HALIFAX
REGIONAL MUNICIPALITY

PO Box 1749
Halifax, Nova Scotia
B3J 3A5 Canada

Halifax Regional Council
April 4, 2007
Committee of the Whole

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY: Ken Reashor, P.Eng., Traffic Authority

DATE: April 3, 2007

SUBJECT: **Pedestrian Crosswalk Issues**

INFORMATION REPORT

ORIGIN

A) Item 12.1, Multiple Lane Crosswalk Controls - "Half Signal" Traffic Light Installations raised at the November 21, 2006 meeting of Halifax Regional Council.

B) Item 9.1.2, Pedestrian Signal Indicators raised at the December 5, 2006 meeting of Halifax Regional Council, and item10.6.1, raised at the June 20, 2006 meeting of Halifax Regional Council.

C) Item 9.1.1, 2006 Crosswalk Education & Public Awareness Program raised at the December 5, 2006 meeting of the Halifax Regional Council.

BACKGROUND

A) MOVED by Councillor McInroy, seconded by Councillor Kent, that staff provide a report on how HRM would retrofit existing crosswalks which now cross multi lane roads which are currently controlled by RA-5 overhead signals.

B) MOVED by Councillor Mosher, seconded by Councillor Sloane, that

1. pedestrian countdown signals be installed at locations frequented by a high percentage of seniors, children and other mobility challenged pedestrians, at locations with a history of pedestrian/vehicle conflicts and those that generate high pedestrian or vehicle traffic levels as per the Transportation Association of Canada recommendations;

2. pedestrian countdown signals be a standard component of all LED traffic control signal installations and LED replacements programs;

3. a pilot project be instituted for existing LED conversions pending success of a pilot project and approval of budgetary measures.

C) MOVED by Councillor Walker, seconded by Councillor Sloane, that staff provide a report on the re-evaluation and costs of the RA-5 lights being lowered,

D) Painting of zebra lines on crosswalks,

E) Installation of fluorescent crosswalk signs, and

F) Placement of posts with crosswalk signs in medians in locations such as Dunbrack Street.

G) Further, HRM create a public service announcement to correspond with these initiatives.

H) Councillor Younger noted Maine uses a thickened paint such that the surface of the crosswalks are raised. He suggested staff look outside Canada to see what other options there may be.

I) Councillor Adams questioned whether it would be possible to put a black background on the flashing overhead lights to allow for better visibility.

J) Councillor Johns asked if it would be possible to start remarking some of the crosswalks and whether there was a way to speed up the crosswalk light when pushed by a pedestrian.

K) Councillor Harvey requested the report include budget implications.

L) Councillor McCluskey requested a copy of the information on flashing red beacons be forwarded to Council. She further noted other cities have a clock showing the time remaining which would be helpful.

M) Councillor Walker stated he was requesting a report to Council not an information report. He stated he would like alternatives on how HRM can request the Province to allow signs if they are currently not allowed.

MOTIONS PUT AND PASSED UNANIMOUSLY.

DISCUSSION

A) Pedestrian half signals have been in use in Canada since the mid-1960's, primarily in large metropolitan areas. Pedestrian half signals at intersections feature signal control for vehicles on the major street and pedestrians crossing the major street, and stop sign control for motorists approaching on the minor street. They are not used by all Canadian jurisdictions, but are relatively common in parts of British Columbia, Alberta and Ontario.

Because pedestrian half signals were not permitted for use in Nova Scotia prior to 1999, Halifax Regional Municipality (and the former cities of Halifax, Dartmouth and Town of Bedford prior to amalgamation) had made significant investments in RA-5 pedestrian crossing devices. At the present time there are 85 multilane RA-5 crosswalk locations with flashers in HRM and only five half signal installations.

