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CONSULTING ENGINEERS

NextEng Consulting Group Inc.

October 21, 2019

Attention: Oksana Vialykh, BBA, AACI

Di Poce Management Inc. c/o
Oksana Vialykh, BBA, AACI
4300 Steeles Avenue West, Unit 32
Vaughan, Ontario L4L 4C2

Re: Traffic Signal Warrant Analysis for County Road 27 and Street 'A'
Proposed Draft Plan of Subdivision
Di Poce Subdivision, City of Toronto
Our Project No. NT-17-231

Nextrans Consulting Engineers (A Division of NextEng Consulting Group Inc.) is pleased to present the enclosed Traffic Signal Warrant Analysis for County Road 27 and Street 'A' to address the City of Barrie comments and in support of the Di Poce proposed Draft Plan of Subdivision. The subject property is located north-east of County Road 27 and Salem Road within the Salem Secondary Plan Area, in the City of Barrie. **Figure 1** illustrates the site location.

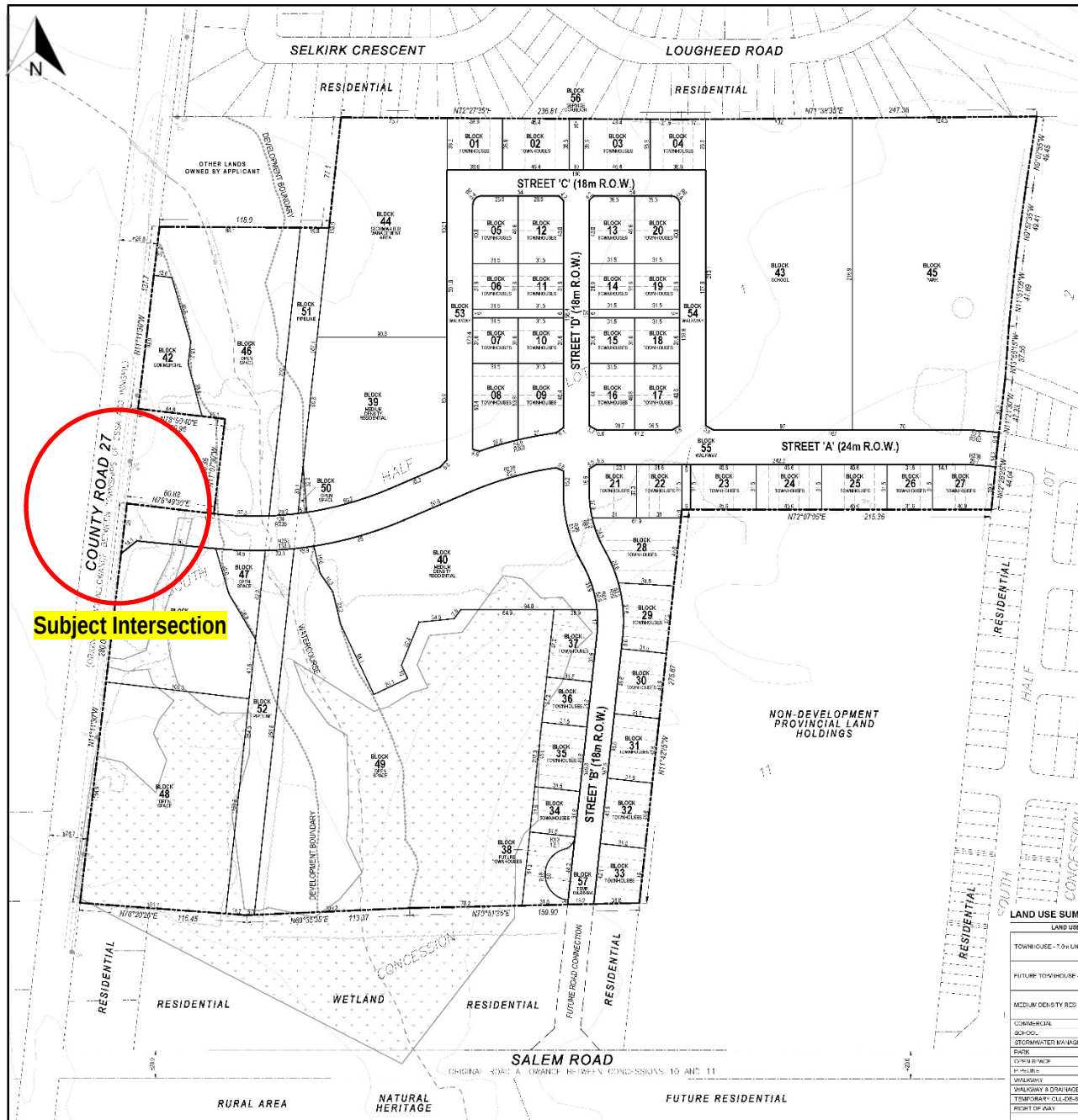
It should be noted that Nextrans has prepared the original Transportation Impact Study dated December 13, 2018 in support of the proposed Di Poce Draft Plan of Subdivision. The proposed development consists of approximately 199 townhouse residential units, up to 242 mid-rise residential units, 0.28 hectares of neighbourhood commercial and an elementary school. The proposed development will be constructed in two phases, with the townhouse units will be constructed in the first phase and the remaining land uses will be constructed in the later phase. **Figure 2** illustrates the proposed draft plan of subdivision.

