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# Memorandum

<b>To/Attention</b>	Sarah Grady, P.Eng. Traffic and Transportation Engineer Transportation Planning and Design City of London	<b>Date</b>	August 30, 2023
<b>From</b>	David Hook	<b>Project No</b>	136632
<b>cc</b>	David Ailles - York Developments Dhaval Harpal - City of London Juan Chamorra - City of London		
<b>Subject</b>	Westwinds Subdivision - Site-Specific Transportation Assessment		

Arcadis IBI Group was retained by Kilbourne Developments Inc. to undertake a Transportation Assessment in support a Plan of Subdivision Application for the proposed Westwinds Subdivision to be located in the southwest quadrant of the Bostwick Road & Pack Road intersection within the Bostwick neighbourhood of the City of London, Ontario.

In conjunction with this site-specific transportation assessment, Arcadis IBI Group was also contracted to undertake the Bostwick Road Area Master Transportation Study (MTS) which provides analysis of the regional traffic impacts of three major developments in the area, including the subject site. As the regional traffic impacts of the proposed development have been addressed as part of the MTS, this assessment focuses on localized impacts such as the site access intersections and any specific transportation considerations of the proposed development.

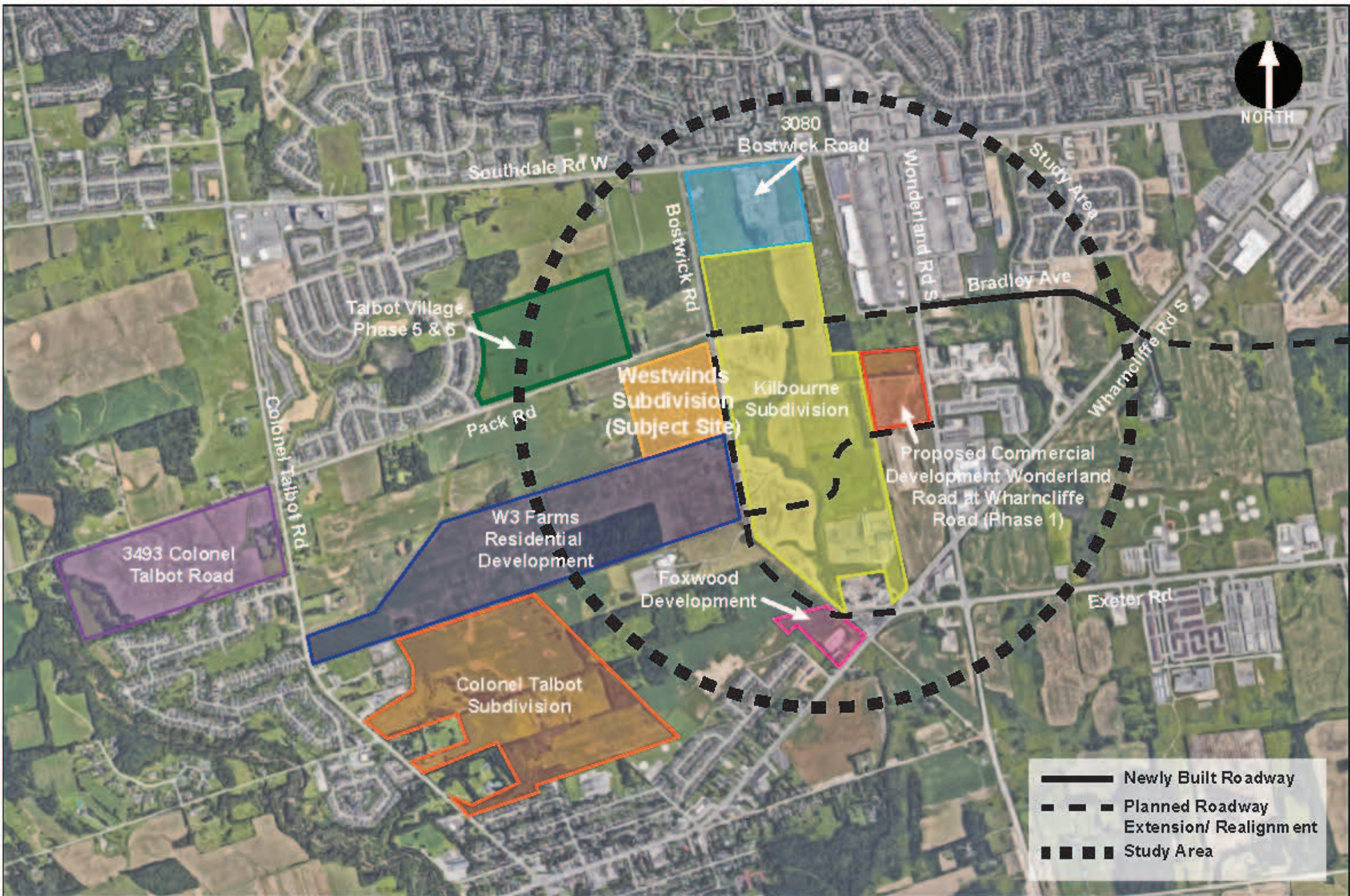
The site-specific assessment will therefore address the following items:

- Description of the proposed development
- Proposed transportation network
- Site access intersection capacity analysis, configuration and geometric requirements
- Transportation Demand Management (TDM)
- Pedestrian crossovers
- Traffic calming measures

## Proposed Development

The Westwinds Subdivision is located in the southwest quadrant of the Bostwick & Pack intersection at the municipal address of 3563 Bostwick Road. The site is bound by Pack Road to the north, Bostwick Road to the east and undeveloped land to the south and west.

The location of the proposed development, and other proposed developments within its vicinity, is illustrated in **Exhibit 1** below.



