DOCUMENT RESUME

ED 460 602 EF 005 443

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TITLE North Carolina Public Schools Facility Standards. A Guide for Planning School Facilities.

INSTITUTION North Carolina State Dept. of Public Instruction, Raleigh.
PUB DATE 1995-08-00
NOTE 43p.
PUB TYPE Reports - Descriptive (141)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Classrooms; *Educational Facilities Improvement; *Educational Facilities Planning; Elementary Secondary Education; *Facility Guidelines; Public Schools; *School Construction; Vocational Education
IDENTIFIERS *North Carolina

ABSTRACT

The State of North Carolina has developed a planning guide for those in the process of building, enlarging, or renovating school facilities. This guide defines and describes the educational spaces needed to support a modern, comprehensive educational program and sets minimal standards for the types and sizes of spaces required. It serves as a guide for evaluating existing facilities for functional adequacy; determining facility needs; and developing sound, long-range building plans. School space standards covered include regular classrooms, science labs, classrooms for exceptional children, arts education/theater, vocational education, media education, physical fitness areas, and commons areas. Appendices provide the state's legislation for the erection of school buildings, legislation for implementing energy-use goals, class size/teacher allotment ratios, the recommended minimum facilities for middle grades workforce development (vocational) programs, and a form for submitting deviations from state school facility standards. (GR)

North Carolina Public Schools

FACILITY STANDARDS

A Guide for Planning School Facilities

PUBLIC SCHOOLS OF NORTH CAROLINA
STATE BOARD OF EDUCATION
DEPARTMENT OF PUBLIC INSTRUCTION

August, 1995

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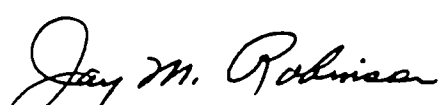
FOREWORD

The responsibility for providing public school facilities in North Carolina rests with the counties and the special chartered school districts within them. State support for school construction was provided by statewide bond issues in 1949, 1953, 1963 and 1973 when it became apparent that the counties' resources could not keep pace with increasing school facility needs. However, the basic responsibility for providing funds for school facilities will continue to be with local governments and the responsibility for funding operating costs will continue to be with the State.

In keeping with this funding policy, the responsibility for assuring appropriate, safe, functional buildings to support educational programs has also rested with local governments and with local boards of education who are the legal owners of the facilities. Various state agencies have always monitored all public construction for structural design, safety, sanitation and environmental impact. The choice of designs, materials, sizes, numbers and types of spaces needed for educational programs has traditionally been left to the local boards.

The 1985 General Assembly approved, in principle, a commitment to improve education for all students and began funding the Basic Education Program. Legislation was designed to assure every child the opportunity to acquire the "basic requirements relating to a common core of knowledge and skills considered essential for mastery ... before graduation from a public high school in North Carolina." The BEP is a ten-year commitment, and, when fully funded, will provide more than $850 million for additional teachers, programs and materials. The BEP also requires a State Standard Course of Study. It describes the "what" and the "how" of the state curriculum. The General Assembly has honored its commitment to the BEP since its approval with allocations according to the eight-year funding schedule.

In 1987, the General Assembly, realizing the impact of the BEP on school facility needs, became aware of the magnitude of these needs. As a result, the School Facilities Finance Act of 1987 was enacted. This act proposes to provide $3.2 billion for school construction over the next ten years. In keeping with the BEP standards for curriculum and instruction, the "Finance Act of 1987" directed the State Board of Education to develop and adopt interim statewide school facility minimum standards ... (to) be used by the Commission on School Facility Needs to make its preliminary report on critical school facility needs in each county. Further, the statute states "the statewide school facility minimum standards ... shall apply to the construction, reconstruction, enlargement and improvement of all school buildings ... regardless of the source of funds for the project." In December 1988, the State Board of Education approved these recommended standards which define and describe the minimum facilities to support the Basic Education Program and to assure a functional learning environment for every student. This publication defines those standards and provides a convenient guide for planning public school facilities.



Jay Robinson, Chairman
State Board of Education

Bob Etheridge, State Superintendent
North Carolina Department of Public Instruction

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DEVIATION FROM THE NORTH CAROLINA PUBLIC SCHOOLS FACILITY STANDARDS

EVIATION FROM THE SCHOOL FACILITY STANDARDS FORM

In July 1987, the North Carolina General Assembly enacted legislation to provide funds for public school construction to assist county governments in meeting their capital building needs and to provide additional funds for selected counties with the greatest critical school facility needs. The legislation follows the state's recently adopted Basic Education Program, which assures every child in North Carolina "a program of instruction which is fundamentally complete and which will provide a thorough grounding in...the arts, communication, media and computer skills, second languages, healthful living, mathematics, science, social studies and vocational education."

This document, in accordance with the legislation's direction, defines and describes the educational spaces needed to support a modern, comprehensive educational program and to set minimal standards for types of spaces and for sizes of spaces. Consequently, it serves as a planning guide for those in the process of building, enlarging, or renovating school facilities. Administrators, teachers, laypersons and design professionals will find the document helpful as they plan and design educational spaces to be used now or in the future.

Also, the document is intended: (1) to serve as a guide in evaluating existing facilities for functional adequacy; (2) to determine facility needs; and (3) to develop sound, long-range building plans. Consequently, it includes standards and recommendations for improving facilities. The standards set forth in this document do not preclude or take precedent over existing standards defined and enforced by other agencies. Standards and other regulatory controls for school construction have been in effect for many years and continue in effect.

All plans for new construction and renovations must have approval and specific permits from the appropriate state and local agencies.

These permits and approvals are issued by agencies including the following:

- *State Department of Labor:*
  Approval of elevator installations.

- *State Department of Insurance:* Compliance with the North Carolina State Building Code.

- *State Department of Environment, Health, and Natural Resources:*
  Approval for new on-site water systems.
  Approval of on-site waste water.
  Approval of kitchen sanitation.
  Approval of soil sedimentation and erosion control plans where one acre or more is to be disturbed.

- *State Department of Agriculture:* Approval of propane gas installations.

- *State Superintendent of Public Instruction:* G.S. 115C-521 (see Appendix)

Although intended to assure adequacy, standards can sometimes be restrictive to the efficient design of a facility. In an attempt to avoid such inhibiting restrictions, the standards do allow some minor deviations in spatial requirements where design efficiency dictates. Such flexibility is essential to good design but cannot be allowed to become a means of lowering standards. It must be understood that, in certain circumstances, some standards will not be appropriate or cannot be met due to atypical programs and special conditions. Also, many older, existing facilities will not meet many of the standards and the cost of renovations to bring them into compliance may be prohibitive.

Phased construction is often necessary and appropriate. When a space to support the program is not provided, either due to lack of funding or for other reasons, it must be shown on the site plan of the project submitted to School Planning.

Small school size may also affect compliance, as multipurpose spaces may serve for specialized needs such as dance, theatre arts or workforce development (vocational) labs. Multipurpose spaces must be designed so that the room, furniture, equipment and storage are compatible with the intended programs. The intent of the standard is to assure that adequate space is provided for those classes and activities that make up instructional programs as mandated by the Basic Education Program and the North Carolina Standard Course of Study. Where single spaces can adequately provide for multiple uses, the standard will be considered met.

The facility standards do not replace the need for educational specifications. Educational specifications should be developed which describe the educational program to be implemented. From educational specifications, the

planners should be able to determine the unique spatial needs to support an individual program and which spaces can serve several activities or functions.

Boards of education which submit plans with deviations from these facility standards must list and justify the deviations. The list must be approved by the local board of education. This information will be reviewed by the State Board of Education each quarter.

The School Facilities Finance Act of 1987 requires local boards of education to develop long-range organizational and facility plans. Specifically, the legislation states "local boards of education shall submit their long-range plans for meeting school facility needs to the State Board of Education by January 1, 1988 and every five years thereafter." To develop a long-range plan, including efficient utilization of existing facilities, priorities for new construction and renovation, cost estimates, and estimates of available resources, a board of education must address the following five questions:

- How many schools are needed?
- Which grades will they serve?
- How many students will they accommodate?
- Where will they be located?
- Which students will they serve?

In the 1950's, most rural school systems were organized to serve grades 1-12 or 1-8 and 9-12, while schools in urban areas were generally organized to serve grades 1-6, 7-9 and 10-12. In recent years, there has been a significant movement toward a middle school plan of organization across the state. A typical organization based on the middle school concept serves grades K-5, 6-8 and 9-12, but organizational patterns with schools for grades K-4, 5-8, 9-12 or K-6, 7-8 and 9-12 are not uncommon.

