Exceptional Children Facilities Planner

guidelines for designers

September 2010

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Division of School Support / School Planning Section
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EXCEPTIONAL CHILDREN FACILITIES PLANNER

School Planning Section
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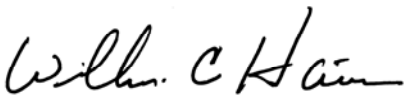
FOREWORD

Programs for exceptional children comprise a unique and growing component of the *North Carolina Standard Course of Study* for students to age 21. Facilities that support instruction for exceptional children must be carefully designed around the students' needs and capabilities, and also interrelate with the overall school design. Instructing in the "least restrictive environment" often means that many exceptional children are taught in typical classrooms most or all of the day.

The rapid pace of technological change and evolving pedagogical theory surrounding the instruction of exceptional children require innovation and flexibility in the design of facilities. Designers, school administrators, and teachers must plan together to determine the most appropriate configuration to meet current and projected needs, while retaining a degree of flexibility necessary to accommodate future programs. Long-term economy and usability are essential to achieving progressive educational agendas.

This publication describes facilities for exceptional children, and as such is a supplement to the *North Carolina Public Schools Facilities Guidelines*. It is meant as a resource to assist design professionals to plan facilities that meet the evolving needs of public schools in North Carolina. We hope you find it useful.



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ABBREVIATIONS

ABA	Architectural Barriers Act of 1968 (PL 90-480)
Access Board	The U.S. Architectural and Transportation Barriers Compliance Board
ADA	Americans with Disabilities Act of 1990 (PL 101-336)
ADAAG (advisory	ADA Accessibility Guidelines for Buildings and Facilities only)
ADA Standards	ADA Standards for Accessibility Design (legally enforceable)
ANSI	American National Standards Institute
CFR	Code of Federal Regulations
EC	Exceptional children
FAPE	"free appropriate public education"
GS	General statutes
IDEA	Individuals with Disabilities Education Act of 1990 (PL 101-476), an amended and renewed version of the Education for All Handicapped Children Act of 1975 (PL 94-142)
IEP	"individualized education program"
LEA	"local education agency"
LRE	"least restrictive environment"
MGRAD	Minimum Guidelines and Requirements for Accessible Design (advisory only)
NCDPI	North Carolina Department of Public Instruction. See website at http://www.ncpublicschools.org
OSEP	Office of Special Education Programs, U.S. Department of Education
Section 502 & 504	sections of Title V of the Rehabilitation Act of 1973 (PL 93-112)
UFAS	Uniform Federal Accessibility Standards (legally enforceable)

INTRODUCTION

Few components of the program for modern school design present a greater challenge to the designer than do facilities to meet the widely varied needs of exceptional children (EC). These are students who, because of permanent or temporary mental, physical, or emotional disabilities are unable to have all of their educational needs met in a regular classroom without special educational and/or related services. While philosophy and law dictate that children with special needs should be placed in the least restrictive environment (LRE) [educated with non-disabled peers to the greatest extent possible], many cannot succeed in the traditional classroom, or even in one having some modification. It is therefore sometimes necessary to provide instructional spaces designed especially for exceptional children.

A further complication to the designer and to his/her clients is that the children with special needs, and the type and severity of their needs, may vary dramatically from one academic term to another, and from one school to another across the district. In addition, on-going review and revision of applicable regulations and guidelines necessitate a significant degree of flexibility in the physical facility.

Some exceptional children may spend their entire day in the traditional classroom; some may be "pulled out" for various lengths of time, at varying schedule, for instruction or activities, therapy, or other functions in additional spaces. Other children, with more profound needs, may be schooled primarily or totally in specially designed and equipped classrooms.

It has generally been the policy to design facilities for Exceptional Children in terms of a particular disability or situation exhibited by the students. That is, previous manuals provided guidance organized by categories of disabilities, such as "autistic," or "visually impaired," or "mentally disabled," to name a few. Current practice is to categorize the needs of the students by extent (severity) of the educational need, rather than by the type of a particular disabling condition. These categories of "service delivery" are as follows:

SPECIAL EDUCATION / GENERAL SKILLS
SPECIAL EDUCATION / TARGETED SKILLS
SPECIAL EDUCATION / SUSTAINED SUPPORT
SPECIAL EDUCATION / INTENSIVE NEEDS

For descriptions of these categories, see "Policies Governing Services for Children with Disabilities," following. [From NC DPI policy 1508, pages 139-140.]

However, in order better to grasp the type of disabilities for which the designer is involved, and to coordinate current criteria with past practice, it may be instructive to understand the areas of eligibility for special education. These are described in Appendix 1, Categories of Eligibility.

Programs for exceptional children are intended to ensure that each student develops mentally, physically, socially, emotionally, and vocationally to the fullest extent possible,

through appropriate individualized education. These guidelines are intended to assist in the design of facilities to enhance that endeavor.

Using the Facility Planner

This publication is intended to be a reference document for designers of school facilities. Its purpose is to provide descriptions of programs and facilities for exceptional children, which can support their needs. It is neither comprehensive nor all-inclusive, but should provide an initial understanding of the nature and purposes of instructional programs around which facility design evolves.

These guidelines in no way supersede state or local codes or regulations, or federal or state legislation regarding building design and construction or access or safety, or other pertinent issues. No attempt is made herein to interpret legislation or guidelines (such as the ADA Accessibility Guidelines) which regulate the provision of access for special populations. Interpretation of any such standards falls wholly within the purview of the regulating agency.

Plans, drawings, photographs, and other visual devices in this document are not intended for replication within a facility design, but are provided for general information only. Additional information is available from Resources listed at the end of this publication. Staff consultants within the Exceptional Children Division of the NC Department of Public Instruction are available to discuss specific interests or concerns, and may be reached at (919)807-3969.

EDUCATIONAL PROGRAMS

Policies concerning services for children with disabilities are found in North Carolina Department of Public Instruction Policy 1500, which begins as follows…

NC 1500-1.1 Goal and purposes

The goal of the State is to provide appropriate educational opportunity to all children with disabilities who reside in North Carolina.

The purposes of this part are—

(a) To ensure that all children with disabilities, ages three through 21, have available to them a free appropriate public education that emphasizes special education and related services designed to meet their unique needs and prepares them for further education, employment, and independent living;

(b) To ensure that the rights of children with disabilities and their parents are protected;

(c) To assist the local educational agencies, including state operated programs and charter schools, to provide for the education of children with disabilities; and

(d) To assess and ensure the effectiveness of efforts to educate children with disabilities.

(Authority: 20 U.S.C. 1400(d); 34 CFR 300.1)

Note that students from three years old through age 21 are included. The entire policy may be accessed on the NC DPI website at http://www.ncpublicschools.org/ec/.

NC 1508-3 Class Size Chart

SPECIAL EDUCATION CLASS SIZE REQUIREMENT per Teacher
Number of Special Education Students and Teacher Assistants

Special Education Service Delivery	Elementary	Middle School	High School

	Standard Course of Study	Study Course Of Study Extended Content Standards	Standard Course Of Study	Standard Course Of Study Extended Content	Standard Courses of Study [5]	Standard Course Of Study Occupational	Course of Study Extended Content Standards
Special Education General Skills [1]	12 Students	10 Students	14 Students	12 Students	14 Students	14 Students 1 Teacher Assistant (Job Coach) [6]	12 Students
Special Education Targeted Skills [2]	10 Students Or 12 Students 1 Teacher Assistant	8 Students Or 10 Students 1 Teacher Assistant	12 Students Or 14 Students 1 Teacher Assistant	8 Students Or 10 Students 1 Teacher Assistant	12 Students Or 14 Students 1 Teacher Assistant	14 Students 1 Teacher Assistant (Job Coach)	10 Students
Special Education Sustained Support [3]	12 Students 1 Teacher Assistant	10 Students 1 Teacher Assistant	12 Students 1 Teacher Assistant	10 Students 1 Teacher Assistant	14 Students 1 Teacher Assistant (Job Coach)	14 Students 1 Teacher Assistant (Job Coach)	12 Students 1 Teacher Assistant
Special Education Intensive Needs [4]	8 Students 1 Teacher Assistant	6 Students 1 Teacher Assistant Or 8 Students 2 Teacher Assistants	8 Students 1 Teacher Assistant	6 Students 1 Teacher Assistant Or 8 Students 2 Teacher Assistants	8 Students 1 Teacher Assistant Or 10 Students 2 Teacher Assistants (Job Coaches)	8 Students 1 Teacher Assistant Or 10 Students 2 Teacher Assistants (Job Coaches)	6 Students 1 Teacher Assistant Or 8 Students 2 Teacher Assistants

NC 1508-3A Level of Service/Supports

Level of Services/Supports

[1] **Special Education General Skills** – Services/supports provided to individuals who require specially designed academic, communication, and/or behavior support outside the general classroom for 20% or less of the day. The services could include, but are not limited to learning strategies instruction, organizational skills training, and curriculum assistance.[2] **Special Education Targeted Skills -**Services/supports provided to students who require specific instruction in targeted skills areas (to include but not limited to: reading, math, written expression, social skills) outside the general education classroom from 21% - 60% of the day. Special targeted skills groups can range from 1-14 students with consideration given to any specific guidelines governing group size composition for any methodologies adopted by the LEA.[3] **Special Education Sustained Support –** Services/supports outside the general education classroom for greater than 60% of the day, to students who require extensive explicit instruction to acquire maintain and generalize multiple skills. Students may have documented health, communication, sensory, and/or behavior problems. Periodic immediate support and supervision are required throughout the day.[4] **Special Education Intensive Needs –** Services/supports outside the general education classroom to students who require extensive and explicit instruction to acquire, maintain, and generalize multiple skills. Students receive extensive, direct special education services for greater than 60% of the school day and require constant immediate supervision. The students may have persistent documented health, communication, and/or behavior problems. The students require an instructional pace requiring individual and small group instruction and have substantial behavioral or physical needs.[5] **Future-Ready Core Course of Study –** The Standard Course of Study (College/University, College Tech Prep, Career Prep) will become the Future-Ready Core Course of Study, effective with the 9th grade class of 2009-2010.[6] **Occupational Course of Study –** Number of assistants (job coaches) will vary depending on the actual work-based requirements of the Occupational Course of Study.

NC 1508-4 Total Caseload

Total Caseload

Elementary Special Education General/Targeted Skills – Not to Exceed 35 Students
Middle and High School General/Targeted Skills –Not to Exceed 50 Students
Related Service Providers – Not to Exceed 50 Students

BACKGROUND and CONTEXT

United States Code, Title 20, Section 1400 includes the following findings:

> Disability is a natural part of the human experience and in no way diminishes the right of individuals to participate in or contribute to society. Improving educational results for children with disabilities is an essential element of our national policy of ensuring equality of opportunity, full participation, independent living, and economic self-sufficiency for individuals with disabilities.

The Individuals with Disabilities Education Act (IDEA) is a federal law enacted in 1990 and reauthorized in 1997 and 2004. It is designed to ensure that every child receives a *free appropriate public education* (FAPE) regardless of ability, and in the *least restrictive environment* (LRE) possible. To the maximum extent possible, the "least restrictive environment" is the general classroom. That is, if appropriate for the child to receive a satisfactory education and to address the child's needs, each child should be educated in the school and classroom he or she would otherwise attend. The term *inclusion* is used to describe this ideology: it involves including the child in the regular classroom and bringing support services to him/her, rather than moving the child to the services.

IDEA does not require total inclusion; facilities other than the general classroom are often provided for Exceptional Children (EC). Specialized facilities may range from a suite of rooms for children with profound intellectual and physical disabilities to a small resource room to augment services for only a few. Again depending on the individual needs, a child may be taught in the general classroom the entire day, or part of the day, or none of the time – if conditions are such that the child requires full time attendance in a specialized environment (see Table 1, which compiles data obtained from the website http://www.nccecas.org/downloads/downloads/APR%202009Final%20Submission.pdf and from personnel of the Exceptional Children Division.)

	2008-09	2007-08	2006-07
General Skills [GS] (removed from classroom less than 21% of the day)	64.1%	64.0%	63.2%
Targeted Skills [TS] (removed from classroom 21% – 60% of the day)	18.0%	17.9%	18.3%
Sustained Support [SS] and Intensive Needs [IN] (removed from classroom more than 60% of the day)	15.6%	15.8%	16.2%
In public or private separate school, homebound or hospital	2.2%	2.3%	2.3%

Table 1. Exceptional Children – Inclusion Rate in N.C.

