

Appendix A. TRAFFIC MANAGEMENT (VOLUMES)

Traffic Management (Volumes)

Description:

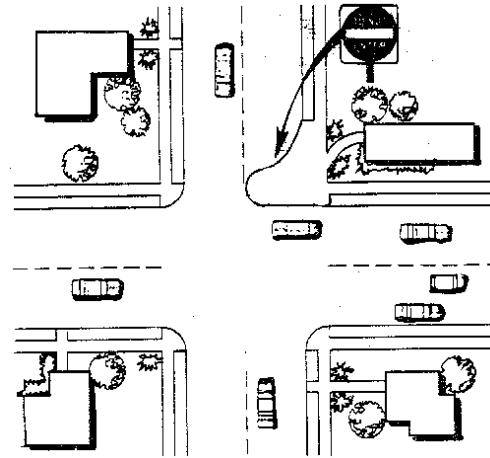
A directional closure is a curb extension or vertical barrier extending to approximately the centreline of a roadway, effectively obstructing (prohibiting) one direction of travel on two-way streets.

Directional closures are often used in staggered sets or in conjunction with other measures to make travel through neighbourhoods with grid pattern streets circuitous. Two directional closures placed across from one another at any intersection is known as a *semi-diverter*.

Bicycles can be permitted to travel through a directional closure in both directions. In some cases, gaps or contra-flow bike lanes are used to provide bicycle access.

DIRECTIONAL CLOSURE

(AKA: partial closure, one-way closure, half closures, "semi-diverter")



Purpose: To reduce or eliminate through traffic

Application:

Local Streets at intersections with collectors / arterials

Type of Problem (Addresses):

Primary

Secondary

Volume

Vehicle Conflicts

Ped. Enviro/Safety

Bike Enviro/Safety

Cost

Approx. \$5 000 and up



Local Examples:

- Various locations in the Glebe community (Bronson shown)

Advantages

- Reduction in vehicle volume on closed roadway
- Enhanced pedestrian environment of intersecting street by reduction in crossing distances and potential conflicts with vehicles

Disadvantages

- Restricts access for residents and other local street users
- May divert significant traffic volumes to adjacent streets
- Can impact transit routes

Design and Program Guidelines/Warrants:

- Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

Traffic Management (Volumes)

Description:

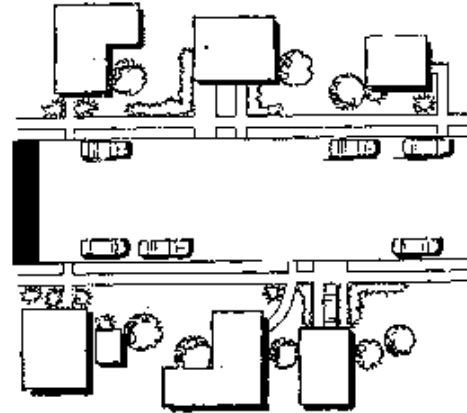
A full closure consists of a barrier extending across the street to close the street to through vehicle traffic. Barriers can take the form of a curb, landscaping, walls, gates, bollards or any other obstruction that may deter vehicle passage. Closures can be located mid-block or at intersections (creating a "T" intersection).

Pedestrian access is usually maintained and bicycle traffic may be accommodated through gaps in the obstruction.

Emergency vehicle access can be accommodated by constructing removable sections or bollards

FULL CLOSURE

(AKA: cul-de-sacs, dead ends)



Purpose: To eliminate through traffic.

Application:

Local streets

Type of Problem (Addresses):

<i>Primary</i>	<i>Secondary</i>
Volume	Bicycle Enviro/Safety
Vehicle Conflicts	Ped Enviro/Safety

Cost

Approx. \$10 000 and up



Local Examples:

- Rochester at Wellington - intersection (shown)
- Daly at Waller
- Spruce between Champagne and Booth - mid-block

Advantages

- Eliminates all through traffic along a street
- For closures at intersections, can enhance the pedestrian environment of intersecting street by eliminating road crossing and potential conflicts with vehicles
- Local reduction in traffic noise

Disadvantages

- Restricts access for residents and other local street users
- May divert significant volume of traffic to parallel street without traffic calming measures
- Large vehicles may not be able to turn around
- Maintenance level of service will decrease
- Can impact transit routes
- Restricts emergency vehicle access

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

Traffic Management (Volumes)

Description:

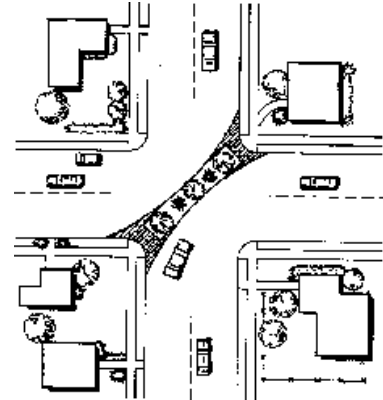
A diverter is a raised barrier placed diagonally across a four-way intersection that forces traffic to turn preventing it from continuing straight through the intersection.

Emergency vehicle access can be accommodated by constructing removable sections or bollards. Pedestrian access is usually maintained and bicycle traffic may be accommodated through gaps in the obstruction.

Diverters often include landscaped areas. A truncated diagonal diverter is a diverter with one end open to allow some turning movements.

DIVERTERS

(AKA diagonal diverters, full diverters, diagonal road closure)



Purpose: Obstructs and redirects through traffic.

Application:

Local streets

Type of Problem (Addresses):

<i>Primary</i>	<i>Secondary</i>
Volume	Bicycle Enviro/Safety
Vehicle Conflicts	
Ped. Enviro/Safety	



Cost

Approx. \$10 000 and up

Local Examples:

- Otterson Drive at Blanchard Crescent

Advantages

- Reduction in vehicle volume on roadway
- Enhanced pedestrian environment by reduction in potential conflicts with vehicles and potential landscaped area.

Disadvantages

- Restricts access for residents and other local street users
- May divert significant traffic volumes to adjacent streets
- Can impact transit routes

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

Traffic Management (Volumes)

Description:

Forced turn islands consist of raised islands located at an intersection to obstruct specific traffic movements and physically direct traffic through an intersection.

Intersection channelization can improve pedestrian crossing comfort and safety by reducing crossing distances and by providing a refuge.

Bicycles can be permitted to make all movements including those motor vehicles are prevented from making. Gaps in channelization islands may be used to accommodate cyclists.

Emergency vehicles can circumvent the islands.

FORCED TURN ISLAND

(AKA intersection channelization, pork chops, right turn islands)



Purpose: Obstruct through traffic along a street by prohibiting specific movements at an intersection.

Application:

Local streets at intersections with collector / arterials

Type of Problem (Addresses):

<i>Primary</i>	<i>Secondary</i>
Volume	Bike Enviro/Safety
Vehicle Conflicts	
Ped Enviro/Safety	

Cost

Approx. \$3 000 to \$5 000



Local Examples:

- Chatelain at Merivale

Advantages


- Reduction in vehicle volume on roadway
- Can restrict entrance and/or exit from neighbourhood
- Can block selective vehicle movements
- Enhanced pedestrian safety and comfort by reduction in crossing distances and provision of a refuge.

