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TO:	**CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON OCTOBER 7, 2013**
FROM:	**EDWARD SOLDO, P. ENG. DIRECTOR, ROADS AND TRANSPORTATION**
SUBJECT:	**RAILWAY PEDESTRIAN CROSSING SAFETY**

RECOMMENDATION

That on the recommendation of the Director, Roads and Transportation, the following actions **BE TAKEN** with respect to a proposed Railway Pedestrian Crossing Safety program:

a) Civic Administration **BE DIRECTED** to liaise with the railway companies regarding opportunities to increase public awareness of rail safety issues;

b) Civic Administration **BE AUTHORIZED** to continue discussions with the respective railway companies and Transport Canada to refine and jointly implement the draft program of engineering crossing safety treatments attached hereto as Appendix "B" under appropriate cost sharing and utilizing any federal rail safety funding programs that are available; and,

c) A new two-year project **BE INTRODUCED** for consideration in the 2014 budget for the implementation of engineering crossing safety treatments.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

- February 25, 2013 – Civic Works Committee – Railway Pedestrian Crossing Safety

BACKGROUND

The City of London is serviced by a network of railway lines that move goods and passengers. The network is comprised of railway owned by Canadian National Railway (CNR), Canadian Pacific Railway (CPR) and Goderich-Exeter Railway (GEXR). The railways are crucial to the economic prosperity of London and Southwestern Ontario as they provide a reliable and affordable way to transport goods.

The City has a number of ongoing railway safety related initiatives in London. At the Council meeting on March 5th 2013, staff were authorized to undertake a Railway Pedestrian Crossing Assessment study to determine appropriate pedestrian focussed solutions at railway crossings. This report presents Committee and Council with the initial results of a network Railway Pedestrian Crossing Assessment.

Railway safety is a function of education, engineering and enforcement. The objective of assessment was to determine best practices for providing effective warnings to non-motorized users of roadway/railways grade crossings that inform the user of the presence of a crossing, and inform the user to take appropriate action to prevent a collision. A draft capital program of safety improvements to reduce the risk of railway pedestrian collisions was developed. The program would form the basis for engagement and potential future discussions with the railway companies and Transport Canada.

DISCUSSION

Rail pedestrian incidents are relatively infrequent events, however, when they do occur, they often result in tragic consequences or significant harm. These rare events have significant

adverse effects on communities as well as personnel operating the trains.

Pedestrian Crossing Safety Statistics

Records indicate fourteen railway-pedestrian incidents have occurred in London in the five years from 2008 to 2012, eleven of which resulted in a fatality. Five of the fourteen collisions occurred at roadway/railways crossing locations and the remainder were mid-block or rail yard trespassing occurrences.

Non-compliance with warning devices is commonly the root issue in these incidents. There were half as many rail-vehicle collisions suggesting that warning device compliance is less reliable amongst pedestrians. 84% of all incidents involved males. Recent pedestrian fatalities include incidents at the CPR/Third Street railway crossing in December 2012 and the CNR/Colborne Street railway crossing in July 2013. During both of these incidents, the roadway gates, flashing lights and bell were operating.

Railway Safety Education

Education is an important component in order to reduce/eliminate railway incidents. The Railway Association of Canada and Transport Canada operate the Operation Lifesaver (www.operationlifesaver.ca) program. Operation Lifesaver uses education, engineering and enforcement to prevent rail collisions and to prevent trespassing incidents that can lead to serious injury or death.

During Rail Safety Week, Operation Lifesaver volunteers engage in a number of local events and activities across Canada, including crossing blitzes, mock collision scenarios, public service announcements and presentations by volunteers to schools, youth clubs, drivers associations and community groups. The goal of educating people of all ages about the dangers of railway crossings and the seriousness of trespassing on railway property is mainly to prevent trespassing incidents that lead to serious injury or death.

Canadian National (CN) and the Canadian Pacific Railway (CPR) deliver a variety of railway safety education and awareness programs in London. The educational programs are intended for various audiences such as kids, teens, new drivers, adults, professional drivers and emergency vehicle operators. The methods used to reach the public include the production and distribution of related educational material, early elementary and driver education curriculum activities, civic presentations, as well as media coverage. Canadian Pacific Railway police officers delivered Operation Lifesaver presentations at 13 schools in London from January to June in 2013, including one held at the F.D. Roosevelt elementary school, the school that the youngster associated with the December 2012 incident at the railway crossing at Third Street near Dundas Street attended.

