TORONTO STAFF REPORT

April 21, 2006

To: Works Committee

From: Gary H. Welsh, General Manager, Transportation Services

Subject: Pedestrian Crossover Review
(All Wards)

Purpose:

The purpose of this report is to respond to requests from Works Committee on issues related to pedestrian crossovers by presenting a discussion of the origin and guiding principles of the pedestrian crossover; a summary of the number and location of pedestrian crossovers in the City; a look at their safety record; the results of the individual reviews of pedestrian crossovers on the major arterials; some recommendations to enhance the pedestrian crossover and improve understanding and compliance of their operation; and a response to other suggestions, including the request that flashing red lights be used.

Financial Implications and Impact Statement:

There are financial impacts to the City arising from the adoption of all or part of the recommendations in this report.

The estimated cost to replace 24 existing pedestrian crossover locations on major arterial roadways with traffic control signals would be $3,000,000.00 including the removal of the existing pedestrian crossovers.

The estimated cost for enhancing the visibility of the 53 existing pedestrian crossovers on major arterial roadways, through changes to flashing beacons, signs and pavement markings, would be $477,000.00.

The estimated cost to develop a public education program would be $150,000.00.

Therefore, the total financial obligation to complete this project in its entirety would be approximately $3,630,000.00.

Funds associated with the installation of new traffic control signals and pedestrian crossovers are contained in the Transportation Services Capital Program under Project No. CTP706-01. In

2006, $2.46 million has been approved for new traffic control signal installations. We anticipate that the $2.46 million allocated for new traffic control signal installations in 2006 will be entirely spent.

Therefore, it is recommended that $3,630,000.00 be added as a new program in the Transportation Services 2007 Capital Budget submission. This amount will include the cost associated with the conversion of 24 pedestrian crossover locations on major arterial roadways to traffic control signals; the enhancements to the pedestrian crossover flashing beacons, signs and pavement markings at 53 pedestrian crossover locations on major arterial roadways, development of an educational/awareness program, and possible project management costs for implementation.

The added annual maintenance and operating costs associated with replacing a pedestrian crossover with a traffic control signal is approximately $4,500.00 per location. The resultant additional annual maintenance and operating costs will be $108,000.00.

The ongoing review of pedestrian crossovers on minor arterial roadways will result in additional financial requirements to those identified in this report.

Recommendations:

It is recommended that:

(1) Approval in principle be granted for replacement of the pedestrian crossovers, identified in Appendix 1, with traffic control signals to be designed by Transportation Services staff;

(2) Pedestrian crossovers, identified in Appendix 2, continue as a pedestrian crossing facility with suggested enhancements to flashing beacons, signs and pavement markings;

(3) Transportation Services develop a program for public education and awareness of the responsibilities of drivers and pedestrians at pedestrian crossovers;

(4) Transportation Services continue with the assessment of pedestrian crossovers on the minor arterial roadways and report back to the Works Committee later this year;

(5) A copy of this report be sent for information to the Toronto Police Service, the Ministry of Transportation for Ontario and the Ontario Traffic Conference; and

(6) The appropriate City Officials be authorized and directed to take the necessary action to give effect to the foregoing, including the introduction in Council of any Bills that may be required.

Background:

At its meeting on July 24, 25 and 26, 2001, City Council in adopting Clause No. 16, Report No. 12 of the Works Committee, without amendment, recommended that "the Province of Ontario be requested to consider amending Section 140 of the Highway Traffic Act of Ontario to provide the option for the use of red flashing beacons to replace yellow flashing beacons at particular high-traffic pedestrian crossover locations where speed is an issue". The Ministry of Transportation responded suggesting that staff of their Engineering Standards Branch work with staff of Transportation Services to review the merit of the request.

Also, the Works Committee requested the former Commissioner of Works and Emergency Services "to submit a further report to the Committee with a breakdown of the number of pedestrian crossovers that are on the different categories of roadways, and on staff's assessment of replacing pedestrian crossovers with pedestrian activated traffic signals over a staged process, with arterial roads first, including costs for such conversion".

Further, Works Committee, at its meeting of March 9, 2006 referred communications from Councillor Fletcher and Councillor Hall to the General Manager, Transportation Services for consideration, with a request that a report be submitted to the next meeting of the Works Committee on the options being considered for crosswalks and on the relationship of crosswalks to the Pedestrian Strategy. (Clause No. 24(c) of Report No. 2 of Works Committee).