Disadvantages

- Restricts access for residents and other local street users
- May divert traffic to adjacent streets
- Some non-compliance
- Can impact transit routes

Design and Program Guidelines/Warrants:

- Context specific

Traffic Management (Volumes)									
<p>Description:</p> <p>A variation of the forced turn island, the right-in/right-out island is a raised triangular island at an intersection approach that obstructs left turns and through movements to and from the intersecting street. The effectiveness of this measure can be increased when used with other measures on an area-wide basis.</p> <p>Bicycles can be permitted to make all movements including those motor vehicles are prevented from making. Gaps in channelization islands may be used to accommodate cyclists.</p>	<p style="text-align: center;"><u>RIGHT-IN/RIGHT-OUT ISLAND</u></p>								
<p>Purpose: Reduce through traffic</p> <p>Application: Local Streets and some collector streets</p> <p>Type of Problem (Addresses):</p> <table border="0"> <tr> <td><i>Primary</i></td><td><i>Secondary</i></td></tr> <tr> <td>Volume</td><td>Vehicle conflicts</td></tr> <tr> <td></td><td>Ped. Enviro/Safety</td></tr> <tr> <td></td><td>Bike. Enviro/Safety</td></tr> </table> <p>Cost Approx. \$5 000</p>	<i>Primary</i>	<i>Secondary</i>	Volume	Vehicle conflicts		Ped. Enviro/Safety		Bike. Enviro/Safety	 <p>Local Examples:</p> <ul style="list-style-type: none"> ▪ Kirkwood/Merivale area ▪ Besserer at King Edward ▪ Moodie/Richmond Road
<i>Primary</i>	<i>Secondary</i>								
Volume	Vehicle conflicts								
	Ped. Enviro/Safety								
	Bike. Enviro/Safety								
Advantages	Disadvantages								
<ul style="list-style-type: none"> ▪ Reduction in vehicle volume on roadway ▪ Can restrict entrance and/or exit from neighbourhood ▪ Can block selective vehicle movements 	<ul style="list-style-type: none"> ▪ Restricts access for residents and other local street users ▪ May divert significant volume of traffic to parallel street without traffic calming measures ▪ Some non-compliance ▪ Need no left turn signage on main street approaches ▪ Can impact transit routes ▪ Can impact cyclists 								
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ <i>Canadian Guide to Neighbourhood Traffic Calming</i>, Transportation Association of Canada, Ottawa, Canada, December 1998. 									

Traffic Management (Volumes)

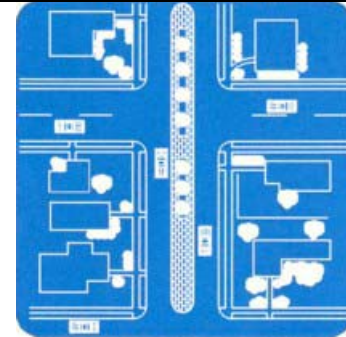
Description:

A median barrier consists of an elevated median located on the centreline of a two-way roadway through an intersection, which prevents left turns and through movements to and from intersecting roadways.

Pedestrian access is usually maintained and bicycle traffic may be accommodated through gaps in the obstruction (with or without pedestrian/cyclists signals). A median barrier can create a refuge for pedestrians and cyclists, enabling them to cross one direction of travel at time. A median can be enhanced by landscaping, if widths permit.

MEDIAN BARRIERS

(AKA median diverters, island diverters)



Purpose: Obstruct through traffic

Application:

Collector or Arterial Streets at intersections with local streets

Type of Problem (Addresses):

Primary
Volume
Ped Enviro/Safety
Bicycle Enviro/Safety
Vehicle Conflicts

Cost

Approx. \$500 per metre



Local Examples:

- Chatelain at Kirkwood
- Chartrand Avenue / Duford Drive (south intersection)

Advantages

- Reduction in vehicle volume on local roadway
- May enhance pedestrian safety and comfort if designed to reduce crossing distances and to provide a refuge and potential landscaped area.

Disadvantages

- Restricts access for residents and other local street users
- May divert traffic to adjacent streets
- Can impact adjacent parking if restricted width of roadway
- Increased maintenance
- Can impact transit routes
- Can impact cyclists

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

Traffic Management (Volumes)

Description:

Turn and movement prohibitions are intended to prevent non-local traffic from using a specific street. They are used to indicate to drivers that they are not permitted to turn right or left or continue through depending on the situation. Prohibitions may be employed at all times of the day, certain days of the week, or restricted to certain hours.

TURN AND MOVEMENT PROHIBITIONS



Purpose:

Prevent non-local traffic from using a street

Application:

Local and some collector streets

Type of Problem (Addresses):

<i>Primary</i>	<i>Secondary</i>
Volume	Vehicle conflicts
	Ped. Enviro/Safety
	Bike Enviro/Safety



Cost

Approx. \$250 per sign (typically more than one sign is required)

Local Examples:

- Navaho at Baseline Road
- Centrepointhe Drive at Baseline Road

Advantages

- Reduction in vehicle volume on roadway
- Can restrict entrance and/or exit from neighbourhood
- Can block selective vehicle movements and/or movements at certain times of the day
- Emergency and transit vehicles, and cyclists can be easily exempted from the prohibitions

Disadvantages

- Restricts access for residents and other local street users
- May divert traffic to adjacent streets without traffic calming measures
- Higher potential violation rates than with physical measures, greater need for enforcement
- Can impact pedestrian traffic if crossing movement on intersecting street is not considered
- Can impact cycling traffic if desired movement is inaccessible due to signal timing (even if the movement is permitted)

Design and Program Guidelines/Warrants:

- As per City practice

Traffic Management (Volumes)

Description:

This measure results in conversion of a two-way street to one-way operation preventing through traffic in one direction. Cyclist traffic can be accommodated on adjacent street or with contra flow bicycle lane.

ONE-WAY STREET



Purpose:

Discourage through traffic.