The following summarizes few examples of educational materials that the railway agencies provide in relation to pedestrians and cyclists:

- Activity Placemats for Kids: a set of eight (4 English/4 French) activity oriented placemats for kids
- Public-Rail Safety Guide: a guide to railway warning signs and devices with safety tips for vehicle operators and pedestrians
- Tips for Cyclists: a guide to cyclists of all ages on how to stay safe around trains and railway property
- Tips for Parents and Caregivers: a guide to parents and caregivers on how to keep children safe around trains and railway property

- OL Activity Book with Rover the Rabbit: activity book for children on staying safe around trains and railway property
- Student Safety Guide: “Find the errors” type puzzle

Railway Crossing Engineering Safety Assessment

In 2007, a review was completed by the City, Transport Canada, CNR, CPR and Goderich-Exeter Railway of all railway crossings in the City of London. The review looked at signage, pavement markings, vegetation, fencing and other issues. The City completed all of the recommended changes that were within its control (e.g. signage, pavement markings and some vegetation). The review provided a good basis for Railway Pedestrian Crossing Assessment.

The City of London retained CIMA Consultants for the Railway Pedestrian Crossing Assessment. The firm is a leader in roadway and pedestrian safety and is currently developing the City’s Road Safety Strategy. The assessment provided a best practices literature review and developed a guideline for safety assessment of railway crossings for vulnerable road users. The Executive Summary is attached in Appendix “A”. The report:

- identified current best practices, regulations and standards used by various jurisdictions;
- identified common risk factors at grade crossings;
- identified appropriate treatments/countermeasures for specific risk factors; and,
- developed a computerized site assessment tool to evaluate crossing compliance, identify risks and recommend countermeasures.

City staff, in conjunction with rail company staff from CN, CPR and GEXR conducted detailed on-site assessments of all railway pedestrian crossings within London during July and August of 2013. Of the 59 railway crossings in London, 46 railway crossings have pedestrian paths and are listed as follows:

Railway	Pedestrian Crossings
Canadian National (CN)	27
Canadian Pacific Railway (CPR)	12
RailAmerica Goderich-Exeter Railway (GEXR)*	7

** Under agreement with CN*

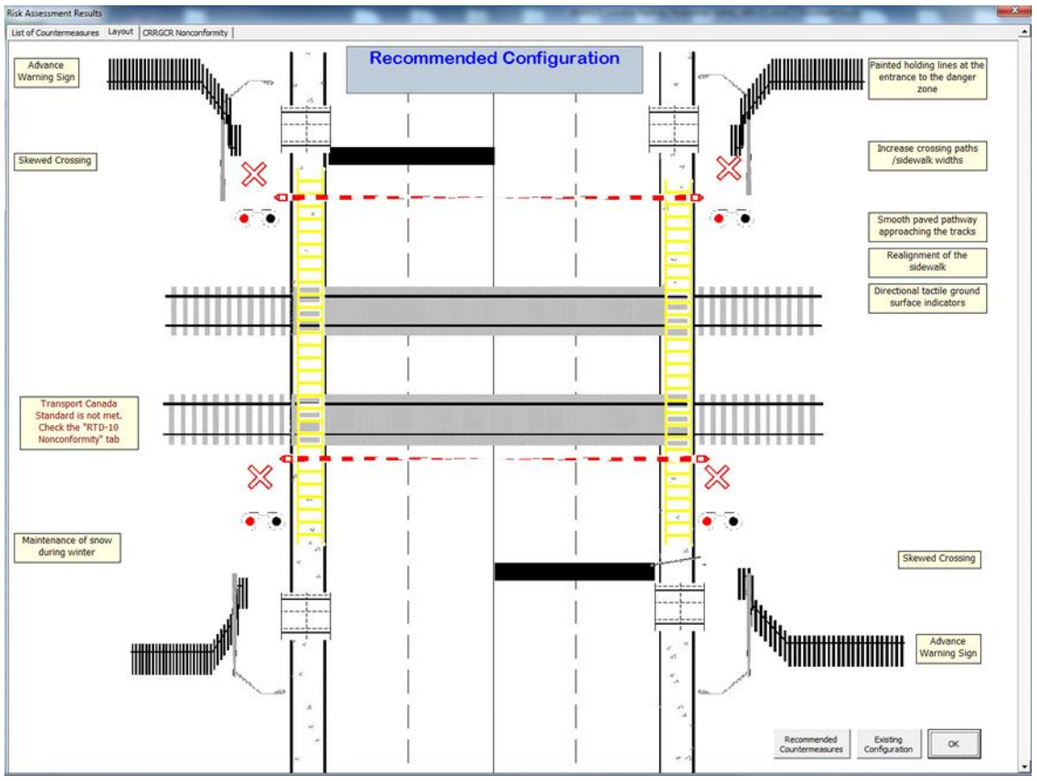
The assessment inspected an extensive list of crossing characteristics including warning devices, clearing sight distance, track angle, slope on approach to the railway, and width of crossing. The assessment identified deficiencies at crossings that do not conform to the Transport Canada standards as well as potential hazards that may increase the risk for pathway users. Transport Canada minimum requirements include:

- Flashing light post needs to be within 3.6 m of the centre of the sidewalk
- Bell and flashers must be located on the side where the pedestrian path exists
- Adequate sightlines (sight triangle clear from obstructions such as buildings and trees)
- Crossing width must extend 0.5 m beyond the width of the approach at a crossing and approach width needs to be 1.5 m or greater
- Stop-bar pavement markings
- Pedestrian warning signs must be 2 m or less in height
- “Trip-free” crossing surface conditions (the elevation difference of the track and the adjacent surface must be less than 13 mm)

In addition to the above minimum requirements, other measures such as additional warning signs, painted delineated pathways, automated gates, maze barriers or zigzag crossings were considered at specific crossing locations to protect and to raise the pedestrian awareness. Exposure factors such as train and pedestrian volume were also considered to evaluate risk.

Figure 1 below provides an example of a sample risk assessment result from the computerized site assessment tool created.

Figure1 - Risk Assessment Tool Result



Proposed Engineering Safety Treatments

The assessment recommended a variety of countermeasures to improve pedestrian safety at railway crossings. During the inspection, it was observed that most pedestrians do not look around for trains before walking through railway pedestrian crossings. As such, additional signage and pavement markings are recommended to be installed at all crossings as visual cues to encourage pedestrians to stop and look both ways before crossing.

Pedestrian deflection mechanisms such as maze barriers or gates as shown in Figure 2 to slow pedestrians and force them to look both ways are recommended where probability of a collision is deemed to be high. The probability of a collision is mainly determined based on the pedestrian volumes, number of trains, speed of trains, length of a crossing, number of tracks and other site specific characteristics such as grade of approaches and adjacent site conditions. Other site specific conditions such as hidden informal pathways or “goat” paths are also identified in the inspection. Additional signage or barriers would be required to prevent pedestrians from accessing those dangerous pathways.

Pedestrian gates currently exist at two locations – CPR/Richmond Street and CN/Egerton Street. However, only two pedestrian gates exist at CN/Egerton Street where four are required to serve all pedestrian approaches. New pedestrian gates are recommended at CN/Egerton Street to complete the installation at this location. CN/Egerton Street is a highly complex location with numerous tracks and highly variable train speeds.

Figure 2 - Deflection Mechanism Example

Pedestrian gates are not recommended at other locations due to ineffectiveness at ensuring compliance. For example, a pedestrian crossing fatality has occurred at Richmond Street with pedestrian gates in place and operational. National statistics reaffirm that a high number of collisions occur at crossings with active warning devices (flashing lights, bells, gates). Pedestrian gates also have high installation and operating costs.

Engineering Safety Treatments Cost

The identified engineering safety treatments recommended by City Staff in order to improve pedestrian safety at all 46 railway crossings are estimated to cost in the order of $470,000. A table summarizing the recommended countermeasures is attached in Appendix “B”.

