

844 Veterans Drive

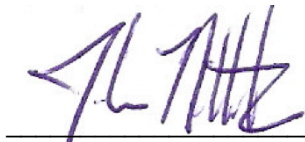
City of Barrie

Traffic Impact Study for 2528286 Ontario Inc.

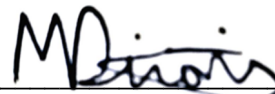
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Executive Summary

This report summarizes the traffic study prepared for the proposed residential development, municipally known as 844 Veterans Drive, in the City of Barrie [City]. The report assesses the impact of traffic related to the development on the adjacent roadway and provides recommendations to accommodate this traffic in a safe and efficient manner.

The proposed development is anticipated to include 80 townhouse units.

The proposed development is anticipated to include a municipal road [Street A] with access onto Veterans Drive. The Street A / Veterans Drive intersection will be initially constructed as a full-movement intersection, but it is anticipated that this intersection will be restricted to a right-in-right-out [RIRO] intersection with the future road widening of Veterans Drive (scheduled for 2029).

The scope of this analysis includes a review of the following intersections:

- Veterans Drive / Street A.

Conclusions

1. The proposed development is anticipated to generate a total of 32 AM and 41 PM peak hour trips
2. Traffic projections for Veterans Drive were obtained from the Watersand Development Traffic Analysis Addendum by JD Engineering dated September 3rd, 2020 [Watersand TA].
3. An estimate of the amount of traffic that would be generated by the proposed development was prepared and assigned to the study area streets and intersections.
4. An intersection operation analysis was completed under total (2025, 2030 and 2035) traffic volumes with the proposed development operational at the study area intersections. No infrastructure improvements are recommended in the study area beyond the planned Veterans Drive widening.
5. Street A will operate efficiently as a full-movement access prior to the Veterans Drive widening and will operate efficiently as a RIRO access, post Veterans Drive widening, with one-way stop control for the eastbound movements for both scenarios. A single eastbound and westbound lane at the Street A will provide the necessary capacity to service the proposed development.
6. The sight distance available for Street A at Veterans Drive meets the minimum stopping and intersection sight distance requirements.
7. In summary, the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

Table of Contents

1	Introduction.....	1
1.1	Background.....	1
1.2	Study Area	1
1.3	Study Scope and Objectives	1
1.4	Analysis Periods	1
2	Information Gathering.....	3
2.1	Street and Intersection Characteristics	3
2.2	Transit Access	3
2.3	Local Road Improvements.....	4
2.4	Other Developments within the Study Area	5
2.5	Horizon Year Traffic Volumes.....	6
3	Proposed Development Traffic Generation and Assignment.....	6
3.1	Traffic Generation	6
3.2	Traffic Assignment.....	7
3.3	Total Horizon Year Traffic Volumes with the Proposed Development	7
4	Intersection Operation with Proposed Development	8
4.1	Introduction	8
4.2	Intersection Capacity Analysis Criteria	8
4.3	Total (2025) Intersection Operation.....	9
4.4	Total (2030) Intersection Operation.....	10
4.5	Total (2035) Intersection Operation.....	10
4.6	Sight Distance Review.....	11
4.7	Site Access	11
4.8	Construction Parking	11
5	Summary	11

List of Tables

Table 1 – Estimated Traffic Generation – Mattamy Homes development (2025).....	5
Table 2 – Estimated Traffic Generation – Mattamy Homes development (2030/2035).....	5
Table 3 – Estimated Traffic Generation – Proposed Development.....	6
Table 4 – Proposed Development Traffic Distribution.....	7
Table 5 – Level of Service Criteria for Intersections.....	9
Table 6 – Total (2025) LOS.....	9
Table 7 – Total (2030) LOS.....	10
Table 8 – Total (2035) LOS.....	10

List of Figures

Figure 1 – Proposed Site Location and Study Area.....	2
Figure 2 – Existing Lane Configuration within Study Area.....	3
Figure 3 – Future Lane Configuration within Study Area (2029).....	4
Figure 4 – Mattamy Homes Development Traffic Assignment within Study Area (2025).....	13
Figure 5 – Mattamy Homes Development Traffic Assignment within Study Area (2030).....	14
Figure 6 – Mattamy Homes Development Traffic Assignment within Study Area (2035).....	15
Figure 7 – Background (2025) Traffic Volumes.....	16
Figure 8 – Background (2030) Traffic Volumes.....	17
Figure 9 – Background (2035) Traffic Volumes.....	18
Figure 10 – Proposed Development Traffic Assignment (2025).....	19
Figure 11 – Proposed Development Traffic Assignment (2030).....	20
Figure 12 – Proposed Development Traffic Assignment (2035).....	21
Figure 13 –Total (2025) Traffic Volumes.....	22
Figure 14 –Total (2030) Traffic Volumes.....	23
Figure 15 –Total (2035) Traffic Volumes.....	24

List of Appendices

APPENDIX A – Site Plan
APPENDIX B – Adjacent Development Excerpts
APPENDIX C – Synchro Analysis Output – Total Traffic Volumes
APPENDIX D – MTO Left Turn Warrant Analysis
APPENDIX E – OTM Signal Justification Sheets

1 Introduction

1.1 Background

2528286 Ontario Inc. [the Client] is proposing a residential development, municipally known as 844 Veterans Drive, in the City of Barrie [City]. The proposed development is anticipated to include 80 townhouse units.

The proposed development is anticipated to include a municipal road [Street A] with access onto Veterans Drive. The Street A / Veterans Drive intersection will be initially constructed as a full-movement intersection, but it is anticipated that this intersection will be restricted to a right-in-right-out [RIRO] intersection with the future road widening of Veterans Drive (scheduled for 2029), as discussed in Section 2.3.

The Client has retained **JD Northcote Engineering Inc.** [JD Engineering] to prepare this traffic impact study in support of the proposed development.

1.2 Study Area

Figure 1 illustrates the location of the subject site and study area intersections in relation to the surrounding area. The Site Plan by IPS Consulting Inc. is provided in **Appendix A**.

The subject site is bound by Veterans Drive to the east, natural heritage lands to the north, and lands designated for residential development to the west and south.

The following intersections will be analysed as part of the study:

- Veterans Drive / Street A.

1.3 Study Scope and Objectives

The purpose of this study is to identify the potential impacts to traffic flow at the site access and on the surrounding roadway network. The study analysis includes the following tasks:

- Consult with the City to address any traffic-related issues or concerns they have with the proposed development;
- Determine existing traffic volumes and circulation patterns;
- Estimate future traffic volumes if the proposed development was not constructed, including the impact of additional proposed developments in the Salem Secondary Plan area;
- Estimate the amount of traffic that would be generated by the proposed development and assign to the roadway network;
- Complete LOS analysis of horizon year (with the proposed development) traffic conditions and identify additional operational deficiencies;
- Identify improvement options to address operational deficiencies; and
- Document findings and recommendations in a final report.

1.4 Analysis Periods

Traffic scenarios for the build-out year (2025), 5-year post-build-out horizon year (2030), and 10-year post-build-out horizon year (2035) were selected for analysis of traffic operations in the study area. The weekday morning [AM] and weekday afternoon [PM] peak hours have been selected as the analysis periods for this study.

Figure 1 – Proposed Site Location and Study Area



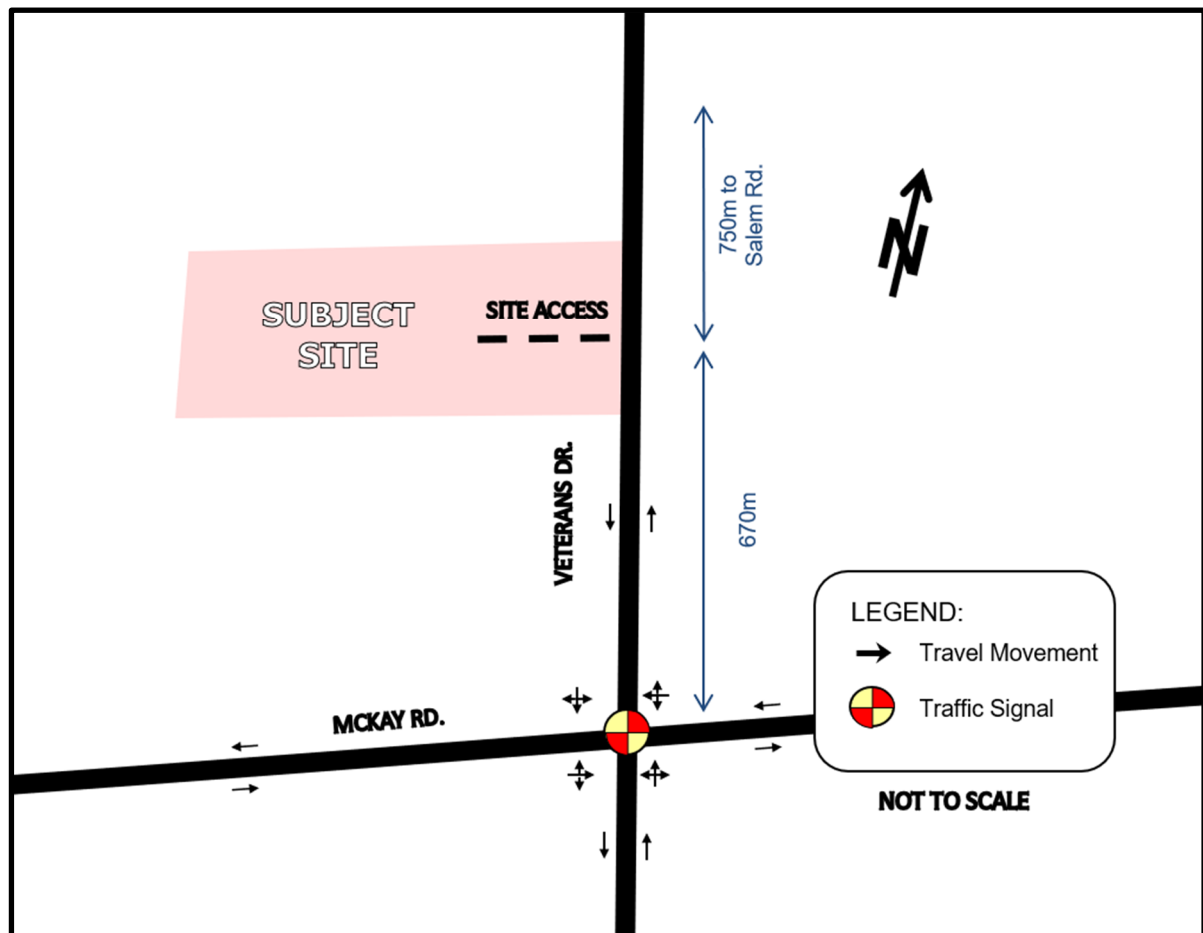
2 Information Gathering

2.1 Street and Intersection Characteristics

Veterans Drive is a two-lane arterial road with a rural cross-section within the study area. Veterans Drive has no sidewalks and a gravel shoulder on both sides of the road within the study area. Veterans Drive has a posted speed limit of 80km/h and is under the jurisdiction of the City within the study area.

The existing intersection spacing and lane configuration within the study area is illustrated in **Figure 2**.

Figure 2 – Existing Lane Configuration within Study Area



2.2 Transit Access

Currently, there is no municipal transit service within the study area; however, the City's Transportation Master Plan (April 2019) [City TMP] identified one transit route on Veterans Drive within the study area and a new transit hub near the McKay Road / Veterans Drive intersection. The timeline for the above noted expansion to the City's transit system is currently unknown and will be dependent on the demand for transit as development progresses within the Salem Secondary Plan area.