Application:

Local and some collector streets

Type of Problem (Addresses):

Primary Secondary
Volume Vehicle conflict

Cost

Approx. \$250 per sign, may require signal modifications



Local Examples:

- Metcalfe south of Pretoria

Advantages

- Eliminates traffic in one direction (may increase traffic in remaining direction)
- May reduce traffic volume
- Can enhance pedestrian environment by eliminating need for left turn pockets, thereby reducing crossing distances

Disadvantages


- May divert traffic to adjacent streets
- Restricts access for residents and other local street users
- Can result in higher operating speeds
- Results in increased travel distances and therefore additional traffic on the network
- Can impact transit routes
- Can impact cyclist traffic



Design and Program Guidelines/Warrants:

- As per City practice

Traffic Management (Volumes)									
<p>Description: Arterial road modifications can be considered when deficiencies or bottlenecks along an arterial are causing through traffic to divert to local or collector streets. For example, insufficient left turn storage capacity and associated delays on an arterial street may prompt drivers to avoid a signal by using adjacent local streets. Adding additional storage capacity on the arterial street may address through traffic issues on the local streets.</p>	<p><u>ARTERIAL ROAD MODIFICATION</u></p>								
<p>Purpose: Reduce through traffic</p> <p>Application: Arterial and collector streets</p> <p>Type of Problem (Addresses): <table> <tr> <td><i>Primary</i></td><td><i>Secondary</i></td></tr> <tr> <td>Volume</td><td>Vehicle conflicts</td></tr> <tr> <td></td><td>Ped. Enviro/Safety</td></tr> <tr> <td></td><td>Bike Enviro/Safety</td></tr> </table> </p> <p>Cost Can vary significantly</p>	<i>Primary</i>	<i>Secondary</i>	Volume	Vehicle conflicts		Ped. Enviro/Safety		Bike Enviro/Safety	<p>Local Examples:</p> <ul style="list-style-type: none"> ▪ Hunt Club (between Merivale Road & Woodroffe Avenue) resolved Woodfield / Medhurst issues ▪ Double left on Vanier Parkway at Beechwood resolved some through traffic in New Edinburgh. ▪ Airport Parkway Ramps at Hunt Club reduced traffic on Flannery
<i>Primary</i>	<i>Secondary</i>								
Volume	Vehicle conflicts								
	Ped. Enviro/Safety								
	Bike Enviro/Safety								
Advantages	Disadvantages								
<ul style="list-style-type: none"> ▪ May avoid the need for local street measures ▪ Can enhance overall efficiency of the transportation system ▪ Can eliminate through traffic 	<ul style="list-style-type: none"> ▪ Arterial road modifications are often expensive ▪ Cost can be prohibitive if undertaken only as an area traffic management initiative 								
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ As per City practice 									

Appendix B. TRAFFIC MANAGEMENT (SPEED AND BEHAVIOUR)

Traffic Management (Speed and Behaviour)	
Description: A speed zone identifies the maximum legal speed on a street. Typical applications include combinations with school area or playground signs.	SPEED ZONING
Purpose: To establish an appropriate travel speeds on a section of roadway.	
Application: Local streets and some collector streets	
Type of Problem (Addresses): Primary Speed Ped. Enviro/Safety	
Cost Approx. \$250 per sign + enforcement cost	Local Examples: <ul style="list-style-type: none"> St. Laurent south north of Walkley
Advantages	Disadvantages
<ul style="list-style-type: none"> Can reduce speeds along specific sections of road 	<ul style="list-style-type: none"> Requires regular police enforcement
Design and Program Guidelines/Warrants: <ul style="list-style-type: none"> As per City policy 	

Traffic Management (Speed and Behaviour)	
<p>Description:</p> <p>This measure results in the conversion of a one-way street to traffic circulation in both directions. Traffic, in some cases, can be slowed due to increased “friction” with opposing traffic, and increased turning movements, particularly left turns, that slow traffic by momentarily blocking a through lane if no turn lane is provided.</p>	<p>ONE-WAY TO TWO-WAY STREET CONVERSION</p> 
<p>Purpose:</p> <p>To reduce speeds</p> <p>Application:</p> <p>Local street, collector street, and arterial street</p> <p>Type of Problem (Addresses):</p> <p>Primary Secondary Speed Volume Ped. Enviro/Safety</p> <p>Cost</p> <p>Varies significantly</p>	 <p>Local Examples:</p>
Advantages	Disadvantages
<ul style="list-style-type: none"> May reduce traffic speed May reduce traffic volume as a result of slower travel speeds and delay related to left turn movements Increased access Can enhance pedestrian environment by slowing traffic Reduced travel distances and therefore reduced traffic on network. Can improve access for cyclists 	<ul style="list-style-type: none"> Increased vehicle conflicts Can increase vehicle and pedestrian conflicts through increased turning movements May divert traffic to adjacent streets as a result of slower travel speeds and delay related to left turn movements Significant change in traffic operations
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> Context specific 	

Traffic Management (Speed and Behaviour)

Description:

Adding additional on-street parking reduces the roadway width available for vehicle movement. Vehicle speed, in some cases, can be reduced due to "friction" with parked vehicles. Parking can also be used as a non-physical means of introducing horizontal deflections, by restricting parking to a single side of a road in an alternating fashion. Cyclist traffic and potential pinch points should be considered when parking is used as horizontal deflection.

ON-STREET PARKING



Purpose:

Add parking

Can reduce vehicle speed.

Can improve pedestrian environment and safety

Application:

Local streets, collector streets, and arterial streets

Type of Problem (Addresses):

Primary

Secondary

Ped. Enviro/Safety

Speed

Cost

Approx. \$250 per sign; may require other infrastructure pavement improvements



Local Examples:

- Kent Street (one of four through lanes was converted to parking)
- Parkdale Avenue – alternate sides of street
- Alta Vista – 2 lanes converted, one to parking and one to bike lanes.

Advantages


- Can reduce travel speeds
- Improved pedestrian environment as parked vehicles act as a buffer and barrier between motor vehicle traffic and the sidewalk, effective narrowing of crossing distance
- Increased parking supply

Disadvantages

- Traffic flow can be interrupted by parking manoeuvres
- Parked cars can pose a hazard to cyclists through sudden vehicle movement or opening of doors (adequate clearance area should be provided).
- On-street parking is space that could be used for wider sidewalks or bike lanes
- Requires parking demand at times of desired effect

Design and Program Guidelines/Warrants:

- As per City policy
- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

Traffic Management (Speed and Behaviour)									
<p>Description:</p> <p>Pavement markings can be used to visually narrow a roadway. Offset edge lines, on both sides of the street, can keep vehicles from “wandering” across wide lanes, may reduce speeds, and can discourage passing on the right. Lane striping in the centre portion of the street may guide vehicles to a narrow section next to the curb. They can also provide a greater buffer area between vehicles and pedestrians and adjacent properties.</p>	<p>PAVEMENT MARKINGS</p>								
<p>Purpose:</p> <p>Restrict motor vehicle traffic to more limited portion of the roadway</p> <p>Application:</p> <p>Local streets, collector street, arterial streets</p> <p>Type of Problem (Addresses):</p> <table> <tr> <td><i>Primary</i></td><td><i>Secondary</i></td></tr> <tr> <td>Driver Behaviour</td><td>Ped. Enviro/Safety</td></tr> <tr> <td></td><td>Bike Enviro/Safety</td></tr> <tr> <td></td><td>Speed</td></tr> </table> <p>Cost</p> <p>Approx. \$5 per metre</p>	<i>Primary</i>	<i>Secondary</i>	Driver Behaviour	Ped. Enviro/Safety		Bike Enviro/Safety		Speed	 <p>Local Examples:</p> <ul style="list-style-type: none"> ▪ McClellan Road (Arlington Woods). ▪ Longfields Drive (Barrhaven) ▪ Bridlewood Drive (Bridlewood)
<i>Primary</i>	<i>Secondary</i>								
Driver Behaviour	Ped. Enviro/Safety								
	Bike Enviro/Safety								
	Speed								
Advantages	Disadvantages								
<ul style="list-style-type: none"> ▪ Inexpensive implementation ▪ May be implemented quickly ▪ No impact on emergency response ▪ Can enhance pedestrian environment by providing additional buffer area 	<ul style="list-style-type: none"> ▪ Increased maintenance cost ▪ May be interpreted as a bicycle lane or parking area ▪ May be ineffective during winter conditions 								
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ Context specific 									

