to be 70 km/h (posted speed of 60 km/h) for the sight distance analysis.

N

LEGEND:

AVAILABLE SIGHT DISTANCE

REQUIRED SIGHT DISTANCE

VEHICLE

No.	ISSUE / REVISION	YYYY/MMM/DD
A	ISSUED FOR REVIEW	2022/01/06

Project

12697 LOYALIST PARKWAY
PRINCE EDWARD COUNTY

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 301
TORONTO, ON M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA

Drawn	Design	Project No.
R.L.	F.H.	1767-5311
Date	Scale	Dwg.
01/06/2022	N.T.S.	SL-01

Table 6: Sight Distance Analysis

Feature	Site Access off Loyalist Parkway
Access Type	Full-Movement
Posted Speed Limit of Roadway	50 km/h to the south of 12996 ON-33 60 km/h to the north 12996 ON-33
Assumed Design Speed	60 km/h to the south of 12996 ON-33 70 km/h to the north 12996 ON-33
Base Time Gap [1]	6.5 s (right turn) 7.5 s (left turn)
Grade of Roadway	Less than 3%
Horizontal Alignment of Roadway	Straight
Required Sight Distance (right turn) [2]	110 m
Required Sight Distance (left turn) [2]	150 m
Available Sight Distance (right turn)	>110 m
Available Sight Distance (left turn)	>150 m
Minimum Sight Distances Satisfied?	Yes

Note 1: Time gap for left-turning vehicles from a stop onto a two-lane highway with no median and with a grade less than 3%. Value from Table 9.9.3 in the TAC-GDGCR.
Note 2: Sight distance values calculated from Intersection Sight Distance equation 9.9.1 in the GDGCR.

Per the results summarized in Table 6, the proposed site access off Loyalist Parkway would meet sight distance requirements and provide sufficient visibility to drivers on the road.

6.1.2 Access Spacing

Per the MTO Highway Corridor Management Manual (MTO HCMM) Figure 4.5.3, Highway 33 (Loyalist Parkway) classifies as a Level 3 Collector Highway. Per Table 4.6.1 of the MTO HCMM, Level 3 Collector Highways require a minimum spacing of 800 meters between public roads and/or commercial/private accesses.

The proposed site access falls approximately 340 meters within the eastern public street access (Phillip Street, southeast of the site access) and 250 meters of the western public street access (Laird Lane).

It is noted that the MTO's permit control on Highway 33 terminates approximately 40 meters north of the proposed site access, and the segment of Bridge Street/Loyalist Parkway in the vicinity of the subject development is generally urban in nature. Additionally, several downstream intersections along Bridge Street are in relatively close proximity (such as Phillip Street and Low Street spaced approximately 125 meters apart along Bridge Street). As such, the required spacing of 800 meters would be expected to be excessive given the existing conditions and urban nature of Loyalist Parkway/Bridge Street.

Per the TAC GDGCR Section 8.3.4, rural accesses should be spaced at a minimum of 150 meters apart along a collector road. Additionally, the spacing between driveways along a collector road in a residential area according to Table 8.9.2 of the TAC GDGCR is 1.0 meters. As the proposed site access along Loyalist Parkway meets these requirements and meets sightline requirements with no delay or operational concerns, the location of the proposed site access can be supported from an access spacing perspective when considering the more applicable TAC GDGCR requirements.

6.2 Owen Street Access

6.2.1 Sight Lines and Access Spacing

As the south site access is proposed as an extension of Owen Street, sight line and access spacing analysis are not required.

7.0 Conclusion

The most recent Draft Plan for the proposed residential development at 12697 Loyalist Parkway (Tulip Estates) was reviewed in comparison to the previous Transportation Impact Study submitted for the project in June 2019.

The Traffic Addendum Letter makes clarifications and amendments to the findings of the original TIS report to address the Peer Review comments (on behalf of the County) as well as comments from the Ministry of Transportation. The key points of the Traffic Addendum Letter are summarized as the following:

- The Addendum Letter details the study area, boundary road classifications, and the lane configurations and traffic controls used at the study intersections.

- The operational analyses presented in the original report remain unchanged as the trips generated per the most recent site statistics are less compared to the previous proposal and thus the analysis shown in previous proposal is more conservative.

- The trip distributions presented in the original TIS remain unchanged. The methodology used to distribute site-generated trips were further elaborated upon and clarified both in tabular and visual forms.

- Signal warrants were conducted for the intersection of Union Street and Bridge Street for the ultimate 2029 horizon and were not found to be warranted.

- All-way stop control warrants were conducted for the intersection of Union Street and Bridge Street and were found to be warranted for the 2024 horizon. Capacity analysis with AWSC under 2029 future total conditions found that delays would be acceptable with no capacity concerns with the implementation of AWSC (which would also apply to 2024 conditions). All-Way Stop Control is recommended for the intersection to mitigate capacity concerns identified in the 2024 and 2029 future total traffic condition.

- Left-turn lane warrants were conducted for the proposed site access off Loyalist Parkway. An auxiliary left-turn lane would be warranted for the westbound approach on Loyalist Parkway under 2029 future total traffic conditions (not under 2024 future total traffic conditions).