2.3 Local Road Improvements

Based on correspondence with the City, and our review of the City TMP and the City's 2022-2031 Capital Plan [City CP], the following improvements are anticipated to be completed within the study area:

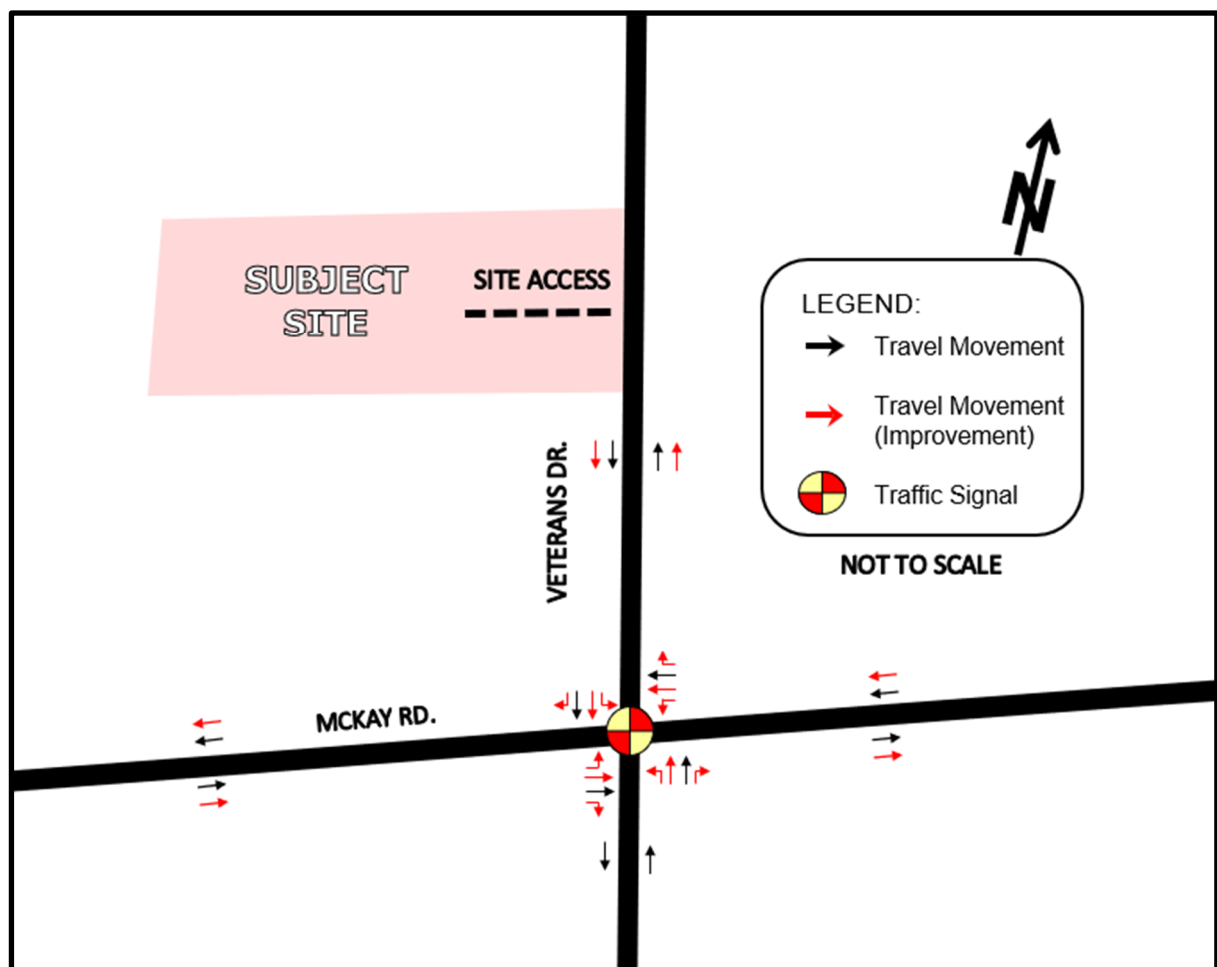
- Veterans Drive within study area (by 2029)
 - Road widening to a four-lane cross-section (including centre median);
 - Construction of buffered bicycle lanes; and
 - Addition of sidewalks on Veterans Drive.

It is noted that the Client has already dedicated land to the City for the widening noted above.

It is also noted that per the City TMP and City CP, widening of McKay Road to a four-lane cross-section (including centre median) is anticipated by 2029 and the construction of a new Highway 400 interchange at McKay Road is anticipated by 2031.

The future lane configuration within the study area is illustrated in **Figure 3**.

Figure 3 – Future Lane Configuration within Study Area (2029)



2.4 Other Developments within the Study Area

In general, there is a significant amount of anticipated development planned within the Salem Secondary Plan area. The traffic anticipated from developments proposed within the Salem Secondary Plan area have been accounted for via the traffic volume selection methodology discussed in Section 2.5.

It is noted that Street A is proposed to extend from the subject site into the proposed Mattamy Homes Development (formerly known as H&H Development) to the west. Consequently, traffic volumes for the Mattamy Homes Development have been accounted for separately.

The Mattamy Homes Development is located on the west side of Veterans Drive, between McKay Road and Salem Road. Based on the latest development schedule for the Salem Secondary Plan area, the Mattamy Homes Development is anticipated to include the following unit breakdown for each horizon year of this study:

- 2025: 242 single detached and 288 townhouse units;
- 2030/2035: 334 single detached and 397 townhouse units.

Traffic generation for the Mattamy Homes development has been calculated based on the data provided in the Institute of Transportation Engineers [ITE] *Trip Generation Manual* (11th Edition) [ITE Trip Generation Manual]. The following ITE land uses have been applied to estimate the traffic from the Mattamy Homes development:

- ITE land use 210 (Single-Family Detached Housing) – General Urban / Suburban Setting; and
- ITE land use 220 (Multifamily Housing (Low-Rise)) – General Urban / Suburban Setting.

The estimated trip generation of the Mattamy Homes development is illustrated below in **Tables 1 and 2**.

Table 1 – Estimated Traffic Generation – Mattamy Homes development (2025)

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached Housing ITE Land Use: 210	242 units	44	126	170	144	84	228
Multi-Family Housing (Low-Rise) ITE Land Use: 220	288 units	28	88	116	93	54	147
TOTAL TRIP GENERATION		72	214	285	237	138	375

Table 2 – Estimated Traffic Generation – Mattamy Homes development (2030/2035)

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached Housing ITE Land Use: 210	334 units	61	173	234	198	116	314
Multi-Family Housing (Low-Rise) ITE Land Use: 220	397 units	38	121	159	128	75	203
TOTAL TRIP GENERATION		99	294	393	326	191	517

The traffic assignment for the Mattamy Homes development has been estimated based on the traffic distribution methodology applied for the proposed development outlined in Section 3.2.

The distribution of Mattamy Homes Development traffic utilizing Street A is based on our review of the internal road network, in conjunction with the external traffic distribution.

Figures 4, 5 and 6 illustrates the Mattamy Homes development traffic assignment within the study area for the 2025, 2030 and 2035 horizon years respectively. It is noted that there are three different traffic assignments for the Mattamy Homes development due to the following:

- 2025 – 530 units, no RIRO restriction at Street A, pre-interchange traffic distribution;
- 2030 – 731 units, RIRO restriction at Street A, pre-interchange traffic distribution; and
- 2035 – 731 units, RIRO restriction at Street A, post-interchange traffic distribution.

2.5 Horizon Year Traffic Volumes

As noted in Section 2.4, there is a significant amount of development planned within the Salem Secondary Plan area that will impact the traffic within the study area. Consequently, the background (2025, 2030 and 2035) traffic volumes on Veterans Drive, adjacent to the subject site have been estimated based on the traffic volume projections from the Watersand Development Traffic Analysis Addendum by JD Engineering dated September 3rd, 2020 [Watersand TA] (excerpt attached in **Appendix B**). It is noted that the Watersand TA did not include a 2025 and 2035 horizon year; consequently, we have conservatively assumed that the 2025 and 2035 horizon year traffic volumes would be equivalent to the 2026 and 2036 traffic volumes in the Watersand TA. This methodology was utilized to estimate the traffic volumes within the study area as it utilizes the best information available for traffic volume projections within the Salem Secondary Plan area.

Figures 7, 8 and 9 illustrate the background (2025, 2030 and 2035) horizon year AM and PM peak hour traffic volumes in the study area.

3 Proposed Development Traffic Generation and Assignment

3.1 Traffic Generation

The traffic generation for the proposed development has been based on the ITE Trip Generation Manual. The following ITE land uses have been applied to estimate the traffic from the proposed development:

- ITE land use 220 (Multifamily Housing (Low-Rise)) – General Urban / Suburban Setting.

The estimated trip generation of the proposed development is illustrated below in **Table 3**. The AM and PM peak traffic generation for the proposed development is not expected to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 3 – Estimated Traffic Generation – Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Multi-Family Housing (Low-Rise) ITE Land Use: 220	80 units	8	24	32	26	15	41

No transportation modal split has been applied to the above-noted traffic generation calculation.

3.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

The ITE data provides the anticipated percentage of new traffic entering and exiting during the peak hour for the proposed development.

The distribution of traffic for the proposed development is based on the distribution of traffic volumes estimated in the Watersand TA. **Table 4** summarizes the distribution of ingress and egress traffic for the proposed development. Table 4 provides two different traffic distribution patterns; one prior to and one post the construction of the McKay Road / Highway 400 interchange.

Table 4 – Proposed Development Traffic Distribution

Travel Direction (to/from)	Pre- Interchange Construction	Post-Interchange Construction
North via Veterans Drive	64%	28%
South via Veterans Drive	36%	72%
TOTAL	100%	100%

Using the traffic distributions pattern noted above, the proposed development traffic assignment was calculated for the AM and PM peak hour and is illustrated in **Figures 10, 11 and 12** for the 2025, 2030 and 2035 horizon years respectively. It is noted that there are three different traffic assignments for the proposed development due to the following:

- 2025 – No RIRO restriction at Street A, pre-interchange traffic distribution;
- 2030 – RIRO restriction at Street A, pre-interchange traffic distribution; and
- 2035 – RIRO restriction at Street A, post-interchange traffic distribution.

For the RIRO scenarios, it is anticipated that some proposed development traffic will utilize the internal Street A connection to the Mattamy Homes Development to find an alternate travel route; however, in order to be conservative, we have assumed all egress traffic will exit via the eastbound right turn movement at Street A with traffic with destinations to the north making a u-turn south of Street A and all ingress traffic will enter via the southbound right turn movement into Street A. This is intended to be a conservative estimate of the traffic operations and not intended to reflect the anticipated traffic operations.

3.3 Total Horizon Year Traffic Volumes with the Proposed Development

For the total (2025, 2030 and 2035) horizon year traffic volumes, the proposed development and Mattamy Homes development traffic was added to the background (2025, 2030 and 2035) traffic volumes. The resulting total (2025, 2030 and 2035) horizon year total traffic volume for the AM and PM peak hour can be found in **Figures 13,14 and 15**, respectively.

4 Intersection Operation with Proposed Development

4.1 Introduction

Traffic operations within the study area were evaluated using the existing and future background traffic volumes with the existing road configuration and traffic control. The intersection performance was measured using the traffic analysis software, Synchro 11, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for analyzing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America.

Synchro 11 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

4.2 Intersection Capacity Analysis Criteria

Individual turning movements with a volume-to-capacity [V/C] ratio of 0.85 or greater are considered to be critical movements and have been highlighted in the LOS tables.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e. less than 10 seconds per vehicle) and LOS F represents very high delay (i.e. greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign-controlled intersections are shown in **Table 5**. A description of traffic performance characteristics is included for each LOS.

Table 5 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	Stop Controlled Intersections
A	Very low delay; most vehicles do not stop (Excellent)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (Very Good)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (Good)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (Satisfactory)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)	greater than 80.0	greater than 50.0

4.3 Total (2025) Intersection Operation

The results of the LOS analysis under total (2025) traffic volumes during the AM and PM peak hour can be found below in **Table 6**. Street A has been analyzed as a full movement access with one-way stop control for eastbound movements and the existing geometry on Veterans Drive for this scenario. Detailed output of the Synchro analysis can be found in **Appendix C**.

Table 6 – Total (2025) LOS

Location (E-W Street / N-S Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Street A / Veterans Drive	-	1.4	A	-	2.3	A
EB	0.27	24.7	C	0.49	79.8	F

The results of the LOS analysis indicate that the control delay for the eastbound movements at the Street A / Veterans Drive intersection is operating outside the typical design limits noted in Section 4.2; however, no improvements are recommended due to the planned widening of Veterans Drive within the study area, as discussed in Section 2.3.

An analysis was completed for northbound left turn movements at the Street A / Veterans Drive intersection based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. According to the above-noted criteria, a left turn lane is warranted (results are provided in **Appendix D**); however, is not recommended due to the planned widening of Veterans Drive within the study area, as discussed in Section 2.3.

A review of the need for an additional auxiliary right turn lane at the Street A / Veterans Drive intersection was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for the southbound movements; consequently, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the Street A / Veterans Drive intersection (results are provided in **Appendix E**).

No infrastructure improvements are recommended within the study area.

4.4 Total (2030) Intersection Operation

The results of the LOS analysis under total (2030) traffic volumes during the AM and PM peak hour can be found below in **Table 7**. Street A has been analyzed as a RIRO access with one-way stop control for eastbound movements and the future intersection geometry on Veterans Drive discussed in Section 2.3 for this scenario. Detailed output of the Synchro analysis can be found in **Appendix C**.

Table 7 – Total (2030) LOS

Location (E-W Street / N-S Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Street A / Veterans Drive	-	0.3	A	-	0.2	C
EB	0.08	13.1	B	0.10	21.8	C

The results of the LOS analysis indicate that the Street A / Veterans Drive intersection is operating within the typical design limits noted in Section 4.2.

A review of the need for an additional auxiliary right turn lane at the Street A / Veterans Drive intersection was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the Street A / Veterans Drive intersection (results are provided in **Appendix E**).

No infrastructure improvements are recommended within the study area.

4.5 Total (2035) Intersection Operation

The results of the LOS analysis under total (2035) traffic volumes during the AM and PM peak hour can be found below in **Table 8**. Street A has been analyzed as a RIRO access with one-way stop control for eastbound movements and the future intersection geometry on Veterans Drive discussed in Section 2.3 for this scenario. Detailed output of the Synchro analysis can be found in **Appendix C**.

