Partnership Alliance for Safer Schools

WHITE PAPER: Ways to Improve School Parking Lot Safety

The volunteers who make up the Partnership Alliance for Safer Schools (PASS) bring together their research and expertise from the education, public safety, and industry communities to develop and support a coordinated approach to make effective use of proven security practices for schools. They are the same volunteers who have dedicated their time to develop these white papers.

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We only facilitate the alliance that has come together under a shared vision: Making all schools safer is both achievable and urgently needed.

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KEY TOPIC

Best Practices for Establishing a Safe and Secure Parking Lot Perimeter

PROBLEM SOLVED

Parking lots are prone to accidents, injuries, and deaths. These spaces can also be venues for various incidents such as falls, theft, vandalism, and assault. Schools, in particular, often encounter significant safety challenges within this area. To mitigate these risks, schools must establish processes and implement solutions to enhance the safety of drivers and pedestrians. This white paper provides an overview of the K-12 parking lot landscape and offers informative insights for addressing safety concerns.

RELEVANT PASS GUIDELINES SECTION/S

District-Wide Layer

MOST RELEVANT FOR:

- School administrators and safety officers.
- Government safety administrators.
- Public safety personnel.

TIME TO READ

16 minutes

Introduction

Staff, students, and visitors park their vehicles or arrive and depart by bus or other means at the parking lot perimeter, which should always be clearly defined, just like the property perimeter layer.

In many cases, this area is where schools experience the most safety issues. For example, according to the National Safety Council, an average of 50,000 crashes happen in parking lots and garages every year, causing more than 60,000 injuries and 500 deaths.

When analyzing this data, the National Highway Traffic Safety Administration estimates that over 200 American children are killed annually, and another 5,000 are seriously injured by motor vehicles in non-traffic locations.

Parking lots present a particular risk, especially for school-aged young people. When you consider a high school parking lot, there will be many young people who, due to inexperience, may not be able to react properly or be aware of the safety concerns. Falls, theft, vandalism, and assault are just some of the other events that can take place in these areas. Below is information that is helpful when addressing parking lot life safety components.

Policies and Procedural Components

Effective management of school emergencies requires training, preparation, and planning. Schools are responsible for anticipating and preparing to respond to a variety of emergencies.

Below are various policies and procedures that will help empower the district, students, and staff to respond in an emergency:

Analyze the risk in the parking lot

Like any organization that invites people onto its property, schools have an obligation to provide a reasonable level of security to mitigate risks. A parking lot is a very complicated space, and the risks need to be evaluated due to the danger to students, teachers, and staff. An ongoing process should be established for identifying, evaluating, and prioritizing risks and areas of weakness within the parking lot layer that could have adverse consequences for individual schools and school districts. This can be done by conducting a walk-through of school grounds and facilities and looking at existing crime and school incidence data. The goal should be to design a system of accountability with measurable activities and timelines to address risks that have been found.

Self-assessments are appropriate and should be done by various district stakeholders who oversee the exterior areas of the facility. A well-thought-out parking lot will reduce liability costs to the school district while keeping students, staff, and visitors safer. It is critical to evaluate the needs of your school parking lots to identify any possible safety issues and to pinpoint problematic heavy traffic areas. Evaluation of the risks in parking lots should be completed often and consistently. It is important to consider the different seasons' impact on parking lot safety. Slips, trips, and falls are typically very costly to school districts, and school districts can mitigate risks by analyzing pedestrian and vehicular traffic to address concerns when seasons change.

Additionally, schools should consider before—and after-school activities, special events, and other concerns that may impact the facility's safety and security. It is important to analyze teen drivers' driving habits during lunch and other off periods.

Create grounds- and facility-use policies for outside and public groups

These policies protect schools and promote the facilities as assets to the community in many ways. While buildings and grounds are maintained primarily for the purpose of educating students, most school boards recognize that district facilities are a valuable community resource and believe they should be made available to the community for uses that will not interfere with educational activities or disrupt district operations such as renovation, maintenance, and/or sanctioned after-school activities.

Provide security training for staff and volunteers

It is critical for a school district to empower staff and the community with security awareness in and around campus, including the parking lot perimeter. Early detection of a security threat generally relies on such measures as behavior-based surveillance (e.g., whether a person is acting oddly, dressed oddly, or out of place). This can be accomplished by students, staff, volunteers, and parents. It requires that the school community embraces the "See something, say something" mentality through an official program or other means, and people should be generally aware of their surroundings. This concept can be applied to the parking lot layer, especially where staff, students, and parents often begin and end their school days.

Staff, volunteers, and parents should also receive training on the proper flow and control of traffic in parking lots during drop-off and pickup times to help reduce the risk of vehicle-pedestrian accidents. While these Tier 1 measures are little to no cost, they can be some of the most important steps a school district can take to improve safety and security.

