
TO: GENERAL COMMITTEE

SUBJECT: RAQUEL STREET PEDESTRIAN SAFETY REVIEW

PREPARED BY AND KEY CONTACT: J. MACDONALD *JM* *SP*
TRAFFIC TECHNOLOGIST (EXT. 5178)

SUBMITTED BY: R. W. MCARTHUR, P. Eng. *R. W. McArthur*
DIRECTOR OF ENGINEERING

GENERAL MANAGER APPROVAL: R. J. FORWARD, MBA, M.Sc., P. Eng. *R. J. Forward*
GENERAL MANAGER OF INFRASTRUCTURE, DEVELOPMENT & CULTURE

CHIEF ADMINISTRATIVE OFFICER APPROVAL: R. J. FORWARD, MBA, M.Sc., P. Eng. *R. J. Forward*
ACTING CHIEF ADMINISTRATIVE OFFICER

RECOMMENDED MOTION

1. That an All-Way Stop be installed at the intersection of Esther Drive and Raquel Street.
2. That no additional school crosswalks be installed on Raquel Street between Russell Hill Drive and Esther Drive.

PURPOSE & BACKGROUND

3. On August 15, 2011, City Council adopted Motion 11-G-228 which states:

"That staff in the Engineering Department investigate the feasibility of installing pedestrian crosswalks or intersection pedestrian control signals at the intersections of Raquel Street and Russell Hill Drive, Chantal Street, Shaina Court, and Grace Crescent and report back to General Committee."
4. Raquel Street is classified as a minor collector roadway in the area of Dean Avenue and Madelaine Drive which has a current traffic volume of less than 2,500 vehicles per day and a pavement width of 8.5 metres and a sidewalk located on the east side. Please refer to Appendix "A".
5. The study area of the pedestrian safety review consisted of five (5) intersections:
 - I. Raquel Street and Russell Hill Drive;
 - II. Raquel Street and Chantal Street;
 - III. Raquel Street and Shaina Court;
 - IV. Raquel Street and Grace Crescent; and
 - V. Raquel Street and Esther Drive.
6. Raquel Street is a free flow roadway with the connecting roadways controlled by stop signs at Raquel Street. Raquel Street is stop controlled at Esther Drive.
7. The intersection of Raquel Street and Dean Avenue is controlled by traffic control signals.

8. In 2010 Raquel Street was selected for the Traffic Calming Pilot Project. During the Pilot, measures were installed along Raquel Street between Dean Avenue and Esther Drive. These measures included: painted islands with planters, relocated centrelines, and chicanes.
9. Speed studies were completed on Raquel Street between Dean Avenue and Esther Drive before and after implementing traffic calming measures. Based on the results of the implementation of the traffic calming measures the 85th percentile speed dropped from 54 km/h (before) to 46 km/h (after).
10. Council adopted a Traffic Calming Policy in January 2011. The local Councillor requested temporary speed cushions be installed along Raquel Drive between Russell Hill Drive and Grace Crescent. The speed cushions were installed April to October 2011.
11. A Community Safety Zone and a 40 km/h speed zone have been implemented along Raquel Street between Esther Drive and Chantal Street.
12. A Community Safety Zone and a 40 km/h speed zone have been implemented along Esther Drive from Madelaine Drive to a point 88 metres west of Carley Street.
13. Currently on-street parking is prohibited on the west side of Raquel Street from Russell Hill Drive to Shaina Court, on the east side from Russell Hill Drive to Chantal Court, and both sides from a point approximately 45 metres north of Grace Crescent to a point 35 metres south of Grace Crescent. On-street parking is prohibited on both sides of Raquel Street from Dean Avenue to a point 30 metres south thereof. Please refer to Appendix "A".
14. Currently stopping is prohibited on the west side of Raquel Street from Esther Drive to a point 35 metres south of Grace Crescent.
15. Overnight on-street parking is prohibited from December 1st to March 31st, between 12:01 midnight and 7:00 a.m. for the purpose of snow clearing.