Table 8 – Total (2035) LOS

Location (E-W Street / N-S Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Street A / Veterans Drive	-	0.4	A	-	0.3	C
EB	0.12	15.3	C	0.13	23.8	C

The results of the LOS analysis indicate that the Street A / Veterans Drive intersection is operating within the typical design limits noted in Section 4.2.

A review of the need for an additional auxiliary right turn lane at the Street A / Veterans Drive intersection was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the Street A / Veterans Drive intersection (results are provided in **Appendix E**).

No infrastructure improvements are recommended within the study area.

4.6 Sight Distance Review

A review of the available sight distance for the proposed Street A was completed as part of this analysis.

The sight distance north and south (greater than 250 meters) of Street A at Veterans Drive is greater than the minimum stopping and intersection sight distance requirements identified in the Transportation Association of Canada *Design Guide for Canadian Roads* (2017) [TAC Guidelines] for a design speed of 100 km/h (185 metres and 210 metres).

There are no issues with the sight distance for the proposed Street A.

4.7 Site Access

Street A will operate efficiently as a full-movement access prior to the Veterans Drive widening and will operate efficiently as a RIRO access post Veterans Drive widening, with one-way stop control for eastbound movements. No lane improvements are recommended on Veterans Drive at Street A beyond the planned Veterans Drive widening discussed in Section 2.3. A single eastbound and westbound lane at Street A will provide the necessary capacity to service the proposed development.

4.8 Construction Parking

Based on our correspondence with the design team for this project, the Client is committed to the following arrangement for construction parking:

The parking of construction vehicles and vehicles owned by staff and subcontractors employed by the Developer will be formally directed (in writing where possible) to avoid parking on municipal streets surrounding the subject site and avoid parking within private parking lots surrounding the subject site, without consent from the owner of the parking lots.

5 Summary

2528286 Ontario Inc. retained **JD Engineering** to prepare this traffic impact study in support of the proposed residential development municipally known as 844 Veterans Drive in the City of Barrie [City]. The proposed Site Plan is shown in **Appendix A**. This chapter summarizes the conclusions and recommendations from the study.

The proposed development is anticipated to include 80 townhouse units.

1. The proposed development is anticipated to generate a total of 32 AM and 41 PM peak hour trips
2. Traffic projections for Veterans Drive were obtained from the Watersand Development Traffic Analysis Addendum by JD Engineering dated September 3rd, 2020 [Watersand TA].
3. An estimate of the amount of traffic that would be generated by the proposed development was prepared and assigned to the study area streets and intersections.
4. An intersection operation analysis was completed under total (2025, 2030 and 2035) traffic volumes with the proposed development operational at the study area intersections. No

infrastructure improvements are recommended in the study area beyond the planned Veterans Drive widening.

5. Street A will operate efficiently as a full-movement access prior to the Veterans Drive widening and will operate efficiently as a RIRO access post Veterans Drive widening, with one-way stop control for the eastbound movements for both scenarios. A single eastbound and westbound lane at the Street A will provide the necessary capacity to service the proposed development.
6. The sight distance available for Street A at Veterans Drive meets the minimum stopping and intersection sight distance requirements.
7. In summary, the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

Figure 4 – Mattamy Homes Development Traffic Assignment within Study Area (2025)

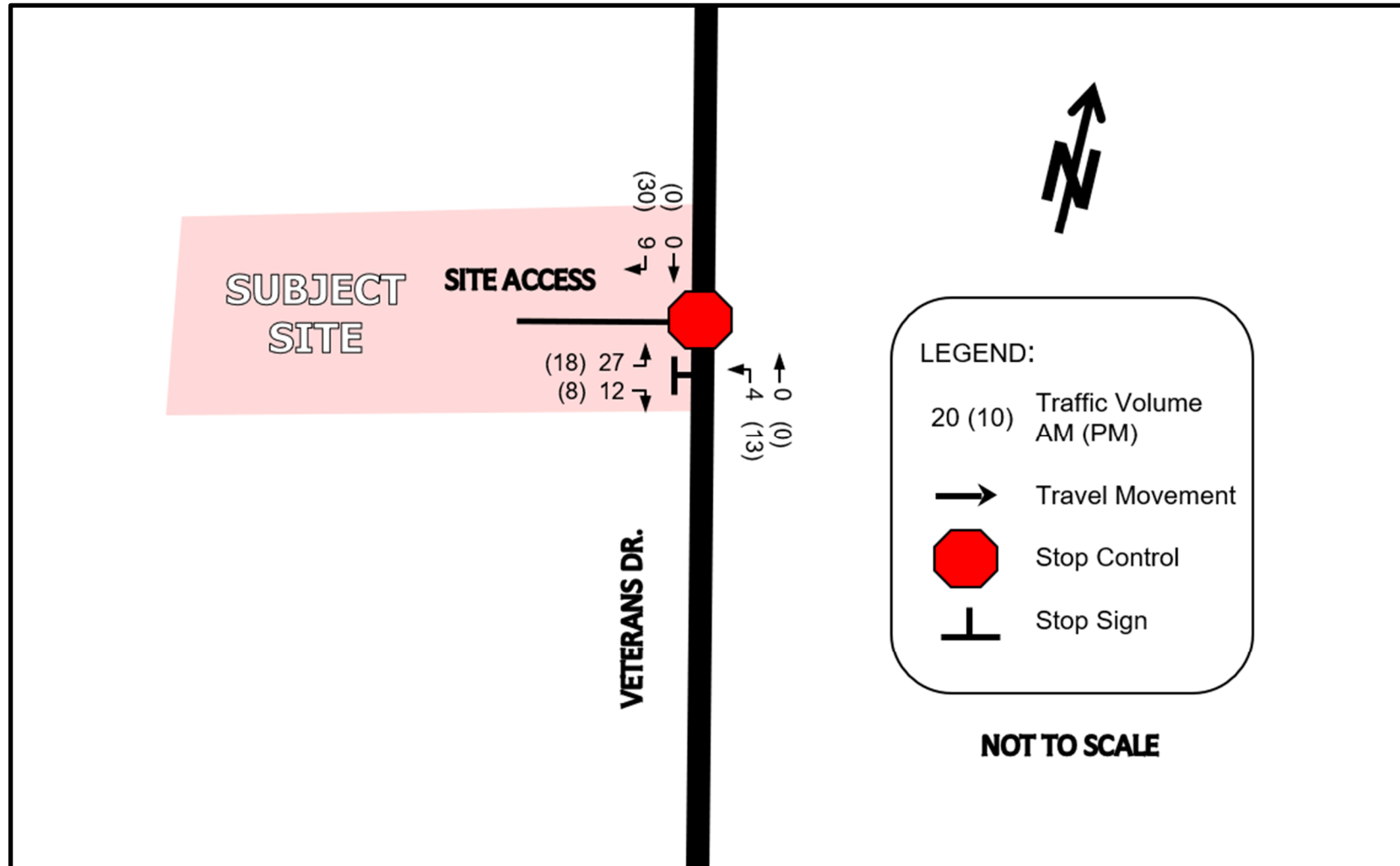


Figure 5 – Mattamy Homes Development Traffic Assignment within Study Area (2030)

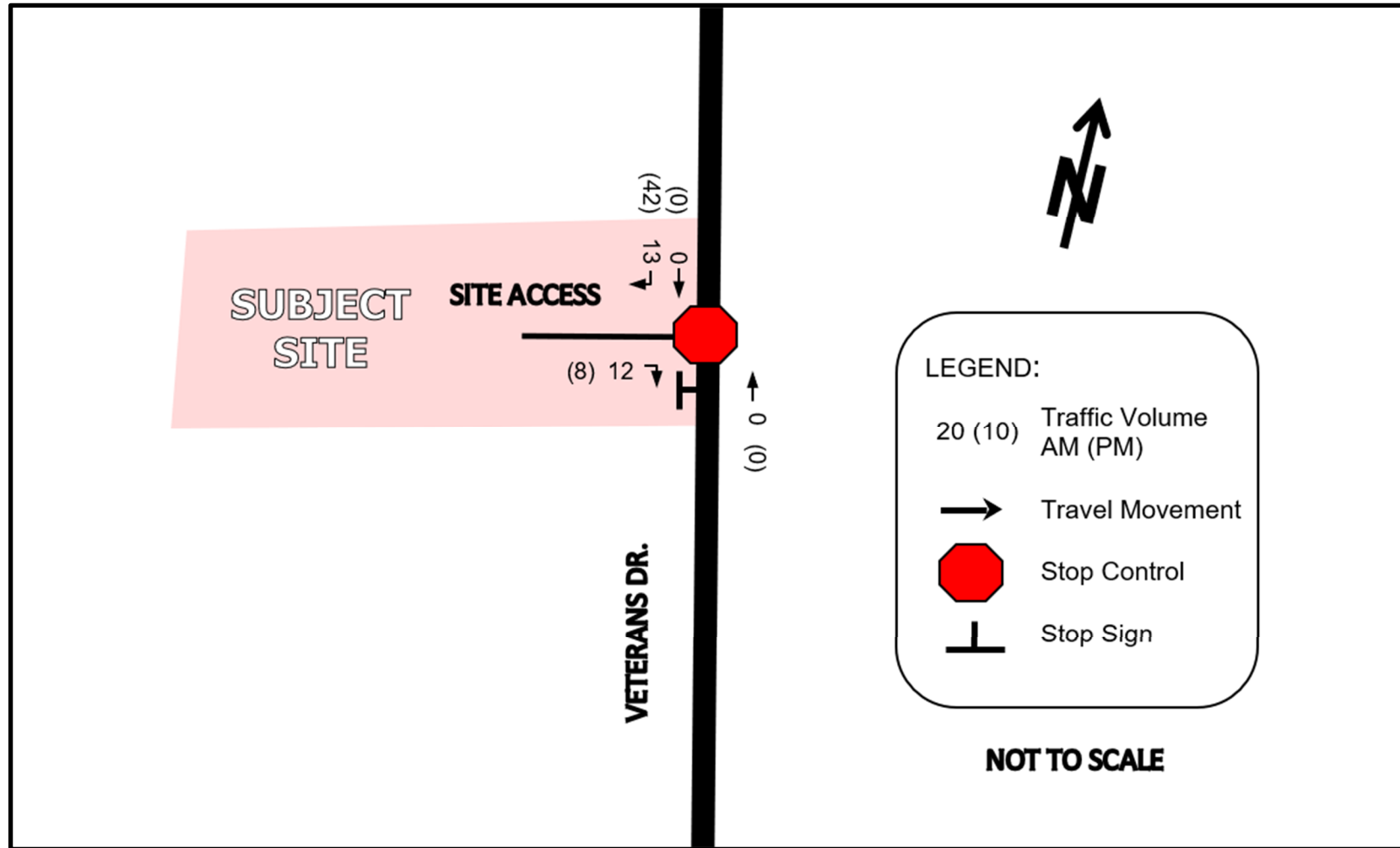


Figure 6 – Mattamy Homes Development Traffic Assignment within Study Area (2035)

