For the University of California-San Diego's Health Sciences 2 Research Laboratory Building, ZGF Architects used a mix of lighting techniques to enhance safety. Occupancy sensors control lighting use in labs and offices. The ground-floor lobby is on a timer so that it can be illuminated at night. For security purposes, exterior pathway lighting is operated via photocell controls. High-efficiency LED fixtures offer energy savings.

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fortifying the ramparts

HOW SECURITY IS INFLUENCING CAMPUS DESIGN AND CONSTRUCTION

Campus crime—whether real or perceived—presents Building Teams with more opportunities for early-stage consultation with university clients.

BY JOHN CAULFIELD, SENIOR EDITOR

These days, news about colleges and universities is as likely to be about the latest shooting incident on campus as it might be about academic matters. The active shooter incident at Florida State University last November was the 12th such event on a college campus in 2014.

Shootings get the headlines, but there’s a steady flow of crime on campus. In 2013, the most recent year for data collected by the U.S. Department of Education, there were 23,913 burglaries, 4,468 robberies, 4,668 aggravated assaults, 3,613 forcible sex offenses, and 6,121 motor vehicle thefts reported on college campuses, to say nothing of the 1,926 arrests for illegal weapons possessions. As of mid-December, the Justice Department was investigating sexual assault cases on 90 campuses nationwide.

Given that there are roughly 41 million students are enrolled in more than 4,000 colleges and universities in the U.S., these crime statistics pale beside the mayhem in most cities. Comparisons of crime data clearly show colleges and universities to be significantly safer than the cities and towns that surround them.

But the placid image of campus life as somehow shielded from society’s dangers isn’t what it used to be, at least in the minds of university administrators, faculty, and college students and their parents. Incidents of lawbreaking and violence still spark headlines, leading college administrators to refocus on devising ways to reduce potential threats to students, their parents, faculty, staff, and visitors.

The renewed attention administrators are giving to security is providing AEC firms with the chance to wedge a little deeper into the
doorway as early-stage consultants for planning, design, and construction. AEC firms can help colleges and universities balance making campuses safer without superseding the open exchange of ideas and information that is at the core of their mission.

Firms that serve this sector—which College Planning & Management magazine estimates spends $10 billion–$11 billion annually on new buildings, additions, and renovations—can't afford to be nonchalant about safety and security, which are now dominant factors in the design, construction, and upgrading of campuses across the country.

"Campuses are building all the time, and there are opportunities to prepare a structure for this type of threat," says Frank Pisciotta, President of the Raleigh-based security consultancy Business Protection Specialists.

To succeed in these environments, AEC firms must find ways to navigate the choppy waters of academic bureaucracies whose constituents aren't always tackling the same way when it comes limiting access to campuses or buildings, or spending money on ultra-sophisticated surveillance and alarm systems. The good news is that administrations are breaking down their departmental silos to develop integrated security standards.

A growing number of colleges and universities have organized security committees to make those decisions. Public safety and IT personnel on these committees are having a greater influence than ever before on what gets built or installed, where, and for how much. "Everything we build has a security component," says Frank Dames, Interim Chief, Office of Safety and Security at Georgia Washington University in the nation's capital.

Jeff W. Fields, PSP, CHS-III, an Atlanta-based security consultant, says that universities are more likely these days to take seriously the advice of security experts when it comes to evaluating the strengths and weaknesses of their campuses' public safety programs. That's a far cry from what he calls "the bad old days" of the mid-1990s, when Fields couldn't convince one client—a college with railroad tracks running 60 feet from its residence halls—to improve its perimeter lighting and alter its pedestrian traffic patterns.

When it comes to public safety on campuses, however, it appears that AEC firms are more the rhythm section than the lead guitar. They're usually not sitting on those security committees—and Fields wonders if these firms would add much to the deliberations. Even when it can be demonstrated that good design can enhance campus safety, some administrators balk at the expense, says architect Randall L. Atlas, PhD, AIA, Vice President of Atlas Safety and Security Design. "You can't get drawings approved..."
without a fire marshal reviewing and signing off the plans for NFPA 101 compliance,” says Atlas, a Certified Protection Professional with the American Society of Industrial Security. “But ask for break-resistant glazing, ground-floor protection, video surveillance, good lighting, proper landscaping design, good circulation patterns, roving patrols, or access control, and you’d think you were asking for a nuclear reactor.”