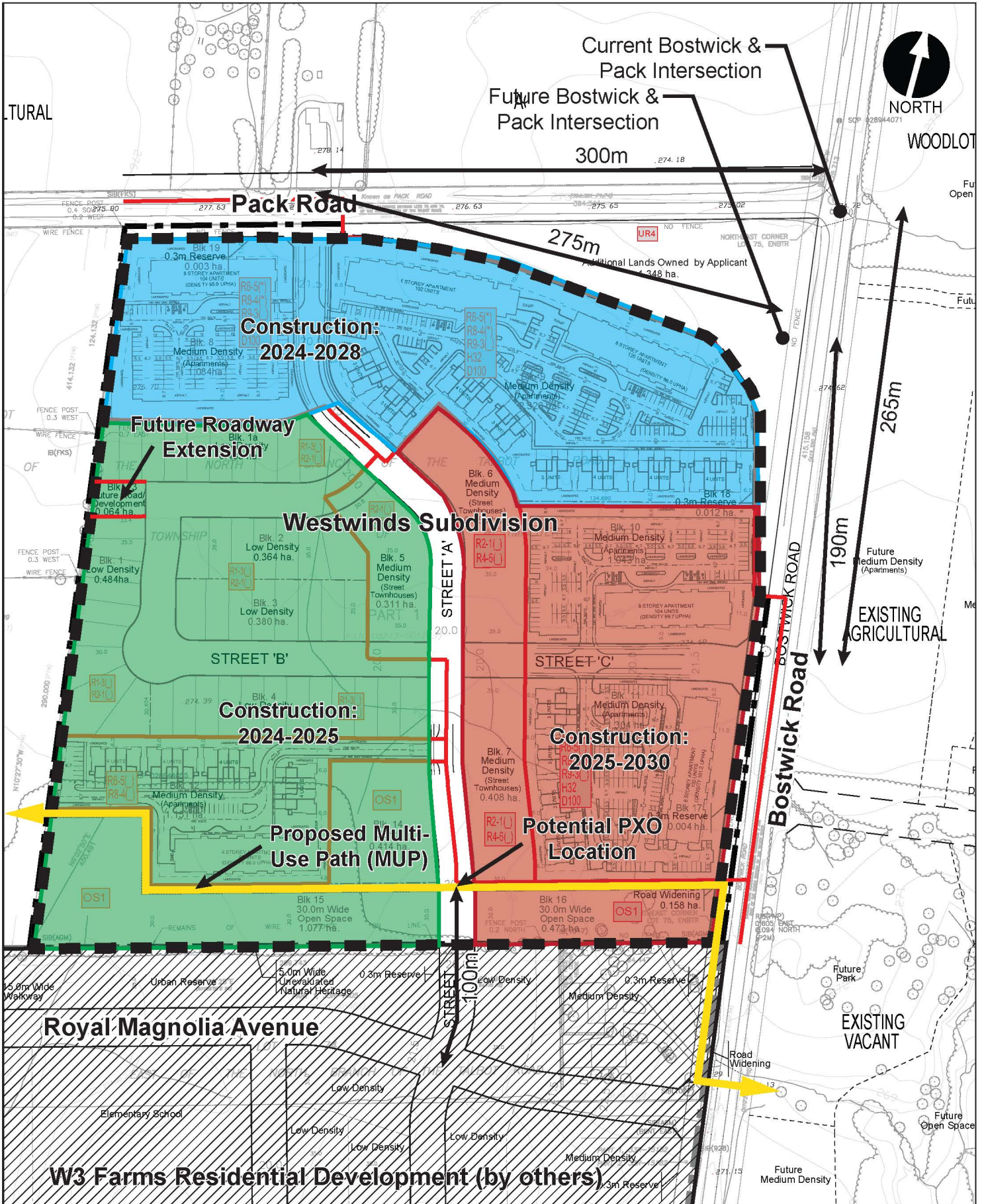
Access to the subdivision will initially be provided via Pack Road, while a second access is ultimately proposed on Bostwick Road. An internal connection to the W3 Farms Residential Development will provide a secondary access to Bostwick Road via Royal Magnolia Avenue to the south.

As described in the Bostwick MTS, the Bostwick & Pack intersection will be reconstructed as a two-lane roundabout in 2026. By 2028, Bradley Avenue will be extended west to Bostwick to form the fourth leg of this junction. This roundabout will be located approximately 75m south of the current Bostwick & Pack intersection.

**Table 1** summarizes the land use statistics and anticipated buildout year of the proposed development. Construction of the proposed development is expected to be begin as early as 2024 with full buildout expected by 2030. The Draft Plan of Subdivision for the proposed development has been provided in **Exhibit 2**.

**Table 1 - Land Use and Phasing**

CONSTRUCTION	LAND USE	SIZE
2024 to 2030	Single Family Homes	46 units
	Street Townhomes	37 units
	Cluster Townhomes	56 units
	Mid-Rise Apartments (6-8 storeys)	610 units
	<b>Total</b>	<b>749 units</b>



## Proposed Transportation Network

A total of three internal roadways are proposed. All internal roadways will be classified as local roads and have a 20.0m right-of-way width. Street 'A' runs north-south through the proposed development from Pack Road to the southern boundary of the proposed development where it intersects an east-west collector road (Royal Magnolia Drive) within the W3 Farms Residential Development. Street 'C' will provide direct access to Bostwick Road and will operate as a right-in/right-out intersection. A future internal roadway connection to the west via Street 'B' has been provisioned for, indicated as Block 13 on the Draft Plan of Subdivision.

Currently, no pedestrian or cycling facilities exist along either Pack Road or Bostwick Road. As part of planned roadway widenings/upgrades/extensions, it is expected that concrete sidewalks will be provided on both sides of Bostwick Road and Bradley Avenue, cycle tracks will be provided on both sides of Bostwick Road and a bi-directional cycle track will be provided along the south side of Bradley Avenue. It is unknown what pedestrian or cycling facilities will be provided along Pack Road when it urbanized in 2032, however, the Cycling Master Plan indicates that separated cycling facilities (i.e., bike lanes or cycle tracks) are planned. Concrete sidewalks will be provided on both sides of all internal roadways.

