

**Bright Ideas
On Saving Energy,
Tax Dollars and
Our Dark Sky Heritage.**



**Prepared for
Galway, Cavendish, Harvey Township Council
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**Buckhorn Observatory
With thanks to
The Peterborough Astronomical Association
The Royal Astronomical Society of Canada
The Calgary Chapter of the RASC
The International Dark Sky Association**

*Above: Goodwood Ontario's night sky during the black out of 2003 and after Toronto's lights came on.
Image by Todd Carlson*

Overview

Recent developments in lamp designs for commercial, home, and municipal use have yielded products which operate much more efficiently. This saves energy. The new designs also boast greater durability which enhances their long-term savings potential.

In addition, these new designs reduce glare so that people within the illuminated area are not blinded by light shining directly into their eyes. They improve security by providing more uniform lighting coverage to reduce shadowy areas in which criminals may hide.

One principal for the new lamp design's improved performance is that it directs light where it is needed, down towards the ground. It is called fully-shielded lighting.

Saving energy begins at home. To show this principal in action, I'll begin with the familiar coach lamp design.



The coach lamp shoots light directly into your eyes. Plus, this non-directed light design sends a significant portion of light upwards where it isn't needed. It's called waste.



A better alternative is a shielded lamp such as this. It's designed to direct light downwards, to illuminate the ground surrounding the entrance way. There is no light glaring in your eyes. And no light is wasted shining into the trees and sky. Having the light directed to the area of need allows you to safely illuminate the area with a lower wattage bulb. Here a 40watt bulb provides more than ample light.

How the same directed light scenario works, on a more grand scale.



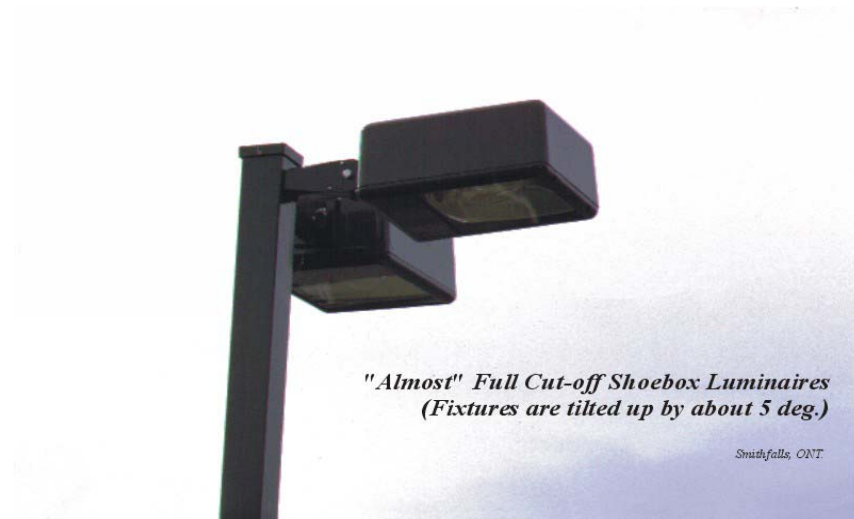
Welcome to the causeway over the Buckhorn locks and the common Cobra Style streetlight. The main flaw in its design is light scatter, just like the old coach lamp.

It shoots light out in all directions, producing dangerous glare – especially on a rainy night. Plus a good deal of the Cobra-Style lamp’s light also goes upwards, and is wasted by lighting roadside trees and adjacent house fronts, which can annoy the residents.



