

## **Parking Garage/Parking Lot Security**

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**The theory of Crime Prevention Through Environmental Design is based on one simple idea: that crime results partly from the opportunities presented by physical environment. This being the case, it should be possible to alter the physical environment so that crime is less likely to occur. — Ronald V. Clarke**

When determining what security components are needed in a parking garage or parking lot (or any other facility), it pays to be proactive. Take into consideration what would be a “reasonable” level of security and base your security program on the recommendations from the vulnerability/physical security assessment recommendations of a security professional. Take into consideration any previous criminal activity in the area, the neighborhood where the parking garage/parking lot is located, the design of the structure or layout of the lot, whether there is an attendant or security officers on-duty 24/7 and the initial and on-going operational costs of security. Both active and passive security measures should be used for an effective security program and don’t forget to practice target hardening. Many times, it is a challenge for planners to pick the right combination of security measures to provide the highest level of safety and security possible. An assessment conducted by a security professional can help with this process. It is more difficult and costly to retrofit security into an existing environment than to “build” security into the design of the parking garage or parking lot. There are many elements that can go into a successful parking safety/security program, including up-graded access

controls with auditing capabilities so access can be tracked or locked down, if necessary.

Adequate lighting must be a part of any security program. Ensure that the type and placement of lighting in parking garages and parking lots is assessed so there are no dark shadows between cars where someone could hide. Lighting in elevator lobbies and stairwells of parking garages should be bright enough to provide facial recognition. Painting the walls and ceilings in parking garages can increase lighting because the light will be reflected and the area will appear better lit. Security officer or law enforcement patrols with varied routes can be a visual deterrent.

Landscaping and engineering adjustments utilizing CPTED concepts can be “built” into the design of the parking garage or parking lot. Parking garages and/or parking lots that are unkempt or rundown invite criminal activity. Sometimes, security equipment will need to be added or upgraded, but something as simple as upgrading maintenance can add to safety and security.

Some safety/security elements are expensive and the benefits they provide must be weighed against their costs. Others are simple and inexpensive and can easily be added. Parking garages and parking lots should have designated and clearly marked entrances and exits, identified and clearly marked pedestrian walkways and the different levels of the parking garage or areas of the parking lot should be easy to identify by the patrons so there is no delay when they return to their vehicles.

There are different reasons why parking facilities need cameras, but first and foremost, it's to keep the cars safe and well-protected, along with keeping the patrons of the parking facility safe. It's important that the right security cameras are in place in the parking facility or parking lot. According to the Bureau of Justice Statistics, 10% of property crimes occur in parking garages or parking lots and parking garages are the third most likely location where

someone may be a victim of violent crime.<sup>1</sup> It is important that owners and property managers put reasonable security measures in place to keep patrons and their vehicles safe. The goal is to efficiently allow vehicles to move to parking spaces, provide a smooth entrance and exit from the facility and to ensure that pedestrians can move about safely in the parking garage or parking lot.

Parking garages and parking lots that are unkempt or rundown are magnets for criminal activity and fear of crime increases. The concept of “Broken Windows”<sup>2</sup> was defined in 1982 by social scientists James Wilson and George Kelling. The Broken Windows Theory states that when there are visible signs of disorder and misbehavior, it will encourage more disorder and lead to serious crime. The idea is that one, unrepaired broken window is a sign that no one cares about the property so it doesn’t matter if more windows are broken. This disorder and crime increases fear among citizens which leads them to withdraw from the area and there will be decreased informal social control. Keep this concept in mind when putting a maintenance, landscaping or basic upkeep program in place for a parking garage or parking lot.

CPTED proposes that the proper design and effective use of the built environment can lead to a reduction in the opportunity, fear and incidence of predatory stranger-to-stranger type crime, as well as result in an improvement of the quality of life (NCPI, 2010). Crime prevention design solutions should be integrated into the function of structures and buildings, or at least the location where they are being implemented. Ease of wayfinding, decreased fear of crime, and increased visibility all add to patron comfort levels. The CPTED approach to physical design focuses on actions to reduce or prevent the opportunity for crime.