Traffic engineering practitioners in Canada have a range of traffic devices that can be considered for pedestrian crossings. There are some variations in devices and applications practices across the country. However in general, crossing protection fits into a hierarchy from least to most expensive devices as follows:

- Signed and marked crosswalk with the side mounted signs;
- Signed and marked crosswalk with overhead mounted signs which may or may not be internally illuminated or with down lighting;
- Signed and marked crosswalk with pedestrian actuated flashing beacons on overhead mounted signs;
- Pedestrian (or half) traffic signals, at intersections or mid-block locations;
- Full traffic signals with pedestrian signal heads; and
- Grade separation.

The cost of installing pedestrian half signals is significant, ranging from $50,000 to $75,000; compared with $20,000 to $30,000 for RA-5 signs with overhead flashers. While some cost savings can be achieved by utilizing existing poles, bases and mast arms when converting from RA-5 devices to pedestrian half signals, in many cases the bases and poles are not in the correct location. The simple controllers used for RA-5 flashers cannot be converted to operate pedestrian half signals but must be replaced.

There are several reasons for maintaining the use of existing flashing amber crosswalk beacons over pedestrian half signals:

1. It is valuable, in terms of educating the public to have a consistent form of crosswalk control. RA-5 overhead crosswalk signs are predominately used not only in HRM but throughout the Atlantic provinces. Half signals are less commonly used in Eastern Canada, and in the U.S. they are still considered experimental and are not currently included in the U.S. Manual of Uniform Traffic Control Devices.

2. With pedestrian half signals, the red light for vehicles on the major street remains on for a preset time (normally for the slowest expected crossing) while the pedestrian crosses facing the Walk and flashing Don't Walk signal indications. In many cases, this adds undue delay to vehicle traffic. In situations where half signals must be coordinated with the adjacent full traffic signals in order to maintain progression, pedestrians are subject to additional delays as well, since the walk light does not display immediately after the button is pushed.

   With the RA-5 flashing amber light, traffic flow can resume once the crosswalk is safely crossed by the pedestrian and pedestrians are not delayed by being forced to wait for a walk light before crossing when there are no approaching vehicles.

3. Pedestrian half signals can be abused by drivers delayed at the side street stop sign(s) who will sometimes leave their vehicle and press the button to activate the signals which forces the main street traffic to stop. The side street driver uses the gap to exit and main street drivers are left waiting for the light to change with no pedestrians in sight. Similarly, passing pedestrians (usually children but not always) with no intention of crossing the main street sometimes push the button on their way by. Such activities cause driver frustration which may result in increased non-compliance with the signals and encourage red light running behavior. In British Columbia, concerns that minor street motorists regularly failed to come to a full stop on the stop sign controlled minor approaches during pedestrian walk phase were confirmed by surveys where stop sign violation rates up to 62% were observed.

The determination of whether to convert existing flasher-equipped RA-5 sign installations to pedestrian half signals will be made by the Traffic Authority on a site specific case by case basis using appropriate traffic engineering principles.

B) The Council Motion infers that the Transportation Association of Canada (TAC) recommends the installation of Pedestrian Countdown Signals (PCS). In fact, the TAC report was only intended to be (as its title states), "Guidelines for Optional Use of Pedestrian Countdown Signals". In 2003, when TAC began investigating the use of PCS there were three different PCS configurations and six different countdown timing strategies being used across North America. Since the technology was obviously popular with the public, TAC felt a need for national standards before the variations

became more widespread and caused more confusion. The TAC "recommendations" quoted in the Council Motion, (that PCS be installed at locations with: a) a high percentage of seniors, children, and other mobility challenged pedestrians; b) a high history of pedestrian and vehicle conflicts; c) high pedestrian and/or vehicle traffic) are too ambiguous to be useful. Since "high" is a relative term that is neither defined nor quantified in the TAC Report, virtually all signalized intersections with any pedestrian activity at all could conceivably qualify. The TAC Report actually also includes a fourth suggestion that width of roadway be considered, implying that PCS are useful for reassuring anxious pedestrians when the ratio of minimum WALK display to FLASHING DON'T WALK display is less than 40% (roughly equivalent to a crosswalk length of 18 metres).