Other laws (e.g., the Americans With Disabilities Act, ADA) also impact the physical facility of the school, and most other public buildings, as well. However, the ADA targets the needs of members of the general public who have disabilities, in ways that ensure mobility, safe use of a building, etc. This Facilities Planner aims at describing how an educational facility may be configured so that it enhances the likelihood of maximizing the learning opportunity of exceptional children.

Note: In North Carolina, "gifted" children have been included within the Exceptional Children Division. For the purposes of this document, EC will be interpreted to mean children with disabilities or needing special educational assistance, excluding the gifted. (However, some children who are gifted academically or intellectually may also have one or more disabilities, and should be considered accordingly.)

PROGRAMMING

During the preliminary design phase, when spaces to be allocated to the various functions are quantified and the relationships between functions are determined, a most important concept—as far as Special Education is concerned—is *flexibility*. This is because the types of students' exceptionalities may vary greatly as children move through the education system, and because the needs of specific children may change from day to day and even from hour to hour. It is no longer considered appropriate to design a room for a specific condition, such as "intellectual disability," except in very rare cases. Rather, as mentioned elsewhere, current practice will envision rooms or collections of spaces that are adaptable to the needs of children with a variety of disabilities, at differing levels of severity.

Flexibility implies the ability to be used for differing purposes or activities, either sequentially or simultaneously. Avoid planning only large rectangular rooms of uniform ceiling height (like a typical classroom), and instead design spaces that allow for group-size alcoves, defined areas, or adjacent spaces, differentiated by change in floor materials, colors, and/or ceiling height and materials. Depending on students' individual needs and the impact of exceptionalities, students' activities during the day will include typical classroom seating, or small group work, or individual study. Moveable partitions, cabinetry, and other furnishings will prove useful.

Another critical concept is that of *inclusion*, of which two aspects may be discussed. First, it is required that, to the maximum extent possible, a child with disabilities must be taught within the typical classroom to which he/she would otherwise be assigned, or in the least restrictive environment consistent with the student's needs and abilities. This policy suggests that all classrooms and other spaces should be made conducive to beneficial utilization by all people (see "Universal Design"), and in fact accommodations within typical classrooms for students with disabilities often benefit all other persons—students, teachers, and other adults—regardless of the presence of a disability.

A second aspect of inclusion deals with the location of special education facilities within the school complex. It is not appropriate to relegate those facilities to a remote and out-of-sight area of the building or campus. For their maximum educational attainment, exceptional children need ready access to auxiliary spaces of the building, such as media center, cafeteria, physical education, and similar functions. Also, and perhaps more importantly, all children need to feel that they belong to (and are not excluded from) the school.

PRELIMINARY ESTIMATES

This exercise is intended to be used for very preliminary planning purposes, and should not supplant the need to utilize actual data from the LEA, when such information becomes available.

Problem: How many EC classrooms should be planned for a new school?

Example: A new Middle School of 800 student capacity.

Solution: (The following is based on data from 2006-07 [see Table 1, page 5, and website noted]; designers should utilize later data when available)

- In 2006-07, statewide, more than 13% of students were identified as having disabilities, and thus have IEPs and are eligible for Federal Funds (Title IV-B).

  800 X 0.13 = 104 (estimated total EC)

- In 2006-07, statewide, 81.5% of students were identified as requiring education in a General Skills or Targeted Skills environment, and 16.2% were identified as requiring Sustained Support or Intensive Needs accommodations. (The remaining 2.3% were in public or private separate school, homebound, or hospital.)

  104 X 0.815 = 85 (GS and TS students)

  104 X 0.162 = 17 (SS and IN students)

- From the Class Size Chart (NC 1508-3) for Middle School, class size for General Skills and Targeted Skills will vary from 8 to 14 students. Assuming a 25% utilization* factor…

  (85 X 0.25) / 8 = 2.6 classrooms
  (85 X 0.25) / 14 = 1.5 classrooms
  so, from 2 to 3 classrooms needed for GS and TS students

- From the Class size Chart (NC 1508-3) for Middle School, class size for Sustained Support and Intensive Needs will vary from 6 to 12 students. Assuming a 100% utilization factor…

  (17 X 1.00) / 6 = 2.8 classrooms
  (17 X 1.00) / 12 = 1.4 classrooms
  so, from 2 to 3 classrooms needed for SS and IN students

**indicates students are mainstreamed on average 75% of the day and in EC classroom 25%. Adjust this factor as required.*

Again, it must be emphasized that these are preliminary calculations based on state-wide averages, and may not be entirely applicable to any specific school district.

UNIVERSAL DESIGN

The concept of Universal Design in general, and of this publication in particular, is *to support all children in all places, not just specific children in specific places*. Advocates of universal design would argue that designing a user-friendly school for people with disabilities and designing for people without disabilities should be one and the same; no visible difference would be apparent.

Prior to the Americans with Disabilities Act (the ADA) this was not the case. Since its implementation, it is required and common practice to follow design criteria which provide uniform accessibility to and use of almost all areas of the building. Hence, such criteria as mounting heights for plumbing fixtures, door widths, grab bar locations, etc. will not be addressed here. School design must incorporate the requirements of the ADA and other applicable state codes and local ordinances. But school designers must "go beyond providing barrier-free buildings by embracing a broader concept of accessibility—that of providing students with disabilities the maximum possible access to general education" (Abend, 2001, p. 1).

However, we caution designers not to follow the letter of the law at the expense of its spirit. For example, there are classrooms with audible fire alarms mounted on the rear wall. A person with hearing loss who is normally facing the front wall, may not be aware when the device is in alarm. It is better to install audible/visual alarm devices on the focus wall of the room, so that an emergency warning will be more obvious to all.

The unique requirements of students with disabilities may entail additional considerations over and above that mandated by the ADA. For example, additional electrical outlets may be needed in certain locations to accommodate supplemental lighting for students with visual impairments, or to accommodate other assistive technology (laptop computers, monitors, etc.) used by students with special needs. "Just" following the requirements of the ADA may not be totally sufficient, but it will be a necessary and tremendous first step. Note: when wall- or ceiling-mounted TVs are provided in a classroom, also provide a low cable or data outlet and power so that a TV cart can be brought in if necessary: some students need to sit within inches of the TV screen in order to see.

Functionally, meeting the needs of exceptional children can benefit everyone, as, for example, improving acoustics increases overall engagement and academic achievement for all students, or improved filtration and humidity control in heating and cooling systems—intended to aid children with certain respiratory ailments—also reduces seasonal allergies for many building users. Also consider that increased building security, for students who may be prone to leave the building unsupervised, also serves to control outsiders' intrusion into the building. (Lowenkron & Ponessa, et al, 2005).

Universal design also supports the use of school facilities for community functions throughout the school week and on weekends. As these programs attract a wider range of

people, from pre-school children to senior citizens, the tenets of universal design ensure a more accommodating building. (See the School Planning publication titled *Community Schools in North Carolina*.)

The following guidelines (from R. V. Olsen, in Lowenkron & Ponessa, 2005) address concepts of universal design in general and accommodation of exceptional children in particular:

Sensory Considerations

- Install soundproofing in the appropriate areas and provide good acoustics throughout the school (see the Acoustics section in this document). Children with auditory processing problems benefit from sound that is balanced.

- Locate classrooms and labs away from noisy areas such as gymnasiums, outdoor play areas, cafeteria, music rooms, vocational trades, entrances to the school, etc. to decrease background noise.

- Install sound enhancement systems (FM broadcast, etc.) in classrooms, labs, and resource rooms. Prewire new construction for these technologies.

- Provide 'white boards' in lieu of chalk boards and use 'smart' or 'activity' boards to magnify a lesson.

- Provide space for a sign language interpreter at the traditional front of the classroom, near the board. Good lighting and unobstructed views are necessary for children who read lips.

- Eliminate or minimize glare in all spaces with good lighting, matte finishes, and sunlight filtration at windows and at doors having vision lites.

- Handrails and guides on the wall will assist with tracking. Locate water coolers in alcoves and otherwise accommodate objects that would have protruded into circulation paths.

- Color-code the different wings and areas of the building to assist wayfinding, and/or color code floor patterns.

- Alarm systems should be visual and auditory, and located so the signal can be heard by students with vision loss and seen by students with hearing loss.

- Signage and room numbers should be provided in Braille.

- Do not install fixed furnishings immediately inside a classroom or lab entry. It is sometimes necessary for exceptional children to pause upon entering the room to 'get their bearings' and to be advised by the teacher or peers of any obstacles close by.

Physical / Orthopedic Considerations

- The entire school should be accessible so all students can be included in all activities. To that end, every entry should be accessible and every 'gang' toilet should have accessible fixtures, so that exceptional children will not be relegated to the 'handicapped' facility.

- Long travel distances are problematic for children using arm canes, manual wheelchairs, or prosthetic legs. Careful design and care in locating various functions can minimize distances traveled by persons with mobility impairments.

- Design wide halls and doorways throughout the building. Locate elevators to minimize travel time between first floor and second floor classrooms.

- Doors must not protrude into the circulation path (as in out-swinging classroom doors). Locate adjacent classroom doors so that they open flat against a wall or in a recess, and not potentially strike other doors. Poor location of doors can contribute to congestion in the hallways when large numbers of students simultaneously move through adjacent doors. Install vision panels as appropriate.

- The gymnasium, cafeteria, and auditorium and stage should be accessible to allow students with disabilities to participate in all activities, and to sit and work with their classmates.

Learning and Intellectual Disabilities

Design considerations relating to these exceptional children focus heavily on circumventing their susceptibility to distractions. The educational environment should be structured to assist with task focusing and individualized learning. Some applicable strategies include the following:

- Locate classrooms away from potential distractions—both visual and auditory.

- Good acoustics to decrease distracting background noise—the use of 'white noise,' acoustical wall panels, acoustical ceilings, etc. Reduce noise from HVAC systems; do not use in-the-room unit ventilators.

- Several different lessons or activities can occur simultaneously. Rooms should be large enough that sub-areas can be created, as with screens, dividers, carrels, furniture, etc. Adjacent small rooms or alcoves can provide space for individualized learning, or removal if children are experiencing behavioral or focusing problems.

- Provide lighting controls and window treatments to filter sources of distractions (i.e., glare, direct sunlight, or outdoor activities) and to make the board easier to see. Sub-areas of the classroom should have independent dimming capability.

- Utilize enclosed storage, not open cubicles, so students are not visually distracted by supplies and equipment.

- Sound enhancement systems (FM broadcast, etc.) are also necessary in these locations (i.e., not just for students with hearing loss), so the teacher is distinctly heard, distractions are filtered out, and the student can remain focused on the lesson.

- Proximity to restrooms impact the time spent un-focused on the lesson.

Emotional & Behavioral Disabilities

Students with emotional-behavioral disabilities may need to be educated outside the general classroom environment at times. In some instances, a separate space for the one student is appropriate (see the section titles "Seclusion/Isolation" in this document). Sometimes a larger space is needed which can accommodate several students and one or two teachers. Such a room should be located close to the classrooms, be safe and quiet, and look and feel comfortable and soothing.

Other considerations are as follows…

- Classrooms often need to accommodate several adults—teachers, consultants, related services personnel, paraprofessionals, aides, etc. Adequate space and furniture are needed.

- Additional space is needed for use and storage of technology such as computers, scanners, projectors, etc.

- Electrical and data outlets should be numerous and placed throughout the walls and floors of the classrooms, so that technologies are readily accessible. Students who need to use such devices should not be relegated to the back or sides of the room where the outlets are located.

Beyond the Standard Classroom

Current legislation as well as pedagogical practice support the ideal of educating the exceptional child in the 'least restrictive environment' possible—that is, usually, in the classroom and in the school to which the student would normally be assigned if there were no exceptionality. In some instances, however, that is not totally practical or even desirable, and classrooms designed specifically for students with disabilities are necessary. These are addressed in the next sections of this document.

GENERAL & TARGETED SKILLS

Space Requirements

1. Relationships: To facilitate inclusion of students with General and Targeted Skills Needs within the regular school program, the classroom(s) where these services are delivered should be centrally located within the school, with easy access to support areas such as the media center, cafeteria, computer lab, multipurpose room or gymnasium, toilets, and health room.

2. Area of Rooms: Even for small groups, a full-size classroom should be provided. A separate storage room is generally not required, nor is a separate teacher's office. (Discuss this with local administrators.) Recommended minimum areas are as follows:

- Elementary-- 1,000 s.f.
- Middle-- 950 s.f.
- High-- 850 s.f.

