TO:	**GENERAL COMMITTEE**
SUBJECT:	**TRANSPORTATION CONSIDERATIONS**
WARDS:	**7 & 8**
PREPARED BY AND KEY CONTACT:	**J. SHARP, C.E.T. SENIOR TRAFFIC TECHNOLOGIST (EXT. 4304)**
SUBMITTED BY:	**D. FRIARY, DIRECTOR OF ROADS, PARKS AND FLEET**
GENERAL MANAGER APPROVAL:	**R. J. FORWARD, MBA, M.Sc., P. Eng. GENERAL MANAGER OF INFRASTRUCTURE & GROWTH MANAGEMENT**
CHIEF ADMINISTRATIVE OFFICER APPROVAL:	**C. LADD CHIEF ADMINISTRATIVE OFFICER**

RECOMMENDED MOTION

1. That traffic control signals at the intersection of Veteran's Drive and Commerce Park Drive be approved for design in 2014 with construction subject to future Business Plans.

2. That pedestrian traffic control signals on Bayview Drive at Springhome Road; and, Marsellus Drive at Timothy Lane be approved and considered for future Business Plans.

PURPOSE & BACKGROUND

3. The purpose of this staff report is to advise of the conclusion of data received as part of our annual Count Program. The review included pedestrian traffic control signals on Bayview Drive at Springhome Road; Marsellus Drive at Timothy Lane; and, traffic control signals at Veteran's Drive and Commerce Park Drive.

4. Bayview Drive is classified as a collector roadway which has a current traffic volume of 5,400 vehicles per day and a pavement width of 10.0 metres. Sidewalks are located on both sides of the roadway south of Springhome Road, and on the west side only north of Springhome Road. An unmanned designated school crosswalk is located on the south side of Bayview Drive and Springhome Road. Please refer to Appendix "A" for a map of the area.

5. Marsellus Drive is classified as a collector roadway which has a current traffic volume of 3,900 vehicles per day and a pavement width of 11.0 metres. Sidewalks are located on both sides of the roadway. Please refer to Appendix "B" for a map of the area.

6. Veteran's Drive is classified as an arterial roadway which has a current traffic volume of 10,400 vehicles per day and a pavement width of 21.0 metres. Sidewalks are located on the east side of the roadway. Please refer to Appendix "C" for a map of the area.

7. Commerce Park Drive is classified as a collector roadway which has a current traffic volume of 7,500 vehicles per day and a pavement width of 19.0 metres. Sidewalks are located on both sides of the roadway.

8. In the review of warrants for traffic control signals and/or pedestrian signals staff perform turning movement counts to determine if provincial warrants have been met but also review sight lines and roadway geometrics.

ANALYSIS

Bayview Drive at Springhome Road

9. Staff investigated the installation of pedestrian traffic control signals on Bayview Drive at Springhome Road. Pedestrian signal warrants are based on Ontario Traffic Manual (OTM) Book 12 – Traffic Signals. The OTM sets criteria for pedestrian signal warrants which are composed of two (2) areas of justification that must be satisfied to be warranted:

   a) Pedestrian Volume Justification – Addresses the minimum pedestrian volume based on traffic volumes on the crossing roadway, and conditions under which pedestrian signalization can be installed. Pedestrian studies are conducted in the highest eight hours of pedestrian traffic.

   b) Pedestrian Delay Justification – Addresses pedestrian delay prior to crossing the roadway during the highest eight hours of pedestrian traffic.

   Note: Both the pedestrian volume justification and pedestrian delay justification warrants must be satisfied to fulfil the warrant justification for the installation of a pedestrian signal. In addition to the OTM warrants, staff evaluate sight lines and roadway geometrics.

10. A pedestrian study was completed on November 14, 2013 for the purpose of the investigation of a pedestrian traffic control signal. The study identified pedestrian volumes of 39 equivalent or 38 actual pedestrians crossing Bayview Drive between Tower Place and Springhome Road with 16 pedestrians being delayed, and a vehicle volume of 3,000 vehicles in the eight-hour survey. These results are indicated (circled) in the specific categories in the below table. The warrant values for Bayview Drive can be found in Appendix "D".