While the movement toward a middle school plan of organization has been substantial, other organizational patterns still exist. Alternative plans of organization will continue to be appropriate in some communities because of existing facilities, natural geographic boundaries, the sparsity of students, road patterns and travel times and distances. The Department of Public Instruction and the State Board of Education do, however, believe that a three-tier plan of organization which allows a specifically designed program for students in the middle grades is desirable and that a grades K-5, 6-8 and 9-12 plan of organization is preferable. The state curriculum and the Basic Education Program are designed around this organization. Local boards of education should continue to evaluate their organizational patterns and work toward this structure where feasible.

Several school systems in North Carolina now have programs for three- and four-year-old children. This trend is expected to continue and is encouraged. For some school districts, programs for pre-school children will be more appropriately located in neighborhood centers; for other districts, these programs might be located on the campuses of neighborhood schools. Consideration should be given to housing three- and four-year-old children as boards of education develop long-range plans for possible reorganization and new facilities.

Boards of education are also encouraged to study the issue of optimal school size. As with grade structure, local conditions may require differences in school sizes, with schools which are smaller or larger in membership than the optimum.

Boards of education are urged to keep abreast of educational trends which affect the design of school facilities. Center-oriented instruction is being seen in the upper elementary grades. Team organization for each grade level in middle schools may vary and elements of center-oriented instruction may be present. There is some interest in dividing the students within a high school into academic houses or pods.

Boards of education are encouraged, however, to continue studying this issue and to strive for schools which are large enough to offer a comprehensive program and student services at a reasonable cost, yet small enough to offer a personal, caring atmosphere.

The Department of Public Instruction and the State Board of Education believe that elementary schools ranging from 450 to 700 students; middle schools ranging from 600 to 800 students; and high schools ranging from 800 to 1,200 students can offer an excellent educational program, including a comprehensive curriculum. The board also believes that schools of these sizes can offer the most efficient use of space and personnel at a reasonable cost per student without losing personal contact with and among students. As with grade structure, school size must ultimately be determined by factors such as existing facilities, areas of population density, natural geographic barriers, road patterns, transportation times and distances, and local preferences.

The Department of Public Instruction conducts surveys for local school systems to help local boards in developing long-range plans. Such a survey provides an outside evaluation of and recommendations for school organization and facilities. This service is available without cost and upon request.

SCHOOL SITES

Grades	Standards Acres
K-6	10 + 1/100 ADM
5-8	15 + 1/100 ADM
7-9	20 + 1/100 ADM
9-12	30 + 1/100 ADM

Traffic — Standard

Drives which completely circle a building, or have to be crossed when going from building to building or playground, must be avoided. Parent auto traffic and bus traffic must be separated once on the school site.

Power Lines — Recommendation

Avoid locating facilities near electric power transmission lines. All site functions (except entry drives) and facilities must observe the clearances noted in **The School Site, Land For Learning.**

Site Evaluation — Recommendations

These factors should be used for evaluating existing or potential school sites:

- Location (bus and auto routes)
- Size (number of acres; road frontage)
- Shape (rectangular 3:5 ratio preferred)
- Topography/Drainage (usable acreage)
- Access (separate traffic types on site)
- Traffic (buses; cars; pedestrians)
- Soil conditions (foundations; waste disposal)
- Plant life (trees; bushes)
- Noise/Air pollution (airport; traffic; industrial)
- Utilities (availability)
- Television signals (ETV; school TV)
- Security/Protection (emergency access; lighting)
- First cost (cost per acre)
- Developed cost (actual cost)

Other Planning Resources:
School Planning, **The School Site, Land for Learning,** October 1994

Comments and Recommendations

The minimum acreages refer to usable land. If on-site water or sewer is required, substantial additional acreage may be needed.

A high school may need an additional area of 10 acres or more if a stadium and spectator parking are anticipated.

Most school districts purchase sites which exceed the minimum acreage requirements; however, because of the availability of adequate acreage in urban areas and usable land in certain areas of the state, the standard may not be attainable. School Planning will assist representatives of the local school unit in determining if the site will be functionally adequate.

Pre-Kindergartens and kindergartens should have a separate shared play area. Fencing may be necessary for safety or control for kindergarten play areas, but fencing is required for pre-K. Fences or walls cannot exceed 32" if there is a locking gate.

All grade levels should have paved activity areas.

The number and types of physical education fields depend on the size and grade structure of the school. Guides for athletic fields may be found in **The School Site, Land for Learning** publication.

Natural features of a new school site should be considered for their potential contributions to the teaching of science. Natural areas suited to the teaching of biology and earth science classes should be preserved in a landscape plan.

Handicapped accessibility to all site functions, including athletic facilities, is required.

Pedestrian traffic in auto and bus areas must be carefully studied. Safety on the school site will carry the same importance as building safety in the approval process.

Grades	Standards
	Square Footage
Pre-K (3 & 4 yr. olds)	1,200-1,400
K	1,200
1-3	1,000-1,200
4-8*	850-1,000
9-12*	750-850
4-12 Computer classrooms	850-1,000

* Grade range change reflects the change from junior high to middle grades organization. (September 1994)

Ceiling Heights	Standards
Room Size	Ceiling Heights
850 sq. ft. or less	9'-4"
851 sq. ft. or more	10'-0"
Mobile classrooms	8'-0"

Windows	Standards
Grades	
K-5	Classrooms must have windows equal to or greater than 8% of the floor area.
6-8	Classrooms must have windows.
9-12	No more than 20% of the total number of teaching stations may be windowless.

Every classroom shall have at least one outside window which can be used for emergency rescue or ventilation, unless an exterior door is provided. The window shall be operable from the inside and provide a minimum clear opening dimension of 24 in. and 5.7 sq. ft. in area. Maximum sill height shall be 32 in. (K-6) and 44 in. (7-12) (N.C.S.B.C. Volume I, section 406.3).

Windowless classrooms shall provide secondary access (through an adjoining classroom or directly) to an exit corridor which is separated by one-hour rated construction from the primary exit corridor. (N.C.S.B.C. Volume I, section 406.3.3)

Comments and Recommendations

The net square footage of a pre-K room may not be less than 1,200 sq. ft. The net square footage of a kindergarten or first grade classroom may not be less than 50 sq. ft. below the standard. Recessed doors, toilets, coat closets, offices, and storage rooms are not included in the net instructional area for pre-K through first grade. Minor reductions in size are allowable when architectural design and detailing require it.

To avoid the expense of a second exit door, 1-3 grade classrooms may be 980 net sq. ft. This does not include storage rooms, teacher offices or wall thickness.

Classrooms should be equipped with computers or conduits for future installation. Head-end equipment is located in the media center.

Equip classrooms with a communication system for information and emergency use.

Classrooms smaller than 1,000 square feet should not exceed a 3:2 length-to-width ratio. The minimum classroom width shall be 24'. Individual toilets for pre-K-1 classrooms may be paired with adjoining classrooms to provide a boys' toilet and a girls' toilet. Individual toilets are not required for the first grade, but may used to provide flexibility.

Heat-producing appliances such as ovens or ranges in pre-K through grade 5 classrooms are not approvable. A separate cooking center (local option) will not be included in the classroom net square footage. Heat-producing appliances and counter outlets in instructional kitchens must be on a "kill switch" with a power-on light, located out of reach by students.

Twenty percent (20%) of a room's ceiling may be lower, provided the North Carolina State Building Code minimum is met.

State legislation requires the local board of education to consider the placement of windows to take advantage of the climate of North Carolina for both light and ventilation. It is recommended that grades 6-12 classrooms have window areas equal to or greater than 6-8% of the floor area.

Increase room size 15-20 sq. ft. per computer when full-size computers are installed.

REGULAR CLASSROOMS (Continued)

Cabinets	
See design information (Page 26)	Cabinetwork should include file drawers, box drawers, wide drawers for poster paper, vertical slots, some open-front bins and a minimum of "kitchen" type cabinets. Wall units should be 60% open shelving for books and displays and 40% door cabinets. Tall reach-in cabinets are preferred for teaching supplies. Provide one section for hanging teacher coats.

Wet Areas	Standards
A wet instructional area is required in grades K-3 and in grades 4-6 when science is taught in the classroom. See design information on page 30 for counter heights.	Wet areas should include a sink mounted in a counter-top for instructional use. The location of the sink should allow maximum student participation. Wet areas are also recommended for middle grades. Hot water in most classroom wet areas is not recommended. Pre-K must have warm water and it is recommended for kindergarten.

Lighting	Standards
	Footcandles 60-70

Science		Standards
Grades	Rooms	Square Footage
6-8	Science	1,000-1,200
	Math/Science	1,000
9-12	Physical Science	1,200
	Biology	1,200
	Physics	1,200
	Earth Science	1,400
	Chemistry	1,500
	Multipurpose Science (if required)	1,500

Windows	Standards
K-12	Project and Science rooms must have windows.

