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Phase I Report

School Safety, Security and Emergency Preparedness Assessment for

School Board of Broward County, Florida

August 2018

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1. Introduction

On February 14, 2018, a student who had formerly attended Marjory Stoneman-Douglas High School (MSDHS) of The School Board of Broward County (SBBC), Florida entered the campus and fatally shot 14 students and 3 employees and wounded an additional 17 victims. This complex and extremely traumatic event is currently under investigation.

In the wake of this tragedy, Broward County Public Schools (BCPS/the District) leadership decided that there was a need for the District to have an external and comprehensive review of safety, security and emergency preparedness measures in place at its schools. After a competitive and emergent bidding process, BCPS selected Safe Havens International (SHI) for the project. The project includes a comprehensive district-wide safety, security and emergency preparedness assessment of all 231 school sites as well as a review of the design criteria for BCPS buildings. Due to the specific needs of BCPS, the project timeline, and the areas that needed to be assessed in our assessment process, this project is divided into two phases, with Phase I (which involves a physical and security technology assessment) to be completed by the end of July 2018 and Phase II (which involves a school climate, culture, safety, security and emergency preparedness assessment) to be completed by the end of October 2018.

During the logistical planning for site visits to the 231 school sites for phases I of the assessment, it was discovered that that the District has 233 school sites. It was also determined that it would be prudent for BCPS to have the District's 22 support facilities assessed in phase I. As it would take considerable time to identify funding for the additional schools and support facilities, and we were concerned that waiting to start this process could interfere with the timeline for Phase II, SHI decided to conduct the assessment for these 24 additional schools and support facilities (a roughly 10 percent increase in the number of sites for assessment) as a pro bono effort.

Additionally, after the tragedy at MSDHS, SHI was contacted by members of Secure our Schools Parkland (SOS Parkland), which was formed by concerned members of the Parkland community including parents and other relatives of MSDHS victims, parents and guardians who have children in Parkland schools, and members of the community and government officials. As part of our mission as a non-profit center is to provide pro bono services to schools in the United States and around the world under specific conditions, we offered to provide a preliminary assessment without written reports for each of the five schools in the Parkland area at no cost. The purpose of this assessment was to help the administrators at those schools and the District to identify opportunities for improvement in safety, security and emergency preparedness that could be implemented before Phases I and II of the project would be completed. This effort was also designed to provide SHI analysts with an opportunity to observe the five schools in operation before the school year ended.

We note that in our experience providing post-incident assistance for 14 other planned K12 school shootings in U.S. and Canadian schools, the majority of school districts opt not to conduct an assessment of this scale, depth or comprehensiveness when litigation is pending or is likely to occur. In fact, it is

fairly typical for school districts that experience a shooting not to have any external assessment even for single victim events. Although we understand why most school districts would not have a deep assessment of this type so soon after a mass-casualty school shooting, this approach has typically led to ineffective security and emergency preparedness measures, wasted fiscal resources and can lead to missed opportunities to prevent additional safety or security events.

The Marjory Stoneman-Douglas High School Community has endured not only this tragedy, but has also been affected by intensive media coverage, large numbers of curiosity-seekers who have travelled from distant regions to drive by the school and countless other stressors that must be extremely taxing to anyone directly impacted by this event. We were deeply impressed by the willingness of people who lost loved ones in the tragedy at Marjory Stoneman-Douglas High School, personnel at the school as well as other schools in the District, as well as public safety responders to meet with our personnel and to discuss school safety during the assessment in this phase. Various personnel on our team have met with hundreds of school and public safety officials who have experienced major acts of school violence over the years. Our experience has been that it is understandably often extremely difficult for people who have experienced these events to discuss school security measures in the wake of a tragedy. While our personnel tried to exercise care in being sensitive to the emotional trauma that the community has experienced, it is still quite easy for a single question, answer or comment to remind people of specific aspects of the traumatic event. Unfortunately, an assessment process is, by nature, extremely difficult for anyone who has been directly involved in such an event to discuss school safety measures with external experts who have not experienced what only those involved in the specific traumatic event can fully comprehend. Therefore, every member of our team is very grateful for the manner and composure of the many people who are directly impacted by the tragedy but have been willing to assist them in evaluating school safety in this project.

We were also amazed at the efforts expended by building administrators and members of their staff who were able to adjust their busy schedules on short notice to meet with our analysts during the process. Some school personnel came in on off days, worked late or came to assist us when they had already scheduled vacations. Without this assistance, we would not have been able to compile and assess the considerable amount of information needed for the Phase I assessment, let alone being able to do so on such a short timeline.

As with all of our assessment projects, our analysts carefully consider the unique features of any public-school system or non-public school we assess. While there are some concepts that are important for most K12 schools, we have found that "cookie cutter" and "one-size fits all" approaches to school safety, security, climate, culture and emergency preparedness are not only often fiscally irresponsible but are also less safe approaches. This is because approaches that are not properly tailored typically result in ineffective and inefficient use of time, energy and fiscal resources. Our assessment process and this report take into account that BCPS is the sixth largest public-school system in America with more than 271,500 students, 175,000 adult learners who receive educational services at 233 schools with 2,381 buildings. Having assessed non-public schools with only 26 students to five of the nation's largest K12

public school systems, our experience has been that a failure to take the size, complexity and local community factors into account can result in less effective approaches.

We also note that as repeated security breaches at highly secured locations including the White House, the U.S. Capitol, U.S. Embassies, the Headquarters of the Central Intelligence Agency, Federal courthouses, airports and hundreds of other heavily secured environments have demonstrated, there are no measures that can provide absolute security in any setting. However, there are opportunities and possibilities to significantly reduce the likelihood that violent incidents will occur while also improving the level of preparedness for students and staff. In our experience, this comprehensive safety, security, climate, culture and emergency preparedness assessment will help BCPS and its community partner agencies and organizations significantly enhance the level of safety, security and emergency preparedness while also improving rather than degrading the positive school climate and culture that are important to safer and more effective schools.

2. Rationale of the Report

While BCPS decided that the assessment in this project is to assist BCPS in finding opportunities for meaningful and long-term improvement of safety, security and emergency preparedness at all BCPS schools, the District also wanted to identify opportunities for improvement that can be implemented before the new school year starts as well as the enhancements that can start during the Fall even though effective implementation will take longer to complete effectively. BCPS also wanted information to determine which enhancements may qualify for the District's school security upgrade grant application to the Florida Department of Education (FLDOE). Therefore, SHI was asked to provide information of this type in the Phase I report.

This Phase I report is based on the following:

- The results of our assessment of the physical and electronic security of all 233 schools in BCPS conducted in this phase. Due to the timeline of this report, the assessment results for 22 support facilities will not be included in the report.
- Our observations from the preliminary assessment of the five schools in the Parkland area.
- The review of BCPS's *2017-2018 Emergency Preparedness Manual* and the recently updated instructional materials for the active shooter training program developed by BCPS and local law enforcement agencies. It should be noted that originally in our proposal, the review of BCPS's documents, policies and procedures related to school safety, security and emergency preparedness would be conducted in Phase II. However, BCPS wanted to start improving the drills and exercises when the new school year starts, so we were asked to add to our scope of work in this phase the review of those two types of documents.
- The review of *The Broward County League of Cities' School and Community Public Safety Task Force Initial Report and Recommendations* published on June 4, 2018 (Task Force Report).

This report also includes our observations and opinions relating to a variety of school security and emergency preparedness measures suggested by employees, parents, students, and members of the general public to the District. It should be reminded that since the assessments in this project have not been fully completed, this Phase I report will be limited to the findings and options for consideration that can be determined without the important assessment processes that must be performed in the Fall while schools are in session. We caution our clients that there are some extremely important life-safety areas that cannot be assessed effectively when schools are not in session. A few examples include but are not limited to:

- Student supervision practices
- School climate – how students interact as well as how students and staff interact
- The flow of passenger cars, school buses and pedestrians during morning arrival and dismissal
- The flow of people into and out of schools during arrival and dismissal

- How students and staff move about during the school day
- Access control practices
- Visitor screening and management practices

We note that in our experience assisting with assessments for more than 6,000 K12 schools across the nation and abroad, there can be differences in actual practice that cannot be determined solely by reviewing policies, procedures and training programs. As almost every aspect of school safety, security and emergency preparedness is human dependent to at least an extent, assessing some aspects of school safety is most effective when schools are in session. These processes will be addressed in Phase II of the project. Additionally, we caution that some findings in this report could change once our analysts complete Phase II of the assessment. The final strategic report, which will have more findings and observations because of the additional processes, will be provided after the completion of the assessments in Phase II.

We also noted that BCPS initially planned to make this report a public document to address the concerns that students, parents, employees and the general public have about school safety in light of the tragedy at MSDHS. In addition, the BCPS leadership team and Board members determined that it was important to demonstrate transparency as major expenditures of public funds and life-safety concerns were being evaluated. As is consistent with all of our previous school safety, security, climate, culture and emergency preparedness projects, we cautioned BCPS that releasing the master strategic report and/or site reports for individual schools in their entirety could create significant danger for staff and students. We note that we state on every page of our reports for all Florida public and non-public school clients, "This document may be confidential and exempt from public disclosure pursuant to Sections 119.071(3) and 281.301, Florida statute." Our concern is that individuals or groups could use some of the information in our reports to plan criminal activities including but not limited to planned acts of violence.

Due to sensitive information in the specific areas of this strategic report, we suggested that we develop a redacted version of this report for the District to release to the general public. This will help serve the District's desire to better inform the public while still not making detailed security sensitive information in the report available to those who might wish to use it to achieve criminal goals. With these concerns in mind, we have specifically redacted some of the rationale and justification for some of our findings in the redacted version of the report to reduce the value of the document to potential future attackers. Our analysts have made extensive efforts to provide a balance for the basis for our findings and options for consideration in this report so BCPS, its students, parents, employees and the public can have confidence in our opinions while limiting the information that could be useful to aggressors to that which can typically be found in the public domain.

However, we suggest that BCPS not make our Phase II strategic report or site reports for individual schools public documents. In the case of site reports, even the redacted versions could be helpful to those who might wish to carry out criminal acts at particular schools. This is because a review of all or

even a portion of individual school reports could make it possible for someone to determine specific vulnerabilities for individual schools. These reports will contain even more sensitive information specific to individual schools. Additionally, in our experience, the level of detail in our strategic reports for school safety, security and emergency preparedness assessment could easily serve as a "blueprint" for potential future attackers. This risk could also extend to other public schools, charter schools, faith-based schools, independent schools, and boarding schools that, based on our experience, typically have many of the same types of vulnerabilities that will be revealed in the reports.

As a case in point, SHI was contacted by an official from the United States Department of Homeland Security (USDHS) after the official found one of our assessment reports on the Internet while performing his duties. His concern was that terrorists and other bad actors would scan the web to find potential targets in the same manner that he did. The official found the report within a few days after it was posted, was quite alarmed and contacted us to have the report removed. We contacted the client district and learned that the report had been included in a packet for school board members and was provided to the media at that time. A local newspaper subsequently posted the entire report on their website.

The USDHS conducts these searches in the same manner as bad actors to help protect organizations from attack. We note that this type of pre-attack research is not restricted to terrorists and that we have noted pre-attack research in a number of the planned school attacks as well as many of the successfully averted school attacks we have worked. While our clients must make the decisions relating to the release of information in our reports, we always advise our clients not to provide our strategic and site reports to the public.

It is important to remember that **the nature of an assessment process is to accentuate the areas where gaps have been identified and to note opportunities for improvement**. Our approach is to give a critical, problem-seeking perspective – a view that can help our clients make changes to reduce the likelihood that tragic safety incidents will occur. Therefore, negative findings tend to overshadow the positive aspects existed in BCPS despite our analysts' reasonable efforts to seek out, identify, quantify, and highlight successes observed during the assessment.

We find that it is important for school officials and the general public to consider that while there are an almost endless array of approaches, technologies, hardware and other options to improve school safety, it is extremely important that school districts not attempt to implement more advancements than the human resources of the organizations can effectively support. Security and emergency preparedness failures can occur because an organization has attempted to implement more protective measures than the people in the organization can support. Few if any protective measures are not human dependent to some extent. Implementing a seemingly simple enhancement in a school district with more than 30,000 employees can require considerable staff development time, logistical work and personnel to provide oversight. Our approach is to weigh each option for consideration with these important logistical considerations in mind.

3. Methodology and Limitations

Due to the timeline of the information needed for BCPS's grant application to the Florida Department of Education and the size of BCPS, the comprehensive district-wide safety, security and emergency preparedness assessment for all 255 BCPS schools and support facilities and design criteria review in this project are divided into two phases. A team of 18 analysts from SHI and our partners Parkhill, Smith & Cooper, Inc. (PSC) and Atlas Safety & Security Design (ASSD), conducted the on-site and off-site assessments in this phase. Specifically, the assessments include:

- **A pro-bono preliminary assessment of five schools in the Parkland area**: A team of five analysts from SHI, our partners PSC and ASSD visited MSDHS, West Glades Middle School, Heron Heights Elementary School, Park Trails Elementary School and Riverglades Elementary School to conduct a preliminary assessment of these schools. These visits included interviews and discussions with administrative and/or security team members and a tour of each campus.

- **Site-level assessment**: Utilizing the SHI web-based assessment tool, a team of 12 SHI and ASSD analysts visited all 233 schools (including second visits to each of the five schools in the Parkland area) and 22 support facilities in BCPS to assess the following areas, which included but were not limited to:

    - Perimeter protection measures
    - Playground perimeter protection
    - Signage and instructions
    - Access control systems for main entry doors, exterior doors (such as kitchen delivery doors), classroom doors that open to the outside for traditional as well as special education schools
    - Emergency communications systems (including radios, intercom, phones, public address, light stroke, etc.) for traditional and special education schools
    - Camera surveillance systems including smart or analytical cameras for loitering detection, etc.
    - Visitor management systems
    - Classroom door locks for traditional and special education schools
    - Intrusion detection and door lock alert systems for regular school hours as well as after-hours for traditional and special education schools
    - Emergency evacuation maps and routes

- Entryway configurations (such as security vestibule)
- Other life-safety devices such as Automatic External Defibrillators (AEDs)

The assessment process typically included areas such as:

- Grounds
- Staff, student and visitor parking areas
- Student pick-up and drop-off areas
- Building exterior
- Main office and/or lobby areas
- A representative sampling of classrooms
- Library/media centers
- Auditoriums
- Science labs, if applicable
- Gymnasiums and weight rooms
- Locker rooms
- Swimming pools, if applicable
- Cafeteria/food preparations
- Storage areas
- Boiler rooms/mechanical rooms
- Other unique relevant spaces

- **District-level assessment**: In addition to the site-level assessment as described above, we also conducted the following meetings:
  - SHI Executive Director Michael Dorn and Analyst Phuong Nguyen visited the District for two days and met with key BCPS personnel to evaluate the following:
    - Preparedness for emergency situations
    - Public safety response capabilities in the District

        - Emergency communications capabilities
        - School resource officer/security staffing and deployment during school hours, after-hours and athletic events
    - A team of two PSC analysts met with BCPS facilities team members to evaluate the District's current facility improvement efforts and planned future actions.

- **Design criteria review**: A team of four PSC analysts visited a sampling of 11 school sites and 1 support facility to evaluate the security infrastructures and patterns within the District. The team also met with key District personnel to assess the application of security technologies at schools and support facilities in the District. The team's on-site observations included interviews and tours of each school with a member of the school's administrative team and/or security officer. The team's approach to assessing buildings and floor plans is to think about the layers of security that can be employed to mitigate these threats – natural surveillance, physical barriers, and electronic tools.
- **An off-site document review**: The following documents were reviewed:
    - *BCPS 2017-2018 Emergency Preparedness Manual*
    - The recently updated instructional materials for the active shooter training program developed by BCPS and local law enforcement agencies
    - Task Force Report

Additionally, our analysts also conducted extensive research collecting and reviewing hundreds of articles, book chapters, guides and manuals to evaluate a wide variety of options for consideration and options that we have been asked to evaluate. Our analysts also spent considerable time reviewing vendor website information, talking to vendors and contacting a number of our previous clients to solicit feedback on their experiences with different types of hardware, software and technologies.

It is beyond the scope of work in this project to assist the District with the completion of the self-assessment using the Florida Safe Schools Assessment Tool (FSSAT). It is also not possible for a vendor to use the tool because the training on how to use it is geared for staff employed by Florida schools. Additionally, access to the tool is also limited to Florida school employees assigned by Florida school districts to complete the self-assessment. The assessments in this project is also limited in scope to general safety, security, and emergency preparedness issues. The assessments do not include:

- Fire code inspections
- Building code compliance inspections
- Inspections of hazardous materials storage or chemistry lab compliance

- Formal playground inspections
- Traffic assessment from an engineering standpoint
- Environmental health and OSHA compliance inspections
- Environmental safety evaluations
- Structural facility integrity or engineering inspections
- Information technology security assessments (such as firewall protection)
- Safety inspections of specific types of systems or equipment (such as boilers and electrical systems)
- ADA accessibility evaluations
- Other specialized types of inspections

Though we may occasionally note obvious gaps in some of these areas, this should not be seen as the result of SHI having formally evaluated those areas.

4. Key Achievements

Even though the focus of this report emphasizes the areas where improvements can and should be made, we would be remiss if we did not point out a number of key achievements and enhancements the District has made in the areas of school safety, security and emergency preparedness. It is important to note that by nature, this report will focus on the areas for improvement rather than on the many notable improvements that have occurred in BCPS.

4.1. School administrators and the staff we interacted with during the assessment exhibited a desire to create and maintain a safe school environment at BCPS.

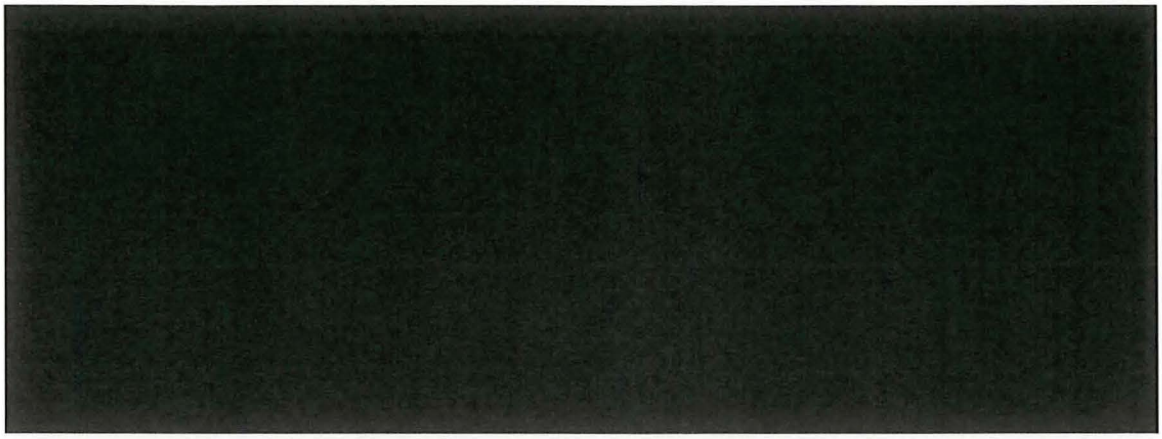
We were also highly impressed with the level of professionalism, expertise and passion exhibited by a wide variety of BCPS employees with whom we interacted during the assessment. We found the personnel we worked with at schools and support facilities in BCPS we visited to be professional, courteous, helpful in answering our questions, and eager to learn improved ways to enhance the many positive safety measures they have already implemented. We found the personnel we interacted with to be very open to questioning how things are currently done and saw no signs of defensiveness in our discussions. This is a highly impactful asset to BCPS. We found BCPS personnel to be highly inquisitive and open to new ideas to enhance school safety.