- Sight lines for the proposed access off Loyalist Parkway were analyzed per the TAC GDGCR, and sightlines were found to be sufficient.

- Access spacing was also reviewed for the Loyalist Parkway site access, and would not meet the MTO HCMM requirements, however the segment of Loyalist Parkway at the site access is not under MTO jurisdiction. Therefore, the TAC GDGCR requirements are considered more applicable and the access spacing is sufficient under the TAC requirements.

Overall, the Draft Plan for Tulip Estates may be supported from a transportation and traffic perspective, with the recommendations outlined as above.

Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Aarzoo Dhanani, M. Eng, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.

Brandon Bradt, M.Eng.CEM, P. Eng
Project Manager, Transportation

BB/AD

I:\1700\1767 - Hilden Homes\5311 - 12697 Loyalist Parkway\Letters\2023 March Addendum Letter\2023.01.11_(1767-5311)_ Loyalist Addendum Letter.docx

APPENDIX A

Official Plan
and Secondary
Plan Excerpts

SCHEDULE 'E': Transportation & Infrastructure

Official Plan of Prince Edward County

Approved by the Ministry of Municipal Affairs and Housing:

Adopted by the County of Prince Edward:

Legend

- Airport
- Existing Deep Water Ports
- Transmission Water Main
- Waste Water Treatment Plant
- Water Treatment Plant

Provincial & County Highways

- Provincial Highway (Loyalist Parkway)
- Provincial Highway
- Municipal Highway (Loyalist Parkway)
- Municipal Highway
- County Road
- Collector Road
- Local Road
- Future Road
- Ferry Route

Other Features

- Secondary Plan Boundary[1]
- Settlement Area Boundary
- County Boundary

[1] *See Official Plan Amendment Nos. 62 - Wellington Secondary Plan, 63 - Picton Secondary Plan, and 67 - Rossmore Secondary Plan*

Inset Map: Main Duck Island & Yorkshire Island

Main Duck & Yorkshire Islands (~18 km) (See Inset Map Below)

N W E S

Scale = 1:75,000

0 5 10 Kilometers

0 2.5 5 Miles

TheCounty PRINCE EDWARD COUNTY ✦ ONTARIO

Prince Edward County GIS

Date Printed: February 18, 2021

Picton Urban Centre

shaping tomorrow, today.
PLAN PICTON-HALLOWELL

Schedule A:

Secondary Plan Land Use Map

Sources	Projection
Prince Edward County	Universal Transverse Mercator (UTM)
Quinte Conservation	North American Datum 1983 (NAD83)
Parcel Fabric as of August 2013	Zone 18N

Published

Date: February 18, 2015

Prepared: IBI Group

0 255 510 1,020 1,530

Meters

Legend

- Planning Area Boundary
- Environmental Protection Area
- Park & Open Space Area
- Town Residential Area
- Downtown Core Area
- Town Gateway Area
- Town Corridor Area
- Waste Management Area
- Employment Area
- Institutional Area
- Heights Development Area
- Area of Natural & Scientific Interest (A.N.S.I.)
- Mineral Aggregate (Licensed Pit)

9.0 Reports\Mapping\Picton-Hallowell\NewLandDesignations\Schedules

333 Preston Street
Ottawa, Ontario
Canada K1S 5N4
Tel: (613) 241-3300
Fax: (613) 241-1130

IBI GROUP

Guiding Policies

It is the intent of this Plan to:

1. Support a diverse range of housing types at a range of residential densities that meet the existing and future needs of the community.

2. Encourage the creation of complete neighbourhoods that meet the everyday needs of residents and make the most of existing municipal infrastructure.

3. Support the intensification of existing neighbourhoods by encouraging compatible infill development and the extension of these neighbourhoods into surrounding undeveloped areas within the Urban Centre.

Implementing Policies

Council shall:

2.4.1 EXISTING NEIGHBOURHOODS

1. Maintain and enhance the built form and character of existing neighbourhoods in Picton-Hallowell.

2. Permit a mix of residential unit types in existing neighbourhoods, including single detached, semi-detached, duplex, triplex, townhouse, and apartment. Secondary and accessory units, provided no more than two units exist on one lot, shall also be permitted. Converted dwellings resulting in no more than three units shall also be permitted.

3. Permit a mix of neighbourhood-scale non-family residential uses in existing neighbourhoods, as appropriate, including assisted and special needs housing, senior housing, and nursing homes as a means of meeting the full range of community housing needs. Permitting such uses will encourage the creation of complete neighbourhoods.

4. Permit a mix of neighbourhood-scale community uses in existing neighbourhoods, as appropriate, including schools, places of worship, libraries, community centres, parks, and day cares. Neighbourhood-scale commercial uses are also permitted, including home-based business and neighbourhood-serving convenience retail. Neighbourhood-scale community and commercial uses should ideally have direct access to a collector street. Permitting such uses will encourage the creation of complete neighbourhoods.

5. Ensure that opportunities for intensification in existing neighbourhoods are consistent with the policies of Section 2.4.3 of this Plan with respect to intensity of use, built form, urban design, and streetscape. Intensification includes redevelopment and the development of vacant and/or underutilized lots.

