
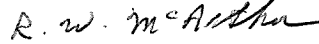

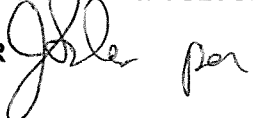

TO: GENERAL COMMITTEE

SUBJECT: TRAFFIC CALMING POLICY

PREPARED BY AND KEY CONTACT: S. ROSE, C.E.T, TSOS
SUPERVISOR OF TRANSPORTATION PLANNING (EXT. 4382) 

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

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

CHIEF ADMINISTRATIVE OFFICER APPROVAL: JON M. BABULIC, CHIEF ADMINISTRATIVE OFFICER 

RECOMMENDED MOTION

1. That a traffic calming policy be adopted for local and minor collector roadways as follows:
 - a) Permanent traffic calming measures be restricted to local and minor collector roadways successfully meeting all criteria of the Traffic Calming Warrant as identified in Appendix "A" of Staff Report ENG003-11;
 - b) Roadways successfully meeting the Permanent Traffic Calming Warrant be ranked for consideration utilizing the Ranking Criteria as identified in Appendix "B" of Staff Report ENG003-11 or be implemented as part of any future road reconstruction project;
 - c) The permanent traffic calming measures to be utilized on local and minor collector roadways are:
 - i) Textured Crosswalks (Pavement Markings/Zebra Striping);
 - ii) Raised Intersections;
 - iii) Curb Extensions;
 - iv) Curb Radius Reductions;
 - v) Raised Median Islands; and
 - vi) Traffic Circles.
 - d) Temporary traffic calming measures be restricted to local and minor collector roadways utilizing the Temporary Traffic Calming Guidelines as identified in Appendix "C" of Staff Report ENG003-11;
 - e) The temporary traffic calming measures to be utilized on local and minor collector roadways are:
 - i) Speed Cushions; and
 - ii) Radar Speed Advisory Boards.

PURPOSE & BACKGROUND

2. On June 29, 2009, City Council adopted Motion 09-G-322 regarding the Traffic Calming Pilot Project as follows:
 1. That the traffic calming measures as identified in Appendix "A" of Staff Report ENG039-09 be installed as a pilot project for Raquel Street from Dean Avenue to Esther Drive.
 2. That the traffic calming measures as identified in Appendix "B" of Staff Report ENG039-09 be installed for as a pilot project for Sandringham Drive from Big Bay Point Road to Consort Drive.
 3. That Traffic By-law 80-138 be amended to restrict on-street parking on the west side of Raquel Street from Russell Hill Drive to Shaina Court.
 4. That Traffic By-law 80-138 be amended to restrict on-street parking on the east side of Raquel Street from Russell Hill Drive to Chantal Street.
 5. That Traffic By-law 80-138 be amended to restrict on-street parking on both sides of Raquel Street from a point approximately 45 metres north of Grace Crescent to a point approximately 35 metres south of Grace Crescent.
 6. That Traffic By-law 80-138 be amended to restrict on-street parking on both sides of Sandringham Drive from Big Bay Point Road to a point approximately 40 metres south of Birkhall Place North.
 7. That Traffic By-law 80-138 be amended to restrict on-street parking on the west side of Sandringham Drive from Consort Drive to a point approximately 38 metres west thereof.
 8. That a speed cushion be installed on Eccles Street North as a pilot project as identified in Appendix "C" of Staff Report ENG039-09, and funded from the Traffic Surplus Account 14-16-2361-9999.
 9. That rumble strips not be considered as a traffic calming measure in residential areas. (ENG039-09) (File: T00) (P56/08)

3. On March 19, 2007, City Council adopted Motion 07-G-118 regarding a Traffic Calming Pilot Project as follows:

"That staff in the Engineering Department develop an inventory of local/minor collector roadways for consideration as part of a traffic calming pilot project and report back to General Committee with two (2) recommended roadways for the pilot project.

That staff conduct a Municipal Class Environmental Assessment for the two (2) selected roadways and report back to General Committee with cost and financing to implement

That pending the successful completion of the Municipal Class Environmental Assessment, staff implement and monitor the effectiveness of the traffic calming pilot project for a one year period and report back to General Committee."

4. On February 6, 2006, City Council adopted Motion 06-G-026 regarding traffic calming measures as follows:

“That the New Secondary Plans section of the draft Traffic Calming Measures Policy attached as Appendix “A” to the October 18, 2005 Report to Community Services Committee be adopted.”