4.2. BCPS has made significant improvement in creating single point of entry (SPE) for its schools.

One of the foremost physical security improvements that can be made in K-12 school design is the securing of exterior doors and requiring all entrants into the facility to funnel through a singular location. BCPS is already on track to complete this work with funding from the SMART bond: 125 sites completed, 31 sites under construction, 2 in contracting/procurement and 80 in various stages of design. In this area, we find the District ahead of many other public-school districts we have worked with. While SPE has limitations at some schools due to the lack of tubular steel ornamental security fencing as is common to most Florida school districts we have assessed, BCPS has been making steady progress towards the creation of SPE for its schools.

4.3. Most of BCPS schools have perimeter fencing.

Most of BCPS schools have six-foot-high chain-link fencing and gate structures to provide an outer layer, or initial perimeter at the campus level. While we heard comments from many parents and school administrators that they were concerned about the current fencing and wanted to replace or raise the height of fences, we see that BCPS is still in line with and, in many instances, ahead of many other school districts in this area. Many schools in the United States, particularly those in the Western part of the U.S., utilize open design concepts, in which schools often have multiple buildings with no perimeter fencing.



4.5. All traditional K12 schools in the District have a computer-based visitor screening system, and front office staff at all five Parkland schools we assessed checked the government issued identification (ID) cards of our analysts.

Our assessment results show that all traditional K12 schools in the District have a computer-based visitor screening system – the Security Tracking and Response (STAR) system. While we will need to evaluate the fidelity of how this system is utilized in actual practices in Phase II, when school is in session, the equipment has been purchased and installed. Even if there are opportunities for improvement in the fidelity of practices, we see that having this electronic system in place makes it easier to effectively manage visitors than a paper-based system, which relies on notes and records from the schools. We note that while these systems are becoming common in K12 schools, there are many public and non-public schools that still operate with paper-based approaches. An electronic system typically allows for a systematic approach across schools in a district to check visitors against sexual predator databases, the lists of individuals who are banned from district properties and people with outstanding court orders to stay away from specific students or employees.

Additionally, during our visit to the five schools in the Parkland area for a preliminary assessment, front office staff at all those schools asked for our analysts' photo IDs and printed out the ID badges for us. We note that staff checked our IDs even though we were escorted by District employees during our site visits. This is a highly positive practice. If this practice is not utilized, it will be easy for a visitor to enter false information to gain access to a school, and thus to students and staff.

5. Opportunities for Improvement

While the District has made significant efforts to address concerns and opportunities for improvement in the areas of school safety, security, and emergency preparedness, as mentioned above, there are still significant opportunities for improvement in each of these important areas. The following are the opportunities for improvement we found in this phase. As discussed above, due to this report being released to the public, we have specifically omitted some of the rationale and justification for these opportunities for improvement to reduce the value of this document to potential future attackers.

Per the District's request, the opportunities for improvement in this section are categorized and prioritized as follows:

- **I**mmediate - Highest priority: Implement in the fastest manner reasonably possible as long as quality of the upgrade can be maintained through maintenance effort or currently available funds.

- **H**igh Priority - As soon as funding becomes available: Implement with any grant funding or security funding sources as they become available.

- **L**ong Range Goal – Plan for implementation over time: Begin systematic implementation through routine maintenance opportunities or planned capital improvement efforts as well as in facility additions and new construction.

- **F**uture Improvement – Not recommended at this time but possible for future improvement: Consider implementing if there is still funding available after improvement efforts for other I, H and L items, or if there are changes in technologies that make the enhancements more cost effective to implement. Individual communities or schools may choose to implement so long as they have funding; no additional personnel will have to be provided by the District to support them; the funding mechanism will provide for any life-cycle replacement costs; the upgrade will not conflict with District construction or information technology standards; and the enhancement is compliant with building, fire and life-safety codes.

- **S**pecs - Include in design specifications for all new facilities: Update design specifications to require in any new construction or renovation project designs.

- **N**ot Recommended – Not for consideration for implementation: Not recommended because the approach is experimental and not yet validated as effective; or because there may be concerns about quality, reliability or sustainability for the District; or potential dangers that could arise from implementation.

We should note that it is impossible to accurately and mathematically rank all safety, security, and emergency preparedness concerns. The wide range of factors makes many of the opportunities for improvement in this report interdependent. For example, the implementation of one opportunity for improvement can increase or decrease the impact of another enhancement. There are also times when the District will be able to move forward on multiple enhancements at the same time, thus changing the priority of these tasks.

Additionally, limited budget realities in relation to overall options for considerations are a factor that should be taken into account when District leaders attempt to prioritize potential enhancements. Any unexpected sources of funding such as new school safety grant funding programs could also make it more practical for BCPS to move forward on a particular option sooner. Availability of short-term and long-term funding is also a reality that must be considered when these types of decisions are made. In our experience, the failure to consider long-term sustainability often results in protective measures being abandoned within a few years. For this reason, this ranking should be viewed as providing general guidelines rather than as an absolute ranking of priority.

Where it is applicable, we will also provide the cost estimate for the implementation of the opportunities for improvement identified. We note that actual costs may vary over time for a variety of reasons. For easy follow-up, the opportunities for improvement in this section are grouped into the following sub-sections. Please note that the opportunities for improvement in this section are not necessarily prioritized by order of importance.

5.1. Surveillance, Emergency Communications and Access Control

5.1.1. The District should continue its efforts to upgrade camera surveillance systems with a long-term goal toward the use of audio and video analytics.

We were advised that the District has completed Phase One of its efforts to upgrade camera surveillance systems for all of its schools. The goal is for the District to finally be able to effectively monitor, manage and protect its video surveillance systems across all BCPS schools. [redacted], all schools now have the electronic surveillance system head-end equipment to support IP based cameras, modern video management system (VMS), and an integrated surveillance solution system such as Avigilon (which includes surveillance cameras, microphones, motion detectors and sensors to monitor and detect motion and sound and report to a control and monitoring center). The end result is a unified video surveillance system across the District that can be monitored and managed at a centralized location such as the Communications and Monitoring Center (as detailed later in this report). This capability will not only help District staff monitor and manage camera systems at all schools more effectively and efficiently but also alleviate the burden of the task from individual schools. Personnel at each school can still have access to the surveillance video information and notifications generated by the system.

[redacted] We see this direction as logical and should be continued when there is funding available. The following are our general recommended camera placement. We should note that there can be other areas where individual schools could benefit from additional cameras due to unique situations, design features and academic programs.

Surveillance Camera Placement (Immediate Priority Areas)		
[redacted]	*Middle School*	*High School*
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	

Surveillance Camera Placement (High Priority Areas)		
Elementary School	*Middle School*	*High School*
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

	[redacted]	[redacted]
		[redacted]
		[redacted]
Surveillance Camera Placement (Long-Range Areas)		
Elementary School	***Middle School***	***High School***
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]		[redacted]
[redacted]		

We should note that the recommended surveillance camera placement in this table, even for the "long-range areas," is not on the high end of what some of our public-school districts have in place. [redacted] We took this approach because our analysts find that there are other more impactful opportunities for improvement in contrast to adding camera coverage beyond what is suggested at this time.

We also suggest the District move forward with a long-term goal toward the use of video analytics (i.e., video content analysis), which is the use of software with applications set up to monitor video feed of specific events (such as motion detection, intrusion detection, entry though an exit, etc.) and send alerts, as well as enterprise level VMS to support a centralized management system and promote integration with other security technologies. As the upgrade moves along, adding additional staff to properly and effectively administer, manage, program and maintain the new and enhanced systems is

important. And once the upgrade is completed and the use of video analytics is in place, staff should also be trained on proper use of VMS as well as response to alerts from video analytics.

The following chart summarizes our ranking for the opportunities for improvement in this section as well as the related estimated cost:

No.	Opportunity for Improvement	Ranking	Estimated Cost
1	Add additional IP-based surveillance cameras in the immediate priority areas	I, S	$4,000-$5,000/camera point
2	Add additional IP-based surveillance cameras in the high priority areas	H, S	$4,000-$5,000/camera point
3	Add additional IP-based surveillance cameras in the long-range areas	L, S	$3,000-$4,000/camera point
4	Replace existing analog and first-generation cameras with programmable IP-based cameras	L, S	$3,000-$5,000/camera point
5	Add appropriate staff resources to properly and effectively administer, manage, program and maintain the new and enhanced systems	L	N/A
6	Provide district-wide training for district level and site level administrators and relevant staff in proper use of surveillance cameras	L	N/A

Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.

5.1.2. We suggest the District consider a much-enhanced investment in portable radios and, as needed, equipment to boost radio reliability and reach, and these efforts should be accomplished in alignment with the Broward County Government's radio upgrade plan.

Our assessment results show that many schools in the District do not have adequate numbers of portable radios for school staff and, in some cases, consistent deployment of personnel with radios. For example, [redacted]

[redacted] We also learned that while the radio coverage is good for most BCPS schools, there are some locations where the radios do not work because of the condition of some of the repeater equipment and the lack of adequate repeaters. Radio repeaters help boost radio signals where the ability of the radio is limited by distance or physical barriers such as building features. There are also concerns that the District's current radios for school buses and key school personnel are outdated. We note that this section will be discussing two different radio systems, one for school-based personnel and another system for school buses and specific key personnel.

While there are a variety of emergency communications technology options for schools, we still find that portable radios, like robust intercom systems, are among the most reliable, rapid and effective means for school staff to communicate in a crisis event. We suggest the District consider adding additional radios for school staff, upgrading some existing repeaters and purchasing more repeaters to boost their radio signals in some school areas. The District should also consider upgrading the radio system for school bus and key personnel.

The District has been aware of the need to upgrade its current radio systems for school buses and key personnel and has been working on this effort for more than two years. We learned that during the past several decades, the District and the County have been collaborating on the use of radio frequencies and systems – the County has been using the District's nine radio frequencies, and the District's radios have access to the County's radio system. According to the District, the County is spending more than $40 million upgrading its existing radio system to a system that will better support police, fire and other first responders. This creates an opportunity for District to upgrade its radios for key personnel at a much-reduced cost.

In fact, in reviewing the three options for the District's radio upgrade efforts prepared by BCPS Chief Information Officer Tony Hunter, we see the option to migrate to the County's new radio system, which is estimated to become available in March 2019, as the most cost-effective and logical for the District in the long term. We base this opinion on the comparison of radio upgrades with overall opportunities for improvement noted in this report. This approach will allow for interoperable communications between key BCPS personnel and local first responders. The interoperable capability between schools, local public safety and first responders is necessary for effective communications between the organizations during an emergency. If there is funding available, the District should also consider purchasing a digital radio system base station to be housed at the District level with digital repeaters and the capability to have direct connection to 9-1-1 dispatchers using digital radios.

We also would recommend increased use of portable radios in specific situations where staff are supervising students both indoors and outdoors. The number of additional radios needed would have to be determined by an inventory of current radios and their condition. We note that the District should consider training for staff who currently use or who will use portable radios. This could be done with

the type of web-based platform we describe elsewhere in this report. Portable radios provide the following advantages:

- They provide day-to-day benefits that can enhance the efficiency of operations of a school.
- Unlike many options, portable radios can be used for a wide array of prevention measures such as communicating where staff should move to enhance student supervision, the need to lock a gate, or to report the presence of a suspicious vehicle on or near a campus.
- Portable radios are not prone to false alerts that have been problematic with some emergency notification systems.
- Portable radios are not prone to the serious risk of sending the wrong emergency voiceover announcements that can easily occur with systems that provide a variety of verbal prompts for different protective actions. For example, accidentally ordering severe weather sheltering when a lockdown is needed.
- Portable radios are generally much easier for people under extreme stress to operate reliably. Because it is common for people who are under extremes stress to experience degraded fine motor skill loss as their heart rate escalates above 115 beats per minute, it can be extremely difficult for them to dial a portable telephone. This can create significant limitations in reliability for emergency phone applications. Portable radios do not require as much fine motor skill utilization for people who are under extreme stress.
- Portable radios often remain operable when portable phone systems become unreliable.
- When properly trained, the user of a portable radio can drown out background noise by pressing the radio to their throat. This can allow a school employee in a loud environment to communicate without leaving the area to seek a quieter environment. This technique is often unreliable with portable telephones.

The following chart summarizes our ranking for the opportunities for improvement in this section as well as the related estimated cost:

No.	Opportunity for Improvement	Ranking	Estimated Cost
1	Repair/Replace all obsolete or non-working repeaters to enhance full campus wide coverage at all schools	H	$2,500/repeater
2	Add new repeaters to fill in blind spots where needed	H	$12,000-$15,000/new repeaters

No.	Opportunity for Improvement	Ranking	Estimated Cost
3	Add additional radios for school staff	H	$350-$450/unit
4	Purchase new radios for school buses and key personnel and migrate to the County's new radio system	H	$2M one-time cost for new radios

Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.

5.1.3. We see opportunities for improvement in the public address (PA) systems at all schools in the District.

Our assessment results indicate that schools in the District do not have adequate PA coverage. While all traditional K12 schools in the District have internal PA systems, only 67 percent of the schools have external PA systems. District personnel advised us during the assessment that the reason many schools in the District do not have an external PA system is because the daily school announcements bother the neighbors. However, the use of digital PA systems can help address the issue as this type of PA system can be "zoned" to limit PA announcements to only some interior or exterior as well as limited areas of school buildings.

Additionally, the PA systems at schools in the District have gaps in their coverage – intercom announcements often cannot be heard in areas such as hallways, interior and exterior student bathrooms, the gyms, and playgrounds/playfields. Communications equipment is very important as it helps avoid critical delays in staff and students being notified to implement life-saving action steps in emergency situations. For example, if a tornado warning is received by a school with an external PA capability, a principal can rapidly notify teachers in a portable unit, on an athletic field or on the playground to move into the school to shelter from the tornado.

Therefore, the District should consider a strategy to check and identify the interior and exterior areas that currently do not have PA coverage and upgrading the current PA systems. The District may wish to consider IP based intercom/PA systems that are tied into the voice over Internet protocol (VoIP) telephone systems to enhance redundancy in communications. Additionally, a system that allows an all-call PA announcement from any and all handsets in the building rather than a central station in the front office is desirable.

The following chart summarizes our ranking for the opportunities for improvement in this section as well as the related estimated cost:

No.	Opportunity for Improvement	Ranking	Estimated Cost
1	Add PA speakers for the interior and exterior areas that can benefit from them but currently do not have the coverage	I	$250-$500/unit, estimated 5-8 units/campus
2	Upgrade PA systems with IP based systems	H, S	$170,000-$215,000/school

Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.

5.1.4. The District should continue to complete the implementation of VoIP phone system at the remaining school campuses and support facility sites.

We were advised during the assessment that the District has upgraded the traditional telephone systems at the majority of its schools to VoIP phone systems – there are only 44 schools that have not had the upgrade. VoIP phones are now an industry standard utilized throughout many commercial, educational, and municipal facilities. The benefit to upgrading these legacy systems has an impact on maintainability, internal and external phone calls, two-way communications, and meeting current industry standards. The added layer of capability to perform an all-call when security or other issues arise provides personnel with ease of use and access and improves notification time. Therefore, we rank the completion of the upgrade to VoIP phone systems for schools and support facilities in the District as a ***High priority*** opportunity for improvement. These systems cost between $75,000 and $100,000 per site or $3,300,000 to $4,000,000 to complete the remainder schools in the District.

5.1.5. We suggest BCPS consider equipping key school locations with fixed duress or panic alarm buttons, but we do not recommend issuing this type of devices to all teachers at this time.

A duress or panic alarm button is an electronic device designed to assist in emergency communications by sending alert signals to a monitored location (district communications center etc.) to summon help. We prefer the use of the word duress or emergency button because the term "panic" button can convey to staff that the button should only be used for dire and out of control situations. There are two basic types of duress buttons currently in widespread use at schools in the U.S.: a portable type for staff to carry on their person and a pushbutton type mounted in a fixed location.

If used properly, duress buttons allow school staff to rapidly and discreetly summon emergency assistance by pressing a button mounted in their work area or on a portable device such as a pendant. Based on the size and complexity of BCPS, we suggest the District consider equipping key school locations such as main office areas and administrators' offices with duress buttons that will send alerts to the Communications monitoring Center (CMC) (as described below). We suggest two to six buttons

mounted at those fix locations per school, depending on the size and complexity of the school. It is important that all staff who are equipped with this type of devices receive appropriate training on how and when to use the devices. The results from our more than 8,000 controlled crisis scenario simulations with school staff across the nation indicate that untrained staff are often unable to determine when to use the buttons or not mentally prepared to use the buttons under the extreme stress of an emergency.

While we suggest the District consider equipping key locations with duress buttons, we do not recommend BCPS consider issuing this type of devices for all teachers. In our experience the BCPS does not have the structure and staffing levels to provide oversight for this approach, even if the level of additional staffing we suggest are attained. We have noted considerable challenges for school districts which implement duress button capability – even for main office areas only. We are concerned that BCPS cannot manage such a wide-spread use of duress buttons while also addressing the wide array of higher priority opportunities for improvement provided in this report. Therefore, at present, we suggest BCPS focus on duress buttons for key school locations.

The following chart summarizes our ranking for the opportunities for improvement in this section as well as the related estimated cost:

No.	Opportunity for Improvement	Ranking	Estimated Cost
1	Install fixed duress buttons at key school locations	H, S	$1,000-$1,500/unit (assuming the suggested staffing of the CMC)
2	Equip all teachers with portable duress buttons	N	$50-$300/button plus infrastructure upgrades

Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.

5.1.6. We see opportunities for improvement in the use of access control technologies for BCPS schools.

Our assessment results show that [redacted] the District have buzzer access control with integrated cameras and intercom for the main entry door and proximity card access for exterior doors to enhance access control. While effective access control requires practices and effort from staff, and students, technologies can help support their practices and efforts. If or when there is funding available, BCPS should consider the use of a buzzer access control system with integrated cameras and intercom so front office staff at schools in the District can see, hear, and talk to and screen visitors before unlocking the entry door for them. This capability for office staff can help enhance access control for the schools.

The District should also consider the use of proximity card access for exterior doors on eligible campuses. The District has several campuses that are designed in a way that make the use of proximity card access control impractical. An example would be schools where the majority of classrooms are accessed by exterior doors. These types of schools would require access control on an excessive number of doors. Criteria (such as campuses that only require 10 or fewer access control points to be secured) should be established to see what campuses would be eligible for proximity card access control. When used properly (i.e., staff and students do not prop doors open or open doors for strangers, etc.), a proximity card reader system on exterior doors can significantly enhance access control for a school.

If or when the District can have these access control technologies for its schools, the District should consider the systems that allow for integration with other security technologies such as surveillance cameras, intrusion detection systems, etc. Traditionally, access control systems, intrusion detection systems, surveillance cameras, etc. are managed separately from each other and not centralized. Modern technologies allow for an integration of security technologies and centralized management to more effectively and efficiently use technologies and staff time.