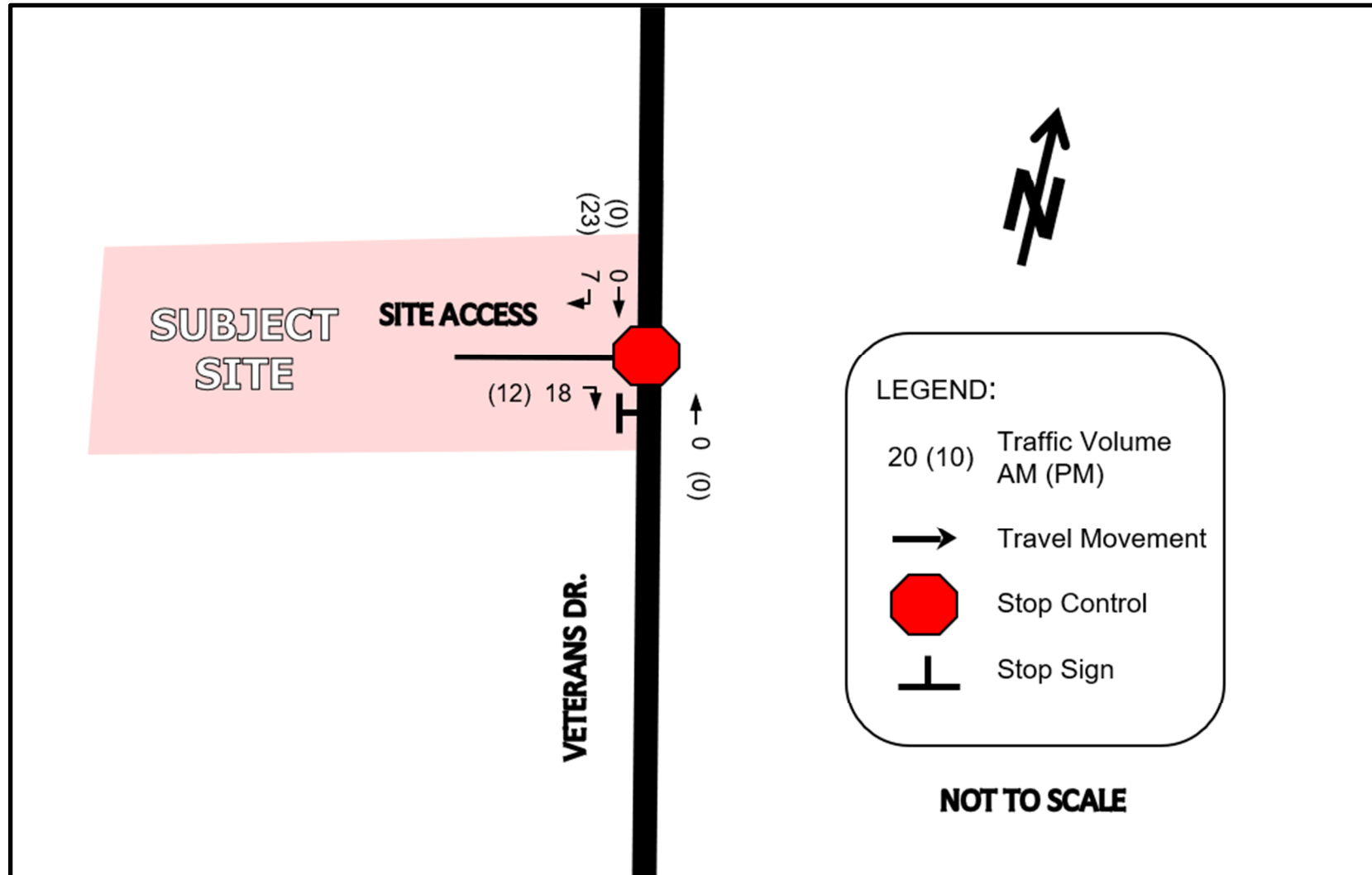


Figure 7 – Background (2025) Traffic Volumes

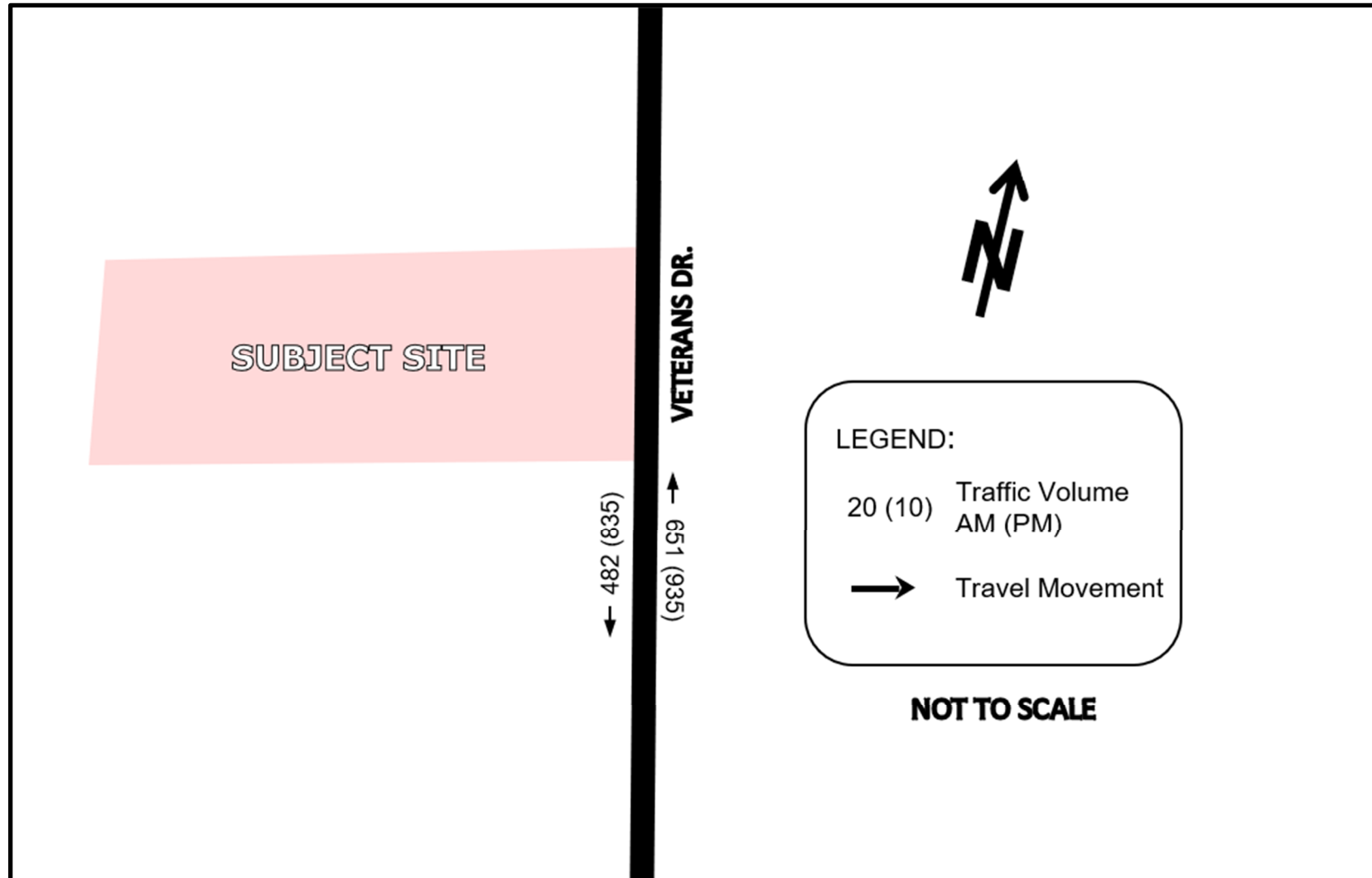


Figure 8 – Background (2030) Traffic Volumes

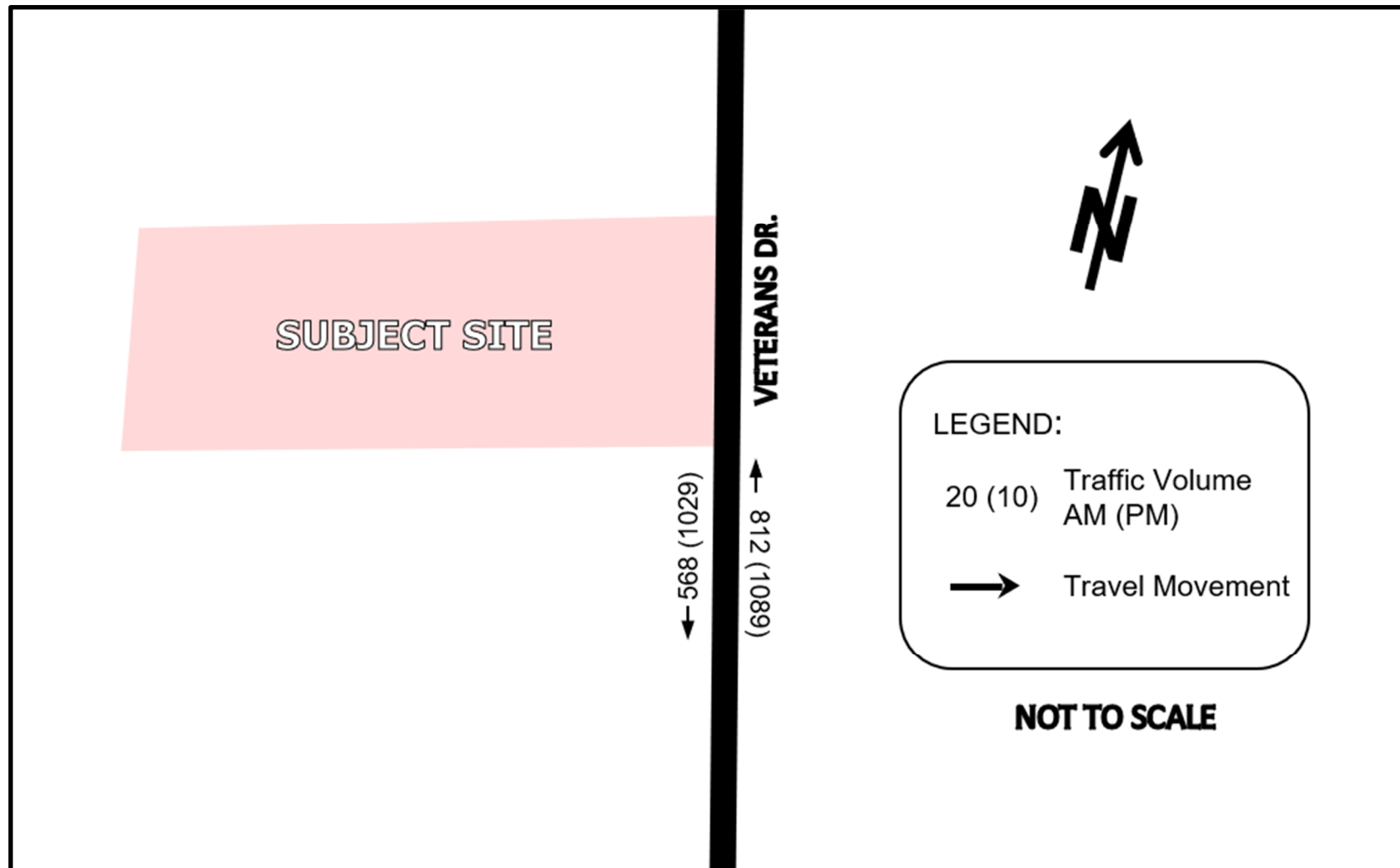


Figure 9 – Background (2035) Traffic Volumes

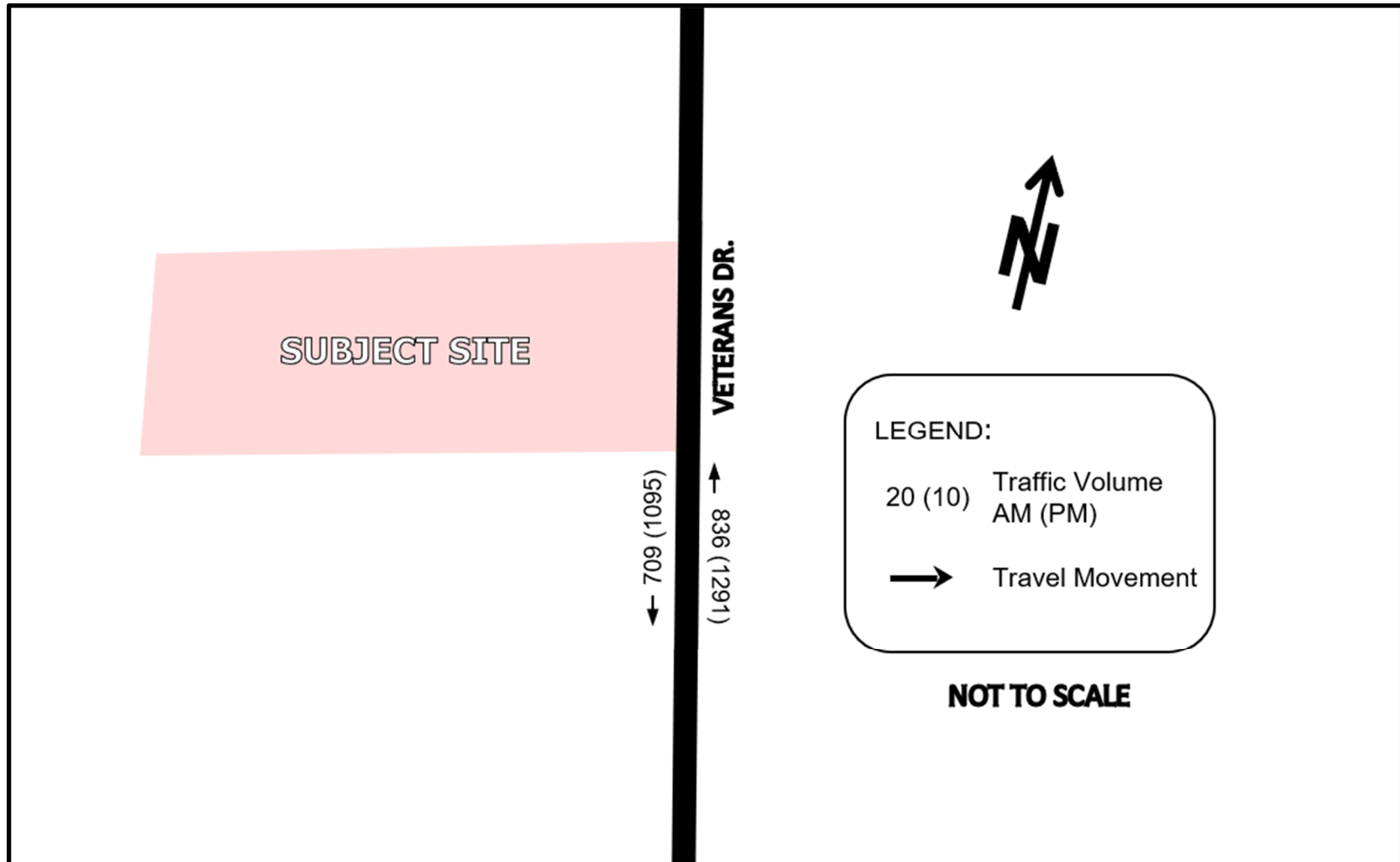


Figure 10 – Proposed Development Traffic Assignment (2025)