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<sup>1</sup> Property crimes often occur in parking lots and garages. Retrieved on 04-16-20 from: <https://www.isenberg-hewitt.com/blog/2017/10/property-crimes-often-occur-in-parking-lots-and-garages/>

<sup>2</sup> Broken Windows Theory. Retrieved on April 17, 2020 from: <https://www.psychologytoday.com/us/basics/broken-windows-theory>

There are some security basics that should be utilized to address safety and security concerns in parking garages and parking lots. Effective lighting, patrol by law enforcement or security officers, a landscaping and engineering program, natural surveillance, security equipment and maintenance procedures all play a part in addressing vulnerabilities. Vehicles and pedestrians should be able to move through well-lit parking facilities using easily identified pathways and driving lanes. Security officers and parking garage or parking lot staff should also have an effective and reliable communication system that has the capability of being integrated into access control and the video management system.

There are many older, unsafe parking garages and parking lots that would benefit from CPTED strategies. Some security measures are inexpensive and relatively easy to add, but others are costly and difficult to implement. A cost/benefit analysis may need to be conducted to determine what security components can be added to decrease crime and the fear of crime. Consider a layered approach with security components working in conjunction with each other. One of the basics of parking garage/parking lot personal security is visibility. If a patron sees something or someone that they perceive to be a threat, they can avoid that area or alert law enforcement or security officers. Perimeter or boundary lighting should allow detection of those who loiter outside the site and those who are entering or exiting the site. Lighting should allow safe movement and easy detection of hazards and threats out to a distance of at least 30 feet.<sup>3</sup>

Adequate lighting is a critical factor in parking garages and parking lots to not only reduce the likelihood that a crime will occur but also to help garage patrons “feel” safer. The purpose of security lighting is to discourage unauthorized entry, protect people and property on the site, detect intruders and help distinguish public from private space - which may aid in

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<sup>3</sup> Fennelly, Lawrence J. Handbook of Loss Prevention and Crime Prevention; Elsevier; Cambridge, MA., 2020.

reducing liability. Security lighting should complement other security measures such as physical barriers, intrusion detection systems, video surveillance systems and security officer activities. Research shows that there is a significant relationship between crime/fear of crime and illumination. Lighting is a powerful tool for crime prevention by enhancing safety and may possibly reduce potential liability.

Designers and security professionals should work together to ensure that lighting is sufficient in the driving and pedestrian areas of parking garages and parking lots. It is also important to eliminate shadows where an attacker may hide. Remember, if garage walls and ceilings are painted or stained white, it will help reflect light and the area will appear brighter. It is also important to have adequate lighting in elevator lobbies, stair towers and at entry/exit doors. High Pressure Sodium (HPS), Metal Halide and Fluorescent lighting were previously the most common types of lamps used for parking garages and parking lots, but when these areas are assessed and light meter readings are taken or a new parking garage or parking lot is designed, many security professionals now recommend Light Emitting Diodes (LED) because they emit a bright white light, have a long life and are energy efficient. When security professionals are involved in the design process of a parking garage, it is more cost-efficient to “build” or “design” security, such as lighting into the parking garage or parking lot. It is important to note that LED lighting does have a higher initial cost for installation, but the savings in energy over time will make up for the difference.

Keep the following information in mind as you read the IESNA Lighting Guidelines for Parking Areas: One foot-candle equals one lumen of light per one square foot of space. One lumen is the measure of light at its source and the amount of light needed to light an area of one square foot to one candlepower. There are different types of illumination. Horizontal

illuminance is measured at grade level with the light meter placed on horizontal surface, such as the pavement. Vertical Illuminance is measured at approximately 5 feet above grade level with the light meter held at approximately 5 feet above grade. Vertical illuminance should be provided where there is a need to identify people-face and body - at a distance of 30 feet. There should be a uniformity ratio of no more than 4:1 variance in lighting. The higher the background illuminance, the higher the vertical illuminance must be to maintain the 4:1 ratio to prevent silhouetting.<sup>4</sup>