Refer to Appendix “D” for New Secondary Plans section.
5. Traffic calming can be defined as physical measures to alter motorist behaviour on a street or street network. Traffic calming also includes traffic management, which involves changing traffic routes or flows within a neighbourhood.
6. Traffic calming is intended to improve the quality of life for residents on traffic calmed streets, achieve slower speeds for motor vehicles, and increase the safety and the perception of safety for non-motorized users of the street. Traffic calming is also intended to promote increased pedestrian, cycle and transit usage in an effort to help reduce the negative effects of motor vehicles on the environment.
7. The Transportation Association of Canada and the Canadian Institute of Transportation Engineers published, in 1998, the Canadian Guide to Neighbourhood Traffic Calming in part to achieve an appropriate level of national standardization of traffic calming measures. The guide provides guidance on the design and installation of traffic calming measures. A copy of this guide has been placed in the Councilors’ Lounge for review.
8. The objective of traffic calming is to achieve uniform driving patterns at reduced travel speeds. That objective is consistent with resident expectations on roads where lower speeds are desired to enhance safety and livability in communities and neighbourhoods. That objective is not tenable on roads where higher speeds are desired. Consequently, physical traffic calming should not be used on roads intended for higher speeds or to move large volumes of traffic such as arterial roads.
9. A local roadway is typically characterized as connecting local and collector roadways carrying up to approximately 1,000 vehicles per day. Sidewalks are typically provided on at least one side of the roadway with transit service generally avoided. The typical roadway width for a local road is 8.5 metres.
10. A minor collector roadway is typically characterized as connecting local, collector and arterial roadways carrying up to approximately 5,000 vehicles per day. Sidewalks are typically provided on both sides of the roadway with transit service generally avoided. The typical roadway width for a minor collector road is 11 metres.
11. The 85th percentile speed is the speed below which 85 percent of the vehicles are travelling along a roadway.
12. Cut through traffic is defined as traffic that utilizes local streets rather than the major collector or arterial roadway network for through movements.
13. Traffic calming objectives are now exempt from the Municipal Class Environmental Assessment process.

ANALYSIS

14. Staff have completed the review of the traffic calming pilot project on Sandringham Drive and on Raquel Street. Staff performed vehicle volume, vehicle speed and origin destination studies on Sandringham Drive and on Raquel Street to review the effectiveness of traffic calming measures. The results are as follows:

ROADWAY	85th PERCENTILE SPEED BEFORE	85th PERCENTILE SPEED AFTER
SANDRINGHAM DRIVE	65 KM/HR	50 KM/HR
RAQUEL STREET	54 KM/HR	46 KM/HR
ECCLES STREET	60 KM/HR	51 KM/HR

15. The before and after travel speeds of the traffic calmed roadways clearly indicates that the majority of vehicles were travelling at a reduced speed with the traffic calming measures installed.
16. An origin destination study (OD) was performed on Sandringham Drive and on Raquel Street to monitor vehicles using the selected roadways as a cut through roadway by avoiding the major collector roadways in the area. The OD results for both roadways indicated that vehicle volume was reduced; as vehicles chose to stay on the peripheral collector roadways and avoid the traffic calming measures.
17. The Canadian Guide to Neighbourhood Traffic Calming would be utilized to provide design guidelines in selecting the appropriate traffic calming measures. Staff will consider various constraints including local climate conditions, environmental impacts, emergency response times and design vehicles that operate in subdivisions.
18. A Traffic Calming Survey was prepared and mailed to 1,138 residents living on and adjacent to roadways with the traffic calming measures within the pilot study. The results are summarized as follows:

QUESTION	VERY POSITIVE	SOMEWHAT POSITIVE	NEUTRAL	SOMEWHAT NEGATIVE	VERY NEGATIVE	NO RESPONSE
What is your overall reaction to traffic calming measures installed to date?	26	19	12	19	38	18
TOTAL (Out of 132)	20%	14%	10%	14%	29%	13%

QUESTION	YES	NO	N/A
Would you like to see more traffic calming measures installed on other local residential roadways in the City?	86	34	12
TOTAL (Out of 132)	65%	26%	9%

19. As the survey indicates, residents are supportive of additional traffic calming measures on City roadways. Forty-three percent of respondents had negative responses. Upon review of the written negative comments, the majority stated the temporary use of planters that are not present during winter months is not effective as children are still walking to school with no measures on the roadway. The planters were removed for winter maintenance and returned in late April. Residents on Raquel Street were not in favour of the use of chicanes which staff will not be recommending for future installations.
20. Operations' staff indicated that permanent traffic calming measures will require additional resources during winter months for snow maintenance at an approximate cost of \$5,000-\$10,000 annually per roadway with permanent traffic calming measures installed.
21. Staff does not recommend the use of raised planters as temporary traffic calming measures as they are not present during winter months and residents preferred permanent raised islands.
22. Speed cushions and radar speed advisory boards are two temporary traffic calming measures that have proven to be effective in curbing negative driving behavior. Operations staff advised that speed cushions do require approximately forty (40), five (5) inch screws per cushion to adhere the cushion to the road. The holes need to be filled after removal of the cushion. The cost to install one (1) set of speed cushions is approximately \$2,000 per roadway.
23. Staff recommend that a traffic calming policy be adopted for local and minor collector roadways as follows:
 - a) Permanent traffic calming measures be restricted to local and minor collector roadways successfully meeting all criteria of the Traffic Calming Warrant as identified in Appendix "A" of Staff Report ENG003-11;
 - b) Roadways successfully meeting the Permanent Traffic Calming Warrant be ranked for consideration utilizing the Ranking Criteria as identified in Appendix "B" of Staff Report ENG003-11 or be implemented as part of any future road reconstruction project;
 - c) The permanent traffic calming measures to be utilized on local and minor collector roadways are:
 - i) Textured Crosswalks (Pavement Markings/Zebra Striping);
 - ii) Raised Intersections;
 - iii) Curb Extensions;
 - iv) Curb Radius Reductions;
 - v) Raised Median Islands; and
 - vi) Traffic Circles.
 - d) Temporary traffic calming measures be restricted to local and minor collector roadways utilizing the Temporary Traffic Calming Guidelines as identified in Appendix "C" of Staff Report ENG003-11;

