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FOREWORD

Safety for students and staff in North Carolina's public schools is paramount in achieving the mission of the State Board of Education. The General Assembly directed the State Board to review and consider modifications to its public schools facilities guidelines, in light of research on the relationship between school size and other design components and climate and order in schools.

Research clearly indicates a significant relationship between the design of school facilities and school climate and order. Likewise, the size of a school has been shown to relate directly to safety for students and staff. This document will highlight those relationships and set forth State Board recommendations for implementing facilities design consistent with the research.

These planning guidelines, for new construction and modifications to existing facilities, supplement the *North Carolina Public Schools Facilities Guidelines*. These represent the State Board's minimum suggested guidelines for public school facilities in North Carolina. They are a resource that can assist design professionals to plan facilities which meet the evolving needs of public schools. We hope you find them useful.

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INTRODUCTION

BACKGROUND AND OVERVIEW

Students enrolled in public schools have the right to attend safe, secure campuses. Instead, both students and staff too often feel unsafe at school, rather than perceiving school as a safe haven. According to the U.S. Department of Justice "Indicators of School Crime and Safety 2010, between July 1, 2008 and June 30, 2009 there were 38 school associated violent deaths for children between ages 5 – 18 and 1.2 million victims of non-fatal crimes at school among students between 12 – 18. Although the number of crimes on school campuses has remained nearly level over the past several years, the crimes are of a more serious nature, children are committing crimes at a younger age, and the frequency of assaults is increasing. Awareness of the magnitude of these issues continues to grow in schools throughout the nation in light of recent events including Columbine, Virginia Tech, and the Sandy Hook Elementary shootings. These events demonstrate the need to further address school safety concerns. In additional to school violence there are other significant concerns that affect school safety and climate including bullying, fire, life safety and egress, accidents, theft and vandalism.

Safe schools issues continue to challenge efforts to provide optimum educational opportunities for children in North Carolina's public schools. In 1997 the North Carolina General Assembly enacted Section 8.29 of Senate Bill 352 to deal with these issues. The section, entitled Safe Schools, in Part (i) directed the State Board of Education to review and consider modifications to its school facilities guidelines in light of research on the relationship between school design components (especially school size) and school climate and order. The Board also developed recommendations to local boards (of education) on modifications to the design or organization of existing schools that will improve school climate and order. This updated version is to continue the goals enacted in the original document and to incorporate new techniques and technologies that did not exist at the time of the original document.

SCHOOL CLIMATE

Research on school climate revealed a correlation with various measures of educational success; therefore, no specific causal statements can be made about the effects of school climate.

Halpin and Croft (1963) used an analogy to define organizational climate--that "climate is to the organization what personality is to the individual." They believe that a school's "behavior" as an organization is organized and directed by its individual personality. Various researchers in school climate have built on or modified that perspective by identifying variables that they believe contribute to the overall school climate.

Anderson (1982), in an exhaustive review of the literature, utilized four broad categories to describe dozens of variables constituting school climate. ECOLOGY describes the school's physical environment; SOCIAL SYSTEM describes formal structures for how individuals and

groups relate to one another, such as administrative leadership, the instructional program, school/community involvement, teacher/student relationships, etc.; and school CULTURE describes the values and belief system within the school, such as teacher commitment to improve student outcomes, student peer norms, academic emphasis and expectations for success by both teachers and students, and discipline within the school. MILIEU describes student characteristics, such as socioeconomic status, morale, race, etc. and teacher characteristics, such as education, morale, staff stability, etc.;

More specifically, variables which showed positive correlation to school climate throughout the body of research and as organized within the four categories include:

ECOLOGY:

- Physical environment, including building condition and cleanliness

SOCIAL SYSTEM:

- Instructional program, including high allocated and engaged time and availability of advanced courses
- Principal-teacher rapport and communication; participation of staff in decision making
- Principal activity level as instructional leader
- Positive teacher-student relationships; student involvement in decision making
- Positive teacher-teacher relationships; collegiality
- Student involvement in school activities
- Positive parent/community-school relationships; parent involvement--especially parent-initiated involvement

SCHOOL CULTURE:

- Teacher commitment to improve student achievement
- Student perception that teachers care about them
- Student peer group values academics
- Emphasis on cooperation; competition between groups--not individuals
- Academic emphasis throughout the school
- All in the school expect academic success
- Student achievement recognized
- Orderly and well disciplined; reinforcement of what is right is emphasized

MILIEU:

- Teacher education and morale
- Staff stability
- Student morale and “academic optimism”

While the foregoing seems to suggest a proportionately smaller role for facilities as compared to programs in the creation of a positive school climate, the value of facility design, construction, and maintenance to the overall process of education should not be underestimated. Although facilities, in and of themselves, clearly fall under Ecology, they cannot legitimately be excluded from any of the other categories. For example, under MILIEU, both teacher and student morale

might be related to the quality, appropriateness, and condition of facilities. Within SOCIAL SYSTEM, the instructional program, student involvement in school activities, and parent/community-school relationships can be related to the designation, quality, and availability of facilities. Clearly, under SCHOOL CULTURE, facilities design can contribute to an orderly and well-disciplined environment.

Dr. Ronald Stephens, in his book entitled *Safe Schools: A Handbook for Violence Prevention*, identifies six broad categories of factors that can contribute to school safety. "Givens" are: (1) personal characteristics of each student and staff member; (2) physical environment of the school; and (3) economic conditions of the community. Those factors that are shaped and improved through planning and action are: (4) social environment on campus; (5) cultural characteristics of staff and students; and (6) local political atmosphere. Stephens identifies a seventh factor that he calls "community will" that may sometimes transcend the other factors in planning, promoting, and achieving safer schools. Stephens specifically notes that a safe school campus is orderly and well maintained, and that facilities and their design can have a major impact on school climate.

Researchers, consulting professionals, and advocating agencies all agree that school facilities constitute one essential facet of a spectrum of ingredients that are critical to a safe and successful school. This publication addresses only the facilities component.

SCOPE

As a supplement to the State Board's *North Carolina Public School Facilities Guidelines*, this document is limited to design-related concepts that can affect school climate and order. While direct reference to the operation and maintenance of facilities is not addressed, their importance to the overall environment within the school should not be overlooked by local school planners. Planning guidelines and recommendations do not distinguish between features for new construction versus modifications to existing facilities, and are appropriate for either.

These planning guidelines are consistent with research findings on school climate and school size covering a period from the early 1960's through 2010's. Further, they are consistent with national CPTED (Crime Prevention Through Environmental Design) guidelines for schools and with the North Carolina State Building Code. Content draws significantly from information and materials provided by the North Carolina Center for the Prevention of School Violence, the Florida Department of Education, the National Educational Service, the North Carolina Department of Public Safety, and the North Carolina Department of Public Instruction.

USING THE PLANNING GUIDELINES

Programs and facilities, together, can contribute significantly to the provision of more secure environments for youth and adults engaged in the educational process. This document contains planning guidelines that are equally appropriate for new construction and for redesign and modification of existing facilities. It is neither comprehensive nor all-inclusive, but provides initial identification of principles around which designs for safer schools may evolve. The planning guidelines in no way supersede state or local codes or regulations or federal or state legislation regarding building design and construction, access, safety, or other pertinent issues.

As a design takes shape, it is likely that additional, more detailed information will be needed about programs, equipment, and purposes that will function within the facility. Staff consultants in various program areas within the School Planning section of the Safe and Healthy schools Support Division are available to discuss topics of concern and may be contacted by phone via the Section's main desk at (919) 807-3554.

NCGA SESSION LAW 2013-360

North Carolinas General Assembly Session Law 2013-360 sections 8.36 – 8.45 included some new provisions associated with school safety. Below is a brief synopsis of each component and location for further information.

Section 8.36 – Grants for School Resource Officers in Elementary and Middle Schools –Establishes grant for School Resource Officers on a basis of two dollars ($2.00) in State funds for every one dollar ($1.00) in local funds. Refer to the School Planning Section of NCDPI's Safe and Healthy School Support Division.

Section 8.37 – Panic Alarm Systems –Includes requirement for Panic Alarm Systems, (systems must be in place by July 1, 2015). Refer to the School Planning Section of NCDPI's Safe and Healthy School Support Division.

Section 8.38 – School Safety Exercises – Includes provisions for School Safety exercise that are encouraged to be performed at regular intervals. Refer to North Carolina Department of Public Safety, Emergency Management Division for direction.

Section 8.39 – Schematic Diagrams for School Facilities – Includes provisions for school schematic diagrams intended to be provided to Local Law Enforcement Agencies. See "Recommendations for Emergency School Schematic Diagrams" at the end of this document.

Section 8.40 – Anonymous Tip Line – Provides encouragement for local school administrative unit to develop and operate anonymous tip lines. Refer to North Carolina Department of Public Safety for criteria

Section 8.41 – School Safety Components of School Improvement Plans – Includes specific privacy provisions for school safety components as part of school improvement plans.

Section 8.42 – School Crisis Kits – Includes direction for provision of school crisis kits. Refer to North Carolina Department of Justice, Center for Safe Schools for criteria.

Section 8.43 – School Safety/Conforming Changes for Charter Schools and Regional Schools – Includes provisions for charter and regional schools to adopt an emergency response plan. Refer to North Carolina Department of Public Safety, Center for Safer Schools.

Section 8.44 – Emergency and Crisis Training – Includes provisions associated with emergency and crisis training for school personnel. Refer to North Carolina Department of Public Safety, Division of Emergency Management. www.ncdps.gov

Section 8.45 – Volunteer School Safety Resource Officer Program – Establishes provisions associated with volunteer school resource officers. Refer to North Carolina Department of Public Safety, Law Enforcement for information.

PLANNING GUIDELINES

These planning guidelines are provided in conjunction with Section 8.29 of Senate Bill 352, as enacted by the General Assembly in 1997. They supplement the State Board of Education's Public Schools Facilities Guidelines established by the School Finance Act of 1987, and may be used by local school units in the design of new construction or the modification of existing public school facilities. This document is provided for guidance purposes and is not intended to establish standards that must be met.