Comments:

As a result of the requests from Works Committee, Transportation Services has embarked on a comprehensive review of pedestrian crossovers within the City of Toronto. The original concept of the pedestrian crossover, its current design, and its future in the City has been considered. As well, we have completed an assessment of each pedestrian crossover on the major arterial roadways, and we are working on the assessment of those crossovers on the minor arterial roadways. This report presents a discussion of the origin and guiding principles of the pedestrian crossover; a summary of the number and location of pedestrian crossovers in the City; a look at their safety record; the results of the individual reviews of pedestrian crossovers on the major arterials; recommendations to enhance the pedestrian crossover and improve understanding and compliance of their operation; and a response to other suggestions, including the request that flashing red lights be used.

Origin:

The first pedestrian crossover was installed by Metropolitan Toronto in 1958. Legislation and Regulations with respect to pedestrian crossovers were incorporated in the Ontario Highway Traffic Act in 1962. More pedestrian crossovers were installed, and other municipalities in Ontario started using them, with varying criteria and designs. In 1988, the Ministry of Transportation of Ontario, in cooperation with the Ontario Traffic Conference and Municipalities in Ontario developed guidelines to ensure uniformity in the installation of pedestrian crossovers in Ontario. These guidelines, which are now incorporated in the Ontario Traffic Manual and the Highway Traffic Act Regulations, include installation criteria (warrant requirements), ground

mounted and overhead signage, pavement markings and pedestrian-activated flashing amber beacons. In Toronto, all pedestrian crossovers were modified to conform with the Provincial guidelines. The most significant change was the addition of the flashing amber beacon which was referred to as the "Early Warning System". The changes were accompanied by an extensive public education campaign.

The intent of the first pedestrian crossovers was to enable pedestrians to cross busy streets safely and with minimal wait times, while minimizing delay to motorists on the main street. The pedestrian crossover was, and still is, a passive device that relies on the motorist and pedestrian sharing responsibility for the pedestrians' safety. The Legislation is written such that the motorist is required to react to the presence of a pedestrian within the crossover, and a pedestrian is required to wait for a sufficient gap in traffic before attempting to cross. The flashing amber beacons, which can be activated by a pedestrian, are a warning to motorists that a pedestrian could be within the crossover. However, pedestrians are not required to activate the warning beacons. The motorist is required to yield to the pedestrian within the crosswalk regardless of whether the beacons are flashing.

In the early 1990's, Metropolitan Toronto conducted an audit of all pedestrian crossovers on the arterial roadways. To address concerns with pedestrian crossovers operating on roadways of greater than 4 lanes, the "split" pedestrian crossover was introduced. A split pedestrian crossover was used in mid-block locations, where the pavement width exceeded four lanes and there was a demonstrated pedestrian crossing volume. The split pedestrian crossover actually operates as 2 pedestrian crossovers with a refuge island in the centre of the road. In order to cross the roadway, a pedestrian pushes the button at the curb side which activates the "Early Warning System" for one half of the roadway only. Once crossing to the centre median, the pedestrian traverses the length of the median and then pushes the button to activate the "Early Warning System" for the other half of the road. This way the pedestrian crosses two lanes at a time and only one direction of traffic is required to stop. There is a clear indication of which direction of traffic should be stopping, the median island emphasises the presence of a crossing device for motorists and the configuration encourages pedestrians to cross properly. There are currently 14 "split" pedestrian crossovers in the City, 11 of which are situated on major arterial roadways and mostly in the suburban areas.

Pedestrian Crossovers in the City of Toronto:

There are currently 577 pedestrian crossovers operating in the City of Toronto. The following table provides a breakdown of the number of pedestrian crossovers on each of the road classifications. Appendix 3 contains a list of the 77 locations on major arterial roadways.

Road Classification	Number of pedestrian crossovers
Major Arterial	77
Minor Arterial	260
Collector	176
Local	64
Total	577

This list is exclusive of those pedestrian crossovers on major arterial roadways to be replaced with traffic control signals which City Council has already approved.

Of the 77 pedestrian crossovers on major arterial roadways, the breakdown of their locations by Community Council area is provided in the table below:

Community Council	Number of pedestrian crossovers
Etobicoke York	20
North York	9
Scarborough	7
Toronto and East York	41
Total	77

Safety Record:

The following table provides information on collisions involving pedestrians within the City of Toronto since amalgamation.

