TECHNICAL APPENDIX

K-12 SCHOOL SECURITY ASSESSMENT TOOL

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ABBREVIATIONS

APL ..... Johns Hopkins University Applied Physics Laboratory

CISA ..... Cybersecurity and Infrastructure Security Agency

CCTV ..... Closed-Circuit Television

CPTED ..... Crime Prevention Through Environmental Design

K-12 ..... Kindergarten through 12th Grade

LE ..... Law Enforcement

LEO ..... Law Enforcement Officer

PASS ..... Partner Alliance for Safer Schools

SSAT ..... School Security Assessment Tool

SME ..... Subject Matter Expert

SSO ..... School Safety Officer

SRO ..... School Resource Officer

The effectiveness of the School Security Assessment Tool depends on the accuracy of the information collected and submitted to the Tool by users of the Tool. Accordingly, the U.S. Department of Homeland Security cannot make any guarantees or warranties as to the effectiveness of the Tool. The U.S. Department of Homeland Security does not endorse any person, product, service, or enterprise. References to specific agencies, companies, products, or services therefore should not be considered an endorsement by the U.S. Department of Homeland Security. Rather, the references are illustrations to supplement discussion of the issues. The Internet references cited in this publication were valid as of the date of this publication.

CHAPTER 1

INTRODUCTION

The purpose of the ***School Security Assessment Tool*** (SSAT) is to help schools create safe and secure learning environments without requiring the primary audience for this tool—i.e., school principals, assistant principals, facilities managers, and other staff involved in the physical security planning and implementation process—to be security experts. It provides action-oriented guidance to school staff by assisting them in identifying the physical security assets they already have in place and the gaps they have in their physical security system. The tool provides actionable results and relevant options for consideration that school staff can use to increase the overall benefits of the school's security system.

The SSAT recognizes that no two schools across the United States are identical, and that creating safe and secure environments that promote teaching and learning requires considering unique school attributes such as the size of a student body, student demographics, the location and physical layout of a school campus, and the age of a school, among other factors. It applies the systems-based approach described in the 3rd edition of the Cybersecurity and Infrastructures Security Agency's (CISA's) ***K-12 School Security Guide***, a companion product that can be used in conjunction with this tool to improve school physical security.

Taking a systems-based approach to school physical security means ensuring that various security measures across a school campus work together in an integrated way, and that planning incorporates the relevant policies and training programs that sustain the entire system and allow it to work effectively. A systems-based approach encourages schools to conceptualize physical security as a component of the broader school safety system, comprised of prevention, protection and mitigation, and response and recovery. The SSAT focuses on considerations that fall under the phases of ***protection*** and ***mitigation***. ***Protection*** refers to keeping people and property safe from threats and emergencies. ***Mitigation*** entails reducing the damage or harm that these safety-related incidents cause when they occur.

The SSAT also stresses that physical security—which falls under the scope of ***protection and mitigation***—is just one phase of a larger school safety system that also depends on successful prevention, response, and recovery efforts. Prevention efforts prioritize topics such as student mental health, school climate, and bullying, and decrease the chance that problems will occur at the school while improving the overall well-being of the school community. Response and recovery activities aim to stop or reduce harms from incidents and to restore a school's day-to-day operations while considering future needs. The tool provides suggested options for consideration to ensure that schools plan and implement their physical security system in a way that supports prevention as well as response and recovery strategies.

The SSAT addresses the three main physical security strategies of ***detection, delay,*** and ***response***. It prompts users to think through how their own school security system works to achieve each one. We define security measures that fall into these three strategies as follows:

- **Detection** measures communicate that a violent threat or incident is occurring or about to occur. Examples can include monitored closed-circuit TV (CCTV), security staff patrols, or open-sight designs that allow for natural surveillance.
- **Delay** measures increase the level of effort, resources, and time necessary for violent threats or incidents to occur. Examples can include fencing, reinforced window, staff patrols, or automatic lock mechanisms.
- **Response** measures contribute to overcoming violent threats or incidents or limiting the damage caused by an incident. Examples can include security guards, communication and notification equipment, or first aid kits placed at various locations throughout a school building.

In line with the systems-based approach described in the companion product, CISA's ***K-12 School Security Guide***, the SSAT asks users to think about the various components that might comprise their physical security system. Specifically, the tool asks users about:

Physical security equipment and technology

» E.g. CCTV, access control technology, automatic lock mechanisms

Site and building design features

» E.g. open-sight design across school grounds, interior design features such as hallway partitions

School security personnel

» E.g. dedicated security staff such as school resource officers (SRO), school security officer (SSO), or school staff playing security roles

Policies and procedures related to school security

» E.g. policies for responding to detected threats, policies against propping classroom doors open

Training, exercises, and drills

» E.g. training for students and staff on emergency procedures, training for staff monitoring security equipment

Different combinations of detection, delay, and response capabilities provide differing levels of security across diverse K-12 campuses and schools. The SSAT therefore guides users through thinking holistically about how various pieces of security equipment, site and building design features, personnel assigned to security roles, policies, and training programs work together across a school campus to detect, delay, and respond to threats.

The SSAT takes a layered approach to school physical security, asking questions about measures and policies in place at four distinct layers:

» The school grounds perimeter layer, or outermost boundary;

» The school grounds layer, which comprises parking lots, playgrounds, outdoor walkways, athletic facilities, and other features outside of school buildings and within the school perimeter;

» The school building perimeter layer, which denotes the outer boundary of a school building as well as satellite structures such as portable units and other detached buildings; and

» The school building interior layer, which encompasses the space inside school buildings, such as classrooms, administrative officers, common spaces, hallways, etc.

Figure 1.1 provides a visualization of how the SSAT conceptualizes a school's physical security layers.

FIGURE 1.1 | **ELEMENTS WITHIN THE SCHOOL PHYSICAL SECURITY SYSTEM**

Consistent with CISA's companion product, ***K-12 School Security Guide***, the SSAT is structured to recognize that security measures perform their various functions of detection, delay, and response at specific locations across a school campus, and that these measures then work together as part of a system. The benefit of a layered, systems-based approach to physical security is that different security strategies in place across a school campus reinforce one another within and across layers. By organizing their physical security system into layers, schools can ensure that their system comprises interconnected support elements that help avoid gaps in protection and mitigation, and guard against single points of failure. Ultimately, a school's location, campus, and layouts will determine the relevance of each layer in providing security benefits.

Physical security layers will also be more or less relevant depending on the threat or safety incident that a school faces. As noted in later sections of this technical appendix, the SSAT takes a scenario-based approach to assessing a school's physical security needs. Diverse threats and incidents evolve differently and can occur at and affect different locations across a school campus. The current version of this tool prompts users to select from the following categories of threats and incidents:

- Active assailant situations in which the assailant is either an outsider or insider to the school community
- Student fights situations involving a large number of students that occur during the school day and during a special event
- Parent abduction situations
- Bomb threat situations

The SSAT is meant to be a part of a holistic planning process that will inform the decisions that school staff make about physical security. The first step in planning is forming a team that includes school staff and community stakeholders such as community organizations, local first responders, and families. Next, the planning team gathers relevant local data that will help schools conduct threat and risk analyses. Threat and risk analyses inform a subsequent vulnerability analysis. This tool provides a structure for that vulnerability analysis, during which schools take stock of their existing security measures and assess how these measures reduce levels of risk identified in prior analyses. The results and options that flow from this tool provide tangible solutions for schools to integrate into their revised physical security plans. The companion ***K-12 School Security Guide*** describes the planning process in more detail.

WHAT INFORMATION ARE YOU LOOKING FOR IN THIS TECHNICAL APPENDIX?

I want to know more about how the SSAT was developed.

Chapter 2 presents information on the development process and the principles that the developers applied. It provides more detail on these topics than the User Guide but is still an overview.

I want to know more about why the developers of the SSAT structured it the way they did, but not the technical detail about the approximations and logic that drive the tool.

Chapter 3 describes how the design principles were used in designing the SSAT, explaining choices including the use of a layered approach, scenarios to structure assessments, and why questions in the tool are presented the way they are. It is more technical than Chapter 2, but should provide all users greater insight into the reasoning behind the tool.

I want to know more about what the descriptions of security measures and their costs or implications on school climate as presented in the SSAT mean, and where they came from.

Chapter 4 describes where the information used in descriptions of the physical security measures came from, and how and why the tool uses qualitative scales to summarize cost and school climate implications. This chapter is likely only of interest to some readers, with most relevance to readers with some knowledge of physical security measures.

I want to know how and why the SSAT outputs specific options, and how individual answers to questions in the survey produce specific results.

Chapter 5 is the most technical component of this appendix, laying out the rationale and logics behind each results module of the tool individually. It presents the full lists of measures relevant for each module, and how different answers trigger individual options being included in the output. This chapter is likely only of interest to the most technical of readers, with broader knowledge of security measures and planning who are seeking to connect their expertise to the assumptions and logics used in the tool.

CHAPTER 2

TOOL DEVELOPMENT PROCESS

The content and structure of the SSAT is based on a review of literature and existing security assessment tools, and also incorporates feedback gathered from interviews with subject matter experts and practitioners in school physical security. This section briefly describes the overall process leading to the development of the SSAT.

LITERATURE AND TOOL REVIEW

The SSAT is based on a literature review conducted by Moore and colleagues (Moore et al., 2021) and Steiner and colleagues (Steiner et al., 2021). The authors reviewed and synthesized the scholarly and practitioner literature on physical security planning from the school safety sector and other sectors comparable to the school environment (e.g., public transportation, houses of worship), and also consulted publicly accessible physical security planning tools from these sectors.

The review examined prominent national examples of K-12 planning tools such as the second edition of ***K–12 School Security Guide*** (CISA, 2018b) and accompanying survey tool (CISA, 2018a), which contains policy recommendations and best practices for physical security. Developers of the tool also examined the Houses of Worship Security Self-Assessment Survey (CISA, undated), developed and hosted by CISA, as well as tools developed by various state and local education agencies (e.g., Arizona Department of Education, undated; Kentucky Center for School Safety, 2016; Texas School Safety Center, undated). The tools captured in this review ranged from simple checklists (e.g., Arizona Department of Education, undated) to guides that walk school staff through a data-based assessment of security vulnerabilities (e.g., PASS, 2020).

The tool review revealed four key takeaways:

1

Most publicly available tools are checklists. Checklists are straightforward to understand and use, but those the tool developers reviewed did not connect identified threats, risks, or vulnerabilities to desired physical security outcomes. They also provided little guidance to help users understand how different physical security outcomes and measures overlap or interact in a school safety system.

2

Few existing tools are context specific. We found few tools that allowed the user to input information about their school context that were highly relevant to security planning—such as grade levels served, location, building configuration and layout. Similarly, few tools considered important aspects of various threats and incidents—such as time of day or location of the incident—that could have implications for the effectiveness of security measures.

3

Policy and planning were absent. The majority of the tools captured in the review focused on physical security equipment in the protection and mitigation space. Few tools addressed the policies, personnel, and training that need to be in place for a security system to function effectively.

4

The tools do not address the cost of security measures and their likely effect on school climate. The review found that few tools provided information about the cost of recommended measures or their impact on school climate and culture.

ENGAGEMENT WITH SUBJECT MATTER EXPERTS, DISTRICT STAFF, AND OTHER STAKEHOLDERS

Throughout the development process and together with CISA, the developers of the SSAT engaged stakeholders from the K-12 school community. In October 2020 and May 2021, CISA held virtual roundtables to gather input from a wide range of stakeholders on the development of both the ***K-12 School Physical Security Guide*** and the SSAT. Stakeholder groups included parent organizations, school safety organizations, state- and county-level school safety offices, school safety centers, teachers, administrators, architects, school counselors and psychologists, and representatives from various federal government agencies involved in school safety and security. During the first roundtable, CISA and the developers of the tool held short focus group discussions with a smaller set of stakeholders to gather more in-depth feedback in the early phases of the development process; questions focused on what taking a systems-based approach to school security means to schools, and the principal challenges that schools and districts face in planning and implementing physical security. During the second roundtable, developers introduced stakeholders from the K-12 school community to an early version of the SSAT, answered questions and about the tool, and gathered input that would inform the rest of the tool development process.

In spring 2021, the developers of the SSAT conducted telephone and virtual interviews with subject matter experts (SMEs) in school physical security and district staff responsible for school security planning. The interviews focused on three main topics: school physical security tools already in use, considerations for the development of a new tool, and big picture considerations in school security planning.

Interview questions focused on tools already in use asked respondents to describe the resources and tools they recommend (for SMEs) or use (for district staff) in the school security planning process. The interview then collected detailed information about these tools, such as the inputs (e.g., security equipment, school context), format (e.g., Word checklist, Excel workbook), platform (e.g., paper, online), and outputs (e.g., options for consideration, role of cost and school climate). The interviews also elicited information about how SMEs and district staff use the outputs from their chosen tool (e.g., what role do the outputs play in the security planning process), as well as the pros and cons of using the tool (e.g., what benefit does the tool provide, what are the drawbacks).