Atlas’s frustrations notwithstanding, administrative intransigence has been waning, partly because campus crime statistics are glaringly available for students and their parents to scan. Plenty of colleges and universities have moved safety and security to their front burners and are looking to experienced AEC firms for guidance.

Take New York University, which Security magazine ranks second among the nation’s securest campuses. Nestled in New York’s Greenwich Village, NYU owns or leases 110 buildings and 11 million sf of space. Alexis Roberts, NYU’s Senior Director of Site Strategies for Public Safety, told BD+C recently that the university was in the process of forming a security committee. Partnerships with AEC firms are a “major component” of campus crime prevention, says Andrew Repoli, Director of NYU’s Office of Construction Management. “They are at the table to ensure they understand what we require, and that it gets into the drawings.” While NYU’s public safety department has the final say, “there absolutely has to be a dialogue,” he says.

The University of Pennsylvania, ranked the safest institution in the nation by Security, has 600 architects in its database. David Hollenberg, AIA, Architect for Penn’s Facilities and Real Estate Services, says he meets with outside architects two to three times a month, but RFPs “are by invitation only.” What Penn looks for in its AEC partners, says Hollenberg, is their capability, record of design excellence, team intellect, and—perhaps most important—their familiarity with the university campus and the city of Philadelphia.

Penn has developed a 150-page engineering guidebook that Hollenberg says is “integral” to the planning process. But the university prefers to give the architecture firms it works with the latitude to pick their engineers and other team members. “There are no arranged marriages here,” he says.

Security consultant Pisciotta says AEC firms’ involvement in campus safety typically starts with assessing a project’s risk. Firms with professionals on staff who have qualified security credentials have a leg up. Pisciotta thinks AEC firms also could be playing larger roles in developing design and construction standards, especially in the area of design to manage a wide variety of facilities—residence halls, classrooms, dining halls, etc.—for safety and protection.

David Keith, AIA, LEED AP, Design Director and Principal with Clark Nexsen, says his architecture/engineering firm is most useful to those institutions that seek its counsel about master planning and site design, where safety issues such as pedestrian traffic flow and access control into and around buildings are first discussed.

Keith thinks early involvement would prevent blind spots or hiding places from creeping into a design that could potentially impede, or at least complicate, the safety and security of a building. Early involvement might also help change administrators’ “bunker” mentality that architects and safety experts say still serves as some colleges’ default safety strategy.

That sentiment is echoed by Joseph Collins, FAIA, NCARB, LEED AP, a Partner with ZGF Architects. “All too often, buildings on campus are thought of as islands in a stream,” he says. “The trick is to approach site infrastructure, landscape, and design as an integrated process.”

THE FIRST LINE OF DEFENSE: CHECK OUT WHO’S COMING IN

While different types of buildings require different levels of security, the design and construction of any campus structure are going to include security features that, in many cases, are determined by crime data and driven by technology.

Here’s a closer look at what colleges and universities have been asking their AEC partners to incorporate into new, renovated, and existing structures on campus:

Rigorous access control. Every expert interviewed for this article pointed to access control as the single most effective way to deter campus crime. The University of Pennsylvania is currently building a $127 million college house—i.e., residence hall—that will have 350 beds and only one
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entrance. (Bohin Cwynski Jackson is the architect; INTECH Construction, the construction manager.) Having that single entryway, says Hollenberg, "drove the design and was at the core of the planning."

When security consultant Fields heard about the active shooter who tried to penetrate a library on Florida State University's campus in late November, he says the first thing he thought was "Did the shooter get into the building, and was there controlled access?" Fields is convinced that altering traffic patterns to control and monitor access into buildings is considerably more effective security than installing bulletproof glass or sturdier door locks.

James Clark, Managing Partner, Clark Security Group, is a proponent of using lighting and physical structures to redirect pedestrian or vehicular traffic entering college campuses onto streets that are either patrolled or monitored by cameras. He notes that Disney and IKEA control crowds this way "and no one seems to mind." Clark says that the quadrangular layout of many structures built on campuses in the 1960s and 1970s actually made access control easier to manage.

However, colleges and universities are different from K-12 schools or office buildings in two distinct ways: first, as institutions of learning, they actively invite visitors to their campuses for interaction and

PREPARING FOR THE WORST: campus security since Virginia Tech

In late November, the Alabama Board of Adjustment denied a $1 million lawsuit brought by parents of an Auburn University student who was fatally shot on campus in March 2008. The victim's father said his main reason for suing the school was to push Auburn to reinstate its campus police department. The university had dissolved its police force in 2004 and contracted with the city's police department for campus protection.