11. Based on the technical warrant guidelines, a pedestrian traffic control signal on Bayview Drive between Springhome Road and Tower Crescent does not satisfy the minimum warrants. Typically a pedestrian crossing volume of 276 is required to satisfy the volume warrant for a pedestrian traffic control signal.

12. In addition to the OTM warrants, staff also reviewed the stopping sight distance from the existing school crosswalk, desired walking routes to St. John Vianney School, and the lane configurations with respect to traffic operations north of the subject intersection.

13. Staff measured the existing stopping sight distance to the north of the school crossing and measured 70 m. The Geometric Design guide for Canadian Roads recommends 75 m of stopping sight distance. Vehicle stopping sight distance to the south is unobstructed.

14. The intersection of Baldwin Lane and Bayview Drive is located approximately 100 m north of the study area and has an eastbound channelized right turn lane with an 80 m acceleration/merge lane onto southbound Bayview Drive. The termination of the acceleration/merge lane is approximately 20 m north of the existing school crosswalk. The weaving of merging vehicles in this area has the potential for drivers to be distracted as they accelerate southbound on Bayview Drive towards the school crossing.

15. The existing school cross walk at Bayview Drive and Springhome Road is located directly at the existing pedestrian walkway to Murray Street. Murray Street provides a direct walking route to St. John Vianney School. This crossing location would directly link school children from the neighbourhood on the east side of Bayview Drive to the west side. Providing a pedestrian traffic control signal will encourage school children to use active transportation on their way to and from school.

16. As a result of the limited stopping sight distance, existing road geometrics, and providing a direct walking route to St. John Vianney School, staff recommend that a pedestrian traffic control signal be considered for installation on the south leg of the intersection of Bayview Drive and Springhome Road.

Marsellus Drive at Timothy Lane

17. A pedestrian study was completed on October 22, 2013 for the purpose of the investigation of a pedestrian traffic control signal. The study identified pedestrian volumes of 228 equivalent and 154 actual pedestrians crossing Marsellus Drive between Sundew Drive and Timothy Lane with 10 pedestrians being delayed, and a vehicle volume of 3,900 vehicles in the eight-hour survey. The warrant values for Marsellus Drive are indicated (circled) in the specific categories in Appendix "E".

18. Based on the technical warrant guidelines, a pedestrian traffic control signal on Marsellus Drive at Timothy Lane does not satisfy the minimum warrants. Typically a pedestrian crossing volume of 276 is required to satisfy the volume warrant for a pedestrian traffic control signal.

19. In addition to the OTM warrants staff measured the existing stopping sight distance to the north from the intersection of Marsellus Drive at Timothy Lane and measured 70 m. The Geometric Design guide for Canadian Roads recommends 75 m of stopping sight distance. Vehicle stopping sight distance to the south is unobstructed.

20. As a result of the deficient stopping sight distance, and the actual pedestrian crossing volume of 228 pedestrians approaching the warrant volume of 276 pedestrians, staff recommend that an intersection pedestrian signal be considered for installation on the south leg of the intersection of Marsellus Drive and Timothy Lane as Timothy Lane provides a direct walking route to W.C. Little School.

Veteran's Drive and Commerce Park Drive

21. A turning movement count was conducted to assess the Traffic Signal Warrant at the Veteran's Drive and Commerce Park Drive intersection on September 17, 2013, to collect the vehicle volumes over typically the busiest eight hours of the day. The Traffic Signal Warrant is a Provincial Guideline for determining the justification of traffic control signal installations. Refer to Appendix "C" regarding the study area.