2.4.2 EXTENSION OF EXISTING NEIGHBOURHOODS

1. Ensure that new neighbourhood development on greenfield lands occurs as an extension of the surrounding existing town fabric and blends the built form and character of existing neighbourhoods in Picton-Hallowell.

2. Permit a mix of residential unit types in new neighbourhood development, including single detached, semi-detached, duplex, triplex, townhouse, and apartment. Secondary and accessory units, provided no more than two units exist on one lot, shall also be permitted.

3. Require a minimum residential density of 17.3 units/net hectare (7.0 units/net acre) in new neighbourhood development with a preferred target residential density of 25 units/net hectare (10 units/net acre). Permit residential densities of 37 units/net hectare (15 units/net acre) in new neighbourhood development, as appropriate. Higher density may be permitted in exchange for the provision of community benefits consistent with the policies of Subsection 5.1.1.4 of this Plan with respect to height and density bonusing.

4. Permit a mix of neighbourhood-scale non-family residential uses in new neighbourhood development, including assisted and special needs housing, senior housing, and nursing homes as a means of meeting the full range of community housing needs.

5. Permit a mix of neighbourhood-scale community uses in new neighbourhood development, including schools, places of worship, libraries, community centres, parks, and day cares. Neighbourhood-scale commercial uses are also permitted, including home-based business and neighbourhood-serving convenience retail. Neighbourhood-scale community and commercial uses should ideally have direct access to a collector street.

6. Ensure that new neighbourhood development connects with existing neighbourhoods by means of streets, sidewalks, walkways or bicycle paths, and open space. Such connections will provide access to schools, parks, shopping, and work places and integrate new development in the existing town fabric. Connections shall encourage modes of active transportation and facilitate the safe separation of pedestrian and vehicular traffic (refer to Section 3.1.4 of this Plan). The removal of any existing connection with surrounding neighbourhoods is strongly discouraged.

7. Ensure that new neighbourhood development is consistent with the town design, green infrastructure, and environmental management policies of Sections 4.1, 4.6, and 4.7 of this Plan.

8. Ensure that new neighbourhood development conforms to the policies of Sections 2.12.1, 2.12.2, and 2.12.3 of this Plan regarding the Town Square, Picton Harbour, and Warings Creek Policy Areas, as appropriate.

2.4.3 RESIDENTIAL INTENSIFICATION

Intensification is the development of a property, site, or area at a higher density or intensity than currently exists. Intensification generally occurs by means of redevelopment, development of vacant and/or underutilized lots within built up areas, or expansion or conversion of existing buildings. Intensification is encouraged in most of the land use areas of this Plan.

Intensification provides an important means of achieving the community vision for future growth and development in Picton-Hallowell. The process of intensification can be used to create complete neighbourhoods. Complete neighbourhoods maximize the use of existing municipal services and facilities, encourage the provision of more affordable forms of housing, provide a broader mix of everyday uses in close proximity, and encourage active modes of transportation. Complete neighbourhoods are vibrant, safe, and healthy places, and in the end, a collection of complete neighbourhoods results in a complete community overall.

1. Encourage intensification in the Town Residential Area as a means of creating complete neighbourhoods that maximize the use of existing municipal services and facilities, encourage the provision of affordable forms of housing, provide a broader mix of everyday uses in close proximity, and encourage active modes of transportation.

2. Recognize that intensification in the Town Residential Area will result primarily from minor infilling on existing lots of record in built areas.

APPENDIX B

Signal Warrants

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION **2029 Future Total Signal Warrant**

Analyst	Farah C	**Jurisdiction**	Prince Edward County
Agency or Company	C.F. Crozier & Associates	**Date**	January 4, 2022
Analysis Period	2029 FT	**East-West Street**	Bridge Street
		North-South Street	Union Street
Flow Conditions	Restricted flow (urban)	**Major Street**	East-West
'T' Intersection	No	**Approach lanes per direction**	1 Major Street
Existing Intersection	Yes	**Approach lanes per direction**	1 Minor Street

Additional Comments

TRAFFIC & PEDESTRIAN VOLUMES

Hour Ending	Main Road Approaches							Minor Road Approaches							Pedestrian Crossing Major Road	Pedestrian Crossing Minor Road
	Eastbound			Westbound			Total	Northbound			Southbound			Total		
	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT			
AM Peak Hour	32	165	214	32	300	1	**744**	311	7	17	1	0	7	**343**		
PM Peak Hour	11	320	330	30	313	0	**1004**	312	6	40	1	2	28	**389**		
Total	**43**	**485**	**544**	**62**	**613**	**1**	**1748**	**623**	**13**	**57**	**2**	**2**	**35**	**732**	**0**	**0**

Parameter	AM	PM	Average Hourly Volume (AHV)
Vehicle volume, all approaches	1087	1393	620
Vehicle volume, along minor street	343	389	183
Vehicle volume, along major street	744	1004	437
Combined vehicle and pedestrian volume crossing from minor streets	319	319	160

NOTES

1. The traffic control signal justification was done as per criteria defined in Ontario Traffic Manual, Book: 12 (March 2012) Justification 7 - Projected Volumes.