This case highlights the potential liability attached to campus public safety programs. Seven years after the mass shootings at Virginia Tech and six years after a similar incident at Northern Illinois University, colleges and universities continue to shake up their emergency communications and response capabilities to shootings and other criminal threats. NIU is now among the many colleges that have systems to transmit alerts to students via email, text, social media, and announcement systems equipped with sirens.

State-mandated alert systems. Many states now mandate that campuses have active, sophisticated alert systems that are immediate and can reach a wide range of people. Within minutes of shots being fired outside Florida State University's Strozier Library last November, FSU police issued an alert to 40,000 students. It read:

"Dangerous Situation—Main Campus—Tallahassee. Seek shelter immediately, away from doors and windows." Tallahassee police swept in and killed the gunman, who had wounded three people.

Smartphone technology and application software have made transmitting mass alerts simpler. Kristina Anderson, a survivor of the 2007 Virginia Tech shooting spree—a 19-year-old sophomore at the time, she was struck by three bullets—co-developed LiveSafe, a GPS-enabled app that can be used to contact the police via chat, video, and voice. It has been in use at Virginia Commonwealth University, Richmond, since August 2013.

Electronic reader systems with personal PIN codes. These have become fairly common. The ID cards can also be used as debit cards. But what's becoming a "big deal," according to security consultant Fred Mielke, Senior Security Consultant, LynStear Engineering, is a new category called video analytics. This includes cameras that have been programmed to spot unusual movements and send out an immediate alarm, or video imagery that can be linked to images of criminals in police databases. All this technology is in the development phase.

Training and preparedness programs. Many security experts say that training students, faculty, and staff to be alert to potential threats is essential to any public safety program. The University of Pennsylvania conducts more than 200 safety workshops and forums each year for students, faculty, and staff. Since 2012, Bowling Green (Ohio) University has been training its campus community members about their options in an emergency through a program called ALICE—Alert, Lockdown, Inform, Counter, Evacuate.

Mental health intervention. More colleges and universities are bringing mental health and psychology experts into their public safety networks to help identify and assist at-risk students, faculty, and staff before things get out of hand. Shootings, arson, and rape may not be predictable, "but they are preventable," says Brian Van Brunt, President, National Behavioral Intervention Team Association, and Senior Vice President, National Center for Higher Education Risk Management.

One public policy issue of special concern to academia is the threat to privacy from the proliferation of camera surveillance on campus. In response, the University of Pennsylvania has restricted its surveillance to security and safety matters and may not intrude on private matters. It has established a monitoring panel comprised of students, faculty, and staff to address such questions as where cameras should be placed to protect privacy. Penn staff who monitor camera systems must sign confidentiality agreements and are prohibited from leaking visuals of, say, public student intimacy, to social media.

Are blue light towers—security systems in fixed locations that are equipped with phones connected directly to campus Public Safety—in danger of becoming superfluous? "Some colleges are pulling back from these towers because there are better ways to communicate with students and faculty," such as through cell phones and social media, says security expert Fred Mielke. He notes, however, that these towers, which can cost more than $8,000 each, still help Public Safety officials pinpoint a trouble spot. They also provide some degree of reassurance for students' parents.
dialogue; second, their campuses are often central to the social fabric of their local towns and cities. Consequently, faculty, administrators, and students often push back against design and construction practices that stifle the free exchange of ideas, or that create—or even seem to create—a wall between the institution and the community.

Urban colleges have the added burden of ambiguous boundaries that make unobtrusive security all the more difficult to execute. NYU—which has more than 11,000 access levels, depending on the building or room, says Roberts—will soon start retrofitting a 600,000-sf property in downtown Brooklyn, N.Y., into an academic center for its engineering and applied sciences programs.

The building, which was once headquarters for the Metropolitan Transportation Authority, has several subway lines running into it, so masses of subway riders and students will be flooding the area every day. The retrofit—from a design by Mitchel|Giurgola Architects—will also convert 14,000 of retail space. In addition to having a public safety officer posted at the entrance, students, faculty, and staff will have to use their ID cards to get through the security turnstile. In sensitive areas like laboratories, they will have to pass through an additional layer of security beyond the usual card swipe, says Roberts.