- e) The temporary traffic calming measures to be utilized on local and minor collector roadways are:
- i) Speed Cushions; and
 - ii) Radar Speed Advisory Boards.
24. The selected temporary and permanent traffic calming measures will provide staff with opportunities to effectively control driving behaviour on local and/or minor collector roadways with minimal impacts to winter maintenance and emergency services.
25. A 2011 Program Change for traffic calming implementation addresses the proposed temporary traffic calming measure program for 2011 which will allow for the following elements to be used at the request of Ward Councillors as per the guidelines in Appendix "C" at a total cost of \$65,000 (\$45,000 materials and \$20,000 installation):
- a) Twenty (20) speed cushions (see Appendix "E") to be installed on ten (10) selected roadways. It is suggested that a speed cushion be installed at two locations along the selected roadway where traffic calming is warranted. The speed cushions would remain in place for a minimum of three months. The speed cushions are to be installed during the non-winter maintenance months (April to October). The City has two (2) speed cushions in stock.
 - b) Ten (10) radar speed advisory board to be utilized. The radar speed boards are to be utilized year round with a minimum duration of three (3) months per location. The City currently has ten (10) speed boards in stock.
26. Engineering staff met with Barrie Transit, Barrie Police Service, Barrie Fire and Emergency Service and Operations' staff in preparation of design elements for traffic calming measures. The group is supportive of implementing traffic calming measures along local and minor collector residential roadways. Barrie Fire and Emergency Service has stated a concern with measures that may restrict flow and/or increase response times, specifically raised intersections and traffic circles. All parties will be included in the design of future permanent traffic calming measures.
27. Barrie Police Service has indicated that they did not receive concerns for speeding from residents for the roadways with traffic calming measures implemented, but did state that motorists in the City do speed during winter months when it is not snowing.

ENVIRONMENTAL MATTERS

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

ALTERNATIVES

29. There is one alternative available for consideration by General Committee:

Alternative #1 Do not implement traffic calming.

This is not recommended due to existing safety concerns expressed by local residents with regards to vehicle speeds and cut through traffic.

FINANCIAL

30. Permanent traffic calming measures are anticipated to cost between \$20,000 and \$100,000 per roadway to install, as typically more than one measure is necessary to control vehicle speeds, as vehicles may speed up after passing the traffic calming measure. Typical costs per recommended traffic calming measure are as follows.

TRAFFIC CALMING MEASURE	COST
Textured Crosswalk	\$1,000-\$2,500 per Crossing
Raised Intersection	\$50,000-\$75,000 per Intersection
Curb Extensions	\$10,000-\$20,000 per Intersection
Curb Radius Reductions	\$10,000-\$20,000 per Intersection
Raised Median Islands	\$10,000-\$30,000 per Median Island
Traffic Circles	\$10,000-\$30,000 per Intersection

Permanent traffic calming measures installed on a roadway would be paid for from the tax based operating budget. If the permanent traffic calming measures are installed on a roadway as part of a complete road reconstruction the cost would be included in the asset replacement cost in the capital budget financed from the tax capital reserve or other funding sources as appropriate.

31. Annual operating and maintenance costs are expected to cost \$5,000 - \$10,000 per roadway with permanent measures installed to accommodate additional staff time for winter maintenance.
32. Through the 2011 Business Plan process staff will be recommending a program change form for Council's consideration on temporary traffic calming measures at an anticipated cost of \$65,000 which includes funds to purchase, install and remove the speed cushions. The cost to relocate the speed cushions on more than one roadway would be an additional \$2,000 per location. All of these costs would be funded from the tax based operating budget. In subsequent years, the \$65,000 allocation could be used for more temporary traffic calming measures or to implement permanent traffic calming measures on a particular road.
33. If the temporary traffic calming measures program change form is not approved, staff will still be able to plan future permanent traffic calming installations as part of future developments; implement warranted measures in conjunction with capital reconstruction road projects; implement the existing ten (10) radar speed boards; and install speed cushions on one (1) selected roadway.
34. Traffic calming measures, like all other assets, provide the most value when it can be clearly demonstrated that they are absolutely required. Traffic calming installations not meeting technical warrants, unnecessarily increase the City's operating and maintenance costs as well as asset renewal requirements and the asset replacement deficit resulting in additional unnecessary pressures on both the Operating and Capital Budgets.

LINKAGE TO COUNCIL STRATEGIC PRIORITIES

35. The recommendation included in this Staff Report is not specifically related to any of City Council's 2007 – 2010 Strategic Priorities.

