



P O L I C Y R E P O R T

Building for the Future: The School Enrollment Boom in North Carolina

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Executive Summary

Multi-million dollar bond referendums and tax increases will not repair the damage done by years of inadequate school facilities planning. With construction and labor costs rising, massive school building programs, such as the one proposed by the Charlotte-Mecklenburg Schools (CMS), will exert a crippling tax burden on local communities.

The 2005 CMS bond referendum would finance the first three years of a proposed ten-year, \$1.975 billion school construction and renovation plan. In addition to the \$427 million requested in this year's bond referendum, the plan will require the citizens of Mecklenburg County to approve, at minimum, a \$550 million bond issue every two years for the next seven years. Even if the state gave Mecklenburg County Schools every school construction dollar generated from the lottery, it would not be enough to finance the construction and renovation projects

Among states in the South, only Florida had a greater percentage increase in public school enrollment than North Carolina.

outlined in its proposed capital needs assessment.

School districts can manage enrollment growth using proven, cost-effective construction,

renovation, and maintenance solutions that are taxpayer-friendly and enhance educational opportunities. Some school districts are using non-traditional funding methods like public-private partnerships to finance new construction. Others are lowering capital expenditures by adapting and reusing buildings, rethinking design standards, revising financing policies for stadiums and sports facilities, building modular schools, and using virtual schools. Finally, districts are experimenting with innovative institutional arrangements such as real estate trusts and non-profit organizations, to manage construction and renovation projects more efficiently.

To implement these cost-effective solutions, school districts need to revise their approaches to facilities planning and management by:

- Improving the management of school construction and renovation planning processes. School districts must make decisions based on sound, specific, and extensive data, establishing clear objectives and priorities for construction and renovation with alternate ways to achieve those objectives.
- Holding school leadership accountable for their capital planning and expenditures. Performance bonuses can be used to reward senior administrators who satisfy all district needs but keep capital expenditures low. Citizen advisory committees could also review all aspects of the district's capital improvement strategy, including planning, budgeting, the construction process, and maintenance expenditures.
- Being attentive to concerns of the community. Taxpayers may be willing to approve occasional bonds or tax increases to pay for school construction and renovation, but they will grow impatient when school systems consistently request multi-million dollar bond issues.
- Lifting impediments to school choice. With more students attending nonpublic or charter schools, school districts would need to accommodate fewer students.

The School Enrollment Boom in North Carolina

North Carolina public schools need to find long term solutions to rising school enrollments. After moderate enrollment growth throughout the 1980s, public school enrollment grew rapidly in the 1990s. Between 1995 and 2001, enrollment increased by 11.2%. Among states in the South, only Florida had a greater percentage increase in enrollment than North Carolina. Even more telling is that only seven states ranked above North Carolina in public school growth during this seven-year period.¹

Because of rapid population increases, school systems in large urban and suburban counties of Mecklenburg, Wake, and Guilford have taken the brunt of the state’s student enrollment growth (See Table 1). Between 1995 and 2001, schools in Mecklenburg and Wake counties had enrollment increases above the state average. Enrollment in Mecklenburg increased by 16% and Wake posted a 21% increase. Guilford had an enrollment increase of 10%. This growth shows few signs of slowing. Since 2001, student enrollment increased by 12% in Mecklenburg, 13% in Wake, and 8% in Guilford.²

The steady influx of students sent school boards and senior school administrators across North Carolina scrambling for solutions to overcrowded classrooms and schools. Their short-term solution was to use portable or mobile classrooms to expand

capacity at existing schools. Their long-term solution was to finance new school construction and renovation projects using tax increases and multi-million dollar bond issues. School districts across North Carolina held 48 bond referendums between 1995 and 2001, requesting over \$4 billion for capital projects.⁴ Yet, despite massive bond issues, large school districts were still unable to contend with enrollment increases. They began to use more, not fewer, portable classrooms, and they held bond referendums more frequently, requesting more money each time. What went wrong?

The problem was that school districts, especially large districts, never revised their outdated facilities planning process. According to one school facilities expert, inadequate planning follows a predictable pattern, what he calls the “downward spiral of poor school planning.” It includes three stages. During the first stage, school districts approve poor maintenance budgets that do not allocate sufficient funds for on-going preventative and maintenance needs. By the second stage, school districts begin authorizing

All too often, taxpayers “react” by giving school districts a blank check without scrutinizing the long-term capital plan.

Table 1: County Growth Comparison³

	Mecklenburg County		Wake County		Guilford County	
	1990	2004	1990	2004	1990	2004
2004 Population	511,433	771,617	423,380	719,520	347,420	438,795
Population % change 1990 to 2004	51%		70%		26%	
Single family owner occupied homes	119,563	166,402	101,003	160,193	84,454	93,405
Median value of home	\$86,900	\$158,952	\$97,200	\$173,478	\$79,400	\$141,499

hurried renovation plans based on incomplete information, failing to consider the life-cycle costs of the building parts. When school districts reach the third stage, they begin making building addition decisions that are not cost-efficient. At the lowest point in the downward spiral, the school district complains of a facilities “crisis” and calls for huge bond referendums for a school construction and renovation program that attempts to compensate for its history of poor planning.⁵

Larger and more urgent bond requests by district leaders suggest that their facilities planning process has been ill adapted to contend with enrollment growth in the past.

School districts then pressure the public to give into their demands to approve the bond referendums. In the words of one Charlotte-Mecklenburg school official, “We must react, and if we don’t, I’m concerned the results will be devastating.”⁶ School boards and senior school administrators use fear to persuade the public to approve their expensive capital projects. All too often, taxpayers “react” by giving school districts a blank check without sufficiently scrutinizing the district’s long-term capital plan or holding them accountable for their spending. When taxpayers give school districts license to raise taxes for unchecked spending year after year, school leaders feel a sense of entitlement for more of the taxpayers’ money. Lacking accountability, school districts turn to more frequent bond referendums to request larger amounts of money, even though past bond and tax revenue increases have not improved the district’s management of school enrollment growth.

