

Good Neighbor Outdoor Lighting

How, you might ask, could “outdoor lighting” be a subject on a site devoted to environmental concerns? Well, consider that half our environment is night time, and for millennia, humans have become well adapted to (and actually dependent on) darkness. In less than one hundred years, use of artificial lighting has become widespread. Although artificial lighting has been a benefit for moving about safely at night, it can also easily and inadvertently become obtrusive to our neighbors and others-light does not stop at property boundaries.

Good Neighbor Outdoor Lighting aims to control the direction of light and avoid detrimental effects of poor outdoor lighting ([glare](#), [light trespass](#) and [sky glow](#)) while still letting us enjoy the benefits of seeing our way at night.



Picture of the world at night from space. Major population centers are easily recognizable from their light pollution.

We can have safe and effective outdoor lighting without becoming a nuisance to our neighbors, by using shielded lighting and also using the right amount, which allows us to see where we are going without being excessive and wasting energy. Learn about these simple and effective [shielding principles](#).

Sometimes we are on the unwelcome receiving end of obtrusive lighting. Here is some [information](#) on Acton’s Outdoor Lighting bylaw and some [tips](#) on how to handle the situation.

What are Glare, Light Trespass and Sky Glow?

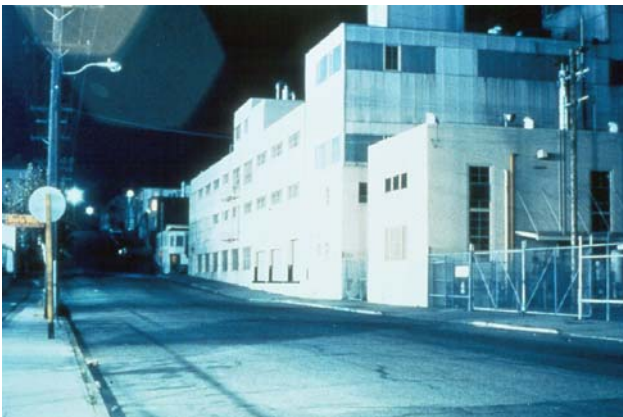
Detrimental effects of poor outdoor lighting include glare, light trespass and sky glow.

Glare is the direct view of light source against dark background. Glare overloads our and actually reduces our ability to see in a generally dark environment, and can actually be a safety hazard. The cause of glare is poorly shielded lights that are aimed at least partially horizontally, not down onto the pavement.



Glare: The left picture illustrates how glare of a light fixture might affect our vision while driving a car. The right picture shows how the scene would look if the offending fixture, the light just above the people walking, is shielded so that the direct view of the lamp is hidden from the driver's view. Glare can easily cause us not to see important objects such as the couple crossing in front of the car.

Light Trespass is unwelcome light spilling off originating property. As with glare, the causes are, first, poorly shielded lights which are aimed partially horizontally, not down, and secondly, too much light power used for the application.



The picture at the left shows an extreme example of light pollution. A bright unshielded fixture off-screen to the left of the picture is shining horizontally and lighting up the entire left wall of this building. The streetlight on the pole in the upper left of the picture is off, even though it is night. The light trespass has caused the light sensor in the streetlight to think it is daytime! Imagine what it would be like to have a bedroom in one of the building rooms.

