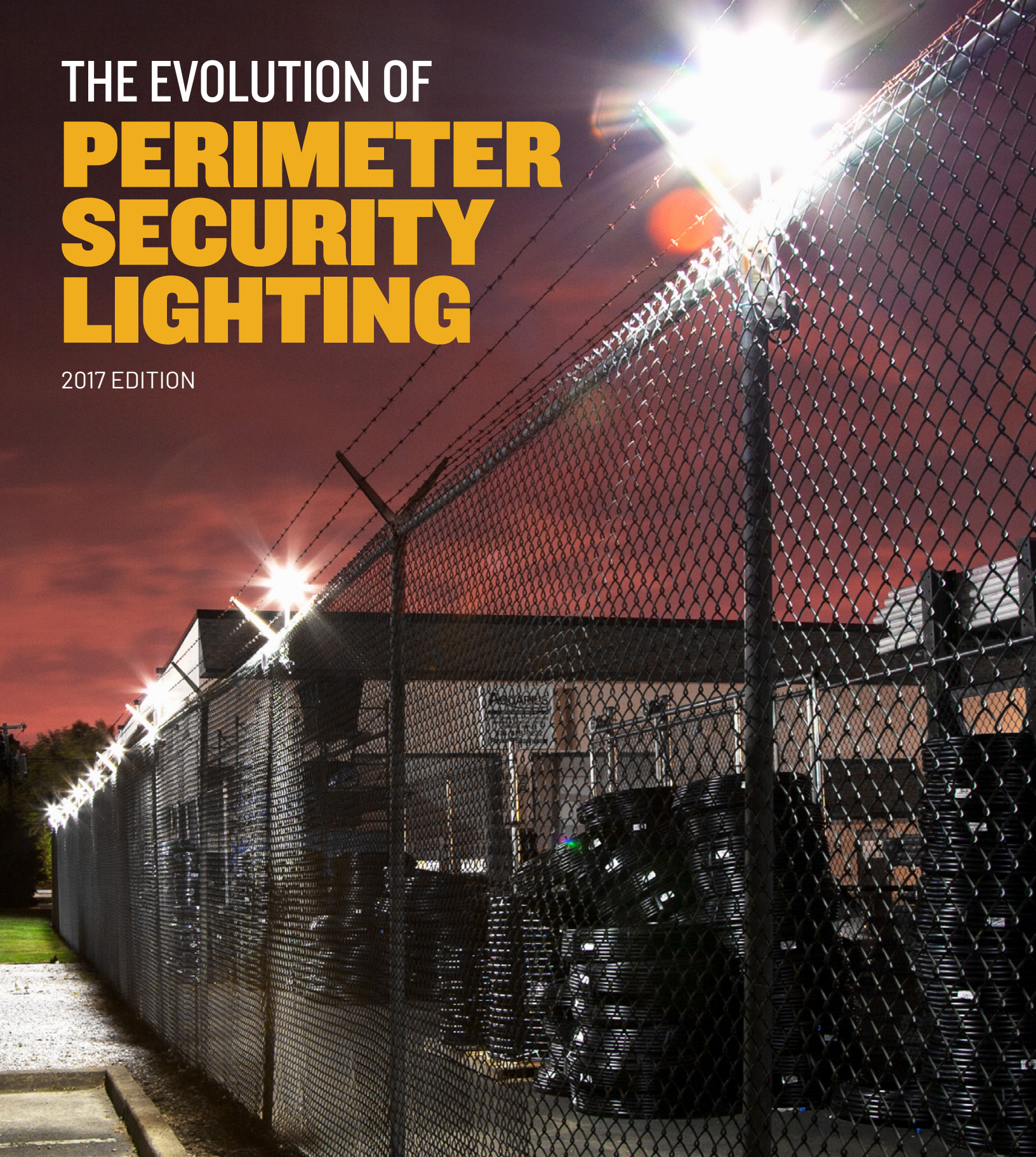


# THE EVOLUTION OF **PERIMETER SECURITY LIGHTING**

2017 EDITION



# TABLE OF CONTENTS

<b>INTRODUCTION</b>	<b>1</b>
<b>SHEDDING LIGHT ON THE ISSUE</b>	<b>1</b>
<b>A BRIGHT IDEA</b>	<b>2</b>
<b>THE PROGRESSION OF PERIMETER LIGHTING</b>	<b>3</b>
<b>PERIMETER SECURITY LIGHTING IS VITAL</b>	<b>4</b>
<b>THE HUMAN EYE &amp; HOW IT REGISTERS LIGHT</b>	<b>4</b>
<b>THE FLAW WITH LEGACY POLE-MOUNTED SECURITY LIGHTING</b>	<b>5</b>
<b>TRADITIONAL LIGHTING, A WAY OF THE PAST</b>	<b>6</b>
<b>OTHER INDUSTRY CHALLENGES, CAST'S SOLUTIONS</b>	<b>7</b>
<b>GLARE</b>	<b>8</b>
<b>SHADOWS</b>	<b>9</b>
<b>DIFFICULTIES WITH ILLUMINATING TIGHT MESH</b>	
<b>ANTI-CLIMB FENCING &amp; WALLS</b>	<b>9</b>
<b>REFLECTIVITY &amp; CHANGING SURFACE CONDITIONS</b>	<b>10</b>
<b>HORIZONTAL &amp; VERTICAL ILLUMINANCE</b>	<b>11</b>
<b>UNIFORMITY OF LIGHT DISTRIBUTION</b>	<b>12</b>
<b>LUX LEVELS: THE HUMAN EYE &amp; CAMERA IMAGING</b>	<b>12</b>
<b>A BETTER DEFENSIVE LIGHTING LINE</b>	<b>13</b>
<b>NIGHTTIME VIDEO SURVEILLANCE DATA STORAGE</b>	<b>13</b>

