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Abstract

Researchers and advocates have linked state guidelines on minimum acreage for schools to the abandonment of historic schools and increased barriers to walking and biking to school. This study examined how the elimination of minimum acreage standards in four states affected school planning processes and outcomes using mixed methods. We found that states changed school acreage policies because of concerns about sprawl and the rising costs of education facilities. However, changes in state acreage policies have not been accompanied by changes in district-level school planning processes and therefore on-the-ground impacts have been minimal in the years immediately after the policy change.

Keywords

infrastructure and capital facilities, schools, state policy, minimum acreage

Introduction

In the early part of the twentieth century, elementary and secondary schools were built on small parcels, often less than ten acres. Today, it is not uncommon for elementary schools to occupy twenty acres and high schools to cover fifty acres or more. While the dramatic increase in the land devoted to schools results from many factors, including school consolidation, educational program demands, and changing land use patterns, previous research has identified state minimum acreage guidelines as a critical factor influencing local decisions about the location and acreage of new schools and ultimately our communities (Salvesen and Hervey 2003; Wyckoff, Adelaja, and Gibson 2011; Ewing and Greene 2003; Vincent 2006). These guidelines provide education facility planners with information about the smallest site considered suitable based on school type (elementary, middle, secondary) and expected enrollment.

Federal agencies, such as the EPA, and nonprofits such as the National Trust for Historic Preservation have cited concerns that these minimum acreage requirements push new schools to the outskirts of communities and may make it more difficult for students to walk and bike to school (Council of Educational Facility Planners, International and Environmental Protection Agency 2004; Beaumont 2003). In response, some states changed school siting policies. These changes provide a natural experiment on how state-level school acreage policies impact district-level school siting practices. Through interviews and surveys with local and

state officials involved in school siting, analysis of school acreage, and review of state guidance around school acreage, we consider the impacts of the policy change on normative guidelines, school siting practice and school acreages.

Conceptual Framework

Our study focuses on the impact of state-level guidelines on local practices. Decisions about school location and acreage are complex and depend on a diverse set of factors from local land market conditions to school district revenue-raising capacity to the interaction between local governments and school districts (Wyckoff, Adelaja, and Gibson 2011; Norton 2007). While acknowledging the importance of these factors in school siting decisions, this article focuses on the role of the state education or school construction agency in setting school acreage policies and creating normative guidelines. We are interested in how guidelines become embedded in policy and what the impact is on the built environment. Our

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work therefore draws heavily on the ideas of Southworth and Ben-Joseph (2003) and Ben-Joseph (2005a) who looked at the influence of street standards promulgated by nongovernmental groups on municipal policy and ultimately city form.

Residential street standards were meant to ensure “driver comfort, safety at high speeds, and the overall efficient movement of vehicles” while simultaneously ensuring “maximum livability” (Ben-Joseph 2005a, 41–42). In the 1960s, the Institute of Transportation Engineers recommended at least sixty feet in right of way and pavement widths of thirty-two to twenty-four feet for the driving lanes (Ben-Joseph 2005a, 42). The recommendations of professional organizations were rapidly adopted by municipal governments seeking to regulate residential development and ensure the maintenance of home values. These standards led to the creation of suburbs where 30 percent of land is allocated to roads (Ben-Joseph 2005a, xvii), and the wide roadways encourage high-speed driving that is perilous for other road users. It also stifled the ability of developers and policymakers to create new forms of suburban development.

Frustration with the guidelines led some jurisdictions to change regulations to increase flexibility, for example, Portland’s Skinny Streets program (Southworth and Ben-Joseph 2003, 142); caused some developers to develop private street networks not subject to municipal regulations (Ben-Joseph 2005a, 143); and ultimately led professional organizations to offer more flexible standards, for example, the Institute of Transportation Engineers’ (1997) *Traditional Neighborhood Development Street Design Guidelines*. These changes in guidelines have led to some changes in the built environment, with a growing inventory of subdivisions using innovative designs and municipalities rethinking their regulations. Change, however, has not been wholesale, with many communities continuing to require wide roadways in residential areas.