Assign staff to periodically check the parking lot

Staff such as administrators, teachers, and custodians assigned to check the parking lot should be equipped with radio communications back to the office. They should also be empowered to initiate an emergency protocol for the school if they detect a threat outside of the building and should be equipped with crisis de-escalation training for dealing with the public. Many districts will also assign a trained staff member to provide persistent patrols. These staff members should be on duty to patrol the exterior of a school, including the parking lot perimeter, at all times during normal operating hours to ensure that safety rules and other practices are being followed and to check for unauthorized vehicles in the lot.

The greatest benefit of having a person dedicated to this task is that they can focus solely on possible exterior threats to the facility. An assigned staff member should be equipped with radio communications and fully trained as a security officer. They should also have a tablet or other portable device to access data such as parking pass registrations and student information, as needed. The device should also provide access to camera feeds and security system information.

Create parking tags

Parking decals, stickers, or numbered hang tags should be provided to staff members and regular volunteers and prominently displayed on their vehicles; however, for employees' protection, these items should not display any information identifying the employee or their position. A numbering or lettering system would be the best deployment.

Architectural Components

Parking lots should have visual access from the main office area for staff to be able to observe vehicles and their occupants as they approach the building. If direct visual access is not possible, video surveillance capabilities should be employed to supplement situational awareness.

Here's how school districts can improve visual access to the parking lot:

Apply Crime Prevention Through Environmental Design (CPTED) principles to enhance natural surveillance

Establish clear sight lines from perimeter windows to the parking lot by removing or trimming vegetation. For new construction, landscaping should be planned with clear sight lines in mind. CPTED principles should never hinder the ability of drivers and pedestrians in the parking to navigate the parking lot layer safely.

Clearly mark drop-off and pick-up areas

During any given school day, arrival and dismissal are typically the busiest times of the day in a school parking lot. During these periods, school parking lots fill with parents, buses, and students and parents on foot. It is important to clearly mark traffic flow. This can be done with clear signage, parking lot painting, and stenciling. Basic wayfinding from the perimeter parking lot should be clear from any point within it.

Signage is the most direct means of guiding building users and visitors to the appropriate entry point. Signage is enhanced by indirect cues provided by thoughtfully designed landscape walkways, crosswalks, and architectural elements at the desired building entry points.

Control speed in school parking lots

Signage is very important in school parking lots to notify drivers to be cautious at all times. Without directions provided, school parking lots with pedestrian and vehicular traffic challenges can be chaotic. Speed limits must be clearly marked, and components such as speed bumps and bollards must be installed to encourage slower speeds. This will also enhance the safety awareness and reactions of both pedestrians and drivers.

Signage and bollards should be installed at a height of 24 to 48 inches. If installed in the ground, signage should be anchored to prevent tipping. Also, it should not be fortified to withstand a car hitting it since this could cause significant damage to a car and/or even injury to occupants if their car were hit.

Implement annual assessment for lighting

A safety and security assessment of lighting based on industry and local standards should be performed annually.

Communication Components

Communication needs within the parking lot (or garage) area are similar to those within the property perimeter layer. This layer is not normally attended by students, staff, or visitors except for very short periods of time. However, it still needs a communication mechanism to ensure that all persons within it are notified of a threat.

Here's how districts can improve parking lot communications:

Install wide-area Mass Notification System (MNS)

Many districts are also adopting wide-area mass notification for emergencies. The parking lot layer is considered to be within the area of a wide-area MNS. A wide-area MNS is similar to weather emergency sirens, with which many are familiar. The intention is to provide a distinct signal to large areas within the school property to quickly inform the persons within the parking areas that a threat is imminent. Recent advancements in wide-area sound technology give districts the ability to use large speakers to provide a clear and intelligible message to parking areas easily. This technology can also be integrated with an emergency paging, fire alarm voice communication, and/or intercom system. It is essential for the school district to work with its MNS system integrator when evaluating the use of the system and testing it on a regular basis.

Utilize two-way emergency communication systems

Many districts have installed emergency two-way call-for-help systems in parking lots, especially at high schools and stadiums. Depending on the size of the school campus, a parking lot area can encompass a vast amount of space that is difficult to monitor, providing a setting susceptible to threats. It is important to have two-way communication, allowing the persons in the parking lot space to communicate with the district security team quickly.

Two-way emergency phones provide locations from which a person can communicate with the district's security team. These emergency phones are normally placed strategically and in sufficient numbers so that one is accessible within 200 feet of any location within a parking lot. These devices also can integrate with the video surveillance system to allow for audio and visual communication with security personnel. The use of this technology is particularly important within large campuses that have multiple parking areas.