For example, the proximity card access control system should be integrated with surveillance cameras and HR systems. This integrated system gives security monitors powerful tools necessary for watching district-wide security. An example would be the access control system would tell the camera system to tag videos to specific access control events, so the personnel monitoring video feed of the events could see whose card was used to access the building with a picture of the person. If the video showing someone else walking through the door, the personnel can immediately deactivate the card and notify the user from the same interface console. For this to work, cameras would need to be located on the inside of doors with access control, so they can see the person's face when they enter the door. With these integrated systems, most access control cards are activated from the HR system and automatically deactivated when the user is terminated or resigns. Connecting the access control systems to the duress alarm allows the access control system to change to an emergency mode with duress alarm. An emergency mode can be set to automatically activate/deactivate access control cards. The majority of access control cards could be deactivated, and emergency cards could be activated. Emergency cards

would be given to first responders. Doors that are normally scheduled to be unlocked on a bell schedule would lock and remain locked. We note that the decision to program these systems to deactivate student and/or staff proximity cards should be made with careful consideration as there are numerous factors that should be evaluated.

Campuses that receive access control should also receive door position sensors (DPS) and request to exit sensors (REX). A DPS tells the access control system when a door is unlatched and how long it has been in the unlatched mode. A REX tells the system when a door is opened from inside. These two sensors allow the access control system to know the difference between someone leaving the building and a door opening without permission. Someone leaving the building would simply be noted and the video tagged. When a door opens without permission a notification of the event would also be made by the system. When a DPS notes that a door has been propped open for too long a similar notification can be made. We find in many schools where door propping is a chronic problem, an alarm sounder could be easily added to the door. We suggest providing DPS and REX on almost all exterior doors that are accessible to students. DPS and REX cannot be installed on campuses without a full access control system. Doors to mechanical rooms and other utility type rooms that do not lead to student occupied areas do not need DPS or REX.

Doors that students must use to pass between buildings can be scheduled to unlock and lock with the bell schedule. If a student must move between buildings during class, they can be given a hall pass card. Hall pass cards will need to be accounted for on a daily basis. Whoever accounts for the hall pass cards will need access to deactivate missing cards. Active hall pass cards would be setup to only work during school hours. Another way to address doors between buildings would be to issue cards to students. Access control card cost about five cents. Districts normally give the first cards for free and change a replacement fee for lost cards. School districts also make student access cards the student's ID cards. Students are more encouraged to have their ID cards if they must have them to access the school. Hall passes and student cards can be deactivated when a duress alarm is activated if this approach is determined to be appropriate after careful consideration.

The following chart summarizes our ranking for the opportunities for improvement in this section as well as the related estimated cost:

No.	Opportunity for Improvement	Ranking	Estimated Cost
1	Install buzzer access control systems with integrated cameras and intercom for main entry doors	L, S	$4,000-$6,000/system
2	Install integrated proximity card access control systems on regularly used exterior doors (by groups of students and staff) on permanent construction facilities when number of required proximity readers is 10 or less. In conjunction, install DPS and REX	L	$50,000-$65,000/campus

No.	Opportunity for Improvement	Ranking	Estimated Cost
	on all other exterior doors		
3	Install integrated proximity card access control systems on existing temporary or portable classroom units	S	$20,000-$26,000/portable unit
4	Require access control systems with DPS and REX devices in all new facilities or additions on all exterior doors into occupiable spaces	S	N/A
5	Retrofit DPS and REX devices on all existing exterior doors to detect a door left open and prevent false alarms	S	N/A

Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.

5.1.7. It is logical for the District to continue the current efforts to create single point of entries (SPEs) for its schools.

According to the District personnel, many BCPS schools have an SPE already in place, several others are currently under construction, and others are being designed. Plans are already in place to have an SPE on all traditional campuses (SPE may not be feasible for some collegiate campuses). We concur with this approach. If done correctly, SPE configurations can enhance security for schools as they allow "trapping" of many situations that are potentially threatening to students and staff such as agitated family members, parents with custody issues, and even active assailants. SPE configurations can help confine the situations to the entry vestibule as a "point of rejection."

We suggest the District consider additional retrofitting existing SPE locations with buzz in capabilities. This capability will allow a front office staff member, SRO or other staff member to prevent people entering the SPE from the outside of the building through the use of electric-strike door hardware for access control from their desks. Additionally, we recommend establishing a security vestibule between the SPE and the entry into the actual school buildings to prevent visitors from bypassing the check-in/out at the front office desks and entering the buildings.

The District should also consider retrofitting existing SPE glazing with windows with hurricane/security glass, security film or possibly ballistic glazing. Security glass or film is designed to slow an attacker by remaining in place even when shot repeatedly. This capability will help give occupants on the other side of the glass time to move to a safer location. Security glass should not be installed on all sides of the SPE, including glass between the SPE and the rest of the building. Hurricane rated glass certified by American National Standards Institute (ANSI) Z97.1 and/or Consumer Product Safety Commission (CPSC) CFR 1201 can also act as security glass. When using a security film retrofit, we caution that the existing glass must be removed to allow for application of the film to the full perimeter edges of the glass prior to reinstallation of the glazing into the frame. Applying the film to the glass only to the frame edge without removing the glass will give no security benefit. The film must be anchored inside the window frame. Otherwise, there is a possibility that the glass could possible fail at the frame interface and come out of the opening frame.

For long range plan, the District may wish to consider retrofitting the transaction window in the SPE at the reception desk with glass with security glazing. This will reduce the vulnerability of the staff manning the SPE from being attacked by an aggravated visitor or intruder. The following chart summarizes our priority ranking for the opportunities for improvement in this section as well as the related estimated cost:

No.	Opportunity for Improvement	Ranking	Estimated Cost
1	Retrofit existing SPE and provide new SPE with buzz in capabilities	H, S	$7,500-$10,000/SPE
2	Retrofit existing SPE glazing with hurricane/security glass or edge-to-edge security film on all sides of new and existing SPE waiting rooms	L, S	$7,000-$8,000/SPE
3	Establish a "transaction window" in the SPE at the front office with security glass to prevent access into school via back office entries and/or protect the front office staff	L, S	$18,000-$20,000/SPE

Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.

5.1.8. We suggest significant cautions if an entry point metal detection is to be used at any or all schools in the District.

We know that many parents as well as some students and District employees have expressed considerable interest in the use of entry point metal detection at all or some schools in the District. In this context, entry point metal detection refers to the approach used in commercial airports, many courthouses and some other government and private sector facilities and venues. We were asked to

provide opinions on the feasibility of entry point metal detection for schools in the District. The observations relating to weapons screening in this section are based on the experience of multiple members of the assessment team as practitioners who have used various types of metal detection in the K12 school setting as well as:

- Our experience helping many school systems establish and improve their metal detection processes.
- Our experience providing post-incident assistance for multiple school shootings and edged weapons attacks where metal detection has been defeated by attackers
- Our experience working with school districts that have found that students have been able to get guns and other weapons into schools with entry point metal detection
- Our experience defeating entry point metal detection checkpoints during penetration tests requested by our clients (attempting to get weapons into schools at the request of clients).
- We also note that it is very typical for us to learn that students are being caught with weapons inside schools that use entry point metal detection during assessment projects for public school systems.

Generally speaking, reasonably effective entry point metal detection is extremely difficult to achieve in most K12 schools due to budget, staffing requirements and the level of intrusiveness that this approach requires. We will explain the challenges that lead us to that opinion later in this section. However, it may be helpful at this point to mention that the cost of even the most expensive metal detectors pales in comparison to the cost of personnel required to maintain an effective entry point metal detection program. We feel that it is also important to note that walk-through metal detectors do not detect guns and other metal weapons specifically, but instead detect metal in or on a person's body. This makes effective metal detection an extremely human-dependent process. As we will point out, effective entry point school metal detection also requires that some people be patted down by hand and requires that security X-ray equipment be used to screen purses, bookbags, books and other hand-carried objects for weapons.

While entry point metal detection can be a viable option for some special school situations such as alternative schools serving youth with a demonstrated and elevated risk for violence, some middle and high schools with specific design features and/or which serve high percentages of students who are gang members, some support facilities and special events, our experience has been that entry point weapons screening is not feasible for the majority of U.S. K12 schools. Entry point metal detection for traditional middle and high schools is often most practical with schools where there are indications that students are carrying weapons to school on a regular basis and some students are carrying weapons repeatedly. In our experience, entry point metal detection can be more effective at deterring gang members or students who carry weapons out of fear. This is because a student who attempts to repeatedly carry a weapon to school will be more likely to eventually be caught and face a consequence such as arrest, alternative placement or expulsion. With a notation that entry point weapons screening has significant

limitations, even in these situations, the balance between the cost and level of intrusiveness can make entry point weapons screening more practical in those specific situations.

In contrast, attempting to deter an attacker who does not fear incarceration, being killed by responding law enforcement officers or especially those who plan to commit suicide is much more difficult. This type of attacker is more likely to be able to circumvent the entry point metal detection process easily and only needs to do so once to carry out their planned attack. If the main goal of entry point metal detection is to prevent a planned active assailant attack, we find that few school districts have the funding and the community support required to implement the costly, time intensive and intrusive level of weapons screening required to obtain a reasonable degree of reliability of deterring this type of attacker.

Entry point metal detection (similar to that used in airports and courthouses) requires a high degree of supplemental physical security measures and personnel to support, has much higher personnel costs than most people realize and must be supported by security X-ray screening of all purses, bookbags and other hand-carry items to be reliable. Finally, reliable entry point metal detection requires screeners to physically pat down some people being screened to determine whether or not a person being screened is carrying a weapon or not. Current weapons screening technologies all require this screening step to prevent the approach from being easily defeated.

While many schools, sporting venues, museums and tourist venues use entry point metal detection, our experience has been that a moderately intelligent teenager or adult can find a way to smuggle a firearm or other weapon into many of these venues without much difficulty. This has repeatedly been demonstrated by successful attacks on venues with metal detection checkpoints, including K12 schools. While the failure of any specific prevention measure should not be taken as proof that the concept cannot work reliably, patterns of gaps should be considered when evaluating the benefits of the measure in relation to the time, energy, and fiscal resources required as well as the level of intrusiveness. The potential benefits from other prevention measures that could be implemented with comparable time, energy, fiscal resources and intrusiveness should also be weighed.

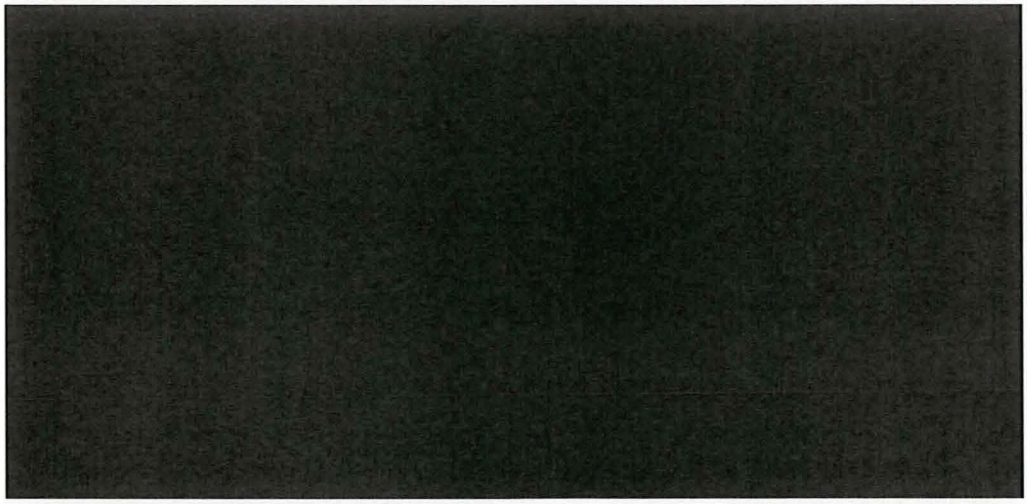
For example, during an assessment of a school district in Illinois, our analyst was easily able to smuggle an official test piece (simulated firearm of similar weight and size of an average weight and mass of the three smallest commercially available handguns) through entry point weapons screening stations where both walk through metal detectors and X-ray equipment were being used. These schools had more than two dozen full-time school security personnel and extensive perimeter security measures, an advanced and robust security camera system, a full-time camera monitor and a police officer. While we were able to help the district improve the reliability of their metal detection program through the assessment, the screening approach still has some gaps that could be exploited. In this instance, the client has opted to continue the use of walk-through metal detection due to the unusually high level of gang violence in the region. However, this client district was also able to implement and maintain many other supportive measures to offset the limitations of the weapons screening program.

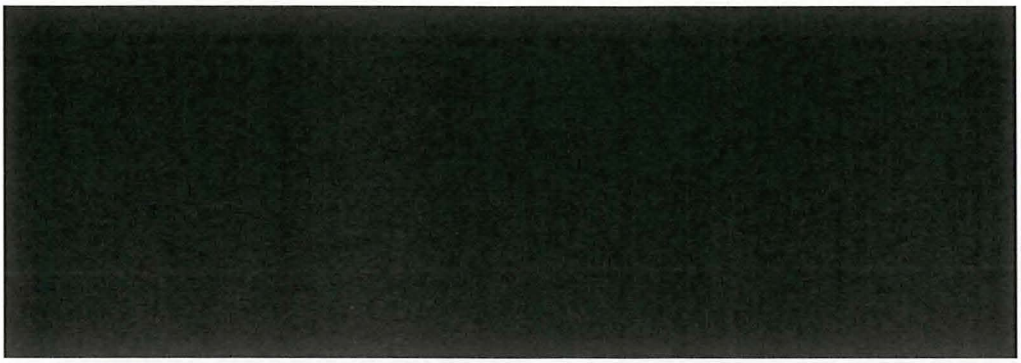
As another example, we find that the large school systems we have assessed that utilize entry point metal detection have reported to our analysts that with the exception of some smaller alternative school programs (with much more invasive screening processes), some students have been able to get firearms and other weapons into their schools on a periodic basis. Our experience has also been that when this type of failure occurs, school officials who have made a good-faith and concerted effort to implement these programs are then criticized for being incompetent when in reality the public has not been willing to provide adequate budget for the approach nor allow the level of intrusiveness that the approach requires to have a reasonable degree of fidelity.

However, entry point metal detection can still help reduce the number of weapons students bring into their schools on a regular basis. For example, the Illinois school district entry point screening with metal detectors and X-ray equipment described earlier has reduced the number of weapons seized at district schools. This approach is most often logical to reduce the chances of gang violence, students using weapons during a fight and other situations where students are more likely to use a weapon because they carry it to school every day. However, as mentioned previously, it is important to understand that deterring, reliably detecting and thwarting a determined attacker who does not fear incarceration or, in many cases, even death, with entry point metal detection is far more difficult. The most successfully implemented school metal detection programs we have seen have been thoughtfully developed with considerable opportunity for meaningful education of and feedback from students, parents and school personnel. In our experience, this type of process takes months rather than weeks to be effective.

For reasonably reliable entry point metal detection in the K12 setting, the following challenges should be considered:

- Common ways for attackers to bypass or defeat entry point metal detection that have been used by violators in past school attacks include but are not limited to:





We note that the above examples can easily be found by an attacker with a modicum of research. There are a number of other ways that attackers can also defeat or workaround metal detection. The above examples demonstrate the challenges of school metal detection that should be considered when evaluating the feasibility of entry point metal detection.

- Additional considerations for a reasonably reliable entry point metal detection program include:
    - Staff who conduct screenings must be properly trained, and the processes used should be described in writing, vetted by legal counsel and communicated effectively to the public. While it is beyond the scope of this project to attempt to address the many logistical details that must be addressed, we caution that the logistics of effective entry point weapons screening are important and require considerable attention to detail.
    - For reasonably reliable entry point screening, security X-ray equipment must be utilized. This expensive equipment requires considerable space and a staff member who is dedicated to the operation of the equipment at all times the checkpoint is operational. Visual examination of the contents of purses, bookbags and other hand-carried items, has some benefit, but is less effective than screening with security X-ray screening by properly trained personnel.
    - Pat downs of people who have artificial joints, pins and other bodies of metal implanted in their bodies is required unless bulky, time consuming, extremely expensive and highly invasive backscatter body scanning equipment is utilized. The pat down in this instance often involves only specific areas such as the right knee of a person who has an artificial knee as long as a multi-zone walk through metal detector is used to pinpoint on the person being screened where the metal object(s) setting off the detector is located.
    - Robust security coverage of each screening station and process should be considered. To protect screening personnel as well as students and others who are screened, video recording of the screening process is desirable. As demonstrated by data from the U.S. Secret Service, U.S. Capitol Police and the Transportation security administration illustrate, when weapons screening is done properly, weapons and other contraband

will periodically be discovered. It is not unusual for people who are caught with contraband to claim that screening personnel "planted" the contraband on them or in their belongings. There have also been allegations of screening personnel inappropriately touching people who have been screened, other forms of staff misconduct and complaints that screeners and people who are being screened have stolen property from people during the screening process. Proper utilization of cameras to document the process combined with periodic viewing of screening processes by supervisors for quality control can help to reduce the chances that these types of misconduct will occur and to bring clarity when allegations are made.

- Penetration testing should be implemented if entry point metal detection is utilized. This approach involves periodically providing selected students and visitors with a standardized "test piece" which is made of metal but does not resemble a weapon. Screeners are trained on what the test pieces look like, so they can recognize them. People selected to conduct penetration testing are tasked with attempting to find a way to smuggle the test piece into the school in a non-alarmist fashion. This is the most reliable means to determine the effectiveness and reliability of entry point metal detection for any environment. This method can also help school officials identify and correct gaps exploited during the penetration tests.

- As with airports and many courthouses, the decision to screen school employees must be considered for a comprehensive approach to violence prevention. As with any other setting, workplace violence incidents involving attackers who are current or former employees should be considered. We note a significant number of planned school shootings by school employees. These include a number of multi-victim school shootings carried out by teachers and school administrators in the U.S., Canada and Austria. One school superintendent and one headmaster of a Lutheran school have been shot and killed by school employees in Florida. Examples of other planned attacks by school employees include but are not limited to:

    - California, 1940: A middle school principal in Pasadena shot and killed three employees at the school district office before going to his school and killing two more school employees.

    - Indiana, 1960: The Principal at William Reed Elementary School shot and killed two teachers in front of their students.

While most of these concerns can be addressed with a fair degree of reliability, the recurring costs associated with these approaches are beyond the reach of most school systems. Depending on the quality and capabilities for security X-ray equipment, walk through multi-zone metal detectors, hand wands for secondary screening, additional security cameras to document the screening process at each station. Tables and stations to guide people being screened will cost an estimated range of $45,000 and

$65,000 per station. The major expense for reasonably reliable weapons screening approach is for the personnel to conduct the metal detection, X-ray screening of bags, secondary screening, roving armed security personnel to patrol the sites and to provide patrol coverage for students gathered outside and waiting to be screened and finally, for supportive access control personnel to reduce the chances that people can bypass the screening stations. At this point, the most accurate estimate for the cost of and screening personnel daytime, evening screening for elementary, middle and high schools will likely vary between $250,000 and $1,000,000 per year, depending on the quality of weapons screening, supportive security measures, building configuration, hours of operation at each school site, and the number of students attending each school. This cost is based on the assumption that one metal detection and security X-ray is used per 500 students. Note that these figures do not include screening for athletic events, ceremonies and other special events.

We also note that during our assessment projects that it is typical for us to learn that students are being caught with knives and firearms inside of schools that use entry point metal detection. There have been multiple shootings at K12 schools with inadequately funded entry point metal detection. While districts with a high-risk profile do often find significant benefit in using entry point metal detection, our experience has been that the fiscal resources required to support this approach are often better applied to other approaches.