# TABLE OF CONTENTS

<u>ACTIVE SECURITY DETERRENTS</u> .....	14
<u>PASSIVE VS. ACTIVE SECURITY DETERRENTS</u> .....	15
<u>TACTICAL GLARE &amp; SAFE, GLARE-FREE OBSERVATION</u> .....	16
<u>INFRARED AS A TACTICAL ADVANTAGE</u> .....	17
<u>INTRUSION DETECTION SYSTEMS</u> .....	18
<u>THE CAST DIFFERENCE</u> .....	20
<u>THE 7 CAST DIFFERENCES</u> .....	21
<u>CONCLUSION</u> .....	25



# INTRODUCTION

**“A need exists to deliver low-level, glare-free, even light distribution across the perimeter fence lines to protect critical assets and people in a way that works with the human eye, the physical surroundings, and current surveillance technology.”**

DAVID M. BEAUSOLEIL | INVENTOR, CAST LIGHTING PRESIDENT

According to independent studies on crime conducted by the Illinois Coalition for Responsible Lighting, shadows, blinding glare, overly bright nighttime illumination, and uneven illumination are key contributors to creating unsafe situations.

## SHEDDING LIGHT ON THE ISSUE

Thousands of miles of perimeter fencing are installed annually in order to protect personal property, critical infrastructure, and individuals from theft, vandalism, and harm. Typically a perimeter fence is the first layer of defense. Since most disturbances occur under darkness, adding perimeter lighting is an essential part of every security plan. The role of lighting is to deter, detect, and detain individuals who would attempt to breach a secure perimeter. Before the introduction of the CAST Perimeter™ Security Lighting system, installing lighting along the fence line was limited to installing lighting products that were designed in another era for entirely different applications such as roadways, off ramps, athletic fields parking lots, and buildings.

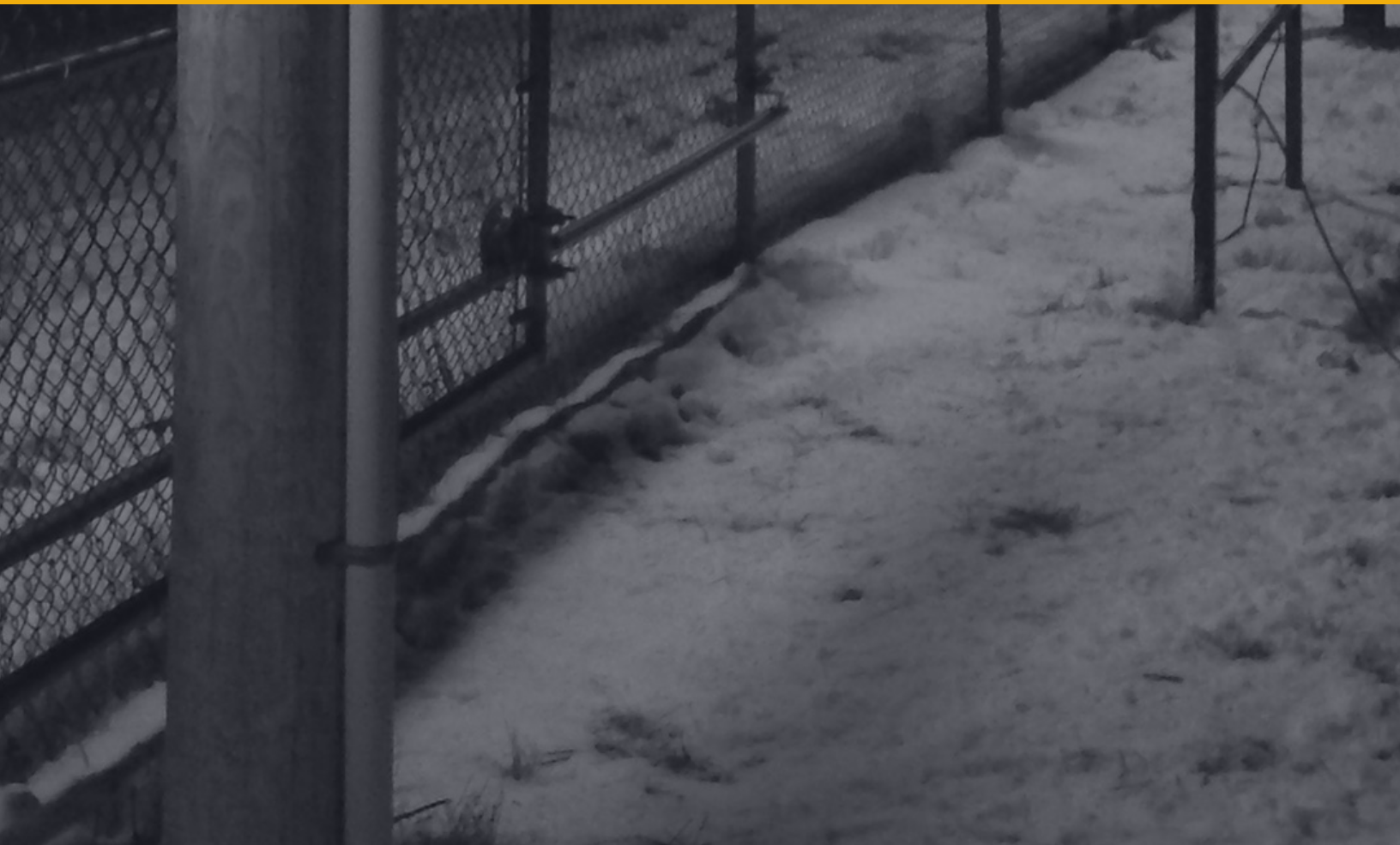
## A BRIGHT IDEA

CAST Perimeter™ Security Lighting system is the first low-voltage fence-mounted security lighting solution designed from the ground up around the needs of security professionals, closed circuit camera systems, the outdoor environment, and interaction with the human eye specifically for perimeter security lighting. The first-of-its-kind, the dedicated low-level glare-free perimeter fence illumination system has evolved into an internationally recognized industry leader and innovator. The CAST Perimeter™ is a seven-time national industry award recipient and continues to set the industry standard and now with the introduction of infrared, field tuneable infrared, producing glare free zones and tactical glare the bar has been set even higher. All of this provides the right lighting solution to meet the specific need of our customers site and security specific application.