ANALYSIS

16. A site visit by City staff along Raquel Street between Dean Avenue and Esther Drive did not reveal any sight obstructions for either vehicles or pedestrians trying to enter the roadway from any of the side streets.
17. Current parking regulations along Raquel Street provide adequate lane widths to provide safe and efficient operation on the roadway for motor vehicles.
18. Staff reviewed the collision history along Raquel Street and found one (1) collision involving a vehicle and a pedestrian. Based on the motor vehicle report a pedestrian was crossing Raquel Street between Grace Crescent and Esther Drive and was struck by a vehicle and no injuries were reported. The lighting conditions during the collision were reported as daylight, the environmental conditions were reported as clear, and the road surface condition was reported as packed snow.
19. The Ontario Traffic Manual (OTM) sets criteria for pedestrian signal warrants which are composed of two (2) areas of justification that must be satisfied to be warranted:
 - I. **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. Pedestrian volumes are based on equivalent pedestrian volumes. Equivalent pedestrian volume applies a doubling factor for unassisted children under 12 years old and for seniors (65+ years).

II. **Pedestrian Delay Justification** – Address 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.

20. Pedestrian studies were completed in November 2011, for the purpose of completing pedestrian signal warrants. The study identified pedestrian volumes on Raquel Street between Russell Hill Drive and Chantal Street; Raquel Street between Shaina Court and Grace Crescent; and Raquel Street between Grace Crescent and Esther Drive. The current vehicle volume for Raquel Street is approximately 1,207 vehicles in the busiest eight (8) hour survey. Below is a summary of the results of the study, please refer to Appendix "B" for complete results.

Location	Satisfied IPS Warrant	
	Yes	No
Raquel Street between Russell Hill and Chantal Drive		X
Raquel Street between Shaina Court and Grace Crescent		X
Raquel Street between Grace Crescent and Esther Drive		X

21. Current pedestrian volumes crossing Raquel Street between Russell Hill Drive and Chantal Street, Raquel Street between Shaina Court and Grace Crescent, and Raquel Street between Grace Crescent and Esther Drive were too low to satisfy provincial warrant guidelines regarding the installation of a pedestrian signal.
22. Staff have investigated all the stop controlled intersections along Raquel Drive to determine if an All-Way Stop is warranted based on criteria within the Ontario Traffic Manual (OTM) Book 5 – Regulatory Signs. These intersections are identified as:
- I. Raquel Street and Russell Hill Drive;
 - II. Raquel Street and Chantal Street;
 - III. Raquel Street and Shaina Court;
 - IV. Raquel Street and Grace Crescent; and
 - V. Raquel Street and Esther Drive.
23. The OTM warrant is based on volume, collision history, and stopping sight distance of the intersection. There are two (2) classes of Minimum Volume Warrants identified in the OTM. The warrant class is determined on the classifications of roadways under review; Minor Roadways (Local Roadways) and Major Roadways (Collector and Arterial Roadways). A road classification is determined by using the City of Barrie Official Plan, Schedule D – Road Plan. Based on the classification of Raquel Street, the Minor Roadway (Local Roadway) Minimum Volume Warrant was used. Each component of the All-Way Stop Warrant has the ability to satisfy the warrant independently.
- **Volume** - the total number of vehicles entering an intersection during the peak hour as well as the percentage of vehicles on the minor street during the peak hour.

- **Collision History** - reviews collisions over a three-year period, which are correctable through All-Way Stop control (i.e. right angle and turning type collisions) and which are reported to the Barrie Police Service.
- **Stopping Sight Distance** - the distance required for a driver to see ahead in order to stop if necessary.

