



THE CITY OF
CALGARY
ROADS

March 12, 2003

Transportation Association of Canada Awards

Nomination Cover Page

Category: 2003 Environmental Achievement Award

Project Title: The City of Calgary's EnviroSmart Streetlights Retrofit Project
(Completion of Northwest Quadrant)

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**TAC Environmental Achievement Award Nomination:
Written Statement
March 12, 2003**

**EnviroSmart Streetlights Retrofit Project (Northwest Calgary):
Protecting the Environment – One Streetlight at a Time**

Residents in northwest Calgary are finding it a little more comfortable now to drive at night, sleep and stargaze, thanks to the completion of the EnviroSmart Streetlights Retrofit Project in The City's northwest quadrant. The City of Calgary, ROADS completed the northwest portion of the citywide residential retrofit in December 2002, changing out 10,400 existing residential streetlights to new lower wattage, flat lens fixtures in just nine months. The northwest retrofit has resulted in the reduction of:

- glare, blinding sideways light entering a driver's eyes;
- light trespass into private property, which disrupts sleep patterns; and,
- light pollution, known as sky glow, which makes stars more difficult to see in urban areas.

By using significantly less electricity, the new energy-efficient streetlights also reduce operating costs and greenhouse gas emissions produced by gas and coal-burning generators. The EnviroSmart Project is one of the most extensive and significant streetlight retrofit projects in North America.

A Bright Idea in Environmental Stewardship

In 2000, a review of Calgary's streetlight system showed that:

- (1) Existing lighting levels in residential areas were excessive; and,
- (2) Cost savings and environmental benefits could be realized by replacing existing dropped lens streetlights with new lower wattage, flat lens fixtures.

Satellite images show that Calgary loses up to ten times the amount of light energy into space than other cities such as Vancouver, Victoria, Seattle and Portland. There's even a joke among airline pilots that they can see Calgary when they take off from Regina at night and that they need sunglasses to land when they get there.

The old high wattage, dropped lens streetlight fixtures are largely responsible for the wasted light. They shine light in all directions, creating glare for motorists, light trespass into bedroom windows and a glow over The City at night. It is estimated that one-third of the light from the old streetlights ends up lighting up the sky.

The new lower wattage, flat lens fixtures have proven to be an innovative way to keep light down on Calgary's residential roadways, where it is needed.

Taking them out for a “Road-Test”

In August 2000, pilot projects were initiated in the Calgary communities of Somerset, Citadel and Elbow Park. Some of the 200W dropped lens fixtures in these areas were retrofitted with 100W lamps. ROADS received no negative feedback from the public. In fact, a home survey of local residents produced requests for additional reductions in wattage and measures to reduce light trespass into homes.

In a follow-up pilot project in March 2001, some of the 200W dropped lens streetlights in the community of Silver Springs were retrofitted with 100W flat lens fixtures. After receiving an incomplete petition requesting the return of the old higher wattage, dropped lens fixtures, ROADS conducted a mail-in survey and hosted an open house for affected residents. Many of the residents indicated support for the citywide implementation of the retrofit project based on reduced electricity costs, CO₂ emissions and light pollution. Others expressed concern about reduced personal and traffic safety, increased crime and reduced visibility of the road caused by lower lighting levels.

Energy-Efficient Streetlighting Enhances Safe and Sustainable Urban Transportation Systems

In response to these concerns, ROADS commissioned an independent engineering consulting firm to conduct a literature search to examine the pros and cons of reduced streetlighting levels in other jurisdictions. The report confirmed the negligible effects of reduced lighting levels on an aging population and the ability to see signs and obstacles in the roadway. In fact, it supported the claim that reduced glare *increases* visibility. The report also indicated that, while reduced streetlighting levels may increase the *fear* of crime, other jurisdictions in the U.K. and the U.S. where lighting levels were reduced did not experience an increase in the number of crimes committed.

The Calgary Police Service issued a report in May 2001 documenting pre- and post-retrofit crime statistics for areas with streetlight retrofit pilot projects. In October 2002, the CPS also reported before and after crime statistics for 22 communities in northwest Calgary where the retrofit was well underway. Both reports showed that reduced lighting resulting from the new EnviroSmart streetlights had no measurable effect on the number of reported violent offences in those neighbourhoods.