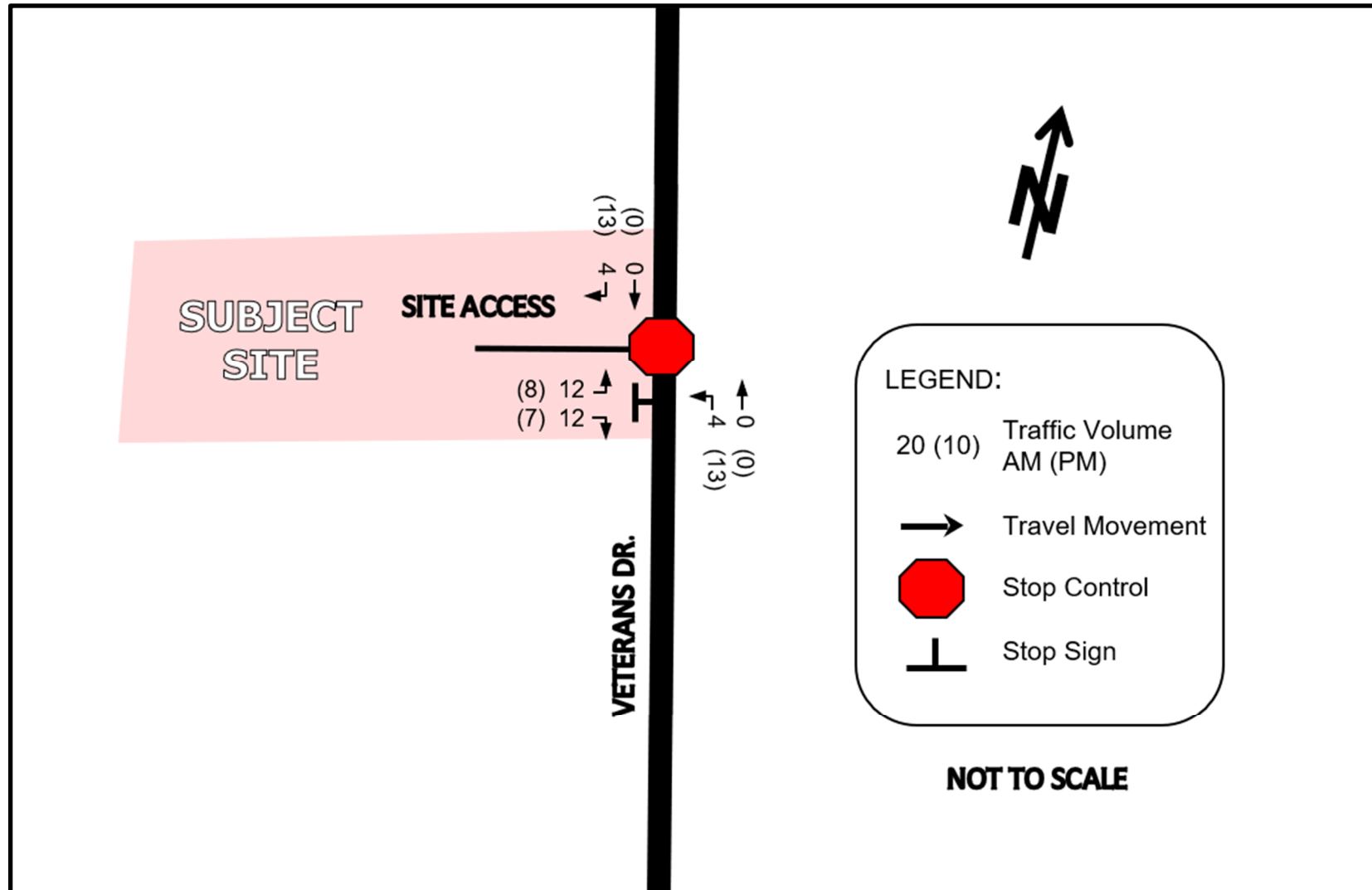


Figure 11 – Proposed Development Traffic Assignment (2030)

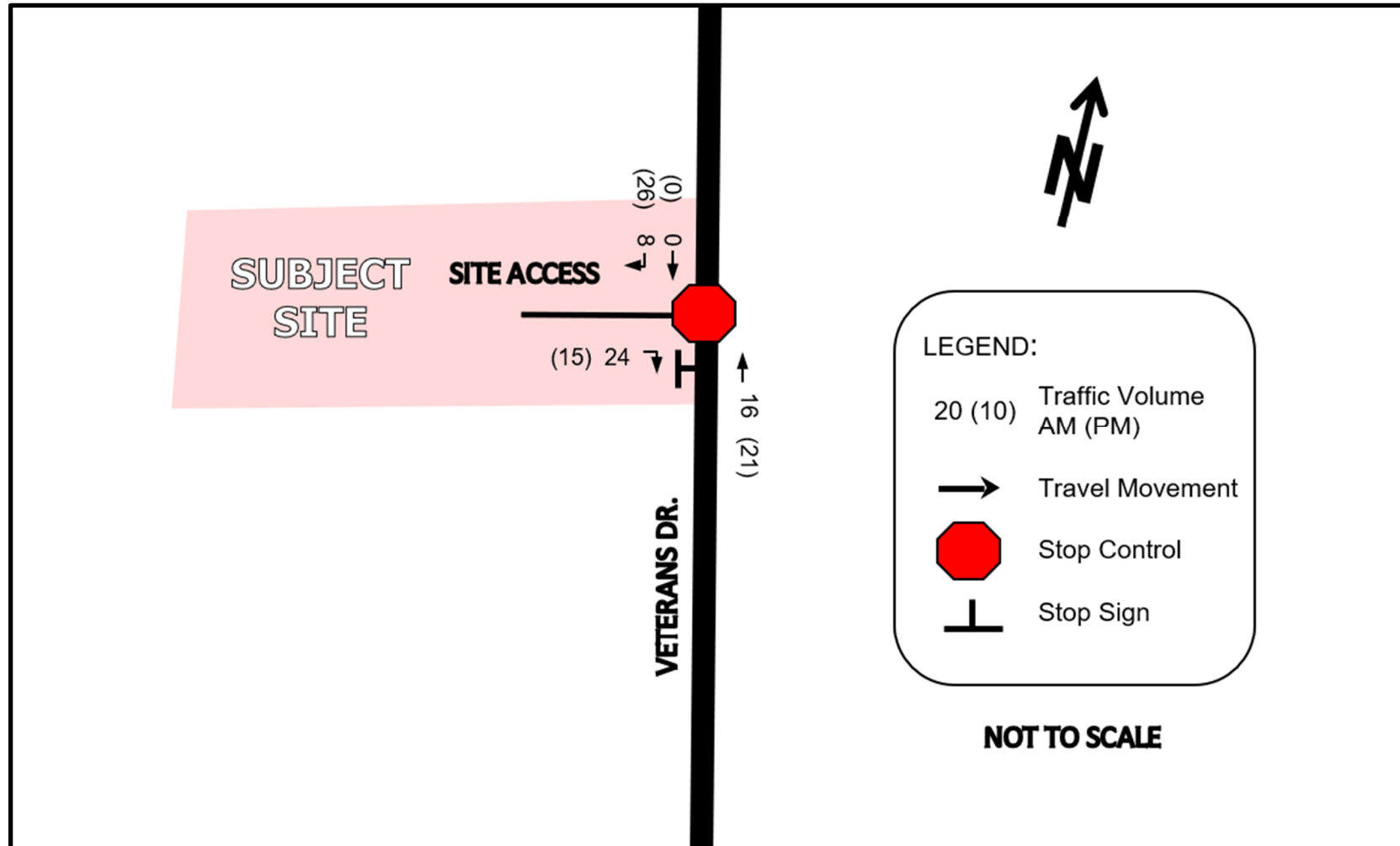


Figure 12 – Proposed Development Traffic Assignment (2035)