An open space with a multi-use path (MUP) is planned through the site along the southern boundary, as shown in **Exhibit 2**. The MUP will cross Street 'A' approximately 100m north of Royal Magnolia Avenue, continue east to Bostwick Road and then turn southwards to cross Bostwick Road at the intersection with Royal Magnolia Avenue. The MUP will ultimately connect to a planned MUP on the east side of Bostwick Road which will provide connectivity to the trail network along the Thornicroft Drain. The planned crossing of Street 'A' is a potential candidate for a pedestrian crossover (PXO), as discussed in a subsequent section of this report. It is expected that the MUP crossing of Bostwick Road will be integrated into the design of the Bostwick & Royal Magnolia intersection.

It is not anticipated that transit service will be provided along any of the internal development roadways. Based on the Bostwick MTS, transit service will likely be provided along Bostwick Road, Pack Road and the future extension of Bradley Avenue. It is recommended that transit stops be provided at the Bostwick & Pack/Bradley roundabout, the Pack & Street 'A' intersection and south of the Bostwick & Street 'C' intersection near Royal Magnolia Drive to ensure that the majority of the subdivision residents are within a 400m (5-minute) walking distance of transit.

Assuming the recommended transit facilities are provided, it is anticipated that the mode share targets identified in the Bostwick MTS can be achieved.

## Intersection Capacity Analysis

The Bostwick MTS provides a detailed analysis of the regional traffic impacts of the proposed development and therefore the following analysis focuses on the intersection capacity of the site access intersections:

- Pack & Street 'A' (unsignalized, full movement)
- Bostwick & Street 'C' (unsignalized, right-in/right-out only)
- Bostwick & Royal Magnolia (unsignalized, full movement)

The W3 Farms Residential Development Transportation Impact Assessment (BTE, February 2017) indicated that the Bostwick & Royal Magnolia intersection is expected to be stop-controlled in 2030 but noted that it may require signalization in the future and should be monitored to determine when signalization is warranted.

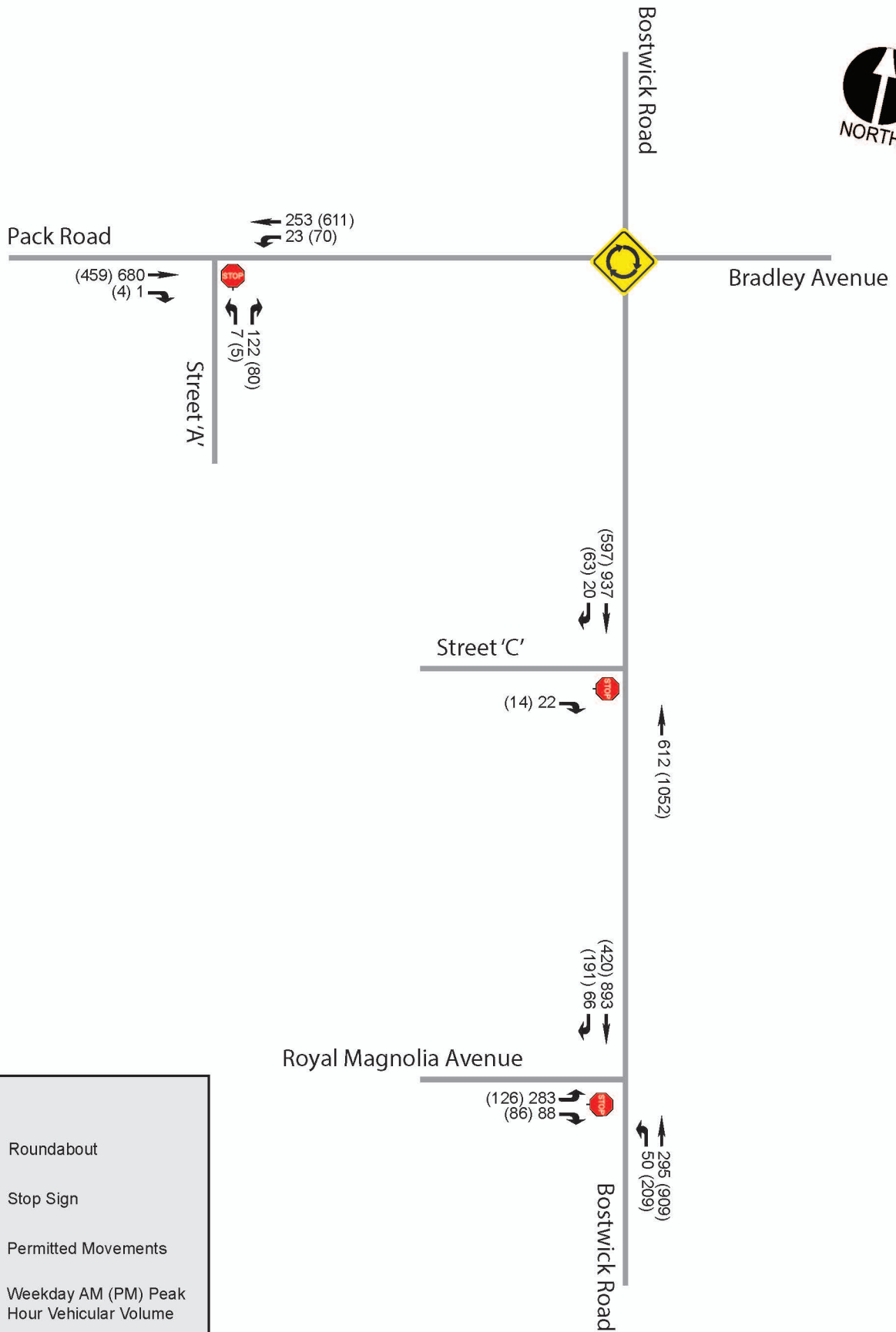
As noted previously in **Table 1**, the buildout year of the proposed development is 2030 therefore traffic operations at each site access will be evaluated under the following traffic conditions:

- Future (2030) Total Traffic
- Future (2035) Total Traffic

The above analysis years have been selected to align with the analysis from the Bostwick MTS. As only the site accesses have been evaluated, no analysis of background traffic conditions has been undertaken.