	Total Pedestrian Collisions							
Criteria	1998	1999	2000	2001	2002	2003	2004	2005
Traffic Signals	826	812	861	913	909	943	825	897
Stop Signs	194	209	212	203	248	218	201	191
Yield Signs	2	3	1	4	4	4	3	1
Pedestrian Crossover	94	96	90	89	111	99	89	65
Pedestrian Crossover – major and minor arterial roadways	*71*	*67*	*61*	*67*	*81*	*90*	*73*	*n/a*
Police Control	0	5	4	4	3	5	5	2
School Guard	2	2	3	3	2	2	0	2
School Bus	1	1	1	0	0	1	1	2
Traffic Gate	1	4	1	2	2	3	3	1
Traffic Controller	9	7	11	11	11	10	12	8
No Control	1,095	928	1,181	1,232	1,132	1,057	984	931
Other or Unknown	20	5	12	17	7	8	2	12
Total	2,244	2,072	2,377	2,478	2,429	2,350	2,125	2,112

	Total Pedestrian Fatalities							
Criteria	1998	1999	2000	2001	2002	2003	2004	2005
Traffic Signals	14	21	5	7	18	19	7	6
Stop Signs	2	3	3	0	2	3	3	5
Yield Signs	0	0	0	0	0	0	0	0
Pedestrian Crossover	2	1	1	1	1	2	0	2
Pedestrian Crossover – major and minor arterial roadways	*2*	*1*	*1*	*1*	*1*	*2*	*0*	*2*
Traffic Controller	0	0	1	0	0	0	0	0
No Control	21	20	16	24	29	19	18	16
Other	0	0	0	0	0	0	0	0
Total	39	45	26	32	50	43	28	29

Generally speaking, according to data supplied by the Toronto Police Service collision records bureau for the eight-year period since amalgamation, an average of 2273 pedestrian collisions have been reported per year which resulted in an average of 36 pedestrian fatalities per year. A closer examination reveals that on average 92 collisions occurred at a pedestrian crossover annually, of which one pedestrian was fatally injured each year. In each fatal incident, the pedestrian crossover was located on a major arterial roadway. Of note, the percentage of all pedestrian collisions at pedestrian crossovers is four per cent. By comparison, 38 per cent of all pedestrian collisions occurred at traffic signals, and 47 per cent of all pedestrian collisions occurred where no control was provided.

Upon reviewing this information, we could conclude that a pedestrian crossover provides pedestrians with an acceptable safety level and is a viable crossing facility for continued use in Toronto. Further, the relative safety of a pedestrian crossover is dependent upon the environment it is located in and pedestrian and driver awareness of their responsibilities.

Appropriate Environment for a Pedestrian Crossover:

In order for a pedestrian crossover to operate successfully, both in terms of collision record, and in terms of the comfort levels of pedestrians crossing there, it is necessary for two conditions to be met. First, approaching drivers must be able to recognize that a pedestrian crossing device is present, and see that a pedestrian is present within the crossover or waiting to cross. Second, it is necessary for a pedestrian to be able to see oncoming traffic and be able to judge whether there is a sufficient gap in traffic to expect drivers to be able to stop their vehicles before stepping into their path.

As long as both of these conditions are met, the pedestrian crossover is still an appropriate device to assist pedestrians in the City of Toronto.

There are certain characteristics of a location that affect the successful operation of a pedestrian crossover. These characteristics are the same ones that are considered when determining whether a pedestrian crossover should be installed. These characteristics, referred to in this report as “environmental criteria”, are listed below:

(1) Vehicle operating speeds on the roadway should be less than 60 km/hr;

(2) The roadway should be not more than four lanes wide on a two-way street, or three lanes wide on a one-way street;

(3) The traffic volume should be less than a total of 35,000 vehicles per day in both directions;

(4) No visibility problems should exist for either the pedestrian or the motorist;

(5) There should be no driveways or entrances nearby that would interfere with the operation of the pedestrian crossover;

(6) There should not be a significant volume of turning vehicles that would interfere with the operation of the pedestrian crossover;

(7) There should be no loading zones in the immediate vicinity of the pedestrian crossover; and

(8) There should be not less than 200 metres to another pedestrian crossover or traffic control device.

Transportation Services staff reviewed all pedestrian crossovers on major arterial roadways to determine their appropriateness relative to the environmental criteria. Specifically, staff conducted a site visit when environmental data was collected, conducted a speed study and completed a collision analysis with emphasis on pedestrian collisions over a five-year period.

In this assessment, it was determined that the speed, volume and road width criteria are critical. If motorists' speeds are too high, the traffic volumes are too great, or the road is too wide, the operational safety of the pedestrian crossover is compromised. It should therefore be replaced because of the increased potential risk for pedestrians to be exposed to injury.