Figure 1 – Site Location



Source: Google Map

Figure 2 – Di Poce Proposed Draft Plan of Subdivision



1.0 INTERSECTION OPERATION ASSESSMENT

Based on the intersection capacity analysis provided in the December 13, 2018 Transportation Impact Study for the County Road 27/Street 'A' intersection, this intersection is expected to operate at acceptable levels of service under the unsignalized intersection control (stop-controlled on Street 'A' and free flow on County Road 27), for both the 2021 and 2031 horizons.

Table 1 summarizes the intersection capacity operation analysis based on the forecast traffic volumes illustrated in **Figures 3 and 4** for the 2021 and 2031 horizons, respectively.

Table 1 – 2021 and 2031 Future Total Levels of Service

Intersection	Key Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		LOS (v/c)	Delay (s)	95 th Queue	LOS (v/c)	Delay (s)	95 th Queue
2021 Horizon							
County Road 27 /Street 'A'/ Mabern Street (unsignalized)	WB – L	B (0.03)	12		B (0.03)	14	
	WB – R	A (0.03)	9	1	B (0.03)	11	1
	NB – T	A (0.11)	0	1	A (0.26)	0	1
	NB – R	A (0.00)	0	0	A (0.01)	0	0
	SB – L	A (0.00)	8	0	A (0.02)	8	0
	SB – T	A (0.15)	0	0	A (0.12)	0	0
2031 Horizon							
County Road 27 / Street 'A' / Mabern Street (unsignalized)	WB – L	B (0.11)	14		C (0.09)	19	
	WB – R	A (0.10)	10	3	B (0.11)	12	2
	NB – T	A (0.14)	0	3	A (0.31)	0	3
	NB – R	A (0.02)	0	0	A (0.04)	0	0
	SB – L	A (0.03)	8	1	A (0.06)	9	2
	SB – T	A (0.18)	0	0	A (0.14)	0	0

2.0 TRAFFIC SIGNAL WARRANT ANALYSIS

To address the City of Barrie's request on the potential signalization of the County Road 27/Street 'A'/Mabern Street intersection, Nextrans has conducted a traffic signal warrant analysis for this intersection based on the future forecast volumes for 2021 and 2031 horizons and Justification 7 of the Ontario Traffic Manual Book 12. The traffic signal warrant analysis as outlined in **Appendix A** indicates that the minimum vehicular volume and delay to cross traffic for major street, as well as the minor street approaches and traffic crossing major street are not warranted because of the low turning traffic volumes and this is a T-intersection.

As such, the analysis indicates the traffic signals are not numerically warranted based on forecast traffic volumes for the County Road 27/Street 'A'/Mabern Street intersection. Although an unwarranted traffic signals can be installed, however, it could cause unnecessary delay on the major street and other operational issues such as driver frustration and U-turns.

3.0 CONCLUSION

Based on the assessment provided in this report, it is indicated that traffic signals are not numerically warranted at the County Road 27/Street 'A'/Mabern Street intersection based on OTM Book 12 – Justification 7 and forecast traffic volumes for 2021 and 2031 horizons. The intersection capacity analysis also indicates that this intersection is expected to operate at acceptable levels of service based on delay and v/c ratio for both the 2021 and 2031 horizons. Although an unwarranted traffic signals can be installed, however, it could cause unnecessary delay on the major street and other operational issues.

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

Yours truly,

Nextrans Consulting Engineers

A Division of NextEng Consulting Group Inc.



