

## **Rectangular Rapid Flashing Beacon (RRFB) Pilot Project**

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### **EXECUTIVE SUMMARY**

The Rectangular Rapid Flashing Beacon (RRFB) pilot was a year long project aimed at determining their feasibility for Calgary. Funded through the Council Innovation Fund, RRFB's were seen as being a cost effective alternative to the use of standard pedestrian crossing signals. Data shows that RRFBs improve driver behaviour and are cost effective, but technically have been unreliable. As a result, Administration recommends a trial extension in order to enhance the technical reliability.

In addition, Administration is taking the lead on a project with the Transportation Association of Canada (TAC) to develop technical specifications and implementation guidelines for RRFBs across Canada. In order to allow investigations to continue, Administration is suggesting an extension of the trial to March 2015, with the results contributing to a recommended application of RRFB technology in Calgary.

During the pilot eight RRFBs were installed. At seven of the eight pilot crosswalks driver yielding was almost 100 percent. These eight locations will remain in service during the extension of the trial and would be equipped with failure alarms or connected to alternate power systems. Administration is proposing to install ten additional RRFBs at locations where warrant scores for pedestrian corridors are highest to increase the data regarding yielding behaviours and solar power viability. A recommended investment of \$400,000 is requested to extend the pilot. This will be funded by the Roads business unit unless alternative financing is arranged.

### **ADMINISTRATION RECOMMENDATIONS**

That the SPC on Priorities and Finance recommends that Council direct Administration to:

1. Expand the pilot project, at a cost up to an additional \$400,000.
2. Report to Council with RRFB trial results and recommendations no later than July 2015.

### **PREVIOUS COUNCIL DIRECTION / POLICY**

On 2011, June 20, Council received Report C2011-60, Rectangular Rapid Flash Beacon (RRFB) Solar Powered Pedestrian Crossing Pilot and adopted the following amended recommendations that Council:

1. Receive this report for information; and
2. Allocate up to \$200,000 of the Council Innovation Fund towards the trial installation of up to 10 solar powered pedestrian crossing signals.

On 2012 November 26, Council approved "Proposed Adjustments to the 2013-2014 Business Plans and Budgets" (C2012-0717), which recommended a budget of \$200,000 for the Rectangular Rapid Flash Beacon Pilot Project from the Council Innovation Fund.

On 2013 July 2, Council approved a recommendation to defer the report on the Rectangular Rapid Flash Beacon Pilot Project to no later than the 2013 December meeting of the Priorities and Finance Committee, due to the State of Local Emergency.

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### **BACKGROUND**

The innovation fund sponsored solar powered RRFB pedestrian crossing pilot project (Attachment 1) involved a year long study to determine the effectiveness and cost efficiency of RRFBs in Calgary.

Key study parameters were:

- Locate pilot installations at existing pedestrian crossings with issues and concerns.
- Test the systems for approximately one year to evaluate performance during all seasons.
- Evaluate effectiveness by comparing motorist yielding behaviour at pedestrian crossings with and without RRFB devices.
- Evaluate solar power device reliability by comparing their maintenance requirements with that of traditionally powered pedestrian crossing devices.
- Compare the yielding at RRFB to traditional signalled crossing devices

Guidelines for application of RRFBs would be developed if the trial indicated they were effective.

### **INVESTIGATION: ALTERNATIVES AND ANALYSIS**

RRFBs were installed at eight locations for the pilot project:

1. Glenmore Trail/18 Street SE
2. Crowchild Trail/Shaganappi Trail NW
3. Sun Valley Boulevard/ Sun Harbour Road SE
4. 18 Street/Riverview Close/Riverwood Circle SE
5. 100 Radcliffe Place/ Radcliffe Drive SE
6. Douglasdale Boulevard/Douglas Ridge Close SE
7. Quarry Park Boulevard and Quarry Gate SE
8. Harvest Hills Boulevard and Harvest Oak Drive North

Study results (Attachment 2) indicate motorist yielding to pedestrians in crosswalks increases significantly, to between 90 and 100 percent, when the devices are in place. However, documentation of regular maintenance performed on the trial devices, as well as 311 service calls, indicated the solar power systems used are unreliable.

The long term reliability and the ongoing maintenance and life-cycle costs of solar powered batteries will require additional investigation before a solar power only device program is implemented. In the interim, use of supplemental power sources such as streetlight power, or connection to continuous power sources, would ensure the RRFBs used in the trial are reliable and allow for testing of alternatives to the sole use of solar power.

RRFB systems are potentially a cheaper alternative to traditional overhead signals used at pedestrian corridors. The average cost to install a traditional pedestrian-activated overhead flasher system is \$70,000 to \$95,000. The estimated cost to purchase and install RRFBs range from \$25,000 to \$66,000, depending on power supply.

Studies conducted by the US Federal Highway Administration (Attachment 3) indicate that RRFBs are more effective at increasing driver-yielding rates than traditional crossing signals.

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The City of Calgary tested yielding at crossing signals and determined a yielding rate of 92% versus the average yielding rate produced by an RRFB to be 98%.

To compare yielding behaviours before and after the installation of an RRFB against a control, a similar study is currently underway to determine the yielding behaviours before and after the installation of a traditional overhead pedestrian crossing signal. Construction of the control is currently underway.

### **STAKEHOLDER ENGAGEMENT, RESEARCH AND COMMUNICATION**

Calgarians were informed of the trial via Calgary.ca and message boards located near the trial installations. Feedback from 40 citizens indicated 36 approved of the devices while four felt the devices were unreliable or required adjustments. Research to date, including driver yielding studies and maintenance records, will supplement the City of Calgary lead TAC study. The TAC study will also include information from other jurisdictions across Canada. A technology review was conducted with RRFB vendors and a plan to increase reliability through site-specific design was developed. Continued vendor involvement during the proposed trial will be required to ensure reliability issues are addressed.

### **STRATEGIC ALIGNMENT**

The RRFB pilot project aligns with the Calgary Transportation Plan's key directions to promote safety for all transportation system users, enable public transit, walking and cycling as preferred mobility choices, and provide transportation services in a safe, effective, affordable and efficient manner.

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

Innovations in pedestrian crossing safety, such as use of RRFBs, encourage Calgarians to use active modes of travel. This can foster a stronger community connection through increased opportunity for interaction.

Continued investigation into the use of renewable energy sources, such as solar power, for traffic devices will help reduce Calgary's dependence on non renewable energy sources and reduce the cities environmental footprint.

### **FINANCIAL CAPACITY**

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

Up to an additional \$400,000 is required to continue the pilot project. Costs associated with continued investigation into solar equipment, retrofitting RRFBs to alternative power sources, installation of up to ten new RRFBs and developing equipment specifications will be supported by this funding. Road's budget would be affected should alternative funding not be available and the pilot project was to continue.

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

A one-time allocation of \$400,000 from the 2014 capital budget will be set for this pilot project.

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### **RISK ASSESSMENT**

Extending the trial to continue testing and develop specifications and guidelines will mitigate risks associated with installation of unsuitable equipment at inappropriate locations.

### **REASONS FOR RECOMMENDATIONS:**

The report recommendations ensure that the RRFB pilot project can produce meaningful data that will set direction for future use of RRFBs and solar power for traffic control devices in the City of Calgary.

### **ATTACHMENTS**

1. Application to the City of Calgary Council Innovation Fund
2. Rectangular Rapid Flashing Beacon (RRFB) Pilot Project Summary Report
3. U.S. Department of Transportation Rectangular Rapid Flashing Beacon Report