Suggestions that entry point metal detection for all schools in the District also raise additional important considerations. The question of whether or not students should be screened and if so, what grade levels to be screened would have to be considered if metal detection is utilized at elementary schools. There have been numerous instances of elementary students bringing firearms to elementary schools with at least one homicide by a first-grade student who shot another student in Flint, Michigan. While we are not familiar with the security measures for every school district in America, we are not aware of any school system that conducts daily entry-point metal detection for elementary school students, and we see very few school districts that use entry point metal detection in elementary schools. While this approach has been used in other countries with higher risk for school violence, we have never suggested that a client school district in the U.S. use entry point metal detection of students at an elementary school.

These types of considerations should be addressed if entry point weapons screening were considered to be desirable on a district-wide basis at BCPS schools. While each of these limitations can be addressed with some degree of reliability, the recurring costs associated with these approaches are beyond the reach of most school systems. The fact that secondary screening would need to be conducted on a significant percentage of people being screened and that on regular occasions, screeners will need to physically pat down students and visitors may be objectionable to many students, staff and parents. We also note that the Transportation Security Administration (TSA) has discontinued the use of hand-held metal detectors for secondary screening and has moved to pat downs of a higher percentage of passengers. This change resulted because screeners were missing simulated firearms and explosives during the majority penetration tests.

Due to the limitations of entry point weapons screening and the requirements for a quality program, random surprised weapons screening is more common in middle and high schools. The surprised screening program is far less expensive, does not require students and staff to arrive much earlier each day, and has been helpful in achieving significant reductions in student weapons violations. We note that this approach can also help address the risk of weapons assaults on school buses when school buses are included in the random screening program.

In our experience, the District would provide far more reliable protection by improving and maintaining effective school security measures as outlined in this report as well as others that will be addressed once the Phase II assessment has been completed, combined with an increased emphasis on behavioral prevention approaches. In the experience of our analysts who have helped to successfully avert a number of planned K12 school shootings and one bombing while serving as practitioners, behavioral approaches are more sustainable, less intrusive, offer a variety of additional benefits relating to successful schools and in our experience can be more effective. Unlike physical security measures such as entry point metal detection, these approaches are not contingent upon a particular weapon type, attack method or specific locations and timing of the attack. This means that these approaches offer a reasonable level of protection whether an attacker plans to use a firearm, explosives, edged weapon, fire, vehicle ramming attack, fire or a combination of weapon types. These measures are also useful to help avert attacks regardless of where they are planned to occur – in a classroom, cafeteria, media center, athletic event, nearby public area, on a school bus or other school-related setting. These approaches include but are not limited to student threat assessment and management, suicide prevention, increased awareness of concepts such as pattern matching and recognition and visual weapons screening. Please see our training video *Secrets of the Weapons Violator Exposed – Visual Screening* segment (we will be shipping to the District as a value-added resource) and our free training video segment *Pattern Matching and Recognition* (available at http://safehavensinternational.org/resources/staying-alive/).

While individual schools may wish to conduct a pilot program for entry point metal detection for further evaluation, we do not recommend that the District attempt to utilize district-wide entry point metal detection at this time. This opinion is based on current risk levels and in relation to the other opportunities for improvement we noted. We are especially concerned that the considerable human resources that would be required to provide even unreliable and rudimentary entry point metal detection could be far more effectively utilized in other ways if funding for such large numbers of personnel were available. Implementing reasonably reliable entry point detection would require even greater human resources.

We should note that while we do not recommend the widespread use of entry point weapons screening for District schools at this time, it is possible that other types of utilization of metal detectors may be feasible. We will examine the feasibility for entry point metal detection at some specific alternative placement programs and/or the development of a random surprise weapons screening program for middle and high schools during the Phase II assessment. An accurate evaluation of the feasibility of

these approaches will require evaluation that could not be conducted in the Phase I assessment process. This type of determination will require a combination of physical assessment of school designs combined with observations of how students arrive and move about specific alternative placement program facilities and a review of data relating to weapons incidents and the types of situations that are often associated with student weapons violence (fights being among the most common). This evaluation will also require an assessment of community violent crime data and a briefing of community gang activity levels by local law enforcement personnel.

5.2. Structure, Staffing and Training Improvement

5.2.1. The District should consider a strategic vision and enterprise risk management (ERM) framework for safety and protection that aligns with other business functions and has measurable outcomes.

Since BCPS will be, in all likelihood, implementing significant security and emergency preparedness upgrades based on our findings, we find that it will be extremely important for the District to create an ERM strategy to support these enhancements early in the process. ERM has several distinct characteristics. First, it is strategic and an extension of the organization's overall plan. Second, it is holistic and capable of managing the shared risk of multiple departments. Third, it is performance-based, measurable and subject to return on investment (ROI) challenges by the organization's leadership. When properly implemented, an ERM approach counteracts the common risk phenomenon known as "concatenation" in which one action contributes to the next and the next, remaining unnoticed until the problem manifests itself as a major incident. Without an ERM strategy, the individual actions leading up to a major incident will, individually, appear insignificant because they cannot be easily connected to a much greater, future negative outcome.

In addition, safety and protection are more difficult to quantify than other business functions because success is typically measured by the absence of major outcomes: no violent threats, no fatalities, no missing persons, no sexual abuse or no life-altering injuries, to name the most obvious examples. Therefore, the District should identify and track relevant key performance indicators that are indicative of safety and protection practices. Unless the organization does this, it will never know if it is truly protecting people or has simply been lucky.

We have observed that among organizations responsible for the care and custody of children and youth, a successful ERM framework requires setting up three functions to work interdependently:

1. A written plan with goals, objectives, standards, measures, outcomes and timetables.

2. A defined and consistent investigative process. As a general prevention approach, we suggest the District consistently utilize a method such as the Six Sigma, root-cause analysis methodology, known as "The Five Whys." This approach identifies and documents the sequence of actions leading up to a recorded safety incident by forcing the assessors to repeatedly ask

"why" and record the findings. This method would be appropriate for identifying the compounding (concatenation) of physical, policy and procedural errors. By contrast, assessing potentially violent threats through a formal and recognized threat assessment process, such as "The Virginia Model," is a form of predictive root cause analysis.

3. Vigorous safety oversight. The best safety and protection plans will not survive the nature of any organization to protect its culture from change without an outside catalyst. Famed business theorist and author, Peter Drucker, characterized this phenomenon as, "Culture eats strategy for breakfast." To drive safety and protection forward, the District will need to create an independent safety oversight board or committee that is empowered to regularly review the plan and its outcomes with safety managers (typically quarterly), challenge the program's ROI and provide regular written reports to the District.

Such a dynamic ERM structure will move an organization beyond expedient but ineffective or outdated strategies or relying on insurance claims, lawsuits or media coverage to know if its strategies are working. Along with the three core components listed above, there are additional factors within the organizational culture that are necessary for ongoing safety program success, such as:

- A process to regularly identify and prioritize internal and external risks and threats,
- Verifying that objectives, policies and procedures address all known areas of risk,
- A monitoring process to ensure procedures are followed,
- Communicating safety values across the entire organization,
- Enforcing safety and protection discussions at every staff, management and board meeting,
- Verifying public and Board support of the protection program, and
- Using the safety and protection program to shape the behaviors and thought processes of all stakeholders—board members, employees, contractors, students, parents and community partners.

To implement an ERM approach, the District will need to staff some new positions to implement and sustain the ERM structure. In our experience, the District would be wise to select and retain a number of key personnel to accomplish this as early in the process as practical. We also suggest that these personnel be brought on board early in the process to assist with implementation and oversight of a variety of other enhancements as described in our reports for Phase I. This also affords the opportunity for these personnel to use their professional philosophies and visions to shape the manner in which these upgrades are implemented. Due to the effects it will create, we rank the creation of an ERM strategy as an ***immediate and critical*** opportunity for improvement that will affect the quality of

implementation for the majority of the options for consideration in this report as well as the phase II reports.

We note that the costs for all new positions described in this report will be contingent upon the District's salary schedules and the costs of supportive infrastructure such as computers, software programs, communications devices, equipment and in some cases, vehicles. For this reason, it is not possible for us to provide projected costs for these positions at this time.

5.2.2. BCPS should consider creating a position to serve as a point person for all aspects of school safety, security, and emergency preparedness in the District.

Often titled as a Chief Security Officer in large and complex organizations using the ERM model, the creation and careful selection of a highly competent professional for this position will be crucial for success of the District's continual school safety improvement efforts. Based on discussions between a number of our lead senior analysts on this project, we find that the District would benefit from the creation of a position for and thoughtful selection of a Chief Security Officer for the District. In our experience, successful staffing of this position will require an individual with the following skills, knowledge and abilities:

- Demonstrated success in extremely demanding security, enterprise risk management, law enforcement, homeland security or compatible field.
- A proven track record in at least one challenging leadership position
- Exceptional written and verbal communications skills

Due to the size of the District, we suggest the District consider conducting a national search for qualified applicants for this position. We note that adequate administrative support will be required for this position to be effective. Similar to the creation of an ERM strategy, we consider the creation and filling of a Chief Security Officer as an ***immediate and critical*** opportunity for improvement.

5.2.3. We also suggest some other positions and infrastructure to support the Chief Security Officer under the ERM model.

We suggest the District consider adequate support staffing for the Chief Security Officer position, so he or she and their team can assist with the facilitation of the many enhancements the District is already making as well as those the District decides to implement after our assessment project is completed. We suggest the following new positions:

- New positions under the Special Investigative Unit (SIU): We suggest three new Protective Intelligence positions assigned to the State's Fusion Center. According to the Florida Department of Law Enforcement (FDLE), "a fusion center is a collaborative effort of two or more agencies

that provide resources, expertise and information to the center with the goal of maximizing their ability to detect, prevent, investigate, and respond to criminal and terrorist activity."[1]

We suggest that one position be assigned to day shift, another to work the evening shift and a third position assigned to work ten-hour split shifts covering Fridays through Mondays. We suggest these positions report to the SIU but work within the Fusion Center to enhance the District's ability to monitor, analyze and respond to a variety of increasingly concerning areas related to the prevention of school violence:

- Social media threats
- Cyber-threats targeting the district and its security technology systems
- Anonymous threats of violence

We caution that the District should confirm that the State's Fusion Center would agree to this staffing prior to creating these positions. If for some reason the Fusion Center cannot accommodate additional staffing or does not desire the resources, these personnel could work out of a new Communications and Monitoring Center (CMC) (a suggested upgrade described later in this section). In our experience, the first option we provide would be the most effective approach.

- We also suggest the District consider adding three new Sergeant positions for the SIU. Currently, the SIU is extremely light on supervisory and management personnel in contrast to other sworn district law enforcement units we have reviewed. The SIU currently has only three law enforcement leadership positions and one civilian supervisory position for a department with 54 sworn and civilian personnel. This degrades the ability of the SIU to provide the level of services for its tasking with the quality and reliability needed.

- We are also concerned about the methods of screening, hiring, training and supervision of the Campus Monitor and Security Specialist positions. Currently, these personnel report to school administrators including building principals and assistant principals. In our experience, school administrators typically do not have the level of school security and emergency preparedness training and experience to qualify them to provide oversight for school security personnel, school security procedures, emergency preparedness procedures, and a host of other areas. Typically, supervisors of security personnel should be able to demonstrate technical expertise in this area when litigation relating to actions or inaction by campus security personnel arises. We have often encountered problems of this type in other regions of the country as well. We note that this type of situation was determined to be a contributing factor in the death of a student in the planned attack at Arapahoe High School in Colorado in 2013. While there are a variety of

[1] https://www.fdle.state.fl.us/Publications/Documents/Brochures/FFC_Florida-Fusion-Center-Flyer_2017.aspx

options to ensure that building administrators are actively involved in determining tasking to meet unique needs at each school, adequately staffed District level oversight of these positions will significantly enhance safety, security and emergency preparedness in the District. Therefore, we suggest the District consider creating a more formalized and enhanced support structure for the various Campus Monitor and School Security Specialist positions. This would require the creation of the following new positions:

- Security Manager position reporting to the Chief Security Officer.
- Assistant Security Manager reporting to the Security Manager.
- Two Security Captain positions (one for Screening, Selection and Training and the other for Operations) reporting to the Security Manager.
- Supervisors for each shift reporting to the Security Captain for Operations.
- We also see a need for additional field supervisory positions for both the Campus Monitor and School Security Specialist positions. The District is currently conducting discussions regarding SRO staffing which could impact the requirements for the staffing numbers both Campus Monitor and Security Specialists. BCPS also began considering the creation of new positions for armed security personnel because the District and community partner law enforcement agencies were not able to provide as many school resource officers as desired. If this option is implemented, there would be an additional impact on the need for field supervisors. We suggest that the District complete these discussions and hire the above described management personnel before determining how many Campus Monitor and Security Specialist Positions are needed long-term. This will in turn make it possible to more accurately determine how many supervisory and training positions will be needed to support the Campus Monitor and Security Specialist positions. SHI will provide further assistance in helping the District to determine how to make these decisions at that time as needed by the District.

We note that the above positions will require budget for equipment, vehicles and training. During our visit to the Technology and Support Service Facility, we noted that some of the vehicles assigned to the SIU appeared to be in very poor condition. When we inquired further, we learned that the estimated average mileage of the SIU vehicle fleet was 121,398 miles. We also learned that the District does not have a life-cycle replacement plan for vehicles with multiple vehicles that are ten years old. In our experience, this situation will inherently limit the effectiveness of any law enforcement unit. The SIU is in not properly equipped with reliable vehicles to carry out their mission. We are especially concerned that SIU personnel could be delayed in providing important critical incident support. We suggest the District replace any of these vehicles which are already above the 120,000-mileage mark. We also suggest the District develop a life-cycle replacement plan to purchase new and properly-equipped vehicles with the replacement of 20% of the fleet each year starting this fiscal year. This will prevent the

District from having to replace the entire fleet every 3-5 years. We also suggest that this type of life-cycle replacement plan be adopted for vehicles for a vehicle fleet for the Security management positions described above.

We also suggest larger and properly equipped and staffed 24 hours a day, 365 day a year CMC that includes:

- Equipment and software
- Interoperable communications capability
- Communications coordinator position (day shift)
- Assistant communications coordinator (evening shift)
- Three communications supervisor positions and three assistant supervisor positions to provide 24/7 supervision with off days for supervisors being covered by assistant supervisors
- 26 operator positions

We note that this staffing level will provide a minimum of six communications personnel on the day and evening shifts Monday through Friday with a minimum of five communications personnel on the midnight and weekend shifts counting the six Shift Supervisor and Assistant Shift Supervisor positions. Note that two off days for each employee need to be factored requiring more positions for each shift than will be on duty each day. Due to concerns of attentiveness, we do not recommend ten or twelve hour shifts for these personnel as a standard shift. To accomplish this, a total of 34 positions will be required.

If the District decides to implement the options for consideration in this section, the District should also seek to develop expanded interoperable communications capability with area public safety agencies. The cost of this upgrade would have to be determined based on the equipment utilized by the local public safety agencies.

These positions and the support structure would dramatically improve the ability of the District to support a wide variety of technology options including but not limited to:

- More robust central monitoring station functions
- Video and audio analytics such as gunshot detection, loitering, climbing of fences and instant tracking of a person who is running, rapid crowd gathering, license plate readers that can alert security staff if a tag connected to a potentially dangerous person (such as someone who has communicated a threat to harm others) enters a campus. etc. We are not recommending the use of all of these analytic options at this time but instead are using these examples to demonstrate some of the options that would require live monitoring capability.

- Intercom with remote access which would allow CMC personnel to provide fast warning and instructions for emergency protective actions
- Duress button capability which would allow for rapid communication of emergency situations (commonly referred to as panic buttons)
- 24-hour tip line monitoring and management capability (We will advise on which type of tip reporting system in phase II)
- Staff and student ID card system with photo and RFID and photo tied to student and staff information systems
- The use of rapidly emerging safety, security and emergency preparedness technologies such as security drones.
- We note that if they can be implemented in accordance with fire code and expanded technological capabilities, any approaches that would involve alterations in procedures to delay evacuation for unexpected fire alarms would require a robust 24/7 communications capability.

These are a few examples of technology solutions that would not be practical or reliable without a properly staffed Communications and Monitoring Center 24-hours a day, seven days a week and 365 days a year. With the District's size and complexity, this capability would provide considerable protection for all schools and support facilities in relation to the cost. Note that we are not recommending that BCPS adopt each of the above examples at this point but instead are using these as a few examples of the types of technologies that would require a robust 24/7 communications center to implement.

The following chart summarizes our ranking for the opportunities for improvement in this section:

No.	Opportunity for Improvement	Ranking
1	Add three new Protective Intelligence positions assigned to the Fusion Center	I
2	Add three new Sergeant positions for the SIU	I
3	Create a more formalized and enhanced support structure for the various Campus Monitor and School Security Specialist positions by adding: • Security Manager position reporting to the Chief Security Officer • Assistant Security Manager reporting to the Security Manager • Two Security Captain positions	I

No.	Opportunity for Improvement	Ranking
	• Supervisors for each shift reporting to the Security Captain for Operations. • Additional field supervisory positions	
4	Upgrade vehicle fleet for the SIU	H
5	Upgrade the Communications and Monitoring Center by adding: • Communications coordinator position (day shift) • Assistant Communications Coordinator (evening shift) • Three communications supervisor positions and three assistant supervisor positions to provide 24/7 supervision with off days for supervisors being covered by assistant supervisors. • Equipment and software • Interoperable communications capability	I
Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.		

5.2.4. While we will be able to provide more accurate and focused opportunities for improvement in Phase II after we have appropriate data, we do note opportunities for improvement in the District's approaches to emergency preparedness.

These opportunities are typical of what we see in the majority of our school safety, security, and emergency preparedness assessment projects. Based on our review of the District's *2017-2018 Emergency Preparedness Manual* as well as our review of the previous and recently updated power point presentation which is based on the popular *Run, Hide, Fight* approach recommended for schools by the United States Department of Homeland Security, we can see that the District has collaborated extensively with local law enforcement agencies in updating the active shooter training program for District employees. At the same time, we see opportunities for improvement in the current emergency preparedness plan and training programs.

We suggest the District plan to revise the current plans and training approaches once our Phase II assessment is completed. Revising the emergency preparedness plan effectively, providing training on the updated plan and addressing other opportunities for improvement in emergency preparedness

identified in both Phase I and II will require the District to add the emergency management coordinator's position and an administrative assistant described earlier as well as extensive collaboration with local law enforcement, fire service, emergency medical and emergency management personnel as well as a broad planning team made up of personnel from a variety of BCPS departments. Developing and implementing the type of plans and training programs we suggest will also require the ERM approach and staffing that is outlined earlier in this report. While it is natural that many people would like to see these improvements made more rapidly, our experience has been that for a school district of the size and complexity of BCPS, attempting to upgrade the plans before this structure and these resources are in place will cause significant problems that could easily outweigh the benefits while resulting in poorly developed and implemented emergency procedures.

At this point, we have been able to determine that BCPS would benefit from a more robust staff development approach that will require a combination of additional training personnel and some form of comprehensive web-based school safety learning platform. There are several companies that offer cost-effective and robust platforms of this type. When combined with effective life training programs, these systems can significantly improve the awareness of staff while providing improved documentation, tracking and management capabilities. These platforms allow school districts to create customized school safety, security and emergency preparedness staff development modules. While the cost of this type of system will vary depending on the features selected by the District, the competitive bidding approach and the vendor selected, we estimate the annual cost of this type of staff development platform at approximately $100,000 to $120,000.