3. Class Size: See "Special Education Class Size Requirements" as published in the *Policies Governing Services for Children with Disabilities* (page 3 of this document).

Furnishings and Equipment

1. Typical furniture:
   - Teacher desk and chair
   - Student desks, age-appropriate
   - Student group tables, age-appropriate, with stacking chairs
   - Upholstered or soft chairs available in reading area
   - Storage units ("cubbies" or plastic storage bins on shelves) for student materials
   - Low, moveable bookcases
   - File cabinet (lockable) (4 drawers)
   - Individual work carrels
   - Locked storage for instructional materials and equipment

2. Typical furnishings
   - Moveable, free-standing acoustic panels to serve as separators
   - Dry marker board and tack surfaces – 100 to 200 square feet
   - Countertop (10 linear feet) and sink with hot and cold water supply (handicapped accessible) (lever-type handles)
   - Adjustable shelving (100 linear feet)

3. Typical equipment
   - Networked computers (4-6) (networked to LAN and WAN, and to the internet)
   - Printers (one per three computers)

- Telephone and two-way intercom to administrative and security offices
- Wall-mounted TV monitor, or projector, with built-in DVD player
- Ceiling-mounted AV screen
- Clock
- Interactive whiteboard (coordinate with local administration)

Special Notes

1. Storage units, moveable partitions, and bookcases should be portable to facilitate the creation and reconfiguration of learning centers and specific activity areas. [Note: any "portable" furniture should be durable and stable to prevent being toppled or overturned.]

2. Electrical receptacles should be located at six feet spacing along perimeter walls, and may be required at strategic locations in the floor, to accommodate assistive technology.

3. Acoustic isolation from adjacent areas is necessary.

4. Classroom windows should not face areas that pose potential distractions (activities).

5. Use differing floor treatments to define specific areas of the room, with flush transitions between the materials.

6. Wall surfaces should be sturdy and easily cleaned. Rough texture surfaces or those vulnerable to easy penetration (such as standard gypsum board) should be avoided.

7. Avoid sharp corners on walls, furniture, and cabinetwork.

8. Low suspended acoustical tile ceilings should be avoided.

9. Provide flexible lighting systems for separate illumination of different areas, and at different intensities. Use electronic ballasts on fluorescent fixtures.

SEE PAGE 19 FOR AN EXAMPLE OF AN ELEMENTARY CLASSROOM FOR STUDENTS REQUIRING "GENERAL SKILLS" AND "TARGETED SKILLS" SERVICES.

SUSTAINED SUPPORT & INTENSIVE NEEDS

Space Requirements

1. Relationships: Inclusion in the general education program should be encouraged by the design and location of learning areas; the special education classroom(s) should be centrally located within the school, with easy access to support areas such as the media center, cafeteria, computer lab, multipurpose room or gymnasium, toilets, and health room. However, not all special education classrooms should be located in just one area of the building. Ground-level exits should be provided to ensure universal access and safe evacuation in an emergency. Outdoor locked storage should be available for special needs equipment, such as prone standers, walkers, and therapy equipment.

2. Area of Rooms: Numerous accommodations (e.g., wheelchairs, communication devices) may be required by students. Ample space must be provided to allow ease of access around the classroom and throughout the school. Adherence to ADA requirements is mandatory. Recommended minimum areas are as follows:

- Grades K - 5 1,200–1,600 s.f. + 125 to 200 s.f. for auxiliary use and storage
- Grades 6 - 12 1,400–1,800 s.f. + 125 to 200 s.f. for auxiliary use and storage

  Note: Resource Rooms = 400 s.f. and 'special purpose' rooms (for 1-4 students) = 200 s.f.

3. Class Size: See "Special Education Class Size Requirements" in the *Policies Governing Services for Children with Disabilities*, reproduced as page 3 of this booklet.

4. Typical Activities: Large and small group instruction; individual work; computer use; learning centers activity; safe space to be out of wheelchair/unencumbered.

Furnishings and Equipment

1. Typical furniture: Furniture should accommodate students of varying sizes (through age 21) and disabling conditions. Attention should be paid to the trade-off between flexibility/adjustability and durability.

- Teacher desk and chair
- Student desks, age-appropriate
- Student group tables, age-appropriate, with stacking chairs
- Upholstered or soft chairs in quiet area
- Low, moveable bookcases
- Storage for larger items, such as mats, standers, and other equipment
- Storage should be designed to enhance maximum independence for student access, making choices and obtaining instructional materials
- File cabinet (lockable) for personal information, IEPs, documentation, etc.
- Locked storage for medications and first aid supplies. Cold storage should be available for medications (a lock box in the refrigerator)

- Locked storage for cleaning supplies
- Raised platform with mat and railing for safety of students when they are out of equipment (e.g., wheelchair or walker).

2. Typical furnishings
   - Moveable, free-standing acoustic panels to serve as separators; flexibility of space is necessary to ensure accommodation of varying instructional needs
   - Dry marker board placed 2 feet above floor level to accommodate students in wheelchairs.
   - Three bulletin boards placed 2 feet above floor level to accommodate students in wheelchairs.

3. Typical equipment
   - Networked computers (4-6) (networked to LAN and WAN, and to the internet)
   - Color printer (one per three computers)
   - Telephone and two-way intercom to administrative and security offices
   - Wall-mounted TV monitor with built-in DVD player (or rolling cart)
   - Clock (digital)
   - Access to washer and dryer

Special Notes

1. Elementary classes need modular wall storage units, with hooks at varying heights for hanging garments and backpacks. This should be provided near the primary entrance to the room. Shelves should be provided for storing changes of clothing, lunch boxes, and students' personal belongings.

2. Secondary students, if assigned hallway lockers, should have easy access (from wheelchair or walker), close to the classroom.

3. Room design should allow for ease of movement by students with walkers or wheelchairs, and for safe transitions to and from wheelchairs to encourage independence.

4. Electrical receptacles should be located at six feet spacing along perimeter walls, with at least two outlets located in the floor, to accommodate assistive technology

5. Acoustic isolation from adjacent areas is necessary. Specific areas of the classroom should be as acoustically isolated as possible (moveable, free-standing acoustic panels, etc) to keep auditory interference to a minimum.

6. Classroom windows should not face areas that pose potential distractions (activities).

7. Use differing floor treatments to define specific areas of the room, with flush transitions between the materials.

8. Carpet should not be the primary floor covering due to the frequency of spills and accidents. If carpeting is used, it should not be constructed with continuous filament; it should be short, tight-loop, and glued down.

9. Wall surfaces should be sturdy and easily cleaned. Rough texture surfaces or those vulnerable to easy penetration (such as standard gypsum board) should be avoided

10. Avoid sharp corners on walls, furniture, and cabinetwork. Protrusions within circulation patterns must be avoided.

11. Provide flexible lighting systems for separate illumination of different areas, and at different intensities. Use electronic ballasts on fluorescent fixtures

12. Ramps should have slip-resistant surfaces. Handrails on both sides are strongly recommended. Handrails should also be provided on both sides of stairs.

13. Classrooms that provide versatility and a variety of choices are indispensable for meeting the educational requirements of exceptional students. Abend (2001) has noted

> students with attention deficit disorders and emotional disabilities often require greater physical and acoustical separation between activities to reduce distractions, making single-space classrooms inadequate for their needs. A more appropriate arrangement consists of a large common classroom area, an alcove off the classroom, and a small room adjacent to the classroom that is acoustically isolated but visible from the common classroom area. Varied ceiling heights can further define separations and help control sound from one space to another. An alcove adjacent to a classroom, for example, could have a different ceiling height than the main space (p. 2).

Ancillary Considerations

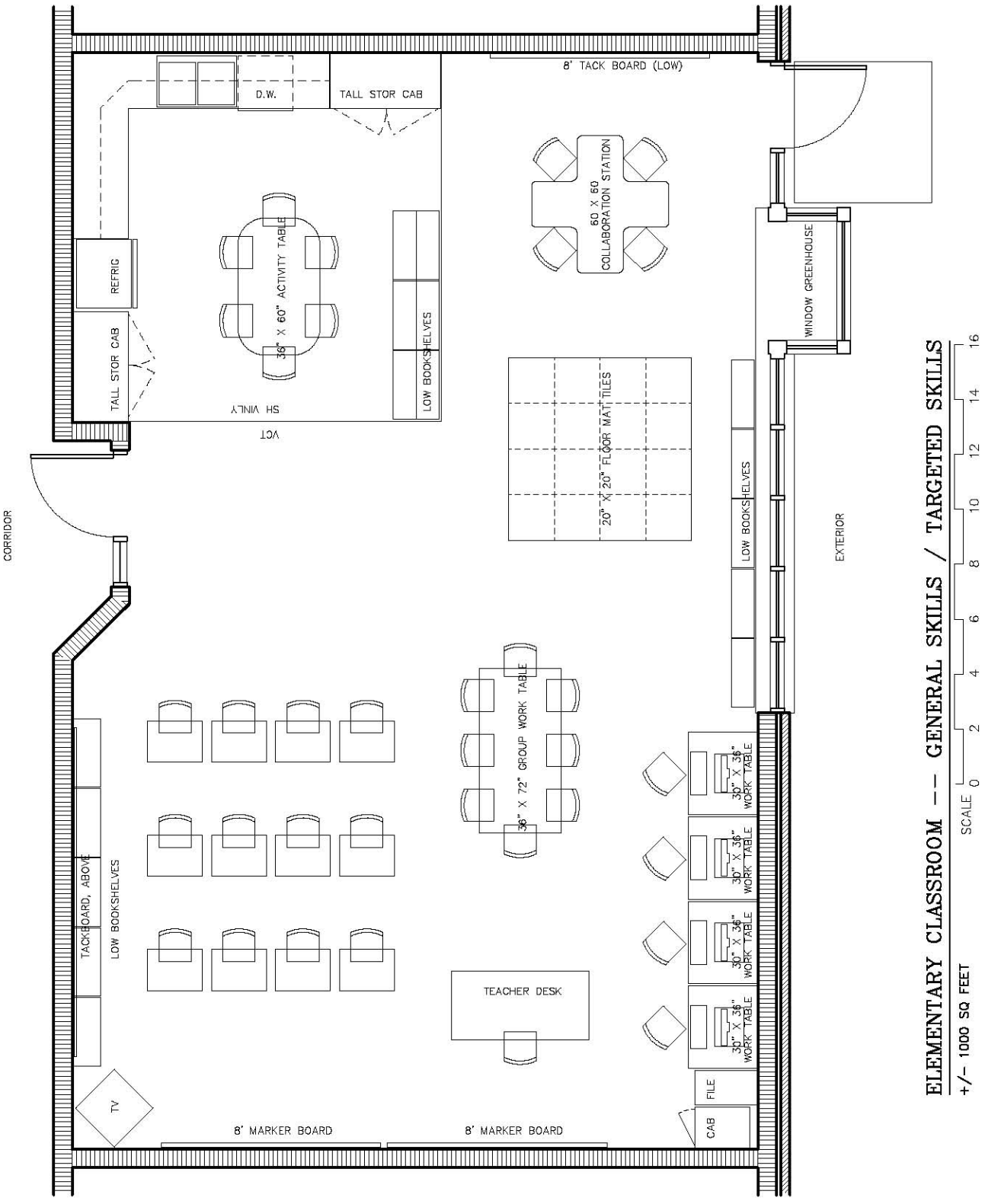
1. Toilet Rooms:
   - Should be in close proximity to or within the classroom
   - Stalls must accommodate a student, their wheelchair or walker, and an adult simultaneously – minimum 5’-0” X 8’-0”
   - Doors must swing out. Stall doors should have magnetic catches
   - Sinks should have hot and cold water. Faucets should have lever handles
   - Provide a changing area that affords privacy, with an adequate container with lid for soiled diapers. A catheterization table is sometimes necessary. At a minimum, the area should be 5’-0” X 7’-0” to accommodate a student, their equipment, a lift system, and an adult
   - Privacy screens should be available to use with commode seats
   - Shower (if needed) should be ‘roll-in’ type.
   - Toilet seats should accommodate students of different sizes, or allow for adaptation

2. Doors and Hallways:
    - Doors should open "out" to facilitate access
    - Lever handles should be used, which can be operated by a single non-precise movement not requiring gripping or twisting.
    - Doors should have a continuous, smooth kick plate on the push side, at least ten inches high.
    - Smooth, hard, slip-resistant floor surfaces at a single level are best. Changes in floor level, if any, should be ramped.
    - Doors should have vision panels to enable students with hearing impairments to avoid collisions.
    - Signage (e.g., room numbers, restroom, exit) should be designed and located to be easily seen, and also provided in Braille.
    - Tactile indicators should be installed on floors and/or walls at stairs, and other areas of congestion or potential danger, to alert students with visual impairments.