APPENDIX "A"

PERMANENT TRAFFIC CALMING WARRANT

Warrant	Item	Requirement	Y /N
Warrant 1 <i>Safety Requirements</i>	1.1 Road Grade	Road grade less than 5%.	
	1.2 Block Length	Street length must exceed 120 metres between controlled intersections.	
	1.3 Sidewalks	Continuous sidewalks on at least one side of the street.	
Warrant 2 <i>Technical Requirements</i>	2.1 Vehicle Speeds	85 th percentile speed greater than 10 km/h over the posted speed limit of the roadway.	
	2.2 Vehicle Volume	Vehicle volume greater than 900 vehicles per day.	
	2.3 AADT	Vehicle volume must be less than 5,000 vehicles per day within a 5 year horizon period.	
	2.4 Transit Route	Roadway is not a transit route	

NOTE: All elements within Warrants #1 and #2 must be satisfied to proceed

APPENDIX "B"

RANKING CRITERIA - PERMANENT TRAFFIC CALMING

The following criteria will be used to rank each project for determination of implementation schedule. The point system is as follows:

1. Pedestrian Generators – *5 points* will be given to each pedestrian generator located in proximity to the proposed traffic calming area. Pedestrian generators include schools, churches, parks, major walking trails, and community centres.
2. Vehicle Speed – *5 points* will be given to every km/hr that the 85th percentile speed exceeds 10 km/hr above the posted speed limit.
3. Collision History – *5 points* will be given to roadways that have experienced at least one collision involving pedestrians or cyclists in the last 5 years.
4. AADT - Points will be awarded for two way traffic volumes as follows
 - a. 900 - 1,500 vehicles = 1 Point
 - b. 1,501 – 2,500 vehicles = 3 Points
 - c. 2,501 – 3,500 vehicles = 5 Points
 - d. 3,501 – 5,000 vehicles = 7 Points

APPENDIX "C"

TEMPORARY TRAFFIC CALMING GUIDELINES

Item	Guideline	Y / N
Speed Cushion	Local and minor collector residential roadways. Road grade less than 5%. Continuous sidewalks on at least one side of the street. Roadway is not a transit route. To be installed during non-winter maintenance months, April to October with a minimum duration of 3 months per location. Complaints received relevant to vehicle speeds.	
Radar Speed Advisory Board	All City of Barrie roadways. Year round use with a minimum duration of 3 months per location. To be installed on existing City owned traffic signal or streetlight poles along the roadway.	

NOTE:

1. Speed cushion and radar speed advisory board locations on selected roadways will be at the request of the Ward Councillors as per guidelines in consultation with Engineering Department staff.
2. It is suggested that all guidelines be met for a successful traffic calming implementation program.

APPENDIX "D"

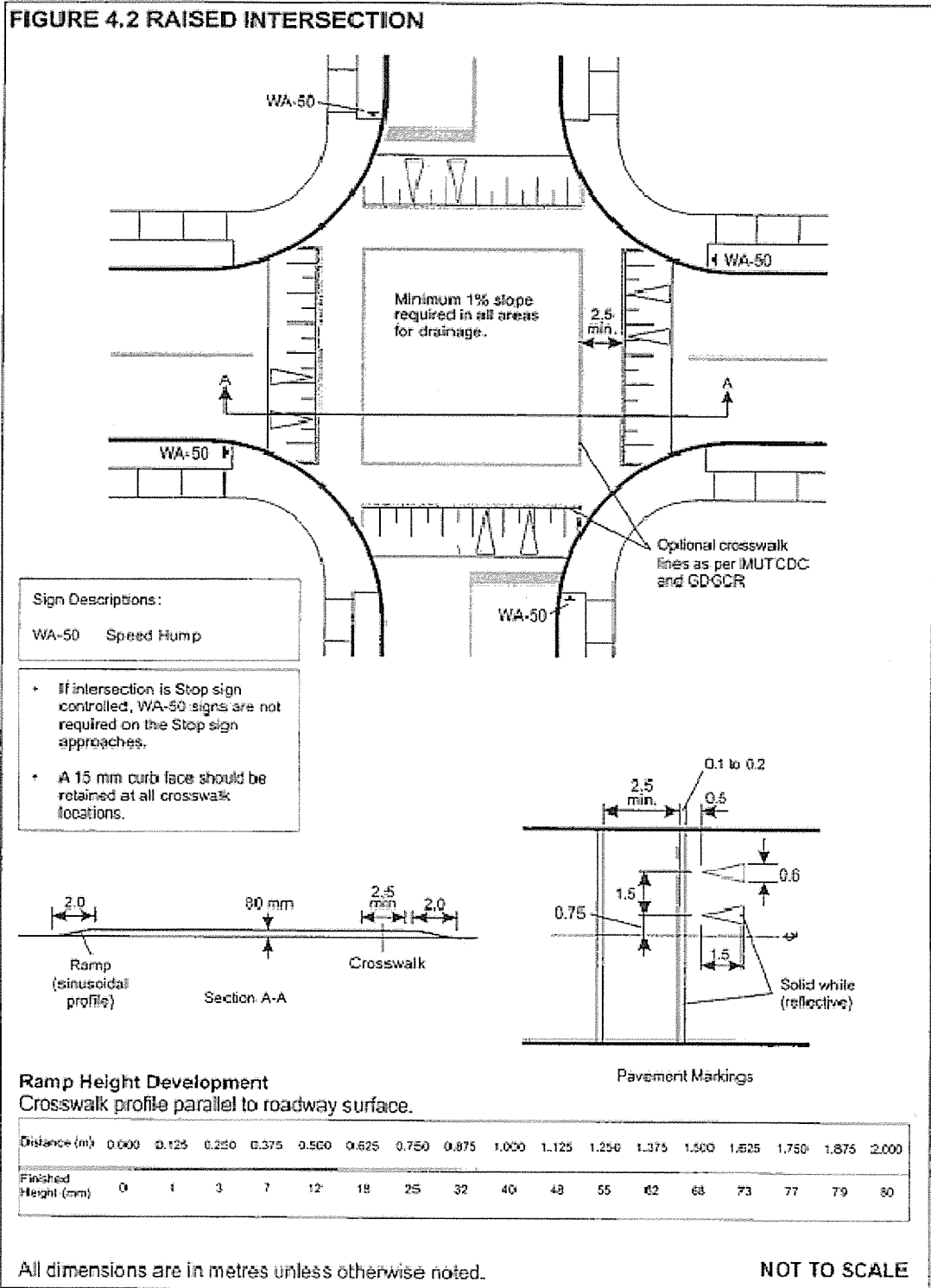
Excerpt from Report to Community Services Committee – October 18, 2005

