

# **Pedestrian Safety Initiatives**

## **Background:**

The Traffic and Transportation Engineering Services section is responsible for the safe and efficient movement of people and goods in the City of Greater Sudbury. The section reviews new devices on a continuous basis and implements new programs aimed at increasing safety for pedestrians, vehicles and other road users. This report focuses on current policy, technology and safety programs aimed at increasing pedestrian safety. Road safety and specifically pedestrian safety has been a long time focus of the Traffic and Transportation Engineering Services section. Many of the initiatives that are described in this report began well before amalgamation and have evolved to the current practice.

## **Pedestrian Crossing Policy**

The Pedestrian Crossing Policy was adopted in 2012 to help the City determine how and when to implement pedestrian crossings. Listed below are the key recommendations contained in the policy.

1. Continue to follow the Ontario Traffic Manual warrants and methodologies for implementing protected pedestrian crossings using traffic control signals, mid-block pedestrian signals and intersection pedestrian signals.
2. With the exception of supervised school crosswalks, marked crosswalks will be discouraged.
3. Utilize warning signs, pedestrian refuge islands and other measures such as reflective delineator posts at unprotected crossings to draw driver's attention to the possible presence of pedestrians.
4. Consider removing crosswalk markings at unprotected crossings on high speed or high volume multi-lane roads.
5. Proactively address pedestrian safety needs and establish a program for reviewing pedestrian crossings.

As a result of the policy uncontrolled crosswalks are no longer painted and locations with apparent desire lines have had additional signs installed.

## **Pedestrian Crossing Time**

The pedestrian crossing time at traffic signals is calculated based on a designated walking speed of pedestrians and the length of the crosswalk. Currently, provincial standards recommend using a walking speed of 1.2 metres per second for a typical adult, and a walking speed of 1.0 metre per second for crosswalks frequented by children, seniors and people with a disability.

In 2014, City staff conducted a walking speed study to determine what walking speed should be used in the City of Greater Sudbury so the majority of residents could comfortably use a crosswalk to cross a roadway. It was determined that if a walking speed of 1.0 metre per second was used, 95 percent of residents within the City of Greater Sudbury would be able to comfortably cross a roadway. These results were similar to a study completed by the Transportation Association of Canada which found that 90 percent of Canadians would be accommodated by a walking speed of 1.0 metre per second. As a result of these studies and a literature review of other completed studies, the City is now using a walking speed of 1.0 metres per second when recalculating pedestrian timing at intersections with traffic signals.

The City has implemented the slower 1.0 metre per second walking speed along the entire Paris Street/Notre Dame Avenue corridor and at the intersections of Regent Street at Walford Road, Regent Street at Bouchard Street, Lasalle Boulevard at Notre Dame Avenue and Lasalle Boulevard at Barry Downe Road.

There is often a misunderstanding regarding the operation of pedestrian signal displays. Although pedestrian signals are very common throughout the City of Greater Sudbury and the Province of Ontario, many pedestrians do not understand the meaning of the "Walk" and "Flashing Don't Walk" symbols. Many pedestrians expect to see the "Walk" symbol displayed during their entire crossing of the intersection. However, the "Walk" symbol is intended to tell pedestrians that they may begin to walk across the intersection. The City of Greater Sudbury typically displays the "Walk" symbol for seven (7) seconds, regardless of the length of the road that is being crossed. Seven seconds is typically enough time to cross two (2) lanes of traffic. The "Flashing Don't Walk" symbol means that if you have started crossing the intersection there will be enough time to complete the crossing but do not begin to cross from the curb or sidewalk. It is important to note that pedestrians continue to have the right-of-way while the "Flashing Don't Walk" symbol is being displayed. The amount of time the "Flashing Don't Walk" symbol is displayed is based on the walking speed and length of the crosswalk as described above. This means at each intersection, pedestrians have the amount of time required to cross the entire road based on the walking speed plus an additional seven (7) seconds.