Ceiling Height	Standard
	10'-0"

Lighting	Standards
	Footcandles
Classroom	60-70
Laboratory; workroom	100-150

Gas Outlets	Recommendations
Do not provide gas outlets in science rooms where not required by the program. Middle/junior high science rooms should have gas only to the teacher's demonstration table.	

Eye Protection/Showers	Standards
Classroom/lab areas requiring eye protection	Safety goggle cabinet Eyewash fountain
Chemistry labs	Add emergency deluge shower

Comments and Recommendations

A 1,200-square-foot project room is recommended for science in elementary schools. Small schools may have a project room that is a multiuse space to serve more than one program, i.e., art, science, crafts, etc. Additional storage may be necessary for the specialists who use this room.

When a middle school grade level has paired teams for language arts/social studies and math/science, there should be a 50% mix of each type of room for that grade level. For four-teacher teams there should be one science room for every three regular classrooms.

A multipurpose science room is appropriate in small high schools where the enrollment does not justify separate specialized science rooms.

Sufficient work areas with sinks should be provided. Storage and teacher preparation rooms can be shared (square footage is not included in minimum size requirements). Darkrooms can be shared with the art and workforce development (vocational) programs. A 1,500-square-foot chemistry room includes a lecture area and work stations.

Twenty percent (20%) of the room's ceiling may be lower, provided the North Carolina State Building Code minimum is met.

Gas installations must include master cut-off valves and must comply with other safety code requirements.

Access to a large-group instructional area, auditorium or teaching theatre with AV capability is needed for special lectures.

Equip classrooms and labs with a communication system for information and emergency use.

Fire extinguishers should be located in each laboratory area.

Chemistry labs should be equipped with fume hoods. For most labs, a low-volume exhaust fan that is controlled by the teacher is recommended. The fan will maintain a slight negative air pressure in the room and prevent the spread of odors to other parts of the building.

SMALL-GROUP ROOMS

Rooms	Recommendation
	Square Footage
Remediation & resource labs	450

Ceiling Height	Standards
Rooms	Ceiling Height
Remediation and resource labs	9'-4"

Windows	Standard

Required for rooms subject to student occupancy. Recommended where possible for smaller spaces. For certain conditions, a second exit is allowable.

Lighting	Standard
	Footcandles
	60-70

Comments and Recommendations

One or more small-group classroom(s) should be provided for remediation, conferences, guidance, testing, etc., for groups of up to twelve. Some smaller rooms may also be needed in addition to the 450-square-foot rooms for smaller group activities.

Storage space for various instructional materials and equipment should be provided.

Exceptional Children Self-Contained

Rooms	Standard Square Footage

Typically 8 to 12 students will require a minimum of 100 sq. ft. each.

Exceptional Children Resource

Rooms	Standards Square Footage

(See Small-group rooms)

Lighting	Standard Footcandles
	60-70

Wet Areas	Standard

Wet area requirements are the same as regular classrooms except certain programs will require an instructional area with water in both classrooms and resource rooms.

Ceiling Heights	Standards
Room Size	Ceiling Heights
850 sq. ft. and less	9'-4"
851-1,200 sq. ft.	10'-0"
Mobile classrooms	8'-0"

Windows	Standards

Resource rooms occupied by one group for more than two hours and all self-contained rooms must have windows. Window sill heights must be low enough to provide a view for students who will spend some time on floor mats.

Comments and Recommendations

Programs for exceptional children vary greatly, depending on local factors. Spaces must be planned to accommodate educational programs identified in educational specifications. The local factors often result in spaces which are larger than the minimum requirements.

Spaces for exceptional children should be integrated into planned areas for other programs.

If resource rooms are clustered around a shared common area, they may be smaller.

Care should be taken to ensure that the characteristics of fluorescent lighting do not adversely affect children with certain disabilities.

Programs serving exceptional children may also require cooking areas, toilets, bath/shower rooms and laundries. Warm water is required.

Wet areas should include a sink mounted in a countertop for instructional use. The location of the sink should allow maximum student participation. Storage designed for instructional supplies and student projects should be in this area. Coat and book storage may be located elsewhere.

Classrooms for hearing impaired programs will require special acoustical treatment of the finishes, the mechanical system and possibly the lighting ballasts.

Minimum requirements for handicapped accessibility as outlined in the North Carolina State Building Code may not be adequate for special education programs.

Equip classrooms with a communication system for information and emergency use.

ARTS EDUCATION - MUSIC

Music Rooms	Standards
Grades	Square Footage
K-6	
General Music	850-1,000
6-8	
General Music	850-1,000
Vocal	1,000-1,200
Instrumental	1,000-1,200*
9-12	
Vocal	1,000-1,500
Instrumental	1,600-1,800

* This space is small; study carefully.

Support Spaces	Standards
Instrument storage room (varies with enrollment)	400-600
Instruments along music room wall (no separate storage room)	200-300
Music Library	200
Instrument Repair	150
Office	150
Uniform Storage	Varies
Practice Room	55-60
Ensemble Practice Room	150-200

Wet Areas	Standard
Workroom	

A sink adequate for cleaning brass instruments is required by middle and high school band programs.

Ceiling Heights	Standards
Room Size	Ceiling Height
900 sq. ft. & less	9'-4"
900-1,000	10'-0"
1,000-1,200	12'-0"
1,200-1,800	14'-0"-16'-0"

Do not reduce the ceiling heights; increase average ceiling height whenever possible for improved accoustics.

Lighting	Standard
	Footcandles
	70-100

Comments and Recommendations

The elementary music room should be designed to accommodate general, vocal and instrumental music. Acoustical treatment is essential and windows are recommended. In smaller elementary schools, spaces to accommodate music plus other programs may be combined into a multipurpose area as outlined in the matrix "Recommended Minimum Facilities for Arts and Physical Education" found in the Appendix.

A single music room of designated size is appropriate for small middle schools. Separate rooms may be required as enrollment increases and when programs are offered simultaneously.

The room sizes indicated here do not include program support rooms such as offices and storage. These areas are listed separately.

Provide separate storage rooms for band and orchestra instruments.

Equip rooms with a communication system for information and emergency use.

The minimum ceiling heights relate to flat-floor rooms. Risers are not necessary, but rooms with risers will need ceiling heights adjusted to the highest riser so that appropriate ceiling height and room volume are achieved. The ceiling height will be negotiable where a music room of less than 1,200 square feet is the only high-ceiling space in the building or addition.

At least one handicapped station within a row of regular seating will be provided in accordance with the North Carolina State Building Code.

Provide an oversized door or pair of doors into the music classroom and instrument storage room.

Art Rooms	Standards
Grades	Square Footage
K-9	1,000-1,400
9-12	1,200-1,500

Ceiling Height	Standard
Grades	Ceiling Height
K-12	10'-0"

Windows	Standard
K-12	An art classroom must have windows.

Lighting	Standards
	Footcandles
General illumination	70
Task Lighting	100-150

Incandescent task and display lighting should be switched to avoid use as general illumination.

Kilns	Standards

Kilns must be in a separate room. Do not locate in a storage room other than one used for clay products and projects.

Comments and Recommendations

During the preliminary design phase, the furniture and equipment plans should be developed showing studio and lecture relationships. The square footage requirements do not include storage rooms, kiln rooms, darkrooms, clayrooms, office, etc. Storage cabinets and shelving with flexibility are needed for a variety of supplies and projects.

In small elementary schools, the visual arts program may be in a project room, i.e., art, science, crafts, etc. See the matrix "Recommended Minimum Facilities for Arts and Physical Education" found in the Appendix.

The ceiling height may vary; however, the average height should not fall below the minimum requirement. The minimum ceiling height is negotiable if the art room is the only space in the building or addition requiring more than a 9'-4" ceiling.

Light sources may vary from daylighting to artificial sources. Artificial light sources should provide full color spectrum and task-level illumination. Skylights, clerestories and rooftop light monitors are permissible. Outside work patios adjacent to classroom exterior windows and doors are recommended. Fluorescent fixtures are recommended; however, incandescent may be used for critical tasks where color is important. Provisions for darkening part or all of the room may be a design consideration.

Kilns have special electrical and ventilation requirements that should be provided for, even if the equipment is not in the contract. Paint spraying and hazardous material storage will be subject to the North Carolina State Building Code. Do not locate kilns adjacent to storage areas for flammable materials.

Equip rooms with a communication system for information and emergency use.

Grades	Standard
K-12	Square Footage 1,800-2,000

Ceiling Height	Standard
K-12	10"-0"

Lighting	Recommendations
30 footcandles for stage setup illumination (fluorescent); 15 footcandles maximum for seating area. Special incandescent illuminated mirrors may be used for makeup in dressing rooms.	