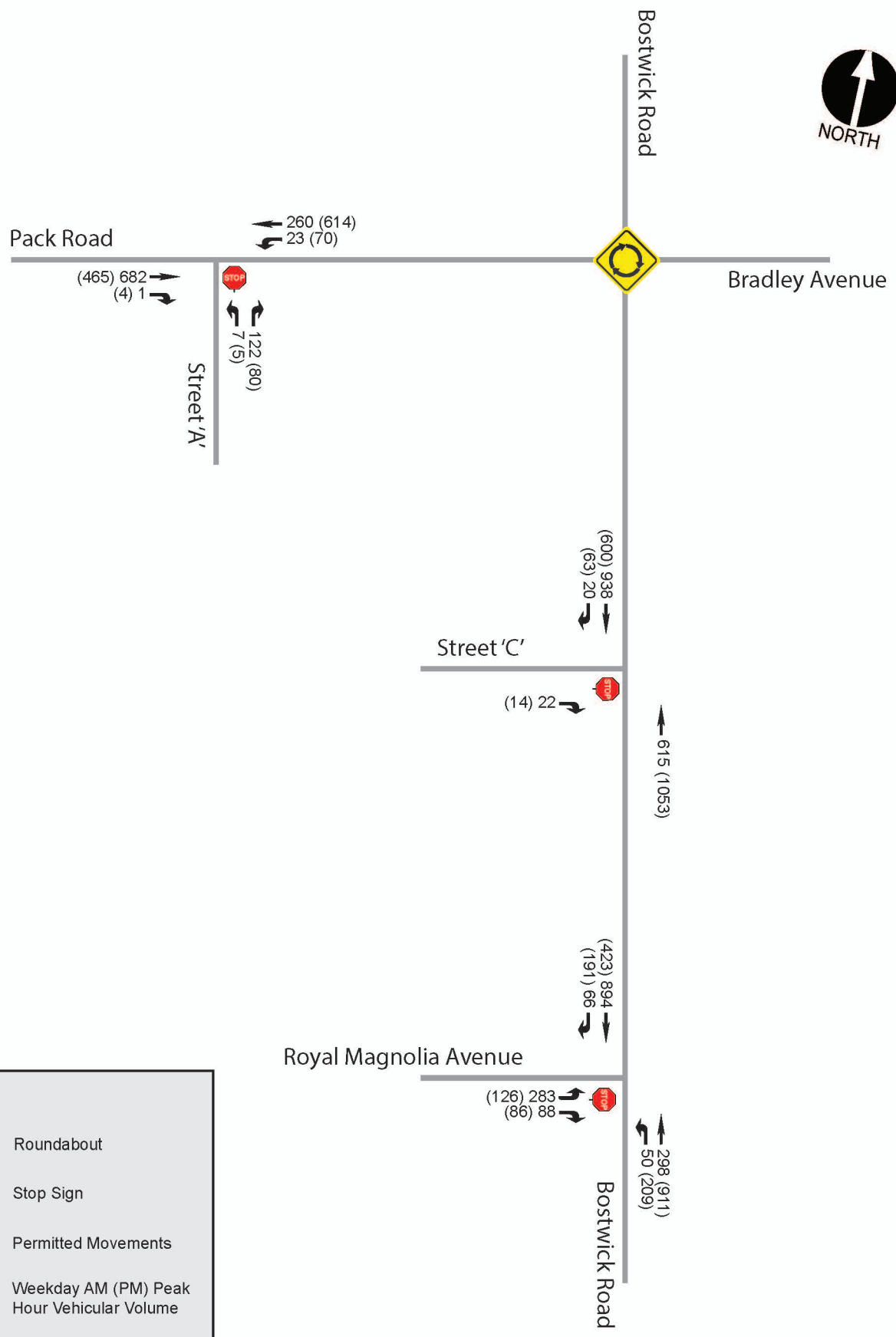
The proposed development will be entirely residential therefore only the weekday morning and afternoon peak hours have been analysed as the combined impact of site-generated and background traffic is expected to be highest during these periods.

Future (2030 & 2035) Total Traffic volumes were calculated by using the vehicle trip generation estimates and distribution from the Bostwick MTS to assign site-generated traffic to the site accesses and then superimposing these volumes over the background traffic volumes from the Bostwick MTS. The resulting Future (2030 & 2035) Total Traffic volumes are illustrated in **Exhibit 3** and **Exhibit 4**.



**LEGEND**

- Roundabout
- Stop Sign
- Permitted Movements
- Weekday AM (PM) Peak Hour Vehicular Volume





The City of London Transportation Impact Assessment (TIA) Guidelines indicate that intersections and movements with a v/c ratio greater than 0.90 or Level of Service (LOS) 'E' or worse should be identified, along with 95<sup>th</sup> percentile queues that exceed the available storage capacity.

Traffic operations at all study area intersections were evaluated using Synchro v11. The results of the intersection capacity analysis of Future (2030 & 2035) Total Traffic conditions are presented in **Table 2** and **Table 3** below. Detailed intersection capacity analysis reports are provided in **Appendix C**.

**Table 2 - Intersection Capacity Analysis Results: Future (2030) Total Traffic**

Intersection	Traffic Control	Lane Group	Storage (m)	AM Peak Hour (PM Peak Hour)						
				Intersection Delay	Intersection LOS	Delay (s)	LOS	v/c Ratio	95th Percentile Queue (m)	
Pack & Street 'A'	Stop-Control	NBRL	-	16.6 (13.0)	C (B)	16.6 (13.0)	C (B)	0.29 (0.16)	8.4 (4.2)	
		WBL	25			9.0 (8.5)	A (A)	0.03 (0.06)	0.7 (1.4)	
Bostwick & Street 'C'	Stop-Control	EBR	-	12.0 (10.5)	B (B)	12.0 (10.5)	B (B)	0.04 (0.02)	1.4 (0.7)	
Bostwick & Royal Magnolia	Stop-Control	NBL	-	349.5 (244.4)	F (F)	10.3 (9.7)	B (A)	0.07 (0.21)	1.4 (5.6)	
		EBL	-			349.5 (218.0)	F (F)	1.62 (1.18)	133.7 (57.4)	
		EBR	-			13.0 (10.9)	B (B)	0.16 (0.12)	4.2 (2.8)	
	Signalized	Signalized	EBL	-	12.9 (7.7)	B (A)	26.3 (23.3)	C (C)	0.64 (0.41)	46.0 (22.5)
			EBR	-			11.1 (7.3)	B (A)	0.21 (0.25)	12.2 (8.6)
			NBL	-			11.0 (9.8)	B (A)	0.20 (0.40)	9.4 (26.6)
			NBT	-			8.1 (6.6)	A (A)	0.16 (0.38)	15.7 (37.0)
SBTR	-	10.6 (5.0)	B (A)	0.52 (0.27)	54.0 (20.2)					