New Secondary Plans

1. A Master Transportation Management Plan will be required for all new Secondary Plans.
2. The Master Transportation Management Plan will be prepared by qualified Transportation Consultants, and will incorporate both roadway design and physical measures to address traffic calming.
3. Physical measures to address traffic calming will meet the criteria outlined on the following pages of proposed design parameters.
4. Where possible, internal roadways in residential neighbourhoods will be limited to two lanes of travel plus turning lanes for collector roads. Reverse frontage lots will be encouraged for arterial roadways or service roads (which can be utilized with no vehicle access to the major roadway).
5. Roadways accessing new plans of subdivision from an arterial or major collector roadway may be required to enter a gateway traffic calming feature before connecting to internal residential roadways. The gateway feature may consist of roundabouts, large raised median islands or other form of traffic calming.
6. All internal roadways should be designed in such a manner as to deter vehicles from a direct access through a residential neighbourhood. A non-linear street grid in residential neighbourhoods is encouraged to reduce through traffic and vehicle speeding.
7. All internal roadways will use a combination of physical measures to deter cut through vehicles, vehicle speeding, and identify areas where pedestrians are anticipated to cross the roadway.
8. City blocks shorter than 120 metres in length, with traffic controls at each end, will be encouraged.

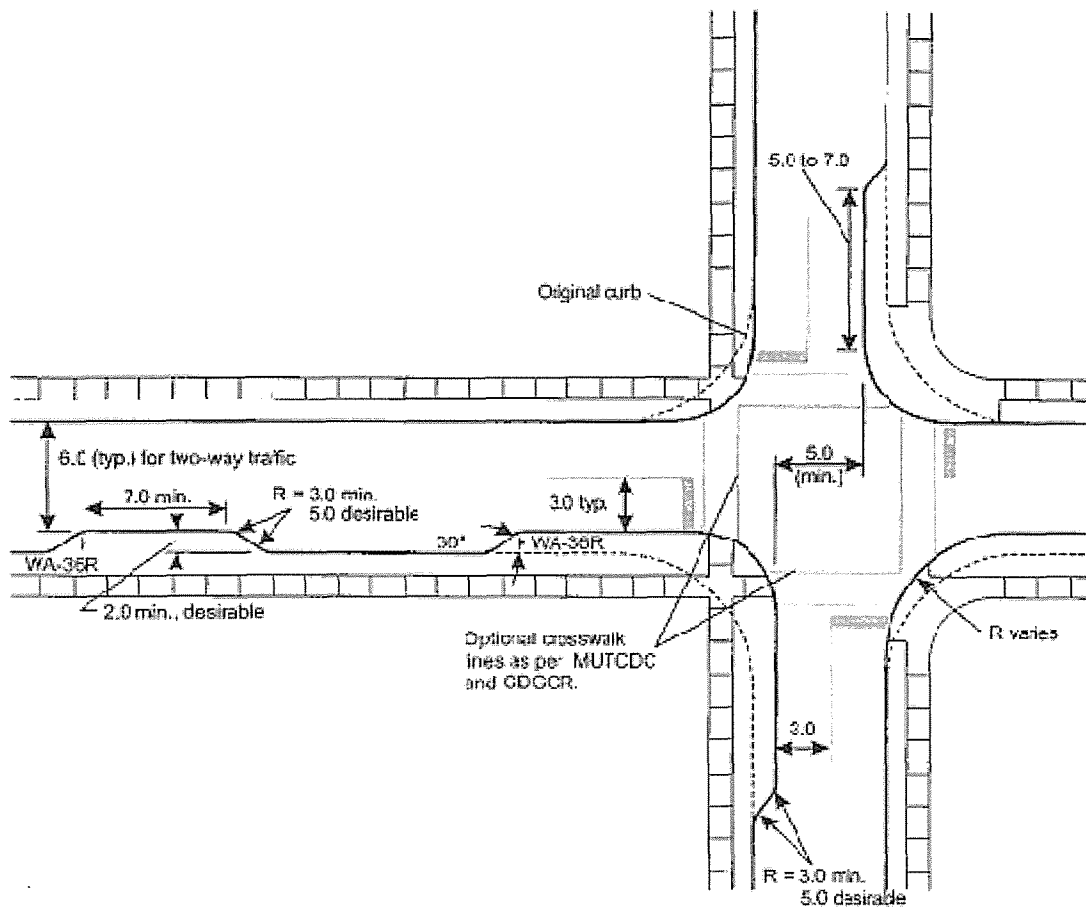
APPENDIX "E"