Comments and Recommendations

The K-6 theatre arts room should be a large open space which is carpeted and acoustically treated. A small raised space with simple, individually controlled directional lighting is required for the presentation and viewing of special projects. Design features such as built-in furniture should be avoided in order to provide maximum flexibility. The middle and junior high theatre arts room should be similar to the elementary classroom. If no other performing facility is available in the school, then this space may be designed as a small teaching theatre where both instruction and performance can take place. In either case, there should be a small, raised performance area with simple, individually controlled directional lighting.

In smaller elementary schools, spaces to accommodate theatre arts plus other programs may be combined into a multipurpose area, as outlined in the matrix "Recommended Minimum Facilities for Arts and Physical Education" found in the Appendix. Multipurpose spaces for middle and junior high schools should be evaluated on an individual basis.

The high school theatre arts room should be a large open space for activity-based instruction. It should have a small, raised space with individually controlled directional lighting. The raised space is not essential where an adequately equipped performing facility is nearby and accessible during theatre arts instructional time. If a small teaching and performing facility is available for all theatre arts instruction, then a separate theatre arts room may not be necessary.

Comments and Recommendations

An additional feature of either situation is that flat-surface work tables be available in order to carry out design and construction projects. In small high schools, theatre arts and dance may be combined, provided the design and additional support space required demonstrate functional adequacy. Support spaces include makeup, scenery construction, and scenery and general storage. Large auditoriums are not recommended for school purposes. The gymnasium or multipurpose indoor playroom can be used for large assemblies.

If the board of education chooses to build a high school auditorium, consideration should be given to seating the largest class (ADM) x 8 sq. ft. plus about 4,000 square feet for the stage, storage and a small lobby. The auditorium should be planned as a theatre, with suitable acoustical design, lighting system, sound system, storage, and support facilities such as makeup and scenery construction spaces. The entire facility should be designed for theatre arts instruction, although this will be a multipurpose space. Adjacent study and work spaces should be available to support and provide instruction in theatre history, literature, design, construction, acting, directing and performance. These support spaces could be unscheduled regular classrooms.

Equip rooms with a communication system for information and emergency use.

ARTS EDUCATION - DANCE

Grades	Standard
K-12	Square Footage
	1,800-2,000

Ceiling Heights	Standards
	10'-0" Minimum
	12'-0" recommended

Windows	Recommendation
Recommended where possible	

Lighting	Standard
	Footcandles
	60-70

Comments and Recommendations

In smaller elementary schools, spaces to accommodate dance plus other programs may be combined into a multipurpose area, as outlined in the matrix "Recommended Minimum Facilities for Arts and Physical Education" found in the Appendix. Multipurpose spaces for middle and junior high schools should be evaluated on an individual basis.

In small high schools, theatre arts and dance may be combined, provided the design and additional support space required demonstrate functional adequacy.

The dance classroom should be a large, unobstructed space with either a suspended wooden floor or a floor covered with a portable or permanent dance surface which provides a resilient surface on which to move. Many wooden gymnasium floor systems are not resilient enough for thin dance shoes or socks. Dance classrooms should not be carpeted or have only a concrete and/or tile floor. It may be desirable to have mirrors on one wall of a shatterproof material or mounted to prevent shattering. An adjustable-height dance barre may also be desirable. The classroom should be soundproofed or located so that music and other noises associated with dance instruction do not conflict with adjacent classrooms. There should be storage and/or closet space for students to use to store their personal belongings during the class. A separate lockable storage space for the dance teacher to store materials, equipment, recordings, props and other related items should be easily accessible. Bulletin boards and chalkboards are needed. Storage should be provided for mats or cushions that students sit on while viewing films or during other instructional activities. It is desirable to locate the rooms near toilets and water fountains.

At the middle and high school levels, dressing room space is needed for students to change clothing.

Equip rooms with a communication system for information and emergency use.

WORKFORCE DEVELOPMENT (VOCATIONAL EDUCATION)

Workforce Development (Grades 6-8)	Standards Square Footage
Exploratory Programs:	
Exploring Career Decisions	*1,300-1,600*
Exploring Life Skills	*1,400-1,600*
Exploring Technology Systems	*1,400-2,000*
Exploring Business & Marketing	*1,300-1,600*
Exploring Biotechnology	*1,400-2,000*
Skill-Development Program:	
Keyboarding	*1,000-1,400*

Proposed sizes pending State Board of Education approval.

Workforce Development Classrooms/Labs (Grades 9-12)	Standards Square Footage
Business Education	1,200-1,400
Family and Consumer Sciences	1,400-1,600
Marketing Education	1,000-1,200
ICT	850-1,000
Heavy-Equipment Laboratories (including lab, storage & office):	2,500-3,000
Agriculture	
Trade & Industrial Education: construction, metals manufacturing, furniture/cabinet making, automotive technology, auto body repair, industrial maintenance, textiles	
Medium-Equipment Laboratories (including lab, storage & office):	2,000-2,500
Health Occupations Education	
Technology Education	
Personal/Human Resources food production and management	
Trade & Industrial Education: masonry, graphics, air conditioning/refrigeration, electrical trades, cosmetology, welding	
Light-Equipment Laboratories (including lab, storage & office):	1,600-2,000
Personal/Human Resources child care apparel and interiors	
Trade & Industrial Education: drafting, electronics	

Comments and Recommendations

For middle school programs, local school districts may select from exploratory courses and keyboarding. Smaller schools may combine certain programs in multiuse labs, as illustrated in the matrix "Recommended Minimum Facilities for Middle Grades Workforce Development Programs," found in the Appendix.
See **Middle Grades Exploratory Vocational Facilities** for proposed space standards.

The Basic Education Program states:
"Vocational Education (grades 7-8) will be available to all students, but not required. A basic high school vocational education program must include offerings in at least three of the following areas:

Agricultural Education
Health Occupations Education
Business Education
Family and Consumer Sciences Education
Marketing Education
Technology Education
Trade & Industrial Education"

Many high schools offer all seven programs. The number and types of laboratories will depend on courses offered locally. More than one laboratory for a program such as family and consumer sciences may be necessary in larger schools.

Career centers serving several schools will affect the types and number of facilities needed at a high school.

Many workforce development programs are moving away from the large and extensively equipped trade and industrial shops. School Planning will review facilities based on new and innovative workforce development programs, as described in the educational specifications developed by the LEA.

Ceiling Heights	Standards
See regular classrooms for workforce development classrooms and light-equipment laboratories up to 1,200 square feet.	
1,200-2,000 square feet	12'-0"
2,000 square feet and above	14'-0"

Lighting	Standards
	Footcandles
Classrooms	60-70
Laboratories, close work	100
Laboratories, general work	60-70

Windows	Standards
See regular classrooms for workforce development classrooms and light-duty laboratories. Laboratories with hazardous equipment must have windows, skylights, or some other daylight source.	

Comments and Recommendations

Multipurpose workforce development laboratories may be necessary in small high schools. A shop-type facility, for example, could serve plumbing, electrical, and sheet metal programs. Multipurpose laboratories must also have a detailed layout to establish functional adequacy. In addition, a multipurpose laboratory must meet the requirements outlined in the Purpose section of this guide.

A larger darkroom with additional storage could serve art and science, as well as the workforce development programs.

A student conference area, office and storage area are to be provided for cooperative method programs. (Agriculture, Business, Marketing, Personal/Human Resources, and Trade & Industrial Education)

Laboratories that generate excess dust or other airborne pollution must have an exhaust system.

If a school store is part of Marketing Education, provide an additional 500 square feet.

Workforce development classrooms without an exterior wall may be windowless if they have windows into a shop or laboratory which has an ample daylight source.

Equip all classrooms and laboratories with a communication system for information and emergency use.

Grades		Standards
	Spaces	Square Footage
K-12	Main Room	4'-6'/student (ADM)
	(RLV)	but not less than 1,600
	See matrix in appendix.	
K-5	Support Areas	1,200
6-8	Support Areas	1,800
9-12	Support Areas	2,000
K-12	Computer Room	850-1,000
K-5	Video Production Room	300
6-12	Video Studio	400
	Control/Editing	260
	Equipment Storage	80

Capacity	Standard
40 students or 10% of the membership (ADM), whichever is greater.	

Ceiling Heights	Standards
Main Room (RLV)	Minimum 12'-0"
Support Areas	9'-4"

Comments and Recommendations

The school's media center should be located on the ground floor, be single story and be convenient to all learning areas of the school. The plan arrangement should not result in the RLV room (reading, listening and viewing) becoming a major thoroughfare for student traffic. Convenience to an outside entrance with access to restrooms allows the center to operate after hours and facilitates the delivery of materials and equipment. The media center's location should not preclude future expansion of the facility.