Both our clients and industry associates look to CAST Lighting as a thought leader, abreast of trends and innovations that will directly affect their budgets and needs. In this e-book, we will help you understand the evolution of perimeter lighting; take an in-depth look at industry challenges; and share our inventive solutions that yield superior performance and uncompromising security using light as never before.



# **THE PROGRESSION OF PERIMETER LIGHTING**





## PERIMETER SECURITY LIGHTING IS VITAL

Perimeter security lighting is a vital part of an overall layered security plan. The benefits of lighting are many, but for security lighting, here is a list of a few key points that any security lighting system must deliver per the IESNA guideline:

- Provide a clear view of an area from a distance, allowing movement to be easily detected
- Deny potential hiding places along frequently traveled foot routes
- Allow for facial recognition with CCTV systems and on-site security personnel
- Deter crime against persons and property

## THE HUMAN EYE & HOW IT REGISTERS LIGHT

The human eye is amazing. It has a natural mechanism that adjusts the iris of the eye to open and close automatically to maximize what the eye can see. When you walk outside during the day, the iris quickly adjusts and constricts to optimize your sight. If exposed to an excessive amount of light suddenly, the rods and cones of the eye go into protective mode and filter the light. You may recognize this as spots and mild disorientation until the eye can adjust. The opposite happens at night where there is little to no

light. In this case, the iris naturally opens to its maximum level to allow the most light in, allowing you to see at night. The human eye does all this on its own without any control by the human.

Surprisingly, to navigate and survey your surroundings effectively at night, you don't need as much light as you'd think. So, why spend more money investing on excess lumens, power, and infrastructure only to produce a light level that is ineffective in most security lighting applications? This is the common mistake most people fall victim to when considering security lighting.

*More light is not necessarily better when it comes to night lighting.* When illuminating for optimal security, it is important to understand how the human eye works and design around these parameters. The iris of the human eye—just like a camera aperture—widens or narrows depending on the amount of ambient light. In the daytime, the iris constricts to limit the amount of light into the eye adjusting for optimal vision. In the evening, the iris naturally widens to its maximum opening, allowing for the greater amounts of light allowed in, giving the optimal light to see at night. As a result, the security lighting goal now becomes twofold. The first objective is to create the perfect interaction with human eye for optimal performance; the second is to create the right light setting for CCTV camera operation.

## THE FLAW WITH LEGACY POLE-MOUNTED SECURITY LIGHTING

Pole, street, and parking lot lights were never designed specifically for perimeter security lighting camera systems or on-site security personnel. Rather, these lighting products were merely adapted to meet the need for “security lighting.” Often times, legacy pole-mounted systems deliver way too much light, creating a slew of potential problems including shadows where intruders can hide, blinding glare that renders security personnel ineffective, and the surrounding unlit areas even darker. Thus, a need was identified for better-targeted perimeter lighting that integrated with human eye and today's camera technology.



## TRADITIONAL LIGHTING, A WAY OF THE PAST

Traditional lighting design has always followed the thought: “More lighting is better.” Many lighting designers today continue designing to specifications using outdated lumen and lux values that were developed in the 1990s, way before the advent of LEDs, precision optics, and complete comprehension of the interaction between light and the human eye.

One important factor that has been ignored over the years is that the human eye will always adjust itself to light levels that are far too bright. As a result, over-lighting has become the industry standard as is the case with most pole-mounted security lighting; unnecessary expenses are made on equipment, energy, and resources that only cause the site to become darker in the surrounding unlit areas, creating hiding places for intruders, and consequently, an environment that is more unsafe overall. While this lighting is adequate for a parking lot or a roadway, it’s unacceptable for security lighting.

*The solution is to match the optimal and natural light level for the human eye to the onsite camera systems. Providing an evenly-distributed, lower level, glare-free lighting system is the goal of any optimized perimeter security lighting system.*



**OTHER INDUSTRY CHALLENGES,  
CAST'S SOLUTIONS**





## GLARE

Glare is a result of artificial light. It occurs at night when the human eye is most sensitive, which is an important factor to consider when designing any high-security lighting system. Glare isn't only a problem for the human eye, but also CCTV cameras. Virtually all legacy pole-mounted lighting systems create glare.

It is important to define the two types of glare: disability glare and discomfort glare. According to the IESNA, disability glare is the effect of stray light in the eye whereby visibility and visual performance are reduced; discomfort glare, on the other hand, produces only discomfort and may not interfere with visual performance or visibility.

Disability glare causes the light-sensitive rods and cones of the eye to become temporarily overloaded, which renders an individual momentarily blind and susceptible to attack. The resetting of the human eye, or adaptation to darkness, can take anywhere from 15 to 120 seconds depending on the severity. This blindness creates vulnerability for onsite security personnel and should be eliminated or significantly reduced. That being said, disability glare can be a useful tool against intruders, which we will discuss shortly.

In addition to eliminating disability glare, the right light level must be delivered to allow the eye to adjust to the artificial light and become comfortable in the night setting. This

eye/site acclimation allows the individual to see into the surrounding darkness, become better aware of the property, and pick up movements that otherwise would be undetected. The improved lighting condition allows security to identify and respond more rapidly to threats than in a glare-filled environment. Glare must also be avoided with all cameras as it reduces resolution quality and increases image contrast, making it more difficult to review captured footage. CAST Perimeter™ Security Lighting uses glare-free technology to avoid unsafe situations that create vulnerability, breaches in security, and poor image capture.

## SHADOWS

Mounting fixtures 25 feet or higher on large pole lights that are typically spaced 100 or more feet apart unquestionably creates shadows with low plant material and provides intruders a place to hide. The better solution is placing fixtures directly on the fence line at a lower mounting height with fixtures spaced 20 to 30 feet apart to reduce or eliminate these shadows. The result: better overall lighting and the reduction of cover for perpetrators to hide in.