The next interview questions focused on future tool development and asked respondents to discuss the aspects of school and district context that are most important for school security planning, the information that is most useful in a security planning process, and who (e.g., school staff, local law enforcement, community partners) is usually part of a school security planning team. The questions about big picture considerations asked about overarching challenges and successes school districts face/experience in the security planning process. The interview concluded with an open-ended question inviting participants to elaborate on their prior responses or share new information.

Finally, in July 2021, CISA and developers of the tool held feedback sessions with small groups of stakeholders to gather additional input on a subsequent version of the SSAT. The main purpose of these sessions was to gauge future end users' initial reactions to the SSAT, probing them on the clarity of content presented in the tool, tool design, overall user experience, and how output and results from the SSAT could best help them plan and improve school physical security.

The interviews and feedback sessions with future SSAT end users revealed four key findings pertinent to the design of a new school physical security planning tool:

1

A new tool should not be repetitive or time consuming to complete. Respondents emphasized that most school or district staff responsible for security planning are primarily concerned with educating students and thus need to be efficient in their work on other essential tasks. Minimizing repetition and time to complete an assessment is therefore crucial.

2

A new tool should consider the school context and setting. Respondents stressed that each school has a different set of security needs and concerns, which existing generic tools do not incorporate. They also noted that specifics about school context, which include factors such as location (e.g., rural vs urban), the age of the student body, and age of school buildings, matter in the security planning process; a tool should therefore ideally consider these factors when producing options of consideration.

3

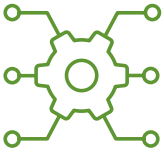
A new tool should be usable on mobile devices. Most interviewees said they tended to use existing tools as part of a walkthrough of the school building, taking inventory of existing measures as they went. Thus, a tool that is easy to use on mobile devices, such as a tablet or smartphone, will be most valuable to those involved in the school physical security planning process.

4

A new tool should be usable without extensive training. School and district staff, as well as state experts, pointed out that the amount of training states and districts provide varies. Therefore, they felt it was important that a future tool be usable by non-experts without extensive training.

GUIDING DESIGN PRINCIPLES

Developers of the SSAT synthesized the key takeaways from the literature and tool review, as well as takeaways from interviews with practitioners and SMEs, into four guiding design principles. They then used these principles to ground the design of the tool. **The overall design objectives were to:**



Ground the tool in a systems-based approach, i.e. design the tool so that it considers the downstream effects of security measures in the context of a school environment, along with the cost of security measures and their effect on the school environment;

Make the tool as responsive as possible to school needs and context;

Make the tool accessible to users of varying levels of expertise and usable without extensive training; and

Minimize repetition and time necessary to complete to the tool.

To build out the tool while seeking to adhere to these principles as closely as possible, the developers had to make some assumptions and simplifications. We discuss these in detail in the next section.

CHAPTER 3

OPERATIONALIZING THE TOOL'S GUIDING PRINCIPLES

The SSAT uses the lens of a systems-based approach to produce relevant options for schools to consider and use to strengthen their safety and security posture. The primary audience for the tool are users that lead or support school physical security. The tool is designed for users of varying levels of expertise, including district leaders and school administrators. Teams that consist of school or district leaders, local first responders or law enforcement officers, security experts, and community members can also use the SSAT to support school physical security efforts. Though not aimed at a specialist audience, the intent is that the tool could be used by security specialists in their work with schools to help structure planning processes and develop more detailed security proposals.

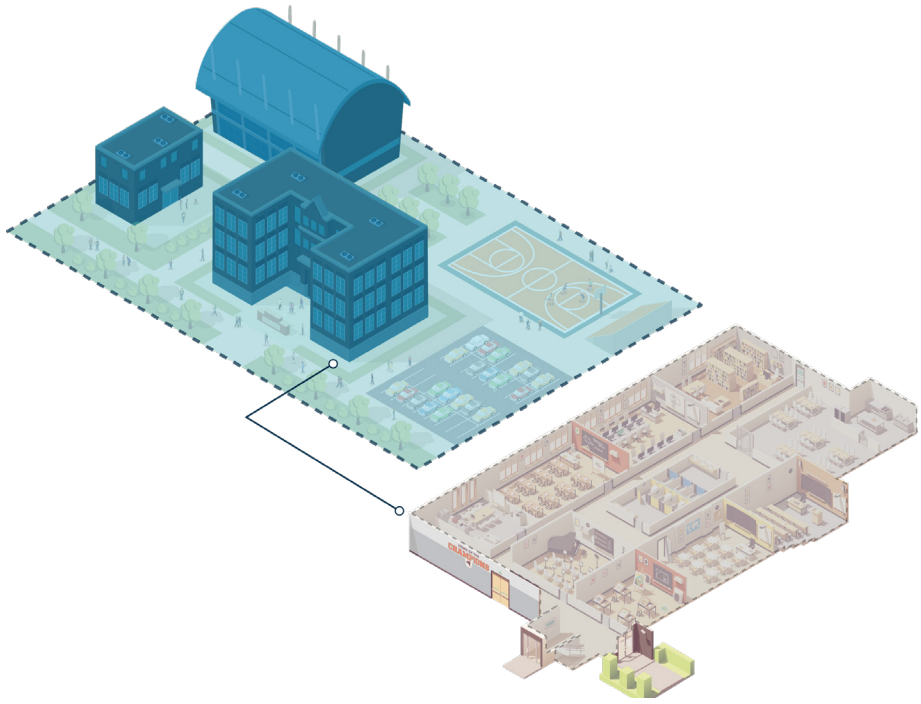
The tool asks users to select a security scenario, follows up with a short set of questions about school-level security policies and training, and then, through a simplified "virtual walk through," asks users to indicate the safety and security measures, policies, training, and other elements that are already in place at their school. The SSAT then asks the user to assess how effective each would be in the context of the selected scenario.

The SSAT uses a web-based format compatible with both desktop computers and mobile devices, allowing users to complete the tool as part of a physical walk through their school. The tool is dynamic, and responses to earlier questions trigger a skip logic so that users are not asked questions that are not relevant to their context or selected scenario.

Because the SSAT is designed to apply to schools in very different environments and circumstances, developers have produced a simplified representation of a school security system. Specifically, the tool treats the components of a school's safety and security system as four layers–the grounds perimeter (the edge of the school campus), the school grounds (outside areas between the perimeter and school buildings), the building perimeter (everything controlling access to and protecting buildings from the outside), and the building interior (measures inside the school buildings themselves.) These four basic layers are shown in Figure 3.1.

FIGURE 3.1 | **THE FOUR SCHOOL PHYSICAL SECURITY LAYERS**

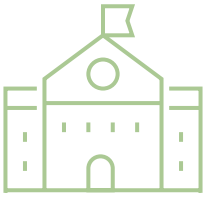
1. The **grounds perimeter layer**, which demarcates the outer boundary of a school campus;
2. The **school grounds layer**, which encompasses athletic fields, parking lots, playgrounds, and any other outdoor space that is part of a school's campus;
3. The **building perimeter layer**, or walls enclosing the inside of school buildings; and
4. The **building interior layer**, which comprises all of the spaces inside school buildings (e.g. administrative offices, hallways, cafeterias, classrooms, gymnasiums, auditoriums, etc.).



SOURCE: Moore et al., 2021.

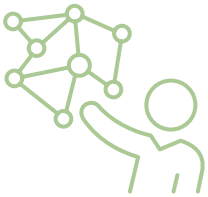
In addition, the tool considers more complex elements of certain layers, such as the school grounds layer (for example, a secondary school is likely to have sports facilities that host large gatherings for major games); the tool addresses the event-specific safety and security measures that could apply to those areas. The SSAT also accounts for the reality that security measures might be implemented in just one layer (e.g., a fence at the school perimeter) or in multiple layers (e.g., CCTV systems that monitor the grounds perimeter, grounds, and building perimeter).

The SSAT asks users four main sets of questions. A users' responses to certain earlier questions informs the questions that the user sees later in the tool (summarized in Figure 3.2):



Questions About the School and Its Context (the *About School* tab)

The tool first asks a set of overarching questions about the school to inform later questions about specific security layers. Some of the questions on this tab ask about high-level policies and capabilities that could affect the performance of other measures, while others help to filter out questions in later sections that are not relevant to a particular school.



A Choice Among a Set of Incident Scenarios (the *Choose a Scenario* tab) and follow up questions relevant to the scenario

The tool considers a user's school physical security system as it pertains to a particular incident scenario (defined as one type of incident carried out by a specific perpetrator at a given point in time and specific location at the school). The user chooses the scenario of interest to them, which then becomes the basis for the rest of the assessment.

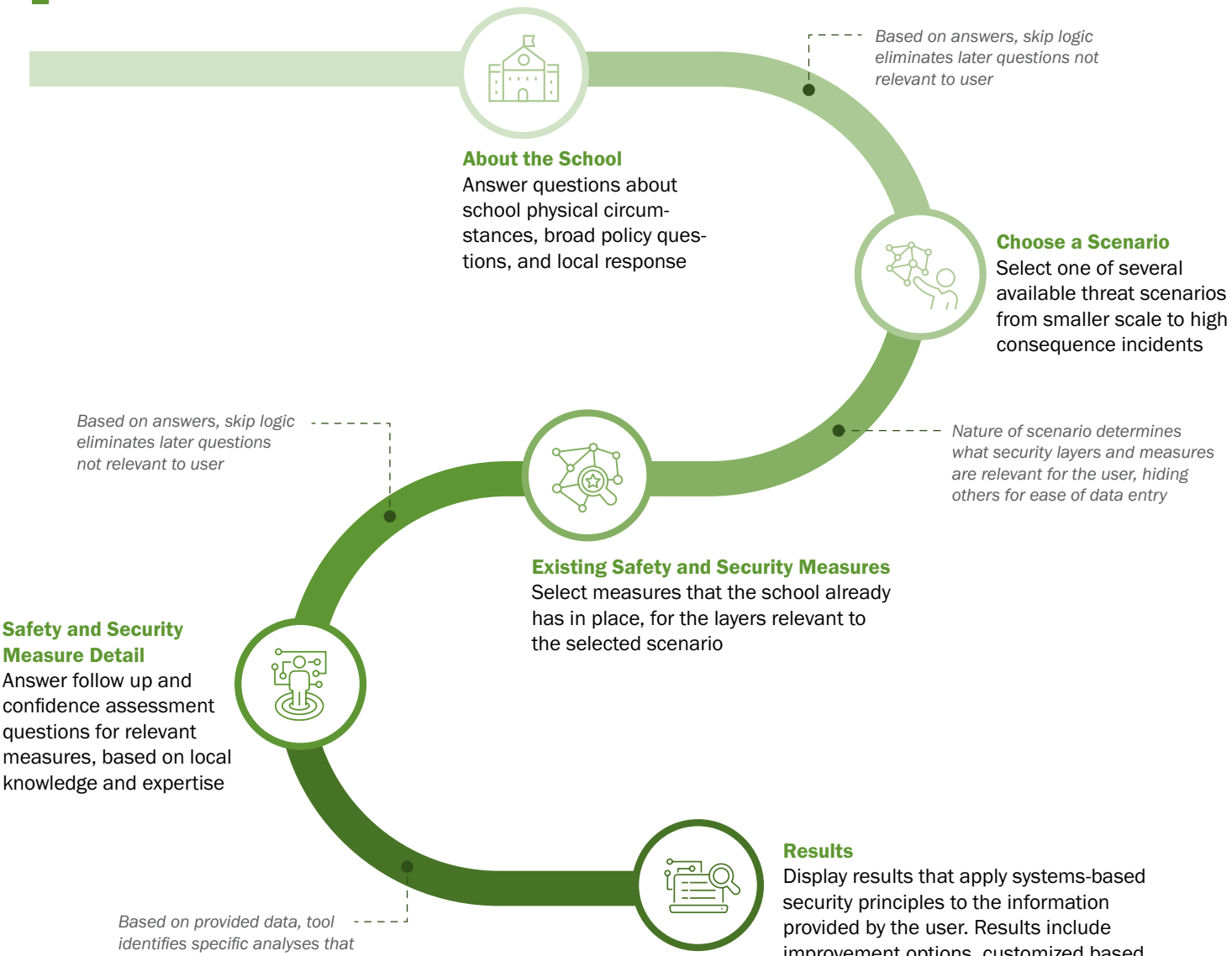
Questions About the Safety and Security Measures Currently in Place at the School (the *Existing Measures* tab)

The tool asks a series of questions about a list of measures that the school may already have in place, filtered to only include those measures and layers relevant to the chosen scenario.

Follow-up Questions on the Existing Safety and Security Measures (the *Measure Detail* tab)

The final set of questions probe for details about each measure the user said was already in place. These questions capture the presence of supporting measures (such as policies and training) and ask the user to assess their confidence.