### **Pedestrian Countdown Timers**



A common concern raised by pedestrians crossing intersections with traffic signals is the uncertainty of the time remaining to cross once the “Flashing Don’t Walk” display begins. In response to this concern, the traffic signal industry developed the Pedestrian Countdown Signal (PCS) head. The PCS is an enhanced pedestrian signal head which displays the amount of time remaining to cross the intersection.

It starts a descending numerical countdown in seconds once the “Flashing Don’t Walk” symbol starts and indicates how many seconds are available for pedestrians to safely cross the intersection before the amber vehicle signal will appear.

The City of Greater Sudbury began installing PCS heads in 2003 and has received very positive feedback from the public. PCS heads have been installed on the main street crossing of all traffic signals throughout the City.

## Accessible Pedestrian Signals



An Accessible Pedestrian Signal is a device that communicates audible, tactile, and vibrotactile to provide crossing information to people who have visual disabilities. Different audio tones are emitted for the east-west and north-south directions at the intersection crosswalks.

The signals come equipped with a pushbutton locator tone. The tone is a repeating sound that informs approaching pedestrians that a pushbutton to activate pedestrian timing or receive additional information exists, and enables pedestrians with visual disabilities to locate the pushbutton. In order for pedestrians to locate the appropriate pushbutton, tactile arrows are used to indicate which crosswalk signal is actuated by each pushbutton. Tactile arrows are located on the pushbutton, have high visual contrast (light on dark or dark on light), and are aligned parallel to the direction of travel on the associated crosswalk.

The City continues to work with the Canadian Institute for the Blind (CNIB) to assist with determining new locations for Accessible Pedestrian Signals. The CNIB also trains people with visual disabilities to cross intersections.

On December 12, 2012, the Province of Ontario passed a regulation to amend the Accessibility for Ontarians with Disabilities Act (AODA) of 2005 to include accessibility standards for the built environment. The amendment to the regulation came into force January 1, 2013 and applies to public spaces that are newly constructed or redeveloped after January 1, 2016 by municipalities among other obligated organizations.

One of the requirements of the new AODA regulation is Accessible Pedestrian Signals (APS) are to be installed a minimum of 3 metres apart where two are installed on the same corner. If this requirement cannot be met because of site constraints or existing infrastructure, two APS can be installed on the same pole, but with a verbal announcement which clearly states which crossing is active. In addition, pedestrian poles are to be located 1.5 metres from the road to shorten the distance for people with visual disabilities to travel and orient themselves to cross the road.

### **Pedestrian Traffic Signals**



Pedestrian traffic signals manage the interaction between pedestrians and vehicles, and present operational benefits to pedestrians by providing priority over vehicles at all times. This priority may provide a sense of security for pedestrians, encourage pedestrians to cross at the controlled location and limit the number of locations where pedestrian crossings occur.

They are similar to standard traffic signals except that there are only two approaches for which traffic signal heads are required. They may be installed at an intersection or at a mid-block location. These signals are actuated with pedestrian push buttons or Accessible Pedestrian Signals (APS) and use the same methodology to determine the pedestrian crossing time as full traffic signals.

The City of Greater Sudbury has installed pedestrian traffic signals at the following locations:

1. Lasalle Boulevard at Holland Road (New Sudbury Library)
2. Lloyd Street at Brady Street
3. Paris Street near Rumball Terrace
4. Paris Street near the Southwind Retirement Facility
5. Regent Street near Hazel Street
6. Second Avenue at Adamsdale Park



