Designing safer schools

School safety expert Paul Timm advises on design elements architects can incorporate to improve school safety.

Schools are intended to be a safe place, fostering a sense of security among students. But balancing a welcoming environment with security measures to protect the school and those inside can be difficult, especially with the startling number of incidents that schools report each year.

Bully, violence, theft and vandalism are among the potential threats schools face. The National Center for Education Statistics reported that in 2015, among students ages 12-18, there were 531,900 violent victimizations. This includes simple assaults, aggravated assaults and rape. Within the same time, 309,100 thefts occurred. The good news is these incidents have dropped over the past 27 years. The rate of violent victimization at school declined overall from 68 victimizations per 1,000 students in 1992 to 21 per 1,000 in 2015. Thefts at school declined from a rate of 114 per 1,000 students to 12 per 1,000. But with nearly half of schools reporting some type of incidents, schools must continue to take action.

Faculty and staff are not alone; many architects and building designers keep security and safety a top priority with designing schools. While they are not directly involved with safety procedures or school policy, architects are able to make a big impact on safety and security through design techniques.

CPTED

Crime Prevention Through Environmental Design (CPTED) considers physical and psychological aspects of a facility's design to help reduce opportunities for crime to occur. At its core, this strategy is designed to prevent crime by increasing the perceived risk of being caught or making it more difficult for a threat to occur.

"Many security professionals are interested in CPTED," says vice president of Facility Engineering Associates (FEA), Paul Timm, PSP. "But CPTED concepts and principles can vary. Some practitioners follow as few as four principles, some follow as many as 12. The four that I focus on are natural surveillance, designed access control, border definition and maintenance."

Natural surveillance

Improving the visibility of potential offenders increases their perceived risk. Offenders don't want to be seen and they definitely don't want to be caught. Designing for clear sight lines means less opportunities for them to lurk or go unnoticed. This can be achieved by adding windows and improving lighting. Avoiding sharp corners and design elements that create blind spots can also improve natural surveillance.

This extends beyond the physical structure to include vegetation. Timm recommends that shrubbery at the entrances, parking lots and walkways should not be more than 3 feet tall. And tree limbs near these areas should be trimmed at least 8 feet above the ground.
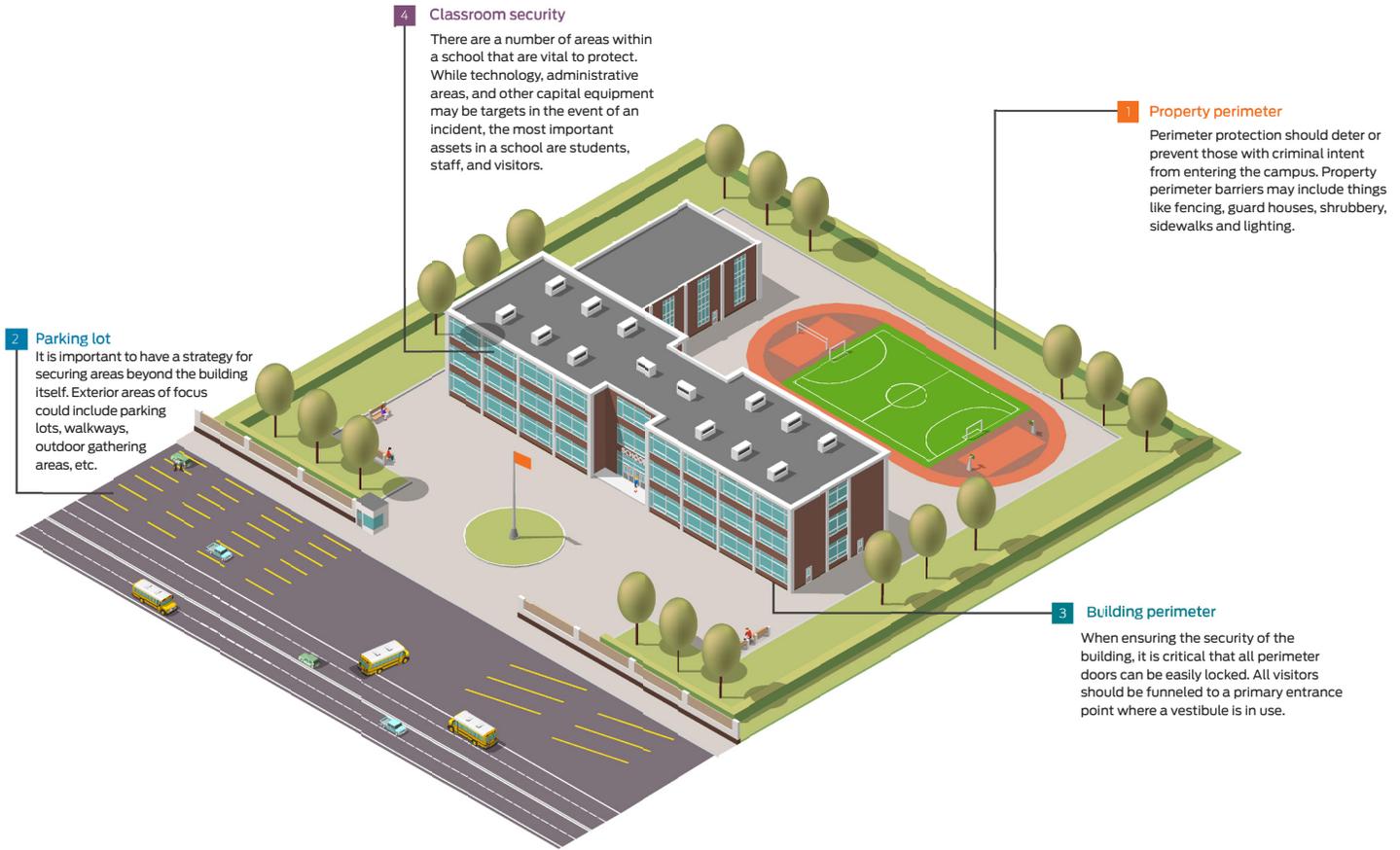
Designed access control

Designed access control, also known as natural access control or way finding, differentiates between public and restricted spaces. This is achieved through the placement of signs, designated walkways, labeled building entrances, gates, vehicle barriers or even landscaping. The goal is to control the flow of access to approved areas.