Getting the Politicians On-Side

On July 3, 2001, ROADS presented its report (FB2001-23 Residential Streetlight Retrofit Funding Requirements) on the retrofit pilot projects and a proposed citywide retrofit implementation plan to The City of Calgary’s Standing Policy Committee on Finance and Budget to solicit approval for the project and proposed funding arrangements. In approving the report, the Finance and Budget Committee directed that Administration prepare for Council’s consideration a supplementary report outlining project cost and cost recovery estimates based on several high and low energy-cost scenarios.

On July 9, 2001, ROADS officials met with The City of Calgary, Corporate Strategy and Economics to discuss high and low energy-cost scenarios to ensure the feasibility of the citywide implementation of the streetlight retrofit. This information was then included in the Supplementary Report to Council.

On July 23, 2001, in a climate of strong aldermanic support, Calgary City Council approved the proposal to retrofit The City’s residential streetlights with new lower

wattage, flat lens fixtures. Executive Report C2001-50 Supplementary Report on Residential Streetlight Retrofit Funding and Amendment FB2001-23 Residential Streetlight Retrofit Funding were both adopted, enabling the project to go forward.

Ironing Out the Details

By October 2001, a detailed design was completed for the retrofit of residential streetlights in The City's northwest quadrant.

Due to the scope and unique nature of this project, ROADS managed competition by tendering out the retrofit work to qualified utility and electrical contractors. The City's own utility was the lowest bidder and was awarded the contract.

To ensure quality, consistency and performance as well as the lowest possible price, The City of Calgary tendered out all the materials involved in the retrofit project. The new EnviroSmart streetlights are high-pressure sodium luminaires. They are the flat lens version of the "Cooper OVH" series. The lamps are made by OSRAM SYLVANIA.

The design of the retrofit lighting must meet the following illumination levels recommended by IES: Average illumination of 4 lux with a uniformity of 6:1 or better. Generally, the wattage in the new fixtures has been reduced from 200W to 100W on residential local roads and from 250W to 150W on collector roads.

ROADS uses its geographical information system (GIS) to determine which streetlights will be retrofitted with lower wattage fixtures, depending on location and pole spacing.

Keeping Calgarians Informed

ROADS made a point of cultivating public support for EnviroSmart by providing efficient customer service and many opportunities for public engagement. The Communications Consultant for ROADS developed an effective communications plan for the project's official launch in March 2002, which included brand strategy and a public awareness campaign about light pollution and how The City is leading the way in reducing light pollution in Calgary.

Communication with the public through print and broadcast media was incorporated from concept to construction. A communications team was assembled to:

- Obtain magnetic signage for contractor's trucks;
- Obtain sandwich boards explaining parking restrictions and project benefits for display in neighbourhoods where the retrofit was taking place;
- Prepare public information documents with The City's Creative Services Department (pamphlets and door hangers);
- Prepare a script for the Corporate Contact Centre to help City employees answer questions from the public;
- Develop media materials (news release, backgrounder, briefing document for Aldermen, frequently asked questions and a media advisory); and,
- Post background documents, media materials and photos to The City's website.

Innovative Communication Strategies

ROADS developed a high-tech means of showing northwest residents the retrofit schedule. A map of the northwest communities was generated using a high-end

mapping tool. The map was then converted to a web-friendly PDF format and pop-up note boxes were added showing the anticipated start-up and completion dates of the retrofit for each community. In fact, this project marked the first time The City used the World Wide Web and the new high-tech interactive maps to provide continuous updates on a project.

In a joint venture between The City of Calgary and Global TV, a one-minute vignette outlining the EnviroSmart Streetlights Project was prepared and began airing on Global TV on January 29, 2003.

Listening to Calgarians

Ever since the initial pilot projects in 2000, ROADS has carefully considered both the support and concern residents have expressed about energy-efficient streetlighting through the Corporate Contact Centre, in writing and via The City's website. While many residents are pleased that The City is reducing CO₂ emissions, energy consumption and light pollution, some still perceive that lower wattage fixtures produce an inadequate level of light, jeopardizing personal and traffic safety and increasing the need for lighting on private property. A sampling of both positive and negative feedback received to date has been posted to The City's website at www.calgary.ca/roads. All sections outlining negative feedback include a detailed response from The City of Calgary, ROADS.

ROADS will continue to assure Calgarians that new streetlighting levels meet minimum Illuminating Engineering Society (IES) guidelines for safe residential lighting. These guidelines take into account such factors as the declining eyesight of an aging population and the visibility of objects in the roadway.

