

## PEDESTRIAN WARRANT REVIEW

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### EXECUTIVE SUMMARY

This report investigates the relationship between warrant scores and pedestrian traffic control device installation including traffic signals, pedestrian corridors and marked crosswalks.

### ADMINISTRATION RECOMMENDATIONS:

That the SPC on Transportation and Transit recommend that Council:

1. Direct Administration to keep warrant threshold for Traffic Signals, Pedestrian Corridors and Marked and Signed Crosswalks unchanged;
2. Direct Administration to divert existing pedestrian corridor budget towards the installation of Rectangular Rapid Flashing Beacons (RRFB). Proceed with installations in priority sequence according to the existing Pedestrian Corridor warrant list in anticipation of national RRFB guidelines by the Transportation Association of Canada (TAC); and
3. Direct Administration to continue to apply new ladder markings at appropriate marked crosswalks.

### RECOMMENDATION OF THE SPC ON TRANSPORTATION AND TRANSIT, DATED 2014 NOVEMBER 05:

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That Council:

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3. Direct Administration to continue to apply new ladder markings at appropriate marked crosswalks.

### Oppositions to Recommendations:

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Opposed: S. Chu, S. Keating

### PREVIOUS COUNCIL DIRECTION / POLICY

On 2014 April 30 at the Combined Meeting of Council NM2014-25 directed Administration to:

1. Review the current warrant requirements and investigate modifications to the process and/or the warrant systems used for crosswalks, pedestrian corridors and traffic signals, and specifically along Neighbourhood Boulevards, to support the desired outcomes of the MDP and CTP and report back to the Standing Policy Committee on Transportation and Transit no later than November 2014;

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2. That the report back include within its scope the procedure to create and update the various warrant lists as well as the associated capital budget programs through the S.P.C. on Transportation and Transit annually; and
3. That the lead division handling this report consults with Transportation Planning regarding the pedestrian strategy.

### BACKGROUND

Transportation uses a variety of tools to protect and provide mobility for pedestrians at intersections (Attachment 1). To determine the appropriate treatment for pedestrians and all modes, intersections are analysed according to geometry, volume and other data. Points are assigned based on these criteria and a warrant score is determined. It should be noted that the warrants for each treatment are different from each other and the point requirements are not thresholds from the same warrant list. The Calgary approach generally follows guidance from the Transportation Association of Canada, though Calgary-specific practices exist, particularly with respect to pedestrian corridors. Intersections are typically considered only after a request is made by a member of the public.

The different treatments used in Calgary form a hierarchy, where traffic signals provide the greatest level of protection. Traffic signals can also be timed to give an advantage to both pedestrians and other modes. The warrant score currently required for traffic signal installation is 100. Pedestrian corridors require a warrant score of 80 to be considered for installation. These devices are pedestrian activated and use flashing overhead lights to signal to other road users to stop. Pedestrian corridors are generally not intermixed with traffic signals along a stretch of roadway. The third principal treatment used in Calgary is the signed and marked crosswalk. While all intersections are crosswalks, pavement markings and signs can be applied to locations that require greater visibility yet do not qualify for or require signals or a pedestrian corridor. Twenty points are required for marked crosswalks.

Each year a specified portion of the Roads capital budget is designated towards pedestrian crossings. The current annual capital budget for traffic signals and pedestrian corridors is \$2.3 million. Table 1 shows the costs for installing and operating these measures as well as the typical number of installations per year.

Table 1: Costs of Traffic Signals, Pedestrian Corridors, and Marked and Signed Crosswalks

Traffic Control Device	Capital Costs (annual program)	Operating Costs (per year)	Number installed each year
Marked and Signed crosswalk	\$1,800 (\$27,000 - \$36,000)	\$300	15 - 20
Pedestrian Corridor	\$85,000 (\$425,000 - \$850,000)	\$100	5 - 10
Traffic Signal	\$300,000 (\$1.5 M - \$3 M)	\$3,000	5 - 10

### INVESTIGATION: ALTERNATIVES AND ANALYSIS

Approval of Calgary Transportation Plan has meant a greater emphasis on pedestrian travel. Analysing the current warrant approach for installing pedestrian treatments at intersections

Approval(s): Logan, Malcolm concurs with this report. Author: Hewitt, Chris  
City Clerk's (C. Smillie)

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helps answer whether these practices continue to meet the objectives of Calgary policy documents and the introduction of new road types like Neighbourhood Boulevards. A Pedestrian Strategy has been initiated and the results, in 2015 Q4, will give additional guidance on pedestrian policy and design.