The public can measure the success of a school district’s facilities planning process by observing the scope of the advertised crisis and the bond issues that it requests to manage the crisis. Calls for larger and more urgent bond requests by school district leaders suggest that their facilities planning process

has been ill adapted to contend with enrollment growth in the past and will continue to be ineffective for years to come. Using this standard, it becomes clear that the 2005 Charlotte-Mecklenburg Schools (CMS) bond referendum, as well as its proposed ten-year Capital Needs Assessment, are the product of an outdated approach to facilities planning and will not adequately address the district’s school enrollment growth.

THE CHARLOTTE-MECKLENBURG SCHOOL BOND

Beginning in 2005, Charlotte-Mecklenburg Schools will begin a proposed ten-year, \$1.975 billion school construction and renovation program to accommodate a projected enrollment increase of 53,000 students over the next ten years.⁷ The 2005 bond issue would fund the first three years of the capital construction and renovation plan. CMS proposes to fund the remaining seven years of the plan by holding bond referendums in 2007, 2009, and 2011.⁸ This means that taxpayers in Mecklenburg County would have to approve, at minimum, a \$550 million bond issue every two years for the next seven years. Even if the state gave Mecklenburg County Schools every school construction dollar generated from the lottery, the estimated \$170 million a year in revenue would still not be enough to finance all of the construction and renovation projects outlined in the district’s proposed capital needs assessment.

The district’s proposed ten-year needs assessment has three components. The first is a plan for extensive lifecycle replacements, including plumbing, roofing, HVAC, paving, electrical, window installation, and other renewal projects. Under this category, CMS would also initiate the following projects:

- Renovating 8 high school stadiums;
- Replacing 6 high school tracks;
- Repairing gym floors and bleachers at 9 schools;
- Renovating 2 auditoriums; and
- Beginning renovation and renewal projects at 48 schools.

The second component includes various mandates and initiatives, such as technology upgrades and projects that bring facilities into compliance with the Americans with Disabilities Act (ADA). Also included under mandates and initiatives are the following projects:

- Installing and upgrading surveillance systems at 32 schools;
- Updating fire alarms at 18 schools;
- Integrating intercom systems at 24 schools; and
- Evaluating and repairing school buildings.

The third part of the assessment is the most extensive and expensive of the three. It calls for the following plan:

- Building 47 new schools;
- Adding 280 classrooms at 22 schools;
- Expanding six support facilities; and
- Acquiring 43 sites for new schools and support facilities.

The third component makes up over \$1.3 billion or approximately 65% of the total cost for all projects outlined in the proposed needs assessment.

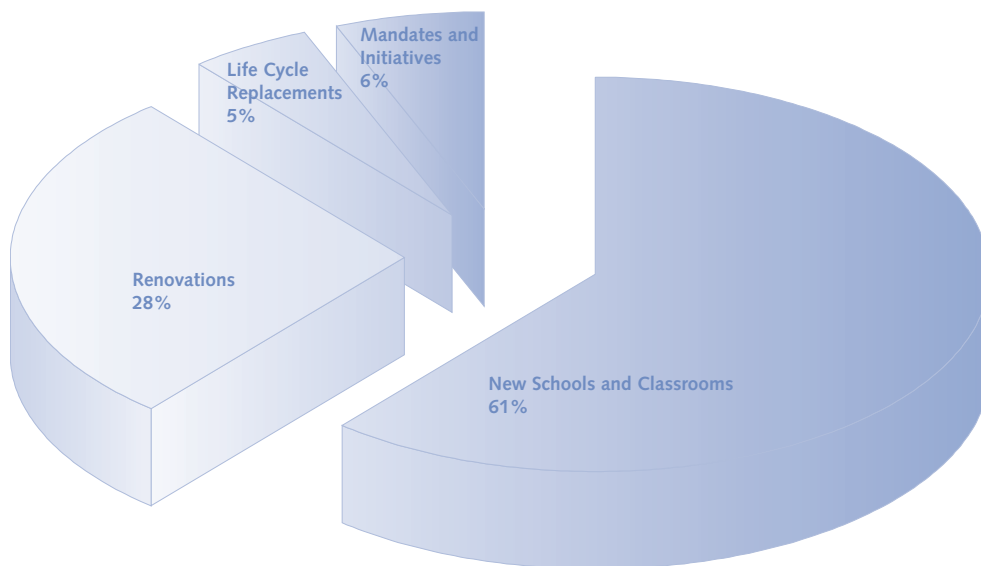
The \$1.975 billion estimate is the construction and renovation costs as of 2005, but the final price tag will be much higher. Large-scale, multi-year capital

projects are susceptible to cost increases due to the rising cost of construction materials and labor. The Department of Public Instruction reported that in 2005 the average school cost \$129.57 per square foot, an increase of almost \$15 a square foot from 2004. Since 2003, the average cost (per square foot) of building a school in North Carolina increased by nearly 32%. The rising cost of steel, concrete, and other building materials is the primary reason why construction costs are higher. Labor costs have been escalating as well. All projected estimates for construction and renovation can be expected to increase in the next ten years.⁹

The 2005 CMS bond issue would allocate \$427 million for school capital projects and other initiatives (See Figure A). More than half of this amount (\$216,570,000) would be used to build seven new

Even if the state gave Mecklenburg County Schools every school construction dollar from the lottery...it would still not be enough to finance the construction and renovation projects outlined in the proposed capital needs assessment.

Figure A: 2005 School Bond Allocation



elementary schools, two new middle schools, and one new high school. Although the school system needs facilities to accommodate overcrowding and enrollment growth, the estimated costs for these schools exceed what other large school systems in North Carolina spend on facilities of comparable size. It also exceeds national, regional, and state median

CMS could save between \$13.3 and \$20.3 million in construction costs for their 7 new schools without compromising the overall size of each school (See Table 3).