	AM	PM
2. Traffic crossing MAJOR street defined as:		
a. Left turns from both minor street approaches	312	313
b. The heaviest through volume from the minor street	7	6
c. 50% of the heavier left turn movement from the major street when both of the following are met:	0	0
1. the left turn volume > 120	No	No
2. the left turn volume + opposing volume > 720	No	No
d. Pedestrians crossing the major street	0	0

3. Justifications 1 and 2 are required to be met to 120% in the case of an existing intersection and 150% in the case of a new intersection
4. For 'T' intersection, the threshold values to be increased by 50%

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION **2029 Future Total Signal Warrant**

Analyst	Farah C	**Jurisdiction**	Prince Edward County	
Agency or Company	C.F. Crozier & Associates	**Date**	January 4, 2022	
Analysis Period	2029 FT	**East-West Street**	Bridge Street	
		North-South Street	Union Street	
Flow Conditions	Restricted flow (urban)	**Major Street**	East-West	
'T' Intersection	No	**Approach lanes per direction**	1	Major Street
Existing Intersection	Yes	**Approach lanes per direction**	1	Minor Street
Additional Comments				

Justification 1: Minimum Vehicle Volumes **JUSTIFIED** **No**

Justification	Guidance Approach Lanes				Compliance			120%
	1 Lanes		2 or More Lanes		Sectional		Entire %	Satisfied
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, all approaches		720			**620**	86%	86%	No
B. Vehicle volume, along minor streets		170			**183**	108%	108%	No

Justification 2: Delay To Cross Traffic **JUSTIFIED** **No**

Justification	Guidance Approach Lanes				Compliance			120%
	1 Lanes		2 or More Lanes [1]		Sectional		Entire %	Satisfied
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, major street		720			**437**	61%	61%	No
B. Combined vehicle and pedestrian volume crossing artery from minor streets		75			**160**	213%	213%	Yes

CONCLUSION

The results of the calculations show that justifications are not met.
Therefore traffic control signal is not justified at this intersection for the horizon year 2029 FT

Note: 1. The minimum volumes were corrected from 120 vehicles and 170 vehicles in OTM, March 2012 to 50 vehicles and 70 vehicles to match Justification 2B.

APPENDIX C

All-Way Stop Warrants

ALL-WAY STOP CONTROL (AWSC) WARRANTS (OTM BOOK 5)

Horizon Year and Analysis Period **2024 Future Total AWSC Warrant**

PROJECT INFORMATION

Analyst	Farah C	**Jurisdiction**	Prince Edward County
Company	C.F. Crozier & Associates	**Project Name**	Loyalist Parkway
Date	2024 FT	**Project No.**	1767-5311

ROADWAY INFORMATION

East-West Street	Bridge Street	**Major Street**	East-West
North-South Street	Union Street	**Number of legs**	3
Roadway Classification (Minor Street)	Minor Roads		

TRAFFIC VOLUMES

Peak Hour	Major Road Approaches							Minor Road Approaches							Pedestrian Crossing Major Road	Pedestrian Crossing Minor Road
	Eastbound			Westbound			Total	Northbound			Southbound			Total		
	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT			
AM	29	142	194	15	248	1	**744**	284	7	11	1	0	7	**310**	N/A	N/A
PM	10	273	301	17	266	0	**1004**	284	6	27	1	2	25	**345**	N/A	N/A
Total	**39**	**415**	**495**	**32**	**514**	**1**	**1496**	**568**	**13**	**38**	**2**	**2**	**32**	**655**	**0**	**0**

Parameter	AM	PM	Threshold
Total vehicle volume on all intersection approaches	939	1212	350
Combined vehicle and pedestrian volumes on minor street	310	345	N/A
Volume Split, Minor Road (vehicles only)	0.33	0.28	0.25

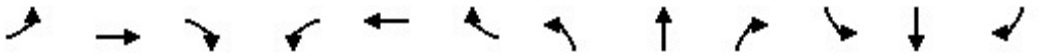
Justification 1: Total Vehicle Volume on all Intersection Approaches **Justified? YES**
Justification 2: Combined Vehicle and Pedestrian Volumes on minor street **Justified? N/A**
Justification 3: Volume Split (vehicles only) **Justified? YES**

Conclusion: The results of the calculations show that All-Way Stop Control at this intersection is justified for the 2024 Future Total AWSC Warrant analysis period.

Note: The All-Way Stop Control justification was done per criteria defined within the Ontario Traffic Manual, Book 5 (March 2012), "All-Way Stop Minimum Volume Warrant" for Arterial and Major Roads, and "Minor Roads"

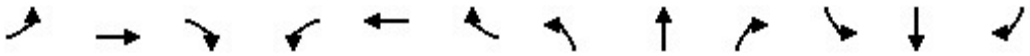
APPENDIX D

Synchro Reports



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	165	214	32	300	1	311	7	17	1	0	7
Future Volume (vph)	32	165	214	32	300	1	311	7	17	1	0	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		20.0	0.0		0.0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.896			0.880	
Flt Protected		0.992			0.995		0.950				0.994	
Satd. Flow (prot)	0	1884	1617	0	1894	0	1825	1711	0	0	1647	0
Flt Permitted		0.992			0.995		0.950				0.994	
Satd. Flow (perm)	0	1884	1617	0	1894	0	1825	1711	0	0	1647	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		130.7			210.3			82.6			54.3	
Travel Time (s)		9.4			15.1			5.9			3.9	
Confl. Peds. (#/hr)			3	3								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	1%	0%	1%	2%	0%	2%	0%	2%	2%	2%
Adj. Flow (vph)	35	179	233	35	326	1	338	8	18	1	0	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	214	233	0	362	0	338	26	0	0	9	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