### **IESNA Minimum Lighting Guidelines for Parking Areas<sup>5</sup>**

Parking facilities and covered spaces	6 fc horizontal
Parking gathering areas, stairs, ramps, elevators	5 fc
Parking for elderly visitors	50 fc
Walkways around senior facilities	5 fc
Parking for public parks	3 fc
Trails and walkways	0.5 – 1 fc
Major retail parking	3 fc
Fast food restaurants	3 fc
Convenience store gas pump areas	6 fc
Convenience store sidewalks and grounds	3 fc

The spacing of light fixtures or poles should allow for some lighting overlap so there are no areas in the parking garage or parking lot that do not have adequate illumination. This is also true of lighting that is placed on the facades of parking structures. It is just as important to

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<sup>4</sup> Fennelly, Lawrence J. Handbook of Loss Prevention and Crime Prevention; Elsevier; Cambridge, MA., 2020.

<sup>5</sup> Illuminating Engineering Society of North America (IESNA) G-1-03, Guidelines for Security Lighting for People, Property, and Public Spaces, IESNA; 2003.

eliminate shadows on the outsides of garages to assure the safety of pedestrians and patrons returning to their vehicles. These same lighting principals apply to parking lots. Bright lighting should be provided throughout lots, and there should be liberal amounts of lighting overlap to minimize shadows. It is important that non-operational lighting fixtures are repaired/replaced within 24 hours of being reported non-operational. Maintenance is vital to lighting efficiency and since illumination levels tend to decrease over time because of aging lamps and dirt on fixtures, lamps, and other surfaces. Together, these factors can reduce total illumination by 50% or more, while lights continue to draw full power. Consider implementing a replacement, maintenance and cleaning program for lighting fixtures. It is less expensive to perform a planned replacement of all or a group of lights rather than replace them one or two at a time. This will ensure that there are no dark areas. It is important that vegetation does not obstruct lighting, so a vegetation maintenance program may need to be implemented. LED (Light Emitting Diodes) are commonly used now in parking garages and parking lots. Even though the initial cost of LED lights may be more than conventional lighting types, LED lighting will provide a return on investment with reduced energy costs and less required maintenance. Additionally, LED lighting provides bright white illumination and much truer color, both of which promote safety and are conducive to an effective video surveillance program. Lights powered with solar energy may be used in some parking garage and parking lot applications.

Light poles and fixtures on the property should be numbered so that they can easily be identified when a light is non-operational. This can be done with black, adhesive numbers, placed on the pole approximately 8 feet up from the ground or on the base of the wall-pack fixtures. Lighting fixtures can be designated by the area of campus where they are located. For example, C-123 would indicate lighting fixture number 123 located in the central area of the

facility. Maintenance and/or security personnel should create maps of all light fixtures and pole numbers. One person or department should report non-operational lighting. Second and third shift personnel should report non-operational lights on their daily reports when they conduct patrols of the property. A procedure should be put into place to track non-operational light fixtures and repairs. Non-operational street lights at the perimeter of the property assessed should be reported to the local government office in charge of street lighting since private property benefits from the light these street lights provide.

Whenever possible, parking garages should not have solid concrete walls or large concrete columns because they obstruct line-of-sight which is a concern for parking patrons as well as law enforcement and security officers. Concrete walls with windows and cabling as seen in the photo below work well to “open up” the parking garage and decrease fear of crime.



(photo No. One taken by Marianna Perry)

Stair towers in parking garages can also have an open, visual design to increase casual observance from the street and people passing by. An example of an open stair tower that increases natural surveillance is below.



(photo No. Two taken by Marianna Perry)

In parking garages and parking lots, consider the use of electronic sensors to provide an effective solution for adjusting the entry and interior illumination when transitioning from day to night. In the event of a power failure, back-up generators can operate minimum lighting levels in parking garages and parking lots, but security officers or staff may need to increase patrol in these areas and/or provide patron escort service.