3. Family Skills / Kitchen:
    - It is generally considered "better" if this is not a part of the classroom, but is nearby and easily accessed.
    - The area should contain a range with oven, microwave, refrigerator-freezer with icemaker, dishwasher, handicapped-accessible sink with hot and cold water supply, and kitchen-type cabinetry and countertop. (Securely attach the range/oven to wall, to avoid overturning if students stand on open door.)
    - Access to a clothes washer and dryer should be provided, but it does not have to be in the same room.
    - Install an emergency "kill switch" that will de-energize all electrical appliances, including convenience outlets over countertop (but not including refrigerator).

4. Outdoor areas:
    - Wheelchair-height water fountain
    - Perimeter fencing
    - Resilient matting around playground equipment which facilitates ease of manipulation of wheelchairs and ensures safety. No obstacles, such as railroad ties or "build-ups," should be used
    - Covered or shaded areas
    - Adaptive playground equipment to provide play options for all students
    - Ramps or grades to accommodate wheelchairs and walkers
    - Textured markers or path surfaces to alert the students with visual impairments to different areas or terrain

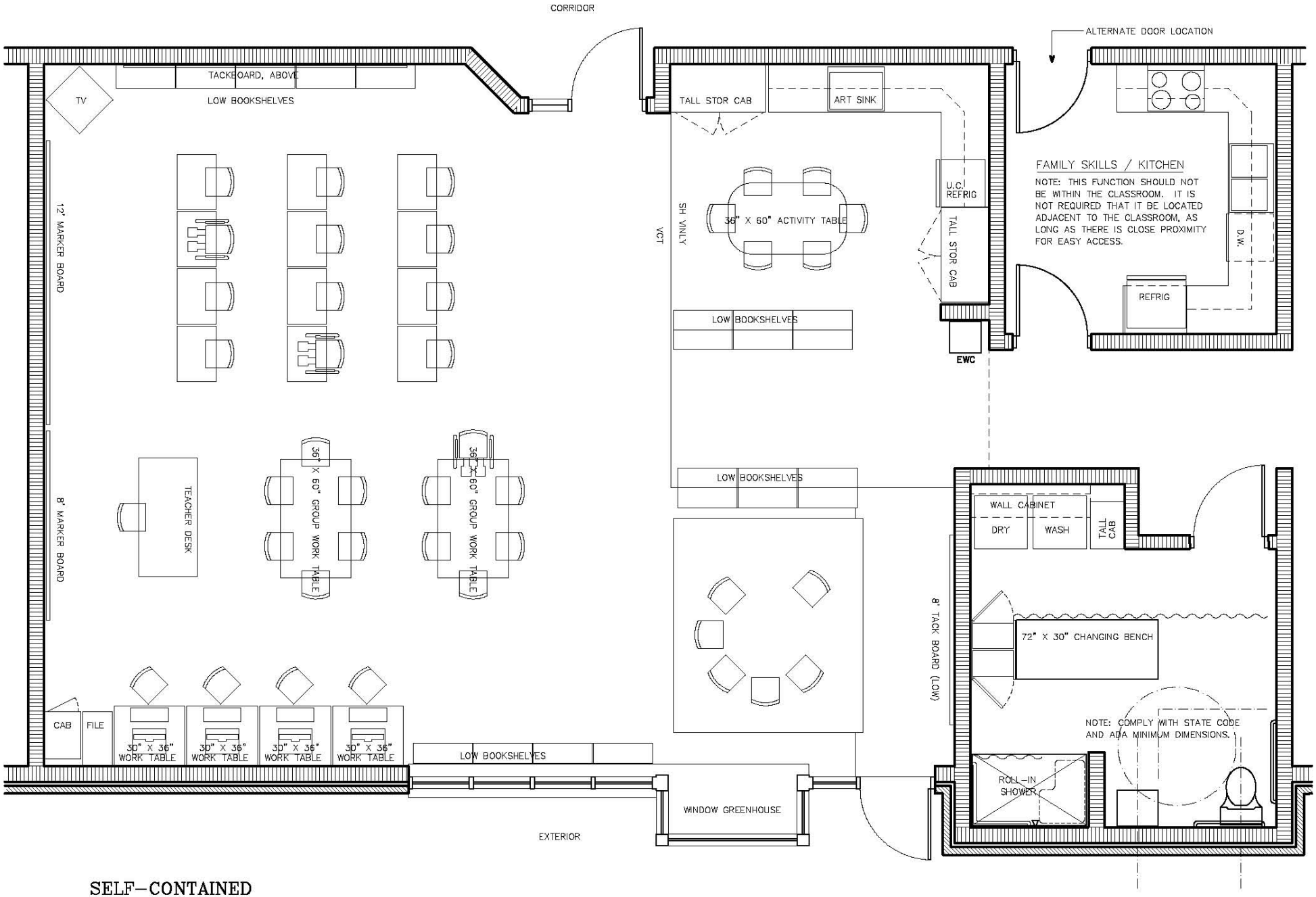
SEE PAGE 20 FOR AN EXAMPLE OF AN SECONDARY CLASSROOM FOR STUDENTS REQUIRING "SUSTAINED SUPPORT" AND "INTENSIVE NEEDS" SERVICES.



ELEMENTARY CLASSROOM -- GENERAL SKILLS / TARGETED SKILLS

+/- 1000 SQ FEET

SCALE 0 2 4 6 8 10 12 14 16



SELF-CONTAINED
SECONDARY CLASSROOM -- SUSTAINED SUPPORT / INTENSIVE NEEDS

+/- 1600 SQ FEET

SCALE 0 2 4 6 8 10 12 14 16

The MEDIA CENTER

The primary means of accommodation for exceptional children is, of course, compliance with the Americans with Disabilities Act (ADA) and similar law, and incorporation of the tenets of Universal Design which is addressed in another section of this document. However, some students with disabilities have needs that require considerations not explicit in the ADA. Also, in many districts, the school media center may be opened at times for community utilization, with the possibility of use by the elderly and infirm. After-hours utilization will require a separate exterior door with convenient access from visitor parking, provision to secure (lock-off) the remainder of the school from the media center, and access to restrooms. The following guidelines (from Irvall & Nielsen, 2005) should be discussed with school administration and media center staff early in the design process, and incorporated as appropriate.

- All shelves should be reachable from a wheelchair, if economically feasible. Lower shelves, of course, mean more floor space is required to house a given number of volumes, so trade-offs should be discussed during the programming.

- Digital interactive boards for instruction should be adjustable in height.

- Provide automatic (powered) door openers.

- Consider providing a unisex, wheelchair-accessible toilet in close proximity.

- Provide an induction loop sound enhancement system for persons with hearing loss at the circulation desk and at the reference/information desk. Wireless voice amplification in other areas of the media center for instructional purposes should be added (this is part of recommendations for 21st Century Classrooms).

- Lighting levels should be adjustable within several areas of the media center.

- Signage: clear and easy-to-read, with Braille and pictograms (where appropriate).

- Visual/audible fire alarms located appropriately for full function.

Considerations regarding furniture and furnishings…

- Chairs (at least some chairs) should have sturdy armrests.

- Reading and computer tables of varying heights (considering the age of the students and adapted for persons in wheelchairs) should be available throughout the library. Some people with disabilities are especially prone to repetitive strain injuries (RSI) which are exacerbated when a computer keyboard is placed on a regular desk or

library table. Some computer desks with adjustable keyboard and monitor shelves should be available for use by the disabled.

- Chairs for persons with mobility impairments and the elderly should be located near the queuing line at the reference/information desk, and at the circulation desk.

- Self-checkout stations should be accessible for the disabled (appropriate height, with a barcode reader on a stand for ease of use).

- Provide auxiliary lights (table lamps and/or floor lamps) available for students with visual impairment.

- A section for talking books and other materials for persons with visual or reading disabilities should be centrally located. Other materials, some requiring specialized storage, include large-print books, easy-to-read books, Braille books, video/DVDs with subtitles and/or sign language, eBooks, and tactile picture books.

- Provide storage for equipment used by exceptional children, for example: tape recorder, CD player, digital audio information system (DAISY), magnifying glass, illuminated magnifier, electronic reader, etc.

- Provide appropriate location and seating for computers with screen adapters and software designed for persons with reading and cognitive disabilities, available as needed.

Assistive technologies (AT) can be beneficial in meeting the requirements of several exceptionalities, but AT does not guarantee access (Cantor, 1995); the comprehensiveness of the services provided by media center personnel is much more important.

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One suggested source of information about assistive technology and accessibility is on the Oklahoma State University website, at http://access.it.okstate.edu/index.php?option=com_content&view=article&id=18&Itemid=11

DINING, PHYSICAL EDUCATION, AREAS OF ASSEMBLY

As noted elsewhere, the primary means of accommodation is adherence to the Americans with Disabilities Act. Beyond those criteria, however, some relatively minor considerations will make a substantial difference to utilization by exceptional children.

Cafeteria

- Avoid changes in floor elevation. Even if accessible seating is 'provided' in one area, exceptional children who cannot be seated in any part of the room of their choosing will feel outcast. (Or provide ramp access to all areas.)

- Keep all aisles a minimum of 36 inches wide. Sometimes overlooked is the aisle between the serving line and the control railing.

- Keep the tray slides continuous if possible. Picking up and carrying trays can become problematic.

- Display cases should be accessible with one hand (important for persons using canes, crutches, etc.).

Auditorium

- The stage should be accessible from both the 'house' and backstage. It should not be necessary for a person to have to leave the auditorium (i.e., to go into the lobby and down a side hallway) to gain access to the stage.

- Accessible seating locations should be distributed throughout the auditorium.

- Accessible seating locations should be arranged so that at least two designated spaces are side by side, or a designated 'companion' seat is available.

- Provide for audio induction loop or FM receivers.

- The lighting and sound control booth or area should be accessible.

Gymnasium

- Most students with disabilities will be served in general physical education classes. Alternative methods of instruction, where appropriate, are designed according to the individualized education program (IEP) of the student.

- Provide adequate lockable storage for specialized apparatus and equipment.

- Ensure access to the weight room (all equipment) and to equipment storage rooms.

- In auxiliary P.E. teaching stations and therapy rooms, the ceiling structure or designated areas overhead should be reinforced to support the weight of a student and any special equipment. Apparatus is sometimes hung from the structure above, to facilitate student transfers or to support exercise devices.

- Ensure appropriate access in the locker rooms, to include lavatory height, hand dryers and hair dryers height, lever handle faucets, temperature safety controls on faucets, mirror mounting heights, etc.

- A separate, private drying/dressing area should be provided outside each shower stall. Utilization will increase by the majority of students as well as by the disabled.

RESOURCE ROOMS

Depending on the number of students with disabilities in the school, and on the degree of severity of their exceptionality, the EC facility could include (or could be limited to) a resource room serving several purposes. For students whose category of service delivery is "General Skills" or "Targeted Skills," the room may serve as a study or tutoring area. Acoustical isolation from surrounding areas is important, as is the capability to increase or decrease lighting levels.

For the visually impaired (VI) student, school personnel often transcribe teachers' notes or other instructional material into Braille. A resource room may be dedicated to this purpose (See Fig 1.), and to the storage of Braille textbooks for those students. Braille printers are large, take up a significant space, and are noisy. For this reason, acoustical absorption within such a room would also be desirable.

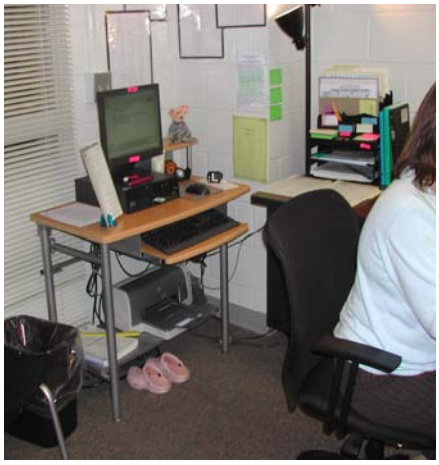

Fig 1. Braille typing station in a resource room

Fig 2. Shelving for Braille textbooks

When a textbook is adopted for use in North Carolina schools, Braille textbooks and large-print textbooks are provided for the use of visually impaired students. A significant quantity of deep (+/- 15") shelving is required for this storage. It might require three to eight linear feet of shelving to hold the Braille equivalent of a single textbook. (See Fig 2.) When not in use by the student, the Braille textbooks are usually stored in the resource area—not in the regular classroom, because if there is another class in session in the classroom, the VI student could not retrieve the needed book. Books-on-tape or other alternative instructional media (CDs, DVDs, iPod, etc.) could also be provided; consult the client for specific requirements. Special textbooks are also sometimes provided for students having autism disorder.