FIGURE 3.2 | **THE FIVE STEPS OF THE SSAT**



SOURCE: HSOAC

WHY DID THE TOOL DEVELOPERS ADOPT A SPECIFIC STRUCTURE FOR THE SSAT?

A tool for assessing a school's safety and security measures could take many different forms. An extremely detailed tool could ask very specific questions about the school's physical layout and the exact placement of different security measures. A very general tool could focus at a more strategic level and ask about plans and the top-level presence or absence of different measures. Tools could use different analytic approaches ranging from highly detailed computer simulations that tried to calculate the likelihood of a school's plans successfully addressing a specific threat, to more menu-like presentations of measures that the school could consider putting in place. Different approaches are more or less useful for different situations and uses, though in general, the more detail and precision that a tool tries to include, the more complicated it will be for users to navigate.

In certain areas of the SSAT, the developers made some substantial simplifications in approach and structure to reduce complexity. In other areas, the developers intentionally did not simplify concepts in an effort to allow the tool to reflect challenges and safety improvement opportunities that they deemed of critical importance. Other planning tools and processes to help schools develop or improve their security posture could make different choices about what simplifications to make. Because

there is no universally correct answer, school physical security planners might want to draw on multiple resources and tools to inform their planning efforts.

To be transparent about the decisions made in designing this tool, this technical appendix provides answers about the main design choices and simplifications that informed the development of the SSAT.

Why Are Incident Scenarios the Primary Structure for the Tool?

The SSAT uses an individual incident scenario as the basis of the security assessment; this choice reflects the reality that different security measures perform differently depending on the incident they are trying to address. The decision to design a scenario-based tool draws on feedback from potential users that a new physical security planning tool needed to be responsive to local safety concerns. In other words, not all possible threats to school safety will be equally relevant across all grade levels, school types, or contexts. Focusing in on an individual scenario also allows the SSAT to limit the number of questions it asks a user; for instance, if the incident scenario of interest is an incident that occurs at a sporting event on school grounds, the tool does not ask questions about measures in place at the school building perimeter layer or inside the school.

Using incident scenarios at the core of the SSAT also makes it possible to ask much more detailed questions about the user's view of the potential effectiveness of security measures when it comes to addressing specific threats. Individual measures – e.g., door locks – may have vastly different levels of effectiveness for different types of threats. Without "zooming in" to the relatively detailed level of a specific incident scenario, the SSAT would not be able to take full advantage of a user's local knowledge about their school and its level of preparedness.

Naturally, opting for a design that focuses in on individual incident scenarios one at a time has its drawbacks. The SSAT is explicitly and intentionally not an all-hazards tool. For a school to assess their level of preparedness to address a wide range of violent incidents, they would have to run the tool multiple times and compare the results. A truly all-hazards tool would also include non-violent threats, such as extreme weather, which are not built into the tool at this time. The benefits of using scenarios that provide detailed snapshots of certain measures' effectiveness therefore comes at a cost in terms of the breadth of the assessment that the tool can provide.

Why Did the Developers Use Layers as the Main Structure for Asking About Security Measures?

In the design of the SSAT, the developers used layers to break up a school's physical security system and consider how measures implemented in one part of the school might support safety and security elsewhere at that school. Layered security is an established concept in planning across many disciplines; as such, using layers allowed developers to draw on expertise and lessons learned from other, comparable sectors to inform the design of the tool. Breaking the physical security system up into layers also provides a way of organizing questions in a way that reflects a virtual walk moving from the outside of a school to the interior. Doing so allows the tool to consider security measures in place at each layer, and to explicitly draw on logic showing that outer layers (such as the grounds perimeter layer) support actions taken at inner layers of the school (such as the building perimeter layer).

The developers opted to base the SSAT on four physical security layers—the grounds perimeter layer, grounds layer, building perimeter layer, and building interior layer—in an effort to make the tool most generalizable to different school environments and contexts. These groupings appeared broadly applicable to most schools, with the exception of those whose location or campus gave them no control over their outer perimeter.[1] Using only four layers is a considerable simplification, however, and depending on the school and the nature of its campus, an analysis using larger numbers of layers could be valuable.

The SSAT's layered structure means that questions about the same security measure can appear multiple times if a school implements certain measures at various locations across campus.[2] However, the simplification to four layers does reduce the potential for repetition to some extent.

Why Were Some Specific Security Measures Included and Others Omitted?

The SSAT includes a set of existing security measures, layer by layer, drawn from published literature. That said, though the tool includes a wide variety of measures, it does not include every possible measure. The developers opted to include measures that a review of published literature identified as the most common in schools,[3] and omitted questions about other, less

[1] For schools that do not have control over their outer perimeter, for instance if they share a building with other schools or businesses, screening questions ensured that the tool dropped questions about the ground perimeter layer for those users.
[2] In the most extreme example, if a school has CCTV covering all exterior areas, they will be asked about it at the grounds perimeter, school grounds, and building perimeter layers.
[3] For further information, see Moore et al., 2021 and Steiner et al., 2021.

common measures in an effort to reduce burden on users. Where schools have many physical security measures already in place, users have the option to input these measures into the tool via free form text at each physical security layer. This organization sought to provide for a simpler baseline tool that also captures and reflects additional responses for schools that have already implemented physical security measures that the SSAT does not inquire about directly.

Table 3.1 presents the list of security measures about which the SSAT asks questions. The measures are organized into the four school physical security layers, and can appear at more than one layer. A checked box indicates which incident scenarios prompts questions about specific measures, and at what physical security layer(s).

TABLE 3.1 - **MEASURES INCLUDED IN THE SSAT AND THEIR APPLICABILITY TO INCIDENT SCENARIOS, BY LAYER**

Layer	Measure	Active Assailant who is not a member of the school community attacks on school grounds on a weekday during student arrival	Active assailant who is a student attacks inside the school building during classroom instruction	Fight involving many students in the school building, on a weekday during lunch	Fight involving many students on the school grounds, on a weekday after school	Non-custodial parent attempting to abduct student on school grounds on a weekday during recess	Non-custodial parent attempting to abduct student inside the school building on a weekday during classroom instruction	Bomb threat to school building interior, issued on a weekday during classroom instruction
Grounds Perimeter	Perimeter lighting	✓	✓			✓	✓	
	Perimeter barrier that is difficult for someone to scale without being detected	✓	✓			✓	✓	
	Single or small number of entry points in the perimeter barrier	✓	✓			✓	✓	
	Staff OR law enforcement stationed at all entry points	✓	✓			✓	✓	
	Staff, volunteers, or law enforcement officer patrolling perimeter	✓	✓			✓	✓	
	CCTV cameras covering the school perimeter	✓	✓			✓	✓	
	Vehicle barriers							
	Perimeter signage (e.g., designating school property, directing visitors to entrance, notifying visitors of CCTV coverage)							
	Other security measures that cover your grounds perimeter [free text entry by user]	✓	✓			✓	✓	

SOURCE: HSOAC

Layer	Measure	Active Assailant who is not a member of the school community attacks on school grounds on a weekday during student arrival	Active assailant who is a student attacks inside the school building during classroom instruction	Fight involving many students in the school building, on a weekday during lunch	Fight involving many students on the school grounds, on a weekday after school	Non-custodial parent attempting to abduct student on school grounds on a weekday during recess	Non-custodial parent attempting to abduct student inside the school building on a weekday during classroom instruction	Bomb threat to school building interior, issued on a weekday during classroom instruction
School Grounds	Grounds lighting	✓	✓		✓	✓	✓	
	Visibility throughout school grounds	✓	✓		✓	✓	✓	
	Staff, volunteers, or law enforcement patrolling grounds	✓	✓		✓	✓	✓	
	Perimeter barrier around the outdoor athletic event that is difficult for someone to scale without being detected							
	Single or small number of entry points in the perimeter barrier at the outdoor athletic event							
	Staff OR law enforcement stationed at all entry points to the outdoor athletic event							
	Are any entry points that are not monitored by staff controlled in another way (e.g., locked, covered by CCTV)?							
	Signage designating entry points to the outdoor athletic event (e.g., directing visitors to entrance and entry points, notifying visitors of CCTV coverage)							
	Screening devices or systems for people and/or bags (e.g., metal detectors, wands)							
	Staff, volunteers, or law enforcement patrolling the outdoor athletic event							
	CCTV cameras covering the school grounds including athletic fields, parking lots, playgrounds				✓	✓	✓	
	Measures to slow traffic (e.g., speed bumps, curved driveways)							
	Signage on the school grounds (e.g., showing evacuation routes, directing visitors to building entrance, notifying visitors of CCTV coverage)							
	Emergency call boxes that notify LE	✓	✓		✓	✓	✓	
	Emergency notification systems (e.g., public address system)	✓	✓		✓	✓	✓	
	Other security measures that cover your school grounds [free entry by user]	✓	✓		✓	✓	✓	

Layer	Measure	Active Assailant who is not a member of the school community attacks on school grounds on a weekday during student arrival	Active assailant who is a student attacks inside the school building during classroom instruction	Fight involving many students in the school building, on a weekday during lunch	Fight involving many students on the school grounds, on a weekday after school	Non-custodial parent attempting to abduct student on school grounds on a weekday during recess	Non-custodial parent attempting to abduct student inside the school building on a weekday during classroom instruction	Bomb threat to school building interior, issued on a weekday during classroom instruction
Building Perimeter	Building perimeter lighting		✓				✓	
	CCTV cameras covering building primary entry point(s) (e.g., the front door)		✓				✓	
	CCTV cameras covering remainder of the building perimeter (secondary doors, windows, etc.)		✓				✓	
	Locks on doors that are not entry points (includes automatic locks, locks triggered by detection systems, manual locks)		✓				✓	
	Is there a master key that allows local law enforcement to access building through locked doors?		✓				✓	
	Single or small number of entry points to the building		✓				✓	
	Staff, volunteers, or LE stationed at entry points?		✓				✓	
	Are entry points that are not monitored by staff controlled in another way (e.g., locked, covered by CCTV)?		✓				✓	
	Physical entry control measures (e.g., turnstile, vestibule)		✓				✓	
	Building design features to prevent entry at unathorized locations (e.g., inoperable windows, bars on windows or doors)		✓				✓	
	Building design features to prevent gunshots or other breakage (e.g., bullet resistant film on glass, shatter proof glass)		✓				✓	
	Intrusion detection systems (e.g., open door or window alarms, motion sensors)		✓				✓	
	Identification system at the building perimeter for staff, students, visitors (e.g., badges, visitor database)		✓				✓	
	Screening devices or systems for people and/or bags (e.g., metal detectors, wands)		✓				✓	
	Emergency notification systems (e.g., public address system, alerts sent to staff cell phones)		✓				✓	
	Other security measures that cover your building perimeter [free entry by user]		✓				✓	

Layer	Measure	Active Assailant who is not a member of the school community attacks on school grounds on a weekday during student arrival	Active assailant who is a student attacks inside the school building during classroom instruction	Fight involving many students in the school building, on a weekday during lunch	Fight involving many students on the school grounds, on a weekday after school	Non-custodial parent attempting to abduct student on school grounds on a weekday during recess	Non-custodial parent attempting to abduct student inside the school building on a weekday during classroom instruction	Bomb threat to school building interior, issued on a weekday during classroom instruction
Building Interior	Indoor lighting							
	Visibility throughout building interior (e.g., interior windows from main office to hallway; from classrooms to hallway)							
	Gunshot detection system	✓						
	CCTV cameras covering building interior		✓	✓			✓	✓
	Interior door locks (includes automatic locks, locks triggered by detection systems, manual locks, biometric locks)		✓	✓			✓	✓
	Is there a master key that allows local law enforcement to access building through locked doors?		✓	✓			✓	✓
	Signage (e.g., to direct first responders or aid building evacuation)		✓	✓			✓	✓
	Interior barriers (e.g., hallway partitions that lock) that make it more difficult for an intruder to move freely throughout the entire building		✓	✓			✓	✓
	Bullet resistant or reinforced doors or windows in interior spaces (e.g., entrances to classrooms, windows in interior spaces)	✓						✓
	Adults monitoring building interior (e.g., staff, LE, volunteers)		✓	✓			✓	✓
	Emergency alarms to notify LE (e.g., duress alarm)		✓	✓			✓	✓
	Other security measures that cover your building interior [free entry by user]		✓	✓			✓	✓

SOURCE: HSOAC

Why Does the Tool Use Intermediate Security Outcomes of Detection, Delay, and Response?

A key theme grounding a systems-based approach to physical security is that security measures work together to reinforce performance. In isolation, physical security measures are often ineffective: for instance, a fire alarm system will not be as effective keeping members of a school community safe if the school does not have a plan to evacuate or respond to a fire. Different security measures also play different roles, or combinations of roles: most staff members involved in security efforts, for example, can detect threats (if they have been trained what to look for and are paying close attention), delay threats (by interfering with an attacker as they try to implement their plans), and can also respond to threats and stop an attack from occurring.