## **Refuge Islands**

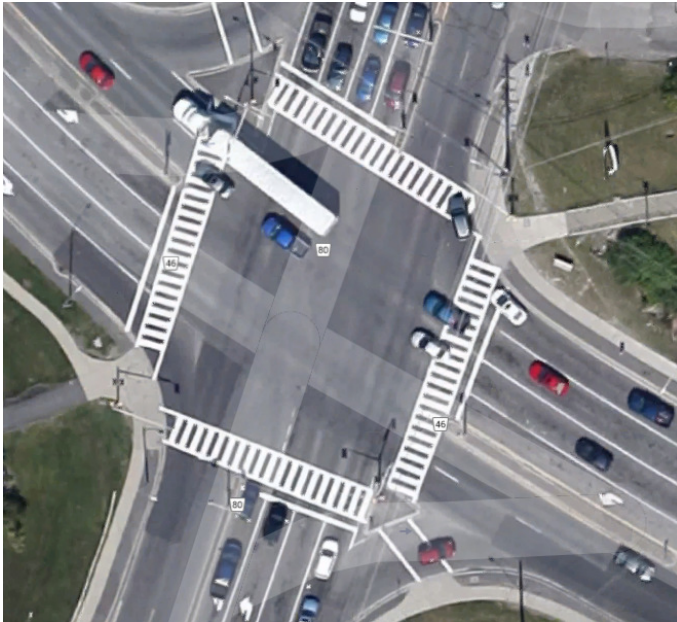


Refuge islands are raised medians placed in the centre of the roadway at midblock locations or unsignalized intersections.

Refuge islands are intended to assist pedestrians in crossing wide streets by providing a safe “refuge” in the centre of the road and allowing pedestrians to cross one direction of traffic at a time. The presence of a refuge island reduces the time a pedestrian must wait for an adequate gap in the traffic stream and reduces the crossing distance and exposure to traffic that they must face at one time.

Where properly installed, pedestrian refuge islands are beneficial in delineating pedestrian activity and encouraging pedestrians to cross at more desirable crossing locations. Some examples of refuge islands that have been installed in the City include Barry Downe Road at Woodbine Avenue, Brady Street at Shaughnessy Street, Municipal Road 8 at Fraser Avenue, Municipal Road 15 near Herve Avenue and Municipal Road 24 near Jacobson Drive.

## **Enhanced Crosswalk Markings**



Enhanced crosswalk markings are a technique that is used to heighten driver awareness of pedestrian crossings and increase crosswalk visibility. Three types of enhanced crosswalk markings are used throughout the City; ladder, zebra stripe and school crosswalks.

Typical crosswalk lines are two parallel white lines which lead from one side of the road to the other.

Zebra stripe crosswalk markings are longitudinal white lines installed 60 centimeters apart within the area that pedestrians are expected to cross the travelled portion of the roadway. For new developments, the City has been requesting them at the driveway entrance to the site, when a sidewalk is present, and within the site where pedestrians need to cross the parking aisles.

Ladder crosswalk markings are enhanced pavement markings that are a combination of zebra stripe pavement markings and standard parallel crosswalk lines (see picture above). Ladder crosswalks increase driver's visibility of crosswalks at all times of the day.

The following guidelines are considered when determining locations for ladder crosswalks in the City:

- The location must be a controlled crossing
- Pedestrian crossing volumes are high
- There is a high volume of turning vehicles
- There is a higher than expected number of pedestrian collisions

For school crossing locations, the Ontario Traffic Manual Book 11 outlines the appropriate pavement markings for urban and rural supervised school crosswalks. The school crossing markings use a variance of standard crosswalk markings and zebra stripe markings.

### **School Crossing Guard Program**

A school crossing is a point on a highway supervised by a school crossing guard, either at an intersection or mid block location that has been designated through a warrant process. A school crossing guard has the authority under the Highway Traffic Act to stop traffic to allow for the safe crossing of pedestrians. On June 2, 2015, the Ontario Government passed Bill 31, also called the Making Ontario's Roads Safer Act, making several important changes to the Ontario Highway Traffic Act (HTA). One of these changes included the requirement for vehicles to yield the entire roadway when a school crossing guard is displaying a stop sign.

To determine where protected school crossings are needed, the City uses the school crossing warrant based on the 1992 School Crossing Review undertaken by the Ontario Ministry of Transportation. The purpose of the warrant is to utilize a consistent and uniform approach when dealing with student safety.

