Infill Development Standards and Policy Guide

STUDY PREPARED BY

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Part One

Introduction and Synthesis of Findings and Recommendations

Chapter 1
SMART GROWTH AND INFILL: CHALLENGE, OPPORTUNITY, AND BEST PRACTICES

Smart growth creates a supportive environment for redirecting a share of regional growth to central cities and inner suburbs.[1] At the same time, growth pressures are reduced in rural and undeveloped portions of the metropolitan area. Public and private strategies shift the demand for growth from outer-suburban and peripheral areas to existing central cities and inner suburbs so that growth is more evenly spread and takes advantage of existing infrastructure. Metropolitan areas employing smart-growth strategies reap several benefits: the regional economy is strengthened, residents' quality of life is enhanced, and outer-area natural resource systems are protected and restored (Burchell et al. 1998).

Infill development is a key component of smart growth. It generally occurs in central cities and inner suburbs on scattered sites, including vacant lots. If sprawl onto greenfields is to be curbed, then development must be accommodated elsewhere. Infill development provides one "smart" way to do so.

Smart growth and infill development (smart growth–infill) are not new; they draw from past growth management, land preservation, and community development practices and influences in the United States. Smart growth–infill has staying power because it provides a sensible approach to growth that is supported by a growing national commitment. In addition, smart growth–infill is in tune with the new demographic demand for central places by retirees and immigrants (Burchell, Listokin, and Galley 2000). Moreover, a growing movement to incorporate best practices in sustainable design ties naturally to infill development objectives. The formulation of the U.S. Green Building Council's LEED® (Leadership in Energy and Environmental Design) building guidelines has created a national standard for developing high-performance, sustainable buildings by encouraging strategies for sustainable site development, including infill development.

This chapter defines smart growth and infill, briefly discusses the benefits of such development when compared with sprawl, and concludes with challenges to smart growth in general and infill in particular. The infill development standards and policy guide describes the challenges to infill development and makes recommendations for addressing them. As some of the development standards may be adopted into the form of an ordinance, the current study is referred to as the *infill ordinance and policy guide*, or in an abbreviated fashion as simply the *guide* or *document.* The guide's key recommendations are summarized at the conclusion of this chapter, and full details on how to proceed are contained in part 2 of the document.

[1] The smart growth portion of this chapter is largely excerpted from Burchell, Listokin and Galley 2000.

WHAT IS SMART GROWTH?

As defined by Burchell et al. (1998), smart growth encompasses five basic activities. The first is *control of outward growth movement.* Growth is managed either between public jurisdictions—usually an urban growth boundary (UGB)—or within a political jurisdiction—occasionally a UGB but most often an urban service boundary (USB). UGBs typically discourage most types of growth beyond a geographic point. USBs allow growth to proceed only if requisite services can be publicly or privately provided.

The second smart-growth activity, *encouraging growth back into slow-growing and more central places,* runs parallel with the control of outward growth. This activity involves targeting public employment; expanding tax bases; upgrading public services and infrastructure; working with the needs and desires of community residents and representatives; and making meaningful changes in the quality of life of the targeted areas (Burchell, Dolphin, and Galley 2000).

The third activity *focuses urban design to help old and new neighborhoods function*. This involves mixing housing types and land uses, creating meaningful central places, and introducing new forms of open space and access to neighborhoods. Strategies here include bringing the building shell closer to the street edge; locating off-street parking in back of buildings and providing for on-street parking in the front; breaking up blank walls of buildings with windows and entrances; and using upper floors to accommodate professional offices and housing (Bohl 2000).

Preserving natural resources, the fourth activity, secures for the public benefit agricultural and environmentally fragile lands. Further, it reduces the overall amount of land converted in development. Strategies for preserving natural resources include establishing agricultural and environmental trust funds, down-zoning in peripheral areas, clustering of development in those areas, and purchasing easements to provide public access to the protected lands.

Finally, smart growth requires *reorienting transportation to reduce dependency on the automobile.* This activity introduces higher densities to make various types of transit feasible. Further, it locates new development and redevelopment with services and public transit. These strategies aim to replace the automobile with other modes of transportation for regional travel and to make local travel nonmotorized.

In recognizing how essential these five activities are to smart growth, the U.S. Green Building Council, the Congress for the New Urbanism, and the Natural Resources Defense Council have developed the first national standard for neighborhood design known as LEED-ND (Neighborhood Design). Four subcategories are used within the LEED-ND standard to suggest methods to integrate sustainable design practices into neighborhood design. Within each of the subcategories, one must first meet a list of prerequisite requirements before earning points for meeting additional aspects of green design. The four subcategories are as follows:

- location efficiency
- environmental preservation
- compact complete and connected neighborhoods
- resource efficiency

Although LEED-ND may be the most directly related principles of smart growth and infill design, it is worth noting additional programs offered by LEED. These include:

- LEED-NC: New commercial construction and major renovation projects
- LEED-EB: Existing building operations
- LEED-CI: Commercial interiors projects
- LEED-H: Homes (forthcoming)

WHERE IS SMART GROWTH TAKING PLACE?

Smart growth is being effected throughout the United States. The following jurisdictions' smart-growth actions—in New Jersey and the nation-- are illustrative of the variety and sweep of the effort to better control growth.

Lexington, Kentucky, and Portland, Oregon—cities containing the two oldest UGBs in the United States—are pursuing smart growth by controlling *peripherally bound growth.* Development is permitted exclusively within the UGBs; growth is not allowed outside the boundaries. Princess Anne County in Virginia, Richland County in South Carolina, Martin County in Florida, Denver County in Colorado, and many other counties have instituted USBs that restrict development outside set boundaries unless public services are in place or private developers provide services with their proposed development.
At least a dozen states (Florida, Georgia, Hawaii, Maine, Maryland, Minnesota, New Jersey, Oregon, Rhode Island, Tennessee, Vermont, and Washington) have adopted comprehensive planning and growth management legislation that recommends locations for more or less growth. New Jersey's state plan specifically maps five planning areas where more growth and less growth should take place. Maryland encourages growth in priority funding areas through "smart-growth" grants to locally complying jurisdictions (Burchell, Dolphin, and Galley 2000).

Inner-area revitalization, an often overlooked element of smart growth, is being undertaken in Atlanta, Georgia, Houston, Texas, Hoboken and Camden, New Jersey, and many other locations. Because of a failure to comply with federal water-quality standards, Atlanta-area suburban municipalities must limit their growth, while the city of Atlanta is increasing the number of building permits it issues. To foster growth in the city of Houston, Texas, urban neighborhoods can qualify for infrastructure grants to bring urban systems up to par with suburban systems.

In a public/private partnership with the city of Hoboken, New Jersey, and the Port Authority of New York and New Jersey, SJP Properties built approximately 1 million square feet of office and retail space (Waterfront Corporate Center) on a site that has ready transit access. The complex is helping to revitalize an urban waterfront area that once housed abandoned buildings, fenced-off lots, and abandoned piers (New Jersey Future 2004b).

A much more daunting redevelopment challenge confronts Camden, New Jersey, which had lost a third of its population by 2000 and which currently has the nation's highest crime rate. Yet, this city is witnessing nascent revitalization through such projects as the "Victor"—a historic tax credit–assisted, adaptive reuse of a closed RCA Victor factory on the waterfront to a mix of luxury housing and retail space (New Jersey Future 2004a).

Urban design also supports smart growth on a scale that varies from large to small and from region to neighborhood to street. At the regional level, New Jersey's 2001 State Plan and Maryland's 1998 Growth Management Act provide for a series of incentives to develop in centers in rural areas and in redeveloped neighborhoods in urban areas (Burchell, Dolphin, and Galley 2000). On the neighborhood level in Baltimore, Maryland, smart growth replaced high-rise public housing projects on superblocks with row houses more connected with the urban street grid. Each residence has its own street space, with front and rear entrances and yards. With commercial uses mixed in, the neighborhood once again becomes the focal point for convenience-oriented activities (Bohl 2000). At the street level, the city of Norfolk, Virginia, transformed barracks-style, lower-income residences in the Diggstown neighborhood into homes that reflect the local architecture. Front porches and individual lots with front and rear yards mimic the local architectural vernacular. Streets were changed to reflect a better sense of local neighborhoods.

Smart growth related to *land preservation* is quite popular. New Jersey voters have approved bonding to acquire 1 million acres of farm and environmentally unique lands for future protection. These lands represent 50 percent of the remaining developable land in New Jersey. Smart growth may also involve transfer-of-development-rights (TDR) ordinances to preserve environmentally sensitive acreage. For example, the Pinelands region—a special regional planning and land-use region—has had a TDR program for many years in which development credits are transferred from "sending areas" (the portion of the Pinelands targeted for preservation) to "receiving areas" (the Pinelands area targeted for development). New Jersey's Meadowlands District (MD) has internalized TDR in its master plan and has incorporated tax-base sharing to compensate those areas within the MD slated for preservation. TDR is not limited to New Jersey's special regional planning and land-use entities. Chesterfield, a rural municipality, is using TDR to direct growth to its town center—a 560-acre receiving area—as a means to preserve its remaining farmland (New Jersey Future 2003).

Transportation reorientation shifts the motorized trip profile of geographic areas from single-occupant automobile trips to other forms of motorized trips (car and van pools, bus, and rail), and from motorized to nonmotorized trips (walking and bicycling). A new commitment by state departments of transportation to bus and rail demonstrates the first shift. Maryland and New Jersey have increased their budgets for heavy-rail commuter lines (MARTA and NJ Transit) each year since 1990. Ridership has increased exponentially each year over that period of time. Cities such as San Francisco, California, Rochester, New York, and Corpus Christi, Texas, are experiencing similar investment and ridership levels on bus lines (STPP and CNT 2000).

New Jersey has instituted numerous changes to further “transit-friendly land use” (New Jersey Transit, 1994, 2006). By encouraging compact forms of development and growth in centers, the New Jersey State Plan (described shortly) can foster transit in the nation’s most densely settled state. Other New Jersey initiatives, such as support for transit villages, transit-friendly planning assistance and a “smart commute” mortgage program (if home buyers choose a home near transit, then participating lenders add a portion of the potential transportation savings to the homebuyer’s income), further support reorientation from automobile dependence in this state.

An innovative Seattle initiative encourages city residents to take nonmotorized trips. The city encourages families to get along with one car. The program, “Way To Go Seattle,” pays participating households $85 per week to leave their car parked for six weeks and to keep a diary of other transportation used and the cost of that other transportation (STPP and CNT 2000).

Federal legislation, such as the Intermodal Surface Transportation Efficiency Act (ISTEA) and its successors, the Transportation Equity Act for the Twenty-first Century (TEA-21), and Safe, Accountable, Flexible, Efficient Transportation Act: A Legacy for Users (SAFETEA-LU), encourages these initiatives and other state and local efforts that foster intermodal transportation and reduced dependence on the automobile. Examples of the application of these programs and other strategies to advance smart growth include Georgia’s Lindbergh Center (a 51-acre, mixed-use development site near an Atlanta MARTA stop) and New Jersey’s Port Imperial (a mixed-use project on a brownfields site that benefited from TEA-21 support of an intermodal facility).

WHY SHOULD WE WANT GROWTH TO BE “SMART”?

Growth Is Good, but Smart Growth Costs Less

Smart growth is touted as an approach that saves resources and tax dollars. The savings occur from reduced and more efficient consumption of land and capital infrastructure, property development, and public services.

Burchell and Mukherji (2003) estimated that smart-growth development in the United States occurring during the 25-year period from 2000 through 2025 could save as much as $250 billion (in 2000 dollars). Three-quarters of the savings would be in the form of housing and development cost savings to developers, new home buyers, and commercial building tenants. An additional 15 percent of the savings would be in road savings to local and state governments. About 6 percent would be in land savings to local and state governments. Finally, 4 percent would be in development utility savings, again to land developers and the occupants of new structures.[2]

Smart Growth Plays Out Differently over the Metropolitan Geography

In recent years, there has been growing appreciation of the importance of the urban core to the vitality of the overall metropolitan area. In the post–World War II era, however, the urban core has been gutted economically and socially by sprawl onto hinterlands. By redirecting development back to the urban cores, smart growth can begin to reverse the downward spiral of those areas. We can quantify the potential benefits from such a shift. Researchers at Rutgers University have compared the implications of sprawl growth with those of smart growth in the 3,100 counties in the United States. If the counties developed in a smart-growth rather than a sprawl-growth pattern over the period 2000 through 2025, 1.8 million of the 23 million new households created in the 25-year period would settle in urban counties instead of suburban counties (Burchell et al. 2002).

The increased population in urban counties under smart growth can improve conditions in those areas. For instance, the income associated with the 1.8 million urban-bound households would be approximately $82 billion, or about $45,000 per household (in 2000 dollars). One can argue whether $82 billion is a large or small number compared with the $1.05 trillion in household income associated with the growth of 23 million households. However, assuming that consumption income is 80 percent of household income, the increased spending generated by the new urban households would amount to $65.4 billion. That spending could support 625,000 new employees across the various components of consumption (food, housing, apparel, transportation, health care, entertainment, and the like). Of the redirected 625,000 new employees, approximately 170,000 employees would be low and moderate income. The shift of households to urban counties would also support 225 million square feet of commercial space related to consumption, or the equivalent of building a new regional shopping mall in every U.S. city with a population greater than 100,000. Clearly, for urban areas experiencing nonresidential decline, these are very welcome numbers.

The discussion above has focused on the potential nationwide benefits of development under smart growth versus sprawl. It is instructive to further consider the advantages of smart growth at the state level, and we shall use New Jersey as an example.

The Benefits of Smart Growth in New Jersey

Smart growth in New Jersey is guided by a planning process and the preparation of guidance documents in the form of a state plan. The 1985 New Jersey State Planning Act (N.J.S.A. 52:18a-196 et seq.) authorized “state planning” to “conserve its natural

[2] Along the same lines, using a life-cycle approach, a recent study of the costs and benefits of green affordable housing development found that green affordable housing is more cost-effective in net present value (NPV) terms than is conventional housing (Bradshaw et al. 2005).

resources, revitalize its urban centers, protect the quality of its environment, and promote needed housing and adequate public services at reasonable costs while promoting beneficial economic growth, development, and renewal." In response to that mandate, a State Development and Redevelopment Plan (the State Plan) was adopted in 1992 and subsequently revised in 2001.

The State Plan Policy Map identifies the ecologically designed compact forms of development and redevelopment that are necessary to ensure efficient infrastructure protection of natural resources in the various regions of the state. It also identifies the regions of the state within which there are critical natural and built resources that should be either protected or enhanced in order to achieve the goals of the State Planning Act (New Jersey State Planning Commission 2004). The compact forms are called centers; the areas outside of the centers are called environs; and the regions in which they are found are called planning areas (PAs). Growth is encouraged in certain areas (e.g., in centers) and discouraged in others (e.g., in rural and environmentally sensitive PAs).

The planning areas include the following:

- Metropolitan planning area (PA-1)
- Suburban planning area (PA-2)
- Fringe planning area (PA-3)
- Rural planning area (PA-4) and rural/environmentally sensitive planning area (PA-4B)
- Environmentally sensitive planning area (PA-5) and barrier island planning area (PA-5B)

What is the impact of development managed according to the strategies of the New Jersey State Plan (PLAN) compared with the impact of growth that continues according to New Jersey's historical sprawl pattern (TREND)? This comparison was made in a series of studies by Burchell at Rutgers University (Burchell et al. 1992; Burchell, Dolphin, and Galley 2000). The latest impact assessment (Burchell, Dolphin, and Galley 2000) found that compared with the impact of TREND, PLAN in New Jersey over the period 2000 through 2020 would help invigorate the state's urban communities through an increase in population (144,000 more than the increase under TREND), a doubling of jobs (80,000 more), a reversal of the loss in household income under TREND ($340 million), and an expansion of the tax base (6.5 times the increase under TREND). Compared with the impact of TREND, PLAN would save 120,000 acres of land, including 68,000 acres of agricultural land and 45,000 acres of environmentally sensitive land. PLAN would also save almost $2 billion in infrastructure costs. Many of the potential benefits of implementing smart growth, including infrastructure and land consumption savings and the job and tax-base benefits offered to urban communities, would result from the furthering of infill, a strategy defined and illustrated below.

WHAT IS INFILL?

There is no single, agreed upon definition of infill, as is revealed by the many examples of the term shown in table 1.1. However, while there is no universal definition, there is general agreement concerning many key infill characteristics.

Location

Infill occurs within an area that is largely already developed. Examples include the infill definitions in table 1.1 that refer to development in a "built-up area," an "established area," "otherwise developed areas," "existing developed areas," or a site "surrounded by older growth."

Geography

Since it takes place in largely developed locations, most infill occurs in the cities and suburbs in the metropolitan region as opposed to exurbia. Examples are definitions in table 1.1 that refer to infill found "in urban or urbanized areas, "on lands within cities and suburbs," or "within an urban area rather than on new outside undeveloped land." While most infill will occur in urban and older suburban locations, infill is certainly possible in the largely built-up centers in rural communities.

Dispersed Nature

Occurring in largely developed areas, infill sites tend to be scattered: they are the "here and there remnant" of passed-over locations from earlier waves of settlement. The illustrative infill definitions (table 1.1) often include "scattered" in their descriptions, for example, "sites scattered throughout the more intensely developed areas of municipalities," or "infill means . . . development . . . on scattered lots."

Development Type

Many definitions of infill refer to new construction, both residential and nonresidential. Examples from table 1.1 include "the development of new housing or other uses," or "the development of new housing or other buildings," or "the construction of new buildings on vacant lots."

The authors, however, subscribe to a more expansive view of infill, one that encompasses new construction as well as the rehabilitation or reuse of existing structures. Illustrative of this broader perspective is the following definition from the Bay Area Greenbelt Alliance (see also table 1.1): "The (infill) development can be of several different types: building on vacant lots, reuse of underutilized sites (such as parking lots and old industrial sites), and rehabilitation or expansion of existing buildings" (Wheeler 2002).

A similar expansive definition, from Maryland's *Models and Guidelines for Infill Development* (2001), is "development on vacant land within built up areas. Infill also includes redevelopment of lots in these areas." The Northeast-Midwest Institute and the Congress for New Urbanism, in Strategies for Successful Infill Development (2001), define this term to include "new development on vacant lots . . . redevelopment of underused buildings and sites, and the rehabilitation of historic buildings for new uses." (See also table 1.1.)

The authors recognize that many studies and documents, including the New Jersey State Plan, differentiate new construction in "infill sites" from rehabilitation and/or the

TABLE 1.1
Illustrative Definitions of Infill

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1. “The development of new housing or other uses on scattered vacant sites in a built-up area.” (Moskowitz and Lindbloom 2004.)

2. Infill is the “development of vacant or remnant lands passed over by previous development in urban areas.” Redevelopment is “the act or process of redeveloping; *esp.:* renovation of a blighted area. Replacement, remodeling, or reuse of existing structures to accommodate new development.” (Otak, Inc. 1999.)

3. “The construction of new buildings on vacant lots, filling a “hole” in the built environment.” (Downtown Brookings, Inc. 2004.)

4. “The construction of new buildings along the traditional commercial street. These new buildings relate harmoniously with the older buildings which surround them. Since these buildings are often constructed on vacant lots, thus filling a ‘hole’ in the street, they are called infill.” (City of San Bernardino 2002.)

5. Infill is “the new development of vacant, abandoned, passed over, or underutilized land within built-up areas of existing communities, where infrastructure is already in place. Infill also includes redevelopment of lots in those areas. Redevelopment is described as encompassing construction in previously developed areas, which may include the demolition of existing structures and building new structures or the substantial renovation of existing structures, often changing form and function.” (State of Maryland 2001.)

6. “The creative recycling of vacant or underutilized lands within cities and suburbs.” (Northeast–Midwest Institute and Congress for New Urbanism 2001.)

7. “Infill development refers to construction of new housing, workplaces, shops, and other facilities within existing urban or suburban areas. This development can be of several different types: building on vacant lots; reuse of underutilized sites, such as parking lots and old industrial sites; and rehabilitation or expansion of existing buildings.” (Wheeler 2002.)

8. An infill lot is defined as “any lot that is bounded on one or more sides by lots with existing residences, in an established neighborhood.” (Village of Glenview 2003.)

9. “Infill is development that occurs on vacant or abandoned parcels in an otherwise built-up portion of the city.” (City of Frederick 2002.)

10. “Urban infill and redevelopment area means an area or areas designated by a local government where (a) public services such as water and wastewater, transportation, schools, and recreation are already available or are scheduled to be provided in an adopted five-year schedule of capital improvements; (b) the area (or one or more neighborhoods within the area) suffers from pervasive poverty, unemployment, and general distress as defined by s. 290.0058 [1998 Florida statutes, chapter 290, section 0058]; (c) the area exhibits a proportion of properties that are substandard, overcrowded, dilapidated, vacant or abandoned, or functionally obsolete that is higher than the average for the local government; (d) more than 50 percent of the area is within one-quarter mile of a transit stop, or a sufficient number of such transit stops will be made available concurrent with the designation; and (e) the area includes or is adjacent to community redevelopment areas, brownfields, enterprise zones, or Main Street programs, or has been designated by the state or federal government as an urban redevelopment, revitalization, or infill area under empowerment zone, enterprise community, or brownfield showcase community programs or similar programs.” (State of Florida 2005.)

TABLE 1.1, continued

11.	"Developing on empty lots of land within an urban area rather than on new undeveloped land outside the city or town." (State of Massachusetts n.d.)
12.	"In housing construction, the process of developing open areas within an established area before developing outside the established area." (Rosner and Rosner 1996.)
13.	"Development on vacant lots or through redevelopment to create additional new residential units." (City of Burlington 1994.)
14.	"The development of vacant land that was bypassed by earlier waves of development and is now largely surrounded by developed land." (Clark County Board of County Commissioners 2005.)
15.	"Development that occurs on a site after completion of the initial development of the area." (Calgary Area, Inc. 1999.)
16.	"Infill development is simply redevelopment within existing developments." (Abalos 2003.)
17.	"Residential or nonresidential development that occurs on vacant sites scattered throughout the more intensely developed areas of municipalities. Generally, these sites are vacant because they were once considered of insufficient size for development, because an existing building located on the site was demolished, or because there were other, more desirable sites for development." (Schultz and Kasen 1984.)
18.	Infill is "development on vacant sites in urbanized areas and redevelopment of areas contiguous to urban development where all services and facilities are projected to have capacity to accommodate additional demand." (Davis 2004.)
19.	Infill development is "the process of developing vacant or underused parcels within existing urban areas that are already largely developed." (Municipal Research and Services Center of Washington 1997.)
20.	"Infill is the creative recycling of vacant or underutilized lands within cities and suburbs. Successful infill often includes new development on vacant lots within urbanized areas, redevelopment of underused buildings and sites, and the rehabilitation of historic buildings for new uses." (Northeast–Midwest Institute and Congress for New Urbanism 2001.)
21.	"Unlike reuse, infill occurs on smaller tracts of vacant land in otherwise developed areas." (Envision Utah 2002.)
22.	Infill means "the development of new housing or other buildings on scattered vacant lots in a built-up area." Redevelopment means "the removal or replacement or adaptive reuse of an existing structure or of land from which previous improvements have been removed, including the conservation or rehabilitation of any structure." (New Jersey State Planning Commission 2001.)
23.	Infill "is defined as development that occurs on previously developed lots within existing developed areas." (Nisenson 2005).

adaptive reuse of existing structures, which they place under the term "redevelopment." Nonetheless, we concur with other studies conducted in Maryland, California, and elsewhere that combine new construction, rehabilitation, and reuse under the term "infill" for various reasons. While these three actions are surely not the same, they constitute a common class of activities that are often conducted either individually or in tandem when developing in the largely built-up locations that geographically contain most infill. All three actions face similar, albeit not identical, challenges, such as dealing with environmental contamination, recalcitrant lenders, and high property taxes.

There are also common, albeit not identical, best practices for fostering infill new construction, rehabilitation, and reuse. A special area designation to allow the use of eminent domain is one example. Much infill new construction in New Jersey benefits from the designation of an “area in need of redevelopment.” Property tax abatement and tax credits are also useful mechanisms for facilitating all three actions. Given those commonalities, we believe it is preferable to include new construction, rehabilitation, and reuse in the definition of “infill.”

Other Attributes

Some definitions of infill refer to development where infrastructure is in place or development that is served by transit. While many infill locations will have these attributes, they are not fundamentally defining characteristics (e.g., infill can occur where transit is not available) but rather reflect broader smart-growth motifs.

What about the scale of infill? Many observers infer that infill will typically be of compact scale, for example, constructing a building on a vacant lot and “thus filling a ‘hole’ in the street,” or building “on smaller tracts of . . . land” (see table 1.1). In practice, infill will often be of smaller scale because the bypassed “holes in the street” are themselves of compact dimensions. We would argue, however, that circumscribing infill to modest-scale development is misleading. First, even largely developed communities may have an inventory of larger sites available for infill. This inventory can be the historical legacy of a massive urban renewal clearance of many blocks that never saw redevelopment. A larger site assemblage can also reflect contemporary policies and influences, such as aggressive city demolition of derelict buildings or a growing inventory of underutilized or obsolete industrial structures ripe for adaptive reuse. Second, scale is contextual: a 25,000-square-foot infill building is of compact scale in a large city, but it may also be the largest development occurring on a historic main street. In short, infill may or may not be of modest scale.

The above discussion suggests the following working definition of infill: *Infill comprises a broad array of development (residential and nonresidential; new construction, reuse, and rehabilitation; and modest and larger scale) occurring on scattered sites in largely developed areas.*

The New Jersey and national examples shown in table 1.2 illustrate the breadth and variety of infill in terms of scale, type, density, former site use, and the like.

TABLE 1.2
Examples of Infill Development

Development Name/Location	Development Scale/Type	Former Site Use
1. Old Town Square, Chicago, IL	15 acres; mixed use	Oscar Mayer processing plant
2. Marston Place, San Diego, CA	1.2 acres; 42 residential units	Previous commercial and residential buildings were demolished
3. Central Station, Memphis, TN	17 acres; 63 housing units and 37,000 square feet of commercial space	Abandoned historic railroad terminal
4. Greenwich on the Park, Cincinnati, OH	1.8 acres; 212 housing units and ground floor retail	Former surface parking lot
5. Old Town Square, Alexandria, VA	12.3 acres; 285 housing units	Abandoned railroad yard
6. Firestone Upper West Side, Fort Worth, TX	11 acres; 350 housing units	14 vacant lots were assembled
7. Southside, Greensboro, North Carolina	10 acre, mixed use	Blighted residential and nonresidential area near to Greensboro's historic main street.
8. Gaslight Commons, South Orange, NJ	2 acres; 200 housing units	Decontaminated car dealership
9. Port Imperial, Weehawken and West New York, NJ	300 acres; 6,000 housing units and 1.7 million square feet nonresidential	Abandoned railroad facility
10. Franklin Square, Metuchen, NJ	3 acres; 105 housing units	Demolished surplus school
11. Society Hill, Jersey City, NJ	19 acres; 1000 housing units	Parcels near Roosevelt Stadium
12. The Victor, Camden, NJ	6-story landmark building; 341 lofts	Adaptive reuse of former RCA Victor factory
13. Oceanfront Asbury Redevelopment, Asbury Park, NJ	56 acres; 3,200 housing units, 450,000 square feet retail, and hotel	Vacant land and former amusement park

INFILL AND SMART GROWTH

Infill is one component of the broader array of strategies that make up smart growth. In its *Smart Growth Tool Kit*, the Urban Land Institute (2000, 2) included infill among the various policies and practices available to guide future growth:

1. Mixing land uses
2. *Encouraging infill development and redevelopment* (emphasis added)
3. Building master-planned communities
4. Conserving open space
5. Providing transportation choices
6. Providing housing opportunities

7. Lowering barriers to and providing incentives for smart development
8. Using high-quality design techniques
9. Collaborating on solutions

The Bay Area Greenbelt Alliance (Wheeler 2002, 2) also described infill development as an essential component of smart growth and a complement to greenbelt protection. Likewise, the State of Maryland (2001, 4) envisions infill as a key smart-growth strategy and a fundamental alternative to sprawl as does the latest edition of *Getting to Smart Growth* (Smart Growth Network and International City Management Association 2003, 62). The Delaware Valley Regional Planning Commission (2003, notes) that "infill is a smart growth tool that tries to bridge 'gaps' in neighborhoods and communities while playing an important role in community revitalization."

A comparison of the attributes of smart growth with those of sprawl highlights the importance of infill to smart growth. The Victoria Transport Policy Institute (Litman 2004) developed a comparison, drawing on the work of Ewing (1996) and Galster et al. (2001). We refer to the VTPI comparison in our examination of the contributions of infill as a component of smart growth.

- *Growth pattern:* According to VTPI, sprawl fosters urban periphery development. In contrast, smart growth emphasizes infill construction.

- *Density:* Infill could be developed at a sprawl-like density; however, because of the characteristically high costs of infill land, this type of development will generally occur at higher densities that further smart growth.

- *Scale and design:* Theoretically, infill could be designed in a sprawl-like fashion, with large blocks, wide roads, and less attention to design details. However, the typical space constraints of infill sites and the need to make higher density appealing through greater attention to detail militate against infill having the bland design of sprawl.

- *Connectivity:* Infill that is not well connected to surrounding roads, sidewalks, and so on is poorly planned—but that is the exception. Infill most likely will be planned in a smart-growth fashion to connect as seamlessly as possible with existing networks.

- *Public spaces:* Smart growth emphasizes the public space (e.g., streetscapes and pedestrian environment), while sprawl emphasizes the private realm (e.g., internal yards). Although infill could be oriented to the private realm (e.g., the use of gated access), its characteristics (e.g., higher density and constrained site dimensions) will typically emphasize a smart-growth orientation toward the public realm.

- *Transport and public services:* Infill may not necessarily be served by transit or public services (e.g., parks). However, its location in already largely developed areas and its tendency to be of higher density increase the likelihood that infill development will be transit-oriented (and less automobile dependent) and that it will capitalize on existing public infrastructure—important smart-growth concepts.

- *Planning process:* Because infill abuts existing development, it raises understandable concerns among stakeholders. Infill development is, therefore, usually characterized by a smart-growth process that emphasizes planning and coordination between the jurisdiction and the various stakeholders.

In summary, infill is one component of the larger set of strategies that make up smart growth. Yet, infill exemplifies many fundamental smart-growth themes, and, indeed, is particularly important to smart growth. Smart growth limits development in outlying locations through the imposition of urban growth boundaries and urban service boundaries, resulting in a concomitant need to foster heightened development in core areas. Infill provides a principal strategy for accommodating the increased development. The incorporation of green building best practices (see table 1.3) into infill development, where appropriate, amplifies the extent to which infill development exemplifies smart growth.

TABLE 1.3
Green Building
Description, Benefits, and Supportive Programs

I. WHAT IS GREEN BUILDING?

Green building techniques make a building healthier, more comfortable, more durable, and more affordable to maintain than a conventional one. This is accomplished by integrating design, engineering, and construction practices that make the most effective use of materials, the local environment's attributes, and sustainable building practices and innovations.

II. THE BENEFITS OF GREEN BUILDINGS

A. Energy and Water Efficiency

In utilizing green building techniques, energy efficiency is achieved through better solar orientation, tighter construction, efficient appliances, and the generation of on-site electricity from renewable sources.

Green buildings are on average 25 to 30 percent more energy-efficient than buildings built to current standards and have even lower peak electricity consumption.

Green buildings also consume less water than conventional buildings by using stored rainwater and greywater (used wash water) for irrigation and other uses. Green buildings are more likely to store and infiltrate stormwater. This reduces the adverse effects of stormwater runoff, which otherwise may become heavily polluted.

B. Site Design

Green buildings are designed to fit with the surrounding natural landscape. They minimize damage to their habitat and preserve the native plants and animals. Landscaping is designed to be appropriate to the existing environment. Green building encourages adaptive reuse and remediation of brownfield sites, as well as location near mass transit.

C. Conservation of Natural Resources

During the construction of a green building, efforts are made both to use recycled construction materials and to recycle the waste from the construction process. Green buildings also frequently use sustainably harvested timber. This timber is collected in such a way that minimum damage is done to the environment, and new trees are planted to replace the harvested trees.

D. Durability

Many of the materials and components used in green buildings are more durable than those used in conventional buildings, resulting in better windows, flooring materials, and mechanical systems. This ensures that the green building will need fewer repairs throughout its life than a conventional building and could be expected to last longer.

E. Indoor Air Quality

Green buildings are constructed with non-toxic materials, wherever possible, and are better ventilated. This ensures that fresh air is constantly provided.

In contrast, many conventional new buildings use materials that release toxic chemicals into the air. Carpet, adhesives, and paints are some of the worst sources, but there are others as well.

III. SUPPORTIVE PROGRAMS

A. Green Building Certification

The most widely adopted program is the Leadership in Energy and Environmental Design (LEED) Green Building Rating System, which was developed by the U.S. Green Building Council (USGBC). LEED has been adopted by many federal agencies, states, and some municipalities.

B. New Jersey State Support for Green Building

New Jersey has in place numerous programs to promote aspects of green building, including the Green Homes Office and the Office of Smart Growth, under the New Jersey Division for Community Affairs, the New Jersey Housing and Mortgage Finance Agency, the Clean Energy Program, the New Jersey Board of Public Utilities (BPU), and the Bureau of Sustainable Communities and Innovative Technologies of the New Jersey Department of Environmental Protection. The LEED-ND (Neighborhood Design) product, which will be entering its pilot phase in 2006–2007, is particularly suitable for infill development

Source: Senick, et al., 2006.

BENEFITS OF INFILL

Many observers have opined on the benefits of infill (State of Maryland 2001, 4, 6–8; Northeast-Midwest Institute and Congress for the New Urbanism 2001, 8–9; Otak, Inc. 1999, 2, 19; Wheeler 2002, 7, 10; Envision Utah 2002, 91; Delaware Valley Regional Planning Commission 2003, 2). Not surprisingly, since infill is a key smart-growth strategy, the benefits attributed to infill echo the benefits attributed to smart growth. For example, the State of Maryland’s *Models and Guidelines for Infill Development* (2001, 6) offers a litany of infill benefits:

> By absorbing growth in existing communities, infill reduces growth pressure on rural areas, provides for efficient use of land, infrastructure, and services, and can improve quality of life in older communities. Infill can enhance the character, viability, and function of existing communities . . . and cities. A successful infill strategy at the local level maintains or restores spatial continuity to streetscapes, strengthens neighborhoods, respects historic preservation, and introduces compatible uses that complement existing community attributes and needs.

The benefits of infill are acknowledged beyond the planning profession as the following statement by a candidate for mayor in San Jose, California attests (Mucahy 2003, 3):

> Conventional land development in California, with its emphasis on low-density housing and automobile dependency, has led to urban sprawl, traffic congestion, and the destruction of open land…It is time for San Jose to prioritize a proven solution to this problem of sprawl—infill development.
>
> Some benefits of infill development include: 1. People live in closer proximity to their work; 2. Increased dependence on walking, biking and public transportation; 3. Increased number of affordable housing units; 4. Preservation of open space; 4. Ability to utilize existing infrastructure like roads, transit, and parks; 5. Ability to redevelop vacant or underused properties; and 6. Creates mixed-use projects.

As energy prices have recently spiraled, the energy conservation benefits of smart growth and infill warrant specific mention. Through enhancing the "walkabilty of a community by replacing vacant sites with uses accessible without driving" (Delaware Valley Regional Planning Commission 2003, 2) and through other means, such as capitalizing on the embodied energy[3] of the existing built environment (Rypkema 2005), smart growth and infill are particularly compelling in an age of $3 per gallon of gasoline. The energy benefit of these land use strategies are amplified when coupled with a green building policy (see table 1.3).

CHALLENGES TO INFILL

There are thousands of completed and successful infill projects throughout the United States. This chapter has already presented several examples. While infill development has often been successful, it is important to recognize the challenge of implementing this strategy. Sprawl onto the hinterlands has often been the norm because it is easier.

The planning and land-use literature has begun to acknowledge the hurdles to infill development. *Building Livable Communities: A Policymakers Guide to Infill Development* (Bragado, Perrlee, and Zykofsky 2001) identified the following six obstacles: (1) infill and redevelopment projects often cost more to build than raw-land projects; (2) policymakers tend to overlook the public cost savings of the strategy; (3) many community members actively oppose infill and mixed-use development, in part due to past experience with poor-quality examples; (4) developers often avoid infill or redevelopment projects in the inner city due to the fear of reduced marketability; (5) finance and capital markets can be a barrier; and (6) the prevailing Euclidian model of segregating uses is not conducive to infill. Similar observations were noted in a San Francisco study (Wheeler 2002, 3): "Impediments [to infill] involve land availability, fiscal disincentives to local government . . . outdated zoning requirements, excessive parking standards, financing difficulties, neighborhood opposition, lengthy permitting processes, toxic contamination of sites, and poor schools and a lack of amenities in older communities."

[3] Donovan Rypkema (2005, 4) cites an Australian study that found that the embodied energy of Australia's existing building stock was equivalent to ten years of the total energy consumption of the entire country.

Another report on the subject (Municipal Research and Services Center of Washington 1997, 8) listed the following obstacles to infill. Vacant parcels in built-up areas typically suffer from site constraints related to size, cost, and environmental and infrastructure issues. Regulations governing parking, landscaping, and drainage may cause difficulty when applied to preexisting lots. Neighborhood opposition can develop, particularly if the infill development "is very different in appearance or scale."

After the publication *Getting to Smart Growth II* (Smart Growth Network and International City Management Association 2003) noted the importance of infill, it acknowledged the variety of barriers to infill relative to greenfield development. "Land use regulations, such as zoning and subdivision requirements, often make it easier to building in greenfields areas. These areas may have little or no land use regulation and few residents may object to new construction. The cost of greenfield development is often subsidized (Smart Growth Network and International City Management Association 2003, 62)."

Some observers have attempted to conceptualize the infill challenges by grouping the hurdles into categories. Envision Utah (2002, 88–90) identified *legal obstacles,* such as restrictive zoning codes; *lack of investment in adequate infrastructure*, such as city sewer, water, street, and other facilities; *market perceptions* that infill areas are run-down; and *environmental pollution* from prior uses. The Delaware Valley Regional Planning Commission (2003, 3) noted six barriers to residential infill including *land availability and readiness* (infill sites are too expensive, have physical constraints, and/or require environmental cleanup), *quality of infrastructure* (infrastructure is aging, under-maintained and/or in need of repair), *available financing* (infill sites may have higher development costs and lenders may be wary), *regulatory issues* (unrealistic zoning or building codes), *community acceptance* (opposition to higher-density development, and increases in traffic, noise, and the like) and *marketing the new development* (barriers due to the cost or the novelty of the product).

The State of Maryland (2001, 5) categorizes the barriers into the following four groups:

- *Physical barriers:* Physical site constraints often limit the feasibility of developing infill sites. Environmental issues, such as wetlands, poor soil, poor drainage, or contamination from prior uses, can reduce the amount of buildable land, require costly design solutions, or necessitate environmental assessments and cleanup.

- *Social barriers:* People have an inherent resistance to change and a natural fear of the unknown. As a result, plans to develop infill sites may encounter vociferous opposition, whether or not it is justified from a land-use perspective. Opposition can center on design compatibility, increased density, different housing types, parking, traffic, or simply the prospect of more or different types of people moving in.

- *Regulatory barriers:* Regulatory constraints often work against good design, raise roadblocks against innovation, or prevent projects that are otherwise consistent with the character of existing communities. The following list offers a sample of the range of potential regulatory constraints:

——Zoning, subdivision, and building codes can inadvertently preclude redevelopment or infill.

—Regulations for parking, road design, or stormwater management may prohibit or severely limit development.

—Conflicting requirements or arbitrary approvals often limit the ability of developers to achieve permitted densities.

—The need for waivers or variables can slow the approval process.

- *Economic barriers:* Difficult sites and uncertain outcomes and time frames can reduce developers' economic interest in undertaking infill projects. In addition, land acquisition costs are usually higher for infill sites. Construction costs are often higher for infill jobs. The infill preconstruction process is often as time-consuming, or more time-consuming than the process for conventional development. Another major obstacle is the lack of funding for infrastructure maintenance and renovation.

Conceptualizing and Illustrating the Challenges to Infill

Evident from the above are the many hurdles that challenge infill and the myriad ways in which those obstacles have been conceptualized by different authorities. It is helpful to categorize the challenges to infill according to the various stages of producing a residential, nonresidential, or mixed-use project:

- Development encompasses all the activities performed before construction can begin, including *acquiring properties, securing financing, designing the project,* and *obtaining development approval.*

- The major concerns in the construction phase are adhering to *zoning and subdivision site plan regulations* and overseeing the "bricks and mortar" work on a development.

- Following construction, the infill property may be subject to several occupancy considerations, including an important one related to the *property tax obligation*.

The limitations of the organizational framework and inclusive hurdles are acknowledged. It surely does not include all possible challenges to infill. In addition, some barriers could have been placed in a different category. For instance, should zoning be categorized under development or construction? We list it here under construction because we focus on the zoning outcome that affects construction rather than the zoning process, which is more closely related to development. The point is not the specific taxonomy but rather the importance of organizing the major hurdles to infill into a schema that follows the development process, albeit in an oversimplified fashion.

The following examples from New Jersey, Oregon, and California illustrate the problems confronted by infill projects:

Acquiring properties. Isles, a nonprofit conducting new construction and rehabilitation infill projects in Trenton, New Jersey, and environs, encounters issues in acquiring properties. Because of the requirements of New Jersey law, acquisition through eminent domain is often expensive. In addition, private owners may refuse to sell or they may demand excessive prices, especially in light of their property's expensive "lienfields" (e.g., outstanding tax certificate, mechanic, and other charges). A recent study of infill in California (Landes and Hood 2005, 111) found that "many of the infill lots are extremely small and/or face other physical constraints" and that "the identification of pareels…appropriate for infill….is independent of current general plan or zoning designations."

Obtaining financing. The Belmont Dairy Project in Portland, Oregon, a creative infill and adaptive reuse project (a closed dairy was converted to a 133,000-square-foot mixed-use project on a 2.5-acre site near Portland's central business district), encountered financing problems. Lenders were originally willing to finance only about one-third of the roughly $20 million project cost, forcing the developer to raise $14 million from a variety of nonconventional sources.

Property tax climate. Basic project economics and lender perceptions concerning infill are affected by the frequently high property taxes in infill locations. U.S. cities, which are ripe for infill, have an equalized (or real) property tax rate (ETR) of 1.33 percent (e.g., a $100,000 property pays $1,330 in annual property taxes); exurban locations have an average ETR of 1.10 percent. The 20 percent lower ETR in exurbia is one factor fostering sprawl there. The situation is worse in New Jersey, where property taxes are higher in general (the average state ETR is 2.38 percent) and the ETR in the central cities (2.78) is much higher than the ETR in the suburbs (2.37).

Design. New Brunswick, New Jersey, has witnessed considerable infill. Much has been context-sensitive. However, other projects—such as a Fortune 500 headquarters built as a white, metallic-clad suburban "tower in a park"—have little connection with the city's existing building scale, materials, or style.

Development processing. San Francisco's Mission Bay Project, a 300-acre mixed-use development, offers one of the last opportunities for large-scale infill in that city. Laborious development processing consumed more than a decade of time and cost millions of dollars (Porter 1992). Mission Bay is finally beginning to be implemented, but many would-be infill projects fall by the wayside in the face of such difficult development processing.

Zoning. Infill typically takes place in locations in the metropolitan area with existing relatively higher densities, yet infill proposals are often fought on this issue. In San Francisco's Haight-Ashbury neighborhood, a developer proposed a 98,341-square-foot mixed-use infill project comprising 162 residential units above 70,000 square feet of commercial space. Many nearby property owners, however, protested "the project's increased density" (Martin 2001, 34). The project was ultimately scaled back to 134 housing units and 53,000 square feet of commercial space—the latter representing only

30 percent of the 177,000 square feet of available commercial development. Defining appropriate density for infill, especially in a climate of "NIMBYism," remains a challenge.

Subdivision and site plan. In general, New Jersey's water and sewage standards are rationally determined. In residential development, for example, the standards factor the number of residents in a dwelling unit and the expected water and sewer usage in terms of gallons per person per day (gpd). For example, a two-bedroom garden apartment, with an average occupancy of 2.33 persons and an expected water consumption of 75 gpd, should be serviced with a water capacity of 175 gallons daily. Sewage capacity is derived as a percentage of the water use, taking into account a loss factor of about 90 percent, to account for intake and irrigation.

The above factors, however, are inappropriate for infill. The demographic profile associated with infill development is different from the averages cited above; a two-bedroom infill garden apartment will have an average occupancy of approximately 1.9 persons. Because of lifestyle and other differences (e.g., infill households have fewer children), the standard demand factors, such as water consumption of 75 gpd, may be inappropriate for infill housing units. The above discrepancies mean that infill is being "overengineered" in terms of both water and sewage capacity, which increases utility line costs.[4] Additionally, utility hookup fees, which are based on standard water/sewage flow volumes, are being overcharged to infill projects.

Note that many of these same challenges apply to green building—which can both further infill and amplify infill's benefits. [5] Imperfect information, regulatory contradictions, and a misalignment of who pays for and who benefits from green building all imply an emergent green building market.

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[4] There may be other differences. For example, because infill may involve less irrigation, the standard water-to-sewage loss factor of 90 percent may be overstated.

[5] Most problematically for the housing market, there is a demonstrated disconnection between incremental first costs and life-cycle benefits of green building. In the home-building industry, green building is more prevalent in higher-priced custom homes than in market-rate production housing as up-market consumers are evidently willing to compensate additional first costs. The incidence of affordable green housing is increasing very noticeably, but this is a special case that is the result of either an additional subsidy or an additional requirement to qualify for low-income tax credits.

In recognition of these challenges, many state and local government entities are implementing programs to facilitate the entry of green building into the affordable housing market. For example, New Jersey Affordable Green (NJAG) is the country's first statewide green affordable housing program and has become a national model for green affordable housing. This comprehensive affordable green building and energy efficiency program works with developers building projects in coordination with the Department of Community Affairs Balanced Housing program, State HOME funds, Low Income Housing Tax Credits, and HMFA Home Express. It has increased the use of innovative green materials and design and building technologies in more than 2,000 affordable homeownership and rental units.

Some of the primary objectives of NJAG are as follows: reduce sprawl, reduce impact on vehicular traffic; encourage superior land use that minimizes damage and, where possible, improves environmental quality; promote infill development, the use of brownfield sites and urban areas, and the avoidance of currently usable agricultural land; reduce the dependence on automobiles and encourage mass transit; build community and promote security by site and building design; and foster the appreciation of, and connection to, the natural world through land use and building design.

STUDY CHARGE, SOURCES, AND ORGANIZATION

This study considers the opportunities for infill, the challenges to this type of development, and proposed best-practice solutions to the identified hurdles. These subjects are considered from both a national and a New Jersey perspective.

Our research draws from the following sources:

- *Literature:* The study reviews pertinent literature on infill, including previous studies examining the hurdles to this strategy and recommended policies for implementing infill.
- *Case studies:* Since the literature on the subject is far from complete, a number of case studies were conducted for this report.
- *Interviews:* The current investigation provides insight into the real-world procedures for accomplishing infill through communication with a variety of individuals and organizations knowledgeable about the subject. This group includes for-profit developers, nonprofit organizations, industry groups, planners, and other professionals.
- *Technical analyses:* We perform a number of technical investigations of such topics as the relationship of development density and land-use pattern to vehicle ownership and land values.
- *Research team experience:* The research team has decades of experience in infill development and construction and related subjects (e.g., context-sensitive design and housing rehabilitation).

The best-practice solutions are directed toward the major hurdles to infill development: *property acquisition*, *economics* (financing and the property tax), *design*, *development processing*, *zoning*, and *subdivision and site plan*. The best practices are formulated in part 2 of this study, in the form of an infill ordinance and policy guide that follows this introductory chapter. Infill ordinance provisions govern such matters as required parking and water-sewage utility capacity. Our document also contains policy provisions that typically would not be contained in an ordinance. For example, one recommended policy would implement tax-base sharing as a strategy to reduce the frequently high property taxes that discourage development in prime infill locations. Another policy recommendation is to grant investment tax credits for infill.

The infill ordinance and policy guide is informed by the background chapters in part 3 of the study. The major study findings with respect to the infill ordinance and policy guide are synthesized below.

SYNTHESIS OF FINDINGS OF THE INFILL ORDINANCE AND POLICY GUIDE

Infill Project Identification

- If infill development is to be aided in terms of accelerated processing, subsidies, and the like, then infill projects must be formally identified. The document considers various examples of smart-growth (SG) and infill rating systems (e.g., San Antonio's SG matrix and the SG scorecards used in Maryland and by New Jersey Future [NJF] and selects the NJF approach to flag smart growth–infill projects, inclusive of sustainable design considerations. Also offered as an option is an alternative SG identification system that defines types of development for the purpose of extending state tax credits for SG developers.

Area Designation to Further Infill

- Special area designations (e.g., "area in need of redevelopment") are often made to enable the use of eminent domain and other infill-supportive tools. The document recommends a flexible and targeted application of such designations. For example, the smallest area possible should be designated on an "as needed basis" (that could mean noncontiguous parcels), and planners should differentiate between areas needing redevelopment and those where rehabilitation will suffice.

Land Acquisition

- Enhance the application of eminent domain through such actions as targeting its use to an "as needed" basis, expediting the process (e.g., the redevelopment authority can provide areawide comparable sales to appraisers) and limiting the private financial exposure of entities acquiring properties through this strategy.
- Encourage other property control strategies, such as appointing receivers to repair deteriorated properties at the "gateway" of an infill project.
- To encourage the use of brownfields for infill purposes, limit legal liability, allow context-sensitive cleanup standards, and cap the private-borne costs of environmental remediation.
- Implement other property acquisition strategies to aid infill. For example, accelerate tax foreclosure and implement landbanking, and proactively identify parcels appropriate for infill (Landis and Hood 2005, IV).