The results of the review of 77 pedestrian crossover locations on major arterial roadways revealed that 24 pedestrian crossover locations did not satisfy at least one or more of the speed, volume and width criteria. As a result, it is recommended that these pedestrian crossovers be replaced with traffic control signals in order to provide a more positive type of control with clearer direction to motorists and pedestrians.

The "split" pedestrian crossover was developed to provide a crossing facility at mid-block locations, where the pavement width exceeded four lanes. The width criteria would not apply to these locations. Therefore, a "split" pedestrian crossover is recommended for replacement if either the speed or volume criteria are exceeded. An implementation plan was developed for the conversion of the 24 pedestrian crossovers to traffic control signals at either mid-block locations or at an intersection depending on the pedestrian crossover.

Each of the pedestrian crossovers on the major arterial roadways has been evaluated and ranked according to all of the environmental criteria and pedestrian collision data. The procedure was to rank the pedestrian crossovers using 3 screening processes in the following order:

(1) Pedestrian crossovers that do not satisfy the critical speed, volume, or width elements of the environmental criteria are considered candidate locations for replacement with traffic signals;

(2) Pedestrian crossovers that do not satisfy the remaining five (secondary) elements of the environmental criteria, which include proximity to driveways, turning movements, loading zones, spacing to adjacent traffic control devices and visibility concerns, are considered for enhancements to flashing beacons, signs, and pavement markings; and

(3) Pedestrian collision data was used to prioritize both our review and the order in which the pedestrian crossovers are recommended for replacement or enhancement.

Appendix 1 lists each location recommended for replacement with traffic control signals and Appendix 2 lists locations for which enhancements to signs, pavement markings and illumination are recommended. The tables in these appendices contain information for each pedestrian crossover on the number of elements that were not satisfied and the total number of pedestrian collisions recorded at the location in the past five years.

Detailed traffic signal plans will be prepared for each of the 24 pedestrian crossovers to be replaced in priority order and installation will be contingent upon funding and consultation with the Ward Councillor. It is likely that the cost estimate for each location will vary depending on the traffic control signal design but a typical cost to replace a pedestrian crossover with traffic control signals is $125,000.00.

Pedestrian Crossover Design:

Regulation 615 of the Highway Traffic Act of Ontario specifies the overhead and ground-mounted signs, the amber flashing beacons, and the pavement markings that identify a pedestrian crossover. All of the pedestrian crossovers in the City of Toronto comply with these regulations. However, there are enhancements that could be made to the pedestrian crossover design to make it more visible to approaching motorists, and to emphasize the presence of pedestrians.

Staff of Transportation Services has reviewed a variety of potential enhancements to the pedestrian crossover design, many of which were received as suggestions from the public. The following is a list of enhancements that are recommended, particularly at pedestrian crossovers that are being maintained on major arterial roadways.

Enhancement	Potential Benefit	Estimated Cost per pedestrian crossover
Flashing Beacons		
Change lamps from incandescent to LED lamp modules	Brighter, more visible when activated	$2,500
Increase size from 20 cm to 30 cm diameter lens	More visible when activated	
Review placement, increasing separation between beacon and overhead sign	Address concern that beacon blends in with illuminated sign, increase field of vision for motorists	
Add additional side-mounted beacon on pole	Increase field of vision for motorists, draw motorists attention to roadside where pedestrian waiting to cross	$3000
Pavement Markings		
Add “zebra” striping between double white crosswalk lines	Emphasize location of crosswalk Encourage pedestrians to cross within	$2,500

	the crosswalk lines	
Parking Regulations		
Increase the length of the No Stopping zone from within 9 metres of the crosswalk to within 15 metres on the approach side of the crosswalk	Increase visibility of pedestrians entering the pedestrian crossover. Remove stopped vehicles from within close proximity to the pedestrian crossover	$200-$1000
Pedestrian Lighting		
Investigate feasibility of adding pedestrian scale lighting to pedestrian crossover poles	Illuminate pedestrians standing at curb, waiting to cross the street	To be determined in consultation with Toronto Hydro
Street Furniture		
Review location of street furniture in close proximity to pedestrian crossovers	Ensure street furniture does not interfere with visibility of pedestrians or obstruct access to the pedestrian pushbutton	

The attached Drawing No. 421F-8286, dated April 2006 provides a diagram of the typical existing pedestrian crossover design, and Drawing No. 421F-8287 dated April 2006 provides a diagram of a typical pedestrian crossover with all of the proposed enhancements.