24. Traffic counts were completed in December 2011 and January 2012 along Raquel Street for the purpose of completing the All-Way Stop warrants. Staff have reviewed the traffic counts along Raquel Street for the installation of an All-Way Stop. The complete results of the investigation are summarized in Appendix "C". A summary of the results are listed below:

Location	Satisfied All-Way Stop Warrant	
	Yes	No
Raquel Street and Russell Hill		X
Raquel Street and Chantal Street		X
Raquel Street and Shaina Court		X
Raquel Street and Grace Crescent		X
Raquel Street and Esther Drive	X	

25. Based on the results of the All-Way Stop investigation staff recommend that an All-Way Stop be installed at the intersection of Esther Drive and Raquel Street.
26. Staff has been in contact with the Principal of Maplevue Heights Elementary School with regards to the potential of installing a designed School Crossing on Raquel Street south of Grace Crescent at an unmaintained pathway, please refer to Appendix "A".
27. As per the Ontario Traffic Manual (OTM) Book 6 – school crossing signage must only be implemented at locations that will be supervised by a police officer, a school guard, or a School Child Safety Patrol person. The City of Barrie does not have a school guard program to be able to patrol a school crossing on Raquel Street. Maplevue Heights Elementary School is unable to provide student patrollers at the unmaintained pathway because students would be out of visible range of the school yard and this is not permitted.
28. In accordance with the OTM, staff do not support the installation of a school crossing on Raquel Street south of Grace Crescent at an unmaintained pathway as it will provide a false sense of security for pedestrians wishing to cross Raquel Street at an uncontrolled crossing.
29. Barrie Police Service has expressed the concern that vehicles are not stopping at stop signs (performing rolling stops). This a key reason why staff use provincial warrants in determining All-Way Stops. Staff will check that existing signs have clear sight lines.
30. Barrie Fire and Emergency Service do not oppose the recommended motions identified in this staff report.

ENVIRONMENTAL MATTERS

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

ALTERNATIVES

32. There are three (3) alternatives available for consideration by General Committee:

Alternative #1 General Committee could decide to install All-Way Stops at any of the following intersections along Raquel Street:

- I. Raquel Street and Russell Hill Drive;
- II. Raquel Street and Chantal Street;
- III. Raquel Street and Shaina Court; and/or
- IV. Raquel Street and Grace Crescent.

This Alternative is not recommended as the results of the investigation show the installation of an All-Way Stop at any of these intersections does not satisfy the warrants identified in the Ontario Traffic Manual.

Alternative #2 General Committee could decide to install a Pedestrian Signal on Raquel Street between Dean Avenue and Esther Drive.

This alternative is not recommended as the Ontario Traffic Manual Warrant for an Intersection Pedestrian Signal was not satisfied.

Alternative #3 General Committee could decide not to install an All-Way Stop at the intersection of Raquel Street and Esther Drive.

This alternative is not recommended as the results of the investigation found that the installation of an All-Way Stop at this intersection does satisfy the warrants identified in the Ontario Traffic Manual.