In response to ongoing requests from the public for technical information, ROADS is preparing a website document outlining the technical details of the EnviroSmart retrofit project.

Accolades from Near and Far

The City of Calgary has received many inquiries from other cities seeking input and expertise on EnviroSmart streetlights. Officials from Vancouver, Montreal and New York City, to name a few, have requested information about the retrofit project.

In 2001, The City of Calgary earned the Responsible Lighting Award from the Calgary Chapter of the Royal Astronomical Society of Canada (RASC) in recognition of energy-efficient and environmentally responsible lighting at a newly constructed major interchange (Crowchild Trail/Shaganappi Trail) in The City's northwest. On February 15, 2003, The City of Calgary received another Responsible Lighting Award from the Calgary Chapter of the RASC for completion of the EnviroSmart Streetlights Retrofit Project in northwest Calgary.

Environmental groups have been very supportive of this project. Alderman Bob Hawkesworth, who is a Member of the Board of Directors of the not-for-profit organization Alberta Climate Change Central, asked ROADS to make a presentation on EnviroSmart at the March 2003 Alberta Urban Municipalities Association conference in Edmonton. The Fatal Light Awareness Program (FLAP) expressed support for EnviroSmart in its efforts to preserve the lives of migratory birds in urban areas.

In addition, the Illuminating Engineering Society of North America has asked ROADS to provide detailed information on the project, for presentation as a case study at their 2003 fall conference.

Paying for EnviroSmart

The cost of the EnviroSmart Streetlights Project is estimated at \$6.6 million. A total of \$3-million was paid by three levels of government – federal, provincial and municipal – under the Infrastructure Canada–Alberta Program (ICAP). The balance of the costs will be recovered from savings associated with reduced electricity consumption and the elimination of group re-lamping. Based on current electricity prices, The City estimates it will recover the cost of the citywide retrofit over a three-and-a-half year period.

Curbing the Power Drain and Reducing Greenhouse Gas Emissions

With the reduction in wattage, the new flat lens fixtures significantly reduce electricity consumption. Before EnviroSmart, Calgary's streetlight system consumed a staggering 90 GWh per year. That's more than Greater Vancouver consumes, which has three times the population Calgary has. Once the citywide retrofit is complete, Calgary's streetlight system will see its energy consumption drop by 19 GWh, a reduction of just over 25 percent. In the long term, the retrofit will result in electricity savings of \$2-million a year.

In June 2000, The City's Carbon Dioxide Emissions Abatement Action Plan called for a target reduction from streetlighting of 10,000 tonnes by the year 2012. This is 6% below the 1990 base year. In 2005, when the citywide implementation of the EnviroSmart Streetlights Retrofit Project is complete, CO₂ emissions will be reduced by 16,000 tonnes, putting The City well ahead of its target.

Achievements of the EnviroSmart retrofit in northwest Calgary, measured from the March 27, 2002 launch date to its completion on December 31, 2002, include:

- Energy savings of 2,431,744 kWh;
- Carbon dioxide emissions reductions of 2412 tonnes; and,
- Cost savings, from reduced energy consumption alone, of \$223,815.

Now that the northwest quadrant is complete, the northeast retrofit of 6,683 streetlights is getting underway. The City of Calgary will be launching additional pilot projects to consider extending the EnviroSmart Streetlights Retrofit Project to non-residential streetlights. These pilot projects will test the feasibility of reducing the wattage for non-residential streetlights from 400 to 310 watts, and from 1000 watts to 750 watts along major roads.

Conclusion

Previous policy in Calgary ensured door-to-door residential streetlighting. Given rising energy costs and the effect of greenhouse gases on the environment, the message from The City of Calgary, ROADS is clear: The City is committed to providing a safe level of lighting on city roads using energy-efficient flat lens fixtures to meet IES guidelines.

The City of Calgary, ROADS deserves to promote with pride the environmental benefits achieved by the EnviroSmart Streetlights Retrofit Project in northwest Calgary.

Let there be light, but let's not waste it!



THE CITY OF
CALGARY
ROADS

March 2003

TAC Environmental Achievement Award Nomination

(Attachment 1)

Testimonials from Residents in Northwest Calgary:

***Environmental Benefits of the
EnviroSmart Streetlights Retrofit Project***

"Bravo and thank you to the City of Calgary for the foresight, planning and initiative you've taken in retrofitting Calgary's residential streetlights. I am thrilled that we are making a real and concerted effort to reduce the amount of the energy we use to produce light and the level of greenhouse gas emitted in generating electric light."