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN

Experience has shown a direct relationship between the design and use of school facilities and the occurrence of unacceptable and criminal behaviors. Crime prevention through environmental design (CPTED) principles underlies the concept that proper design and effective use of the physical environment can reduce both the incidence and the fear of crime. A safer environment, in turn, can create a psychological advantage for positive behavior and for learning.

Unacceptable behavior, campus crime and violence can be significantly reduced through the application and interaction of the following seven key components of CPTED.

ACCESS CONTROL

Controlling campus access, either through natural or constructed components, is a basic concept of creating a safe school climate. Often, it is the non-student who represents a threat to school safety, rather than students who are enrolled in the school.

Campus Perimeter: Design the campus so that visitors and guests must pass through a particular point or entrance.

Entrances and Exits and other entry points: Minimize the number of entrances and exits to the campus and direct traffic flow, both vehicular and pedestrian, to eliminate confusion and congestion and to provide ease of observation. Design parking areas to limit and control access. Replace or reconfigure windows so that they would be difficult to be used as entry points for people or contraband, making sure required egress is maintained.

Visitor Parking: Clearly identify visitor parking with proper signage and arrange visitor traffic, both vehicular and pedestrian, in a way that it can be easily supervised from the main office or by assigned security personnel.

Visitor Screening: Clearly worded and placed signage should direct visitors to the main office or designated visitor reception areas where they can be screened, using uniform visitor screening

procedures, to ensure that they have legitimate business on campus.

NATURAL SURVEILLANCE

Formal Gathering Areas: Gathering areas should be optimally located subject to natural surveillance or access control or located outside the view of the would-be offender. Informal areas then become off-limits and subject to automatic scrutiny. Clear spatial definition will cause unauthorized users to feel at greater risk and encourage staff to assume greater ownership for supervising such areas.

Natural Supervision: Enhance natural supervision by eliminating architectural barriers. Ensure open sight lines through the design and placement of buildings, landscaping components, lighting, and access control. In some cases convex mirrors can provide additional visibility around corners.

FORMAL SURVEILLANCE

High-risk and high-incidence areas should be identified through a formal crime reporting process to guide the assignment of appropriate supervision.

High-risk Areas: To the extent possible, design high-risk areas to accommodate natural surveillance and to facilitate formal supervision where required. Such areas may include the main entrance or campus perimeter--especially where problems with intruders are typical. Toilet rooms, corridors, stairways, and locker clusters are often key trouble spots. Commons areas and courtyards frequently have similar problems. Remote parking areas and buildings, and athletic fields may create additional risks.

Remote Surveillance: Where limited staff availability or a high number of identified problem areas generate a need for other, more formal monitoring, electronic surveillance equipment can be used. See "School Security Technologies".

TERRITORIALITY

Territoriality is the personalization of space that might be available to any person in order to emphasize the perception of ownership. This translates to the identification of territories within the school campus, assignment of internal territories to "proprietors," and assignment of general supervision and care responsibilities that go with "ownership" of the identified spaces. The most straightforward examples of territoriality are signs restricting access, directing visitors to the office, or posting campus closing times.

Delineation of Space: Space should be clearly delineated throughout the campus to encourage territoriality and better control. For example, it should be clear to anyone when they are moving from the fine arts wing to the science department or to the math department, or from one "house" to another in the lower grades. Smaller spaces may be assigned to individual teachers or staff.

DEFENSIBLE SPACE

Environmental concepts can contribute to the productive management of schools by providing clearly marked transitional zones that indicate movement from spaces designated for public, combined, and private-only use.

Access Points: Reduce access points to parking areas to decrease the perception that they are public spaces, reduce the possible escape routes for potential offenders, and increase the perception that they are risky for the potential intruder. Use gates to close off unnecessary entrances during low-use times to control access and reinforce the perception that the parking areas are private.

TARGET HARDENING

Effective target hardening maintains a balance between the development and implementation of appropriate security measures versus creating an image of a prison or fortress. It must include the vigorous identification, apprehension, and prosecution of criminals, to the end that the school campus becomes unattractive as a site for entertainment or wrongdoing.

Target Hardening: Design facilities with the idea of making the perpetrator's objective difficult to attain and controlling crime by slowing the perpetrator's progress. Refer to DPI's "Design of Schools to resist Violent Attack" for additional criteria to consider.

PROGRAM INTERACTION

Effective program interaction can be achieved through a combination of designing facilities that enhance both natural and formal supervision and the development and utilization of a close partnership among law enforcement and emergency service personnel, administration, staff, and students.

Enhanced Natural Surveillance: If necessary, areas where unauthorized infringement might normally occur should be assigned only to activities which are easily supervised. Natural surveillance for these activities will be enhanced through increased perceptions of safety for the legitimate user and risk for the potential offender. Conversely, activities which are more difficult to supervise should be assigned to areas where infringement is typically less likely to occur.

Conflict Reduction: Provide separate entrances and exits to areas that are associated with high-volume use, such as cafeterias and corridors. This serves to reduce time required for movement into and out of such spaces and thereby reduce the opportunity for personal conflict. Separation or differentiation of student traffic flow can help define orderly movement and save time, and the illegitimate user will feel at greater risk of detection.

Communication: Design communication systems to overcome the barriers posed by distance and isolation.

Modifications: Redesign problem spaces and uses of spaces to provide natural barriers to the occurrence of potential conflict. As an example, where congestion and conflict are likely to occur when classes are entering and leaving a cafeteria at the same time using the same entrance, separate the entrance and exit so that different traffic routes are utilized for moving from and returning to instructional areas.

Clear Borders: Provide clearly defined borders for controlled space.

Proper design and use of physical space can affect human decisions and behavior. Successful application of these seven principles can enable the creation of a welcoming educational setting that has by-products of improved safety, productivity, and loss prevention.

SCHOOL SIZE

CONSOLIDATION

The trend to school consolidation which began relatively early in the 20th century continues. Schools and school districts continue to become fewer in number and larger in size. Despite the professional literature which supports educating children in smaller schools, the consolidation trend continues to create larger schools. This trend suggests that such decisions are being driven by considerations other than student welfare, such as political, economic, social, and demographic factors (Cotton, 1996).

American school leadership continues to build large public schools in pursuit of cost effectiveness and curriculum diversity, but may be sacrificing positive school culture and meaningful education reform in the process (Conway, 1994). Decades of research reveal student achievement in small schools to be at least equal--and often superior-- to achievement in large schools (Fowler, 1995; Howley, 1994). Gregory (1992) noted that, "Although it is often assumed that large schools are cheaper to operate and provide richer curricula than smaller schools, studies show that neither of these things is necessarily true. Although research provides ample evidence of the superior social climates of small, informal high schools, these schools have been presumed to have inevitable high costs and program limitations. Such deficits are inevitable only when stuck in the big bureaucracy model of education."

CLIMATE, SAFETY AND ORDER

The issue of school size, as it relates to school climate, safety and order, has been researched extensively over more than five decades, with remarkable consistency of findings. Using a wide range of methods, samples, variables, and hypotheses, most researchers have identified positive correlation of smaller school size to safety, order, or climate. A large body of research into the affective and social realms of schooling affirms the superiority of small schools. Since many small schools are in rural areas, some research has controlled for "ruralness" and revealed that it is the smallness of the school, regardless of setting, that is beneficial to the student (Cotton).

The 1993 National Household Education Survey, conducted for the National Center for Education Statistics, produced the following result: "Students at larger schools are more likely than students at the smallest schools to be exposed to bullying, physical attack, or robbery. A greater percentage of students at schools containing 600 or more students than those attending schools of fewer than 300 students reported knowledge of crime or threats at school and witnessing crime." *The Annual Report on School Violence: 1995-96*, published by the North Carolina Department of Public Instruction, noted that disproportionately more reported incidents (of violence) occurred in the largest schools, regardless of grade level. The report revealed that "this effect was greatest for large elementary schools (of 750 students or more) and large high schools (of 1,500 students or more), where the percent of incidents in such schools was approximately double what would be expected of these schools by chance alone." Schwartz (1996) proposed downsizing schools as a school reform, noting that it has been widely

documented that smaller schools have fewer disruptions and incidents of violence. Safety and order in the school seem inextricably interrelated with school climate. Definitions of school climate abound, but much of the research identifies two major areas of influence--student feelings, attitudes, and social behavior; and school administrator and teacher attitudes.

STUDENT FEELINGS, ATTITUDES, AND SOCIAL BEHAVIOR

In studying the relative effects of large and small schools on student attitudes toward school in general and toward school subjects in particular, Fowler (1995), Howley (1994), and Rutter (1988) found that the evidence overwhelmingly favors small schools. Additionally, compared to students in large schools, both the personal and the academic self-concepts of students in small schools are more positive (Rutter, 1988; Stockard and Mayberry, 1992).

Research also indicates that students in small schools experience a much greater sense of belonging, which is sometimes expressed as a lower level of alienation (Fowler and Walberg, 1991; Gregory; Stockard and Mayberry). A related finding is the higher quality of interpersonal relations found in small schools (Fowler and Walberg; Rutter). Cotton, Fowler, and Stockard and Mayberry found that students participate in extracurricular activities at significantly greater levels in small schools than in large ones, and are also more likely to participate in a greater variety of activities and hold important positions in the activities in which they are involved. Research has consistently shown that attendance of smaller high schools leads to increased participation in extracurricular activities (Barker and Grump, 1964; Grabe, 1976, 1981; Holland and Andre, 1987; Lindsay, 1982; Morgan and Alwin, 1980; Schoggen and Schoggen, 1988) and that participation in activities and positive self-esteem are also correlated in such schools.

Students in small schools have higher attendance rates than those in large schools. With regard to dropouts, the holding power of small schools is considerably greater than that of large schools (Fowler; Fowler and Walberg; Rutter). The Bill and Melinda Gates foundation has committed more than $1.8 billion to encourage the use of smaller high schools. In New York City graduation rates in new small schools exceeded 70 percent in 2007, double the 35% graduation rate posted by the schools they replaced.