Traffic Management (Speed and Behaviour)

Description:

This measure physically reduces the number and/or width of travel lanes available on the roadway, reducing the curb-to-curb width along the length of the street. In some cases, travel lanes may be reduced while maintaining turn lanes at intersections. Another common example is the conversion, on collector or arterial streets, of a four lane two-way section to one lane in each direction with a centre turn lane. Depending on the situation, these conversions can maintain similar volumes of traffic while reducing speeds and conflicts.

NARROWING OF STREETS



Purpose:

Reduce conflicts (in case of four lane conversion to two lane and continuous left turn lane)

Enhance pedestrian environment and safety

Application:

Local streets, collector streets, and some arterial streets

Type of Problem (Addresses):

Primary *Secondary*

Conflicts
Ped. Enviro/Safety
Bicycle Enviro/Safety
Speed

Cost

Varies



Local Examples:

- Piccadilly at Byron
- Wellington
- Kent
- Wilbrod Street west of King Edward Avenue

Advantages

- Can enhance local access
- Can enhance pedestrian and bicycle environment
- Can reduce conflicts (in case of four lane conversion to two lane and continuous left turn lane)
- Can reduce speeds

Disadvantages

- Can be expensive if done as a retrofit due to utility relocations
- Perceived or actual reduction in roadway capacity can be controversial
- Can result in increased delay and travel times

Design and Program Guidelines/Warrants:

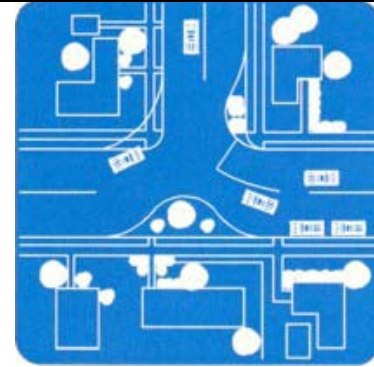
- Context specific

Traffic Management (Speed)

Description:

A realigned intersection is a change in alignment of an existing T-intersection with straight approaches to one with curving streets that meet at right angles. They result in former through movements becoming turning movements.

REALIGNED INTERSECTION



Purpose:

Reduce speed
Reduce vehicle conflicts

Application:

Local streets and some collector streets

Type of Problem (Addresses):

Primary Secondary
Speed Volume
Vehicle Conflicts

Cost

Approx: \$10 000 and up



Local Examples:

- Johnson at Zaidan
- Huron at Island Park (north of Carling)

Advantages

- Can reduce speed
- Can reduce conflicts
- One of few options for T-intersections

Disadvantages

- Curb realignment can be costly
- Additional right of way may be required

Design and Program Guidelines/Warrants:

- Context specific

Appendix C. PHYSICAL MEASURES (TRAFFIC CALMING)

PHYSICAL MEASURES (TRAFFIC CALMING)

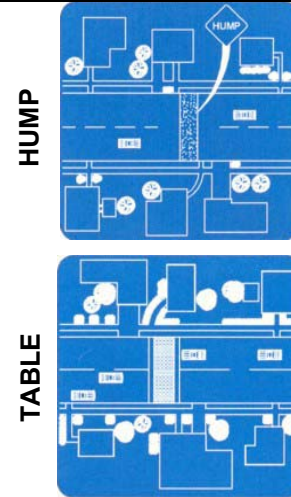
Description:

A speed hump is a raised portion of the roadway, which vertically deflects both the wheels and frame of a traversing vehicle.

Speed Tables are flat-topped speeds humps. The long flat area of the speed table results in a higher design speed than speed humps. The angle of approach can be designed to be bicycle friendly.

SPEED HUMPS/TABLE

(AKA undulations, flat topped speed hump, trapezoidal humps)



Purpose:

Reduce vehicle speeds

Application:

Local streets and some collector streets

Type of Problem (Addresses):

Primary	Secondary
Speed	Volume
	Ped Enviro/Safety

Cost

Approx. \$3 000 (hump)

\$10 000 (table)



Local Examples:

- Riverdale
- Des Epinettes
- Churchill (north of Richmond Road)
- Lyon

Advantages

- Reduces vehicle speeds

Disadvantages

- Some traffic may be diverted to adjacent streets
- Can delay emergency vehicles
- Can be relatively costly due to current Environmental Assessment (EA) requirements
- Can be very uncomfortable to vehicle occupants with certain disabilities

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

PHYSICAL MEASURES (TRAFFIC CALMING)

Description:

Raised crosswalks are speed tables that are marked as crosswalks. The flat surface of the speed table can be constructed with a brick or other textured material. The angle of approach can be designed to be bicycle friendly.

RAISED CROSSWALKS

Purpose:

Reduce vehicle speed
Improve pedestrian visibility
Reduce pedestrian-vehicle conflicts

Application:

Local streets and some collector streets

Type of Problem (Addresses):

Primary Secondary
Speed Vehicle conflicts
Ped. Enviro/Safety Volume

Cost

Approx. \$10 000



Local Examples:

- Kirkwood at Byron
- Des Epinettes at Yves Richer Park

Advantages

- Reduction in vehicle speeds
- Enhanced pedestrian comfort and safety when used in conjunction with crosswalks

Disadvantages

- Some traffic may be diverted to adjacent streets
- Can be relatively costly due to current Environmental Assessment (EA) requirements
- Can be very uncomfortable to vehicle occupants with certain disabilities

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

PHYSICAL MEASURES (TRAFFIC CALMING)

Description:

A raised intersection is an intersection, including crosswalks, constructed at a higher elevation than the approaching roadways. They help to clearly define the pedestrian zone. The angle of approach can be designed to be bicycle friendly.

RAISED INTERSECTION

(AKA raised junctions, intersection humps)



Purpose:

Reduce vehicle speeds
Better define crosswalk areas
Reduce pedestrian-vehicle conflicts

Application:

Local streets and some collector roads

Type of Problem (Addresses):

Primary	Secondary
Ped. Enviro/Safety	Volume
	Speed
	Vehicle conflicts

Cost

Approx. \$30 000 per installation.