"People are more likely to follow a predetermined path if it is well-marked," says Timm. "Within the parking lot, there should be a pedestrian walkway to lead visitors to the main school entrance. It directs them to the approved area, but it also alerts drivers that people may be walking there."

> **CPTED**
> Crime Prevention Through Environmental Design (CPTED) is defined as a multi-disciplinary approach to deterring criminal behavior through environmental design. CPTED strategies rely upon the ability to influence offender decisions that precede criminal acts by affecting the built, social and administrative environment.
>
> – As defined by the International CPTED Association

4 Classroom security
There are a number of areas within a school that are vital to protect. While technology, administrative areas, and other capital equipment may be targets in the event of an incident, the most important assets in a school are students, staff, and visitors.

1 Property perimeter
Perimeter protection should deter or prevent those with criminal intent from entering the campus. Property perimeter barriers may include things like fencing, guard houses, shrubbery, sidewalks and lighting.

2 Parking lot
It is important to have a strategy for securing areas beyond the building itself. Exterior areas of focus could include parking lots, walkways, outdoor gathering areas, etc.

3 Building perimeter
When ensuring the security of the building, it is critical that all perimeter doors can be easily locked. All visitors should be funneled to a primary entrance point where a vestibule is in use.

Border definition

This is also referred to as territorial reinforcement and is another way to make the distinction between private and public property. People tend to protect what is their own. Using fences, sidewalks and landscaping, property owners can display their ownership and deter potential offenders. No trespassing or private property signs are common, as well as those that indicate a security system is currently in place.

Three principles are defined here, but there are more that architects may find beneficial, like designing for unsafe activities to happen in safe places. If you know that issues like drug dealing or fighting tend to happen on the basketball court, design for that to be in a highly visible area.

CPTED principles usually can be implemented at little to no cost, especially when designed upfront. "Architects have the opportunity to improve natural surveillance without breaking the bank," says Timm. "They may not need to hire additional people or install more cameras."

However, Timm points out that CPTED is only one element of physical security. These measures are a deterrence, but they often cannot fully prevent a crime from occurring. For him, it comes down to the three Ds: deterrence, detection and delay. Deterrence is a combination of the CPTED strategies and other elements that discourage a potential offender from acting. For detection, Paul encourages cameras, communication systems, electronic access control — anything that alerts the school that something needs to be addressed. Delay includes anything that keeps people from quickly gaining access to where they want to go. This includes door locking mechanisms, vehicle barriers and secure vestibules. Lastly, Timm recommends that the school address the response plan, looking at who is qualified, positioned and equipped to react in an emergency.

Layered security

Architects should also consider a layered security approached when designing schools. Layered security works from the outside in. As one layer is bypassed, another layer

provides an additional level of protection. The asset being protected is at the center of the layers, which typically include:

- Perimeter and perimeter barriers
- Exterior
- Interior
- Procedural
- People
- Technology

Layered security combines measures that effectively deter, detect and delay adversarial behaviors.
For example, architects that design for a layered approach to security help better control traffic and funnel visitors into the main office. This is achieved by incorporating elements mentioned above for natural access control and securing the building perimeter openings. From there, visitors enter a secured vestibule that has the appropriate access control specified so that school personnel can determine who is granted access to the school.

"The goal is to let people know all the way at the property perimeter that there are certain measures in place that restrict access," explains Timm. "Start with border definition on the outside, which ensures people have to walk or drive through approved areas. Once they get past that layer, the building should be locked at each exterior opening except for the visitor entrance. Ideally, that opening is only accessible after pushing a button or some method of authorization by the staff. From there, they enter a secure vestibule, sign-in or register as a visitor and are escorted throughout common areas of the school."

All of these layers of security are intended to protect the most important layer, the classroom. As architects design schools, they should consider how each layer could be more secure. Depending on the level of security, a school may need an intercom at the main entrance along with mechanical locks and exit devices. Schools looking for a more advanced approach might request cameras and electronic access control with a door position switch. It is important to understand the level of security that is needed. According to the Partner Alliance for Safer School (PASS) guidelines, these are referred to as tiers. Schools should develop a security plan for each layer, then decide which tier is needed for each level.

Designing security measures from the beginning allow architects to create safe learning environments that are also aesthetically pleasing. After all, students should think of their schools as a safe, welcoming place. By understanding these approaches to school security as well as the specific needs of the school, architects can more easily blend security into the overall aesthetics.

There are many resources available to architects like first responders, fire marshals, local law enforcement officers and physical security professionals. Collaboration upfront with security experts, law enforcement and the school administration is beneficial for all parties. Together, they will ensure best practices are in place for a safe and secure school. Allegion architectural hardware consultants are also available to help.

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