PCS are not necessarily installed in other jurisdictions because they are safer, but because they are popular. Pedestrians like them and believe the countdown signals provide more information from which to make a decision to attempt a crossing.

If Council decides to proceed with the installation of PCS concurrent with the LED Traffic signal conversion program, it should be understood that it will be difficult if not impossible to exempt any more than a handful of signalized locations from the conversion process once phase-in begins. There will also be considerable public pressure exerted to speed up the rate of conversion once the PCS start to appear on the streets.

Installing PCS concurrent with the LED Traffic Signal Conversion program will cost an additional $1,600.00 for a typical four-way intersection. Retrofitting existing LED converted locations will cost approximately $7,000.00 for a similar typical four-way intersection because of equipment, labour, and readjustment of heads.

The TAC Report notes that the Quebec Ministry of Transportation's PCS standard completely eliminates the flashing DON'T WALK display. Pedestrians are shown the WALK display with the countdown numbers. This is followed by the steady DON'T WALK display with no countdown numbers being displayed. The existing North American standard flashing DON'T WALK display means different things to different pedestrians:

- For pedestrians approaching the curb, it means don't walk, stop at the curb.
- For pedestrians that have left the curb, it means keep walking, don't stop.

Quebec's pedestrian signalization alternative eliminates the perceived ambiguity of the flashing DON'T WALK display.

The Quebec PCS standard provides pedestrians with the information on how many seconds are left before the steady DON'T WALK interval is displayed. Pedestrians still would need to judge if the number of seconds displayed is sufficient for them to cross the road. Some of the studies reviewed in the TAC Report have shown that pedestrians do not have a reasonably good sense of the required walking clearance time.

The November 14, 2006 Information Report remains the Traffic Authority's position on the use of Pedestrian Countdown Signals (PCS). In summary, that position is that the safety benefits of PCS have not yet been conclusively quantified, and while studies have indicated that pedestrians overwhelmingly favour PCS because they prefer "knowing how much time remains to cross", studies have also indicated that the presence of PCS tends to increase the number of pedestrians who start into the crosswalk illegally on a FLASHING DON'T WALK signal display. However, staff will proceed with a trial location in conjunction with the traffic signal upgrades to the intersection of Alderney Drive and Ochterloney Street.

C) Existing RA-5 overhead illuminated crosswalk signs with pedestrian-activated flashing amber beacons in HRM presently conform to the "Regulations Respecting Traffic Signs" pursuant to Section 88 of the Motor Vehicle Act. Additional flashing amber beacons could be mounted on poles at the side of the road as supplementary, optional devices without compromising the integrity or legality of the existing RA-5 sign installations. There are several locations in HRM where supplementary flashers have been installed. (Robie at Welsford, Brunswick at Carmichael).

Since there is no available evidence to indicate that additional flashing beacons would increase driver compliance or provide any additional measure of safety at marked crosswalks, staff is not recommending that additional flashers be adopted as standard devices at all RA-5 locations. It should be noted that it is the intent to eventually replace all existing incandescent flashers with the brighter and energy efficient LED.

COST:
Cost of installing additional beacons would vary from location to location depending on existing electrical wiring, type of installation (pole-mounted or span-wire mounted), presence of median, etc. Typically, the initial cost would be around $900 per location and equipping all existing RA-5 locations could cost upwards of $135,000. Additional beacons would increase annual maintenance costs due to power consumption and servicing.

D) The twin parallel line crosswalk marking identified in the MUTCDC is considered the minimum standard and typically is used where vehicles are required by a traffic signal or stop sign to stop. The zebra style marking, with 600mm longitudinal bars alternating with 600mm spaces may be used optionally.

The disadvantages of the use of zebra markings include the increased maintenance cost for repainting and the reduced traction caused by the larger painted surface which can be hazardous for pedestrians, bicycles and motorcycles. Although the zebra markings are intuitively more visible, the increased visibility is much more apparent to pedestrians than to drivers (who view the markings from a lower eye level and from an end-on perspective). There is a concern that pedestrians will have an exaggerated expectation regarding the visibility of the crosswalk to motorists.