BCPS could also explore using a blend of in-house staff and, as needed, hiring qualified subject matter experts to develop customized school safety, security and emergency preparedness courses for the District's current web-learning platform. This approach would likely have higher up-front costs but could be less expensive in the long-term. The challenge for this approach is the number and variety of topical areas that would need to be addressed.

The approach that is selected combined with the types of live training programs already in place will determine how many additional training personnel will be needed and which department should provide oversight for these personnel. Currently, SIU personnel have been providing training on emergency preparedness, and this function could reside within SIU. Alternatively, this function could be located under the new emergency management position we have suggested. In our experience, assigning these personnel to SIU should provide fewer challenges with continuity of training programs. At this point, we estimate that six additional positions will be needed to adequately address the District's needs. We suggest that the Chief Security Officer be tasked with determining where these positions reside. We find these positions will be especially important to support the enhanced emergency plans we are suggesting for development and implementation by the District as well as the sheer size and complexity of operations of BCPS.

The following chart summarizes our ranking for the opportunities for improvement in this section:

No.	Opportunity for Improvement	Ranking	Estimated Cost
1	Revise the current plans and training approaches once our Phase II assessment is completed	L	N/A
2	Add six additional training positions	H	N/A
3	Add comprehensive and robust web-based school safety learning platform or use a blend of in-house staff and, as needed, hiring qualified subject matter experts to develop customized school safety, security and emergency preparedness courses for the District's current web-learning platform	H	$100,000-$120,000/year for a commercial web-based learning platform

Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.

5.3. Other Security Measures

5.3.1. We do not recommend overall perimeter fencing upgrades for BCPS schools, but a focus on installing emergency egress security gates and electronic detection capabilities would be a meaningful improvement.

Much of the District's current fencing consists of 6-foot chain link fencing which offers very limited security benefits. While moving to the use of proper ornamental steel tubular security fencing with supportive emergency egress security gates and electronic detection capabilities as described below would be a meaningful improvement, the costs for this type of upgrade would be significant in relation to the benefits. We also find that other opportunities for improvement would yield more reliable results than this type of fencing due to the inherent limitations of fencing. As the Task Force Report points out, BCPS currently has more than 750,000 linear feet of perimeter fencing. We share the concerns voiced in the Task force Report about the cost in relation to the benefits of district-wide upgrades of the current fencing.

As with most large Florida public school districts, the cost of upgrading the current chain link fencing to proper decorative tubular security fencing of adequate height would not be as effective as the other opportunities for improvement addressed in detail in this report. For this type of fencing to be of adequate height to slow an intruder, the District would also have to install emergency egress gates with "crash bars" so staff and students could evacuate the fenced areas rapidly if an attack occurred while they are outside. This in turn would require video analytic security camera capability for each school. This would in turn require a substantial increase in the number of personnel to staff the District's current camera monitoring capability on a 24/7, 365 day a year basis.

We note that high-level security camera video analytic capabilities and other detection systems can provide more reliable detection of someone who is climbing a fence. While these do not slow an attacker, they can increase the chances of rapid detection. This type of option would require an additional increase in the level of staffing for the electronic security capabilities of BCPS after the options for consideration in our report relating to structure and staffing are addressed.

In addition, there are a number of schools that would require manual and, in some instances, electronic security gates for walkways and entrance drives to obtain the reasonable potential for increased security that could be provided by this type of fencing. Chain link fencing is of limited reliability as a determined intruder can often scale a 12-foot, or even a 16-foot chain link fence in 30 to 60 seconds. Correctly designed and installed steel tubular security fencing can create further delays but as multiple intruders at high security installations have demonstrated, even these can often be breached more easily by a determined intruder than most people realize.

One recent example of this was a March 2017 incident where a 28-year-old California man was arrested after he scaled three different steel security fences in an attempt to gain access to the White House. According to the Unites States Secret Service, the man was on the White House grounds for 16 minutes before he was detected. We note that the security fencing at the White House is much taller, is of proper heavy steel construction and has aggressive spikes topping the fence that are not typically utilized at K12 schools due to liability and school climate concerns. The White House fencing is supported by one of the most heavily funded and staffed security systems in the world, but this intruder breached multiple layers of very heavy perimeter security. We also note that this was not the first breach of White House security. For example, a minister was able to defeat White House security on two different occasions and was able to shake hands with two different presidents before being detained by Secret Service personnel. Similar breaches of other highly secured facilities across the globe highlight the point that while security fencing often does significantly enhance school security, school officials should remain cognizant of its limitations when prioritizing the use of available funding.

The replacement of chain link fencing with taller decorative tubular steel fencing with the supportive emergency egress gates and security technologies noted above could be a viable long-term goal. However, this would require a substantial increase in funding for security upgrades in relation to benefits, limitations noted and the other enhancements that our analysts find would provide greater improvements in security at this time. We suggest the District focus the limited fiscal resources on the opportunities for improvement listed in our report before such an expensive upgrade be implemented on a District-wide basis. We also note that the type of fencing selected can be important from a school climate standpoint. Properly designed decorative tubular steel fencing can reduce the prison-like visual effect that tall chain-link fencing conveys.

At this time, we do see that a focus on installing emergency egress security gates and electronic detection capabilities would be a meaningful improvement due to current concerns about emergency egress from fenced areas. Due to competing security concerns about after-hours intrusion, these gates

would be more effective if they were covered by analytic cameras (e.g., software to detect fence climbing behaviors) supported by robust 24/7 live monitoring. This type of upgrade, however, would require the approval the Phase I and Phase II security camera upgrades and funding of the communication center as described earlier.

As long as fire code, labor, facilities concerns, BCPS's requirements, and some technical details are addressed, we would not oppose individual schools using donated funds to install this type of fencing.

The following chart summarizes our ranking for the opportunities for improvement in this section as well as the related estimated cost:

No.	Opportunity for Improvement	Ranking	Estimated Cost
1	Install 8-foot-tall security type fencing	F	$100/lf
2	Update design specifications and requirements to require 6-foot chain link fencing around all exterior, student occupied or gathering areas and perimeters but not staff or student parking areas	S	N/A
3	Update design specifications and requirements to require 8-foot security fencing around all exterior, student occupied or gathering areas and perimeters but not staff or student parking areas	S	N/A

Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.

5.3.2. We suggest BCPS identify and replace the windows not in compliance with Florida code glazing requirements but do not recommend the widespread use of ballistic glass protection products at this time.

During the visit of a sampling of 11 schools in the District in this project, our PSC team noted that some exterior windows at the schools do not have missile impact rated exterior glazing (commonly referred to as hurricane windows) as required by Florida code. This glazing is capable of resisting winds of up to 200 mph and will prevent windborne debris, or "missiles," from penetrating the glazing unit and entering the building. The glazing is comprised of a sandwich of two layers of glass with a high strength plastic film in the middle. As an added benefit, this type of glazing helps prevent intrusion through the window opening even if the window has received multiple bullet penetrations, provided that it is installed (or attached) to the framing properly. While the glass will still break and will not stop bullet penetrations, the high strength inner layer will delay or in some instances, prevent someone from getting a hand or body through the opening even with the glass broken. It is also possible to "film" windows. Due to these benefits of impact rated exterior glazing and Florida code compliance, we suggest BCPS identify the

windows that are not in compliance with these code glazing requirements and begin replacing the non-compliant exterior window glazing.

While properly installed high-quality ballistic glass protection products can offer significant levels of protection, our experience has been that these products are extremely expensive in relation to the protection they offer in the K12 setting. For example, spending several hundred thousand dollars to install glass products with ballistic protection which are rated for handguns only for all ground floor doors and windows of a school provides no protection for a school shooting carried out by a student in a classroom, hallway, cafeteria, gymnasium, media center or parking lot. In addition, these products often degrade in effectiveness over time requiring replacement life-cycles of 5-9 years for most products of this type if they are used on outside doors or windows. For this reason, we advise our clients to consider whether their budget will also provide for replacement windows as required. More often, we find that the use of these products can be logical for limited situations such as windows for areas where office staff can retreat to if they feel threatened (known as safer rooms). Another option for these situations is the use of security glazing products that provide protection from forced entry but do not provide ballistic protection. While these products do not provide ballistic protection, they can delay an attacker who is trying to force entry by breaking windows. In our experience, a wider use of security glazing is more likely to reduce the risk of violence than the limited use of ballistic protection for fewer windows.

We note that there are a number of highly technical considerations that must be taken into account when ballistic or impact rated glass (security glazing) products are used. For example, some ballistic products may stop several projectiles but can then easily be pushed or knocked out by an attacker because the window's integrity is compromised to the point where the window is not rigid. This is but one of dozens of important technical points that must be considered to prevent a false sense of security and/or easily exploited gaps in protection.

By comparison, the types of behavioral prevention measures such as multi-disciplinary threat assessment and management, suicide prevention, behavioral intervention teams and protective intelligence can afford a reasonable degree of protection regardless of the attack method, timing or location. For example, while ballistic protection of windows can protect people from a shooting in specific locations and attack methods, behavioral approaches can offer protection from the use of firearms, knives, vehicle ramming, arson fire attacks and explosives. [redacted]

[redacted] We do, however, more often recommend that our clients consider forced entry protection for selected glass including main entryways, office areas and exit doorways with windows that are by

practice kept locked during the day. We are less prone to suggest ballistic protection for windows for most of our U.S. K12 clients.

For these reasons, our analysts do not recommend wide usage of ballistic protection for windows at this time unless the product and installation by a qualified vendor are provided through donations. If this approach is utilized, the District should consider the funding for life-cycle replacement costs. Similarly, if grant funding were available, BCPS could consider limited use of ballistic protection for windows in specific key areas. Based on the per-pupil funding levels for BCPS, other than these two sources of funding, we do not suggest BCPS use its limited time, energy and fiscal resources on ballistic protection for windows. In our experience, a broader utilization of security glazing to increase the time it takes for an intruder to force entry by breaking a window would be statistically more likely to prevent violence than a more limited use of far more expensive ballistic protection which will still not provide protection from many types of commonly available firearms.

Additionally, we were asked to consider the use of steel ballistic panels in specific areas of classrooms. We see limited statistical likelihood of providing protection from the use of steel ballistic panels in relation to their cost. The use of steel would provide some protection, but there are concerns about the weight of this type of upgrade for upper floors. Though even more expensive, laminated ballistic Kevlar panels on classroom walls could enhance safety better while reducing concerns about structural load. It could be possible to use a blend of less expensive steel panels on lower floors and ballistic Kevlar panels on upper floors. If this approach is utilized, we suggest a minimum height of 6 feet from floor level with 7 feet preferred when possible. Similar to our view on ballistic protection, we do not recommend the District's or grant funds be used for steel ballistic protection at this time. We do not object to these upgrades being implemented via donations as long as BCPS's requirements are met.

While we do not recommend the use of ballistic glass protection products, we suggest the District consider verification and replacement, if needed, of all exterior glazed openings, including "missile impact" rated glazing certified by ANSI Z97.1 and/or CFR 1201, as this will also provide a level of security glazing to prevent rapid building entry through broken glass openings. We also suggest the District consider the use of hurricane/security glazing on exterior windows. Hurricane rated glass can act as security glazing and is normally provided on new buildings in South Florida.

The following chart summarizes our ranking for the opportunities for improvement in this section:

No.	Opportunity for Improvement	Ranking	Estimated Cost
1	Verify and replace, if needed, all exterior glazed openings, include missile impact certified safety glazing, as this will also provide a level of security glazing to prevent rapid building entry through broken glass openings	H, S	$30-$50/sf

No.	Opportunity for Improvement	Ranking	Estimated Cost
2	Install steel or laminated ballistic panels in strategic locations to establish "armored" protected zones for lockdowns.	F, S	$15-$25/sf for steel, $25-$65/sf for laminated panel
3	Install missile impact/security laminated safety glazing in classroom door vision windows to prevent "reach in" and opening of doors. Will NOT stop bullets	L, S	$60-$100/ door (approx. $30/sf)
4	Install ballistic (level 1) glazing in classroom door vision windows to prevent bullet penetration. Will NOT reliably stop multiple shots or higher velocity (rifle) rounds	N	$200-$400/door (approx. $100/sf)
5	Install ballistic glass protection on all windows	N	$ 100/sf

Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.

5.3.3. We do not recommend the use of barricade devices in BCPS schools and support facilities due to fire code violations, security and other life safety concerns.

The FLDOE Memorandum issued on November 13, 2015 specifically stated that the Department and the State Fire Marshal's office will not approve the use of door security devices (such as barricade devices) that do not comply with the current laws, codes and standards in the State. In addition, there are concerns by many school security experts that none of the door blocking devices are in compliance with the National Fire Protection Association Life Safety Code (NFPA).

Our analysts are also concerned that these devices could easily be used to "lock out" school and police personnel while a sexual assault, hostage situation, active assailant attack or other form of violence is committed in a classroom or office. Of even greater concern, there are multiple scenarios where these devices or any other approach which significantly slow evacuation could result in mass casualty loss of life. These scenarios are not hypothetical and are based on actual attack methods in U.S. K12 schools as well as schools in other countries. We will not detail these attack methods in this document as this could serve to educate future attackers, especially those who might carry out an attack on a school or district where these options are in use.

Sexual assaults and other types of assaults of staff and students are also a concern with these devices as they can allow an aggressor to lock out help while they carry out an attack in an unattended classroom that has been left unlocked. We also have concerns that in our experience, many school staff have

experienced difficulty in rapidly locking their work areas with these devices when we have asked them to do so in real time. We have also seen many instances where school staff have been unable to rapidly unlock the devices [redacted] As there have been six attacks of this type in U.S. K12 schools to date, we see this as a viable concern.

While the public perception is often that gunmen frequently force their way into locked classrooms and attack staff and students after entering the room, the reality is that unless a post-incident investigation of any of this year's deadly school shootings documents such an attack method, there previously has been one attack in U.S. history at a K12 school where victims have been killed in this manner. SHI Executive Director Michael Dorn served as an expert witness on this case which occurred at the Red Lake High School in Minnesota. While the attacker in the deadly Sandy Hook Elementary School attack did make entry to the school by breaching the main entryway glass, the Connecticut State Police Report on the event documented that the attacker did not force entry to any interior office areas or classrooms.

Inaccurate social media and media discussions combined with the use of emotive descriptions and inflated data on active shooter incidents of this type by a variety of security product vendors and training companies has created a perception that students and staff are frequently killed because an attacker forces their way into a locked classroom in active assailant events. While this attack method has been used in one of our nation's most deadly school shootings and could easily be repeated, we have found no other K12 active assailant attack of this type. We note that this includes a review of all known active assailant attacks dating back to our nation's first mass casualty school shooting at a Parochial school in Newburgh, New York in 1891.

For these and other reasons, we do not recommend general usage of these types of devices in BCPS schools and support facilities.

5.3.4. [redacted]

[redacted]

[redacted]

5.3.5. We suggest caution when considering the installation of window coverings.

The Task Force Report suggest the installation of window coverings using magnets where possible. However, we suggest that the use of window coverings should only be considered when a classroom does not allow staff and students to move to a position where they cannot be seen from the hallway. This is because covering windows in any manner can:

- Increase the time that a teacher is in view from the hallway, which creates increased risk for the teacher and students.
- [redacted]
- Increase the number of action steps a teacher needs to remember under stress, which could result in the teacher forgetting other important action steps.

If one or more attackers plan to force entry into classrooms to attack victims, having a number of locked classrooms with lights out and no occupants in sight can make attackers consider the prospect that they may have to waste time forcing entry into and searching empty classrooms.

Additionally, we note that if teachers make it a practice to keep classroom door windows covered when not in lockdown, the practice will reduce natural surveillance which can, in turn, increase the risk of security incidents, such as assaults on school employees and students. There have been instances around the nation where staff members have used the added privacy, achieved by covering windows, to engage students with increasingly inappropriate behaviors, such as stroking of hair, touching, etc. before moving on to more serious types of inappropriate behavior. This process is called "grooming" by child abuse experts and is commonly an integral part of the process of a sexual predator seducing a child or youth. The practice of covering door windows on a daily basis also increases the difficulty in clearing the name and reputation of school employees, the schools, and the school district when false allegations are made relating to misconduct of a sexual or non-sexual nature. Legal costs for incidents arising from this type of behavior can be significant and more importantly, the impact on victims can be devastating.

While the Task Force Report does not suggest covering door windows on a daily basis, many schools around the country have been allowing the practice, especially those where active assailant training that is not well thought out has occurred. Therefore, we suggest caution when considering the installation of window coverings.

5.3.6. We suggest caution when considering the use of lines on floors, markers on walls and other visual indicators in classrooms to visually depict for students and staff the shelter areas they should move to during a lockdown.

Some schools around the nation have marked "out of view areas" in classrooms and other areas with a variety of types of visual markers to help staff and students quickly identify the spaces in the rooms they should move to during a lockdown to be out of view from the hallway and, in some cases, from outside the school (via exterior classroom windows). The rationale behind this concept is that these visual markers can help students and staff who are under stress and/or who are not familiar with these locations quickly determine where they should move to in a lockdown.

While we feel this practice can be appropriate in some schools, we do have some cautions about this approach, especially for a large public-school system. For example, we have seen a number of instances where the marking locations have been improperly selected. We have also seen situations where different law enforcement personnel have different opinions on where the markings should be, making it difficult for school officials to reach a viable consensus. As teachers often need to add or move around desks and tables to accommodate an increase in students in a particular classroom or to accommodate learning objectives, the markings can become inaccurate after the changes, which could result in students and staff moving to a space that is no longer out of view. As the Task Force Report mentions, BCPS has more than 25,000 classrooms and other rooms not counting many other types of rooms. Making the decisions for the locations of markings and keeping the markings in each classroom current would require significant staff time each year.

We also had an administrator in the District who expressed concern that these types of markings could also cause anxiety among students. The administrator noted that when he discussed this option with his staff, some of them felt that it would be viewed as a "kill line," which would serve as a constant reminder of the tragedy at MSDHS as well as the possibility that they could be attacked while at school. We find this to be a valid concern but note that other students and staff might be reassured by the same approach. We would suggest the District consider the above factors before implementing the use of visual markers.

We caution our clients that the more complex physical and technology approaches for a school district become, the greater the need for personnel to develop, implement and maintain them, and the greater the opportunity for failures to occur. With the current human and financial resources, the size and

complexity of BCPS, we do not see the concept of using visual markers to indicate lockdown areas that should be implemented properly on a wide scale in BCPS. We feel that the District would be wise to focus their limited resources on enhancements that offer greater benefits.