RAISED INTERSECTION



CURB EXTENSION

FIGURE 4.6 CURB EXTENSION



Sign Descriptions:	
WA-36	Object Marker

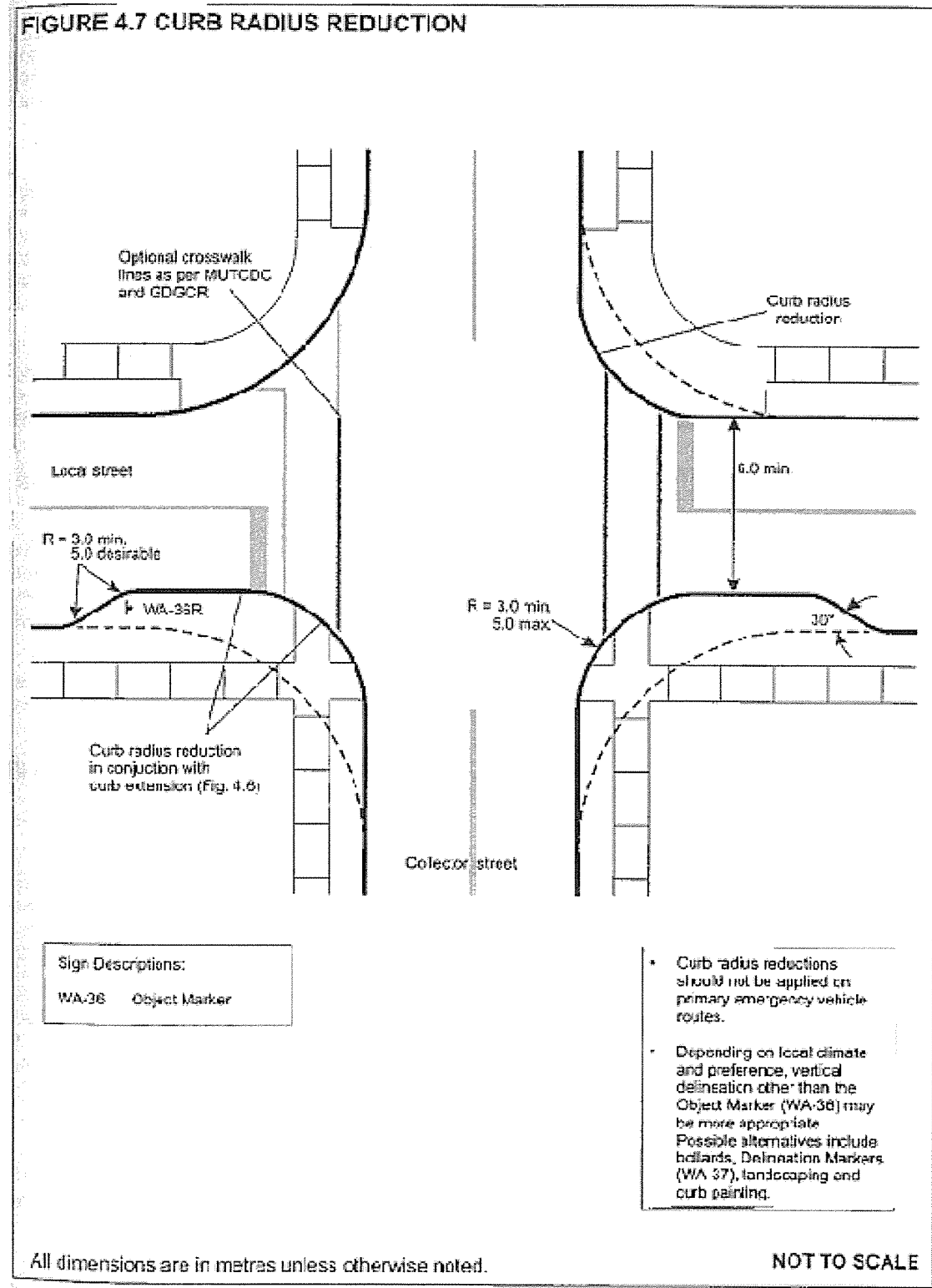
- Intersection radii should accommodate design vehicles applicable to street.
- Mid-block curb extensions should be combined with crosswalks where possible.
- Length of curb extensions must recognize site conditions, e.g., driveway locations.
- Depending on local climate and preference, vertical delineation other than Object Markers (WA-36) may be more appropriate. Possible alternatives include bollards, Delineation Markers (WA-37), landscaping and curb painting.
- If local conditions permit, the lane widths at mid block curb extensions can be reduced to a minimum of 2.75 m and the approach lane at an intersection curb extension can be a minimum of 2.5 m. In all instances, the minimum overall roadway width should be 5.5 m.
- If curb extensions are placed on diagonally opposite corners of an intersection, a minimum clear offset between extensions of 5.0 m should be provided to minimize vehicular conflicts within the intersection.