Financing

- The private real estate community can help by offering infill-supportive strategies and products (e.g., location-efficient mortgages) and providing loan and collateral flexibility (e.g., modifying current FHA GSE [government-sponsored enterprise] lending caps on mixed-use project financing).
- The public and nongovernment sectors can provide a supportive climate for infill financing and can provide financial assistance when necessary (e.g., offer a smart-

growth state tax credit when a project would not be viable without such assistance). At minimum, existing subsidies should not encourage sprawl over infill. For instance, instead of favoring low-income housing tax credit (LIHTC) projects that have the least expensive housing units—a common LIHTC selection criteria, yet one that often inadvertently favors projects in greenfields—subsidy decisions could proactively favor LIHTC developments in infill locations.

Property Tax

- The basic solution to the frequently high property taxes in prime infill locations is fundamental public finance reform (PFR), such as the state assuming the major responsibility for funding local education. New Jersey has the nation's highest property taxes—PFR can reshape the state's climate for infill.
- Infill-supportive tax strategies, as an incremental step to PFR, include tax-base sharing or TBS (e.g., the New Jersey Meadowlands Commission has revised its TBS to proactively reward smart-growth projects) and offering property tax reductions for infill. The latter can be applied flexibly, for example, allowing a variable payment in lieu of taxes (PILOT) according to an infill project's need. In New Jersey, for example, the current PILOT guideline is 15 percent of project revenues or 2 percent of project costs. Perhaps a lower PILOT should be authorized for pioneering infill projects in very challenging locations, such as Camden, when the projects may not otherwise be viable.

Procedure

- Provide a rational review framework for infill; for example, encourage preapplication and concept plan reviews.
- Extend flexible development application reviews to infill; for example, allow General Development Plan (GDP) reviews for infill projects. GDP reviews are currently limited to large-scale projects (i.e., in New Jersey, projects of at least 100 acres), a constraint that hampers their use for infill applications.
- Provide fast-track processing for infill development proposals (e.g., such proposals should get priority review by government).
- Allow reduced or waived governmental review fees for infill projects.
- Appoint a state ombudsman to facilitate state agency review of infill projects (New Jersey already has a smart-growth ombudsman).
- Refine development impact assessments (DIA) of infill proposals (e.g., apply infill-specific trip generation and school children multipliers, which are lower than the standard DIA parameters).
- Calibrate equitable impact fees for infill. The rational nexus between growth and infrastructure is more complicated with infill, and one needs to carefully credit infill-associated revenues, such as a PILOT.

Design

- Develop design standards that reflect community goals, respect neighborhood context, and encourage pedestrian activity.
- To realize the above goals, follow recommendations concerning a comprehensive design process and incorporate the design elements that are particularly important to infill development (e.g., building arrangement, circulation systems, building style, historic preservation, and landscaping) and to green building, of which there is a high degree of overlap with infill development objectives.

Zoning

- Allow sufficient density to amortize the frequently higher per acre land costs of infill development, compared with the land costs of greenfields development, and to create a distinct sense of place.
- Provide density bonuses for historic preservation, affordable housing, green building, and other purposes.
- Provide setback, building arrangement, open space, and other zoning provisions to foster infill.
- To regulate "McMansions," provide guidance on when to allow teardowns and the appropriate scale of the replacement structure.

Subdivision and Site Plan

- Provide street dimensions (e.g., cartway and right-of-way) appropriate to infill.
- Design streets to encourage pedestrian activity and mass transit.
- Reduce parking requirements for infill developments to reflect the accompanying reduced dependence on automobiles.
- Allow flexible strategies for satisfying parking requirements (e.g., payments in lieu of spaces).
- Provide infill-sensitive water-sewage standards that reflect the typically lower demographics of infill projects.
- Prioritize infill projects with regard to available water capacity.
- Identify new stormwater standards applicable to infill projects only (e.g., require recharge to the maximum extent practicable and remove the limit on impervious cover).
- Prioritize infill projects with regard to available wastewater treatment capacity.

The infill development ordinance and policy guide in part 2 of this study and the background chapters in part 3 discuss the above recommendations in greater detail. Table 1.4 shows the location of additional information on the infill development topics presented here.

TABLE 1.4
Location of Infill Development Topics

Topic	Monograph Location	Title
Infill project identification	Part 2, Section II	Development Area Designation
Area designation to further infill	Part 3, Chapter 2	Identifying a Smart Growth–Infill Development
Land acquisition	Part 2, Section III Part 3, Chapter 3	Land Acquisition Property Acquisition and Infill
Financing	Part 2, Section IV Part 3, Chapter 4	Financing Financing and Infill
Property tax	Part 2, Section V Part 3, Chapter 5	Property Tax Strategies Property Tax and Infill
Procedure	Part 2, Section VI Part 2, Section X Part 3, Chapter 6	Procedure Documents Documents to be Submitted Processing and Infill Demographic Multipliers and Impact Fees
Design	Part 2, Section VII Part 2, Sections XI-1 through XI-3 Part 3, Chapter 7	Design Lighting, Signs, and Landscaping Design and Infill
Zoning	Part 2, Section VIII Part 3, Chapter 8	Zoning Residential Development Densities and Profitable Infill Development
Subdivision and site plan	Part 2, Section IX Part 3, Chapter 9	Subdivision and Site Plan Infill Parking Demand and Strategies

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Part Two

Infill Development Standards and Policy Guide

COMMENTARY	STANDARD
Section One (I) **General Provisions** **A. Short Title** The current document includes both an ordinance and a policy guide for infill. References in the text below to "the document" include both parts. The ordinance provisions for infill development cover such matters as recommended density and required parking. While infill standards are usually incorporated within a larger local land-use development ordinance that contains overall zoning, subdivision, and other regulations, in this study, the infill provisions are contained in a separate "ordinance." All material in the ordinance appearing between brackets is to be filled in by the jurisdictions adopting the ordinance. In many sections, standards have been suggested and are shown within the brackets. It is recommended that these standards be adopted. Revised standards may, however, be substituted after careful consideration and review of local characteristics and needs. This document also contains policy recommendations for infill that typically would not be contained in an ordinance. An example is the implementation of tax-base sharing (TBS) as a strategy to reduce the frequently high property taxes that discourage development in prime infill locations. Another policy recommendation is to grant investment tax credits for infill. The study authors believe that infill-sensitive development standards, such as higher-density and reduced parking requirements for transit-oriented infill, and infill-supportive strategies, such as TBS and infill-targeted tax credits, are both necessary to reverse a pattern of sprawl and natural resource depletion by encouraging infill. Complementary strategies for sustainable design and development amplify the land-use and natural-resource benefits of infill development.	***Section One (I)*** ***General Provisions*** ***A. Short Title*** *This ordinance and policy guide shall be known and may be cited as The Infill Ordinance and Policy Guide Document of [municipality or other jurisdiction].*
B. Authority and Purpose These and similar enumerated purposes would typically be found in the purpose section of the land-use development ordinance that contains overall zoning, subdivision, and other regulations. 1. The statutory authority for land-use regulations, in general, should be cited. 2. Land-use regulations are designed to protect the public welfare. As chapter 1 indicates, smart growth and infill offer many environmental, economic, aesthetic, and other benefits.	***B. Authority and Purpose*** *1. This document is adopted pursuant to the authority delegated to [municipality or other jurisdiction] under [cite relevant enabling state/other land-use regulations] and to promote good planning practice.* *2. The overall purpose of this document is to protect the public's health, safety, and general welfare by furthering smart growth and, particularly, infill and by discouraging sprawl.*

3. The general statement of purpose in the document is brief. Not uncommonly, more specific statements are added, and examples of the intent of furthering infill are given in item 3. This "intent" section is extracted, with revisions, from the State of Maryland *Models and Guidelines for Infill Development* (2001).	*3. It is the specific intent of this document to: [other statements of intent may be substituted here]* *a. accommodate growth in [name of jurisdiction] by encouraging and facilitating new development on vacant, bypassed, and underutilized land within areas that already have infrastructure, utilities, and public facilities, while addressing the needs of [name of jurisdiction] residents;* *b. encourage efficient use of land and public services in the context of existing communities;* *c. stimulate economic investment and development in older established communities;* *d. promote neighborhood preservation and enhancement through redevelopment of blighted, distressed, and underutilized properties;* *e. encourage compact development that is pedestrian-scaled and, if applicable, transit-oriented;* *f. create a high-quality community environment that is enhanced by a balanced, compact mix of residential, commercial, recreational, open space, employment, and institutional uses and building types;* *g. encourage mixed-use development to complete neighborhoods and provide housing close to employment and services;* *h. allow flexibility in housing location, type, density, and configuration;* *i. encourage quality and variety in building and landscape design;* *j. ensure the compatibility of new construction and structural alterations with the existing scale and character of surrounding properties;* *k. protect historic buildings and provide standards for the redevelopment and alteration of historic buildings;* *l. encourage affordable housing through infill development;* *m. enhance streets as public places that encourage pedestrian and bicycle travel;* *n. implement the goals, objectives, and policies of [New Jersey State Development and Redevelopment Plan] and other [state, regional, and local documents];* *o. improve approval certainty for infill development by providing clear development standards.*

4. The purpose of this section is not to stipulate a technical legal requirement that infill regulations be "in accordance with" the indicated local official land-use guides, but rather to encourage the integration of land-use controls.	*p. encourage sustainable building practices based upon those outlined by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) program.* *4. The provisions in this document shall be administered to ensure orderly growth and development and to facilitate the provisions in the master or comprehensive plan, official map, capital budget, and other official guides.*
C. Jurisdiction 1. It is recommended that the document have a comprehensive spatial scope. It may apply to the full corporate limits of the municipality, county, or other applicable jurisdiction, or to targeted infill locations within these respective jurisdictions. There is also a moving spatial boundary in the sense that what is not an infill location today may very well become one tomorrow. Specific sections of the document may have further spatial connections. For example, the zoning provisions may be a "floating zone" throughout the jurisdiction, or they may apply only in specified locations within the jurisdiction. 3. An ordinance and policy guide should be a living document to be amended when necessary.	***C. Jurisdiction*** *1. The provisions in this document shall be applicable in [specify area].* *2. This document shall become effective on [specify date].* *3. When necessary to further its purposes, this document shall be amended [specify amending agency and procedure].*
D. Enforcement 1. This provision is intended to ensure that the regulations are enforced.	***D. Enforcement*** *1. It shall be the duty of the [specify agency or individual] to enforce the provisions of this document and to bring to the attention of [specify agency or individual] any violations or lack of compliance.*

Section Two (II)
Definitions and Development and Area Designations

A. Defining Smart Growth

There are many definitions of smart growth. The definition incorporated in this document is derived from Burchell and Listokin 2001, New Jersey Office of Smart Growth 2004, and New Jersey Future 2004. It is supplemented by the smart growth objectives of the U.S. Green Building Council (USGBC) and especially USGBC's development guidance offered through its LEED® (Leadership in Energy and Environmental Design) rating system and building standards. The LEED rating system establishes measurement criteria for existing buildings (LEED-EB), new construction (LEED-NC), homes (LEED-H), neighborhoods (LEED-ND), commercial interiors (LEED-CI), and core and shell (LEED-CS). Of these development types, this document draws most directly on LEED-ND as it is the most relevant for infill development. Complying with LEED requirements results in a wide range of practices that are beneficial to infill development, including compact development, resource conservation and efficiency, light pollution reduction, walkable streets, pedestrian safety and comfort, landscaping, applying contextually sensitive regional precedents in building design, and adaptive reuse of historic buildings. See chapters 1, 7, and 8 for a fuller discussion of LEED objectives and its rating system.

B. Defining Infill

As with smart growth, there is no one accepted definition of infill. Chapter 1 considers many previous definitions, and the current document opts for an encompassing definition of infill. The definition purposely includes both new construction and reuse-rehabilitation—the latter sometimes referred as "redevelopment."

C. Identifying Smart Growth–Infill Development

1. This document is directed toward smart growth–infill projects and recommends special inducements for such development, for example, accelerated processing and reduced review fees. As such, it is important to determine whether a project is a smart growth–infill development. Chapter 2 examines nationwide efforts to "score" or in other ways identify smart growth, including infill projects. Examples include the "Smart Growth Criteria Matrix" used in Austin, Texas, the "Smart Growth Scorecard" used in Maryland, and the "Smart Growth Scorecard—Proposed Developments" from New Jersey Future (NJF).

Chapter 2 evaluates the various scorecards and presents the reasons for selecting NJF's methodology for the purpose of

Section Two (II)
Definitions and Development and Area Designations

A. Defining Smart Growth

Smart growth creates a supportive environment for redirecting a share of regional growth to central cities and inner suburbs while simultaneously reducing growth pressures in rural portions of the metropolitan area. Smart growth emphasizes well-planned, well-maintained, and ecologically sustainable growth and in [New Jersey] is guided by the [New Jersey State Development and Redevelopment Plan].

B. Defining Infill

Infill, a component of smart growth, encompasses a broad array of development (residential and nonresidential; new construction, reuse, and rehabilitation; and modest and large scale) occurring on scattered sites in largely developed areas.

C. Identifying Smart Growth–Infill Development

1. For the purpose of this document, a development will be deemed a smart growth–infill project if (1) its overall grade in New Jersey Future's Smart Growth Scorecard (NJFSGS) is an "A" or a "B" and (2) its NFJSGS grade in Section I of that scorecard ("project location near existing development or infrastructure") is an "A."

identifying a smart growth–infill project in New Jersey. The NJF scorecard considers such factors as whether a project (1) *is located near existing development and infrastructure,* (2) *provides a range of housing options,* (3) *protects open space, farmland, and critical environmental areas,* (4) *has a mix of uses,* (5) *provides choices for getting around*, (6) *is walkable and designed for personal interaction,* and (7) *is respectful of community character and design*. The most infill-significant NJF smart-growth measure is whether a development is "near existing development and infrastructure." According to NJF, that element encompasses the following four measures: (a) the "project is located adjacent to existing infrastructure, roads, water, and sewer"; (b) the "project is in State Plan planning areas 1 or 2, a designated center . . . and/or a designated Area in Need of Redevelopment"; (c) the "project is near at least three of the following: housing/restaurants/ retail/convenience/services, schools, recreation centers, offices"; and (d) the "project requires new/additional services and/or facilities (fire, police, school)." On the last item, "not needed" results in a higher score. All seven overall NJF measures are scored, and the numerical score is assigned a letter grade from A (best) to F (worst).	
2. A jurisdiction may have already defined the term "smart growth–infill" for official purposes, and it is sensible to incorporate that definition for consistency purposes. To illustrate, proposed legislation in New Jersey (S.274, 2004) would offer state tax credits for smart-growth development where such development meets specific criteria with respect to *location* (e.g., a "center" designated by the State Planning Commission), *transit access* (the site must be served by bus, train, or ferry), *infrastructure* (e.g., the development must not require a sanitary-line extension of 1,000 feet or greater or new streets with more than two traffic lanes), *density* (e.g., a minimum residential density of six units per acre), *subdivision* (e.g., maximum parking standards are set), and *other characteristics*. In New Jersey, the definition of smart growth–infill for the purposes of this document might simply reference S.274, 2004. Proposed legislation in Mississippi (MS H.B.1704, 2005) would offer a smart-growth tax credit to developments meeting such criteria as *location* (e.g., in urban or suburban areas or centers), *transit access* ("served either by adequate bus . . . or rail service"), *infrastructure* (the development must not require a water- or sanitary-line extension of 1,000 feet or greater), *environmental sensitivity* (the development must not be near wetlands, critical slopes, or critical habitats), and *design* and other characteristics.	*2. As an alternative to II.C.1, a smart growth–infill project shall be defined as per [cite legislation, ordinance, or regulation] of [cite jurisdiction, e.g., in New Jersey, S.274, 2004, Proposed Smart Growth Tax Credit].*

D. Area Designation to Further Infill To foster revitalization, government may authorize the designation of a "blighted" or otherwise deteriorated location as a "redevelopment" or similar area. Such designation then enables the application of eminent domain, the granting of property tax abatement, and other actions. Smart growth and, especially, infill may take advantage of these special area designations. Examples of infill projects that used special area designations include the Gaslamp Quarter in San Diego (Hamilton 1994, 24), Circle Center in Indianapolis (Eckstut 1995, 30), and University Park in the Boston area (Lassar 1999, 58). In New Jersey, infill projects in Asbury Park, Camden, Newark, New Brunswick, and many other locations have similarly been preceded by a special area designation, often an "area in need of redevelopment." The problem, however, is that the "standard" area designations may not be appropriate. They may be based on an urban renewal model that emphasized the designation of large areas slated for wholesale demolition and new construction—in contrast to a contemporary infill model that often targets smaller-scale intervention, including both new construction and rehabilitation-adaptive reuse. The document provides area descriptions that better comport with the contemporary application of infill. While the specific area examples refer to New Jersey designations, the application is far broader.	***D. Area Designation to Further Infill***
1. This recommendation is prompted by the New Jersey experience. Pursuant to the New Jersey Local Redevelopment and Housing Law, N.J.S.A. 40a:12A et seq. (hereafter, LRHL), and associated statutes, the "area in need of redevelopment" designated by a municipality cannot consist of a series of *individual* blighted properties. The LRHL requires the properties to touch one another, forming a single contiguous area. Nonblighted properties may be included within the designated area in need of redevelopment to obtain the requisite contiguity and/or if their inclusion will assist in accomplishing the public purpose for which the redevelopment area has been designated. For example, the acquisition of nonblighted properties by eminent domain may be deemed necessary to provide adequate access or "gateways" to the rest of the designated redevelopment area. The contiguous property requirement for areas in need of redevelopment can be problematic. In the first place, it is likely that for many communities, permitting redevelopment areas to consist of noncontiguous blighted properties would allow the redevelopment plan to better target specific redevelopment goals. Secondly, the contiguity requirement tends to create relatively large redevelopment areas, increasing the costs of land acquisition. Finally, the nonblighted properties that often must be included within the designated redevelopment areas to meet contiguity requirements can become stigmatized, and, as a result, their value may decrease.	*1. For the purpose of furthering infill, an "area in need of redevelopment" may be designated. A redevelopment area may consist of both contiguous and noncontiguous parcels.*

The document therefore calls for amending the LRHL so that an "area in need of redevelopment" could consist of *noncontiguous* properties. The recommended change would allow communities to target specific nuisance properties for redevelopment or rehabilitation and more effectively achieve their redevelopment goals. It also would result in fewer disturbances to nonblighted properties and/or minimize any diminutions in their value.	
2. This recommendation is prompted by the New Jersey situation, which is applicable in many jurisdictions. Under the current New Jersey LRHL, a municipality or redevelopment authority may designate an "area as being in need of rehabilitation" rather than redevelopment. Unlike the designation of an area in need of redevelopment, the rehabilitation designation does *not* entail the application of eminent domain, which can be costly and time consuming and resisted by affected property owners. The rehabilitation designation, however, is not frequently used, so the document calls attention to it as a viable alternative for those areas that are deteriorated but would not meet the blight criteria for the designation of an area in need of redevelopment.	*2. To foster infill in deteriorated, but not blighted, areas, the designation of "areas in need of rehabilitation" is encouraged.*
3. The appropriateness of the special area designations needs to be considered on a continuing basis. This change would avoid the situation of areas continuing to be designated for revitalization long past the appropriateness or usefulness of such demarcation—a problem that occurred during urban renewal. For example, the New Jersey LRHL lacks a provision for the expiration of a redevelopment designation. In other words, once an area is designated for redevelopment there is no statutory mechanism for rescinding the designation, even when the intended redevelopment never comes to fruition. Washington Market in Trenton and Renaissance Tower in Newark are classic examples of areas long designated for redevelopment (about two decades ago) that were never actually redeveloped. Although this is probably not a major problem (i.e., most redevelopment-rehabilitation areas are acted upon in a more timely fashion), it can lead to some sloppiness from a procedural standpoint and can stigmatize affected areas. The document's "sunset provision" attempts to address this problem. As an aside, redevelopment areas that never undergo redevelopment may still require cleanup. In such cases, New Jersey can issue certificates of completion to the municipalities, and that might provide a means of addressing the lack of statutory expiration language.	*3. The designation of an "area in need of redevelopment" or an "area in need of rehabilitation" can be rescinded if the conditions prompting the original redevelopment designations have changed and/or there has not been satisfactory progress toward realizing the redevelopment or rehabilitation.*

Section Three (III) Land Acquisition	*Section Three (III) Land Acquisition*
A. Enhance the Application of Eminent Domain	***A. Enhance the Application of Eminent Domain***
1. This provision is intended to focus the application of eminent domain and to balance the interests of the public and the affected owners (see chapter 3 for additional details). Infill development often entails the use of eminent domain for property acquisitions. That, in turn, has evoked growing criticism from both owners of properties affected by the eminent domain takings and from many would-be infill developers. Property owners claim that eminent domain is being overused for infill and, in any event, that it is a protracted procedure that does not fully compensate them. While many in the development community appreciate eminent domain as a property acquisition tool, they complain that the process is lengthy and expensive, or at least not very predictable with respect to costs. The document attempts to address concerns regarding the implementation of eminent domain for infill purposes. While the United States Supreme Court, in *Kelo et al. v. City of New London et al.,* No. 04-108 (2005), has upheld the use of eminent domain for economic development purposes, the Court indicated that states could further frame the application of this police power. Indeed, many states, including Texas and Delaware, are currently doing just that. New Jersey may very well act in this regard. The New Jersey Public Advocate has recommended changes in the application of eminent domain in the state and more than a dozen legislative bills have been introduced to alter how eminent domain is effected in New Jersey (Chambers 2006). In this spirit of change, the model document proposes a strategy for a balanced application of eminent domain in infill. Accordingly, the model document proposes the revision of state statutes to establish thresholds for using eminent domain to facilitate infill that promotes essential economic development. Specifically, the model document provides two thresholds for determining when it is appropriate to use eminent domain for a residential or nonresidential infill project to meet a community's economic development needs. This two-threshold, or two-part, test derives from similar language in Section 4(f) of the Amended Department of Transportation Act, 49 U.S.C. 303, Public Law 100-17, 1987, which sets thresholds for the use, for transportation purposes, of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of a national, state, or local significance, or private land of a historic site of national, state, or local significance. The first threshold, or test, requires	*1. Focus the application of eminent domain. Establish thresholds for using eminent domain to facilitate residential and nonresidential infill for economic development purposes.* *When eminent domain is used to promote a residential or nonresidential infill project for economic development purposes it shall only be used when:* *a. there is a compelling reason, as demonstrated by (1) the fact that the community is clearly distressed and needs economic development, as indicated by high tax rates in combination with low valuation per capita, low valuation per student, falling municipal bond ratings, high unemployment, or other commonly accepted socioeconomic indicators, and (2) the fact that the project is important for realizing the community's demonstrable economic development needs; and* *b. there are no reasonable and prudent alternatives in light of the fact that all other good-faith efforts at property acquisition have failed or have been shown to be impractical or inadequate for meeting the community's economic development needs.*

demonstration that there is a *compelling reason* for the use of eminent domain based on two subcriteria: (1) the municipality is distressed, as measured by defined and commonly used socioeconomic indicators; and (2) the infill project in question is necessary for meeting the municipality's economic development needs. The second threshold, or test, requires demonstration that there are *no other reasonable and prudent alternatives* to using eminent domain for property acquisition, as all good-faith efforts to acquire property through other means have failed, have not been practical, or have not been adequate to meet economic development needs.

Indeed, eminent domain should be a last-resort application, effected only after other property acquisition strategies fail. The other strategies include, among other methods, negotiation with private owners, tax foreclosure, receivership of deteriorated properties, and land swaps. Each of these approaches has advantages and disadvantages, as illustrated in table III.1 (see also chapter 3). Eminent domain should be applied only when the alternative property acquisition strategies are not "prudent or feasible."

In short, the cardinal objective in applying the police powers of eminent domain is to further the public's welfare through fostering vital economic development and to use this power in a circumscribed fashion. In an infill situation, eminent domain should be applied only when the condemned property is a keystone to infill, is immediately needed, and cannot be acquired through other means. Other strategies suggested in the model document should also further the goal of focusing the application of eminent domain. These include allowing redevelopment areas to include noncontiguous parcels, as opposed to a larger area of contiguous parcels (thus reducing the geographic scale over which eminent domain can be applied); encouraging the designation of "areas in need of rehabilitation" (unlike the redevelopment area, the rehabilitation designation does not entail the application of eminent domain); and allowing for the cancellation of the redevelopment designation if conditions change or if satisfactory redevelopment progress is not made (thus removing the application of condemnation when unnecessary).

TABLE III.1
Impact of Property Acquisition Strategies

	Eminent Domain Takings	Conventional Purchase	Receivership of Deteriorated Properties	Other Methods (e.g., Negotiated Purchase, Tax Foreclosure, Land Swaps, Joint Ventures)
Cost	Moderate	Highest	Low	Moderate
Time	Slower	Faster	Moderate	Faster
Certainty of acquisition	High	High	Moderate	Low
Flexibility	Low	Medium	Medium	High
Degree of encroachment on property rights	Maximum	Neutral	Minimal	Neutral

The cardinal objective in applying the police power of eminent domain is to further the public's welfare. In an infill situation, eminent domain should only be applied when the condemned property is keystone to the infill, is immediately needed, and can not be acquired through other means. Other document-suggested strategies should also further the goal of focusing the application of eminent domain. These include allowing redevelopment areas to include non-contiguous parcels, as opposed to a larger area of contiguous parcels (thus reducing the geographic scale over which eminent domain can be applied), encouraging the designation of "areas in need or rehabilitation" (unlike the redevelopment area, the rehab designation does not entail the application of eminent domain), and allowing for the rescinding of the redevelopment designation if conditions change or if satisfactory redevelopment progress is not made (thus removing the application of condemnation when unnecessary).

Expedite and Improve Process

Some of the major complaints about the use of eminent domain for infill is that it takes so long to effect this process and that the appraiser-determined values do not reflect local conditions. The model document attempts to expedite the process and enhance the valuation process. One way of accomplishing that is for the redevelopment authority to assemble information useful to the property appraisers. The latter use sales, cost, and income approaches to value properties involved in infill assignments. To assist appraisers, the redevelopment authority can assemble redevelopment area-specific data on recent sales (thus facilitating the identification of comparable sales that underlie the sales approach), land and constructions costs (useful for the cost method), and rent, vacancy, operating costs and

Expedite and Improve the Process

Expedited and appropriate valuation of properties acquired via eminent domain in redevelopment ar[e] is encouraged through such means as the redevelopment authority making available compar[] sales data in the redevelopment area and providin[] cost and income data useful to appraisers.

capitalization rates (useful for the income approach).

The appropriate condemnation valuation in an infill situation will incorporate such factors as value under existing zoning, redevelopment zoning and “highest and best use.” (Clarification is needed concerning who captures the value from the redevelopment effort – the infill developer, or the property owner whose land is condemned.) The valuation should factor full cleanup costs and all other expenses (e.g. stabilizing a landfill and posting a bond to guarantee remediation) necessary to prepare a site for development.

Limit Financial Exposure

A development community domain concerning the application of eminent domain for infill is that there is considerable uncertainty concerning the ultimate property acquisition cost. The document attempts to bound the private property cost exposure when using eminent domain for infill as follows.

The infill developer and the redevelopment authority would authorize appraisers to conduct a good faith, reconnaissance valuation of the property(ies) to be acquired for infill via eminent domain. Two or three appraisers might be commissioned with an average “base value” then determined. Ultimately, the latter might very well be contested as inadequate by affected property owners. Yet the developer’s financial exposure would be capped to say 20 percent of the base value. Who would absorb the “overage” – added property costs above the 20 percent? The document suggests a number of possibilities:

1) A public entity, possibly local, county or state government and/or the redevelopment authority would agree to assume the “overage” liability.

2) An insurance company would absorb the “overage.”

For example, all infill development could pay premiums for infill financial liability concerning such matters as the “overage” on the property acquisition costs (i.e. above the 120 percent of base value), or, a similar run-up in cost regarding land clean-up (see section III. B.c.1).

3) Foundations and other parties interested in encouraging infill development could also participate.

There is no easy answer to “who pays” and in all likelihood it will be a combination of parties – the developer absorbing the “overage” up to [120] percent of the base value and then sharing of liability by government, insurance companies and others. If the financial exposure of infill-related property acquisition and clean-up costs can be capped, then remaining project-related expenses, such as construction expenses, can be reasonably estimated by the development community. While processing time and expense is another “gray area,” the document commits government to “fast track” the infill applications. All of these strategies should remove some of the uncertainties that currently dissuade would-be infill investors.

B. Consider Other Forms of Property Control

1. Under current redevelopment practice, properties are condemned and acquired in redevelopment areas through eminent domain. IN some instances, however, it may not be necessary to

Limit Financial Exposure

To limit private financial exposure of infill project redevelopment areas, a reasonable limit, or cap, n be imposed on the property acquisition costs such an infill developer would be obligated to pay up to {120} percent of a “base’ property valuation, with public entity, insurance company, and/or other pa agreeing to absorb the financial liability of a prop acquisition cost above the {120} percent level.

B. Consider other forms of property control

1. As an alternative to acquiring properties thr eminent domain (in redevelopment ar receivership of statutorily determined properties be utilized as a means of addressing violations

acquire properties outright, but rather to control them to address a continuing pattern of deterioration and code violations. An example might be a single deteriorated property at the gateway to the infill project. To allow for greater flexibility in property control for infill purposes, the document encourages the use of receivership for this purpose.	*encouraging infill development.*
a) While there may be an inherent authority by government to abate a public nuisances, such as to repair a deteriorated property through the appointment of a receiver, receivership is on firmer legal ground when authorized by state enabling legislation. Seventeen states currently have such statutes (California, Connecticut, Delaware, Illinois, Michigan, Indiana, Maryland, Massachusetts, Minnesota, Missouri, New Jersey, New York, and Oregon). The document calls for a broad authorization of receivership that would allow appointment of both public and private receivers in a variety of situations (e.g. when occupancy codes for both residential and on residential properties are being violated). Chapter 3 considers in detail how receivership may be applied to an infill situation—and that application will differ as state laws vary. New Jersey s is illustrative. A 2004 receivership statute broadened and strengthened the application of this strategy. Neighborhood organizations were authorized as receivers and were empowered to borrow funds, the receivers; liens were given priority status, and a $4 million reviver's revolving loan fund was established. New Jersey receivers could aid infill. For example, instead of infill developers having to purchase deteriorated properties at the gateway to their site in other to stabilize the area, a receiver could temporarily be appointed and could then abate the outstanding violations in these gateway parcels. While there are limitations to the receivership strategy of foster infill in New Jersey and elsewhere (e.g. a receiver can be appointed in New Jersey only on building s that are at least 50 percent residential), receivership offers strategic benefits for infill that merit its consideration (See chapter 3 for details.)	*a) To facilitate the application of receivership for purposes, states should adopt enabling legisl authorizing receivership and allowing it to be bro applied.*
C. Foster the Use of Brownfields for Infill Purposes.	**C. Foster the use of brownfields for Infill purp**
Infill may involve development in brownfields (e.g. environmentally contaminated lands and building) and that poses legal, economic, and other challenges. Strategies to remedy these hurdles could comprise a separate study into itself. The document presents some of the major strategies for dealing with brownfields that were recommended by the national and New Jersey infill developers. For illustration purposes, we refer to New Jersey examples.	
1. *Cap legal liability* Development in brownfields has been thwarted by lawsuits against the many parties associated with such sites, including those having no connection with the original contamination, (e.g. lenders). Legislation in NJ, MN, and elsewhere has begun to curb this liability so as to foster reuse of brownfields—yet further reforms may be necessary. New Jersey is illustrative. The Brownfield and Contaminated	1. Cap legal liability

Site Act (N.J.S.A. 58:10B-! et seq.) protected buyers of tainted sites from private lawsuits related to past contamination problems if they agree to clean up the properties according to state requirements (Gairbarine 1990). Once the site is remediated according to an agreed-upon cleanup plan, the state agrees not to sue. Further, this law also exempts buyers from any new cleanup costs once environmental officials approve cleanup job. While this law provides safeguards from liability , it does not provide absolute immunity (Lyncott 1998). For example, the liability protection extends only to the purchased property but does not take into account contaminants migrating off-site to adjacent properties that may be affected. New Jersey should thus consider extending its brownfields liability protections to that and other unprotected situations.	
2. *Allow context sensitive brownfields remediation.* This varying standard targets the extent of the environmental remediation to the need. To illustrate, the New Jersey Brownfield and Contaminated Site Act requires different standards depending on the planned new use of the site and also allows alternative remediation methods such as installing impermeable caps to stop wastes from seeping out, instead of requiring the removal of industrial residue (Garbaine 1998, 6).	*2. Allow context sensitive brownfields remediation* *Allow context sensitive standards, such as less cle for industrial redevelopment and greater cleanu residential reuse.*
3. *Provide financial incentives for brownfields remediation, such as grants and loans.* New Jersey is again illustrative. Its Hazardous Discharge Site Remediation Fund offers grants and loans to municipalities (up to $2 million annually) and private parties (up to $1 million annually) for the investigation and remediation of contaminated sites. New Jersey's Brownfields Redevelopment Program allows developers to borrow up to $250,000 up-front remediation funding. Other New Jersey financial aid is always available (e.g. Petroleum Underground Storage Tank Funding).	3. *Provide financial incentives for brown remediation, such* as grants and loans.
4. *Credit brownfields site-generated revenues for cleanup reimbursement.* This strategy is a variation of tax increment financing. New Jersey is again illustrative. New Jersey developers who are willing to voluntarily remediate contaminated sites for which no responsible party is available can be reimbursed for up to 75% of the cleanup costs. The costs must be fronted by the developer, but then are reimbursed through new tax revenues derived by the State as a result of the project. Yet the New Jersey law can be improved. An example is to expand the tax revenue pool to reimburse brownfields remediation costs to include state income and sales taxes paid by households living in the redevelopment area's residential housing units. This change is prompted by the following. While the New Jersey Statute provides many redevelopment site revenues that can be used for reimbursing clean-up costs, most of these revenues are linked to non-residential uses only (e.g. sales taxes from a retail store). The only residential revenue currently allowed is the sales tax on the housing-related	4. *Credit brownfields site-generated revenues cleanup reimbursement. These revenues s include a wide variety of sources.*

construction materials. The document recommendation expands the residential-associated revenues to include household-generated sales and income taxes—a change expanding the revenues for cleaning redevelopment sites with largely residential uses. (See chapter 3 for details.)	
5. *Limit Financial Exposure*	5. *Limit Financial Exposure*
Environmental cleanup and remediation is a big wildcard for infill development. In the first place, because redevelopment sites may contain high levels of hazardous materials and it is difficult to determine where contaminants are concentrated, it is hard for developers to know up front the ultimate cleanup and remediation costs. If developers cannot easily determine upfront costs, it is more difficult for them to proceed with infill projects. The document addresses this problem by capping the privately-borne cleanup liability. This strategy parallels the recommendation to cap the privately-borne cost of the property acquisition for infill—another wildcard expense that may discourage developers from effecting infill. See Section III A.3. for further details.	*To limit the financial exposure of infill developers dealing with brownfields, a reasonable limit or cap may be imposed on the cleanup costs such that the infill developer* *would be obligated to pay up to [120] percent of a "base" determination of remediation costs, with a public entity, insurance company and/or other parties agreeing to absorb the financial liability of cleanup costs above the [120] percent level.*
D. Effect Other Strategies for Infill Property Acquisition	*D. Effect Other Strategies for Infill*
Examples include accelerated property tax foreclosure ("fasttake"); proactively favoring infill in disposing of surplus and foreclosed properties, forgiving back taxes that may hinder reuse, effecting land banking, encouraging land swaps, and improving property identification. See chapter 3 for details.	

Section Four (IV) **Financing for Infill Development**	***Section Four (IV)*** ***Financing for Infill Development***
Lenders may be wary of financing infill for a variety of reasons (see chapter 4 of this study). Infill development embraces mixed-use, higher density, and, in other ways, a product type different from those lenders may be accustomed to. In addition, infill projects may be complex (e.g., they may involve different components and participants), may confront legal issues (e.g., designating a "redevelopment area"), and may have large up-front costs for cleanup and the like. Higher property taxes in many infill locations also form a barrier to financing. This section presents strategies for securing financing for infill development and includes actions for both lenders and the public sector. Section five (V) considers property tax strategies for fostering infill.	
A. Fostering Infill Financing: Strategies for the Real Estate Finance Community	***A. Fostering Infill Financing: Strategies for the Real Estate Finance Community***
1. The financing of a proposed infill project can be stopped in its tracks if the appraisal of the development falls short or, at the extreme, is less than the cost of construction. The comparable sales and income approaches used to estimate value, however, may not capture the true value of an infill project, creating an appraisal gap. The private sector can help address the problem by developing and disseminating information on appraisal techniques that are appropriate for infill. For example, the area from which comparable sales ("comps") are selected may need to be expanded. When new for-sale housing was built in Detroit, Michigan, a few years ago, appraisers had to look at suburban comps. A pilot program could also consider the valuation of reclaimed brownfields and mixed-use, adaptive reuse, and rehabilitation projects. See chapter 4 for further details.	*1. The real estate finance community can develop and disseminate information on appraisal techniques that capture the value of infill development.*
2. An example is the Location Efficient Mortgage (LEM℠) which began a pilot program. The LEM assumes reduced transportation expenses for residential neighborhoods with mixed-use development and access to mass transit and therefore an increased capacity for housing debt. Expanded debt ratios increase the home-buying capacity of consumers who purchase housing in compact, transit-served, mixed-use, and similar areas favored by infill development. See chapter 4 for further detail.	*2. By participating in and expanding pilot financing programs for infill development, the real estate finance community can establish a track record for smart growth–infill financing and develop a model for regular loan programs.*
3. For example, some lenders may have a minimum commercial loan amount reflecting underwriting and other origination costs. The minimum requirement may preclude lending for small-scale commercial infill projects. Flexibility in other requirements can help, for example, the minimum housing unit size (square footage) necessary to qualify for mortgage	*3. Enhanced loan and collateral flexibility can further infill development.*

insurance or to be salable to the secondary-mortgage market. Housing unit size affects marketability, but the overall character of infill endeavors may more than offset any perceived negative effect. For instance, compact studio apartments in an attractively designed downtown area may be in high demand. See chapter 4 for additional details. 4. For instance, a report by the Federal Reserve Bank of Minneapolis indicated that mixed-use financing is sometimes impeded by the common practice of lenders having separate commercial and residential underwriting departments and/or appraisers (Bennett 1999). The Federal Reserve report notes that to take advantage of the business opportunity of smart growth, "Lenders with separate commercial and residential loan departments may need to develop a team with the expertise to analyze mixed-use projects" (Bennett 1999, 4). See chapter 4 for additional details. 5. For example, in Chicago, lenders were interested in doing purchase–rehabilitation loans but were daunted by the construction oversight of the loans. These loans could cost a bank as much as $5,000 to $10,000 per loan to supervise the renovation, since they involved considerable administration and typically were made on a limited scale by any one lender (Listokin and Wyly 2000). To meet this challenge, Chicago lenders partnered with Neighborhood Housing Services of Chicago (NHS), which conducted the rehabilitation construction supervision for many banks. Outsourcing this function to NHS, which did the work in volume, was a cost-efficient solution for the lenders. 6. For instance, the Federal Housing Administration (FHA) Section 221(d)(4) loan program allows nonresidential space to compose 10 percent of a project. The FHA Section 220 program allows nonresidential space to compose up to 20 percent of a project. The HUD regional offices can allow additional nonresidential cap flexibility through in these programs. The additional flexibility could be used to promote infill objectives. See chapter 4 for additional details.	*4. Flexibility in underwriting processes can increase infill lending opportunities.* *5. Lenders might also consider outsourcing specialized functions to finance infill projects.* *6. Allowing limited and targeted nonresidential components in loans primarily residential in nature also can promote infill.*
B. Fostering Infill Financing: Strategies for Government and Other Entities 1. The economic, legal, and institutional framework in which lenders operate is critical to their willingness to finance infill projects. Thus, whenever governments and others—for example, non-governmental organizations (NGOs), including foundations and community development corporations (CDCs)—can responsibly act, they should structure the lending environment to be consistent with reasonable underwriting standards and to provide lenders with a "clean" collateral position.	***B. Fostering Infill Financing: Strategies for Government and Other Entities*** *1. Enhance the climate for infill financing.*

Public and NGO participation to further infill financing is often done in partnership with the private sector. Some of the recommendations included here overlap with recommendations in other sections of the document.	
a. Governments have promoted brownfield reclamation through regulatory relief (e.g., liability limitations) and public subsidies. See section III.C of this document and chapter 3 for more details.	*a. Policies can be established to address liability issues that stymie the reuse of such parcels as brownfields.*
b. Since time is money, development and regulatory efficiencies that cut time and add certainty make infill development more attractive to lenders. Examples of such actions include assistance in assembling land, clearing title, and fast-track processing of infill applications. As part of the Building Homes in American Cities initiative, Tampa, Florida, has streamlined its permitting process and is adopting a fully electronic application and inspection system. Chicago, Illinois, permits a builder self-certification of preapproved home designs, thus bypassing a series of administrative reviews. Finally, Houston, Texas, allows private inspections to augment the city's overworked inspectors (Porter 2000). See also document recommendations to aid infill land assembly (section III) and accelerated processing of infill development applications (section VI).	*b. Streamlining the development permitting process can enhance the flow of real estate finance to support infill.*
c. For example, "smart codes" can facilitate infill involving rehabilitation. New Jersey crafted and adopted separate regulations for building rehabilitation and reaped the benefit of lowered renovation costs (with estimated savings of 10 percent to 20 percent) and expanded rehabilitation investment (NAHB Research Center Inc. 1999). As part of its smart-growth initiative, Maryland also revised its building code to support renovation. The New Jersey and Maryland revisions, as well as the Nationally Applicable Recommended Rehabilitation Provisions (NARRP) developed by the Department of Housing and Urban Development (HUD) are all smart codes that merit consideration by other jurisdictions interested in increasing financing for rehabilitation-related infill.	*c. Technology and innovative regulations can improve the climate for infill financing.*
d. For example, as part of the Building Homes in America's Cities initiative, sponsored by National Association of Homebuilders, HUD, and the United States Conference of Mayors, Houston, Texas, developed a Neighborhoods to Standard program that focuses on improving public facilities and services, such as better trash removal and street repairs (Porter 2000). Other cities participating in the initiative have taken similar actions to improve neighborhood QOL: San Antonio's Neighborhood Sweeps program combines city cleanup and improvements, and Chicago provides grants for home façade improvements.	*d. Local governments can improve the quality of life (QOL) in areas targeted for infill efforts, creating the environment where commercial and residential lenders can safely project sufficient economic activity to justify lending.*
e. All levels of government can locate facilities in areas targeted for infill investment. By enhancing the economic viability of the surrounding properties and businesses, the government actions facilitate additional lending in the targeted	*e. Placing public employment and facilities in targeted areas also can revitalize community economies, making adjacent properties and businesses stronger candidates for financing.*

areas. The federal government has existing directives to locate facilities in or otherwise support urban, central business district (CBD), historic, and other areas that infill initiatives typically seek to revitalize. State government can consider similar mandates.	
2. Government and NGOs can provide subsidies and other support, such as risk sharing, to bolster the economics of infill development (see chapter 4 for more details). Such assistance is especially important to support more challenging smart growth–infill projects, including pioneering efforts in the inner cities.	*2. Provide subsidies for infill financing.*
a. Investment tax credits are commonly used to spur socially supportive activities, such as building affordable housing or investing in historic properties. The document proposes extending this strategy to foster investment in smart growth–infill. To target the proposed credit to need, it would be made available only when an applicant proves that "but for" the credit, the development would not proceed. Proposed New Jersey legislation (S.247, 2004) would make such a tax credit available. Its provisions, which can serve as a model for other states, are summarized in table IV.1. (The proposed New Jersey legislation does not incorporate a "but for" test.) Mississippi (CMS H.B.1704, 2005) has proposed a state income tax credit for developers of residential and mixed-use projects that meet specific smart-growth and green building criteria. See chapter 4 for details.	*a. Provide a specially targeted [state and federal] investment tax credit for smart growth–infill when needed (i.e., "but for" the credit, the smart growth–infill development would not proceed.)*

TABLE IV.1
Proposed New Jersey Smart Growth Tax Credit

Background

S.274, or the Smart Growth Tax Credit Act of 2004 ("the Act"), provides tax incentives against the state corporation business tax (section 5 of P.L.1945, c.162) and the gross income tax for developers and owners who design and build residential and mixed-use developments that meet specific smart-growth and green-building criteria.

The Act was sponsored by Sen. John H. Adler (District 6, Camden) and Sen. Barbara Buono (District 18, Middlesex) and would be administered by the Department of Community Affairs in consultation with the Department of Environmental Protection.

Restrictions

Smart-growth buildings and developments may receive tax credits if they:

1. are located in Planning Areas 1, 2, or 5b as defined by the State Plan, located in centers designated by the State Planning Commission, or located in municipalities or portions of municipalities identified by the New Jersey Office of Smart Growth as being substantially in conformity with the State Plan or smart-growth principles;
2. are served by adequate bus, rail, or ferry transit service;
3. are not located in the Pinelands National Reserve (with some exceptions), in public parkland or within 1,000 feet of any critical habitat site within public parkland, within 300 feet of a wetland, within 100 feet of a critical slope area, within the 100-year floodplain, nor within 1,000 feet of the mean high-water mark for any saltwater body—unless the site is located on a brownfield site or within a highly urbanized area—nor in an area designated as a water supply deficit area in the Statewide Water Supply Plan (with some exceptions);
4. do not require a sanitary-line extension of 1,000 feet or greater, with some exceptions;
5. meet the standards for energy efficiency, building materials, wood use, water efficiency, indoor air quality as defined by the act.

Schedule of Credits

Under the proposed legislation, a taxpayer may apply for a credit for allowable costs paid or incurred from the construction or rehabilitation of a smart-growth development. The Department of Community Affairs can grant each eligible taxpayer a credit of up to $20 million for the first fiscal year and up to $50 million in the next six fiscal years.