The CMS Architects and Engineers Design Guide is a manual containing recommendations for new schools and school additions. For elementary

Table 2: School System Comparison¹⁰

	Charlotte-Mecklenburg Schools	Wake County Schools	Guilford County Schools
Total K-12 public school students	121,640	114,068	67,099
Total education expenditure FY2004	\$822,672,681	\$757,623,816	\$480,826,862
Total number of public schools	152	132	108
Per pupil expenditure FY2004	\$7,300	\$6,989	\$7,384

costs reported by three independent sources. By taking steps to economize and prioritize new construction projects, CMS could save millions of dollars in new school construction costs without compromising school quality or capacity (See Table 2).

For example, the Charlotte-Mecklenburg Schools bond issue would finance the construction of seven new elementary schools identical in size to the sample elementary school in Wake County, but the school district would spend over \$2.9 million more per school. The sample elementary school in Guilford County costs about \$1.9 million less per school.

schools, the guide outlines a building containing approximately 7,000 square feet of specialty class space, 6,000 square feet for a media center complex, and 4,000 square feet for administrative space. In addition to classroom space, recommended specialty classrooms include 16 tutoring rooms, classrooms for art, music, and computers, two resource rooms, and two flex rooms.¹⁷

New elementary school design could easily combine several specialty activity rooms into three multipurpose classrooms. Elementary school facilities can also include computer space within the media

Table 3: Elementary School Construction Costs

	National Median (2004) ¹¹	2005 School Construction Report: Region 4 Median Cost ¹²	Real Estate Journal Estimate for Charlotte Area ¹³	CMS Proposed ¹⁴	Wake County (Briar Creek) ¹⁵	Guilford County (Reedy Fork) ¹⁶
Cost	\$8,600,000	\$10,000,000	\$5,354,000	\$15,850,000	\$12,948,563	\$13,890,416
Capacity	500	600	N/A	800	600+	725
Size	68,932 SF	75,000 SF	55,000 SF	82,000 SF	82,000 SF	87,000 SF
Cost per square foot	\$137.00	\$116.50	\$97.35	\$193.29	\$157.91	\$159.66

center complex, eliminate tutoring rooms and the TV studio, and reduce the administrative space by four offices/rooms. Economizing on ancillary spaces in this way would reduce the size of the school by approximately 6,200 square feet. Such reductions would maintain classroom size (800-1200 square feet each) and still provide ample space for administration, student services, and food service. These minor modifications would save just under \$1.2 million per

in Wake County and \$2.2 million more than a comparable middle school in Guilford County (See Table 5). Although CMS would only save between \$4.4 and \$7.2 million for the two middle schools proposed in the 2005 bond referendum, the potential savings for elementary and middle schools combined would total between \$17.7 million and \$27.5 million, enough to fund the construction of two additional elementary schools or one additional middle school.

Table 4: Potential New Elementary School Space Savings¹⁸

	Number	Total Square Footage	Revised Plan	Revised Square Footage	Savings
Computer Room	1	1,050	Include in Media Center	0	1,050
Visual Arts Class	1	1,050	Combine to create three multipurpose rooms	2,700	1,200
Music/choral class	1	1,050			
Resource Room	2	900			
Flex Room	2	900			
Tutor Room	16	2,200	Eliminate	0	2,200
TV Studio	1	300	Eliminate	0	300
Administration Work Room	1	600	Eliminate	0	600
Administration Flex Office	1	100	Eliminate	0	100
Administration Itinerant Staff Office	1	450	Eliminate	0	450
Parent Center	1	300	Eliminate	0	300
Total Savings					6,200

elementary school and a total of \$8.4 million for the seven new elementary schools that CMS plans to build with the 2005 bond issue (See Table 4).

A proposed middle school in the CMS bond costs \$3.6 million more than a comparable middle school

For middle schools, the CMS Architects and Engineers Design Guide recommends separate classrooms for visual arts, dance, theatre arts, choral music, and instrumental music. Other recommendations include a student store, parent center, four

Table 5: Middle School Construction Costs

	National Median (2004)	2005 School Construction Report: Region 4 Median Cost	Real Estate Journal Estimate for Charlotte Area	CMS Proposed	Wake County (Heritage)	Guilford County (Northern)
Cost	\$15,000,000	\$12,000,000	\$11,527,000	\$25,667,000	\$22,000,000	\$23,461,507
Capacity	750	615	N/A	1,200	1,293	878
Size	120,000 SF	104,926 SF	119,000 SF	140,000 SF	149,973 SF	141,000 SF
Cost per square foot	\$118.00	\$116.40	\$96.87	\$183.33	\$146.69	\$166.39

conference rooms, a TV production studio, and three science labs per grade. The school includes 25 offices for administration, student services, and teacher activities.¹⁹

By taking steps to economize and prioritize new construction projects, CMS could save millions of dollars in new school construction costs without compromising school quality or capacity.

CMS could economize middle school space by using three multipurpose rooms for fine arts and eliminating the student store, parent center, TV production studio, two conference rooms, and three team areas. Schools can suffice with one shared science lab per grade.²¹ These reductions would save at least 15,214 square feet and over \$2.7 million per school without reducing the size of classrooms (850 square feet each) or removing any administrative office, student service office, or resource room. Savings would total \$5.4 million for the two new middle schools that CMS plans to build with the 2005 bond (See Table 6).

Building new high schools is an immense financial undertaking for any school district, but the \$54.2 million set aside for one new high school easily exceeds the cost of new high schools in Wake and Guilford counties. The new high school would be larger and have a greater capacity than those in Wake and Guilford, but will also cost \$42 per square foot more than the high school in Wake and \$27.11 per square foot more than the high school in Guilford. Even a modest reduction of \$20 per square foot would reduce the cost of the proposed CMS high school by \$5.6 million. Reducing the cost of the CMS high school comparable to the sample one in Guilford County would save \$7.6 million (See Table 7).

Unfortunately, the latest CMS Architects and Engineers Design Guide does not include specifications for high schools, but many of the same recommendations for elementary and middle schools can be applied to high schools. High schools should minimize the number of fine arts classrooms, resources rooms, conference rooms, and spare administrative offices. In addition, high schools should combine cafeterias and auditoriums into one multipurpose room.