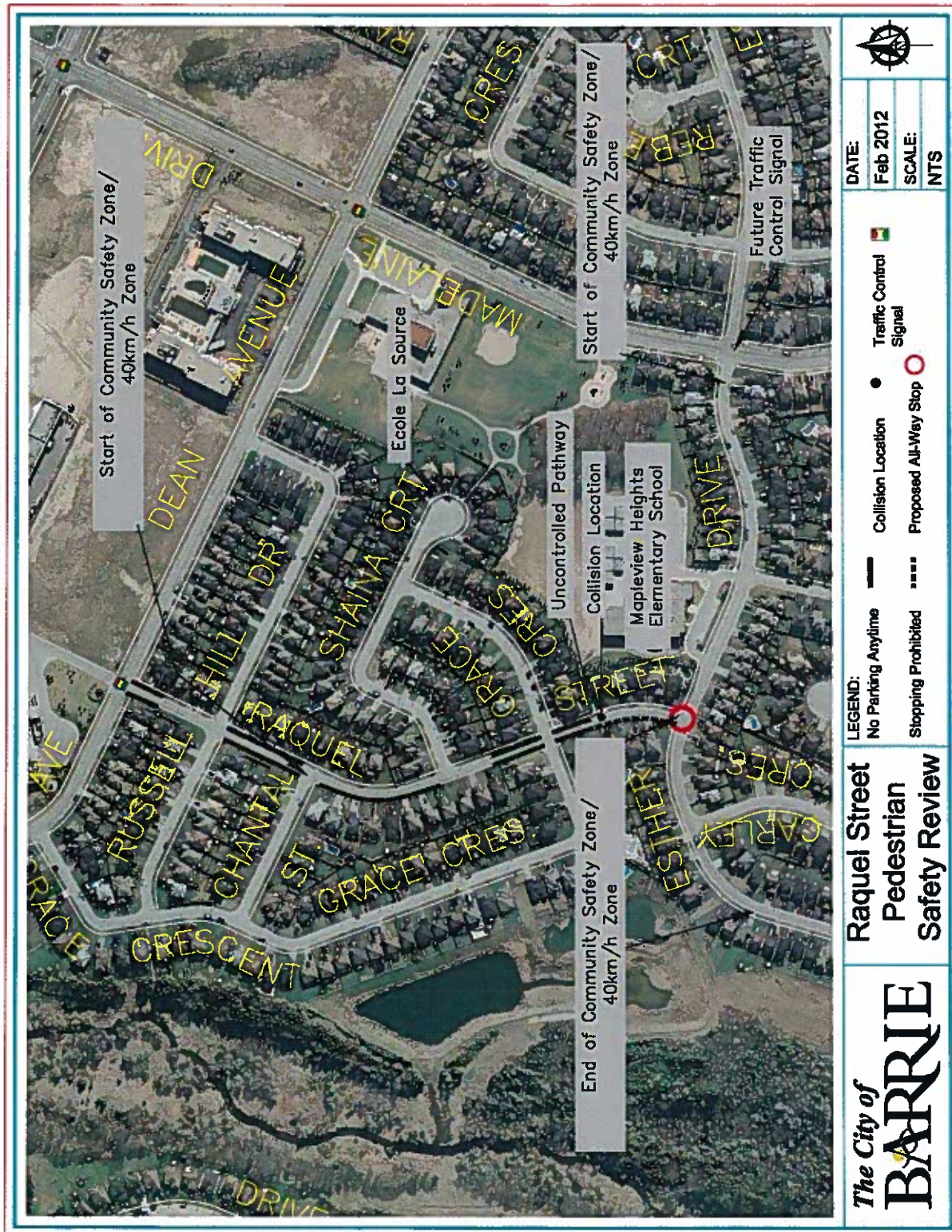
FINANCIAL

33. The approximate cost to install an All-Way Stop at the intersection of Raquel Street and Esther Drive would be \$1,000 and funds can be accommodated in the 2012 Operating Budget.

LINKAGE TO COUNCIL STRATEGIC PRIORITIES

34. 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'



APPENDIX 'B'

Raquel Street between Russell Hill and Chantal Crescent

Street Pedestrian Volume Justification

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

Note:

1. Traffic volume of 1,207 vehicles in the busiest eight (8) hour survey.
2. 8 equivalent (8 actual) pedestrians were observed.

Pedestrian Delay Justification

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: 0 equivalent pedestrians were delayed greater than 10 seconds.

Raquel Street between Shaina Court and Grace Crescent

Pedestrian Volume Justification

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

Note:

1. Traffic volume of 1,207 vehicles in the busiest eight (8) hour survey.
2. 9 equivalent (9 actual) pedestrians were observed.

Pedestrian Delay Justification

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: 0 equivalent pedestrians were delayed greater than 10 seconds.

Raquel Street between Grace Crescent and Esther Drive

Pedestrian Volume Justification

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

Note:

1. Traffic volume of 1,207 vehicles in the busiest eight (8) hour survey.
2. 61 equivalent (36 actual) pedestrians were observed.

Pedestrian Delay Justification

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: 0 equivalent pedestrians were delayed greater than 10 seconds.

APPENDIX 'C'

Raquel Street and Russell Hill Drive

Description	All-Way Warrant	Recorded Data	Satisfied All-Way Warrant	
			Yes	No
Part 1a – Total Volume Peak Hour Traffic Volume ⁽¹⁾	Greater than 350 vehicles in peak hour	293 vehicles in the peak hour		X
Part 1b – Volume Split Percentage of Traffic on Russell Hill Drive (Minor Street)	Greater than 35%	16 vehicles (5%)		
Part 2 – Collisions Intersection Collision History	Average 4 per year over 3 years	0 collisions over a 3 year period		X
Part 3 – Visibility Stopping Sight Distance from Russell Hill Drive	Less than 65m	No restrictions		X

⁽¹⁾ Peak Hour Volume is the maximum number of vehicles that pass through the intersection during a one hour period.