In a systems-based approach to security, the ideas of detection, delay, and response act as common denominators to assess how different security measures contribute to overall safety and performance. Examining whether a part of a school's physical security system has many measures that do the same thing, or whether certain parts of the system are missing measures that perform specific roles, is a core part of assessing where cost effective opportunities for improvement exist.

Categorizing measures based on whether they detect, delay, or respond to incidents (or some combination of those roles) allows the SSAT to look across different measures in an effort to identify areas for improvement. However, it is important to recognize that this approach is a significant simplification: for example, the detection capability that a burglar alarm system provides is very different from the detection capability that a security staff member provides during a violent threat or incident in progress. In the SSAT, both of these measures count as providing detection capability at specific layers.

? Why Were Specific Follow-Up Questions Chosen for Security Measures?

One of the challenges in designing a tool that will be useful to schools that vary significantly in terms of geographical and other context, and in levels of maturity in safety and security planning, is reflecting these differences in the results without over-burdening users with too many questions.

From a systems perspective, it is also challenging to fully capture dependencies that exist between different security measures, and the potential for different measures to reinforce one another's performance. Specifically, information that some measures produce can trigger or activate other measures: a call from a security officer, for instance, might prompt a lockdown or evacuation. Some measures also purely play roles that support other measures: lighting and Crime Prevention Through Environmental Design (CPTED) design features, for instance, are less about producing direct security outcomes (such as detecting or delaying a threat) than they are about ensuring that other measures—school staff, security cameras, etc.—are more likely to detect the presence of threats.

Fully reflecting all of these interactions could require a tool to either ask a large number of specific questions (e.g., for just one pair of measures: "Does having the CCTV video analytic tool make the staff assigned to building security more effective? Or does their confidence that the technology will detect a threat for them make security staff less effective?") or to make a large number of assumptions (e.g., that all possible interactions happened as expected) that could be very wrong for any given school. **The SSAT employs two strategies to address these challenges:**

1. Integrating ***consistent, structured follow up questions*** to ask about key complementary measures and dependencies across measures (i.e., whether a policy is in place or whether staff have been trained on a measure);

2. Integrating ***response priming or framing*** to remind users about other complementary measures and characteristics about their local context to inform their judgements about how confident they are that the measure in question would be effective for the given scenario.

Both of these strategies prompt respondents to consider local context and to reflect on their school's preparedness and capabilities as they answer follow-up questions about specific measures.

Consistent Structured Follow-Up Questions

Examinations of past safety incidents have shown that security measures are unlikely to effectively address threats if certain complementary ingredients are not in place to support their functionality. This is particularly the case for measures that involve people; when school security staff, teachers, or students assume security roles, the chance of their having value in addressing an actual threat drops significantly if policies do not clearly define those roles and there is no training to prepare them to act. Similarly, security staff or others who detect that an incident is happening or about to happen will have no tangible security value if they have no way to communicate the awareness of that threat to others.

As a result, the SSAT asks follow-up questions about all physical security measures that involve staff members. The tool asks (a) if policies are in place outlining the expectations of staff in emergency situations; (b) whether staff have recently been trained on those policies; and (c) whether relevant staff have communication capabilities available to them.

These lines of questioning for each staff-based security measure significantly increase the overall number of questions that the SSAT asks users. The tool accepts this increase because doing so significantly reinforces the importance of policy, training, and communication capabilities as part of any personnel-dependent security measure and emphasizes the need for plans that equip staff with what they will need to be effective in emergency situations. The design of the SSAT seeks to minimize this increased burden by asking these questions in exactly the same order and using the same language each time they appear; as such, a user who learns what to expect can answer them more rapidly as they continue through the tool.

Response Priming or Framing

In the design of surveys across many fields, there is an understanding that the order in which questions appear and the specific way that questions are worded can have a major effect on responses. This effect is known as "priming" or "framing;" how a respondent is directed to think about a question can prime them to answer in a specific way (Wolf et al., 2016). The SSAT seeks to use priming to incorporate a school's local context and the user's knowledge into single answers to questions, reducing the total number of questions included in the overall tool.

The SSAT uses this approach most directly when asking users to judge their confidence in the performance of security measures. Asking whether a user believes that safety and security measures will work or not is an important part of a security assessment; simply having a measure in place could be irrelevant if there is no confidence that this measure will have any value when an incident occurs. That said, assessing confidence in a particular measure requires local knowledge—two schools with the same number of security staff patrolling their grounds and with the same configuration of lighting across school grounds could have very different assessments of the likelihood of these measures contributing to the detection of a threat. These varying levels of confidence across two different users could be the result of differences in landscaping or because a significant number of the bulbs in one school's outdoor lights burned out and were not replaced. Similarly, a school may have a policy in place requiring that all doors inside school buildings be closed and locked; however, staff with local knowledge of the school might know that the likelihood that staff or students will actually lock doors is low, or that many of the locks are broken.

To help users internalize these local differences as they assess their confidence in the effectiveness of various measures, the SSAT therefore primes responses using information that the user provided in previous sections of the tool. For example, when assessing whether they are confident that some staff would be able to detect an active assailant threat, the SSAT reminds the user that they answered that the design of their school gave open sight lines to facilitate detection. The intent in structuring the tool in this way is to help the user consider these other relevant factors as they make judgments about their confidence in the performance of various measures.

? Why Does the Tool Ask Users – Who May Not Be Security Experts – To Make Judgments About Confidence in Security Performance?

Making judgements about whether a safety or security measure will be effective is a major part of planning. As a result, such judgements must be part of a tool that is trying to assess an overall safety and security posture at a school. As discussed previously, judgements about confidence in a security measure's performance require local knowledge of conditions and information about the quality of security and preparedness efforts. It is likely that some users will have difficulty making these confidence judgements. In that case, the SSAT includes "I don't know" as a response option. Selecting this option will trigger a results module that flags areas where users responded that they were uncertain about the performance of an existing part of their safety and security plan and may therefore need to collect more information to make a confidence judgement before acting on results.

In using the SSAT, an initial user flagging several measures where they are not confident in the performance of a measure of policy, or not knowing how to assess confidence in this area, can also point to the need for further engagement with other members of the school staff, local law enforcement or emergency responder organizations, or other outside experts.

? Why Did the Developers Select the Specific Results Modules for the SSAT?

The SSAT's full results output is modular: the tool considers a user's inputted information through several different lenses to identify various options for improving their school's safety and security plan. The modular design allows a user to display only a limited set of results that they deem will be most relevant for their school. Results modules that are not relevant to a particular user are not displayed in the final briefing.[4]

Because the SSAT applies a systems-based approach to security, the final results produced for the user consider inputted information to identify areas where adding complementary or supporting measures could strengthen performance, or where individual layers of security that depend on single security measures could be improved to yield more complete security benefits. The SSAT returns a total of eight results modules; each of these considers a different "slice" of a school's existing physical security system to identify whether a specific strategy for strengthening security is present based on the data entered. If the specific strategy is relevant, the SSAT returns a list of measures that could be used to implement the strategy.

[4] For example, if a user reports in the tool that all of their staff in security roles have functional communications capability, the SSAT will not display results related to improved communications capabilities.

The specific modules, which this appendix describes in more detail in the next section, are as follows:

1

Identifying measures that need policy development and/or training:

One of the core assumptions of the SSAT is that personnel who have safety and security responsibilities need to know what they are supposed to do if an incident occurs (i.e., there is a policy in place) and need to have been trained on relevant actions. Compared to costs associated with personnel, adding policies and training are a lower-cost approach to increasing the effectiveness of existing security measures. This results module checks if the user inputted that their school has security staff in place, but no policies and training in place to support these staff.

2

Identifying core policies and plans that are missing:

Though some policies and training are specific to ensuring the performance of individual security measures, overarching policies and plans—such as lockdown, lockout, and evacuation policies—are also a critical component to school physical security. This results module checks whether a user has inputted that their school has such overarching policies and returns them as suggested improvements if they are absent.

3

Identifying security measures where performance is uncertain:

Since one goal of the SSAT is to enable users to assess and receive options for ways to improve security even if they are not security experts, the tool provides users the option to select "I don't know" in response to multiple questions. The SSAT treats such responses as a high priority, and this module returns a list of all measures where users inputted "I don't know" when asked about their confidence in the performance of various security measures.

4

Identifying physical design features or technical measures that could make other measures more effective:

Measures like lighting or design features can make other personnel-based security measures or CCTV cameras more effective. This results module checks the data inputted by the user to identify if there were any relevant measures in this category that could benefit from complementary physical design features or other measures to improve security.

5

Identifying measures involving security personnel who do not have communication capabilities:

In a layered, system-based approach to security, communications capability is the key "connective tissue" that links together various parts of the system. Security staff with communications equipment who detect a threat can pass on warning to others at other locations across a school campus, enabling other elements of the system to respond and giving them more time to do so. This module checks whether users have inputted that staff with security responsibilities have functional communications capability connecting them either to other members of the school community or to law enforcement. If communications capabilities are missing, the module returns a list of measures whose performance will improve with the addition of such capabilities.

6

Identifying ways to strengthen integration with local emergency responders:

Although the timeline of many school violence incidents is short enough that emergency response focuses on the consequences of the incident, rather than interrupting an incident in progress, certain physical security measures are designed to facilitate response to threats. This results module checks for the presence of a variety of security measures that create links between the school and local law enforcement and other emergency responders (e.g., communications capabilities that allow school staff to call police directly). The module also checks for the presence of systems that allow emergency responders access to real-time CCTV video footage during response operations. For each physical security layer, the SSAT returns a list of any measure that the school does not already have in place to enhance communication between school staff and local emergency responders.

7

Identifying measures with low confidence in performance:

When users assessed that they had low confidence in certain measures performing as intended to detect, delay, or respond to threats, the SSAT treats steps to address issues that might undermine confidence as high priority improvements. This module returns a list of all the measures in which the user inputted they have low confidence.

8

Identifying layers reliant on one measure or entirely missing a key security function:

The most robust physical security systems make sure that each individual physical security layer consists of multiple measures that can detect, delay, and respond to potential threats. Having multiple measures in place at each layer to achieve these three physical security functions provides for stronger protection; if one measure fails, another is in place as a backstop. Though having multiple reinforcing security measures may not always be practical or financially possible for schools, layers that are missing measures or rely on only a single measure to detect, delay, or respond to threats would be high priority areas for strengthening. However, the implementation of any new measures could be significantly more costly than undertaking improvements in policy, training, or lighting, as identified by earlier modules.

This results module checks each physical security layer for the presence of security measures that provide detection, delay, and response capabilities (and, where applicable, also checks a user's confidence in the performance of these measures). If no relevant measures or only a single relevant measure are present, the SSAT returns the specific layer and physical security function (e.g., Grounds Perimeter, Delay) as a potential area for improvement. The module also includes a list of measures that are not already implemented at the school and could work to improve otherwise absent capabilities.

How Did the Developers Decide What Information to Include About Additional Physical Security Options?

In an effort to make the tool accessible to users, the developers included a summary description of each security measure that the school did not already have in place. The developers also included brief qualitative information about the relative costs of each measure and its expected effect on school climate. How much each measure may cost and its likely effect on school climate will vary from school to school. The developers based these qualitative assessments on the school security literature (see Steiner et al., 2021) but factors such as the school's budget, local statutes and policies, number and age of school buildings, and extent to which the measure is implemented will also affect cost and effect on climate. Thus, the qualitative assessments of cost and impact on climate are intended as a guide to help users balance the costs and benefits of each option in the context of the school's budget and educational mission. More information is available in Chapter 4.

CONCLUSION

Based on the data gathered to support the development of the SSAT, developers have structured the tool around four guiding principles:

Take a systems-based approach

Be as responsive as possible to school needs and context

Be accessible to non-experts and usable without extensive training

Minimize repetition and time to complete

In the implementation of the tool, the ***application of a systems-based approach*** to evaluation and improvement of school physical security was at the core of the development approach. Considering the interaction of physical security layers in responding to specific incident scenarios was central to the design of the results modules, which emphasize how different security measures can reinforce one another. The tool also emphasizes the role of outer layers of security and of communications capabilities in supporting the performance of inner layers of security.

The principle of making the tool as ***responsive as possible to the needs and context of individual schools*** drove both the initial collection of key information about the school itself (which shaped later questions in the tool to limit asking questions that were not relevant for individual facilities or areas), and the decision to use scenarios as the core of the assessment. Beyond the other reasons for a scenario-based approach discussed earlier in this appendix, allowing users to select scenarios of specific interest and to ignore scenarios deemed irrelevant to their circumstances was responsive to this desire for customization.

The goals of being ***accessible to non-experts*** and ***minimizing repetition and time to complete*** the tool created some tension in the tool development process. To make the tool as accessible as possible to non-experts, questions incorporated reminders of other measures that users inputted as being present and that users should consider when answering specific questions (see discussion of priming, above). However, doing so increased the text length of questions and the time necessary to complete the tool.