Taxpayers receive credits according to the following schedule:

1. 4.0 percent of allowable costs
2. 0.5 percent, 1.0 percent, 1.5 percent, or 2.0 percent of allowable costs attributable to buildings—but not to other site improvements—qualifying as certified, silver, gold, or platinum status, respectively, under the LEED Green Building Rating System or the LEED Residential Green Building Rating System
3. 0.5 percent of allowable costs for mixed-use developments
4. 0.5 percent of allowable costs for developments located on brownfield sites
5. 0.1 percent of allowable costs for developments in which less than 10 percent of the land, not including shared open spaces, is devoted to parking areas, garages, and driveways
6. 0.1% of allowable costs for developments that secure municipal variances permitting a reduction of at least 50 percent in the number of parking spaces normally required by the applicable local zoning

codes and that are built in accordance with such variables;

7. Up to 2.4 percent of allowable costs for developments with higher-than-required residential density levels, as shown in table IV.1.a:

TABLE IV.1.a
Additional Tax Credit Allowed by Dwelling Units per Residential Acre

Dwelling Units per Residential Acre	Multiplier Value	Additional Credit, as Percentage of Allowable Costs
7–10	.05	0.2%
11–17	.10	0.4%
18–29	.30	1.2%
30–39	.50	2.0%
40 or more	.60	2.4%

8. Up to 1.4 percent of allowable costs for developments with higher-than-required levels of transit service, as measured by the number of cumulative rides available each weekday (table IV.1.b):

TABLE IV.1.b
Additional Tax Credit Allowed by Number of Cumulative Rides Available per Weekday

Number of Cumulative Rides Available per Weekday	Multiplier Value	Additional Credit, as Percentage of Allowable Costs
60–124	.05	0.2%
125–249	.10	0.4%
250–499	.15	0.6%
500–999	.20	0.8%
1,000 or more	.35	1.4%

b. The LIHTC is a major subsidy for affordable housing. From 1987 through 2003, the LIHTC nationally allocated $6.3 billion for federal tax credits granted for the production of about 1.4 million housing units. The LIHTC may be used to support infill development (e.g., about 40 percent of units aided involved rehabilitation), and the document attempts to enhance the LIHTC for infill purposes.	*b. Enhance the Low-Income Housing Tax Credit (LIHTC) for infill*
(1) Each state has a QAP with scoring or other selection criteria used in the evaluation of LIHTC project applications. This heavily competitive process is popularly referred to as a "beauty contest." Certain QAP criteria are supportive of infill projects and should be considered. These include points for specifically identified infill developments (California has a variation of this approach); rehabilitation of historic housing; small-scale projects; and location in challenging areas.	*(1) Offer Qualified Allocation Plan (QAP) points—used to score applications for LIHTCs—for affordable-housing projects furthering infill.*
(2) QAP criteria that may penalize applications from affordable projects on infill sites should be avoided. These include the following: (a) lowest cost per unit (i.e., LIHTC housing costs may be less expensive in greenfields than in infill locations), (b) lowest fees and overhead, and (c) "ready to go" projects (i.e., because they are generally more complicated, infill projects may require higher fees and overhead and are not easily "ready to go"). Segregating the LIHTC applications by geographic track (e.g., urban versus suburban) also may inadvertently work to the disadvantage of infill applications because these tend to cluster in the typically more competitive urban pool. Each state should evaluate its QAP criteria with respect to their impact on infill project applications. To make the LIHTC more supportive of infill projects in New Jersey, we recommend (a) adding points for identified smart growth–infill projects, (b) allowing cost-ceiling flexibilities for such projects, and (c) monitoring the geographic tracking to ensure that such slotting is not hurting the selection prospects for smart growth–infill projects. See chapter 4 for details. New Jersey has started to take positive action on this and related fronts. For example, the New Jersey Housing and Mortgage Finance Agency now offers an additional QAP point for green buildings. See section IV.B.3 for further details.	*(2) Remove QAP points that may favor affordable-housing projects furthering sprawl.*
c. To date, the ITC has generated more than $31 billion in investment in the rehabilitation of historic residential and nonresidential income-producing properties. Twenty percent of the ITC projects have involved mixed use, and the program has cumulatively aided about 325,000 housing units; about one-quarter of those are affordable units. The ITC is clearly an important subsidy for infill development, and the document	*c. Enhance the use of the federal historic rehabilitation investment tax credit (ITC) for infill development.*

recommends strategies to enhance its usefulness.	
(1) Only rehabilitation that is "historically certified" (i.e., consistent with the historic character of the building/district, using the Secretary of the Interior Standards as a guide) is eligible for the ITC. That certification is done by the NPS and the SHPOs. To enhance the usefulness of the ITC for furthering infill, the document recommends that the NPS and the SHPOs incorporate flexibility and a broad context in conducting the certification of rehabilitation projects. Examples include allowing contextually sensitive vinyl replacement windows (when the original wood or other window materials cannot be repaired or restored) and permitting minor interior changes when such actions are necessary for economic and other reasons (see chapter 4 for details).	*(1) In administering the federal ITC, the National Park Service (NPS) and State Historic Preservation Offices (SHPOs) should allow for flexibility and a broad context in considering what is historically appropriate rehabilitation in an infill situation.*
(2) The technical amendments, including modifying the basis reduction, the tax-exempt use rules, and the substantial rehabilitation test, are described in detail in chapter 4.	*(2) Adopt technical amendments to the federal ITC to enhance the usefulness of this support for infill projects.*
(3) About 25 states have adopted ITCs that typically "piggyback" on the federal ITC. The specific state provisions vary. The investment tax credit ranges from 10 percent to 50 percent and there are variations in other program characteristics, including required investment amounts and property eligibility requirements. Missouri, for example, offers a 25 percent state ITC for both owner-occupied and income-producing historic properties, and this aid has been quite useful for spurring infill investment in St. Louis, Kansas City, and other urban communities. From 1998 to 2001, $74 million in Missouri state ITCs supported $350 million in total historic rehabilitation. Other states, including New Jersey, should consider this form of assistance for historic preservation and infill purposes.	*(3) Adopt a state historic investment tax credit.*
d. Structured parking is illustrative. While greenfields development can often make do with surface parking, infill development often requires structured parking. (The subject of how much parking is needed is covered later in this document in Section IX.C.) As noted by Bier et al., (2006), setting aside land costs, surface parking has a typical cost of $2,000 to $3,000 per space. Structured parking is much more expensive. Structured parking costs from $15,000 to $25,000 per space above ground and $35,000 to $40,000 per space below ground. As typical parking revenue supports a value of approximately $12,000 to $15,000 per space (Bier et al., 2006, 9), some economic subsidy or creative financing is typically required in the early years of operation until parking occupancy is stabilized and monthly rates have matured. Bier et al. (2006, 32) present a comprehensive parking garage financing "tool box," some of which include public subsidy. For example, New Jersey "tools" for financially realizing structured parking for infill include	*d. Provide public assistance when infrastructure for infill is disproportionately expensive.*

applying Redevelopment Area bonds, Revenue Allocation District revenues, and tapping resources from the New Jersey Enterprise Zone. (See Bier et al. 2006 for details.) 3. Provide tax Credits and Other Incentives for Green Building. As an example, the State of New Jersey has adopted numerous financial incentives for green building. Some of these are intertwined with the financial instruments described above—e.g., the NJ Green Homes Office, through its New Jersey Affordable Green (NJAG) Program works with the New Jersey Housing and Mortgage Finance Agency to offer an additional point for green building and/or solar technologies on the 2006 Low Income Housing Tax Credit (LIHTC) Qualifying Allocation Plan. This extra point provides a valuable incentive for affordable housing developers to build to "premium" green standards. The New Jersey program also offers technical and financial assistance, as well as advocacy and education programs to encourage the use of green technologies in New Jersey's homes. The only statewide affordable housing program in the country, the program is a national model for green affordable housing and has worked to increase the use of innovative green materials and design and building technologies in more than 2,000 affordable homeownership and rental units in New Jersey. Its success has led to rules that will require developers of all affordable housing units within the State of New Jersey to meet minimum green requirements, with the option to receive additional funding to develop a higher threshold of green affordable housing units. The Brownfields program of the Office of Smart Growth, New Jersey Department of Community Affairs, includes green building as a competitive criterion in making awards decisions. Beyond these examples, the Office of Clean Energy of the New Jersey Board of Public Utilities offers among the nation's most generous grants to encourage the use of renewable energy sources in new and existing buildings and to encourage energy efficiency.	*3. Provide incentives for infill fostering "green development."*

Section Five (V) **Property Taxes** As is discussed in chapter 5, smart growth-furthering development, such as infill in cities and older suburbs, may be discouraged because it is precisely such locations that have a higher property tax burden. While the average effective (real or full market value) property tax rate (ETR) in the United States as of 2000 was 1.27 percent (i.e. a $100,000 property paid $1,270 in property taxes), it was 1.31 percent in central cities and 1.10 percent in America's nonmetropolitan locations. Sprawl in the latter locations benefits from an initially lower property tax burden. (It may increase over time as sprawl-necessitated public infrastructure is provided.) The average ETR in New Jersey is much higher (2.38 percent as of 2000) and the average ETR is yet again more burdensome in New Jersey's cities (2.78 percent), for the state's multifamily versus detached housing (2.63 percent versus 2.32 percent), and for New Jersey households with no vehicles (2.65 percent) versus those with three or more vehicles (2.28 percent). Mutifamily and low vehicle households have a higher ETR, because they are disproportionally located in New Jersey's high-ETR urban areas. In short, just the areas and situations most conducive for infill in New Jersey have the highest property tax burden. New Jersey is not alone in this regard; For instance, the average ETR in Maryland as of 2000 was 1.32 percent. The ETR was much higher in Maryland's cities (2.02 percent) and for Maryland's multifamily versus detached housing (1.48 percent versus 1.19 percent). The objective of this section is to provide a property tax environment more supportive of infill.	
A. Effect Public Finance Reform The authors believe that only fundamental public finance reform (PFR) will address the property tax challenge to infill described above (see chapter 5 for more details). 1. The school property tax is typically the largest component of the overall property tax obligation and responsibility to pay for education costs often falls primarily on local taxpayers. School finance reform that would shift more of the responsibility to pay for education from local to state (or regional) levels would relieve the local property tax burden in currently high ETR locations. Litigation in many states, such as Texas, Michigan and New Jersey, has in fact fostered some of the above described change. In New Jersey, for instance, the courts held that the historical reliance on the local property tax to pay for schools violated the state constitutional mandate for a "through and efficient education." While state school aid was subsequently increased, especially in New Jersey's poorest (i.e., "Abbott") school districts, New Jersey still heavily relies on the local property tax to pay for	***A. Effect Public Finance Reform*** *1. Effect state school funding reform to lessen the local property tax burden.*

school and local services. While the property tax in the United States as a whole contributed about 30 cents of every dollar of local revenue, in New Jersey it was 50 cents. More far-reaching public financing reform in New Jersey and other states that would lessen the reliance on the local property tax, especially concerning how schools are funded, is thus a fundamentally important strategy to foster infill. This change could take many forms, such as reducing local school property taxes while increasing the state sales tax (Michigan halved its school ETR through that reform) or other state taxes. A possible New Jersey state constitutional convention may consider these matters in the future (See chapter 5 for details).	
2. While some states (e.g. Connecticut and Colorado) tax vehicles as personal property for the purposes of property taxation, other states (including New Jersey) do not. Imposing a property tax on vehicles offers a number of advantages. First, it would lower the property tax rate on real property, in New Jersey, by about 10 percent. Second, a lowered real property tax burden would further the ability to purchase a home because in considering the housing related costs that are borne by a would-be homebuyer, mortgage underwriters only count the real property tax obligation. About 20,000 additional households in New Jersey could purchase the average single-family detached home sold in that state were real property reduced by 10 percent as a results of taxing vehicles. A third benefit of treating vehicles as property is that such a levy would tax automobile consumption on an annual basis. In New Jersey, a $35,000 SUV would have an annual personal property tax of about $750—if vehicles were subject to property taxation. Since smart growth-infill reduces the need for automobiles, then taxing automobile ownership as personal property would add to the benefit of residing in a smart growth-infill development (see chapter 5 for details).	*2. Subject vehicles to a personal property tax.*
3. This recommendation is yet another example of a public finance reform to encourage infill. In brief, TBS is a mechanism designed to share revenues, often income generated by development, on a regional basis. Such sharing should reduce the infill-challenging high property tax burden in cities and older suburbs. It should also dampen the “local rateables chase” mentality that is antithetical to the regional orientation of smart growth. Besides these general benefits, incorporating specific infill-enhancing measures into the tax base sharing formula would further encourage infill. For example, the share of regional rateables allocated to a local community under TBS could be increased if that community fostered infill. See chapter 5 for details and an example of incorporating a smart growth-enhancing amendment to the TBS in the New Jersey Meadowlands—one of the two jurisdictions nationally (the other is the Twin Cities region in Minnesota) with the longest operating	*3. Encourage tax base sharing (TBS) and incorporate smart growth and infill-enhancing measures in the TBS.*

and most comprehensive TBS systems.	
B. Provide Property Tax Incentives for Infill Many states have enabled local governments to offer property tax incentives to encourage a variety of socially desirable investments ranging from building job-enhancing industrial facilities to historic preservation. To our knowledge, no state authorizes property tax incentives solely on the grounds that a development furthers smart growth-infill purposes; however, smart growth-infill developments could take advantage of more broadly available tax breaks for residential development in economically depressed areas, historic preservation, and the like. New Jersey is illustrative. Much infill development in this state benefits from a long term tax exemption (up to 30 years) and a short term (5 years) exemption available in designated "areas in need of redevelopment" and "areas in need of rehabilitation" respectively. Other states offer similar tax benefits. While the extant tax programs are quite useful, the problem in New Jersey and elsewhere is that the tax provisions may not be sufficiently flexible with respect to *terms* (i.e. greater or lesser property tax reductions for longer or shorter periods might better support infill), *type* of eligible development product (e.g. available for rental but not ownership housing) and *place* (i.e. the benefits are only available in restricted designated locations). To address the above described limitations, the document proposes changes. While the specific revisions are targeted to New Jersey, the basic concepts are applicable to other states. 1. In "Redevelopment" (R) and in "Areas in Need of Rehabilitation" (ANR) a. In New Jersey, as in many other states, property tax relief is often afforded in the form of a payment in lieu of taxes (PILOT) that is less than the nominal property taxes. The current NJ PILOT payment formula, however (a guideline of 15 percent of project revenues or 2 percent of costs) may offer an insufficient property tax reduction in challenging infill situations. The latter might include a "pioneering" infill development in a difficult inner city market. Here, but for a lower PILOT (i.e. an amount less than the 15 percent of revenues or 2 percent of guidelines),	***B. Provide Property Tax Incentives for Infill*** *1. In "Redevelopment" (R) and in "Areas in Need of Rehabilitation" (ANR)* *a. Allow a lower payment in lieu of taxes (PILOT) in R areas [beyond the current guidelines of 15 percent of revenues or 2 percent of costs] if such reduced payment is necessary (i.e. "but for the lower PILOT, the infill project is not viable".)*

the infill project may not be viable, so the document recommends this lower payment. b. This recommendation is prompted by the same logic as discussed in 1.a above. c. The New Jersey Long Term Tax Abatement (LTTA) statue clearly authorizes tax abatements for rental and condominium properties undergoing redevelopment in redevelopment areas. What remains unclear, however, is whether the statute authorizes tax abatement for redevelopment of *fee simple uses,* such as townhouses and single-family dwelling units -- despite the fact that condominiums are essentially a form of fee simple ownership. (This may reflect a vestigial perspective that only rental housing would be offered in redevelopment locations). The document addresses this problem by extending the LTTA to fee simple ownership. 2. Infill can occur outside of R and ANR locations and the designation of such areas can be time consuming and expensive. It would be reasonable to grant tax reduction on such infill projects located outside of R and ANRs when such assistance is necessary. 3. The onset of infill often raises the value of the entire infill site, including portions of the site that will not be used until later phases. If these yet-to-be developed "inventory" portions are assessed at their future anticipated "highest and best use," then the infill developer will be faced with higher carrying costs. By assessing the inventory parcels at their "current use," this problem is mitigated. There is a conceptual precedent for such treatment. A number of states specifically direct local tax assessors to value landmarked historic properties at their "current" and not their theoretical (i.e. if demolished) highest and best use. Similarly, to preserve farmland, such acreage may also be assessed at its current (i.e. undeveloped), rather than its "highest and best use" (i.e. farmland converted to development uses).	*b. In ANR's, allow a longer property tax abatement (than the current 5 years) if this incentive is necessary (i.e. apply the "but for" test)* *c. In R areas, allow a long term tax abatement for fee-simple users, such as townhouses and single-family detached units.* *2. Outside redevelopment (R) and areas in need of rehabilitation (ANR), allow varying levels of PILOTs and abatements for infill projects if these incentives are necessary (i.e. apply the "but for" test).* *3. All areas (in and outside of R and ANR locations). In a phased infill development, assess currently fallow portions of the development site for real taxation purposes at their "current" and not "highest and best use."*
C. Slot Property Tax Revenues for Infill 1. TIF involves a financial separation of a designated area (TIF district) within a unit of government where some form of development or redevelopment is about to occur. By designating a TIF district, the property tax assessments in the district prior to the improvement are frozen; after these property valuations increase, the incremental tax revenues to the local jurisdictions are captured to help aid the project. TIF is commonly used to fund infrastructure improvements, brownfields cleanup, extension of below market rate financing,	***C. Slot Property Tax Revenues for Infill*** *1. Authorize tax increment financing (TIF) to assist infill.*

and for other purposes that can assist an infill development. A TIF may be termed in various ways. New Jersey recently authorized "revenue allocation financing," which is this state's version of a TIF.	
2. This strategy is a variation of a TIF and works as follows. a. A PILOT between the developer and the host public jurisdiction is determined following the statutory formula (e.g. in New Jersey 15 percent of revenues or 2 percent of costs). b. Instead of all the PILOT moneys going to the host public jurisdiction, the developer keeps a share to fund infrastructure, cleanup, and other extraordinary costs. This sharing arrangement is maintained for the duration of the PILOT (e.g. in New Jersey up to 30 years) and the PILOT payments are made over this period by the renters and owners residing in the infill project. The developer-directed share of PILOT payments over the PILOT period can be securitized as a means to finance the project or to make up for project economic shortfalls (e.g. cleanup costs exceed the value of the land).	*2. Allow developer sharing of Payments in Lieu of Taxes (PILOT) if such revenue is necessary (i.e. "but for" the PILOT-shared revenues, the infill project is not viable).*
3. The basis for this recommendation is as follows. State intergovernmental aid, such as support for local education, is typically granted inversely to local wealth: poorer communities get more and their wealthier counterparts receive less. State school aid may be granted according to the local equalized property valuation per pupil (EVPP); a poor district with a low EVPP would receive greater state aid. This arrangement has a bearing on the intergovernmental aid consequences from an infill project. A large infill development sited in a poor community can so increase that community's affluence (e.g. its EVPP) that the jurisdiction can suffer a sudden and dramatic reduction in intergovernmental support. A number of billion dollar infill projects in New Jersey's poorest cities and "Abbott" school districts (e.g. Camden and Perth Amboy, NJ) could have the above described effect (see chapter 5 for details.) While such intergovermental aid adjustment makes sense in the long run, and in fact infill is slotted to inner cities and older suburbs precisely to improve their economic fortunes, in the short run an infill-induced dramatic loss in intergovernmental support is disruptive. To avoid this situation, the document proposes a staggered and modulated adjustment in intergovernmental aid.	*3. To cushion the possible reduction in state intergovernmental aid as a result of infill development, that reduction should be capped [at 20 percent] through use of a "hold harmless" provision and/or should be phased in over a [five] year period.*

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Section Six (VI)
Procedure

A. Purpose

To encourage smart growth, including infill, this section presents procedures that provide expeditious yet thorough review of such development applications (see also chapter 6). Delay is costly to both the developer and the host community, yet a through review is important for all parties concerned. The procedures specified here are intended to provide a framework for the rational review of infill developments.

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Section Six (VI)
Procedure

A. Purpose

The purpose of this section is to establish the procedure for planning and zoning board review and action on applications for infill projects. The procedure is intended to provide orderly and expeditious processing of such applications.

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B. Pre-Application

The objective of both a pre-application conference and concept plan presentation is to foster informal plan review between the applicant and the municipality (or other review jurisdiction). A pre-application conference is envisioned as a forum for the technical staffs of both the developer and the municipality to meet informally; the concept plan presentation is a forum for an informal presentation to the planning board.

The model document makes both the pre-application conference and concept plan optional on the part of the applicant. A concept plan may not be appropriate for routine or minor applications, but an informal meeting in the form of a pre-application conference is generally encouraged.

The conduct of a pre-application conference and a concept plan presentation should reflect their purpose—informal review and exchange. Requiring a formal and detailed format would defeat the intended function and add to the length and expense of the review process. No one is served by repeated, nearly identical presentations of pre-applications, concept plan, preliminary approval, and final approval.

1. Pre-application conference

a. and b. The informal presentation provides an invaluable forum for eliciting reactions from the jurisdiction's planner, engineer, and other professionals.

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B. Pre-Application

For the purpose of expediting applications, the developer may request a pre-application conference and/or concept plan review in accordance with the following requirements:

1. Pre-application conference

a. At the request of the applicant, the planning board shall authorize a pre-application conference.

b. The pre-application conference shall allow the applicant to meet with appropriate government representatives. These individuals, who shall be designated by the [mayor and governing body/the planning board/other] may include:

(1) [municipal/county] engineer;
(2) [municipal/county] planner;
(3) [municipal/county] construction officer and zoning officer;
(4 representative(s) from the planning board and the board of adjustment;
(5) representative(s) from a local green building organization, from historic preservation and other commissions, and from other organizations, as deemed appropriate;
(6) subdivision and site plan committee representative(s) if this committee is established;
(7) any other representative(s) invited by the

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c. The purpose of the meeting is defeated if the technical staff does not have the preliminary plat and other conceptual plans far enough in advance to study them. d. A written summary is useful for clarifying the results of the discussion. e. This underscores the function of the pre-application conference and concept plan presentation—informal review rather than final decision-making and the conferring of rights. 2. Concept plan See Pre-Application Conference section.	*planning board chairperson.* *c. Applicants seeking a pre-application conference shall submit the information stipulated in Section X of this document [10] days prior to the pre-application conference.* *d. If requested and paid for by the applicant, a brief written summary of the pre-application conference shall be provided within [10] working days of the final meeting.* *e. The applicant shall not be bound by the determination of the pre-application conference, nor shall the planning board or subdivision and site plan committee be bound by any such review.* *2. Concept plan* *a. In addition or as an alternative to the pre-application conference, at the request of the applicant of an infill project, the planning board or the subdivision and site plan committee shall grant an informal review of a concept plan for a development for which the applicant intends to prepare and submit an application for development.* *b. The purpose of the concept plan is to provide planning board or subdivision and site plan committee input in the formative stages of subdivision and site plan design.* *Applicants seeking concept plan informal review shall submit the items stipulated in Section X of this document [10] days before the concept plan meeting. These items provide the applicant and planning board or subdivision and site plan committee with an opportunity to discuss the development proposal in its formative stages.* *c. If requested and paid for by the applicant, a brief written summary of the concept plan review shall be provided within [10] working days of the final meeting.* *d. The applicant shall not be bound by any concept plan for which review is requested, nor shall the planning board or subdivision and site plan committee be bound by any such review.*
C. Application 1. Assignment However clearly statutes are written, it is not uncommon for uncertainty to arise concerning the proper board to be approached and the appropriate procedure to follow. This is an issue which can be discussed at the pre-application conference. To provide further clarification, the document allows for assistance on this matter by the administrative officer.	***C. Application*** *1. Assignment* *The applicant shall have the option of seeking the direction of the administrative officer as to which approvals are required and the appropriate board for hearing same, or of filing an application and proceeding before the board which the applicant believes to be appropriate. The administrative official's determination shall be presumed to be correct. The following applications may be filed:* *a. exempt subdivision* *b. minor subdivision* *c. major subdivision* *d. minor site plan* *e. major site plan* *f. general development plan* *(Note: Certain applications may involve a combination of actions.)* *2. Content*

2. Content The checklist in Section X is for general application; the list of documents to be submitted should be reviewed on a case-by-case basis to determine which submissions are appropriate. Section X allows for such flexibility. It provides that "in specific cases and for documented reasons, the approving authority may waive the submission of a particular document."	*An application for development shall include the items specified in Section X of this document which constitutes a checklist of items to be submitted for subdivision and site plan review.*
3. Complete Application As with other provisions concerning procedure, governing state statutes should be checked. Where state law does not specify whether the planning board or administrative officer determines completeness, then the choice should be made on the basis of local conditions. Is the board "detail oriented," in which case it should be assigned responsibility? On the other hand, where the board is facing a heavy volume of applications, then the determination of completeness should perhaps best be left to the administrative officer. On another note, the indicated time periods for completion are designed to foster movement in the administrative flow; an applicant should be able to obtain a response within a reasonable period of time. Yet, time limits should be adequate for proper consideration by the municipal planning, engineering, and other review staff. It is also important that the institution of time limits not be thwarted by applicants being asked, as a matter of course, to waive this right. The length of the time periods should be workable and adhered to.	*3. Complete Application* *A subdivision and site plan application shall be complete for purposes of commencing the applicable time period for action when so certified by the [administrative officer/planning board]. In the event such certification of the application is not made within [45] days of the date of its submission, the application shall be deemed complete upon the expiration of the [45]-day period for purposes of commencing the applicable time period unless (1) the application lacks information indicated on the checklist of items to be submitted specified in Section X and provided in writing to the applicant, and (2) the [administrative officer/planning board] has notified the applicant, in writing, of the deficiencies in the application within [45] days of submission of the application. The planning board may subsequently require correction of any information found to be in error and submission of additional information not specified in the ordinance, as is reasonably necessary to make an informed decision. The application shall not be deemed incomplete for lack of any such additional information or any revisions in the accompanying documents so required by the planning board.*

D. Minor Subdivision and Minor Site Plan Procedure	***D. Minor Subdivision and Minor Site Plan Procedure***
The document does not define what is a "minor" versus a "major" application. The distinction may be stipulated in the state statute. Where it is not, then a local definition, sensitive to local conditions, should rule. What is a significant development in a small community will often be viewed as minor in a larger jurisdiction.	
1. The concept of time limits, incorporated with respect to the completeness of an application, is found here as well concerning the action on the application.	*1. Any applicant requesting approval of a proposed minor subdivision or minor site plan as defined in this ordinance shall submit to the administrative officer [ ] copies of the items required in Section X of this document, together with an executed application form, the prescribed fee, and evidence that no taxes or assessments are outstanding against the property.*
2. and 4. These provisions incorporate a middle ground with respect to the powers of the subdivision and site plan committee versus those of the full planning board. If the former unanimously approves a minor application, then it is sensible to defer to the committee and let its approval stand. Where the committee itself disagrees, then the matter should be referred to the board. Again, as with other procedural provisions, possible state statutory stipulations should be checked.	*2. The application shall be declared complete or incomplete within a [45]-day period from the date of its submission according to the provisions of Section VI.C.3, of this document.*
	3. If the subdivision or site plan is unanimously approved with at least [ ] members of the subdivision and site plan committee present and voting (only those who are members or alternates of the board having jurisdiction to act, may vote), no further action shall be required of the planning board as a whole. If the vote is not unanimous, or if such committee has not been established, the minor subdivision or site plan shall be referred to the planning board. If a variance within the jurisdiction of the planning board is requested, the subdivision or site plan shall not be referred to the committee but instead to the planning board as a whole.
	4. The action of the subdivision and site plan committee or the planning board under this article must be taken within [45] days, or [90] days if a variance is involved, of a complete application as defined in Section VI C.3 of this document, or within such further time as is agreed to by the subdivider and the board. Failure of the planning board or committee to act within the period prescribed shall constitute minor subdivision or site plan approval and a certificate of the administrative officer as to the failure of the planning board or committee to act shall be issued on request of the applicant.
5. The specific endorsements, plat details, and related requirements will often be indicated in state statute.	*5. Approval of a minor subdivision shall expire [90] days from the date of approval unless within such period a plat in conformity with such approval and the provisions of [map filing law/other regulations] or a deed clearly describing the approved minor subdivision is filed by the*

	developer with [specify agency/ individuals]. Any such plat or deed accepted for such filing shall have been signed by the chairperson and secretary of the planning board. The planning board may for good cause shown, extend the period for recording for an additional period not to exceed [ ] days from the date of signing of the plat.
6. On the one hand, an applicant should be able to expect that the conditions of approval will continue to prevail for a reasonable period of time. On the other hand, the municipality or county should not be locked into an agreement for an indefinite period of time, as conditions and the sense of development direction change over time. The provisions in the document attempt to balance these two concerns	*6. The zoning requirements and general terms and conditions, whether conditional or otherwise, upon which minor subdivision and site plan approval was granted, shall not be changed for a period of [two years] after the date of minor subdivision and site plan approval.*

E. Major Subdivisions and Site Plan

1. General Development Plan

The General Development Plan (GDP) is a mechanism usually designed to permit the developer of a large-scale project (e.g. in New Jersey, a minimum of 100 acres) to go before the planning board with a description, but not full engineering details of the project, and secure formal approval of basic development parameters such as the total number of residential units and nonresidential square footage. Once having secured such approval, the developer proceeds with full engineering plans to be considered at the preliminary subdivision and site plan review stages.

The GDP offers economies to the developer. It is a wasteful outlay to prepare full engineering details on a major project before basic project parameters are settled upon. There is also a benefit to the host jurisdiction: the GDP permits review of project fundamentals which are sometimes lost in the details of the project engineering and planning which accompany preliminary major sub-division and site plan review. Similarly, the GDP can offer a point in the project timeline for any LEED-based initiatives to be discussed. It is beneficial for developers to implement sustainable design elements in the project before investing in full engineering and architectural details.

a. While infill projects may not be "large," (e.g. in New Jersey, less than 100 acres), they are often sufficiently complex so that it is not productive to commence the process with the level of detail required for preliminary subdivision and site plan approval. The document therefore allows the flexibility of GDP for designated infill projects.

b. A balance is especially critical with respect to the GDP submission items; the project should be adequately described, yet excessive detail is to be avoided.

c. A period of three to six years is recommended for the infill GDP designation. This period is shorter than the longer approval extended (e.g. 15 years in N.J.) to general large scale GDPs.

E. Major Subdivisions and Site Plan

1. General Development Plan

a. Applicants of infill developments shall have the option of bifurcating preliminary approval into two phases: Phase One – General Development Plan, and Phase Two – Preliminary Approval.

b. An applicant requesting General Development Plan approval shall first submit to the administrative officer of the planning board [ ] copies of the materials stipulated in Section X of this ordinance.

c. Phase One-General Development Plan, shall confer upon the applicant the following rights for a period of [at least 3 years but not exceeding 6 years]:

(1) The total number of residential dwelling units, and the general type (single-family detached residences, townhouses, garden apartments, etc).

(2) The amount and type of non-residential gross floor area, i.e., commercial, office, institutional, industrial.

The planning board shall indicated the following, which shall not vest, but still be presumed to be valid at Phase Two – Preliminary Approval, subject to engineering and environmental considerations:

- *The location of the collector roads.*
- *The general location of the different uses and density by land-use area.*

2. Preliminary Approval Of Major Subdivision and Site Plans a. and c. While the subdivision and site plan committee can-not act on major applications, it can serve an invaluable role by reviewing, commenting on, and making recommendations on applications. b. and d. Any time period is difficult to specify (i.e., 30 versus 45 days) and, moreover, may be already governed by state law. Where local specification of time limits is permitted, the time period should be formulated on the basis of functional considerations. For instance, the document provides for a longer review period for larger subdivision and site plans. Similarly, where a variance is involved, and additional deliberation is necessary, then the nominal time span for official response is extended.	• *2. Preliminary Approval Of Major Subdivision and Site Plans, Including Building Orientation on Site and Impervious Surface Calculations* *a. Following approval of the General Development Plan (or if the applicant does not choose to seek General Development Plan approval), the applicant seeking preliminary major subdivision or preliminary major site plan approval shall submit to the administrative officer of the planning board [] copies of the materials stipulated in Section X of this document.* *b. The application shall be declared complete within a [45]-day period from the date of its submission according to the provisions of, Section VI. C.3, of this document.* *c. The subdivision and site plan committee, if established, shall review the application and shall comment and make recommendations to the planning board.* *d. A complete application for a major subdivision or site plan of fewer than [lots/acres/units] shall be acted upon within [45] days of the date of such submission, or [90] days if a variance is required, or within such further time as may be consented to by the developer. A major subdivision or site plan of more than [lots/acres/units] shall be acted upon within [90] days of the date of such submission, or [120] days if a variance is required, or within such further time as may be consented to by the developer. Otherwise, the planning board shall be deemed to have granted preliminary subdivision or site plan approval.*
3. Effect Of Preliminary Approval of Major Subdivisions and Site Plans a. Given the more significant nature of a major versus minor application, a slightly longer protective time period—three versus two years—is conferred. b. Not uncommonly, a major approved application will be developed in stages. c. and d. Again, these provisions attempt to strike a balance between the need of an applicant for time extensions because of market, financing, and other factors and the right of a community not to be locked into approvals which have not been acted upon for a long period of time.	*3. Effect of Preliminary Approval of Major Subdivisions and Site Plans* *Preliminary approval of a major subdivision and site plan shall confer upon the applicant the following rights for a [3]-year period from the date of the preliminary approval:* *a. That the general terms and conditions on which preliminary approval was granted shall not be changed.* *b. That the applicant may submit for final approval on or before the expiration date of preliminary approval the whole, or a section, or sections of the preliminary subdivision plat or site plan, as the case may be; and* *c. That the applicant may apply for and the planning board may grant extension on such preliminary approval for additional periods of at least [I] year but not to exceed a total extension of [2] years.* *d. In the case of a subdivision or site plan of more than [lots/acres/units], the planning board may grant the rights referred to in Subsections a., b., and c. above for such period of time longer than*

	[3] years as shall be determined by the planning board to be reasonable.
4. Final Approval of Major Subdivisions and Site Plans a. and b. The transition from preliminary to final approval consists mainly of the submission of technical as-built plans, ensuring that infrastructure improvements have been provided or guaranteed, etc. Given the routine nature of the tasks at this stage, the administrative officer can monitor compliance and give approval—where allowed by state law.	*4. Final Approval of Major Subdivisions and Site Plans* *a. An applicant requesting final approval of a proposed major subdivision and site plan shall submit to the administrative officer of the planning board, or other designee, [] copies of the materials specified in Section X of this document. The final plat shall be accompanied by a statement from the [municipal/county] engineer that the [municipality/county] is in receipt of as-built plans showing all streets and utilities in exact location and elevation and identifying those portions already installed and those to be installed, and/or certified in the amount of performance guarantees required to assure completion of those improvements not yet installed.* *b. The application for final subdivision or site plan approval shall be declared complete within a [45]-day period from the date of its submission according to the provisions of Section VI. C.3, of this document.* *c. Final approval shall be granted or denied within [45] days after submission of a complete application to the administrative officer, or other designee, or within such further time as may be consented to by the applicant. Failure of the [administrative officer/planning board] to act within the period prescribed shall constitute final approval, and a certificate of the administrative officer as to the failure of the planning board to act shall be issued on request of the applicant.* *d. Final approval of a major subdivision shall expire [90] days from the date of the signing of the plat by the chairman and secretary of the planning board unless within such period the plat shall have been duly filed by the developer with the [specify agency/individual]. The planning board may for good cause shown, extend the period for recording for an additional period not to exceed [ ] days from the date of signing of the plat.* *e. No subdivision plat shall be accepted for filing by the [specify agency/individual] until it has been approved by the planning board as indicated on the instrument by the signature of the chairperson and secretary of the planning board or a certificate has been issued. The signatures of the chairperson and secretary of the planning board shall not be affixed until the developer has posted the required guarantees.*
5. Effect of Final Approval of Major Subdivisions and Site	*5. Effect of Final Approval o Major Subdivisions And Site Plans* *a. The zoning requirements applicable to the preliminary approval granted and all other rights*

Plans See comments with respect to the "Effects of Final Approval," Section VI. D and E, for minor and preliminary major applications.	*conferred upon the developer pursuant to preliminary approval whether conditionally or otherwise shall not be changed for a period of [three] years after the date of final approval.* *b. If the developer has followed the standards prescribed for final approval and in the case of a subdivision has duly recorded the plat, the planning board may extend such period of protection for extensions of [one] year, but not to exceed [three] extensions.* *c. In the case of a subdivision or site plan of more than [lots/acres/units], the planning board may grant the rights referred to in Subsections a. and b. above for such period of time, longer than [3] years, as shall be determined by the planning board to be reasonable.*
F. Provide Expedited Processing and Reduced Fees 1. Fast Tracking a. Infill development can be costly, time-consuming, and complicated (see chapters 3 and 4). Procedural delays can increase the costs of development and redevelopment and create barriers to the residential and commercial revitalization of potentially valuable infill locations. The intent of the document's fast-tracking language is to move an infill project to the head of the queue. Fast tracking can minimize overall costs by shortening the time required for review, approval and permitting of infill projects. In addition to basing fast tracking solely on infill development, municipalities may also incorporate sustainable design principles into the fast-tracking process. The document purposely does not assign a mandatory period for governmental action on the infill application, such as was incorporated in New Jersey's overall "Fast Track" mechanism (adopted in 2004, but with delayed implementation) because such a fixed deadline is inappropriate. Instead, the model document gives priority to the infill application—it should be considered ahead of other applications but, given the complexity and unique conditions of each development, the review should take as long as is appropriate (the fixed time for a public decision in New Jersey's overall Fast Track program was one of its most controversial features and led to delay in its implementation). 2. Appoint a state ombudsman to facilitate state review of smart growth-infill projects State review of smart growth–infill proposals may sometimes confront delays in obtaining necessary approvals, in part due to the multitude of approvals that are needed and the diverse perspectives held by different state offices For example, remediating a brownfields may raise water quality and wetlands	***F. Provide Expedited Processing and Reduced Fees*** *1. Fast Tracking* *a. Infill development will receive expedited review and approval at all governmental levels federal, state, regional, county, and local.* *2. Appoint a state ombudsman to facilitate state review of smart growth-infill projects*

issues. Should topsoil be preserved, or not? Is impervious concrete "good or bad?" An ombudsman could expedite the review process and would work to have different public agencies adopt parallel standards. New Jersey already has a smart growth ombudsman who could serve this role. 3. Reduced Fees a. This provision of the document reducing the fees on infill proposals parallels the fast-tracking of such proposals. Both provisions are designed as incentives for infill projects.	*3. Reduced Fees* *a Infill development may be charged reduced fees [or fees may be waived] for governmental review and other services.*
G. Enhance Development Impact Assessment of Infill Proposals 1. Impact Assessment Development Impact Assessment (DIA) includes such analyses as traffic, environmental, and demographic impacts. The "standard" multipliers associated with such impact studies, such as the trip generation and average household size-school age children per housing unit may overstate the effects from an infill project since these developments are less auto dependant and attract smaller households with fewer school children. (See chapter 6 for further details.) Applying the "standard," DIA multipliers, as opposed to infill-specific parameters, will thus tend to overstate the actual infill project impacts. 2. The guidelines in table VI.1 reflect fundamental impact fee concepts and procedures such as charging only those capital improvements having a "rational nexus" to the proposed development and crediting a share of the project- generated revenues against the cost of the growth-induced infrastructure. (See chapter 6 for further details.) The document further emphasizes the importance of only using infill-specific data (e.g. lower school children multipliers and generally higher product values) in the calculation of impact fees as these have an important bearing on the calculation of appropriate charges. Through the use of green building methodologies, environmental impacts also may be significantly reduced.	***G. Enhance Development Impact Assessment of Infill Proposals*** *1. Impact Assessment* *The development impact assessment of infill projects should reflect the unique traffic, environmental, demographic and other characteristics of such developments.* *2. Impact fees for off-tract capital improvements imposed on infill developments shall follow the guidelines shown in table VI.1 and should incorporate development impact and project financial characteristics unique to infill.*

TABLE VI.1
Development Exaction Framework, Principles, and Procedures

Framework	*Guiding Principles*	*Operational Procedures*
I. "Rational Nexus" between growth, infrastructure costs, and exactions	1) Linkage between imposed exaction and marginal capital improvement	1a) Exactions cover only planned or necessary improvements. 1b) Exaction must not be used to compensate for existing deficiencies or to upgrade existing standards. 1c) Exaction totals must not exceed facility cost. 1d) Fund segregation.
	2) Proportionality between exaction and benefit	2a) Exactions must be allocated according to facility usage by different types and size development. 2b) Estimates of facility usage (e.g., trip generation tables, and school-age population multipliers) should be most current available, should reflect infill conditions.
II. "Fair Taxation" of growth	3) EQUITY ADJUSTMENT Exaction must reflect the net cost of infrastructure provision engendered by development	3a) Tally all development-generated revenues. 3b) Determine that the share of total revenues assignable to infrastructure financing revenues has been credited. 3c) Subtract this amount (capitalized) from the development-associated infrastructure costs to determine the net assignable development exaction.
	4) FISCAL IMPACT ADJUSTMENT Exaction should reflect the net fiscal impact of development	4a) Determine development-generated operating and infrastructure costs. 4b) Determine development-generated total revenues. 4c) Subtract development-generated total costs from total revenues to yield the net fiscal impact. 4d) Subtract the net fiscal impact (capitalized) from the development-associated infrastructure cost to determine the net assignable development exaction.

Section Seven (VII) *Design*	**Section Seven (VII)** **Design**
A. Objective	***A. Objective***
Section VII presents design guidelines for infill development to be followed in the preparation of the development plan. (See chapter 7 for background and further details.) Because infill development takes place in established areas, its design is particularly important. The challenge in drafting design standards for any kind of development, including infill, is to strike a balance between providing flexibility and affording greater certainty. When design standards are overly prescriptive, they can be unworkable, requiring many variances in order for development to proceed. When design standards are too vague, communities have been disappointed by the poor design of new developments. The design guidelines presented here are intended to help infill development contribute positively to the area in which it is located, to be a flexible tool rather than prescriptive requirements, and to allow a development to respond better to the distinctive character of its surroundings. Better design results when the infill development plan takes into account the larger context of the area, when the architecture respects the neighborhood context, when the infill street façade creates a safe and interactive pedestrian environment, when the project's public amenities enhance the streetscape and common areas, and when vehicular access and parking result in minimal impacts on pedestrian environment. The guidelines establish an orderly process in the design of a site for infill development. Following these guidelines in their logical sequence will help achieve the objective of a plan that reflects developmental and environmental constraints, encourages compatibility between new and existing development, promotes certainty in the marketplace, strengthens the community, provides a functional and visually appealing layout and building arrangement, provides flexibility in site circulation and parking, encourages mass transit usage, and provides for an appropriate level of site development features and details. The guidelines will help the site designer pin-point site problems that need to be addressed and provide direction for adjusting the proposed development to relate better to site constraints. The infill design guidelines are intended to be used by the applicant in development plan preparation, and by the Planning Board (or other reviewing agency) in its review of the plans. The purpose of guidelines is to provide applicants with a development design methodology that, if followed, will help achieve the stated objectives of good infill design. For most infill projects, the applicant will include a team of specialists including a site designer, architect, engineer, landscape architect, traffic engineer, and environmental expert. In a team design effort, the team leader will be responsible for coordinating site design preparation using the design guidelines. The guidelines are organized in logical steps, beginning	*The objective of good infill design is to create a functional and attractive development that strengthens the local community, is aesthetically pleasing, and is sensitive to its surroundings. The following guidelines aim to achieve these goals by providing clear development standards that focus on: (1) site environmental and developmental constraints and opportunities; (2) site use requirements; (3) safe and efficient circulation and parking systems; (4) compatibility between new and existing development; (5) sensitivity to historical and architectural characteristics and;(6) an appropriate level of supporting features such as landscaping, lighting, signage, and street furniture and hardware.* *To achieve these objectives, the infill development plan shall be prepared in accordance with, and shall conform to, the design guidelines enumerated in Section B, below.*

with the gathering (step one) and analysis (step two) of data on all aspects of the site and its surroundings. These analyses are then synthesized in a mapped format that is required for submission with the development plan application. For both the applicant and reviewer, it is most helpful for these steps to be completed and used during the conceptual plan review process. Unless the applicant completes these steps, the application may be ruled incomplete. More importantly, without completion of these steps, the applicant will lack the information needed to create a plan that adequately reflects (1) site environmental and developmental constraints, and (2) area compatibility considerations.

The third step in the design process is to use the data gathered and analyzed in steps one and two to plan the development. This step provides general guidelines for balancing the requirements of the applicant's project (the purpose of the project, building use and size, site access, parking need, and so forth) with the constraints and opportunities identified in steps one and two.

Step four focuses on the circulation system design and parking layout. This step logically follows the establishment, in step three, of site access points, general building parking locations, and the establishment of other major site features. Step four is carried out in conjunction with step five, building arrangement and design.

Step five addresses the three-dimensional arrangement and design of site structures. This is one of the most important steps in achieving a well-integrated development that will prove an asset to the community.

The final step is one of integrating supporting features into the overall plan. Once the arrangement and design of the major elements (circulation, buildings, parking, and open space) are established, the site designer can readily integrate the supporting features of site lighting, signage, trash storage, and landscape treatment. The integration of these features may require the talents of a specialist (landscape architect, lighting consultant). Design guidelines for these features are found in Section XI of the document.

B. Site Selection Criteria

Given that property is zoned for particular uses, it is nevertheless important for the type and size of a proposed infill project to be appropriate for the selected site. The site selection criteria in the document address some of the issues that must be considered in determining if a potential site is suitable for the proposed infill project.

B. Site Selection Criteria

The choice of site for an infill development should be based on the assessment criteria outlined below. Considerable importance should be given to the process of ensuring that a site is appropriate for the proposed infill development or redevelopment project.

1. Context. Infill site locations should be evaluated in terms of how the intended use for the site relates to surrounding land uses, existing and proposed.

2. Accessibility. The evaluation of infill site locations should take into account site accessibility with respect to pedestrian travel, public

C. Design Guidelines

1. *Site analysis.* Once a site has been selected, the first step in infill development design is an assessment of the existing environmental and developmental site features and constraints. This step is documented with a required submission providing a summary of findings that is helpful to the reviewing agency as well as the site designer.

Each infill site is, of course, unique, and infill developments vary greatly. Accordingly, the type and volume of data will vary depending on the type of development, size and nature of the site, and available resources. A listing of the data to be gathered, how it is to be evaluated and reference material to be consulted is provided in chapter 7 of this study.

By identifying at an early stage in the site design process those features of a site that pose environmental and developmental constraints as well as opportunities, the potential for infill that is sensitive to these unique conditions is greatly enhanced. Further, these very same considerations are key to green building as well.

2. *Area context.* Contextual considerations are often overlooked or omitted in the preparation of site and development plans. Yet, harmonious visual and functional integration between the existing environment and the proposed infill development is important to continuing the surrounding character.

Completion of this step will provide the site designer with all of the relevant data on the area surrounding the site. As with the previous site analysis step, the amount and detail of the data required here will vary greatly, and no data should be collected

transportation, and vehicular traffic.

3. Physical Opportunities and Constraints. Selection of a site for infill development should consider the physical advantages of the site while addressing its constraints.

C. Design Guidelines

1. Site analysis. An analysis of the infill site shall identify opportunities and constraints posed by environmental and developmental features. Relevant factors include, but are not limited to, the following:

a. Geology and soils. Identify significant rock outcroppings, soil types and capability; ground water depth; and depth to bedrock.

b. Topography and drainage. Identify steep slope areas (between 15% and 25%); patterns of surface drainage; stream corridors and water bodies; areas of flood hazard; and wetlands.

c. Climate. Identify local conditions, such as summer and winter solar orientation, prevailing wind patterns, and frost pockets.

d. Vegetation and wildlife. Identify and locate all vegetation; the size and species of all specimen plants; the size and species of all trees over ten (10) inches in diameter; and site wildlife and habitats, if applicable.

e. Man-made development. Identify and locate all existing structures, open lots, utilities and areas for improvement, structural and visual; historic and archaeological features or landmarks; public rights-of-way; easements and other similar features.

f. Visual features. Identify site-specific positive visual features such as scenic drives and vistas, focal points, landmarks and significant natural features or site amenities; and negative visual features such as overhead wiring, views to adjacent unattractive areas, and similar problem conditions.

g. Environmental conditions. Identify the presence of brownfields, industrial pollution, and related areas of contamination.

2. Area context. A contextual analysis shall be made of the immediate area surrounding the infill site [a variable radius is recommended], and shall include, but not be limited to, the following information:*

a. Land uses and structures. Identify and locate all adjacent land uses; all significant structures, including their size, height, and materials; and all woodland, open spaces, and parking areas.

b. Zoning and local and regional master plan

unless it has some value in the site design process. 3. Site Development This step provides general design guidelines for preparing the plan for infill development. These guidelines offer direction in how the infill development project should be shaped to respect site and area conditions. They also serve as a checklist for both the applicant and the reviewing agency to consider in meeting infill development design objectives. More specific design standards are found in later sections of the document (Section XI). In addition, the USGBC LEED-ND guidelines contain many useful standards for site development, some of which are incorporated here. For an overview of all proposed LEED-ND standards, see table 7.1 in chapter 7.	*proposals. Indicate site perimeter zoning and identify significant local and regional master plan proposals affecting the site and area, such as road improvement proposals, traffic management plans, open space plans, urban design plans, and so forth.* *c. Utilities available to site and area. Identify and locate all existing utilities in the area and serving the site; include utility easements and rights-of-way, both on- and off-site.* *d. Area circulation systems and site access. Identify and locate all existing systems for all modes of transportation, both on-site and in the surrounding area; identify the most appropriate points of site access in terms of area conditions. The analysis should include bicycle and pedestrian circulation systems as well as existing public transit service, planned service, and potential service for the future.* e. *Community facilities and services. Identify and locate all public and semi-public facilities and services in the area that serve the development site, including street furniture, crossing signals, lighting, and signage. Potential linkages with activities adjacent to the site and in the larger surrounding area should be highlighted. Open spaces, pedestrian connections, shared parking, and other facilities should also be identified.* *f. Visual Features. Identify significant positive and negative visual features, similar to those identified in the site analysis, in the area surrounding the development site that may have an impact on the site. If the site is located in an area of historical interest, a study of the historical context of the site should be included* *g. Environmental Conditions. Identify and locate brownfields, industrial areas, and similar locations of possible contamination in the area that may affect the development.* *h. Site Context Map. The completed site analysis shall be included with the proposed site development plans. A single contextual features map, summarizing analysis findings from the site and area context analyses, is required.* *3. Site Development.* *Infill developments shall conform to all applicable provisions of the jurisdiction's Land Development Ordinance and the following guidelines:* *a. Infill development shall reflect the findings of the site analysis in Section VII.C.1, above, insofar as is practicable, as follows:* *(1) The developmental constraints of site geology and soils, as applicable to the type of infill development proposed, shall be addressed* *(2) Site design shall minimize topographic*

	modifications, and those required shall not be disruptive to the site or adjacent areas. Site drainage shall avoid methods that require extensive site disruption or are inconsistent with area drainage patterns. (3) *Building orientation shall, as appropriate, consider the advantages of passive solar use, wind protection, building shade, and related microclimate design factors.* (4) *Site landscape shall be preserved in its natural state, insofar as is practicable, by minimizing vegetation and soil removal.* (5) *Where existing site development is to be retained, it shall be appropriately incorporated into the proposed infill design in terms of pedestrian linkages and vehicular access; building massing and scale relationships; use of materials and building design; landscaping; and utilities.* (6) *Distinctive existing visual features, such as view corridors, tree stands, water bodies, land form, and historic and/or architectural landmarks, shall be preserved and incorporated into the infill site design. Good site design will respect, and where possible enhance, the positive visual features of a site, and will work to mitigate any negative features.* *b. Infill development shall reflect the findings of the contextual analysis in Section VII.C.2, above, insofar as is practicable, as follows:* (1) *Infill development shall, in its arrangement of uses and structures, complement surrounding and adjacent uses and structures. Where conflicts are unavoidable, they shall be mitigated with appropriate techniques, such as, transitional uses and structures; building orientation, shape, or design; landscaping; fencing; etc.* (2) *Infill development shall incorporate, as appropriate, local and regional master plan proposals, and shall not impede the normal and orderly development or improvement of surrounding property.* (3) *Infill development shall consider the area utility infrastructure, in terms of adequacy and efficiency. This may entail, for example, provision for the looping of water lines, the storage of sewage for off-peak hour treatment, the resolution of area storm water management concerns, underground utility linkages, etc.* (4) *Infill development shall include appropriate linkages with area circulation*

4. Site Circulation and Parking

In this step, together with the building arrangement and design step (step five), the project designer tests the conceptual development design layout generated in the site development step. First, the circulation and parking guidelines offered here are addressed; then, the details of specific parking layouts, road widths and placement, and various engineering details are added. Some of this work is trial and error—considering one-way parking systems versus two-way systems, for example, or weighing alternative access and direct access combinations, service and emergency vehicle access alternatives, alternatives for future expansion, and so forth.

Design strategies to accommodate mass transit and pedestrian linkages are also included under this step. Strategies related to structures can be found in the section that follows, "Building Arrangement and Design."

systems, including pedestrian access and public transit service, and shall consider area systems in developing safe and efficient site access points.