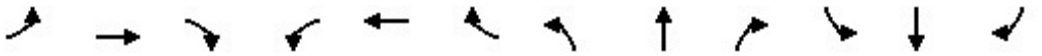
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 62.2%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	32	165	214	32	300	1	311	7	17	1	0	7
Future Volume (vph)	32	165	214	32	300	1	311	7	17	1	0	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	179	233	35	326	1	338	8	18	1	0	8

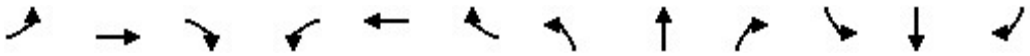
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	214	233	362	338	26	9
Volume Left (vph)	35	0	35	338	0	1
Volume Right (vph)	0	233	1	0	18	8
Hadj (s)	0.10	-0.68	0.03	0.50	-0.47	-0.48
Departure Headway (s)	6.7	5.9	6.6	7.3	6.3	7.4
Degree Utilization, x	0.40	0.38	0.66	0.68	0.05	0.02
Capacity (veh/h)	514	586	532	477	545	393
Control Delay (s)	12.8	11.2	21.5	23.3	8.4	10.6
Approach Delay (s)	12.0		21.5	22.2		10.6
Approach LOS	B		C	C		B

Intersection Summary				
Delay	18.1			
Level of Service	C			
Intersection Capacity Utilization	62.2%	ICU Level of Service		B
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	320	330	30	313	0	312	6	40	1	2	28
Future Volume (vph)	11	320	330	30	313	0	312	6	40	1	2	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		20.0	0.0		0.0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850					0.871			0.877	
Flt Protected		0.998			0.996		0.950				0.998	
Satd. Flow (prot)	0	1916	1633	0	1896	0	1825	1669	0	0	1648	0
Flt Permitted		0.998			0.996		0.950				0.998	
Satd. Flow (perm)	0	1916	1633	0	1896	0	1825	1669	0	0	1648	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		130.7			210.3			82.6			53.9	
Travel Time (s)		9.4			15.1			5.9			3.9	
Confl. Peds. (#/hr)			3	3			8		1			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	0%	1%	2%	0%	2%	0%	2%	2%	2%
Adj. Flow (vph)	12	348	359	33	340	0	339	7	43	1	2	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	360	359	0	373	0	339	50	0	0	33	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.5%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	320	330	30	313	0	312	6	40	1	2	28
Future Volume (vph)	11	320	330	30	313	0	312	6	40	1	2	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	348	359	33	340	0	339	7	43	1	2	30

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	360	359	373	339	50	33
Volume Left (vph)	12	0	33	339	0	1
Volume Right (vph)	0	359	0	0	43	30
Hadj (s)	0.02	-0.70	0.03	0.50	-0.60	-0.51
Departure Headway (s)	7.0	6.3	7.2	8.0	6.9	8.3
Degree Utilization, x	0.70	0.62	0.74	0.75	0.10	0.08
Capacity (veh/h)	502	555	486	438	504	381
Control Delay (s)	23.4	17.9	28.3	30.2	9.4	12.0
Approach Delay (s)	20.7		28.3	27.5		12.0
Approach LOS	C		D	D		B

Intersection Summary				
Delay	24.1			
Level of Service	C			
Intersection Capacity Utilization	69.5%	ICU Level of Service		C
Analysis Period (min)	15			

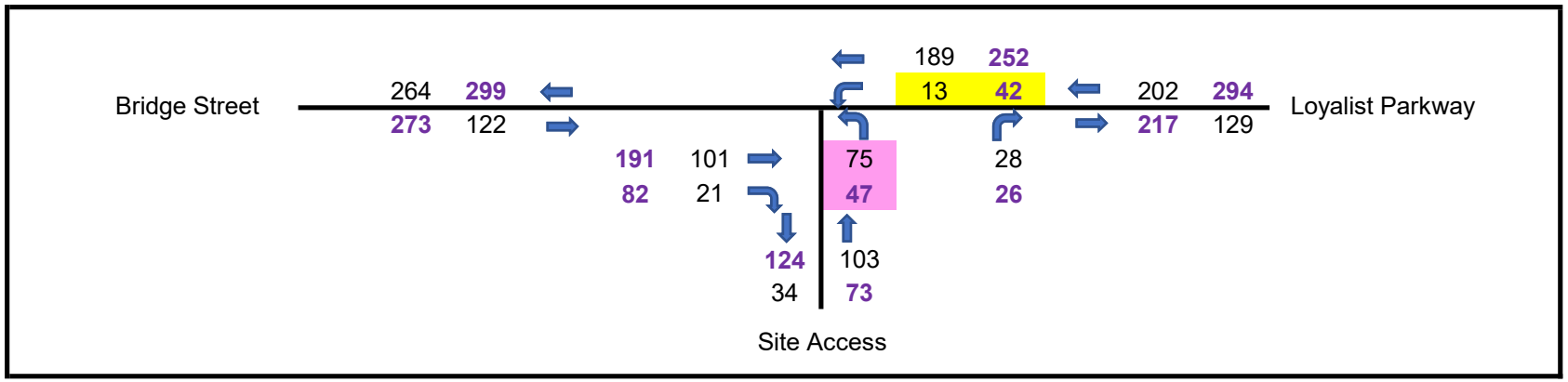
APPENDIX E

Left-Turn Lane Warrants

Left Turn Lane Warrant
MTO GDGCR Supplement

Analyst	Farah C	Analysis Period	2024 FT
Agency	C.F. Crozier & Associates	Date	24-Jan-22