The history of school siting standards is in many ways analogous to street standards. Early school acreage guidelines grew out of efforts in the late 1800s and early 1900s to improve conditions in urban areas. Many schools of this era failed to provide outdoor play facilities (Wickersham 1871; Moore 2006; McDonald 2010). Some of the first minimum acreage guidelines—which were part of the 1929 *Regional Plan of New York and Its Environs*—were meant to address this deficiency and recommended a minimum of five acres for an elementary school, eight acres for a junior high, and twelve acres for a senior high (Strayer and Engelhardt 1929).

Those early, relatively modest, standards were a precursor to the school acreage guidelines developed by the Council of Educational Facility Planners, International (CEFPI)—a professional organization of education facility planners. These guidelines were intended to guide postwar suburban school construction and help practitioners avoid the problems encountered in previous decades. The 1949 CEFPI guide recommended five acres plus one acre for every hundred students for elementary schools, ten acres plus one acre for

every hundred students for middle schools, and ten acres plus one acre for every hundred students for high schools (McDonald 2010); by 1964, the recommended acreage was ten acres plus one acre for every hundred students for elementary schools, twenty acres plus one acre for every hundred students for middle schools, and thirty acres plus one acre for every hundred students for high schools (the ten/twenty/thirty rule) (McDonald 2010). Thus, an elementary school with five hundred students would need at least fifteen acres, while a high school with two thousand students would need at least fifty acres. Rather than the original public health-oriented justification for the school acreage, the CEFPI standards addressed the concerns of education facility planners who faced rapid growth pressures in the postwar years. As the 1964 *Guide for Planning School Plants* stated, “sites of inadequate size have been one of the primary causes of early school building obsolescence” (National Council on Schoolhouse Construction 1964, 26). Purchasing large school sites provided insurance for unexpected increases in the student population.

From Guidelines to Policy

Just as street design recommendations from professional organizations such as the Institute of Transportation Engineers rapidly became legal requirements when municipalities adopted them into local development codes (Southworth and Ben-Joseph 2003), the CEFPI guidelines were integrated into state school construction guidelines. By 1958, all states but Wyoming had established minimum size guidelines (Taylor 1958). These state guidelines may be formal requirements or recommendations; there is generally a process for school districts, particularly those in urban areas, to request waivers of the standards. However, these state guidelines often become binding because school districts adopt the state guidelines as their own local policy, thereby making the guideline a requirement (McDonald 2010). As Ben-Joseph has noted when analyzing the impact of development standards on urban form, this process “shields [local governments] from responsibility in decision making” and “break[s] the connection with the original rationale for [the standard’s] existence” (Ben-Joseph 2005b, 1–2).

In the past decade, advocates, researchers, and government officials have begun to question whether minimum acreage standards have become disconnected from the original purpose and might be causing other unintended effects. Critics contend that minimum acreage standards have led to an increase in the siting of schools on the urban fringe—where land values are lower and large parcels are available—and abandonment of schools integrated into existing neighborhoods because they do not meet the acreage guidelines (Salvesen and Hervey 2003; Wyckoff, Adelaja, and Gibson 2011; Beaumont and Pianca 2002). Advocates and policymakers are concerned that this process contributes to sprawl, increases vehicle miles of travel, and reduces

Table 1. Comparison of Study States, 2010–2011.

	School Districts	Schools	Students	% Free or Reduced Price Lunch	% White	% School Construction Funds from State ^a
Eliminated minimum acreage requirements						
Minnesota	555	2,392	838,037	37	74	21
New Mexico	130	862	338,122	67	26	52
Rhode Island	54	317	143,793	43	65	34
South Carolina	105	1,214	725,838	54	53	2
Maintained minimum acreage requirements						
California	1,193	10,124	6,289,578	53	27	30
Georgia	212	2,449	1,677,067	57	44	15
New Hampshire	277	480	194,711	25	90	31

Source: National Center for Education Statistics, Common Core of Data.

^aData on percentage of school construction funds from state are from Filardo et al. 2010.

opportunities for physical activity (Ewing and Greene 2003; Council of Educational Facility Planners, International, and Environmental Protection Agency 2004; McClelland and Schneider 2004; Miles 2011).