Table 6: Potential Middle School Construction Savings²⁰

	Number	Total Square Footage	Revised Plan	Revised Square Footage	Savings
Visual Arts Class	1	1,050	Combine to create three multipurpose rooms	3,600	3,175
Dance Class	1	1,600			
Theater Arts	1	1,250			
Choral Music	1	1,075			
Instrumental Music	1	1,800			
Science Labs	9	12,996	Reduce to one per grade	4,332	8,664
Student Store	1	70	Eliminate	0	100
Parent Center	1	200	Eliminate	0	450
TV Studio	1	350	Eliminate	0	300
Conference Rooms	4	950	Reduce to two	600	350
Team Area	3	2,175	Eliminate	2,175	2,175
Total Savings					15,214

Finally, new high schools should integrate computer labs into media centers and maintain one science lab per grade. The minor modifications would save the school district millions of dollars without sacrificing the size or number of classrooms.

Public-private partnerships combine the resources of the private sector with the needs of the public sector. They require long-term, collaborative planning by the school board, school administrators, teachers, and members of the community. Public-private

Table 7: High School Construction Costs

	National Median (2004)	2005 School Construction Report: Region 4 Median Cost	Real Estate Journal Estimate for Charlotte Area	CMS Proposed	Wake County (Panther Creek)	Guilford County (Northern)
Cost	\$27,000,000	\$27,000,000	\$18,617,000	\$54,282,000	\$40,668,873	\$41,673,040
Capacity	1,025	1319	N/A	2000	1,600	1,200
Size	159,000 SF	233,000	175,000 SF	280,000 SF	267,800 SF	250,000 SF
Cost per square foot	\$120.00	\$115.29	\$106.38	\$193.86	\$151.86	\$166.69

SOLVING THE ENROLLMENT GROWTH CRISIS

Clearly, school districts occasionally require additional funds to build and renovate facilities that accommodate school enrollment increases, but recurring multi-million dollar bond referendums and annual tax increases will not solve the long-term problem of planning and expanding facilities. With construction and labor costs rising, massive school renovation and building programs will exert a crippling financial burden on local communities. School districts throughout North Carolina can manage enrollment growth using proven, cost-efficient solutions that do not burden county taxpayers and enhance educational opportunities for students.²²

NON-TRADITIONAL FUNDING: PUBLIC-PRIVATE PARTNERSHIPS

The idea of using private sector resources to finance capital projects runs contrary to the culture of most school districts. Even so, private sources of revenue are nothing new – school districts already accept grants, services, and equipment from non-profit organizations and businesses. When it comes to the school construction and renovation process, nonprofits and businesses can do more than just offer occasional support. They can become long-term partners that provide resources and cost-savings unavailable to school districts working alone.

Public-private partnerships also require a serious commitment to using community resources and private businesses for school capital projects.

Public-private partnerships can take many forms, depending on what kind of relationship the school system wants to have with the private sector. At minimum, a school system could sell surplus school property to a private developer and use the funds to offset the costs of building or renovating a school. A school system may also forgo direct payment for the surplus property in exchange for the construction services of a private developer. School districts are often not aware of the market value of their surplus property, especially in high-growth urban and suburban areas. Thus, they fail to seize the opportunity to use their valuable property to support school capital projects.

The Oyster School Project in Washington, DC is one example of using the sale of assets to

School districts occasionally require additional funds to build and renovate facilities...but recurring multi-million dollar bond referendums and annual tax increases will not solve the long-term problem.

fund a school construction project. The District of Columbia Public Schools (DCPS) sold half of a lot that housed a former school to a local developer, who built two hundred upscale residential units on the property. On the other half of the land, the DCPS contracted with the developer to build a new school for the district. The arrangement required the developer, rather than the school district, to repay the bond used to finance the construction of the school with the property taxes it generated from the newly constructed residential property.²³

Most public-private partnerships involve a contract between a school district and a private developer

Nonprofits and businesses can do more than just offer occasional support. They can become long-term partners that provide resources and cost-savings unavailable to school districts working alone.

to build a school and lease it back to the school system. Until recently, private developers had no incentives to agree to a public-private partnership with a school system. Now, under the Economic Growth and Tax Relief Reconciliation

Act of 2001, private companies can obtain tax-exempt bonds to build qualified public education facilities for school districts, a privilege formerly reserved only for federal and state governments.

School districts begin the process by negotiating with developers to build a school in accordance with community and/or state standards. Once a school district and developer settle on the details of the construction project, both parties agree to a long-term rental agreement. Throughout the life of the contract, the developer is responsible for maintaining the physical structure of the school, while the district operates the school as usual. At the end of the lease term with the developer (which must coincide with the term of bonds issued to finance the facility), the leased building automatically becomes the property of the school district.

Public-private partnerships generate across the board savings for school districts. Regulations,

restrictions, referendum votes, design reviews, and review of competitive bids associated with public sector bonds do not apply. More importantly, by introducing a profit motive and competition between private developers, total construction costs will be lower. One study estimated that school districts could save as much as 25 to 30 percent using a public-private partnership rather than financing the construction with public sector bonds.²⁴

Public-private partnerships have proven successful in school districts in Florida, Texas, and California, but few North Carolina school systems have engaged in partnerships with the private sector. Recently, school officials in Hoke County indicated that they would like to establish a public-private partnership to finance school construction. Under the proposed terms of the partnership, the school would contract with a Fayetteville architectural firm to build a school for the district. The firm would open competitive bids for construction and materials and oversee construction of the school. The school system would then lease the building from the firm for a time equal to the term of the lease. As with most public-private partnerships, the school system will own the building at the end of the term of the lease.²⁵

New school construction projects are only one potential partnership between a school district and a private investor. Private developers or businesses can finance renovations and special projects in cooperation with a public school. A school in Waltham Forest, England contracted with a private company to build a state-of-the art music facility in the school. In return for the facility, the school offered the company discounted rent. The students used the facility during the day, and the company used the facility on evenings and weekends. Schools in other parts of England have made similar arrangements to build cafeteria kitchens, sports facilities, and gymnasiums. In these cases, students had access to top of the line facilities and equipment during the day, and the sponsor companies enjoyed a low rent facility for their use on evenings and weekends.²⁶