SCHOOL ADMINISTRATOR AND TEACHER ATTITUDES

While much of school size research has focused on students, studies have been conducted on administrator attitudes toward work; teacher attitudes toward work, administration, and one another; and incidences of cooperation and collaboration among colleagues. The research on teachers and administrators favors small schools (Gottfredson; Gregory; Stockard and Mayberry). Gottfredson (1985) noted that “Large schools appear to promote negative teacher perceptions of school administration and low staff morale.” Change can be implemented more quickly in smaller schools, where layers of bureaucracy are reduced (Tadlock and LoGuidice, 1994).

SCHOOLS WITHIN SCHOOLS

Some schools-within-a-school efforts, in which large schools are divided into sub-units, have been initiated in an attempt to garner at least some of the benefits of smaller schools. In Philadelphia and New York, for example, independent studies agree on the importance of large buildings containing multiple units, with no "regular" or "host" school holding the small ones to "guest" status in the building.

The growing body of research on schools-within-a-school suggests the potential for producing results like those associated with small schools, provided they are distinct administrative units within the buildings that house them (Cotton). Raywid (1985) noted that "The major challenge to schools within schools has been obtaining sufficient separateness and autonomy to permit staff members to generate a distinctive environment and to carry out their own vision of schooling."

SCHOOL SIZE

There is no universal agreement on the ideal size for schools. Indeed, schools should reflect the nature and requirements of the communities served. For example, research shows that higher percentages of economically disadvantaged or minority students in a student body should precipitate a reduction in school size (Cotton; Fowler; Howley; Lee and Smith, 1996). What is clear from the research, however, is the positive relationship between smaller school size and a number of variables associated with school climate and order.

On average, this research (Williams, 1990; Howley, 1996) indicates effective school sizes to be:

Elementary:	300-400 students
Middle:	300-600 students
High:	400-800 students

Researchers also agree that these estimates push the upper limits, since many investigators conclude that no school should have more than 400-500 students (Cotton).

The State Board of Education's facilities guidelines identify preferred school sizes, based on recommended square footage per student as a factor of estimated economy of construction, operation, and maintenance. Those size ranges are:

Elementary:	450-700 students
Middle:	600-800 students
High:	800-1200 students

The local school unit must determine school sizes that best serve its purposes. Often, size designation is a compromise among objectives for student achievement, student and staff safety, and effective and efficient utilization of fiscal resources.

SCHOOL SECURITY TECHNOLOGIES

INTRODUCTION

We now live in an information age with computers, tablets, and cell phones. There a significant number of electronic security tools available to supplement physical and environmental tools discussed in other portions of this document. Technology improvements are changing every day and keeping up with them is a full time job. Following is a brief description of some prevalent systems being used within school facilities as of this writing. In reviewing technology systems several important concepts need to be considered. Although technology systems are an excellent supplement to environmental/physical security within a school it isn't a replacement of proper supervision and good building design practices. Technology systems add significant cost to facilities and require maintenance, monitoring, operation and support. It is not advisable to start by choosing a technology and looking for a problem it can solve. Properly evaluate your facilities security needs and determine if a particular technology will be helpful to meet this need. Consider NCDPI's document "Design of Schools to Resist Violent Attack" which is based on FEMA 428 which discusses risk assessment concepts (Threat, Vulnerability and Asset Value) which may assist in making a proper decision for a specific facility for violent attacks or other security risks.

ELECTRONIC ACCESS CONTROL

Electronic Card Access (ECA) systems are systems that control door locks via a card, or fob. Systems can monitor, lock or unlock, or sound an alarm in response to controls at a door. Systems can be wired or wireless and can be incorporated into almost any type of door. It is usually easier to incorporate systems during the initial installation of a door, but there are methods to use or incorporate into existing door hardware. Design of systems require close coordination between Architect, hardware installer, system designer, electrician, and owner to provide a properly working system. If budget does not exist in initial construction project provisions should be made to prepare specific doors for inclusion of ECA when funds become available.

Electronic Card Access systems are useful where key lock systems have problems (loss of keys, duplicate keys, scheduling issues). An ECA system if fully implemented on all interior and exterior doors could be very effective in a lock down situation. The most practical use is to have card access at primary building entry points and alarms at secondary doors and high risk areas. ECA allows dynamic scheduling, multiple user settings, and can be easily changed (in contrast to rekeying). ECA is often used in conjunction with a doorbell or a camera to allow visitors to enter the facility.

SURVEILLANCE SYSTEMS (CCTV)

Surveillance Systems also known as Closed Circuit TV systems (CCTV) use cameras to monitor or record events to assist in building security. "Lock It and Watch It" is a statement from

NCDPI's document, "Design of Schools to Resist Violent Attacks" to simplify the goals of security. Where Electronic Card Access systems supplement the ability to "Lock It" CCTV systems supplement the ability to "Watch It". Cameras allow multiple areas to be monitored from a single point and also provide a means to store events for forensic/evaluative purposes. According to "School Security Technologies" by Tod Schneider "studies have shown that people cannot focus effectively on electronic monitors for more than 15 minutes at a time". Based on this thought it should be understood that cameras primarily provide a recorded image and provide limited live monitoring. In addition to monitoring and recording cameras often serve as a deterrent to many negative activities such as vandalism, bullying, fighting and a plethora of undesirable behavior. All aspects of CCTV systems are not positive. An extensive presence of cameras can have a negative impact on school climate bringing thoughts of "Big Brother", so judicious placement of camera's is recommended. Some camera locations can possibly create liability issues associated with violation of privacy.

One typical use for cameras is to monitor the exterior and interior exits and entrances to assist in securing the perimeter of the building. Some schools only have one camera to monitor the main entrance to control visitor access. Cameras can also be located in corridors and common areas such as hallways, stairs, entry to locker areas, lobbies, cafeterias, and gymnasiums. These cameras serve as a second level of intruder monitoring, and also serve as a means to maintain order in trouble areas within the school. Cameras can also be useful at Bus/Parent drop-off areas or to secure parking areas. The general concept is to use them in areas where it is impractical to provide personnel to constantly watch an area. Due to obvious privacy reasons cameras are rarely used in bathrooms or locker room areas which are prime areas for bullying and other negative activities so other means of monitoring will still be required in these areas.

Camera systems can be costly and complex. The three major components of the system, cameras, cabling and storage media, have various types and configurations. Cameras can be color or black and white, analog or digital, standard or high definition, intelligent, fixed or pan, tilt and zoom. Cabling can be coax, twisted pair, power over the Ethernet (POE), fiber optic and even wireless. Storage media can include Digital Video recorders and Network servers and even "Cloud" based storage over the internet. As with any technology, it is changing and improving on a continual basis so proper planning needs to look at current and future needs and may need to include assistance from system integrators, engineers, IT staff, and security personnel to conclude a proper solution for a particular facility or school system.

Following are some other considerations:

The larger the number of cameras there are the more the cost becomes. The amount of cameras and how they record can also affect the size and cost of the storage media.

Lighting needs to be closely coordinated since certain cameras require proper lighting.

Cameras should be installed in out-of-reach places and installed in opaque domes to prevent vandalism. Cross zoning view ranges can also reduce vandalism and prevent perpetrators from disabling cameras.

Outdoor cameras usually include heaters which may require 120V or POE power.

Dummy cameras can be useful as a deterrent, but on the other hand they may create a false sense of security.

Systems should be provided with a back-up source of power (batteries, UPS or Generator).

Internet Protocol (IP) based or network based systems can be susceptible to network outages or security breaches.

MOTION DETECTION SYSTEMS

Motion Detection Systems use a combination of door contacts, glass break detectors, and passive infrared detectors to monitor the facility. The systems can activate local alarm, a remote panel or an offsite monitoring point. Motion detection systems are primarily used for after hour property protection. They could also be used to prevent access to specific areas of the building (Cafeteria, Band Room) during business hours. Local door contacts/alarms can be useful to inhibit intruders from entering or students from leaving points of the building not monitored by staff. Some systems are integrated with camera systems, so that when the monitoring device is initiated, it turns on a camera to monitor the activity.

COMMUNICATION AND MASS NOTIFICATION SYSTEMS (MNS)

A communication system can be any device that transmits a message from one user to one or more users. The simplest form is a one way public address/intercom which exists in almost every school in North Carolina. In addition to providing standard school announcements a public address/intercom system can send out weather or fire emergency tones or announcements, provide evacuation directives and notify the facility of an intruder alert or lockdown condition. Most system also include a means of two way communication between program areas and the main office via system telephones, call switches and two-way talk back speakers. This type of system should be considered a minimum for a school facility. Systems of this type also can include zone paging, digital displays, class change bells, duress/emergency buttons, system clocks and interfaces with classroom monitors. One step further is “Mass Notification Systems”. As described by Tod Schneider in School Security Technologies, “Mass Notification Systems/Emergency Notification Systems” refer to “a collection of methods that facilitate the one way dissemination or broadcast of messages to one or many groups of people with the details of an occurring or pending emergency situation”. For schools the Public address/Intercom system usually serves as the Mass Notification System. However more complex systems could add specific visual appliances, mass text messaging, messages to multiple campuses, Twitter/Facebook updates, and mass automated dialing. Many schools and school systems currently have mass dialing systems to inform students of school closings, announcements and other emergency notifications.

In addition to Public Address/Intercom and Mass Notification Systems there can be a need to

provide direct, secure, peer to peer communication between parties where everybody is not listening. Many schools have local telephone communication using the intercom system, a telephone switchboard or VOIP phones via the data network. Radios and cellular phones can also be used by staff for peer to peer communication. Two important principles should be noted when using radios or cellular phones for emergency communication. One is that the school has proper coverage. Many schools are located in remote areas where coverage does not exist or the building itself can serve as a barrier to communication. Antennas and repeaters may need to be provided to allow clear communication. The other principle is that any system that is used in an emergency situation must have a source of back-up power whether it is repeaters, network servers, or the schools switchboard. A school should always have a limited number of copper POTS (Plain Old Telephone System) lines: (two) for the fire alarm system, (one) for the elevator, (one) for the security system and at least one spare for when other systems fail.