COST:
It is estimated that painting a 600mm bar would cost between $3.00 and $3.50 per linear metre. Assuming the average width of roadway (ie: length of crosswalk) is 12 metres and would require 10 bars per crosswalk, and the standard width of a crosswalk is 2.5 metres; the estimated cost for a typical zebra crosswalk would be $75.00 to $90.00. Painting all 500 uncontrolled marked crosswalk locations in HRM with zebra markings is estimated to cost upwards of $44,000 annually. However, it probably would cost more the first year because of the extra time involved in the initial layout of the bars.

E) As noted previously in the November 14, 2006 Information Report, the only fluorescent yellow-green signs currently approved for use in Nova Scotia are WC-1 "School Area" signs and R-102 "End School Area" signs which are installed adjacent to schools. The Province has advised that they have adopted the black and white regulatory crosswalk signs provided in the MUTCDC and included them in regulations pursuant to the Motor Vehicle Act. Failure to comply with the "Regulations Respecting Traffic Signs" leaves the Traffic Authority in an untenable position regarding potential liability in the event of a lawsuit. Since fluorescent yellow-green RA-3 or RA-4 side-mounted, crosswalk signs are not presently available options, the Traffic Authority will not be authorizing their installations.

COST:
If the Province were ever to change the "Regulations Respecting Traffic Signs" it is estimated that the cost of replacing the 2000 signs at 500 locations in HRM core would approach $150,000.

F) Crosswalk signs have always been installed on posts in medians throughout HRM.

COST:
Not applicable since it is already being done.

G) A press release will be prepared and issued to the media with respect to any initiatives undertaken as a result of this report.

COST:
Minimal if sent through John O'Brien, Media Relations.

H) The "thickened paint" is probably thermoplastic which has been used in this area in the past. It costs roughly eight times as much as paint, takes much longer to dry (resulting in longer traffic control set-up times and potentially more tracking of paint), and is susceptible to chipping and damage from snow plows.

Staff is always open to trying any new product which may be more efficient or effective.

COST:
Variable.

I) This question has been asked on a number of previous occasions, most recently in 2003. The answer remains that use of a black backboard around the flashers is not recommended or required by either the MUTCDC or the Province. Since a major consideration with the overhead signs is wind load, adding backboards would cause significant problems in keeping the signs properly oriented to traffic under windy conditions. It is unlikely that the existing support system could handle the additional wind loading. As indicated previously, the replacement with substantially brighter LEDs will improve the visibility factor without creating other issues.

COST:
Not applicable.

J) The crosswalk marking program will resume in the spring when temperatures remain consistently warm enough to promote fast drying of the paint. All existing marked crosswalks are repainted annually and new locations authorized by the Traffic Authority are added to the list.

The standard for all new traffic installations throughout HRM is to install pedestrian push buttons and vehicle detector loops on at least the minor street approaches, and in some cases all approaches. One of the primary reasons for this is to operate the signals in what is known as semi or fully actuated control. This allows the signals to remain green on the major street when no vehicles or pedestrians are waiting to enter from the minor streets. Also, pedestrian timings (walk + flashing don't walk) are displayed only when required, resulting in more efficient signal operation. Another benefit with semi or fully actuated control is that flashing operation late at night is no longer necessary. While quick response to the push button is programmed into the system, it cannot result in instantly changing a DON'T WALK to WALK.

K) Budget implications are included under the appropriate heading in the report.

L) Information on flashing red beacons was provided directly to Councillor McCluskey as a result of her follow-up request at Council on January 9, 2007 and is included as an attachment to this report. It is assumed her comment that "other cities have a clock showing the time remaining" refers to pedestrian countdown signals which are addressed in another report specific to that topic.