⁽²⁾ Each component of the All-Way Stop Warrant has the ability to satisfy the warrant independently

Raquel Street and Chantal Street

Description	All-Way Warrant	Recorded Data	Satisfied All-Way Warrant	
			Yes	No
Part 1a – Total Volume Peak Hour Traffic Volume ⁽¹⁾	Greater than 350 vehicles in peak hour	197 vehicles in the peak hour		X
Part 1b – Volume Split Percentage of Traffic on Chantal Street (Minor Street)	Greater than 25%	5 vehicles (3%)		
Part 2 – Collisions Intersection Collision History	Average 4 per year over 3 years	0 collisions over a 3 year period		X
Part 3 – Visibility Stopping Sight Distance from Chantal Street	Less than 65m	No restrictions		X

⁽¹⁾ Peak Hour Volume is the maximum number of vehicles that pass through the intersection during a one hour period.

⁽²⁾ Each component of the All-Way Stop Warrant has the ability to satisfy the warrant independently

Raquel Street and Shaina Court

Description	All-Way Warrant	Recorded Data	Satisfied All-Way Warrant	
			Yes	No
Part 1a – Total Volume Peak Hour Traffic Volume ⁽¹⁾	Greater than 350 vehicles in peak hour	277 vehicles in the peak hour		X
Part 1b – Volume Split Percentage of Traffic on Shaina Court (Minor Street)	Greater than 25%	19 vehicles (7%)		
Part 2 – Collisions Intersection Collision History	Average 4 per year over 3 years	0 collisions over a 3 year period		X
Part 3 – Visibility Stopping Sight Distance from Shaina Court	Less than 65m	No restrictions		X

⁽¹⁾ Peak Hour Volume is the maximum number of vehicles that pass through the intersection during a one hour period.

⁽²⁾ Each component of the All-Way Stop Warrant has the ability to satisfy the warrant independently

Raquel Street and Grace Crescent

Description	All-Way Warrant	Recorded Data	Satisfied All-Way Warrant	
			Yes	No
Part 1a – Total Volume Peak Hour Traffic Volume ⁽¹⁾	Greater than 350 vehicles in peak hour	273 vehicles in the peak hour		X
Part 1b – Volume Split Percentage of Traffic on Grace Crescent (Minor Street)	Greater than 35%	43 vehicles (16%)		
Part 2 – Collisions Intersection Collision History	Average 4 per year over 3 years	0 collisions over a 3 year period		X
Part 3 – Visibility Stopping Sight Distance from Grace Crescent	Less than 65m	No restrictions		X

⁽¹⁾ Peak Hour Volume is the maximum number of vehicles that pass through the intersection during a one hour period.

⁽²⁾ Each component of the All-Way Stop Warrant has the ability to satisfy the warrant independently.

Raquel Street and Esther Drive

Description	All-Way Warrant	Recorded Data	Satisfied All-Way Warrant	
			Yes	No
Part 1a – Total Volume Peak Hour Traffic Volume ⁽¹⁾	Greater than 350 vehicles in peak hour	391 vehicles in the peak hour	X	
Part 1b – Volume Split Percentage of Traffic on Raquel Street (Minor Street)	Greater than 25%	103 vehicles (26%)		
Part 2 – Collisions Intersection Collision History	Average 4 per year over 3 years	1 collisions over a 3 year period		X
Part 3 – Visibility Stopping Sight Distance from Raquel Street	Less than 65m	No restrictions		X

⁽¹⁾ Peak Hour Volume is the maximum number of vehicles that pass through the intersection during a one hour period.

⁽²⁾ Each component of the All-Way Stop Warrant has the ability to satisfy the warrant independently