# School Siting

## Contested Visions of the Community School

Noreen C. McDonald

**Problem:** The United States is embarking on an unprecedented era of school construction even as debate continues over where schools should be located and how much land they should occupy.

**Purpose:** My three goals for this study were to trace the evolution of school siting standards, to explain the factors currently influencing school facility location decisions, and to identify what local and regional planners could contribute to school siting decisions.

**Methods:** I reviewed the land use planning and educational facilities literatures on school siting and conducted in-depth interviews with school facility planners from 10 counties in Maryland and northern Virginia to assess their perspectives on the school planning process.

**Results and conclusions:** I discovered that different groups use very different definitions of *community school*. Smart growth proponents advocate community schools that are small and intimately linked to neighborhoods, while school facility planners expect community schools to meet the needs of entire localities. I recommend that individual communities consider the tradeoffs associated with different school sizes and make choices that meet local preferences for locations within walking distance of students, potential for sports fields, school design, and connections to neighborhoods. State school construction and siting policies should support flexibility for localities.

**Takeaway for practice:** Local and regional planners should work with school facility planners to conduct exercises and charettes to help each community determine how to realize its own vision of community schools.

**Keywords:** schools, school siting, smart growth, community schools, neighborhood

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Schools represent long-lived and spatially fixed infrastructure investments. Decisions about where to locate new schools (commonly called *school siting* in the academic literature and *site acquisition* by practitioners) influence the travel patterns of students and parents in the short run and the spatial development of the community in the long run. Despite the clear relationship between school facility planning and comprehensive planning, connections between the two are sparse. Only six papers in the 75-year history of the *Journal of the American Planning Association* have directly addressed school planning (Baum, 2004; Feld, 1969; Glazer, 1959, 1964; Rosenberg, 1957; Seelig, 1972).[1] But several recent articles on transportation, smart growth, and historic preservation have brought school location to the attention of local and regional planners (Beaumont & Pianca, 2002; Ewing & Greene, 2003; Gurwitt, 2004). Critics contend that the current trend toward what they call *school sprawl* (locating schools on large campuses away from the residential areas they serve) eliminates neighborhood schools, creates environments where few children can walk to school, increases pollution and congestion, and reduces community connections. As an alternative, they have proposed community-centered schools that are "small, . . . integrated into the community fabric, . . . and . . . located within the neighborhoods they serve" (Sharp, 2008, p. 5).

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But there are challenges to implementing community schools. Racial diversity goals, desires for athletic fields, increased numbers of charter schools, and federal efforts to encourage school choice are obstacles to the establishment of small, neighborhood schools within walking distance of their students. And the phrase has varied meanings. One definition says a *community school* is relatively small and located within the neighborhood it serves (Council of Educational Facility Planners, International [CEFPI] & U.S. Environmental Protection Agency [EPA], 2004). Another view is that a community school serves an entire community, with extensive facilities that can accommodate youth and adult sports leagues, adult education in the evenings, community libraries, and theater (Engelhardt & Engelhardt, 1940). If planners want to make a significant impact on school siting decisions, they must understand this difference.

The current conversation on school siting in the United States occurs while an unprecedented amount of school construction is underway (Agron, 2004). California has passed nearly $82 billion in school facilities construction measures since 1996 (Fuller, Vincent, McKoy, Bierbaum, 2009). Ohio has undertaken a four-year, $10.5 billion school construction program (Gurwitt, 2004). The federal government is also becoming involved in school construction. The American Recovery and Reinvestment Act of 2009 allocated $22 billion to a new tax credit bond program that allows public agencies to finance school construction, rehabilitation, and land purchase through zero-interest bonds (bondholders receive credits against federal tax liabilities). The Energy Independence and Security Act of 2007 required the EPA to develop school siting guidelines. Decisions made now about how to build schools will have long-lasting effects for communities across the United States.

I had three goals for this article. The first was to place the current dialogue on school siting in context by exploring the evolution of school siting standards and tracing the historical connections between school siting and comprehensive planning. My second goal was to explain the factors currently influencing school facility location decisions and how land use regulations affect school facility planning. Case studies from Virginia and Maryland allowed me to explore the criteria that school facility planners use to site schools and to analyze whether the differences in land use regulation in these two states were associated with differences in their school acreage guidelines and the land they devote to schools constructed recently. My final goal was to identify the role that local and regional planners play in the evolving conversation on school siting and to explore how state policy can allow local jurisdictions more flexibility in their school location decisions.

## Origins of School Facility Planning

The proportion of young people enrolled in secondary schools in the United States rose during the 20th century as compulsory attendance laws and economic conditions encouraged them to acquire more schooling rather than going to work at an early age. For example, 10% of those aged 14–17 were enrolled in secondary schools in 1910, but 90% of this age group was enrolled by 1970 (Goldin, 1998). Early education reformers found that the physical infrastructure was not up to the requirements of a modern education system. Fletcher B. Dresslar (1911), an expert in school hygiene, stated that city schools were "housed in buildings situated on small lots, hemmed in by other buildings, and immersed in foul air, much dust, and the din of the hurrying multitude" (p. 1).

To remedy this situation, reformers recommended minimum requirements for adequate natural light, classroom size, heating, and fire safety, which were adopted into state school construction standards starting in the late 1800s and early 1900s. From the school building, attention turned to the school site. Early guidelines on school size and location recommended sites be of "adequate size" to accommodate the school building and space for "outdoor games and physical education" and that the school should be away from the "noise and dust of the street" (Cooper, 1925, p. 13). Experts quickly transformed these use-based standards to minimum acreage guidelines. One of the earliest acreage guides came from Strayer and Engelhardt (1929/1974), two professors at Columbia's Teachers College, as part of the *Regional Plan of New York and Its Environs*. They recommended a minimum of 5 acres for an elementary school, 8 acres for a junior high, and 12 acres for a senior high (Table 1).