All dimensions are in metres unless otherwise noted.

NOT TO SCALE

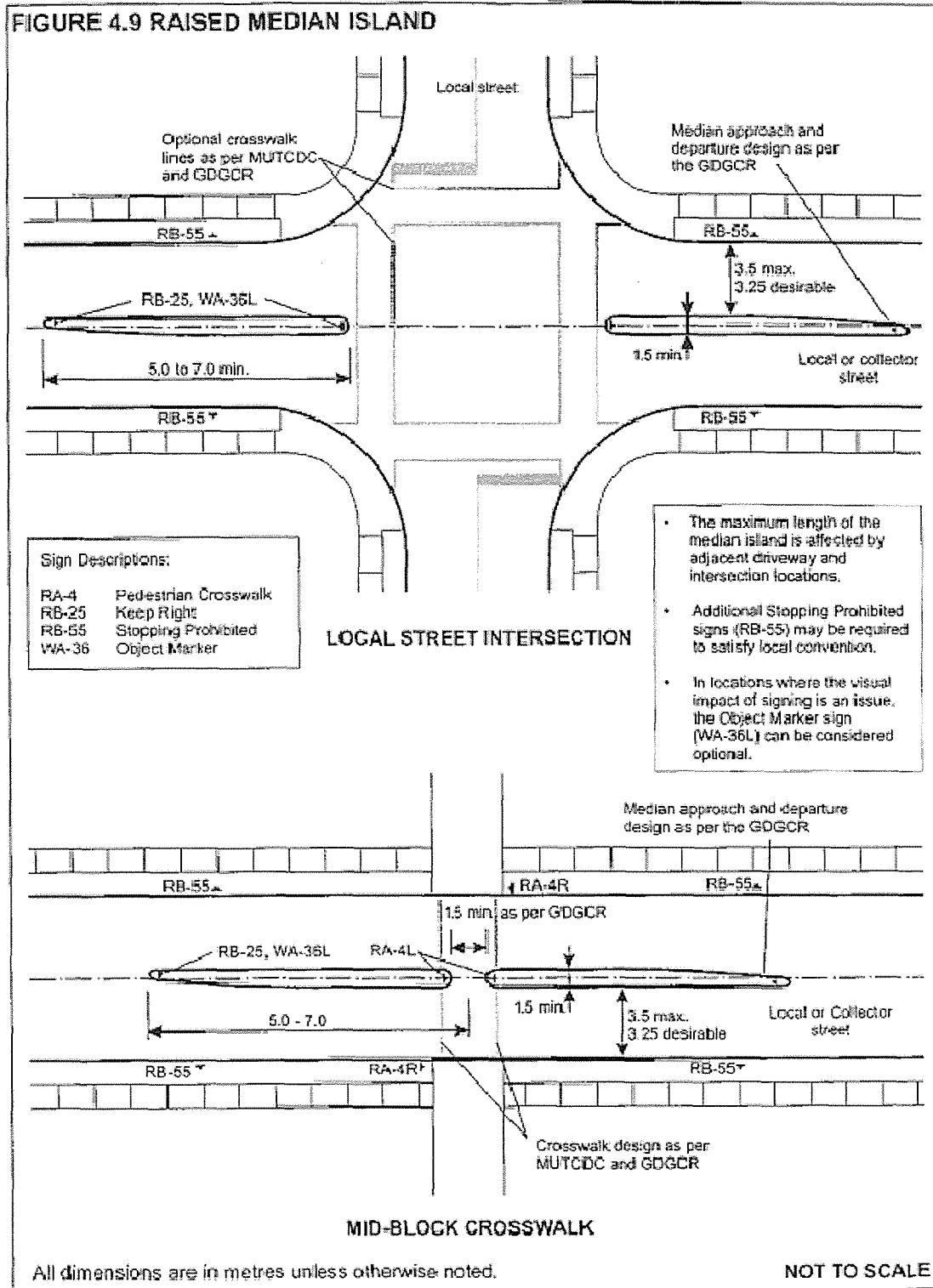
CURB RADIUS REDUCTION

FIGURE 4.7 CURB RADIUS REDUCTION



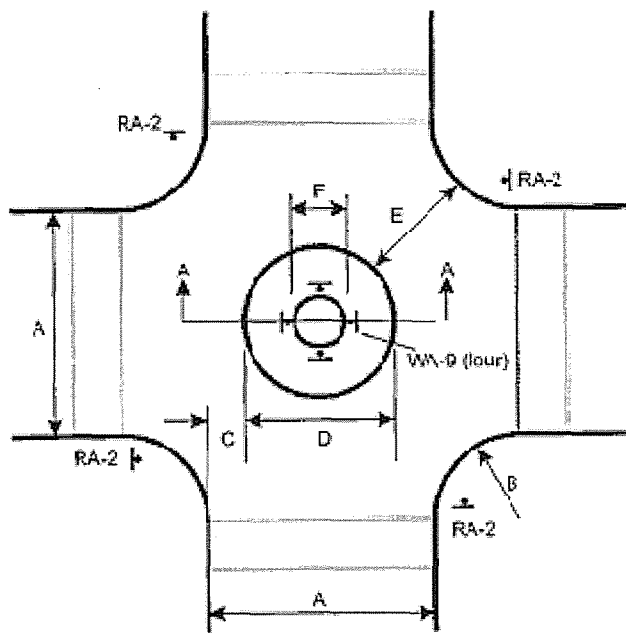
RAISED MEDIAN ISLAND

FIGURE 4.9 RAISED MEDIAN ISLAND



TRAFFIC CIRCLE

FIGURE 4.10 TRAFFIC CIRCLE



Sign Descriptions:

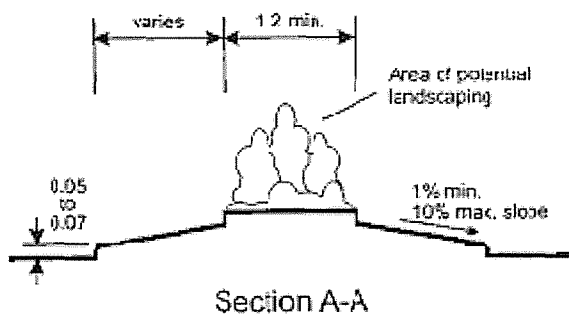
- RA-2 Yield
- WA-9 Chevron Alignment

Dimension Chart for Varying Roadway Widths

A Roadway Width	B Curb Return Radius	C Off-Set Distance	D Circle Diameter	E Minimum Opening Width
6.0	4.7	1.7	2.6	4.9
	5.3	1.6	2.8	5.0
	6.9	1.4	3.2	5.5
	8.1	1.2	3.6	5.8
7.0	4.2	1.7	1.6	4.9
	4.8	1.6	3.8	5.0
	6.4	1.4	4.2	5.5
	7.8	1.2	4.6	5.9
8.0	3.7	1.7	4.6	4.9
	4.3	1.6	4.8	5.0
	5.9	1.4	5.2	5.5
	7.3	1.2	5.6	5.9
9.0	3.2	1.7	5.6	4.9
	3.8	1.6	5.8	5.0
	5.4	1.4	6.2	5.5
	6.6	1.2	6.6	5.8
10.0	2.0	1.7	6.6	5.0
	3.3	1.6	6.8	5.0