M) Requests for changes to Official Traffic Sign Regulations, as well as, to the Motor Vehicle Act are received by the Provincial Traffic Authority's office all the time. There is no restriction on who can make the request; they are prepared to consider any amendment proposals from any source that is accompanied by sound background reasons. Because the application of traffic control signs,

markings and signals must be uniform, consistently applied, and effectively enforced, the Province is unlikely to vary to any great degree from the nationally accepted Manual of Uniform Traffic Control Devices of Canada unless such deviation can be justified by supporting evidence. In the specific case of fluorescent yellow-green crosswalk signs, they have advised that they are not intending to include them in the Regulations at this time.

BUDGET IMPLICATIONS

Since none of the crosswalk control devices discussed in this report is currently budgeted for, additional funding would be required for any discretionary devices. The following table summarizes the cost implications:

Table 1 - Estimated Costs

Crosswalk Control Devices	Units	Unit Cost	Total Costs
Discretionary			
Side Mounted Flashers	150	$900	$135,000
Painted Zebra Lines	500	$75 to $90	$44,000
Pedestrian Countdown Signals	255	$1,600 to $7,000	$700,000
Non-Discretionary			
Fluorescent Crosswalk Signs	2,000	$75	$150,000
Pedestrian Half Signals	87	$50,000 to $75,000	$4.0 mil to $6.0 mil

FINANCIAL MANAGEMENT POLICIES / BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Capital and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Capital and Operating reserves, as well as any relevant legislation. Implementing any of the above measures would increase the Gross Capital Budget.

ALTERNATIVES

Council can direct that additional funds are added to the appropriate Traffic & Right of Way Capital and Operating Budgets for future implementation of non-regulatory crosswalk control devices, specifically:
- additional pole-mounted flashing amber beacons at RA-5 crosswalks.
- zebra bars in place of twin-parallel lines at uncontrolled crosswalks.
- pedestrian countdown signals at designated locations.

Staff does not recommend this alternative because the funding directed to increasing the visibility of a limited number of marked crosswalks could be better applied to education and enforcement with respect to all crosswalks including unmarked ones. The Traffic Authority is not prepared to install the non-discretionary, regulatory crosswalk control devices. However, we are prepared to install the discretionary non-regulatory crosswalk control devices if Council chooses to add the additional funds for any or all of these devices.

ATTACHMENTS

1. Pedestrian Protection Study prepared for City of Regina by EPEC Consulting (Sask) Ltd 1989

2. Development of Uniform Pedestrian Crossings Project #41 Final Report prepared by Technical and Research Committee of the Council of Uniform Traffic Control Devices for Canada 1986 (in which use of pedestrian activated flashing red beacons on overhead crosswalk sign was rejected 17 votes to 2)

3. Minutes of Traffic Operations and Management Standing Committee (TOMSC) meeting held April 2005 (in which request to initiate a study project to consider use of flashing red at pedestrian crossings was rejected 23 votes to 3)

A copy of this report can be obtained online at http://www.halifax.ca/council/agendasc/cagenda.html then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Ken Reashor, P.Eng., Traffic Authority, 490-6637

CITY OF REGINA

PEDESTRIAN PROTECTION STUDY

epec consulting (sask) ltd.

5.3 Advance Warning Sign

Advance warning at pedestrian corridors is provided through the use of speed zoning signs or a warning type of sign. The use of a warning sign, posted in advance of a pedestrian corridor, containing the crosswalk legend, arrow and the word corridor; is recommended for use in Saskatchewan by Swanson et al and is currently used in the City. This practice should be continued in the City of Regina.

5.4 Flashing Light Colour

The use of a flashing amber light at pedestrian corridors is prevalent throughout Western Canada. The City of Regina uses red flashing lights.

The red flashing light requires that the motorist stop regardless whether the crosswalk is occupied or not and as such should provide enhanced protection for the pedestrian. In practice, however, studies in other centers indicate that motorists tend to ignore the flashing red stop requirement when the crossing is unoccupied.