Each of these recommended enhancements comes with an associated cost. The cost for each pedestrian crossover location is estimated at $9000.00. The total estimated cost of implementing these enhancements at the 53 pedestrian crossovers recommended to be maintained on the major arterial roadways is estimated to be $477,000.00. Pedestrian crossover locations where enhancements are recommended are contained in Appendix 2.

Education:

A viable solution to increase awareness of driver/pedestrian responsibilities at pedestrian crossovers lies with education. The public, in general, needs to be better informed of safe operating practices at pedestrian crossovers. With visitors and new residents in Toronto from places which may not have pedestrian crossovers a public education campaign including print media (advertising in local newspapers, providing brochures to schools, seniors, cultural groups) and radio (such as public service announcements) should be undertaken**.** Funding required for such a campaign is estimated at $150,000.00.

Bill 169:

The Ontario Government introduced the Transit and Road Safety Bill (Bill 169) in February 2005. The main components of Bill 169 include:

(1) making public transit more attractive;
(2) improving the commute experience;
(3) delivering an integrated transit network; and
(4) making journeys safer.

The primary traffic–related item of Bill 169 as it relates to this report proposes legislation which would impact driver behaviour at pedestrian crossovers by increasing the minimum fines and demerit points if motorists do not stop or yield for pedestrians at pedestrian crossovers, crosswalks at traffic control signals and school crossings.

HTA Section 140 (pedestrian crossover) and Section 144 (Pedestrian crosswalks at traffic control signals) will be amended to reflect this legislation which includes an increase in the minimum fine from $60 to $150 and an increase in the demerit point penalty to 3 points for driver yield-to-pedestrian offences. This legislation does not change the current driver yield-to-pedestrian requirements.

Bill 169 received Royal Assent in November 2005 and the traffic-related amendments were proclaimed on March 31, 2006.

Increasing the set fines at pedestrian crossovers could be a positive measure to deter driver/pedestrian infractions at pedestrian crossovers. However, regardless of the fines schedule, the success of this measure is contingent upon police enforcement.

Other Suggestions for Changes:

Many other suggestions for changes to pedestrian crossovers have been received, which we are not recommending at this time. Some of these suggestions and their associated impacts are discussed as follows:

(1) Change the Flashing Beacons to Red

As has been stated earlier, the pedestrian crossover is currently designed such that a motorist is required to react to the presence of a pedestrian within the crossover by yielding to the pedestrian. The flashing beacons are a supplemental warning to motorists that a pedestrian could be within the crossover. As such, the colour of the beacons is amber (yellow), which in Ontario signifies caution.

The impacts of changing the flashing beacons to red are as follows:

(a) The rules would change – Motorists would be required to stop upon activation of the red flashing beacons. They could then proceed if the way is clear. This takes away the motorists' responsibility to look for the presence of a pedestrian, at least initially. Pedestrians would have to be required to activate the flashing beacons, which is not currently a requirement;

(b) Legislation – Changing to flashing red beacons would require changes to the Highway Traffic Act of Ontario, Part X – Rules of the Road, Section 140 in terms of the duties of the driver and of the pedestrian. Also, Regulation 615, Section 20.2(8), which specifies the amber beacon, would need to be amended;

(c) Sudden Stops – It takes a certain amount of time for a driver to recognize, react, and stop for a red light. Simply changing the colour of the beacons to red would mean that a driver approaching a pedestrian crossover could suddenly be faced with a red flashing light requiring him/her to stop. This could result in sudden stops, non-compliance of the stop condition, and possible rear-end collisions. A possible solution would be the addition of an amber flash prior to the red flash to warn drivers of an upcoming stop condition. This would then require some sort of signal to pedestrians to let them know when the red flash was on and it is safe to proceed. Once we add these features, we would be getting very close to a traffic signal operation;

(d) Length of flash – Currently the length of time that the beacons flash upon activation is calculated based on the width of the street, a pedestrian walk speed of 1.0 m/s, with an additional 13 seconds added. This is usually well in excess of the time that a pedestrian needs to cross the street. In addition, if more pedestrians arrive and push the button while the beacons are already flashing, the length of time they flash can be extended. If the amber beacons are flashing, and pedestrians are no longer present within the crossover, motorists are not required to stop unnecessarily. Changing the beacons to red would require motorists to stop regardless. This could potentially result in disrespect for the stop condition and unnecessary delays to motorists;