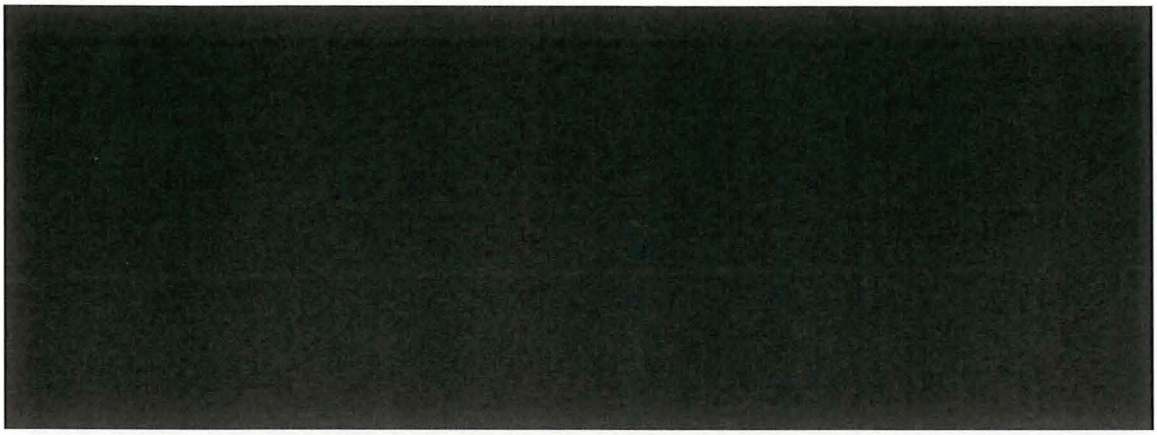
In our experience, most school districts have opted not to implement the use of visual markers for some of the reasons spelled out above. We suggest BCPS instead address this legitimate concern by way of enhanced communications with staff, age-appropriate discussions with students and in revised training and drill programs. It is our understanding that some of these concerns are being addressed in this year's updates to active assailant training. We will be further evaluating the District's emergency preparedness approaches in Phase II of this project. We have already had some discussions with SIU staff regarding how these concerns can be addressed at present. If needed, we can also have additional discussions with BCPS personnel on options for consideration involving other ways to communicate to staff and students how to better prepare themselves to make these types of decisions in an emergency.

5.3.7. The District should consider protective measures for [redacted]

Physical security measures for the site also extend to [redacted] During the assessment, we observed many protective measures for pedestrian crossings on school property that included signage, pavement markings and speed bumps to help slow traffic. At the same time, while most schools observed in the District have [redacted] The District should consider improvement in this area as part of the overall safety and security plan.

Another leading practice to consider is [redacted] There are many sources available to help school planners determine that speed and the design requirements necessary for protective measures. [redacted] It is our recommendation that these measures be incorporated into an integrated security approach to the site that includes lighting, exterior surveillance cameras, landscaping, grading and unobstructed views for natural surveillance. [redacted]

[redacted]



5.3.8. We do not recommend the use of classroom ballistic sheltering systems at BCPS due to their cost, concerns about practicality under field conditions and potential inherent dangers.

We were asked to review the approach of using ballistic shielding and sheltering systems such as bullet-resistant shields, bullet-resistant tents, and armored storm shelters installed inside classrooms or in outdoor areas to provide an additional layer of protection to students and staff in an active assailant event. Due to the cost of these systems in relations to the level of security they might provide, our concerns about their practicality under field conditions and, most importantly, our concerns about the inherent potential dangers their use could pose, we do not recommend these types of security measures for BCPS or any other K12 school system.

Our analysts are skeptical to deeply concerned about each of these theoretical approaches. For example, our analysts are concerned that students and staff would find the bullet-resistant shields to be of very limited protection in a sudden and violent attack, easy for attackers to work around in close quarters attack and if stored in classrooms, would not be at hand for use in a very high percentage of common active assailant attacks such as those in cafeterias, hallways, commons areas, on the playground etc.

We have our deepest reservations about the bullet-resistant tents and armored storm shelters. We are advised that the cost of these shelters have starting prices at $23,000 and higher. At the same time, this type of sheltering approaches could provide protection only for specific and, statistically, unusual scenarios. Additionally, even those that are advertised to be built with bullet-resistant materials could be easily circumvented by an attacker in a close-quarters event by deadly alternate attack methods. In our opinion, other preventative measures at much lower cost could offer greater benefit and address multiple safety and security concerns.

We also have significant concerns about the potential dangers inherent to this type of sheltering approaches. For example, armored storm shelters that must be left unlocked for rapid access and can be quickly locked from the inside without a key can create significant increased risk of sexual assault for students, and even staff. |

have similar concern about any systems that could significantly delay evacuation in an attack. While this sheltering approach may seem logical, a closer look at the approach and the attack methods that have been used in mass casualty school violent incidents, we see it could be relatively easy for an attacker to increase rather than decrease casualties using alternative attack methods if these types of shelters were utilized.

6. Implementation Plan

For easy follow-up, we group the opportunities for improvement identified in this report as well as the security measures we were asked to opine on either by BCPS staff and/or parents into two sections: One is for the opportunities for improvement we suggest the District should consider, either for short-term or long-term plan; and the other is for the security measures we do not recommend at this time.

6.1. Opportunities for improvement

The table in this section will provide the list of the opportunities for improvement identified in this report, their ranking and estimated cost where applicable. We should note again that it is impossible to accurately and mathematically rank all safety, security, and emergency preparedness concerns. The wide range of factors makes many of the opportunities for improvement in this report interdependent. The ranking should serve as advisory information for the District.

Additionally, for easy to follow, we include the terms for our ranking again here:

- **I**mmediate - Highest priority: Implement in the fastest manner reasonably possible as long as quality of the upgrade can be maintained through maintenance effort or currently available funds.
- **H**igh Priority - As soon as funding becomes available: Implement with any grant funding or security funding sources as they become available.
- **L**ong Range Goal – Plan for implementation over time: Begin systematic implementation through routine maintenance opportunities or planned capital improvement efforts as well as in facility additions and new construction.
- **F**uture Improvement – Not recommended at this time but possible for future improvement: Consider implementing if there is still funding available after improvement efforts for other I, H and L items, or if there are changes in technologies that make the enhancements more cost effective to implement. Individual communities or schools may choose to implement so long as they have funding; no additional personnel will have to be provided by the District to support them; the funding mechanism will provide for any life-cycle replacement costs; the upgrade will not conflict with District construction or information technology standards; and the enhancement is compliant with building, fire and life-safety codes.
- **S**pecs - Include in design specifications for all new facilities: Update design specifications to require in any new construction or renovation project designs.

- **N**ot Recommended – Not for consideration for implementation: Not recommended because the approach is experimental and not yet validated as effective; or because there may be concerns about quality, reliability or sustainability for the District; or potential dangers that could arise from implementation.

Item	Opportunity for Improvement	Ranking	Estimated Cost
Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.			
5.1. Surveillance, Emergency Communications and Access Control			
5.1.1	Add additional IP-based surveillance cameras in the immediate priority areas	I, S	$4,000-$5,000/camera point
	Add additional IP-based surveillance cameras in the high priority areas	H, S	$4,000-$5,000/camera point
	Add additional IP-based surveillance cameras in the long-range areas	L, S	$3,000-$4,000/camera point
	Replace existing analog and first-generation cameras with programmable IP-based cameras	L, S	$3,000-$5,000/camera point
	Add appropriate staff resources to properly and effectively administer, manage, program and maintain the new and enhanced systems	L	N/A
	Provide district-wide training for district level and site level administrators and relevant staff in proper use of surveillance cameras	L	N/A
5.1.2	Repair/Replace all obsolete or non-working repeaters to enhance full campus wide coverage at all schools	H	$2,500/repeater
	Add new repeaters to fill in blind spots where needed	H	$12,000-$15,000/new

Item	Opportunity for Improvement	Ranking	Estimated Cost
Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.			
			repeaters
	Add additional radios for school staff	H	$350-$450/unit
	Purchase new radios for school buses and key personnel and migrate to the County's new radio system	H	$2M one-time cost for new radios
5.1.3	Add PA systems for the interior and exterior areas that can benefit from the systems but currently do not have the resources	I	$250-$500/unit
	Upgrade PA systems with IP based systems	H, S	$170,000-$215,000/school
5.1.4	Complete the implementation of VoIP phone system at the remaining school campuses and support facility sites	H, S	$75,000-$100,000/site
5.1.5	Install fixed duress buttons at key school locations	H, S	$1,000-$1,500/unit (assuming the suggested staffing of the CMC)
	Equip all teachers with portable duress buttons	N	$50-$300/button plus infrastructure upgrades
5.1.6	Install buzzer access control systems with integrated cameras and intercom for main entry doors	L, S	$4,000-$6,000/system
	Install integrated proximity card access control systems on regularly used exterior doors (by groups of students and staff) on permanent construction facilities when number of required proximity readers is 10 or less. In conjunction, install DPS and REX on all other exterior doors	L	$50,000-$65,000/campus

Item	Opportunity for Improvement	Ranking	Estimated Cost
Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.			
	Install integrated proximity card access control systems on existing temporary or portable classroom units	S	$20,000-$26,000/portable unit
	Require access control systems with DPS and REX devices in all new facilities or additions on all exterior doors into occupiable spaces	S	N/A
	Retrofit DPS and REX devices on all existing exterior doors to detect a door left open and prevent false alarms	S	N/A
5.1.7	Retrofit existing SPE and provide new SPE with buzz in capabilities	H, S	$7,500-$10,000/SPE
	Retrofit existing SPE glazing with hurricane/security glass or edge to edge security film on all sides of new and existing SPE waiting rooms	L, S	$7,000-$8,000/SPE
	Establish a "transaction window" in the SPE at the front office with security glass to prevent access into school via back office entries and/or protect the front office staff	L, S	$18,000-$20,000/SPE
5.2. Structure, Staffing and Training Improvement			
5.2.1	Create an EMR strategy	I	N/A
5.2.2	Create and fill the Chief Security Officer position	I	N/A
5.2.3	Add three new Protective Intelligence positions assigned to the Fusion Center	I	N/A
	Add three new Sergeant positions for the SIU	I	N/A
	Create a more formalized and enhanced support structure for the various Campus Monitor and School Security Specialist positions by adding: • Security Manager position reporting to the Chief	I	N/A

Item	Opportunity for Improvement	Ranking	Estimated Cost
Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.			
	Security Officer • Assistant Security Manager reporting to the Security Manager • Two Security Captain positions • Supervisors for each shift reporting to the Security Captain for Operations. • Additional field supervisory positions		
	Upgrade vehicle fleet for the SIU	H	N/A
	Upgrade the Communications and Monitoring Center by adding: • Communications coordinator position (day shift) • Assistant Communications Coordinator (evening shift) • Three communications supervisor positions and three assistant supervisor positions to provide 24/7 supervision with off days for supervisors being covered by assistant supervisors. • Equipment and software • Interoperable communications capability	I	N/A
5.2.4	Revise the current plans and training approaches once our Phase II assessment is completed	L	N/A
	Add six additional training positions	H	N/A

Item	Opportunity for Improvement	Ranking	Estimated Cost
Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.			
	Add comprehensive and robust web-based school safety learning platform or use a blend of in-house staff and, as needed, hiring qualified subject matter experts to develop customized school safety, security and emergency preparedness courses for the District's current web-learning platform	H	$100,000-$120,000/year for a commercial web-based learning platform
5.3. Other Security Measures			
5.3.1	Install 8-foot-tall security type fencing	F	$100/lf
	Update design specifications and requirements to require 6-foot chain link fencing around all exterior, student occupied or gathering areas and perimeters but not staff or student parking areas	S	N/A
	Update design specifications and requirements to require 8-foot security fencing around all exterior, student occupied or gathering areas and perimeters but not staff or student parking areas	S	N/A
5.3.2	Verify and replace, if needed, all exterior glazed openings, include missile impact certified safety glazing, as this will also provide a level of security glazing to prevent rapid building entry through broken glass openings	H, S	$30-$50/sf
	Install steel or laminated ballistic panels in strategic locations to establish "armored" protected zones for lockdowns.	F, S	$15-$25/sf for steel, $25-$65/sf for laminated panel
	Install missile impact/security laminated safety glazing in classroom door vision windows to prevent "reach in" and opening of doors. Will NOT stop bullets	L, S	$60-$100/ door (approx. $30/sf)
5.3.4	Equip all schools and support facilities with [redacted]	L	$5,000, [redacted]

Item	Opportunity for Improvement	Ranking	Estimated Cost
Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.			
	capability		point
5.3.7	Use protective measures for the outside areas where vehicles have a straight path	L, S	N/A

6.2. Security measures we do not recommend at this time.

Below is the list of the security measures we do not recommend for implementation at BCPS. The specific reasons for our opinions on these measures are included in Section 5 above. Where applicable, the table also provides the estimated cost to implement each measure.

Item	Measures Not Recommended at this Time	Estimated Cost
Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.		
5.1.5	Equip all teachers with portable duress buttons	$50-$300/button plus infrastructure upgrades
5.1.8	Implement entry point metal detection for schools in the District	$250,000-$1,000,000/year (assuming one metal detection and security X-ray station per 500 students)
5.3.2	Install ballistic (level 1) glazing in classroom door vision windows to prevent bullet penetration. Will NOT reliably stop multiple shots or higher velocity (rifle) rounds	$200-$400/door (approx. $100/sf)
	Install ballistic glass protection on all windows	$ 100/sf
5.3.3	Install barricade devices for classroom doors	N/A
5.3.5	Install window coverings	$10-$50/covering
5.3.6	Use visual markers to indicate lockdown areas	N/A

Item	Measures Not Recommended at this Time	Estimated Cost
Legend: **I**: Immediate, highest priority; **H**: High priority; **L**: Long range goal; **F**: Future improvement; **S**: Specifications in design criteria; **N**: Not recommended at this time.		
5.3.8	Use classroom shelter systems	$23,000/unit

7. Conclusion

While this report details many opportunities for improvement, BCPS has implemented a number of significant practices to enhance school safety, security and emergency preparedness. We noted numerous logical and positive efforts to enhance safety have already been implemented or were already in process when we began the assessment. The District has expended considerable time, energy and fiscal resources to enhance safety, security and emergency preparedness measures. We also observed a pronounced desire on the part of employees we interviewed to continue to build on current safety efforts.

We were also impressed with the clear desire expressed by the employees we interacted with to find additional ways to enhance safety in their schools and support facilities. Making improvements in school safety, security, and emergency preparedness can be far easier when school employees are receptive to improvements. Conversely, no security equipment or technology can overcome apathy or lack of support by school and district employees. This makes the commitment of the employees we interacted with an invaluable asset to BCPS.

We urge that efforts to address the opportunities for improvement outlined in this report be made with a focus on effective implementation of the changes rather than on the speed of implementation. While we do not advocate delays in action, we urge our clients to focus on quality above speed in making long-term adjustments in safety. This will be especially important for the many physical security upgrades we provide as options for consideration. We also routinely advise our clients not to take the options for consideration listed as specific mandates. We suggest our clients prioritize options for consideration based on their available resources. School officials should view our report within the context of the overall options rather than focusing intently on individual options. Clients should also keep in mind that their efforts to address one option for consideration sometimes affect how beneficial another enhancement might be. We have emphasized the areas where improvements can be achieved, but once again remind all who read this report of the substantial successes which have been achieved in the areas of security, climate, and culture in the School. We at Safe Havens International consider it an honor to work with the District on this important and worthwhile initiative and applaud the efforts of the District leadership to seek ways to improve the level of safety for the precious human beings that make up Broward County Public School Community.

Appendix I: Sample School Safety Management Scorecard

	Q1	Q2	Q3	Q4	YTD	Last Year
1. Safety Oversight						
a. # Meetings of Independent Safety Oversight Board						
b. # Safety-related policies reviewed, updated or added						
2. Safety Training & Exercises						
a. % School-based staff completing a safety-related training						
b. % District staff completing a safety-related training						
3. Safety Awareness						
a. # Safety/security examples shared with all staff						
b. # Staff recognized for safety-related improvements						
c. # Safety policy improvements adopted						
d. # Safety surveys conducted on students or parents						
4. Safety Drills						
a. % Schools conducting an evacuation drill						
b. % Schools achieving 100% evacuation in < 3 minutes						
c. % Schools conducting a lockdown drill						
d. % schools achieving 100% lockdown in < 3 minutes						
5. Safety Inspections & Assessments						
a. % Schools conducting a safety-related inspection						
b. % Schools receiving a 3rd-party safety assessment						
c. # school life-safety/fire code violations reported						
6. Emergency Communication, Response & Resolution						
a. # Notifications (all sources & levels) regarding student safety						
b. % Notifications escalated to higher level						

c. % Notifications de-escalated to lower level						
d. Avg. response time (minutes) for high-level notifications						
e. Avg. response time (minutes) for low-level notifications						
f. Avg. resolution time (hours) for high-level notifications						
g. Avg. resolution time (hours) for low-level notifications						
h. % Incidents or events managed by school SRO						
7. Access Management System						
a. # Visitor management issues, errors or complaints reported						
b. % Hit rate from Raptor system						
c. # Intrusion incidents reported						
d. % Intrusion false alarms reported						
e. # Panic alarm calls reported						
f. % Panic false alarms reported						
g. # Secure entry/exit issues reported						
h. # Investigations facilitated by access management system						
8. Video Management System						
a. # Cameras offline during school operating hours						
b. Avg. time (hours) required to correct offline camera issues						
c. % Schools receiving full video system assessment and report						
d. # Video system upgrades implemented						
e. # Investigations facilitated by video management system						

Appendix II: About Safe Havens International and Key Project Team Members

1. About Safe Havens International, Inc.

Formed in 2001, Safe Havens International, Inc. (SHI) is the world's leading non-profit school safety center. We are dedicated to assisting schools and their community partners in creating a safer world for our children and those who dedicate their lives to educating them. We have K-12 experience that is unmatched in the private sector. The work experience of our analysts in all 50 states, Mexico, Canada, Trinidad-Tobago, Honduras, Bolivia, the U.K., South Africa, Kenya, Mozambique, India, Israel, Vietnam, Trinidad-Tobago and other countries provides our clients with a high degree of K12 specific expertise. Our 62 analysts have assisted with school security and emergency preparedness assessments for a wide diversity of K12 schools and school districts as well as six state-wide school security assessment projects. In addition to the current projects to assess more than 750 K12 schools, our analysts have assisted clients with safety, security, climate, culture and emergency preparedness assessments for more than 6,000 public, private, independent, charter and faith-based K12 school sites over the past 17 years. Our analysts have previously conducted various types of security assessments for five of the ten largest school districts in America: Orange County Public Schools (Florida), Hillsborough County Public School (Florida), Clark County School District (Nevada), the School District of Philadelphia (Pennsylvania), and the Hawaii Department of Education – the only state-run school district in America.

Our analysts authored the content for the United States Department of Homeland Security's IS-360: *Preparing for Mass Casualty Incidents: A Guide for Schools, Higher Education, and Houses of Worship* web-course which focuses on active assailant situations as part of the 2013 White House School Safety Initiative. Five of our analysts also authored the book *Staying Alive – How to Act Fast and Survive Deadly Encounters*. Released by Barron's in bookstores May 2014, this book is designed to be the most heavily researched book on the topic of evidence-based approaches to life and death decision-making and the prevention of violent incidents.

More than half of the members of our team for this project are serving on the authoring team for a 600-page university textbook *Protecting People from and Understanding Active Assailant, Hate Crime and Terrorist Attacks* which is due for publication by Cognella in 2019. This book is designed be the definitive work on the topic in print. The analysts on our project team have collectively published 28 previous books on school safety and have served as keynote speakers for hundreds of state, national and international professional conferences in the United States, Canada, Trinidad-Tobago and Vietnam. With more than 90% of our work being in the K12 arena, we offer an un-paralleled depth of experience focused on helping make schools safer.

Our analysts also have an extensive base of experience providing post-incident assistance for targeted school shootings and K12 active shooter events. We have provided post-incident assistance for 14 planned K12 school shootings. SHI is also well respected for developing assessment-based and

evidence-based evaluation methodologies to help improve staff performance under the extreme stress of a major crisis event.