22. The Traffic Signal Warrant is composed of four (4) areas of justification:

a) *Minimum Vehicular Volume* – Addresses the minimum volume conditions in which signalization can be used to minimize total average vehicle delay from all approaches at the intersection.

b) *Delay to Cross Traffic* – Intended where the traffic volume on the main road causes excessive delay or creates a traffic hazard to traffic entering or crossing the main road from a cross street.

c) *Accident Experience* – Where an un-signalized intersection has a high collision record.

d) *Combination Warrant* – Signals are justified where one of Warrant No's 1, 2 or 3 is 100% satisfied, or where two or more are at least 80% of the warranted values.

23. Traffic control signals are not justified as Warrant Numbers 1, 2 or 3 are not 100% satisfied, or two or more are not at least 80% of the warrant values. However, further review of the hourly traffic volumes indicate that the typical study times did not capture the 8 busiest hours of the day due to the commercial nature of the area. The Warrant Values for Veteran's Drive and Commerce Park Drive can be bound in Appendix "F".

24. Staff recommend that traffic control signals be considered for installation at this intersection as the OTM warrant would be met if the study was conducted between 10 a.m. and 8 p.m. and not the typical hours of 7 a.m. and 6 p.m.

25. Barrie Police Service and Barrie Fire and Emergency Services support the installation of pedestrian control signals and traffic control signal at the proposed locations.

ENVIRONMENTAL MATTERS

26. There are no environmental matters related to the recommendation.

ALTERNATIVES

27. The following Alternatives are available for consideration by General Committee:

Alternative #1 General Committee could decide to not install the pedestrian traffic control signals on both Bayview Drive and Marsellus Drive.

This Alternative is not recommended as the installation of pedestrian traffic control signal in these locations will provide a safer environment for both motorists and pedestrians while encouraging active transportation.

Alternative #2 General Committee could decide to not install the traffic control signal at the intersection of Veteran's Drive and Commerce Park Drive.

This Alternative is not recommended as the vehicle volume is very close to warranting the signal and the installation will reduce the collision frequency at the intersection.

FINANCIAL

28. The estimated capital cost for a pedestrian traffic control signal is $65,000 per location and for a full traffic control signal is $165,000. Based on warrant values and the hierarchy of roadway classifications from arterial to local roadways, staff would prioritize the installations as follows:

i) Veterans Drive and Commerce Park Drive (arterial full signals)

ii) Bayview Drive and Springhome Road (arterial pedestrian signals)

iii) Marsellus Drive and Timothy Lane (collector pedestrian signals)

29. Capital funds in the amount of $30,000 have been identified in the 2013 Business Plan (Account #14-16-2361-1550) for the design of unanticipated pedestrian and/or traffic signals that may be identified within the year. There have been no other pedestrian or traffic control signals that have met warrants in 2013 other than the identified signals above.