(5) *Infill development shall consider the proximity and capacity of applicable area community facilities and services. This consideration may include the linkage of open spaces, pedestrian connections, the sharing of parking and other facilities, and the inclusion of needed area facilities within the proposed infill development.*

(6) *Infill development shall not detract from any desirable area visual characteristics or features and, where appropriate, shall incorporate such features into proposed infill site designs*

(7) *Infill development shall incorporate the following elements to enhance the compatibility with the surrounding community:*
- *Sidewalks that connect with the existing sidewalk network*
- *Public streets that connect with the existing street network*
- *Preservation of architecturally significant structures whenever feasible*
- *Street furniture, lighting, and landscaping that is primarily oriented to pedestrian use*
- *Setbacks, building envelopes, use, and parking compatible with surrounding community.*

4. Site Circulation and Parking

The circulation and parking design for the infill site shall accommodate all appropriate modes of transportation, such as pedestrian, bicycle, automobile, delivery and service vehicles, emergency vehicles, and taxis and buses, to form a compatible, integrated circulation system. Larger sites may require separate circulation systems for some modes of transportation. To minimize vehicular congestion, air pollution, and other adverse environmental effects, mass transit, bicycle, and pedestrian linkages and usage shall be encouraged. Where mass transit is present, the guidelines contained in Section C.4.b, below, shall apply. Site circulation design needs for infill development vary considerably with the site uses involved. Some general design guidelines that apply to most uses are as follows:

a. Vehicular traffic

(1) *Safe site access should be provided.*

(2) *Where applicable, an internal street*

	hierarchy from local to more major streets should be established for large infill projects to create an efficient circulation pattern (see section IX). Direct, efficient routes through the site are advised (see section IX). *(3) The inter-connection of sites should be encouraged so as to reduce vehicular traffic.* *b. Public transportation/mass transit* *(1) Where applicable, internal road improvements should be designed to handle public transportation vehicles.* *(2) Transit routes on the major roadways that serve the main entrances of buildings should be included to facilitate efficient access to the site.* *(3) Well-defined pathways to streets with transit facilities should be provided, and transit stops should be treated as an important part of the design.* *c. Pedestrian and bicycle mobility* *(1) Pedestrian routes should be provided along streets adjacent to the site and, if applicable, within the site to promote pedestrian travel through the site and to and from adjacent uses.* *(2) Pedestrian routes should be designed to be direct and to minimize unnecessary meandering.* *(3) Shortcuts that permit access through long midblocks should be provided to increase flexibility for foot travelers.* *(4) Pedestrian routes to public transportation linkages should be provided and marked.* *(5) Bikeways linking facilities on the site and providing access to adjacent uses should be encouraged.* *d. Parking* *(1) Parking should be located on the street, or to the sides or in back of buildings so that pedestrians or public transit users are not required to walk through large parking lots to reach building entrances.* *(2) Parking areas should provide safe access to and from the vehicle for the driver and passengers.* *(3) Parking lots should be screened and landscaped; and very large lots should be organized into smaller units, separated by walkways and landscaping. Landscaping and fencing should not, however, create barriers for pedestrians or transit users, and especially for disabled pedestrians.* *(4) The number of parking spaces should be limited to the lowest possible number to accommodate vehicular usage, while the*

design should allow for future expansion of parking facilities where appropriate (see also section IX).

(5) The design of parking lots is further an opportunity to address wastewater management with consideration to impervious parking surfaces and runoff.

5. Building Arrangement and Design

The intent of this step is to ensure that the building design and layout in infill projects give appropriate consideration to the existing natural and built environment in which the development is to be located. It is not the intent of these guidelines to require a particular architectural style, nor to constrain the creativity of a designer.

The guidelines offer rather broad direction for the site designer to use in the arrangement of buildings on the site, selection of building materials and other design elements, weather orientation, and the design of building additions. These guidelines are applicable to any area and to historic or other special design districts. In the case of historic or special design districts, however, more specific building design standards may apply depending on the requirements of the particular district (see section XI-4).

It should be noted that many land use issues, such as the mixing of uses and scale (i.e. density) of development, are set forth in a community's master plan, zoning ordinance, and related land use documents and regulations other than the infill development plan ordinance. Further, design is considered at different points in the land use review process, for example, at the concept plan stage. In evaluating the overall design concept of an infill project, these documents and proceedings should be taken into consideration as well. The guidelines in this document reflect some of these other land use issues as they relate to overall project design.

a. Overall design concept

(1) In general, infill building design should be consistent with the design of significant buildings that already exist in the adjacent vicinity.

(2) New buildings should strive for a contextual approach to design. A contextual design approach does not mean that new buildings should imitate older buildings, but rather that they should be sensitive to the surrounding built and natural environment.

(3) Research shows that bringing together mixed uses,

5. Building Arrangement and Design

a. Overall design concept

(1) All new infill buildings should be related harmoniously to the terrain (natural features) and to existing buildings and other substantial structures in the vicinity that have a visual relationship to the proposed infill building(s). The achievement of such relationship may include the enclosure of space in conjunction with other existing or proposed buildings and/or the creation of focal points with respect to avenues of approach, terrain features, or other buildings.

(2) Each building in the infill development should be designed to form a part of the larger composition of the area within which it is located.

(3) Where appropriate, infill developments should contribute to a mix of uses (office,

such as residential, office, and retail, encourages walking, mass transit use, and ridesharing. (4) Other infill strategies can foster mass transit use and pedestrian linkages (i.e., transit-oriented development). Examples include: (a) clustering of land uses to encourage pedestrian access to an infill development while shortening walking distances; (b) designing building and main entrances that are oriented to public transportation to facilitate pedestrian access to a site; (c) providing preferential parking for carpools, vanpools, etc.; and (d) developing at higher densities, which concentrates activities, minimizes travel distances, and helps create a critical mass sufficient to support public transportation services.	*commercial, residential, and service). Where this is not possible on the infill site, the development should contribute to the mix of uses in the adjacent area and should be designed to be within walking distance of adjacent uses.* *(4) Other infill design strategies to foster mass transit and pedestrian linkages are encouraged.*
	b. Building arrangement *(1) All new infill structures (except accessory structures) shall have the primary entrance oriented to the street or public walkway, with direct, barrier-free and convenient pedestrian connections.* *(2) When infill development consists of multiple structures, buildings should be oriented to the street or clustered around a central pedestrian space to facilitate pedestrian access while shortening walking distances.* *(3) Buildings on infill sites should be arranged to reduce the walking distance between each of the buildings as well as services such as transit stops.* *(4) The placement of new infill buildings on a site should take into consideration the natural environment. For example, the design and location of pedestrian areas and plazas, with respect to building orientation, should be based on use in all weather conditions at all times of the year.* *(5) Further detail on building arrangement is found in section VIII.*
c. Building heights are controlled by FAR and setback requirements only (see VIII, Zoning, Section II, Building Heights) but these design guidelines encourage new infill development to respect and fit in with existing development.	*c. Building height and scale* *(1) New buildings on an infill site should provide an appropriate harmonious relationship to existing nearby structures and to the natural environment, in terms of height and scale.* *(2) The height and scale of new buildings should be similar to that of the surrounding area, or articulated or subdivided into massing that is more or less proportional to other structures in the area and maintains the existing architectural rhythm.* *(3) The scale of new infill buildings should be sensitive to pedestrians. Large buildings*

d. and e. The compatibility of new infill buildings may be enhanced by incorporating building styles and details common in the surrounding neighborhood. For example, infill building design should generally relate to surrounding buildings in terms of scale, color, window orientation and proportion, and façade articulation. Negative impacts can be reduced by using building materials that are consistent with the character of nearby buildings. Ideally, as recommended by LEED-ND, materials selection for existing building styles and details will also encourage the use of local building materials, thus requiring less embodied energy in delivering materials to the site.

6. Site Design Details

Well-designed and integrated site details, such as landscaping, lighting, signs, street furniture, and waste storage facilities, can make a significant difference in the visual appeal and functionality of infill development. The consideration of site design details is sometimes omitted or treated as an after-thought. In such cases, the results could be a trash storage area that does not function very well, for example, or is poorly located, or street furniture—benches, trash receptacles, bike racks, and the like—that is uncoordinated in design. In addition, it is important that the site details for new infill projects take into consideration the design of those already existing in the surrounding neighborhood.

The design of site details is another area where communities should determine their vision for their community. Some communities may wish to have infill design details reflect a common theme; other communities may prefer that details complement each other but allow for more diversity. Still other communities may wish to continue the design style of nearby areas. These decisions should be made by the community and the design of site details be worked out with the developer.

should contain design elements for entrance ways, plazas, facades, and general street level design that creates a street frontage that is an attractive and pleasant for pedestrians.

(4) The height and orientation of infill buildings may have to be adjusted in order to maintain a relationship with existing structures or to protect a view corridor. Higher intensity buildings should not cast a shadow line on surrounding areas.

d. Building design elements. The selection of infill building design elements, such as materials, fenestration, color, texture, etc., should ensure that such treatment is harmonious with that prevalent in the area, where such prevalence exists and where such harmony is desirable.

e. Area design features. The incorporation by infill projects of desirable design features in the surrounding area, for example, continuing a particular design feature or statement, is encouraged.

f. Building additions. When an infill project consists of or includes a building addition, the addition should be designed to reflect the existing building in terms of scale, materials, fenestration, and color. A change in scale, for example, may require a transitional design element between the infill addition and the existing building.

6. Site Design Details

A final, but important phase of infill site design is the consideration of site design details. The landscaping, lighting, signage, and accessory features such as street furniture and hardware, trash storage, and mechanical equipment shall be consistent with established norms and compatible with the infill design.

a. Landscaping. The landscape design shall be concerned with the overall arrangement, species selection local to the area, and visual impact of site landscape treatment. Landscaping shall be used to complement building design, to emphasize a formal approach, to form linkages between areas, to help new projects blend into existing development, and to assist in the screening of storage and service areas. (See section XI-3 for further details.).

b. Lighting. The design of lighting standards shall be compatible with building design and take into consideration the design of existing lighting features. (See sections VIII-15 and XI-1 for further details.)

c. Signs. Signs should be designed so that they are compatible with their surroundings and create a positive visual image for the infill project.

	(See section XI-2 for further details).
	d. Street furniture and hardware. These features, which include benches, trash receptacles, phone booths, bike racks, fences, fountains, etc., shall be appropriately considered in site design in terms of need, location, and consistency of design treatment. (See section XI.3.K for further details.)
	e. Trash storage. Exterior trash storage facility design shall reflect site building materials and design, shall accommodate present and projected recycling needs, and shall be appropriately located to serve on-site functional need and screened to lessen visual impact.
	f. Mechanical equipment. Mechanical elements, whether located on the ground or on the rooftop, should not be visible from the public street and should be screened from view with the appropriate materials. Note that it will not always be possible to abide by this provision with regard to rooftop solar arrays.
7. Historic Preservation The design of infill development should respect the design character of surrounding historic areas (see Technical Note to chapter 7). Historic preservation initiatives have been shown to strengthen local economies and real estate values (Pottstown, PA, ordinance; Design and Development: Infill Housing Compatible with Historic Neighborhoods, p. 20). Infill design that is sensitive to the historic and architectural history of an area will differ depending on the district. Local preservation ordinances and historic preservation commissions may provide design guidelines specific to each community. The Secretary of the Interior's Standards for Rehabilitation is a standard guide used by the National Park Service and many other preservation entities. In cases where no design guidelines exist, the design of new infill buildings should reflect the general harmony of style, form, proportion, and materials of buildings of historic design so that historic buildings and historic districts will continue to be a distinctive aspect of the community. Chapter 7 has information on the basic elements featured in a historic preservation ordinance, including general design guidelines.	*7. Historic Preservation* *The preservation and maintenance of the historic character of the surrounding area shall be taken into account in carrying out infill. Local preservation ordinances and historic preservation commissions may provide specific design guidelines in designated areas. In areas where no such guidance exists, the design of new infill development shall be in harmony with the historic and architectural character of the surrounding area (see also chapter 7).*

Section Eight (VIII) **Zoning**	***Section Eight (VIII)*** ***Zoning***

In recent years, many jurisdictions have been grappling with the problem of zoning regulations that prohibit the development of compact, walkable, diverse, mixed-use communities. Conventional ("Euclidean") zoning regulations focus on the separation of uses and maximum densities for each zone, which present obstacles to community revitalization efforts and many infill projects. Efforts to fix Euclidean zoning have led to the adoption of numerous alternative regulatory concepts. These include conditional-use or special-use permits, overlay zoning districts, floating zones, planned unit developments, cluster development, performance standards, incentive zoning, traditional neighborhood development, transit-oriented development, and form-based zoning (see chapter 8).

Section eight of the model ordinance, zoning, proposes creating a distinct infill development district instead of applying a special overlay district superimposed on use-based zoning regulations. This approach avoids confusion and permits a jurisdiction greater flexibility in shaping the kind of development it wants. It assumes that infill development will often entail mixed uses and that incentives to encourage mixed uses will be offered; but single uses are permitted. It emphasizes principles of good design and planning and promotes walkable communities offering a variety of housing types and commercial and civic uses.

The section provides a *general template*: *it includes essential zoning components, and the user can add or drop provisions to simplify the regulations or to create different zoning districts. Similarly, suggested zoning parameters (e.g. FAR) can be modified in order to reflect local conditions and desires.*

The infill zoning section was developed by considering model guides in Maryland and Oregon, including State of Maryland (2001), which contains a model infill ordinance and examples of development guidelines; Otak, Inc. (1999), a handbook on infill and redevelopment prepared for the state of Oregon that contains sample code provisions; and Oregon Transportation and Growth Management Program (2001), which contains a model ordinance.

The infill zoning section also considered exemplary infill and redevelopment projects in the Urban Land Institute's project reference files. This database was enhanced by interviews with the developers associated with these projects and the planning officials from the communities where the projects were located. A partial list of the projects studied include the Yards (Portland, Oregon); Pacific Palace (Seattle, Washington); Stapleton (Denver, Colorado); Buckhead Village (Atlanta, Georgia), the Burnham building (Chicago, Illinois); and Solaire (New York City). The section also drew on the zoning codes and regulations from a wide cross-section of communities (see references).

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A. Infill Development (ID) District

1. This statement of purpose provides a shortened version, or restatement, of the general purposes contained in section one (I) B. of the model ordinance and alerts the reader or user to the fact

A. Infill Development (ID) District

1. Purpose

The purpose of the infill development (ID) district is to provide for complete [neighborhoods

that the permitted uses, the siting standards, and the types of improvements allowed in the Infill Development (ID) District are set forth in this section of the model ordinance.	*/ town centers / main streets / employment centers, etc.] with efficient land use and cost-effective delivery of urban services. The provisions of this section of the document define the uses of land and the siting and character of the improvements allowed on the land in a manner that allows a balanced mix of uses in a pedestrian-friendly environment.*
2. This section makes clear that the provisions contained herein are specific to uses within the infill development (ID) district.	*2. Applicability* *The provisions of this section apply to all lands designated infill development (ID) on the community's official zoning map. All new buildings and all additions, alterations, or repairs to existing buildings exceeding __ percent of the assessed value of the buildings in the ID shall be sited and constructed in accordance with these provisions.*
3a. Applications for ID districts are required to provide information about existing physical conditions on the site and in the immediate area of a proposed infill development. This subsection provides a list of the conditions that must be considered and accounted for in the proposed design of the development and expressed on a detailed site plan.	*3. Development Plan Review* *a. Each application for ID zoning shall be accompanied by a detailed site plan, schematic building elevations, context photos of the site and adjacent properties, and other supporting information indicating the following (see sections VII and X for further requirements and details):* *(1) Locations, uses, heights and floor areas of all buildings.* *(2) Physical relationships to surrounding development.* *(3) Location, amount, character and continuity of open space.* *(4) Protection of desirable views.* *(5) Pedestrian and vehicular access and circulation.* *(6) Landscape plans.* *(7) Location and dimensions of off-street parking and loading.* *(8) Location and dimensions of on-site signage.* *(9) Such other matters as are necessary for plan evaluation with respect to criteria set forth in subsection (b) of this section, below.*
3b. provides a list of objective criteria to be used by the planning director in reviewing the detailed site plan and recommending its approval, denial, or modification. These criteria essentially enable the planning director to consider the application in light of existing conditions and help him/her determine whether the plan meets the stated purposes of the model ordinance, as set forth in section one (I) B.	*b. In reviewing and making recommendations concerning ID zoning requests, the [Director of Planning] shall consider the following criteria:* *(1) Use characteristics of the development, including provision for ground-floor active uses and continuity along street fronts.*

	(2) Preservation of historic buildings and significant features of existing buildings when such buildings are to be renovated. *(3) Vehicular and pedestrian access to the site and circulation within the site.* *(4) Location and adequacy of off-street parking and loading, including the desirability of bicycle parking.* *(5) Traffic generation characteristics of the proposed development in relation to street capacity.* *(6) Location, design, landscaping, and other significant characteristics of open space within the development, and its relation to nearby public and private open spaces.* *(7) Architectural relationships to surrounding buildings, including building siting, massing, proportion, scale, color, fenestration, and façade articulation.* *(8) Microclimate effects of development, including effects on wind velocities and sun exposure.* *(9) Protection of significant views and view corridors.* *(10) Sustainable guidelines to be implemented in new ID projects.* *c. The [Planning Commission] may adopt rules and regulations establishing standards for review of development plans based on the criteria set forth in subsection (b) of this section.*
4. A mix of commercial, residential, and business uses brings people to an infill district at different times and for different reasons, helping to create vitality, attract economic activity, and provide an interesting and enjoyable pedestrian experience. b. An underlying purpose of the model ordinance is to ensure that infill development occurs as part of an overall attempt to facilitate the creation of complete, balanced mixed-use communities. Indeed, section one (I) B. 3. states that a goal of the ordinance is to "create a high quality community environment that is enhanced by a balanced, compact mix of residential, commercial, recreational, open space, employment and institutional uses and building types." The earlier experiences of municipalities that have tried to facilitate mixed-use infill development has demonstrated that the development of nonresidential uses must, as much as possible, coincide with the development and occupancy of residential units; otherwise the result can be an incomplete community of residences with no shopping, no services, and no destinations, pedestrian or	*4. Mixed-Use Developments; Phasing* *a. Mixed-use development is encouraged for infill. A mixed-use development consists of residential and nonresidential uses in the same building or in separate buildings on the same lot. Residential and non-residential uses may be mixed vertically or horizontally. Mixed-use development may include any uses permitted by right, and any approved conditionally. This combination of residential and nonresidential uses should offer opportunities for residents to live and work in the same community.* *b. For mixed-use developments with residential and nonresidential uses in separate buildings, no certificate of occupancy shall be issued for the residential building(s) until a schedule for completion of the nonresidential building(s) is presented to and approved by the [Director of Planning] during the development plan review process, and substantial construction of the nonresidential buildings is building(s) is presented to and approved by the [Director of Planning] during the development plan review process, and substantial construction of the nonresidential buildings is completed.*

otherwise. Therefore, the model infill ordinance mandates that no certificates of occupancy for residential units in mixed-use infill development projects shall be issued until there is an approved schedule for completing the nonresidential portion of the project and not until substantial construction of the nonresidential portion has occurred.	*Substantial construction means that the framing of the exterior walls has been inspected and approved. The same requirement applies to nonresidential buildings in mixed-use developments where residential uses are the first to be occupied.*
5. The basic thrust of this set of regulations is to create a "mini master development plan" for a multi-lot, multi-owner, mixed-use development by treating the development as a single lot. The goal is to ensure that the design and construction of such mixed-use developments proceed as a unified whole relative to aesthetics, signage, pedestrian and vehicular access, building placement and scale, off-street parking and loading, and other requirements and improvements.	*5. Unified Plan for Multiple Lots* *a. A mixed-use development may consist of two or more lots if they are developed under a unified development plan. The plan must be:* *(1) Signed by or on behalf of all of the owners of the property involved;* *(2) Approved by the [Director of Planning] during development plan review; and* *(3) Filed in the deed records of [name of county where the property is located].* *b. When a mixed-use development consists of multiple lots, its development standards and off-street parking and loading requirements shall be calculated by combining the lots and treating them as a single lot.*
6. Infill districts allow a mix of nonresidential and residential uses to create complete neighborhoods, provide housing close to employment and services, encourage pedestrian-scaled development, and promote the economic vitality of the district. In some locations, the mixed uses also serve to provide a transition between existing residential and commercial development.	*6. Permitted Land Uses*
a. As indicated elsewhere, the specific uses in each infill district would be determined locally, taking into account local conditions. This affects the template values in tables VIII.1 through VIII.8.	*a. Table VIII.1 employs general use categories for some types of land uses. A particular use may be determined to be within a general use category if not listed specifically elsewhere in the table and if not determined to be within another general use category. Determination of whether a particular use is included within a general use category shall be made by the [Director of Planning].*
b. The infill development district allows for the designation of subdistricts within the broader ID district. ID1 is the subdistrict (or portion of the ID) with the highest allowed density. By allowing subdistricts, the zoning section incorporates the flexibility to apply regulations to the entire ID district or to modify them for portions (or subdistricts) of it. Allowed uses will vary from community to community (and within ID subdistrict to ID subdistrict), but, generally, uses that provide entertainment or leisure activities, or are shopping destinations are considered desirable in infill districts that seek high levels of pedestrian activity.	*b. Table VIII.1 indicates whether land uses are permitted (P), conditional (C), or not permitted (N) in infill district (ID) subdistricts, ID1, ID2, etc Uses not listed are not permitted in these sub-districts. Permitted uses are uses by right, subject only to the development plan review in Section 3. Conditional uses must be approved by the [Director of Planning] as consistent with the objectives stated in Section I.B.3 of this ordinance.*

TABLE VIII.1 Permitted Uses

	ID1	ID2	ID…
RESIDENTIAL USES			
Single-family detached housing	C	P	
Single-family attached and multifamily housing	P	P	
Group homes, nursing homes, fraternities and sororities, and other congregate living facilities	P	P	
Live/work units	P	P	
LODGING			
Hotels, motels, and bed and breakfasts	P	P	
GENERAL RETAIL SALES			
Bookstores, clothing stores, drug stores, electronic stores, furniture stores, hardware stores, grocery stores, pet stores, and video stores	P	P	
PERSONAL AND BUSINESS SERVICES			
Barber shops, beauty salons, laundries, dry cleaners, photocopying outlets, photo processing outlets, shoe repair shops, and tailors	P	P	
Banks, law offices, accounting firms, insurance agents, realtors, printers and publishers	P	P	
ENTERTAINMENT AND RECREATIONAL USES			
Coffee shops, sit down restaurants, fast food restaurants, drinking establishments, and outdoor cafes	P	P	
Theaters, bowling alleys, nightclubs, fitness centers, museums, art galleries, and amusement arcades	P	P	
Sidewalk cafes	P	P	
AUTOMOTIVE SERVICES			
Gas stations	C	C	
Car and truck rentals	C	C	

Garages and body shops	N	N	
Car dealerships	N	N	
Car washes	N	N	
TRANSPORTATION SERVICES			
Ambulance services, limousine services, and package delivery services	C	C	
PARKING			
Parking garages	P	P	
Parking lots	C	C	
EDUCATIONAL INSTITUTIONS			
Daycare and kindergartens	P	P	
Elementary schools	P	P	
Middle and high schools	C	C	
Vocational or business schools	C	C	
University and colleges	C	C	
Performing and visual arts schools	P	P	
HEALTH CARE FACILITIES			
Doctor and dentist offices	P	P	
Medical and dental clinics	P	P	
Veterinary clinics	P	P	
Medical labs	P	P	
Hospitals	C	C	
MISCELLANEOUS			
Adult businesses	N	N	
Building supply stores	N	N	
Parks and playgrounds	P	P	
Churches, synagogues, and temples	P	P	
Civic buildings	P	P	
Commercial storage facilities	N	N	
Communication towers	C	C	
Convention and conference centers	C	C	
Correctional facilities	N	N	
Driveways	C	C	
Electric substations	C	C	
Equipment maintenance facilities	N	N	
Equipment rental outlets	C	C	
Funeral homes	C	C	
Furniture moving and storage	N	N	
Greenhouses and nurseries	C	C	
Helicopter landing facilities	C	C	
Manufacturing facilities	C	C	

Marine sales and service	N	N	
Park-and-ride lots	N	N	
Radio and TV stations	C	C	
Recycling centers	N	N	
Sports arenas and stadiums	C	C	
Transit stations	P	P	
Warehouses	N	N	
Water filtration plants	N	N	
Work-release centers	N	N	
MODIFY AS APPROPIRATE LOCALLY			
"P" designates permitted uses. "C" designates uses permitted only after review and approval by the [Director of Planning]. These uses may be subject to additional regulations. "N" designates uses not permitted.			

7. Since an important purpose of infill districts is to encourage walkable neighborhoods, zoning regulations may specify that the ground floor of infill developments contain enough space to support a sufficient volume of activity to attract pedestrians. The City of Nashville, for example, stresses that the ground floor, or how the building meets "the ground plane," is of utmost importance because "it is at this most critical juncture that the character and ambiance of [a] city's urban fabric is established from a pedestrian point of view" (2004, 0.1). Historically, downtown sidewalks were a shopper's delight. Merchants displayed their goods in storefront windows in building after building along the street. But, when other functions were allowed, less display space was provided, and the shopper's experience changed. The provisions specified here help ensure that mixed-use developments will contain pedestrian-generating activities in sufficient numbers and size.

7. Ground Floor Uses

a. In mixed-use developments, at least __ percent of the street frontage at ground level shall be occupied by general retail sales, personal and business services, entertainment and recreational uses, or other uses deemed by the [Director of Planning] to be pedestrian-generating. The remaining __ percent of the street frontage may contain other permitted uses and/or vehicular entrances.

b. The required uses shall extend an average depth of at least __ feet from the front façade.

c. Where a lot fronts on two or more streets, the street frontage requirement shall be calculated by totaling the combined street frontage.

d. The street frontage requirements shall not apply to permanent public open spaces in front of buildings.

8. Building intensity, both residential and nonresidential, is often regulated by floor area ratio (FAR) standards. Such standards are usually contained in zoning ordinances. FAR standards limit the total gross area that the floor, or floors, of a building may consume to a stated fraction of the total gross floor area of the parcel upon which it is situated. This fraction, which is usually expressed as a maximum, is the actual FAR. For example, if the zoning ordinance permits construction on a parcel and specifies a maximum FAR of .35, then the total gross floor area of all floors in the building(s) on that lot must not exceed 35 percent of the gross area of the lot (Merriam 2004).

A unique feature of FAR standards is the unification of the horizontal and vertical parameters of a building in the calculation of the maximum permissible gross floor area. How this is expressed in terms of building bulk is relatively simple. For a given maximum FAR, the footprint of the building is mediated by the number of floors. As an example, the footprint

8. Floor Area Ratios (FARs)

a. Floor area ratios (FARs) shall not be greater than or less than specified in table VIII.2 for sample infill districts (e.g. ID1—the most dense in the illustrative community—ID2, etc.), FAR is computed by dividing the total of the gross floor areas of all buildings on a lot by the gross area of the lot.

of a single-story building on a lot with a maximum FAR of .35 must cover no more than 35 percent of the lot. In contrast, if the building is multi-storied, its gross floor area must still not exceed 35 percent of the gross area of the lot but its first floor would necessarily occupy a smaller footprint. At ground level, a multi-story building would simply occupy less of the lot than would a single-story building.

FAR standards usually mesh well with on-site requirements, such as parking and loading, because these tend to be measured per gross square feet of floor area and are not affected by the building's shape or the horizontal or vertical distribution of its gross floor area. Indeed, FAR standards may mesh better with on-site parking and loading requirements than would more rigid, conventional height, width, length, and setback requirements (Merriam 2004).

Table VIII-2 Floor Area Ratios

	ID1	ID2	ID…
Base FAR	3.0	2.0	0.75
Maximum FAR	4.0	3.0	1.0
Minimum FAR	2.0	1.0	0.5
MODIFY AS APPROPIRATE LOCALLY			

As is discussed in section 10-A, many factors, such as environmental sustainability, infrastructure capacity; traffic, fiscal and other development impacts; economic impacts; and design considerations, all bear on what is appropriate density for infill. The determination of what is an appropriate FAR for a given infill district requires careful local analysis of the above-cited factors.

b. Base FARs are a matter of right. Maximum FARs may be earned through FAR bonuses or FAR transfers from other properties.

c. The following areas shall not count against the base or maximum FARs in table VII.2:

(1) Floor area of basements occupied by parking.

(2) Floor area of plazas and other passageways through buildings.

(3) Others (add as appropriate).

d. The following land uses are exempt from the minimum FAR requirements: recreational uses, educational institutions, and all conditional uses [add or modify as appropriate].

9. The overall objective in providing FAR bonuses is to grant incentives for ensuring that infill development meets the stated purposes of the model ordinance, including promoting sound, compact design with the mixing of residential and commercial uses; providing affordable and flexible housing options; facilitating pedestrian-friendly and transit-friendly development and street design; providing usable open space; preserving historic buildings; ensuring the compatibility of new construction with the existing character of the neighborhood; and providing development standards that are clear and not

9. FAR Bonuses

a. Developments in the ID district may increase their FARs above the base levels in table VIII.2 by taking advantage of the FAR bonus provisions set forth in this section. The FAR bonus provisions may be used alone, in combination with each other, or in combination with FAR transfers to achieve the maximum FAR established for each sub-district.

b. In no case shall the total FAR on a lot, including FAR transfers pursuant to Section 10, cumbersome.

(1) The model ordinance provides an FAR bonus to permit greater intensities for mixed residential and nonresidential development as a way to promote community policy goals and to increase the financial feasibility of infill development. Refer especially to the goal contained in section one (I) general provisions, subsection B.3.f., of the model ordinance.

(2) FAR bonuses, in return for the provision of more affordable housing, encourage the development of more diverse communities, especially from the standpoint of income and household type. Refer especially to the goal contained in section one (I) general provisions, subsection B.3.l: "encourage affordable housing through infill development."

(3) This provision is designed to encourage the creation and provision of public art, which can greatly enhance the appeal of plazas and small public parks within an infill area and promote their use by pedestrians. Strategically placed public art can help revitalize communities by providing a visual focus for outdoor activities and public events. The provision relates to several of the goals contained in section one (I) general provisions, subsection B. 3. of the model ordinance.

(4), (5), and (6) The U.S. Green Building Council's LEED program establishes measurement criteria for various types of construction. This ordinance draws on LEED-ND standards for energy and water efficiency and stormwater management in constructing FAR bonuses. See, for instance, LEED Water Efficiency Credits 1 and 3.

(7) Transit stop or station FAR bonuses can help meet the

exceed the maximum FAR established in table VIII.2.

c. Any land use for which an FAR bonus has been granted shall continue to be occupied by that use which originally earned the bonus, or by other uses that would earn at least an equal amount of extra floor area.

d. FAR bonuses are earned according to schedule in table VIII.3 for the following features of enhanced public benefit.

(1) Mixed-use developments as defined in Section 4. To qualify for the bonus, no less than __ percent or more than __ percent of the building floor area on a lot shall be occupied by residential uses.

(2) Permanent affordable housing for ____ income households as defined in [section of state or local code that defines target income group and establishes requirements for affordability]. To qualify for the bonus, no less than __ percent of the building floor area on a lot shall be occupied by affordable housing units.

(3) Public art that is valued at not less than _ percent of the cost of new construction or building renovation as reflected in approved building permits. To qualify for the bonus, the public art shall be placed outdoors and be highly visible from at least one public street.

(4) Energy efficient construction that provides not less than a __ percent increase in overall building energy efficiency as compared to the [state or local energy code] and/or meets Leadership in Energy and Environmental Design (LEED) certification. Documentation shall be provided by a licensed engineer to demonstrate this increase in energy efficiency.

(5) Water efficiency

A water utilization plan that decreases water utilization by __ percent.

(6) Stormwater efficiency

A stormwater management plan that decreases the rate and quantity of stormwater runoff from pre-development levels by __ percent.

(7) Transit stops or stations accommodated within the lot or within a building on the

goal stated earlier in section one (I), general provisions, subsection B. 3.e, of the model ordinance, which is to "encourage compact development that is pedestrian–scaled and, if applicable, transit oriented". Clearly, this FAR bonus provisions would only be applicable in communities already served by mass transit.

lot.

TABLE VIII.3 FAR Bonuses

	ID1	ID2	ID…
Mixed-Use Development	1.0	1.0	
Affordable Housing	1.0	1.0	
Public Art	0.2	0.2	
Energy Efficiency	0.5	0.5	
Water Efficiency	0.5	0.5	
Stormwater Efficiency	0.5	0.5	
Transit Facility	0.5	0.5	
[add and modify as appropriate]			
MODIFY AS APPROPRIATE LOCALLY			

10. There is a relatively high likelihood that infill development, especially in older urban areas, will involve new construction adjacent to, or very near, existing historic buildings. The model ordinance reflects this likelihood and anticipates community-wide desires for the preservation of such buildings and structures. One of the general purposes of the model ordinance, as stated in section one (I) general provisions, subsection B. 3. k., is to "protect historic buildings and provide standards for redevelopment and alteration of historic buildings." This section of the ordinance (VIII.A.10) provides standards for using FAR transfers to protect historic buildings and prevent them from being either inappropriately altered or torn down.

10. FAR Transfers

a. Developments in the ID district may increase their FARs above the base levels in table VIII.2 by taking advantage of the FAR transfer provisions set forth in this section.

b. In no case shall the total FAR on a lot, including FAR bonuses pursuant to Section 9, exceed the maximum FAR established in table VIII.2.

c. FAR transfers are allowed under the following circumstances:

(1) The sending property lies with __ feet of the receiving property;

(2) The sending property is designated for preservation under the [name of jurisdiction] historic preservation or [____] program;

(3) The building or buildings on the sending lot are restored and maintained as required by the [name of jurisdiction] historic preservation or [____] program.

d. The maximum amount of undeveloped floor area available for transfer from a sending property shall be equal to the difference between the actual gross floor area of the historic building or buildings or [____] and the maximum gross floor area permitted under existing zoning. Undeveloped floor area shall be reduced by any amount previously transferred from the sending property.

e. No transfer of undeveloped floor area shall be effective under this section unless an

	instrument, approved by the [title of local counsel] to be legally sufficient to effect such a transfer and approved in content by [the Director of Planning] has been entered into among the parties concerned. *f. When undeveloped floor area is conveyed to the owner of a receiving lot, then title shall pass with the receiving lot whether or not a building using the additional floor area is constructed.* *g. If a qualifying historic building or [____] is partially or completely destroyed after its undeveloped floor area has been transferred, no new building shall be built on the sending property exceeding the floor area of the former building.*
Section 10-A Additional Economic Guidance on Developmental Density The following provides an economic guide for the development density to be permitted in the various infill districts (IDs) specified in table VIII.2. The guide is designed to indicate the order of magnitude density required to secure a specified economic return given variations in land costs, residential product values, and other factors. The provisions in this section are intended to provide useful information for local discussion concerning what is appropriate density? By way of background, infill development often entails expenses that do not apply to traditional, greenfield projects. Infill's property acquisition costs per acre can be much higher, especially if environmental remediation and building demolition are necessitated. The logistical challenges of construction on a site surrounded by other buildings and roads may slow construction and additional infill related costs may be encountered (chapters 3 and 4). These additional expenses may not be offset by any savings due to the use of existing water/sewer and road infrastructure. To be economically feasible, therefore, infill development must often be effected at a higher density than that pervading in most greenfields projects. The question remains, however, what is the appropriate density. To provide an empirical framework for considering appropriate infill density, this section presents guidelines relating land cost, unit price, and development density. (See also chapter 8.) It is designed to facilitate discussions between developers, local governing bodies, and concerned citizens on the subject of appropriate design. *Its must be joined, however, by other considerations influencing density, such as design, infrastructure, environmental, fiscal, and other factors. Thus, "place-making," environmental constraints, and other considerations may compel either higher or lower densities than the sole economic-based factors that underlie table VIII.4.* 1. Residential Density a. The determination of appropriate residential density is an important land use regulation. Numerous local contextual variables must be considered in making that determination (see above). Among them are the economic challenges of	*Section 10-A* *Additional Economic Guidance on Developmental Density* *The following provides an economic guide for the development density to be permitted in the various infill districts (IDs) specified in table VIII.2.* *1. Residential Density* *a. Appropriate residential density for infill should be developed by considering environmental constraints, aesthetic impacts, infrastructure loadings, fiscal impacts, and the costs of development, among other concerns.* *b. The figures in table VIII.4 indicate*

redeveloping the land. b. The development density necessary to make residential infill economically viable derives directly from costs of land and other factors and from the sale price of new housing units. The figures in VIII-4 represent the distillation of developers' and municipal planners' experience in New Jersey and elsewhere. They do not represent "hard and fast rules," but rather points from which to begin development discussions. See chapter 8 for further details.	*approximate relationships among land cost, residential unit sales price, and residential density. They should be used to guide discussions between governing bodies, infill developers, and local citizens.*

TABLE VIII.4
Minimum Residential Floor Area Ratios (FAR) by Varying Land Prices and Housing Unit Characteristics (size and value)
(15% return – FAR)

1000 net sf per unit

Unapproved, unimproved land price: $1,000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.1	0.3	0.4	0.6	1.2	1.4	1.6	1.8	2.0	
300	0.1	0.2	0.3	0.4	0.5	1.0	1.2	1.4	1.5	1.6
350	0.1	0.2	0.3	0.3	0.4	0.5	0.6	1.1	1.2	1.4
400	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	1.0	1.1
450	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
500	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
550		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
600		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
650		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
700		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
750		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
800		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
850		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
900		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
950			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1000			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2

1500 net sf per unit

Unapproved, unimproved land price: $1,000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.3	0.7	1.0	2.2						
300	0.2	0.4	0.6	1.2	1.7	2.0	2.4			
350	0.2	0.3	0.5	0.6	1.1	1.0	1.7	2.0	2.2	
400	0.1	0.3	0.4	0.5	0.6	1.1	1.3	1.0	1.7	1.9
450	0.1	0.2	0.3	0.4	0.5	0.6	1.1	1.2	0.9	1.6
500	0.1	0.2	0.3	0.4	0.4	0.5	0.6	1.0	1.2	1.3
550	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	1.0	1.1
600	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7
650	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6
700	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
750	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
800		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
850		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
900		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
950		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
1000		0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4

2000 net sf per unit

Unapproved, unimproved land price: $1,000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	1.0									
300	0.5	0.9	2.2							
350	0.3	0.6	1.2	1.7	2.2					
400	0.2	0.4	0.6	1.1	1.1	1.9	2.2			
450	0.2	0.3	0.5	0.7	1.1	1.0	1.7	1.9	2.2	
500	0.1	0.3	0.4	0.6	0.7	1.1	1.0	1.1	1.8	2.0
550	0.1	0.2	0.4	0.5	0.6	0.7	1.1	1.0	1.1	1.7
600	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	0.9	1.1
650	0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.7	1.1	0.9
700	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	1.1
750	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	1.0
800	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7
850	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
900	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
950	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
1000	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5

TABLE VIII.4, continued
Minimum Residential Densities by Varying Land Prices, and Housing Unit Characteristics
(size and value)
(15% return—units per acre)

1000 net sf per unit

Unapproved, unimproved land price: $1,000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	6	12	19	25	31	37	46	52	59	
300	5	9	14	18	23	28	32	37	43	48
350	4	7	11	15	18	22	26	29	33	37
400	3	6	9	12	15	18	21	24	27	30
450	3	5	8	10	13	16	18	21	23	26
500	2	5	7	9	11	14	16	18	20	23
550	2	4	6	8	10	12	14	16	18	20
600	2	4	5	7	9	11	13	14	16	18
650	2	3	5	7	8	10	11	13	15	16
700	2	3	4	6	7	9	10	12	13	15
750	1	3	4	6	7	8	10	11	12	14
800	1	3	4	5	6	8	9	10	12	13
850	1	2	4	5	6	7	8	10	11	12
900	1	2	3	4	6	7	8	9	10	11
950	1	2	3	4	5	6	7	8	9	11
1000	1	2	3	4	5	6	7	8	9	10

1500 net sf per unit

Unapproved, unimproved land price: $1,000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	10	19	29	44						
300	6	13	19	25	34	41	48			
350	5	9	14	18	23	28	34	39	44	
400	4	7	11	15	18	22	26	30	35	39
450	3	6	9	12	15	18	21	24	27	32
500	3	5	8	10	13	16	18	21	23	26
550	2	5	7	9	11	14	16	18	20	23
600	2	4	6	8	10	12	14	16	18	20
650	2	4	5	7	9	11	13	14	16	18
700	2	3	5	7	8	10	12	13	15	16
750	2	3	5	6	8	9	11	12	14	15
800	1	3	4	6	7	8	10	11	12	14
850	1	3	4	5	6	8	9	10	12	13
900	1	2	4	5	6	7	8	10	11	12
950	1	2	3	4	6	7	8	9	10	11
1000	1	2	3	4	5	6	7	8	10	11

2000 net sf per unit

Unapproved, unimproved land price: $1,000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	23									
300	10	20	36							
350	6	13	19	29	36					
400	5	9	14	19	24	31	36			
450	4	7	11	15	18	22	28	32	36	
500	3	6	9	12	15	18	21	25	29	32
550	3	5	8	10	13	16	18	21	24	27
600	2	5	7	9	11	14	16	18	21	23
650	2	4	6	8	10	12	14	16	18	20
700	2	4	5	7	9	11	13	15	16	18
750	2	3	5	7	8	10	12	13	15	16
800	2	3	5	6	8	9	11	12	14	15
850	1	3	4	6	7	8	10	11	13	14
900	1	3	4	5	6	8	9	10	12	13
950	1	2	4	5	6	7	8	10	11	12
1000	1	2	3	5	6	7	8	9	10	11

11a. As discussed in the earlier commentary for section eight, (VIII.A.8), FAR standards treat the vertical and horizontal parameters of a building as a unified parameter; building footprint at the ground floor level and building height are essentially mediated, or controlled, by each other as long as maximum FAR standards are not exceeded.

c. Step-downs are required to minimize scale contrasts between existing buildings and infill developments that may be built at higher densities and contain taller buildings.

12a. The purpose of the setback regulations is to create a cohesive visual identity and attractive pedestrian street scene for an area. Minimum building frontage specifications are designed to ensure that the development has a street "presence." If the buildings do not frame the street, they will not be as inviting to pedestrians. Creating a strongly defined street edge improves visual appeal and distinguishes an infill development from more suburban development. Street frontage that is interrupted by stretches of parking lot asphalt or other empty spaces detracts from a positive pedestrian experience. The standards provide for the creation of a continuous, defined street edge, enhancing the pedestrian experience and allowing a developer to maximize the developable area of the infill parcel.

In setting the minimum requirements, a community should take into consideration established setback patterns in adjacent development, or, alternatively, establish new criteria to reflect desired community design goals for the area.

b. Variations are permitted in order to ensure that infill development is compatible with the established character of the existing neighborhood. New developments should also maintain a streetscape that is similar to the existing development with respect to lot width and orientation.

d. Side setbacks were initially established to avoid the spread of fire between buildings. Setbacks also serve the

11. Building Heights

a. Building heights are controlled by FAR and setback requirements. There are no additional restrictions on building height.

b. Chimneys, flagpoles, antennas, mechanical equipment, and other projections above rooflines may rise ___ feet above the highest point on the roof. Measures shall be taken to screen rooftop equipment from public view.

c. Taller buildings shall step down to provide a height transition to adjacent or facing low-rise buildings.

12. Building Setbacks; Setback Limits

a. New buildings shall be sited such that a minimum of __ percent of street frontage on any lot has a building facade within __ feet of the street property line to a height of __ feet above sidewalk grade. This requirement is subject to the following exceptions:

(1) Any permanent public open space that satisfies the open space requirement of Section 15 is not subject to the building setback limit.

(2) Outdoor dining is not subject to the setback limit if screened by a wall 3 to 4 feet in height.

(3) Façade recesses for architectural and decorative purposes are not subject to the setback limit provided that: the aggregate area of recesses is less than __ percent of façade area, the depth of any recess is less than __ feet, and recesses do not be open to the sky.

(4) The following land uses are not subject to the setback limit: transit stations, schools, [add and modify as appropriate].

b. The {Director of Planning] may approve variations from the setback limit of subsection (a) under the following circumstances:

(1) A building façade may, in some instances, be built to the minimum setback of existing buildings on adjacent properties in order to maintain a consistent street edge; and

(2) A building façade may, in some instances, be set back farther from the front property line due to site constraints such as existing landscape features or inadequate sidewalk width.

c. Where a lot fronts on two or more streets, the building setback limit of subsection (a) shall apply to each street frontage individually.

d. New buildings shall be set back from side and rear property lines (in the absence of street frontage to the side or rear) as specified in table purpose of providing adequate space between abutting land uses. By restricting where a building can be placed on the site, they also effectively limit the bulk of the building. Communities may wish to modify the setback values shown in tables VIII.5 and VIII.6.

VIII.5.

TABLE VIII.5 Side and Rear Setbacks (feet)

	ID1	ID2	ID…
RESIDENTIAL DEVELOPMENT			
Adjacent to or across the alley from:			
Residential use with facing windows	15 ft	17 ft	
Residential use without facing windows	5	7	
Non-residential use	5	7	
NON-RESIDENTIAL DEVELOPMENT			
Adjacent to or across the alley from:			
Residential use with facing windows	15 ft	17 ft	
Residential use without facing windows	0	2	
Non-residential use	0	2	
MIXED-USE DEVELOPMENT			
Adjacent to or across the alley from:			
Residential use with facing windows	15 ft	17 ft	
Residential use without facing windows	5	7	
Non-residential use	5	7	
MODIFY AS APPROPRIATE LOCALLY			

e. Landscaping serves to soften hard edges and to provide visual interest for pedestrians and others.

e. The yards resulting from the foregoing setbacks shall be used for landscaping and access ways and shall not be used for the parking of vehicles. Yards shall be landscaped as specified in sections VII and XI-3 of this document. Landscaping is not required where buildings adjoin a lot line.

f. Building elements may encroach into the required building setback space by the distances indicated in table VIII.6.

TABLE VIII.6 Permitted Encroachments on Side and Rear Setbacks (feet)

Building Element	Permitted encroachment
Belt courses, sills, lintels, and pilasters	2 ft
Cornices, eaves and gutters	3
Outside stairways	5
Handicapped ramps	5
Unwalled porches, terraces, and balconies	2
Chimneys	2
Gas and electric meters if screened on all sides by a masonry wall	3
MODIFY AS APPROPRIATE LOCALLY	

13a. The purpose of specifying the use of architectural features on ground floor façades is to avoid large areas of blank walls along a streetscape. Architectural details create visual interest, provide a human-scaled level of detail, enhance orientation, invite pedestrian interaction, and contribute to the pedestrian-oriented character of a development. Requirements that specify offsets, projections, or other forms of articulation or architectural relief be located at least every 30 feet along a façade facing a public street are typical (see Oregon Transportation and Growth Management Program 2001; City of Overland Park 2002).

b. Windows add to the visual interest of buildings, break up long walls, and promote pedestrian enjoyment by engaging pedestrians with the activities occurring within them. Not only do windows at the street level enliven the street environment, at night they provide a secondary, more intimate, source of lighting (Seattle 1999, 24). On the other hand, the City of Nashville warns in its design standards that buildings that have "too high a percentage of glass seem to float and not have the grounding that helps anchor a building" 2004, 2.1).

Some ordinances require shopfront windows (with doors included in the calculation) to cover at least 75 percent of a building's front façade, beginning no more than 3 feet and measuring a minimum of 10 feet in height above the sidewalk (Georgia Department of Community Affairs n.d.). Others require that windows be divided by multiple panes of glass to help "hold" the surface of the façade rather than appearing like a "hole" in the wall (Arlington County 2003). Requirements vary depending on a site's location. For a main street, for example, Arlington County's code requires that windows cover between 60 percent and 90 percent of the building façade when measured as a percentage of the area of each façade and story between 2 and 10 feet above the fronting sidewalk (2003, attachment I, 27).

Clear glass is required because any saturation will cause the display to become invisible behind the resulting reflection (City of Asbury Park 2002, 69). Clear windows encourage pedestrians to look into the building interior and interact with

13. Ground Floor Façades

a. For new buildings facing a street or public open space, no more than __ feet of building façade measured horizontally shall be without articulation or architectural relief. Building wall articulation or architectural relief may include, but is not limited to, pilasters, windows, pedestrian entrances, or other types of architectural detailing that modulates the building mass or surface texture.

b. For new buildings facing a street or public open space, transparent windows shall cover at least __ percent of the ground-floor façade between _ and _ feet above sidewalk grade, subject to the following conditional and exceptions:

(1) Windows shall use clear or lightly tinted glass, except for decorative or architectural accents. Reflective glass is not an acceptable window material.

(2) Windows shall allows pedestrians unobstructed views into the buildings or into display windows from the outside extending at least __ feet into the interior.

(3) The bottom of the windows shall be no more than _ feet above the sidewalk grade.

(4) Other openings to the inside of buildings shall count toward this transparency requirement.

(5) Display cases attached to the outside wall of a building shall not count toward this transparency requirement.

(6) Ground-floor residences, transit stations, parking garages [add and modify as appropriate] are exempt from this transparency requirement.

the activities within.

14. Entrances are building features that add to the character of the streetscape and contribute to a pedestrian-friendly environment. They should be visible, clearly identifiable, easily accessible, and inviting to the pedestrian.

b. This requirement ensures that the front entrance is on the front façade, oriented to access from the primary street.

c. Requiring a minimum spacing for entrances along the frontage of a building helps pedestrians access buildings and avoids the effect of a single long blank wall without human interest.

14. Entrances

a. The main entrance of buildings shall be on the first floor facing the street. The main entrance shall not be oriented toward a parking lot.

b. Buildings on a corner lot or a lot fronting on two streets shall have the main entrance on the primary street. This requirement does not preclude additional rear or side entrances facing parking areas.

c. Entrances to a building, excluding vehicular entrances, shall be separated by not more than __ feet on average along the linear frontage of the building. There shall be a functioning entry door at each entrance.

15. Open spaces are incorporated in infill projects to make the development more attractive and to reinforce the downtown pedestrian experience, by providing opportunities for outdoor activities, such as relaxing, sitting, dining, or socializing. Instead of specifying a minimum amount of open space, some communities set a maximum size (e.g., not larger than 3 acres) observing that large open spaces can hinder the walkability and neighborhood connections that are desired in higher-density infill developments (Dane County 2004, 50).

15. Open Spaces

a. New developments shall provide open space in an amount and of a type specified in table VIII.7.

TABLE VIII.7
Required Open Space

	Percentage of Lot Area	Type of Open Space
Single-Family Attached Housing	20%	common or public
Multifamily Housing	30	common or public
Office Buildings	20	public
MODIFY AS APPROPRIATE LOCALLY		

b. Features such as outdoor plazas and parks offer attractive spaces for people to gather and enjoy. They create an inviting image and can draw people to the area. The site amenities mentioned in the ordinance, such as benches, art, and water features, provide areas for interaction and add to the quality of the development and the surrounding area.