Resource rooms for non-specific function should look like, and be equipped similarly to, the regular classroom of the school (R. V. Olsen, in Lowenkron & Ponessa, 2005). These spaces serve as classrooms for children needing special attention. There should be

capability to divide the room into smaller areas so students can work individually or in small groups.

Specialized Usage: Speech Therapy

In some schools, a separate Resource Room may be needed for speech therapy. Criteria would include good acoustical separation from adjacent spaces, a location away from high noise activities such as gym and band, and suppression of ambient noise such as HVAC fans. Also, provide adequate levels of illumination so that students can observe proper word enunciation. A sink may also be useful.

Specialized Usage: Occupational Therapy

Instruction is client-centered, assessment-based, and individualized to meet the needs of the specific student. Instruction is generally delivered on a one-to-one basis. Room size: 350 square feet, minimum. Focus is on improving the student's functioning within the school setting on daily living activities such as toileting, dressing, feeding/eating, and mobility; on play and leisure activities; and on school/work strategies such as attention span, social/interpersonal skills, organizing materials, handwriting, pre-vocational / transition skills, and use of assistive technology.

Specialized Usage: Physical Therapy

Instruction is individualized, and usually provided on a one-to-one basis. Activities may include functional mobility training, gross and fine motor skill development, muscle strengthening, flexibility and endurance training, promotion of good posture and balance, development of control of movement and coordination, development of independence in daily living skills, and learning the use of assistive technology. The PT resource room should be centrally located and may be shared with other service programs such as occupational therapy. Room size: 300 square feet, minimum.

Equipment might include such items as supportive chairs and specialized desks, positioning equipment (wedges, rolls, floor sitters, etc.), standers, mats, toilet chairs, and wheelchairs. Specialized equipment could include evaluative equipment, mat tables, mirrors, therapy benches, toys or other age-appropriate materials for use in therapy. Large, secure storage areas are needed for specialized equipment.

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Office, meeting, and planning space should be provided for staff, to include provision for computers and printers, telephone, lockable storage cabinets for special equipment and for professional and personal materials.

The demand for physical therapy (PT) and occupational therapy (OT) within the school building has increased significantly. In many cases, it is both logistically and financially appropriate to provide these services in the school setting, rather than sending the student to an off-site provider. Due to the complexity and variation of the equipment needed for

these functions, it is recommended that local staff and administration be consulted for proper planning. A designated (shared) room for PT and OT should be considered in a school large enough to justify those programs.

Older students may view having to use the resource room as a sensitive issue. Consider locating the resource room(s) in a less trafficked area, and reducing the visibility from the hall into the room.

PSYCHOLOGICAL SERVICES

Program Description

The purpose of this program is to facilitate learning and to promote the cognitive, social, and professional development of the student, and to assist parents, teachers, and other professionals in improving the student's performance and educational success. Services are delivered in individual and small-group counseling sessions and in classroom instructional sessions, as determined by the student's IEP. Services also include consultation with parents, teachers, and other professionals, and assistance in the development of specialized, targeted programs and services.

Note: this program should not be confused with the guidance and counseling program.

Space Requirements

Private offices and testing rooms should be in proximity to the administrative area and other support services such as counseling, social work, and health. Locations should ensure privacy and confidentiality of students, parents, teachers, and others. Suggested room sizes are as follows:

Office	150 s.f. min.
Testing Room	200 s.f. min.
Conference Room	200 s.f. min.

Testing room and conference room may be shared with other programs if scheduling can be adjusted to accommodate. Counseling and instructional meetings may include from one to twelve persons.

Spaces should be quiet, free from visual and auditory distractions, and lockable. Vision panels with blinds should be provided for all rooms where one-to-one services are provided. Convenient access to toilets and water fountains should be provided.

Furnishings and Equipment

Office: Typical office furniture with seating for four adult guests.
Locking file cabinets for storage of records and testing materials.

Testing: Adult- and child-size work tables with chairs.
Dry marker and tack boards.

Conf: Adult-size conference table with chairs for at least 12.
Dry marker and tack boards.

RENOVATIONS of EXISTING BUILDINGS

Schools constructed after January 26, 1992 should have met the requirements of the Americans with Disabilities Act (ADA). As discussed in Appendix 2 and elsewhere in this publication, it is not mandatory that schools constructed before January 26, 1992 be brought into compliance with every aspect of the ADA. However, such facilities must "make each program, service, and activity, when viewed in its entirety," accessible by reassigning services to an accessible location; by purchasing, redesigning, or relocating equipment; by assigning personal aides; or by making physical changes to the facility. The ADA guidelines, officially known as the *Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines*, are available at http://www.access-board.gov/gs.htm .

Regardless of the original date of construction of the school building, any renovation must meet certain criteria. The following are taken from the ADA Accessibility Guidelines for Alterations, at http://www.access-board.gov/adaag/html/adaag.htm#4.1.6.

- No alteration shall be undertaken which *decreases* accessibility of a building or facility below the requirements for new construction, in effect at the time of the alteration.
- No alteration shall impose a requirement for *greater accessibility* than that which would be required for new construction.
- If existing elements, spaces, or common areas are altered, then each such altered element, space, feature, or area shall comply with the applicable provisions of accessibility as in new construction.
- An alteration that affects the usability of or access to an area containing a *Primary Function* shall be made so as to ensure that, to the maximum extent feasible, the path of travel to the altered area and to the ancillary services (rest rooms, etc.) serving the altered area, are readily accessible to and usable by individuals with disabilities, unless such alterations are disproportionate to the overall alterations in terms of cost and scope.

Note: There is the concept of *Technical Infeasibility*, which means that a particular alteration has little likelihood of being accomplished because of existing structural conditions, or other existing physical or site constraints. In some circumstances, technical infeasibility can override certain ADA criteria during a renovation project. Due to the complexity of this issue, each situation must be addressed individually with the architect, engineer, and code official.

Additions to an existing building shall comply with the provisions for new construction.

OVERVIEW of DESIGN for EXCEPTIONAL CHILDREN

Exceptional children may utilize any and all areas of the school facility. They are not to be regarded as limited to one area or one classroom or one wing of the building; this is the concept of inclusion, within the 'least restrictive environment.' This also supports the model of universal design. Not surprisingly, design concepts that aid exceptional children also benefit other students, faculty and staff. The following are examples for application throughout the school building:

- Good acoustics are important, not only for the student with a hearing disability, but also for the youngster with an ear infection, the student for whom English is a second language, and the teacher with a head cold. Practice proactive design by
    - acoustical separation between classrooms – extend walls to the structural deck above, if practical
    - control noise from HVAC systems and other equipment; suppress noise transmitted through ductwork and vibrations from fans. Use electronic ballasts to avoid ballast "hum."
    - provide sound-absorbing materials and control reverberation time as needed and where appropriate.

- Lighting control is important. Most education areas should have the capability of at least two levels of illumination. Co-ordinate with the school faculty to identify areas needing additional variability.

- Locate electrical receptacles at 6' on center along perimeter walls, and in floor boxes in open floor areas, to support assistive technology.

- Control adjacencies among various building functions. Classroom windows should not face areas that pose potential distractions. High-noise generating functions (music, gym) should not be adjacent to areas requiring quiet (such as classrooms or media center).

- Use color, pattern, and texture for functional purpose, not just design value—such as wayfinding in corridors. Floor treatments may be used to define specific areas of the classroom, with flush transitions between different materials. Tactile indicators should be placed on floors or walls at stairs and corridor intersections to alert visually impaired students.

- Control the 'little details' of the environment, because everything matters.
    - Wall surfaces should be sturdy and easily cleaned. Rough texture surfaces (such as unfinished concrete masonry units) or those vulnerable to easy penetration (such as standard gypsum board) should be avoided.
    - Avoid sharp corners on walls, furniture, and cabinetwork.
    - Choose floor materials, keeping in mind the use of wheelchairs and walkers, and the possibility of spills and accidents.

The SCHOOL CAMPUS and BEYOND

It is no longer sufficient for the designer to be concerned with the accessibility of 'just' the school building, by including interior ramps and doorways of width adequate to allow passage of a wheelchair. The designer, and the LEA, must be concerned with buildings, grounds, play areas, parking, and even access to the campus—not only for those with mobility impairment but for those with other disabilities as well.

Site Circulation

See other publications (e.g., *Facilities Guidelines* and *School Site Facility Planner*) of the School Planning Section, (available on the website www.schoolclearinghouse.org) for detailed criteria pertaining to site design. In summary, designers must be acutely aware of the crossing of vehicular circulation paths with pedestrian circulation paths, and with the travel distances of pedestrian circulation paths. During site design, remember that the campus is utilized not just by healthy students, faculty, and staff, but also by persons with impairments of mobility, vision, hearing, or cognition. Simplicity of pedestrian travel paths, and juxtaposition of functions having common usage, will always be appreciated.

Outdoor Play Areas

Typically, separate play areas for exceptional children are no longer desired, but this should be verified with the faculty and administration of the individual school. The playgrounds in elementary schools are to be made useable by students with disabilities by the installation of appropriate surfacing material and play equipment. Federal guidelines (available at http://www.access-board.gov) address the components that are to be accessible, acceptable play surfaces, the height and clearance of equipment, etc. This criteria has not yet been adopted by the U.S. Department of Justice, but should be used as a guide in the interim. Travel distance to play areas should be considered in the locating of classrooms for exceptional children.

Play areas and sports facilities for older students should also be accessible to exceptional children, to allow their participation as abilities permit, and/or as spectators.

Natural Environment / Teaching Areas

Design of some schools includes conserving and developing the surrounding environment in a natural state for educational and ecological purposes. These areas are intended to be studied as part of the school curriculum. For example, wetlands are being created or conserved for storm water management, and meadows, in lieu of turf, provide a rich study area as well as reduce maintenance costs. It is important to design pathways to and thru these natural features so that students with disabilities may use them. Path surfaces should be stable, firm, and slip-resistant, while harmonizing with the natural surroundings.

Planting beds are constructed at some schools in support of learning objectives or programs, or for personal satisfaction. Some beds should be raised so that students in wheelchairs can have access. This meets the intent of the ADA without limiting use by persons without disabilities.

Building Security

Most methods of building security are intended to keep unauthorized individuals out of the school, but keeping students with disabilities such as autism and emotional disability from leaving the building is also a concern. Such children have a greater propensity for leaving the building unsupervised, and thereby risk harm to themselves. Fortunately, many of the techniques for preventing intrusion also function to preclude unauthorized egress, for example

- the careful placement of entries during the design process so that observation by staff is always likely
- the installation of alarms on exit doors that are not under staff observation
- the installation of key-card or pass code locks on doors that are not required exits.

For additional considerations, see *Design of Schools to Resist Violent Attack*, available on the School Planning website, noted above.

Also of importance is the limiting of access to areas within the building which pose a potential threat of injury to unauthorized individuals. Obviously, mechanical and storage rooms or areas with potentially dangerous equipment or supplies should be locked.

Building Circulation

As noted above, mobility issues, while important, are not the only types of disability to be considered. Persons with limited vision will benefit from the thoughtful integration of color, texture, and pattern into the building, especially for the purpose of wayfinding. Some visual limitations are significantly exacerbated by bright lighting or glare, as for example that caused by an unshaded west-facing window at the end of a corridor. Persons with hearing limitations, as well as everyone else, will benefit from the control of noise and reverberation in corridors and locker areas.

The location of circulation paths for exceptional children throughout the building will require special care. On one hand, it is not desirable to locate all services for EC in one area of the building, and certainly not in one remote or separated area. Travel between the various EC classrooms and support rooms will be frequent. But it is also desirable to facilitate travel between the EC rooms and core facilities of the building, such as cafeteria, media center, gymnasium, administration, and health services. Also, designers should keep in mind that current practice is to include exceptional children into the regular classroom, at least part of the day, as their individual situations allow.