## DIFFICULTIES WITH ILLUMINATING TIGHT MESH ANTI-CLIMB FENCING & WALLS

Most cyclone fencing provides ample open mesh space allowing in light and an unobstructed view of a property. This allows for active on-site security monitoring inside and outside the fence line. With the hardening of the fence line at many critical facilities such as airports, military installations, and substations, the fence height is often increased from 8 feet to 10 feet, and incorporates tight anti-climb fencing to create a nearly impenetrable perimeter line.

Often times, a “louvered mesh” or a tight-wire cell is used to prevent any hand holds for a perpetrator to use to scale the fence. This is a great way to secure the perimeter, but proves challenging to illuminate as the new high-security fence systems allow little light to pass through. As a result, a dark shadow is created—an ideal place for intruders to hide. The darkness on the outside of the fence starts at the top of the fence and extends outward to the base. Distances are as little as 10 feet to as much as 20 feet depending on the mounting height of the fixture and the distance the pole lights are mounted inside the fence line. The best scenario would be placing the street lights directly centered over the fence line, which requires precise construction, extensive fine tuning, and the ability to problem solve during construction and create custom

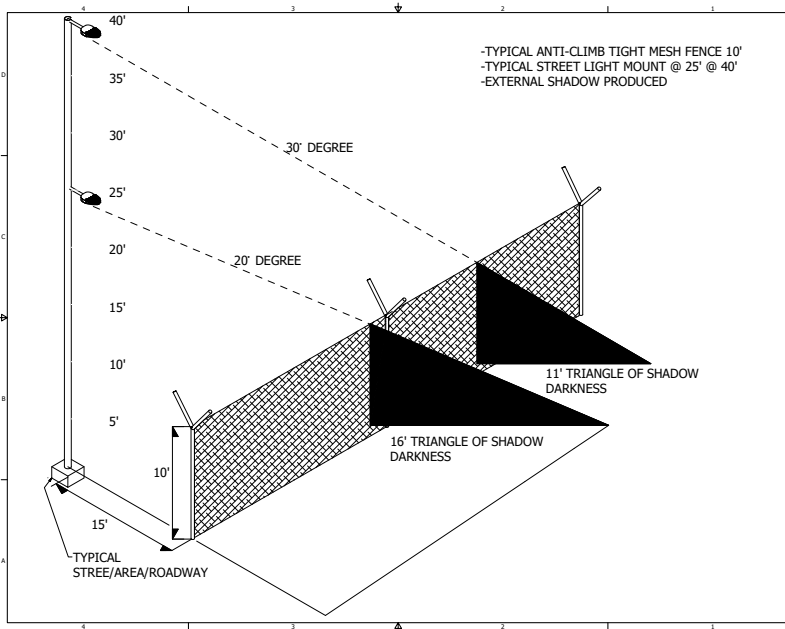


Fig. 1.1

solutions for turns along the fence line and uneven site conditions. Such circumstances can make effective security lighting using legacy pole systems extremely difficult and extremely expensive.

CAST lighting was the first perimeter security lighting system designed specifically for the fence line as well as these new tight mesh fence systems. CAST Perimeter fixtures provide even illumination on both the inside and the outside of the fence line, eliminating any space a perpetrator can hide while

also producing better camera images and an overall better security lighting solution: The CAST solution is easier to install, easier to maintain, and provides 60 to 80 percent savings to the end user compared to legacy pole mounted systems.

## REFLECTIVITY & CHANGING SURFACE CONDITIONS

Unfortunately, reflectivity and changing surface conditions happen all the time. Closed-circuit camera systems struggle with the reflectivity of changing ground conditions caused by rain on plant materials, puddles that create mirrored surfaces, and the reflective value of white snow. Overly-illuminated areas cause these conditions to worsen significantly, which interfere with camera images by creating unwanted glare. The CAST Perimeter™ Security Lighting system delivers the right light level, reducing this potential problem before you even knew it was an issue.

### How Much Light (lux) falling on the ground is enough?

Envision if you will what it is like to stand outside in the summer under a full “Harvest Moon” with no clouds in the sky. The Horizontal Lux falling on the ground is typically .108 which is roughly one tenth of a lux. Once your eyes have had a chance to adjust at this lux level you can make out your physical surroundings and gingerly navigate your surroundings. This leads us to the greater question that has perplexed security lighting designers since the invention of artificial lighting, which is, how much light is enough? Now remember we are talking about Perimeter Security Lighting not lighting a parking

lot at a strip mall. For security lighting 2.5 Lux we feel is more than adequate illuminance for security lighting at the periphery in conjunction with a four to one min to max light uniformity ratio. This would put the lighting along the fence at 10 lux.

## HORIZONTAL AND VERTICAL ILLUMINANCE

### Understanding Horizontal Illuminance

Most lighting designs use the common horizontal lux or foot candle light distribution plot to design any lighting system layout. This plot is essentially a scaled numeric rendering displaying in a grid format the light that will fall on the “horizontal” ground surface using a chosen lumen fixture, beam spread, fixture spacing and mounting height. So, imagine turning on the lights in your office. The light that hits the ground is the horizontal ground surface or horizontal illuminance. Now, hold that thought as we explain vertical illuminance.

Fig. 1.2

LUX		Brighter Than Harvest Moon
0.108	1x	Harvest Moon
0.216	2x	% Brighter than Harvest Moon
0.432	4x	% Brighter than Harvest Moon
0.864	8x	% Brighter than Harvest Moon
1.080	10x	Deep Twilight (10% Twilight)
1.728	16x	% Brighter than Harvest Moon
2.500	23x	% Brighter than Harvest Moon (B)
3.456	32x	% Brighter than Harvest Moon
5.000	46x	% Brighter than Harvest Moon
6.912	64x	% Brighter than Harvest Moon
10.000	92x	Twilight (A)

### REFERENCE LIGHT LUX VALUES

- (A) Twilight Defined as the time just before sun rise and just after sunset at which there is natural light provided by the upper atmosphere
- (B) On Site Cast Testing. 2.5 Lux provides more than adequate illuminance for security lighting at the periphery with a 4 to 1 min to max light uniformity across the site.