Similarly, the SSAT asks questions regarding policy and training as part of an assessment of each personnel-dependent security measure. While the reason for doing so is to consider the importance of appropriately preparing staff members for safety or security-related roles, and to make sure that doing so is reflected in the options provided by the tool, adding these questions increases repetition. In sum, while design efforts pursued both these goals, in the end they had to be balanced in the context of the larger goals for the tool and the utility of its output.

CHAPTER 4

SUPPORTING INFORMATION ON SECURITY MEASURE DESCRIPTIONS, COST, AND CLIMATE ASSESSMENT

SECURITY MEASURE DESCRIPTIONS

The descriptions of each of the physical security measures that appear in the SSAT were based on information drawn from the technical and evaluation literature and summarized in the literature review that supported the tool development process (Moore et al., 2021; Steiner et al., 2021). In addition, the developers drew on a few key sources, such as recent reviews of school safety technology (APL, 2016; Schwartz et al., 2016) and school safety and security practitioner handbooks (Fennelly and Perry, 2014; Baker and Benny, 2013; Atlas, 2013). Please refer to the Glossary of Security Terms and Measures provided with the SSAT for more information about specific measures.

COST AND CLIMATE ASSESSMENTS

The SSAT results modules include information about the approximate cost (or range of costs) of each security measure option and its likely effect on school climate. The developers of the SSAT included this information to help users consider and balance the costs and benefits of each option in the context of their schools' budget and climate considerations.

Cost considerations are presented in three categories—low, medium, and high—and are intended to represent the cost, or range of costs, that specific measures are likely to present for most schools. For example, adding signage directing visitors to the building entrance or announcing the presence of CCTV is likely to be a lower-cost measure, while hiring security staff to patrol the school grounds or building interior is likely to be higher cost for most schools. In the SSAT results modules, relatively lower-cost options are represented with $, medium-cost options with $$ and higher-cost options with $$$, as described in Box 4.1.

BOX 4.1 | **COST AND CLIMATE RATINGS SHOWN IN THE SSAT**

Cost and climate ratings shown in the SSAT:

Cost

$	low cost for most schools
$$	medium cost for most schools
$$$	high cost for most schools
$-$$$	costs for most schools will vary

School Climate

+	likely positive impact on school climate
±	neutral or variable impact on school climate
–	likely negative impact on school climate

The literature that developers of the SSAT reviewed provided few, if any concrete estimates around the cost of physical security measures. Instead, most sources refer to the relative cost of measures, indicating that the cost certain solutions will be higher or lower depending on factors such as the age or condition of the school building, or the presence of security staff or existing security measures. For example, physical entry control measures could be relatively inexpensive if a school chose to install a simple turnstile with no electronic access control. Alternatively, a physical entry control measure could be very expensive if a school opted to rebuild its entrance to construct a vestibule with an electronic badge reader system. The SSAT therefore

provides only approximations of the cost of various measures based on cost considerations highlighted in the literature,[5] and indicates measures that are likely to vary in cost depending on school context with $-$$$, as shown in Box 4.1.

The SSAT also represents the likely impact of each measure on school climate in three categories—likely positive impact, likely neutral or variable impact, and likely negative impact. For example, lighting and visibility installed throughout the school grounds are likely to enhance school climate by making the school campus and building feel accessible and welcoming. On the other hand, CCTV or screening systems such as metal detectors are likely to have a negative effect on school climate by making the school feel closed, inaccessible, and unwelcoming. Students may also feel unfairly monitored and may move illicit behavior to unmonitored areas. These judgments are based on findings from the literature on school safety and security, such as the literature on CPTED and other relevant sources.

Most measures are likely to have a neutral or variable impact on school climate. Measures such as door locks are unlikely to have either a positive or negative effect on school climate. The SSAT assesses measures such as staff patrols, or staff stationed at entry points, as having a variable effect because the impact on school climate depends on how the measure is implemented by that school. Staff who are trained to interact positively with students could enhance school climate, but staff whose actions and roles are perceived by students as punitive may have a detrimental effect on school climate. Table 4.1 lists the security measures considered in the SSAT, along with assessments of cost and likely impact on school climate.

The developers of the SSAT drew on the available technical literature and took a broad, qualitative approach to develop these assessments of relative cost and likely impact on school climate.[6] This qualitative approach was intended to provide SSAT users with a relative sense of the likely benefits and costs to consider as they progress in the security planning process. That is, the coding system aimed to capture the likely relative costs for most schools—e.g., that signage will generally be less expensive than emergency call boxes, which will likely be less expensive than CCTV or extensive staff monitoring. The approach also aimed to capture the likely effect that measures would have on school climate in most school contexts. In reality, the likely effect of most measures considered in the SSAT will be variable across schools and depend largely on whether the measure is implemented in a way that will contribute to a positive school climate versus one that could contribute to a negative school climate.

[5] See, for example, Johns Hopkins University APL, 2016; Schwartz et al., 2016; New Jersey School Security Task Force, 2015; Fennelly and Perry, 2014.
[6] See, for example, Moore et al., 2021, Steiner et al., 2021, Johns Hopkins University APL, 2016; Schwartz et al., 2016; School Security Task Force, 2014; Atlas, 2013; Rabkin et al., 2004; Federal Commission on School Safety, 2018; Division of Homeland Security and Emergency Management, 2014, PASS, 2020

TABLE 4.1 - **COST AND CLIMATE IMPLICATIONS OF SCHOOL PHYSICAL SECURITY MEASURES**

Layer - Grounds Perimeter				
Measure	**Cost**		**School Climate**	
Perimeter lighting	$	Lighting is relatively inexpensive to install and maintain. LED lighting can also be a more cost-efficient solutions for schools, and schools can further reduce or offset costs via rebates or incentives to implement energy efficient lighting technologies.	+	Lighting can make school campuses more attractive and feel more safe and welcoming.
Perimeter barrier that is difficult for someone to scale without being detected	$-$$$	A wide variety of perimeter barriers are available to schools. Costs to purchase, install, and maintain hedges and other landscaping as a barrier could be prohibitive, as can ornamental fencing. Chain link fencing, concrete or cinder block walls are less expensive solutions.	±	A wide variety of perimeter barriers are available to schools. Hedges and landscaping are visually appealing and can make a school campus appear more attractive and make the school feel safer and more welcoming. Ornamental fencing is also visually appealing. On the other hand, chain link fencing or concrete or cinder block fencing are less visually appealing and may reduce the extent to which a school campus feels welcoming.

Layer - Grounds Perimeter				
Measure	**Cost**		**School Climate**	
Single or small number of entry points in the perimeter barrier	$$	For an area on school grounds that already has a perimeter barrier such as a fence or landscaping, reducing the number of entry points into that area may be too costly. Erecting a new barrier that includes a single or small number of entry points can also be expensive.	–	Reducing the number of entry points through a perimeter barrier surrounding an event facility could make school grounds less welcoming. However, the overall effect that this particular measure will have on school climate will vary significantly from school to school based on geography and local context.
Staff OR law enforcement stationed at all entry points	$$	Hiring or reassigning staff to monitor entry points to the school grounds can be expensive. Consider whether full time monitoring is needed at your school, or whether monitors would be most useful at specific times during the day.	±	Consider how placing staff at the entrance to the school grounds might affect school climate. Personnel who are trained to interact positively with students will likely enhance a school's welcoming ambiance. Personnel whose actions and roles are perceived by students as punitive may have detrimental effects on school climate, and reduce the extent to which students feel safe and welcome at their school.
Staff, volunteers, or law enforcement officer patrolling perimeter	$$$	Hiring or reassigning staff to patrol the perimeter around school grounds can be expensive. Consider whether full time patrols are needed at your school, or whether monitors would be most useful at specific times during the day.	±	Consider how placing staff around the perimeter of school grounds might affect school climate. Personnel who are trained to interact positively with students will likely enhance a school's welcoming ambiance. Personnel whose actions and roles are perceived by students as punitive may have detrimental effects on school climate, and reduce the extent to which students feel safe and welcome at their school.
CCTV cameras covering the school perimeter	$$$	Installing CCTV cameras and hiring associated staff to monitor camera feeds in real time can be expensive. CCTV systems also have maintenance and upgrade costs that will accrue over time. Some schools install non-functioning or unmonitored CCTVs as a cost-saving measure, but there is no evidence that these work as effective deterrents to crime or violence.	–	Surveillance measures such as CCTVs can have detrimental effects on school climate, and reduce the welcoming ambience that a school might otherwise provide. Students may feel unfairly monitored, and may move illicit behavior to other, unmonitored areas on or off school campus. CCTV cameras can also violate the privacy and other rights of students and other members of the school community if they not implemented with these concerns in mind.
Vehicle barriers	$	Vehicle barriers installed at the perimeter of school grounds to prevent or limit access are typically low-cost measures.They can include drop-down gates, concrete bollards, or water- or sand-filled barricades.	±	Vehicle barriers installed at the entrance to school grounds are unlikely to affect school climate, either positively or negatively.
Perimeter signage (e.g., designating school property, directing visitors to entrance, notifying visitors of CCTV coverage)	$	Installing signs to designate the school perimeter boundary, notifying visitors of various security practices (such as the presence of CCTVs or security staff), or directing visitors to the main office is a relatively low-cost measure.	±	The extent to which signs will affect climate will depend on what the sign is drawing attention to. For example, signs drawing attention to the presence of CCTV cameras installed throughout school campus and at the perimeter may reduce a school's welcoming ambience. A sign directing visitors to please make their way to the main office is unlikely to have any effect on school climate.

Layer - School Grounds				
Measure	**Cost**		**School Climate**	
Grounds lighting	$	Lighting is relatively inexpensive to install and maintain. LED lighting can also be a more cost-efficient solutions for schools, and schools can further reduce or offset costs via rebates or incentives to implement energy efficient lighting technologies.	+	Lighting can make school campuses more attractive and feel more safe and welcoming.
Visibility throughout school grounds	$	Increasing visibility across school grounds can be a low-cost way of helping staff and others detect threats. You can do so by keeping hedges and trees located on school grounds well-trimmed, or by designating visitor, staff, and student parking areas so that they do not obstruct views of campus from the front office and other areas.	+	Consider how actions you take to improve visibility across school grounds may impact the welcoming atmosphere your school provides. If actions involve eliminating otherwise attractive landscape features, they may degrade school climate. On the other hand, if actions involve moving the location of recess, parking areas, or student arrival points to improve sightlines, they are unlikely to have an impact on school climate.
Staff, volunteers, or law enforcement patrolling grounds	$$$	Hiring or reassigning staff to patrol school grounds can be expensive. Consider whether full time patrols are needed at your school, or whether monitors would be most useful at specific times during the day.	±	Consider how staff patrolling the school grounds might affect school climate. Personnel who are trained to interact positively with students will likely enhance a school's welcoming ambiance. Personnel whose actions and roles are perceived by students as punitive may have detrimental effects on school climate, and reduce the extent to which students feel safe and welcome at their school.
Perimeter barrier around the outdoor athletic event that is difficult for someone to scale without being detected	$-$$$	A wide variety of barriers are available to schools to enclose areas within school grounds. Costs to purchase, install, and maintain hedges and other landscaping as a barrier could be prohibitive, as can ornamental fencing. Chain link fencing, concrete or cinder block walls are less expensive solutions.	±	A wide variety of barriers are available to schools to enclose areas within school grounds. Hedges and landscaping are visually appealing and can make a school campus appear more attractive and make the school feel safer and more welcoming. Ornamental fencing is also visually appealing. On the other hand, chain link fencing or concrete or cinder block fencing are less visually appealing and may reduce the extent to which a school campus feels welcoming.
Single or small number of entry points in the perimeter barrier at the outdoor athletic event	$$	For an area on school grounds that already has a perimeter barrier such as a fence or landscaping, reducing the number of entry points into that area may be too costly. Erecting a new barrier that includes a single or small number of entry points can also be expensive.	±	Reducing the number of entry points through a perimeter barrier surrounding an event facility could make school grounds less welcoming. However, the overall effect that this particular measure will have on school climate will vary significantly from school to school based on geography and local context.
Staff OR law enforcement stationed at all entry points to the outdoor athletic event	$$	Hiring or reassigning staff to monitor entry points to athletic facilities or other areas during major events s can be expensive. Consider whether full time monitoring during the event is needed at your school, or whether monitors would be most useful at specific times during the event.	±	Consider how placing staff at the entrance to athletic and other events might affect school climate. Personnel who are trained to interact positively with students will likely enhance a school's and the event's welcoming ambiance. Personnel whose actions and roles are perceived by students as punitive may have detrimental effects on school climate, and reduce the extent to which students feel safe and welcome at their school and during the event.