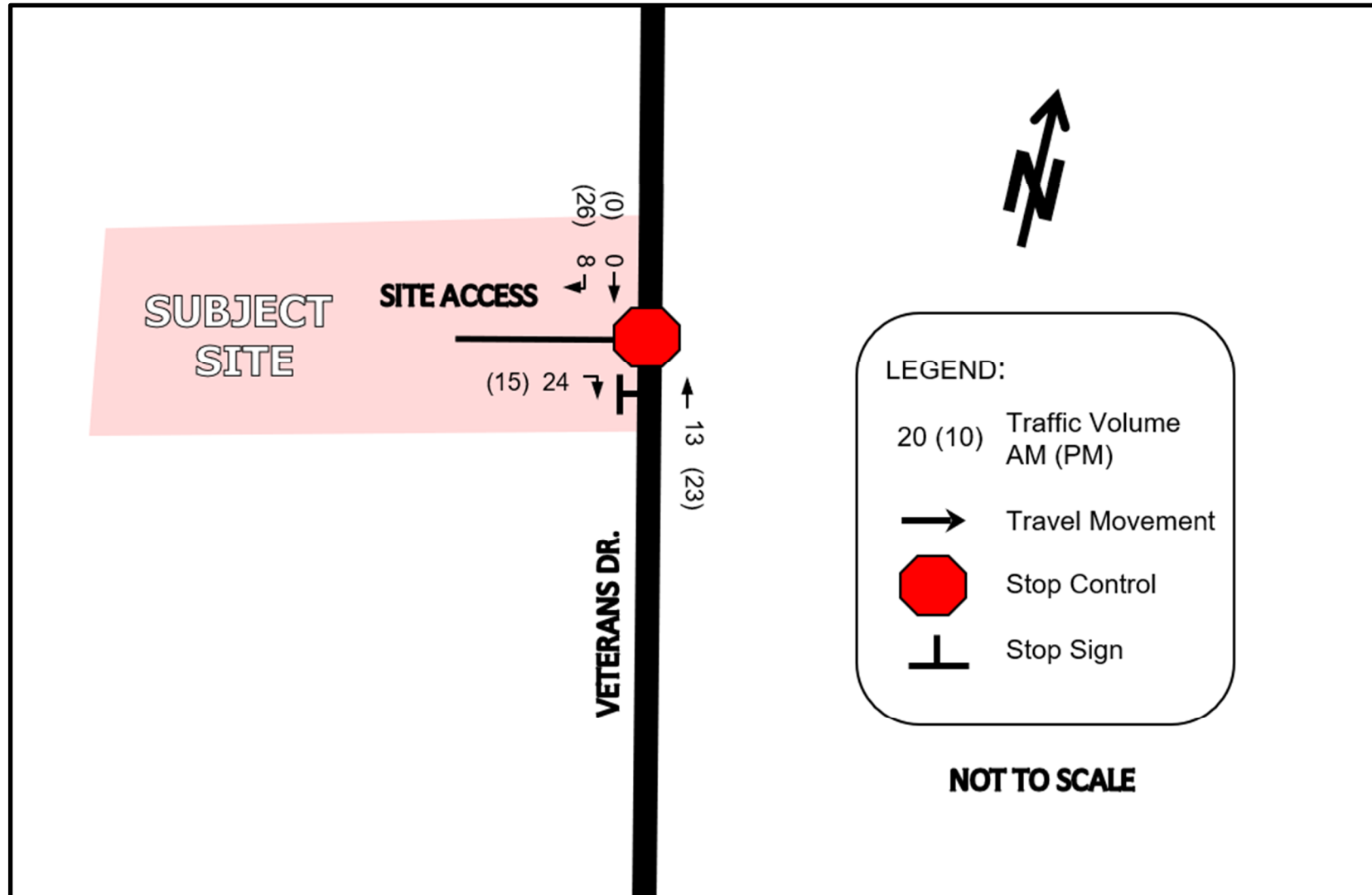


Figure 13 –Total (2025) Traffic Volumes

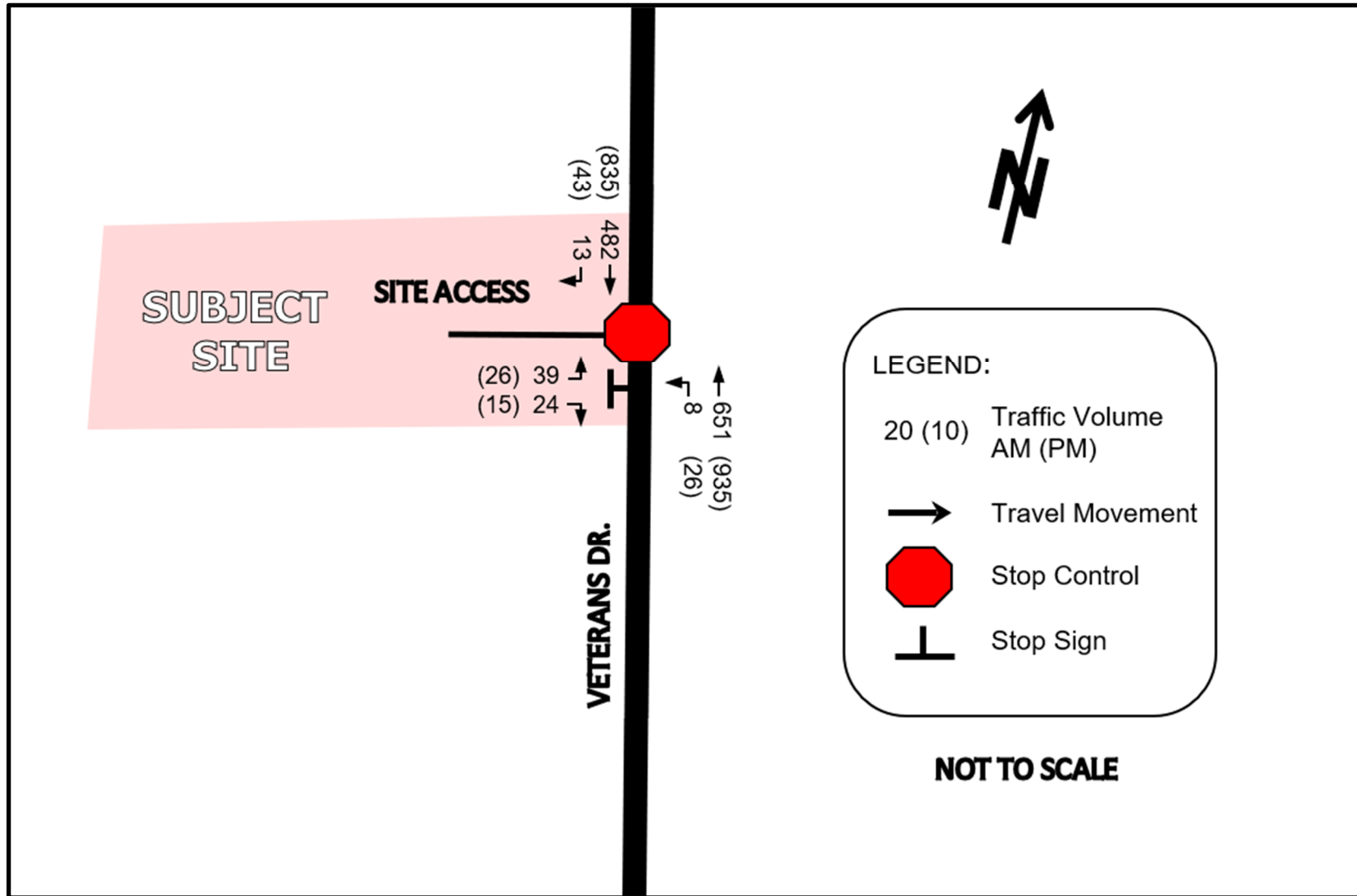


Figure 14 –Total (2030) Traffic Volumes

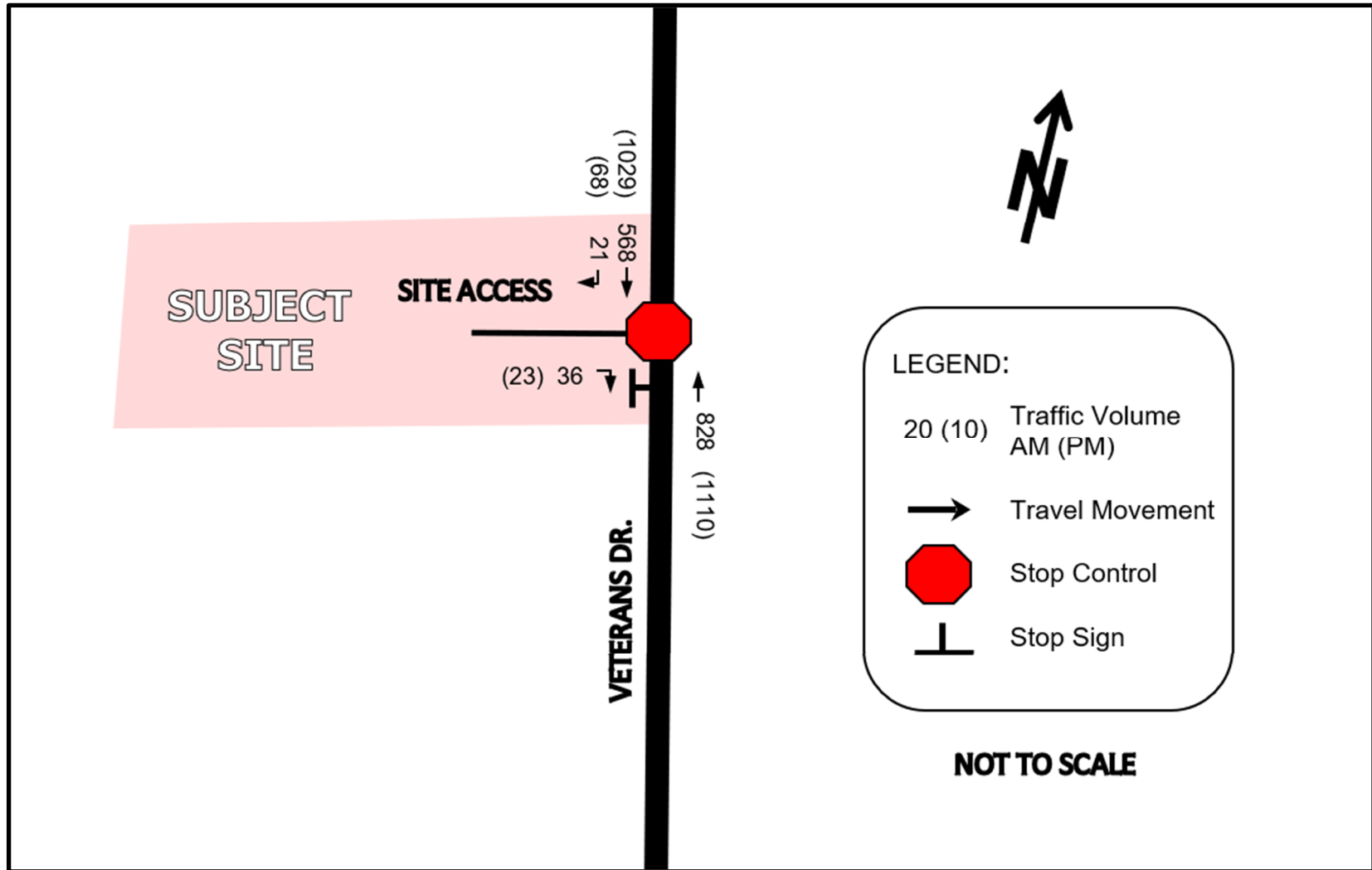
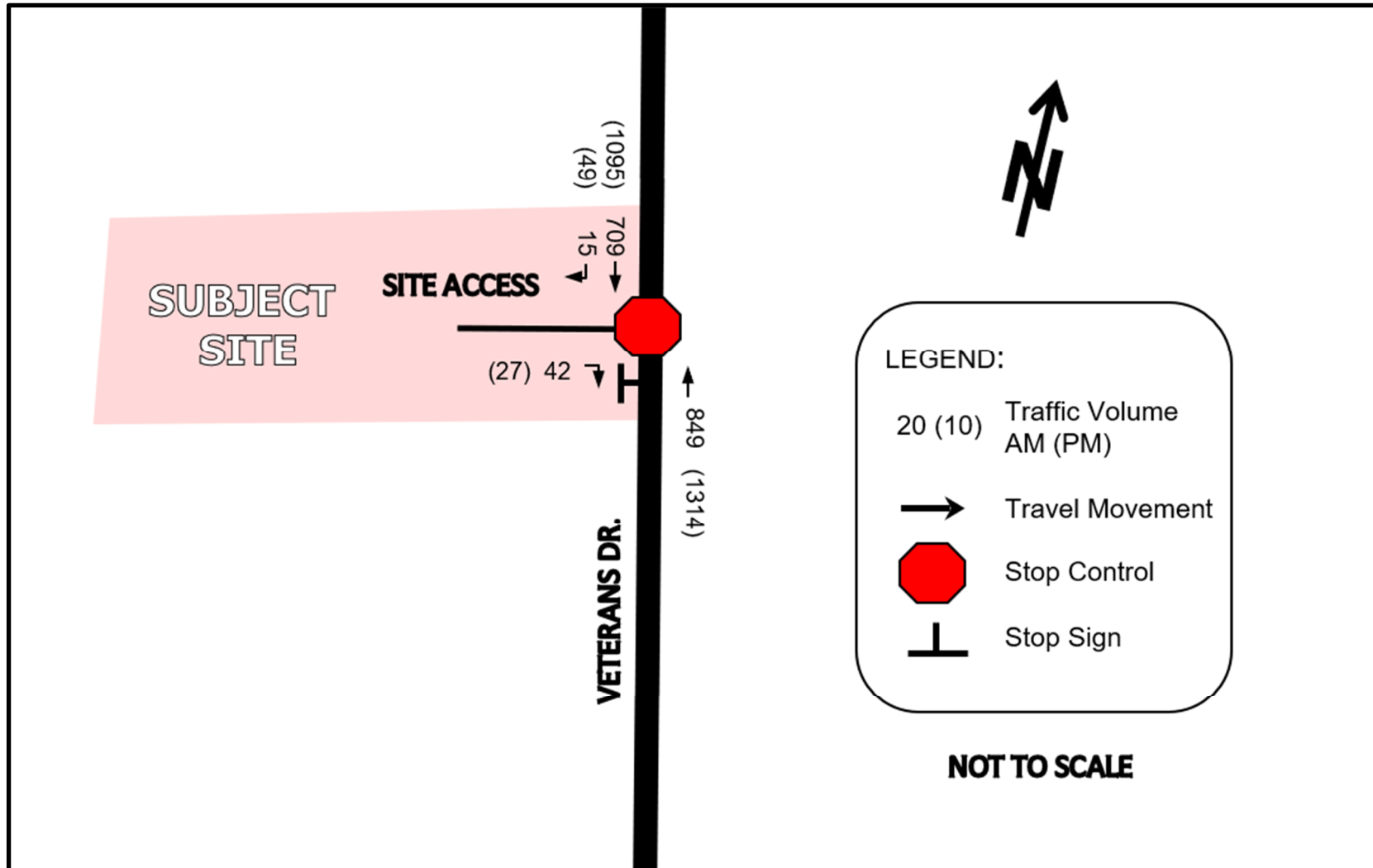
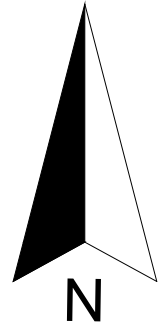