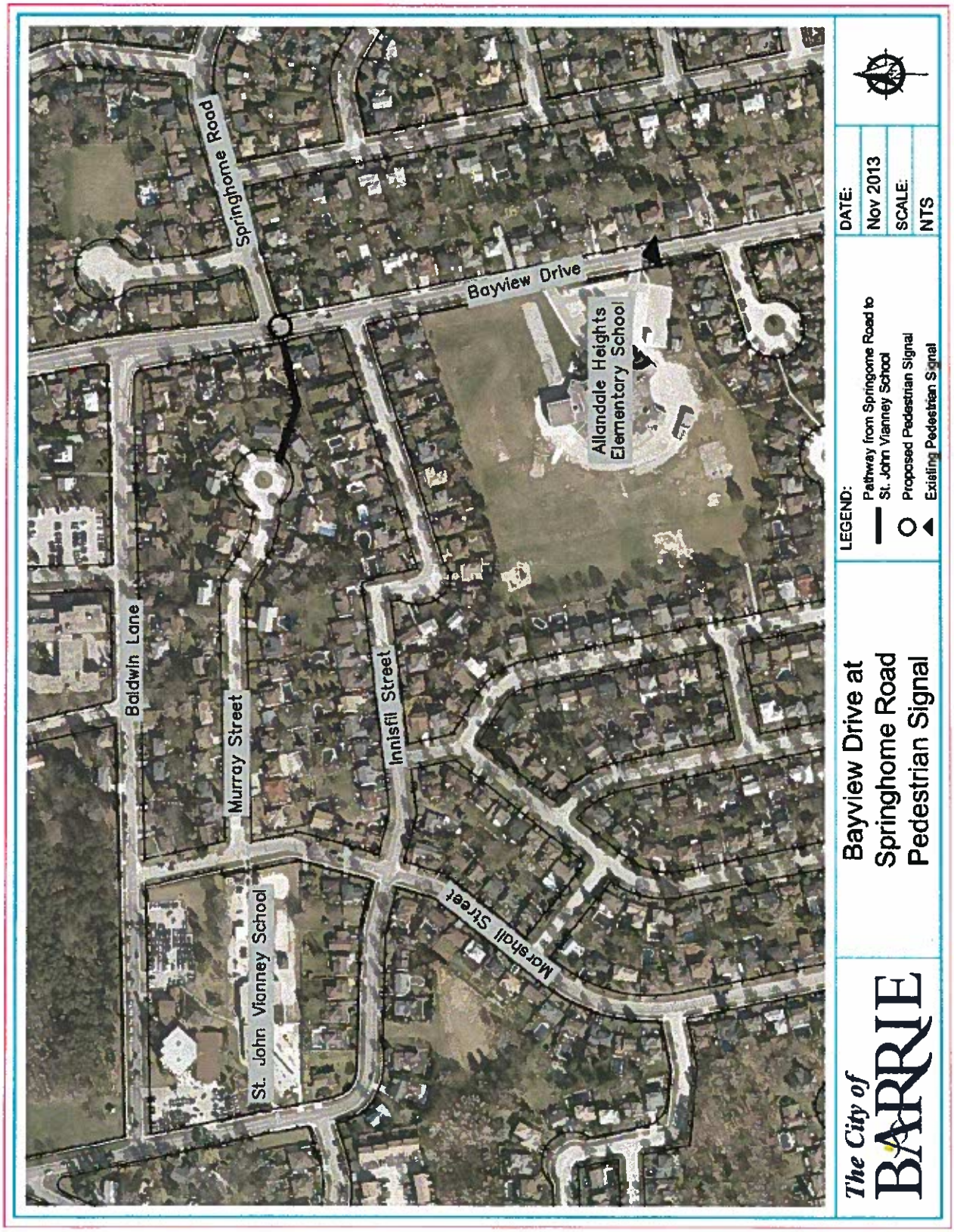
30. Upon Council approval, staff will start the design of Veterans Drive and Commerce Park Drive. Design of the other two identified pedestrian signals will commence when funds have been identified within future Business Plans.

31. The approximate annual operation and maintenance costs for pedestrian traffic control signals and traffic control signals are $750 and $2,000 respectively, and would be included in future operating budgets.