After studying the use of red flashing lights, the City of Calgary discontinued using them for the following reason; "The failure by motorists to obey the flashing red light establishes bad driving habits, and creates potentially dangerous driving practices at locations where, for safety reasons, drivers must stop for the flashing red indication."

Based on Calgary's experience the guidelines for signalization in Saskatchewan prepared by Swanson et al recommended that the use of a flashing red indication at a pedestrian corridor be discontinued, and instead, only a flashing amber signal be used.

COUNCIL ON UNIFORM TRAFFIC
CONTROL DEVICES FOR CANADA

TECHNICAL AND RESEARCH COMMITTEE

PROJECT NO. 41

DEVELOPMENT OF UNIFORM PEDESTRIAN CROSSINGS

FINAL REPORT

JANUARY 1986

2 1 1

Internally illuminated:

Yes	12	
No	6	/18

Pedestrian activated flashing amber beacons on sign:

Yes	12	
No	7	/19

Pedestrian activated flashing red beacon on sign:

No	17	
Yes	2	/19

Audible signal indication advising that beacons activated:

No	13	
Yes	6	/19

Visual indication (light) advising that beacons activated:

Yes	10	
No	9	/19

Downlighting on crosswalk area:

Yes	15	
No	3	/18

Special external lighting of crosswalk area:

No	10	
Yes	7	/17

Agencies Replying to QUESTIONNAIRE

Vancouver	B.C.
Edmonton	SASK
Calgary	MAN
Saskatoon	ONT
Regina	QUE
Winnipeg	N.B.
London	N.S.
Hamilton	P.E.I.
Metro Toronto	
Ottawa-Carleton	
Montreal	/20

MEMORANDUM

TO: ALL MEMBERS
TRAFFIC OPERATIONS AND MANAGEMENT
STANDING COMMITTEE (TOMSC)

FROM: CHRIS BRINKMANN, Secretary

DATE: MAY 23, 2005

RE: MINUTES OF MEETING # 28

Enclosed are the minutes of TOMSC Meeting # 28 held April 15-17, 2005, in Ottawa, Ontario.

Please note that the next meeting will be held during the fall meetings (September 16-

Pavement Markings for Canada." **CARRIED** Project will be #**269**. Chair: Chow Volunteers: Harold Doyle, Greg Iwaskow, Milt Harmelink, Bernie Clancy.

MOTION (Cook/Sanderson) McCusker on behalf of the town of Balgonie, SK presented project initiation sheet for "**Flashing Red** at Pedestrian Crossings" **DEFEATED** (3/23).

Discussion: Hunt explained that the location of request is on a Saskatchewan provincial highway. Banks indicated this topic was previously raised with TOMSC years ago and was strongly rejected.

MOTION (Chow/Banks) Approve the Project Initiation form as submitted by Chow to develop a "Load Restriction Sign." **CARRIED** (27/1) Project will be #**270**. Chair: Richard Chow, Volunteers: Ben Rogers, Luis Escobar, Phil Edens (Ottawa), Paul Hunt, Harold Doyle, Michel Masse, Brian McKinney.

Discussion: It is noted that the name of the project on the original Project Initiation form was Road Ban Sign but during discussion the group agreed it be changed to "Load Restriction Sign".

MOTION (Chow/Iwaskow) Approve the Project Initiation form as submitted by Chow for "Signing for Non-Hospital Emergency Health Facilities." **CARRIED** (27/1) Project will be #**271** Chair: Greg Iwaskow, Volunteers: Ben Rogers, Harold Doyle, Paul Hunt, Jean-Francois Robert, Luis Escobar, Bernie Clancy, Neil Campbell, Suzanne Beale, Doug Bowron (Ottawa), Richard Chow.

Discussion: Iwaskow spoke to the need from Alberta's perspective. Also noted that these types of facilities already exist in British Columbia, Nova Scotia, and Manitoba. Sign will benefit out of town motorists. It was suggested that the group liaise with provincial health ministries. Doyle noted that Ontario attempted to develop signage