Figure 15 –Total (2035) Traffic Volumes



Appendix A – Site Plan

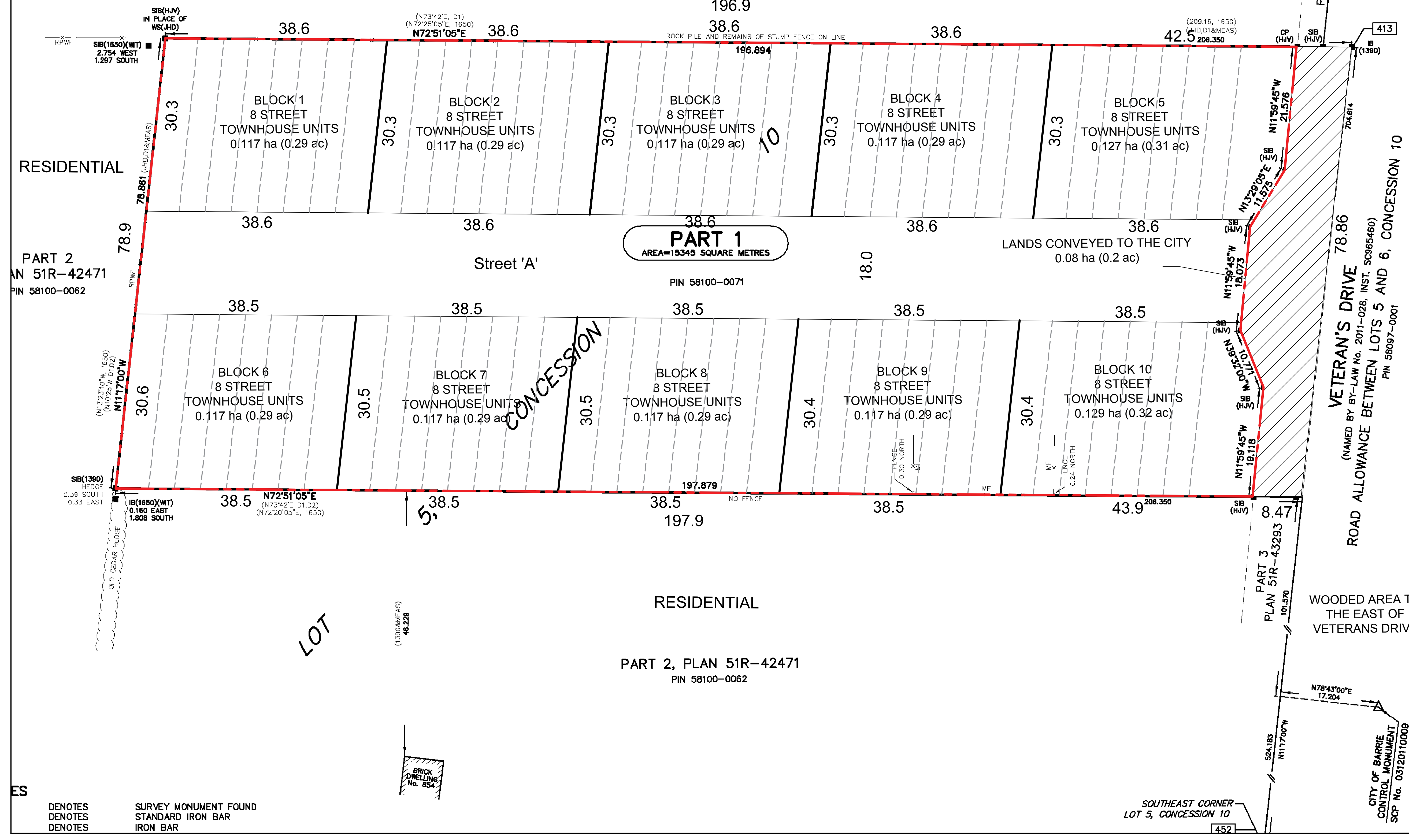


COUNTY OF SIMCOE LANDS

COUNTY OF SIMCOE LANDS

LOT 5, CONCESSION 10

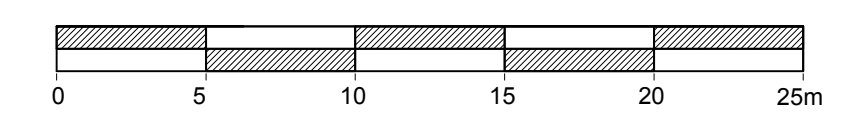
PIN 58100-0041
196.9



DRAFT PLAN OF SUBDIVISION

844 Veterans Drive
PART OF LOT 5, CONCESSION 10
(GEOGRAPHIC TOWNSHIP OF INNISFIL)
CITY OF BARRIE
COUNTY OF SIMCOE

Scale 1:500



LEGEND

- SUBJECT LANDS (WITHOUT ROAD WIDENING)(1.53ha/3.78ac)
- LOTS

OWNER'S CERTIFICATE
I HEREBY AUTHORIZE INNOVATIVE PLANNING SOLUTIONS TO PREPARE THIS DRAFT PLAN OF SUBDIVISION AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

DATE: _____ OWNER'S NAME:
2528286 Ontario Inc. &
2431805 Ontario Inc.

SURVEYOR'S CERTIFICATE
I CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____ SURVEYOR'S NAME:
Holding Jones Vanderveen Inc.

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

- | | |
|------------------|-----------------------------|
| a) SHOWN ON PLAN | g) SHOWN ON PLAN |
| b) SHOWN ON PLAN | h) MUNICIPAL WATER |
| c) SEE KEY PLAN | i) SAND, SILT GLACIAL TILL |
| d) RESIDENTIAL | j) SHOWN ON PLAN |
| e) SHOWN ON PLAN | k) MUNICIPAL WATER & SEWAGE |
| f) SHOWN ON PLAN | l) NONE |

LAND USE STATISTICS

LAND USE	BLOCK No.	UNITS	AREA (ha)
RESIDENTIAL	1-10	80	1.19
LANDS CONVEYED TO CITY			0.08
STREET 'A'			0.34

IPS INNOVATIVE PLANNING SOLUTIONS
PLANNERS • PROJECT MANAGERS • LAND DEVELOPERS
647 WELHAM ROAD, UNIT 9, BARRIE, ON, L4N 0B7
tel: 705 • 812 • 3281 fax: 705 • 812 • 3438 e: info@ipsconsultinginc.com www.ipsconsultinginc.com

Date: July 26, 2022	Drawn By: JV
File: 16-664	Checked: DV

ES
DENOTES
DENOTES
DENOTES

SURVEY MONUMENT FOUND
STANDARD IRON BAR
IRON BAR

SOUTHEAST CORNER
LOT 5, CONCESSION 10

CITY OF BARRIE
CONTROL MONUMENT
SCP No. 03120110009

Appendix B – Adjacent Development Excerpts

Figure 8 –Total (2026) Traffic Volumes within Study Area

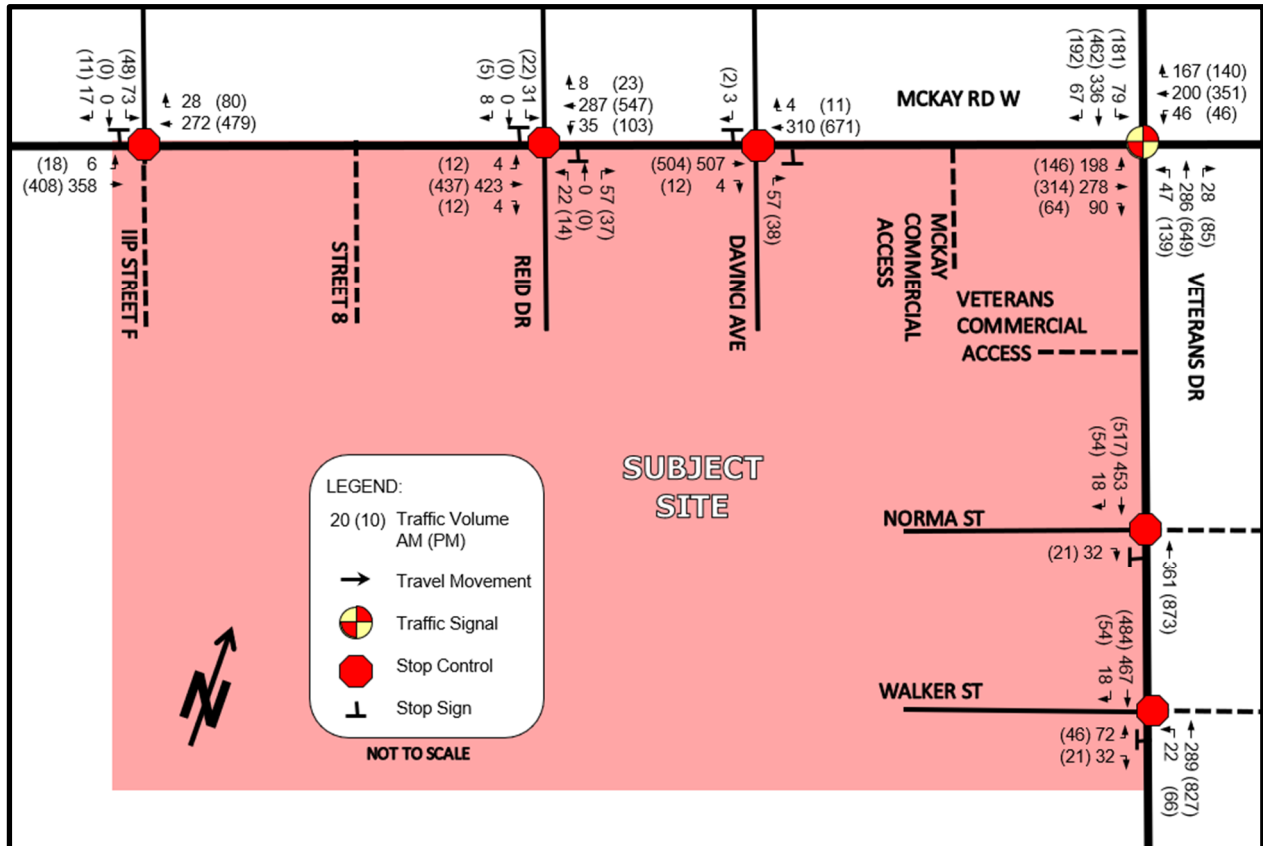
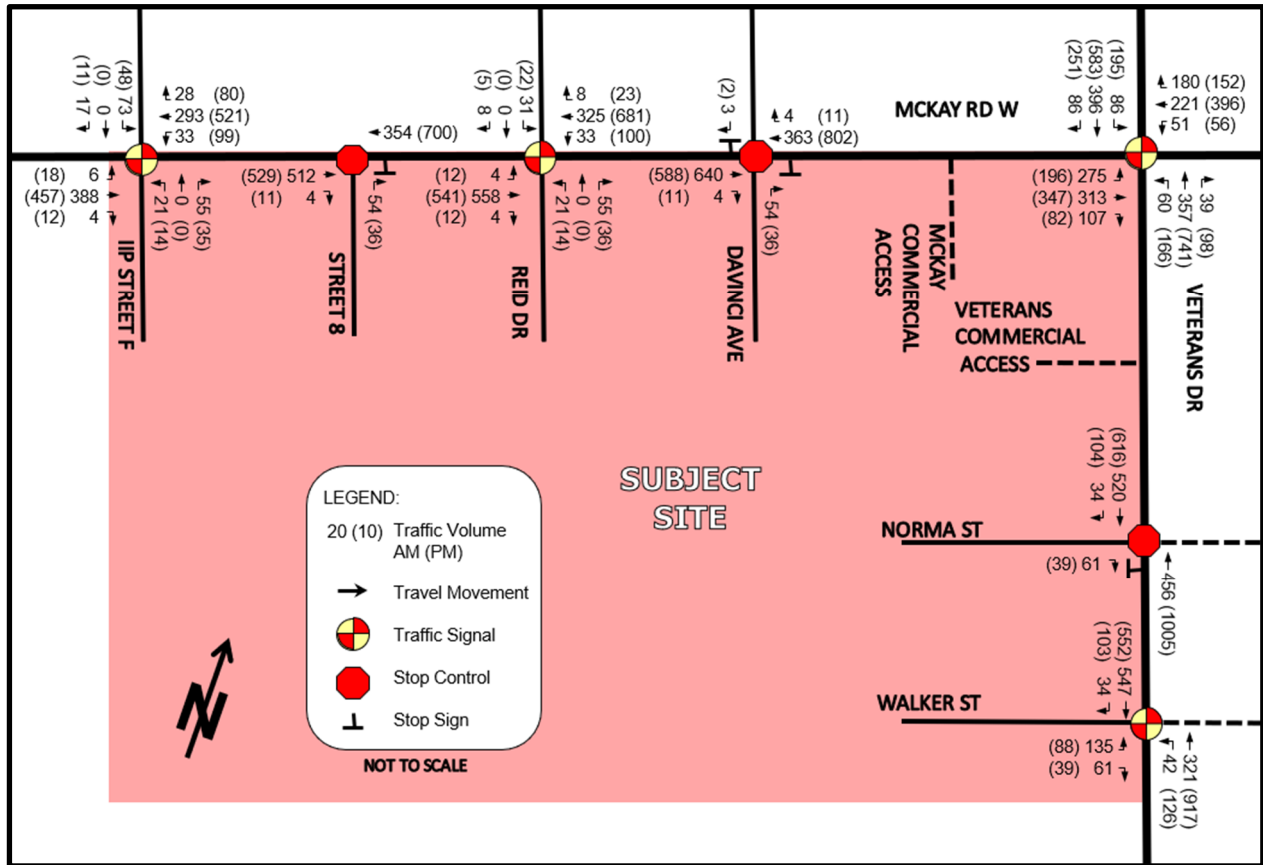
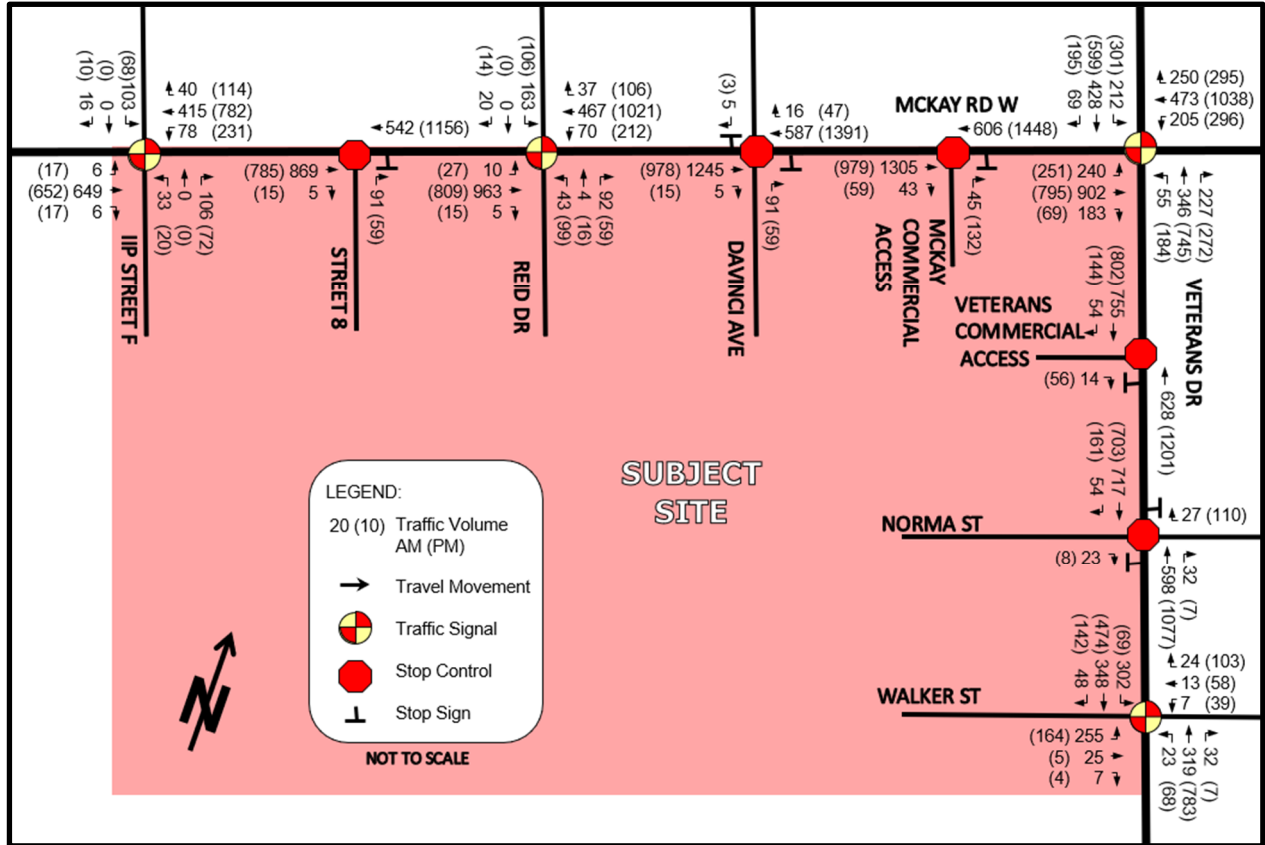