These recommendations influenced planning practice. Clarence Perry (1929/1974) placed the elementary school at the heart of his neighborhood unit, and advocated neighborhoods large enough to support one elementary school to protect neighborhood children from the dangers of the automobile (Figure 1). To determine the dimensions of these neighborhood units in both population and extent, Perry looked to school facility planners. He cited Strayer and Engelhardt's (1929/1974) suggestion that "children of the elementary-school grade should not be required to travel more than one-half mile to school" (p. 130). Table 2 shows the history of recommended travel distances to schools, corresponding to recommended school sizes. Perry also used Strayer and Engelhardt's recommendations for elementary school enrollments to determine the size he would recommend for a neighborhood unit. In a single-family neighborhood, Perry concluded that 8 acres would

Table 1. School size guidelines from education, planning, and public health.

| Source | Author | Year | Minimum site size (acres) | | |
|---|---|---|---|---|---|
| | | | Elementary | Middle | High |
| Education | Cooper | 1925 | | | |
| | Committee on Regional Plan of New York and Its Environs | 1929 | 5[a] | 8[a] | 12[a] |
| | National Council on Schoolhouse Construction | 1949 | 5 | 10 | 10 |
| | National Council on Schoolhouse Construction | 1953 | 5[a] | 10[a] | 10[a] |
| | National Council on Schoolhouse Construction | 1958 | 5[a] | 20[a] | 30[a] |
| | National Council on Schoolhouse Construction | 1964 | 10[a] | 20[a] | 30[a] |
| | Council of Educational Facility Planners | 1969 | 10[a] | 20[a] | 30[a] |
| | Council of Educational Facility Planners, International | 1976 | 10[a] | 20[a] | 30[a] |
| | Council of Educational Facility Planners, International | 2004 | | Flexible | |
| Planning | Planning Advisory Service | 1952 | 5[a] | 10[a] | 10[a] |
| | Chapin | 1957 | 5[a] | 10[a] | 20[a] |
| | Chapin | 1965 | 5[a] | 10[a] | 20[a] |
| | Chapin & Kaiser | 1979 | 5[a] | 15[a] | 25[a] |
| | Kaiser, Godschalk, & Chapin | 1995 | 7–8[b] | 18–20[c] | 32–34[d] |
| | Berke, Kaiser, Godschalk, & Rodriguez | 2006 | 7–8[b] | 18–20[c] | 32–34[d] |
| Public health | American Public Health Association Committee on the Hygiene of Housing | 1948 | 8.2 | | |
| | American Public Health Association Committee on the Hygiene of Housing | 1960 | 8.2 | | |

Notes:
The National Council on Schoolhouse Construction changed its name to the Council of Educational Facility Planners, International in 1965.
a. Plus 1 acre per 100 students of anticipated final enrollment.
b. This standard also established a maximum of 16–18 acres.
c. This standard also established a maximum of 30–32 acres.
d. This standard also established a maximum of 48–50 acres.

accommodate an elementary school, playgrounds for younger children, and playfields for older children (Perry, 1939, p. 59).

Perry's model also influenced other fields. The American Public Health Association (APHA) used neighborhood units in their *Planning the Neighborhood* guides published in 1948 and 1960. For a neighborhood elementary school, APHA recommended a total of 8.2 acres for the school and neighborhood playground for a 450-pupil school (APHA Committee on the Hygiene of Housing, 1948, 1960). Engelhardt, Engelhardt, and Leggett (1953) used the neighborhood unit concept in their guides to school planning by showing how neighborhood elementary schools fed into middle and high schools, which served wider areas.

There are other early sources on school siting. In 1922, the heads of the planning divisions from many state departments of education came together to form the National Council on Schoolhouse Construction (NCSC; Beck, McClurkin, & Darby, 1982). The NCSC's mission was to establish school building standards, combat wastefulness, and disseminate information. The organization (today called the Council of Educational Facility Planners, International, or CEFPI), published an influential series, many called *Guides for Planning School Plants* (NCSC, 1930, 1949, 1953, 1958, 1964). Although the group's recommendations were only guidelines, many states adopted them into law.

The NCSC's first standards focused only on schoolhouses (NCSC, 1930), but after World War II, they expanded their guidelines to include school location. In 1949, the NCSC recommended 5 acres plus 1 acre for every 100 students at the elementary level (e.g., 10 acres for a 500-student elementary school) and 10 acres plus 1 acre for every 100 students for secondary schools (NCSC, 1949). Stating that "it is desirable to locate schools within walking distance of the greatest number of pupils" (p. 18), these standards were quite similar to those developed by Strayer and Engelhardt (1929/1974) in the *Regional Plan of New York and Its Environs*.