A proposed furniture and equipment plan should be developed during the early design development stage in order to determine functional adequacy. The minimum media collection must be equivalent to a school serving 400 students.

Minimum support areas include offices, work/production rooms, conference rooms, periodical storage, audiovisual equipment storage and spaces for a professional collection. Audiovisual equipment storage rooms should have a second door leading into a corridor for the convenience of teachers checking out equipment for their classrooms.

Video production areas are sized for consumer-grade equipment.

Most schools no longer include a computer room as part of the media program. The current trend is for the media center to house head-end equipment to serve computers located in the classrooms.

The optional computer room requires additional electrical outlets (surge protection devices are recommended), a central electrical control switch, and a phone line (dedicated is recommended). Appropriate lighting, additional ventilation for equipment, and security are additional planning considerations.

Elementary schools should have a storytelling area for 29 pupils.

Varied ceiling heights in the main room (RLV) are desirable as part of an aesthetic, acoustical and lighting strategy.

Lighting	Standards
Spaces	Footcandles
Stacks and storage areas	30
Main room and support areas	70

HVA/C System	Recommendations
The HVA/C system should be separately zoned from those parts of the building which are not mechanically conditioned all year. Special attention must be given to adequate ventilation and humidity control to prevent mold and mildew. Computer hardware and software must be protected from temperature extremes.	

Windows	Recommendations
Windows are recommended in the main media center room (RLV), but are not recommended for electronic equipment storage rooms. They are recommended in the support areas, but are not necessary if there are windows into the main room (RLV).	

Wet Areas	Standard
The work/production room requires a sink.	

Other Planning Data From:
•School Planning
•Media and Technology Services

Comments and Recommendations

Lighting controls should be convenient and capable of darkening or dimming specific areas. The RLV should have a switch at the entry to control some general lighting. Electrical outlets (some with surge protection) should be coordinated with the furniture and equipment plan. Computer and electronic equipment will require more electrical outlets than required by code. Use fluorescent lighting in most areas. Metal halide lighting may be used in the main area. Incandescent fixtures should be limited to special-effect lighting.

Windows should neither admit distracting light nor hinder space utilization and should be equipped with draperies or darkening shades.

Television outlets should be conveniently located no higher than 48" above the floor.

Intercom speaker(s) should have independent volume control(s).

Consideration should be given to providing a MATV/CCTV system for the school (Specialized satellite instructional television). Provisions should be made to receive signals from the University of North Carolina Center for Public Television and bring it into the media center workroom.

Handicapped access to the media center must meet the requirements of the North Carolina State Building Code, except that the 32" clear spacing for existing shelving will not apply to renovated or remodeled public schools. The spacing between movable furniture must allow for handicapped access.

Rooms		Standards
Grades	Spaces	Square Footage
K-6	Multipurpose/indoor P.E.	3,600 (play area)
6-9	Gymnasium 42' x 74' court + *safety space + seating	Varies
9-12	Gymnasium 50' x 84' court + *safety space + seating	Varies

* Safety space of 6' on each side and 8' on each end of a basketball court is required in all cases.

9-12 wrestling (competitive)	3,000
9-12 resistive exercise (weight room)	2,000-3,000

Windows	Standard
Play areas and gymnasiums must have windows or other daylight sources to provide a minimum amount of natural lighting.	

Lighting	Standards
Spaces	Footcandles
Exercise areas, gymnasiums and locker rooms	30
Athletic events	50

Ceiling Heights	Standards
Grades	Ceiling Height
K-6	15'-0"
6-9	20'-0"
9-12	20'-0" to 24'-0"
Support areas under 850 sq. ft.	9'-4"
Dressing, showers, etc.	10'-0"
P.E. and athletic teaching areas (weight, team, wrestling rooms)	12'-0"

Other Planning Resources:
Planning a Fieldhouse, Division of School Planning, 1987

Comments and Recommendations

K-6 indoor P.E. areas should include additional square footage for an office, storage and toilets for boys and girls. Add space if a stage is included. The 6-8 grade gymnasium should include dressing and shower areas, offices and some storage. Assembly and spectator use may require increased size. The 9-12 gymnasium should include space for two play courts, spectator seating, dressing and shower areas, office areas, storage and a lobby. Additional P.E. and athletic facilities may be needed to schedule the program in larger schools. Additional storage may be needed for exceptional children programs. Locker and dressing rooms should be visible from P.E. teachers' offices to reduce vandalism and violence. Private shower stalls with an enclosed dressing area should be provided for both boys and girls.

An auxiliary gymnasium with a minimum of 3,600 sq. ft. is recommended for schools with 1,000 and more students.

A resilient floor finish such as high-density gym carpet is recommended for wrestling rooms and resistive exercise rooms. Resistive exercise and wrestling rooms must be located in an area accessible to both genders.

Windows in physical activity areas should be located to prevent glare. Locker rooms should have a daylight source for safety.

Lay out resistive exercise rooms with 2'-0" clear around extended equipment parts or limbs and allow additional width for spotters and circulation.

Guardrails must be provided at the rear and at open ends of elevated seating facilities, including tip-and-roll bleachers, where the seating height exceeds 30".

Twenty percent (20%) of the gymnasium and playroom ceiling may be lower, provided the North Carolina State Building Code minimum is met. All playrooms and gymnasiums are teaching stations and require good acoustics. The ceiling is the best area to treat acoustically.

Swimming pools are a local option that is recommended. An instructional pool can serve many programs and the design should meet the requirements of the educational specifications. It is recommended that a competition pool be 50 meters in length with 6 lanes. Community use of the multipurpose room, gymnasium or swimming pool may require additional design considerations.

ADMINISTRATION

Rooms	Recommendations Square Footage
Principal	200
Assistant principal (each)	150
Reception area	400
Secretary	150
SIMS K-5	120
SIMS 6-8	150
SIMS 9-12	200
Other student services	200
Workroom/Storage	200
Conference room	200
Record storage	100
General storage	100

Lighting Spaces	Standards Footcandles
All offices	80-100
Conference room	50
Storage room	20

Comments and Recommendations

Sizes and number of spaces will vary according to staffing. Partition construction should allow for flexibility.

An assistant principal is funded by the state when the enrollment reaches 700.

At least two unisex toilets are recommended for the administrative staff. Group toilets are appropriate in larger schools or where guidance personnel and teachers also use these facilities. Individual toilets in private offices are inefficient, expensive, and not recommended.

Rooms		Recommendations
Grades	Rooms	Square Footage
K-5	Guidance	450
6-12	Guidance	300
9-12	Reception/Career center	varies
K-12	Counselor office	150
K-5	Other student services	150
6-12	Other student services	200
K-8	Health room	200
9-12	Health room	150
K-12	Health room toilet (required)	50

Lighting	Standard
	Footcandles
	60-70

Comments and Recommendations

Elementary guidance areas serve small-group and individual guidance and should include a private counselor office. Schools with more than one counselor may need additional space.

The 6-12 guidance recommendation is for a small school with one counselor. Larger schools will require additional counselor offices. Depending on the size of the school, the reception area may need to be expanded to handle the number of students who may use catalogs and other materials in the guidance center. A guidance/student services center in a large high school can be in the 2,000-3,000-square-foot range.

The health room may serve the nurse and other medical professionals and as a temporary station for sick students. The health room must be located to allow for easy supervision and must include an adjacent toilet. A vision panel with blinds is helpful for supervision by office personnel.

Rooms designated for other student services may house social workers, psychologists or other health professionals. Student offices may be needed for student publications, student government and student clubs.

Provide a vision panel with blinds in a door or wall for all guidance or consultation rooms where staff liability issues could arise.

STAFF SUPPORT AREAS

Rooms		Standards
Grades	Rooms	Square Footage
K-3	Teacher office/workspace	100-125/ teacher
4-12	Teacher office/workspace	80-100/ teacher
K-12	Special assistant and itinerant teacher office/work space	80-100
K-12	Workroom varies	
K-12	Lounge varies	

Telephones	Standard
Faculty use (exclusive of Child Nutrition and Administration)	1 per 200 ADM

Staff Toilets
(See comments and recommendations)

Lighting	Standards Footcandles
Lounges and toilets	30
Workrooms and offices	50-70

Comments and Recommendations

Combined or shared areas are recommended for efficient and flexible use of offices/workspaces. Teacher offices/ workspaces should be near but not in the classrooms, where feasible. In addition to a desk and chair, the workspace should include tables, shelving and storage.

Workspace dividers should have acoustical treatment which will allow telephone and computer use in combined or shared areas.

Work space must be provided for instructional, lab, and clerical teacher assistants (one per 285 students in ADM). Provide one office/workspace per projected itinerant teacher plus an appropriate number for volunteers and student teachers.