(e) Provincial standard - As mentioned previously, the current design and regulations of the pedestrian crossover were developed as a standard in the Province of Ontario. Changing the flashing beacons to red would significantly change the operation, which would affect other municipalities within Ontario that use pedestrian crossovers;

(f) Uniformity in the City of Toronto – Since the use of red flashing beacons would change the rules and expectations at a pedestrian crossover, there would need to be an extensive public education campaign to explain the changes. Existing safety programmes would change. The current concern that drivers and pedestrians do not understand their roles could actually be made worse. There would be a time of transition when both operations would be in place, but eventually all pedestrian crossovers would be changed to the new operation for uniformity and understanding; and

(g) Cost – The approximate cost to change the amber flashing beacons to red would be $1,600.00 per pedestrian crossover. The addition of a “clearance” amber flasher, which would be necessary, would increase the cost by $3,200.00 to $4,800.00. The cost of these changes, to all 577 pedestrian crossovers in Toronto would be almost $3,000.000.00 ($2,769,600.00). This is in addition to the costs of the other enhancements identified previously in this report.

(2) Flash full overhead signs

The overhead signs contain low pressure sodium lamps for better pedestrian illumination in the crossover. It is not possible to flash low pressure sodium lamps. There would be significant costs involved to change the type of lamps within the overhead signs to allow them to flash.

(3) Lights embedded in the pavement along the crosswalk lines

This type of feature has not been tested in the City of Toronto, and there is concern with its effectiveness in winter conditions.

(4) Request streetcar operators to open their doors when stopped for a pedestrian within a pedestrian crossover, so that vehicles will not pass the streetcar

This request has been referred to staff of the Toronto Transit Commission for comment.

(5) Install stop bars where vehicles must stop 150 feet (46 metres) away from the crosswalk

This distance is excessive. There would be no connection for motorists between the stop bar and the pedestrian crossover. This spacing exceeds the current 30 metre No Passing zone. Compliance by motorists would be doubtful and on-street parking would be impacted. Also, many of our pedestrian crossovers are at intersections, not mid-block locations. The 15 metre stop bar setback currently provided at mid-block signal locations is to ensure that drivers can see the signal when stopped. At a pedestrian crossover, the driver should be reacting to the presence of a pedestrian not the flashing beacon.

(6) Rumble strips on the pavement approaching the pedestrian crossover

Rumble strips are generally used in a rural environment to warn motorists of an upcoming change in conditions or hazard. Their effectiveness is in the noise and vibration that results when a motorist drives over them. Since many pedestrian crossovers are located in residential areas, residents would not tolerate the resultant noise levels.

(7) A band of bright lights shining onto the pedestrian from the side

The existing overhead illuminated signs provide down-lighting of the pedestrian within the crossover and we are recommending investigation of pedestrian scale lighting at the ends of the pedestrian crossover. Bright lights shining from the side would be problematic.

Pedestrian Strategy:

Transportation Services has begun preliminary work on a Pedestrian Master Plan to be completed in 2007. The recommendations contained in this report are consistent with one of the

underlying objectives of the Pedestrian Plan, which is to improve pedestrian safety and reduce the number of pedestrian/Motor-vehicle collisions in the city.

This report was prepared in consultation with the Toronto Pedestrian Committee. We have also consulted with staff of the Ministry of Transportation.

Conclusions:

The relative safety of a pedestrian crossover can be measured by its compliance to the environmental criteria. Any pedestrian crossover which fails the critical speed, volume or road width elements should be replaced by traffic control signals regardless of the road classification it operates on. Based on the results of our review, a total of 24 pedestrian crossovers on major arterial roadways should be replaced with traffic control signals.

The remaining 53 pedestrian crossovers on major arterials should undergo visibility enhancements to flashing beacons, signs and pavement markings. The priority for improvements at these pedestrian crossovers has been determined by the five secondary elements of the environmental criteria and the pedestrian collision history at the pedestrian crossovers.

Also, a combination of increased enforcement and education should bring a greater awareness and more respect for the use of this crossing facility.