Cell phones in student hands create a conflict for schools. According to Tod Schneider in School Security Technologies cell phones can be "lifesaver in an emergency, but they can also be disruptive and in some cases, tools for cyber bullying". Many schools ban cell phones, or at least require that the phones be off or not in the student's possession due to harassment, cheating, and other negative behaviors.

VISITOR BADGING, AND METAL DETECTORS

Visitor badging is a useful resource to identify who is allowed to be in the facility. Most schools still use sign-in books and stickers to identify non-school personnel. Schools should also require outside contractors to have outside screening and identity badges. Technology is now available that will allow schools to provide temporary picture badges for visitors. Systems often require presentation of license information which could be cross referenced with sex offender registries or other data bases.

Metal Detectors are another form of technology that is considered to enhance school safety. Detector portals can cost $3,000 to $8,000. They also require staffing which can be an even larger expense. The presence of detectors may provide a negative effect on school climate. Screening requires time and creates lines of students which results in another opportunity for negative behavior. A reasonable alternative to Metal detectors are hand wands. Hand wands are significantly less expensive than Metal Detector Gates (hundreds as compared to thousands) and are portable. They can be employed during heightened security periods or used for a specific purpose like a football game.

SITE

1. Hazardous entrances off main thoroughfares should be avoided. If possible, lanes into and out of a campus should be separated by a landscaped median.

2. Auto and bus traffic should be separated upon entry onto school property.

3. Landscaping, screen walls, or building corners that block the vision of drivers entering or leaving school property should be avoided.

4. To decrease potential hazards to pedestrian traffic, bus parking should be located so that buses do not have to back up to turn or park, nor should buses be parked in double rows.

5. Long, straight layouts for parking lots, especially those used by students, should be avoided in order to reduce vehicle speeds and lower risk to pedestrians. Traffic control devices, such as speed bumps, can greatly reduce the potential for high-speed vehicular activity. Raised sidewalks can double as speed bumps where pedestrian traffic merits.

6. Unloading areas for students should not be located so that children have to cross vehicle traffic.

7. Pedestrian traffic patterns in areas of vehicular traffic should be designed to minimize potential risks. Where students must cross drives, raised sidewalks should double as speed bumps and traffic should be one-way only.

8. Drives that completely encircle a building or which have to be crossed when moving between buildings or to playgrounds or athletic fields are hazardous and should be avoided.

9. Adequate campus access and circulation for emergency service personnel and vehicles should be ensured. Fire department vehicle access lanes that extend beyond parking lots or service drives should be avoided, due to potential hazards to pedestrians. If access lanes are required by local code, they should be constructed as wide sidewalks or grassed hardened surfaces. Vehicular access should be over the curb, rather than via curb cuts which could encourage unauthorized use.

10. Avoid locating facilities near electric power transmission line easements that cross or border school property. All facilities and site functions (except drives) should observe the following minimum clearances:

100-110 kv line:	100 feet from easement
220-230 kv line:	150 feet from easement
345 kv line:	250 feet from easement

11. Noise levels that are generated by on-site mechanical equipment or nearby industries or transportation systems can interfere with communication or create a hazard to hearing and should be avoided.

12. To reduce potential injury from industrial accidents, avoid locating schools near industries that utilize hazardous materials or processes or that generate hazardous by-products or discharges.

13. Pre-kindergarten and kindergarten classes should have shared play areas separate from areas for older children. To avoid trapping children during emergency egress from buildings, perimeter walls or fences should have gates that are easily unlatched from the inside.

14. Playground equipment with sharp edges, rough surfaces, or hazardous projections that may entangle clothing or cause injury should be avoided. Additional guidelines for play equipment are outlined in *The School Site: Land for Learning* (2010, North Carolina Department of Public Instruction).

15. In addition to providing ground fault protection for outlets on exteriors of buildings near Athletic Fields as required by code, provide ground fault protection for any outlet that has the potential to serve an exterior area.

16. Panelboards and electrical equipment should be located in dedicated equipment rooms whenever possible. Panelboards located in program spaces should be properly locked and have adequate flash protection/shock hazard labeling. Where generators or other back up emergency systems serve a facility, they should be separated from the normal system to avoid simultaneous outages.

CIRCULATION

1. Minimum recommended corridor widths are:

Major corridors*	Elementary and middle: 10'-0"
	High: 12'-0"
Serving more than two classrooms:	8'-0"
Serving more than eight classrooms:	9'-0"

For lockers along one wall, add 2'-0" of width. For lockers along both walls, add 3'-0".

(* Major corridors serve classroom feeder corridors and large-group spaces such as cafeterias, media centers, gymnasiums, multipurpose rooms, and auditoriums.)

2. Doors which open into corridors must be recessed or protected by wing walls so that no part of the door swing projects into the circulation path by more than seven inches.

3. Multiple single doors reduce congestion and are recommended, rather than double doors.

4. Oversize doors accommodate movement of equipment and supplies and are recommended for exceptional children entries and for music, workforce development, kitchen, and receiving areas.

5. During class changes, corridors also serve as commons areas. Spacious corridors may reduce undesirable behavior.

6. To reduce injuries from falls, single stair runs should not exceed 8'-0" without a landing.

7. Minimum stair width for grades 6-12 should be 6'-0".

8. For efficiently moving large numbers of students, additional sets of stairs may function more safely and effectively than very wide stairs.

9. Wire-glassed openings should be used for visibility in fire-rated doors along main egress routes.

10. Provide a means to lock doors to classrooms from the inside without the necessity to enter the corridor. This means shall be capable from being unlocked from the outside to prevent students from isolating themselves inside a space.

11. Consider providing a means to lock primary entrances from a single point for lock down conditions.

12. To help with school climate in multilevel schools a possible arrangement to consider is to configure the school with one primary open stair in the center of the building to allow teacher's to monitor student traffic during the day. The other stairs can be alarmed so that they can be used for emergency egress only.

CLASSROOMS AND LABORATORIES

1. Provisions for two-way communication to the administrative or security offices should be provided in all occupied areas, including remote buildings and relocatable classrooms. Include in your school emergency plans a means to communicate to remote buildings during an emergency. Locate this protocol at locations where mass announcements are made.

2. To enhance safe movement during power interruptions, daylight sources should be provided in locker rooms and in laboratories containing hazardous equipment.

3. Light switches for toilets and corridors should be keyed or located in remote locations not accessible to students.

4. Fluorescent lighting with magnetic ballasts should not be used where it may adversely affect children with certain disabilities. Additional guidelines for exceptional children are outlined in

Exceptional Children Facilities Planner (2010), North Carolina Department of Public Instruction.

5. Fire extinguishers should be located in all laboratory areas.

6. Heat-producing appliances should be avoided in elementary classrooms and should be controlled via a "kill switch" with pilot light in middle and high schools.

7. Circuits for hazardous machines and tools, to include counter receptacles in kitchen areas, should be controlled via "kill switches" with pilot lights.

8. Additional guidelines for Science Classrooms are outlined in *School Science Facilities Planner* and *Checklist for Science Safety Requirements* (2010), North Carolina Department of Public Instruction).

SUPPORT AREAS

1. To address potential liability and safety issues, a vision panel with blinds should be provided in guidance offices and other areas where one-on-one adult/child conferencing is conducted.

2. For supervision of clients, a vision panel with blinds should be provided in health rooms.

3. To prevent a client's being trapped upon becoming incapacitated while in a toilet, toilet room doors in health rooms should swing outward into the main room.

4. To eliminate the potential for accidental falls, orchestra pits should be avoided. Several rows of removable seats at the front of an auditorium should be considered as an alternative.

5. To eliminate potentially serious injuries from falls, fly lofts or working stages are discouraged.

6. Dance classrooms should utilize sprung wooden floors or floor covering systems which provide adequate resilient surfaces.

7. Mirrors in dance classrooms should be shatterproof.

8. To eliminate the potential for accidental falls, storytelling pits in media centers should be avoided. Removable, carpeted risers should be considered as an alternative.

9. To enhance player and spectator safety, safety borders should be provided around basketball courts--a minimum of six feet wide along the sides and eight feet wide on the ends. Walls or protrusions at the ends of courts may require padding, where safety borders are too narrow.

10. Permanent stairs, with security features which prevent unauthorized use, should be provided to mezzanine or roof areas where mechanical equipment is located.

11. A well-ventilated storage area in a separate building should be provided for the storage of equipment and materials that pose a combustion hazard.

12. To enhance surveillance, locker rooms and shower areas should be visible from inside gym teachers' offices.

13. To reduce fire and toxic hazards, kilns should be located in separate rooms with adequate exhaust and ventilation. A Kiln Room should only be large enough for the kiln itself and a minimum amount of non-combustible shelving for ceramics use (40-60sf). Kilns should not be located in storage rooms where materials other than clay products are stored.

14. Group toilet rooms should utilize screen walls to eliminate the need for entry doors.

SCHOOL CLIMATE AND ORDER

GENERAL

1. Since maintenance of the facility has a significant impact on school climate and in turn school safety. School design should use techniques to reduce or simplify maintenance for the facility. Low maintenance landscaping, easy to clean surfaces, easy to access filters, and lamp types with long lifes are some examples that can help reduce maintenance.

SITE

1. Edges of school property can be defined with appropriate tree plantings and other landscaping elements. Careful design can maintain ample sight lines for effective surveillance. In urban settings where fences are used to border property, such plantings can soften edges while communicating to the public the message of privacy. Uninviting neighborhood development can be screened and intrusive noise softened, while discouraging unwanted visitors. In more rural settings, landscaping can be used to create visual lines that define boundaries without the use of fences.

Tree canopies should be maintained at a minimum height of eight feet and hedges should be kept low enough not to provide places where people can hide. Landscaping should never prevent visual access into school property.

2. A less stressful, healthier, and safer school environment can be achieved through thoughtful, well-designed landscaping. Trees can provide shade and protection from the wind to people and structures, and act as visual and noise buffers. Large tree canopies have a tremendous capacity to absorb high-speed wind energy from hurricanes and other storms. Absorption of high decibel levels of noise before it reaches the hub of the school campus makes verbal communication and surveillance easier.