One or more centralized workrooms is/are required for copy machines, duplicators, specialized computers, and other equipment and supplies which are not typically located in teacher offices/workspaces.

Sizes and number of lounges will be determined by faculty size and building plan. Provide limited kitchen facilities.

Faculty telephones must be located for private use.

Faculty toilets should be located near classrooms. Teachers must not have to travel over 200' to reach a toilet. The minimum fixture count for the staff must be based on Public Office Building Occupancy, not School Occupancy (Table 922.2 North Carolina State Building Code, Volume II). The ratio of male and female staff must be considered in the use of Table 922.2. Faculty toilets should have a parcel shelf, a place to hang garments, a full-length mirror, and an appropriate area for grooming.

Corridor Widths	Standards
Serving more than two classrooms	8'-0"
Serving more than ten classrooms	9'-0"
Elementary and Middle school major corridors	10'-0"
High school major corridors	12'-0"
Lockers along one wall add	2'-0"
Lockers along two walls add	3'-0"

Commons Size	Recommendation
Grades	Square Footage
7-12	Varies

Entries	Recommendation
Bus rider entries and automobile rider entries should receive equal attention.	

Stairs	Standard
A single run of stairs will not exceed 8'-0" without a landing. (The code limit which is greater is not satisfactory for schools.)	

Toilets	Recommendations
Group toilet entries should have adequate privacy screening that does not depend on doors. (N.C.S.B.C. Volume tl, Principle No. 20; 301.20)	

Group toilets for boys must have a minimum of two water closets.

Lighting	Standard
Most areas must have at least 20 footcandles and a maximum of 30 footcandles in toilets.	

Ceiling Heights	Standard
All Spaces	9'-4"

Doors	Standard
Doors which open into a corridor must be recessed or protected by wing walls so that any part of the door swing does not project into the circulation path more than 7". (also see 1114.5 NCSBC)	

Comments and Recommendations

The minimum corridor width approvable by School Planning is 6'-0', except that corridors within administrative areas, guidance areas and locker rooms may be 5'-0".

Major corridors serve classroom feeder corridors and/or major spaces such as the cafeteria, media center, auditorium or gymnasium.

During class changes, wide corridors in secondary schools serve a social function better than a student commons. Narrow corridors amplify unacceptable behavior.

Commons should be designed as a student social center. Location and design of commons are more important than size.

Student entries and areas near the cafeteria are good locations for a commons. Ceremonial and visitor entries can be combined with the student entries.

The minimum code width for stairs may not be adequate for two-way traffic in 6-12 schools. Stair widths of 6'-7' are recommended.

Many schools have reduced social problems and maintenance by eliminating entry doors to group toilets and using screen walls for privacy at entrances. Where vandalism is a problem, reinforced masonry privacy partitions should be used around commodes and urinals. Natural lighting is desirable in all areas. Light switches located in the toilets and corridors should be key operated or located in administration areas or equipment rooms not accessible to students.

Group toilets for each gender with 5 to 7 flushing fixtures are most efficient. The code minimum is 4 fixtures.

Group toilets should be located on main circulation paths between classrooms and major support spaces (cafeteria, media center, gymnasium, etc.).

Group toilets must be available to students in self-contained classrooms for group use when going to the cafeteria, media center, etc.

Provide covered areas at all exterior doors. Provide covered walks between separate buildings.

Except for delivery areas, use multiple single doors rather than double doors. Use oversized doors for exceptional children entries, shops, kitchens and music areas.

CHILD NUTRITION - CAFETERIAS

Dining Room Seating Area	Standards
Grades	Square Footage
K-6	12-14*
5-8	12-14*
7-9	14*
9-12	14*
	Per Pupil Dining Including 2 square feet for circulation

Dining Area Ceiling Heights	Standards
Minimum below 3000 Sq. Ft.	12'-0"
Minimum 3000 Sq. Ft. or above	14'-0"

Kitchen/Serving	Recommendations

*The total area for grades K-12 can vary from 856 square feet per 100 meals served to 2,880 square feet per 1,500 meals served.

Meals Served	Square Footage
100	856
250	1,261
500	1,518
750	1,938
1,000	2,208
1,250	2,566
1,500	2,880

Lighting	Standards
Rooms	Footcandles
Kitchen, office, serving and preparation	70
Dining areas and storage areas without natural light	20

Other Planning Resources:
An Architects Guide to Planning School Cafeteria Facilities, School Planning, NCDPI

Comments and Recommendations

The dining area size is determined by dividing the number of participating children by the number of seatings multiplied by the square footage per pupil (size = ADM ÷ number of seatings x sq. ft. per pupil). A very small school may have one seating. A very large school may have four seatings. For the typical school, three seatings make the best use of cafeteria facilities. A program of continuous serving and seating requires some additional planning and may be most efficient.

These ratios relate to a complete lunch and are a valid basis for any public school child nutrition program which is operated in a self-contained cafeteria. The term "kitchen" includes all the usual support areas needed for preparing and serving food for school children and staff.

The minimum standards for child nutrition facilities are based on a traditional program which includes a full-service kitchen and seating to accommodate the entire student body in shifts. The standards will not be appropriate where central kitchens or satellite food preparation areas are used. Likewise, the dining room area could be reduced for schools with open lunch periods which do not serve the entire student body. For these atypical situations, the board of education should provide a description of the child nutrition program which must be accommodated. Refer to Public School Laws of North Carolina, Article 17. Supporting Services, Part 2 Food Service, 115C-263 and 115C-264.

Rooms	Recommendations
	Square Footage
Mechanical rooms	Varies
Electrical rooms	Varies
Custodial rooms	Varies
Storage areas	Varies
Book storage	Varies
General storage	Varies

Comments and Recommendations

Sizes and locations of support area rooms are determined by need.

Where mechanical equipment is located on the roof or mezzanine, permanent stairs are recommended.

All support areas need ventilation.

Louvers in interior doors are not recommended; undercut doors instead.

Provide a well-ventilated storage area for yard maintenance equipment and combustible materials. A building separate from the main building is preferred.

Allow adequate space above mechanical equipment for ceiling installation and maintenance.

Separate boiler and furnace rooms with 2-hour-rated walls and ceilings, with no openings except to the outside of the building (N. C. S. B. C. 406.2.1.4)

Provide illumination for reading mechanical equipment controls and gauges.

DESIGN INFORMATION

Work Counter Heights			Standards
Pre-K-3	4-5	6-8	9-12
24" to 26"*	30"*	30" to 36"*	33"to 36"

* Handicapped standards for children up to age 12 must be met.

Chalkboard Rail Heights			Standards
Pre-K-3	4-5	6-8	9-12
21"-26"	28"-30"	29"-32"	33"-36"

Plumbing Fixture Mounting		Standards
Grades	Height (to rim)	Accessible to the Disabled
Water Closets		
K-3	15"	15"
4-6	15"	15"
7-12	15"	17"-19"
Urinals		
K-3	14"-17"	14"
4-6	20"	14"
7-9	22"	17"
10-12	24"	17"
Lavatories		
K-1	24"	28" (24" min. knee space)
2-6	27"	30"
7-12	31"	34"
Drinking Fountains		
K-3	24"	30"
4-6	28"	30"
7-12	34"	34"
Showers		
K-5 Boys & Girls	50"-56"	66" fixed 48" flexible
7-9 Boys	72"	74" fixed 60" flexible
7-9 Girls	60"-66"	74" fixed 60" flexible
10-12 Boys	72"	74" fixed 60" flexible
10-12 Girls	66"	74" fixed 60" flexible

Construction
School Planning will not approve new school construction or school additions of type VI construction (N.C.S.B.C.) over one story. Type VI construction is strongly discouraged due to its inherent fire hazard potential and future limitations on expansion.

Space Profiles
Upon request, School Planning can provide a computerized space profile for a given enrollment (Pre-K-5, 6-8 & 9-12).

Ceilings
Lay-in ceilings are most often used and are acceptable. Gypsum board is recommended in small spaces, low-ceiling areas, toilets and dressing rooms, and unsupervised areas. Multipurpose rooms and gymnasiums should have a cementitious fiber roof deck for proper acoustics.

Walls
Masonry walls are preferred. Gypsum board stud walls require more maintenance. Chair rails and double layering of sheetrock are recommended for increased durability. Stud walls in administration and guidance areas may be preferred for flexibility.

Floors
Primary classrooms should have a good grade of carpet, since many activities take place on the floor. Resilient tile is recommended for other classrooms and for wet areas in carpeted rooms. Multipurpose rooms and gymnasiums should have resilient floors such as wood, synthetic or high density carpet. Dance rooms should have wood floors that have more resilience than many gym floors.