Another CPTED concept to consider with both parking garages and parking lots is landscaping. Dense vegetation can provide hiding places for attackers. High, dense shrubs and trees can provide excellent hiding places. Planners and parking managers should make sure that any vegetation surrounding parking garages or lots is thinned out and kept low so there are no hiding places and that the vegetation does not obstruct lighting. This approach is one of the concepts of CPTED. It is important to have a vegetation maintenance program so that trees and shrubs are trimmed on a regular schedule. Additionally, trees and bushes should not obstruct the line-of-sight of law enforcement and security officers patrolling the property or casual, natural surveillance of others in the area, particularly the areas next to parking garages and parking areas. Tree canopies should be trimmed up to 8 feet and bushes/shrubs should be no higher than

36 inches in height and should be set back 1 yard from walkways and trimmed below the window levels.

An area of concern in parking garages is the cut-away areas beneath the stairways in stair towers. These areas can provide hiding places for attackers, but this problem can be easily addressed with adequate lighting and chain link fencing as an inexpensive solution.

Video surveillance systems are commonly used in parking garages and parking lots to help monitor incidents and accidents, catch vandals and other criminals and to protect drivers. The goal is to keep vehicles and patrons safe. It's important that the parking garage or parking lot owner/manager know about any suspicious activities that might be occurring so they can be addressed. Video surveillance can help identify problem areas. Video surveillance is an effective tool, but it is important that the systems are actively monitored so that a security officer, law enforcement or parking attendant can respond to suspicious activity or a crime in progress. The purpose of having active video surveillance is to possibly deter criminal activity, have evidence for prosecution, reduce the fear of garage/lot patrons and to be monitored by someone who can intervene if there is an issue. If there are cameras that are not actively monitored, it may give parking patrons a false sense of security and if someone is the victim of a crime, it may increase liability for the parking garage or parking lot owner.

Some parking garages or parking lots have voice activated security sound systems and the area is divided into zones so that for example, if someone is attacked and screams, cameras record activity and security officers or law enforcement can respond to the exact location where there is a problem. A video surveillance system can be integrated with a security alarm system so that, for example, a door alarm can trigger a nearby PTZ camera to pre-position, aim at and zoom in on the person walking through the door. By utilizing motion detection, digital recording

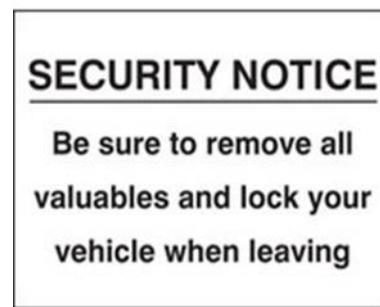
systems can alert personnel by initiating an alarm and a full screen view if a person or object enters the area monitored. Since intelligent video analytics measure/monitor changes in a digitized video scene and compare these changes internally utilizing an algorithm, analytics can help assist in detecting suspicious movement and also identify sounds such as screams, gun shots, a car alarm and can also detect a vehicle driving the wrong direction or speeding in the parking garage or parking lot. Uses can include facial recognition and the recognition of certain events and conditions, such as an unattended package or vehicle, or movement by an animal versus a human being. Video analytics utilizing license plate recognition can also be useful for investigations of criminal activity or accidents, but can also help to locate a patron's vehicle if they parked in a large multi-level structure or large lot and has forgotten where they parked or they have lost their parking ticket.

Thermal cameras are now more commonly used in parking garages and parking lots because they can detect things regular security cameras cannot. Thermal cameras pick up the heat from a person's body and can aid security officers and staff members when monitoring activity in the facility.

It is also important that the video surveillance system have exception capabilities so that audits can be conducted. For example, video can be used to count cars to verify that the number of cars parked in the parking garage or parking lot matches the number of tickets issued at the entrance. The manufacturers of video surveillance systems specify the amount of illumination needed for minimum function and for maximum performance, so it is important to keep this in mind when designing security for a parking garage or parking lot. Analog and Internet Protocol (IP) Cameras are both available in either black-and-white or color. Some analog cameras capture color images during the day and switch to black and white images at night. IP cameras

combine both a camera and a computer and use a network rather than a dedicated cabling medium to transport the video signal and they can be monitored from anywhere – such as a computer or a smart phone.