COST-SAVING STRATEGIES

Adaptive Reuse

One way to finance the construction of new school facilities is through the adaptive reuse of existing buildings. The most important aspect of adaptive reuse is that it can save a school district time and money. Yet, adaptive reuse has an even greater value to the community. Vacant buildings in cities and

square foot facility near Apex, into Lufkin Road Middle School. The district needed the space due to the Apex High School construction project, which displaced 800 ninth grade students. The following year the building became a permanent school site. The total cost for the project was \$20.5 million, approximately the cost of a new building. Nevertheless, the advantage of using the American Sterilizer

Table 8: The Varieties of Adaptive Reuse

Location	Example of Adaptive Reuse
Phoenix, AZ	A 320,000 square foot mall is converted into two schools, a physical education facility, warehouse, and performing arts center
Wake County, NC	The 150,000 square foot American Sterilizer Company complex is converted into Lufkin Road Middle School
Pomona, CA	A 1957 shopping mall is converted into the Village @ Indian Hill, which includes two schools, a training facility, adult education facility, and commercial and nonprofit enterprises
Littleton, NH	Schools create satellite campuses by utilizing space in an empty furniture store, local businesses, a bank, and the old city hall

suburbs become permanent eyesores that discourage investment and development in the surrounding area. When school districts find innovative uses for vacant buildings, they revitalize communities and reinforce ties between schools, neighborhoods, and the business community.

Facing an enrollment surge, the Cartwright School District in Phoenix, Arizona purchased a 320,000 square foot, 25-acre mall from a local philanthropist and developer for \$9 million. Architects and designers divided the large building into smaller sections to accommodate several distinct educational and administrative functions. When construction was completed, the facility included a 1000 student middle school, a 600-student elementary school, transitional space, a physical education facility, playgrounds, and athletic fields in the mall’s former parking lot, a school district warehouse, and a planned performing arts center and auditorium.

In Wake County, the school district converted the vacant American Sterilizer Company, a 150,000

Company facility was that the district could convert the facility into a school in only one year. A new school construction would have taken two to three years to complete, and would have increased the total cost of the school.

In Pomona, California, student enrollment increases required the school district to add new educational facilities almost every year. To accommodate the influx of new students, the district converted the 66 acre Plaza Azteca shopping mall into a new education center called The Village @ Indian Hill. The reconstructed mall includes three elementary schools serving a total of 1,800 students, a 400-student high school, a

Public-private partnerships have proven successful in school districts in Florida, Texas, and California, but few North Carolina school systems have engaged in partnerships with the private sector.

district training facility, an adult education program, commercial and nonprofit programs including a health clinic, and a nonprofit educational foundation. The district financed the \$50 million cost using state and local funds, grants, and income generated by leases from the nonschool property at the Village. Soon after its opening, the school district created the Pomona Valley Educational Foundation to manage the nonschool leases, build an endowment to support programs, write grant proposals, and solicit equipment donations and services from

In Chicago, Illinois, a historic armory was converted to the Bronzeville Junior ROTC High School. In Rocky Gap, Virginia, an 1887 church became the Rocky Gap High School Annex.

local businesses. The foundation generated long-term partnerships with the Los Angeles County Office of Education, NASA's Jet Propulsion Laboratory, and AT&T.

Reusing an entire building is not the only option. For example, Littleton High School in Littleton, New

Hampshire wanted to expand its vocational and business programs but could not afford to construct a new building for these programs. Its solution was to find vacant spaces in the community for satellite campuses. The school district rented an empty furniture store, shared space with a local business, and converted extra space at a bank for its technology program. One advantage of using satellite campuses was that vocational and business teachers were able to combine classroom instruction with an on-site demonstration of its practical application. The success of these satellite campuses led school officials to consider converting part of a town hall into classroom space.

Successful adaptive reuse for school construction can utilize a number of different types of buildings. In Chicago, Illinois, a historic armory was converted

to the Bronzeville Junior ROTC High School. In Rocky Gap, Virginia, an 1887 church became the Rocky Gap High School Annex. School districts can reuse even smaller buildings to suit their instructional programs. A school district in St. Paul, Minnesota converted an old YMCA building into a 170-student middle school. Other possibilities for adaptive reuse include former military bases, vacant warehouses and distribution centers, office buildings, and former "big box" retail stores.²⁷

Rethinking Design, Efficiency, and Space

Minor design modifications can save school districts thousands of dollars in construction and utility costs. The American Institute of Architects recommends a number of design and renovation modifications that add no additional cost to the school district and are friendly to the environment.²⁸

School districts should make sure that all school buildings and additions are aligned along an east-west axis so that windows face either north or south. The low morning and evening sun causes glare and solar heat when windows face east and west. Large windows should face north to take in cool and diffuse north light. On the south side of the building, window height should be kept to a minimum and must be properly shaded. Trees, overhangs, or canopies on the south side of the building will help to shade the windows from direct sunlight.

Schools should eliminate floor finishes like carpet and tile, especially in service areas, restrooms, locker rooms, cafeterias, and storage rooms. Concrete finishes cost less and are easier to maintain than carpet and tile finishes, and contrary to popular opinion, concrete floors have little effect on acoustics.

All schools should install water-efficient fixtures for toilets, sinks, and showers. The most popular options are the push-rod bathroom faucet, water-efficient showerheads, and bathroom fixtures that are regulated by electronic sensors. One bathroom fixture that is gaining popularity is the waterless

urinal. Some airports and athletic facilities already use waterless urinals and report excellent results. Waterless urinals are clean, efficient fixtures that conserve water and require minimal maintenance and plumbing cost.

Builders should utilize the standard sizes of materials for the school's exterior structure and interior spaces. This will reduce the cost of materials, minimize material waste and disposal, and save labor costs for cutting and measuring the materials. When school districts require standard-sized materials for the construction and renovation of a number of different projects, the savings are even more substantial.