	4.9	1.4	7.2	5.5
	6.1	1.2	7.6	5.8
11.0	6.9	1.0	8.0	5.9
	3.4	1.5	8.0	5.2
	3.8	1.4	8.2	5.2
	5.8	1.2	8.6	5.8
12.0	6.8	1.0	9.0	6.1
	3.0	1.5	9.0	5.2
	3.9	1.4	9.2	5.5
	5.1	1.2	9.6	5.8
6.3	1.0	10.0	6.1	

Legend:

- A Roadway Width
- B Curb Return Radius (3.0 m min.)
- C Off-Set Distance (1.7 m max.)
- D Circle Diameter
- E Opening Width (See table above)
- F Raised Island Diameter (1.2 m min.)

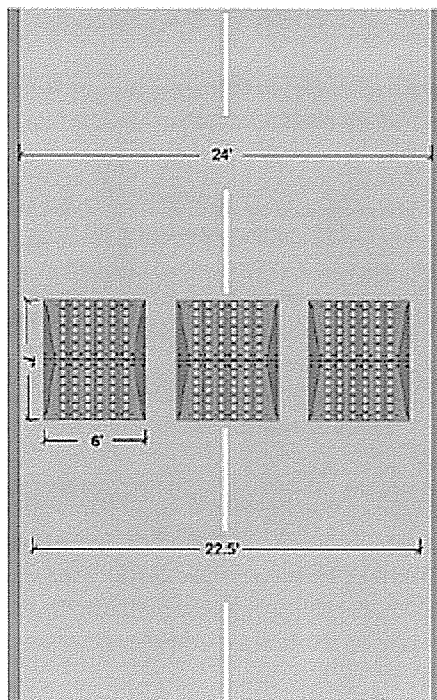


- Minimum opening width to be provided to all crosswalks.
- A deflector triangle painted on the pavement on each approach to the traffic circle may be appropriate.

All dimensions are in metres unless otherwise noted.

NOT TO SCALE

SPEED CUSHION



It is suggested that a speed cushion as shown above be installed at two locations along the selected roadway as part of the temporary traffic calming measures.

RADAR SPEED ADVISORY BOARD