Local Examples:

- Cartier Street at Somerset
- Broadview Avenue at Avondale Avenue
- Lyon at Gladstone / Kirkwood at Byron.
- Sunnyside at Grovesnor Avenue

Advantages

- Reduced vehicle speed
- Enhance pedestrian comfort and safety

Disadvantages

- High cost
- Some traffic may be diverted to adjacent streets that do not have traffic calming measures.
- Delays to emergency vehicles
- Can be relatively costly due to current Environmental Assessment (EA) requirements
- Can be very uncomfortable to vehicle occupants with certain disabilities

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

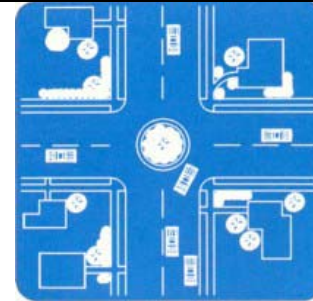
PHYSICAL MEASURES (TRAFFIC CALMING)

Description:

A traffic circle is a raised island located in the centre of an intersection around which traffic must circulate. They are sometimes landscaped in the centre. The outer ring is usually mountable so large vehicles can navigate the otherwise small curb radii. Traffic circles are generally located within the existing paved area of the intersection. They can effectively reduce speeds and volumes if used in series.

TRAFFIC CIRCLE (MINI)

(AKA raised junctions, intersection humps)



Purpose:

Reduce vehicle speeds

Reduce vehicle-vehicle conflicts at intersections.

Application:

Local streets and some collector streets

Type of Problem (Addresses):

Primary Secondary
Speed Volume
Vehicle conflicts

Cost

Approx: \$10 000



Local Examples:

- Lenester Avenue at Hare Avenue

Advantages

- Reduces vehicle speed
- Reduces vehicles conflicts
- Landscaped island can enhance streetscape

Disadvantages

- Comparatively expensive measures
- Can direct vehicles into unmarked crosswalk area on narrower streets
- Cyclists may feel "squeezed" by motor vehicles trying to pass at a traffic circle.
- Can restrict access for large vehicles
- Can slow emergency vehicles
- Some traffic may be diverted to adjacent streets that do not have traffic calming measures
- Maintenance more difficult, especially snow removal
- Can be relatively costly due to current Environmental Assessment (EA) requirements

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

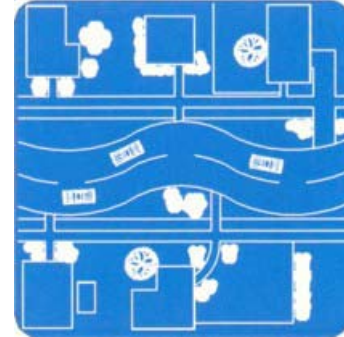
PHYSICAL MEASURES (TRAFFIC CALMING)

Description:

A chicane is a series mid-block curb extensions or islands on alternating sides of a roadway that narrow the roadway and require drivers to follow an S-shaped path. They can be used on one-way or two-way streets and can be single lane or two-lane configurations.

CHICANES

(AKA deviations, serpentine, reversing curves)



Purpose:

Discourage through traffic

Reduce vehicle speeds

Application:

Local streets and some collector streets

Type of Problem (Addresses):

Primary
Speed

Secondary
Volume

Cost

Varies \$10 000 to \$50 000



Local Examples:

- Kirkwood (north of the Queensway)
- Chapel (north of Mann) –lateral shift
- Parkdale (south of Queensway)

Advantages

- Can reduce vehicle speed, volume, and conflicts.
- Landscaped chicane can enhance streetscape

Disadvantages

- Comparatively expensive measure
- Can be relatively costly due to current Environmental Assessment (EA) requirements
- Some traffic may be diverted to adjacent streets that do not have traffic management measures.
- May require removal on on-street parking
- Increased street maintenance requirements
- Cyclists may be “squeezed” by motor vehicle traffic at deflection points

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

Appendix D. PHYSICAL MEASURES (OTHER)

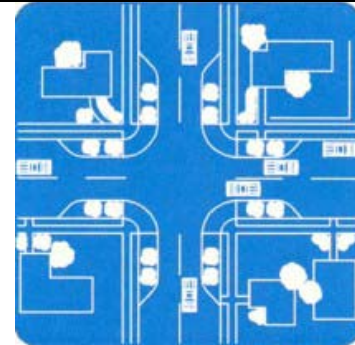
PHYSICAL MEASURES (OTHER)

Description:

Intersection narrowings are curb extensions at intersections that reduce roadway width curb to curb. The curb can be extended from one or both sides depending on the objective. The effectiveness of an intersection narrowing can be increased when used in conjunction with speed humps, raised crosswalks, raised intersections, textured crosswalks, landscaping, or curb radii reductions.

INTERSECTION NARROWINGS

(AKA curb extensions, neckdowns, nubs, bulbouts)



Purpose:

- Reduce crossing distance for pedestrians
- Increase pedestrian visibility
- Prevent parking close to intersection
- Reduce vehicle speeds

Application:

Local Streets, collector streets, and some arterial

Type of Problem (Addresses):

Primary Secondary
Ped. Enviro/Safety Speeds

Cost

Approx. \$7 000 each or higher if drainage modifications are required.



Local Examples:

- Many examples throughout the central area of the city

Advantages

- Reduced pedestrian crossing distances, extended pedestrian environment, and potential for enhanced landscaping and street amenities
- Some reduction in vehicle speeds
- Helps define parking areas

Disadvantages

- Reduces potential pavement area for cyclists
- May require removal of on-street parking
- Can impact manoeuvrability of large vehicles resulting in intrusion into other travel lanes or mounting the curb (with associated pedestrian and maintenance issues)
- Additional maintenance cost particularly snow removal
- Cyclists may be "squeezed" by motor vehicle traffic at deflection points

Design and Program Guidelines/Warrants:

- Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

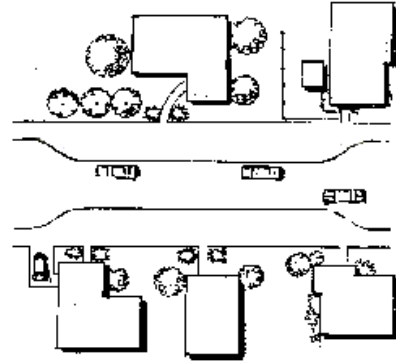
PHYSICAL MEASURES (OTHER)

Description:

Mid-block narrowings are curb extension at mid-block that reduce the roadway width curb to curb at that location. Extensions of the curb can be from either or both sides of the street, and can leave the street cross section with two narrow lanes or with a single lane.

MID-BLOCK NARROWINGS

(AKA chokers, pinch points, mid-block bulbouts)



Purpose:

Reduce vehicle speeds

Application:

Local Streets, collector streets, and some arterial

Type of Problem (Addresses):

Primary Secondary
Ped. Enviro/Safety Speed

Cost

Approx. \$20 000 for both sides.