Most importantly, district planners should keep school buildings at the absolute minimum square footage required by the program. Schools should have narrow corridors, small classrooms, and few large gathering rooms like gymnasiums, cafeterias, and auditoriums. These measures will save money on construction costs, reduce air conditioned/heated space, lessen lighting needs, moderate material consumption, and minimize site disturbance.²⁹

One practical way to minimize the size of a new school is to consolidate an auditorium and cafeteria into one well-designed multipurpose space. When the school is not using the space for assemblies, shows, or meals, it could accommodate study halls, virtual classes, or large group instruction. The school could allow groups to rent the facility on evenings and weekends, and could offer regular programming, movie nights, or concerts to bring in additional revenue, especially during the summer months. Involving the students in such an operation would provide students a valuable experience for learning firsthand about accounting, finance, advertising, and public relations.³⁰

In recent years, small schools have become the exception rather than the norm. Even though research confirms that students perform better at smaller schools, most school districts believe that

the added costs of small schools outweigh its proven educational benefit. The truth is that small schools are not significantly more expensive to build and operate than larger schools. One estimate points out that a smaller school would only add \$5 a square foot to the construction cost. Smaller schools also save on faculty and staff costs, the largest expenditure in every school budget because larger schools must add assistant principals, guidance counselors, and security guards to compensate for the alienation students feel at a larger school. Finally, school districts can also save on transportation costs if they locate a greater number of small schools within walking distance to communities and subdivisions. In the end, small schools add a nominal upfront cost to a construction budget, but save the school districts money on long-term utility, staffing, and transportation costs.³¹

Stadiums and Sports Facilities

At one time, school boards mandated that booster clubs finance their own stadium construction and renovation projects. Today, many booster clubs still support and maintain baseball facilities through sponsorship, fundraising, and private donation, and volunteer labor.

Yet, school districts now assume total responsibility for the construction, maintenance, and renovation of football stadiums. In

Mecklenburg County, the school district assumed total responsibility for football stadiums when a handful of booster clubs complained that they could not raise funds in a timely manner. The school district instructed facilities planners to include a football stadium at every new high school in the county.

Some booster clubs will be more effective raising money than others, but this should not preclude them from financing stadium construction and renovation

Minor design modifications can save school districts thousands of dollars in construction and utility costs.

projects. Instead of abandoning the booster-funded stadium idea, school systems should offer the school a low interest loan to finance sports facilities projects. The booster clubs would be responsible for repaying the district according to a schedule agreed to by the district and the booster club. Booster clubs from different sports should share responsibility for construction and maintenance costs for field houses and other facilities used by multiple sports teams.

Booster clubs could obtain a portion of the funds by selling naming rights to the stadium or obtaining sponsorship for each sports team. For example, two schools near Cincinnati sold the naming rights

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to each of their football stadiums. An alumnus of one school purchased the naming rights to the school's football stadium for a total of \$75,000. The school board and the high school principal had to approve the name

change, so there was no chance that the name would be offensive. The school used the proceeds to build baseball dugouts, a storage barn, and purchase athletic equipment. This is also an example of how football revenue sharing, which is widely used at the collegiate level, can benefit the school's other sports teams.³²

Proper building alignment, minimal floor finishes, water-efficient fixtures, standard-sized materials, smaller schools, and booster-financed sports facilities are all commonsense ways to lower the construction and maintenance costs of school facilities, but they do not exhaust the ways that school districts can save on facility expenditures. Independent planners, architects, contractors, developers, and interior designers can all provide valuable input on cost-saving strategies at every stage of the facility planning and construction process. Yet, the best

resource is the experience and advice of other school districts, especially urban and suburban districts that have dealt with rapid increases in student enrollment. School facilities planners in states like Florida, Nevada, Texas, and California can offer invaluable counsel and expertise to high-growth school districts in North Carolina.

Modular Construction

A modular building is not the same as a portable building. A portable is a single or doublewide temporary wood structure that is pre-built in a manufacturing facility and assembled on site. They are not built or intended for long-term use. School districts use portables (sometimes called trailers or mobile classrooms) to alleviate classroom space shortages and overcrowding.³³

A modular school is also built in sections off-site, transported, and assembled on-site, but the similarities to portables stop there. A modular building is a permanent structure, and is often built using the same materials and construction methods as any traditional school. Like other school construction they are not restricted by size, capacity, or limited to a single-story. Modular schools can meet almost any architectural, design, or building code specification required by the school district.

After the planning and design stage, the components of the modular school building are manufactured off-site. At the same time, workers prepare the site of the school, laying the foundation, sidewalks, and landscaping. By the time the modular building company delivers the components of the building, the site is ready to receive the modules, which are craned into place and welded together. Electrical wiring, plumbing, and interior decoration take up much the remaining time required to complete the module school.

School districts that work with a modular building company save money by avoiding the bidding process. Both architecture and construction are the responsibility of the builder. The builder must guarantee error free plans and provide a fixed price for

the project. It is important to note that the savings are not in the materials, because modular buildings often use the same materials as a traditional school. In fact, this makes a modular school indistinguishable from a traditional school. School districts save money by decreasing the time required to build the school. One school district in Phoenix, Arizona built a 40,500 square foot elementary school in seven months using modular construction. The school would have cost double and taken twice as long to build using traditional construction methods.³⁴

The Vista Unified School District in Los Angeles, California turned to modular construction in 2002 to maximize its limited bond funds. The modular buildings saved the district \$5.76 million for one school and \$2.11 million for another. Modular buildings allowed the school district to create three “campuses” on the site of an existing school building. For some schools in the district, modular buildings serve as additional classroom space on the campus of existing schools. The school also used modular construction to build entire school buildings.³⁵

Miami-Dade County Public Schools, having to expand classroom space because of enrollment increases and class size restrictions, also turned to modular construction. The district paid only \$72 per square foot for its modular schools, which was approximately \$30 per square foot less than a traditional school construction estimate. Moreover, all schools in Florida have to adhere to strict building codes. Florida building codes require hurricane and wind resistance standards, nine-foot high ceilings, recessed doors, and specific parameters for windows. Despite these strict requirements, fully compliant modular schools took only four months to complete.³⁶

Virtual Schools

A virtual school is an Internet-based learning environment that allows students to participate in a class using a computer rather than being present in a school classroom. Contrary to popular perceptions,

virtual schools are rigorous academic institutions that exceed state curriculum standards. Students can access all class materials, including lectures, notes, assignments, and handouts, through the Internet. Students can also access audio and video content not available to those in traditional classrooms. Certified teachers offer one-on-one communication with the student, and they often recruit experts in the subject area to interact with virtual school students through interactive lectures and online chats.