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List of Attachments:

(1) Appendix 1: pedestrian crossovers to be replaced
(2) Appendix 2: pedestrian crossovers to be upgraded
(3) Appendix 3: All pedestrian crossovers on Major Arterial Roadways
(4) Drawing No. 421F-8286 dated April 2006, Pedestrian Crossover – Existing Standard Conditions
(5) Drawing No. 421F-8287 dated April 2006, Pedestrian Crossover – Proposed Standard Conditions

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Appendix 1

Pedestrian Crossovers to be Replaced

Location	Ward	Critical Criteria Not Satisfied				Secondary Criteria	Pedestrian Collisions/ 5 years
		Speed	Width	Volume	Total		
Sheppard Avenue West approximately 27 metres west of Buckland Road	9	yes	yes	no	2	3	2
Dundas Street West immediately west of Chestnut Hills Crescent	4	no	yes	yes	2	3	1
Weston Road approximately 100 metres north of the north curb line of Coronado Court	7	yes	no	yes	2	3	1
Weston Road approximately 67 metres north of Habitant Drive	7	yes	yes	no	2	2	0
Danforth Road immediately north of Neston Avenue-Tyne Court	35	yes	no	no	1	4	0
Lake Shore Boulevard West immediately east of Symons Avenue	6	no	yes	no	1	2	3
Birchmount Road at Modern Avenue	37	yes	no	no	1	2	2
Park Lawn Road at a point 176.0 metres north of Lake Shore Boulevard West	6	yes	no	no	1	2	1
Brimley Road at Bernadine Street/Applefield Drive	37/38	yes	no	no	1	2	0
Birchmount Road at Vauxhall Drive	37	yes	no	no	1	1	2
Lake Shore Boulevard West, 3 metres south of Hillside Avenue	6	no	yes	no	1	1	2
Midland Avenue 37 metres south of Norbury Crescent	37	yes	no	no	1	1	1
Evans Avenue at Delta Street	6	no	yes	no	1	1	0
Kingston Road immediately east of Queensbury Avenue	36	yes	no	no	1	1	0
Leslie Street approximately 122 metres south of Francine Drive	24	yes	no	no	1	0	1

"Split" Pedestrian Crossover Locations to be Replaced

Location	Ward	Critical Criteria Not Satisfied				Secondary Criteria	Pedestrian Collisions/ 5 years
		Speed	Width	Volume	Total		
Finch Avenue West between north side (westbound Finch Avenue West) and centre pedestrian refuge island, approximately 16 metres west of Endell Street and Finch Avenue West between south side (eastbound Finch Avenue West) and centre pedestrian refuge island, approximately 37 metres west of Endell Street	23	yes	no	yes	2	2	2
Parkwoods Village Drive between the east side (northbound Parkwoods Village Drive) and the centre pedestrian refuge island, 50 metres north of Brookbanks Drive and Parkwoods Village Drive between the west side (southbound Parkwoods Village Drive) and the centre pedestrian refuge island, 60 metres north of Brookbanks Drive	34	yes	no	yes	2	1	0
Avenue Road between east side (northbound Avenue Road) and centre pedestrian refuge island, approximately 26 metres south of Roe Avenue and Avenue Road between west side (southbound Avenue Road) and centre pedestrian refuge island, approximately 26 metres	16	no	no	yes	1	3	2

Location	Ward	Critical Criteria Not Satisfied				Secondary Criteria	Pedestrian Collisions/ 5 years
		Speed	Width	Volume	Total		
south of Roe Avenue							
Kipling Avenue between east side (northbound Kipling Avenue) and centre pedestrian refuge island approximately 88 metres south of Henley Crescent and Kipling Avenue between west side (southbound Kipling Avenue) and centre pedestrian refuge island approximately 88 metres south of Henley Crescent	2	yes	no	no	1	2	4
Kipling Avenue between east side (northbound Kipling Avenue) and centre pedestrian refuge island approximately 17 metres south of Hinton Road and Kipling Avenue between west side (southbound Kipling Avenue) and centre pedestrian refuge island approximately 17 metres south of Hinton Road	2	yes	no	no	1	2	3
Kipling Avenue between east side (northbound Kipling Avenue) and centre pedestrian refuge island, approximately 16 metres south of the south curb of Snaresbrook Drive and Kipling Avenue between west side (southbound Kipling Avenue) and centre pedestrian refuge island, approximately 16 metres south of the south curb of Snaresbrook Drive	2	yes	no	no	1	2	2
Kipling Avenue between east side (northbound Kipling Avenue) and centre pedestrian refuge island	1	yes	no	no	1	2	1