Inclusion in Any Classroom

Federal legislation requires that children with disabilities be educated, to the maximum extent appropriate, within the same setting as nondisabled students…that is, the typical

classroom (or the "least restrictive environment"). Therefore, any classroom in a school could, at some time, serve a student with a disability. The tenets of Universal Design (page 9) are therefore relevant throughout a school. Every instructional space should be designed under the assumption that criteria relating to mobility impairment, vision or hearing limitations, disability of cognition or concentration, etc. will be incorporated.

Parental Involvement

Parents of exceptional children may visit the school campus with some frequency for a variety of reasons including meetings with teachers, administrators, and other professionals. It would be conducive to have sufficient parking close to the administrative offices, or close to other locations where teachers and parents might meet. The parking could be designated specifically for parents, as opposed to visitors, placing parents on the same level of importance as staff.

Parents could also come to the school to observe their children in the educational setting, to volunteer in some educational or enrichment activity, or to participate in social functions. Having a meeting room or conference room available to EC teachers and parents would be convenient.

Student Sense of Dignity

School planners should always consider ways to maintain the dignity of students with disabilities. Exceptional children should not be separated from their peers in instructional settings or be limited in their educational opportunities. Abend (2001) has advised that

- Accessible lab stations, computer desks, etc. should not be separated from stations for nondisabled students, but rather integrated into the classroom arrangement so that students may participate fully in group activities
- Accessible seating in auditoriums, lecture halls, and sports arenas should not be isolated or inconvenient or in less desirable places, so that disabled students will have the ability to view and participate fully in the activity
- The health suite should meet the wide range of medical services needed by students with disabilities. Procedures such as changing colostomy bags, administering medication, and providing breathing treatments may require adding a private examination room. In addition, the health suite should not be located directly on a main traffic corridor, or children entering and leaving the facility might feel "on display."

The successful school design neither calls attention to exceptional children nor conceals them from view.

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APPENDICES

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CATEGORIES OF ELIGIBILITY FOR SPECIAL EDUCATION

Appendix 1

A full and individualized evaluation of a child's needs must be conducted before any action is taken with respect to determining eligibility for special education. Listed below are the categories of eligibility, with abbreviated descriptions of the characteristics of each disability category. In each case, the disability must (a) have an adverse effect on educational performance, and (b) require specially designed instruction.

NC 1500-2.4 Child with a disability

(a) General

(1) Child with a disability means a child evaluated in accordance with NC 1503-2 through NC 1503-3 as having autism, deaf-blindness, deafness, developmental delay (applicable only to children ages three through seven), hearing impairment, intellectual disability, multiple disabilities, orthopedic impairment, other health impairment, serious emotional disability, specific learning disability, speech or language impairment, traumatic brain injury, or visual impairment (including blindness), and who, by reason of the disability, needs special education and related services.

(2) (i) If it is determined, through an appropriate evaluation under NC 1503-2 through NC 1503-3, that a child has one of the disabilities identified in paragraph (a)(1) of this section, but only needs a related service and not special education, the child is not a child with a disability under IDEA.
(ii) If the only service required by the child is speech language, it is considered special education rather than a related service and the child would be determined to be a child with a disability under paragraph (a)(1) of this section.

(b) Definitions of disability terms. The terms used in the evaluation of a child with a disability are defined as follows:

(1) Autism, sometimes called autism spectrum disorder,

(i) means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences.
(ii) Autism does not apply if a child's educational performance is adversely affected primarily because the child has an emotional disability, as described in paragraph (b)(5) of this section.
(iii) A child who manifests the characteristics of autism after age three could be identified as having autism if the criteria in paragraph (i) of this section are satisfied.

(2) Deaf-blindness means hearing and visual impairments that occur together, the combination of which causes such severe communication and other developmental and educational needs that they cannot be accommodated in special education programs solely for children with deafness or children with blindness.

(3) Deafness means a hearing impairment that is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification that adversely affects the child's educational performance.

(4) Developmental delay means a child aged three through seven, whose development and/or behavior is delayed or atypical, as measured by appropriate diagnostic instruments and procedures, in one or more of the following areas: physical development, cognitive development, communication development, social or emotional development, or adaptive development, and who, by reason of the delay, needs special education and related services.

(5) Serious emotional disability (hereafter referred to as emotional disability)

(i) means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance:

(A) An inability to make educational progress that cannot be explained by intellectual, sensory, or health factors.

(B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.

(C) Inappropriate types of behavior or feelings under normal circumstances.

(D) A general pervasive mood of unhappiness or depression.

(E) A tendency to develop physical symptoms or fears associated with personal or school problems.

(ii) Serious emotional disability includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance under paragraph (b)(5)(i) of this section.

(6) Hearing impairment means an impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance but that is not included under the definition of deafness in this section.

(7) Intellectual disability means significantly subaverage general intellectual functioning that adversely affects a child's educational performance existing concurrently with deficits in adaptive behavior and manifested during the developmental period.

(8) Multiple disabilities means two or more disabilities occurring together (such as intellectual disability-blindness, intellectual disability-orthopedic impairment,

etc.), the combination of which causes such severe educational needs that they cannot be accommodated in special education programs solely for one of the impairments. Multiple disabilities does not include deaf-blindness.

(9) Orthopedic impairment means a severe physical impairment that adversely affects a child's educational performance. The term includes impairments caused by a congenital anomaly, impairments caused by disease (e.g., poliomyelitis, bone tuberculosis, etc.), and impairments from other causes (e.g., cerebral palsy, amputations, and fractures or burns that cause contractures, etc.).

(10) Other health impairment means having limited strength, vitality or alertness, including a heightened alertness to environmental stimuli, that results in limited alertness with respect to the educational environment, that--

(i) Is due to chronic or acute health problems such as asthma, attention deficit disorder or attention deficit hyperactivity disorder, diabetes, epilepsy, a heart condition, hemophilia, lead poisoning, leukemia, nephritis, rheumatic fever, sickle cell anemia, and Tourette's Syndrome, etc.; and

(ii) Adversely affects a child's educational performance.

(11) Specific learning disability.

(i) General. Means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the impaired ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.

(ii) Disorders not included. Specific learning disability does not include learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of serious emotional disturbance, or of environmental, cultural, or economic disadvantage.

(12) Speech or language impairment means-

(i) A communication disorder, such as an impairment in fluency, articulation, language, or voice/resonance, that adversely affects a child's educational performance.

(ii) Language may include function of language (pragmatic), the content of language (semantic), and the form of language (phonologic, morphologic, and syntactic systems).

(iii) A speech or language impairment may result in a primary disability or it may be secondary to other disabilities.

(13) Traumatic brain injury means an acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. Traumatic brain injury applies to open or closed head injuries

resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech. Traumatic brain injury does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma.

(14) Visual impairment including blindness means an impairment in vision that, even with correction, adversely affects a child's educational performance. The term includes both partial sight and blindness. A visual impairment is the result of a diagnosed ocular or cortical pathology.

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In keeping with current practice, students are not grouped according to the category of disability as listed above. Rather, services and supports to individual students are determined in a case-by-case manner, based on educational needs. These are reflected in the following service/support delivery levels: General Skills; Targeted Skills; Sustained Support; and Intensive Needs.

It should be noted that not all students with disabilities require or receive special education. Many other students have documented disabilities and are educated completely through regular classroom instruction. This is one factor that necessitates the utilization of Universal Design principles for all facilities, not just those facilities specifically dedicated to special education delivery.

(Adapted from *Policies Governing Services for Children with Disabilities*, 2010, NC Department of Public Instruction, Section 1500-2.4, pages 3-5, available at http://www.ncpublicschools.org/docs/ec/policy/policies/policies-62010.pdf.)

For much of the history of education in North Carolina, children with disabilities have been excluded from the regular schools and served in specialized facilities—if at all. However, federal legislation has taken the education of exceptional children into a new direction, of inclusion in the general classroom wherever possible.

An early impetus to the evolution of inclusion was the U.S. Supreme Court's decision in *Brown v. Board of Education* (347 U.S. 483 (1954)), in which Chief Justice Warren held that "separate educational facilities are inherently unequal." Following several Federal District Court decisions addressing equal opportunity for children with disabilities, these federal laws were enacted (from Abend, 2001):

- Section 504 of the Rehabilitation Act of 1973 (Public Law 93-112) applies to children with disabilities whether or not they require special education services.
- Education for All Handicapped Children Act of 1975 (Public Law 94-142) applied to children with disabilities who require special education and related services.

…requiring every K-12 school district to identify every eligible person with a disability and "provide him or her with a free appropriate public education (FAPE), regardless of the nature or severity of the disability" (Ansley, 2000, p.4). Disabled students must be educated, to the maximum extent appropriate to their individual needs, within the same settings an nondisabled students—that is, in the least restrictive environment (LRE).

> Establishing EC classes in areas not conducive to learning may be considered a violation of Section 504; so will classroom sizes that are "not adequate to accommodate specific educational, physical, and/or medical needs of students with disabilities" (Huefner, 2006, p. 106).

Subsequent important legislation includes…

- Individuals with Disabilities Education Act (IDEA) of 1990 amended the Education for All Handicapped Children Act
- IDEA amendments of 1997 (Public Law 105-17) strengthened the right of students with disabilities to be educated with nondisabled peers, and emphasized that disabled students be provided access to general education programs.
- IDEA amendments of 2004 (Public Law 108-446) aligned student assessment requirements with No Child Left Behind (NCLB), simplified disciplinary provisions, etc.

…the provisions of which are considerably more detailed than those of Section 504 and apply only to disabled children requiring special education and related services. In addition, see the provisions of…

- The Americans with Disabilities Act (ADA) of 1990 requires LEAs to provide programs and services that are readily accessible to and usable by individuals with disabilities. Further, it required that schools comply with either the Uniform Federal Accessibility Standards (UFAS) or the ADA Accessibility Guidelines (ADAAG). Both the UFAS and the ADAAG are based on adult anthropometric data, and do not well address the design needs of children. However…
    - *Building Elements Designed for Children's Use* (1998), published by the Federal Access Board, an amendment to the ADAAG, includes specifications of accessible building elements designed for use by children age 12 and under. These guidelines, available at http://www.access-board.gov have not been adopted by the Department of Justice and remain advisory.

In summary, the goal of legislation with respect to school facilities has been to promote inclusion of the exceptional child into a normalized educational environment, and to provide appropriate dedicated facilities as required to benefit each exceptional child.

> "We should understand that it is simply impossible for hard of hearing children to utilize their residual hearing when speech signals are masked by noise and reverberation. Furthermore, the classroom acoustical conditions must be optimized whether or not children use personal or classroom amplification systems." Dr. Mark Ross, PhD, *The Role of Sound: Don't Ignore the Hard of Hearing Children*, 2003, [From a paper supported in part by grant#H133E980010 from United States Department of Education, NIDRR, to the Lexington Center, at http://www.hearinglossresearch.org/Dr.Ross/hearingofHOHchildren.html.] [1]

Many studies have found a link between academic achievement and the acoustical environment of the classroom. See, for example, Sutherland and Lubman (2001) for a listing and discussion. For exceptional children, poor or marginal acoustical conditions may be even more problematic.

General Acoustical Considerations:

An acoustical environment should provide +15dB signal-to-noise ratio (SNR) throughout the entire classroom, as the minimum for clarity of the spoken message. Assuming a minimum speech level of 50 dB, a SNR of +15dB will be achieved if the background noise level does not exceed 35 dB. See Table 1. Classrooms for severely acoustically challenged students may require even more stringent design.

Table 1 – Basic Acoustical Criteria

Learning Space (a)	Background Noise (b) Average A / C Weighted	Reverberation Time
Enclosed volume <10,000 ft^3	35 / 55 dB	0.4 - 0.6 second
Enclosed volume <20,000 ft^3	35 / 55 dB	0.4 - 0.7 second
Enclosed volume >20,000 ft^3	40 / 60 dB	consult acoustician.

Note (a): Learning Spaces refers to spaces for educational activities where the primary functions are teaching and learning, and where good speech communication is critical to a student's academic achievement. This also includes "ancillary learning spaces" of 20,000 cu. ft. or more, in which good communication is important, but in which the primary educational functions are informal learning, social interaction, etc. such as cafeterias, gymnasia, and indoor swimming pools.

Note (b): Measured while space is unoccupied. Corridors may be increased to 45 dBA, and should not be used for formal learning purposes.