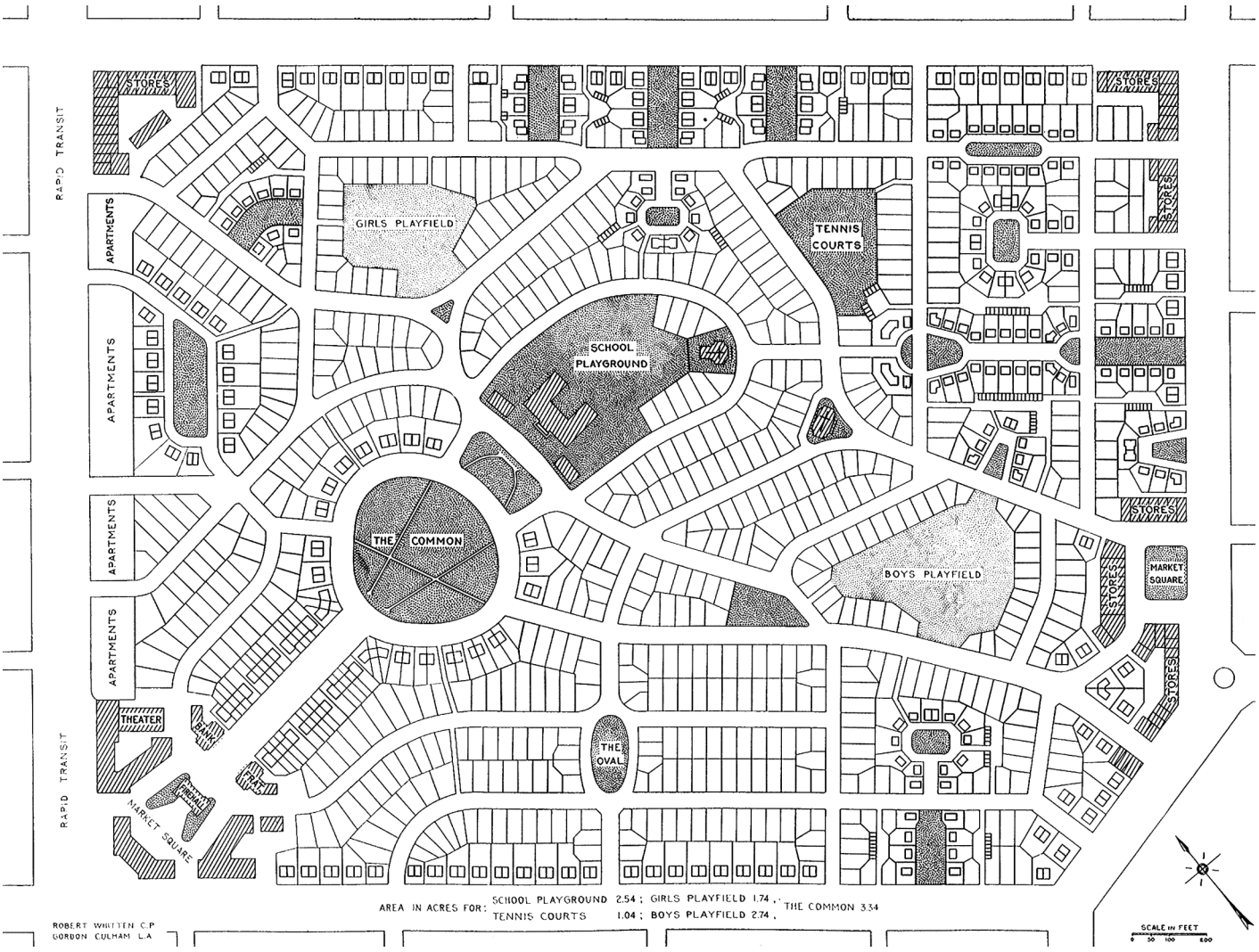


Figure 1. Schematic of a neighborhood unit for modest dwellings.

Source: Perry, 1929/1974, p. 36. (© Regional Plan Association; image used with permission.)

But recommended site sizes continued to rise in the postwar decades. By 1958, the NCSC issued revised guidelines with minimum sizes of 5 acres (elementary), 20 acres (junior high), and 30 acres (senior high; NCSC, 1958). By 1964, the recommended minimum acreage for elementary schools was raised to 10 acres, after which the 10-20-30 standard remained in place for several decades (NCSC, 1964).

These guidelines were rapidly adopted into state school construction codes. By the late 1950s, all states except Wyoming had established minimum size guidelines, with 43 states recommending minimum sizes of at least 5 acres for elementary schools and 45 states recommending at least 10 acres for secondary schools (Taylor, 1958). While the acreage guidelines were suggested in most states, local school boards often interpreted them as requirements.

## Why Large School Sites?

Why did recommended site sizes increase during the 1950s and 1960s? The NCSC's 1949 *Guide* observed that:

> Most school sites are too small. Modern schools require sites larger than were considered necessary a generation ago. Larger areas are necessary because of the continued expansion of educational programs, the greater use of schools by the entire community, and the necessity for sufficient space for both present and future building needs. (p. 19)

Table 2. School travel time and distance guidelines from education, planning, and public health.

| | | | Travel | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Elementary | | Middle | | High | |
| Source | Author | Year | Walk (miles) | Drive (mins) | Walk (miles) | Drive (mins) | Walk (miles) | Drive (mins) |
| Education | Cooper | 1925 | ½–¾ | | 1¼–1½ | | 1½–2 | |
| | Committee on Regional Plan of New York and Its Environs | 1929 | ½ | | 1 | | Varies | |
| | National Council on Schoolhouse Construction | 1949 | ¾ | 30 | 1½ | 60 | 2 | 60 |
| | National Council on Schoolhouse Construction | 1953 | ¾ | 30 | 1½ | 60 | 2 | 60 |
| | National Council on Schoolhouse Construction | 1958 | ¾ | 30 | 1½ | 60 | 2 | 60 |
| | National Council on Schoolhouse Construction | 1964 | ¾ | 30 | 1½ | 60 | 2 | 60 |
| | Council of Educational Facility Planners | 1969 | ¾ | 30 | 1½ | 60 | 2 | 60 |
| | Council of Educational Facility Planners, International | 1976 | ¾ | 30 | 1½ | 60 | 2 | 60 |
| | Council of Educational Facility Planners, International | 2004 | | | | | | |
| Planning | Planning Advisory Service | 1952 | ¼–½ | | ¾–1 | | 1–1½ | |
| | Chapin | 1957 | | | | | | |
| | Chapin | 1965 | | | | | | |
| | Chapin & Kaiser | 1979 | | | | | | |
| | Kaiser, Godschalk, & Chapin | 1995 | ½ | | ¾ | | 1 | |
| | Berke, Kaiser, Godschalk, & Rodriguez | 2006 | ½ | | ¾ | | 1 | |
| Public health | American Public Health Association Committee on the Hygiene of Housing | 1948 | ¼–½ | 20 | | | | |
| | American Public Health Association Committee on the Hygiene of Housing | 1960 | ¼–½ | 20 | | | | |

Note:
The National Council on Schoolhouse Construction changed its name to the Council of Educational Facility Planners, International, in 1965.

School facility planners foresaw campuses providing a wide range of vocational and recreational activities, including construction, farming, "building of model villages," and camping (Engelhardt, Engelhardt, & Leggett, 1949, p. 7; Taylor, 1958). Engelhardt et al. (1949) even speculated that high schools might begin to train glider pilots, an activity that would require 100 to 200 acres. Such extensive education programs required a great deal of land. The expansion of sports programs also affected school facility planners' site recommendations. These increased again in the early 1970s when the passage of Title IX (Patsy T. Mink Equal Opportunity in Education Act, 1972) required parity between boys' and girls' sports programs.

But school facility planners also envisioned schools that served the entire community with campuses that "will be busy day and night with a wide variety of activities for adults" (Engelhardt et al., 1949, p. 8). In fact, school facility experts believed "the widest possible use of its [the school's] facilities for the education of all children and citizens is the justification for the enormous expenditure of public funds" (Engelhardt & Engelhardt, 1940, p. vii). They noted the need to co-locate community and school facilities such as "playgrounds, libraries, health centers, and neighborhood houses" (Engelhardt & Engelhardt, 1940, p. viii). As Figure 2 shows, these community schools were large, potentially requiring 25–100 acres. While most communities did not implement schools providing such extensive facilities, this utopian vision of the school serving the entire community rather than simply a neighborhood was influential in school facility planning practice.