Because of these concerns, CEFPI removed minimum acreage guidelines from its recommendations. CEFPI's 2004 *Guide for Educational Facility Planning* now endorses a flexible approach that supports schools as centers of community (Council of Educational Facility Planners, International 2004). Other entities have also worked to develop alternative guidelines for school location and acreage. The US Green Building Council's LEED for Neighborhood Development rating system rewards developments if 50 percent of new residences are within a half-mile walk of an elementary or middle school. The guidelines also set maximum acreage standards of five acres for an elementary school, ten acres for a middle school, and fifteen acres for a high school (US Green Building Council 2011). The EPA published *School Siting Guidelines* in 2011. These guidelines provide guidance on site selection, particularly potential health impacts, and are intended for states and school districts. The guidelines make no specific acreage recommendations, but do suggest that states eliminate minimum acreage requirements (U.S. Environmental Protection Agency 2011).

So now the question is whether the system that produced large minimum acreage standards can work in reverse. CEFPI and EPA have recommended removing minimum acreage requirements. Will these new recommendations become as embedded in policy as the original ten/twenty/thirty acreage standards? Based on the uneven outcomes with changing street standards, we wanted to assess how changes in minimum acreage requirements impacted school planning processes and outcomes. Specifically, our study asked,

1. What factors motivated policy changes around minimum acreage requirements?

2. How were changes in state acreage requirements reflected in state guidance on the subject, school planning processes, and the acreage of new schools?

Study Design

Changes to minimum acreage guidelines in several states allowed us to compare states that changed acreage policies to those that did not make changes. We selected the four states that eliminated state minimum acreage guidelines during the 2000s—South Carolina (2003), Rhode Island (2007), Minnesota (2009), and New Mexico (2009)—and compared these states to three states that had maintained their minimum acreage guidelines—Georgia, New Hampshire, and California. Comparison states were selected to match the geographic and size range of states that eliminated minimum acreage guidelines and based on researcher contacts with school siting decision makers. We used in-depth interviews and reviews of school siting guidance across these states to understand and identify the factors leading to changes in state policies on minimum acreage. To assess changes in school planning processes and outcomes, we used multiple methods including in-depth interviews with state education agency and school district officials as well as staff at nonprofits and professional associations; an online survey of school siting decision makers; and an analysis of the acreage of newly constructed schools in South Carolina.

For the online survey and analysis of acreage, we focused on South Carolina and Georgia. This pair of states was selected because South Carolina's policy change was the earliest among our study states, increasing the likelihood of observing changes in local school siting practices. In addition, factors affecting school siting decisions (other than minimum acreage requirements) were similar between the states. The two states are similar demographically and geographically (Table 1) and both states pay for the majority of school district pupil transportation costs and provide low

Table 2. Summary of Interviews.

	Number of Interviews	State Agency	Professional Association	School District	Nonprofit
Eliminated state acreage guidelines					
Minnesota	2			✓	✓
New Mexico	1	✓			
Rhode Island	2	✓			✓
South Carolina	5	✓	✓	✓	✓
Maintained school acreage guidelines					
California	3	✓			✓
Georgia	4	✓	✓	✓	
New Hampshire	3	✓	✓		✓

levels of school construction funding. For example, both states were in the second lowest quartile of state support for school construction (Filardo et al. 2010). In Georgia, all school districts are fiscally independent and in South Carolina two-thirds of districts have revenue-raising capacity (Filardo et al. 2010). To understand school planning practices in these states, we conducted additional interviews, an online survey, and analyzed the acreage of school sites before and after the South Carolina policy change.

Methods and Data

We utilized mixed methods to understand the impacts of changes in school siting guidelines and the motivations for policy change, including a review of state siting policies and guidance, interviews with key informants, an online survey of district-level school siting decision makers, and analysis of changes in school acreage before and after South Carolina's policy change.

Review of State School Siting Policies

For all of the states in the study, we reviewed the current guidance available from the state education agency related to school acreage. The review focused on acreage requirements and recommendations. In South Carolina and Minnesota where minimum acreage requirements were removed by legislators, we also reviewed the legislation.

Key Informant Interviews

We conducted interviews with individuals working on school facility planning at the state and local levels as government staff, members of professional organizations, and nonprofit staff (Table 2). Of the twenty interviews conducted, ten were from states that had removed minimum acreage standards and ten were from states with minimum acreage standards. The interviews included questions about the factors that led a state to change (or not change) its policies on school site sizes, the perceived effectiveness of the policy change, and the district-level school siting process. Interviews were taped, transcribed for analysis, and then reviewed by the research team to

determine key themes and extract differences and similarities across states that influenced state guidelines on school acreage.