Tree species that will resist winds should be selected. Species that could split off in a storm, causing additional hazards, should be avoided.

3. Landscaping can serve to control and direct traffic just as well as walls or fences. Trees lining sidewalks or drives can give natural direction to pedestrian and vehicular traffic, while limiting or denying access to identified sections of the campus.

4. Covered walkways between buildings should be bordered by low shrubs and hedges, not to exceed 18 inches in height. Taller hedges should be placed and maintained in such a way as to prevent someone from hiding behind them.

5. Shaded areas should be provided for students waiting for buses, in order to offer protection from undesirable climate or weather.

6. Walkways and corridors that serve student drop-off areas should be wide enough to

accommodate peak periods of use and reduce the unwanted effects of crowding.

7. Vehicular routes and parking areas should be in visual proximity to strategic sections of buildings, such as administration and classrooms, and should be adequately lit using vandal-proof lighting. The primary entrance intended for visitors should be designed to be obvious by using drives, sidewalks, signage and lighting. Sufficient visitor parking should be provided near primary entrance to encourage visitors to use the correct entrance.

8. If two entries to a campus are needed, they should be close enough to each other to allow one individual to monitor both.

9. To reduce the possibility of vandalism and other undesirable behavior, avoid the use of loose gravel or crushed rock for surfacing.

10. Outdoor facilities, such as athletics or recreational fields, should be organized around a single axis to facilitate immediate visual surveillance of the entire area. School buildings placed on higher elevations than such facilities provide better opportunities for observation. On flat sites, vantage points should be identified or constructed to allow unobstructed visual surveillance.

11. Signs should have large lettering, bold graphics, simple directions, and be well lit. In order that signs not provide hiding places for people, the ground behind a sign can be bermed up or the sign can be raised high enough off the ground to expose the feet of a person hiding behind it.

12. Bicycle racks should be located in highly visible areas near a main entry or parking area, but with clear separation from vehicular traffic.

13. Where walls project, dark niches where people can hide are created. The planting of low hedges and the provision of nearby windows or recessed exterior lighting can reduce the improper use of such spaces.

14. Walls in graffiti-prone locations should be of a material and finish that can repel graffiti or tolerate repeated cleanings.

15. Screen walls of metal or decorative blocks should provide no footholds, and the top three to four feet nearest the roof should be smooth and not climbable.

16. Exterior mechanical equipment enclosures should utilize designs and materials which make climbing difficult and provide side protection from thrown projectiles. Access doors should be solid, with concealed hinges and deadbolt locking.

17. Dumpsters should be secured and enclosed to prevent persons from climbing inside to play or hide. Eight-foot-high screen walls, constructed to minimize climbing, should surround three sides. Any gate should be lockable and should provide visual access to the inside of the enclosure.

18. Integrate school sign design into the school project design.

19. Consolidate functions that have compatible functions and similar threat levels, and separate higher risk areas from higher value areas. For example, visitor entrances and material receiving/loading docks should be physically separated from key functions such as main operational areas or concentrations of students.

20. Secure access to roofs, mechanical rooms, crawl spaces and other unauthorized spaces.

ACCESS CONTROL

1. The primary entry point (see figure 1) should be at the front of school buildings and should provide a safe, well-lit, protected shelter for those entering the building.

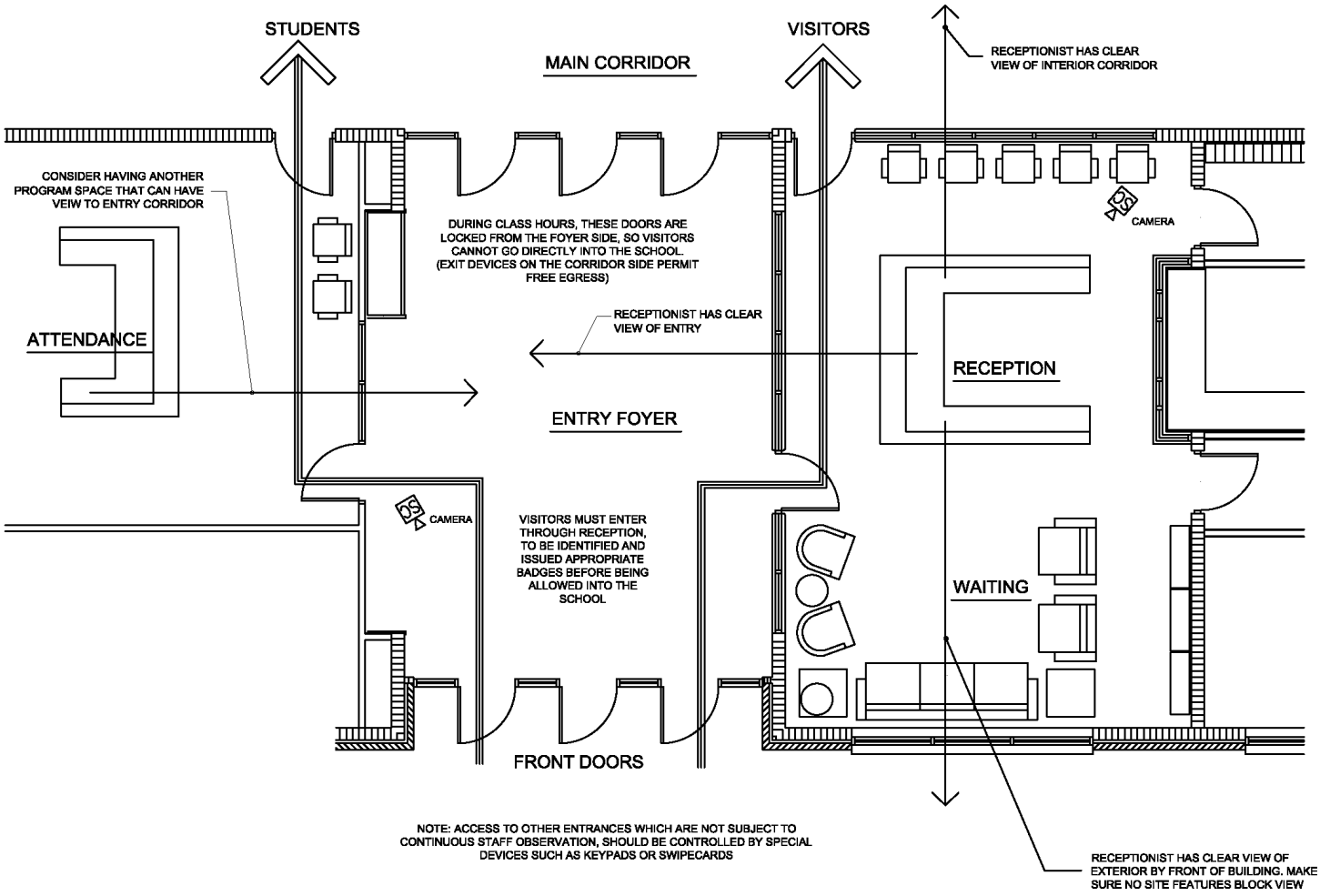


FIGURE 1 ACCESS CONTROL AT MAIN ENTRANCE

2. Sufficient windows and glazed doors should be provided to facilitate visual surveillance from strategic areas, such as administration or the visitor reception desk. Refer to Figure 1 which shows a suggested concept for a Main Entrance. The Entrance is arranged to channel visitors through the main office. Proper location of the receptionist desk and the provision of windows allow the receptionist to supervise the primary entry, the interior corridor and the site outside the main entrance.

3. Electronic card access can be added to doors so that the receptionist has to "buzz" visitors into the building and to secure part of the building. Cameras can also be provided in this scenario for an additional level of "electronic surveillance".