Also critical were the historical contingencies. School planning was formalized in the postwar years when schools were being built rapidly in undeveloped suburban areas, as Rosenberg's 1957 *JAPA* article illustrates:

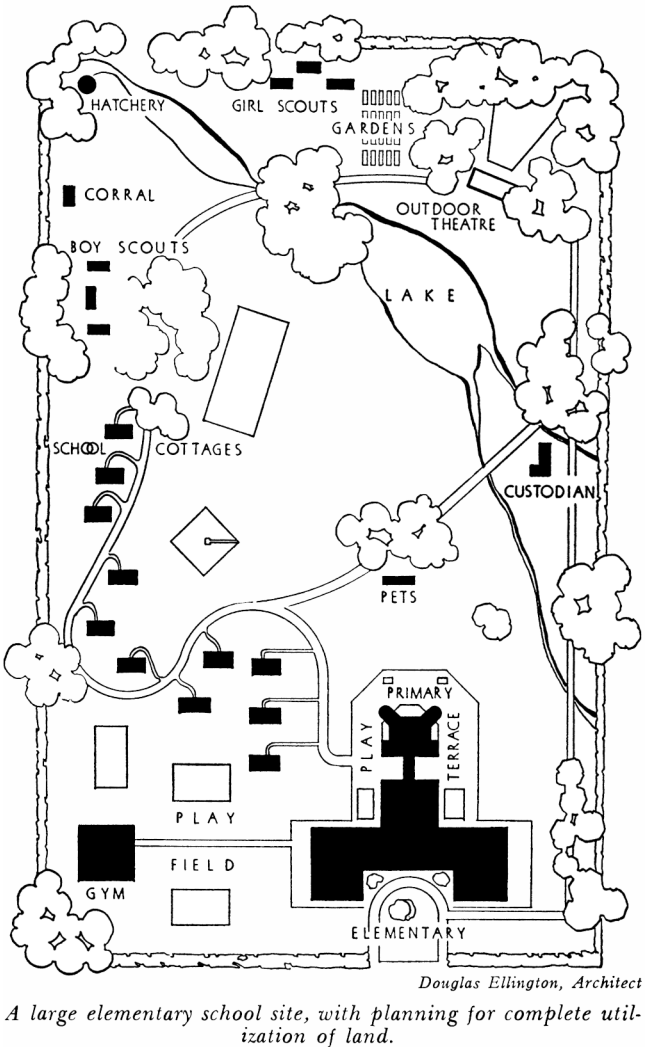


Figure 2. Example of a community elementary school.

Source: Engelhardt & Engelhardt, 1940, p. 125.

> In 1947 the site of Levittown [Long Island] was a 'potato patch' with scattered farmhouses and a three-room schoolhouse accommodating 37 children. In 1954, Levittown with six square miles and 70,000 people in 14,000 homes had 12,500 pupils crowded into nine schools. (p. 52)

In this environment, land was not a limiting factor, but it was essential to build schools quickly to accommodate all the new children. This situation favored the construction of larger schools surrounded by enough land to allow for expansion in the future. Many school facility planners also perceived economies of scale in school construction. Whether or not this is true has been much debated, and was particularly challenged by foes of school consolidation, but played an important role in siting decisions nonetheless (DeYoung & Howley, 1990; Howley, Howley, & Shamblen, 2001).

School architecture also changed after the war. The one-story modernist design of Eliel and Eero Saarinen's 1940 landmark Crow Island School quickly replaced designs for traditional multistory buildings common in the early 1900s (Brubaker, 1998). These buildings required a larger footprint for the same interior space and thus occupied more land than their predecessors.

Finally, as travel became increasingly motorized and schools were built with cafeterias to allow students to eat lunch at school rather than returning home, schools no longer needed to be within walking distance of where students lived. The wider use of motorized vehicles also affected land requirements, since many high schools began providing parking for faculty and students. Some schools even built dedicated learning tracks for their driver education programs (Taylor, 1958).

### The Role of Local and Regional Planners

After Perry's proposal to place the school at the center of the neighborhood unit, "the school pretty much disappeared as an important element from planning literature and planning discussion" (Glazer, 1959, p. 191). Comprehensive planners largely ceded school siting to school districts in the 1950s and 1960s. Two Planning Advisory Service reports (1952, 1963) compiled standards on school siting from the education facilities field and instructed planners how to project school enrollments, but paid little attention to how schools shape communities. The influential textbook *Urban Land Use Planning* (editions in chronological order: Chapin, 1957, 1965; Chapin & Kaiser, 1979; Kaiser, Godschalk, & Chapin, 1995; and Berke, Kaiser, Godschalk, & Rodriguez, 2006) included a section on school planning in each edition (see Table 1). The acreage guidelines in the 1957, 1965, and 1979 editions are lower than the CEFPI standards, but they have increased over time. For example, the 1976 CEFPI standards for elementary, junior high, and senior high schools were 10, 20, and 30 acres, respectively, but the *Urban Land Use Planning* recommendations in 1979 were 5, 15, and 25 acres, respectively. The 1995 and 2006 editions of *Urban Land Use Planning* shifted to minimum and maximum site size guidelines derived from texts on urban design standards.

## Current Situation

The CEFPI guidelines have came under criticism in recent years. Opponents argued that the recommended

school site sizes were not sensitive to local context and such large campuses could only be accommodated at the edge of developed areas in many communities (Beaumont & Pianca, 2002). Some critics have contended that these size requirements have prevented schools from locating in neighborhoods, leading to low rates of walking to school; the closing of existing urban schools because they do not meet size requirements; and new housing developments near greenfield school sites (Beaumont, 2003b; Ewing & Greene, 2003). In response to these and other concerns about school sprawl, CEFPI issued new guidelines in 2004 without recommended minimum size standards, allowing more flexibility in school design (Myers & Robertson, 2004). While no complete current inventory of state standards exists, a 2003 study showed half the states have minimum acreage requirements (Weihs, 2003). South Carolina and New Mexico have eliminated acreage requirements in the last five years, and Illinois and Maine have placed limits on the maximum parcel size for which state funds can be spent.

CEFPI also collaborated with the EPA (2004) on *Schools for Successful Communities: An Element of Smart Growth*. This document provides principles and examples of how localities can "integrate smart growth principles into the educational facility planning process" to develop "community-centered schools" (p. 11). According to McCann and Beaumont (2003), *community-centered* or *smart growth schools* have the following characteristics.