SHI analysts have served as crisis management advisors and/or keynote presenters for state departments of education, in Florida, Georgia, Hawaii, Indiana, Iowa, Kentucky, Maine, Massachusetts, Pennsylvania, Oregon, South Carolina, South Dakota, Tennessee, Texas, Virginia, and Washington State. Our analysts have extensive experience in Florida and have presented at state-wide conferences not only for the Florida Department of Education, but for the Florida Department of Law Enforcement, the Florida Division of Emergency Management, and the Florida Association of School Resource Officers. Just a few examples of agencies and organizations we have assisted include, but are not limited to, the U.S. Department of Education, Federal Bureau of Investigation, the U.S. Department of Homeland Security, Federal Emergency Management Agency, Bureau of Alcohol Tobacco and Firearms, Transportation Security Administration, U.S. Attorney General's Office, Office of Justice Programs, Boys & Girls Clubs of America, International Association of Chiefs of Police, National Association of School Resource Officers, National Association of School Security Directors and Law Enforcement Officers, National Safety Council, National Association of Pupil Transportation, California Highway Patrol, California Office of Emergency Management, Georgia Emergency Management Agency, Kansas Highway Patrol, Oklahoma State Police, Pennsylvania State Police, New York State Police, Wisconsin Homeland Security Council, the Department of School Education and Literacy Government of India, Israel National Police, Trinidad-Tobago Ministry of Education and Vietnam National University. These and many other organizations have all relied upon SHI analysts for their expertise.

2. Sub-Contractor: Parkhill, Smith & Cooper, Inc.

Parkhill, Smith & Cooper, Inc. (PSC) is assisting SHI in accomplishing the physical evaluation of campuses as well as the review of current security systems and design criteria in this project. PSC is an architectural and engineering consulting firm in Texas with over 70 years of continuous professional practice and project experience with K-12 school districts. Over this time, PSC has grown to 330 employees in nine fields of practice, the largest of which is the K-12 sector. Their team has worked all over the United States and internationally on facility assessments, master-plans, educational adequacy studies, preventative maintenance programs, energy audits, and full-service design projects with construction administration. PSC is one of only seven firms nationally invited to form the 21st Century Schools Design Council for the Department of Defense Education Activity (DoDEA).

PSC's relationship with DoDEA began in 1996 with several projects in the southeastern United States. Since then, PSC has designed all the operations and maintenance projects for their 58 stateside schools. In 2010 and again in 2018, PSC was part of a team that completed a facility assessment and educational adequacy study for 157 public schools on 34 military installations across the United States, an effort that ultimately led to the federal funding of public school replacements serving high percentages of military families. Their experience with DoDEA has involved numerous projects involving security considerations and provisions for anti-terrorism and force protection, including school projects in Germany, Italy and

Japan. Currently, PSC is the prime design firm responsible for a new high school for our military dependents in Vicenza, Italy. In addition, PSC has also led the design and scoping efforts for two new elementary schools, a middle and high school in Wiesbaden, Germany. Coordination with the base anti-terrorism officer was crucial. Given the current heightened threat level on the global level, incorporation and development of security criteria have been key components of their work on these projects. The benefit of this experience is the ability to relate and apply best practices in visitor entry, perimeter control, and broad design principles to address multiple security threats.

In their work for K12 public schools in the United States, PSC has helped districts assess, plan and design security improvements as stand-alone projects and those incorporated into larger renovations or new schools. One such project scoped and delivered by PSC was comprehensive security upgrades for Lubbock ISD that included 63 instructional facilities serving almost 29,000 students. More recently, PSC helped assess and design security improvements for Abilene ISD (17,000 students) and Amarillo ISD (33,000 students). As the design criteria sample illustrates, PSC has experience with state and national security guidelines and can incorporate vulnerability assessment data into a comprehensive set of guidelines used by professional architects and engineers for incorporation into BCPS's educational specifications for future projects.

PSC has experience working with Safe Havens International, a relationship that started with a school safety training course for PSC employees to enhance the understanding of safety and security concepts in K-12 schools. PSC has also included school administrators and police officials from over twenty school districts and two universities in seminars featuring Safe Havens analysts and some of the top experts in the field of Crime Prevention through Environmental Design (CPTED). PSC was on SHI's team that delivered a project of similar scope for 205 schools in Orange County Public Schools in Florida in 2014.

3. Sub-Contractor: Atlas Safety & Security Design, Inc.

Founded in 1988, Atlas Safety & Security Design, Inc. (ASSD) is an independent, non-vested, architectural security design consulting firm which provides consulting and design services to architects, owners, and developers in the private and public governmental sectors. ASSD provides programming and design services for justice facilities, along with other commercial and institutional work. ASSD specializes in the planning, design, and construction of criminal justice facilities, building security, anti-terrorism and infrastructure protection design, safety design, and accessibility features in all types of buildings such as apartment buildings, office buildings, shopping centers and plazas, parks and recreation, parking garages and lots, nightclubs and restaurants, schools and universities, jails, prisons, courthouses, and police facilities. ASSD is a leader in the industry, with extensive experience in large building projects that require security in the early stages of the design process for full integration of the research-based concepts of crime prevention through environmental design (CPTED) into the facility and infrastructure. ASSD is a certified Micro/Small Business Enterprise in Miami Dade County, a registered vendor in the categories of Safety & Security Consulting, Crime Prevention Services, Feasibility Studies, Security Systems, and General Consulting Services, and is certified as a Title II ADA Consultant.

ASSD Vice-President, Dr. Randall Atlas is a registered architect, NCARB certified, and practices criminal justice architecture, environmental security design, counter terror design, and infrastructure protection. He is a certified protection professional with the American Society of Industrial Security (ASIS) and is an appointed member of the ASIS Security Architectural and Engineering Council. Dr Atlas serves on the faculty of the annual ASIS Faculty Design Workshop and is a member of the American Institute of Architects (AIA) Architecture for Justice Committee. Dr. Atlas has been appointed to the Oklahoma City National Memorial Institute of the Prevention of Terrorism peer review panel 2001. Atlas is an appointed member of the Premises Security Committee with the National Fire Protection Association developing new security standards and guidelines 730 and 731.

4. Key Project Team Members

Name & Title	Roles and Relevant Skills
Michael Dorn, SHI Executive Director & Senior Analyst 	**Project Assignment: Overall project manager, conducted off-site document review and on-site district-level assessment, and assisted with writing reports.** Director Michael Dorn is one of the most respected, widely recognized, highly credentialed and trusted school safety experts in the world. During his campus safety career of more than 36 years, Michael's work has taken him to numerous regions including Mexico, Honduras, Canada, Vietnam the U.K., Kenya, South Africa, Israel and Mozambique. Michael has provided post-incident assistance to law firms, school systems, state agencies and insurance carriers for 14 mass casualty and targeted school shooting incidents in K12 schools in the United States and Canada. A leading school safety malpractice expert witness consultant, Michael served as an expert witness consultant for superior and federal court cases in eleven states and the District of Columbia. Michael was an expert witness consultant in the school safety malpractice litigation following the Red Lake Reservation School Shooting, the nation's third most deadly K12 school shooting. Published by four major publishing houses, Michael has authored and co-authored 27 books on school safety including *Innocent Targets – When Terrorism Comes to School*, the peer reviewed 450-page Jane's *Safe Schools Planning Guide for All Hazards* and *Staying Alive – How to Act Fast and Survive Deadly Encounters* which was released by Barron's in May of 2014. Michael is currently co-authoring a 600-page university textbook *Extreme Violence: Understanding and Protecting People from Active Assailants, Hate Crimes and Terrorist Attacks* for Cognella due for publication in 2019. Michael also served on the authoring team for the IS 360 *Preparing for Mass Casualty Incidents: A Guide for Schools, Higher Education, and Houses of Worship* training program focused on active shooter incident prevention and preparedness for the United States Department of Homeland Security as part of the 2013 White House School Safety

Name & Title	Roles and Relevant Skills
	Initiative. Michael has co-authored more than two dozen nationally distributed school safety web courses with seven of those courses being specific to active shooter events and six courses on terrorism. Michael has also authored hundreds of articles and columns for national publications including School Planning and Management, Campus Safety, Today's School, School Transportation News and College Planning and Management magazines. A graduate of the prestigious three-month FBI National Academy and bachelor's and master's programs at Mercer University, Michael has completed more than 3,000 classroom hours of formal law enforcement, fire service, and emergency management training. Michael received fourteen days of intensive training and orientation from the Israel National Police, Israel Defense Forces and Israeli intelligence agencies through a fellowship from Georgia State University. Michael has also provided training to two groups of police commanders from Israel. Michael also holds a certificate in Management Development from the American Management Association – Harvard School of Business delivered through Mercer University. During his 25-year public safety career, Michael served as: • Police Officer, Corporal, Sergeant and Lieutenant, Mercer University Police • Chief of Police for the Bibb County Georgia Public School System • School Safety Specialist for the Office of the Governor – Georgia Emergency Management Agency (top expert for the nation's largest state government school safety center). • State Antiterrorism Planner for the Georgia Office of Homeland Security Terrorism Division – Georgia Emergency Management Agency. • Lead Program Manager for the Georgia Office of Homeland Security Terrorism Division – Georgia Emergency Management Agency. • Senior Analyst for Public Safety and Emergency Management – Jane's (top expert for the renowned 105-year-old British defense, intelligence and school safety publisher with offices in nine countries). During his ten-years of service as the Chief of Police for the Bibb County Public School System in Macon, Georgia, his officers developed what is believed to be the nation's first multidisciplinary threat assessment team for a K12 school system. This approach and other innovative measures helped the district prevent a number of planned school

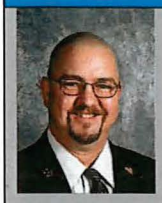
Name & Title	Roles and Relevant Skills
	shootings, one planned school bombing and a planned double suicided. Michael helped the Georgia Department of Education develop the nation's first 24 hour a day, seven days per week, year-round hotline. The state hotline was launched in August of 1998 and was based on a similar live monitored hotline developed in 1990 in his school system police department. Michael also assisted in launching the e-mail-based reporting feature for this hotline while he was serving at the state level. The Bibb County Public School Police Department was widely utilized as a model program by dozens of organizations including the United States Departments of Education and Justice, the FBI, International Association of Chiefs of Police and National Association of School Resource Officers. Michael has presented nationally and internationally on student threat evaluation for more than twenty years and has personally helped avert a number of planned school shootings and one school bombing incident.
Russell Bentley, SHI Senior Analyst 	**Project assignment: Conducted off-site document review and on-site assessment.** Russell Bentley is a 28-year police veteran with 23 years of experience in executive positions with campus police agencies. Mr. Bentley is a 2001 graduate of the FBI National Academy and has received extensive formal training in law enforcement and emergency management. He holds a Master of Science Degree in Administration and a Bachelor of Science Degree in Child Development and Family Life Education, both from Georgia College and State University. Mr. Bentley is currently a contributing author for a 600-page university textbook *Extreme Violence: Understanding and Protecting People from Active Assailants, Hate Crimes and Terrorist Attacks* for Cognella due for publication in 2019. During his career, he has: • Served as police chief for eight years at both the K-12 and post-secondary levels. • Served for five years with the Macon Police Department working undercover narcotics, patrol division, crime prevention bureau, communications division, housing authority unit and was promoted to police sergeant. • Served for eight years as the Deputy Chief of Police and for eight years as the Chief of Police for a Georgia Board of Education Campus Police Department. The department has been widely featured as a model school law enforcement partnership by many agencies including the U.S. Department of Education, the International Association of Chiefs of Police and the U.S. Department of Justice. • Served as Chief of Police for the Fort Valley State University Police Department for

Name & Title	Roles and Relevant Skills
	two years. • Has completed more than 1,600 hours of advanced level law enforcement and emergency management training at the state and federal level. • Served in the development and final review of the Jane's Safe Schools Planning Guide for All Hazards, the Jane's School Safety Handbook and the Jane's Teacher's Safety Guide. • Serves as an adjunct faculty member teaching police and security technology at Central Georgia Technical College. Mr. Bentley has extensive experience in conducting school safety assessments and school safety assessment train-the-trainer programs. He has presented at state, national, and international professional conferences across the nation.
Phuong Nguyen, SHI Analyst 	**Project assignment: Assisted in writing reports.** A trained and skilled researcher, Ms. Nguyen has analyzed assessment data, prepared documents, and provided oversight for reporting for all SHI school safety assessment projects since 2010, including major projects for the Center for Safe Schools funded by Pennsylvania Department of Education, the Hawaii Department of Education, the Wisconsin Homeland Security Council, the Indiana Department of Education, and the Maine Department of Education, covering more than 2,000 public, private, charter, independent, and parochial schools. Ms. Nguyen has also assisted in conducting on-site school security and emergency preparedness assessments for public, independent, and faith-based K12 schools in 19 states and the District of Columbia. Ms. Nguyen served as the content editor for the book *Staying Alive – How to Act Fast and Survive Deadly Encounters* which was released to bookstores by Barron's in May 2014. Ms. Nguyen also co-authored the IS 360 *Preparing for Mass Casualty Incidents: A Guide for Schools, Higher Education, and Houses of Worship* web training program on active shooter prevention and preparedness for the United States of Education as part of the 2013 White House School Safety Initiative. Ms. Nguyen has also served as a co-author for six web courses on the prevention of and preparedness for active shooter events and six terrorism web courses for Scenario Learning Inc. Ms. Nguyen is also currently the lead co-author for a 600-page university textbook *Extreme Violence: Understanding and Protecting People from Active Assailants, Hate Crimes and Terrorist Attacks* for Cognella due for publication in 2019.

Name & Title	Roles and Relevant Skills
	Ms. Nguyen holds the following degrees: • Bachelor of Arts Degree in English Linguistics, Quinhon University, Vietnam. • Master of Arts Degree in Applied Linguistics, Vietnam National University, Vietnam. • Master of Arts Degree in Mass Communications, Texas Tech University. • Master of Science Degree in Cyber Security, University of Maryland University College.
Chris Dorn, SHI Senior Analyst 	**Project assignment: Conducted off-site document review and on-site assessment.** Well-known and respected in the field, Chris Dorn has presented at conferences in more than two dozen states and at Vietnam National University in Saigon. Chris has served as a trainer for the U.S. Office of Homeland Security, FEMA, Israel National Police, International Association of Chiefs of Police, National Association of Pupil Transportation, Bureau of Justice Assistance, and the Bureau of Alcohol, Tobacco and Firearms and numerous state departments of education, law enforcement and emergency management. Chris has presented and keynoted for hundreds of state, national and international professional conferences. Chris has authored and co-authored five books on school safety, *including Innocent Targets – When Terrorism Comes to School* and *Staying Alive – How to Act Fast and Survive Deadly Encounters* which was released by Barron's in May of 2014. He is currently a contributing author for a 600-page university textbook *Extreme Violence: Understanding and Protecting People from Active Assailants, Hate Crimes and Terrorist Attacks* for Cognella due for publication in 2019. Chris has co-authored numerous school safety papers and authored a peer-review paper on schools and terrorism in the Journal of Emergency Management, the most widely circulated peer-reviewed journal in the field of emergency management. Chris co-authored the IS 360 *Preparing for Mass Casualty Incidents: A Guide for Schools, Higher Education, and Houses of Worship* web training program on active shooter prevention and preparedness for the United States of Education as part of the 2013 White House School Safety Initiative. Chris has co-authored seven active shooter web training programs for Scenario Learning Inc. one of the largest providers of school safety web courses. Chris has more than ten years of experience assisting with and performing school safety, security, climate culture and emergency preparedness assessments for schools across the

Name & Title	Roles and Relevant Skills
	country. He has conducted the assessments for more than 500 K12 schools in 38 states. He was one of the team leaders in our assessment project for all 201 schools for Orange County Public Schools (Florida). Chris holds a bachelor's degree from Georgia Institute of Technology.
Rod Ellis, SHI Analyst 	**Project assignment: Conducted off-site document review and on-site assessment.** Police Chief Rod Ellis has been a sworn law enforcement officer at the local and state level for 28 years. Chief Ellis was a key official for operational planning and logistics for the 1996 Olympic Games held in Georgia as well as the 2004 G-8 Summit held on Sea Island, Georgia. He served 18 years with the Georgia DNR Law Enforcement Division where he played a key role and received commendations in the rescue response operations for the 1994 floods in Albany, Georgia. He was the agency Investigator of the Year twice in his tenure with DNR as well as a recipient of the James R. Darnell outstanding ranger award for the department. Chief Ellis has completed over 3,000 hours of formal law enforcement training during his career and has also trained with the Israeli Police, security forces and intelligence agencies in the State of Israel through a fellowship from Georgia State University. He also has advanced training in school threat assessment and emergency planning from the U.S. Department of Homeland Security (DHS), Georgia Emergency Management Agency (GEMA), United State Department of Education, and Safe Havens International. He has also been actively involved in active shooter/active killer and anti-terrorism projects including: • The initial basic level start-up training in K12 threat assessment by the State of Virginia Department of Education where he was sought out as a subject matter expert. • The 2012, 2013, and 2014 National Summit on Preventing Multiple Casualty Violence, a joint initiative of DHS, the U.S. Department of Justice (DOJ), Federal Law Enforcement Training Center (FLETC), John Hopkins University's School of Education, and Office of Community Oriented Policing Services (COPS) where he served as a panel member representing the K12 school. • The Georgia Office of Homeland Security where he served as a subject matter expert, provided training in K12 threat assessment and assisted with school assessments.