Traffic Volumes

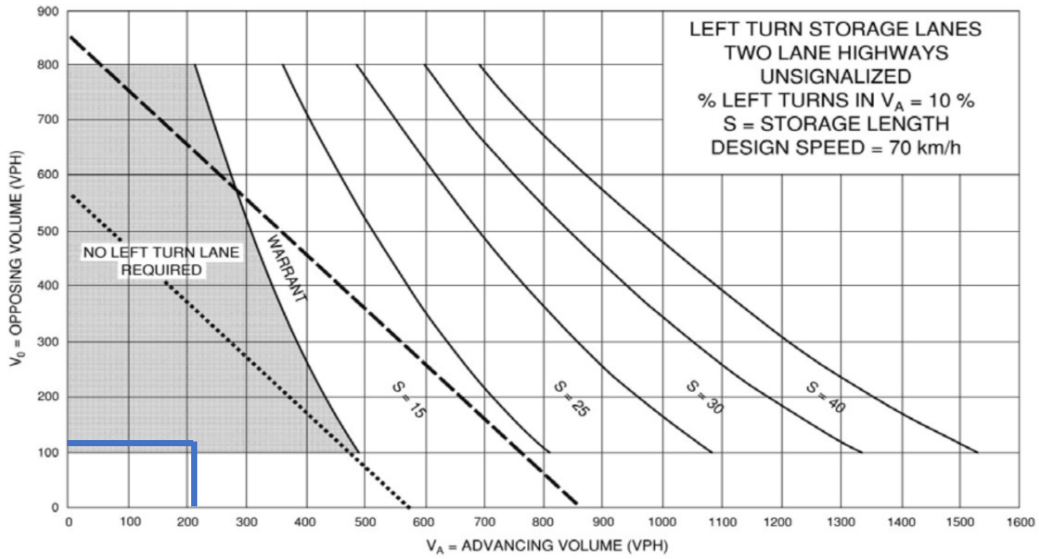


Hour Ending	Main Road Approaches							Minor Road Approaches						
	Eastbound			Westbound			Total	Northbound			Southbound			Total
	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT	
AM Peak Hour	0	101	21	13	189	0	**324**	75	0	28	0	0	0	**103**
PM Peak Hour	0	191	82	42	252	0	**567**	47	0	26	0	0	0	**73**
Total	**0**	**292**	**103**	**55**	**441**	**0**	**891**	**122**	**0**	**54**	**0**	**0**	**0**	**176**

Major Roadway	Loyalist Parkway	Minor Roadway	Site Access
Posted Speed Limit	60 km/h	Assumed Speed Limit	50 km/h

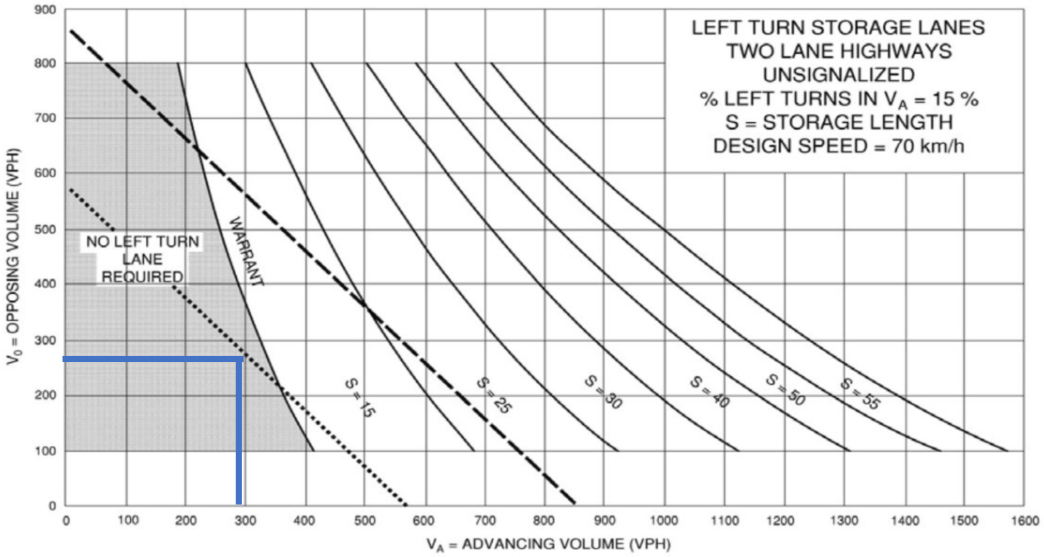
AM PEAK

Subject Roadway	Loyalist Parkway	
Design Speed	70	km/h
Advancing Volume, Va	202	veh/h
Opposing Volume, Vo	122	veh/h
Left-Turning Volume, VL	13	veh/h
Percentage Left Turning	6%	
Warranted?	NO	