-- Resident of West Hillhurst

"I was ecstatic when I read your yellow information pamphlet. I think this is an extremely wise move on the part of the City, and I'm sure I speak for many global citizens when I say it's a positive and necessary step for the environment. I feel proud to be a

-- Resident of Northwest Calgary

"Thank you for doing your part in saving energy and protecting the environment for future generations."

-- Resident of Northwest Calgary

"I commend The City for saving energy, reducing greenhouse gases and saving money."

-- Resident of Montgomery

"Just a quick note to say I approve of (the retrofit), in fact, I applaud it and am extremely impressed that The City should make such a smart move."

-- Resident of Northwest Calgary

"This is an excellent program."

-- Resident of Northwest Calgary

"We appreciate that we will be saving money and reducing the amount of carbon dioxide produced because of the streetlight program. Keep up the good work."

-- Resident of Tuscany

"I think that the EnviroSmart streetlights are an excellent idea. I believe there is more light pollution in Calgary than many other cities and it is about time we were more environmentally friendly."

-- Resident of Northwest Calgary

EnviroSmart Nomination for The Calgary Awards (Attachment 2)

(Attachment 2)

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Street lamp project starts

Northwest first area to be converted in \$7.2 M scheme

DEBORAH TETLEY
CALGARY HERALD

The City of Calgary is shedding some light on energy conservation, street safety and street lamp pollution.

Or, rather, taking some away.

Wednesday marked the official launch of a northwest initiative to retrofit 11,000 street lights by year's end, saving \$2 million a year on operating costs.

The city-wide EnviroSmart street light projects aims to install at least 40,000 lower-wattage, flat-lens street lamp fixtures by the end of 2007.

A work crew began retrofitting some "cobrashead" residential street lights on Buckhorn Road N.W. in Thorncliffe with flat heads Wednesday.

From there, workers will replace lights in the entire northwest before moving on to a second quadrant.

Const. Kevin Leitch, community liaison for the Calgary police, said residents need not fear that lower wattage means less visibility.

On the contrary, he says, people walking down the street will better be able to focus on what's going on around them because of reduced glare.

"What we try to accomplish is 'eyes on the street,'" he said. "Light is light, but if you can't see into your neighbour's yard because of the glare from the light, then you're not get-

QUOTABLE

“
This will
get eyes
on the
street and
that will
make
it safer
”

CONST. KEVIN
LEITCH

ting eyes on the street. This will get eyes on the street and that will make it safer."

Most street lamps in Alberta use 200-watt bulbs and are fitted with light fixtures with a rounded glass bottom that shines a large part of their light sideways and upward, wasting light. The new lamps will have 100-watt bulbs and a flat lens to reduce glare, improving road safety by increasing visibility.

The entire project will cost \$7.2 million, with \$3 million coming from all three levels of government while the remaining costs are recouped from savings associated with lower electricity use.

Street lighting co-ordinator Barry Poon said Calgary is the first North American city to embark on such a comprehensive program, although the lower-wattage lamps have been used in other cities on a smaller scale.

Newspaper clipping from The Calgary Herald
March 28, 2002

(Attachment 3)

Five pictures of the EnviroSmart Project (3 pages):

Sheet 1:

Picture 1 - A portion of northwest Calgary before the EnviroSmart retrofit.

Picture 2 - The same part of Calgary after completion of the EnviroSmart retrofit.

Sheet 2:

Picture 1 - A street in the northwest community of Thorncliffe before the EnviroSmart retrofit.

Picture 2 - The same street after the streetlights were retrofitted.

Sheet 3:

Comparison of old and new streetlights.

NW Calgary – Before Retrofit

Looking NE

Crowfoot Business Centre

Nosehill Drive

Residential areas
(Arbour Lk, Citadel)

Stoney Trail & Bridge

Scenic Acres



NW Calgary – After Retrofit

Looking NE

Crowfoot Business Centre

Nosehill Drive

Residential areas

(Arbour Lk, Citadel)

Stoney Trail & Bridge

Scenic Acres



Thornccliffe - Before Retrofit



Thorncliffe - After Retrofit

**Less light, less glare
roadway still well lit**



Crowchild Trail NW

Looking East from Pedestrian Overpass



**Guess which one has
not been retrofitted?**