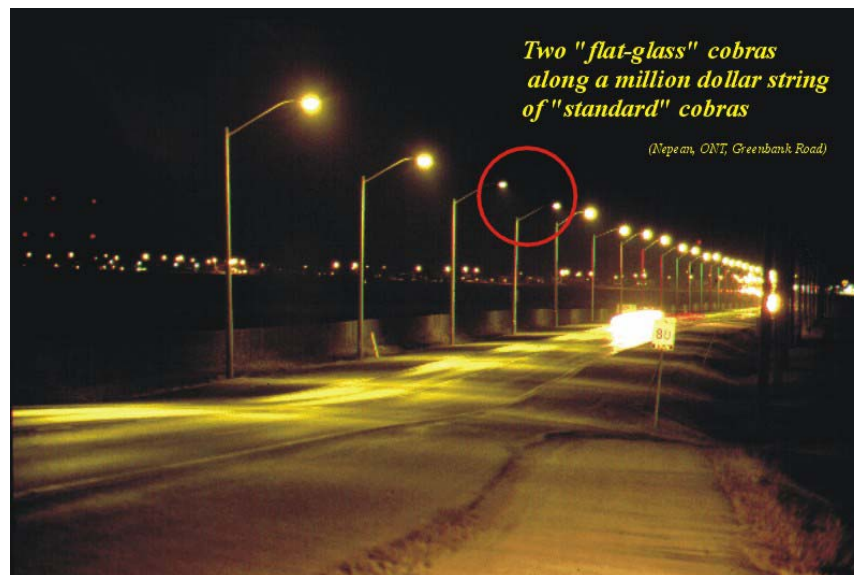
This is called light trespass. The well-lit house in this photo is Three Castles in Buckhorn. The hardware store across the street shuts its lights off at night. But with the glare from this single lamp it is small wonder that they keep their blinds drawn tight at night.

The solution to light trespass is a fully shielded streetlight. In this design the lens is flat and the light is directed only where it is needed. The ground and roadway will be well illuminated. No light goes up into the trees or out into your eyes. And, because no light is wasted, a lower wattage bulb can be used to illuminate the desired area. This very efficient lamp works for the city of Smithfalls, Ontario



Examples of this lamp design may also be found in most Tim Horton outlets and the parking facilities of ecologically-responsible malls, municipal buildings and factories.

Here is the flat lens design in action on a roadway in Nepean, Ontario. The two circled lamps are the flat-lens design. The glowing balls of glare are old cobra lamps.



You will notice the fully-shielded flat-lens lamps do an equally good job of illuminating the road, without sending light up into the sky or out into your eyes.

Here is another flat-lens, fully-shielded lamp system on the night shift in Smithfalls.



Again, because the light goes only where it is directed, less energy and money are spent. If this was a municipal building instead of a factory, the savings would be in taxpayers' pockets.

Does Turning Down The Lights Turn Up Crime?

More light doesn't mean less crime. 85% of all crimes are committed in the daytime.

A test in West Sussex, UK showed that crime went up in lit areas. All-night lighting was installed in test areas. Other areas were kept as control areas. Police monitored the crime patterns for comparison with the previous year in both the test and control areas.

Statistics showed an increase in crime in the test areas as compared to the control areas and to the county as a whole! West Sussex has decided against all-night lighting.

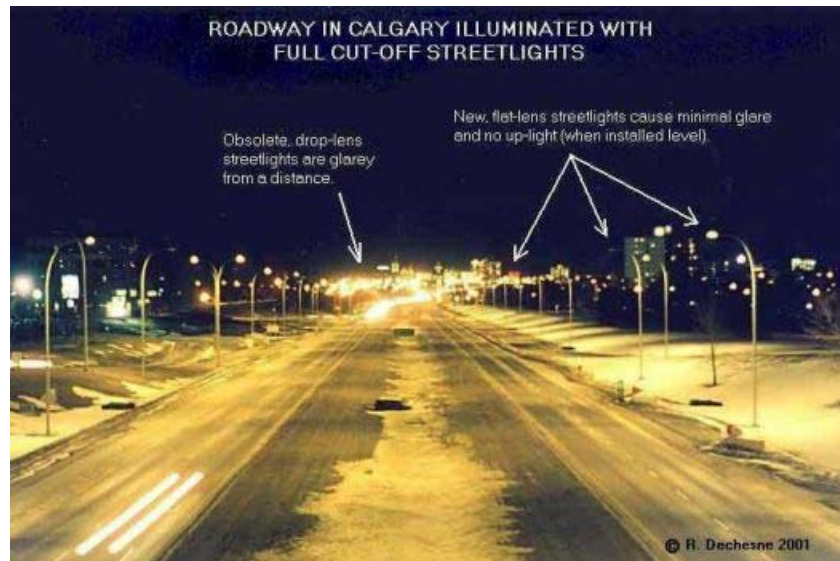
Police also report that such darkness is often safer because neighbors soon learn to alert police if they see any lights on in a building. There's even less graffiti because it's usually lighted walls that attract the spray-can vandals, not dark ones.