The warrant consists of a site inspection conducted at each location where student safety is an issue and a gap study. The purpose of the site inspection is to study and analyze apparent hazards at a potential school crossing location and determine if there are alternatives to a school crossing to improve student safety. If it is determined that a school crossing is the best solution, a gap study is conducted to record the number of students crossing, the number of gaps for students to cross safely and any conflicts between pedestrians and vehicles.

A school crossing warrant is approved if:

- There are less than five (5) safe gaps in traffic in fifty per cent of the five minute timed intervals on a road having a posted speed limit of not more than 60km/ h, and
- The number of students crossing meets or exceeds the minimum number previously established in the terms of reference (in the case of the City the minimum number is 20)



### **Tactile Warning Panels**



As part of the new Accessibility for Ontarians with Disabilities Act standards, tactile warning indicators are to be installed where an accessible walkway crosses a vehicle path. The purpose of the tactile warning indicators is to alert visually impaired pedestrians when they are approaching an intersection before they reach the curb ramp.

The tactile warning indicators are panels with a pattern of truncated domes on the surface. They are typically made with a composite material and are wear and slip resistant. A panel uses a colour that contrasts from the surrounding concrete. After consultation with the CNIB, the City decided to use yellow tactile warning panels. They are installed at the bottom of curb ramps and are set back between 150 mm and 200 mm from the curb edge.

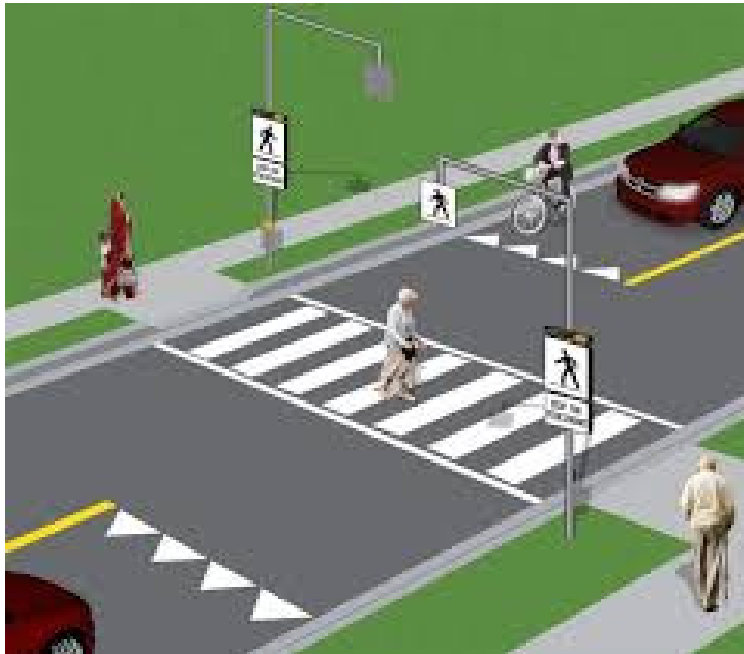
In 2015, tactile warning panels were installed at the intersection of Municipal Road 80 and Municipal Road 15 and at the northeast and southeast corners of Municipal Road 80 and the entrance to the Val East Mall. The City now installs the panels as part of all capital projects at controlled crosswalks.

### **Uninterrupted Power Supplies**

In the event of a power failure, an uninterrupted power supply (UPS) will provide battery backup power with no interruption to traffic and pedestrian signals for up to four (4) hours of normal operation. If the power is off for longer than four (4) hours, the signals will continue to operate for another six (6) hours in a flashing mode. In most cases, power will be back on before the four (4) hour period is over. In the City of Greater Sudbury 75 percent of signalized intersections have an UPS installed.