(5) and (6) The purpose of the open space landscape standards is to provide an attractive, shaded environment, soften hard edges, focus views, increase the sense of neighborhood scale and character, and add to the enjoyment of pedestrians and motorists. Landscaping, however, should not be provided to satisfy the open space requirements, but

b. Qualifying open spaces may include parks, plazas, esplanades, play areas, and other open areas that are:

(1) utilized only for landscaping, tables, seating, recreational facilities, public art, water features, and trash receptacles;
(2) easily accessible from the adjacent sidewalk;
(3) located near building entrances;
(4) closed to vehicular traffic;
(5) landscaped with at least one permanent canopy tree (minimum __ inch caliper at the time of planting) for every ___ square feet of required open space (see sections VII and XI-3 for further

integrated into an infill project's overall design. In addition to landscape standards related to open space, communities may wish to include standards requiring street trees. The consistent use of plantings along street edges provides visual cohesion along streets and helps buffer automobile traffic. Arlington County's code, for example, requires street trees along the street length, one canopy shade tree (with a minimum 4 to 4.5 inches caliper) per 550 square feet of required open space, and ground cover in any unpaved front area (2002, 32). The code also requires that public open spaces (squares and greens) be designed with paved surface areas, tree canopies, and ground covers (2003, 32). Raleigh's code, by way of comparison, requires one tree (3.5 inch caliper) for every 1,000 square feet of open space (2002, 3.2.8). (7) Places to sit that are accessible to the public are important not only as basic amenities, but also in encouraging social interaction.	*details);* *(6) landscaped with groundcover, shrubs, or flowers covering a minimum of __ percent of the required open space (see sections VII and XI-3 for further details);* *(7) equipped with at least one linear foot of seating for every ___ square feet of required open space;* *(8) open to the sky and located to maximize access to sunlight, except that up to __ percent of the space may include a covered arcade; and* *(9) lighted for nighttime safety (see section XI-1 for further details).* *c. Public open space may contain facilities for food service, but a majority of the space shall be available for general public use without charge.* *d. Public open space shall be open to the general public at least during the normal business hours of the surrounding area.* *e. New developments are exempt from the open space requirements of this section if:* *(1) they contain fewer than __ square feet of gross floor area; or* *(2) they lie within __ feet of an improved public park, plaza, or other open space and are connected by a continuous sidewalk meeting Americans with Disabilities Act (ADA) requirements.*
16. Although fences and walls are sometimes necessary, they can create visual barriers in a neighborhood. Care should be taken in their design to ensure that they complement the overall development and surrounding properties and do not act as barriers to adjacent properties. Restricting their height helps achieve this objective.	*16. Fences and Walls* a. Newly constructed fences, walls, and retaining walls may not exceed the heights specified in table VIII.8.

TABLE VIII.8
Fence, Wall, and Retaining Wall Height Limits (inches)

	Height Limit
Between Street Property Line and Facade	4 ft
Within Side or Rear Building Setbacks	7
Within Side or Rear Building Setbacks Adjoining a Pedestrian Path	4
MODIFY AS APPROPRIATE LOCALLY	

	b. The following exceptions to the foregoing height limits are permitted: *(1) Retaining walls may be built to any height abutting a public right-of-way;* *(2) Fences and walls may be erected to a height of __ feet in the side or rear setback adjoining a surface parking lot;* *(3) Fences and walls may be erected to a height of __ feet around schools;* *(4) [add and modify as appropriate]* *c. The height of walls, fences, and retaining walls shall be determined by measurement from the lowest grade level within __ feet of either side of such wall, fence, or retaining wall.* *d. For further guidance on the design of fences and walls, see section XI-3.*
17. Unsightly loading and service areas can detract from the character of an area, adversely impact the pedestrian environment, and create hazards for pedestrians and automobiles. Steps should be taken to minimize the negative impacts.	*17. Loading* *a. Off-street loading requirements of this code shall be in full force and effect in the ID district.* *b. A loading area shall be provided for any building that contains a commercial use on the ground floor.* *c. All loading and maneuvering space shall be concealed from streets, sidewalks, and public open spaces, and shall be located within building lines.*
18a. Drive-through facilities in infill districts are discouraged because 1) their driveways create breaks in the streetscape, 2) they cater to automobile rather than pedestrian usage, effectively "deadening" the street, 3) they increase pedestrian exposure to moving vehicles, 4) they limit opportunities for landscaping and reduce the number of street trees, 5) they eliminate on-street parking spaces, and 6) they prohibit other uses that would promote pedestrian interaction (City of Seattle 1999, 44). b. The provisions here are intended to help lessen some of the negative aspects of these facilities.	*18. Drive-Through Facilities* *a. Drive-through facilities are generally prohibited in ID districts.* *b. Restaurants with drive-through lanes may be permitted as conditional use if the following criteria are met:* *(1) the restaurant has only one drive-through lane;* *(2) drive-through windows are located at the rear of buildings;* *(3) appropriate litter-control measures are in place; and* *(4) cars waiting to use the facility will not queue across the sidewalk or onto the street.*
19. Vacant lots interrupt the streetscape along pedestrian-oriented streets and negatively impact surrounding development. These provisions are intended to prevent vacant lots from becoming eyesores, dumping grounds, and locations for criminal activities.	*19. Vacant Lots* *a. Any lot within the ID district kept vacant for more than 180 days shall be landscaped and thereafter maintained in good order. The landscaping shall be appropriate to an urban park or garden (see section VII and XI-3).*

	b. All plant material shall be watered, pruned, kept free from weeds and litter and replaced if diseased, injured or dead, consistent with good horticultural practices. *c. The lot shall be fenced as appropriate for public safety and aesthetics.* *d. Such lots shall not be used for storage.*
20. The ordinance requires that steps be taken to mitigate any negative acoustical impacts of a development on the surrounding area.	*20. Noise Mitigation* *a. For commercial uses in close proximity to residential uses (including mixed-use developments), noise mitigation may be required as a condition of development approval.* *b. For a proposed development deemed to be a major noise generator, the [Director of Planning] may require a report from an acoustical consultant recommending measures to mitigate noise impacts on nearby uses. A similar report may be required regarding construction period noise impacts.* *c. For purposes of this section, noise mitigation measures include, but are not limited to, the use of landscape buffers, use of walls and fences, reduction in hours of operation, relocation of mechanical equipment, relocation of refuge storage areas, parking design modifications, and use of specific construction techniques or building materials. After a development permit has been issued, any measures which are required by the permit to limit noise shall be maintained.* *d. For further guidance on landscape buffers, see section XI-3.*
21. A "McMansion" is a large residential home that does not match the surrounding character of the neighborhood. Typically, a McMansion is of a size, design, and construction that comes as close to the setback lines as possible, emphasizes the driveway with increased paving, and is much higher and more monolithic than surrounding homes. These design choices result in increased impervious cover per lot, the elimination of vegetation to make room for the larger development, decreased quality of life for neighbors, and an increase in site runoff to surrounding lots when compared with the previous, more modest-scale existing building. The regulations define the criteria that can be used in determining whether replacement of an existing structure should be permitted. Many New Jersey communities are applying regulations to control McMansions. For example, to preserve its character, *Tewksbury, a rural community,* applies such controls as: • Limiting the area of development • Specifying minimum lot sizes • Specifying the types of ancillary structures permitted • Specifying setbacks, building heights and FARs	*21. Demolition and Replacement Properties in Infill Districts ("McMansions")* *Since "McMansions"–-oversized, typically residential structures replacing modest-scale existing buildings—affect the quality of life in infill districts, the following measures should be adopted.* *a. Regulate Teardowns. Since existing homes comprise the fabric of a neighborhood, teardowns in infill districts should be limited. In deciding whether to allow a teardown, regulatory bodies should consider such factors as whether the existing structure is an "underimprovement" and the extant building's "perceived importance" to the neighborhood. One measure of an underimprovement is significantly lower improvement to land value relative to this ratio in the surrounding neighborhood. Demolitions should generally be limited to instances when this ratio for existing structures is significantly lower than the prevailing neighborhood standard. Perceived importance compromises historical, architectural, cultural, affordable housing, and other contribution. The demolition of existing structures having such significance should be*

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- Specifying land uses
- Having open space requirements
- Requiring homeowner associations; and
- Requiring LEED compliance.

Essex Fells, a garden-city style old suburb, is preserving its character through the following regulations:

- Large-lot designations
- Auxiliary building limitations, and
- Setback, FAR, and height requirements

Highland Park, a two-square-mile, older, urban suburb maintains its character through keeping residential zones as small as a few blocks each (e.g., residential multifamily garden apartment, townhouse, midrise and historic zones). Within each zone, development type is regulated, as are setbacks, heights, bulk, parking, impervious cover, and open space.

New Brunswick, a medium-density urban community, controls its character by the designation of ten residential districts and regulating the type of housing that can be built within each district (e.g., very low density, medium density, and high-density single-family detached). In addition, the character of each type of residential district is controlled through minimum lot sizes, setbacks, maximum building heights, maximum lot coverage, and FAR ratios.

Jersey City, a high-density, urban community, controls residential building construction through many zones, (e.g., multifamily low-, mid- and high-rise), design guidelines, and other specifications.

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discouraged.

b. Regulate the Replacement Structure.

(1) The replacement structure in infill districts must abide by the design guidelines indicated in section VII of this document and the zoning regulations for infill districts indicated in the current section VIII including FAR (section 8) building height (section 11), setbacks (section 12), ground floor facades and entrances (sections 13 and 14), open space (section 15), fences and walls (section 16), vacant lots (section 19) and noise mitigation (section 20).

(2) In addition to the above, the replacement structure might also use as guidelines the U.S. Green Building Council's LEED criteria and/or other green building criteria.

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Section Nine (IX) **Subdivision and Site Plan**	***Section Nine (IX)*** ***Subdivision and Site Plan***
	General Provisions
A. Purpose	***A. Purpose*** *The subdivision and/or site plan shall conform to standards that will result in a well-planned community, protect the health and safety of the residents, and provide a desirable living environment without unnecessarily adding to development costs. The following improvements shall be required: B) streets and circulation, C) street parking, D) storm water management, E) water supply, F) sanitary sewers and G) energy efficiency..*
B. Streets and Circulation The Institute of Transportation Engineers (ITE) and other organizations such as the American Association of State Highway and Transportation Officials (AASHTO), Federal Highway Administration (FHA), and the Transportation Review Board (TRB) have assembled and published guidelines that consider appropriate design standards for streets and traffic circulation associated with land development. The information contained in the ITE and other cited organization publications form the primary basis for the recommended street and circulation standards in this section.	***B. Streets and Circulation*** *1. General* *a. The purpose of proper street and design is to create a functional and attractive development, to minimize adverse impacts, to foster mass transit and pedestrian linkages, and to eliminate unnecessary development costs.* *b. Where practical, and consistent with the circulation plan of the master plan or official map, the existing street system should be preserved and utilized in infill development.* *c. Residential and non-residential developments that involve new streets shall as far as practical, connect with the existing street system, especially if the existing streets are of similar land uses.* *d. Streets providing mixed use development shall be designed so as to integrate their location and design with the arrangement and location of existing streets so far as practical.*
2. Street Hierarchy a. Streets can be described in terms of serving different functions. Some provide access to parking areas; others are designed to collect and move traffic to interconnecting arterials. Because the design of streets differs depending on the function served, streets in this document are classified into a hierarchy. b. The street hierarchy system is defined by road function, as well as usage, with usage being measured by average daily traffic. The document further recognizes the trip generation reduction impact in instances where a transportation demand management (TDM) plan is in effect. The document also recognizes the systematic effect on traffic generation from mixed-use developments. That is, the trip generation from all the uses in a mixed-use development is less than the sum of their individual trip generation characteristics.	*2. Street Hierarchy* *a. Streets shall be classified in a street hierarchy system with design tailored to function.* *b. The street hierarchy system shall be defined by road function and average daily traffic (ADT), calculated by trip generation rates prepared by the Institute of Transportation Engineers (ITE) as indicated in table IX.1. Trip generation rates from other sources may be used if the applicant demonstrates that these sources better reflect infill conditions.* *c. Each new street shall be classified and*

e. The cited 2006 ITE (2006) study as well as other recent publications (Institute of Transportation Engineers 1994, 1997, 2003; American Association of State Highway and Transportation Officials 2004a and 2004b; Federal Highway Administration 1997, 2002; Transportation Research Board 2002; Ewing and King 2001; California Department of Transportation 2002; and Maryland Department of Transportation 2002) present context sensitive solutions (CSS). As defined by the Federal Highway Administration, "CSS is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist." The cited ITE study (2006) advances the successful use of CSS in the planning and design of major urban thoroughfares for walkable communities—and is thus most applicable to infill.	*designed to meet the standards for one of the street types defined in table IX.2.* *d. The applicant shall demonstrate to the Planning Board's satisfaction that the distribution of traffic to the proposed street system will not exceed the ADT thresholds indicated in table IX.2 for any proposed street type.* *e. As an alternative to table IX.1, the "thoroughfare type descriptions" contained in the ITE's* Context Sensitive Solutions *(2006) may be followed.*

TABLE IX.1
ITE Trip Generation Rates By Major Land Use Categories

LAND USE TYPE*	AVERAGE WEEKDAY TRIP GENERATION RATES	
Residential	***Trips Per Indicated Measure: Dwelling Unit (Based on 50 Units)***	
Single family detached	10.99	
Condominium/townhouse	7.12	
Low-rise apartment	12.87	
High-rise apartment	6.26	
Elderly housing attached	3.48	
Mid-rise apartment		
Office Building	***Trips Per Indicated Measure:***	
	Employee	***(1,000 gross ft.² of building area)***
General office 10,000 ft.²	4.97	22.66
General office 50,000 ft.²	3.84	15.65
General office over 100,000 ft.²	3.44	13.34
Medical office building 10,000 ft.²	8.91	36.59
	19.39	20.09
Industrial	***Trips Per Indicated Measure:***	
	Employee	***(1,000 gross ft.² of building area)***
Warehousing	17.09	5.08
Mini warehouse	56.28	2.38
Lodging	***Trips Per Indicated Measure:***	
	Employee	***Room***
Hotel	14.28	8.92

TABLE IX.1, continued
ITE Trip Generation Rates By Major Land Use Categories

LAND USE TYPE*	AVERAGE WEEKDAY TRIP GENERATION RATES	
Retail	***Trips Per Indicated Measure:***	
	Employee	***(1,000 gross ft.^{2} of building area)***
Specialty Retail	12.36	44.32
Discount Club	NA	41.80
Shopping Center:		
Under 10,000 ft.^{2} leasable area	NA	193.77
10,000 ft.^{2} leasable area	NA	152.03
50,000 ft.^{2} leasable area	NA	86.56
100,000 ft^2 leasable area	NA	67.91

Notes:
* For definitions, see below.
** More detailed data needed to develop satisfactory trip generation rates.
NA = Information not available from ITE.

ITE DEFINITIONS OF LAND USES BY MAJOR LAND USE CATEGORIES

Single-family detached
A single-family detached home on an individual lot.

Low-rise apartment
Apartments in buildings that are only one or two levels (floors).

Mid-rise apartment
Apartments that have between 3 and 10 levels.

High-rise apartment
Apartments in buildings more than 10 levels high.

Condominium/Townhouse
One family ownership units that have at lease one other one family owned unit within the same building structure. Both condominiums and townhouses are included in this category.

Elderly housing attached
Attached independent living units including retirement communities, age-restricted housing, and active adult communities.

TABLE IX.1, continued
ITE Trip Generation Rates By Major Land Use Categories

General office building
Houses one or more tenants and is the location where the affairs of a business, commercial, or industrial organization, professional person, or firm are conducted.

Medical office building
A facility that provides diagnoses and outpatient care on a routine basis but which is unable to provide prolonged in-house medical/surgical care.

Hotel
A place of lodging providing sleeping accommodations and supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (pool, fitness room) and other retail and service shops.

Shopping center
An integrated group of commercial establishments that is planned and managed as a unit.

Specialty retail center
Small shopping centers which contain a variety of retail shops and specializing in quality apparel, had goods, and services.

Discount club
A discount store or warehouse where shoppers pay a membership fee to purchase a wide variety of items.

Warehouse
Warehouses are primarily devoted to storage of materials, but they may also include office and maintenance areas.

Mini-warehouse
Mini-warehouses are buildings in which a number of separate storage units are rented for the storage of goods. Typically referred to as “self-storage” facilities.

Source: ITE 2003.

TABLE IX.2
Street Hierarchy: Definition

STREET TYPE	FUNCTION	GUIDELINE MAXIMUM ADT
Residential	Primary purpose for a residential street is to provide frontage and access for residential development. All, or the maximum number of housing units, shall front on this class of street. Residential streets should be designed with limited to no driveway access. Access to single-family and townhouse developments should be by means of alleys to maximize pedestrian-friendly streets. Residences must be oriented to an existing or new street or to public open space. So far as practical, residential streets should align with existing residential streets or streets with residential compatible land uses.	1500
Collector	Primary purpose for a collector street is to provide frontage and access to mixed-use properties where predominant land uses could be intensive residential uses or mixed commercial and residential uses. Land uses should be oriented to the street with direct vehicular access limited to maximize pedestrian circulation.	7500
Arterial	Arterial streets function to carry intermunicipal and regional traffic. It is unlikely that infill development will result in the creation of new arterial roadways. However, it is likely that major roads will be required to be extended through infill development to maintain the integrity of the circulation system. There are no traffic volume limitations to an arterial street, and design will be based on traffic analyses, or municipal, county or state master plan requirements for extensions involving existing streets. As a general rule for infill development, limited access should be provided along arterial streets with access for parking and delivery being from intersecting streets.	
Special Purpose Streets:		
a) Alley	A service road that provides secondary and vehicular access to lots. Alleys can be one-way or two-way.	500
b) Residential Cul-de-Sac	A residential street with a single means of ingress and egress and with a turnaround at the end. Cul-de-sacs should generally be avoided in infill development.	1000
c) Residential Court	A residential street with a single means of ingress that does not provide a means for vehicles to turn around. The length of a residential court is limited to 300 feet.	NA
Access Driveway Residential	A means of ingress and egress to residential properties from access streets. Depressed curb flared driveways shall be used in all cases.	NA
Access Driveway Commercial	A means of ingress and egress to nonresidential properties from access streets where pedestrian activity exceeds 100 pedestrians per hour. Depressed curb flared driveways shall be used. In low-volume pedestrian areas, street grade driveways may be used, provided the driveway services predominately truck traffic.	
Divided Street	Streets may be divided for aesthetic purposes. Design standards should be applied to the combined dimension of the street width and the divider (median) width.	

NA= Not Applicable

3. Cartway Width

a.-c. The cartway is the area of the roadway within which vehicles are permitted. It includes moving (and parking lanes), but not shoulders, curbs, sidewalks, or swales. The document specifies cartway width on a performance-based standard, one that takes into account the road hierarchy and function.

d. Possible alternative cartway widths to be considered are discussed in the ITE's *Context Sensitive Solutions* (2006) study as well as the recommendations shown below from the North Carolina Department of Transportation for traditional neighborhood development and by the state of Oregon for neighborhood street design.

I. North Carolina Department of Transportation Recommendations

	Travel/ Moving Lane	Parking Lane	Total Cartway	Recommended
Street Type				Right of Way
Alley: One-Way	One @ 12'-14'	N/A	12'-14'	20'-22'
Alley: Two-Way	Two @ 11'	N/A	22'	22'
Lane	Two @ 9'	N/A	18'	40'
Residential Street (Yield)	N/A	N/A	26'	52'
Collector Street	N/A	N/A	32'	60'
Main Street	Two @ 11'	Two @ 8'	38'	66'
Commercial Avenue	Three @ 11'	Two @ 8'	49'	73'
Avenue w/ Parking	Two @ 12'	Two @ 8'	Two @ 26'	98'
Boulevard	Four @ 11'	Two @ 8'	Two @ 30'	120'
Parkway	Two @ 13', Two @ 14'	N/A	Two @ 27'	118'-152'

II. Neighborhood Street Design Guidelines: Oregon

	Travel/Moving Lane	Parking Lane	Total Cartway	Recommended
Street Type				Right of Way
Scenario 1	Two @ 10'	N/A	20'	42'-48'
Scenario 2	17'	One @ 7'	24'	47'-52'
Scenario 3	14'	Two @ 7'	28'	52'-56'

N/A= Not available or appropriate.

4. Street Right-of-Way

3. Street Cartway Width

a. Cartway width for each street shall be determined by street function and classification.

b. Cartway width may also consider possible limitations imposed by sight distances, climate, terrain, and maintenance needs, as well as context sensitivity. In order to minimize street costs, the minimum width assuring satisfaction of needs shall be selected.

c. Cartway widths for each street classification are as shown in table IX-3.

d. To reduce impervious cover, lower infrastructure costs, and to enhance aesthetic design, alternatives to the cartway widths shown in table IX-3 may be considered.

4. Street Right-of-Way

a. The right-of-way shall be measured from lot line to lot line and shall be sufficiently wide to contain the cartway, curbs, sidewalks, graded areas, utilities and shade trees. Right-of-way requirements are shown in table IX-3.

b. The right-of-way width of a new street that is a continuation of an existing street shall in no case be continued at a width less than the existing street.

c. To reduce improvement costs, alternatives to the right-of-way requirements shown in table IX-3 may be considered.

c. Possible alterative right-of-way (ROW) widths to be considered are discussed in the ITE's *Context Sensitive Solutions* (2006) study as well as the alternative ROW standards shown in the section under cartway width. These alterative right-of-way dimensions are recommended by the North Carolina Department of Transportation for traditional neighborhood development and by the state of Oregon for neighborhood street design.

5. Public Transportation

a. Internal roads should be designed to handle the needs of public transportation vehicles including weight and turning movement requirements.

5. Public Transportation

The specific dimensions of roadways handling public transportation vehicles will vary depending on the type (i.e., bus, trolley, or vans) and size of the vehicles being used. For instance a GMC 1900 series bus accommodates 47 passengers and has a minimum turning radius of 44 feet, while the smaller GMC 1600 series seats 36 and has a 39 foot minimum turning radius. Area transit companies, districts, authorities and the like often publish design guidelines. See, for instance, *Design Guidelines for Bus Facilities* (Orange County, 1987) and *Transit Facility Design Guidelines* (Denver Regional Transportation District, 1987). The state of Maryland has also produced excellent site design criteria for public transit. The reader should also refer to *A Guide to Land-Use and Public Transportation* (Snohomish County, 1989).

b. Bus pullouts should be provided, with design based on transit agency guidelines.

c. Bus stops should be provided at major boarding points and spaced to minimize walking distances from building entrances. Stops should include benches with back rests, attractive landscaping, trash containers with lids, information displays and guides, and appropriate lighting and other amenities such as public telephones. Shelters should be provided to protect riders from the weather and to buffer them from abutting streets.

d. Separate waiting places for transit patrons should be provided out of the walking path of pedestrian circulation.

e. Exclusive bus lands, entrances, and exists should be provided when traffic volumes warrant such facilities.

b. Bus pullouts are among the design criteria specified to accommodate mass transit vehicles. The dimensions of the pullout will depend on specific site requirements.

c. and d. Transit use will be encouraged if separate, attractive, weather-protective facilities are provided. As a goal, bus stops should be placed no more than one-quarter mile from building entrances.

e. If buses and other mass transit vehicles are assigned priority access, they will be more convenient to use and their patronage will increase.

6. Vehicular Access

a. Garage entrances and alleys shall be the sole means of vehicular access to a lot, except where a driveway is approved as a conditional use.

b. Vehicular access shall be limited to locations that will minimize adverse traffic circulation impacts on adjacent streets, and generally shall not be within __ feet of a block corner.

c. When a lot abuts an alley, access to parking should be from the alley, provided that when the lot fronts on more than one street, access may also be from the street with the lower traffic volume.

d. Street access to parking is limited to one two-way curb cut. The aggregate width of curb cuts provided for vehicular access may not exceed __ feet for each street *upon which a development fronts.*

TABLE IX.3
Cartway Width and Right of Way

STREET TYPE	TRAVEL/MOVING LANE	PARKING LANE [a]	TOTAL CARTWAY	RECOMMENDED RIGHT OF WAY
Residential	Two @ 8 ft.	Two @ 7 ft.	30 ft.	50 ft.
Collector	Two @ 10 ft.	Two @ 8 ft.	36 ft.	66 ft.
Arterial	Two @ 12 ft. Four @ 12 ft.	Two @ 8 ft.	40 ft.	70 ft.
Alley:				
One-way	One @ 16 ft.	None	16 ft.	24 ft.
Two-way	Two @ 10 ft.	None	20 ft.	24 ft.
Residential	Two @ 8 ft.	Two @ 7 ft.	30 ft.	50 ft.
Cul-de-sac	Two @ 12 ft.	0	24 ft.	44 ft.
Residential	Two @ 8 ft.	Two @ 7 ft.	30 ft.	50 ft.
Court	Two @ 12 ft.	0	24 ft.	44 ft.
Divided Street[b]				

[a] Refers to parallel parking. Angle parking shall not be permitted on through streets.

[b] Cartway width for divided streets shall conform to standards of street classification and should be the aggregate of the street width and median width. There shall be no parking along the median divider.

7. Walkways and Sidewalks

a. To reduce vehicular traffic and to foster pedestrian usage, well-placed, attractive, and safe pedestrian walkways should be provided.

b. Sidewalks must be accessible to all users. There is a practical limit to how fare people will walk and pedestrian routes must be designed accordingly.

7. Walkways and Sidewalks

a. There shall be direct paved walkways from entrances of each building on a lot to the streets on which they front. The walkways may be no longer than __ times of the straight line distance from the entrance to the closest sidewalk or improved right-of-way where there is no sidewalk.

b. Internal walkways must connect all buildings on the site, and provide connections to other areas of the site, including open spaces and parking areas.

c. Sidewalks shall be placed in the right-of-way, parallel to the street within the right-of-way as shown in ___, unless an exception has been permitted to preserve topographical or natural features, or to provide visual interest, or unless the applicant shows that an alternate pedestrian system provides safe and convenient circulation. In commercial and in high density residential areas, sidewalks may abut the curb.

d. Sidewalks may also be located away from the road system to link dwelling units with other dwelling units, the street, and on-site activity centers such as parking areas and recreational areas.

e. Pedestrian way easements (10 feet wide) may be required by the approval authorities through the center of blocks more than (600 feet) long to provide circulation or access to schools, playgrounds, shopping, or other community facilities.

f. Residential sidewalk widths shall be a minimum of [5] feet. Where sidewalks abut the curb and cars overhang the sidewalk, widths shall be 6 feet.

g. Commercial sidewalks shall be a minimum of [15] feet. Shade trees, lighting and sidewalk furniture (benches) may be placed within the sidewalk area.

h. Sidewalks should be designed to protect the safety of the user. In general, all sidewalks should be paved. Paving materials need to be safe under wet weather conditions. The sidewalks should be adequately lighted (see section XI-1 for details) and visible from buildings.

8. Overhead Weather Protection

a. The entire length of façades on buildings open to the public shall include awnings, overhangs, or overhead weather protection at street level meeting the following criteria:

(1) Overhead weather protection shall extend 6 feet measured horizontally from the building wall or to a line 2 feet from the curb, whichever is less;
(2) A minimum of 1/2 of the overhead weather protection, for the entire length of facade where protection is required, must be over the public right-of-way or a widened sidewalk on private property;
(3) No obstructions in the sidewalk area shall be permitted as part of the structure of the overhead weather protection.

	b. Overhead weather protection should be continuous from lot to lot where feasible. *c. For further guidance on awnings and similar protective and design amenities, see section XI-3.*
9. Bicycle Circulation a. To reduce vehicular traffic, bicycle circulation should be provided for. b. A bikeway can be defined as a pathway designed to be used by bikers. Bikeways take one of the following forms: a) *bicycle paths* designed specifically to satisfy the physical requirements of bicycling; b) *bicycle lanes* at the edge of streets reserved and marked for the exclusive use of bicycles; and c) *shared or bicycle-compatible roadways* designed to accommodate the shared use of the roadway by bicycles and motor vehicles.	*9. Bicycle Circulation* *a. Bikeways should be provided to link facilities on the site and to provide access to adjacent uses.* *b. Bikeways can be provided through bicycle paths, bicycle lanes, or shared (bicycle compatible) roadways.* *c. Bicycle lanes, where required, shall be placed in the outside lane of a roadway, adjacent to the curb or shoulder. When on-street parking is permitted, the bicycle lane shall be between the parking lane and the outer lane of moving vehicles. Lanes shall be delineated with markings, preferably striping. Raised reflectors or curbs shall not be used.* *10. Roadway and Pedestrian Lighting* *(See section XI-1)*

C. Parking

In a fierce controversy in St. Louis, Missouri, one building on the National Register of Historic Places was destroyed to support the revitalization of a neighboring landmark—the St. Louis Post Office. The National Register building was imploded to provide parking for the retail and office facilities in the adaptively reused Post Office.

While parking is usually an arcane subject, the St. Louis example illustrates that it can have important consequences that literally shape our environment. Parking also has a significant financial bearing on the cost of residential and nonresidential development and indeed whether development proceeds at all; many a potential project has been stopped in its tracks because the development site could not "fit" the required parking. That challenge is yet greater for infill as is described shortly.

As the importance of parking is being better appreciated, more attention is being paid to many facets of this subject. One central issue is whether to provide parking and if so, how much? There are different schools of thought on this matter. Do you simply provide the number of parking spaces that are "demanded," such as having sufficient parking for the workers in and visitors to an office building, or do you reverse this model and have the parking supply affect the demand? An illustration of the latter approach was the policy of deliberately limiting parking at Baltimore's Camden Yards baseball field precisely to encourage fans to come via mass transit.

Assuming parking is to be provided, then a key question is the number of required spaces. One of the central objectives of this section of the model ordinance is to ensure that the parking requirement comports with the actual demand, not an assumed figure based on some general standard that does not reflect the realities of infill. Going beyond the determination of the appropriate parking requirement is the subject of how to respond to that mandate. While the traditional solution has been for each development to provide its requisite parking on its segregated site, it does not have to be just that way. Shared parking and developer contribution to a regional parking authority are but two more creative solutions.

It is important to realize that there is no one stock "response" to the many parking subjects just mentioned. For instance, in downtown New Brunswick, New Jersey, one transit oriented development (TOD) provides 1.6 parking spaces per unit, another 1.5, yet another 1.2, and there is one TOD that provides no off street parking. All of the above parking "figures" work for the individualized context of their projects. For example, the TOD with no off-street parking relies on a next-door city parking authority garage.

None of the above TODs—a prime example of infill—would have been feasible had they been required to provide 2.0 parking spaces per unit—a common mandated standard for multifamily

C. Parking

Conceptual Framework

Parking for infill shall be provided on an as needed basis and flexible responses to "providing" parking are encouraged.

housing in many jurisdictions. Excessive parking requirements, and mechanical responses to providing parking (e.g., always on site) are impediments to infill that this section of the model ordinance attempts to address.

1. Provision

The more flexible treatment of existing buildings recognizes the difficulty of retrofitting parking in existing structure.

1. Provision

The provision of off-street parking for motor vehicles is generally required for new buildings. The provision of additional off-street parking is not required for conversions or renovations of existing buildings, provided that any increase in gross floor area does not exceed ___ square feet. This exception may be used only once for any individual building.

2. Number of Spaces

2. Number of Spaces

Parking standards for residential and nonresidential development, such as the number of spaces per housing unit or per 1,000 ft^2 of business space, are critical development requirements that bear on where projects are built (e.g., infill versus greenfields) and their cost. For instance, underground parking for a downtown New Jersey office building can cost as much as $40,000 per space. (See also discussion at Section IV.B of this document.)

General parking standards promulgated by the Institute of Transportation Engineers (ITE), the Urban Land Institute (ULI), and other groups, as well as those contained in the New Jersey Residential Site Improvement Standards (RSIS), may not be insufficiently sensitive to the special conditions often present in infill developments. This section provides infill-sensitive standards (see also chapter 9).

Institute of Transportation Engineers parking studies, and the minimum requirements based on them, generally ignore the fact that due to lower densities and fewer travel choices, vehicle trips per household are significantly higher in suburban communities when compared with infill locations. The ITE requirements include no adjustments for pricing, for lower-income users, or for locations that are more accessible by transit, bicycling, and walking. As a result, the requirements do not accurately represent parking demand at a particular site, especially infill locations.

Among the reasons that published road and parking standards tend to be excessive are the following:

1. Most study sites have free parking. Basing parking requirements on demand studies at zero price results in a self-fulfilling prophecy: standards are so generous it would be uneconomical to charge for parking since most spaces would be unused if priced.
2. Most published demand studies are performed at relatively isolated sites since it is difficult to attribute shared parking to a particular building. As a result, suburban automobile-dependent sites are over-represented, resulting in standards that are excessive for urban conditions, areas with multi-modal transportation, or areas where roads and parking are not free.

3. Parking facilities tend to be taxed at a lower rate than if the same land were devoted to buildings. Federal tax laws favor parking as an employee benefit. Most employers provide free employee parking, but do not offer an equivalent benefit to employees who use other modes.
4. Transportation planners are primarily concerned with traffic movement, parking spillover problems, and regulatory simplicity. Therefore, abundant road and parking capacity are a solution to satisfy their professional interests.

In short, minimum parking regulations based on published parking standards tend to be excessive, especially for infill situations. Excess parking should be avoided for cost, environmental, design, and other reasons and the model document presents rationally-based and infill sensitive parking standards.

a-b. As with traditional projects, infill developments must be accountable for meeting the parking demand that they create.

a. Infill developments must provide a number of parking spaces adequate to satisfy the parking demands of users, residents, and visitors.

b. Residential and nonresidential parking standards should reflect the variations of conditions that bear on the actual need for parking. These factors include development type (housing category and nonresidential land use) and development location (the region, census tract and block group where a residential or a nonresidential project is located).

c. Table IX.4 describes a method for estimating required parking supply for residential developments (see also Cuddy and Listokin with Ewing and Sherry [2006].) It is sensitive to number of bedrooms in the housing unit and the housing unit type, as is common among generally prevailing residential parking standards. It also includes the effects of location, population density, and other factors. Table IX.4 was developed by analyzing New Jersey-specific data incorporating the above described variables (see chapter 9 for details). Similar standards could be created for other states, following the methods laid out in the current research.

c. For residential infill development, parking demand shall be estimated according to the guidelines set forth in table IX.4.

Quantification of the residential parking standards incorporates the following concepts and procedures:

Concept

1. Use household vehicle data from a larger area—the Public Use Microdata Area (PUMA) from the Public Use Mircodata Sample (PUMS))—combined with aggregate household characteristics of the smaller area—the block group—to "look up" how many vehicles would be in the block group if it were perfectly characterized by the table from the PUMA.
2. Subtract the resulting computed PUMA-based average vehicles per household for the block group from the actual average vehicles per household published by the census for the block group.

3. Use the difference from calculations 3 as the "local effect" on vehicles per household in the given block group The "local effects" factor can be viewed as the difference between the inter-relationship of housing unit type (units in structure), bedrooms, and household vehicles at the block group level versus the PUMA level. *Procedure* Operationally, the analyst proceeds as follows: 1. Look up the number of vehicles in a given household, (according to its number of bedrooms and units-in-structure) and given location by using the table for its PUMA (see chapter 9 and Cuddy and Listokin with Ewing and Sherry 2006). Then add the "local effect" corresponding to its block group (see chapter 9 and Cuddy and Listokin with Ewing and Sherry 2006). 2. To the figure obtained from calculation, add a factor for visitor parking as indicated in chapter 9. Table IX.4 illustrates the above described approach for two contrasting locations: Gaslight Commons, a TOD in South Orange in higher density Essex County (PUMA 1402—Central Essex County—census tract 193, block group 2) and a Boonton condo complex in lower density Morris County (PUMA 1503—West Morris County—census tract 416.03, block group 1). The parking calculation for the South Orange example (1.00 per housing unit) is substantially lower than the parking figure obtained for the Morris County example (1.38 per housing unit) because car ownership is lower in the former case and there are other distinguishing features. Incorporating the approach indicated in table IX.4 and chapter 9 (and described above) will reduce the parking demand for residential infill development. To illustrate the practical benefit of the proposed approach, we shall refer to the case of Gaslight Commons, a TOD project built in South Orange, New Jersey. According to this study's methodology (table IX.4), the 200 unit Gaslight Commons would require 1.00 parking spaces per unit, or a total of 200 spaces. That comports very closely to the 202 vehicles actually registered with the Gaslight Commons property management company. In fact, Gaslight Commons was mandated (based on RSIS with some modifications) to provide 338 parking spaces: 162 on the surface and 176 underground. If the approach for determining parking standards proposed in this study had been applied, the Gaslight Commons developer could have provided 138 fewer parking spaces (338-200). That 138 parking space differential would have saved from $1 to $4 million in construction costs (depending on whether spaces were underground or on the surface) -- $5,000 to $20,000 per housing unit-- and would have freed up to 2 acres for enhanced open space or added residential development (from the reduced acreage devoted to parking spaces). d. Experience demonstrates that many garages are not used for off street parking because of a lack of interior storage	*d. For residential parking requirements, a one car garage shall count as 1.00 off street parking space provided said garage contains an area beyond a ten (10) foot wide by twenty (20) foot deep parking space,*

area. With minimal impact, this provision provides convenient storage for recreational equipment, recycling containers, trash receptacles, etc.	*containing a storage volume of 200 cubic feet with a maximum vertical height of seven (7) feet, minimum vertical height of five (5) feet, and minimum horizontal depth/width of three (3) feet. Where such storage space is not available, a one car garage shall count as 0.75 space. Where there is a driveway or a driveway combination with a garage which measures a minimum of eighteen (18) feet in length, not including any right-of-way, an additional 1.0 space shall be credited.* *A two-car garage shall count as 1.75 parking spaces except that should similar in house storage area provisions be provided, the combination shall count as 2.0 parking spaces. For a driveway combination, each paved nine (9) foot width by eighteen (18) feet deep area, exclusive of any public right-of-way shall count as 1 space.*

TABLE IX.4
Residential Infill Parking Requirements

A location-sensitive, cross classification method is used to estimate residential parking demands for infill sites throughout New Jersey. This approach is detailed in chapter 9. In brief, the methodology incorporates such factors as the number of housing units in the proposed residential structure, the number of bedrooms in the particular unit, and the location-sensitive vehicle ownership per housing unit. In accordance with the modeling above, concentrated (i.e. higher density) population and development are associated with lesser automobile ownership, and also, lesser residential parking requirements. Two illustrations of the methodology follow for two contrasting locations: South Orange in higher density Essex County and Boonton in lower density Morris County.

Illustration 1. South Orange, Essex County

Gaslight Commons is a 200-unit, two-building complex at 28 West 3rd Street in South Orange, which includes 72 1-BR units and 128 2-BR units. We take these steps to estimate the number of vehicles owned by the 1-BR units.

1. Use American Factfinder at the Census Bureau's website to get the development's Census geography information. Go to http://factfinder.census.gov and select the Address Search function from the bottom of the list on the left-hand side. The development is in Essex County, Census tract 193, Block group 3, and 5% Public Use Microdata Area 01402.

2. From a list of tables in chapter 9, find the average vehicles per household by household characteristic for PUMA 1402. For 1-BR units in a 50-or-more-unit building, the average is 0.51 vehicles per household.

PUMA 1402: Average vehicles per household

	Bedrooms					
	0	**1**	2	3	4	5+
Single-family detached	0.50	1.22	1.14	1.58	1.65	1.87
Single-family attached		0.83	1.27	1.13	1.33	1.00
Two-family	0.60	1.02	1.07	1.47	1.23	1.67
3- to 4-family	2.00	0.79	0.78	1.28	1.00	1.53
5- to 9-family	0.33	0.80	0.85	0.71		
10- to 19-family	0.20	0.64	0.50	0.75		
20- to 49-family	0.61	0.58	0.90	1.12	0.75	
50+ -family	0.32	**0.51**	0.73	0.86	0.00	

3. From another list of tables in chapter 9, find the block group-level correction for Census tract 193, block group 3. It is 0.12.

4. Adding the results from steps 2 and 3, estimate that the development will have 0.63 vehicles per 1-BR household.

5. The estimated vehicle ownership result found in 4 above plus an additional factor for visitor parking (0.27 vehicles per unit; see chapter 9) is the residential parking requirement—1.00 per housing unit.

Illustration 2. Boonton, Morris County

A hypothetical condo building in Boonton has 60 1-BR units.

1. Use American Factfinder at the Census Bureau's website to get the development's Census geography information. Go to http://factfinder.census.gov and select the Address Search function from the bottom of the list on the left-hand side. This hypothetical development is in Morris County, Census tract 416.03, block group 1, and 5% Public Use Microdata Area 01503.

2. From a list of tables in chapter 9, find the average vehicles per household by household characteristic for PUMA 1402. For 1-BR units in a 50-or-more-unit building, the average is 1.09 vehicles per household.

PUMA 1503: Average vehicles per household

	Bedrooms					
	0	**1**	2	3	4	5+
Single-family detached	1.00	1.72	1.89	2.06	2.40	2.64
Single-family attached		1.09	1.61	1.91	1.88	3.00
Two-family	1.00	1.23	1.70	2.21	2.00	1.50
3- to 4-family		1.08	1.39	1.29		
5- to 9-family	0.75	1.07	1.24	2.00		1.00
10- to 19-family	0.83	1.31	1.28	1.50		
20- to 49-family		1.22	1.75	1.00		
50+ -family	0.67	**1.09**	1.63	1.50		

3. From another list of tables in chapter 9, find the block group-level correction for Census tract 416.03, block group 1, in Morris County. It is 0.02.

Morris County: Block-group-to-PUMA correction

Tract	Block group	Local effect
416.01	7	0.18
	8	-0.02
	9	0.09
416.02	1	-0.08
	2	-0.36
	9	0.02
416.03	**1**	**0.02**
	2	0.01
416.04	1	0.11
	2	-0.03
	9	0.18

4. Adding the results from steps 2 and 3, estimate that the development will have 1.11 vehicles per 1-BR household.

5. The estimated vehicle ownership result found in 4 above plus an additional factor for visitor parking (0.27 vehicles per unit; see chapter 9) is the residential parking requirement—1.38 per housing unit.

e. The materials presented in tables IX.5A and IX.5B are derived from an innovative procedure developed by the state of Washington that the authors believe is sensitive to infill situations. This procedure is detailed in chapter 9 and in Listokin and Cuddy (2006).

In brief, the nonresidential parking standards are developed as follows. Unlike for residential, there is no analogous data, such

e. For nonresidential infill developments, the parking calculation template and illustration set forth in tables IX.5A and IX.5B shall be used as a guideline.

as the PUMS, which quantifies vehicles associated with different types of nonresidential land uses at varying locations. Instead, we quantify the number of workers associated with different nonresidential uses and then by empirically determining how many of them arrive via automobile as opposed to other means of transportation (i.e., the "modal split"), plus including a factor for visitor parking and other influences, ultimately derive a nonresidential parking standard sensitive to the locational attributes (e.g. transit access and use) that affect the demand for nonresidential parking.

As noted, the above procedure incorporates nonresidential parking requirements sensitive to infill situations (e.g., where there is higher transit utilization). For instance, with a higher transit utilization—characteristic of infill—(table IX.5B), the parking requirement per 1000 square feet of office space is 1.89 spaces versus 2.76 spaces with lower transit utilization (IX.5A) The template shown in tables IX.5A and IX.5B generates different parking requirements based on employee density, location, with its varying modal split consequences, and other factors. For instance, because of its enhanced mass transit access, urban locations will require less parking than suburban or rural locations. A rough approximation of the parking demands yielded by the IX.5A and B template is summarized below—with infill most closely approximated by the urban scenario. In short, the infill parking requirement will range roughly from 1.0 to 2.5 spaces per 1000 square feet of nonresidential space. That is considerably lower than the 3.0 to 5.0 spaces per 1,000 feet square of nonresidential space standard found in general application parking publications for nonresidential uses and reflects infill's enhanced transit access and other distinguishing features (see chapter 9 for details).

Employees per 1000 GLSF	Parking Demand By Employee Density and Location		
	Rural/Suburban	Intermediate	Urban
5	4.5	3.92	2.56
4.75	4.28	3.73	2.44
4.5	4.05	3.53	2.31
4.25	3.83	3.34	2.18
4	3.6	3.14	2.05
3.75	3.38	2.94	1.92
3.5	3.15	2.75	1.79
3.25	2.93	2.55	1.67
3	2.7	2.35	1.54
2.75	2.48	2.16	1.41
2.5	2.25	1.96	1.28
2.25	2.03	1.77	1.15
2	1.8	1.57	1.03

f. (1). Nearby uses with different time profiles of parking demand can share a parking lot and thereby reduce their aggregate need for parking.

f. The number of required off-street parking spaces for residential and nonresidential infill development may be reduced as follows:

(1) In developments with multiple distinct uses, including and especially mixed-use

The methodology outlined in the publication, *Shared Parking (*Urban Land Institute and International Council of Shopping Centers, 2005) is a recognized approach that can be used to calculate the number of parking spaces required for mixed-use developments. First, the peak parking demand factors for single land uses are identified. Next, the time of peak parking demand is calculated. The Urban Land Institute (ULI)-International Council of Shopping Centers (ICSC) *Shared Parking* study (2005) found that hourly accumulation of parked vehicles varied significantly among land uses. These differences in time provide an opportunity to share the use of parking facilities. Thus, the mixing of uses allows for sharing parking, which in turn allows for a reduced number of parking spaces—below that of the sum of the individual land uses parking requirements. An example of shared parking in a mixed-used situation is given by Pasadena (California) Towers (ITE 1995). The first phase of this mixed-use project includes 193,000 square feet of offices, a 10,000-square-foot bank, a 15,000-square-foot cafeteria, and 16,000 square feet of retail space (ITE 1995, 47). According to City of Pasadena standards, 952 spaces were required. Using demand by time, day, and month data from the standard reference on the subset *Shared Parking* (ULI-ICSC 2005), we estimate that the peak parking demand for the uses in Phase I is 683 spaces—a reduction of 269 spaces (952 - 682), or 28 percent. Failure to incorporate a shared parking adjustment can lead to excessive parking provision. An example is Headquarters Plaza in Morristown, New Jersey—comprising office space, retail space, and a 10-screen theater. As noted by Bier et al (2006, 12), Headquarters Plaza was required to provide 3,000 parking spaces; this calculation did *not* factor shared parking, and, as such, Headquarters Plaza often has 1,000 empty parking spaces. The unnecessary spaces equate to two acres and more than $10 million that could have been better applied.	*developments, the amount of required off-street parking shall be reduced to account for peaking of parking demands at different times of the day, week, month, or year. Through the development plan review process, the [Director of Planning] shall establish an appropriate percentage reduction based on an analysis of parking demand. Reductions may be based on data and formulas contained in the (Urban Land Institute and International Council of Shopping Centers 2005) Shared Parking publication and National Cooperative Highway Research Program's Enhancing Internal Trip Capture Estimation for Mixed-Use Developments, Project 8-51 (see also chapter 9).*

TABLE IX.5A
Illustrative Parking Demand Calculations—Office Uses (Lower Transit Utilization)[a]

1. General Assumptions: Gross Square Feet of space:	100,000
2. Average Occupancy Rate:	95%
3. Occupied Area (1 x 2):	95,000
4. Average Employee Density per kGLSF:	3.5
5. Percent Present at one Time (PAOT):	85%
6. Visitor Parking Rate (spaces/employee):	25%
7. Total employees (kGSF x Emp Density; 3 x 4):	333
8. X 85% PAOT (7 x 6):	283
9. Peak Present at one Time:	283 employees

10.

	Modal Split	Persons	Person Trips	Avg. Vehicle Occupancy	Vehicles
Single Occupant Vehicle	79.41%	283	225	1.00	225
Carpool/ Vanpool	3.73%	283	11	2.25	5
Transit	0.00%	283	0		
Walk /Bike / Telecommute	16.86%	283	47		
Total	100.00	283	283		230

11.	Total Employee Parking Demand (from 10)	230
12.	+ 10% (practical capacity) (11 x1.1)	253 Total Employee Spaces
	Peak Visitor Demand	
13.	Total employees x visitor spaces per employee (7 x 6)	83
14.	Divided by the turnover rate (4 /.25)	21
	+ 10 % (practical capacity) (14 x 1.1)	23 Total Visitor Spaces
15.	Total Peak Parking Demand (12 + 15):	276
16.	Employee Parking Rate (12/3)	
	Employee spaces/Occupied Area	2.67 spaces per kGSF
17.	Total Parking Rate (15/3)	
18.	Total Parking Demand/Occupied Area	2.91 spaces per kGSF
19.	Final Parking Demand Rate (18 x 2)	
	Total Parking Rate x Occupancy Rate	2.76 spaces per kGSF

TABLE IX.5B
Illustrative Parking Demand Calculations—Office Uses (Higher Transit Utilization)

1. General Assumptions: Gross Square Feet of space: 100,000

2. Average Occupancy Rate: 95%

3. Occupied Area (1 x 2): 95,000

4. Average Employee Density per kGLSF: 3.5

5. Percent Present at one Time (PAOT): 85%

6. Visitor Parking Rate (spaces/employee): 25%

7. Total employees (kGSF x Emp Density; 3 x 4): 333

8. X 85% PAOT (7 x 6): 283

9. Peak Present at one Time: 283 employees

10.