### Defining Vertical Illuminance

If you’re still imagining the office scenario I just described, vertical illuminance is the light that reflects off walls and lands on objects or a person’s face. Previously, vertical illuminance was disregarded, but as security lighting experts, we began carefully exploring this as a valuable security tool.

According to the IESNA, “one lux of vertical illuminance is sufficient to obtain a 90 percent probability of correct detection of an approaching person (but not facial recognition).” The 2003 IESNA findings reported, “Facial recognition can be made at levels as low as 2.5 lux. The IESNA Security Lighting Committee recommends that for facial identification the minimum vertical illuminance should be 5.0 lux.” One inherent flaw when using pole-mounted

fixtures mounted 20 feet or higher and typically spaced 100 or more feet apart is the difficulty projecting vertical illuminance on faces for identification, to read body language, to identify those who are familiar or threatening, and for security camera image capture. The CAST Perimeter™ lighting solution resolves this issue by placing fixtures typically 10 to 12 feet off grade with spacing of 20 to 30 feet apart. This provides a light closer to the subject and better, more directed light that delivers both horizontal and vertical illuminance to enhance both camera imaging and on-site security detection.

## UNIFORMITY OF LIGHT DISTRIBUTION

We believe uniformity of light is far more important than the amount of light falling on the ground. Even, consistent light distribution spread across an entire perimeter fence line is critical to avoid eye fatigue, eyestrain, and quality night camera images. Avoiding contrasting brightness levels, especially total darkness (what we call “black holes”) to full brightness (“light bombs,”) is paramount for security personnel and camera systems. These site conditions must be avoided at all costs. Such extremes of uneven light levels severely reduce an individual’s ability to process images and capture site-specific threats. Using the CAST Perimeter™ Security Lighting system, you provide even and consistent light distribution across an entire fence line or property border eliminating hot spots, black holes, or light bombs with a light level that bleeds off gradually into the darkness to extend the range of the viewing field.

According to the IESNA, light uniformity refers to the evenness of light distribution on surfaces. For security, the lower the minimum to maximum, the better the eye adaptation at night. This reduces the necessity for eye adjustment when scanning or using an area, making it more comfortable and effective for guards to do their job while improving the CCTV camera images at the same time. A common uniformity ratio for security lighting is 4:1 minimum to maximum horizontal illumination, i.e. the light falling on the ground. Take note: 10 lux divided by 2.5 lux equals the 4:1 ratio.

## LUX LEVELS: THE HUMAN EYE & CAMERA IMAGING

The human eye has an amazingly effective working range. For example, the brightest full moon (a harvest moon) is only .108 lux while the typical lux value on a sunny summer day at noon is 107,527 lux. Most high quality 2-megapixel cameras and the human eye operate quite well at between 2 to 4 lux. The CAST Perimeter™ Security Lighting system delivers the right light lux level for both effective camera imaging and optimal eye performance at night with the added benefit of greatly reduced glare for both. This achieves the main objective of producing a more secure site condition.

## A BETTER DEFENSIVE LIGHTING LINE

Legacy pole-mounted light covers much larger areas, but, this isn't a solution by itself. The typical pole spacing is usually 100 feet (30 meters) apart. However, should a legacy pole-mounted fixture fail, the resulting unlit area is considerable, which creates significant vulnerability to the security of the perimeter. CAST's Perimeter™ Lighting System, on the other hand, spaces poles typically 20 feet (6.09 meters) to 30 feet ( 9.0 meters) apart for added security. Should a CAST perimeter fixture fail or break, coverage is not completely lost as the two adjacent fixtures provide overlapping or backup light coverage. This redundancy is extremely valuable when properly securing a defensive perimeter.

## NIGHTTIME VIDEO SURVEILLANCE DATA STORAGE

Combination day/night surveillance cameras operate as two cameras in one, a day light camera during the day and in infrared camera at night. All video surveillance camera systems use some sort of digital storage to record events or perform video analytics, and the cleaner the image, the less storage space on the DVR or cloud storage system is required. Better image quality lowers bandwidth and maintains a high frame rate, providing better real-time video. Even the best night cameras provide noisy images in darkness. This noise on the screen, which resembles snow, is the result of low-light conditions, which can require 50 to 100 percent additional data storage than during daylight image capture. Thus, a need exists to improve surveillance images at night while, at the same time, reducing the data storage requirements of the system. This is especially important when dealing with large surveillance systems as the data space requirement can add up exponentially. The CAST Perimeter™ Security Lighting system applies the right amount of light to enhance camera image quality and also decreases the data storage requirements of the camera system at night.





**ACTIVE SECURITY  
DETERRENTS**





## PASSIVE VS. ACTIVE SECURITY DETERRENTS

In choosing your security system, it is important to determine if you want a passive security system or an active one. What is the difference? With a passive system, you are made aware of an event after it occurs. You must replay the recorded video to see what happened and enlist police investigators and insurance companies for assistance. An active system notifies you when an event is underway, allowing you to take immediate action before the crime or event is over. For example, a CCTV surveillance system can send a signal to the owner, police, and/or monitoring center during an event and dispatch resources to stop the threat.

When coupling lighting with these proactive solutions, you gain a tactical advantage slowing down the threat and exposing the intruder, causing him or her to pause or retreat. Intruders don't like to be seen. The ability to disorient intruders when they are first detected will usually cause the perpetrator to think twice. This is done by dimming lights or turning them on or off repeatedly. A good security plan will contain layers of security features, and will not rely on any one single security measure for success.