W.M. Jordan Company is building a new residence hall on the campus of Virginia Commonwealth University, in Richmond. The 399-bedroom complex, designed by Clark Nexsen, will have a common open space and an alleyway accessible to the public. First-floor retail and conference/meeting spaces will be available along one street. After considering several security options, says Keth, the design firm and the university came up with a compromise that will require students to use a card key to get through a gated area monitored by cameras. The residence halls will have only one entrance, with a manned security desk.

**Crime Prevention Through Environmental Design.** CPTED has been around for decades as one of the more elegant ways to keep unwanted from entering certain areas on campus. "Sometimes it's your only defense," says Chad Parris, President of Security Risk Management Consultants. That's especially true for urban campuses that have public streets running through them. The boundaries between town and gown can be "very porous," says Parris.

John Kieberg, a Consultant with Parris's company, describes CPTED as "design that incorporates interior and exterior security with territorial reinforcements that define the space." CPTED can take many forms, he says. It could be a well-manicured hedge that restricts or directs access. It could be uplifting a structure to make it harder for intruders to hide, while accenting the building's aesthetic features. It could be something as simple as a reception desk, says Kieberg, because a desk creates a manmade barrier.

Kieberg says that for campus landscaping to be most effective, it must not only be attractive, it must also regulate pedestrian traffic flow: "You don't want the campus to be like a bank: you want it to be open." He advises landscape architects and contractors to hold off laying sidewalks until they can see if students are taking routes that could put them in danger; if so, permanent sidewalks should be laid down along safer paths.

**There's consensus among experts we consulted that older buildings are harder and more expensive to trick out for security, especially when they've been added onto over the years. ZGF's Collins believes the easiest fix is to illuminate older buildings, rather than trying to redesign them. He says lighting should be an essential ingredient in making any place—from the residence hall lobby to a parking garage—safer for users. The advent of much more affordable, energy-efficient LED lighting has made objections to this solution for cost reasons less defensible, he contends.**

**Surveillance and alarm systems.** For parking garages, public safety experts and architects say lighting works best when used in tandem with white or reflective
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Point on the ceiling of each deck. However, most colleges and universities beef up their garage security with emergency call boxes, alarms, and surveillance cameras.

Security-related technology is pervasive on American campuses, and IT personnel appear to be assuming a much greater role in decision making about campus safety. That can be a double-edged sword, says Atlas, who questions how much IT people actually know about security.

On the positive side, IT’s higher profile in campus safety is pushing colleges to establish security equipment standards, which are important when replacing legacy systems. IT’s greater involvement is also helping to reframe the practice of decentralized procurement, which has left many campuses with a conglomeration of systems that can’t talk to one another.

The University of Pennsylvania has addressed the procurement problem by mandating that any new technology must be able to integrate with Tyco International’s Software House security management system, according to Maureen Rush, Penn’s Vice President for Public Safety.

After operating on multiple systems for decades, Ohio State University finally came up with a unified security platform, which Parris says it used on OSU—one of his clients—five years to develop. Only in the last two years has OSU’s medical center, which is autonomous from the university, attempted to integrate its security systems with the main Columbus campus.

Watching and Waiting: Cameras on Campus

Surveillance cameras don’t prevent crime. Nevertheless, camera surveillance is alive and well on America’s campuses. Many large universities have thousands of cameras at work. The University of Pennsylvania’s Public Safety division has access to 2,000 stationary cameras and 130 pan-tilt-zoom models.

Higher education’s reliance on cameras as a psychological deterrent and a forensic starting point for investigations is growing. “When technology is present and working, word spreads,” says Security Risk Management’s Parris.

New York University has been analyzing video to develop the appropriate alarm integration with its motion-activated cameras, says Roberts. Penn is experimenting with cameras that emit beams that, once broken, set off an audio alarm and take a picture of persons on the scene. The university is beta

Penn Strengthens Campus Security—by Reviving its Surrounding Neighborhood

In 1996, the University of Pennsylvania’s sprawling campus in Philadelphia was in the grip of an unprecedented crime wave.

While other universities chose to wall themselves off from their surrounding neighborhoods, Penn’s administrators, led by then-President Judith Rodin, decided that such a strategy wouldn’t work for their 280-acre campus. “The notion back then was, ‘If West Philly goes down, Penn would go down with it,’” says University Architect David Hollenberg, AIA.