	Modal Split	Persons	Person Trips	Avg. Vehicle Occupancy	Vehicles
Single Occupant Vehicle	48.95%	283	139	1.00	139
Carpool/ Vanpool	9.89%	283	28	2.25	12
Transit	35.49%	283	100		
Walk /Bike / Telecommute	5.67%	283	16		
Total	100.00%	283	283		151

11. Total Employee Parking Demand (from 10) 151
12. + 10% (practical capacity) (11 x1.1) 166 Total Employee Spaces

Peak Visitor Demand

13. Total employees x visitor spaces per employee (7 x 6) 83
14. Divided by the turnover rate (4 /.25) 21
 + 10 % (practical capacity) (14 x 1.1) 23 Total Visitor Spaces

15. Total Peak Parking Demand (12 + 15): 189

16. Employee Parking Rate (12/3)
 Employee spaces/Occupied Area 1.74 spaces per kGSF

17. Total Parking Rate (15/3)
18. Total Parking Demand/Occupied Area 1.99 spaces per kGSF

19. Final Parking Demand Rate (18 x 2)
 Total Parking Rate x Occupancy Rate 1.89 spaces per kGSF

(2) This provides an alternative adjustment for transit utilization—if the location-sensitive parking calculation shown in tables IX.4 and IX.5 are not followed.	*(2) In developments located within __ feet of rail transit stations, the amount of required off-street parking shall be reduced to account for substitution of transit for car trips and for car shedding by residents. For each qualifying development, the [Director of Planning] shall establish an appropriate percentage reduction based on an analysis of mode shares and automobile ownership. Reductions may be based on data and formulas contained in the final report of the Transit Cooperative Research Program's Transit and Urban Form, TCRP Report 16 (see also chapter 9).* *(3) In developments whose employers run carpooling or vanpooling programs, the amount of required off-street parking shall be reduced to account for substitution of shared ride trips for drive-alone trips to work. For each qualifying development, the [Director of Planning] shall establish an appropriate reduction based on the number of parking spaces set aside for carpools and vanpools. To qualify, carpool and vanpool spaces must be physically set aside and designated for exclusive carpool and vanpool use between 6:00 a.m. and 10:00 a.m., and shall be used only as public short-term parking with appropriate signage after 10:00 a.m. Subsidies for ride sharing shall be equal to at least 30 percent of the monthly market rate charged the general public for a parking space.* *(4) In developments providing permanent affordable housing for ____ income households as defined in [section of state or local code that defines target income group and establishes requirements for affordability], the amount of required off-street parking shall be reduced for each affordable housing unit to account for lower automobile ownership at lower income levels. For each qualifying development, the [Director of Planning] shall establish an appropriate reduction based on the income levels of residents of affordable housing, and the availability to transportation alternatives to the automobile.* *(5) In developments adjacent to on-street parking, the amount of required off-street parking shall be reduced by one off-street parking space for every on-street parking space. To qualify, curb space must be contiguous to the lot on the same side of the street.* *g. A developer may request a reduction in or waiver of off-street parking requirements based on a parking impact study, trip reduction plan, or transportation management plan (see chapter 9 for discussion of traffic demand management). The study or plan is subject to review and approval or modification by the [Director of*

Planning] during the development plan review process.

h. Off-street parking requirements may be met by leasing or constructing parking spaces off-site, provided that the following conditions are met:

(1) no more than __ percent of the required spaces are provided off-site;

(2 the spaces are located no more than __ feet from the furthest point in the development; and

(3) the spaces are usable by of the occupants and visitors of the development for which they are being provided.

i. The objective of this section is to promote flexibility in how the off-street parking requirement can be met. The cited examples are illustrative of the many possible flexible responses.

i. Off-street parking requirements can be met through other flexible means such as in-lieu fees and transit benefits.

For instance, a developer should have the option to have the option to pay an in-lieu fee rather than provide the full amount of parking that the city would normally require. The city would then use the fee to provide public parking, in the amount of the reduction in the requirement, to serve the development in question. Theoretically, the amount of the in-lieu fee approximates the expense the developer avoids by providing fewer than the required number of spaces.

Shoup (1999) surveyed in-lieu parking programs in 46 cities to understand the benefits of and the problems with the use of such programs. City officials cited five benefits of in-lieu fee programs: 1. They offer developers flexibility in meeting parking requirements. 2. They facilitate shared parking (and therefore more efficient use of parking space) by replacing spaces dedicated to particular developments with public spaces. 3. They allow cities to put parking where it has minimum impact on pedestrian and automobile traffic and the streetscape. 4. They simplify the approval process by reducing variance requests. 5. They facilitate historic preservation: new uses with parking requirements otherwise too great for the lot can be accommodated.

Another flexible response is to offer transit benefits. The need for employee parking can be reduced at a work site by recognizing the cash value of a parking spot and offering the employee choice in how that money is spent. Cash-out programs offer the cash value of an employer-subsidized parking space to employees who do not drive. As of 1992, California law requires certain employers to offer cash-out programs (EPA 1999, 22). Shoup (1997) reviewed eight such programs and found that they reduce drive-alone commuting by 17 percent.

There are many such success stories. For example, upon moving into new offices in the Seattle suburb of Bellevue, Washington, the 430 employees of the engineering firm of CH2M Hill were offered $40 per month if they walked, bicycled, carpooled, or took transit to work, or they were offered free parking if they drove alone. The firm's drive-alone rate declined from 89 percent to 54 percent, and stayed there, while the percentage biking or

walking increased from 1 percent to 17 percent. With parking demand down by 39 percent, the firm's problem of “too many parkers for too few spaces” disappeared. This approach reduced costs to the company and reduced traffic and pollution, while increasing tax revenue.	*j. The number of secure bicycle parking spaces shall be at least _ percent of the number of off-street spaces for motor vehicles, but in no case shall fewer than __ bicycle parking spaces be provided in a development requiring more than __ off-street parking spaces for motor vehicles.*
k. Permitting a staged development plan when not all the parking spaces are needed immediately allows cost savings and decreases runoff—at least initially. It is also possible that, in practice, not all of the parking spaces originally required will be necessary. This provision provides the flexibility to determine after a period of 18 months whether the parking area already provided is sufficient to meet the needs of the development. The provision also includes safeguards to protect the community in case a developer defaults on building the remainder of the spaces, if it is determined that they are necessary. It should further be noted that review by agencies other than the Planning Board may be required with reference to the staged parking provision. For instance, if a site is defined as a “project,” then certification by the Soil Conservation District is needed.	*k. Where the total number of off-street parking spaces required is not immediately needed for a particular use, a staged development plan may be permitted requiring that only a portion of the parking area, but no less than sixty-five percent (65%) of the required spaces, be completed initially subject to the following regulations:* *(1) The site plan shall clearly indicate both that portion of the parking area to be paved initially and the total parking needed to provide the number of spaces required.* *(2) The site plan shall provide for adequate drainage of both the partial and total parking areas.* *(3) The portion of the parking area not to be paved initially shall be landscaped with a ground cover to prevent erosion. The ground cover shall be appropriate for soil conditions, water availability, and the environment. State soil erosion and sediment control standards for soil stabilization should be maintained.* *(4) The applicant shall post separate performance guarantees in addition to the performance guarantees required under the site plan ordinance that shall reflect the cost of installing the additional parking facilities necessary to provide the total number of parking spaces required.* *(5) In lieu of a permanent Certificate of Occupancy, a temporary Certificate of Occupancy shall be issued for a period of two (2) years. Prior to the expiration of the two-year period, the applicant may either install the additional parking shown ion the site plan and apply for issuance of a permanence Certificate of Occupancy, or apply to the [Planning Board] after the use has been in operation for a minimum of eighteen (18) months for a determination as to whether or not the initial parking area provided is adequate. If the [Planning Board] determines that the parking facility is adequate as originally constructed, the performance guarantees shall be released and a permanent Certificate of Occupancy issued. If, however, the [Planning Board] determines that the partial off-street parking area is not adequate, the applicant shall be required to install the additional parking facilities in accordance with the terms of the performance guarantees prior to*

	issuance of a permanent Certificate of Occupancy.
3. Size of Spaces Parking stall dimensions should take into consideration the location and the specific land use served by the parking area. The dimensions should also consider the size of the vehicles likely to use the parking spaces. The standards shown in this section are based on national recommendations and the authors' professional experience. c. The 8.5 foot width by 18 foot length dimension has been recommended in a recent New Jersey publication *Getting it Right on the Money* (Bier et al 2006). d. The practice of designating separate areas in parking lots for compact cars became widespread during the 1990s as a means of reducing impervious cover, providing the required number of spaces, and lowering construction costs. Some authorities, however, believed that the separate areas did not work well in practice and were often filled with full-sized cars. The growing popularity of sports utility vehicles (SUVs) in the 2000s further exacerbated the problems with the smaller-sized parking stalls (a typical SUV measures between 15 and 17 feet in length and between 6 and 7 feet in width). Data show that New Jersey experienced the same nationwide explosion of SUV ownership. In 2002, one in six New Jersey motorists owned an SUV (U.S. Census Bureau, available at http://www .census.gov/prod/ec02/viusff/ec02tvff-nj.pdf). Recently, many communities have either eliminated compact car areas or considered doing so. Nevertheless, a community may still decide to allow compact car stalls in situations where fewer in and out movements are anticipated and where users are more likely to use compact car spaces appropriately, for example, in employee lots where the usage of such spaces can be monitored. e. As mentioned above, parking dimensions should take into consideration the specific land use served by the parking area. Where parking duration is very short, such as at a neighborhood convenience store and, especially, when packages or young children are moved in or out of the passenger compartment, wider parking spaces are desirable. Adequate width in these situations is critical to prevent vehicle property damage (dings and dents) due to cramming narrow parking spaces into a small area to meet total parking space requirements. However, where parking durations are quite long or even all day, narrower spaces are permissible. This may be less of an issue in infill development, however, since the number of required parking spaces is less than for conventional development.	*3. Size of Spaces* *The following minimum parking space dimensions shall apply:* *a. Curb side parking – seven (7) feet in width by twenty-three (23) feet in length.* *b. Off street surface parking lots – nine (9) feet in width by eighteen (18) feet in length.* *c. Off street parking garage structures – eight and one half (8.5) feet in width by eighteen (18) feet in length.* *d. Smaller dimension compact car spaces are permitted, such as a sixteen and one-half (16.5) length. These are most appropriate in employee or long-term parking situations and should be avoided where turnover is high.* *e. Parking space dimensions may further be modified by the land use served.*
4. Design of Parking Areas a. Rather than include detailed diagrams of acceptable parking lot layout and entrance and exit design, the document substitutes a performance standard on the presumption that the	*4. Design of Parking Areas* *a. Parking garages shall meet the following design requirements:*

planning board engineer will determine the safety of the plan design. Poorly designed lots and garages result in confusion, frustration, traffic accidents, and damage to parked vehicles. See *Getting it Right on the Money* (Bier et al. 2006) for detailed design recommendations for structured parking in smart growth situations, including infill.	*(1) Be even with or behind building façades;* *(2) Be no taller than any building within __ feet of the parking garage;* *(3) Extend no more than __ feet along any street frontage, without a vertically prominent and active use interrupting the parking streetscape;* *(4) Have facades that are compatible in texture, color, articulation, and detailing with adjacent buildings; and* *(5) Have entrances that are oriented toward the side or rear of properties whenever possible.* *b. Parking lots, approved as a conditional use, shall meet the following design requirements:* *(1) Be in the rear and/or interior side of buildings; no surface parking for motor vehicles is allowed between the front property line and the adjacent building;* *(2) Be even with or behind building façades;* *(3) Extend no more than __ feet along any street frontage, without a vertically prominent and active use interrupting the parking streetscape;* *(4) Be screened from any adjacent street by a wall 3 to 4 feet in height; alternatively, landscaping 3 to 4 feet high may be used if it screens parking with a least __ percent opacity; and* *(5) Aisle lengths should not exceed 350 feet without a cross aisle for vehicle circulation.* *(6) Access to parking lots shall be designed to facilitate entering traffic so as not to induce queues on travel ways.* *(7) The width of all aisles providing direct access to individual parking stalls shall be in accordance with the requirements specified in table IX.6. Only one-way traffic shall be permitted in aisles serving single row parking spaces placed at an angle other than 90 degrees.* *(8) Where sidewalks in parking areas abut parking areas, a minimum of five (5) feet shall be provided with parking on one side and six (6) feet with parking on two sides.* *9) Be landscaped as prescribed in sections VII and XI.3.* 5. *Lighting of Parking Areas* (See section XI.1)

TABLE IX.6
Parking Angles & Aisle Widths

PARKING ANGLE (degrees)	Aisle Width (feet)
30	***12***
45	***13***
60	***18***
75	***22***
90	***24***

D. Stormwater

1-2. Application of regulatory requirements.

In response to the Federal Water Pollution Control Act (Clean Water Act) a National Pollution Discharge Elimination System (NPDES) was developed that relied on "best management practices" (BMPs) to manage stormwater (Nisenson 2005, 7, 12). While not intentional, site-(or project-) focused, BMPs designed to lessen impervious cover and in other ways to enhance water-handling benefits on-site worked to the disadvantage of infill. "Urban developers increasingly encountered resistance to infill and redevelopment projects based on predictions of additional stormwater-related impacts to urban streams" (Nisenson 2005, 15).

The purpose of this section is to reverse the above-described situation and to incorporate stormwater management regulations that further infill.

The changes to the existing regulatory framework for stormwater management cannot be accomplished through a change to the local ordinance alone. Since these parameters have been established through regulations enacted by the state (e.g., in New Jersey, by the Departments of Environmental Protection (DEP) and Community Affairs), state action is necessary.

To illustrate, the New Jersey Department of Environmental Protection Stormwater Management Rules at N.J.A.C. 7:8 do not address the special needs of infill projects. The regulatory requirements apply to all major development, which is defined as "any 'development' that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre of more. Disturbance for

D. Stormwater

1. Application of regulatory requirements.

Infill projects shall be subject to the [state] Stormwater Management rules but shall be granted greater flexibility in meeting the existing standards based on infill's inherent benefits.

the purpose of these rules is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting or removing of vegetation." Development is defined as "the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, for which permission is required under the Municipal Land Use Law."

Given the above, the document calls for flexible state stormwater regulations for infill.

2. *Infill project-specific stormwater best management practices should be identified.*

a. Infill projects should manage stormwater to the maximum extent practicable as determined by the design engineer.

b. Stormwater management should incorporate best management practices (BMPs) developed specifically for infill projects. These BMPs should accommodate the restrictions of the infill site, including space limitations, the need for maximizing impervious cover, the need for encroachment into special water resource protection areas, and onsite contamination for brownfield redevelopment projects.

c. Reflecting their varying stormwater management conditions, differing BMPs may be developed for small infill sites, large infill sites, contaminated infill sites, and [other] sites.

d. Examples of BMPs supportive of smart-growth and infill are found in table IX.7.

3. Some New Jersey stormwater regulations already may further smart growth and infill (see table IX.7). Particular attention should be paid to such stormwater management rules as:

- Mandatory non-structural strategies
- Impervious cover limits
- Recharge requirements
- Total suspended solid (TSS) removal requirements
- Stormwater runoff quantity requirements
- Special water resource protection area requirements

These standards should strike a balance between the required stormwater management and the successful completion of the infill project.

In many instances, an infill project will actually improve the existing conditions even though the project may not meet the minimum requirements of the existing stormwater management rules.

3. *Develop infill project-specific standards and thresholds.*

a. Infill-specific stormwater management requirements shall be developed based on the site restrictions typical to infill projects.

In each category, the existing standards should serve as a goal for infill projects, which should be required to meet a maximum extent practicable test as determined by a design engineer. This test will vary depending on the type of infill project (redevelopment, brownfield, previously undeveloped site, and so forth) and its location. To accommodate the range of projects that will be encountered, the maximum extent practicable test is a more workable alternative than developing specific standards. See table IX.7 for examples.

b. Infill projects should be given credit toward meeting stormwater management goals for improving existing conditions.

4. *Water Quality.*

a. Small infill sites (less than 10 acres) shall be permitted to use one of any pre-approved water quality treatment devices, such as oil water separators, sediment trash traps, and vortex separators and filters, and so forth. No state approval is required.

	b. Large infill sites (10 acres or more) must achieve 50 percent removal of total suspended solids using DEP approved BMPs. *c. Contaminated infill sites shall be remediated to DEP standards and then use one of the pre-approved water quality treatment devices as identified for small sites.* *5. Recharge. No requirement for recharge shall be imposed for any infill project.* *6. Water Quantity.* *a. Small infill sites (less than 10 acres), shall ensure against localized flooding.* *b. Large infill sites (10 acres or more) must comply with the DEP stormwater rules; however, emphasis should be added to the rules that underground detention is acceptable.*

TABLE IX.7
Stormwater Best Management Practices (BMPs) to Further Smart Growth and Infill

OBJECTIVES AND CONCEPTS

- Couple smart growth planning with site design criteria to further improve the watershed-wide benefits of the smart growth and redevelopment plans.
- Implement watershed-wide or regional policies to consider simultaneously areas for growth and those for conservation.
- Effect better designs for reducing the impervious surfaces associated with development, such as compact street designs and lower parking requirements.

EXAMPLES

New Jersey has developed a successful strategy for considering both smart growth and stormwater in its state water quality and smart growth plans. In seeking to meet the dual goals of reducing runoff and replenishing aquifers, the state has developed policies to encourage growth in targeted areas while protecting environmentally sensitive areas and open space. The state's regulations are divided into requirements for runoff control and requirements for infiltration. Redevelopment and infill in designated urban areas are exempt from the stormwater infiltration rules. The reasons supporting the policy are: (1) recharge regulations can pose a regulatory barrier to redevelopment, (2) the regulations can be impractical in highly urbanized areas and (3) recharge is not always desirable in areas with environmentally compromised soils.

California. The Santa Clara Valley Urban Runoff Pollution Prevention Programs (SCVURPPP;s) 2001 Phase 1 permit renewal recognized that there could be cost-effective opportunities to implement stormwater control during the land use approval process. In particular, SCVURPPP noted several smart growth options, including neo-traditional street design standards and more effective use of existing parking spaces. The permit goes further, nothing that certain development projects, such as transit villages, are likely to be exempt from several requirements because hey are typically built in areas already covered with impervious surfaces.

The SCVURPPP permit lists numerous criteria for onsite stormwater control requirements but also include flexibility by allowing its permitees to document where standard criteria would be impractical, where compensatory mitigation would be allowed, and where localities could use alternative strategies to better match stormwater control techniques to the local condition.

San Jose, California is one of the co-permitees under the SCVURPPP program. The city sought to incorporate the new guidance from the 2001 permit into its local stormwater ordinance and into its smart growth initiative, the San Jose 2020

Plan.

The two main areas that allow consideration of smart growth include.

- *Finding of Impracticality*: San Jose structured its policy to take advantage of the SCVURPPP permit's flexibility, as noted above. Under the permit, deviations from the standard requirement could be established through a finding of impracticality. San Jose' policy includes some of the more common reasons for a finding of impracticality, such as soil type, but also recognized that the natural onsite measures for infiltration and runoff control can be impractical in built-out, urban areas.
- *Flexibility*: If there is a finding of impractical, the San Jose policy allows several alternatives to the permit's standards that *recognized the benefits of smart growth* projects (e.g. significant redevelopment within the urban core and brownfields projects).

Poway, California has defined BMPs to include redevelopment projects that improve stormwater performance as compared to conventional designs.

Source: Niesenson (2005, 20-21.)

E. Water Supply	***E. Water Supply***
1. While public utility law generally holds that utilities have a "duty to serve" all customers who can pay for the service, water service and planning should be aligned with land use plans and regulations, such as those associated with smart growth and infill (Van Lare and Arigoni 2006, 17).	*1. Water utility's "duty to serve" should take into account land use planning that further smart growth and infill.*
2. The changes to the existing regulatory framework for water supply cannot be accomplished through a change to the local ordinance alone. As these parameters are usually adopted by formal rulemaking by non-local entities (e.g., in New Jersey, by the Department of Environmental Protection and/or the local purveyors of water), extralocal action is required to ensure sufficient water supply for infill. To illustrate, in New Jersey, water supply is currently regulated pursuant to the Water Allocation Rules at N.J.A.C.7:19 and the Safe Drinking Water Act rules at N.J.A.C. 7:10. These rules establish the tests and standards that must be met to supply and provide water. These regulatory programs do not establish any priorities for supplying water based on location or project type. Water is supplied on a first come first serve basis—and infill projects may not be the "first come." Instead of the "first come" standard, infill projects should be granted priority with regard to water supply. In no instance should water supply be a deterrent to these projects. Where water supply is a limiting factor, the state should identify alternative sources and work to make such sources available. Where water supply is not the limiting factor, infill projects should be granted priority over noninfill projects with regard to water supply. These infill-supportive policies have been put into effect by some jurisdictions. As noted by Van Lare (2005, 20) "Salt Lake City applies two sets of fees: one to infill sites within existing city lines and one to the growing Northwest Quadrant area. San Antonio waives water and other fees in infill areas the city has targeted for redevelopment. San Antonio also charges lower water rates to customers inside the city limits."	*2. Water supply for infill projects should be granted priority over other noninfill projects.*

3. Water is a limited resource that requires money and raw materials for treatment, both before and after use. The indicated recommendations help decrease the amount of municipal water needed for buildings.	3. *Infill projects should be designed to incorporate and maximize water conservation and water reuse opportunities. As an example, consider installing native plants and xeriscaping so the amount of irrigation necessary is minimized. Decrease the quantity of potable water used for landscape. (For more information see LEED Water Efficiency credit 1.) Install ultra low flow fixtures in bathrooms, and consider reusing roof runoff volumes for flushing toilets in order to reduce the amount of potable water required. (For more information see LEED Water Efficiency credit 3.)*
4. Design standards for water consumption may be based on outdated data (e.g., household size data from 1990 or earlier), or on data not specific to infill. Table IX.8 develops design requirements for water consumption based on 2000 census information applicable to infill developments.	4. *Water design standards for infill should reflect infill-specific demographic profiles that bear on water usage. The figures in table IX.8 may be used as a guide.*
5. The United States Green Building Council has established various goals, including water conservation, for new development and is currently working on water conservation goals for residential development. Alternative design flows for water supply for infill projects should be established. These flows should incorporate water conservation and water reuse as well as other infill-specific factors that will impact water use (e.g., household size). The LEED rating system identifies the potential to limit site irrigation water use (a reduction of up to 100 percent) with use of captured rainwater for irrigation purposes. Landscape design should focus on limiting the need for irrigation as well. As noted earlier, table IX-8 establishes water demand figures for various residential and commercial infill developments in terms of gallons per person per day (gpd). It incorporates the most current and infill-specific demographic data (e.g., household size). The LEED water demand figures in this table show a reduction (about 20 percent) that will result from LEED design requirements. The water demand figures shown in table IX.8 may differ from the standards currently prevailing in New Jersey. For example, the table shows water demand for a two-bedroom apartment at 145 gpd for the standard and 120 gpd for the LEED scenario, compared with the existing New Jersey water standard of 175 gpd for the same two-bedroom housing unit. Non-irrigation water use can be reduced by 20 percent to 30 percent by using high-efficiency fixtures and by reusing stormwater and greywater. Indoor use accounts for approximately 60 percent of all residential use, according to the United States Environmental Protection Agency. Thus, a significant water savings can be accomplished.	5. *Standards for water conservation and reuse for infill projects should be established. Standards may draw on the water conservation techniques specified in the LEED rating system. Table IX.8 may be used as a guide.*
6. Infill projects should be granted priority government assistance with regard to infrastructure improvements needed to ensure the necessary water supply.	6. *Provide necessary infrastructure or other assistance where needed for the provision of water supply capacity for infill projects. Where water supply capacity is limited or unavailable, assistance with regard to water supply infrastructure should be provided (see also section IV.B).* ***F. Wastewater***

F. Wastewater

As with respect to storm water and water supply regulation, the changes to the existing regulatory framework for wastewater to encourage infill cannot be accomplished through a change to the local ordinance alone. In New Jersey, these wastewater parameters have been adopted through regulations enacted by the Department of Environmental Protection and the local Municipal Utilities Authority.

2 and 3. Where wastewater treatment capacity is limited, infill projects should be given priority over noninfill projects. In addition, assistance with regard to infrastructure or other means of providing treatment should be provided. Further, where onsite individual subsurface disposal systems are to be used, innovative and alternative technologies should be encouraged and permitted.

4 and 5. Currently, comprehensive environmental reviews are required in instances where there are changes to existing water quality management plans and wastewater management plans. These reviews are required in accordance with the Water Quality Management Planning rules and Executive Order (EO) 109. Infill projects are the preferred form of development and thus are inherently beneficial to the environment. As such, infill projects should be considered as compliant with the requirements of the EO109 reviews, and any changes necessary to the existing plans should be processed as revisions, rather than as amendments.

6. Infill projects should incorporate the most advanced design technologies with regard to waste flows. As such, alternative design flows specific to infill projects should be developed. Design standards for waste flows should reflect infill-specific demographic and other characteristics.

Table IX.8 includes wastewater flow estimates for infill development. The Standard flows are based on established engineering methodologies. The Standard flow figures do not represent any decrease in flow because without other design changes, infill development may not result in reductions in flow. What has changed is the incorporation of the most current and infill-specific demographic data (e.g., household size). The LEED flow numbers show even more of a decrease, ranging from 15 percent to approximately 21 percent.

Like the water demand values, the wastewater values shown in table IX-8 are lower than those currently prevailing in New Jersey. To illustrate, the table shows wastewater flow for a two-bedroom garden apartment at 130 gpd for the standard and 110 gpd for the LEED scenario compared with the existing New Jersey wastewater standard of 225 gpd for the same two-bedroom housing unit.

G. Energy Efficiency

According to the US Department of Energy reports, buildings

1. Infill projects shall be granted priority with regard to available wastewater treatment plant capacity.

2. Necessary infrastructure or other assistance should be provided where needed for the provision of wastewater treatment of infill projects.

3. Alternative and innovative technologies that are acceptable and allow for use of such treatment for infill projects should be identified.

4. State Water Quality Management rules should be modified to allow for revisions to Water Quality Management Plans for infill projects.

5. All infill projects should be considered as compliant with the requirements of Executive Order 109.

6. Criteria for wastewater technologies for infill project should be established. Corresponding alternative design flows for infill development should be developed. Table IX.8 may be used as a guide.

G. Energy Efficiency

1. Buildings in an infill area shall be designed to meet or exceed by [15%] the state energy code or the most recent edition of ASHRAE/IESNA Standard 90.1 (without

consume approximately 40% of the energy and 70% of the electricity produced in the United States. Seventy percent of the nation's energy is produced by burning fossil fuels, which are non-renewable resources and a major source of pollution. The indicated guidelines are intended to reduce the demand for energy brought on by infill.	*amendments), whichever is more stringent. (For more information see LEED Energy & Atmosphere perquisite 2 and credit 1.)* *2. Building owners in an infill area are encouraged to provide a portion of the total energy used an infill area by building with on-site renewable sources, such as photovoltaic systems. (For more information see LEED Energy & Atmosphere credit 2.)*

TABLE IX.8 **Water Demand/Wastewater Flows by Type of Establishment**					
Type/Size	Number of Residents	Water Demand (Gallons per Day)		Wastewater Flows[c] (Gallons per Day)	
		Standard[a]	LEED[b]	Standard	LEED
Single-family detached					
2 Bedroom	2.15	215	175	195	160
3 Bedroom	2.91	290	235	260	210
4 or more bedrooms	3.86	385	310	345	280
Garden apartment					
1 Bedroom	1.63	125	100	115	90
2 Bedroom	1.95	145	120	130	110
3 Bedroom	2.72	205	165	185	150
Townhouse					
2 Bedroom	1.91	145	115	130	105
3 Bedroom	2.44	185	150	165	135
4 Bedroom	3.22	240	195	215	175
High-rise					
Studio	1.07	80	65	70	60
1 Bedroom	1.34	100	80	90	75
2 Bedroom	2.14	160	130	145	120
Commercial	(d)	0.125[d]	0.100[d]	0.100[d]	0.08[d]

Notes: [a]Based on 100 gallons per person per day for single-family detached units and 75 gallons per person per day for other housing types (rounded).

[b]Based on LEED building measures reducing flows to 80 gallons per person per day for single-family detached units and 60 gallons per person per day for other housing types (rounded).

[c]Based on wastewater flows being 90 percent of water demand for residential + 80 percent for commercial (rounded).

[d]Commercial demand/flows based on gallons per day per square foot.

G. Permit Processing	***G. Permit Processing***
Timing is a key element in any development project. Obtaining approvals from state agencies can be a complicated and costly process, and, in some instances, can delay, or even, stop infill development. By definition, infill projects are in smart-growth areas and meet certain environmental tests. As such, the need for additional comprehensive environmental reviews is minimized. To encourage infill projects and to reduce the cost of processing state approvals, state permits for infill should be streamlined and expedited to the maximum extent practicable. State agencies should work with the applicant to minimize delays and costs. These projects—reflecting the philosophy for preferred processing for infill development enunciated in section VI—should be granted priority with regard to processing and review.	*State stormwater, water quality, water supply, and wastewater permitting and approval processes for infill developments should provide for expedited timeframes, minimized costs, and maximum assistance (see also section VI).*

Section Ten (X)
Documents to be Submitted

The study’s requirements for documents to be submitted organizes and lists submission items. Three categories of information are required:

(1) *basic project and plat information* (i.e., applicant's name, block and lot number, zoning district, key map, signature blocks, etc.);

(2) *setting and environmental information* (i.e., key map, location of flood plains, wetlands, and other sensitive areas, drainage calculations, topography, vegetation, etc.); and

(3) *project improvement and construction information* (circulation, parking, landscaping, lighting, architectural plans, etc.).

To help the expeditious and "rational" consideration of development applications, the study’s list of documents to be submitted is keyed to different stages in the development process: the preliminary pre-application and concept plan stage, the General Development Plan (GDP) review stage, and the final review stage when applications are reviewed according to their category—minor or major (see section VI and chapter 6).

Section Ten (X)
Documents to be Submitted

A. Purpose

The documents to be submitted are intended to provide the approving authority with sufficient information and data to ensure compliance with all municipal codes and specifications and ensure that the proposed development meets the design and improvement standards contained in this document. The specifications of items to be submitted is based on the type of development and particular stage of development application.

B. Requirements

The documents to be submitted are shown in table X-1. In specific cases and for documented reasons, the approving authority may waive the submission of a particular document. The reasons for the waiver shall be indicated in the minutes of the approving authority. The approving authority may request additional information, but such request cannot hold up a completeness ruling.

The preliminary pre-application/concept plan stage is *not* mandatory, but a developer can request the planning board to hold an informal review for a development for which the developer plans to submit an application for development. The developer is not bound by the concept plan for which the review is requested, nor is the planning board bound by the review. For the pre-application/concept plan stage, only preliminary project and area information, which, for the most part, is readily obtainable, would be submitted. Examples include a tax map sheet, north arrow, and topographic features from the United States Coast & Geodetic Survey (U.S.C. & G.S.).

At the later review stages, more detailed information is requested, especially for the major site plan category of development applications. To illustrate, the specification of contour intervals is required for a major site plan, whereas specification of topographical features is sufficient for a minor site plan application.

This same philosophy is incorporated in the specification of items to be submitted for a GDP. The GDP is the stage before preliminary site-plan review. It is designed to permit the developer of a complex project, such as a mixed-use and staged infill project, to go before the planning board with a description, but not full engineering details, of a development and secure formal approval of basic development parameters, such as major circulation patterns. Once having secured such approval—an agreement that cannot be obtained in a binding manner at the informal or pre-application stage—the developer proceeds with full engineering plans (which may be for only a portion of the total development in accordance with an approved GDP phasing plan) to be considered at length at the preliminary site-plan review stage.

Since the GDP allows the review of infill projects without immediately necessitating all detailed project engineering plans, the document calls for only those submission items that are appropriate for overall project consideration, such as the site and contextual analysis composite maps and the general project circulation pattern. Deliberately not required at the GDP stage are detailed engineering specifications, such as drainage calculations, a soil erosion plan, and road cross-sections and profiles. It makes little sense to submit these items when the planning board has yet to decide on the exact size and land-use mix of a major project. Once this determination is made at the GDP stage, detailed engineering specifications are then appropriately submitted at the preliminary major site plan review stage.

It is further noted that the model document permits a waiver of a submission item if it is deemed unnecessary. Documents should be required only if functionally necessary for proper site plan review.

TABLE X.1

REQUIRED SUBMISSION DOCUMENTS

		DEVELOPMENT STAGE				
			Minor	Major Application		
Item Number	Description	Pre-Application/ Concept Plan	Application Site Plan	General Development Plan	Site Plan Preliminary	Site Plan Final
I.	PROJECT-PLAT INFORMATION					
1.	Name, address of owner and applicant.	X	X	X	X	X
2.	Affidavit of ownership or permission of owner to file.	X	X	X	X	X
3.	Name, signature, license number, seal and address of engineer, land surveyor, architect, planner, and/or landscape architect, as applicable, involved in preparation of plat.	X (no seals)	X	X	X	X
4.	Title block denoting type of application, tax map sheet, county, name of municipality, block and lot, and street location.	X	X	X	X	X
5.	A key map at specified scale showing location of tract with reference to surrounding properties, streets, municipal boundaries, etc., within 500'.	X	X	X	X	X
6.	A schedule of required and provided zone district(s) requirements including lot area, width, depth, yard setbacks, building coverage, open space, parking, etc.	X	X	X (vested items only)	X	X
7.	North arrow and scale.	X	X	X	X	X
8.	Proof that taxes are current.		X	X	X	X
9.	Signature blocks for Chairman, Secretary, and Municipal Engineer.		X	X	X	X
10.	Date of current property survey.		X	X	X	X
11.	One (1) of four (4) standardized sheets: 30" x 42" 24" x 36" 15" x 21" 8.5" x 13"		X	X	X	X

(continued)

TABLE X.1

REQUIRED SUBMISSION DOCUMENTS (CONTINUED)

		DEVELOPMENT STAGE				
			Minor	Major Application		
Item Number	Description	Pre-Application/ Concept Plan	Application Site Plan	General Development Plan	Site Plan Preliminary	Site Plan Final
12.	Metes and bounds description showing dimensions, bearings, curve data, length of tangents, radii, arcs, chords, and central angles for all centerlines and rights-of-way, and centerline curves on streets.		X		X	X
13.	Acreage of tract to the nearest tenth of an acre (for GDP and pre-application/ concept plan, to nearest acre).	X	X	X (general)	X	X
14.	Date of original and all revisions.	X	X	X	X	X
15.	Size and location of any existing or proposed structures with all setbacks dimensioned (for GDP and preapplication/concept plan, general location but not setbacks).	X (general)	X	X (general)	X	X
16.	Location and dimensions of any existing or proposed streets (for GDP and preapplication/concept plan, general locations).	X (general)	X	X (general)	X	X
17.	All proposed lot lines and area of lots in square feet. (If tract to be subdivided, subdivision application must also be filed.)		X		X	X
18.	Copy and/or delineation of any existing or proposed deed restrictions or convenants.	X (existing)	X	X (existing)	X	X
19.	Any existing or proposed easement or land reserved for or dedicated to public use.[1]	X	X	X	X	X
20.	Development stages or staging plans (for GDP, general staging).			X (general)	X	X

TABLE X.1
REQUIRED SUBMISSION DOCUMENTS (CONTINUED)

		DEVELOPMENT STAGE				
			Minor	Major Application		
		Pre-Application/ Concept Plan	Application Site Plan	General Development Plan	Site Plan	
Item Number	Description				Preliminary	Final
21.	List of required regulatory approvals or permits.[2]		X	X (vested items only)		X
22.	List of variances required or requested.[1]		X		X	X
23.	Requested or obtained design waivers or exceptions.[2]		X		X	X
24.	Payment of application and escrow fees.	X	X	X	X	X
II.	SETTING-ENVIRONMENTAL INFORMATION					
25.	Property owners and lines of all parcels within 200' identified on most recent tax map sheet.		X	X	X	X
26.	Composite site features and constraints map and analysis.		X	X	X	
27.	Composite contextual features map and analysis.		X	X	X	
28.	All existing streets, water courses, flood plains, wetlands, or other environmentally sensitive areas on site; all existing streets, water courses, and flood plains within 200' of site.	X (general)	X	X (general)	X	X
29.	Existing rights-of-way and/or power and utility easements on and within 200' of tract.	X	X	X (vested items only)	X	X
30.	Topographical features of subject property from U.S.C.&G.S. map.	X	X	X		
31.	Existing and proposed contour intervals based on U.S.C.&G.S. data. Contours to extend at least 200' beyond subject property as follows: up to 5% grade = 1' contour interval 5%+ grade = 2' contour interval		X (if necessary)		X	X

TABLE X.1
REQUIRED SUBMISSION DOCUMENTS (CONTINUED)

		DEVELOPMENT STAGE				
			Minor	Major Application		
Item Number	Description	Pre-Application/ Concept Plan	Application Site Plan	General Development Plan	Site Plan Preliminary	Site Plan Final
32.	Boundary limits, nature, and extent of wooded areas, specimen trees, and other significant physical features (details may vary).	X (general)	X	X (general)	X	X
33.	Existing system of drainage of subject site and of any larger tract or basin of which it is a part.		X	X (general)	X	X
34.	Drainage Area Map.			X (general)	X	X
35.	Drainage calculations.			X (general)	X	X
36.	Perc tests.		X		X	X
37.	Environmental Impact Statement (formal where required).			X	X	
III.	IMPROVEMENTS AND CONSTRUCTION INFORMATION					
38.	Proposed utility infrastructure plans, including sanitary sewer, water, stormwater management.		X	X	X	X
39.	Proof of utility service, including telephone, electric, gas, cable TV, sewer, water.		X	X (general availability)		X
40.	Soil Erosion and Sediment Control Plan.		X		X	X
41.	Spot and finish elevations at all property corners, corners of all structures or dwellings, existing or proposed first floor elevations.		X	X (general location of buildings)	X	X
42.	Construction details as required by ordinance.		X (if necessary)		X	X
43.	Road and paving cross-sections and profiles.				X	X
44.	Proposed street names.				X	X

TABLE X.1
REQUIRED SUBMISSION DOCUMENTS (CONTINUED)

		DEVELOPMENT STAGE				
			Minor	Major Application		
Item Number	Description	Pre-Application/ Concept Plan	Application Site Plan	General Development Plan	Site Plan Preliminary	Site Plan Final
45.	Lighting plan and details. Lighting schedule.		X		X	X
46.	Landscape plan and details. Maintenance plan.		X		X	X
47.	Solid waste management plan.		X		X	X
48.	Site identification signs, traffic control signs, and directional signs, including sign application package (see attached).		X		X	X
49.	Sight triangles.		X		X	X
50.	Vehicular and pedestrian circulation patterns (less detail necessary for preapplication/concept plan and GDP stages).	X (general)	X	X (general)	X	X
51.	Parking plan showing spaces, size and type, aisle width, curb cuts, drives, driveways, and all ingress and egress areas and dimensions.	X (general)	X	X (general)	X	X
52.	Preliminary architectural plans and elevations.		X		X	X
53.	Proof of compliance.		X			X
IV.	TRAFFIC IMPACT REPORT					
54a.	Establish study design and verify existing peak hour traffic.			X	X	X
54b.	Project peak hour traffic situation without development.			X	X	X
54c.	Project peak hour site development traffic.			X	X	X
54d.	Project future peak hour traffic situation with site developed.			X	X	X
54e.	Develop site access related solutions.			X	X	X
54f.	Develop offsite related solutions and assess offsite contribution.				X	X

54g.	Develop agreement for offsite contribution.				X	X

TABLE X.1
REQUIRED SUBMISSION DOCUMENTS (CONTINUED)

		DEVELOPMENT STAGE				
			Minor	Major Application		
					Site Plan	
Item Number	Description	Pre-Application/ Concept Plan	Application Site Plan	General Development Plan	Preliminary	Final
55.	Traffic Demand Management plan.				X	X

Notes:

Items 28–37 - These would often be included in or referred to in the composite site features and constraints map and analysis, and in the composite textual features map and analysis.

Item 32 - May be required by Planning Board for minor site plan for particular site specifics.

X = Item required at indicated development stage.

[1] Proposed restrictions or convenants do not have to be included for pre-application/concept plan and GDP stages.

[2] Conditional approval may be granted subject to other regulatory approvals.

Documents to be Submitted

I. PROJECT—PLAT INFORMATION

- 1, 2. Basic, readily available information.
- 3. Authorship of documents should be indicated.
- 4. Basic, readily available information.
- 5. Describes setting; may be less detailed in pre-application.
- 6. May be less detailed in pre-application/concept plan stages.
- 7. Items necessary for orientation.
- 8. Basic, readily available information.
- 9. Not relevant at pre-application/concept plan stages.
- 10. Basic information.
- 11. May be specified by state statute.
- 12. Such detail is unnecessary for pre-application/concept plan, and GDP.
- 13. GDP does not require detail because of its conceptual focus.
- 14. Item necessary for continuity and history of project.
- 15, 16. Item important for detailed planning.
- 17. Unnecessary for pre-application/concept and GDP stages.
- 18. Item basic to planning.
- 19. Basic, readily available information.
- 20. Not applicable at pre-application/concept plan stage; minor plans not usually built in stages.
- 21, 22, 23. Basic planning information
- 24. Required by ordinance; should reflect locally incurred review costs.

II. SETTING—ENVIRONMENTAL INFORMATION

- 25. Describes location of all adjacent structures; not necessary at pre-application/concept plan stages.
- 26, 27. Necessary for basic environmental and site design analysis.
- 28. While detailed specification of environmentally sensitive areas may not be necessary at pre-application/concept plan and GDP stages, general specification of and sensitivity to such conditions are important planning considerations.
- 29. Rights-of-way and easements are often unknown at the pre-application/concept stages.
- 31. Major site plan applications require level of detail of item 31 as opposed to item 30.
- 32. Basic for good planning and site design.
- 33, 34. See item 31. Extensive level of detail required only for major site plan applications.
- 35. Required for minor applications if deemed necessary by planning board; not required at GDP stage because storm water management evaluated at major site plan stage.

36. Necessary where using septic systems. 37. Required for larger scale developments only. III. IMPROVEMENTS AND CONSTRUCTION INFORMATION 38, 39. Information necessary for minor as well as major site plan applications because of potential effect on utility systems. Only general location required for telephone, electric, and cable TV. 40. Required for soil disturbance of over 5,000 square feet. 41, 42, 43. Such level of detail is generally necessary only for major applications. 44. Applicable only when new road is proposed. 45. Basic design consideration. 46. Required for site plans because of magnitude of required landscaping. 47. Basic site design consideration. 48. Basic site design consideration. A uniform and complete sign application package is an important requirement to ensure an effective sign review process and uniformity in interpreting local sign provisions. To save time, effort, and money on the part of both the applicant and the municipality, a copy of the sample sign application, the sign standards, and the sign design guidelines should be given to all applicants. 49. Necessary even for minor applications because sight triangle easement created. 50. A lesser level of detail is appropriate for more minor applications. IV. TRAFFIC IMPACT REPORT 51a.–51g. These items indicate appropriate traffic impact calculations by development stage. 52. Where a TDM plan is required or is voluntarily proposed. 53, 54, 55. Basic site design consideration.	

Section XI-1
Lighting

Lighting is usually treated as a minor part of site plan design, and lighting standards are rarely provided in any detail in most ordinances. This document attempts to correct that omission by including lighting guidelines for different applications. Appropriate lighting is especially important to infill given its nature and location.

A. General Requirements

1. The fundamental purpose of lighting is to ensure the security of a property and the safety of its users.

2. As noted in table XI-1, the multiple lighting sources have varying characteristics and advantages and disadvantages. These should be taken into consideration in lamp selection. For example, incandescent lighting, while providing excellent color rendition, is not frequently used outdoors because of its short life and poor efficiency. Florescent lighting, which has a moderate lamp life, is also not used outdoors in colder climates since it is inefficient. Mercury vapor lighting, which as an extremely long lamp life and fair color rendition, has poor efficiency, which in turn provides poor lighting levels when it begins to deteriorate. Metal halide and high pressure sodium are the most commonly used lighting sources because of their high efficiency and lamp life; however, high pressure sodium can cause a glare and some designers prefer to use other lighting sources. Finally, low pressure sodium lighting, while exhibiting high efficiency and lamp life, is not commonly used because of its large size and poor color distinctions. Induction lighting is an alternative introduced recently that offers an energy-efficient white lighting option with a long life. However, it has an expensive initial cost, and retrofitting existing fixtures for induction lighting is difficult. Induction lighting is now in use at the Liberty Science Center in New Jersey and in Philadelphia, Sacramento, San Diego, and Tacoma (Local Government Commission n.d., 5).

3, 4, 5 and 6. Although safety and security are paramount in the lighting plan design, care must be taken in the design and in the placement of lighting fixtures to avoid excess amounts of light spillage or other adverse effects on adjacent properties—a special concern for infill. The ordinance contains provisions intended to prevent this from occurring: flashing lights, floodlight, and spotlights, for example, must be designed so as to eliminate glare.

To further the goal of creating pedestrian-friendly infill projects with a sense of place, lighting fixtures and light levels should be designed and coordinated with the use, colors, and materials used in other elements throughout the site. California's Local Government Commission points out in a special newsletter on street lighting that the choice of lighting design is important in creating different types of night-time ambiances (n.d., 4). For example, the mood of a neighborhood

Section XI-1
Lighting

A. General Requirements

1. Adequate lighting shall be provided on each site for the security of the property and to protect the safety of its users.

2. Different sources of lighting may be used. See table XI-1 as a guideline.

3. Lighting shall be designed so as not to create a hazard or nuisance to the adjoining properties or the traveling public. It shall be designed so as to avoid light spillage beyond the property as well as light pollution and glare above or beyond the site.

4. Lighting that requires a flashing or intermittent illumination shall not be permitted. Lighting that requires change in color, intensity or hue shall likewise be prohibited except when completely shielded from the external segments of the property. Said lighting shall in no way interfere with, detract from, or diminish in any way the effectiveness of any traffic signal or similar safety or warning device.

5. All lighting shall be provided by stanchion or pole-mounted fixtures or by

can be altered by choosing lamps that give off a white or orange glow. It can also be altered by the height and design of the light fixtures that are selected, with shorter, closely spaced poles providing a more pedestrian-friendly atmosphere than widely-spaced lamps mounted at higher levels. Further, coordinating street lighting with other street elements (trees, benches and other street furniture, storefronts) strengthens the perception of the streetscape as a public living room. The Local Government Commission notes that post-top lights are the more traditional and "pedestrian-friendly" option because they are lower in height, closer to the eye, and use lower wattage lamps to avoid glare than taller cobrahead and shoebox style street lights. The Commission recommends using 13-foot high post-top-mounted streetlights to produce a pleasing pedestrian environment and using taller and less ornamental poles for highways and in locations where pedestrians are not an issue. Taller poles with brighter lamps light the roadway for greater distances where traffic moves at higher speeds; in slower speed areas, vehicle headlights provide sufficient illumination.	*bollards and serviced underground. Flood or spotlights that utilize a focused, concentrated light output or directed beam may be used in limited quantity and shall be focused downward to hide the view lamp source and eliminate glare from the fixture. The flood or spotlight may be focused onto opaque non-reflective architectural structures and shall not create light trespass beyond the property line.* *Building-mounted light fixtures with hidden, indirect, or shielded light sources focused downward onto a non-reflective ground plan bay be used.* *6. Lighting levels, colors, and fixture types shall be consistent throughout the site and shall complement site architecture and landscaping.*
7. Because lighting values depreciate with time between relamping and washing cycles, appropriate depreciation factors must be used in designing lighting systems (IES reference volumes may be consulted for the use of light loss factors in calculations). Lighting systems require a continuing program of maintenance to provide the designed illuminance. Where vandalism is likely to be a problem, it can generally be reduced by installing lighting standards measuring at least 10 feet above ground level and through the use of vandal-proof materials.	*7. Lighting shall be designed taking into consideration maintenance requirements and to reduce possible vandalism of fixtures.*
8. Although energy-efficient light bulbs may cost more initially, not only do they save on energy cost, they also have a longer bulb life, which cuts labor costs for bulb replacement.	*8. Use of energy-efficient light bulbs is encouraged.*
9. In addition to requiring a post-development inspection to facilitate maintenance and proper operation, the planning board should consider requesting a lighting manual prepared with information on maintenance, operations, and equipment reordering.	*9. All lighting shall be subject to a post-development inspection by the municipal engineer to determine compliance with the approved lighting plan.*

TABLE XI.1
Guidelines to Commonly Used Light Sources

Source	Emergency Efficiency (lumens/watt)	Lamp Life (hours)	Color Rendition	Advantages/ Disadvantages
Incandescent	10–18	750–2,000	Full color spectrum	Most common light source used in homes Very short lamp life; produces heat Excellent color rendition
Fluorescent	40–75	6,000–18,000	Full color spectrum high blue and green content	Not suitable for low temperatures (for use where ambient air is 80 degrees F) Moderate lamp life
Mercury vapor	30–65	12,000–26,000	Harsh, blue-green spectrum tends	Once commonly used for outdoor lighting; replaced by high-pressure sodium lighting Long lamp life, but poor energy efficiency Fair color rendition
Metal halide	75–125	10,000–20,000	Full multiband spectrum	Can implode Excellent color rendition; provides bright white light; used to light parking lots and arenas Good energy efficiency; moderate lamp life
2 High pressure sodium	60–140	12,000–24,000	Full spectrum	Standard option for street lighting today Long lamp life Light source is yellowish-gold in color Use where color rendition is not important
Low pressure sodium	100–200	14,000–18,000	Yellow monochrome spectrum	Very high energy efficiency, but poor color distinctions, giving rise to safety and aesthetic concerns Lamp size is larger than most other sources, light control difficult
Induction	57–90	10,000–100,000	Full color spectrum	Recently introduced High-quality light, exceptionally long lamp life High initial cost, but high maintenance savings

Sources: Devine Design 1987; Local Government Commission n.d.; IDA 1999.