> They are small in size and thus fit gracefully into the neighborhoods they serve. They encourage broad community involvement in school facility planning. They provide high-quality education. They are located within a neighborhood and are safe for children to walk or bike to. They act as a neighborhood anchor and support community use of the school facility after school hours. They are well designed and fit in well with the scale and design of the surrounding neighborhood. They make good use of existing resources, including historical school buildings. (p. 25)

### Current Challenges to Community-Centered Schools

While the vision of community-centered schools is attractive, there are important reasons why school facility planners have favored larger schools. One major problem with assigning children to neighborhood schools is that this practice may limit the school's racial and economic diversity. Just as critics observed that the neighborhood unit promoted segregation (Banerjee & Baer, 1984), the neighborhood school reflects the demographic characteristics of the surrounding area. In a 1964 *JAPA* article, Gans argued that school integration required moving beyond neighborhood schools.

> He [the planner] must give up his allegiance to that fictionary community of the old site selection standards, in which the main worries were the tender leg muscles of young children and the alleged dangers of automobiles—a community in which there were no racial differences or parochial schools, no educational haves or have-nots, and no disagreements about the ingredients or costs of a good education. (p. 190)

Baum (2004) criticized the smart growth movement for failing to consider the complex interactions between race, schooling, and urban development, and advocated improving urban education to "manage the sprawl system" (p. 17). He also noted that emphasizing smart growth concerns in school planning diverts attention from the critical issue of educational quality, and may "explicitly oppos[e] desegregation" (p. 17) by ruling out larger schools that draw from a wider and more diverse geographic area.

Trends in school assignment policy have also challenged the idea of neighborhood schools. Families increasingly have the option to choose their child's school through magnet or charter programs. In addition, the federal No Child Left Behind Act (2001) allows families to choose higher quality schools if their school is not performing adequately. School choice has proved popular with parents (Teske & Schneider, 2001), but adds substantial uncertainty to planning school facilities (Donnelly, 2003) and can lead to perverse outcomes if districts overdesign schools to attract more students (Norton, 2007). School choice may also violate the definition of a community-centered school. Is a school community centered if most students do not come from the neighborhood?

## Method: Comparing Maryland and Northern Virginia School Districts

To understand how CEFPI's recent flexibility and the current dialogue on community-centered schools are affecting school planning, I looked at siting practices in 10 school districts in growing areas of Maryland and northern Virginia, interviewing school facility planners and analyzing recently constructed schools. The boundaries of all 10 of these school districts correspond to their county boundaries: five in northern Virginia (Fairfax, Fauquier, Loudoun, Prince William, and Stafford counties), and five in Mary-

land (Anne Arundel, Frederick, Howard, Montgomery and Prince George's counties). All 10 of these counties are part of the Washington, DC, metropolitan area. They encompass established high-density suburbs and rapidly growing exurbs. Tables 3 and 4 show some basic data about these counties and their schools. I selected these two states for study because they have different approaches to land use regulation. Maryland has a history of promoting smart growth through strong land use controls, such as Adequate Public Facilities Ordinances (APFOs), while Virginia localities have more limited growth controls.

I conducted in-depth interviews with 11 school facility planners employed by these 10 school districts in Maryland and northern Virginia in 2007 and 2008. These interviews probed the siting processes in the subjects' local area with an emphasis on how they selected parcels and how land use planning regulations affected the siting process. I included questions such as "Can you describe the school siting process in your district?" "What is your role in the school siting process?" "What are the main considerations when looking for school sites?" and "How much communication is there between school facility managers and county planners?" I also interviewed Maryland and Virginia Department of Education officials to gather information on school size and construction funding policies. I obtained supplemental information on the development approval process in each area from county comprehensive planners and county web sites.

I also collected information on the size of all 72 of the recently constructed schools in these 10 school districts, excluding charter, adult, and evening schools, to assess how schools are being planned and built. I used the National Center for Education Statistics database (U.S. Department of Education, 2009) to identify schools that opened in these school districts between 2000 and 2006. I estimated the sizes of the parcels on which these schools were built using Google Earth, cross-checking my results with local tax assessor information on parcel size. Tax assessor data existed for only 44 of these schools, but for these I found the tax assessor parcel size data correlated well with my Google Earth estimates ($r = 0.80$). The average difference between my Google Earth estimates and parcel sizes in the tax assessor data was 3.4%.

# Results

## School District Acreage Guidelines and Construction Practices

Neither Maryland nor Virginia requires that local school districts adhere to state acreage standards. Maryland eliminated state acreage standards in the 1970s due to concerns over how urban districts would meet them, but maintains strong state oversight of school facilities through an interagency committee with representatives from the state Departments of Education, General Services, and Planning (Whitaker et al., 2008). Schools are exempt from the Maryland Smart Growth Areas Act of 1997, but an executive order (Maryland Executive Order No. 01.01.1998.04, 1998) encourages all state agencies to comply with that legislation. In addition, Maryland regulations favor renovation of existing schools over construction of new ones (Beaumont, 2003b). Virginia eliminated mandatory school size standards in the mid-1990s and the Virginia Department of Education currently recommends, but does not require, school sites of at least 4 acres plus 1 additional acre for every 100 students at the elementary level and 10 acres plus 1 additional acre for every 100 students at the middle and high school levels. Officials in the Virginia Department of Education informally suggest sites of 15–20 acres for elementary schools, 20–30 acres for middle schools, and 30–40 acres or more for high schools.

Even though neither state has binding acreage requirements for school sites, all of the school facility planners I interviewed reported either that their school boards had officially adopted acreage guidelines or that they relied on the pre-2004 guidelines as unofficial rules of thumb for school siting. The school facility planners reported in interviews that they look for 15–20 developable acres for an elementary school, 20–40 acres for a middle school, and 40–80 acres for a high school. Districts in Maryland generally suggest lower acreages for middle and high schools than do their counterparts in Virginia, but they also have lower student enrollments per school.

School facility planners felt these acreages were necessary for three reasons. First, facility planners believed community residents expected the school to provide ample parking, drop-off areas, and athletic fields. As a Virginia school planner noted, "We have a lot of parents who for whatever reason insist on driving their kids to school." For high schools, the provision of student parking was also a concern. A school facility planner explained:

> The reason why we look for that much land is because there is a significant community use aspect to any school site. Ball fields have nothing to do with our curriculum. There is nothing in the gym curriculum that requires a softball diamond or a baseball diamond. There's no actual need for it, but there's so much youth athletics and recreational leagues and so forth that we routinely put those in because of the demand and if we don't put it in that'll be a problem.