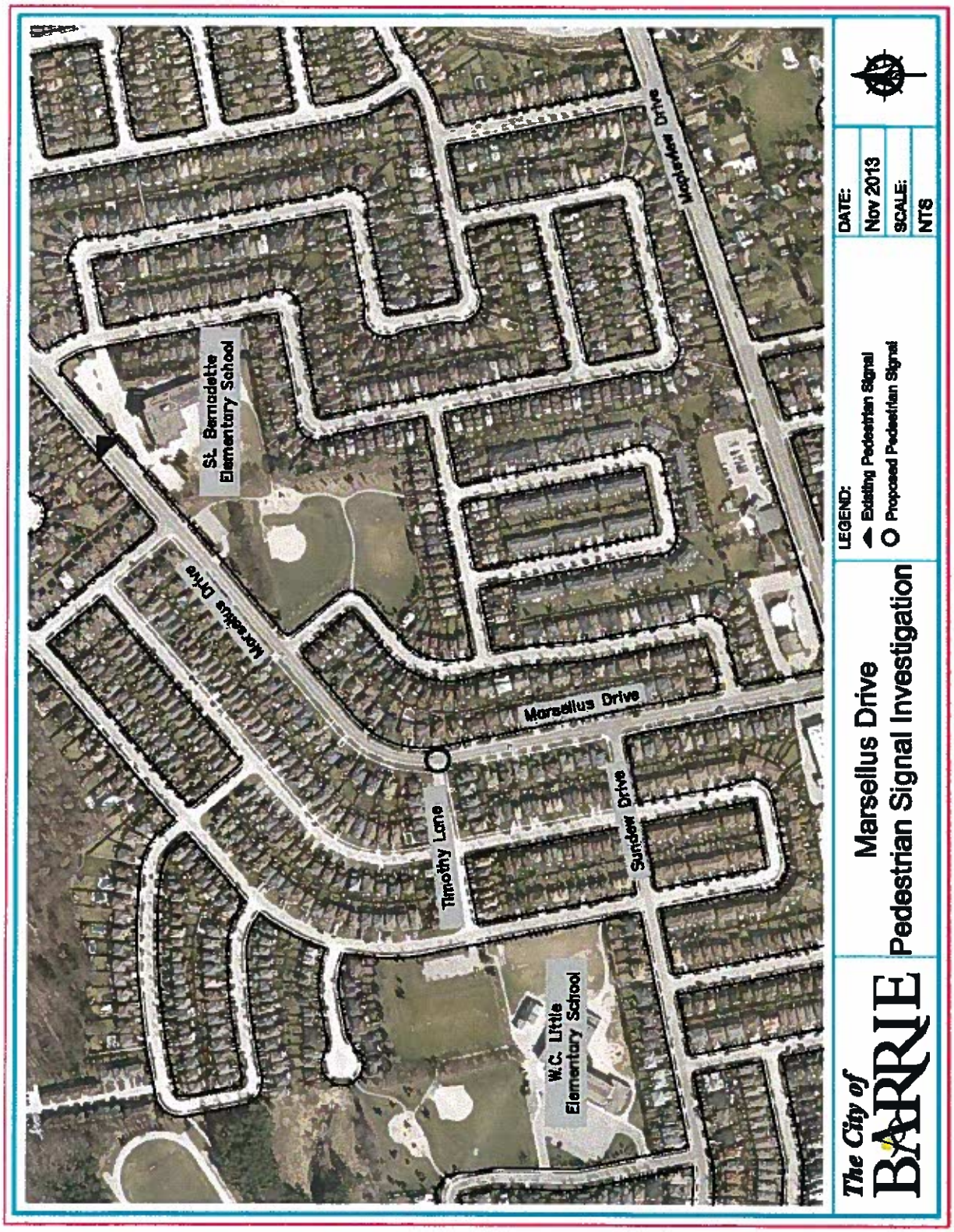
LINKAGE TO COUNCIL STRATEGIC PRIORITIES

32. The recommendations included in this Staff Report are not specifically related to the goals identified in the 2010-2014 City Council Strategic Plan.