Local Examples:

- Flora near Bronson
- Clifton Road near Scott and Richmond Road (one lane)

Advantages

- Reduced pedestrian crossing distances, extended pedestrian environment, and potential for enhanced landscaping and street amenities.
- May reduce speeds
- Provide buffer for sidewalk
- Help define parking areas
- Discourages vehicles from passing on the right

Disadvantages

- Reduces potential pavement area for cyclists
- May require removal of on-street parking
- Additional maintenance cost particularly snow removal

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

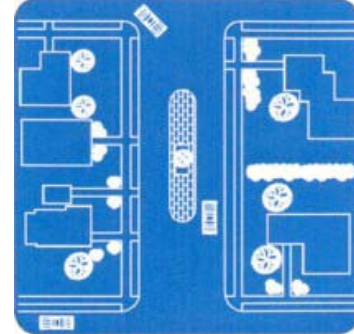
PHYSICAL MEASURES (OTHER)

Description:

A centre island narrowing is an elevated median constructed on the centreline of a two-way roadway to reduce the overall width of the adjacent travel lanes. If required, bicycle lanes can be included to prevent motorists from intruding into the path of cyclists.

CENTRE ISLAND NARROWINGS (MEDIAN)

(AKA Raised median island, midblock medians, median slow points, median chokers)



Purpose:

Reduce vehicle speeds

Reduce pedestrian-vehicle conflict

Application:

Local streets, collector streets, arterial streets

Type of Problem (Addresses):

Primary Secondary
Ped. Enviro/Safety Speed



Cost

Approx. \$5 000 and up

Local Examples

- Laperriere at Kirkwood
- Castlefrank at Katimavik
- Britannia at Howe
- Flannery at Brookfield (\$150 000)

Advantages

- Reduced vehicle speeds
- Can serve as pedestrian refuge
- Can accommodate landscaping

Disadvantages

- May require removal of on-street parking
- May restrict access
- Increased maintenance cost
- May reduce potential pavement area for cyclists

Design and Program Guidelines/Warrants:

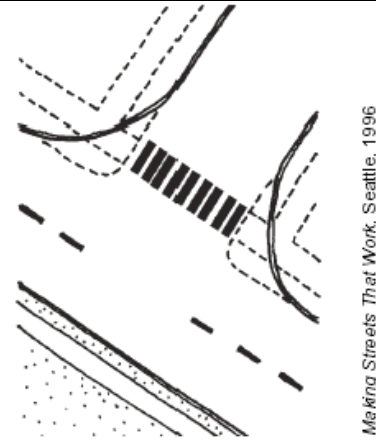
- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

PHYSICAL MEASURES (OTHER)

Description:

A curb radius reduction is the reconstruction of an intersection corner with a smaller radius, usually in the 3 m to 5m range.

CURB RADII REDUCTION



Purpose:

Slow right turning vehicles
Reduce crossing distance for pedestrian
Improve pedestrian visibility

Application:

Local streets and collector streets, and some arterial streets

Type of Problem (Addresses):

Primary
Ped. Enviro/Safety

Cost

Approx. \$5 000



Local Examples:

- Woodroffe at Lenester (construction 2003)
- Cartier Street between Park and Laurier

Advantages


- Speed of right turning vehicles reduced
- Reduced pedestrian crossing and increased pedestrian visibility
- Can improve conditions for cyclists by reducing the speed of turning vehicles and by discouraging inappropriate use of a street by large vehicles.

Disadvantages


- Larger vehicles may need to infringe on other travel lanes to negotiate turn or mount curb (with associated pedestrian and maintenance issues)

Design and Program Guidelines/Warrants:

- *Canadian Guide to Neighbourhood Traffic Calming*, Transportation Association of Canada, Ottawa, Canada, December 1998.

PHYSICAL MEASURES (OTHER)	
<p>Description: A lateral shift, similar to a chicane, is a curb extension that shifts the roadway horizontally without returning to the original centreline.</p>	<p>LATERAL SHIFT</p> 
<p>Purpose: Reduce speed</p> <p>Application: Local street, collector street</p> <p>Type of Problem (Addresses): <i>Primary</i> <i>Secondary</i> Speed Behaviour</p> <p>Cost Approx. \$7 000 each or higher if drainage modifications are required.</p>	<p>Local Examples:</p> <ul style="list-style-type: none"> ▪ Chapel north of Mann ▪ Sandy Hill Neighbourhood
Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ Can slow traffic on higher volume streets ▪ Maintains access for large vehicles 	<ul style="list-style-type: none"> ▪ May impact on-street parking ▪ May cause driver confusion
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ Context specific 	

Appendix E. TRANSPORTATION DEMAND MANAGEMENT

TRANSPORTATION DEMAND MANAGEMENT							
<p>Description:</p> <p>Transportation Demand Management (TDM) measures improve people's travel options and encourage personal travel choices that benefit individuals and their communities. This is accomplished by reducing the number of motor vehicle trips people make, and supporting increased reliance on walking, biking, carpooling or using transit as a means of getting around. The City is developing new approaches to TDM that extend beyond trip-end and employer-based programs and reach households at the neighbourhood level. It is these new programs that show the most promise for assisting in addressing neighbourhood traffic issues.</p> <p>The City is considering development of a neighbourhood-based TDM toolkit to guide staff, consultants and community groups in considering TDM either as an integral part of area traffic management processes, or independently.</p>	<p>NEIGHBOURHOOD-BASED TDM TOOLKIT</p>						
<p>Purpose:</p> <p>Reduce motor vehicle trips</p> <p>Educate public on travel options and traffic issues</p> <p>Application:</p> <p>Local street, collector streets, arterial streets</p> <p>Type of Problem (Addresses):</p> <table border="0"> <tr> <td><i>Primary</i></td><td><i>Secondary</i></td></tr> <tr> <td>Volume</td><td>Ped Enviro/Safety</td></tr> <tr> <td></td><td>Bike Enviro/Safety</td></tr> </table> <p>Cost</p> <p>Varies</p>	<i>Primary</i>	<i>Secondary</i>	Volume	Ped Enviro/Safety		Bike Enviro/Safety	<div data-bbox="852 892 1502 1239">  </div> <p>Local Examples:</p> <ul style="list-style-type: none"> ▪ Under development
<i>Primary</i>	<i>Secondary</i>						
Volume	Ped Enviro/Safety						
	Bike Enviro/Safety						
Advantages	Disadvantages						
<ul style="list-style-type: none"> ▪ Can be used as a precursor to other measures ▪ Can reduce motor vehicle trips as a whole ▪ Can be used to educate public on neighbourhood traffic issues 	<ul style="list-style-type: none"> ▪ Usually requires sustained effort 						
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ As per City program 							

Appendix F. EDUCATION AND ENFORCEMENT

EDUCATION AND ENFORCEMENT

Description:

A neighbourhood speed watch program consists of a partnership between the City and the concerned neighbourhood to educate drivers to slow down and exercise caution when using neighbourhood streets. It can also help the residents better understand the nature and extent of local speeding issues.

Drivers are made aware of their travel speed through the use of speed display boards. A speed display board typically consists of a mobile display board and radar unit. It alerts drivers by displaying their travel speed and the posted speed limit. The City may lend the equipment to volunteer residents and trains them in its use.

The device can be effective as a precursor to enforcement by identifying locations where there is a problem.