Layer - School Grounds				
Measure	**Cost**		**School Climate**	
Are any entry points that are not monitored by staff controlled in another way (e.g., locked, covered by CCTV)?	$-$$$	There are various ways to secure entry points to the school that are not monitored by school staff or otherwise controlled. A low-cost option includes installing locks on all doors, and ensuring that doors remain closed and locked at all times. Higher-cost options include installing CCTV cameras to monitor these entry points, and hiring staff to monitor camera feeds in real time.	±	Different approaches to securing entry points not monitored by staff or otherwise controlled will have variable effects on school climate. For example, installing locks on all entry points is unlikely to have any effect on school climate. However, surveillance measures such as CCTVs can have detrimental effects on school climate, and reduce the welcoming ambience that a school might otherwise provide. Students may feel unfairly monitored, and may move illicit behavior to other, unmonitored areas on or off school campus. CCTV cameras can also violate the privacy and other rights of students and other members of the school community if they not implemented with these concerns in mind.
Signage designating entry points to the outdoor athletic event (e.g., directing visitors to entrance and entry points, notifying visitors of CCTV coverage)	$	Installing signs across school grounds to designate entry points to facilities hosting special events, notifying spectators of evacuation routes and of various security practices in place during the event (such as the presence of CCTVs or security staff) is a relatively low-cost measure.	±	The extent to which signs installed at entry points to facilities located on school grounds will affect school climate will depend on what the sign is drawing attention to. For example, signs drawing attention to the presence of CCTV cameras installed throughout the event facility may reduce the event's welcoming ambience. A sign directing visitors to please make their way to designated entry points or to appropriate evacuation routes is unlikely to have any effect on school climate.
Screening devices or systems for people and/ or bags (e.g., metal detectors, wands)	$$	Various entrance screening technologies are available to schools, and come at different costs. Portable solutions, such as metal detector wands, are a low-cost solution and can be used at various locations throughout campus. Magnetometers and walk-through metal detectors are more expensive.	–	Studies show that metal detectors can have negative effects on school climate by reducing student perceptions of safety, and degrading a school's welcoming ambience. Less-visible and portable, yet effective, solutions such as metal detector wands are an option for schools who seek to minimize the impact that this type of security technology will have on their school's climate.
Staff, volunteers, or law enforcement patrolling the outdoor athletic event	$$$	Hiring or reassigning staff to patrol a special event hosted on school grounds can be expensive. Consider whether full time patrols are needed at your event, or whether monitors would be most useful at specific times during the event.	±	Consider how staff patrolling a special event hosted on school grounds might affect school climate. Personnel who are trained to interact positively with students and other spectators will likely enhance the event's welcoming ambiance. Personnel whose actions and roles are perceived by spectators as punitive may have detrimental effects on school climate, and reduce the extent to which they feel safe and welcome during the event.

Layer - School Grounds				
Measure	**Cost**		**School Climate**	
CCTV cameras covering the school grounds including athletic fields, parking lots, playgrounds	$$$	Installing CCTV cameras and hiring associated staff to monitor camera feeds in real time can be expensive. CCTV systems also have maintenance and upgrade costs that will accrue over time. Some schools install non-functioning or unmonitored CCTVs as a cost-saving measure, but there is no evidence that these work as effective deterrents to crime or violence.	–	Surveillance measures such as CCTVs can have detrimental effects on school climate, and reduce the welcoming ambience that a school might otherwise provide. Students may feel unfairly monitored, and may move illicit behavior to other, unmonitored areas on or off school campus. CCTV cameras can also violate the privacy and other rights of students and other members of the school community if they not implemented with these concerns in mind.
Measures to slow traffic (e.g., speed bumps, curved driveways)	$	Installing measures to slow traffic, such as speed bumps or modular traffic barriers along school driveways, is a relatively low-cost measures. However, other options to slow traffic such as curved driveways could impose more significant costs if significant rerouting and landscaping is required.	±	Measures to slow traffic such as speed bumps or modular traffic barriers are unlikely to have any effect on school climate.
Signage on the school grounds (e.g., showing evacuation routes, directing visitors to building entrance, notifying visitors of CCTV coverage)	$	Installing signs around school grounds to designate evacuation routes, notify visitors of various security practices (such as the presence of CCTVs or security staff), or directing visitors to the main office is a relatively low-cost measure.	±	The extent to which signs on school grounds will affect school climate will depend on what the sign is drawing attention to. For example, signs drawing attention to the presence of CCTV cameras installed throughout the grounds may reduce a school's welcoming ambience. A sign directing visitors to please make their way to the main office is unlikely to have any effect on school climate.
Emergency call boxes that notify LE	$$	Emergency call boxes installed throughout school grounds--for example in parking lots, along walkways, and at event facilities--can be somewhat expensive. Costs will range depending on the technology installed (e.g. Analog, Wireless, IP call boxes) and on associated infrastructure already in place at the school.	±	Emergency call boxes situated across school grounds are unlikely to have a significant impact on school climate. Boxes that are installed at strategic, but limited, locations across grounds are unlikely to have any effect. Schools should also ensure that emergency call boxes are ADA compliant with Braille labels and other features to ensure accessibility by all members of the school community.
Emergency notification systems (e.g., public address system)	$	Most schools already have a public address system in place, and incur relatively low long term costs to maintain and upgrade these over time.	±	Emergency notification systems such as public address systems are unlikely to have any effect on school climate.

Layer - Building Perimeter				
Measure	**Cost**		**School Climate**	
Building perimeter lighting	$	Lighting is relatively inexpensive to install and maintain. LED lighting can also be a more cost-efficient solutions for schools, and schools can further reduce or offset costs via rebates or incentives to implement energy efficient lighting technologies.	+	Lighting can make school campuses more attractive and feel more safe and welcoming.
CCTV cameras covering building primary entry point(s) (e.g., the front door)	$$$	Installing CCTV cameras and hiring associated staff to monitor camera feeds in real time can be expensive. CCTV systems also have maintenance and upgrade costs that will accrue over time. Some schools install non-functioning or unmonitored CCTVs as a cost-saving measure, but there is no evidence that these work as effective deterrents to crime or violence.	–	Surveillance measures such as CCTVs can have detrimental effects on school climate, and reduce the welcoming ambience that a school might otherwise provide. Students may feel unfairly monitored, and may move illicit behavior to other, unmonitored areas on or off school campus. CCTV cameras can also violate the privacy and other rights of students and other members of the school community if they not implemented with these concerns in mind.
CCTV cameras covering remainder of the building perimeter (secondary doors, windows, etc.)	$$$	Installing CCTV cameras and hiring associated staff to monitor camera feeds in real time can be expensive. CCTV systems also have maintenance and upgrade costs that will accrue over time. Some schools install non-functioning or unmonitored CCTVs as a cost-saving measure, but there is no evidence that these work as effective deterrents to crime or violence.	–	Surveillance measures such as CCTVs can have detrimental effects on school climate, and reduce the welcoming ambience that a school might otherwise provide. Students may feel unfairly monitored, and may move illicit behavior to other, unmonitored areas on or off school campus. CCTV cameras can also violate the privacy and other rights of students and other members of the school community if they not implemented with these concerns in mind.
Locks on doors that are not entry points (includes automatic locks, locks triggered by detection systems, manual locks)	$-$$$	Different types of locks and lock systems are available to schools to secure secondary doors to their buildings. Simple locks operated by keys are low-cost solutions. Automatic lock systems operated by key fobs and integrated to function in response to intruder detection systems are high-cost solutions. Automatic systems will also require periodic testing and maintenance to ensure their effectiveness.	±	Locks and lock systems installed on secondary doors are unlikely to have any effect on school climate.
Is there a master key that allows local law enforcement to access building through locked doors?	$	Providing emergency responders with a master key or key fob to enable access to all areas of a school building in the event of an emergency is a low-cost security solution for schools. For schools that install automatic door lock system throughout school buildings, this cost will be included in the cost of that system.	±	Providing a master key to emergency responders is unlikely to have any effect on school climate.
Single or small number of entry points to the building	$	To reduce the number of entry points into school buildings, schools can install locks on doors not designated as main entrances. They can also install signage directing students, staff, and visitors to main entrances that are monitored. These are all low-cost solutions to improving security.	±	Reducing the number of entry points into school buildings by installing locks on secondary doors and posting signage directing visitors to main entrances is unlikely to have any effect on school climate.

Layer - Building Perimeter				
Measure	**Cost**		**School Climate**	
Staff, volunteers, or LE stationed at entry points?	$$	Hiring or reassigning staff to monitor entry points to school buildings can be expensive. Consider whether full time monitoring is needed at your school, or whether monitors would be most useful at specific times during the day.	±	Consider how placing staff at the entrance to school buildings might affect school climate. Personnel who are trained to interact positively with students will likely enhance a school's welcoming ambiance. Personnel whose actions and roles are perceived by students as punitive may have detrimental effects on school climate, and reduce the extent to which students feel safe and welcome at their school.
Are entry points that are not monitored by staff controlled in another way (e.g., locked, covered by CCTV)?	$-$$$	There are various ways to secure entry points to the school that are not monitored by school staff or otherwise controlled. A low-cost option includes installing locks on all doors, and ensuring that doors remain closed and locked at all times. Higher-cost options include installing CCTV cameras to monitor these entry points, and hiring staff to monitor camera feeds in real time.	±	Different approaches to securing entry points not monitored by staff or otherwise controlled will have variable effects on school climate. For example, installing locks on all entry points is unlikely to have any effect on school climate. However, surveillance measures such as CCTVs can have detrimental effects on school climate, and reduce the welcoming ambience that a school might otherwise provide. Students may feel unfairly monitored, and may move illicit behavior to other, unmonitored areas on or off school campus. CCTV cameras can also violate the privacy and other rights of students and other members of the school community if they not implemented with these concerns in mind.
Physical entry control measures (e.g., turnstile, vestibule)	$-$$$	Schools can integrate different types of physical entry control measures into their schools; depending on what you select, improvements can range from low-cost to high-cost solutions. Turnstiles, for example, come at varying costs depending on the technology that they employ (e.g. some are equipped with sophisticated sensors, while others require manual activation to prevent someone from passing through). For most schools, adding a vestibule to a main entrance will also likely require expensive remodels.	±	Different types of physical control entry measures will have variable impacts on school climate. For example, adding turnstiles that resemble metal detectors is likely to have a negative impact on school climate by degrading a welcoming ambience and possibly making students less safe. Other approaches, such as using CPTED approaches to design and integrate vestibules into the main entrance can increase the extent to which students, staff, and visitors feel welcome at the school. To make vestibules more appealing, art classes, student artists, or community and parent organizations can point murals or other art onto vestibule walls.
Building design features to prevent entry at unauthorized locations (e.g., inoperable windows, bars on windows or doors)	$	Preventing entry at unauthorized entry locations, such as windows, is a relatively low-cost security improvement. Schools can select to install bars to prevent entry, or equip their windows and doors that have windows with relatively inexpensive shatterproof security film.	±	Different options to prevent entry at unauthorized locations at the school building perimeter will likely have variable impacts on school climate. Certain solutions, such as installing bars on windows or doors that include windows is likely to degrade the extent to which a school feels welcoming. Other solutions, such as shatterproof security film is unlikely to have any effect on school climate. If anything, such film may enhance school climate to the extent that it allows for unobstructed views of outdoor spaces.

Layer - Building Perimeter				
Measure	**Cost**		**School Climate**	
Building design features to protect from gunfire or other breakage (e.g., bullet resistant film on glass, shatter proof glass)	$$	Design features to protect windows, doors, and walls from gunfire can be expensive. Schools can install security film to protect glass at the building perimeter layer (e.g. on windows, doors with windows), or reinforce exterior walls with poured concrete. All of these measures are likely to come at medium cost to most schools.	±	Building features to protect exterior building walls, windows, and doors from gunfire are unlikely to have any effect on school climate. Most, if not all, measures that schools might implement in this area would be invisible to the naked eye.
Intrusion detection systems (e.g., open door or window alarms, motion sensors)	$$	Intrusion detection systems installed at the building perimeter layer are likely to come at a medium cost to schools. The systems can be expensive on their own, and will be even more costly if they need to be integrated with motion sensors, alarm systems, or other technology that the school may need to put in place to maximize security benefits. Intrusion detection systems also require periodic testing and maintenance, which can raise costs.	±	Intrusion detection systems are unlikely to have a significant impact on school climate. Most likely, these will not be visible to members of the school community.
Identification system at the building perimeter for staff, students, visitors (e.g., badges, visitor database)	$-$$$	Identification systems to control entry into schools come at varying prices depending on their level of sophistication. Simple solutions such as providing all students and staff with ID cards, but not requiring that these badges be scanned upon entry, are low-cost solutions. Higher-cost solutions might include accompanying ID scanners. Integrating identification sytems with other security technology, such as intrusion detection systems, will likely be a high-cost solution for most schools.	±	Different types of identification systems, and the school policies that are associated with these systems, will have different effects on school climate. Schools should ensure that the integration of such systems promote equity among all members of the student and staff population, and do not degrade the welcoming ambiance of the school or make certain members of the school community feel less safe.
Screening devices or systems for people and/ or bags (e.g., metal detectors, wands)	$$	Various entrance screening technologies are available to schools, and come at different costs. Portable solutions, such as metal detector wands, are a low-cost solution and can be used at various locations throughout campus. Magnetometers and walk-through metal detectors are more expensive.	–	Studies show that metal detectors can have negative effects on school climate by reducing student perceptions of safety, and degrading a school's welcoming ambience. Less-visible and portable, yet effective, solutions such as metal detector wands are an option for schools who seek to minimize the impact that this type of security technology will have on their school's climate.
Emergency notification systems (e.g., public address system, alerts sent to staff cell phones)	$	Most schools already have a public address system in place, and incur relatively low long-term costs to maintain and upgrade these over time. Applications to send automatic alerts to staff cell phones is also a low-cost emergency notification option for schools.	±	Emergency notification systems such as public address systems or cell phone applications are unlikely to have any effect on school climate.