Under Future (2030) Total Traffic conditions, the eastbound left-turn movement at the Bostwick & Royal Magnolia intersection is expected to exceed its theoretical capacity during the weekday morning and afternoon peak hours. This is entirely due to heavy eastbound left-turn traffic associated with the W3 Farms Residential Development; it is not expected that the proposed development will contribute any significant amount of traffic to this movement. The installation of traffic signals at this intersection is expected to improve traffic conditions to within acceptable operating standards. If the poor Level of Service at the intersection is not addressed, it is likely that eastbound left-turn traffic from W3 Farms will reroute through the proposed development to the Pack/Bostwick roundabout to avoid long delays resulting in significant volumes of cut-through traffic within the proposed development.

Traffic signal warrant analysis was completed for the Bostwick & Royal Magnolia intersection under Future (2035) Total Traffic conditions. The results of the warrant analysis indicate that, despite being operationally required, the intersection does not meet the technical warrants for signalization. The results of the traffic signal warrant analysis have been provided in **Appendix A**.

The W3 Farms TIA recommended implementing traffic signals only when they are warranted. Given that they are expected to be operationally required by 2030, however, it is our recommendation that traffic signals be implemented in conjunction with the planned widening and realignment of Bostwick Road in 2026 or sooner. Providing traffic signals at this location also has the secondary benefit of providing a signal-controlled crossing for pedestrians and cyclists travelling along the MUP.

Both the Bostwick & Street 'C' and Pack & Street 'A' access intersections are expected to operate within their theoretical capacity (i.e., LOS 'E' or better) under the Future (2030) Total Traffic conditions, with the Bostwick & Street 'C' intersection operating as a right-in/right-out access.

**Table 3 - Intersection Capacity Analysis Results: Future (2035) Total Traffic**

Intersection	Traffic Control	Lane Group	Storage (m)	AM Peak Hour (PM Peak Hour)					
				Intersection Delay	Intersection LOS	Delay (s)	LOS	v/c Ratio	95th Percentile Queue (m/veh <sup>1</sup> )
Pack & Street 'A'	Stop-Control	NBRL	-	16.7 (12.8)	C (B)	16.7 (12.8)	C (B)	0.30 (0.16)	8.4 (3.5)
		WBL	25			9.0 (8.5)	A (A)	0.03 (0.06)	0.7 (1.4)
Bostwick & Street 'C'	Stop-Control	EBR	15	12.0 (10.5)	B (B)	12.0 (10.5)	B (B)	0.04 (0.02)	0.7 (0.7)
Bostwick & Royal Magnolia	Signalized	EBL	-	12.9 (7.6)	B (A)	26.3 (23.3)	C (C)	0.64 (0.41)	46.0 (22.5)
		EBR	-			11.1 (7.3)	B (A)	0.21 (0.25)	12.2 (8.6)
		NBL	-			11.1 (9.9)	B (A)	0.20 (0.40)	9.4 (26.6)
		NBT	-			8.1 (6.6)	A (A)	0.17 (0.38)	15.8 (37.2)
		SBTR	-			10.6 (5.0)	B (A)	0.52 (0.27)	54.1 (20.3)

The results of the Future (2035) Total Traffic analysis are largely similar to results under the Future (2030) Total Traffic conditions. All study area intersections are expected to operate at an acceptable Level of Service.

## Geometric Review

The distances from the proposed site accesses to the current and future Bostwick & Pack intersection and the future Bostwick & Royal Magnolia intersection are summarized below in **Table 4**.

**Table 4 - Proposed Access Locations**

Intersection	Distance from Intersection to Site Access	
	Bostwick & Street 'C'	Pack & Street 'A'
Bostwick & Pack (Current, Unsignalized)	270m south	300m west
Bostwick & Pack (Future, Roundabout)	190m south	275m west
Bostwick & Royal Magnolia (Future, Signalized or Roundabout)	255m north	N/A

The City of London Access Management Guidelines classify all development intersections as major access connections. Bostwick and Pack are both classified as Civic Boulevards (i.e., Urban Arterials) and are assumed to have a design speed of 80 km/h (posted speed limit plus 10 km/h). As such, the following geometric requirements are applicable to the site access intersections:

**Table 5 - Geometric Requirements**

Geometric Requirement	Distance Required/ Recommended
<b>Sight Distance Requirements</b>	
Minimum Intersection Sight Distance <sup>1</sup> (Street 'A' only)	170m
Minimum Intersection Sight Distance <sup>1</sup> (Street 'C' only) <sup>2</sup>	145m
Desirable Decision Sight Distance <sup>3</sup> (Street 'A' and 'C')	325m
<b>Intersection Spacing Requirements<sup>4</sup></b>	
Desirable Spacing from a Signalized Intersection <sup>3</sup> (Street 'A' only)	400m
Minimum Spacing Required from a Signalized Intersection <sup>3</sup> (Street 'A' only)	300m
Minimum Spacing Required between Major Access Connections <sup>3</sup> (Street 'C' only)	75m

**Notes:**

<sup>1</sup> – Based on the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads.