The City of Calgary prioritizes the installation of signals based on a warrant process and Administration looked at whether decreasing the warrant threshold would benefit pedestrian safety. In some cases, if a device is not warranted the result can actually decrease safety as compliance may be low. Analysis does not specifically consider roadway type since the warrants approach considers pedestrian activity and risk exposure. Land use destinations accessed by pedestrians exist on most roadway types throughout Calgary, and the warrant system accounts for this.

Table 2 shows the number of intersections that meet existing warrant thresholds and the number of new installations should thresholds be lowered.

Table 2: Capital Costs Associated with Reduced Warrant Thresholds

Warrant Scores (Each treatment uses a different warrant)	Traffic Signals		Pedestrian Corridors		Marked and Signed Crosswalks	
	All Roadways	Capital Costs	All Roadways	Capital Costs	All Roadways	Capital Costs
100	0	\$0	-	-	-	-
95	1	\$300,000	-	-	-	-
90	4	\$1.2	-	-	-	-
85	7	\$2.1	-	-	-	-
80	10	\$3.0 M	0	\$0	-	-
75	26	\$7.8 M	4	\$340 000	-	-
70	46	\$13.8 M	10	\$850 000	-	-
65	-	-	17	\$1.445 M	-	-
60	-	-	40	\$3.4 M	-	-
20	-	-	-	-	18	\$32,400
10	-	-	-	-	24	\$43,200

Table 2 shows that small reductions in warrant thresholds does not significantly increase the number of new intersection treatments for pedestrians. Further, it shows the high costs of these kind of devices.

Roads is currently piloting two new tools: ladder crosswalk markings and Rectangular Rapid Flashing Beacons (RRFB). In the case of RRFBs, site selection criteria is being developed with TAC and formal national guidelines are anticipated in the next two years. The installation costs

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of these new approaches (approximately \$25,000 to install RRFB per location – about one third the cost of a pedestrian corridor) shows that many more intersections could be equipped as compared to lowering warrant requirements to install Calgary's traditional tools. Rather, installing RRFBs within the existing budget following the current Pedestrian Corridor warrant rankings list will ensure installations occur in priority sequence and at more locations. Lowering Pedestrian Corridor warrant thresholds is not required to equip additional intersections with pedestrian protection.

### **Stakeholder Engagement, Research and Communication**

The report was shared with the Pedestrian Strategy Lead in Transportation Planning. Ongoing research is shared by the Transportation Department and the Transportation Association of Canada on new technologies and intersection warrant thresholds. The City of Calgary is currently leading, in collaboration with the Transportation Association of Canada, the development of an RRFB warrant system. Formal national guidelines for RRFBs are anticipated within the two years.

Citizens can make a inquiries via 311 into the possibility of installing Traffic Signals, Pedestrian Corridors or Marked and Signed Crosswalks to a particular intersection.

### **Strategic Alignment**

Improving pedestrian safety and mobility is consistent with the goals of the Calgary Transportation Plan and our corporate goal of making Calgary a safe place to live.

### **Social, Environmental, Economic (External)**

Encouraging pedestrians to walk promotes physical fitness and greater interaction between citizens in their communities. Supporting active modes of transportation helps reduce automobile dependency and green house gas emissions. Local businesses can benefit from increased foot traffic in their areas when a focus is placed on making walking a desirable mode of transport. Pedestrian injuries and fatalities have a significant short and long term impact for all parties involved.

### **Financial Capacity**

#### **Current and Future Operating Budget:**

This report has no direct impact on future operating budget. Changes to the warrant system could have a large impact on operating budget in the future as there could be an increase in infrastructure that requires maintenance.

#### **Current and Future Capital Budget:**

This report has no direct impact on future capital budget. Changes to the warrant system could have a large impact on capital budget in the future as there may be a requirement to build additional traffic signals, pedestrian corridors and crosswalks. The assumption of this report is that the capital budget for pedestrian crossings would remain as recommended in the draft Business Plan and budget for 2015 at least.

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### Risk Assessment

Roads current capital budget for Traffic Signals and Pedestrian Corridors is sufficient to complete all currently warranted projects. Lowering the warrant requirement would introduce a budget shortfall and increase associated operating costs.

Driver compliance may be reduced in locations where traffic control devices are installed when warrants are not met. Lowering warrants requirements would not be consistent with Transportation Association of Canada's national standards which are generally agreed upon as sound practice across Canada.

### REASON(S) FOR RECOMMENDATION(S):

This report provides Council with information detailing the impacts of changing warrant requirements for traffic signals, pedestrian corridors and crosswalks on Calgary roadways and specifically on roads classified as liveable streets.

### ATTACHMENT

Review of Warrant Process for Crosswalks, Pedestrian Corridors and Traffic Signals