Layer - Building Interior				
Measure	**Cost**		**School Climate**	
Indoor lighting	$	Lighting is relatively inexpensive to install and maintain. LED lighting can also be a more cost-efficient solutions for schools, and schools can further reduce or offset costs via rebates or incentives to implement energy efficient technologies.	+	Lighting can make school campuses more attractive and feel more safe and welcoming.
Visibility throughout building interior (e.g., interior windows from main office to hallway; from classrooms to hallway)	$-$$$	The cost of improving visibility throughout the interior of school buildings will depend on the existing configuration of your school's building interiors. For buildings where hallway design and classrooms and offices already promote visibility across large spaces, improving visibility through enhanced lighting is a low-cost solution. For buildings where visibility was not built into the original architectural design (e.g. classrooms and offices do not have windows, hallways are narrow and connect via tight corners), structural modifications are likely to impose significant costs.	+	CPTED approaches to interior design of school buildings can help schools think through how to implement effective security features without degrading visual appeal and overall ambience. Wide hallways and classrooms and offices with windows also contribute to a more open and welcoming ambience.
Gunshot detection systems	$$$	Systems to detect gunfire in buildings and report that a shot has occurred are a high-cost security solution for schools. Some systems are standalone, while others require integration into existing public address or other mass notification systems in place at the school, as well as integration into automatic door lock systems, if these exist. For detection systems that include live camera feeds, schools will also need to designate staff to monitor the feed if the system is activated. Systems also require periodic testing and maintenance.	±	Gunshot detection systems are unlikely to have any effect on school climate, as the technology will be minimally visible to members of the school community inside school buildings.
CCTV cameras covering building interior	$$$	Installing CCTV camera and hiring associated staff to monitor camera feeds in real time can be expensive. CCTV systems also have maintenance and upgrade costs that will accrue over time. Some schools install non-functioning or unmonitored CCTVs as a cost-saving measure, but there is no evidence that these work as effective deterrents to crime or violence.	–	Surveillance measures such as CCTVs can have detrimental effects on school climate, and reduce the welcoming ambience that a school might otherwise provide. Students may feel unfairly monitored, and may move illicit behavior to other, unmonitored areas on or off school campus. CCTV cameras can also violate the privacy and other rights of students and other members of the school community if they not implemented with these concerns in mind.
Interior door locks (includes automatic locks, locks triggered by detection systems, manual locks, biometric locks)	$-$$$	Different types of locks and lock systems are available to schools to secure interior doors. Simple locks operated by keys are low-cost solutions. Automatic lock systems operated by key fobs and integrated to function in response to intruder detection systems are high-cost solutions. Automatic systems will also require periodic testing and maintenance to ensure their effectiveness.	±	Locks and lock systems installed on secondary doors are unlikely to have any effect on school climate.
Is there a master key that allows local law enforcement to access building through locked doors?	$	Providing emergency responders with a master key or key fob to enable access to all areas of a school building in the event of an emergency is a low-cost security solution for schools. For schools that install automatic door lock system throughout school buildings, this cost will be included in the cost of that system.	±	Providing a master key to emergency responders is unlikely to have any effect on school climate.

Layer - Building Interior				
Measure	**Cost**		**School Climate**	
Signage (e.g., to direct first responders or aid building evacuation)	$	Installing signs to designate emergency exits or to direct first responders in the event of an emergency is a relatively low-cost measure.	±	The extent to which signs will affect climate will depend on what the sign is drawing attention to. For example, signs drawing attention to the presence of CCTV cameras installed throughout school campus and at the perimeter may reduce a school's welcoming ambience. A sign designating emergency exits and evacuation routes is unlikely to have any effect on school climate.
Interior barriers (e.g., hallway partitions that lock) that make it more difficult for an intruder to move freely throughout the entire building	$$	The cost of installing interior barriers in school buildings will depend on the existing configuration of your school's building interiors. For buildings where hallway design allows for the simple installation of partitions, this can be a low-cost security solution. For buildings with very wide hallways and large, open common areas, structural modifications that will make it more difficult to intruders to move about the building freely are likely to impose significant costs.	±	CPTED approaches to interior design of school buildings can help schools think through how to implement effective security features without degrading visual appeal and overall ambience. Hallway partitions that can be stored out of sight when not in use are unlikely to affect school climate.
Bullet resistant or reinforced doors or windows in interior spaces (e.g., entrances to classrooms, windows in interior spaces)	$$	Design features to protect windows, doors, and walls from gunfire can be expensive. Schools can install security film to protect glass inside school buildings (e.g. on classroom or office windows, classroom and other doors with windows), reinforcing interior walls with poured concrete, or equipping classrooms and/or common spaces with portable ballistic partitions. All of these measures are likely to come at medium cost to most schools.	±	Building features to protect interior building walls, windows, and doors from gunfire are unlikely to have any effect on school climate. Most, if not all, measures that schools might implement in this area would be invisible to the naked eye.
Adults monitoring building interior (e.g., staff, LE, volunteers)	$$	Hiring or reassigning staff or other adults to monitor building interiors can be expensive. Consider whether full time monitors are needed at your school, or whether monitors would be most useful at specific times during the day.	±	Consider how having staff or other adults monitor building interiors might affect school climate. Personnel who are trained to interact positively with students will likely enhance a school's welcoming ambiance. Personnel whose actions and roles are perceived by students as punitive may have detrimental effects on school climate, and reduce the extent to which students feel safe and welcome at their school.
Emergency alarms to notify LE (e.g., duress alarm)	$$	Duress alarms other alarms installed throughout school buildings to directly notify law enforcement of an emergency can be somewhat expensive. Costs will range depending on the technology installed (e.g. Analog, Wireless, IP call boxes) and on associated infrastructure already in place at the school.	±	Emergency call boxes situated inside school buildings are unlikely to have a significant impact on school climate. Alarms that are installed at strategic, but limited, locations inside buildings are unlikely to have any effect.

CHAPTER 5

SUPPORTING INFORMATION ON RESULTS LOGIC, CALCULATIONS, AND DISPLAYS

For users interested in the specific logics that lead from the information submitted by an SSAT user to the options produced in each of the eight results modules, this chapter describes the following four elements:

1. What is being assessed in each results module (building on the summary description included in Chapter 3);
2. Any underlying assumptions built into the module;
3. The measures and questions that the tool checks to assess the user's school against the element; and
4. How the SSAT presents results.

The next sections provide descriptions of each of these four elements all of the eight results modules, in turn. They are designed for use as a reference for users interested in learning more about how the tool produces results, and to provide transparency into the logic through which specific responses to questions asked throughout the SSAT lead to specific results.

RESULTS MODULE 1:
Identifying Security Measures that Need Policy Development and/or Training

1. This results module assesses whether the school has policies and regular training in place to support any staff who have safety and security roles (e.g., patrolling school grounds or hallways, activating design features like barriers to reduce mobility through the school, responding to automated detection systems or CCTV feeds).

2. The module assumes that, in the absence of policies that lay out what staff should do during active threat incidents, and in the absence of training designed to ensure that these staff have up to date knowledge, staff in security roles will be less effective at improving security.

3. The module checks whether the user answered "no" to any question regarding security staff policy and training (for staff-based security measures that they indicated were in place for layers relevant to the scenario being used).

   The tool assumes that measures whose performance will improve with associated training and policies include:

   - **Grounds perimeter**
     - Staff monitoring the perimeter entry point(s)
     - Staff patrolling the perimeter
     - Staff monitoring CCTV cameras covering the school perimeter
   - **School grounds**
     - Staff patrolling the grounds
     - Staff monitoring CCTV cameras covering the school grounds
   - **Building perimeter**
     - Staff monitoring CCTV cameras covering the primary entry points
     - Staff monitoring CCTV cameras covering the remainder of the building perimeter

- Staff monitoring primary entry points
- Staff monitoring screening devices for people and/or bags

- **Building interior**
  - Staff monitoring CCTV cameras covering the building interior
  - Adults monitoring the building interior
  - Locks on interior doors
  - Building design features that make it difficult to move freely thorough the entire building
  - Gunshot detection systems

4. The SSAT presents results as a list of measures where users answered "no" to either or both the follow-up policy or training question, and whose performance the implementation of complementary ingredients would likely strengthen.

RESULTS MODULE 2:
Identifying Core Policies and Plans that are Missing

1. This results module assesses the presence or absence of certain overarching policies and plans (and where relevant, associated training).

   In contrast to policies and training that are specific to a personnel-based security measure (e.g., how staff should respond when a threat is detected), overarching policies and plans can be relevant across multiple scenarios. Examples in the SSAT include general evacuation policies (beyond those for fire), lockdown policies (i.e., plans for locking interior doors within the school to mitigate the effects of an incident in progress), and lockout policies (i.e., plans for locking exterior school doors to mitigate the effects of an external threat and keep it out of the school buildings).

   Such overarching policies and plans can be scenario specific—for instance policy and plans for active assailant incidents, and accompanying training or exercises for staff or students. They can also make other measures like staff or systems controlling building access (lockout policies) or emergency notification systems (which could be used to trigger lockout, lockdown or evacuation) more effective.

2. The module assumes that the security performance of a range of measures will improve with the support of overarching plans and policies, and student and staff knowledge of those policies.

3. The module checks whether the user reported not having implemented any of the following:
   - **Evacuation policy for incidents other than fire**
   - **Lockdown policy**
   - **Lockout policy**
   - **Overall policy for [selected scenario] from Scenario Follow Up questions**
     - ***And*** staff training on policy
     - ***And*** student training on policy

4. The SSAT presents results as a list of any of measures that the school has not already implemented as options for improvement.

RESULTS MODULE 3:

Identifying Security Measures Where Performance is Uncertain

1. This results module assembles information on the subset of measures in the tool where the user selected "I don't know" when asked to assess their confidence in the likely ***detection*** or ***response*** performance of specific measures during an incident. As an understanding of likely performance is important for security evaluation, such unknowns are viewed as high priority to enable a complete assessment of the school's physical security efforts.

2. The module assumes that the user answered honestly about areas of uncertainty regarding security performance.

3. The module checks whether the user reported having implemented the following measures at the physical security layers relevant to the selected scenario:

    - Tip line (confidence) on ***About School*** tab
    - **Grounds perimeter**
        - Staff monitoring the perimeter entry point(s)
        - Staff patrolling the perimeter
        - Staff monitoring CCTV cameras covering the school perimeter
    - **School grounds**
        - Staff patrolling the grounds
        - Staff monitoring CCTV cameras covering the school grounds
        - Emergency call boxes
        - Emergency notification systems
    - **Building perimeter**
        - Staff monitoring CCTV cameras covering the primary entry points
        - Staff monitoring CCTV cameras covering the remainder of the building perimeter
        - Staff monitoring primary entry points
        - Staff monitoring screening devices for people and/or bags
        - Locks on doors that are not entry points
        - Identification system
        - Emergency notification systems
    - **Building interior**
        - Staff monitoring CCTV cameras covering the building interior
        - Adults monitoring the building interior
        - Locks on interior doors
        - Building design features that make it difficult to move freely thorough the entire building
        - Emergency alarms to notify law enforcement
        - Emergency notification systems (if either relevant confidence question is an "I don't know," if asked)

RESULTS MODULE 4:

Identifying Missing Physical Design Features or Technical Measures that Could Make Other Measures More Effective

1. This results module assesses whether the school has physical design or other technology features that would make it easier for CCTV cameras and staff with security responsibilities to detect threats.

2. The module assumes that design features like barriers that make it difficult for an assailant to enter a school campus or buildings unobserved, design features such as sight lines that are part of CPTED approaches, and lighting (for scenarios occurring during periods with limited or no natural light) make it easier for staff members to detect an incident in progress. Further, it assumes that providing staff members with information gathered through a threat tip line will assist the school to detect individuals who may pose a threat to the school.