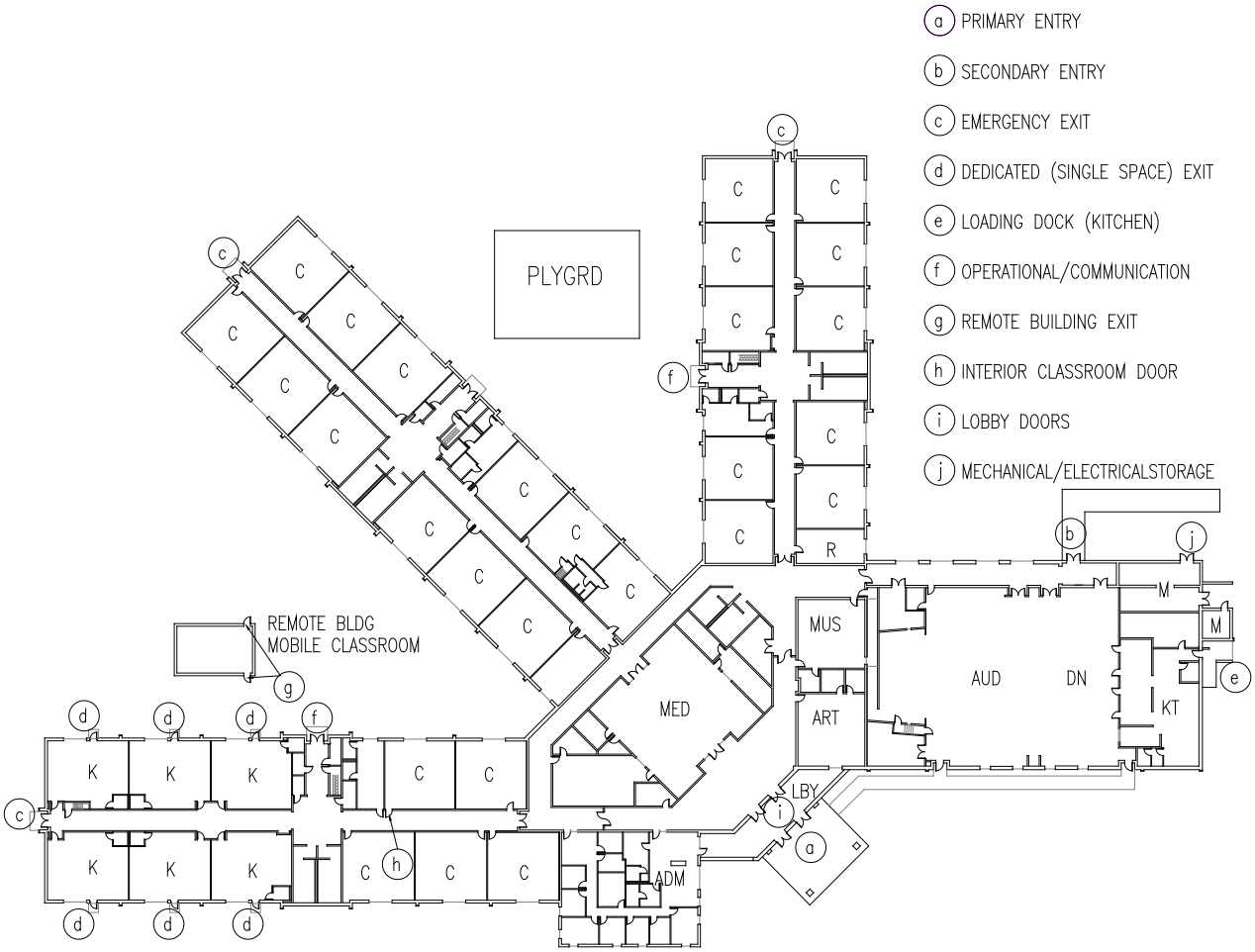


FIGURE 2 TYPICAL SCHOOL ACCESS DIAGRAM

4. Typical School Access - Refer to Figure 2 - Typical School Access Diagram which shows typical types of doors on a school campus. Below is a description and control strategy for each door type. It is understood that each door has proper panic hardware to allow egress from the building during an emergency.:

    a. Primary Entry - Primary entry doors are doors where visitors should be directed into the building. See Figure 1 - Access Control at Main Entrance which illustrates strategy associated with primary entry doors.

b. Secondary Entry – Secondary entry doors are doors that are intended to allow students in/out the school at the beginning and ending of the school day(parent or bus drop off) or doors that serve as a primary entry during specific events.(Gymnasium, Auditorium). During the specified entry periods these doors are intended to be unlocked. During the remainder of the day the doors are locked. The expectation is that students and visitors will use primary entry during school hours. One possible method of access control for this type of door is to manually unlock these doors and provide supervision during entry periods and lock them when school is operation. These doors could also be provided with electronic locks that could be connected to an access system which would make locking and unlocking easier and would allow for schedule flexibility. Another advantage to being connected to an access system would allow a card or keypad entry to use a primary entry for teachers or admin staff. If provided with electronic locks the door could be monitored and it would be easy to lock the door in an emergency. An additional safety measure is to add a local audio alarm to impede student use during school hours if desired.

c. Emergency Exit – An emergency exit door is a door whose primary purpose is to allow people to exit the building during an emergency. They are usually not intended to allow people to enter the building and are specifically prescribed by code to meet egress requirements. They should be locked from the outside and should have panic hardware to allow people to exit the building at all times. The handles on the door should be designed to prevent chain locking on the outside or inside of the building. An additional safety measure is to add a local audio alarm to impede student use during school hours if desired.

d. Dedicated (single space) exit – A dedicated exit is a door (emergency or convenience) that is solely used for one space. The expectation is that the door is always locked from the outside unless the primary user of the space intends for it to be opened. Alarming or electronically monitoring this door is not usually needed since the primary user serves as a monitor any time the space is intended to be used.

e. Loading Dock/Kitchen Entrance – This door serves as the primary entrance/exit for the kitchen/cafeteria area. Since the staff of the kitchen/cafeteria are usually a separate entity, this door should be treated like a separate tenant door. If it has card access it would primarily serve the kitchen staff only. This door should be locked unless opened by the kitchen staff. It usually will have a bell to inform the staff that someone needs to enter. A window near the door or a view panel will be useful for verification of visitors. Often even the other doors (including interior) to the cafeteria/kitchen are also controlled by the kitchen staff. These could have dedicated locks or electronic entry control. The expectation is that similar to a dedicated (single space) door that the kitchen staff will monitor this door during operational periods otherwise the doors are locked.

f. Operational/Communication doors – These doors usually need to remain open from the outside for proper operation of school to occur. They serve as travel paths between buildings, mobile classrooms, playgrounds or athletic fields. These doors could be locked during classes and opened during class changes. This could impede school function and be difficult to operate. Electronic control could be used to make the process easier, but it still would require a process to be followed. Due to the need to allow entry in the building the number of these types of doors should be limited.

g. Remote Building Door – This type of door is a door that serves a remote building or a trailer as a primary entrance/exit. These doors could remain locked if used similar to a dedicated exit or may need to remain open if used as an operational/communication door. If the building is more complex it may have all variations of doors. Doors in a remote building are difficult to monitor since they are isolated from the building. Providing electronic monitoring could also be an issue due to the distance from the building and the increased cost of cabling. This type of door is a circumstance where the provision of security cameras would be helpful to provide proper visual monitoring of the doors.

h. Interior Classroom Doors - Interior doors should be able to be locked from the inside to avoid having to enter the "line of fire" during an incident. They should also have a means for staff to unlock the doors so a student or perpetrator can't lock themselves inside. A view panel can be useful to see what's going on inside the classroom. The design of the panel should prevent the ability to open the door from the inside. Provision of electronic locks could be useful to initiate a lockdown, but due to the number of interior doors it can be cost prohibitive for most schools.

i. Lobby doors – The lobby doors in conjunction with the door leaving the receptionist area can be used to direct visitors to enter the building through the reception area (see figure 1).

PANIC ALARMS

5. Per Session Law 2013-360 - Every Public School shall have a panic alarm system that connects with the nearest local law enforcement agency identified in the local board of education's emergency response plan. The primary required device will be a single button with a single initiation (hard wired at a fixed location) located in the administration area of the building. Additional wireless or wired devices can be provided at the LEA's option, but are not required. All components necessary for system operation should be provided with a back-up power source. It shall be the LEA's responsibility to determine a communication protocol with the local law enforcement agency. The design should be submitted to School Planning for verification of compliance.

6. Exterior covered walkways should be designed to prevent access to adjoining windows, roofs, or other upper-level areas, and to promote adequate illumination and visual surveillance. Support columns should be made of a smooth, difficult-to-climb material. Trees should be planted away from buildings and covered walkways to prevent access to such structures. “T” connections should be provided at entries to avoid creating building niches and to provide clear sight lines and circulation paths unobstructed by doors or loitering students.

7. Secondary entries should be recessed for protection from the weather, but should not provide places for people to hide. Completely hidden alcoves which shield doors and stairs from weather can also serve as concealed areas for unwanted activity. Visibility into alcoves can be enhanced by the use of chamfered wall corners and adequate glazing and lighting

8. Enclosed exterior courtyards should permit visual supervision by one individual.

9. Corridors should be broad and well lighted, with no projections. Sudden 90-degree turns and narrow hallways should be avoided. Smoother traffic flow and better visibility should be provided through the use of chamfered wall corners.

10. Door niches on hallways should be chamfered and wide enough to provide clear lines of sight down hallways. Windows should be provided in or near classroom doors to allow staff to monitor hall traffic.

11. Alcoves along corridors for locating items such as lockers, vending machines, trash containers, and water coolers should be avoided, in order to eliminate difficult-to-supervise hiding places or spaces that promote undesirable activity. Such items should be either low profile in design or mounted flush with corridor walls. Lockers which are single height, as opposed to an over-and- under configuration, reduce undesirable crowding during periods of heavy congestion.

12. Stairs should be well lit. Enclosed stairwells should have electronic surveillance equipment to provide motion detection at main access points and on landings. The entire area under all stairs should be enclosed and unavailable for any use.

13. Stair handrails should be constructed so as to provide visual access from either side of the stairs. (Solid handrails can provide hiding places on stairs and landings.) Handrails should be designed to discourage sliding on them and horizontal rails should incorporate vertical supports that discourage climbing.

14. Risers should be enclosed on the sides to prevent persons from grabbing the ankles of others using the stairs.

15. Fixed Metal Detectors may need to be considered for schools to reduce incidence of weapons being brought into the school building. See School Security Technologies for thoughts to consider in respect to Metal Detectors.

16. Access to elevators should be limited to authorized individuals. Elevators should be located in lobbies or other areas with higher-than-normal natural surveillance. A five-foot-deep landing area should minimize obstruction of student traffic. Video surveillance of and into elevators can significantly deter criminal or other undesirable activity.

17. Water fountains and toilet rooms should be located in gathering areas that are typically monitored.

18. Vending machines should be located adjacent to or inside cafeterias or other well-monitored spaces, rather than in isolated areas.

19. Standpipe cabinets and fire extinguishers in main corridors should be flush mounted.

20. Lighting should be located so as to minimize the creation of dark or shadowed recesses that might be conducive to undesired activity.

21. Circulation areas should be designed and sized to avoid overcrowding during times of peak congestion.

22. Restricted areas within the school and on school property should be properly identified.

CLASSROOMS AND LABORATORIES

1. Relocatable classrooms should be sufficiently separated from each other and permanent structures to permit visual surveillance. In order not to provide hiding places for people, spaces underneath relocatables should be secured with chain link fencing or a similar material that can prevent access and maintain visibility.

2. Narrow windows or sidelights around doors allow for seeing who is on the other side before opening a door and to observe adjacent spaces. Where such windows are used, door hardware and glazing products should be used that will deter unauthorized entry through breakage of the glass.

3. Operable transom windows are not recommended for use over exterior doors.

4. Interior door recesses should be top-lighted and chamfered to eliminate dark corners.

5. Classrooms should be organized for ease of monitoring by staff. Visual access to the corridor, and in some instances to the building's exterior, is desirable.

6. Retractable partitions should contain windows or provide other visual access into adjoining spaces, and should be stored in permanent, lockable niches.

