

Traffic Calming Measures							
Traffic Calming Measure	Application	Impact	Pro	Con	Viability	Capital Cost	Maintenance Requirements
<u>Vertical Deflection</u>							
Speed Cushion	Raised area on the road but does not cover the entire width of the road. To be used on roads with speed limits 50km/h or less.	-Reduction of 85th percentile of up to 8km/h -Traffic volume reduction of 30%	-Lower cost -Reduced traffic noise due to slower traffic -Large vehicle can straddle the speed cushion	-Could affect emergency response -Could affect snow plowing operations -More difficult to construct compared to speed hump -Additional signs and pavement markings could detract from the appearance of the street -Traffic may be diverted to side streets -Risk of vehicle damage	Not appropriate on Urban or Rural Arterial	> \$10,000	Pavement markings Signage
Speed Hump/ Table	A raised area of roadway which causes a vertical upward movement of a traversing vehicle. To be used on roads with speed limits 50km/h or less.	-Reduction in 85th percentile between 6 and 13km/h -Reduction of traffic volume between 15% and 27%	-Significant conflict reductions -Low to medium cost for permanent installs -Reduced traffic noise due to slower traffic	-Could affect emergency response -Affects snow plowing operations -Additional signs and pavement markings could detract from the appearance of the street -Traffic may be diverted to side streets -Risk of vehicle damage	Not appropriate on Urban or Rural Arterial	> \$10,000	Pavement markings Signage
Raised Crosswalk/ Raised Intersection	A marked pedestrian crosswalk/intersection constructed at a higher elevation than the roadway. To be used on roads with speed limits of 50km/h or less.	-Reduction of the 85th percentile speed between 5 and 13km/h for a crosswalk, and up to 10km/h for a raised intersection -Traffic volume reduction of up to 26%, and increase of up to 7% on neighboring streets	-53% of drivers yielding to pedestrians compared to 13% before -Noise reduction due to slower speeds -Ease of use for assistive devices due to no accumulation of rain or snow at the bottom of the curb	-Emergency response time impact -Snow clearing time may be increased -Interferes with pavement overlays -Additional catch basins may be required to provide drainage -Traffic may be diverted to side streets -Additional signs and pavement markings could detract from the appearance of the street	Not appropriate on Urban or Rural Arterial	\$25,000 - \$50,000	Pavement markings Signage

<u>Horizontal Deflection</u>							
Chicane (One lane/ Two Lane)	Curb extension on alternating sides of the roadway which narrow the roadway. To be used on roads less than or equal to 50km/h. To be avoided on transit routes.	-Reduction of speed between 6 and 10km/h -Collision rate reduction up to 40%	-Noise reduction due to slower speeds -Improved street appearance	-May affect emergency response times -Loss of parking -Negative effects on snow plowing operation -Cannot be swept by a street sweeper -Some motorists may attempt to travel at higher speeds by crossing centreline -High installation cost -May require replacement of existing curbing for drainage	Not appropriate on Urban or Rural Arterial	\$50,000 - \$100,000	Pavement markings Signage
Curb Radius Reduction	The modification of an intersection corner with a smaller radius. Avoid intersections of designated truck or transit routes.	-Speed reduction for right turning vehicles -Reduction of vehicle/pedestrian conflicts	-Reduced pedestrian crossing distance -Improved visibility	-Issues with large vehicles -Potential of mounting the curb for large vehicles or entering oncoming traffic lane	Not appropriate for Rural Arterial, use with caution on Urban Arterial	\$25,000 - \$50,000	No additional maintenance
Lateral Shift	Pavement marking or curb extension to create a curvilinear alignment in the roadway. Posted speed limit below or equal to 50km/h.	No data available	-Vehicle speed reduction -Noise reduction due to slower speeds -Collision rate reduction	-Could affect emergency response times -Loss of parking -Installation cost depends on type of application (curb extension or pavement marking)	Not appropriate on Rural Arterial, to be used with caution on Urban Arterial	> \$10,000	Pavement markings Signage