The proposed treatments need to be reviewed with the railway companies, particularly treatments within the crossing that would require railway installation or cooperation. Cost sharing of some treatments with the appropriate railway companies is appropriate and will be pursued further. Rail transportation is under the jurisdiction of the federal government and funding may be available through the Government of Canada’s Grade Crossing Improvement Program. Staff involved Transport Canada in this assessment.

With the introduction of City funding, many treatments can be implemented in 2014. Treatments that require more involvement or installation by project partners may take longer, therefore staff is recommending a two-year program for the installation of all measures. The schedule is subject to railway partnering and funding.

Whistle Cessation

Train whistling requirements are set out in the Canadian Rail Operating Rules, which state that trains must whistle as they pass through public and pedestrian crossings at grade. There are provisions in the *Railway Safety Act*, 2001, for eliminating the use of train whistling at a crossing at the request of a municipality. Equipment that meets specific safety standards, including adequate warning systems, must be put in place to compensate for the elimination of whistling.

Municipal Council has passed several by-laws to regulate the use of train whistles in the urban areas in conformity with Transport Canada guidelines. The oldest by-law still in force is dated September 3rd, 1963.

Council had directed staff to review and consider the repeal of those whistle cessation by-laws at all or some locations so that train crews would announce their approach to a crossing. While the by-laws regulate the use of train whistles at railway crossings, it should be noted that it does not prevent trains from utilizing whistles in the case of emergencies. CN and CPR have both confirmed that while they refrain from their automatic use at roadway crossings, they are

activated whenever there is a circumstance that warrants it, such as the presence of pedestrians on the track.

The compensatory warning systems are robust and maintained to operate reliably. The analysis indicates that rail-pedestrian incidents are most often a result of non-compliance. The analysis indicates that reinstating train whistling within the urban area of London would provide a negligible benefit to safety and it is recommended that the whistle cessation bylaws be maintained.

SUMMARY

Railway safety is a function of education, engineering and enforcement.

- Rail pedestrian incidents are relatively infrequent events, however, when they do occur, they often result in tragic consequences or significant harm.
- Operation Lifesaver is one of the leading programs that promote railway safety.
- The Canadian National (CN) and the Canadian Pacific Railway (CPR) deliver a variety of railway safety education and awareness programs in the City.
- 46 of the 59 railway crossings in London have pedestrian path crossings. A Railway Pedestrian Crossing Assessment study was conducted to determine appropriate pedestrian focussed safety solutions at railway crossings.
- The assessment recommended a variety of countermeasures to improve pedestrian safety at all pedestrian crossings at an approximate total cost of $470,000 to be shared with the appropriate railway companies. Potential federal government funding assistance will be pursued.
- The recommended treatments need to be reviewed with the railway companies and Transport Canada.
- Staff is recommending the introduction of a two-year railway pedestrian safety project in the 2014 budget. This will allow installation of many easy-to-implement countermeasures in 2014. Countermeasures requiring a longer lead time due to 3rd party involvement or installation would follow subject to railway and Transport Canada agreement.

Acknowledgements:

This report was prepared within the Transportation Planning and Design Division with input from Shane Maguire, Manager, Roadway Lighting & Traffic Control and Maged Elmadhoon; Manager, Transportation Planning, and with the assistance of Shaun Chen, Engineer-In-Training.

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Attach: Appendix “A” – Railway Pedestrian Engineering Safety Report, Executive Summary, July 2013
Appendix “B” – Recommended Engineering Safety Treatments

c. Sgt. Ryan Scrivens, London Police
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Appendix “A”
Railway Pedestrian Engineering Safety Report
Executive Summary, July 2013

The City of London (the City) conducted a safety assessment of the 59 crossings in 2007 in response to a relatively high frequency of collisions at railway crossings in the City. This assessment was conducted in collaboration with CN, CP, and GEXR, identified deficiencies in terms of signage, pavement markings, vegetation, fencing and other issues and recommended treatments to address the deficiencies.