7. Two-way communication to administrative or security offices should be provided from all

occupied areas, including relocatable classrooms.

SUPPORT AREAS

1. Administration areas should be contiguous with main entries, with easy visual access into and from the area.

2. Health rooms should include locked storage for equipment and supplies.

3. Locker rooms should be arranged for easy surveillance, with instructors' offices positioned near main entries and exits to provide visual access to locker areas.

4. Free-standing or island lockers should be adequately spaced to avoid student crowding. Lockers should not exceed four feet in height, in order to permit visual surveillance. Perimeter lockers should be mounted flush to the walls to minimize opportunities to hide on top of them or to attempt access to ceiling areas.

5. Mirrors, windows, and light covers in toilet and locker rooms should be impact resistant.

6. Ceilings in toilet rooms and locker areas should be made of exposed concrete, plaster, or double-thickness drywall, rather than accessible materials such as lay-in tiles, to prevent the use of the spaces above as hiding places for persons or contraband.

7. Control points and clear sight lines in the media center should be used to minimize opportunities for theft or creating hiding places.

8. The reception area or circulation desk in the media center should be located to facilitate the monitoring of student traffic into and out of the facility.

9. Interior media stacks should be a maximum of four feet in height, well-spaced, and visually accessible from strategic locations.

10. Skylights or clerestory windows on roofs should be tamper-proof and should be positioned well clear of any means of climbing down to the rooms underneath.

11. Large assembly areas, such as auditoriums, music rooms, and band rooms, should provide clear sight lines and easy traffic flow. Niches along walls should be avoided and folding partitions should recess fully into walls to eliminate barriers behind which people can hide.

12. Single, designated control points with clear sight lines should be positioned near the entrances and exits to cafeterias.

13. Avoid overcrowding and promote efficient traffic flow in cafeterias by providing ample space between serving counters and between dining tables.

14. Locate toilet rooms directly adjacent to main corridors in order to maximize visibility and surveillance. Many schools have reduced social problems and maintenance by eliminating entry doors to group toilets and using screen walls to create a maze for privacy. Some schools even have the sinks located directly off the corridor for visual surveillance.

15. Large-event toilet rooms should provide secondary access and should remain locked or should be reduced in size during normal school operation. Hardware should permit doors to be locked in the open position for use during designated events.

16. Group toilet rooms should not have doors, in order to provide acoustic surveillance from adjoining corridors.

17. Toilet partitions should be structurally sound and attached at floor, wall and ceiling. Partition walls should not exceed 5'-6" in height and should have a 1'-0" clearance above the floor to allow visual surveillance.

18. Toilet room hand dryers, vending equipment, and trash containers should be heavy duty, recessed, fire resistant, and lockable.

19. Retractable gymnasium bleachers should be capable of being locked in place when not in use, to prevent persons from hiding or engaging in undesirable activity in the space underneath.

20. While stage curtains can be left open to allow visual surveillance, electrical and lighting controls for an auditorium should be located in a locked panel or room.

21. Designs for areas in which there will be large congregations of students, such as music or band rooms, should support visual supervision of an entire area by one individual.

RECOMMENDATION FOR PREPARATION OF EMERGENCY SCHOOL SCHEMATIC DIAGRAMS

As required by Session Law 2013-360 section 8.39, each LEA is to provide to local law enforcement a schematic diagram of the each school in its district. It is recommended that the diagrams consisting of site plan and floor plans are prepared in a digital drawing format for ease of updating when the plan may change due to renovations or additions.

All new schools and renovation construction documents are prepared by architects and engineers using a digital drawing format. The standard at this time is AutoCAD DWG format. LEA's should make part of their design agreements the providing of the completed plan with required information affixed to the drawings provided in both DWG format and PDF format. AutoCAD DWG format can be converted to a portable document format such as Adobe Acrobat for printing and transmitting.

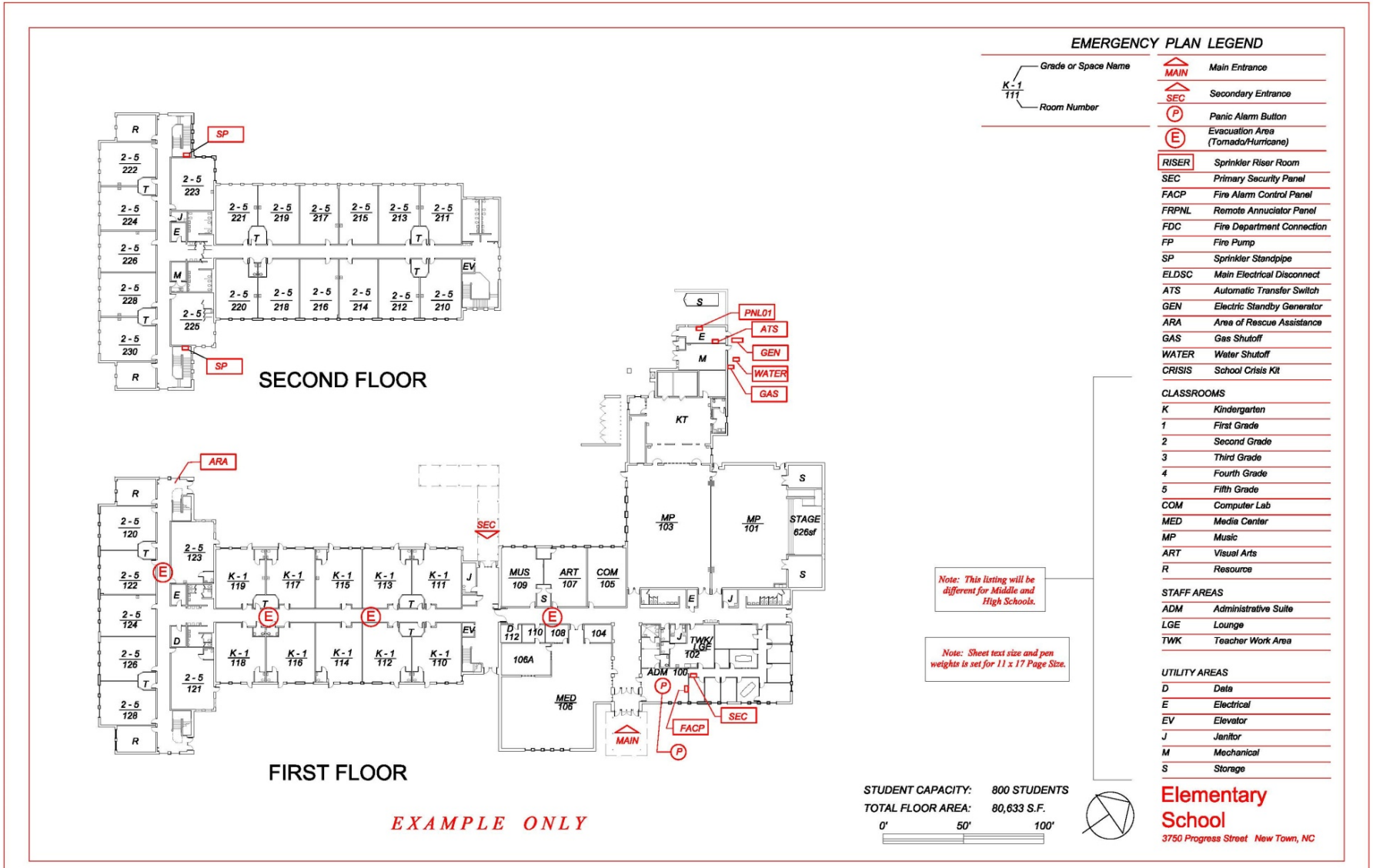
The following is a recommended standard for the preparation of these drawings.

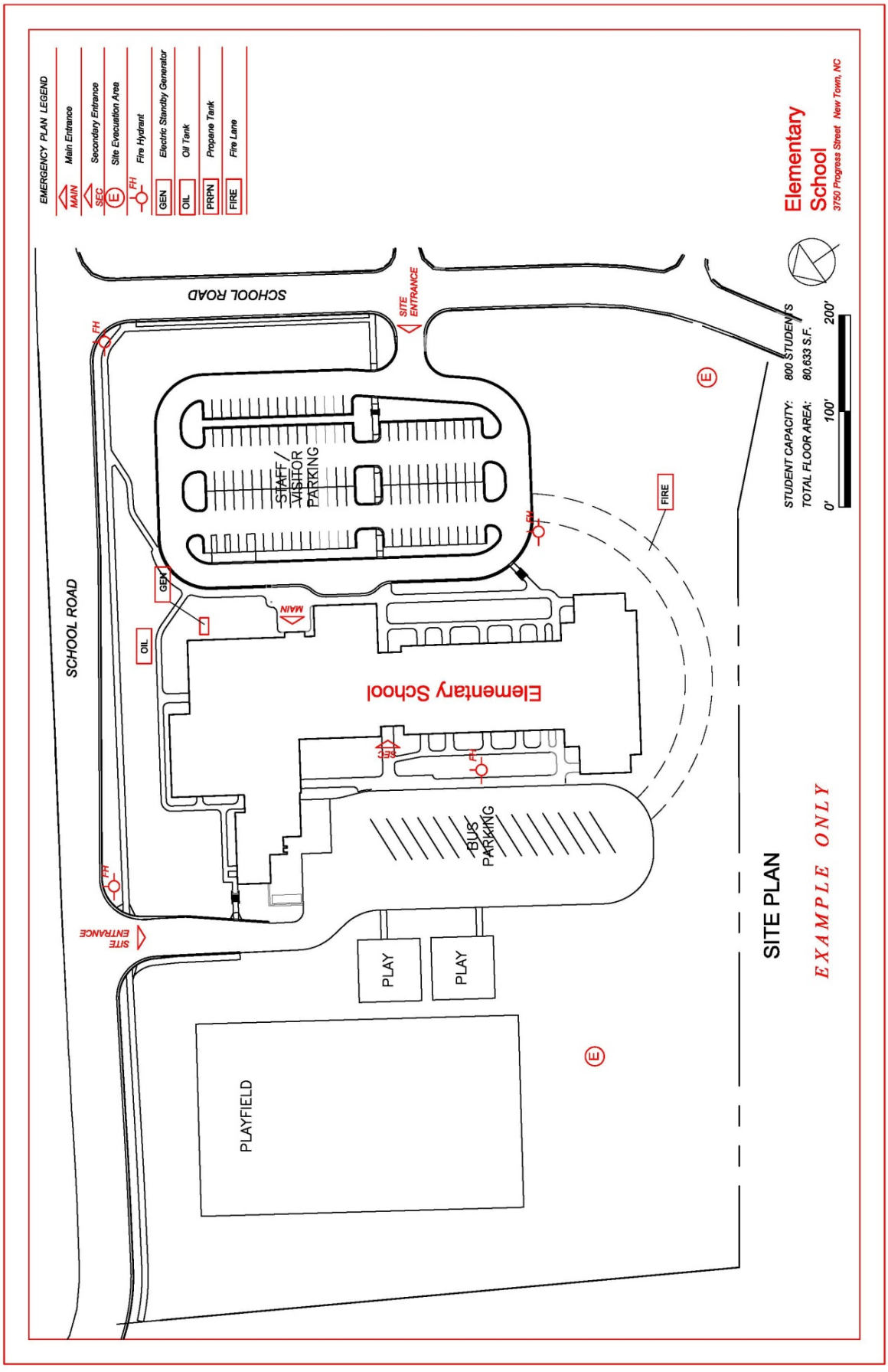
Digital drawings do not need to contain the designers seal or information as these plans serve a totally different purpose and are not considered a public record as the term "public record" as is defined under G.S. 132-1 and shall not be subject to inspection and examination under G.S. 132-6. The base digital drawings can also be used for property accounting drawings by the LEA.