Table 3. Statistics describing Maryland counties studied and their schools between 2005 and 2007.

| | Maryland counties | | | | |
|---|---|---|---|---|---|
| | Anne Arundel | Frederick | Howard | Montgomery | Prince George's |
| Population[a] | 510,824 | 222,034 | 270,651 | 925,719 | 833,862 |
| % population change from 2000[a] | 4.3 | 13.7 | 9.2 | 5.6 | 4.0 |
| Persons per sq. mile in 2000[a] | 1,177.2 | 294.5 | 983.5 | 1,760.8 | 1,652.6 |
| Median household income[a] | $79,294 | $76,920 | $97,837 | $89,284 | $68,410 |
| % White[a] | 78.2 | 83.8 | 68.3 | 61.2 | 22.8 |
| % Black[a] | 14.5 | 8.1 | 16.3 | 16.2 | 64.1 |
| % Asian[a] | 3.0 | 3.3 | 10.8 | 13.0 | 3.9 |
| % Hispanic/Latino[a] | 3.9 | 5.1 | 4.4 | 14.0 | 11.3 |
| % with bachelor's degree[a] | 34.2 | 33.6 | 56.7 | 56.5 | 30.1 |
| Number of schools[b] | 114 | 62 | 69 | 195 | 205 |
| Average enrollment per elementary school[b] | 421 | 488 | 556 | 473 | 456 |
| Average enrollment per middle school[b] | 762 | 656 | 634 | 812 | 785 |
| Average enrollment per high school[b] | 1,556 | 1,172 | 1,240 | 1,589 | 1,297 |

Notes:

a. These data represent the average characteristics of each county between January 2005 and December 2007 and are calculated from American Community Survey estimates.

b. These data are for 2006–2007.

Sources: U.S. Census Bureau (2009), U.S. Department of Education (2009).

Table 4. Statistics describing Virginia counties studied and their schools between 2005 and 2007.

| | Virginia[a] counties | | | | |
|---|---|---|---|---|---|
| | Fairfax | Fauquier | Loudoun | Prince William | Stafford |
| Population[b] | 1,006,576 | 65,417 | 266,087 | 352,773 | 118,551 |
| % population change from 2000[b] | 3.8 | 18.6 | 56.9 | 25.6 | 28.2 |
| Persons per sq. mile in 2000[b] | 2,455.1 | 84.9 | 326.2 | 831.3 | 342.4 |
| Median household income[b] | $102,460 | $80,549 | $104,612 | $85,538 | $85,793 |
| % White[b] | 67.7 | 86.3 | 73.3 | 61.3 | 73.8 |
| % Black[b] | 9.3 | 7.7 | 7.8 | 19.1 | 16.1 |
| % Asian[b] | 15.8 | 1.6 | 11.6 | 6.9 | 2.6 |
| % Hispanic/Latino[b] | 13.3 | 5.0 | 9.7 | 18.3 | 7.4 |
| % with bachelor's degree[b] | 58.4 | 28.7 | 55.2 | 36.5 | 33.6 |
| Number of schools[c] | 190 | 17 | 63 | 80 | 29 |
| Average enrollment per elementary school[c] | 612 | 508 | 576 | 606 | 671 |
| Average enrollment per middle school[c] | 954 | 501 | 977 | 1,101 | 926 |
| Average enrollment per high school[c] | 1,978 | 1,775 | 1,296 | 2,160 | 1,723 |

Notes:

a. Data for Virginia counties do not include data for the independent cities they contain, which have their own school districts.

b. These data represent the average characteristics of each county between January 2005 and December 2007 and are calculated from American Community Survey estimates.

c. These data are for 2006–2007.

Sources: U.S. Census Bureau (2009), U.S. Department of Education (2009).

The second reason facility planners looked to acquire ample acreage was to accommodate future enrollment growth. Facility planners believed that the most cost-effective means of accommodating enrollment growth, particularly as large parcels disappeared, was by building additions onto existing schools. Such additions are only possible if sites are large enough to increase building square footage and recreational facilities. This attitude is not surprising given that nearly all the CEFPI guides acknowledge the importance of acquiring enough land to allow future additions and school facility planners in the denser counties reported building additions to accommodate growth.

The final reason for acquiring larger parcels is that they provide insurance against construction problems. Many planners recounted stories of land acquired through developer donation that posed many challenges when they constructed the school. Difficult construction experiences combined with the high cost of due diligence have created strong incentives to acquire large school sites.

I found that districts became more flexible in their size requirements when they could no longer find parcels that met their size requirements. This occurred in the built-out, high-density suburbs I studied, and the literature reports numerous creative solutions to space constraints in cities. A school facility planner from a more developed county reported:

> One of the things that we have cautioned our board [about] is that most of the low hanging fruit is gone, and we are going to be making some adjustments, . . . having to do the same program on less land simply because you don't have those desirable properties out there. And what is there is going to have its limitations. And they're also getting squeezed by the price. In the end, instead of more suburban model schools, like one-story schools for elementary and middle schools, we're now looking at two-story designs to have a little more compact footprint to cut down on our acreage requirements. We are starting to adapt.

Analysis of recently constructed schools revealed a close match between district-level parcel size guidelines reported in the interviews and the size of newly built schools. As Table 5 shows, the sites for recently constructed elementary schools averaged just over 15 acres, with approximately 2 acres for the school building and just over 4 acres for playgrounds and other outdoor recreational spaces. The remainder of the land was left undeveloped or was used for parking and access. Some differences in site size exist between the states. Virginia middle schools were nearly 50% larger than Maryland middle schools. However, once student enrollments were taken into account there was no statistically significant difference in parcel area, building size, or recreation area; that is, Virginia middle schools are bigger because they have more students. Differences in parcel area between the two states at the high school level were not statistically significant. However, because the number of new high schools was very small ($n = 4$ in Maryland and $n = 7$ in Virginia), it is probably not appropriate to generalize from this result.

## Factors Used to Select School Locations

School facility planners identified water and sewer access and adequate road capacity as prerequisites for any potential school location. For elementary schools, they preferred sites located within neighborhoods, although how important this was varied among the counties. One Maryland school facility planner reported that for elementary schools they would "review the development proposal and make sure there are sidewalks throughout the development to allow for safe access to the school, for pedestrian access." However, another school facility planner noted that "we're kind of stuck with the pattern of land development that the community has approved already. So if it's a very suburban site with not a lot of walking, there's not much we can do."