Noise sources within the learning space. A primary noise source in America's classrooms is the heating, ventilation, and air conditioning (HVAC) system. The level of background noise should not exceed the limits specified in Table 1. HVAC equipment which operates at multiple stages should not exceed the limits in Table 2. Sound levels

generated by other building systems such as lighting should be combined with the levels of HVAC noise before determining conformance. If present, the contribution to the classroom sound level from an outdoor condenser or chiller it to be combined with other building services.

Table 2 – Limits on sound levels from building services and utilities (A- and C-weighted sound levels, in dB)

Room Type HVAC operating conditions	Single Mode HVAC	Multiple Mode HVAC
Core Learning Spaces		
Design or maximum capacity heating or cooling	35 / 55	37 / 57
Reduced or low capacity heating or cooling or ventilation	N/A	34 / 54
Ancillary Spaces		
Design or maximum capacity heating or cooling	40 / 60	42 / 62
Reduced or low capacity heating or cooling or ventilation	N/A	39 / 59

See ANSI S12.60-2010 for measurement criteria, etc.

Disturbing tonal sounds such as hums, buzzes, whines, or whistles generated by building services and utilities should be controlled so as not to interfere with speech communication or be distracting or annoying to the occupants. There should be no "prominent discrete tones" as defined by ANSI/ASA S1.13.

It is important that the level of low frequency noise is kept to a minimum. For many people with hearing impairment, low frequency noise has a devastating impact on speech recognition, masking many important speech sounds. At frequencies of 125 – 750 Hz, a minimum SNR of 20 dB is appropriate.

Outdoor-to-indoor sound attenuation. The background noise level in the classroom from exterior sources is a function of (a) the noise generated in the environment and (b) the reduction of the noise provided by the building shell. In order to meet the criteria of Table 1, the building shell should be designed with systems having the appropriate sound transmission class (STC). Some general guidelines are as follows:

Where there is an exterior walkway within 3 m / 10 ft, or a playground within 9 to 15 m / 30 to 50 ft of the exterior wall, the wall should have an STC rating of at least 45 and exterior doors should have an STC rating of at least 30. If there are windows within 3 m / 10 ft of an exterior walkway or within 9 to 15 m / 30 to 50 ft of a playground, the composite STC of the wall including windows and doors should be at least 40. If the playground is closer than 9 m / 30 ft to the wall, the composite STC should be at least 50, except that this criteria does not apply where the playground is dedicated solely for the

use of the adjacent learning space, and will therefore not be active while learning activities are occurring inside.

Indoor-to-indoor sound attenuation. Wall and floor-ceiling assemblies that separate core learning spaces from adjacent spaces should be designed to achieve the STC ratings shown in Table 3. This applies also to "temporary" partitions that subdivide the learning space.

Table 3 – Minimum STC ratings for separation of a core learning space from an adjacent space.

Other enclosed or open-plan core learning space, therapy room, health care room and space requiring a high degree of acoustical privacy (a)	50
Common-use and public-use toilet room and bathing room (a)	53
Corridor, staircase, office, or conference room (b)(c)	45
Music room, music performance space, auditorium, mechanical equipment room (d), cafeteria, gymnasium, or indoor swimming pool	60

Note (a): These requirements do not apply to toilets opening only into the core learning space and used only by occupants of the core learning space.
Note (b): Applies to the basic wall only. See below, for criteria for doors.
Note (c): Where acoustical privacy is required, the minimum STC rating including the effects of doors, should be increased to 50.
Note (d): Isolation should be STC 60 or greater unless it is shown that the sound level in the mechanical equipment room combined with a lower STC rating of the enclosure can achieve the required sound level in the core learning space. In no case should the design STC be less than 45.

For walls between a core learning space and corridors or stairwells, Table 3 applies to the wall exclusive of any door. For walls between a core learning space and offices, conference rooms, or toilets, Table 3 applies to the wall exclusive of any door that opens into the core learning space. In all other cases, Table 3 applies to the composite construction including the effects of doors, windows, penetrations, etc.

Interior door assemblies and window assemblies up to 1 m^2 / 10 s.f. immediately adjacent to the door, opening into core learning spaces from corridors, stairways, offices, or conference rooms, should achieve a STC rating of 30 or greater in their operable condition. Interior entry doors into music rooms from corridors or staircase areas should be at least 40 STC if such doors are within 9 m / 30 ft of a door to a core learning space. A vestibule entry composed of two sets of doors with STC rating of 30 or greater is considered to conform to the STC 40 criteria.

Structural-borne impact sound isolation. The floor-ceiling assemblies of normally occupied rooms located above learning spaces should be designed for a laboratory test rating of an Impact Insulation Class (IIC) as follows:

Above core learning spaces	IIC 45
Above ancillary learning spaces	40

The floor-ceiling assemblies of gymnasia, dance studios, or other rooms with high floor-impact activity (in existing construction) should have an ICC as follows:

Above core learning spaces <20,000 ft^3	IIC 70
Above core learning spaces >20,000 ft^3	65
Above ancillary learning space	65

In renovations, such rooms should be relocated. In new construction, rooms having high floor-impact activity should not be located above classrooms or other core learning spaces.

Hearing Assistive Technology:

Sound field amplification improves the signal-to-noise ratio (SNR) in a classroom through the use of a microphone transmitter to amplify the teacher's voice and deliver this signal or one or more speakers located in the ceiling or along the classroom walls. The desired SNR is +15 or greater, with a reverberation time of 0.6 seconds or lower. The use of assistive technology alone will not adequately address students' listening needs when a classroom is noisy or reverberant. For the child with hearing loss, the combination of adequate classroom acoustics and FM system technology is necessary to assure that noise will not preclude learning in the educational space.

Use of a sound field amplification system even in a classroom meeting typical acoustical standards may benefit children of normal hearing and the teacher as well. See ASLHA (2005a) for listings of research findings. This research also found significant improvement in word and sentence recognition for students with developmental disabilities, for non-native English learners, and for students with minimal degrees of hearing loss. For preschool, elementary, and secondary school students, improved on-task concentration and listening behaviors have been identified as benefits of hearing assistive technology.

Amplification can overcome the effects of low levels of background noise and speech degradation due to distance between teacher and students. Assistive technology cannot overcome the smearing effects of inappropriate levels of reverberation, however, which should be remediated in the design of the room. Furthermore, hearing instruments have been found to be ineffective in environments with noise in excess of 60 dB.

Severe Hearing Impairment:

Classroom acoustics are still important; the use of assistive technology alone cannot be considered sufficient to meet the needs of students with hearing loss, whether they are users of hearing aids or cochlear implants. In fact, hearing instruments have been found to be ineffective where background noise exceeds 60 dB; some classrooms have measured SNR in the dB range of 70 and above.

Even given adequate acoustic treatment to achieve a +15 SNR, the degradation of speech across distance may still be problematic, as may interference from fluctuating noise. In mitigation, there is a higher level of speech perception performance when ear-level or desktop FM devices are used (as opposed to wall or ceiling speakers), and when reverberation times are less than 0.4 seconds.

Mild or Temporary Hearing Impairments:

Young children, more than adults, are susceptible to temporary hearing impairment caused by ear infection (otitis media). Research by Schappert (1992) over the years 1975-1990 has identified otitis media as the most prevalent medical disorder in young children, affecting 25% to 30% of kindergarten and first grade children. Other research (Ries, 1994) found that more than 10% of students age 6 to 19 had mild high-frequency hearing impairment. According to the ANSI (2009) report, "Signal-to-noise ratio improvements of 3 dB to 5 dB together with increases in absolute speech sound levels of 10 dB to 30 dB are necessary for children with these impairments to achieve the same level of speech intelligibility in classrooms with high background noise" (p. 12).

Other Circumstances Requiring Acoustical Consideration:

Children with expressive and receptive language disorders require better signal-to-noise ratios in order to achieve speech intelligibility, compared to children without these disorders. Also, children for whom English is not the primary language (English Language Learners) need a better acoustical environment, because limitations in their vocabularies make it difficult to 'fill in the blanks' when only partial communication occurs. These children may need 2 to 5 dB better signal-to-noise ratios to achieve the same intelligibility as children with normal English proficiency.

Interior Materials:

All room surfaces should be addressed in order to control excessively long reverberation times. The sound absorption coefficients for various ceiling, wall, and floor materials are important in improving room acoustics; there are many publications by manufacturers and consultants which address this criteria. In reviewing that data, it is important to note the absorption provided in the critical frequencies, i.e., speech frequencies. Most surface materials do not absorb low-frequency sound as effectively as high-frequency sound.

Ceilings. Where reverberation time is a problem, a major contributor to this situation is often high, very reflective ceiling surfaces. A ceiling height of 9-12 feet is often considered optimal for the speaking-listening environment. Acoustical ceiling panels are beneficial, as are suspended banners, student work, and similar absorptive items.

Floors. Carpet is excellent for reducing noise and reverberation, but presents difficulties in sanitation (in case of spills or "accidents"), and in regard to indoor air quality and allergic reactions. The Designer should carefully coordinate with the client concerning the type and location of any carpet to be used in EC facilities.

Windows and Doors. Glass is highly reflective of sound, and acoustical treatment may be necessary. Double-pane glazing is necessary for reasons of sound isolation as well as energy conservation. Well-fitted and weather-stripped doors and windows, with proper sealant around the frames, will help to lessen noise from exterior or adjacent sources.

Walls. Reflective wall surfaces may be treated in various ways to dampen noise and reduce reverberation time. Such modifications include acoustical panels and cork, felt or flannel bulletin boards.

In Summation

Students with hearing impairments are found in all areas of the modern school. It has been estimated that 20% of the school population may have a hearing situation at any given time. And students with chronic hearing loss are often in the "main-stream" classroom with their peers. Even in classrooms dedicated for EC use, sound amplification systems alone are not the solution. Important benefits to hearing, and therefore to learning, are in (a) controlling reverberation time and (b) reducing background noise from the exterior, from adjacent spaces, and from building systems.

[1] The Hear to Learn Center, accessed January 12, 2010, http://www.heartolearncenter.org

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Sources of Criteria and Guidelines

In general, guidelines listed above represent a consensus among the following sources and others listed at the end of this publication.

The American National Standards Institute (ANSI) has published *Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools*, ANSI S12.60 – 2010, available (free) at http://asastore.aip.org/index.do. This criteria has not been adopted into the North Carolina State Building code; some authorities consider it to be overly restrictive in areas. Certain manufacturers or trade associations have published recommendations for acoustical performance, such as the Ceilings & Interior Systems Construction Association's *Acoustics in Schools*, a 2009 document available (free) at http://www.cisca.org/files/public/Acoustics%20in%20Schools%20White%20Paper.pdf.

In addition, the United Kingdom has published two extensive documents of interest: *Building Bulletin 93: Acoustic Design of Schools*, especially Section 6, available (free) at http://www.teachernet.gov.uk/management/resourcesfinanceandbuilding/schoolbuildings/environ/acoustics , and *Building Bulletin 102: Designing for Disabled Children and Children with Special Educational Needs: Guidance for Mainstream and Special Schools*, available (free) at http://www.teachernet.gov.uk/_doc/13210/BB102.pdf.

There are multiple publications of the American Speech-Language-Hearing Association, available at http://www.asha.org. Also, the Acoustical Society of America (ASA) has published two manuals for architects on classroom acoustic design. Volume 1 is a design manual, available on the web at http://asa.aip.org/classroom/booklet.html. Volume 2, available at http://asa.aip.org/classroom/bookletII.pdf, outlines key acoustical issues.

Volume 1 "provides a supplemental resource for architects, educators, and school planners for use in new construction or in renovation of existing learning spaces. It is not intended to replace the services of a professional acoustical consultant but to serve as an introduction to the understanding of the elements of desirable listening conditions in classrooms and demonstrates how good acoustical design can improve the learning environment."

Volume 2 "is designed to provide an overview of the need for quiet classrooms. It includes information on the problems experienced by students and teachers as a result of excessive noise and reverberation in classrooms. Special attention is focused on children: 1) learning English as a second language, 2) with ear infections, and 3) with permanent hearing loss. In addition, this booklet lists over 150 additional references on the topics covered."

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LIGHTING and the VISUALLY IMPAIRED Appendix 4

In keeping with the concept of educating exceptional children in the 'least restrictive environment,' the entire facility should be designed to facilitate the inclusion of students with visual impairments (VI) into the general education setting. That does not require, per se, extensive costs or complex design parameters—only the awareness and application of some basic accommodation ideals. Keep in mind that it would be quite common for special education students to travel through and utilize any part of the building or campus.