Carpeting is recommended in corridors for acoustical control. There should be a separate area of carpet at outside doors so that it can be replaced easily.

Terrazzo is often used in corridors when durability is desired.

Computers
Provide cable trays, conduit and equipment rooms for a computer network. (see "Minimum Checklist for Mechanical and Electrical Plans & Specifications," 1992, School Planning)

Lighting
Fluorescent lighting is recommended for general lighting. Incandescent lighting should only be used for limited accent lighting, stage lighting and special art room lighting. Gymnasiums should use metal halide fixtures. Metal halide should be considered in other large-volume spaces.

Fluorescent fixtures should have T-8 lamps & electronic ballasts with three or four tubes, and double switching to control inside tubes separately. Fixtures in dishwashing areas, kitchens and shower rooms should be moisture resistant.

Handicapped Accessibility Standards

Each teaching station should have an area that meets the requirements of the North Carolina State Building Code. In regular classrooms, this can be accomplished by rearranging the desks. Laboratories and other specialized areas may need one station modified for accessibility. Programs for exceptional children may entail design features that exceed the building code requirements.

Refer to Appendix A, Vol. I-C or latest ADA standards for mounting heights and clearances for use by children in grades K through 7.

APPENDIX

GENERAL STATUTE 115C-521. Erection of School Buildings.

(a) It shall be the duty of local boards of education to provide classroom facilities adequate to meet the requirements of G.S. 115C-47 (10) and 115C-301. Local boards of education shall submit their long-range plans for meeting school facility needs to the State Board of Education by January 1, 1988, and every five years thereafter. In developing these plans, local boards of education shall consider the costs and feasibility of renovating old school buildings instead of replacing them.

(b) It shall be the duty of the boards of education of the several local school administrative school units of the State to make provisions for the public school term by providing adequate school buildings equipped with suitable school furniture and apparatus. The needs and the cost of those buildings, equipment, and apparatus shall be presented each year when the school budget is submitted to the respective tax-levying authorities. The boards of commissioners shall be given a reasonable time to provide the funds which they, upon investigation, shall find to be necessary for providing their respective units with buildings suitably equipped, and it shall be the duty of the several boards of county commissioners to provide funds for the same.

Upon determination by a local board of education that the existing permanent school building does not have sufficient classrooms to house the pupil enrollment anticipated for the school, the local board of education may acquire and use as temporary classrooms for the operation of the school, relocatable or mobile classroom units, whether built on the lot or not, which units and method of use shall meet the approval of the School Planning Division of the State Board of Education, and which units shall comply with all applicable requirements of the North Carolina State Building Code and of the local building and electrical codes applicable to the area in which the school is located. These units shall also be anchored in a manner required to assure their structural safety in severe weather. The acquisition and installation for these units shall be subject in all respects to the provisions of Chapter 143 of the General Statutes. The provisions of Chapter 87, Article 1, of the General Statutes, shall not apply to persons, firms or corporations engaged in the sale for furnishing to local boards of education and the delivery and installation upon school sites of classroom trailers as a single building unit or of relocatable or mobile classrooms delivered in less than four units or sections.

(c) The building of all new school buildings and the repairing of all old school buildings shall be under the control and direction of, and by contract with, the board of education for which the building and repairing is done. If a board of education is considering building a new school building to replace an existing school building, the board shall not invest any construction money in the new building unless it submits to the State Superintendent and to the North Carolina Historical Commission an analysis that compares the cost and feasibility of building the new building and of renovating the existing building and that clearly indicates the desirability of building the new building. Boards of education shall also not invest any money in any new building that is not built in accordance with plans approved by the State Superintendent to structural and functional soundness, safety and sanitation, nor contract for more money than is made available for its erection. However, this subsection shall not be construed so as to prevent boards of education from investing any money in buildings that are being constructed pursuant to a continuing contract of construction as provided for in G.S.115C-441 (c 1). All contracts for buildings shall be in writing and all buildings shall be inspected, received, and approved by the local superintendent and the architect before full payment is made therefor: Provided, that this subsection shall not prohibit boards of education from repairing and altering buildings with the help of janitors and other regular employees of the board.

In the design and construction of new school buildings and in the repair and renovation of existing school facilities that are required to be designed by an architect or engineer under G.S. 133-1.1, the local board of education shall participate in the planning and review process of the Energy Guidelines for School Design and Construction that are developed and maintained by the Department of Public Instruction and shall adopt local energy-use goals for building design and operation that take into account local conditions in an effort to reduce the impact of operation costs on local and state budgets. In the design and construction of new school facilities and in the repair and renovation of existing school facilities, the local board of education shall consider the placement and design of windows to use the climate of North Carolina for both light and ventilation in case of power shortages. A local board shall also consider the installation of solar energy systems in the school facilities whenever practical.

GENERAL STATUTE (Continued)

In the case of any school building erected, repaired, or equipped with any money loaned or granted by the State to any local school administrative unit, the State Board of Education, under any rules as it may deem advisable, may retain any amount not to exceed fifteen percent (15%) of the loan or grant, until the completed buildings, erected or repaired, in whole or in part, from the loan or grant funds, shall have been approved by a designated agent of the State Board of Education.

Upon approval by the State Board of Education, the State Treasurer may pay the balance of the loan or grant to the treasurers of the local school administrative unit for which the loan or grant was made.

(d) Local boards of education shall make no contract for the erection or repair of any school building unless the site upon which it is located is owned in fee simple by the board: Provided, that the board of education of a local school administrative unit, with the approval of the board of county commissioners may appropriate funds to aid in the establishment of a school facility and the operation thereof in an adjoining local school administrative unit when a written agreement between the boards of education of the administrative units involved has been reached and the same recorded in the minutes of the boards, whereby children from the administrative unit making the appropriations shall be entitled to attend the school so established.

In all cases where title to property has been vested in the trustees of a special charter district which has been abolished and has not been reorganized, title to property shall be vested in the local board of education of the county embracing the former special charter district. (1955, c.1372, art. 15, ss57; 1969, c. 1022, s. 1; 1981,c. 423, s. 1; c. 638, s. 1; 1983, c. 761, s. 93; 1985, c. 783, s. 3; 1987, c. 622, s. 14.)*

* G.S. 115C-S24. Repair of school property; use of buildings for other than school purposes. Repair of school buildings is subject to the provisions of G.S. 115C-521 (c) and (d).

IMPLEMENTING ENERGY-USE GOALS AS REQUIRED BY G.S. 115C-521(c)

The 1993 Legislature enacted legislation that requires energy-efficient school construction. Local school boards must adopt energy-use goals for their school unit. Energy goals and standards adopted by many of North Carolina's local school units extend beyond construction. Many policies also cover the daily use and operation of facilities by students, teachers, administrators and support staff.

The recently developed *Energy Guidelines for School Design and Construction* publication is now part of the law dealing with the erection of school buildings (G.S.l lfc-521). The *Guidelines* is currently undergoing evaluation in several pilot school construction projects across the state. Initial response says that the information contained is useful. Comments also point out a need to refine and edit the material to make the reporting forms more efficient and meaningful. Revisions to the publication will take place after an evaluation of all pilot projects has been completed. Staff members in School Planning and Plant Operations are currently reviewing energy guidelines being developed by several county and municipal governments. These guidelines will probably influence revisions to the *Energy Guidelines*

If a local unit is preparing to start a construction project, the *Energy Guidelines* must be used. As in the pilot projects, the *Guidelines* may be used as is or modified to meet the specific needs of the owner and designers. Unlike the pilots, the *Guidelines* are now mandatory, so any modifications must be approved by School Planning. School Planning is currently upgrading many of its publications and forms to cover energy-use goals and standards. These revised materials offer another path similar to the planning processes covered in the *Guidelines*. These publications will ease the information transfer process, especially for small projects where conditions do not warrant a lengthy study.

Another change made by the Legislature to G.S. ll 5C-521 requires a cost and feasibility analysis for renovating an old school building when a school board intends to replace it with a new school. When developing the cost of fully renovating an existing building, the same energy goals and standards must be applied.

It is suggested that a staff member be assigned as an energy management coordinator. Most larger school systems have a facility division that includes an energy section to handle these matters. Smaller school units will be more dependent on their architects and engineers for energy design data and the reviews for that data made by School Planning. School Planning staff members are available for assistance and to answer questions.

FEASIBILITY AND COST ANALYSIS AS REQUIRED BY G.S.115C-521

The 1993 session of the General Assembly of North Carolina passed House Bill 1001, "AN ACT TO ENCOURAGE LOCAL BOARDS OF EDUCATION TO RENOVATE OLD SCHOOL BUILDINGS INSTEAD OF REPLACING THEM". This Act modifies General Statute 115C521. It requires that "If a board of education is considering building a new school building to replace an older school building, the board shall not invest any construction money in any new building unless they submit to the State Superintendent and the North Carolina Historical Commission an analysis that compares the cost and feasibility of building the new building and of renovating the existing building and that clearly indicates the desirability of building the new building."