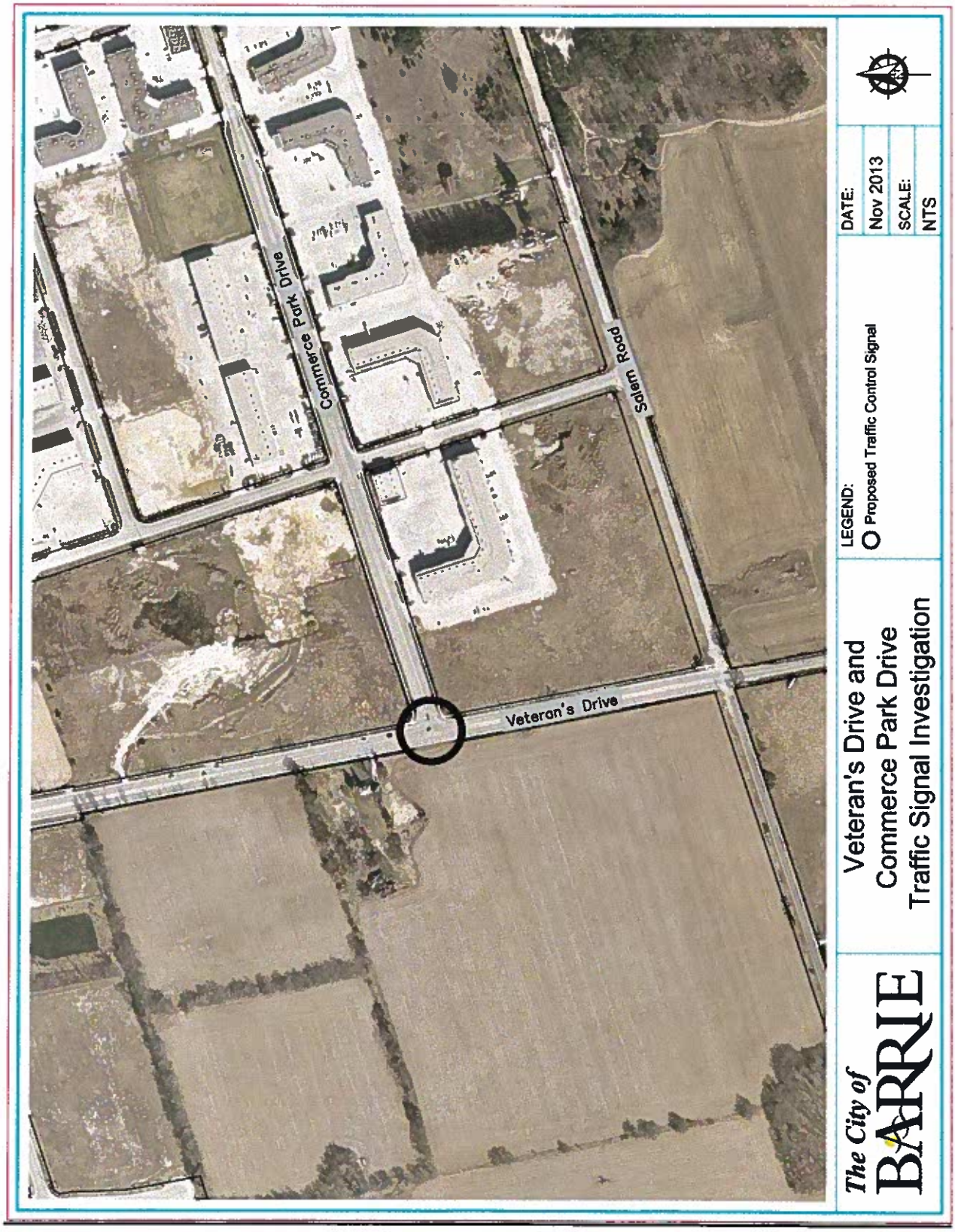
APPENDIX "A"


Springhome Road
Bayview Drive
Allandale Heights Elementary School
Baldwin Lane
Murray Street
Innisfil Street
Marshall Street
St. John Vianney School
The City of BARRIE
Bayview Drive at Springhome Road Pedestrian Signal
LEGEND:
Pathway from Springome Road to St. John Vianney School
Proposed Pedestrian Signal
Existing Pedestrian Signal
DATE: Nov 2013
SCALE: NTS

APPENDIX "B"


St. Bernadette Elementary School
Marsellus Drive
Maplevew Drive
Timothy Lane
Sundew Drive
W.C. Little Elementary School
The City of BARRIE
Marsellus Drive
Pedestrian Signal Investigation
LEGEND:
Existing Pedestrian Signal
Proposed Pedestrian Signal
DATE:
Nov 2013
SCALE:
NTS

APPENDIX "C"


Commerce Park Drive
Salem Road
Veteran's Drive
The City of BARRIE
Veteran's Drive and Commerce Park Drive Traffic Signal Investigation
LEGEND:
Proposed Traffic Control Signal
DATE: Nov 2013
SCALE: NTS