The San Diego police have gone on record indicating they see no real influence of lighting source on crime levels.

The City of Calgary Police Service has also concluded that when or where crimes occur is not related to the amount of darkness available.

Energy Savings Mean Tax Savings

A few years ago the city of Calgary received a \$7 million grant from the federal government to begin switching from old cobra-style street lamps to the fully-shielded, flat lens design that we are suggesting. Once they implemented the first phase of the project, they realized enough savings after the first year to fund the next stages.



- City taxpayers will save \$2 million in electricity costs per year.
- Lower light pollution levels are good for the environment.
- Low-glare light fixtures mean Calgary roads are safer for drivers and pedestrians.

Success Stories Closer To Home.

Here's another example of potential savings that I have borrowed from a presentation given to the township of Smith-Ennismore-Lakefield in January of 2006. The presenter was Mark Coady who is the chairperson of the Peterborough Astronomical Association's Light Pollution Abatement Committee. I quote from Mr. Coady's presentation: "If the municipality were to adopt flat-lens, full cut-off fixtures their energy costs would drop by about 50%. Also, because the fixtures have fewer parts, they will last about 15% longer."

When Smith-Ennismore-Lakefield Township reviewed the presentation, their conclusion was to implement full cut-off, flat-lens lighting as the replacement of choice when one of the old Cobra-Style fixtures cease to function. As well, all new street lighting will be of similar design. They have also extended this "retro-fit program" to their own properties by replacing all parking lot lights at the Lakefield-Smith Arena with full cut-off fixtures.

The city of Peterborough is also considering adopting a similar approach to their streetlights. As well, they are hoping to adopt more stringent regulations concerning commercial and institutional outdoor lighting.

At this point I would also like to congratulate Galway Cavendish Harvey Council for their foresight in building light-trespass into the existing noise pollution bylaw. You have already taken a leadership role, one which our neighbour townships have just recently incorporated...and I trust more will follow.

Summary

The monetary rewards of using our energy resources wisely can be realized quickly. But there is a secondary benefit to a Premier Tourist area such as ours. That benefit comes from the fact that responsible lighting also preserves our night sky.



As mentioned earlier, I own and operate an observatory just north of Buckhorn. The dark Kawartha night sky is one of the reasons Deb and I chose to locate here.

Since then, we often have visitors to Buckhorn Observatory remark on how long it has been since they last saw a sky filled with stars. In many instances it is grandparents who want to show their grandchildren what the sky was like when they themselves were kids.

It is a heritage that we can preserve for future generations if we make the right decisions now. Can a strict lighting code do this? You bet. Tucson, Arizona has a population of 550,000 residents and a metropolitan area population of 980,000. Yet you can still see the Milky Way from the centre of downtown Tucson. Tucson has 1/3 the population of Toronto yet it only produces 5% of the light pollution that Toronto does. Buckhorn and the Kawarthas may never grow to the size of Tucson. But I would be sorry if we lost our dark sky heritage to unregulated growth.

I therefore urge Council to adopt a plan to retro-fit existing Cobra Style street lamps with Fully-Shielded ones as quickly as possible or when the old units fail. I also urge council to establish responsible lighting specifications for any new municipal, commercial or home lighting that will help preserve our heritage of a dark Kawartha night sky.

Thank you for granting me this time. I am at your service to answer any future questions.

With responsible lighting Buckhorn and the Kawarthas can grow without the glow



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