Online Survey

To examine how changes to state policies impacted local school planning in South Carolina and Georgia, we conducted an online survey of individuals involved in school administration and planning. The online survey included questions on the respondents' position and experience with school siting, awareness of state acreage guidelines, factors influencing school acreage decisions, and school acreage preferences. To recruit respondents in South Carolina, we used an email list developed for its 2009 School Siting Summit. This list was compiled from the membership of the state chapter of CEFPI, the School Board Association, superintendents, and school facility planners. In Georgia, the Georgia School Boards Association shared e-mail addresses of superintendents and school board members, and the Georgia CEFPI chapter sent the survey to its members on the researchers' behalf.

We received 324 valid responses to the survey from South Carolina and Georgia. Over three-quarters of respondents in South Carolina and Georgia were school district superintendents or school board members. To ensure comparability of the South Carolina and Georgia samples, we restricted the analysis to these two groups. The final sample of superintendents and school board members was 101 in South Carolina and 158 in Georgia. In South Carolina, the response rate was 18 percent among school board members and superintendents; in Georgia the response for these same groups was 14 percent. This response rate is low compared with other studies of school administrators (Norton 2007), though not out of line with response rates for even large government surveys such as the National Household Travel Survey (Federal Highway Administration 2011).

Analysis of Changes in School Acreage

We investigated the impact of changes in state acreage guidelines on the size of school parcels by examining the

acreage of school parcels before and after changes to state policy. We selected South Carolina, because the minimum acreage policy changed in 2003, allowing time for the guideline changes to impact on-the-ground outcomes. South Carolina has kept track of the size of parcels approved for school sites since the 1960s. Similar data from Georgia was not available. We analyzed the South Carolina Department of Education's list of parcels approved between January 1997 and March 2011. During this period, 283 school sites were approved. We excluded sites that were intended to serve multiple schools ($n = 60$), vocational schools ($n = 8$), accommodate administrative functions ($n = 7$), were solely for additional acreage ($n = 53$), or had missing information for acreage or approval date ($n = 15$). After removing these school sites, there were 166 parcels available for analysis.

We compared average acreage before the policy change to those of schools sites acquired after the policy change. School site acquisition processes are long. Therefore, we allowed lag periods of zero to four years after the policy change. The statistical significance of our findings was the same no matter the lag period used. Therefore, our final analysis compared seventy-five school sites in South Carolina approved prior to January 2003, with ninety-one sites approved after January 2003. We compared differences in means between the two groups and disaggregated by school level. The lack of comparable school acreage data in Georgia means that our analysis cannot provide causal evidence of the policy's impacts. Instead, the acreage analysis assessed whether school acreage has changed over time and provided an opportunity to identify an association between the acreage policy change and practice.

Results

Review of State School Acreage Policies and Guidelines

In their guidance for school districts, California, Georgia, and New Hampshire recommend minimum acreage for school sites. Georgia and New Hampshire use smaller versions of the former CEFPI guidelines (ten/twenty/thirty). California provides very specific estimates of acreage requirements by presenting separate recommendations for building space, grounds, parking, play and sports facilities (California Department of Education 2000). While California does not "recommend exceedingly large schools," it recognizes that "some districts may desire to build schools that exceed the requirements" and provides different guidance later in the Guide for these expanded sites with total acreages of 10.2–11.7 acres for grades one to three; 17.2–18.5 acres for grades four to six; 27.4–29.4 acres for grades six to nine without football/track facilities; 33.7–35.7 for grades six to nine with football/track facilities; and 61.5–82.2 acres for high schools (California Department of Education 2000).

According to the *Georgia Guideline for Educational Facility Site Selection* (2012), the recommended site sizes of

five acres for elementary, twelve acres for middle, and twenty acres for high schools—plus one acre for each additional hundred students—apply to all circumstances including "the purchase of all new sites on which an educational facility will be constructed, the purchase of additional acreage for an existing educational facility site, existing sites on which a new educational facility will be constructed, before reopening a closed facility, or any leased or privately owned site on which public school students will be attending school or an educational program." The planning document also states, "Although minimum useable acreages are established, large acreages are highly desirable." A variance may be granted if the local school district proves that the smaller site can accommodate "all facility, parking, and outdoor areas."