NEIGHBOURHOOD SPEED WATCH

Purpose:

Educate drivers on excessive speed

Educate residents on nature of speed issues

Application:

Local street, collector streets

Type of Problem (Addresses):

Primary

Secondary

Behaviour

Vehicle conflicts

Speed

Ped Enviro/Safety

Bike Enviro/Safety

Cost

Varies



Local Examples:

- N/A (temporary use)

Advantages

- Reduction in vehicle speed on roadway
- Can be used as a precursor to other measures
- Can be used to educate public on nature of speed issue

Disadvantages

- Usually requires sustained or periodic enforcement effort
- Effect on speed reduction is usually fleeting unless combined with other measures

Design and Program Guidelines/Warrants:

- As per City program

EDUCATION AND ENFORCEMENT	
<p>Description: Safety campaigns are usually directed at a specific target group of road users and are designed to change their behaviour. They are likely to be most successful in the self-contained suburban communities, where most of the problems are caused by internally generated traffic.</p> <p>Specific campaigns, programs or initiatives may require community participation and support.</p>	<p><u>SAFETY AND EDUCATION CAMPAIGNS</u></p>
<p>Purpose: Educate road users</p> <p>Application: Local streets, collector streets, arterial streets</p> <p>Type of Problem (Addresses): <i>Primary</i> <i>Secondary</i> Behaviour Speed</p> <p>Cost \$0 to \$50 000</p>	<div data-bbox="1062 722 1273 1058" data-label="Image"> </div> <p>Local Examples:</p> <ul style="list-style-type: none"> ▪ Ongoing programs ▪ Share the road ▪ Rear end collision prevention initiative ▪ Community-based aggressive driver awareness and prevention program
Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ Can be a low cost measure that may address specific local issues ▪ May avert the need for physical measures 	<ul style="list-style-type: none"> ▪ To be effective requires identifiable target group ▪ Usually requires sustained effort
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ As per City program 	

TARGETED ENFORCEMENT	
<p>Description: Targeted enforcement as a traffic management measure that includes stepped up enforcement of speed limits and other traffic laws such as failure to yield to pedestrians. Visible and targeted enforcement can be very effective deterrent and is an important first step in addressing neighbourhood traffic issues.</p>	<p>TARGETED ENFORCEMENT</p>
<p>Purpose: To reduce traffic speed and increase safety</p> <p>Application: Local streets, collector streets, arterial streets</p> <p>Type of Problem (Addresses): <i>Primary</i> <i>Secondary</i> Speed Volume (for restricted turn violations) Behaviour Ped Enviro/Safety Bike Enviro/Safety</p> <p>Cost Varies</p>	<p>Local Examples:</p> <ul style="list-style-type: none"> ▪ Ongoing throughout city
Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ May avert the need for physical measures ▪ Can be done immediately and can be effective ▪ Flexible; can be tailored to suit needs 	<ul style="list-style-type: none"> ▪ Usually requires sustained effort ▪ May be difficult to provide enforcement to the extent and with the frequency that residents desire.
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ As per City policy 	

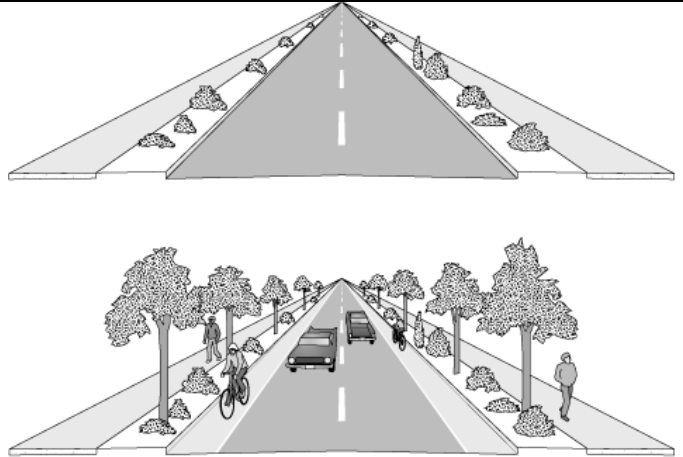
Appendix G. STREET ENVIRONMENT

STREET ENVIRONMENT

Description:

Streetscaping incorporates a number of potential elements including landscaping and pedestrian amenities such as benches and lighting. Streetscaping can slow traffic and enhance the pedestrian environment. Street trees can effectively narrow the perceived roadway width and reduces the forward field of view often resulting in reduced speeds. Alternating the type of tree used at intersection can serve as a visual cue to drivers that an intersection is approaching. Amenities, such as lighting can also alter driver behaviour. Pedestrian scale lighting is a cue to the nature of the street and also reduces the forward field of view.

STREETSCAPING



Purpose:

Enhance pedestrian environment
Alert driver to context of roadway
Reduce speeds

Application:

Local streets, collector streets, arterial streets

Type of Problem (Addresses):

Primary Secondary
Ped. Enviro/Safety Speed
Behaviour

Cost

Varies significantly



Local Examples:

- Ottawa parkways
- Island Park Drive

Advantages

- May reduce speeds
- Positive aesthetic effect

Disadvantages

- Possible increased maintenance cost
- Can create sight distance issues if not done correctly
- Can be impacted by salt spray
- Vegetation may interfere with roadway illumination

Design and Program Guidelines/Warrants:

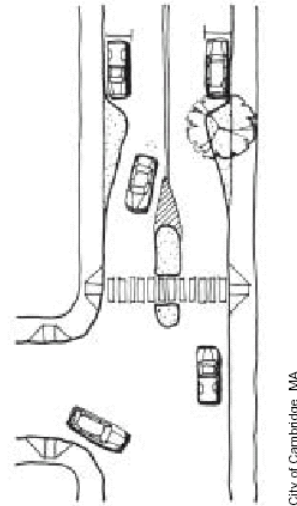
- Context specific

STREET ENVIRONMENT

Description:

Gateways include decorative signing and/or landscaping to visually identify the entrance to neighbourhoods or commercial areas. This measure alerts drivers to the nature of the area and is intended to make the area appear as a destination rather than a through route. Cyclist access should be considered in the design of a gateway.

GATEWAYS



Purpose:

Alter driver to context of roadway
Reduce volumes
Reduce speeds

Application:

Local streets, collector streets, arterial streets

Type of Problem (Addresses):

Primary Secondary
Speed Behaviour

Cost

Approx. \$5 000 but can be much higher depending on local circumstances.