PM PEAK

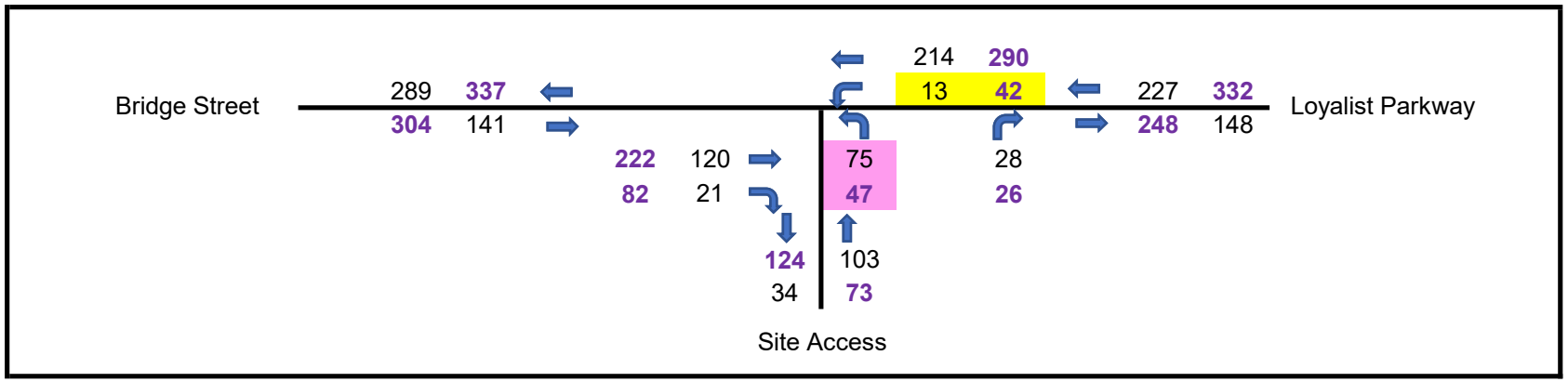
Subject Roadway	Loyalist Parkway	
Design Speed	70	km/h
Advancing Volume, Va	294	veh/h
Opposing Volume, Vo	273	veh/h
Left-Turning Volume, VL	42	veh/h
Percentage Left Turning	14%	
Warranted?	NO	



Left Turn Lane Warrant
MTO GDGCR Supplement

Analyst	Farah C	Analysis Period	2029 FT
Agency	C.F. Crozier & Associates	Date	24-Jan-22

Traffic Volumes

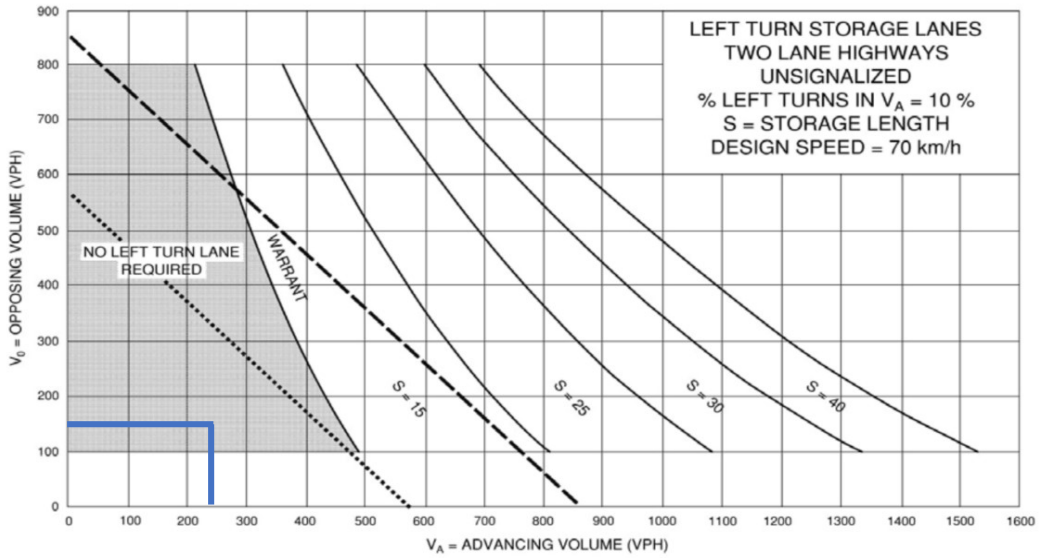


Hour Ending	Main Road Approaches							Minor Road Approaches						
	Eastbound			Westbound			Total	Northbound			Southbound			Total
	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT	
AM Peak Hour	0	120	21	13	214	0	**368**	75	0	28	0	0	0	**103**
PM Peak Hour	0	222	82	42	290	0	**636**	47	0	26	0	0	0	**73**
Total	**0**	**342**	**103**	**55**	**504**	**0**	**1004**	**122**	**0**	**54**	**0**	**0**	**0**	**176**