Do students perform better at virtual schools? A recent study compared learning outcomes between students attending a virtual school and students attending a traditional school. The results were overwhelmingly in favor of the virtual school. Students had higher academic achievement than students who attend a traditional school. Students at the virtual school also became more computer literate and expressed more satisfaction with their learning environment than their traditional school counterparts. One reason why the virtual school students outperformed traditional students was that students are better learners when they are able to manage their own pace and are free from the distractions of the typical public school classroom.³⁷

Distance education courses have been available in North Carolina for many years. Early distance education courses were simply satellite television broadcasts beamed to schools from a central educational broadcasting center. Recently, Internet-based courses have revolutionized distance education by adding interactive and multi-media capabilities not possible with television broadcasts. In North

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Carolina, UNC's Learn NC and the North Carolina School of Science and Mathematics offer Internet-based courses, Iredell-Statesville Schools operate a virtual high school, and Cumberland County's Web Academy offers Internet courses to county and out-of-county students. Nevertheless, schools in North Carolina underutilize virtual schools, which can save school districts money on salaries, instructional materials, and classroom space.

In 2004, the Business Education Technology Alliance (BETA), a group of business leaders, policy makers, and educators, requested that the Department of Public Instruction create a commission to explore

Florida building codes require hurricane and wind resistance standards, nine-foot high ceilings, recessed doors... Despite these strict requirements, fully compliant modular schools took only four months to complete.

ways to bring more virtual schools to North Carolina. In response to their request, the DPI created the 33 member State E-Learning Commission to “develop e-

learning standards and infrastructures that provide virtual learning opportunities to students and other citizens through all North Carolina schools, universities and community colleges.”³⁸ Although virtual courses and schools are available to students in North Carolina, the commission recognized that core classes offered by virtual schools must have a curriculum aligned with the ABC exams. The commission seeks to bring instructional resources together into a comprehensive virtual school that students can access from across the state.

The first report from the commission called for additional funding, legislation, and policy changes to ease implementation of a virtual high school and to further develop course evaluation strategies. The commission also noted a need for a 10-fold increase in data capacity, a better broadband infrastructure, and a course management system to support the

technical needs of the school.³⁹ As a first step, the General Assembly recently approved DPI's request for \$150,000 virtual high school pilot program for the 2005 – 2006 school year.

Although the formation of the commission is an important step towards having more virtual schools in our public schools, it also puts North Carolina behind states like Florida and Kentucky in developing statewide virtual school initiatives. Public education in North Carolina took a step back when the State Board of Education denied an application to the New Connections Academy virtual charter school in 2002. It has taken nearly three years and the intervention of a group of civic leaders for the State Board of Education to reconsider the use of virtual schools. The state cannot afford a piecemeal approach to making virtual schools an integral part of public education in North Carolina.

New Institutional Arrangements: Non-Profit Organizations and Real Estate Investment Trusts

School districts can realize greater cost-savings and more efficient facilities management by changing the way that they own and manage their real estate. For example, schools districts can form or collaborate with a non-profit organization to obtain tax-exempt bonds to finance the school construction projects. The non-profit obtains the money that it needs to build the school using tax-exempt bonds, purchases the site, contracts with the school district to build or renovate the facility, and leases the building to the school district. The School District of Greenville, South Carolina, for example, formed a non-profit organization, directed by former school administrators and school board members, to finance several school construction projects.

School districts can also use a Real Estate Investment Trust (REIT) to serve as a lease vehicle to fund school facilities. A REIT would manage construction and renovation projects for several school districts, and each district would pay a rent/management fee directly to the REIT. One advantage of using a REIT is that it would open the construction

process to market competition, lowering construction and renovation costs for the school district. A REIT also allows the school district to act as manager of its school facilities, permitting school districts to hire and fire managers and control all facilities planning and decisions.⁴⁰

A Real Estate Investment Trust is a new idea, but school districts are beginning to use REITs to manage their complex real estate and facilities needs. In 2002, a Portland, Oregon school district established the Portland Schools Real Estate Trust to help negotiate leases, sales, and property purchases in accordance with its long-range facilities plan. The school district will eventually transfer management and ownership of the district's properties to the real estate trust.⁴¹

Recommendations

One facilities planner describes a situation that is all too common among growing school districts in North Carolina.

“It is not unusual to see a report with a few pages showing that a county is growing. All those graphs and pictures seem informative, but they actually give just a general picture of a large area. Then the report takes a leap in logic and calls for huge construction programs here and there around the district, describing the projects in detail, along with cost data and construction schedules. There is no process that bridges from the broad generalities to why these particular projects should be built. Often, it turns out that the report was driven by preconceived answers instead of a planning process.”⁴²

It is clear that rethinking the planning process is the first step toward better management of the school construction and renovation process. What should such a process include?