Location	Ward	Critical Criteria Not Satisfied				Secondary Criteria	Pedestrian Collisions/ 5 years
		Speed	Width	Volume	Total		
approximately 22 metres north of Penlea Avenue and Kipling Avenue between west side (southbound Kipling Avenue) and centre pedestrian refuge island approximately 22 metres north of Penlea Avenue							
Lawrence Avenue West between north side (westbound Lawrence Avenue West) and centre pedestrian refuge island approximately 15 metres west of Brookhaven Road and Lawrence Avenue West between south side (eastbound Lawrence Avenue West) and centre pedestrian refuge island approximately 15 metres west of Brookhaven Road	12	no	no	yes	1	1	0
Finch Avenue West between north side (westbound Finch Avenue West) and centre pedestrian refuge island, approximately 37 metres east of Edithvale Drive and Finch Avenue West between south side (eastbound Finch Avenue West) and centre pedestrian refuge island, approximately 37 metres east of Edithvale Drive	23	yes	no	no	1	0	1

Appendix 2

Pedestrian Crossovers to be Enhanced

Location	Ward	Secondary Criteria	Pedestrian Collisions/ 5 years
Dundas Street West immediately east of Palmerston Avenue	19	4	6
Dupont Street east side of Huron Street	20	4	0
Eastern Avenue east side of Morse Street	30	3	3
Dundas Street East immediately east of Bond Street	27	3	2
Dundas Street East immediately west of George Street	27	3	1
Dupont Street west side of Brunswick Avenue	20	3	1
Woodbine Avenue at Cassels Avenue	32	3	1
St. Clair Avenue West immediately west of Britannia Avenue	11	3	0
Dundas Street East immediately east of Pembroke Street	27	2	3
Evans Avenue at Treeview Drive	6	2	3
Burnhamthorpe Road immediately west of Meadowbank Road	3/5	2	2
Queen Street West west side of St. Patrick Street	20	2	2
Woodbine Avenue immediately south of the East Roadway of Milverton Boulevard	31	2	2
Bathurst Street immediately north of Nassau Street	19/20	2	1
Dupont Street west side of Bartlett Avenue	18	2	1
Kingston Road immediately west of Manderley Drive	36	2	1
Pape Avenue immediately north of Torrens Avenue	29	2	1
The Queensway immediately east of Milton Street	5	2	1
The Queensway immediately west of Holbrooke Avenue	5	2	1
Woodbine Avenue immediately north of Plains Road	31	2	1
King Street West east side of Fraser Avenue	14	2	0
King Street West west side of Brant Street	20	2	0
Danforth Avenue immediately east of Caithness Avenue	29/30	1	6
Bathurst Street immediately south of Scadding Court	19/20	1	5
Bloor Street West immediately west of Emerson Avenue	18	1	4
King Street West west side of Close Street	14	1	3
King Street West west side of Dowling Avenue	14	1	3
Bayview Avenue immediately north of Parkhurst Boulevard – Soudan Avenue	22/26	1	2
College Street west side of Shaw Street	19	1	2
Dundas Street East immediately east of Sackville Street	28	1	2
Dupont Street west side of Perth Avenue	18	1	2
Kingston Road immediately east of Lee Avenue	32	1	2

Queen Street West east side of Portland Street	20	1	2
Bathurst Street approximately 128 metres north of College Street	19/20	1	1
Bloor Street West immediately east of Pauline Avenue	18	1	1
Dupont Street east side of Edwin Avenue	18	1	1
King Street East east side of Ontario Street	28	1	1
King Street East east side of Sackville Street	28	1	1
Pape Avenue immediately north of Aldwych Avenue	29	1	1
Queen Street East east side of Ontario Street	28	1	1
College Street west side of Havelock Street	18	1	0
Keele Street immediately south of Avon Drive	12	1	0
King Street West east side of Stanley Terrace	19	1	0
Oxton Avenue west side of Highbourne Road	22	1	0
Queen Street East west side of Carroll Street	30	1	0
Queen Street West east side of Triller Avenue	14	1	0
St. Clair Avenue East approximately 36 metres west of Clifton Road	27	1	0
York Mills Road at Birchwood Avenue	25	1	0
King Street West 70.7 metres west of Wilson Park Road	14	0	1
Laird Drive immediately south of Lea Avenue	26	0	0
Queen Street East west side of Sackville Street	28	0	0

"Split" Pedestrian Crossover Locations

Location	Ward	Secondary Criteria	Pedestrian Collisions/ 5 years
Brown's Line between east side (northbound Brown's Line) and centre pedestrian refuge island immediately south of Woodbury Road and Brown's Line between west side (southbound Brown's Line) and centre pedestrian refuge island immediately south of Woodbury Road	6	1	6
Scarlett Road between east side (northbound Scarlett Road) and centre pedestrian refuge island immediately north of Raymore Drive and Scarlett Road between west side (southbound Scarlett Road) and centre pedestrian refuge island immediately north of Raymore Drive	2	1	4