<sup>2</sup> – The Bostwick & Street 'C' intersection is restricted to right-in/right-out only and therefore a shorter intersection sight distance is required to allow vehicles to safely turn onto Bostwick Road.

<sup>3</sup> – Based on the City of London Access Management Guidelines

<sup>4</sup> – Intersection spacing requirements are intended to provision for the potential future signalization of intersections.

The sight distance requirements were reviewed at the two proposed access intersections and the results are summarized in **Table 6**.

**Table 6 - Sight Distance Requirement Compliance**

Location	Sight Distance Requirement Compliance	
	Minimum Intersection Sight Distance	Minimum Desirable Decision Sight Distance
Bostwick & Street 'C'	✓	✓
Pack & Street 'A'	✓	✓

Both the Street 'A' and Street 'C' access intersections meet the desirable decision sight distance with the existing Pack & Bostwick intersection configuration. It should be noted that the future roundabout configuration could potentially limit the sight distance to below the desirable decision distance but both intersections would still meet the minimum intersection sight distance.

Based on elevation data from Google Earth, the proposed access intersection is located at the peak of the crest vertical curve and therefore it is not anticipated that sightlines will be impacted.

The intersection spacing requirements were also reviewed for the two proposed access intersections and the results are summarized below:

- Pack & Street 'A'
  - Desirable Spacing from a Signalized Intersection: **X**
  - Minimum Spacing Required from a Signalized Intersection: **X**
- Bostwick & Street 'C'
  - Minimum Spacing Required between Major Access Connections: **✓**

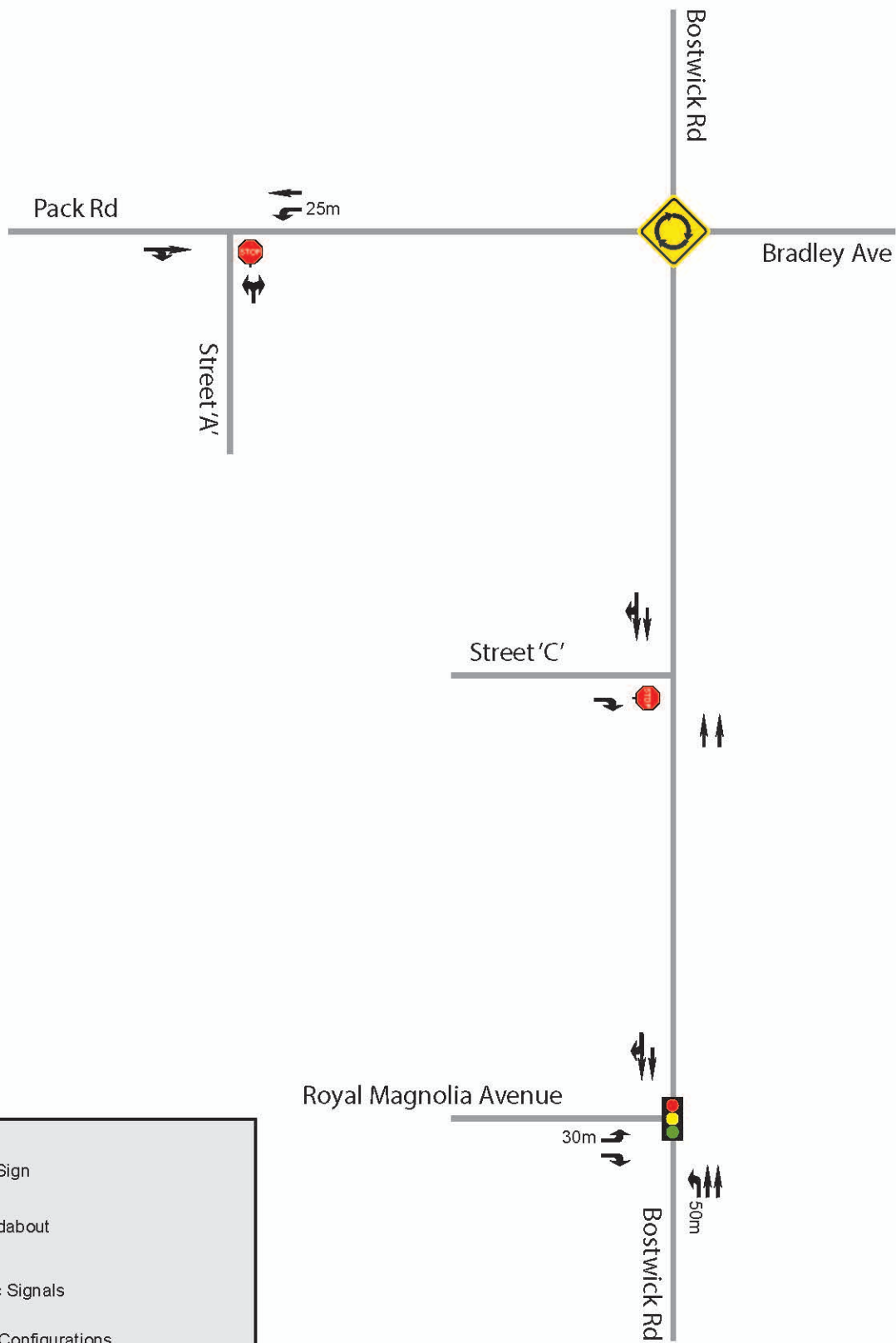
The Street 'A' access intersection does not meet the desirable spacing nor the minimum required spacing from the future Pack & Bostwick roundabout. As such, should both the intersections of Pack & Street 'A' and Bostwick & Pack be signalized in the future there could be some operational issues with regards to signal progression as a result of their relative proximity to each other. As both intersections are expected to operate with minimal delays as non-signalized intersections, however, it is not expected that either will require signalization in the future and therefore the substandard spacing between the two is considered acceptable. Furthermore, relocating Street 'A' further west to achieve the minimum or desirable intersection spacing would result in sightline deficiencies. Based on the intersection capacity analysis, there is no anticipated queueing issues at these two intersections that would impede the operation of any surrounding intersections.