Local Examples:

- Castlebrook Lane at Centrepoin Drive
- Flannery and Brookfield
- Preston at Carling
- Orleans at Innes (arterial)

Advantages


- May reduce speed
- Positive aesthetic effect


Disadvantages


- Can be expensive
- Possible increased maintenance cost

Design and Program Guidelines/Warrants:

- Context specific

STREET ENVIRONMENT	
<p>Description: A textured crosswalk is a crosswalk incorporating a textured and/or patterned surface that contrasts with the adjacent roadway and sidewalk.</p>	<p>TEXTURED CROSSWALK</p>
<p>Purpose: To indicate pedestrian crossing to approaching traffic To better define the crossing location for pedestrians</p> <p>Application: Local streets, collector streets, arterial streets</p> <p>Type of Problem (Addresses): <i>Primary</i> <i>Secondary</i> Ped. Enviro/Safety Driver Behaviour</p> <p>Cost Approx. \$3 000 to \$7 000 but can be much higher depending on local circumstances.</p>	 <p>Local Examples:</p> <ul style="list-style-type: none"> ▪ Rochester and Primrose ▪ Cumberland at Watters - imprinted asphalt ▪ McArthur at Vanier Parkway
Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ Reinforces pedestrian priority and may reduce conflicts as a result ▪ Enhanced appearance of street 	<ul style="list-style-type: none"> ▪ May have maintenance issues depending on base, surface material, and vehicle loads ▪ Imprinted asphalt texture can wear rapidly in high heat conditions ▪ Uneven surfaces can pose a tripping hazard ▪ Can complicate installation of loop detectors
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ <i>Canadian Guide to Neighbourhood Traffic Calming</i>, Transportation Association of Canada, Ottawa, Canada, December 1998. 	

STREET ENVIRONMENT	
<p>Description: Textured and coloured pavement includes the use of stamped pavement or alternate paving materials to create an uneven surface the length of the road. Materials include cobblestone, bricks and textured concrete.</p>	<p>TEXTURED SURFACES</p>
<p>Purpose: To designate special area</p> <p>Application: Local streets, collector streets, and some arterial streets</p> <p>Type of Problem (Addresses): <i>Primary</i> <i>Secondary</i> Ped. Enviro/Safety Driver Behaviour Speed</p> <p>Cost: Approx. \$10 000 but can be much higher depending on local circumstances.</p>	 <p>Local Examples:</p> <ul style="list-style-type: none"> Primrose at Rochester
Advantages	Disadvantages
<ul style="list-style-type: none"> Can reduce vehicle speeds over an extended length Can have positive aesthetic value 	<ul style="list-style-type: none"> Can be expensive Can result in increased noise May have maintenance issues depending on base, surface material, and vehicle loads Uneven surfaces can pose a tripping hazard Imprinted asphalt texture can wear rapidly in high heat conditions
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> Context specific 	

STREET ENVIRONMENT	
<p>Description: Sidewalks may be added on roads where there are reported pedestrian/vehicle conflicts. It should be noted that these measures reduce conflicts through separation of the modes, rather than by calming or reducing traffic.</p>	<p>SIDEWALKS</p>
<p>Purpose: Reduce Vehicle / Pedestrian conflicts</p> <p>Application: Local streets, collector streets, arterial streets</p> <p>Type of Problem (Addresses): <i>Primary</i> Ped. Enviro/Safety</p> <p>Cost Approx. \$350 per metre</p>	 <p>Local Examples:</p> <ul style="list-style-type: none"> ▪ Britannia Road (looking toward Carling) ▪ Main at St. Paul University
Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ Can reduce vehicle / pedestrian conflicts 	<ul style="list-style-type: none"> ▪ Cyclists may use sidewalk if cyclist needs are not adequately addressed
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ As per City standards 	

STREET ENVIRONMENT

Description:

A woonerf (Dutch for "street for living") is a street designed primarily for foot traffic, bicyclists and children playing - automobiles are treated as guests. The street is designed with physical constraints that allow only local motor vehicle access (residents and visitors) at low speeds (under 15 km/h). Streets are designed with physical constraints that do not allow high speed. Woonerven can be considered a combination of specific traffic calming measures such as a extreme chicane and streetscaping.

WOONERF

Purpose:

Reduce vehicle speed
Reduce vehicle volume
Reduce Vehicle / Pedestrian conflicts
Enhance pedestrian environment

Application:

Local street

Type of Problem (Addresses):

Primary
Ped. Enviro/Safety
Speed
Volume

Cost: \$200 000 (one block on Cambridge)



Local Examples:
Cambridge

Advantages

- Can be less expensive when constructed as part of a new street and depending on the design (streets are very narrow, which reduces the total paved surface area, and there is no need for curb and sidewalks)
- Reduces vehicle / pedestrian conflicts
- Very effective at reducing speed
- Very effective at changing the nature of a street
- Can be bicycle friendly due to lower motor vehicle travel speeds



Disadvantages

- Generally not appropriate where there is a need to provide nonresident motorists with access to services or through travel.
- Can be expensive
- High maintenance cost

Design and Program Guidelines/Warrants:

- Context specific

Appendix H. TRAFFIC CONTROL

TRAFFIC CONTROL	
<p>Description: Stop signs are used for right of way control. Warrants for stop signs are provided in the Ontario Traffic Manual and City policy.</p>	<p>STOP SIGNS</p> 
<p>Purpose: Reduce conflicts at intersections</p> <p>Application: Local and some collector streets based on warrants</p> <p>Type of Problem (Addresses): <i>Primary</i> <i>Secondary</i> Vehicle conflicts Volume Ped. Enviro/Safety Bike Enviro/Safety</p> <p>Cost Approx. \$250 per sign</p>	 <p>Local Examples</p> <ul style="list-style-type: none"> ▪ Widely used
Advantages	Disadvantages
<ul style="list-style-type: none"> ▪ Relatively low cost option ▪ Warranted stops can reduce vehicle conflicts. 	<ul style="list-style-type: none"> ▪ Unwarranted stops signs typically result in compliance problems and in some cases can result in higher speeds ▪ Increased noise levels associated with braking and acceleration ▪ Misuse can lead to disrespect for stop signs in general ▪ Reduce cycling benefit of side streets
<p>Design and Program Guidelines/Warrants:</p> <ul style="list-style-type: none"> ▪ As per City warrants 	

TRAFFIC CONTROL

Description:

Modern roundabouts are similar to mini traffic circles with traffic circulating around a centre island. Roundabouts are used at higher volume intersections to control competing movements. They are larger than traffic circles and have splitter islands to channel approaching traffic to the right. Roundabouts can substitute for traffic signals or all-way stops in certain situations, can reduce vehicle conflicts, and are most effective with moderate, directionally balanced volumes of traffic.

MODERN ROUNDABOUTS



Purpose:

Reduce vehicle conflicts

Application:

Arterial and collector streets

Type of Problem (Addresses):

Primary *Secondary*
Vehicle conflicts
Speeds

Cost

Varies: \$100 000 and up



Local Examples:

- Sussex Drive at Rideau Gate
- Waterbridge at Cresthaven, Barrhaven

Advantages

- Reduces vehicle conflicts
- Reduction in vehicle speeds
- Can serve as a "gateway"

Disadvantages

- Requires relatively large land area compared to a typical signalized intersection
- May require removal of on-street parking
- Additional maintenance cost, particularly snow removal
- Potential for greater pedestrian crossing distances
- Cyclists may be "squeezed" by motor vehicle traffic at deflection points

Design and Program Guidelines/Warrants:

- To be developed