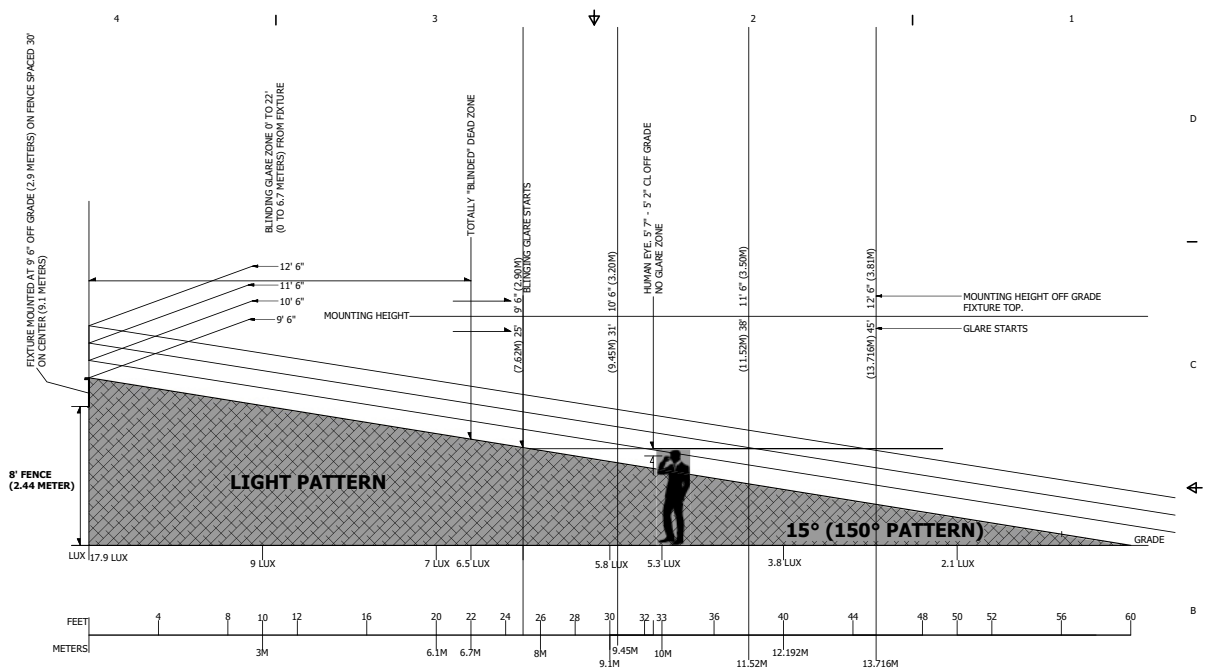
# TACTICAL GLARE & SAFE, GLARE-FREE OBSERVATION

Special Forces use stun grenades—or flash bang grenades—to blind, deafen, and disorient combatants. Local police use light to blind possible threats during evening traffic stops, and we all know how annoying high beams are at night for oncoming traffic. Blinding glare is a tool that disables assailants (and even undeserving drivers!) and should be deployed tactically to YOUR perimeter security advantage, too. We've developed the perfect tool to do just that.

With the introduction of the third-generation CAST perimeter security light, the light fixtures have taken precision optics, specific illuminance values, minimum to maximum ratios, electrical efficiency, and security lighting to create a whole new level of lighting that can be used as a tactical advantage. By strategically positioning a precision beam angle and accompanying glare shroud and mounting on top of a fence, this next generation of lighting is something truly extraordinary. We have produced, for the first time, a tactical blinding glare solution in what we call the "glare zone" as well as a "glare-free observation zone" for on-site security guards.

Here's how it works: (See Fig. 1.3) The glare zone runs from 22 feet to 45 feet depending on the mounting height of the fixture on both the inside and outside sides of the fence. Intruders that approach the fence enter the glare zone and are quickly exposed to blinding disability glare, which will likely deter their intrusion. At the same time, guards can monitor this activity from the glare-free observation zone, providing a tactical advantage for guards to remain virtually out of sight while observing anyone in the glare zone. Essentially, the glare-free observation zone is the equivalent to a sun visor, allowing guards to see more clearly without being exposed to blinding glare.

Fig. 1.3



# INFRARED AS A TACTICAL ADVANTAGE

The human eye cannot detect infrared (IR) light so it appears no lights are in use. But, deploying IR lighting across the perimeter—a light spectrum a camera can see—allows for enhanced image capture at night while, at the same time, not drawing attention to the site or annoying residents in close proximity with light trespass in an urban settings.

## The Problem with Existing IR Systems

Existing IR lighting solutions typically attach the IR luminaire directly to the camera or to a fixed pole using a spotlight-style beam to project IR using varying beam patterns (i.e. narrow, medium, and wide.) This method is both expensive to procure and clumsy to install and adjust while providing limited flexibility to the end user. This illumination method with IR has several distinct disadvantages, limiting their effectiveness:

- A pan-tilt-zoom (PTZ) camera fitted with an IR illuminator can inadvertently washout or blind the adjacent camera images during operation.
- A PTZ camera using a fixed position IR illuminator can inadvertently pan in the direction of the IR and washout the camera image.
- Most fixed IR illuminators have a difficult time covering evenly across a wide deep areas and require time-consuming beam angle and fixture power adjustments and modifications that require bucket trucks to service.
- Security guards fitted with night image camera systems will be blinded when facing the direct light emitted by an IR illuminator.
- Typical IR beams, designed for short-range spectrums up to 100 feet, try to “see” an intruder beyond that range and are ineffective.

## A Better Tunable On-Site Infrared Solution

Each site is different, each camera is different, and each IR security requirement is different. The CAST Perimeter Night Owl Tunable IR solution allows the operator to set the exact site-specific IR lighting requirement for the camera systems and fixtures placed along the fence line to deliver a uniform IR light level across a wide area. Having the fixtures installed below the mounting height of the camera avoids any direct IR glare washout with adjacent cameras. On-site personnel using IR headgear are shielded from the IR in the glare-free zone, which increases their visual effectiveness.

## Infrared Solution with a White Light Option

Should the site require the Night Owl™ Tunable IR fixture, it can be delivered with a separate white light circuit option that allows for automatic or user controlled activation. Meaning, once an intrusion is detected, white light could be switched on by the on-site security coordinator to scare off intruders on premise. This allows for maximum on-site customer-specific tactical lighting.