FEASIBILITY AND COST ANALYSIS forms shall be submitted to School Planning, NCDPI for review along with the first submittal of plans for review, whenever a new project would replace an older school building. The address for submittal of plans and the analysis is as follows:

NCDPI, School Planning
NC Education Building, 7th Floor
301 N. Wilmington St.
Raleigh, NC 27601-2825
(919) 715-1990

The feasibility and cost analysis forms are provided as a guideline. Other formats may be used, but comparisons must be based on useful life and cost per student.

FORMS AND ASSISTANCE ARE AVAILABLE FROM SCHOOL PLANNING.

Maximum Legal Class Sizes (1995-96)*

Grade(s)	Class Size
K	23
1-9	26
10-12	29

*A class may exceed the legal maximum size by up to three students provided the LEA average does not exceed the legal limit (G.S. 115C - 301(c).

State Regular Classroom Teacher Allotments (1995-96)

Grades	Teacher/Pupil Ratios
K-1	1:23
2-9	1:26
10-12	1:28.425

Basic Education Program Recommendations

The Basic Education Program calls for "expanded instruction in the arts, in a second language, and in physical education." To provide instruction in these subjects for every child will require a lower teacher/pupil ratio, as follows:

Grades	BEP Teacher/Pupil Ratio
K-3	1:20
4-6	1:22
7-8	1:21
9-12	1:24.5

Pre-kindergarten Recommendations

Grades	Teacher/Pupil Ratios
3 year old	1:8
4 year old	1:8 or 9

The maximum daily load for teachers teaching only in grades 7- 12 is 150 students. Current State Board policy establishes the maximum class size at 50 students in selected areas such as music, physical education and similar classes, with the exception of activities such as band and choral music. Keyboarding classes are now subject to normal class size limits.

Recommended Minimum Facilities for Arts and Physical Education

Elementary School ADM	200	350	500	625
Project Room (see Science & Visual Arts comments and recommendations)	*			
Visual Arts 1200 sq. ft.		*	*	*
Music 1000 sq. ft.			*	*
Theatre Arts 2000 sq. ft.				*
Dance 2000 sq. ft.				*
Theatre Arts/Dance 2000 sq. ft.			*	
Music/Theatre Arts/Dance 2000 sq. ft.		*		
Music/Theatre Arts/Dance/PE 3600 sq. ft.	*			
PE 3600 sq. ft.		*	*	*

A project room should be available for art and science.
Additional facilities may be needed to house locally paid teachers

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Recommended Minimum Facilities for Middle Grades Workforce Development (Vocational) Programs

Middle grades Workforce Development programs are elective. A local administrative unit may choose from five exploratory courses and keyboarding. Minimum facilities should be based upon student enrollment

COURSE/MEMBERSHIP	200	400	600	800
Keyboarding	*(1)	*(1)	*	*
Exploring Career Decisions	*	*	*	*
Exploring Biotechnology			2 LABS	3 LABS
Exploring Business & Marketing				
Exploring Life Skills				
Exploring Technology Systems				
Combined Lab (2)	*	*		

Facilities based on LEA course selection and enrollment

① May be shared with a general computer lab.

② Combination laboratories will need additional storage areas.

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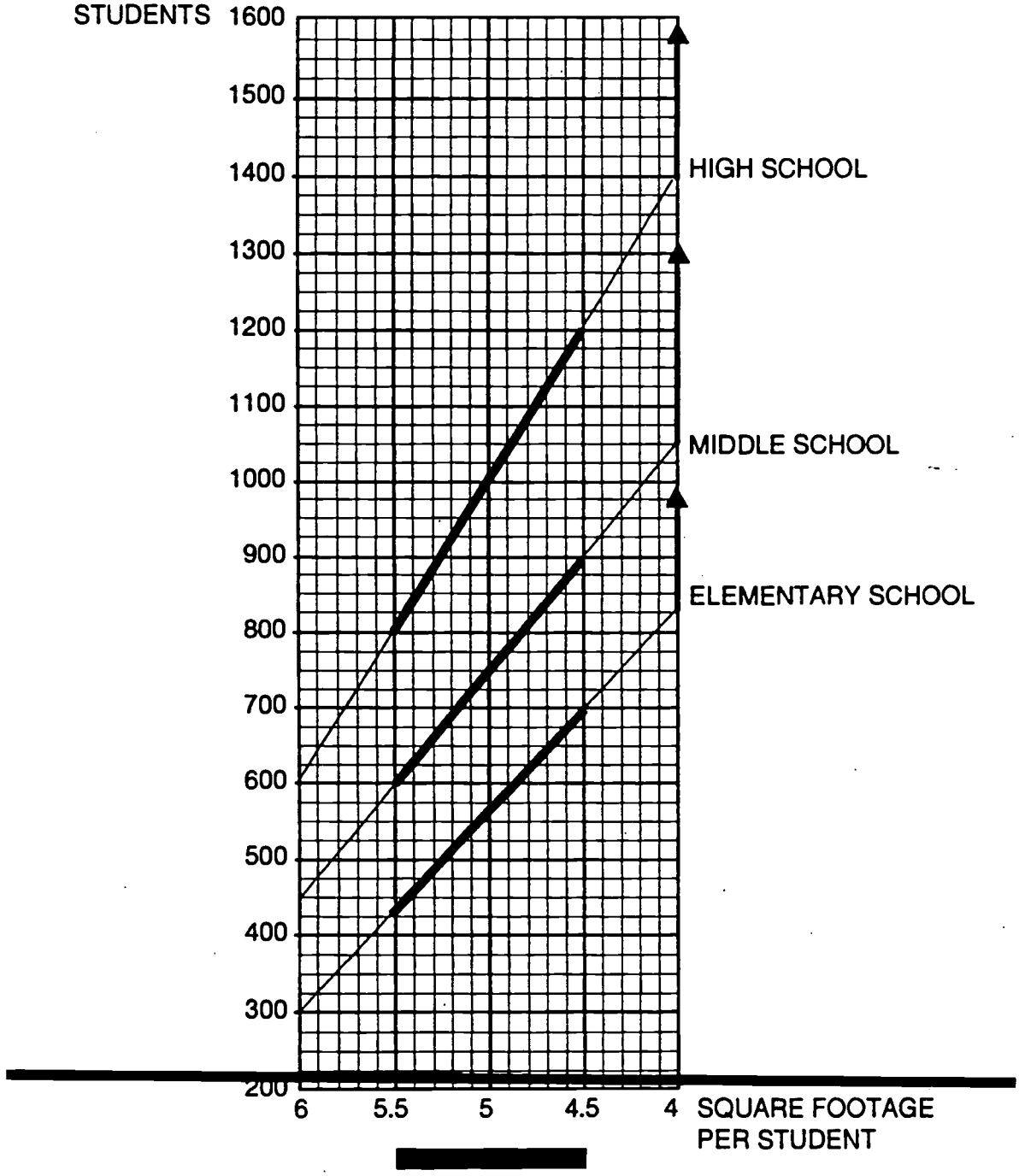
SUGGESTED SIZING FOR MEDIA CENTER MAIN ROOMS



1600 SQ. FT. MINIMUM SIZE

Deviation from the North Carolina Public School Facility Standards

School Planning will evaluate plans for compliance with the "Standards." When deviations are identified during the review process, School Planning will notify the local unit that a "Deviation From the North Carolina Public School Standards" form must be submitted. The completed form shall describe the nature and reason for the deviation. It must be signed by the Chair of the Board of Education. Deviations submitted are available for reporting to the State Board of Education each quarter. A certificate of approval for a school construction project as required under G.S. 115C-521 cannot be issued until submittal of the deviation form to School Planning. Additional comments by School Planning may be submitted to the State Board along with the deviation form, if the issues are not clearly addressed.

The deviation form is on the following page.

Deviation From the North Carolina Public School Facility Standards

Board of Education _____ Project/Grades _____

	Size Standard	Diviation in size of more than 10%	Comments and Explanation (Attach additional sheets where necessary.)
Site			
Regular Classrooms			
K			
1-3			
4-6			
7-12			
Science			
Exceptional Children			
Arts			
Music			
Visual			
Theater			
Dance			
Workforce Development			
Media Center			
Physical Education			
Staff Offices			
Circulation			
Other (Itemize)			

Approved by the _____ Board of Education on _____, 19_____

_____, Chair _____, 19_____

_____, Secretary, Ex officio _____, 19_____

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

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EFF-089 (3/2000)