Figure 10 –Total (2030) Traffic Volumes within Study Area



Figures 12 and 13 illustrate the total (2036 and 2041) horizon year AM and PM peak hour traffic volumes in the study area.

Figure 12 –Total (2036) Traffic Volumes within Study Area



Appendix C – Synchro Analysis Output – Total Traffic Volumes

844 Veterans Drive
2: Veterans Drive & Street A

HCM Unsignalized Intersection Capacity Analysis
Total (2025) AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	24	8	651	482	13
Future Volume (Veh/h)	39	24	8	651	482	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	42	26	9	708	524	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1257	531	538			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1257	531	538			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	95	99			
cM capacity (veh/h)	187	548	1030			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	68	717	538			
Volume Left	42	9	0			
Volume Right	26	0	14			
cSH	250	1030	1700			
Volume to Capacity	0.27	0.01	0.32			
Queue Length 95th (m)	8.6	0.2	0.0			
Control Delay (s)	24.7	0.2	0.0			
Lane LOS	C	A				
Approach Delay (s)	24.7	0.2	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			50.9%	ICU Level of Service	A	
Analysis Period (min)			15			

844 Veterans Drive
2: Veterans Drive & Street A

HCM Unsignalized Intersection Capacity Analysis

Total (2025) PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	15	26	935	835	43
Future Volume (Veh/h)	26	15	26	935	835	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	16	28	1016	908	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2004	932	955			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2004	932	955			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	56	95	96			
cM capacity (veh/h)	63	323	720			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	44	1044	955			
Volume Left	28	28	0			
Volume Right	16	0	47			
cSH	89	720	1700			
Volume to Capacity	0.49	0.04	0.56			
Queue Length 95th (m)	17.0	1.0	0.0			
Control Delay (s)	79.8	1.2	0.0			
Lane LOS	F	A				
Approach Delay (s)	79.8	1.2	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			80.1%	ICU Level of Service	D	
Analysis Period (min)			15			

844 Veterans Drive
2: Veterans Drive & Street A

HCM Unsignalized Intersection Capacity Analysis
Total (2030) AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	36	0	828	568	21
Future Volume (Veh/h)	0	36	0	828	568	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	39	0	900	617	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1528	628	640			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1528	628	640			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	92	100			
cM capacity (veh/h)	129	483	944			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	39	900	640			
Volume Left	0	0	0			
Volume Right	39	0	23			
cSH	483	1700	1700			
Volume to Capacity	0.08	0.53	0.38			
Queue Length 95th (m)	2.1	0.0	0.0			
Control Delay (s)	13.1	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	13.1	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			46.9%	ICU Level of Service	A	
Analysis Period (min)			15			

844 Veterans Drive
2: Veterans Drive & Street A

HCM Unsignalized Intersection Capacity Analysis
Total (2030) PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	23	0	1110	1029	68
Future Volume (Veh/h)	0	23	0	1110	1029	68
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	25	0	1207	1118	74
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2362	1155	1192			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2362	1155	1192			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	90	100			
cM capacity (veh/h)	39	240	586			
Direction, Lane #						
	EB 1	NB 1	SB 1			
Volume Total	25	1207	1192			
Volume Left	0	0	0			
Volume Right	25	0	74			
cSH	240	1700	1700			
Volume to Capacity	0.10	0.71	0.70			
Queue Length 95th (m)	2.8	0.0	0.0			
Control Delay (s)	21.8	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	21.8	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			68.3%		ICU Level of Service	C
Analysis Period (min)			15			

844 Veterans Drive
2: Veterans Drive & Street A

HCM Unsignalized Intersection Capacity Analysis

Total (2035) AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	42	0	849	709	15
Future Volume (Veh/h)	0	42	0	849	709	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	46	0	923	771	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1702	779	787			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1702	779	787			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	101	396	832			
Direction, Lane #						
	EB 1	NB 1	SB 1			
Volume Total	46	923	787			
Volume Left	0	0	0			
Volume Right	46	0	16			
cSH	396	1700	1700			
Volume to Capacity	0.12	0.54	0.46			
Queue Length 95th (m)	3.1	0.0	0.0			
Control Delay (s)	15.3	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	15.3	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			48.2%		ICU Level of Service	A
Analysis Period (min)			15			

844 Veterans Drive
2: Veterans Drive & Street A

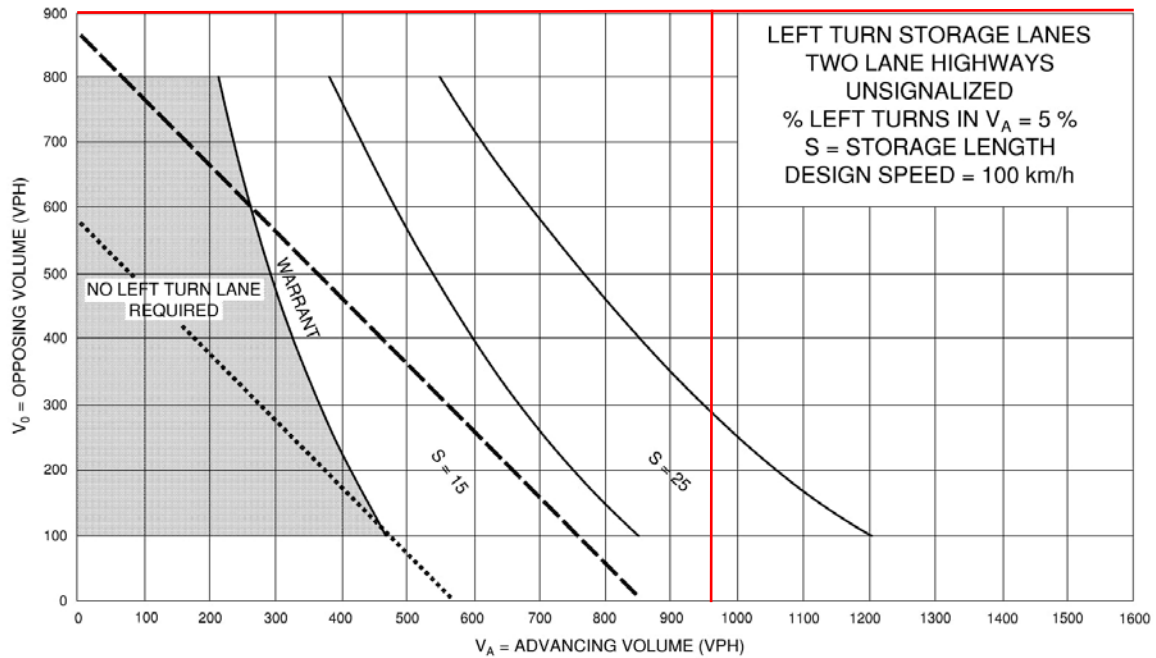
HCM Unsignalized Intersection Capacity Analysis
Total (2035) PM Peak Hour



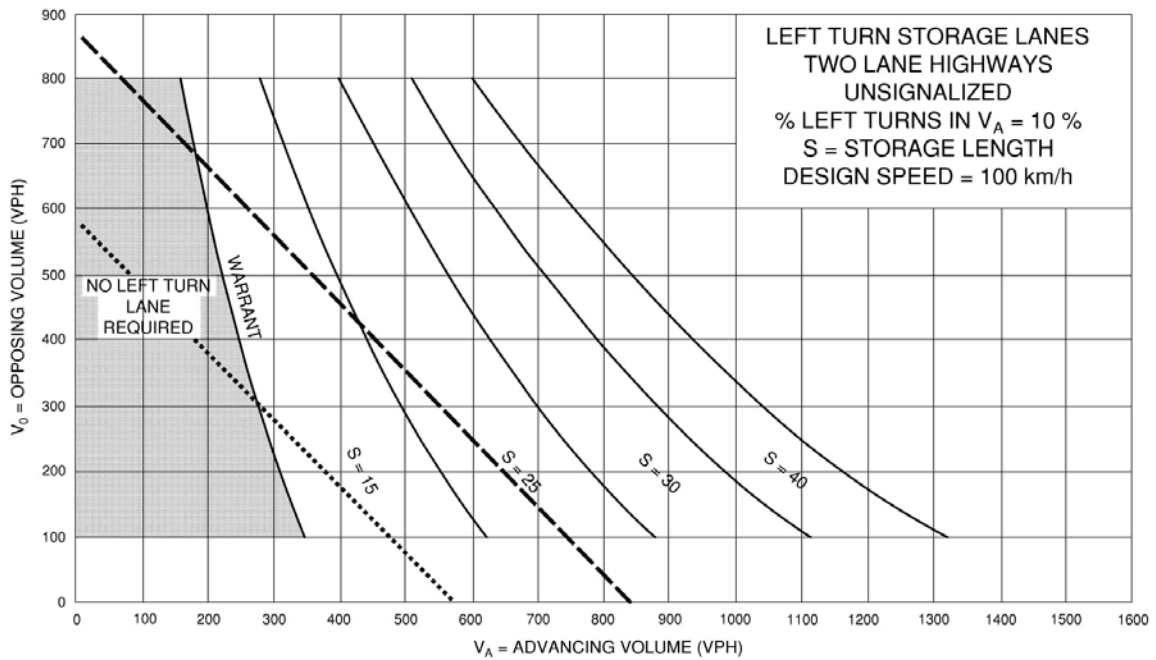
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	27	0	1314	1095	49
Future Volume (Veh/h)	0	27	0	1314	1095	49
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	29	0	1428	1190	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2644	1216	1243			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2644	1216	1243			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	26	221	560			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	29	1428	1243			
Volume Left	0	0	0			
Volume Right	29	0	53			
cSH	221	1700	1700			
Volume to Capacity	0.13	0.84	0.73			
Queue Length 95th (m)	3.6	0.0	0.0			
Control Delay (s)	23.8	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	23.8	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			72.5%	ICU Level of Service	C	
Analysis Period (min)			15			

Appendix D – MTO Left Turn Warrant Analysis

Exhibit 9A-22



- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW
- TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



Appendix E – OTM Signal Justification Sheets

Justification No. 7 - 2025 Total Traffic (Critical Case)

Street A / Veterans Drive

Justification	Description	Free Flow	Compliance		Entire %	Signal Warrant	Underground Provisions Warrant
			Sectional				
			Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	480	774	161%	10%	YES	YES
	B. Vehicle volume, along minor streets (average hour)	180	26	14%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	734	153%	22%	YES	YES
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	16	33%		NO	NO

Justification No. 7 - 2035 Total Traffic (Critical Case)

Street A / Veterans Drive

Justification	Description	Compliance				Signal Warrant	Underground Provisions Warrant
		Free Flow	Sectional		Entire %		
			Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	480	1025	214%	6%	YES	YES
	B. Vehicle volume, along minor streets (average hour)	180	17	10%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	992	207%	0%	YES	YES
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	0	0%		NO	NO