New Hampshire's *Minimum Standards for School Sites* (1999) requires school districts to meet minimum site sizes of five acres for elementary, ten acres for middle, and fifteen acres for high schools—plus one acre for each additional hundred students—before providing "building aid" or construction funding. New Hampshire also limits the amount of land available for state funding with a maximum site size of ten acres for elementary, twenty acres for middle, and thirty acres for high schools—plus one acre for each additional hundred students. The state's *Manual for Planning and Construction of School Buildings* (New Hampshire Department of Education 2006) indicates that waivers are available and, according to our interview with the New Hampshire Department of Education, frequently granted in cases where urban sites cannot meet the standards.

Of the four states that removed minimum acreage requirements, Minnesota and South Carolina revised their acreage policy via legislative measures and Rhode Island and New Mexico changed their minimum acreage requirements through administrative action. In 2009, Minnesota passed a measure in the Education Omnibus bill (HF 2) that stated that the Education Commissioner may not issue "a negative or unfavorable review and comment" for a school facility "solely based on too little acreage of the proposed school site." However, the current *Guide for Planning School Construction Project in Minnesota* (Division of Program Finance 2003) lists a minimum number of acres for constructing a new school facility that are larger than the guidelines in Georgia, New Hampshire, and are almost equal to the ten/twenty/thirty acreage guidelines. The same adopted measure in HF 2 reiterated that "the local school board retains the authority to determine the minimum acreage needed to accommodate the school and related facilities."

In 2003, the South Carolina legislature eliminated its acreage requirement, "Notwithstanding another provision of law, a requirement that public schools be constructed on a lot or parcel of certain minimum size is prohibited." After the change, the South Carolina Department of Education's Planning and Construction Guide described this elimination and encouraged districts to utilize the latest CEFPI recommendations.

Rhode Island and New Mexico changed their minimum acreage requirements through administrative action. Rhode Island revised its policy guide as a result of a Governor's Growth Planning Council that met in 2001 and 2002. The Commissioner of Elementary and Secondary Education added a two-page addendum to the state's school siting guidance that recommended against using minimum acreage when selecting sites. However, this information was not available online until 2007 when the state revamped its regulations. In 2009, the New Mexico Public School Facilities Authority reevaluated its guidance and eliminated its acreage requirements. Instead of recommending a certain number of acres based on student size, New Mexico now asks school districts to submit information about the planned curriculum and the desired learning environment when applying for state funding for school renovation or construction.

Review of school sites by the state is mandatory in each of the state's policies we reviewed. Whether labeled as recommendations, standards, or guidelines, the minimum acreage for school sites is set by the state and therefore must be followed by the school districts unless a waiver is granted.

Interviews

The interviews probed why states had changed—or failed to change—minimum acreage requirements, the implementation of changes, and perceptions of impacts.

Factors motivating the revision (or decisions not to revise) of state school siting policies. When interviewed, respondents in South Carolina, Rhode Island, Minnesota, and New Mexico expressed three motivations for removing minimum acreage standards. The first theme was a desire to build or keep open schools on small acreage generally located in more urban areas. A staff member at the South Carolina state education agency stated that the motivation for eliminating minimum acreage requirements was "concern over losing neighborhood schools." Similarly, a staff member at a Rhode Island state education agency reported that the minimum acreage requirements had "preclude[d] building any schools in any urban environment, because there's no way you'd have that kind of acreage available." While most states had maintained waiver processes to allow construction of smaller schools, respondents felt that eliminating minimum acreage requirements created more flexibility.

Concerns about the cost burden of building ever-larger schools were the second theme motivating the removal of minimum acreage standards in some states. These statements accord with documented sharp increases in the cost of school construction in recent decades (Vincent and Monkkonen 2010). Key informants expressed concern about the additional and often hidden costs of building schools on larger, more distant sites, including the costs of infrastructure and busing.

We noticed that there were some circumstances where there seemed to be the potential for the district to reuse or renovate and add on to an existing facility at a much lower cost versus going out to the fringe, outside of town, and buying a huge site where there are no utilities. (New Mexico State Education Agency)

The final reason given for removing minimum acreage regulations was a desire to limit sprawl. "Early on, the [nonprofit] organization targeted [the state's] minimum acreage requirements as something to change, because we realized it was a critical factor in promoting sprawl" (respondent from Minnesota nonprofit organization). It appears that advocates and elected officials saw changing school acreage standards as a "low-hanging fruit" of addressing sprawl. For officials, changing the acreage guidelines imposes no additional costs or regulations on local government. In fact, the elimination of minimum acreage standards serves to increase local control.