Horizontal Deflection							
Speed Kidney	An arrangement of three speed humps elongated with a curvilinear shape in the direction of traffic. To be used on roads less than or equal to 50km/h.	-Reduction of the 85th percentile speed of 5km/h	-No effect on transit or emergency vehicles -Less discomfort to passengers or motorcyclists	-Specific signing required as the speed kidney directs vehicles towards the curb -Loss of parking -Negative effect on snow plowing -Additional signs and pavement markings could detract from the appearance of the street -Risk of vehicle damage	Not appropriate on Urban or Rural Arterial	> \$10,000	Pavement markings Signage
Traffic Circle/ Button/ Mini-Roundabout	An island located in the center of an intersection which requires vehicles to travel through the intersection in a counter-clockwise direction. To be used on roads with less than 1500 veh/day and less than or equal to 50km/h.	-Reduction of the 85th percentile speed up to 14km/h -Reduction of traffic volume of up to 20%	-Collision rate reduction of 30% compared to traffic signals -Reduction in noise -When landscaped, could improve appearance of street	-Emergency response delay -May force large vehicles into crosswalk areas -Minor effect on snow plow operation -Traffic could divert to other streets -High cost depending on type used	Use with caution on Rural Arterial, not appropriate on Urban Arterial	< \$500,000	Pavement markings Signage Street sweeping

Roadway Narrowing							
Lane Narrowing	Reduction of lane width using pavement marking, bicycle lane, street beautification program, pavement texture.	-Reduction in the 85th percentile up to 10km/h	-Reduced pedestrian crossing distance -Can be implemented rapidly if pavement markings are used	-Cyclist could feel squeezed closer to vehicles -Reduced separation between oncoming vehicles	Not appropriate on Rural Arterial, used with caution on Urban Arterial	> \$10,000	Pavement markings
Road Diet	Reconfiguration of roadway where travel lanes are reduced or the effective width of the road is reduced. To be used with moderate traffic volumes.	-Speed reduction between 5 and 12km/h -Reduction of collisions by 25% in number of collision/km	-Can be used to widen sidewalks, add bicycle lanes, and create friendly streets for pedestrians and transit users -Low cost if only pavement markings are required	-Impact on emergency response times	Not appropriate on Rural Arterial, applicable on Urban Arterial	N/A	Signage
Vertical Centreline Treatment (Flexible Delineators)	Use of vertical treatment such as delineator or raised pavement marker. To be used away from driveways on two way roads.	Reduction of 85th percentile of up to 5km/h	-Separation of traffic has the potential to reduce collisions	-Replacement costs -Seasonal implementation only	Applicable for Rural Arterial, not appropriate in Urban Arterial	> \$10,000	Requires frequent replacement
Curb Extension (bulb-out)	A curb extension is a horizontal intrusion of the roadway resulting in a narrow section of the roadway. To be used on a curb and gutter roadway.	-Speed reduction between 2 and 8 km/h	-Reduced pedestrian crossing distance may reduce pedestrian collisions -Use of additional space could be used for snow storage	-Not compatible with bicycle lanes -Loss of parking -Increase snow removal cost and damage to grass -Issues with longer vehicles -High cost	Not appropriate on Rural Arterial, applicable on Urban Arterial	\$10,000 - \$25,000	No additional maintenance
Raised Median Island	Elevated median island on the centreline.	-Speed reduction between 3 and 8km/h	-Can be used as a pedestrian refuge -Could improve aesthetic -No effect on snow plowing	-May restrict access to driveways -Cyclist may feel squeezed -Loss of parking -Speed may increase if left turn movements are restricted	Applicable for Rural Arterial, use with caution in Urban Arterial	\$25,000 - \$50,000	Pavement markings Signage

Pavement Markings							
Converging Chevrons	Applicable in all roadways, painted in a forward facing V pointing in the roadway direction.	-Reduction of 85th percentile between 5 and 11 km/h	-Easy to install -Low initial cost -No affect to resident access, parking, street sweeping	-Need for maintenance -Less effective in the winter months -Not visible from significant distances upstream	Applicable on Rural Arterial, used with caution on Urban Arterial	> \$10,000	Pavement markings
Dragon's Teeth	Series of triangular pavement markings along the edge of the travelled lane.	No data Available	-Easy to install -Low initial cost -No affect to resident access, parking, street sweeping	-Need for maintenance -Less effective in the winter months -Not visible from significant distances upstream	Applicable on Rural Arterial, used with caution on Urban Arterial	> \$10,000	Pavement markings