Audio and video emergency call boxes have been popular and effective technology deployments for maintaining safe school campuses. While more prevalent on college campuses, many K-12 schools also realize the benefits of utilizing video call boxes for emergency situations and, in some cases, access control. These same call boxes can also be configured to work 24/7 beyond access control, where someone who may be in trouble is utilizing the grounds and could access the call box to call for help.

Most two-way emergency phones can be unified with other security systems. Such devices can be easily configured to send out emergency messages from the MNS and use a visual indicator atop the device to represent a threat visually. Districts are encouraged to investigate and implement this technology to ensure baseline two-way communications and allow a wide-area MNS to provide clear and intelligible messages to the persons within the parking lot layer.

Access Control Components

Access control may or may not be required at the property perimeter parking lot entrance, depending on risks specific to the property's geographic location and where the access point(s) is located. As appropriate, and after an assessment determines it is necessary to do so, gates can be left open during school drop-off and pickup times. Note—In some locations, particularly urban settings, access gates must be placed within the parking lot perimeter due to space constraints.

Here's how access control to the parking lot can be improved:

Use electronic gates

Manual gates to control access to the property must be physically unlocked and opened by staff at the beginning of open hours and likewise physically closed at the end. To get around this, some school districts will deploy electric gates to control access. Electronic gates can be installed at each entry point and include features such as intercom voice communication to the front office for vehicle entry and card access for staff and authorized visitors. Barrier gate systems can be very effective when integrated with an access control system.

Barrier gates should operate very quickly, especially for parking lots and areas with a lot of flow. Barriers should be made of material that will not damage a vehicle or cause injury from impact; however, schools may have to use slide-and-swing gates, which by nature are reinforced and impact-resistant and, in turn, could cause damage to an inexperienced driver's vehicle and injury to the driver themselves.

Barrier gates can be integrated to work with a district's access control system. The preferred method can be using a proximity card to open the gate. This can be the same access card that is used by the district to open other access doors in schools. Cards can be programmed to work only with the gate card readers so that they could be issued to students. Sole keypad entry is possible but is less secure, as codes can be easily shared. Automatic vehicle identification systems can also be used. This type of device requires little or no interaction by the driver since a system reader will read the radio frequency signal as a vehicle approaches. This is often the safest type of system for pedestrians because the driver is not distracted.

Video Surveillance Components

Whenever people and vehicles are combined in a confined area, the rate of accidents increases. As a result, parking lots are some of the most dangerous areas on school grounds. Video surveillance of this area should incorporate wide-area coverage to record general activity and include cameras that can record resolutions that meet the identification guideline for specific pickup and drop-off areas. Video surveillance is one component that can be used to mitigate risks for school parking lots by providing surveillance, assessment, forensics, and risk mitigation as defined in the district layer of the Guidelines.

Today, there are many different capability levels available in video surveillance equipment. Establishing an "operational requirement" for each camera deployed ensures the selection of equipment appropriate to the specific uses for which it is intended. These operational requirements are defined as:

- Detection- The ability to determine whether a person or object is in the field of view of the camera.
- Recognition- The ability to differentiate and classify people and objects in the field of view of the camera (e.g., man or woman, child or adult, red or blue jacket, two cars, one truck).
- Identification- The ability to identify specific individuals or objects where present in the field of view of the camera (e.g., John Smith, a 2009 Toyota Camry, a license plate number).

The parking lot perimeter can be improved if schools:

Employ fixed cameras, wide-area coverage

Fixed cameras provide video surveillance of outdoor activities taking place in the camera's field of view. Cameras should be rated for outdoor use to prevent the ingress of dust or water and should be environmentally rated to function in upper and lower temperature ranges. The field of view should overlap the desired coverage area by at least one meter (when applicable) to ensure that the surveillance, assessment, and forensics use cases are met.

In some cases, cameras can be mounted directly on the building that houses the system's recording devices; this is the most cost-effective approach but can limit the field of view. Other mounting options include adding cameras to new or existing lighting poles around the property perimeter or on other buildings on the school property, such as athletic or maintenance structures.

All these mounting options present the challenge of transmitting the video data back to the facility where the video is recorded; this is accomplished through wired or wireless transmission, each with its own cost and technology limitations.

Choose wide dynamic range cameras

These cameras are used in outdoor placements where the field of view includes areas that have a range of lighting conditions, from bright light to dark areas. Wide dynamic range cameras can process both areas in the field of view differently, providing images that meet the operational requirement and use case.

Include people identification field of view at pick-up/drop-off area

Use video surveillance to cover the specific area where children are released to their parent or guardian, which will ensure that the school has a visual record of the person to whom a child was released. An ideal situation would be to pair this camera with a fixed camera wide-area coverage field of view also to record details of the vehicle used by the parent or guardian. A higher-resolution camera with a wide-area lens can sometimes provide both.