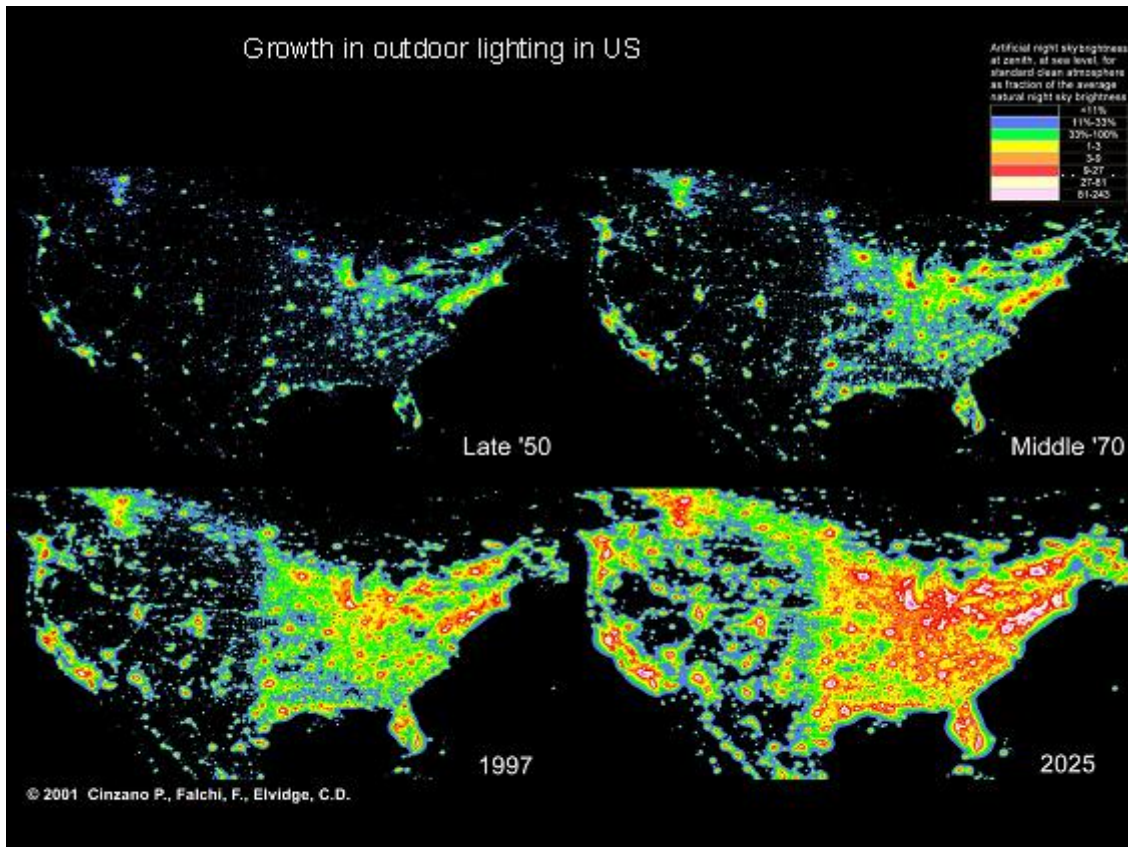
Sky Glow is a general brightening of the normally black night sky caused by artificial light pollution. Excessive sky glow can almost completely block out views of stars. The main causes are upward-directed light (again from poorly shielded fixtures) and too much light power used for the application.



The left picture shows a view during the 2003 blackout in Canada, showing how the sky looked in Toronto, Ontario, before the general use of artificial lighting in this area.

The right picture shows the now-normal night sky, after the blackout was resolved. Light pollution has almost completely blocked out the any view of the stars. *Picture credit Todd Carlson.*

General use of artificial lighting, which began about 100 years ago, has been accelerating in the past 50 years.



This picture shows the view from space of upward directed light. The views of the mid-70's and 1997 are from satellite data; the late '50's and 2025 views are extrapolations from the satellite views, using known or expected amounts of outdoor lighting. All the light that is visible from space is obviously wasted energy which produces no useful effect (and lots of bad effects) for people on the ground.

Outdoor lighting is growing at greater than 5% per year. At the present time, artificial lighting obscures the Milky Way (our home galaxy) from view of more than 70% of the households in the United States. In a dark-sky site, about 2500 stars are visible; but in the sky over a large city like Boston, that number is reduced to less than 100.