Pavement Markings							
Full Lane Transverse Line	Series of parallel pavement markings which extend across the majority of the travelled lane width.	-Reduction in 85th percentile speed between 5 and 15km/h	-Easy to install -Low initial cost -No affect to resident access, parking, street sweeping	-Need for maintenance -Less effective in the winter months -Not visible from significant distances upstream	Applicable on Rural Arterial, used with caution on Urban Arterial	> \$10,000	Pavement markings
On Road "Sign" Pavement Markings	On road "sign" pavement marking that would typically be shown through signage. May be used as a part of gateways.	-Reduction of vehicle speed between 6 and 14 km/h	-Easy to install -Low initial cost -No affect to resident access, parking, street sweeping	-Need for maintenance -Less effective in the winter months -Not visible from significant distances upstream	Applicable for Urban and Rural Arterials	> \$10,000	Pavement markings
Peripheral Transverse Lines	Series of parallel pavement markings along the edge of the travelled lane width.	-Reduction in 85th percentile speed up to 8 km/h	-Easy to install -Low initial cost -No affect to resident access, parking, street sweeping	-Need for maintenance -Less effective in the winter months -Not visible from significant distances upstream -Affects on speed may reduce over time	Applicable on Rural Arterial, used with caution on Urban Arterial	> \$10,000	Pavement markings

Other Features							
Speed Feedback Sign	An interactive sign that displays vehicle speeds as oncoming motorists approach.	-Reduction of the 85th percentile speed between 3 and 14km/h	-Reduction in speed related collisions -Portable units can be deployed in different locations -Less expensive than police enforcement when considering long term use	-Drivers may become immune to speed feedback signs -Motorist could speed up to see how fast they go -Could be less accurate on multi-lane roads -Requires maintenance and a power source	Applicable on Rural and Urban Arterials	> \$10,000	Data management
Gateway	A combination of traffic calming devices, that helps provides an entry that identifies transitional zones between urban/rural residential zones.	-Reduction of 85th percentile up to 10km/h	-May increase compliance with speed limit -Improved aesthetics -Creates easily identifiable transitional zones for motorists	-Ongoing maintenance -Not as effective for frequent commuters -Cost depends on traffic calming measures used	Applicable for Urban and Rural Arterials	> \$10,000	Signage Landscaping
Active and safe route to school program	A community based initiative that promotes the use of active transportation for the daily trip to school while addressing traffic safety issues.	-No traffic calming effect on vehicular traffic	-Increase active transportation awareness	-Requires community commitment to the program	Not appropriate on Urban or Rural Arterial	N/A	N/A
PACE Car Program	A community awareness strategy where drivers sign a pledge to drive within the speed limit, effective becoming a traffic control device.	-Forces a portion of other motorists to obey speed limit	-No cost to community	-Requires community commitment to the program	Use with caution on Rural and Urban Arterials	N/A	N/A
Textured Roadway	Incorporates a textured/patterned surface.	No data available	-Improved aesthetics -Different texture alerts driver of a potential need to reduce speed	-Could affect cyclists -Less effective during winter -Potential noise, cost	Not appropriate on Urban or Rural Arterial	\$10,000 - \$25,000	N/A
Community Watch Program	A placement of a speed watch board that measures the speed of passing vehicles and displays it as they pass. Residents, police services, and volunteers monitor the traffic and record license plates of vehicles travelling excessive speeds	-Reduction in speed up to 8 km/h (1-3 km/h is most common)	-Reduction in speed related collisions -Portable units can be deployed in different locations -Less expensive than police enforcement when considering long term use	-Requires community commitment to the program -Registered vehicle owners who receive letters may not be a high speed driver -Requires monitoring by staff to avoid potential abuse or harassment -Requires accurate notation of vehicle license number -Police involvement is required	Not appropriate on Rural Arterial, applicable on Urban Arterial	N/A	Police involvement to access vehicle owner information Data Management Staff involvement
Transverse Rumble Strips	Grooves in the roadway that creates noise and vibration. Avoid locations within a 200m radius of residential areas.	-Reduction of 85th percentile between 3 and 8km/h	-Little to no maintenance -No affect to resident access parking, street sweeping, or enforcement -Low cost	-Should not be used in high traffic volume areas -Not to be used as a stand-alone speed control device -Noise levels increase by 3 to 4 dB	Applicable for Rural Arterial, not appropriate in Urban Arterial	> \$10,000	N/A