The Bostwick & Street 'C' meets the minimum spacing requirements for a right-in/right-out access.

Left- and right-turn auxiliary lane warrant analysis was completed for both accesses in accordance with the City of London Access Management Guidelines. The results of the analysis indicate that a westbound left-turn lane with 25m of storage is warranted at the Pack & Street 'A' intersection. The results of the left-turn lane warrant analysis are provided in **Appendix B**.

The W3 Farms Residential Development TIA did not identify the storage lane requirements for the Bostwick & Royal Magnolia intersection. Based on the results of the intersection capacity analysis, it is expected that a minimum of 30m and 50m of storage capacity will be ultimately required for the northbound left-turn and eastbound left-turn lane, respectively, when the signalized intersection is constructed.

**Exhibit 5** illustrates the recommended traffic controls and lane configurations at the site access intersections based on the results of the intersection capacity analysis and geometric review.



**Legend**

- Stop Sign
- Roundabout
- Traffic Signals
- Lane Configurations
- xxxm Storage Lengths



## Transportation Demand Management (TDM)

The Bostwick MTS identifies a number of Transportation Demand Management (TDM) measures that the City of London is undertaking to manage traffic demand. To support these City-initiated TDM measures, it is proposed that a multi-modal information package be provided to all new residents upon first occupancy of the development to highlight the range of alternative transportation options available in the area. This package may include information about local pathways, bicycle infrastructure, nearby services and amenities, nearby bus stops/routes/schedule, schools, local taxi companies, etc. The intent of this package is to provide new residents with options to get around their new community without reliance on a private automobile and establish sustainable travel behaviours upon first occupancy.

## Pedestrian Crossovers (PXO)

As discussed previously, a multi-use path (MUP) is expected to extend along the southern boundary of the proposed development and cross Street 'A' approximately 100m north of Royal Magnolia Avenue. This crossing is therefore a potential candidate for a pedestrian crossover (PXO).

Based on Ontario Traffic Manual (OTM) Book 15 – Pedestrian Crossing Facilities, PXOs are warranted on the basis of traffic volumes, system connectivity and the lack of alternative crossing locations. Book 15 also indicates that traffic signal warrants should also be assessed to identify whether a higher-level form of traffic control may be warranted. Given that the future pedestrian crossing volumes at the potential PXO location are unknown, traffic signal warrant analysis cannot be completed and the warrant for the PXO was therefore assessed based solely on the need for system connectivity.

Given that the potential PXO location on Street 'A' is located along a MUP, there is a need for system connectivity at this location. This will ensure that the MUP network is continuous, as a disjointed network could discourage the use of active transportation (walking/cycling) modes within the broader community. As there are no other signal-controlled pedestrian crossings within 200m of this location, the minimum spacing requirement for a PXO is also met. As such, a PXO is warranted at and can be deemed suitable this location.

OTM Book 15 provides a PXO selection matrix to help identify the appropriate PXO configuration for a crossing location based on traffic volumes, posted speed limit, crossing distance and the presence or absence of a median refuge. Based on projected traffic volumes along Street 'A', a Level 2 Type D PXO is recommended. Curb extensions should be incorporated at the proposed crossing on Street 'A' to ensure the crossing distance doesn't exceed 7.5m.

The PXO Decision Support Tool and the Selection Matrix have been provided in **Appendix D**.

## Traffic Calming Measures

The layout of the internal road network has been assessed to determine the suitability for traffic calming measures. The street that is the most susceptible to higher traffic speeds is Street 'A' due to its length and lack of abrupt curvature. Recommended measures to mitigate high traffic speeds include horizontal measures such as curb extensions (mid-block or at intersections), and reduced curb radii as well as vertical measures such as speed humps. This combination of horizontal and vertical measures has been selected to slow the speed of turning and through-traffic while also shortening pedestrian crossing distances.

As noted previously, there is a potential for traffic associated with the adjacent W3 Farms Residential Development to potentially use Street 'A' as a detour route to avoid the Bostwick & Royal Magnolia intersection. With consideration that Bostwick Road has a higher speed limit, a 4-

lane cross-section and a lack of friction due to parked vehicles and driveways, however, it is not expected that Street 'A' will be an attractive alternative route unless delays at the Bostwick & Royal Magnolia intersection are sufficiently high such that detouring via Street 'A' represents a faster route than using Bostwick Road.

To protect against the potential for excessive traffic speeds along Street 'A', it is recommended that curb extensions be provided adjacent to the proposed park and along the flankage of the properties along Street 'A' to break up the roadway segment and frame on-street parking. It is further recommended that the recommended PXO along Street 'A' be constructed with a raised crosswalk as an additional means of traffic calming, complimented with a raised intersection and speed humps further to the north along this roadway.

The City of London is currently implementing an Area Speed Limits program to lower speed limits to 40 km/h on roads with high levels of pedestrian and cycling activity. Within the Southwest Area of London, area speed limits have been implemented within the area bound by Westdel Bourne, Oxford, Commissioners, Boler and Byron Baseline and the area bound by Wonderland, Southdale, White Oak and Exeter.