B. Roadway Lighting This section sets forth lighting requirements for roadway applications, which vary depending on roadway, area, and pavement classifications. In designing a roadway lighting system, the designer should also consider such site-specific conditions as (1) the type of land use abutting the roadway; (2) the type of route; (3) traffic accident experience; (4) nighttime security needs; and (5) roadway specifications including pavement width; the presence and location of curbs, severe grades, and curves; the location and width of sidewalks and shoulders; and the presence and location of driveways, intersections, interchanges, and trees. Although many, if not most, infill projects will be located in built-up areas, others may be large-scale developments located in urban centers adjacent to interstate highways (e.g., Atlanta's Atlantic Station). Therefore, table XI-2 includes lighting specifications for a full range of roadway classifications.	***B. Roadway Lighting*** *1. All roadways shall be sufficiently illuminated to ensure traffic safety under all weather conditions. In determining adequate lighting, the following factors should be taken into consideration:* *a. The brightness of the roadway background, and the ratio of the pavement brightness as seen by either pedestrians or motorists.* *b. The size of objects viewed and their detail, and the brightness of objects viewed on or near the roadway in relationship to them.* *c. The brightness contrast between the object viewed and its general surroundings (the roadway and its adjacent areas).* *d. The time available to the motorist or pedestrian to view the object.* *e. Direct glare from the luminaire, and reflected glare from the pavement surface.* *2. Lighting for roadways shall be provided in accordance with the footcandle levels set forth in XI-2, which take into consideration both the roadway classification size and surface type.* *3. Placement of lighting standards. Roadway lighting should be designed for either a two-sided pole spacing or a one-sided only spacing. Staggered pole arrangements tend to produce better light uniformly.*

C. Parking Areas	*C. Parking Areas*
1. The lighting of parking areas is important for traffic safety, security, protection against vandalism, ease of use, and business attraction. Lighting requirements in open parking areas depend on the amount of usage as indicated by activity levels in table XI–3. If the activity involves a larger than usual number of vehicles, then the lighting recommendations for low and medium activity levels belong in the next higher level of activity.	*1. Lighting for parking areas shall be provided in accordance with the footcandle levels and uniformity ratios set forth in table XI-3.*
2. Exits, entrances, loading zones, pedestrian crossings, and collector lanes may need special consideration in the lighting plan to ensure safety and visibility.	*2. All parking, loading, and unloading areas and walkways thereto and appurtenant passageways and driveways serving commercial, public office, industrial or other similar uses having off-street parking and loading areas and building complexes requiring lighting shall be illuminated adequately during the hours between sunset and sunrise when the use is in operation.*
3. The height of mounting poles should be determined in accordance with community design objectives, the site-specific use, and the requirements of the light source used. Allowing higher poles will minimize the number of poles and total wattage requirements, but communities may prefer more and smaller-scale streetlights of heights no greater than 13 feet to 15 feet.	*3. The lighting plan in and around the parking areas shall provide for non-glare, color corrected lights focused downward. The light intensity provided at ground level shall be a minimum three-tenths (0.3) foot-candle anywhere in the areas to be illuminated and shall average a minimum of five-tenths (0.5) foot-candle over the entire area. Such lighting shall be provided by fixtures with a mounting height not more than twenty-five (25) feet, or the height of the building if attached, whichever is lower. The height of the fixture shall be measured from the ground level directly below the centerline of the luminaire to the lowest direct light-emitting part of the luminaire. Spacing of fixtures shall not exceed five (5) times the mounting height. Except for low-intensity sign and exterior building surface decorative lighting, for each fixture the total quantity of light in lumens radiated above a horizontal plane passing through the light source shall not exceed seven and one-half percent (7 ½%) of the total quantity of light in lumens emitted from the light source.*
4. This provision is intended to reduce excessive nighttime light, which can be a particular nuisance in residential neighborhoods. Of course, adequate lighting for safety and security must be permitted, and municipalities may modify the time limitation set forth in the document.	*4. Any other outdoor lighting, such as building and sidewalk illumination, driveways with no adjacent parking, and ornamental light, shall be shown in the lighting plan in sufficient detail to allow determination of the effects on adjacent properties, traffic safety, and overhead sky glow. The objective of these specifications is to minimize undesirable off-premises effects. No light shall shine directly into residential*

	windows or onto streets and driveways in such manner as to interfere with residential uses and distract driver vision. To achieve these requirements, the intensity of such light sources, light shielding, and similar characteristics shall be subject to site plan approval. *5. Light standards in parking lots should be located where they will not be damaged by parking automobiles. Designers should take into consideration the overhang of the average automobile (approximate 1.5 to 3.3 feet in front and 4.9 feet in the rear).* *6. Lighting of the access road to parking lot areas should match the local highway lighting as much as possible. In some cases, the access road forms part of the parking areas, and, in such cases, the illumination may be incorporated with the parking area and lighting.* *7. Parking lot lighting shall be arranged and shielded so as to minimize undesirable lighting impacts such as glare, excessive illumination of adjacent properties, driver distraction, unnecessary illumination and nightglow. Automatic shut-off or dimming devices shall be required for all light fixtures not required for safety and security after 10:00 p.m., or one-half hour after the closing of any nonresidential use, whichever is earlier.* *8. All parking areas for ten (10) or motor vehicles shall have artificial lighting that will provide an average lighting level of five-tenths (0.) horizontal foot-candle throughout the parking area. The minimum lighting level at any location within the parking areas shall be seventy-five percent (75%) of the average level. Freestanding light poles shall be no higher than the height of the highest principal building served by the parking area.* *9. The fixture style and height of any lighting shall be subject to the approval of the reviewing authority.*

TABLE XI.2
Roadway Light Recommendations*

Recommended Maintained Luminance and Illuminance Values for Roadways					
(a) Maintained Luminance Values (L_{avg}) in Candelas per Square Mile					
Roadway and Area Classification		**Average Luminance L_{avg}**	**Luminance Uniformity L_{avg} to L_{min}**	**Luminance Uniformity L_{max} to L_{min}**	**Veiling Luminance Ratio (maximum)**
Freeway Class A		0.6	3.5 to 1	6 to 1	0.3 to 1
Freeway Class B		0.4	3.5 to 1	6 to 1	0.3 to 1
Expressway	Commercial	1.0	3 to 1	5 to 1	0. 3 to 1
	Intermediate	0.8	3 to 1	5 to 1	
	Residential	0.6	3.5 to 1	6 to 1	
Major	Commercial	1.2	3 to 1	5 to 1	0. 3 to 1
	Intermediate	0.9	3 to 1	5 to 1	
	Residential	0.6	3.5 to 1	6 to 1	
Collector	Commercial	0.8	3 to 1	5 to 1	0.4 to 1
	Intermediate	0.6	3.5 to 1	6 to 1	
	Residential	0.4	4 to 1	8 to 1	
Local	Commercial	0.6	6 to 1	10 to 1	0.4 to 1
	Intermediate	0.5	6 to 1	10 to 1	
	Residential	0.3	6 to 1	10 to 1	

* All luminance values reflect average maintained footcandle levels.
Source: IES 1987.
Notes:

1. Five different roadway classification sizes are recognized by the Illuminating Engineering Society of North America (IES) and the American National Standards Institute (ANSI) and defined as follows:
   a. Freeway: A divided major roadway with full control of access with no crossings at grade. This definition applies to both toll and non-toll roads as follows:
      Class A Freeway: Roadways with greater visual complexity and high traffic volumes. Class A freeways are commonly located in major metropolitan areas and are normally traveled at or near design capacity during the early evening hours of darkness.
      Class B Freeway: All other divided roadways with full control of access, which require lighting for safe operation.
   b. Expressway: A divided major roadway designed for through traffic with partial control of access. In general, there are interchanges at major crossroads. Expressways for noncommercial traffic within parks and park-like areas are often referred to as parkways.
   c. Major: The part of the roadway system that serves as the principal network for through traffic flow. These routes connect areas of principal traffic generation and important rural highways entering the city.
   d. Collector: The distributor and collector roadways serving traffic between major and local roadways. These roadways are used mainly for traffic movement within residential, commercial, and industrial areas.
   e. Local: Roadways used primarily for direct access to residential, commercial, industrial, or other abutting properties. They do not include roadways carrying through traffic. Long local roadways are often divided into shorter sections by collector roadway systems.

   Three area classifications (abutting land uses) are recognized by IES and defined as follows:
   a. Commercial. A business area of a municipality where ordinarily there are many pedestrians during night hours.

b. Intermediate. Those areas of a municipality often characterized by moderately heavy nighttime pedestrian activity such as blocks having libraries, community recreation centers, large apartment buildings, industrial buildings, or neighborhood stores.
c. Residential. A residential development, or a mixture of residential and small commercial establishments, characterized by few pedestrians at night. This definition includes areas with single-family homes, townhouses, and/or small apartment buildings.

2. Lighting for roads is also classified according to surface type in order to determine the effectiveness and reflectance a luminaire may have on the particular surface.

Surface Class:	*Description of Roadway Material*	*Mode of Reflectance*
R1	Portland cement concrete road surface. Asphalt road surface with a minimum of the aggregates composed of artificial brighteners.	Mostly diffuse
R2	Asphalt road surface with an aggregate composed of a minimum of 60% gravel. Asphalt road surface with aggregate mix composed of 10% to 15% artificial brighteners.	Mixed (diffuse and specular)
R3	Asphalt road surface (regular and carpet seal) with dark aggregates and a rough texture after several months of use. This is the surface of most typical highways.	Slightly specular
R4	Asphalt road surface with very smooth surface.	Mostly specular

3. Although maximum/minimum uniformity ratios are not a part of the current IES recommendations, a 12:1 maximum/minimum ratio is considered good field practice for all roadway classifications except Local. A 15:1 maximum/minimum uniformity ratio is recommended for local roadways.
4. This table does not apply to high mast interchange lighting systems, e.g., mounting heights over 20 meters.
5. The relationship between individual and respective luminance and illuminance values is derived from general conditions for dry paving and straight road sections.
6. For divided highways, where the lighting on one roadway may differ from that on the other, calculations should be made on each roadway independently.
7. For Freeways, the recommended values apply to both mainline and ramp roadways.
8. The recommended values shown are meaningful only when designed in conjunction with other elements. The most critical other elements are as follows:
   (a) Lighting system depreciation
   (b) Quality
   (c) Uniformity
   (d) Luminaire mounting height
   (e) Luminaire spacing
   (f) Luminaire selection
   (g) Traffic conflict area
   (h) Lighting termination
   (i) Alleys

TABLE XI.3
Lighting Recommendations
for Outdoor Parking Facilities

	General Parking and Pedestrian Area	*Vehicle Use Area (only)*
Level of Activity[1]	**Footcandles (Minimum on Pavement)**[2]	**Footcandles (Average on Pavement)**[3]
High	1.0	2.2
Medium	0.6	1.1
Low	0.2	0.5

Source: IES 1987.
Notes:
1. Levels of activity are defined by IES as follows:

High Activity Levels	Major regional shopping centers or malls. Major League athletic stadiums and arenas. Major cultural and civic facilities such as museums, art galleries, etc. Convention centers and parking for major political rallies and concerts. Fast-food franchises.
Medium Activity Levels	Community shopping centers or strip malls. Hospital parking areas. Transportation parking—airports, rail terminals, bus terminals. Area cultural, civic, or recreational events. Local sports facilities, residential complexes parking, apartment parking, condominium parking. Office complex parking.
Low Activity Levels	Local merchant parking and local or neighborhood shopping centers. Industrial employee parking. Educational facility parking. Church parking.

2. Average maintained levels on pavement.
3. Minimum levels on pavement.

4. Pedestrian Areas Proper lighting of pedestrian areas is essential for safe and comfortable use. Since most sidewalks are located adjacent to lighted roadways, lighting requirements for pedestrian areas are often not specified. Designers should check the lighting provided by roadway to ensure that the proper quality or level is provided for the comfort and safety of pedestrians and then make modifications to the roadway lighting system to correct any deficiencies. For walkways that are more distant from roadways, the designer often has more freedom in terms of system and luminaire design, but the design should be in accordance with the lighting requirements indicated. Where pedestrian safety is of concern, such as in areas bordering pedestrian walkways in parks, hidden entrances, gaps between buildings, and dense shrubbery, additional lighting may be required.	***4. Pedestrian Areas*** *1. Lighting for pedestrians shall be provided in accordance with the levels set forth in table XI–4.* *2. All objects that need to be visually identified by a pedestrian should be adequately illuminated.* *3. Care should be exercised to avoid conditions of illumination where excess light spillage occurs to adjacent residential areas.*

TABLE XI.4
Pedestrian Way Lighting Recommendations*

Walkway Classification	MINIMUM AVERAGE LEVEL[1] (Horizontal on pavement) Footcandles	MINIMUM MAINTAINED LEVELS FOR SPECIAL PEDESTRIAN SECURITY[2] (Vertical @ 6′ above walkway) Footcandles
Sidewalks (roadside) and "A" bikeways[3]		
Commercial areas	2.0	2.2
Intermediate areas	0.6	1.1
Residential areas	0.2	0.5
Walkways distant from roadways and type "B" bikeways[4]		
Park walkways, bikeways, and stairways	0.5	0.5
Pedestrian tunnels	2.0	0.5
Pedestrian overpasses	0.3	0.4

* Crosswalks traversing roadways in the middle of long blocks and at street intersections should be provided with additional illumination.
Source: IES 1987; IES 1993. RP-33-99; RP8-00.
Notes:
1. Average to minimum uniformity ratios where special security is not essential should not exceed 4:1 except for residential sidewalks and type "A" bikeways in residential areas, where a ratio of 10:1 is acceptable.
2. Where increased pedestrian security is desirable, the uniformity ratio should not exceed 5:1 for any walkway or bikeway.
3. Type A—Designated bicycle lane: A portion of roadway or shoulder that has been designated for use by bicyclists. It is distinguished from the portion of the roadway for motor vehicle traffic by a paint stripe, curb, or another similar device.
4. Type B—Bicycle trail: A separate trail or path from which motor vehicles are prohibited and which is for the exclusive use of bicyclists or the shared use of bicyclists and pedestrians. Where such a trail or path forms apart of highway it is separated from the roadways for motor vehicle traffic by an open space or barrier.

Section XI-2
Signs

The infill document includes guidelines for all types of signs with the exception of directional, regulatory, and warning signs (see section XI-2-E for definitions). Standards for the latter types of signs are specified in the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), published by the Federal Highway Administration. Sign guidelines in the infill document and policy guide draw on sign design guidelines adopted by the city of Pasadena, California as well as those from other communities.

Generally, sign standards are concerned with sign size, location, size of lettering, color, materials, and design. The specific standards adopted by a community are a matter of policy to be determined by each community. They should be appropriate to the community and reflect local design objectives. Standards often vary by zoning district. In general, more restrictive requirements are imposed in residential areas and less restrictive standards in commercial districts.

Some communities include signs as part of an overall design scheme for central business districts or commercial areas, specifying the standards to be followed. For example, buildings in Manhattan's Times Square are permitted to have large exterior signs, befitting the area's unique character. Historic districts also may have special sign design requirements befitting their unique historic character.

In infill projects, signs may be part of an entire package of streetscape elements and amenities (benches, newsstands, lighting fixtures, etc.) that follow a coordinated design theme. This is particularly encouraged to unify areas with a distinct identity. Communities should use the infill document as a guide as they develop standards reflecting local design objectives.

A. Objective

1. Unlike "standards," these sign "guidelines" are intended to provide good examples of techniques that should be followed in order to achieve quality signage in infill projects. There are no set "rules" to follow, but the guidelines demonstrate the expectations of the community that should be carefully considered by the developer.

2. As part of redevelopment efforts, many communities have invested in downtown improvements that coordinate paving, landscaping, benches, trash receptacles, and the like. Signs are usually included in these improvements whose intent is to create an image for the locality and enhance community appearance through consistent design.

Section XI-2
Signs

A. Objective

1. The objective of these guidelines is to provide guidance in the way signs are designed, constructed, and placed in infill projects.

2. The objective of these guidelines is also to preserve and/or enhance local character and community design objectives by requiring new and replacement signage that is:

a. creative and distinctive;
b. compatible with its surroundings;
c. appropriate to the type of activity to which it pertains;
d. expressive of the identity of the proprietors or of the community as a whole; and
e. appropriately sized in its context and

	location.
B. Applicability	***B. Applicability***
1. Sign design is considered as part of development plan review, along with other plan details.	*1. The sign guidelines shall be applied during plan review. Signs will be reviewed for their consistency with the guidelines. All signs shall be reviewed and approved prior to obtaining sign permits according to the procedures set forth in this document.*
2. As noted, guidelines are not as strict as “standards,” and may be interpreted during plan review with flexibility. The overall objective is to ensure that the intent and spirit of the design guidelines are followed.	*2. The sign design guidelines are designed to help ensure quality signs that communicate their message in a clear fashion. However, the design guidelines may be applied with some flexibility to specific signs and infill projects, as not all design criteria may be workable or appropriate for each sign or project.*
3. In addition to the sign details required on the plan, information should be provided on the relationship of the proposed signs to other signs on or adjacent to the site.	*3. Development plan applications shall provide a signage plan that includes all signs proposed on site.*
4. This provision refers to traffic or street name signs that a developer may be required to install in a public right-of-way. Other types of signs are prohibited from placement in the right-of-way.	*4. The location of a sign in a public right-of-way will require permission by both the local authority and the agency having jurisdiction over the right-of-way.*
	5. All signs shall comply with applicable provisions of the Uniform Construction Code and the electrical code of the community at all times, and shall be maintained in good structural condition.
C. General Guidelines	***C. General Guidelines***
1. Compatibility with Surroundings a. Signs play a major role in creating either a positive or negative visual image for a development and its immediate area. Well-designed signs can be a major asset to a building or to a project, and the intent of the guidelines is to encourage high quality, imaginative, and innovative sign design.	*1. Compatibility with Surroundings* *a. Signs should make a positive contribution to the general appearance of the street and the area in which they are located.*
b. The size, shape, and scale of a sign should be proportional with the scale of the structures on which it is placed. Small storefronts, for example, should have smaller signs than larger storefronts. This can be accomplished by restricting sign area to a percentage of building façade area.	*b. The size and scale of signs should be appropriate for the building on which they are placed and the area in which they are located.*
c. A well-designed building façade is created by the careful coordination of sign and architectural design and a coordinated color scheme. Signs for multiple tenant buildings should be designed to complement or enhance the other building signs. The coordination of signs with other street	*c. Signs should be designed so that they are coordinated with the design of the buildings and so that they complement the overall design of the site. Coordinated sign designs are required for multiple tenant sites. Signs may be coordinated with other street amenities to unify areas with a distinct*

amenities adds visual interest and contributes to a sense of place for an infill development.	*identity.*
d. Respect for architectural elements and details**.** Signs for infill developments should recognize the architectural details of the buildings in their design, size, location, orientation, and illumination. Signs should fit into the building façade as if they were one of the architectural elements. Possible locations for signs could include the lintel band above transom windows, an entranceway, or the display windows.	*d. Respect for architectural elements and details. Signs should respect the architectural elements of the development and the buildings on which they will be placed. Signs should not cover or otherwise interfere with design elements that contribute to a building's character, including architectural elements such as transom windows, vertical piers, or spandrel panels.*
e. Compatibility with adjacent development. Through sensitive design and alignment, signs can contribute to the visual continuity of infill development. In considering design, a stronger visual impression is made with simple, coordinated signs than with a jumbled array of various sign sizes, types, and locations. This does not suggest that signs have to be all the same size, style, type, and color to work well together. When infill development consists of diverse, yet compatible architectural styles and building types, creative and unique signage makes for a more interesting street scene.	*e. Compatibility with adjacent development. The determination of size color, and location of signs should take into consideration adjacent development and signage located on flanking buildings, particularly if the neighboring buildings are similar in style, are of comparable height, and of compatible type and scale.*
	f. When residential and commercial uses exist in close proximity, signs should be designed so that they have little or no impact on adjacent residential neighborhoods. The illumination of signs may be restricted adjacent to residential uses.
	g. Sign placement. The placement of wall signs on a façade should establish or continue appropriate rhythm, scale, and proportion.
h. Signs oriented to the pedestrian ("pedestrian-oriented signs") are signs that are designed for and directed toward pedestrians so that they can easily and comfortably read the sign as they stand adjacent to the business. Since infill developments are often intended to be areas of high pedestrian activity, it may be more important to reach customers on the sidewalk than those driving by in a car. Pedestrian-oriented signs do not need to be large. These signs are usually read from a distance of 15 to 20 feet and may include projecting signs, banners, awnings, and wall and window graphics. These types of signs will be more effective visually when designed to complement each other and work together to form an overall image for the business(es).	*h. Pedestrian-oriented signs are encouraged.*
i. Alleys and intra-block areas are not like thoroughfares. To explore these areas, people must park their cars and walk. From this vantage, pedestrians are able to notice more details; smaller-scale signs with more detail are appropriate. Signs may be located in entryways; windows also provide locations for signs. Tenant directory signs may be wall-mounted or freestanding.	*i. Alleys and intra-block areas. Smaller-scale signs are more appropriate for alleys and intra-block areas, and signs in these areas can incorporate a higher degree of detail. Tenant directory signs are permitted for businesses located off alleys, courtyards, and intra-block areas that do not have street frontage.*
2. Color a. Color is one of the most important aspects of visual communication. It can be used to catch the eye or to	2. *Color* *a. In designing signs, select colors carefully. Colors should be selected to contribute to legibility and design integrity.*

communicate ideas or feelings. Even the most carefully thought out sign may be unattractive and a poor communicator because of poor color selection.	
b. Contrast is an important influence on the legibility of signs. Light letters on a dark background or dark letters on a light background are most legible. Light letters on a dark background work best for both day and night time use and may be preferred.	*b. Contrasting colors should be used to increase visibility. A substantial contrast should be provided between the color and material of the background and the letters or symbols to make the sign easier to read in both day and night.*
c. Too many colors can confuse the reader and negate the message of a sign. Small accents of several colors may make a sign unique and attractive, but it often decreases readability.	*c. Avoid using too many colors, which may interfere with the legibility of the sign.*
3. Materials a. In choosing sign materials, the architectural design of the infill project and of the building's façade should be considered and materials that complement the design should be selected. The selected materials should also contribute to the legibility of the sign. For example, shiny surfaces are often difficult to read because of glare and reflections.	*3. Materials* *a. Sign materials should be compatible with the design of infill project and of the façade on which they are placed.*
b. Sign materials should be extremely durable. Paper and cloth signs are not suitable for exterior use (except on awnings) because they deteriorate quickly. If wood is used, it should be properly sealed to keep moisture from soaking into the wood and causing the sign's lettering to deteriorate.	*b. Except for banners, flags, and awnings, signs should be constructed of permanent materials.*
4. Sign Legibility The style and content of a sign is vital to its readability and, therefore, to its ability to convey its message. Color and contrast also affect the legibility of signs. The guidelines presented here are targeted to infill projects and aimed at pedestrian usage; different guidelines would apply to legibility standards for highway locations, which would require the letter size to increase with the speed of the adjacent highway.	*4. Sign Legibility*
a. The fewer the words, the more effective the sign. A sign with a brief, succinct message is easier to read and looks more attractive because it is less cluttered.	*a. Signs messages should be as brief as possible.*
b. Letters and words should not be spaced too closely. Crowding of letters, words, or lines, will make any sign difficult to read. Conversely, overspacing of these elements causes the reader to read each item individually, also obscuring the message.	*b. The design of signs should space letters and words carefully so as to facilitate legibility. As a general rule, letters should not occupy more than 75 percent of sign panel area.*
c. Pictographic images or logos, such as the McDonald's logo, will usually register more quickly in a viewer's mind than a written message. Some communities, however, have made efforts to restrict their use or size in accordance with community design goals.	*c. Logos and symbols may be used whenever appropriate.* *d. The number of lettering styles used on a sign should be limited in order to increase legibility. As a general rule, the number of letter types is limited to no more than two for small signs and three for large signs. Similarly, in order to increase legibility, simple typefaces are preferred*

	over more intricate ones.
5. Location and Mounting	*5. Location and Mounting* *a. Signs should be located to be visible to the intended user of the site and effective in communicating their intended purpose.* *b. No sign shall be located within or overhanging the street right-of-way. No sign shall be located where it could restrict sight distance for motorists entering or leaving a street.* *c. No sign shall be affixed to a fence, bench, utility pole, or tree, shrub, rock, or other natural object, except at the discretion of the municipality.*
d. If a sign cannot be located above a transom window, consider locating it behind the window so the window's details are still visible from the street.	*d. Signs should be mounted in locations that respect the design of a building, including the arrangement of bays and openings. Signs should not obscure windows (including transom windows and second-story windows), window trim or molding, grillwork, piers, pilasters, and other ornamental features.*
e. Typically, wall-mounted signs should be centered on horizontal surfaces (e.g., over a storefront opening).	*e. Wall-mounted signs on fascias above storefront windows should be sized to fit within existing friezes, lintels, spandrels, and other such features and not extend above, below, or beyond them.*
f. Maintaining continuity will reinforce the building's façade composition while still retaining each business's identity.	*f. When a large building contains several storefronts, signs for the individual businesses should relate well to each other in terms of location, height, proportion, color, and illumination.*
	g. To minimize irreversible damage to masonry, all mountings and supports drilled into masonry (including terra cotta) should be into mortar joints and not into the face of the masonry. *h. A projecting sign shall conform to the following placement standards:* *(1) The supporting framework shall be in proportion to the size of such sign;* *(2) No projecting sign shall extend into a vehicular public way, or be less than ten (10) feet above a pedestrian way.* *(3) The top of the sign may be suspended in line with one of the following, whichever is the most successful application of scale, linear continuity, and visibility as determined during development plan review:* *(a) Between the bottom sills of the second-story windows and the top of the doors and windows of the*

	ground floor; or *(b) The lowest point of the roof of a one-story building.*
6. Sign Illumination Lighting is essential for any sign to be visible after dark. However, sign lighting should be carefully reviewed to ensure that it creates no adverse glare onto adjacent properties or into approaching traffic. Internally illuminated signs generally provide a soft light without glare; external light sources may require shielding and screening to limit their lighting to the area of the sign and a small portion of the sign only. As noted, the infill standards are intended to serve as a guide, and municipalities should evaluate them according to their own design objectives.	*6. Sign Illumination*
a. Projected lighting (e.g., spotlights) is preferred because the sign will appear to be better integrated with the building's architecture. Projected lighting emphasizes the continuity of the structure's surface and signs become an integral part of the façade. This is not the case with internal illumination.	*a. Projected light sources are preferred. Light fixtures supported in front of the sign cast a light on the sign and generally on a portion of the building's façade as well.*
b. Oversized projection lighting fixtures that are out of scale with the sign and structure should be avoided as they detract from the message.	*b. Light fixtures used for externally illuminated signs should be simple and unobtrusive in appearance and size. Fixtures should not obscure the graphics of the sign.*
c. Signs comprised of individual letters mounted directly on a structure can often use a distinctive element of the structure's façade as a backdrop, thereby providing a better integration of the sign with the structure.	*c. Individually illuminated letters, either internally illuminated or backlighted solid letters (reverse channel) are a preferred alternative to internally illuminated plastic cabinet (can) signs.*
d. When the background of internally illuminated cabinet signs is not opaque, the entire sign face becomes bright and the sign becomes visually separated from the building. As a result, this type of sign can disrupt the continuity of the façade.	*d. Internally illuminated cabinet signs should not be allowed, except as projecting signs. When such signs are proposed, the background field shall be opaque so that only the lettering appears illuminated (e.g., routed or push-through lettering or graphics).*
	e. Neon back-lighted signs with opaque, reverse channel letters, neon back-lighted signs with dimensional Plexiglas letters, and signs with illuminated open-face channel letters are appropriate forms of illuminated signs. Exposed neon tubing script is also an appropriate alternative. Such signs should be designed to be compatible with the building's architectural character and their colors should harmonize with the building's exterior colors.
	f. Gas-filled light tubes will be allowed for indirect illumination and when placed in such a manner that the tubes are not exposed to view from any point along the public roadway or sidewalk.
	g. Whenever projection lighting is used (fluorescent or incandescent), the light source should be carefully shielded to prevent glare from

	spilling over into residential areas and any public right-of-way.
h. The infill document provides a lighting schedule for signs, requiring lights to be extinguished from 11 PM to 7 AM unless the activity on-site is operational during those hours. There is little need for lighted signs when the site is not in use.	*h. If a sign is necessary to indicate an activity operational during the nighttime hours, signs should be lighted only to the minimum level required for nighttime readability. Otherwise, sign lighting should be extinguished from 11 p.m. to 7 a.m.*
	7. Electrical Raceways and Conduits *a. Electrical raceways, conduits, and transformer boxes shall be concealed from public view. If a raceway cannot be mounted internally behind the finished exterior wall, the exposed metal surfaces of the raceway should be finished to match the background wall, or integrated into the overall design of the sign.* *b. If raceways are necessary, they should be as thin and narrow as possible and should never extend in width or height beyond the area of the sign's lettering or graphics.* *c. All exposed conduit and junction boxes should also be concealed from public view.*
	8. Freestanding Signs *a. Freestanding signs are allowed to display up to 6 individual tenant signs or 5 tenant signs and the name of the center.* *b. Individual tenant sign panels should be uniform in size, recognizing that the major tenant, or the name of the center, may have a slightly larger sign panel.* *c. The sign structure should be architecturally designed and incorporate the design details, materials, and colors of the associated buildings.* *d. Freestanding signs may be internally illuminated; however, the sign copy is the only portion that is allowed to be illuminated. The sign background or field shall be opaque. Signs with individual letters, or stenciled panels with push-through graphics, are encouraged.*
9. Awnings Awnings have become a feature of infill projects in urban centers. These guidelines suggest appropriate design considerations when awnings are part of an infill project.	*9. Awnings* *a. Awnings should be mounted in locations that respect the design of the building, including the arrangement of bays and openings. Awnings should not obscure transom windows, grillwork, piers, pilasters, and other ornamental features. In openings with transoms, the awnings should be mounted below the transom on the horizontal framing element separating the storefront window from the transom.*

	b. Awnings should be designed to project over individual window and door openings (i.e., mounted in the reveals of openings). Awnings that are a continuous feature, extending over several windows, doors, masonry piers, or arches, are strongly discouraged. Awnings should be mounted on the door or metal framing within a door or window opening (and not on the wall surrounding the opening). *c. Shed awnings, with no end panels, are the preferred awning style. Shed awnings are visually lighter and simpler, and they are more traditional in appearance than convex or box awnings. Awnings with no end panels are more transparent and allow better views into storefronts. Dome-shaped awnings may be appropriate for locations with round-arched window/door openings.* *d. Awnings should have simple horizontal valances. Scalloped or decorative valances are discouraged.* *e. Any valance attached to an awning shall not project above the roof of the awning at the point of attachment and shall not extend more than 12 inches below the roof of the awning at the point of attachment, but in no case shall any portion of a valance be less than 7 feet in height above the public way.* *f. Awnings with a single, solid color are preferred. Awning colors should complement the colors of the building. Colors that call more attention to the awning than to the building are inappropriate.* *g. Awnings with striped colors may be appropriate for some buildings without ornamental façades. Striped awnings with highly contrasting, bright colors are discouraged.* *h. Awnings should be retractable (or appear to be retractable) so that they may be used seasonally and appear as temporary features on a building instead of fixed architectural elements.* *i. Metal or glass canopies may be appropriate on some buildings if they are compatible in scale and overall design. Canopies should be simple in design and not obscure architectural features. Elongated bullnose entrance canopies are inappropriate because of their exaggerated scale and projection.*
D. Prohibited Signs The types of signs that are prohibited are a matter of policy and should be reviewed by the community.	***D. Prohibited Signs*** *The following signs shall be prohibited:*

	1. Streamers, pennants, ribbons, spinners, or other similar devices shall not be constructed, posted, or erected. Exceptions include flags and buntings ed to commemorate national patriotic holidays, and temporary banners announcing charitable, civic, or special events, provided such displays conform to community authorization procedures. *2. Flashing signs, roof signs, vehicle advertising signs, unshielded light displays, portable signs, signs containing moving parts, and signs containing reflective elements that sparkle or twinkle in the sunlight are not permitted. Signs indicating the current time and/or temperature are permitted provided they meet all other provisions of this document.* *3. Strings of bulbs are not permitted, except as part of a holiday celebration, or at the discretion of the municipality. Strings of bulbs may also be permitted to decorate trees at the discretion of the municipality, provided that such display does not interfere with neighboring land uses.* *4. No sign, except for a traffic, regulatory, or informational sign, shall use the words "stop," "caution," or "danger," or shall incorporate red, amber, or green lights resembling traffic signals, or shall resemble "stop" or "yield" signs in shape and color.* *5. No sign shall be erected so that by its location, color, size, shape, nature, or message it would tend to obstruct the view of or be confused with official traffic signs or other signs erected by governmental agencies.*

E. Definitions–Signs

Address/Identification Sign. A sign displaying the nature, logo, trademark, or other identifying symbol; street address or name of the occupant of the premises or both; or any combination of the name, symbol, and address of a building, business, development, or establishment on the premises where it is located. Such sign may be freestanding or attached to a building.

Awning. A rooflike cover that is temporary or portable in nature and that projects from the wall of a building for the purpose of shielding a doorway or window from the elements and is periodically retracted into the face of the building. Awning shapes and types include those for rectangular openings: traditional/shed, concave, and convex; for arched openings: dome/bullnose; and for entrances: marquee.

Awning, fixed. An awning constructed with a rigid frame that cannot be retracted, folded, or collapsed.

Awning Sign. A sign that is mounted or painted on, or attached to, an awning or other window or door canopy.

Banner. A temporary sign of cloth or similar material that celebrates an event, season, community, neighborhood, or district and is sponsored by a recognized community agency or organization.

Cabinet Sign. A sign with its text and/or logo symbols and artwork on a translucent face panel that is mounted within a metal frame or cabinet containing the lighting fixtures that illuminate the sign face from behind; also known as a can sign.

Canopy. See **awning.**

Casing, or **Trim.** Exposed molding or framing around a window or door, on either the inside or outside used to cover the space between the window frame or jamb and the wall.

Channel Letters. Individual letters constructed to be applied singly in the formation of a sign. Channel letters may be illuminated or non-illuminated. See **Raceway-Mounted Channel Letters; Reverse Channel Letters; Wall-Mounted Channel Letters.**

Conduit. A metal or plastic pipe used to encase buried or exposed electrical cables and protect them from moisture or physical damage.

Cornice. An ornamental molding used along the top of a wall or at the edge of a roof.

Directional Sign. A sign that provides information to pedestrians or vehicles through a subject property by identifying entrances, exits, and routes of travel.

Directory Sign. A sign listing the tenants or occupants of a building or group of buildings and that may also indicate their respective professions or business activities.

Externally Illuminated Sign. A sign whose light source is external to the sign and which casts its light onto the sign from a distance.

Façade. The exterior surface of a building, including door and window area, in a single elevation, between the finished grade and the line formed where the wall meets the roof.

Façade Sign. See **Sign, Wall.**

Fascia. A flat board that runs horizontally along the eaves of a roof, often used to conceal the ends of rafters; roof drain gutters are attached to the fascia.

Flag. Any fabric, plastic, or similar material containing distinctive colors, patterns, symbols, or emblems that are used to identify or designate a corporation, nation, organization of nations, state, city, religious, fraternal, educational, or civic organization.

Flashing Sign. Any directly or indirectly illuminated sign that s changing natural or artificial light or color effects by any means whatsoever.

Freestanding Sign. Any nonmovable sign not affixed to a building resting on or supported by means of poles, stakes, or any other type of base in the ground.

Frieze. A horizontal band which runs above doorways and windows or below the cornice; may be decorated with designs or carvings.

Grillwork. A framework of metal bars used as a partition or a grate.

Ground Sign. A freestanding sign, other than a pole sign, in which the entire bottom is in contact with or is close to the ground.

Historic District. An area designated by ordinance that contains unique visual or historic characteristics or whose natural beauty requires special regulations to ensure that signs and other design elements displayed within the area are compatible.

Illuminated Sign. A sign lighted by, or exposed to, artificial light, either by lights on or in the sign or directed toward the sign.

Internally Illuminated Sign. A sign whose light source is located in the interior of the sign so that light passes through the face of the sign, or light source which is attached to the face of the sign and is perceived as a design element of the sign.

Lintel, Lintel Band. A horizontal piece of wood or stone that spans the top of an opening, such as a window or door, or that connects two columns

Logo (symbol, pictographic image). A letter, character, or symbol registered with an independent third party used to represent a person, corporation, or business enterprise.

Marquee. Any hood, canopy, awning, or permanent construction that projects from a wall of a building, usually above an entrance.

Marquee Sign. Any sign made a part of a marquee and designed to have changeable copy, either manually or electronically.

Neon Sign. A sign consisting of glass tubing, bent to form letters, symbols, or other shapes and illuminated by neon or a similar gas through which an electric voltage is discharged.

Opaque. Not allowing light to pass through.

Pedestrian-Oriented Sign. A sign near street or sidewalk level, oriented and scaled to the pedestrian rather than the motorist.

Pennant. A display of lightweight plastic, fabric, or other material, not containing a message of any kind, suspended from a rope, wire, or string, usually in a series, designed to move in the wind.

Pier. A vertical, non-circular masonry support, more massive than a column.

Pilaster. A rectangular vertical member projecting only slightly from a wall, with a base and capital as well a column.

Pole Sign. A sign that is mounted on a freestanding pole or other support so that the bottom edge of the sign face is 6 feet or more above grade.

Portable Sign. Any sign not permanently attached to the ground or other permanent structure, or a sign designed to be transported, including, but not limited to, signs to be transported on wheels; sandwich board signs; and signs on balloons and umbrellas.

Projecting Sign. A sign that is wholly or partly dependent upon a building for support and that projects more than 12 inches from such building

Raceway. A channel designed to enclose and loosely hold electric conductors, such as those used for the installation of channel letter signs, to protect them from moisture or physical damage.

Raceway-Mounted Channel Letters. Individual letters mounted on a raceway, with wiring contained inside the raceway.

Reverse Channel Letters. Channel letters that do not emit light through the faces; instead, a soft glow is cast around each letter.

Reveal, Window or Door. The part of the side of a window or door opening that is between the outer surface of a wall and the window or door frame, i.e., that part of the edge of a door or window jamb not covered by the casing.

Roof Sign. A sign that is mounted on the roof of a building or that is wholly dependent upon a building for support and that projects above the top edge or roof line of a building with a flat roof, the eave line of a building with a gambrel, gable, or hop roof, or the deck line of a building with a mansard roof.

Scale. A term used to define the proportions of a building in relation to its surroundings.

Sign. Any object, device, display, or structure, or part thereof, situated outdoors or indoors, that is used to advertise, identify, display, direct, or attract attention to an object, person, institution, organization, business, product, service, event, or location by any means, including words, letters, figures, designs, symbols, fixtures, colors, illuminated or projected images.

Spandrel. The approximately triangular surface area between two adjacent arches and the horizontal plane above them

Transom. A horizontal crosspiece over a door or between a door and a window above it.

Transom Window A window over an entry door or over eye-level windows.

Valence. The lower edge of an awning or canopy; may be rigid but is usually loose and can flap in the wind.

Vehicle Advertising Sign. A sign on a vehicle not customarily and regularly used to transport persons or properties.

Wall Sign. A sign fastened to, or painted on, the wall of a building or structure in such a manner that the wall becomes the supporting structure for, or forms the background surface of, the sign and that does not project more than 12 inches from such building or structure.

Wall-Mounted Channel Letters. Individual letters mounted individually with wiring concealed behind the fascia.

Window Sign. A permanent sign that is painted or mounted onto a windowpane, or that is hung directly inside a window solely for the purpose or effect of identifying any premises from the sidewalk or street; or a temporary sign advertising special sales, events, or products**.**

Section XI-3 **Landscaping** Since landscaping can help tie together the components of a design, it plays an important role in the planning of infill development sites. Detailed, prescriptive standards, however, may be excessive and unworkable for infill situations. Small parcels may not be developable after subtracting required landscape areas. Other parcels may be large enough to supply the required landscaping, but the resulting design may not be desirable. Because infill takes place in developed areas, the landscape design should take into consideration the surrounding area. The infill project's landscape plan must be coordinated with that of the adjoining properties and be in compliance with any community's master landscape plan. The landscape guidelines in the infill ordinance and policy guide cover a wide array of landscape considerations, including general design, street trees, planting requirements, site protection, plazas and courtyards, buffering, parking lot landscaping, paving materials, walls and fences, street furniture, and sidewalk dining. Obviously, few infill projects will require consideration of all of these elements; most projects call for simple landscape treatment. Communities with master landscape plans may already have regulations dealing with many of these elements. The infill document uses an inclusive approach with the idea that communities can review the guidelines and select those that supplement existing regulations, adapting them to reflect their design goals.	***Section XI-3*** ***Landscaping***
A. Objective	***A. Objective***
1. By stating the objective of the landscaping standards and guidelines, it is hoped that more thought will be given to how landscaping can help achieve the quality of infill developments that most communities are looking for.	*1. All infill projects shall provide landscaping as an integral part of project design. Landscaping shall be located throughout the site, integrating the various elements of site design, preserving and enhancing the particular identity of the site, safeguarding environmentally sensitive areas, and creating a pleasing site character.*
2. This provision is an example of a performance standard, which states landscaping objectives but allows flexibility in their implementation.	*2. Landscaping shall accomplish the following objectives: shading of parking areas and walkways; ground cover consisting of planted materials or usable features such as seating, plazas, or similar areas; erosion control; and attractive streetscapes and common areas.*
3. Landscaping elements are commonly thought to consist of plant materials, yet all of the items listed in the infill	*3. Landscaping may include plant materials such as trees, shrubs, ground covers, perennials, and annuals, and other materials such as rocks,*

development ordinance affect the appearance of the landscape and should be considered in the landscape design. Some urban infill sites and developments may not lend themselves to landscaping with plant materials. Consideration of paving materials or street furniture, such as benches, trash receptacles, and decorative planters assumes more importance in these plans. Nevertheless, plants remain the fundamental landscaping material, and much of the language in the document regarding landscaping concerns plantings and their requirements.	*water, sculpture, art, walls, fences, paving materials, and street furniture.*
B. Landscape Plan For large infill sites, the landscape plan is likely to be quite extensive, including location and planting details for trees, buffering, and the landscaping of public areas and parking lots. For smaller sites, the plan will be more limited, consisting of the number and type of foundation plantings (if any) and treatment of the streetscape.	***B. Landscape Plan*** *A landscape plan prepared by a certified landscape architect shall be submitted with each development plan. The plan shall identify and locate existing and proposed trees, shrubs, and ground covers; natural features such as rock outcroppings; and other landscaping elements. Where existing plantings are to be retained, the plans shall include proposed methods of protection during construction.*
C. Landscape Design Guidelines for Infill Development The purpose of the design guidelines is to encourage quality design and the use of landscaping materials suitable to the site and the proposed development.	***C. Landscape Design Guidelines for Infill Development*** *Landscape plans shall conform to the following general design guidelines.*
1. The landscape plan for infill sites should be in accordance with the landscape master plan, if one has been adopted by the community.	*1. The landscape plan should reflect the design goals of the community.*
2. The landscape plan should complement nearby landscaping and take into consideration the architectural style of the infill development. Installation of street trees, for example, to continue adjacent patterns is strongly encouraged.	*2. New planting, furniture, lighting, and site details should respect the landscape character of the immediate area and support the design intentions of the building architecture.*
3. Existing landscape elements provide a sense of historical and physical continuity, strengthen the urban fabric, and reinforce the unique qualities of the urban area. New development should continue to build on these traditions and qualities found in the local landscape unless the community has adopted different design goals that would apply to the infill project.	*3. Retain the following landscape elements unless removal or replacement supports long-term planning objectives: street trees; granite curbs; ornamental tree grates; historic street lights; and similar historic or design-coordinated street elements.*
4. The physical safety and comfort of pedestrians is critical to the success of urban area development. Pedestrians must feel that they are in a safe situation and that they are a welcome presence in the community. Streetscape design and amenities should emphasize pedestrian safety and comfort. For instance, the proper placement of street furniture	*4. The landscape plan should be based on functional efficiency, appearance, security and safety, and the needs of the people using the site. For example, if appropriate for the site and project, introduce shading elements and outdoor furniture such as benches to improve pedestrian access and comfort. Provide bus stops with seats and shelter to increase safety and comfort; consider additional*

introduces distance and a perceived protection from vehicular traffic.	*amenities such as waste receptacles, water fountains, and directional maps.*
5. Site features and orientation, adjacent properties, infill project buildings, plantings, and street furniture—the landscape plan should link all elements together.	*5. The design for different components of the landscape should be coordinated so that there is a harmonious relationship among the various elements.*
6. Public streets, plazas, parks, and other civic spaces support public life. They are not left-over spaces to be "dressed up," but lively, public spaces. If part of the infill project, development should focus activity and attention upon and along these spaces.	*6. Use landscaping to define and contain public spaces. Use street trees to delineate public streets. Emphasize the planting of street trees to provide overhead cover; species choices should consider access to both shade and sun along sidewalks.*
7. Design downtown streets for safe and comfortable movement on foot; incorporate a high level of streetscape amenity such as street trees, street furniture, and street lights. The overhead cover provided by street trees offers shade and protection from the rain. Streetscape amenities should be located to support safe, convenient, and unimpeded pedestrian flows.	*7. Encourage buildings adjacent to the sidewalk to provide overhead cover in the form of canopies, awnings, and overhangs, especially where there is an insufficient or immature street tree canopy, or along a southern exposure.*
8. Grouping these elements and locating them near the curb not only creates a barrier for pedestrians, it also reduces street clutter. Some cities have adopted design standards applying to these street amenities.	*8. Locate street amenities in a zone along or near the curb as a barrier to automobile traffic; this is especially applicable to street lights, parking meters, street trees, trash receptacles, news racks, and heavy planters.*
	9. Consider the use of special landscape treatment, including paving, to give areas distinctive accents and a unique identity.
	10. The landscape character of the site should be extended to surface parking lots.
11. Native species require less maintenance (watering, spraying, etc.) than species introduced to an area.	*11. Select native species that are hardy to local conditions and appropriate to the development design scheme./Plant materials should be selected that are adapted to the local climate and that are compatible with their environment. Care and consideration should be given to the future care and maintenance of these materials.*
	12. Consider the impact of any proposed landscaping plan at various time intervals so that plant materials will not interfere with utilities, roadways, sidewalks, sight easements or site lighting.
	13. Consider both short- and long-term maintenance in the design of any proposed landscape plan

14. Automatic watering systems and drought-tolerant species are encouraged to reduce maintenance concerns and to promote water conservation.

15. Ground-level landscaping that conflicts with retail entrances and window displays should be restricted. Avoid planting too close to a structure that will damage architectural features or building foundations.

D. Street Trees

Street trees provide numerous benefits and are an important part of an urban environment. Most obviously, they enhance the visual quality of the area. Street trees provide shade, comfort, and greenery. They also contribute to the spatial definition of the street to create a human-scaled space with a comfortable sense of enclosure.

Since many infill projects are located in downtown areas, separate treatment of street trees in the landscaping standards has been included.

The city's master plan of street trees and applicable streetscape plans should be consulted when preparing street tree plans for infill development. The city's master plan may call for continuation of particular tree types on certain streets or in special districts. Consistent street tree plantings lend a special identity to a street.

The Asbury Park, New Jersey, ordinance, for example, states that the "successful design of urban streets and thoroughfares places heavy reliance upon the integration of trees to provide shade, comfort, greenery and visual relief from the extent of built surfaces." The ordinance limits the species of street trees to those that are tolerant of the oceanfront environment and specifies the particular species to be planted on each street in the waterfront redevelopment area.

D. Street Trees

1. Plant street trees so as to define the street and sidewalk; emphasize the consistent use of tree species, size, and spacing along a street to create a pleasant rhythm and reinforce the delineation of the street and sidewalk.

2. Use street trees to unify areas with a distinct identity.

3. Street trees should be selected in accordance with their function and environment. Commercial streets should have trees that compliment the face of the buildings and shade the sidewalk. Residential streets should provide for an appropriate canopy that shades both the street and the sidewalk and serves as a visual buffer between the street and the home. Chose trees that hold up to urban conditions and provide shady canopies at maturity.

4. Plant Material. Some communities may wish to include minimum standards for the tree caliper, height, and branching height. Street tree caliper standards reviewed for the policy guide varied from 2.5 to 3 inches to 6.25 inches. Asbury Park requires a minimum street tree caliper of 2.5 inches to 3 inches, a minimum tree height of 12 to 14 feet, and a minimum branching height of 7 feet, which would safeguard pedestrians as they walk under the trees.

4. Plant Material. Street trees shall be nursery grown, sound, healthy, vigorous, and free from insects, injuries, and diseases. They shall be of substantially uniform size and shape and have straight trunks. Trees shall be properly planted and staked and provision made by the applicant for regular watering and maintenance until the trees are established.