What can we personally do about this? Use [Fully Shielded](#) light fixtures, use the proper amount of light for the job (resist the urge to over-light), and turn off light (either manually or with motion sensors) when there is no one around to use it. These simple steps will result in both reduction of light pollution and conservation of energy.

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Principles of Good Neighbor Outdoor Lighting

We all like the freedom to do as we want on our own property. However, at the same time most of us realize it's also important not to intrude on our neighbor's rights by our actions. We are generally careful not to project very loud sounds toward our neighbor, and to aim our water sprinkler so it doesn't spray on his house, and we don't let our dog exercise on his lawn. But often we don't stop to think that the outside lights we install on our house can be just as obtrusive to our neighbors.

The fact is that the light our fixtures produce doesn't stop at our property boundary. Light travels in straight lines from our outside fixture and can directly shine on our neighbor's house and property, and then it becomes obtrusive and unwelcome. A bright, lighted, unshielded bulb on our house or yard will cause unpleasant glare in our neighbor's eyes. Glare is the uncomfortable situation in which the human eye is unable to respond both to the dark surround and also a very bright source. We instinctively squint our eyes to try to close out the offending light. If our light trespasses through the windows of our neighbor's house, and into, for example, his bedroom, then our light can even affect his ability to have a sound sleep.

The solution to prevent glare and the majority of light trespass is very simple and inexpensive. We can apply shielding to our bright outside lights, such as floodlights and other bare bulbs that are bright. "Bright" is defined in Acton's outdoor lighting bylaw as 60-120 watts for incandescent bulbs and 13-20 watts for fluorescent bulbs. Now, Acton's Outdoor Lighting Bylaw does not apply to residents of single family dwellings- so we residents are on our honor to do the right thing here!

Shielding

Shielding is used to block the lamp's rays from traveling upward (causing sky glow) or sideways (and off your property). To direct the lamp's rays onto the ground- the place we are trying to illuminate after all- the shield should cover the top and sides of the lamp. Viewing the fixture from a point horizontal to the lowest point of its shield, we should not be able to see any direct light from the fixture. The only visible light should be that illuminating the ground-where of course it is needed! A fixture like this that is shielded on the top and all sides, and directs all its light onto the ground, is called Fully Shielded. An example of a Fully Shielded fixture (with the brand name Glare Buster) is shown here



The Parabolic Reflector (PAR) lamp is the familiar cone-shaped bulb, about six inches in diameter, that is used on many houses to light driveways and yards. If unshielded, it can project light for long distances, because of the focusing reflector built into it.

Here is a picture, taken from the neighbor's lot, of an unshielded PAR light used over garage doors. The [glare](#) is obvious and unavoidable, even if the PAR light is tipped downward.



It is easy to make a simple shield using aluminum flashing and to fix it to the PAR lamp with a clamp. Installing one on these garage lights, even without changing the direction in which they are aimed, dramatically reduces glare, without affecting the light that falls on the driveway



This site contains a list of shades (or shields) that can be mounted to existing fixtures or bulbs: <http://store.starrynightlights.com/lightshades.html>

You can learn much more about shielding and principles of good lighting from sites sponsored by [NELPAG](#), and the [International Dark Sky Association](#) -we recommend all

these sites to you.

Or write to us at green-acton-odlighting@googlegroups.com for advice on how to solve your lighting needs with Good Neighbor outdoor lighting principles.

Here is a short list of sites that provide fully shielded fixtures for home use:

<http://www.starrynightlights.com/>

<http://www.utahskies.org/lightpollution/products/index.html>

<http://www.theglarebuster.com/> The last item, the Glare Buster, is also available from some large hardware stores.

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Bright lights in your eyes? A survival primer for Acton residents

Acton has an Outdoor Lighting Bylaw that affects primarily commercial developments. Commercial development that was done after 2004, and that required a Site Plan Special Permit (developments that are above a certain size need this permit), are obliged to follow the 2004 Acton Outdoor Lighting Bylaw.