3. The module checks whether the user reported having implemented the following measures at the school (for the layers relevant to the scenario being used):

    - Perimeter lighting, perimeter barrier that would make it difficult to scale without being detected
    - Grounds lighting, visibility throughout school grounds
    - Interior building design features that make it more difficult for an attacker to hide
    - Tip line and distributing information from the tip line to staff in detection roles

    The measures in the tool whose performance is assumed to be improved by these measures include:

    - **Grounds Perimeter** [if perimeter OR grounds features OR tip line + distributing information to staff not present]
        - Staff monitoring entry points
        - Staff patrolling perimeter
        - CCTV cameras at perimeter
    - **School grounds** [if grounds OR perimeter features OR tip line + distributing information to staff not present]
        - Staff patrolling grounds
        - CCTV cameras covering grounds
    - **Building perimeter** [if grounds features OR tip line + distributing information to staff not present]
        - CCTV covering entry points
        - CCTV covering remainder of building perimeter
        - Staff covering entry points
    - **Building interior** [if interior features OR tip line + distributing information to staff not present]
        - CCTV covering building interior
        - Adults monitoring building interior

4. The SSAT presents results as a list of already implemented measures that might enhance the performance of existing staff and/or CCTV detection capabilities.

RESULTS MODULE 5:

Identifying Measures Involving Security Personnel Who Do Not Have Communication Capabilities

1. This results module assesses whether staff identified as part of the user school's physical security approach were all equipped with functional communications equipment.

2. The module assumes that communication between staff is important for a physical security system to function effectively, and that communication of threats from outer layers of the system enables action in interior layers. The tool treats the presence of communication capability for staff (both between staff and school leadership, and between staff and law enforcement) as beneficial, neglecting the negative effects that can occur from communication (e.g., conflict in information communicated, information overload, etc.).

3. The module checks for instances where users answered "no" to questions about whether staff or other applicable measures are all equipped with functional communication equipment:

   - **Grounds perimeter**
     - Staff monitoring the perimeter entry point(s)
     - Staff patrolling the perimeter
     - Staff monitoring CCTV cameras covering the school perimeter
     - Any free response measure entered by the user that involves communications
   - **School grounds**
     - Staff patrolling the grounds
     - Staff monitoring CCTV cameras covering the school grounds
     - Any free response measure entered by the user that involves communications
   - **Building perimeter**
     - Staff monitoring CCTV cameras covering the primary entry points
     - Staff monitoring CCTV cameras covering the remainder of the building perimeter
     - Staff monitoring primary entry points
     - Staff monitoring screening devices for people and/or bags
     - Any free response measure entered by the user that involves communications
   - **Building interior**
     - Staff monitoring CCTV cameras covering the building interior
     - Adults monitoring the building interior
     - Any free response measure entered by the user that involves communication

4. The SSAT presents results as a list of staff measures and other applicable measures that are lacking functional communication capability; these are opportunities to strengthen physical security performance by providing that capability.

RESULTS MODULE 6:

Identifying Ways to Strengthen Integration with Local Emergency Responders

1. This results module assesses the level of connection between the school and local emergency responders, including law enforcement. This includes elements that are already on campus (e.g., the presence of SSOs, SROs, or law enforcement officers (LEOs)) and technical connectivity measures including communication.

2. Although the timeline of most school violence incidents is short enough that off-campus response typically occurs after an incident is already completed, this module assumes that greater connectivity between schools and responders will be beneficial if an incident occurs.

3. The module checks whether the user answered "no" or did not indicate connectivity between staff/school and responders/law enforcement for the following measures:

   - **From *About School* tab**
     - SSO/SRO/LEO – Not present
     - Local law enforcement (LE) access to CCTV feed – Not present
   - **Grounds perimeter**
     - Any "Staff have functional communications equipment to report a detected threat … directly to law enforcement" – Not selected as including direct communication to law enforcement
     - Any free response measure entered by the user that could have direct communication with law enforcement but not selected as doing so
   - **School grounds**
     - Any "Staff have functional communications equipment to report a detected threat … directly to law enforcement" – Not selected as including direct communication to law enforcement
     - Emergency call boxes that notify LE – any answer except (Yes + confident)
     - Any free response measure entered by the user that could have direct communication with law enforcement but not selected as doing so
   - **Building perimeter**
     - Any "Staff have functional communications equipment to report a detected threat … directly to law enforcement" – Not selected as including direct communication to law enforcement
     - If school has locks on doors that are not entry points + Is there a master key that allows local LE access = No
     - If they have Intrusion detection system, it will notify LE = No
     - Any free response measure entered by the user that could have direct communication with law enforcement but not selected as doing so
   - **Building interior**
     - If they said they had a Gunshot detection system, it only notifies "School staff"
     - Any "Staff have functional communications equipment to report a detected threat … directly to law enforcement" – Not selected as including direct communication to law enforcement
     - IF they have Interior Door Locks + Is there a master key for local LE = No
     - IF they have Building design features like barriers + Is there a master key for local LE = No

- Emergency Alarms that notify LE = No
- Any free response measure entered by the user that could have direct communication with law enforcement but not selected as doing so

4. The SSAT presents results as a list of measures where there were options for more connection with local responders and law enforcement.

RESULTS MODULE 7:
Identifying Measures with Low Confidence in Performance

1. This results module assembles information on all the measures in the tool where the user indicated that they had low confidence (corresponding to the third and fourth answer on the presented confidence scale) in the likely performance of a measure to ***deter*** or ***respond*** to the selected incident scenario. Having used priming and the presentation of relevant measures in the question itself, this confidence judgment is designed to leverage the user's local information and insight in assessing the security measure.

2. The module assumes that the user, if they provided a confidence assessment (i.e., any answer other than "I don't know" to this question), has considered how the local context could affect security performance, and made an honest assessment.

3. The module checks the user's confidence assessment for the following measures:
   - **Tip line** (confidence) **on *About School* tab**
   - **Grounds perimeter**
     - Staff monitoring the perimeter entry point(s)
     - Staff patrolling the perimeter
     - Staff monitoring CCTV cameras covering the school perimeter
   - **School grounds**
     - Staff patrolling the grounds
     - Staff monitoring CCTV cameras covering the school grounds
     - Emergency call boxes
     - Emergency notification systems
   - **Building perimeter**
     - Staff monitoring CCTV cameras covering the primary entry points
     - Staff monitoring CCTV cameras covering the remainder of the building perimeter
     - Staff monitoring primary entry points
     - Staff monitoring screening devices for people and/or bags
     - Locks on doors that are not entry points
     - Identification system
     - Emergency notification systems
   - **Building interior**
     - Staff monitoring CCTV cameras covering the building interior

- Adults monitoring the building interior
- Locks on interior doors
- Building design features that make it difficult to move freely thorough the entire building
- Emergency alarms to notify law enforcement
- Emergency notification systems (if either relevant confidence question is a no or low confidence, if asked)

4 The SSAT presents results as a list of the measures the user flagged as having low or no confidence. Because a variety of mechanisms could result in concerns about physical security performance, the tool provides a set of generic steps that could be taken to increase confidence. The choice of applicable steps and their relative priority is left to the user, based on the specific reasons that resulted in their low confidence assessment.

RESULTS MODULE 8:
Identifying Layers Reliant on One Security Measure or Entirely Missing a Key Security Function

1 This results module is the systems-based assessment of the overall robustness of the school's physical security system. The module considers each layer and examines the measures that reported as present in each and categorized to achieve one or more physical security strategy (detection, delay, response). In some cases, the assessment includes the user's confidence assessment:

- To **assess detection**, if relevant, a measure is only treated as a detection measure for the layer where the user indicated they had high or moderate confidence in its likelihood of detecting a threat.
- To **assess delay**, if relevant, a staff-based measure is only included if both policy and training is in place.
- For **assess response**, if relevant, a measure is only treated as a response measure for the layer where the user indicated they had high or moderate confidence in its likelihood of responding effectively to a threat.

2 The module assumes that staff responding to a threat have the potential to delay its evolution even if there is low or no confidence in their ability to respond effectively (i.e., for their intervention to stop the incident entirely). It also assumes that the user's assessments of confidence in measures are correct and reflect local conditions and circumstances.

3 The module checks the following combinations of answers to questions for measures in each layer for detection, delay, and response (for measures and layers relevant to the scenario):

- **Grounds perimeter**
  - **Detection**
    - → Staff monitoring the perimeter entry point(s) + Confident of Detection
    - → Staff patrolling the perimeter + Confident of Detection
    - → Staff monitoring CCTV cameras covering the school perimeter + communications equipment + policy + training + Confident of Detection
    - → Any free response measure entered by the user identified as detection

If none or only one of these holds, include "Grounds Perimeter, Detection" in results.

  - **Delay**
    - → Staff monitoring the perimeter entry point(s) + policy to respond + training to respond
    - → Staff patrolling the perimeter + policy to respond + training to respond
    - → Perimeter barrier that is difficult for someone to scale without being detected + single or small number of entry points

- → Any free response measure entered by the user identified as delay

If none or only one of these holds, include "Grounds Perimeter, Delay" in results.

- **Response**
  - → Staff monitoring the perimeter entry point(s) + policy to respond + training to respond + Confident of Response
  - → Staff patrolling the perimeter + policy to respond + training to respond + Confident of Response
  - → Any free response measure entered by the user identified as response

If none or only one of these holds, include "Grounds Perimeter, Response" in results.

School grounds

- **Detection**
  - → Staff patrolling the grounds + Confident of Detection
  - → Staff monitoring CCTV cameras covering the grounds + communications equipment + policy + training + Confident of Detection
  - → Emergency call boxes + Confident
  - → Any free response measure entered by the user identified as detection

If none or only one of these holds, include "School Grounds, Detection" in results.

- **Delay**
  - → Staff patrolling the grounds + policy to respond + training to respond
  - → Any free response measure entered by the user identified as delay

If none or only one of these holds, include "School Grounds, Delay" in results.

- **Response**
  - → Staff patrolling the grounds + policy to respond + training to respond + Confident of Response
  - → Any free response measure entered by the user identified as response

If none or only one of these holds, include "School Grounds, Response" in results.

Building perimeter

- **Detection**
  - → Staff monitoring CCTV cameras covering the entry points + communications equipment + policy + training + Confident of Detection
  - → Staff monitoring CCTV cameras covering the rest of the perimeter + communications equipment + policy + training + Confident of Detection
  - → Staff at entry points + Confident of Detection
  - → Intrusion detection
  - → Identification system + Confident of Detection
  - → Screening devices or systems + in use at time of attack + staff monitoring + Confident of Detection
  - → Any free response measure entered by the user identified as detection

If none or only one of these holds, include "Building Perimeter, Detection" in results.

- **Delay**
  - → Locks on doors + policy + confident
  - → Staff at entry points + policy to respond + training to respond

- → Screening devices or systems + in use at time of attack + staff monitoring + policy + trained
- → Any free response measure entered by the user identified as delay

If none or only one of these holds, include "Building Perimeter, Delay" in results.

- **Response**
  - → Staff at entry points + policy to respond + training to respond + Confident of Response
  - → Lockout policy + confident
  - → Screening devices or systems + in use at time of attack + staff monitoring + policy + trained + confident response
  - → Any free response measure entered by the user identified as response

If none or only one of these holds, include "Building Perimeter, Response" in results.

- **Building interior**
  - **Detection**
    - → Gunshot detection system + policy + training
    - → Staff monitoring CCTV cameras covering interior + communications equipment + policy + training + Confident of Detection
    - → Adults monitoring building interior + Confident of Detection
    - → Emergency Alarms to notify LE + Confident
    - → Any free response measure entered by the user identified as detection

If none or only one of these holds, include "Building Interior, Detection" in results.

- **Delay**
  - → Locks on doors and ((policy + trained + confident) OR automatic lock)
  - → Adults monitoring building interior + policy to respond + training to respond
  - → Building design features to make difficult to move freely + (lock automatically OR (policy + trained + confident))
    + How significant an effect? (To a great extent, to a moderate extent)
  - → Bullet resistant or reinforced doors and windows
    + How broadly implemented? (All or Most)
  - → *Any free response measure entered by the user identified as delay*

If none or only one of these holds, include "Building Interior, Delay" in results.

- **Response**
  - → Adults monitoring building interior + policy to respond + training to respond + Confident of Response
  - → Emergency notification + lockdown policy + confidence
  - → Emergency notification + evacuation policy other than fire + confidence
  - → Any free response measure entered by the user identified as response

If none or only one of these holds, include "Building Interior, Response" in results.

4 The SSAT presents results as a list of layers and functions that are candidates for strengthening. Measures that the user did not report as being in place are included in the SSAT's Results Summary page as options for further strengthening school security.

In some cases, the SSAT will flag layers as not robust due to the user's low confidence in specific measures. Advice to improve confidence in those existing measures is not returned in this module, since doing so would be duplicative of the earlier module that specifically addresses confidence issues.

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The U.S. Department of Homeland Security does not endorse any person, product, service, or enterprise. References to specific agencies, companies, products, or services therefore should not be considered an endorsement by the U.S. Department of Homeland Security. Rather, the references are illustrations to supplement discussion of the issues. The Internet references cited in this publication were valid as of the date of this publication

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