### **New Pedestrian Crossing Facilities**

On June 2, 2015, the Ontario Government passed Bill 31, also called the Making Ontario's Roads Safer Act, making several important changes to the Ontario Highway Traffic Act (HTA). Another measure of the Making Ontario's Roads Safer Act was the introduction of new pedestrian crossover facilities (PXOs). These new crossing treatments will allow pedestrians to cross the right-of-way under a greater number of conditions and will provide municipalities with a more cost effective solution to ensure pedestrian safety.



Staff will bring forward a report in the near future describing these new facilities.

### **Traffic Calming**

The Institute of Transportation Engineers defines traffic calming as the combination of measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users. Traffic calming consists of physical design and other measures put in place on existing roads to reduce vehicle speeds and improve safety for pedestrians and cyclists. For example, vertical deflections (speed humps, speed tables, and raised intersections), horizontal shifts, and roadway narrowing are intended to reduce speed and enhance the street environment for non-motorists.

An example of road narrowing is curb extensions which are an extension of the curb line into the roadway. The pedestrian safety benefits include a shorter crossing distance and increased visibility for both the driver of the waiting pedestrian and the waiting pedestrian of the approaching vehicles. Curb extensions can also make pedestrian crossings more visible, especially when used in combination with high visibility markings.

Attlee Avenue is an example of a traffic calmed road. Curb extensions, raised median islands, edge lines and radar speed display signs were used to reduce the overall operating speeds by up to 10 km/h in certain areas of the road. In addition to reducing operating speeds, curb extensions were installed at locations where pedestrians are known to frequently cross the road and would benefit from the shorter crossing distance and increased visibility.

### **Channelized Right Turn Lanes**

Many channelized right turn lanes are designed for unimpeded vehicle movement. In areas with pedestrian activity and crosswalks this makes it difficult for pedestrians to find safe gaps to cross the lane. Where possible, the City is removing channelized right turn lanes in conjunction with capital road projects. However, there are situations where removing the channelized right turn lane is not practical and would decrease pedestrian safety. In these situations, the City is constructing Smart Channels. Smart Channels reduce the approach angle of vehicles to the intersection. By reducing the angle, drivers are no longer required to look over their shoulder for a gap in traffic and can focus more on the road in front of them. This design also reduces a vehicle speed which creates a better environment for pedestrians trying to cross the right turn lane. Below is an example of a smart channel at the intersection of Paris Street and Brady Street.



## Sudbury Road Safety Committee



The City of Greater Sudbury is a standing member of the Sudbury Road Safety Committee. The mission of the committee is to promote road safety within Greater Sudbury for all road users through education, enforcement, engineering and enthusiasm. Its goals are to reduce the incidence of road injuries in Greater Sudbury and provide safe transportation for all transportation modes and populations, including the most vulnerable road users.

The committee aims to achieve its goals through information sharing, research, policy recommendations and education. An example of one of the committee's education initiatives is the Do the Bright Thing campaign which ran in the fall of 2015. The campaign encouraged pedestrians to wear bright or light-coloured clothing or reflective strips especially at dusk, dark or when it is raining, or snowing so they would be more visible to other road users.

### RP-8 Street Lighting

In 2014, the City adopted a street lighting policy based on the Illuminating Engineering Society of North America's (IESNA) RP-8 guideline. The purpose of the guideline is to serve as the basis for design of fixed lighting for roadways, adjacent bikeways, and pedestrian ways. The RP-8 guideline provides recommendations for designing new continuous lighting systems for roadways and it is not intended to be applied to existing lighting systems until such systems are redesigned. Through the use of the RP-8 guideline, roadways and sidewalks throughout the City will be brighter and more evenly lit. A brighter and more evenly lit roadside environment will enhance pedestrian visibility and increase pedestrian comfort levels.

**Conclusion**

Pedestrian safety has been and remains a primary focus of the Traffic and Transportation Engineering Services section. Although many pedestrian safety initiatives have been implemented over the years, staff remains committed to researching and implementing new safety initiatives as they are developed throughout the industry with the goal of providing the safest transportation network for all road users.