(See Section 10.6 of the Zoning Bylaws <http://www.acton-ma.gov/index.aspx?nid=167>) Site Plan Special Permit developments that were permitted between 1984 and 2004 must follow the previous [1984 Acton Outdoor Lighting Bylaw](#).

If you believe that the offending commercial development falls into one of these categories, then you should call the Acton Zoning Enforcement Officer, Scott Mutch (978) 264-9612 (Planning Department) and state your case.

Various Acton Boards of Selectmen have agreed that the Town should also follow the outdoor lighting bylaw, but there is no binding agreement that requires them to do so.

For issues with lights that are owned by the municipal government (library, streetlights, South Acton Train Station parking lot, transfer station, police and fire departments), call the Municipal Properties Director, Dean Charter (978)264-9629.

For problems associated with any school-owned property, call the Coordinator of Facilities and Transportation, John D. Head; (978).264-4700.

Acton's bylaws don't cover residential lighting. However, oftentimes a simple discussion with the owner can solve the problem. Here are some tips on how to approach that discussion, abstracted from an excellent International Dark Sky information sheet: <http://docs.darksky.org/PG/PG3-residential-lighting.pdf>

- 1. Make friends, not enemies.** Your neighbors probably don't realize the light is bothersome. Always approach people in a friendly, non-threatening way, and don't argue. Be tactful and understanding about their right to light their property. Suggest alternatives to their current fixture. (Ask them to move the light, add a [shield](#) to it or add a motion sensor).
- 2. Be informative.** There are many reasons to use dark sky friendly lighting. Safety is important, but brighter does not mean safer. A starry sky is a natural resource.
- 3. Do your homework and be prepared to address the real issues.** It is useful to know the local costs of electricity (cents per KWH), and the local lighting control ordinances. You may also want to compile a list of local businesses with good quality lighting as examples. A list of shielded light fixtures to provide as alternatives to your neighbor's current light is also recommended.
- 4. Stay positive.** Don't let bad lighting create a feud in your residential area.

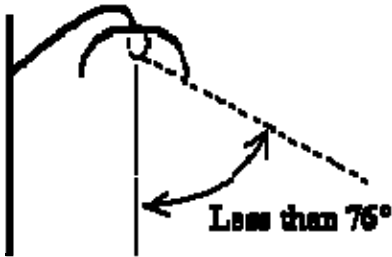
We encourage you to read the entire IDA document that these tips were borrowed from.

If you need for more help, write to green-acton-odlighting@googlegroups.com and we'll try to provide support to you.

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1984 Acton Outdoor Lighting Bylaw

Acton's most previous lighting bylaw was enacted in 1984. It's primary purpose is to control glare by requiring bright lights to be aimed down, and also to control light trespass from the originating property onto an adjacent property by additional shielding.



10.4.3.2 Outdoor Lighting- In the area of new construction all outdoor lighting, with the exception of pedestrian lighting with a height of less than eight feet, shall be designed and located so that:

Less than 76°

1) the luminaire has an angle of cutoff less than 76

degrees;

2) a line drawn from the height of the luminaire along the angle of cutoff intersects the ground at a point within the development site, and

3) the bare light bulb, lamp or light source is completely shielded from direct view at any point five feet above the ground on neighboring properties or STREETS. Pedestrian lighting with a height of less than eight feet shall be regulated through the Building Commissioner's Office.

This bylaw is strict in terms of requiring effective shielding. However, OLEC found the following shortcomings in this bylaw:

-Technical requirements for shielded lights; the current bylaw requires a strongly shielded light, but doesn't use more modern terminology.

-There is no limit to the amount of light that may be used. There are now guidelines established that suggest effective and considerate lighting levels.

-Hours of operation is not addressed. Lights that are kept on after close of business, and are not used specifically for safety or security, should be turned off.

-Special provisions; there are special cases that are not well handled by the current bylaw, and consequently, there is in practice no control over these situations.

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