So Penn doubled down on its investment in public safety. More important, it launched initiatives that addressed quality of life and security issues as well as housing and economic development in the surrounding West Philadelphia neighborhood.

The results have been striking. Crime in the 2.5-square-mile Penn Patrol Zone—which stretches from 30th to 43rd Streets, and from Market to Baltimore Streets—was down 49% from 1997 through 2012, says Maureen Rush, Penn’s Vice President for Public Safety and Superintendent of Penn Police. The last fatal shooting close to campus occurred last April, outside a bar unaffiliated with the university. For eight consecutive years, Security magazine has ranked Penn first among colleges and universities for public safety.

One bonus, says Rush, is that “all this produced community relations that Penn did not have before.” The campus holds monthly town meetings that are regularly attended by 60–70 local residents and business owners.

In a recent interview with BD+C, Rush, Hollenberg, and Michael Dauch, Executive Director of Design and Construction Management for Penn’s Facilities and Real Estate Services department, recounted the steps Penn took to secure its campus.

In 1996, the university hired 19 new police officers, installed 102 new blue light phones, and integrated its policing strategy with that of the Philadelphia police force. (The Daily Pennsylvanian reports that Penn spent $7 million on these actions alone.)

While other campuses were fencing themselves off from communities to thwart crime, the University of Pennsylvania created a public safety buffer zone beyond its campus into adjacent neighborhoods and formed security alliances with Philadelphia’s police force and other local colleges.
Penn's 180-building campus now has over 500 emergency phones and 116 sworn officers, according to its 2014 Annual Security and First Safety Report, which covers 2011 to 2013. Its PennComm Communications Center processes over 106,000 calls a year, including Walking Escort requests.

The university beefed up its security presence in 1996 by contracting with Allied Barton Security, which stations officers around the campus. (There are now more than 550 guards on site.) Penn created a buffer zone beyond the campus's patrolled area, which is supported by safety "ambassadors" who escort students and faculty to their cars and homes. This University City District includes security and communications partnerships with nearby Drexel University and the University of the Sciences.

But policing alone could not be the only answer to Penn's crime problems, says Rush. Equally critical was the introduction of its West Philadelphia Initiative, which focused on making surrounding neighborhoods safer and better places in which to live and work.

Those initiatives, says Hollenberg, included mortgage assistance programs for graduate students and faculty; the construction of a K-8 school, which Penn continues to support financially with a per-student donation of about $1,300 a year; and a $140 million investment in commercial development that drew retail stores and groceries to the community.

Penn is still improving its campus security. Rush says the university is in the midst of "Operation Building Safe," a university-wide communications system that includes "virtual concierges"—a video camera/intercom combination that allows Public Safety to remotely verify the identity of a person seeking entry to a building.

Rush's department also oversees "Penn Ready," an emergency preparedness and notification program that includes SMS and email messages, and 29 discrete sirens placed around campus for alerts. The ultimate goal: emergency lockdown capability, via Public Safety control of every door on campus. "We're moving toward that," she says.

dead spots that block or impede the transmission of alarms or alerts. ZGF's Collins says his firm uses repeaters whenever the design of a collegiate building calls for the installation of communications systems.

The pervasiveness of camera surveillance on campuses is also having an impact on building design. Some institutions—New York University is one, according to Repoli—are asking for straighter corridors, more interior visibility, and cleaner exterior site lines to enhance visual surveillance.

EVERYONE NEEDS TO MAKE CAMPUS SECURITY A PRIORITY

Taken together, these security measures would appear to be making colleges and universities safer. But any public safety program, no matter how rigorous or sophisticated, has limits.

Security consultant James Clark says that schools could be making better use of their campus security personnel. He says colleges and universities need to encourage students, faculty, and staff to report any unusual events to campus security, so that the burden of detecting potential crimes doesn't fall entirely on the university police force.

Architectural design and construction can play an important role in university security. Atlas says it's worth noting that the shooter at FSU was thwarted from getting into the library by something as simple as a turnstile and security desk at the entryway. "In that case, prevention turned out to be the cure," he says.

But it's still not clear how many colleges and universities will look to AEC firms as full partners in devising their public safety strategies, rather than simply viewing them as executors of building programs divided internally. AEC firms' best course might be to stay true to their principles and do their best to mesh those ideals with the institution's security priorities.

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