The following terms are often used to describe and categorize levels of vision:

Low vision: students are able to learn using their visual sense, but they may need certain accommodations regarding instructional materials.

Functional blindness: students generally read and write using Braille; they may or may not see well enough to move around the environment.

Blindness, near blindness, and total blindness: Learning takes place using data from the other senses most or all of the time.

Most students with visual impairments have some usable vision; the environment should be designed to enhance and effectively utilize existing capabilities (Cox and Dykes, 2001). In some cases, extremely bright lighting is necessary for the VI student to function. In other cases, lighting of even moderate intensity can be painful and debilitating. Therefore, some means to modify the lighting level (through dimmers or multiple switching arrangements) would be helpful. Additionally, an electrical outlet located to permit an individual desk lamp to be utilized would be appropriate.

Designers should be aware that conditions having little or no impact on nondisabled people could be difficult to use or even dangerous for certain disabled individuals. In the case of students with visual impairment, use of a cane is taught and practiced. Some configurations of the building components may be problematic in this regard. For example, the area under exposed stairs can be a hazard, because a person's head or upper body will strike the stair stringers before the "sweep" of the cane will contact the base of the stair. In schools with VI students, the area under stairs must often be closed-off to prevent injury to those students. See Fig. 3. In new construction, this condition can be avoided altogether.

Some VI students may have limited sight, and the environment should be planned to maximize their abilities. It is often difficult for such individuals to distinguish planes and surfaces if there is little contrast with the surroundings. See Fig. 4 for example. If the wall color were different from the wall cabinets, and different from the base cabinets, it would be easier for a disabled person to recognize them as different planes, and utilize the storage provided. Also, white (dry erase) boards are better than chalkboards, because of the contrast between the marker color and the bright background.

Additionally, changes in color and in texture can be utilized to signal important information to the EC, and to others as well. Floor patterns, changes in color, etc. can

Fig 3. Area under stairs, with blocking rails

Fig 4. Classroom with a limited color palette.

signal that one is approaching a corridor intersection, or an area of congestion such as entrances to toilet rooms. Floor color and changes in texture can warn of an approach to stairs – at the top and at the bottom, and perhaps intermediate landings as well. This could be especially critical where doors swing toward the approaching person.

Evacuation: Few instances of school design-related literature on emergency evacuation can be found, either for the general school population or for special needs children, as reported by the National Clearinghouse for Educational Facilities. (See the NCEF report at http://www.ncef.org/pubs/evacuating_special_needs.pdf .) However, a reasonable explanation for this scarcity of information exists: compliance with the Americans with Disabilities Act appears adequate in most cases.

Schools built since January 26, 1992 were required to comply with Title II of the ADA, which addressed the best practices for making buildings accessible to individuals with special needs or with disabilities. It is generally accepted that students located in ADA-compliant buildings can be readily evacuated in an emergency, along an established accessible route, although some with mobility, sensory, or cognitive impairments may require assistance to do so. For this reason, it is *recommended* that all facilities for exceptional children be located on the level of exit discharge, and it is *strongly recommended* that facilities for Sustained Support and Intensive Needs be located on the level of exit discharge (the ground level).

Schools built prior to January 26, 1992 are not required to be renovated to comply with all provisions of the ADA. See the section titled "Renovations of Existing Buildings" for a further discussion of requirements for any renovation project.

A critical element is the preparedness of school faculty and staff to deal with emergencies. The school emergency management plan should include procedures and training for evacuating all school occupants—including special needs students—in a variety of building conditions and by a variety of routes. See the publication titled *Practical Information on Crisis Planning: A Guide for Schools and Communities,* especially pages 6-30 and 6-31, by the Office of Safe and Drug-Free Schools, U.S. Department of Education, available at http://www2.ed.gov/admins/lead/ safety/ emergencyplan/crisisplanning.pdf .

Shelter: Specific areas within schools are sometimes designated as areas of refuge to protect school occupants during a crisis and/or to shelter community members during or after a natural disaster. Many documents are available regarding the constructing and furnishing of areas to be used as shelter in an emergency, including FEMA publications 424, 361, and 428, available from http://www.fema.gov. However, accessibility of exceptional children is generally not addressed therein.

A publication of the U.S. Department of Justice's Disability Rights Section includes a discussion of accessible community shelters. It is *An ADA Guide for Local Governments: Making Community Emergency Preparedness and Response Programs Accessible to People with Disabilities,* at http://www.ada.gov/emergencyprep.htm .

Communication: Schools traditionally have relied on fire alarms and public address systems to notify occupants of a crisis and to provide instructions. However, wireless communications—both voice and text—are playing an increasing role. Steel structure within a building could disrupt emergency radio and phone transmissions; where necessary, repeaters must be installed within the building to correct this problem.

Additional discussion of emergency communications can be found in a publication of the Federal Interagency Coordinating Council on Emergency Preparedness and Individuals with Disabilities titled *Preparing the Workplace for Everyone*, specifically the sections "Shelter-in-Place (SIP) Plans" and "Emergency Notification Strategies," available at http://www.dol.gov/odep/pubs/ep/preparing.htm.

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Additional information and web addresses are available in the NCEF report listed in the first paragraph of this section.

SECLUSION & ISOLATION Appendix 6

Based on G.S. 115C 391.1, school personnel may use seclusion and restraint under certain conditions as described therein. The requirements for any space in a school building to be used for such purposes are as follows:

Seclusion ... means the confinement of a student alone in an enclosed space from which the student is (a) Physically prevented from leaving by locking hardware or other means, and/or (b) Not capable of leaving due to physical or intellectual incapacity.

- The student must be monitored at all times; therefore, the adult monitoring the student must be able to see and hear the student at all times.
- The space must have been approved for such use by the LEA.
- The space must be appropriately lighted.
- The space must be appropriately ventilated and heated or cooled.
- The space must be free of objects that unreasonably expose the student or others to harm.
- The space can only be locked with a special locking mechanism constructed so that it will engage only when a key, knob, handle, button, or other similar device is being held in position by a person, and provided further that, if the mechanism is electrically or electronically controlled, it automatically disengages when the building's fire alarm is activated. Upon release of the locking mechanism by a supervising adult, the door must be able to be opened readily.

Isolation … means a behavior management technique in which a student is placed alone in an enclosed space from which the student is not prevented from leaving.

- The space used for isolation must be appropriately lighted, ventilated, and heated and cooled.
- The student must be reasonably monitored while in isolation.
- The isolation space must be free of objects that unreasonably expose the student or others to harm.

For additional information regarding the appropriate use of seclusion and isolation, see the legislation referenced above, available on the website of the NC General Assembly at http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_115C/GS_115C-391.1.html. [These functions formerly referred to as "Time Out."]

Minimum dimensions are 6'-0" X 6'-0" with ceiling height at 8'-0" minimum. Door should swing 'out' into the classroom. Glazing (as required for visual monitoring) shall be impact resistant and shatterproof, per applicable codes. Interior finishes shall have a class A flame spread rating, and not produce toxic fumes if burned. Heavily cushioned carpeting should be used on floors.

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Service Animals in Schools

The use of service animals in schools is permitted under Title II and III of the Americans with Disability Act (ADA). Title II addresses the obligations of a public entity, defined as any state and local government. Title III (regarding the obligations of private entities) Section 36.302(C) (1) refers to Modifications in policies, practices and procedures and states that "generally, a public accommodation shall modify policies, practices, or procedures to permit the use of a service animal by an individual with disabilities."

The ADA defines a service animal as any guide dog, signal dog, or other animal individually trained to provide assistance to an individual with a disability, regardless of whether the animal has been licensed or certified by a state or local government. A service animal is not a pet.

In a final ruling issued by the Department of Justice (DOJ) on January 26, 1992, specific guidance was provided in the area of accommodations in public schools:

> "Public school systems must comply with the ADA in all of their services, programs, or activities, including those that are open to parents or to the public. For instance, public school systems must provide program accessibility to parents and guardians with disabilities to these programs, activities, or services, and appropriate auxiliary aids and services whenever necessary to ensure effective communication, as long as the provision of the auxiliary aids results neither in an undue burden nor in a fundamental alteration of the program."

Under certain conditions, as when a service animal barks or growls at other people, or otherwise acts out of control, or if its behavior poses a direct threat to the health or safety of others, the animal may be excluded from the premises. However, the disabled individual should be offered the opportunity to remain, without the service animal.

See “Commonly Asked Questions About Service Animals in Places of Business,” available at http://www.ada.gov/qasrvc.htm. If there are further questions about service animals or other requirements of the ADA, call the U.S. Department of Justice’s toll-free ADA Information Line at 800-514-0301 (voice) or 800-514-0383 (TDD).

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RESOURCES

References

Abend, A. C. (2001). *Planning and designing for students with disabilities*. National Clearinghouse for Educational Facilities: Washington, DC. Accessed May 28, 2010, at http://www.edfacilities.org/pubs/disabilities.html .

American National Standards Institute, Inc. (ANSI) (2009). *Acoustical performance criteria, design requirements, and guidelines for schools*. Acoustical Society of America. Melville, NY.

American Speech-Language-Hearing Association (ASLHA) (2005a). *Guidelines for addressing acoustics in educational settings*. Accessed May 28, 2010, at www.asha.org/policy.

American Speech-Language-Hearing Association (ASLHA). (2005b). *Acoustics in educational settings: Technical report.* Accessed May 28, 2010 at www.asha.org/policy.

Ansley, J. (2000). *Creating accessible schools*. National Clearinghouse for Educational Facilities: Washington, DC. Accessed May 28, 2010 at http://www.edfacilities.org/pubs/accessibility.html .

Cantor, A. (1995). The A-D-A-P-T-A-B-L-E approach: Planning accessible libraries. *Information Technology and Disabilities, ii*(December). Accessed April 9, 2010 at http://people.rit.edu/easi/itd/itdv02n4/article2.htm .

Cox, P. R., & Dykes, M. K. (2001). Effective classroom adaptations for students with visual impairments. *Teaching Exceptional Children 33*(6), pp. 68-74.

Huefner, D. S. (2006) Getting comfortable with special education law: A framework for working with children with disabilities (2nd Ed). Christopher-Gordon Publishers: Norwood, MA.

Irvall, B. & Nielsen, G. (2005). Access to libraries for persons with disabilities. *IFLA Professional Reports, 89*. International Federation of Library Associations and Institutions.

Lowenkron, R. & Ponessa, J, et al. (2005). *Long range facilities planning and design implementation for students with disabilities: A guide for New Jersey school district*. Education Law Center: Newark, NJ.

Ries, P. (1994). Prevalence and characteristics of persons with hearing trouble: United States, 1990-1991. *Vital and Health Statistics Series 10 188*, pp. 1-22.

Schappert, S. (1992). Office visits for otitis media: United States, 1975-1990. *Vital and Health Statistics 214*, pp. 1-15.

Sutherland, L.C. & Lubman, D. (2001). The impact of classroom acoustics on scholastic achievement. *17th Meeting of the International Commission for Acoustics*. Accessed January 12, 2010 at http://www.nonoise.org/quietnet/qc/ICA2001.htm.

Additional Sources

Building Elements Designed for Children's Use. Uniform Federal Accessibility Standards, website at http://www.access-board.gov/adaag/kids/final.htm . (Based on dimensions and anthropometrics for children ages 12 and under; guidelines not adopted by Department of Justice, and therefore are advisory.)

Center for Universal Design, College of Design, NC State University, website at http://www.design.ncsu.edu/cud/index.htm .

National Center on Universal Design for Learning, website at http://www.udlcenter.org .

National Clearinghouse for Educational Facilities, website at http://www.ncef.org.

National Universal Design for Learning Task Force, website at http://www.advocacyinstitute.org/UDL/index.shtml .

NC Comprehensive Exceptional Children Accountability System, website at http://www.nccecas.org.

Self-Evaluation Guide for Public Elementary & Secondary Schools. U. S. Department of Education, Office for Civil Rights. Available from Adaptive Environments, at http://www.adaptenv.org/index.php?option=Resource&articleid=230&topicid=2 .

Special Education Accommodation: NCEF Resource List, website at http://www.edfacilities.org/rl/special_ed.cfm .

U. S. Department of Education, Office of Special Education Programs, website at http://www.osepideasthatwork.org .

Various publications of the School Planning Section, NC DPI, available at the website http://www.schoolclearinghouse.org .