The drawing can also be used for Property Accounting by turning off the emergency layer of the digital copy.

The following example is shown at a reduced scale. It is highly recommended that the print size should be at least 11" x 17" minimum for the clarity of reading the drawing.

SITE PLANS: Site plans should also be provided that will indicate the location of surrounding access streets, driveways, on-site parking areas, and the Main Entrance points to the building. In addition, there should be indication of Evacuation Areas that may be located on the site.


EMERGENCY PLAN LEGEND
Grade or Space Name
K-1 111
Room Number
MAIN Main Entrance
SEC Secondary Entrance
P Panic Alarm Button
E Evacuation Area (Tornado/Hurricane)
RISER Sprinkler Riser Room
SEC Primary Security Panel
FACP Fire Alarm Control Panel
FRPNL Remote Annunciator Panel
FDC Fire Department Connection
FP Fire Pump
SP Sprinkler Standpipe
ELDSC Main Electrical Disconnect
ATS Automatic Transfer Switch
GEN Electric Standby Generator
ARA Area of Rescue Assistance
GAS Gas Shutoff
WATER Water Shutoff
CRISIS School Crisis Kit
CLASSROOMS
K Kindergarten
1 First Grade
2 Second Grade
3 Third Grade
4 Fourth Grade
5 Fifth Grade
COM Computer Lab
MED Media Center
MP Music
ART Visual Arts
R Resource
STAFF AREAS
ADM Administrative Suite
LGE Lounge
TWK Teacher Work Area
UTILITY AREAS
D Data
E Electrical
EV Elevator
J Janitor
M Mechanical
S Storage
Note: This listing will be different for Middle and High Schools.
Note: Sheet text size and pen weights is set for 11 x 17 Page Size.
SECOND FLOOR
FIRST FLOOR
EXAMPLE ONLY
STUDENT CAPACITY: 800 STUDENTS
TOTAL FLOOR AREA: 80,633 S.F.
0' 50' 100'
Elementary School
3750 Progress Street New Town, NC


EMERGENCY PLAN LEGEND
Main Entrance
Secondary Entrance
Site Evacuation Area
Fire Hydrant
Electric Standby Generator
Oil Tank
Propane Tank
Fire Lane
Elementary School
3750 Progress Street New Town, NC
SCHOOL ROAD
SITE ENTRANCE
STAFF / VISITOR PARKING
Elementary School
BUS PARKING
PLAY
PLAY
PLAYFIELD
SITE PLAN
EXAMPLE ONLY
STUDENT CAPACITY: 800 STUDENTS
TOTAL FLOOR AREA: 80,633 S.F.
0' 100' 200'

PLOT SCALES AND TEXT SIZES:

It is recommended that the drawing plot size be 11” x 17” because of the ease of reading reduced size drawings. Font type should be legible and not clutter the readability of the drawing at the plot scale. Text style should be an open non-serif face such as Arial. Bolding the type should not be necessary.

SCHOOL	PLOT	SCALE	TEXT SIZES AT 11” X 17” PLOT SCALE		
			Room Names & Nos.	Emergency Building Names	Titles
Elementary & Middle Floor Plans	11” x 17”	1” = 50’	4’-0”	4’-0”	9’-0”
Elementary & Middle Site Plans	11” x 17”	1” = 100’	4’-0”	4’-0”	9’-0”
High School and Very Large Floor Plans	11” x 17”	1” = 60’	4’-0”	4’-0”	9’-0”
High School and Very Large Site Plans	11” x 17”	1” = 200’	4’-0”	4’-0”	9’-0”

DRAWING COLORS AND LINE WEIGHTS

At reduced scales, floor plans and site plans can become “muddy” and not clearly readable. It is recommended that all line weights for the floor and site plans be set to those indicated in the table below. Extraneous information such as furniture, column lines, hatching, material indication in walls, and non-essential text should be removed. Show doors and windows in simplified form. Walls should be indicated without indication of cavities.

DRAWING COLORS AND LINE WEIGHTS			
LOCATIONS	COLOR	LINE WEIGHT	NOTES
Drawing	White/Black	0.09 mm	
Text	White/Black	0.15 mm	
Emergency Text	Red	0.30 mm	
Emergency Symbol	Red	0.30 mm	Size: 9’-6” x 22’

LAYERS

LAYERS – FLOOR PLANS		LAYERS – SITE PLANS	
Emergency Symbols and Text	A-FL-EMER	Emergency Symbols and Text	A-FL-EMER
Walls	A-FL-WL	Building Perimeter	A-ROOF / 1
Windows	A-FL-GL	Drives & Parking	C-PAVE / 2
Doors	A-FL-DR	Property Lines & Easements	C-PROP / 3
Stairs	A-FL-STR	Tree Lines & Major Planting Area	C-TREE / 4
Plumbing Fixtures	A-FL-FIX	Creeks, Ponds & Rivers	C-WATR / 5
Text 11 X 17 Plot	A-TXT-17	Playfields	C-PLAY / 6
Sheet 11 X 17 Plot	S-11X17	Text 11 X 17 Plot	A-TXT-17 / 41
		Sheet 11 x 17 Plot	S-1117 / 51

SYMBOLS AND ABBREVIATIONS

EMERGENCY PLAN LEGEND

MAIN	Main Entrance
SEC	Secondary Entrance
E	Site Evacuation Area
FH	Fire Hydrant
GEN	Electric Standby Generator
OIL	Oil Tank
PRPN	Propane Tank
FIRE	Fire Lane

Site Plan Legend

EMERGENCY PLAN LEGEND

Grade or Space Name

K - 1
111

Room Number

MAIN	Main Entrance
SEC	Secondary Entrance
P	Panic Alarm Button
E	Evacuation Area (Tornado/Hurricane)
RISER	Sprinkler Riser Room
SEC	Primary Security Panel
FACP	Fire Alarm Control Panel
FRPNL	Remote Annuciator Panel
FDC	Fire Department Connection
FP	Fire Pump
SP	Sprinkler Standpipe
ELDSC	Main Electrical Disconnect
ATS	Automatic Transfer Switch
GEN	Electric Standby Generator
ARA	Area of Rescue Assistance
GAS	Gas Shutoff
WATER	Water Shutoff
CRISIS	School Crisis Kit

Floor Plan Legend

GENERAL FLOOR PLAN - STANDARD ABBREVIATIONS			
Designation	Description	Designation	Description
DN	Cafeteria / Dining	COM	Computer Lab
KT	Kitchen	MED	Media Center
M	Mechanical	ART	Art Classroom
J	Janitor	MUS	General Purpose Music Room
T	Group Toilet	DD	Dance / Drama Room
ADM	Administrative Suite	AUD	Auditorium
GUI	Guidance Suite (when separate from ADM)	TWK	Teacher's Workroom
RES or R	Small Group Exceptional Children Resource Room	LGE	Teachers' Lounge
EXC	Self-Contained Exceptional Children Classroom	O	Office (Asst. Principal, Resource Officer when remote from ADM)

ELEMENTARY SCHOOL ABBREVIATIONS			
Designation	Description	Designation	Description
PK	Pre-Kindergarten	5	Fifth Grade
K	Kindergarten	4/5	Classroom for use by either grade (example)
1	First Grade	MUS	Music
2	Second Grade	MP	Multi-Purpose / Play
3	Third Grade	PRJ	Multi-Purpose Science or Project Room
4	Fourth Grade		

MIDDLE SCHOOL ABBREVIATIONS			
Designation	Description	Designation	Description
6	Sixth Grade Classroom	BND	Band Room
6SC	Sixth Grade Science Classroom	CHR	Chorus Room
7	Seventh Grade Classroom	MUS	Multi-Purpose Music Room
7SC	Seventh Grade Science Classroom	GYM	Gymnasium
8	Eighth Grade Classroom	WDV	Workforce Development
8SC	Eighth Grade Science Classroom	HL	Health Classroom

HIGH SCHOOL ABBREVIATIONS			
Designation	Description	Designation	Description
CR	Multi-Purpose Classroom	HL	Health Classroom
SC	Science Classroom Lab	AUX	Auxiliary Gym
WDV	Workforce Development	WT	Weight Room
BND	Band Room	WR	Wrestling Room
CHR	Chorus Room	LL	Foreign Language Lab
MUS	Multi-Purpose Music Room	FHSE	Field House
GYM	Gymnasium		

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