An excellent way to communicate with parking garage and parking lot patrons is through signage. Entrances, exits and pedestrian walkways should be clearly marked. To achieve a possible deterrent effect, install clearly visible signage (example below) indicating that the parking garage or parking lot is being monitored by video surveillance.



To help employees and visitors remember where their car is parked, parking garages sometimes utilize color to differentiate between different levels in the parking structures. This is an excellent CPTED example of using signage and wayfinding. See photos below.



(Photos taken by Marianna Perry 2020)

Another security feature that is found in parking garages and in parking lots are emergency phones that provide patrons with immediate access to security. Sometimes duress or panic buttons are also used for this same purpose. Video surveillance with analytics can be integrated into the emergency phone or duress button so security officers or parking facility staff can respond or alert law enforcement if there is a problem.



(photo taken by Marianna Perry 2020)

There should be initial and ongoing training with parking garage and parking lot management and staff as well as security officers. This training should include customer service, computer systems, financial responsibilities and emergency procedures. It's important that staff understand the owner or manager's expectations when interacting with parking patrons. In the case of a vehicle or pedestrian accident, a fall or other emergency situation, staff and management should be prepared to give life saving emergency care such as CPR and First Aid until first responders arrive on the scene. Some parking garages and parking lots are equipped with an AED (Automated External Defibrillator) to use in conjunction with CPR until medical professionals arrive. Consider also the Department of Homeland Security program, "Stop the

Bleed” training which is a national awareness campaign to encourage individuals to learn the life-saving skill of controlling bleeding to save lives and reduce pain and suffering.<sup>6</sup>

It’s critical that parking garage/parking lot owners and managers keep their facilities as safe and secure as possible. A security professional with experience in conducting physical and vulnerability assessments will be able to help ensure that there is the right mix of policies and procedures, people, physical components and technology in the parking garage or parking lot security program so that a “reasonable” level of security is achieved. The goal is not only to keep people and their vehicles safe and secure, but also ensure that people “feel” safe when parking or returning to their vehicles.

## **Six-Point Checklist for Lights & Lighting**

### **Introduction**

There is quite a bit of information that has been written about interior and exterior lighting. For example, there is one particular airport in the northeast that uses garage lighting that is motion-controlled and as a pedestrian or vehicle approaches the area, the light become brighter and then dims as the pedestrian or vehicle exits the area. What a great energy saving idea.

1. Companies today are saving thousands of dollars annually by installing cost-effective LED lighting. When we conduct assessments, we always tell management how to save money as well as how they should spend it.
2. Exterior lighting should be placed in weatherproof, tamper-resistant fixtures. Fixtures damaged by weather and vandalism can increase lighting costs and cause havoc to the lighting budget.

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<sup>6</sup> Stop the Bleed. Retrieved on July 10, 2020 from: <https://www.dhs.gov/stopthebleed>

3. Lights that are ON during the daytime should be replaced or repaired. Check the timers and consider installing dusk to dawn sensors.
4. Non-operational lights should be completed within 24 hours.
5. Illumination levels should meet local and national organizational recommendations.
6. Interior and exterior emergency lighting needs to be checked daily as part of the lighting inspection process. Lighting should be uniform and designed in such a way as to avoid shadowy areas and ensure an average luminance level that is sufficient for the risk level of the particular location.

### **Signs and graphics**

Careful placement of signs and graphics helps orient patrons and allows them to move quickly in and out of the parking facility, making them less vulnerable to attack. Color coding and/or unique memory aids also help patrons quickly relocate their parked vehicle when they return to the facility. Signs and graphics can also assure patrons that their safety is being monitored. Likewise, potential perpetrators may be deterred by a notice that they are under surveillance.<sup>7</sup>

**Keywords:** CPR and First Aid, Lighting, both parking garages and parking lots, energy saving idea, license plate recognition.

**Abstract:** There are no Guidelines for Parking lots and Garages, several cities have Building codes but overall they use an architect who has built several Garages and work with the Director of security as to what he wants inside his garage. Only articles like the above.

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<sup>7</sup> Crime Prevention Through Environmental Design in Parking Facilities April 1996 by Mary S. Smith