Richard Pernicky, CET, MITE
Principal





Appendix A

Traffic Signal Warrant Analysis

OTM Book 12 – Justification 7

2021 and 2031 Horizon Years

Signal Warrant Calculation (OTM Book 12 - Justification 7)

Major Street: County Road 27

Minor Street: Street 'A'/Mabern Street

Comment: Future Total (2021) Traffic Condition

Number of Approaches: 1 ☐ 2 ☒

Tee Intersection Configuration: Yes ☒ No ☐

Flow Condition: Free Fv (Rural) ☐ Restricted Flow (Urban) ☒

VOLUME	AM	PM	FACTOR *	
1A - All	462	659	n/a	280
1B - Minor	44	29	25%	18
2A - Major	418	630	25%	262
2B - Cross	18	20	25%	10

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

OVERALL WARRANT	150% Satisfied:	Yes ☐	No ☒	Warrant for new intersection with forecast traffic
	120% Satisfied:	Yes ☐	No ☒	Warrant for existing intersection with forecast traffic
	100% Satisfied:	Yes ☐	No ☒	Warrant for existing intersection with existing traffic *
	COMBO 80% Satisfied:	Yes ☐	No ☒	Warrant for existing intersection with existing traffic
	80% Satisfied:	Yes ☐	No ☒	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
				X	
ALL APPROACHES	480	720	600	900	280
	% FULFILLED				31%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
				X	
MINOR STREET APPROACHES	180	255	180	255	18
	% FULFILLED				7%

150% Satisfied: Yes ☐ No ☒

120% Satisfied: Yes ☐ No ☒

100% Satisfied: Yes ☐ No ☒

80% Satisfied: Yes ☐ No ☒

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
				X	
MAJOR STREET APPROACHES	480	720	600	900	262
	% FULFILLED				29%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
				X	
TRAFFIC CROSSING MAJOR STREET	50	75	50	75	10
	% FULFILLED				13%

150% Satisfied: Yes ☐ No ☒

120% Satisfied: Yes ☐ No ☒

100% Satisfied: Yes ☐ No ☒

80% Satisfied: Yes ☐ No ☒

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

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

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

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

Signal Warrant Calculation (OTM Book 12 - Justification 7)

Major Street: County Road 27

Minor Street: Street 'A'/Mabern Street

Comment: Future Total (2031) Traffic Condition

Number of Approaches: 1 ☐ 2 ☒

Tee Intersection Configuration: Yes ☒ No ☐

Flow Condition: Free Fv (Rural) ☐ Restricted Flow (Urban) ☒

VOLUME	AM	PM	FACTOR *	
1A - All	680	899	n/a	395
1B - Minor	117	79	25%	49
2A - Major	563	820	25%	346
2B - Cross	62	55	25%	29

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

OVERALL WARRANT	150% Satisfied:	Yes ☐	No ☒	Warrant for new intersection with forecast traffic
	120% Satisfied:	Yes ☐	No ☒	Warrant for existing intersection with forecast traffic
	100% Satisfied:	Yes ☐	No ☒	Warrant for existing intersection with existing traffic *
	COMBO 80% Satisfied:	Yes ☐	No ☒	Warrant for existing intersection with existing traffic
	80% Satisfied:	Yes ☐	No ☒	

* Consider full underground provisions if 100% for forecast traffic

WARRANT 1 - MINIMUM VEHICULAR VOLUME

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
				☒	
ALL APPROACHES	480	720	600	900	395
	% FULFILLED				44%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
				☒	
MINOR STREET APPROACHES	180	255	180	255	49
	% FULFILLED				19%

150% Satisfied: Yes ☐ No ☒

120% Satisfied: Yes ☐ No ☒

100% Satisfied: Yes ☐ No ☒

80% Satisfied: Yes ☐ No ☒

WARRANT 2 - DELAY TO CROSS TRAFFIC

APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
				☒	
MAJOR STREET APPROACHES	480	720	600	900	346
	% FULFILLED				38%
APPROACH LANES	1		2 OR MORE		AVERAGE HOUR PERIOD
FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	
				☒	
TRAFFIC CROSSING MAJOR STREET	50	75	50	75	29
	% FULFILLED				39%

150% Satisfied: Yes ☐ No ☒

120% Satisfied: Yes ☐ No ☒

100% Satisfied: Yes ☐ No ☒

80% Satisfied: Yes ☐ No ☒

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

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

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

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