1. Sound, specific, and extensive base data, including school programs, student demographics, and district facilities, using projected enrollments that more accurately

reflect the needs of the school system in the next ten years;

2. Clear objectives for construction and renovation;
3. Alternate ways to achieve those objectives, including proposals for cost-efficient construction techniques and innovative methods to finance school construction and renovation projects;
4. Established program priorities that begin by making sure that capital improvement projects bring facilities up to code; and⁴³
5. Comprehensive assessments of renovation versus new construction. One rule of thumb for school renovations is that a school district should not renovate a school building if the true cost of renovation, including life cycle costs, is more than half the price of the new building. There are four additional criteria for determining whether it is advantageous to renovate a school building:
 - a. The building has architectural merit;
 - b. The building can be renovated cost-effectively;
 - c. After the renovations, the learning environment will be comparable to a new school building; and
 - d. The building cannot be sold for private development that can find a market to support the renovations required.⁴⁴

School districts cannot enjoy the benefits of public-private partnerships, cost-saving strategies, and new institutional arrangements if school board members and senior administrators cannot rise above traditional ways of thinking about school construction and renovation. One problem is that schools districts do not reward school officials who find creative solutions to school facilities needs or implement cost-effective measures to manage enrollment growth. Incentives like performance bonuses are one way that school boards can reward senior

administrators who satisfy all district needs but keep capital expenditures low and minimize dependence on large bond issues and tax increases.

Citizen advisory committees are another mechanism to hold senior administrators accountable for facilities planning and financing. School boards should empower citizen advisory committees, with one or two non-voting seats reserved for students interested in architecture or construction, to review all aspects of the district's capital improvement strategy, including planning, budgeting, the construction process, and maintenance expenditures. The committee should have a clear mission and stated role within the district's organizational structure. It should also hold regular public meetings and issue detailed reports of the school district's construction, renovation, and maintenance projects.

The state cannot afford a piecemeal approach to making virtual schools an integral part of public education in North Carolina.

School districts must also be attentive to concerns of their constituency, the citizens. For example, a recent survey of likely Mecklenburg County voters were asked to rank what

Charlotte-Mecklenburg Schools should cut from their budget to deal with financial constraints. Half of the respondents were willing to cut new schools construction, and 55% were willing to cut school renovation. Voters are evenly split in their support of the 2005 bond referendum, and fewer than half support higher property taxes to support school construction and renovation.⁴⁵

Finally, charter schools and private schools can alleviate part of the burden that public school districts encounter for construction and renovation costs. Taxes and bond issues do not support capital projects for charter or private schools, which usually finance school facilities for a fraction of the cost to build or renovate a public school facility. If more students were able to attend charter or private schools, then public school districts would need to accommodate fewer students and could reduce its capital expenditures accordingly. Unfortunately, the state impedes school choice by refusing to lift the cap on charter schools and rejecting proposals for tuition tax credits.⁴⁶

Taxpayers may be willing to approve occasional bonds or tax increases to pay for school construction and renovation, but they rightfully grow impatient when school systems request multi-million dollar bond issues year after year. The 2005 Charlotte-Mecklenburg bond referendum is the first of four proposed bond referendums in the next seven years. The mixed support for the 2005 bond issue suggests that each subsequent bond referendum will enjoy less public support. CMS and school districts across North Carolina must be committed to implementing new, permanent, and cost-efficient approaches to school construction and renovation. The Mecklenburg County taxpayer demands it. The students of Mecklenburg County Schools deserve it.

Notes

- 1 Debra Gerald and William Hussar, “Projections of Education Statistics to 2013,” National Center for Education Statistics, October 2003, 45 – 56.
- 2 Calculations based on Department of Public Instruction, “Educational Statistics Access System,” [Online database] <http://www.dpi.state.nc.us/reportstats.html>.
- 3 U.S. Census Bureau, “Community Fact Finder,” <http://www.census.gov>.
- 4 North Carolina Department of Public Instruction, “Local Bond Issues for Schools Since 1995,” January 5, 2001, pp. 1 – 2.
- 5 Kelley D. Carey, “Stretching Construction Dollars,” *American School Board Journal*, October 2004, 26 – 30.
- 6 Peter Smolowitz, “CMS Sees Suburbs’ Growth Driving Need for \$2 Billion,” *Charlotte Observer*, August 9, 2005, <http://www.charlotte.com>.
- 7 Ibid. CMS based this estimate on a predictive model that projects both the population and the number of households that will occupy a given geographic boundary within Mecklenburg County. The model divides the county into 946 Traffic Analysis Zones (TAZ), predicts how land will be used within each zone, and then projects how many households will populate that zone in ten-year increments. Although using this method is common, it can lead to errors of both underestimation and overestimation. For example, school districts in Phoenix, Arizona and Pomona, California found that using TAZs to predict school enrollment led to persistently low school enrollment projections. On the other hand, if higher interest rates, rapid appreciation of housing prices, or an economic downturn slowed new housing starts, new students will likely enroll in the school district at a slower rate. The author used two alternate predictive models to project enrollment growth and both yielded figures comparable to CMS.
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- 12 Paul Abramson, “10th Annual School Construction Report,” *School Planning and Management*, February 2005, <http://www.peterli.com/spm/resources/rptsspm.shtm>. Region 4 consists of Tennessee, Kentucky, North Carolina, and South Carolina.
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- 14 Charlotte-Mecklenburg Schools, “Charlotte-Mecklenburg Schools Proposed 2005 Capital Needs Assessment.” Square footage in the tables is lower than figures listed in the report because CMS school facilities planners revised their initial estimates. Construction costs for all proposed CMS schools includes equipment, furniture, books, and soft costs.

- 15 Wake County Public School System, “Plan 2004: New Schools,” <http://www.wcpss.net/plan-2004/maps/new.html>; “2004-05 New School Openings and Projects,” <http://www.wcpss.net/auillary-services/newschoolstats04.html>. Construction costs for all new Wake County schools includes fees, equipment, and furniture. Projected/actual completion dates are as follows: Briar Creek Elementary (2006), Heritage Middle School (2004), and Panther Creek High School (2006).
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- 18 All square footage amounts are the median of the range provided by the elementary school design guide.
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- 31 Barbara Kent Lawrence et al. “Dollars & Sense: The Cost Effectiveness of Small Schools,” KnowledgeWorks Foundation, 2002, pp. 1 – 41.
- 32 Sue Kiesewetter, “The Name Game,” *School Planning and Management*, August 1998.
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*“To prejudge other men’s notions
before we have looked into them
is not to show their darkness
but to put out our own eyes.”*

JOHN LOCKE (1632–1704)

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