Most school facility planners did not try to place high schools in neighborhoods for two main reasons. First, they noted that neighborhoods and developers oppose this because high schools generate so much traffic and because neighbors are concerned about having teenagers around. Second, facility planners generally cannot find enough land to site a high school within developed areas.

However, the usual school planning process did not trade parcel size off against other considerations. Most school facility planners first evaluated available sites to see if they met size requirements and then presented the school board with estimates of pupil transport cost, walkability, and connection to neighborhoods among those that met those requirements. Arranging the process in this way eliminates small sites from consideration early, without considering their potentially unique location advantages.

## Effect of Land Use Regulations

The Maryland and Virginia land use controls and development approval processes differ. Under Virginia law, localities cannot require developers to pay fees to offset the costs of their projects. However, local planning commissions may consider voluntary offers of land or cash from applicants seeking changes to existing zoning (Planning, Subdivision of Land and Zoning, 1997). This system involves significant negotiation. Although local authorities can deny the request for rezoning, developers can still go

ahead and develop at the *by-right* density (the density allowed under current zoning) without mitigating the impacts of the development.

In Maryland, local governments may use APFOs to tie development approval to infrastructure capacity. "If the roads are too congested, if the school classrooms are too crowded, if the water system cannot provide enough water, if the sewer pipes or treatment plant are full, or if there are not enough playing fields for recreational use, then development can not be approved until the problem is corrected" (Maryland Department of Planning, n.d.). When there is inadequate school capacity, the county can impose a building moratorium on an area until the gap between enrollment and capacity no longer exists, the moratorium expires, or developers provide additional schools.

These differences in the development approval process affected school siting, but did not significantly affect the size of recently constructed schools (Table 5). Maryland's APFOs tend to favor larger developers who can either donate land or construct new schools, or have the financial resources to wait for a moratorium to end. This means that a large portion of new construction in undeveloped areas is done through planned unit developments, giving school facility planners the opportunity to negotiate donations of school sites with developers. In Frederick and Howard counties, most of the school sites were acquired this way. In Virginia, school facility planners and local planners were in a weaker negotiating position because developers can opt to develop at by-right densities rather than proffering land or cash for new schools. By-right development also presented fiscal challenges because governments must provide schools for these developing areas before new property tax collections could begin to offset the costs.

The APFO process also encouraged communication between school facility planners and local planners. This generally resulted in more contact and stronger working relationships between the two groups in Maryland than Virginia. For example, a Maryland school facility planner stated, "The county has a subdivision review process that causes a meeting to occur every week, and there is [school] staff that attends that meeting every week, so we have an ongoing review of any development that is occurring." And another Maryland school facility planner said:

> We jump in when the land use is undergoing revision. We collaborate with the county to identify the number of schools that are needed and where they should be located. And then later on when the preliminary plan is submitted by a developer, we sit on the development review board to collaborate with other county agencies to figure out where exactly the schools should be located, whether or not it can be a donated site or if it would have to be a sale, a purchase. And then later on still we may be involved with the site plan.

Table 5. Average areas of schools constructed between 2000 and 2006, by grade level and significant difference between states.

| | Elementary school | | | Middle school | | | High school | | |
|---|---|---|---|---|---|---|---|---|---|
| | MD | VA | Signif. diff. | MD | VA | Signif. diff. | MD | VA | Signif. diff. |
| *n* | 21 | 21 | | 9 | 10 | | 4 | 7 | |
| **Parcel area** | | | | | | | | | |
| Total (acres) | 17.1 | 15.3 | | 21.3 | 31.2 | * | 53.8 | 65.9 | |
| Per student (sq. ft.) | 1,235 | 864 | * | 1,378 | 1,429 | | 1,360 | 1,875 | |
| **Building footprint area** | | | | | | | | | |
| Total (acres) | 1.9 | 2.0 | | 2.2 | 3.3 | * | 4.4 | 5.3 | |
| Per student (sq. ft.) | 137 | 116 | | 145 | 143 | | 107 | 142 | |
| **Recreation area** | | | | | | | | | |
| Total (acres) | 4.6 | 4.2 | | 4.4 | 10.5 | * | 22.3 | 24.6 | |
| Per student (sq. ft.) | 312 | 229 | | 291 | 470 | | 576 | 663 | |

Note:
I calculated the significance of the differences between the measures for Maryland and Virginia schools based on Mann Whitney nonparametric test.

*$\alpha < 0.05$

While Fairfax County, VA, has benefitted from a longstanding collaboration between land use and school facility planners even though Virginia does not have an APFO statute, APFOs do tend to create institutional arrangements that encourage close work between the two groups.

## Discussion

### Improving the School Siting Process

Recent debate on school siting has criticized existing school facility planning practices and advocated community-centered schools. While the phrase "community-centered" means small and integrated into a neighborhood to smart growth advocates, it has historically meant something else to school facility planners. After World War II, school planners identified community use of the school as a major reason for acquiring large parcels. They anticipated that schools would be used for adult education and community group meetings and would provide community facilities such as theaters, libraries, playgrounds, and ball fields. Similarly, school facility planners I interviewed for this study reported that accommodating community desires for sports fields and space for parking and those driving children to school required them to obtain larger school sites. The contested use of the term "community" highlights the tradeoffs involved in siting schools.

The current dialogue over school siting echoes debates over how we should build our communities. Have scale economies and the easy availability of motorized transportation allowed us to build larger schools with ample playfields, science and computer labs, theaters, and other amenities? Do large schools create environments where children fall through the cracks academically and escalating fuel prices make the cost of transporting students untenable? Webber (1963) argued eloquently that propinquity no longer matters, and we can exploit the relative ease with which we are now able to travel to interact with the activities and people we prefer. In contrast, many smart growth and preservation advocates have argued that smaller community schools can "instill a sense of pride" and "build connections between members of the school and the community" (CEFPI & EPA, 2004, p. 11), resulting in a better education for students and better economic development, housing value, and health outcomes for the community.

Underlying these positions are many empirical questions that simply have not been analyzed or have produced contradictory evidence. Do new schools encourage new housing development or does causation run the other way, with low-density housing patterns and high rates of vehicular travel requiring the construction of additional schools? Do neighborhood schools increase connections and social capital among residents? More analysis is necessary, but the answers to these questions are highly context-sensitive and individuals vary in which questions they consider important.