Key informants from states with minimum acreage requirements provided insight into why minimum acreage policy has not been changed after the 2004 revision by CEFPI that advocated flexibility in site size. Some respondents identified benefits from larger schools. For example, larger sites address concerns about future expansion. As expressed by a California respondent working for a government agency, "[The guidelines] serve as a bargaining chip [for the districts] with . . . developers to make sure that they got enough space set aside." A Georgia school district leader expressed it this way, "You have a severely unknown future . . . so I want some expansion room. But it's more than that. It's the opportunity of what could come in the future to better serve the community." Others felt that the state needed the guidelines since local school districts lacked real estate expertise because they acquired land so infrequently. "I think it gives school systems in general who may not have the expertise . . . at least a guideline to go by because they're not real sure sometimes what they actually need, especially in a smaller school system, smaller county, smaller towns" (Georgia respondent from state agency). Others said that smaller sites did not provide as much educational space and therefore as many educational opportunities as larger sites and that it was easier to do future boundary changes with fewer larger schools than with many smaller schools.

Uneven implementation and impact on practice. In states that eliminated minimum acreage requirements we asked respondents about how the change had been communicated and the impacts on practice. Some respondents reported that state policy changes had impacted local practices. In Rhode Island informants believed that removing the minimum acreage standard had a positive effect, but the state's small size makes it challenging to see any impact. One Rhode Island interviewee said "if we had had that [minimum acreage requirement] in our regulations, we probably would not have

approved a few projects.” According to another respondent from Rhode Island, “We may have made a great policy change, but we’re also not a state that’s building a lot of new schools and we’ve only got thirty-nine cities and towns and only thirty-six school districts, so you’re not going to see a lot of movement in a given year.”

In contrast, respondents from South Carolina and Minnesota felt the policy change had not impacted practice. As stated by a school district staff member in South Carolina, “While it [minimum acreage requirement] has been removed in practice, nothing has changed.” One explanation given for the lack of impact was that districts continued to use the older minimum acreage requirements even after the policy change.

It seems to me that even though the minimum acreage standards were repealed, they still are used by a majority of the school districts as a way for making decisions on where schools will be placed and the amount of land that they need. (South Carolina nonprofit)

Similarly in Minnesota, a key informant from a nonprofit organization stated:

The challenge is that, we passed this rule, but I would be reasonably certain that all the school districts and school boards probably don’t know that we changed it.

The reasons given for this were lack of knowledge of state policy changes, school district policies that used the older acreage standards, and risk aversion.

Another explanation for the lack of change is that other regulations impact school acreage. For example, local government regulations for traffic impacts can also encourage larger school sites. Respondents in California, Georgia, and South Carolina noted that schools must provide sufficient space for vehicle queuing on site to avoid congestion on public roads.

Cities are requiring no on-street parking, so we’re building huge traffic patterns on site. (California state agency)

Some of the new schools have what we call fairly significant stacking lanes, where parents are dropping off, and to keep them from backing up on school sites, we have 1,400 linear feet of stacking lanes so that cars can get off of those sites. (South Carolina state agency)

Survey Analysis

School superintendents and school board members in South Carolina and Georgia reported their experience with school siting through an online survey. The survey asked about familiarity with state policies around minimum acreage, probed the factors that influence school siting decisions,

Table 3. Role in Selecting Sites for New Schools.

	Proportion (%)	
	Georgia (n = 158)	South Carolina (n = 101)
Role (multiples allowed)		
Identify sites	23	30
Review sites	48	51
Recommend sites	32	33
Approve sites	65	65
Location		
Urban	15	13
Suburban	24	31
Rural	61	56

Table 4. Awareness of and Information Sources about State School Facility Policy.

	Proportion (%)	
	Georgia (n = 158)	South Carolina (n = 101)
State has established minimum acreage guidelines		
Yes	58	61
No	12	11
Don’t know	30	28
Source of information on school facility planning (multiples allowed)		
State department of education	65	61
School district staff	14	21
Continuing education/ conferences	67	71
Word of mouth	20	24

and assessed their normative views on school acreage. Respondents were involved in multiple aspects of the school siting process, including identifying, reviewing, recommending, and approving sites (Table 3). Superintendents and board members were most likely to report approving sites (65 percent) and reviewing school sites (50 percent). Respondents self-reported their location in region and the majority of respondents were in rural areas; one-quarter to one-third of respondents were in suburban school districts and the balance were in urban areas.