# INTRUSION DETECTION SYSTEMS

## Security Leverage: Integration with Intrusion Detection Systems

The CAST Perimeter™ Security Lighting system can be integrated to work in unison with most modern intrusion detection systems to create effective zones of protection. During an intrusion, CAST Perimeter™ lights can be triggered to operate for a specific duration or setting coinciding with the specific detection zone. The lighting can be set for a host of activities when an intrusion occurs such as:

- Turning on
- Turning off
- Blinking
- Dimming or brightening
- Switching from IR to white light

## Using Light to Disorient & Disable

Light is powerful. Perhaps the one sense criminals rely on most heavily on is vision. Once someone is blinded by light, it takes up to two full minutes for the eye to naturally adjust, and as I'm sure you have experienced, dots or "artifacts" are still visible after turning away from bright glaring light.

The CAST Perimeter system can be fitted with a relay that will cycle from full-on to total darkness every 45 seconds, essentially never allowing an intruder's eye to fully reset, causing extreme visual disorientation! This feature can be activated via a simple dry contact or power signal provided by any intrusion detection system and can be adjusted by the end user for cycle time and duration settings. This is an inexpensive and extremely effective feature that uses light in a whole new way to stop an intruder from carrying out his or her intended act.

## Taking It a Step Further

When securing a perimeter, it is important to understand what is required for the most effective solution to this unique security challenge. In most circumstances, the solution is broken down into three parts:

- 1 **Detecting** when an intruder is approaching the fence.
- 2 **Deterring or thwarting** the intruder from entering the property.
- 3 Forcing the intruder into **retreat**.

The goal is to identify the intrusion and stop it before it happens to protect your people, property, and assets.

## What's Been Available

There are several intelligent perimeter solutions available today that can identify when an intruder is approaching. These solutions—to name a few—include smart cameras with built-in analytics, video management systems (VMS), motion detection, laser, and other fence-mounted monitoring solutions.

Unfortunately, all the perimeter security solutions sold today are passive systems. They merely identify that an intruder is approaching or has already breached the fence, and record the incident; they do nothing to stop the intruder or chase the intruder away. Thus, the critical real-time response to an intrusion is left up to the property owner, but that responsibility is often out of reach as the people required to respond are not immediately available.

## **Introducing CAST Lighting FlashGlare**

The human eye is an amazing organ. Its ability to rapidly adjust to light—or lack of light—in seconds is an unconscious and primal function designed to protect the eye. Knowing this we use it to your advantage to protect your property.

With the introduction of the CAST Lighting “FlashGlare,” property owners can now interface with other perimeter security solutions to deter an intruder in real time. By using the blinding flash-glare light to temporarily disorient the intruder’s eyes, you can stop and intruder in the act.

Flash glare works by leveraging the natural chemical function of the eye to create an environment where the intruder can’t see, causing disorientation and blindness. After retreating, the perpetrator’s eyes will return to normal within 20 to 30 minutes.

When implementing CAST Lighting FlashGlare, a typical security scenario would go something like this: Perimeter lights are kept off at night. As an intruder approaches the fence, a dry contact closure signal is sent the lighting system or lighting zone, and CAST Lighting FlashGlare is initiated with a repeating cycle of lights turning on and off every 10 seconds for roughly one to two minutes.

Here’s what happens: FlashGlare takes control of the intruder’s eyes. As the intruder approaches an unlit fence, their iris is wide open because it’s dark out. When we are alerted that there is an intruder, we turn on the lights—the CAST Lighting LEDs produce blinding 2200 lumens of light that is directed straight through the wide-open iris to the back of the intruder’s eye. The chemicals of the eye react immediately, and the brain sends a signal that there is a problem. The intense direct light, however, causes the chemicals in the eye go haywire as they are unable to adjust quickly enough the two extremes: total darkness to bright glaring light.

The FlashGlare feature “bleaches the receptors” of the eye, according to Dr. Kristen

Thelen of the Emory Eye Clinic in Atlanta, causing the chemicals in the back of the eye become disrupted. The intruder immediately begins to see stars, splotches, artifacts an experience, causing a high level of discomfort.

To correct the glare problem, the intruder's brain sends a signal to the eye to close the iris immediately. Within 1 to 2 seconds, the iris will close to adjust to the light and protect the eye.

Here's where it gets interesting: When the iris closes, we turn the lights off so the intruder can't see. The eye attempts to adjust by opening the iris back up, and once that happens, we bleach the receptors again. Then brain closes the iris again and we turn off the lights. As we repeat the light cycling process, the chemicals in the back of the eye continue to become more and more confused. In approximately six to ten cycles, the intruder will be so disoriented they will no longer be able to think about cutting climbing or vandalizing the property; the intruder's main concern becomes primal—trying to get his eyesight back by retreating to safety.

According to Thelen, it will take the intruder's eyes between five to eight minutes to chemically settle down enough to see between the splotches and stars—and another twenty to thirty minutes for the chemicals to return back to normal levels where he can see again. There is no harm to the eye as the natural process of the eye will balance out the chemicals once away from the light.

By combining the intelligent features of the cameras, VMS, motion detection, or fence-mounted solutions with CAST Lighting FlashGlare, the customer will have both the ability to identify when an intruder is approaching, and chase him away, protecting their assets and property without the need of costly onsite security guards or outside security services.





**THE CAST DIFFERENCE**



## THE 7 CAST DIFFERENCES

As mentioned earlier, CAST Perimeter™ Lighting optimizes the light source and output to enhance the interaction of light with the human eye and improve closed-circuit camera system imaging. Our perimeter lighting system requires minimal maintenance, and completely eliminates the need to pour concrete footings, install light poles, trench conduit, and backfilling, reducing installation expenses and material savings by as much as 80 percent compared to legacy pole-mounted systems. This system uses safe low-voltage power, long-life LEDs, and can be custom designed for any size project or purchased in ready-to-install lighting kits, ranging from 80 to 1200 feet in length (based on the selected product.)

### **1 LED Driving & Junction Temperature**

Every LED lighting fixture designer makes a choice concerning how hard to drive the LED and how hot the LED will become during operation. We operate perimeter LEDs at only 42 percent of the maximum limit of 150°C (64.6° C) and we're more than happy to provide the reports that support this exercise. A good rule of thumb is to never operate your LEDs over 75° C, otherwise they simply will not last the L70-rated life expectancy of 65,000 hours of operation.