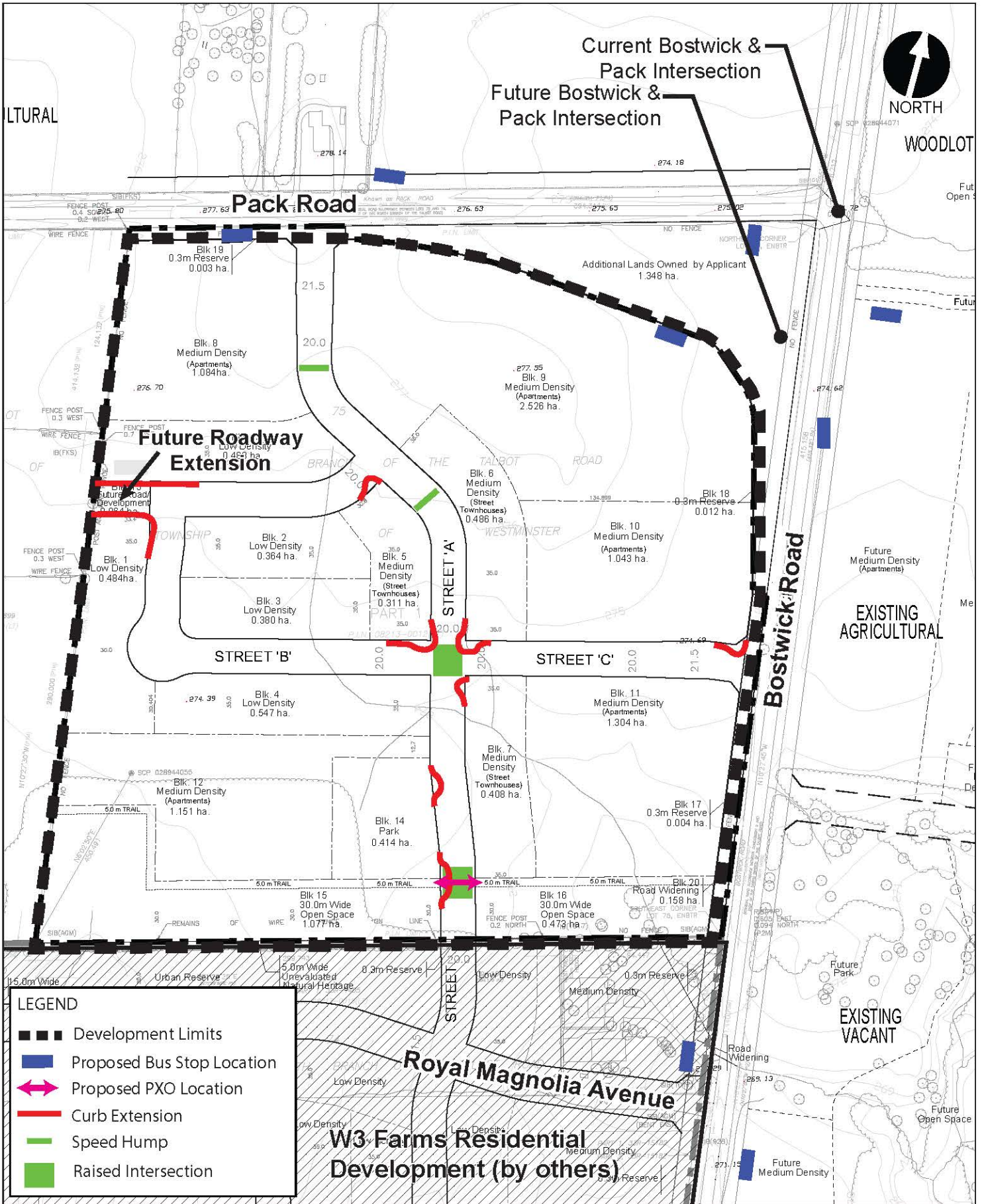
In order to ensure that walking and cycling are attractive and safe modes of transportation for residents of the proposed development, it is recommended that Area Speed Limits be implemented for the area bound by Colonel Talbot, Southdale, Wonderland, Wharncliffe and Main, with exceptions for Bostwick Road, Pack Road and Bradley Avenue.

The following measures are also recommended:

- Reduced curb radii of 5-7m at all local-local intersections, where appropriate;
- Reduced curb radii of 9m at all local-collector/arterial intersections, where appropriate;
- Strategically located intersection narrowings to 6-6.5m at select local-local intersections; and
- Strategically located mid-block narrowings to 6-6.5m at minimum 100m-frequency along Street 'A'.

Traffic-calming measures will be incorporated into the subdivision roadway design following draft approval of the subdivision. A conceptual traffic calming and mobility plan is illustrated in **Exhibit 6** below.





## Conclusion

The proposed Westwinds Subdivision will include approximately 750 residential units and is expected to achieve full occupancy by 2030.

The intersection capacity analysis results conducted for this study indicated that the Bostwick & Royal Magnolia intersection is expected to exceed its theoretical capacity before 2030 due to background traffic demand. Introducing traffic signals at this location is expected to improve the operation of the intersection beyond the 2035 horizon year under total traffic conditions, although warrants are not likely to be met. As a multi-use path (MUP) is expected to cross at this location as well, it is recommended that pedestrian and cycling crossing treatments be provided when this segment of Bostwick Road is reconstructed.

At the Bostwick & Royal Magnolia intersection, a northbound and eastbound left-turn lane with a minimum of 50m and 30m of storage, respectively, is recommended. Auxiliary lane analysis also indicates that a westbound left-turn lane with 25m of storage is warranted at the proposed access intersection on Pack Road at Street 'A'.

A desktop review of sightlines at each of the proposed site accesses indicate that there are no anticipated deficiencies at either location. The Pack & Street 'A' intersection does not meet the minimum spacing requirements from the Bostwick & Pack roundabout but as neither intersection is expected to be signalized in the future the substandard spacing is expected to be acceptable. The spacing of Street 'A' is constrained by vertical curvature on Pack Road and therefore has been positioned to maximize visibility.

A number of traffic calming measures are recommended to discourage cut-through traffic and discourage excessive speeds. These recommended measures include mid-block and intersection narrowings, reduced curb radii and the implementation of Area Speed Limits for the area bound by Colonel Talbot, Southdale, Wonderland, Wharncliffe and Main.

The location where the planned MUP crosses Street 'A' has also been reviewed to assess the suitability of this crossing location for a PXO. It is recommended that a Level 2 Type D PXO be provided at this location. Implementation of curb extensions and a raised crossing in conjunction with the proposed PXO on Street 'A' is also expected to contribute to the traffic-calming measures planned on this street.

**The overall conclusion of the Westwinds Subdivision Site-Specific Transportation Assessment is that the proposed development can be accommodated by the adjacent road network with consideration of the above recommendations.**

**Report Prepared By:**



**Eric McLaren, P.Eng.**

**Reviewed By:**



**David Hook, P.Eng.**