Knowledge of minimum acreage requirements. We asked respondents whether their “state established guidelines on the minimum number of acres needed for a school.” Approximately 60 percent of respondents said “yes,” about 10 percent said “no,” and 30 percent did not know (Table 4). Most interesting was that these proportions were consistent across South Carolina and Georgia despite their different policies and guidelines on minimum acreage. For these senior

Table 5. Proportion of Respondents Rating Factor as Important or Very Important in School Siting Decisions.

	Proportion (%)	
	Georgia (n = 158)	South Carolina (n = 101)
Sewer and water availability	93	95
Land costs	92	89
Space for parking and queuing	90	90
Parcel size	88	81
Distance from student population	85	90
Space for playground	83	83
Access to major road	71	79
Distance to fire and emergency services	74	74
Parcel shape	53	58
Proximity to other recreational facilities	44	48
Students can walk and bike	37	43

decision makers, it may not be surprising that they are not familiar with state minimum acreage policies—staff or consultants would be responsible for providing boards and superintendents with current information on these policies. From a policy change perspective, it may be more concerning that in South Carolina 61 percent of decision makers believe that the state has established guidelines on the minimum number of acres needed for a school.

Key factors in school siting decisions. The survey asked respondents to rate eleven factors on a five-point Likert-type scale to evaluate the importance of each factor in school siting decisions. At least nine in ten respondents identified the availability of water and sewer, land costs, space for parking and queuing, and distance from student populations as important or very important factors. Three factors were significantly less likely to be viewed as important by decision makers: whether students can walk or bike to school, proximity to other recreational facilities, and parcel shape. The results were consistent across South Carolina and Georgia with no significant differences (Table 5).

Analysis of School Acreage Before and After South Carolina's Change in State School Siting Guidelines

Analysis of school acreage in South Carolina showed no statistically significant difference in site size after the elimination of minimum acreage requirements in 2003 (Table 6). For example, the forty-seven elementary sites approved after South Carolina changed their school siting policy were *larger* (33.4 acres), on average, than the forty-one sites

Table 6. Average Approved Acreage before and after Elimination of South Carolina's Minimum Acreage Guidelines.

	Sample Size		Average Acreage		Difference	t (p Value)
	Before	After	Before	After		
Elementary	41	47	29.8	33.4	3.6	0.64 (.523)
Middle	18	22	65.2	53.5	-11.7	1.11 (.276)
High	16	22	89.7	80.4	-9.2	0.48 (.635)

Note: *Before* refers to schools approved between January 1997 and December 2002. *After* refers to schools approved between January 2003 and March 2011. Parcels serving multiple schools and administrative functions were eliminated from the analysis.

acquired prior to the policy change (29.8 acres). For middle and high schools, there was a decrease in average acreage but the change was not statistically significant. A similar pattern was observed after controlling for the number of students in a school (results not shown). Because we lack data for a control state such as Georgia, there is still a possibility that the elimination of minimum acreage standards slowed the increase in school parcel size.

Policy Implications

Our study analyzed the impact of state school acreage policies on school planning and found that eliminating minimum acreage guidelines has had little immediate impact on school siting practices. Interviewees reported that many school districts continued to utilize the outdated CEFPI standards because they were either still listed as recommended acreages in state guidance, still district policy, or because other objectives such as providing adequate parking and queuing space and minimizing land costs dictated site selection. The online survey of school board members and superintendents in South Carolina and Georgia found that the majority believed their state had minimum acreage requirements though, in fact, only Georgia does. In South Carolina, there was no statistically significant change in the average acreage of schools after the removal of minimum acreage requirements. These results may not be surprising given the experience with changing street standards. Flexibility in street standards led some jurisdictions and developers to complete innovative projects and revise institutional practice. However, change has been uneven, with many jurisdictions continuing with previous street design practice.