These cameras should be specified to meet the operational requirement of identification defined above, rated for outdoor use to prevent ingress of dust or water, and environmentally rated to function in both upper and lower temperature ranges. They should also include wide dynamic range sensors to ensure image usability.

Implement loitering detection analytics

This technology for risk mitigation use proactively notifies school security personnel when triggered. A parking lot poses a unique challenge with loitering on school property since it is a common-use area between known (students, staff, faculty, and parents) and unknown individuals.

Video surveillance analytics can help mitigate the risk of loitering before it escalates into a more serious problem by alerting school security personnel that someone may be loitering in a specific area and initiating a response, if required. Implementation of this technology should follow the manufacturer's guidelines for camera selection and placement.

Utilize pan-tilt-zoom (PTZ) camera coverage

PTZ cameras provide a means to proactively assess a specific area of interest by remotely moving the camera's field of view and focal length. This requires personnel manually operating the camera in response to an incident alert. For this reason, PTZ cameras are a great tool for assessment and surveillance use cases. They are of limited use if you do not have an operator but can be set to act as a fixed camera for a specific field of view when not being controlled.

In some cases, PTZ cameras are set on a "guard tour," moving from one preset position to the next and providing video coverage of that area for a set amount of time. This way, one camera can cover multiple areas, but there is always the risk of a missed incident if the camera covers a different area than that of the incident. PTZ cameras should be rated for outdoor use to prevent

ingress of dust or water and environmentally rated to function in upper and lower temperature ranges. They should also include wide dynamic range sensors to ensure image usability.

Integrate audio analytics

Audio analytics involves the use of sensors and software that can detect and identify specific acoustic signatures of threat indicators, such as audible alarms and aggression or panic in people's voices. This technology can be loaded directly on the camera (as most network cameras already include a microphone), providing a dual-sensor technology capability within the same coverage area or by using stand-alone devices that provide additional types of sensors. When triggered, an alert can be sent to designated safety and security staff to review the video and determine if a response is required.

If incorporated on a camera, audio analytics are not limited by its field of view, so in some cases, a trigger may require other means to verify a threat. Many assaults are immediately preceded by a verbal argument, which can trigger audio analytics and possibly provide a timeframe for staff to respond before violence occurs. False alarms can be frequent with aggression and panic analytics since they can be triggered by children playing aggressively or shouting. Implementation of this technology should follow the manufacturer's sensor selection and placement guidelines.

Implement speeding car violation analytics

Speeding is a major factor in a large proportion of crashes, injuries, and fatalities on school grounds. Some video management systems have speeding vehicle analytics. The systems can be helpful in detecting dangerous driving behaviors of students, especially in high school parking lots.

Employ license plate recognition (LPR) and data integration

LPR technology uses specific camera fields of view to cover entry points for vehicles so that license plate data can be recorded. LPR solutions can provide the ability to enter license plate information for vehicles in areas where notification to safety and security staff is needed upon entry, such as for vehicles belonging to individuals involved in custody issues, for example.

License plate data can also be processed through criminal and sexual offender databases to provide security and safety personnel with an early warning when a related vehicle enters the property. Local laws and regulations may require sworn law enforcement personnel to be on staff to allow the use of criminal and sexual offender databases. Implementation of this technology should follow manufacturer guidelines for camera selection and placement.

Consider various means of video management

There are Artificial Intelligence (AI) programs that can detect weapons on school property by analyzing video streams from surveillance cameras in real time. AI can possibly identify visible weapons and can also detect components of weapons. When a weapon is detected, AI can send an alert to school officials and local authorities. For AI to be successfully utilized, it is important for school decision makers to test and vet the technology. They must ensure that the school's video management system is capable of efficiently detecting visible weapons and components. This also includes determining the best policies, emergency procedures, and potential integrations and interoperability with other life safety components. A pilot project is a good way for districts to evaluate new security products, particularly enhanced technologies such as AI, prior to full-scale implementation. This allows the collection of data on its performance, refinement of processes, and even finding additional beneficial uses. Many manufacturers and integrators will provide products and services that can be tested by end users in a small, controlled location before they are deployed on a larger scale. PASS encourages end users to "try before you buy" when it comes to enhanced technologies to ensure that the technology or service will work with their district security posture and systems.

These are emerging technologies considerations and not current PASS Guideline components.

Conclusion

In closing, we covered the recommendations of the Partner Alliance for Safer Schools for the parking lot layer. Let's review some basics for addressing life safety components at your school.

It is important to realize that those visiting your school parking lot may not be aware of the layout and nuances of the area. Use signage to guide pedestrians and drivers to be safe. Many schools will also implement a communication plan to periodically educate the staff, students, parents, and community about the parking lot safety plan. It is important to realize that every school parking lot is different, and it is important for you to carefully consider the plans that you implement to create a safe school parking lot.