## **2 Safe Low Voltage**

Instead of unnecessary high-voltage power, we use low-voltage as a safe alternative. By using 24-volt power, there is never a need to worry about the risks of installing dangerous high-voltage power on the fence line. Low voltage is safe and easy to install and maintain. Unlike 120 volts or 220 volts in a 24-volt system, the direct burial UV-resistant wire that powers the fixtures attaches directly to the fence, which significantly reduces installation time and labor expense. Because it is low voltage, you are not required to hire an electrician to design and install the lighting. This saves money and allows certified low-voltage technicians to do the installation.

## **3 Maintenance**

Legacy pole-mounted street lighting fixtures require large concrete footings, construction cranes, bucket trucks, high-voltage power and yearly maintenance. When these fixtures require servicing, which could be in a remote area, the task requires coordinating sophisticated equipment and expert personnel that are very expensive and often times not readily available. Conversely, the CAST Perimeter™ Security Lighting system uses safe low-voltage power, requires a stepladder, pickup truck, and one man to repair or maintain. It is a quick and simple system to install, service, and maintain, which is extremely important when considering critical high-value perimeter security applications in remote locations.

## **4 Safety**

All CAST Perimeter™ Lighting products are UL listed to the 1838 and 8750 standard for safety, as well as IP66 ingress protection rated, CE listed, and FCC Class B-certified against conducted and radiated emissions (Electromagnetic Interference [EMI]) which will not interfere with wireless communication signals.

## **5 Dark Sky Friendly**

Overly illuminated areas create light pollution, which is negatively impacting us world-wide. Light pollution is harmful to our health, the environment, and has a disruptive effect on the world's ecosystems and natural cycles.

To do our part, CAST Perimeter™ Security Lighting is dark-sky compliant. In 1988, the nonprofit International Dark-Sky Association was founded to protect the night skies and

advocate for environmentally responsible outdoor light solutions. CAST's lighting meets the Illuminating Engineering Society of North America (IESNA) classification for "full cutoff" optics and reduce high-angle brightness. In other words, our light angles do not exceed 90 degrees, and therefore CAST adheres to the Modern Light Ordinance, which regulates outdoor lighting in North America to help reduce glare, light trespass, and skyglow.

## **6 CAST Perimeter™ Lighting Features**

Our engineer team continues to develop innovative products and features designed to work seamlessly with modern intrusion detection systems while delivering unmatched benefits and value. No shortcuts or sacrifices are ever made in our manufacturing process. Our commitment to the safety and security of our clients is our core value, and every step of our product development process carries that steadfast commitment. We've patented features that deliver superior performance and flexibility, and strive every day to continue to offer innovation and value.

### **HIGHLIGHTS OF THE CAST PERIMETER™ SECURITY LIGHTING FEATURES INCLUDE:**

- 50 to 80 percent less material cost than traditional lighting systems depending on the fixture selected
- 50 to 80 percent less labor cost than traditional lighting systems depending on the fixture selected
- Safe low-voltage 24-volt power supply
- Low 7 to 28-wattage consumption models available to save ongoing energy costs
- Excellent L70- life expectancy of 65,000 hours LEDs
- Simple fast installation
- Mounts easily to a fence, post, pillar or wall
- Great warranty

## 7 Custom Perimeter Solution Design

CAST Perimeter™ Security Lighting offers custom design services to maximize each of client's security. Each solution is customized based on the following criteria:

- Height of the fence or wall
- Length of the fence or wall
- Fence post or column spacing
- Average lux or lumen value, if applicable
- Location of power source and voltage
- Intrusion Detection System plan, if applicable
- Or you can simply purchase a kit containing everything you need to cover a perimeter fence line of 80 feet, 150 feet, 250 feet, 500 feet, 750 feet, 1000 feet, or 1,200 feet using 120-volt or 220/230-volt power.



# CONCLUSION

As evidenced, security lighting extends far beyond simply illuminating a perimeter; it is a precise science that involves analysis, customization, and innovation. At CAST, our commitment to the safety and satisfaction of our clients is a core value. We employ highly trained and experienced engineers and professionals, and use the highest quality materials and components to create superior products that outshine the competition. Through our steadfast dedication to security and award-winning design, our clear objective is to create safer environments through active security measures that bring comfort and relief to each of our clients. Our goal will always be to provide the best perimeter lighting solution available by integrating multiple security solutions including CCTV, access control, fence-mounted solutions, and motion detection.



# THE SPECIALISTS IN LOW-VOLTAGE OUTDOOR LIGHTING.

CAST Perimeter™ of NJ, USA specialize in manufacturing low voltage precision lighting to deliver the most effective perimeter security lighting solutions in the world.

## 6 INDUSTRY AWARDS AND COUNTING

- ▶ Product Innovation Award Architectural Products
- ▶ Best In Category—Industrial, Vandal, Emergency & Exit, Light Fair International
- ▶ Most Innovative Product of the Year, Light Fair International
- ▶ Best of Security Products, ASIS Accolades
- ▶ Homeland Security Finalist—“Best Perimeter Protection Solution,” Government Security News
- ▶ Top 30 Technology Innovations Security Sales & Integration

## CONTACT US

For more information, site estimates, kit choices, and pricing.

## DIRECT LINE:

**EMAIL** [perimeter@cast-lighting.com](mailto:perimeter@cast-lighting.com)

**PHONE** 973.423.2303

**FAX** 973.423.2304

**ONLINE** [cast-lighting.com/perimeter](http://cast-lighting.com/perimeter)

**ADDRESS** 1120-A Goffle Rd,  
Hawthorne, NJ 07506

Patents: US Patent 8, 845,124; 9,360,197; 9,593,832; 9,777,909; Intl Patents; Other Patents Pending.

GSA Advantage! [www.gsaAdvantage.gov](http://www.gsaAdvantage.gov)  
Contract #GS-07F-183CA.

Cast Perimeter™ is a division of CAST Lighting which specializes in the research, innovation and manufacturing of low voltage LED lighting solutions.