The City initiated this project to develop guidelines for safety assessment of railway crossings for vulnerable road users. The guidelines will assist the City staff to collect required information at crossings, identify risk factors, and recommend countermeasures and treatments to mitigate potential risks. The main objectives of this project include:

- Identification of common risk factors at grade crossings,
- Identification of current practices, regulations, and standards used by different jurisdictions to mitigate risks at grade crossings,
- Identification of appropriate treatments for specific risk factors,
- Development of a computerized tool to assist the City in identification of risk factors and recommendation of countermeasures, and
- Development of a computerized tool to evaluate compliance of grade crossings with the existing Canadian regulations and standards.

This report presents the identified risk factors and their related treatments. The identified risk factor include: Presence of vulnerable road users; Train operations; Site Characteristics; Channelization; and vulnerable road user action and condition. A risk assessment matrix is introduced in which potential countermeasures are suggested to mitigate risk factors at grade crossings. Moreover, a set of criteria were presented to evaluate different countermeasures, including: Accessibility; Comprehension; Compliance; Maintenance costs; Operating costs and Capital costs.

A field checklist was created to assist in collecting required data (site characteristics, pedestrian approach/crossing characteristics, train operations, etc.) during a site visit for crossings. A Microsoft Excel based tool, Railway Crossing Safety Assessment Tool (RCSAT), was developed to assess existing treatments at grade crossings against Canadian standards and regulations, identify risks at each crossing, identify countermeasures to mitigate risks, and rank countermeasures based on their costs or effectiveness to mitigate risks.

It is important to highlight that the recommendations of this report and the RCSAT are supplementary tools to Transport Canada Guidelines and procedures and have been developed and recommended only for vulnerable road users.

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Appendix “B”
Recommended Engineering Safety Treatments

	Counter Measures	Number of locations	Description	Notes	Total Cost *
Transport Canada Requirement	**Apply pavement markings**	42	Double yellow transverse pedestrian pavement marking (Stop Bar)	25% are in good to fair condition	**$6,150**
	Trim Bushes to increase sight lines	22	Trim bushes and tree branches to increase the sightline	Adjacent area to the crossing and along the track	**$4,400**
	Increase the Width of the Approach to 1.5m	2	Extend the width of the sidewalk or relocate flaser pole to meet the 1.5m approach width	Flasher pole is too close to sidewalk	**$810**
	Improve the Surface Condition of the Approach (within 5 metres)	19	Sidewalk replacment (3 panels of sidewalk at each approach)	Cracked or settled sidewalk	**$22,680**
	Reconfigure "Second Train" Warming Sign	11	Relocate 15 signs and replace 4 signs	Existing signs damaged or need to be relocated (50% in good or fair shape)	**$2,850**
	Resurface the Crossing	14	Reconstruct the crossing surface	Determined based on the rail condition and surface condition	**$11,340**
	Reduce the Approach Grade for Smoothness	31	Reconstruct the approach grade to the crossing	significant sudden change in grade at the crossing (trip hazard)	**$82,350**
	Widen crossing 0.5m beyond Approach	14	Apply asphalt to extend the crossing surface to a minimum 0.5m beyond the edge of the approach	18 intersections have this issue but it may not occur in both directions	**$4,050**
Additional measures	**Implement Deflection Mechanisms (maze, barrier, etc.)**	9	Install Fences/barrier or deflect the sidewalk	Locaions with steep approaches. Subject to further evaluation and design work	**$79,200**
	Improve Lighting Condition	6	Install additional street light	Street light at wrong side or lack of street light	**$18,000**
	Automatic Gate	1	Install automatic gate	To complete and upgrade the gate system on all approaches at CN-Egerton-main line	**$210,000**
	Delineated Pathway across the Crossing	5	Pavement marking delineated pathway through the crossing to 5 metres beyond the edge of the	Where pathway is not aligned beyond the crossing	**$2,000**
	"Look Around" Sign at all Corners	46	Install additional sign at each approach	New signs to warn pedestrian users to stop and look both side before crossing	**$24,600**
	Additional sign where sightline requirement cannot be met	3	Install additionall warning sign at each approach		**$900**
	Goat (Informal) Path Prevention	2	Install fence or other measures to prevent pedestrian from accessing those path	Needs fence or signs	**$1,200**
					$470,530

* Costs do not consider cost sharing or federal government funding.