Some general patterns will continue to prevail. Elementary schools are more easily located within neighborhoods than are middle and high schools, even in low-density environments. Their enrollments tend to be smaller and they generally have lower space requirements than secondary schools. For example, at a density of 10 persons per acre, and assuming that 9% of the population are between the ages of 5 and 10 (U.S. Census Bureau, 2000), about 450 elementary school children would be expected to live within one-half mile of a centrally located school. About one in four Americans lives in a census tract with a density at or above this level. In addition, developers are often willing to provide land for elementary school sites, because the school can be marketed as an amenity.

Space constraints in urban areas make smaller sites more appropriate and create incentives for districts to share facilities such as pools, theaters, and libraries and to reuse existing structures. Recent articles in *Planning* and publications from CEFPI and the EPA, the International City/County Management Association, and the National Trust for Historic Preservation describe examples of this (Beaumont, 2003a; CEFPI & EPA, 2004; Donnelly, 2003; Romeo, 2004; Sharp, 2008). Fuller et al. (2009) documented the very creative siting strategies of the Los Angeles Unified School District, which has emphasized "two-story schools . . . , green design principles . . . , and . . . shared use of school facilities and outdoor recreational spaces" (p. 5).

It is less clear what community-centered schools look like in suburban areas, particularly at the secondary school level. Is it possible to provide a walkable school integrated into the fabric of the neighborhood when the neighborhood itself is not walkable and individuals have shown a preference for vehicular travel by choosing to live at low density? If the school provides most of the town's athletic fields on a large campus, is it a community school?

What does seem clear is that neither large schools nor small neighborhood schools are appropriate everywhere. The challenge is to develop a process that considers the tradeoffs before choosing goals for the siting process, and that gives school districts flexibility in implementing their plans. School facility planning in many districts places a higher priority on meeting size requirements than on proximity to neighborhoods, and does not explicitly recognize that this is a choice that involves tradeoffs. Local

and regional planners can assist school facility planners as they move beyond size requirements and focus more on matching school sites to community needs and desires. Local and regional land use planners' experiences with visioning processes and charettes can inform discussions of school siting and provide methods for identifying alternatives and tradeoffs. Flexibility in school siting will also require adjustments to state policies on acreage, school construction financing, and housing, as discussed below.

### Acreage Guidelines

Advocates of smart growth schools have endorsed eliminating state acreage guidelines because they limit school districts to locating new schools where large parcels are available. Eliminating the standards gives local areas more flexibility. However, I found that eliminating state acreage minima will not necessarily affect siting outcomes because some district policies simply continue past practices even when they are not bound by state size requirements.

If states wish to nudge school districts into considering alternative siting models, they could instead set upper limits for the acreages of new schools and provide financial assistance for certain models of school siting. For example, Illinois and Maine set maximum acreages above which they will not reimburse local districts. In Maine, the sizes are 20 acres (elementary), 25 acres (middle school), and 30 acres (high school) plus 1 acre for every 100 students at all levels. In Illinois, the standards are 5-15-20 plus the addition of 1 acre per 100 students. Such an approach only works if the state provides substantial funds for school construction. It also raises the possibility of perverse outcomes if districts opt to exceed the standards at their own expense. Without an explicit prohibition, affluent districts might obtain state funding for the state maximum acreage and then add to it using local funds.

### State and Federal Subsidies and Support

State school construction and operating subsidies can also affect local decisions. States can encourage renovation by covering a larger proportion of those costs or by providing guidance on how schools should choose between new construction and renovation. For example, a traditional rule of thumb has recommended building a new school if renovation would cost more than two thirds of the cost of new construction (Beaumont, 2003b). Maryland encourages renovation and, as a result, 80% of state funds reimbursing localities for school construction have been used for renovation (Beaumont, 2003b).

States can also recognize the connections between housing and schools with subsidies for schools. As part of Massachusetts' efforts to encourage higher density housing, the state will reimburse localities for school costs. Massachusetts law states that "any city or town that has established one or more smart growth zoning districts shall receive smart growth school cost reimbursement from the Commonwealth" (Massachusetts Smart Growth School Cost Reimbursement, 2005, n.p.). "The reimbursement equals the cost of educating students living in new housing in smart growth districts less an amount equal to the sum of: (a) new property and excise taxes in the smart growth district multiplied by the average percent of total local spending on education across the commonwealth (about 52%), and (b) any increases in other state education funding that is directly a result of these new students" (Massachusetts Executive Office of Housing and Economic Development, 2009).

Until the passage of the 2009 federal stimulus package (American Recovery and Reinvestment Act, 2009), the federal government had very limited involvement in school construction. That bill created qualified school construction bonds to provide substantial federal assistance to local school districts in building, rehabilitating, and purchasing land for schools over the next two years. The Energy Security and Independence Act of 2007 required the EPA to develop model guidelines for siting school facilities. The guidelines have not been issued, but both developments suggest a larger federal role in school construction in upcoming years.

## Conclusions

The need to build new or refurbish many of the nation's primary and secondary schools presents opportunities and challenges to school facility planners and local and regional planners. I found an important difference in the normative goals for school siting between these two groups. In both utopian visions and day-to-day practice, school facility planners emphasize that schools should serve the entire community, not one neighborhood. This involves providing athletic fields for youth and adult sports leagues and parking to accommodate modern travel patterns. When local and regional planners and smart growth advocates discuss the community-centered school, by contrast, they mean a school that serves and is integrated into the fabric of a particular neighborhood. Rather than engaging in a debate over these alternative visions, I recommend identifying where each model is most appropriate. For example, urban areas face space constraints that require siting schools on smaller parcels and sharing facilities, while high schools in low-density suburban areas will serve many neighborhoods and need to be accessible to all.

State policy should support flexibility in school siting by eliminating acreage requirements, but this will only have the desired effect if local communities also take advantage of that flexibility by engaging in a public debate about school planning. School facility planners and local and regional planners can and should work together on this. The experience local and regional planners have with public participation, visioning, and charettes will help their communities choose the optimal sizes and locations for their future schools. School districts must then accommodate the needs and values of their communities in their school siting guidelines.

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## Note

**1.** I ascertained this by searching the keyword "school" in the *JAPA* online archive. I did not include articles on school transportation or comments on articles on school planning.

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