APPENDIX "D"

Pedestrian Volume Justification for Bayview Drive at Springhome Road

Eight-Hour Vehicular Volume	Net Eight-Hour Pedestrian Volume				
	<200	200 – 275	276 – 475	476 – 1000	>1000
< 1440	Not Justified	Not Justified	Not Justified	Not Justified	Not Justified
1440 – 2600	Not Justified	Not Justified	Not Justified	See Equation	Justified
2601 – 7000	**Not Justified**	Not Justified	See Equation	Justified	Justified
>7000	Not Justified	See Equation	Justified	Justified	Justified

Pedestrian Volume Delay Justification for Bayview Drive at Springhome Road

Net Total Eight-Hour Volume of Total Pedestrians	Net Total Eight-Hour Volume of Delayed Pedestrians		
	<75	75 - 130	>130
< 200	**Not Justified**	Not Justified	Not Justified
200 - 300	Not Justified	Justified if volume of delayed peds > (240 – (.55 x vol. of total peds))	Justified
>300	Not Justified	Justified	Justified

Note:

I. Three equivalent pedestrians were delayed greater than 10 seconds. Equivalent pedestrians are pedestrians 12 years of age or younger and/or 65 years or older and count as two (2) pedestrians.

II. Count conducted on a typical weekday during the school year in clear weather.

APPENDIX "E"

Pedestrian Volume Justification for Marsellus Drive at Timothy Lane

Eight-Hour Vehicular Volume	Net Eight-Hour Pedestrian Volume				
	<200	200 – 275	276 – 475	476 – 1000	>1000
< 1440	Not Justified	Not Justified	Not Justified	Not Justified	Not Justified
1440 – 2600	Not Justified	Not Justified	Not Justified	See Equation	Justified
2601 – 7000	Not Justified	**Not Justified**	See Equation	Justified	Justified
>7000	Not Justified	See Equation	Justified	Justified	Justified

Pedestrian Volume Delay Justification for Marsellus Drive at Timothy Lane

Net Total Eight-Hour Volume of Total Pedestrians	Net Total Eight-Hour Volume of Delayed Pedestrians		
	<75	75 - 130	>130
< 200	Not Justified	Not Justified	Not Justified
200 - 300	**Not Justified**	Justified if volume of delayed peds > (240 – (.55 x vol. of total peds))	Justified
>300	Not Justified	Justified	Justified

Note:

I. Three equivalent pedestrians were delayed greater than 10 seconds. Equivalent pedestrians are pedestrians 12 years of age or younger and/or 65 years or older and count as two (2) pedestrians.
II. Count conducted on a typical weekday during the school year in clear weather.

APPENDIX "F"

Veterans Drive & Commerce Park Drive

TRAFFIC SIGNAL WARRANT	WARRANT VALUE	ACTUAL VALUE
Warrant No. 1 - Minimum Vehicular Volumes	900 vehicles per hour on all approaches combined for eight hours in one day. 80% of traffic volume required to satisfy Warrant No. 1.	A) All Approaches: 86% fulfilled. B) Minor Street Both Approaches: 88% fulfilled.
Warrant No. 2 - Delay to Cross Traffic	900 vehicles per hour on the Major Roadway (Huronia Road) for eight hours in one day. 80% of traffic volume required to satisfy Warrant No. 2.	A) Major Street Both Approaches: 76% fulfilled. B) Traffic Crossing Major Street: 87% fulfilled.
Warrant No. 3 - Accident Experience	5 collisions per year for 3 consecutive years correctable by traffic signals.	8 collisions reported within last three years. 53% fulfilled.
Warrant No. 4 - Combination Warrant	Any 2 warrants satisfied at least 80% (Warrant No's 1, 2 or 3).	Warrant No. 1 satisfied at least 80%. No other warrant satisfied at least 80%.
Warrant Satisfied		**NO**