Name & Title	Roles and Relevant Skills
	During his career, Chief Ellis has: • Trained officers on how to respond to an active threat as a United States Department of Homeland Security Certified Active Shooter Threat Response Instructor. • Served as an instructor for Crisis Intervention for Mental Health for Law Enforcement Professionals. • Served as a panel member representing the k-12 school sector on the Federal Law Enforcement Training Center's National Summit of Mass Casualty Violence. • Keynoted at professional conferences nationally and specifically on student threat evaluation for the Virginia Department of Education. • Served on the review team for the post incident evaluation of the Arapahoe High School active shooter incident in Littleton, Colorado for the Littleton Public School System. • Assisted with security assessments for hundreds of schools and facilities in Georgia, Florida and Virginia. Chief Ellis is a Georgia Peace Officer's Standards and Training Council Certified Instructor and has had articles published in Campus Safety Magazine regarding school safety issues. Chief Ellis is currently serving as a contributing author for a 600-page university textbook *Extreme Violence: Understanding and Protecting People from Active Assailants, Hate Crimes and Terrorist Attacks* for Cognella due for publication in 2019. He is also currently pursuing a master's from Columbia Southern University. Chief Ellis was among SHI team members to perform school safety, security, and emergency preparedness assessments for all 201 schools in the Orange County Public Schools, one of the tenth largest school districts in the United States. Chief Ellis is currently pursuing a master's Degree from Columbia Southern University.
Steve Satterly, SHI Analyst	**Project assignment: Conducted off-site document review and on-site assessment.** A nascent writer on school safety issues, Steve Satterly is well known locally and in the Midwest as a school safety practitioner and for numerous presentations at state, regional, and national conferences on school safety topics. Mr. Satterly co-authored the IS 360 *Preparing for Mass Casualty Incidents: A Guide for Schools, Higher Education, and Houses*

Name & Title	Roles and Relevant Skills
	*of Worship* web training program on active shooter prevention and preparedness for the United States Department of Education as part of the 2013 White House School Safety Initiative. He also co-authored *Staying Alive – How to Act Fast and Survive Deadly Encounters* which was released by Barron's in May of 2014. Mr. Satterly is currently a contributing author for a 600-page university textbook *Extreme Violence: Understanding and Protecting People from Active Assailants, Hate Crimes and Terrorist Attacks* for Cognella due for publication in 2019. Mr. Satterly has also authored or co-authored numerous magazine articles, such as a cover story for Campus Safety Magazine entitled 14 Severe Weather Survival Tips in April of 2012. He also wrote a cover story for School Planning and Management Magazine entitled After the Storm: Recovery Planning for Disasters in Schools in May of 2012. He has written other articles for School Planning and Management Magazine, as well as The Safety Net, an electronic publication of Safe Havens International. He recently completed a project as a subject matter expert in tornado preparedness for the American Clearinghouse of Educational Facilities. A twelve-year veteran of the United States Army, Mr. Satterly uses his experiences as an Infantryman to drive his desire to protect others. He has taken numerous law enforcement training courses and has received certification in the Active Shooter Doctrine from the Indiana Law Enforcement Academy. He is a graduate of the 2007 FBI Citizen's Academy through the Indianapolis Field Office and holds certification as a Gang Specialist through the National Gang Crime Research Center in Chicago, which awarded him a Certificate of Appreciation in 2008 for his anti-gang work in his local district. The Indiana School Safety Specialist Academy, the Indiana Association of School Principal, the Hancock County School Safety Commission, and the Hancock County Emergency Management Agency have routinely used Mr. Satterly's expertise. Since joining SHI assessment team, Mr. Satterly has conducted school safety, security, and emergency preparedness assessments for nearly one hundred schools from various school districts around the nation, including the climate, culture, safety, security, and emergency preparedness assessment project for 201 schools operated by Orange County Public Schools in Florida in 2014.
Tod Schneider, SHI Adjunct Analyst	**Project assignment: Conducted off-site document review and on-site assessment.** A multi-talented school safety expert with a broad perspective, Tod Schneider has authored, co-authored or contributed to countless books and articles on school safety, including *Safe School Design* (ERIC 2000), one of the first and few books dedicated to

Name & Title	Roles and Relevant Skills
	Crime Prevention Through Environmental Design (CPTED) for schools, and *Safe and Healthy School Environments* (Oxford Press 2006). Tod has served for 27 years as a crime prevention specialist for the Eugene, Oregon Police Department. Simultaneously he has served as a school safety consultant nationwide, writing, speaking and consulting on related topics. Tod was the primary author for the comprehensive school safety checklist developed by the National Clearinghouse for Educational Facilities and has visited hundreds of schools to offer his services, including Thurston High School in Springfield, Oregon, after the Kip Kinkel shooting. Groups Tod has served over the past two decades include the National Clearinghouse for Educational Facilities, the U.S. Dept. of Education, Hamilton Fish Institute, the Northwest Regional Education Labs, SAIF, the National Association of Housing Officials, the California Department of Education, the Department of Justice, the Arizona Juvenile Justice Association, Jackson State University, Safe Havens International, the Peter Li Group (School Planning and Management and College Planning and Management publications), the U.S. Forest Service, the Hamilton Fish Institute (Georgetown Univ.) and numerous school districts ranging from Oregon to Tennessee. Tod is a certified instructor for CPTED as well as for the Second Step violence prevention curriculum. He was one of the founding members of the International CPTED Association (ICA) as well as SafeCascadia, a CPTED consulting consortium. He has presented his extremely popular seminar on confrontation management to a diversity of organizations such as Trillium Health Care, the American Society of Safety Engineers, Balzhiser Engineering, Northwest Youth Corps, Montessori School, Serenity Lane, Public Health, Eugene Water and Electric Board, ISTE, Legal Aid, the U.S. Forest Service and countless others. Tod holds a bachelor's degree in Community Service and Public Affairs and a master's degree in Journalism, both from the University of Oregon. In his work at Eugene Police he has played a number of roles, including designing the School Whatever It Takes (SWIT) training for school crime prevention officers, CPTED and crime prevention training for officers as well as citizens, and customized seminars for schools, businesses, social services and government programs.
Brian Gard, SHI Adjunct Analyst	**Project assignment: Conducted off-site document review and on-site assessment.** Brian Gard serves as the Manager of Safety and Health for one of the largest charter school management companies in the United States. In this role, he provides support for

Name & Title	Roles and Relevant Skills
	87 K-8 public charter schools in nine states. He leads a team that is responsible for emergency planning, health and safety training, and compliance, as well as implementing and assessing transportation and traffic plans at each school. He created a unique and nationally recognized "Schools Safety Specialist" program to address the unique needs of the charter school industry. Prior to his current position, Brian spent 12 years with the Grand Rapids Police Department in Grand Rapids, MI where he served on the special response team, training bureau, and patrol division. While at the police department, he was a certified field training officer, defensive tactics instructor, Taser instructor and ethics instructor. Brian has several hundred hours of instruction ranging from law enforcement training and tactics, police academy and traditional college courses. He also instructs to his principals and school safety specialists on leading school safety practices. Brian has previously served on two national school safety committees. These include, being on the board for Security 100 Summits K-12 and he served four years as the Midwest Director of the National Association of School Safety and Law Enforcement Officers (NASSLEO). He has presented at national conferences and is frequency consulted with by other school safety professionals. Brian received a master's degree in management from Aquinas College and a bachelor's degree in criminal justice from Western Michigan University.
Stephanie Prater, SHI Adjunct Analyst 	**Project assignment: Conducted off-site document review and on-site assessment.** Ms. Stephanie Prater has thirty years of law enforcement and security experience and has worked for a public-school district for the last twenty-one years. During those thirty years, she spent seven years in the United States Air Force as a Security Specialist, worked as an undercover narcotics agent, return to school (truancy) officer and is the first female in her department to be promoted through the ranks to her current position as Deputy Chief. She also serves as an adjunct instructor for the Criminal Justice Technology degree and certification programs for a local technical college. During her 25-year career of law enforcement, Stephanie has completed hundreds of classroom hours on public safety training on the use of force, school violence, school search and seizure, emergency operations planning, exercise design and evaluation, etc. She has more than 10 years of experience in conducting school safety assessments, including the climate, culture, safety, security, and emergency preparedness assessment project for 201 schools operated by Orange County Public Schools in Florida in 2014. Stephanie has also assisted in the development of school safety and emergency plans and

Name & Title	Roles and Relevant Skills
	procedures for school districts and train-the-trainer programs.
Ulric Bellaire, SHI Adjunct Analyst 	**Project assignment: Conducted off-site document review and on-site assessment.** Bellaire is a 13-year police veteran with three years of experience in supervisory positions. He began his career in law enforcement with the Macon Police Department as a Patrolman and a Neighborhood Police Officer with the Americorp Cadet Program. After two years with the Macon Police Department, he accepted a position with his current school system police department where he has received extensive formal training in school policing, youth intervention and emergency management. Mr. Bellaire has extensive experience working in the prevention of youth gang violence. Mr. Bellaire is a certified Field Training Officer, who trains officers on using proactive approaches when policing school settings, is the Field Training Supervisor, and oversees the department's Field Training Program. He has certifications in law enforcement supervision and management. He also served in the Army Reserves with the 921st Field Hospital in Sacramento, California, and received an honorable discharge after fulfilling his commitment. He holds a Bachelor of Science Degree in Computer Information Systems from Mercer University. Mr. Belaire is currently serving as a contributing author for a 600-page university textbook *Extreme Violence: Understanding and Protecting People from Active Assailants, Hate Crimes and Terrorist Attacks* for Cognella due for publication in 2019. Since joining SHI assessment team, Mr. Bellaire has conducted school safety, security, and emergency preparedness assessments for various school districts around the nation, including the climate, culture, safety, security, and emergency preparedness assessment project for 201 schools operated by Orange County Public Schools in Florida in 2014.
David Gowan, SHI Adjunct Analyst 	**Project assignment: Conducted off-site document review and on-site assessment.** David Gowan has spent his twenty-seven-year career in occupational safety and health. He has served as an analyst for school districts, private industry, and municipalities all over the southeastern United States. His most extensive work has been in school safety, emergency management, risk assessment, occupational safety and health consulting and assessing OSHA compliance. David has extensive experience in assessing and recommending modifications to the employee safety program as it relates to OSHA compliance. Some of the OSHA plans relevant to K-12 schools include, but are not limited to, Emergency Action, Fire Protection,

Name & Title	Roles and Relevant Skills
	Hearing Conservation, Process Safety Management, Emergency Response (HAZWOPER), Hazard Assessment, Respiratory Protection, Powered Industrial Trucks (Forklifts), Confined Space Entry, Personal Protective Equipment, Trenching and Shoring, Hazardous Energy (Lock-Out/Tag-Out), Bloodborne Pathogens, Hazard Communication (Chemical Safety), Chemical Hygiene, OSHA Injury and Illness Reporting, and Workplace Violence. David's experience in school safety and risk management relates to students as well as employees. For the last eleven years, David has served as a Safety and Risk Management director for a Georgia public school district with 42 schools, 3,800 employees, and 25,000 students. In addition to OSHA expertise, David has completed extensive training from FEMA in Incident Command Systems, Initial Action Incidents, National Incident Management Systems, National Response Framework, and Incident Command for Expanding Incidents. David holds a degree in Management with a concentration in Occupational Safety and Health from Clemson University. He has been a member of the National Safety Council since 1994.
Latricia Gittens, SHI Adjunct Analyst 	**Project assignment: Conducted off-site document review and on-site assessment.** Latricia Y. Gittens is a 23-year police veteran with four years of experience in a supervisory position. She began her career as a Correctional Officer with the Wilcox State Correctional Facility where she was quickly promoted to the Tactical Squad. After four years, she accepted a position with the Macon Police Department as a Police Officer. While with the Department, Mrs. Gittens assumed a specialized position with the Specialized Criminal Apprehension Team (S.C.A.T.). Mrs. Gittens has been with a large Georgia public school system since 2001 as a School Resource Officer. In her 17 years with the school system, she has attained numerous certifications, to include, G.R.E.A.T. Instructor Training Certification which targets gang issues in school systems. She also attended classes on areas such as emergency operation planning for schools, school safety and security assessments, student threat assessments, recognizing suspicious and unusual activity, school behavioral threat assessments as well as crisis intervention. In addition, she received training from the Mexico Technical College for Prevention and Response to Suicide Bombing Incidents and Incident Response to Terrorist Bombings. Mrs. Gittens holds certifications in Law Enforcement Supervision, Management as well as the Intermediate Program. In addition, she completed her certification as a Certified Fitness Instructor and attended the U.S. Department of Homeland Security's Federal Law Enforcement Training Center becoming a Law Enforcement Fitness Coordinator. While at

Name & Title	Roles and Relevant Skills
	this training center, Mrs. Gittens received the Distinguished Fitness Award and she was the only female in the class that obtained a score of 90 or above in four out of 5 evaluated areas.
Richie Kendrick, SHI Adjunct Analyst 	**Project assignment: Conducted off-site document review and on-site assessment.** Richie Kendrick is a police officer with 23 years of law enforcement experience. Richie has been an SRO at his current school district in Georgia for more than 11 years. During his service with this department, Richie received extensive training through the Georgia Public Safety Training Center for investigative procedures, gang investigations, post blast investigations, understanding Islamic militant terrorism and evidence preservation. Richie has completed all three phases of the supervisory courses in addition to the various training courses through the Department of Juvenile Justice. Richie also received training at the Emmetsburg, Maryland FEMA site for multi hazards planning train-the-trainer in 2004 and the revised course for multi hazard planning for schools in 2013. Richie has been conducting school safety assessments for eight years and evaluating traffic safety for ten years for his school system police department.
Dr. Randall Atlas, Vice-President of Atlas Safety & Security Design 	**Project assignment: Conducted on-site district-level and school-level assessments.** Dr. Atlas is a nationally recognized trainer, author, and practitioner in the field known as Crime Prevention Through Environmental Design (CPTED) and in architectural security design. A registered architect, NCARB certified, and an appointed member of the American Society of Industrial Security (ASIS) Security Architectural and Engineering Council, Dr. Atlas practices criminal justice architecture, environmental security design, counter terror design, and infrastructure protection all over the world. Dr. Atlas has a unique background in conducting threat assessments, crime analysis, gang and drug intervention plans, community oriented problem-solving policing strategies, resident surveys, real estate highest and best use analysis, capital improvement master plans, expansion and renovation plans, security systems analysis, and urban planning visioning for future expansion. Dr. Atlas has recently completed the Lighting School at Hubbell Lighting, and just published a chapter on security lighting for the International CPTED Association. During his extensive career, Dr. Atlas has: • Been a presenter and trainer at the annual ASIS Faculty Design Workshop, the National Crime Prevention Institute (NCPI), the Campus Security Conferences, the

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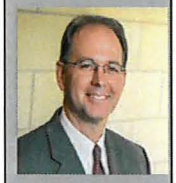
	Palm Beach County School Resource Officers, National Association of School Resource Officer's conferences, International Association of Campus Law Enforcement Administrator's conventions. The International Conference on Safe Schools Design at Johnson and Wales University, The National Campus Safety Conference and has presented workshops on "Designing Safe Schools" and security conferences from New Delhi, India, to Seattle, Washington. • Assisted with school security assessment projects for more than 100 schools including projects for Lowell Public Schools in Massachusetts, U-46 Public Schools in Chicago, Richmond Public Schools in Virginia, and Bibb County Public Schools in Georgia. • Provided consulting advise for the security and CPTED analysis of campus perimeter for Georgetown University, Duke University, Tennessee State University, University of Miami, etc. • Conducted CPTED and security audits for the cities of Opa Locka, Albuquerque, Miami, Metro-Dade HUD, and numerous United States HUD Housing Developments, including West Palm Beach, New Bedford, Marin City, Marietta, Paris (Ky.), Cincinnati, Albuquerque, Phoenix, New Bern (N.C.), Clarksdale (Al.), Los Angeles, Covington, Ky., and many others. • Developed campus security master plans for the University of Miami, Barry University, University of Louisville, and Tennessee State University. • Participated in a Homeland Security Grant for evaluating critical infrastructure for 100 facilities for Miami Dade County in 2005. • Been a technical assistance consultant with the National Institute of Justice, National Institute of Corrections, and the Florida Department of Corrections. • Conducted ADA accessibility compliance surveys for private and public-sector clients. • Served as an expert witness on hundreds of premises liability lawsuits. Dr. Atlas has several hundred articles appearing in publications such as Protection of Assets Manual, Security Management, Security Design and Technology Magazine, American Jail Magazine, Corrections Today, Ergonomics and Design Security Journal, and

Name & Title	Roles and Relevant Skills
	Professional Safety Magazine.
Allan Wolf, PSC Principal and Analyst 	**Project assignment: Conducted off-site and on-site review of design criteria.** Allan Wolf has over 23 years total experience in K12 facility design, spending the last 17 years leading Parkhill, Smith & Cooper's facility assessment department. Notable projects include evaluation of 58 stateside, dependent schools in 2003 and evaluation of 157 public schools on 34 military installations in 2010 and 2018 – all three projects were commissioned by the Department of Defense Education Activity. Prior to his facility assessment tenure, Allan worked on a variety of projects that included truss structures at SeaWorld and Universal Studios, Florida. He also completed blast analysis studies for two governmental clients in Texas after the 9/11 attacks. Mr. Wolf's varied experience with military and public-school projects has exposed him to a wide range of security guidelines and anti-terrorism and force protection provisions. Mr. Wolf also has extensive experience developing project scopes and design guidelines for K12 school projects. His work has included the development of large bond programs and budgets for many Texas School District Clients, including Abilene ISD, Clint ISD, Lubbock ISD, Lubbock-Cooper ISD, and Midland ISD. He also served as a Vice Director for the Texas Engineers Task Force for Homeland Security, a group formed at the request of the Governor. Allan Wolf holds a Master's Degree in Engineering and Technology Management from Oklahoma State University and a Bachelor of Science Degree in Civil Engineering from Texas Tech University. Allan Wolf is a registered professional engineer in Texas and New Mexico.
Robert Rollo, PSC Principal and Analyst 	**Project assignment: Conducted off-site and on-site review of design criteria.** Robert Rollo has collaborated and facilitated work with large teams in master planning, charrettes, and design meetings, including multiple projects in international markets such as Italy, Germany and the United Kingdom. Robert has worked with the Department of Defense Education Activity (DoDEA) for more than 22 years, completing security upgrade projects for schools at Laurel Bay, SC, Quantico, VA and Camp Lejeune, NC. He is a current member of the DoDEA design center of expertise for 21st Century K-12 school planning and design under the guidance of the USACE Norfolk District. Rollo is also highly knowledgeable on ASTM 1233 requirements for security glazing materials and systems and has applied these materials to designs for schools on military

Name & Title	Roles and Relevant Skills
	installations. In this capacity, Robert understands best practices for schools to mitigate vehicular attack, active shooter and long-range attack. Currently, Robert and his team are completing a state-of-the-art, 21st century educational delivery model high school at Camp Ederle in Vicenza, Italy. Rollo is a Principal and Director of Federal Projects in PSC's K-12 Sector. His experience includes assessment and MILCON planning and budgeting on school and military support facilities in the United States and at several installations across the world. Robert Rollo holds a Bachelor's Degree in Architecture and Civil Engineering from Texas Tech University and is also a licensed Architect and Engineer in Texas.
Miles Hardaway, PSC Analyst 	**Project assignment: Conducted off-site and on-site review of design criteria.** Miles Hardaway joined PSC in 2010 after working eight years for a design/build firm and another consulting firm. As a member of the PSC's K-12 sector, Mr. Hardaway has travelled on numerous assessment and design projects to military dependent schools across the United States and Japan. Closer to home, Mr. Hardaway serves PSC's K-12 clients in Texas as a project architect and security hardware specialist. He developed the scope, specifications, drawings and bid documents for security upgrades to 63 instructional facilities for Lubbock ISD in Texas. He followed this work with similar efforts for Abilene ISD and Clint ISD in El Paso, Texas. His current access control and security projects include detailed specifications for Vicenza High School in Italy and a district-wide security project for Clint ISD. Mr. Hardaway chairs the City of Lubbock's International Building and Fire Codes Review Subcommittee. He also teaches seminars regularly about storm shelter design and the new International Building Code, IBC 2015. Mr. Hardaway holds a Master of Architecture Degree and a Bachelor of Science Degree in Civil Engineering, both from Texas Tech University. Mr. Hardaway is a licensed architect in Texas.
Jonathan Hartman, PSC Analyst 	**Project assignment: Conducted off-site and on-site review of design criteria.** Jonathan Hartman has experience with projects of many varieties: Healthcare, Higher Education, Community Practice, Infrastructure, Federal, State, Private, Religious, and Industrial where he is responsible for lighting design, electrical distribution, communications systems with experience in public address, sound system design, structured cabling, security system, fire alarm system, and access controls. Jonathan has a depth of knowledge in security assessments and the implementation of

Name & Title	Roles and Relevant Skills
	electronic equipment and physical measures to improve the safety of school campuses. He has worked on projects both in public school districts and with DODEA in military installations on bases along the east coast. With DODEA he has worked both the Laurel Bay School Security Improvements, Quantico School Security Improvements, and McBride Elementary School at Fort Benning to provide electronic security measures to the military base schools. Jonathan has worked with Amarillo ISD, Dimmit ISD, Sterling City ISD, Lubbock ISD, and many others in Texas to provide access control modifications and installations for physical and electronic security measures. Jonathan serves as a Senior Member on the Institute of Electrical and Electronics Engineers (IEEE) Panhandle Section Board and on the Education Committee that provides continuing education for professional engineers in the Amarillo and surrounding Panhandle region. Jonathan holds a Bachelor of Science in Electrical and Electronics Engineering from Baylor University and is licensed in Texas, New Mexico, and Oklahoma.