Why has there been little observable impact of changing minimum acreage guidelines? There are several possible explanations. The first is that state policy change can be slow to be adopted locally. Change may come to school siting practice, but may require time for information dissemination. Another explanation is that it takes time for innovative examples to appear and become known to practitioners. Because the siting of public schools is a bureaucratic process

controlled by the public sector, changing outcomes requires changing institutional practices and regulations. In the context of street design, the option of creating private street networks has allowed innovative subdivisions to move forward. Such a process is not available to most school districts. This highlights the role of the private sector in changing governmental rules and practices and highlights a difference between street standards and acreage guidelines.

Other explanations focus on the particular way that changes to minimum acreage requirements were carried out. A critical factor is that institutional guidelines and norms have not always shifted in response to policy changes. State education and construction agencies often provide recommendations on acreage—irrespective of whether acreage minimums exist. For example, in Minnesota, the legislature decreed that inadequate acreage could not be used by the state education agency as justification for rejecting a proposed school site. Despite this, the state education agency continues to provide recommended acreages in its school construction guide. School districts may look to or even adopt the state recommendations for their local policies and these recommendations can continue to influence built form.

The other explanation for why removing minimum acreage has had a muted impact on practice is that selecting school locations is a complex process where officials are trying to meet multiple objectives, including cost minimization, access to sewer and water, acceptable buildability, and are subject to local real estate market dynamics as well as local politics. Given the complexity of the process, it may not be surprising that changing one regulatory element has little impact. This concurs with previous research detailing the complex set of factors influencing site selection (Wyckoff, Adelaja, and Gibson 2011; Norton 2007; McDonald 2011).

What are the implications of these findings? The first is that the focus among academics, nonprofits, and federal agencies on minimum acreage policies may miss the mark. In practice, many states that have no minimum acreage standards prominently display recommended acreages in school facility guidebooks. In contrast, some states with formal minimum acreage standards have robust waiver programs that allow school districts to tailor school sites to the local context. In addition, our findings highlighted how local land use regulations, for example, traffic impact analysis, affect school acreage and site selection, impact school siting. Several interviewees commented on how parking and queuing requirements require large amounts of land. These requirements are a response to the rise in the number of parents driving their children to school in the United States; as of 2009, nearly one in two students were driven to school (McDonald et al. 2011). There is a need for further research to identify how local regulations interact with state policy to influence outcomes (Vincent 2006).

Based on these findings, we would recommend that states eliminate minimum acreage requirements to ensure that school districts have the necessary flexibility to meet their

educational and infrastructure needs. However, simply changing the state policy will not be enough to change practice—as this study highlights. Our study suggests that states need to provide more education on school siting and examples of successful outcomes to practitioners and decision makers. One of the reasons why minimum acreage guidelines have been so influential on school planning practice is that the decision makers—school board members and superintendents—generally do not have formal training in school facility planning and therefore rely heavily on recommended guidelines. States could influence practice by providing examples of best-practice school design in urban, suburban, and rural areas that provide information on construction costs and address critical topics such as room for future expansion. For example, South Carolina maintains a best practice document around school planning (South Carolina Department of Education, n.d.); this document could be amended to showcase how site selection might vary across communities of different size and location. A similar approach has been important in changing approaches to subdivision street design. Case studies of innovative subdivisions and municipal regulations have been a prime reason that the design of subdivisions has started to change. By documenting that narrower rights of way provide adequate property access for residents and emergency vehicles, the case studies address concerns of developers and planners.

There are several important limitations of this analysis. The first is that our results may not generalize beyond the states studied; future research should explore issues related to school siting in other geographic contexts. Second, our results are limited by the number of interviewees, survey respondents, and the low survey response rate. Third, our analysis of school acreage in South Carolina did not address whether there have been other changes beyond site acreage such as decisions to renovate rather than replace schools, nor were we able to compare the South Carolina results with equivalent information from Georgia.

Conclusion

Several states recently have changed state school siting policies to give school districts more flexibility to build schools on smaller sites. Our study showed that these changes have not yet strongly impacted siting practices or school acreage purchased by school districts. Several reasons for the lack of impact emerged. First was that state guidance on recommended school acreages has important impacts on district practice and internal policies. In some states that have eliminated minimum acreage requirements, state school facility guidance has not reflected this change or provided a range of normative examples of how districts could utilize the increased flexibility. Our research also emphasized the complex nature of school siting where district officials balance multiple and potentially competing goals. Creating change in school siting practice requires aligning state guidance with

state policy and providing concrete examples of “recommended” site sizes in different contexts.

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