Major Roadway	Loyalist Parkway	Minor Roadway	Site Access
Posted Speed Limit	60 km/h	Assumed Speed Limit	50 km/h

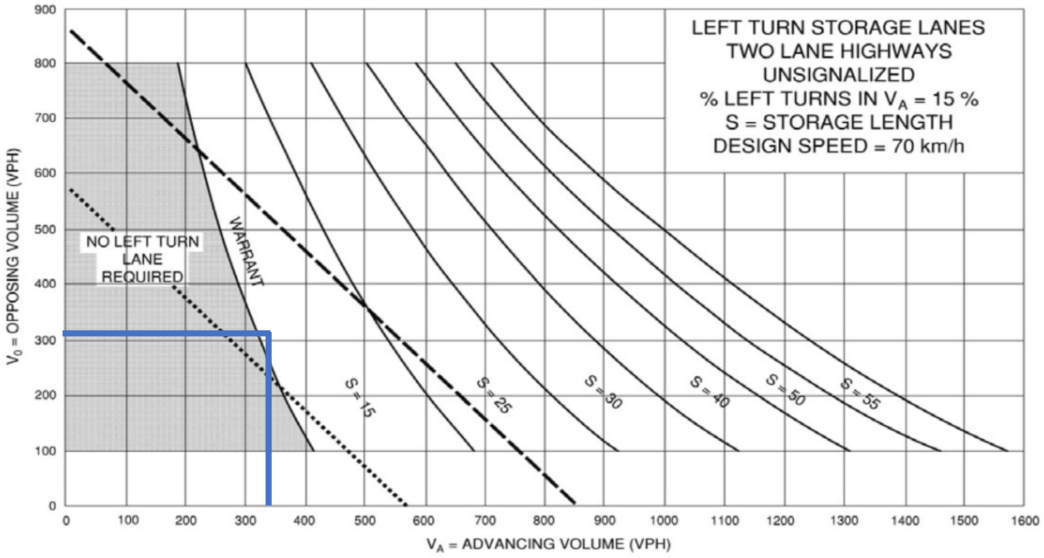
AM PEAK

Subject Roadway	Loyalist Parkway	
Design Speed	70	km/h
Advancing Volume, Va	227	veh/h
Opposing Volume, Vo	141	veh/h
Left-Turning Volume, VL	13	veh/h
Percentage Left Turning	6%	
Warranted?	NO	



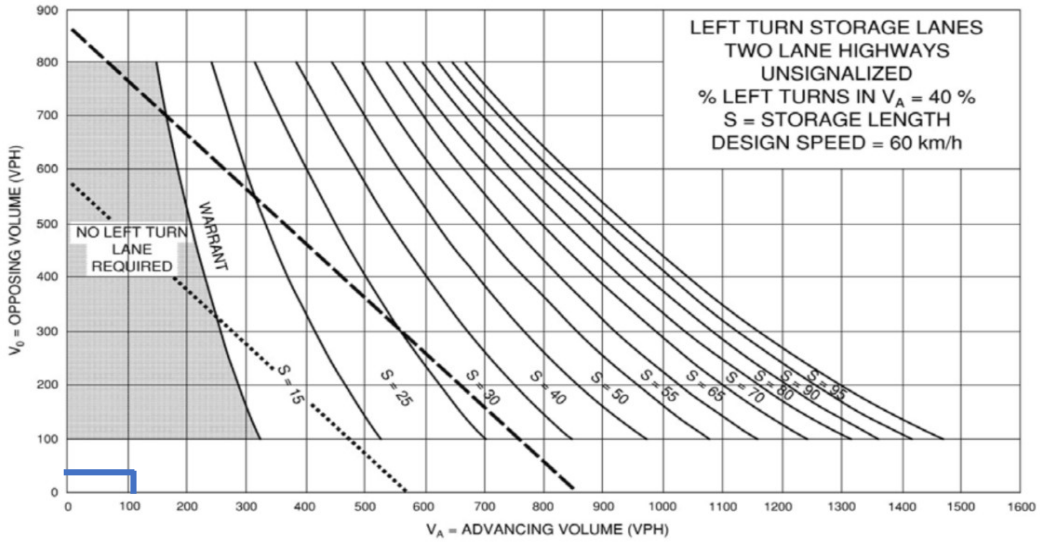
PM PEAK

Subject Roadway	Loyalist Parkway	
Design Speed	70	km/h
Advancing Volume, Va	332	veh/h
Opposing Volume, Vo	304	veh/h
Left-Turning Volume, VL	42	veh/h
Percentage Left Turning	13%	
Warranted?	YES	



AM PEAK

Subject Roadway	Site Access	
Design Speed	60	km/h
Advancing Volume, Va	103	veh/h
Opposing Volume, Vo	34	veh/h
Left-Turning Volume, VL	75	veh/h
Percentage Left Turning	73%	
Warranted?	NO	



PM PEAK

Subject Roadway	Site Access	
Design Speed	60	km/h
Advancing Volume, Va	73	veh/h
Opposing Volume, Vo	124	veh/h
Left-Turning Volume, VL	47	veh/h
Percentage Left Turning	64%	
Warranted?	NO