5. Planting Specifications. Urban soils are generally low in fertility, with low available soil moisture, low levels of organic matter, and a high degree of compaction. These factors, combined with the urban environment, make ensuring

5. Planting Specifications. Street tree plantings within sidewalk areas shall be placed in continuous trenches that have a minimum depth of two (2) feet. A prepared planting medium shall be used that is capable of permitting the percolation of water and air. On-site irrigation methods shall be

the health of plantings a challenge. Some communities may wish to include a provision that plantings areas be outfitted with the infrastructure (e.g., access ports located within the planting strip, water access utilities, drainage pipes) to facilitate irrigation, fertilization, aeration, and drainage.	*specified. Water hose locations shall be convenient, and underground irrigation shall be provided if deemed appropriate and suitable. Trees shall be properly planted and staked, and provision made by the applicant for regular watering and maintenance until the trees are established.*
6. Tree grates increase sidewalk width, reduce safety hazards, and prevent compaction of the root-ball on heavily trafficked urban sidewalks.	*6. The use of tree grates in areas with considerable commercial and pedestrian activity is encouraged.*
7. Some communities may wish to include minimum standards for the dimensions of the street tree landscape strip. Typically, the width of a street tree landscape strip is 6 to 8 feet, but this may vary depending on the particular application.	*7. Plant street trees in the zone adjacent to the curb that is also devoted to other streetscape amenities; exceptions may apply for unique conditions, such as a double row of trees. Allow sufficient room for tree canopies to grow without conflict with other building elements, as far as this is feasible.*
8. This is not always feasible, but nevertheless, should be considered in the placement of trees (and other streetscape amenities).	*8. Where on-street parking is provided, trees, shrubs, and raised planters should be located so as not to conflict with opening car doors or pedestrians' access to and from on-street parking.*
E. Site Protection and General Planting Requirements	***E. Site Protection and General Planting Requirements***
These standards and guidelines apply to overall landscaping for infill projects. Depending on their size and context, some projects will require minimal landscaping, and others will require more extensive landscaping. These standards can be adapted to fit a particular project. In general, these standards will be more appropriate for large projects where construction does not cover the land. For small infill projects in high-density urban locations, landscaping is likely to be minimal or nonexistent. Standards in brackets are suggested; individual communities may adjust them to suit their own circumstances.	
1. Topsoil Preservation. Some municipalities may wish to require four or five inches of topsoil to save on development costs where subsoil conditions permit; this ordinance suggests six inches to create a more favorable environment for new plantings. If a development site does not have six inches of topsoil initially, this provision requires the developer to provide sufficient topsoil to satisfy the six-inch requirement. Seeding or planting stabilizes the area and prevents erosion. Adverse subsoil conditions, e.g. acid soils or clays, may require additional treatment to create a suitable planting condition.	*1. Topsoil Preservation. If called for in the infill project's landscape plan, topsoil moved during the course of construction shall be redistributed on all regraded surfaces, or replaced if available topsoil on site is insufficient, so as to provide at least [six (6) inches] of even cover to all disturbed areas of the development and shall be stabilized by seeding, planting, or other landscape treatment. Additional topsoil or subsoil conditioning may be necessary when adverse subsoil conditions exist (i.e. acid soils, clay).*
2. Removal of Debris. This provision is intended to ensure	*2. Removal of Debris. All scrap building materials or other debris or stumps and other tree parts, litter, brush, weeds, excess shall be removed*

that the development site is clean and presents no safety hazards. Any brownfields cleanup must be carried out in accordance with applicable regulations.	*from the site and disposed of in accordance with the law. No construction debris, tree stumps, or portions of tree trunks or limbs shall be buried anywhere in the development. All dead or dying trees, standing or fallen, shall be removed from the site. If trees and limbs are reduced to chips, they may be used as mulch in landscaped areas, subject to approval by the municipal engineer.*
3. Protection of Existing Plantings. If the site design of an infill development permits it, preservation of existing vegetation can be the best method of landscaping. Fine specimens in particular should be retained whenever possible. A "fine" specimen can be defined as one that is large for its species, rare to the area, or of special horticultural or landscape value. This provision outlines the steps that must be taken to protect trees and shrubs during construction.	*3. Protection of Existing Plantings. Reasonable effort shall be made to preserve existing vegetation and to save fine specimens. No construction materials or temporary soil deposits shall be placed within the dripline of trees designated on the landscape plan to be retained. Protective barriers shall be used if necessary. Barriers shall be placed at the drip line of any tree or at least four (4) feet from any shrub. They shall not be supported by the plants they are protecting, but shall be self-supporting. They shall be a minimum of four (4) feet high and constructed of a durable material that will last until construction is completed. Snow fences and silt fences are examples of acceptable barriers. Tree wells shall be installed around each plant and/or group of plants that are to remain on the site should grade conditions warrant.*
4. Slope Plantings. Retaining walls are another option to prevent erosion.	*4. Slope Plantings. Landscaping of all cuts and fills and/or terraces shall be sufficient to prevent erosion, and all roadway slopes steeper than one (1) foot vertically to three (3) feet horizontally shall be planted with ground cover appropriate for the purpose and for soil conditions, water availability, and environment.*
5. Additional Landscaping. Although this ordinance allows a municipality the flexibility to require more plantings where necessary, caution should be used in exercising this option. Landscaping requirements can be justified only if there is enabling language that allows them, or if they can be justified on the basis of public health and safety. Even where there is legal justification for the requirement, aesthetic concerns can become an issue. From a design point of view, for example, some infill sites may not require additional landscaping—adding planting would not be appropriate to the design. The reviewing agency must reasonably apply landscaping requirements, as it must all land use controls.	*5. Additional Landscaping. All areas of the site not occupied by buildings and required improvements shall be landscaped by the planting of grass or other ground cover, shrubs, and trees, or by the inclusion of other landscaping materials, such as paving, as part of the landscape plan approved by the planning board. Additional plantings or landscaping elements may be required throughout the site where necessary for climate control, privacy, or other reasons.*
6. Planting and Irrigation Specifications. Some ordinances specify even larger size requirements for plantings in public areas. For example, communities may require larger calipers for street trees. Balled and burlapped plant materials and	*6. Planting and Irrigation Specifications. Deciduous trees shall have at least a [two and one-half inch (2 1/2')] caliper at planting. Evergreens shall be a minimum of [six (6) feet] high, ornamental trees shall have at least a [two (2) inch] caliper, and shrubs shall be a minimum of*

properly grown container plants are usually preferred in landscaping and often required by ordinances. Since the developer is required to replace dead and low vigor-plants, it is in the developer's interest to use appropriate and healthy plant materials in landscaping, and the municipality is protected. As noted in the section on street trees, urban soil is typically low in fertility and highly compacted. These factors make ensuring the health of plantings more of a challenge. Planting specifications include a provision that plantings be placed in a prepared planting medium. Irrigation methods are to be specified in the landscape plan, but some communities may wish to require planting areas be outfitted with the infrastructure to facilitate irrigation, fertilization, aeration, and drainage, with the justification that the proper installation of plants and their ongoing maintenance will add value to adjacent properties.	*[eighteen (18) inches] in height. All plants shall be nursery-grown, sound, health, vigorous, and free from insects, diseases, and injuries.* *All trees, shrubs, and ground covers shall be planted according to accepted horticultural standards. Dead and low-vigor plants shall be replaced by the applicant during the following planting season.* *All plantings shall be placed in suitably sized planting areas containing a prepared mixture of planting medium with a minimum depth of 2 feet that is capable of permitting the percolation of water and air.* *On-site irrigation methods shall be specified. Water hose locations shall be convenient, and underground irrigation shall be provided if deemed appropriate and suitable. The use of an automatic drip or low volume irrigation system to water shrubs and trees is encouraged.*
7. Plant Species. "Climatic zone" refers to the division of the country into temperature zones according to average minimum winter temperature. Plants are hardy depending on the climate of each zone. Any number of standard reference books on trees and shrubs can be consulted for lists of plants appropriate for each zone and comments on the advantages and disadvantages of each species. In selecting appropriate species, the natural physiological suitability of species to survival in an urban environment should be considered. Native species are more likely to meet this criterion.	*7. Plant Species. The plant species selected should be hardy for the particular climatic zone in which the development is located and appropriate in terms of site location, function, and size. New vegetation shall consist of native species to the maximum extent practicable. Non-native species will be permitted according to recommendations of a certified landscape architect.*
8. Shade Trees. The species selected may vary depending on overall effect desired. As a general rule, however, sources recommend restricting trees in infill developments to a few species, both for economy and the power of effect.	*8. Shade Trees. Shade trees, if part of the landscape plan, shall be installed in accordance with the following:* *a. Location. The trees shall be planted so as not to interfere with utilities, roadways, sidewalks, sight easements, or site lighting.* *b. Tree type. Tree type will depend on overall aesthetic effect desired and environmental factors (e.g., soils, hydrology, solar orientation).* *c. Planting specifications. All trees shall have a caliper of [two and one-half (2 1/2) inches] and be nursery grown or transplanted, of substantially uniform size and shape, and have straight trunks. Trees shall be properly planted and staked, and provision made by the applicant for regular watering and maintenance until the trees are established.*
F. Plazas and Courtyards	***F. Plazas and Courtyards***

Plazas and courtyards promote civic gathering and provide a refuge from the urban environment. Outdoor spaces and plazas can provide a comfortable transition between the exterior and interior of a building as well as a transition from the street. Their provision as part of infill development is encouraged.	*1. The presence of well-defined outdoor space, such as on-site plazas, courtyards, patios, and gardens is desirable, especially for major infill developments (see section VIII-15 for requirements).* *2. The type and character of the open space should be influenced by the surrounding uses (e.g., retail, office, mixed use) as well as by the prospective user groups (e.g., workers, shoppers, residents, and children).*
3. The location, size, and design of a plaza, courtyard, or garden, must be carefully considered in relation to the surrounding area. Outdoor spaces that are excessively large or incorrectly sited may lack spatial definition, weaken the continuity of the streetfront, or detract from the existing network of open space. Further, design details may discourage their use. These guidelines address those issues. Plazas should be located at or near street grade to promote physical and visual connection to the street. Outdoor spaces that are located at mid-block are better locations than at street corners. Plazas and other open spaces at intersections may be attractive to look at, but they are not very well used. In those locations, the park or open space feature should be well-buffered with plantings and/or a low masonry wall, or other barrier.	*3. Outdoor spaces should be sited in accordance with the location and scale of adjacent buildings, streets, and uses. For example, on-site plazas should not unduly interrupt the continuity of building façades on the street. Solar orientation is also a factor when positioning public spaces to ensure a balance of shading elements and exposure to the sun.* *The space should be located where it is visible and easily accessible from public areas. It should contain direct access from the adjacent sidewalks and allow for multiple points of entry. The space should also be visually permeable from the sidewalk, allowing passersby to see directly into the space. The space should be well-buffered from moving cars so that users can enjoy and relax in the space. The space may be visible from streets but should not be wholly exposed to them.*
4. The space may be partially enclosed with building walls, freestanding walls, landscaping, raised planters, or on-street parking to help buffer it and create a comfortable "outdoor room."	*4. Outdoor spaces should be defined and contained through a combination of buildings and landscape. Oversized spaces that lack containment are discouraged.*
5. Plantings, warm and inviting materials, pleasing details, and quality construction help ensure that plazas will be attractive and inviting to users.	*5. Plantings, lighting, and coordinated design details should be used to shape, enhance, enliven, and give purpose to outdoor spaces.*
6. Deciduous trees effectively regulate shade and sunlight. Landscaping can include planters or freestanding pots of various sizes. If seating is provided, it should be located with consideration to noontime sun and shade.	*6. The landscaping of plazas and courtyards should create a pleasant microclimate, including shade from summer sun and access to winter sunlight.*
7. Sometimes outdoor spaces are fenced and locked at night as a security precaution. The problem with this practice is that the fencing acts as a barrier to the public space and discourages usage. Clear visibility is a more effective way of dealing with security.	*7. The design of outdoor space should take safety into consideration; public plazas located on infill sites should promote visibility from the street, and architecturally compatible lighting should be provided to enhance nighttime security.* *8. Comfortable and well-designed seating should be provided.*

8. Places to sit that are accessible to the public are important as basic amenities and encouraged in infill developments. Seating can be both formal and informal, including park benches, the tops of garden walls or planters, or monumental stairs at the entrance to buildings.	
G. Buffering	***G. Buffering***
In infill development, buffering must strike a balance between screening and creating barriers. Ideally, infill development should fit into the area within which it is located; walls, fences, or berms should not be erected that act as barriers to adjacent properties. In some cases, however, landscaping or a fence or wall may be required for privacy, security, or mitigation between incompatible uses. In these cases, a gate or breaks in the screening should be provided where needed for pedestrian and vehicular crossings and access.	
1. Function and Materials. Buffering may be required to screen land uses that create nuisances, to divert or soften glare, to filter noise, to modify climatic conditions, or to create privacy. The guidelines are flexible in the materials allowed for buffering, as long as the screening objective is met. Landscape materials are generally preferred, however. Fencing often deteriorates over time, is not replaced, and does not provide as attractive a screen as landscaping. Landscaping with plant materials, however, may not be possible in all situations.	*1. Function and Materials. Buffering shall provide a year-round visual screen to minimize unsightly or undesirable land uses. Buffers may be landscape and/or architectural in character. Buffering materials may consist of evergreen and deciduous trees, shrubs, berms, rocks, boulders, mounds, walls, fencing, or combinations thereof to achieve the same objectives.*
2. When Required. The determination by the reviewing agency of when buffering is required is not as straightforward as it may sound. In more urban areas, for example, municipalities may prefer a mix of uses, with minimal or no buffering. Buffering, like so many other things, should not be done automatically, but rather when there is an identified need. To minimize the need for buffering in infill developments, the siting of necessary building elements such as service access and mechanical equipment should be given careful consideration. Planning in the early stages of development should consider the placement of service facilities and their effects on the public environment. They should be located away from public streets and public spaces as far as feasible. These facilities, which can create unsightly conditions, detracting from the development, should be buffered. Landscaping or cohesive architectural treatment can be used to screen service access and facilities. The guidelines do not include the dimensions of buffer strips; in infill developments, these should be decided on a	*2. When Required. Every development shall provide sufficient buffering when topographical or other barriers do not provide reasonable screening and when the reviewing agency determines that there is a need (a) to shield neighboring properties from any adverse external effects of a development; (b) to shield the site from negative impacts of adjacent uses; (c) to screen nuisances on a site; or (d) to provide a windbreak or to stop windborne debris from leaving a site.* *When buffering with plantings, the quality, species, and size of existing vegetation within the landscape buffer area should be reviewed to determine if it should be saved. When insufficient, the landscape strip shall be supplemented with new plantings.*

case-by-case basis. The background chapter on design includes typical buffering requirements for developments in general.	
3. Design. The guidelines allow flexibility of design. Every buffer need not look like every other to be functional. Plant materials may consist of evergreen trees with deciduous and ornamental trees and shrubs for visual interest and variety. The specific mix should be selected depending on their function. For example, shade trees should be provided for parking and lawn areas, and evergreen and ornamental trees can be used to screen nuisances.	*3. Design.* *a. Buffer planting arrangements shall be unified with the overall landscape and site design.* *b. The landscape design may include shade trees and evergreen and ornamental trees in an appropriate mix depending on function.* *c. The arrangement of plantings in buffers shall provide maximum protection to adjacent properties and avoid damage to existing plant material.* *d. Graded berms may be used provided that: (a) the contouring of the berms is compatible with the site design and is coordinated with general site grading; and (b) the combined mass of earth grading and supplemental plantings provide the desired screen. If planted berms are used, the maximum side slope shall be 2:1.* *e. If fencing is used, its height shall be adequate to perform its screening function and its design shall be consistent with the architecture of the principal building(s). Planting shall be included to augment any fencing plan.*
4. Planting Specifications. A performance approach is used, with the method for achieving the buffering objective left flexible. Land use ordinances often include specific requirements for buffers, but these may not apply in infill situations. For example, a typical requirement is that landscaped buffers be at least eight (8) feet in height within three (3) growing seasons. Minimum plant sizes may also be specified, as follows: shade trees of two and one-half (2 1/2) inches caliper; evergreen trees, six (6) feet in height; ornamental trees, two (2) inches in caliper; and shrubs eighteen (18) inches in height or diameter. These standards can be used as guidelines, but the infill document has used a more flexible approach to achieving the objective.	*4. Planting Specifications. Plant materials shall be sufficiently large and planted in such a fashion that an effective year-round visual screen is achieved. If plant materials are used, the species selected should be hardy to local conditions, and all plantings shall be installed according to accepted horticultural standards.*
5. *Maintenance. These* ordinance provisions are intended to protect the municipality and ensure that it is in the best interests of the developer to plant healthy specimens.	*5. Maintenance. Irrigation of all planting areas should be provided as needed. Plantings shall be watered regularly and in a manner appropriate for the specific plant species through the first growing season. Local plant species are encouraged so as to minimize the frequency of necessary watering. Dead and low-vigor plants shall be replaced by the applicant during the next planting season. Buffer areas shall be maintained and kept free of all debris, rubbish, weeds and tall grass.*
H. Parking Lot Landscaping	***H. Parking Lot Landscaping*** *1. General. Parking areas shall be suitably*

1. General. While not promoting off-street parking lots as the solution to accommodating cars in urban areas, the reality is that they are a fact of life in many areas and require careful planning. It is important that the overwhelming visual presence of parked cars be minimal and that entrances to parking areas not interrupt pedestrian and retail continuity. Curb cuts should be managed to reduce potential conflicts with pedestrians and to avoid interruptions in street tree and building rhythms.

Landscaping can play a significant role in minimizing and moderating many adverse effects of parking lots. It breaks up the broad expanse of pavement and screens the lot from the street and surrounding properties. Planting strips and islands help guide the circulation of vehicles and pedestrians, creating a safe environment for both. Landscaping reduces the expansiveness of surface parking lots, and rows of mature canopy trees shade surface parking, reduce heat build-up, and buffer winter winds. Buffer strips or low masonry walls between off-street parking areas and the street and sidewalk help protect pedestrians and improve the appearance of the parking area.

Some ordinances specify that all off-street parking areas of twenty or more spaces be provided with planting islands. While this number seems reasonable, the guidelines leave the number open to be determined by the particular development. Nevertheless, including landscaped islands in parking areas associated with infill development is encouraged.

Finally, the design of buffer strips and planting islands should be subject to approval to ensure that no safety hazards are created for pedestrians and drivers.

landscaped to minimize noise, glare, and other nuisance characteristics, as well as to improve the environment of the site and surrounding area.

a. Large parking lots shall be broken down into sections as appropriate for the type and size of the development. Sections shall be separated by landscaped strips, islands, and similar elements.

b. Parking lots along the street must be screened from the adjacent street and sidewalk by walls, fences, or landscaping.

c. Landscaped pedestrian pathways linking the parking area to buildings and/or the street may be required to aid pedestrian navigation and comfort.

d. The size, location, frequency, and design of buffer strips and planting islands shall be subject to the approval of the Planning Board.

2. Amount of Required Landscaping. Some communities may decide not to include standards specifying the amount of required landscaping since the guidelines have specified under the general requirements that the parking area be "suitably landscaped."

These requirements can be modified depending on the specific situation. Some ordinances, for example, require that at least ten percent of a parking area be landscaped. Others require a buffer strip of ten feet between the parking area and the street; these requirements may not be feasible in infill development.

b. When part of the parking lot landscape plan, planting islands should be planted with shrubs to channel internal traffic flow, prevent indiscriminate movement of vehicles, aid pedestrian circulation and improve the appearance of the parking area.

2. Amount of Required Landscaping. In parking lots, the interior parking area shall be considered to consist of that area within the outermost edge of the parking lot, not including the landscape strip surrounding the lot. Planting required within the parking lot is exclusive of other planting requirements, such as for shade trees planted along the street. The following requirements may be modified depending on the specific infill development.

a. At least [five percent (5%)] of the interior parking area shall be landscaped with plantings.

b. All off-street parking and loading areas of twenty (20) or more spaces shall be provided with planting islands.

c. [One (1) tree for each ten (10) spaces] shall be installed.

d. Buffer strips separating off-street parking areas shall be a minimum of [five (5) feet] wide along the street frontage and perimeter.

3. Location. The landscaping should be located in

3. Location. Planting areas should be large enough to support the plantings installed. Findings from recent research show that the healthiness of trees in urban areas is directly related to the amount of pervious soil (measured in cubic feet) under the trees that will permit water retention and root development. The 4' x 4' diamond islands in parking lots, for example, that are used to meet shade tree landscaping standards, do not provide a desirable environment for tree growth and should be discouraged. The size of the island should be related to the type of trees provided. A rule of thumb for an average tree is approximately 400 cubic feet of soil per shade tree.

4. Plant Type. Plants appropriate for the plant hardiness zones and ones that will be able to withstand the often adverse conditions of a parking lot should be selected. As much pervious soil as possible should be retained under trees in order to promote tree growth. However, the portion of the island that will be under the car overhand should be mulched or covered with paving material because the heat from car engines will usually kill plantings in this area.

I. Paving Materials

Paving serves a number of functions. On sidewalks or in courtyards, it creates a firm, level surface to facilitate passage. It can be used to define areas by varying materials, colors and textures—highlighting a crosswalk with a different paving surface would be an example of this use. Paving also stabilizes surfaces by preventing erosion. Finally, it provides visual interest to a landscape.

1, 2, and 3. These considerations are important when choosing paving materials. Compatibility with surroundings, (i.e., the choice of materials that complement the design of the project) is particularly important in infill developments. Function is also a major consideration. Tanbark, for example, might be appropriate for a jogging trail, but not in urban areas where there is heavy pedestrian or bicycle traffic. Brick often ices up in cold climates, and this should be taken into consideration. Smooth pavement, rather than decorative pavers which can result in an uneven surface, might be more appropriate in high use pedestrian areas.

protected areas, such as along walkways, in center islands, at the ends of bays, or between parking stalls. The size of the planting island should be adequate to provide a healthy environment for the type of planting materials installed. In addition to locating planting islands to subdivide parking lots of more than [20] spaces, planting islands should be located to manage and minimize stormwater runoff. Car stops should be provided to prevent cars from encroaching on the plantings. All landscaping in parking areas and on the street frontage shall be placed so that it will not obstruct sight distance.

4. Plant Type. A mixture of hardy evergreen and deciduous shade and flowering trees and shrubs may be planted. Evergreens may be used for parking lot screening along the perimeter and within the islands to block direct views. Deciduous trees shall provide a shade canopy. Flowering trees and shrubs add seasonal color interest. Landscaping along pedestrian pathways may include rows of trees and shrubs, flower beds, and planters.

The area between trees shall be mulched, or planted with shrubs or ground cover. Any area that will be under the overhang of vehicles shall be mulched or covered with paving material.

I. Paving Materials

1. Design and choice of paving materials used in pedestrian areas shall consider such factors as function, climate, characteristics of users, availability, cost, maintenance, glare, drainage, noise, appearance, and compatibility with surroundings.

2. Acceptable materials shall include, but are not limited to, concrete, brick, pavers, asphalt, and stone. Choice of material shall depend on function and compatibility with the surrounding area.

3. The use of pervious pavers is encouraged when

	appropriate.
J. Walls and Fences	***J. Walls and Fences***
1. Walls and fences serve a number of important functions in site planning. They provide enclosure, separate areas, provide security, screen areas from view, serve as a backdrop, focus a view, aid in climate control as a wind barrier or sun screen, and retain water or earth.	*1. Walls and fences shall be erected where required for privacy, screening, separation, security, erosion control, or to serve other necessary* *y and reasonable functions (see section VIII-16 for height limits).*
2. Walls and fences often become a dominant spatial feature of the landscape and materials must work with the design of the project and the surrounding area. The use of chain link or stockade fences is strongly discouraged.	*2. The design and materials used shall be functional and compatible with the character of existing and proposed development. Chain link, concrete block, unfaced concrete, plastic, fiberglass, plywood, and mesh construction fences are strongly discouraged.*
	3. No fence or wall shall be constructed or installed so as to obstruct sight views or constitute a safety hazard to traffic or pedestrians.
	4. Walls or fences should not act as barriers to adjacent properties; breaks for pedestrians and vehicles should be created.
5. In areas where steep slopes exist, the addition of retaining walls may be necessary. New retaining walls should be constructed with materials that are compatible with surrounding development. Unfaced concrete, concrete block, log and railroad ties are not recommended in most cases. Concrete block should be covered with plaster or stucco.	*5. New retaining walls should be compatible in design and materials to surrounding development. For retaining walls over an aggregate height of [2 to 3-1/2 feet], the design, construction specifications and structural calculations must be submitted to and approved by the municipal engineer prior to construction.*
K. Street Furniture	***K. Street Furniture***
1. Most of the man-made objects located on plazas, sidewalks, or in other pedestrian areas can be considered street furniture. These objects are usually associated with amenities for pedestrians and may be freestanding or fixed. Besides the items listed, street furniture includes kiosks, drinking fountains, bus shelters, information signs, game tables, and notice boards.	*1. Street furniture, such as, but not limited to, trash receptacles, benches, bike racks, planters, bollards, fountains, mailboxes, bus shelters, and phone booths, shall be located and sized in accordance with function.*
2. Because of the number and variety of components, street furniture often accumulates without design, resulting in a cluttered and discordant streetscape. To overcome visual chaos, the site details of infill projects should be compatible with each other and with adjacent development in terms of colors, textures, and materials.	*2. The different street furniture components shall be compatible in style, scale, and materials. Design and materials shall be coordinated with existing and proposed site architecture. Selection of street furniture shall take into consideration function, durability, maintenance, and long-term cost.*
3. Placement. Sidewalks accommodating street furniture of this kind should be at least 10 to 15 feet wide	*3. Placement.* *a. Street furniture, especially benches and*

L. Sidewalk Dining While not strictly “landscaping,” tables and chairs and planters used in many sidewalk dining areas fall under the broad category of street furniture. Since infill projects may include plans for sidewalk cafés, the ordinance and policy guide includes general guidelines for their design. The design guidelines, like those for other aspects of infill projects, are based on the principle that sidewalk dining accessories should complement their surroundings.	*trash receptacles, should be placed at frequent intervals along sidewalks for pedestrian comfort and use.* *b. Bike racks, when provided, should be located close to main building entrances so that they are highly visible and convenient. They should be constructed of durable materials and designed for ease of use.* ***L. Sidewalk Dining*** *1. All additions to the streetscape to accommodate sidewalk dining should maintain clear passage for pedestrians.* *2. All additions to the streetscape to accommodate sidewalk dining should be compatible with adjacent buildings.* *3. All materials, finishes, and colors of barriers should be consistent with adjacent buildings.* *4. Tables, chairs, and other furniture should be durable and compatible with adjacent buildings in design, material, and color.* *5. Lighting fixtures provided for sidewalk dining should complement adjacent buildings and other lighting fixtures and provide light that is soft and directed.* *6. The use of planters as barriers is encouraged.* *7. Placement of such items as service carts and refuse containers in the sidewalk dining area is discouraged. Where proposed, such items should be screened from view or visually acceptable.* *8. Any attachments to the buildings, such as the installation of awnings, signs, or lighting fixtures, are subject to design review for those elements.*

Part Three

Background on Infill Development: Challenges and Best Practices

Chapter 2
IDENTIFYING A SMART GROWTH–INFILL DEVELOPMENT

INTRODUCTION

The current study is directed toward smart growth–infill projects and recommends special inducements for such development, for example, accelerated processing and reduced review fees (see part 2, sections II and VI). As such, it is important to determine whether a project is a smart growth–infill development. This chapter examines efforts to score or in other ways identify smart growth, including infill projects. Examples include the "Smart Growth Criteria Matrix" used in Austin, Texas, the "Smart Growth Scorecard" used in Maryland, and the "Smart Growth Scorecard—Proposed Developments" from New Jersey Future (NJF). These can be supplemented by the smart-growth objectives of the U.S. Green Building Council (USGBC), especially its development guidance for neighborhoods known as LEED®-ND, explored elsewhere in this document. The various scorecards are evaluated, and reasons are presented for selecting NJF's scorecard to help identify smart growth–infill projects in New Jersey. An alternative approach would use the definition of smart growth found in the legislation for a state tax credit in New Jersey (S.274, 2004, Proposed Smart Growth Tax Credit).

EXAMPLES OF EFFORTS TO IDENTIFY SMART-GROWTH PROJECTS

Six prior efforts to identify smart-growth projects, including infill developments, are presented below, roughly in order of decreasing age (i.e., the oldest studies are presented first). In the terminology used here, "criteria" are groupings of specific elements, some of which are measurable.

Austin, Texas: Smart Growth Criteria Matrix

Use

The criteria listed below are used to assign a total score to a project under evaluation. The total project score is then used in a preliminary review to determine the project's eligibility for tax increment financing (TIF) incentives. A city review team conducts a final review to determine ultimate eligibility (City of Austin Transportation, Planning, and Design Department 2001).

Criteria

- Location—near transit or planned smart-growth (dense development) area
- Process—transparent and includes citizen input
- Density—dense enough to support transit
- Land use—appropriate for the area (e.g., regional-draw retail in an urban core), compatible with official plans, and mixed use
- Design—human scale, consistent with surroundings, includes public space

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This chapter by Matt Cuddy and David Listokin.

- Transportation—includes and encourages alternatives to automobile travel
- Parking—is minimally intrusive
- Housing—includes affordable housing
- Local economy—supports locally owned businesses
- Tax-base enhancement

Quantification

Numerical ranges and weights are given for each element. Quantitative goals are included for many elements.

State of Maryland: Smart Growth Scorecard

Use

The Maryland Office of Smart Growth describes its scorecard as follows: "The Office of Smart Growth has developed a tool to identify the attributes of Smart Growth projects, enabling staff to make objective assessments and to offer assistance on specific aspects of projects to improve their smart growth performance. The Smart Growth Scorecard was developed in coordination with numerous State agencies and went through an informal peer review with the private sector and local governments" (Maryland Office of Smart Growth 2001).

Criteria

- Location—near existing development or an area identified as being in need of redevelopment
- Services—adequate infrastructure and schools in place
- Density and compactness—supports transit, with area for roads minimized
- Mixed use
- Housing diversity
- Transportation—includes and encourages alternatives to automobile travel
- Community character and design—includes quasi-public spaces, consistent architecture, preserves historic structures
- Environmental protection—avoids environmentally sensitive areas
- Stakeholder participation
- Economic development—provides jobs and meets identified community needs

Quantification

Each element under each criterion is rated on a four-point scale. No weights are provided for the elements or criteria. Quantitative goals are not provided for the elements.

Greenbelt Alliance (San Francisco Area): Compact Development Endorsement Program

Use

Through its compact development endorsement program, the Greenbelt Alliance endorses and supports residential, mixed-use, and commercial developments that are pedestrian-oriented and transit-accessible, use land efficiently, and contribute to the provision of affordable housing (Greenbelt Alliance 2004). A member of the Greenbelt Alliance compact development team (CDT) reviews a given project using the criteria shown below and prepares a report for the team. The team then decides whether to endorse and support the project. Developers can use the team’s endorsement letter as a tool to promote the project, and, in some cases, the Greenbelt Alliance actively advocates for endorsed projects. The Alliance endorsed at least seven projects in 2003, and more than that number from 2000 to 2002.

Criteria: Residential and Mixed-Use

- Location—in currently developed area
- Reduces dependence on automobiles
- Density of at least 20 units per acre
- Affordable—includes affordable housing
- Design—pedestrian friendly
- Size—at least 20 units
- Community input—addresses community concerns

Criteria: Commercial

- Commercial-applicable criteria from the list above
- Efficient land use
- Innovative design
- Supports downtown revitalization
- Reclaims a brownfield
- Supports “clean” industry
- Does not induce sprawl
- Addresses a jobs/housing imbalance

Quantification

The criteria and elements are not scored or weighted. The only quantitative goals are related to development size and density, as shown above.

Vermont Smart Growth Collaborative: The Housing Endorsement Program

Use

To be eligible for endorsement, a project must score at least one point (out of a possible 15) in the area of “easy access to jobs, services, transportation, and grocery stores” and at least 15 points overall (Vermont Smart Growth Collaborative 2003). A review committee evaluates eligible projects and determines whether to endorse them as examples of smart growth. The endorsement may be submitted with other project materials as a promotional tool during the planning and permitting stages. At least six projects have been endorsed.

Criteria

- Concentrated development—dense, served by infrastructure and stores
- Land-use mix
- Transportation—encourages alternatives to driving
- Working landscape—preserves prime agricultural soil and other natural resources
- Human scale
- Environmental quality—uses brownfields, preserves open space, avoids floodplains
- Community involvement in design and approval process
- Energy/water conservation
- Social equity/fair share—affordable housing

Quantification

A score is assigned to each element. Few element goals are defined quantitatively.

Washington (DC) Smart Growth Alliance (SGA): Smart Growth Recognition Program

Use

The Washington SGA is a collaborative partnership of five organizations:

- Urban Land Institute–Washington
- Chesapeake Bay Foundation
- Greater Washington Board of Trade
- Coalition for Smarter Growth
- Metropolitan Washington Builders' Council

Projects to be considered for endorsement by the SGA submit a project proposal to a jury made up of one member from each organization (Washington Smart Growth Alliance 2004). The jury evaluates a project using the criteria shown below and decides whether to endorse it as a smart-growth development. The SGA endorsement is meant to be used to promote the project and smooth the approval process. Six projects were endorsed in 2003.

Criteria

- Location—in an area designated and appropriate for growth, served by existing water/sewer infrastructure, and accessible to transit
- Density, design, and diversity of uses—has sufficient density and scale to support mix of uses; design integrates project into the existing community fabric

- Transportation—encourages alternatives to automobile travel
- Environment—preserves important natural resources
- Mixed income—adds to the overall mix of housing for different income levels
- Community assets—generates benefits for the surrounding area (e.g., economic growth, affordable housing, open space)

Quantification

Each criterion has several elements, but they are not scored. There are metrics offered only for development density.

New Jersey Future: Smart Growth Scorecard—Proposed Developments

Use

New Jersey Future describes its scorecard as being "as much a conceptual model as it is a practical tool. It should be viewed as a way to help citizens and local officials evaluate development proposals and the potential benefits and drawbacks they may bring to the community. The card is best applied to larger projects, which tend to have larger implications for smart growth, but is a useful exercise for most development proposals" (n.d., 1). The scorecard was developed by synthesizing existing scorecards, tailoring the result to the New Jersey context, and testing it against the experience of local experts and projects recognized by New Jersey Future for their exemplary smart-growth characteristics. Whether the scorecard has been used to make endorsement decisions, however, is not known.

Criteria

- Located near existing development and infrastructure
- Increases range of housing options
- Protects open space, farmland, and critical environmental areas
- Creates or enhances mix of uses
- Creates or enhances choices for getting around to decrease dependency on the automobile
- Walkable, designed for personal interaction
- Respects community character, design, and historic features

Quantification

Each element is scored and weighted. The scorecard includes metrics where appropriate.

EVALUATION

Many jurisdictions have incorporated scorecards, endorsement programs, and the like to identify smart-growth development. While the specific individual measures differ, there is considerable similarity in their underlying criteria. Further, many of the methodologies incorporate various indicators of infill, either directly (e.g., "location in a currently developed area" or "near existing development") or indirectly (e.g., "served by infrastructure and stores" or "served by water/sewer and transit").

A good checklist covers all the essential elements of smart growth and infill: compact development, near existing services, mix of uses, context-sensitive and human-scaled design, and alternatives to automobile transportation (Fleissig and Jacobsen 2002). To be useful, a checklist must also include quantitative benchmarks within elements and at least suggest a scoring system, so that dissimilar project attributes can be weighted against one another. These considerations, along with the fact that it is designed with the New Jersey context in mind, lead us to suggest the New Jersey Future Smart Growth Scorecard (NJFSGS) for flagging smart growth–infill projects.

Besides being a useful device for flagging smart growth—its intended purpose—the NJFSGS both directly and indirectly incorporates many characteristics of infill projects. That is not surprising given the importance of infill to smart growth, especially in a state like New Jersey. Among the NJFSGS infill-linked measures are the following (New Jersey Future n.d.):

1. Project is located adjacent to existing infrastructure (section I).
2. Project is in a designated "area in need of redevelopment" (section I).
3. Project is near housing, retail services, schools, recreation centers, and offices (section I).
4. Project does not require additional services or facilities (section I).
5. Project cleans up a brownfield site (section III).
6. Project is accessible by multiple modes of transportation or is within walking distance to public transit (section V).
7. Project has higher densities or FARs (floor-area ratio) (section VI).
8. Project reuses or rehabilitates existing and/or historic structures (section VII).

The NJFSGS assigns "grades" (A to F) to each of its seven smart-growth measurement sections: I. near existing development and infrastructure; II. range of housing options; III. protects open space, farmland, and critical environmental areas; IV. mix of uses; V. provides choices for getting around; VI. walkable, designed for personal interaction; and VII. respectful of community character, design, and historic features (New Jersey Future n.d.). For the purposes of the current study, a development will be deemed a smart growth–infill project if (1) its *overall* NJFSGS grade is an A or a B and (2) its NJFSGS grade in section I, project location near existing development and infrastructure—a critical measure of infill—is an A.

A jurisdiction may have defined smart growth–infill for official purposes; therefore, where a definition already exists, it is sensible to incorporate it for consistency. To illustrate, proposed legislation in New Jersey (S.274, 2004) would offer state tax credits for smart-growth development, where it is defined with respect to *location* (e.g., a "center" designated by the State Planning Commission); *transit access* (the site must be served by bus, train, or ferry); *infrastructure* (e.g., the development must not require a sanitary-line extension of 1,000 feet or more or new streets with more than two traffic lanes); *density* (e.g., a minimum residential density of six units per acre); *subdivision* (e.g., maximum parking standards are set); and *other characteristics* (e.g., the development must not be located in areas with environmental constraints, such as the Pinelands, wetlands, parkland, critical slopes, or water supply areas). In New Jersey, the definition of smart growth–infill, for the purpose of flagging a project as eligible for accelerated processing, reduced fees, and other incentives, might simply reference S.274, 2004. Given the above, the infill ordinance and policy guide (see part 2, section II) recommends two ways to flag a smart growth–infill project in New Jersey: the NJFSGS and the S.274 methodology.

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Chapter 3
PROPERTY ACQUISITION AND INFILL

INTRODUCTION

This chapter considers the challenges of property acquisition for the purpose of facilitating infill and proposes best-practice solutions. There are two underlying problems. First, parcels acquired for infill are by definition in targeted locations; they are found in largely developed areas, not in the more encompassing geography of greenfields. Second, the sites most suitable for infill often are subject to legal, environmental, and other issues stemming from the fact that, unlike blank-slate greenfields, they are the remnant parcels of prior waves of development. These two problems magnify others. Because properties must be acquired in a certain area, an owner reluctant to sell can stop an infill project in its tracks. Lengthy negotiations with such owners and the application of eminent domain, if negotiations fail, add to the time and cost of infill development. All of the above may dissuade would-be developers and lenders from engaging in infill development projects.

Property acquisition is not always a problem for infill projects. An infill developer may already own the land or may acquire readily available parcels from land banks or other sources. It is also true that greenfield development is not immune from property acquisition challenges. However, although not unique to infill, property acquisition challenges are often more problematic to infill projects.

THE LIMITATIONS OF ACQUISITION STRATEGIES

Properties for acquisition infill (that is, infill projects for which the infill developer does not already own the land) can be obtained on the private market and from government sources. Private sources include individual owners and/or banks. Acquisition from government sources entails such strategies as purchasing tax liens on property tax–delinquent parcels and foreclosing on those liens and acquiring properties through public condemnation. Each approach offers certain benefits, yet all are subject to practical drawbacks as well.

Problems in Acquiring Properties from Owners

The most straightforward way to acquire property for an infill project is to contact the owner of the desired property and negotiate a sale. That is much easier said than done, however. Two major problems can impede the process.

1. *Identifying and finding the owner.* Property-ownership records are often inaccurate, outdated, or vague. These conditions make it hard to identify and contact owners. Estate complications also frequently impede efforts to track owners and negotiate a sale.

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2. *Owners refuse to sell or to offer their properties at reasonable prices*. Just because an owner is contacted does not mean a sale can be consummated. Owners may not be inclined to sell, or they might ask unrealistic prices given their property's location, condition, or other factors, such as the existence of expensive tax, mechanic, and other liens that effectively add to the purchase price.

Little Haiti Housing Association (LHHA) is a community development corporation (CDC) that delivers infill housing (mostly rehabilitated units) in Miami, Florida. LHHA often encounters difficulties in acquiring properties from owners. It is often challenging for the organization to identify a property's legal owners. LHHA finds that the ownership information on property tax records frequently is erroneous (e.g., it indicates a deceased person) or outdated (e.g., the property owner is correctly listed but has moved from the address given) or in other ways not usable. For instance, a property may be recorded in the name of a shell corporation filed at an attorney's office. LHHA has attempted to track down owners through such means as contacting the Florida motor vehicle bureau to ascertain an owner's current address, but this is a time-consuming process that often comes to naught.

Even if contact is made, an owner may not be willing to sell, or the owner may demand an unrealistic price, despite the fact that the property may need extensive rehabilitation and incur other charges that must be met. The additional charges can amount to a five-figure sum for back taxes and mechanic and other liens (e.g., city-county back charges for cleaning trash from an empty lot or house).

LHHA's experience is common. Isles, a CDC in Trenton, New Jersey, also provides affordable infill housing (both rehabilitation projects and new construction). Isles confronts many issues in acquiring properties from existing owners. The owners have to be located, and they have to be amenable to a sale. Isles finds the former to be less of a problem than the latter; indeed, owner intransigence is often an insurmountable problem. Isles cites many "situations where we have had to build a project around owners who refused to sell" (Kasabach 1999).

Owners refuse to sell for various reasons. These may be personal (e.g., estate) complications. Owners may have unrealistic expectations of the worth of their holdings, and their asking price often far exceeds Isles's budget. The price offered by Isles is also tempered by the outstanding liens that typify many inner-city properties. Isles finds that the properties it seeks in Trenton are often at least two years delinquent on property tax payments. A property also may have had a prior two-year period of tax delinquency that was resolved when the taxes were paid by an investor; the investor would then hold a five-figure tax certificate with an 18 percent interest rate. Unpaid water and other utility charges, as well as mechanic and related liens, often add thousands of dollars to the amount owed. The cumulative arrearage of the property alone often exceeds Isles's purchase budget. Isles describes the situation as "lienfields."

The difficulties encountered in identifying property owners were also described in a nationwide study on dealing with abandoned properties (International City/County Management Association, Local Initiatives Support Corporation, Smart Growth America 2004, 15). “Often you can’t do anything with an abandoned property because you don’t know who owns it. There is a name on the tax record, but that individual can’t be found.”

Nonprofits, such as LHHA and Isles and those dealing with abandoned properties, are not alone in expressing frustration with the hurdles encountered when trying to acquire property from owners. The comments of the New Jersey infill developers interviewed in the course of this study, including those working on luxury developments, provide additional examples. One developer reported that owners of potential infill sites are hard to find (e.g., when title is held in the name of a holding company), that estate problems are common, and that clearing title is a hurdle because of judgments, liens, and other encumbrances. Assemblage presents another hurdle. For zoning and subdivision reasons, the infill work done by this developer sometimes entails acquisition of adjacent or nearby properties. For instance, in trying to adaptively renovate an old school into apartments, the developer had to provide additional parking spaces. To do so, he had to buy an adjacent lot and building. Because he had to buy those parcels, he confronted a seller’s market. Similar sentiments were voiced by the other New Jersey infill developers. Stated one, “Land assemblage is a huge challenge because we have to deal with multiple owners.” Another said, “To create a market and ambience, and to do mixed use, the project has to be of certain scale. Assembling land that meets those qualifications is difficult.”

These experiences are echoed nationwide. A California study of the challenges to and the potential for small-scale, mixed-use infill found that “some landowners have unrealistic expectations regarding the value of their property. They are not willing to sell their land or enter into a joint venture development because they are unwilling to accept a lower [and more correct] land value” (Hamilton, Rubinovitz, and Alschuler, Inc. 1996, 10–11).

Mission Bay, a large infill development in San Francisco, encountered an “intricate problem involving reconciling the various landownerships” (Porter 1992, 31). In converting a run-down Pasadena, California, suburban mall into a mixed-use (housing, retail, and entertainment) “urban village,” the developers (TrizecHahn and Post Properties) encountered a tedious, 10-year property acquisition process that necessitated the following steps (Urban Land Institute 2000, 12):

- The interest of the divergent minority partner was purchased.
- The underlying lenders’ interest from Teachers Insurance was purchased.
- The leasehold interest [from the center’s anchor stores] was acquired.
- The leasehold rights of 65 remaining tenants were purchased, and the developers dealt with the costs associated with the displacement of those establishments.
- A complex purchase and sale agreement was negotiated between Post Properties, TrizecHahn, and the City of Pasadena. Approximately $1 million was spent on documenting the deal alone. The transaction included the purchase of air-rights parcels; the separation of residential parking from retail parking; the establishment of

reciprocal easements among the property owners; the development of a compatible set of rules and regulations between residential and retail uses; and other legal operational issues.

Problems in Acquiring Properties from Banks

Suitable infill properties may very well have delinquent mortgages. Infill developers should be able to purchase the nonperforming loans, foreclose on the delinquent mortgagors, and thus acquire the properties. Banks do foreclosures, and the bank-acquired properties could be made available for infill.

At least two problems impede attempts to acquire property from banks. For example,

1. Banks may hesitate to foreclose on delinquent mortgages because to do so would confirm a bad investment. Banks also do not want to be saddled with the challenges and potential liability of owning problem real estate.
2. Purchasing delinquent mortgages is not always well suited to the targeted infill process. Lenders will often seek to sell their “bad loans” to others who will deal with them. While these sales are open to entities doing infill, there are frequent practical stumbling blocks. For instance, banks may only be interested in a wholesale approach—that is, selling “bad loans” in bulk. However, for financial and other reasons, bulk acquisition is not feasible for many infill organizations.

The experiences of New Haven Neighborhood Housing Services (NHNHS), a Connecticut CDC, are illustrative. New Haven, Connecticut, had a surge in the speculative real estate market in the early 1980s, followed by a crash at the end of that decade. With the change in fortune, many speculator purchasers ceased making mortgage payments. That situation seemed to provide an opportunity for NHNHS to acquire either foreclosed parcels or “bad loans” from banks. While the nonprofit acquired some properties in this fashion, it found bank property acquisition to be problematic. First, lenders sometimes were hesitant to foreclose on nonperforming loans because they feared the liability of owning marginal urban properties in New Haven. Second, rather than foreclose, lenders often preferred to sell their nonperforming portfolio to investors. That type of sale, however, was often done in bulk, and the purchasers typically were speculators who bought a package of loans. The bulk sale hurt NHNHS in two ways. As a small nonprofit, NHNHS was not prepared to buy in bulk, nor was it willing to outbid the speculators. In addition, the speculators who made the wholesale purchase were often irresponsible landlords, so their disinvestment led to further property deterioration in the Dwight neighborhood where NHNHS operated.

Problems in Acquiring Properties from Donations

Owners of private property can donate unwanted holdings to entities doing infill. Such largesse, however, is not often forthcoming. In addition, donations may make the receiving infill organization susceptible to brownfields liability and costs, as we illustrate below.

Isles has acquired some buildings through outright donations. For instance, Bell Atlantic gave Isles an industrial property that the CDC converted to 50 apartments. The building had a market value of about $250,000, so the utility's generosity saved Isles that amount. In addition, Bell Atlantic transferred the building in an environmentally clean condition, thus saving Isles many thousands of dollars in cleanup costs. (The issue of brownfields and infill is considered shortly in greater detail.)

Few private owners, however, share Bell Atlantic's charitable spirit; they generally want to be compensated for their properties, and they surely will not incur expenses for environmental remediation. Further, even if an owner were to donate a property to Isles, that would still leave the "lienfields" noted earlier—the outstanding property taxes, tax certificates, and utility and other charges, which are often quite costly. Infill organizations can reduce the lienfields arrearage by securing properties from public entities, for example, through tax foreclosure. Yet foreclosure acquisitions and similar strategies can be problematic.

Problems in Acquiring Properties through Property Tax Foreclosure

Properties suitable for infill may be delinquent in their tax payments. An infill developer could purchase tax liens, which are sold periodically by a municipality (or county) in cases of delinquent property taxes, and subsequently foreclose on those liens. The municipality or county also could foreclose on the liens and then offer to sell (or donate) the foreclosed properties to infill sponsors. These approaches, however, often fall short:

1. Tax foreclosure is a time-consuming process that often takes years to finalize (Boston 1976). Most infill organizations cannot wait that long.
2. Tax foreclosure is an uncertain process. Besides taking a long time, purchasing a tax lien does not guarantee that the property will be acquired. A tax sale of a delinquent property is usually held after taxes have been in arrears for a period that could range from less than a year to more than five years. The purchaser becomes the inchoate (imperfect) title holder of the land. As such, the purchaser's title is subject to defeasance should the taxpayer redeem the property by paying the taxes and the penalties owed. The period of redemption varies from one to three years. Only if redemption is not made will the title rest indefeasibly with the purchaser.
3. Tax foreclosure can be expensive. If the infill entity has to pay the back taxes, property acquisition can be quite expensive. The tax liability can be wiped out, however, if the city forecloses on back taxes and then conveys the property to the infill entity at no cost or at a nominal cost.
4. Cities may hesitate to foreclose on back taxes because they do not want to be saddled with marginal real estate. New York City's experience is illustrative. After accelerating its property tax foreclosure process in the 1970s from *in personam* (action against the property owner) to *in rem* (actions against the property), New York City was burdened with thousands of abandoned or badly deteriorated properties. Maintenance of that portfolio was so expensive that for many years New York City allocated all its Community Development Block Group (CDBG) moneys

for that purpose. (When the real estate market improved, New York City ultimately disposed of its *in rem* properties to private and nonprofit owners). Even if municipalities did more to foreclose on back taxes, they would not necessarily be willing or able to transfer the parcels to infill entities, especially at a nominal cost. For example, there might be legal restrictions against such transfer.

5. Tax-delinquent properties may not be in neighborhoods where infill entities are active, or the parcels may not be the right property type. There may be other drawbacks, such as not delivering a marketable title.

Experience in the field attests to both the myriad problems of tax foreclosure and its potential as a strategy for infill projects. Trenton, New Jersey, regularly moves to foreclose on back taxes, and the city makes the properties available to Isles and other nonprofits, as well as to private parties interested in redevelopment, at no cost or at a nominal cost. Isles has acquired most of its properties in this fashion. Foreclosure offers other advantages as an acquisition strategy. In New Jersey, it conveys a strong, insurable title. In addition, the foreclosure wipes out many outstanding charges, including back taxes and utility and mechanic liens.

In Trenton, however, the foreclosure does not eliminate the obligation of the tax-sale certificate, a drawback of this approach. In fact, Trenton does not proceed on the tax foreclosure of a property that has an outstanding tax certificate. This means that the lienfield problem lingers in the presence of a tax certificate. Ironically, as Trenton's fortunes have improved—due in part to the infill activities of Isles and other nonprofits—there has been enhanced investor interest in tax-sale certificates. As more of these certificates are sold, tax foreclosure becomes a less effective way of delivering properties for infill.

The length of the foreclosure acquisition process is presents another hurdle. Although Trenton uses *in rem* foreclosure, which is less time-consuming than the *in personam* process, it still takes years to move the process along from initial delinquency to the time a property is available for rehabilitation. A few years is an eternity in an urban setting like Trenton, and in that time, the property can deteriorate so badly that it is beyond reclamation.

Isles also observes that city-owned properties are not adequately stabilized. Full stabilization can help thwart vandals, squatters, drug users, and others from causing much damage in a short period of time. However, once a parcel is foreclosed, Trenton may simply lock the exterior doors rather than board all doors and windows. As a result, the tax-foreclosed properties may be ravaged before they can be transferred to Isles or another nonprofit.

LHHA operates in a somewhat different environment. Unlike Trenton, Miami-Dade County is reluctant to foreclose on tax-delinquent properties because the county fears it will become the property caretaker of last resort. Although private entities such as LHHA could try to acquire properties through tax foreclosure, this approach is not very fruitful in the Miami context. First, the process would take years, and, in the interim, the tax-delinquent parcels very likely would be severely neglected, thereby making rehabilitation difficult and expensive. Second, and more fundamental, is the frail title that results from the proceeding. The Miami-Dade County tax title is not recognized by title insurance companies, so it is effectively valueless.

Problems in Acquiring Properties through Condemnation (Eminent Domain)

Federal, state, and local governments and their agencies may use an inherent, sovereign power known as eminent domain to appropriate private property as long as two essential criteria are met: (1) the appropriation, or taking, is in furtherance of a public use and (2) the affected owner is first paid just compensation for the taking. These criteria comply with the “takings clause” of the Fifth Amendment of the United States Constitution, which states that the government shall not take private property for a public use without first paying just compensation. Eminent domain is usually justified either under the police power, in general furtherance of the public health, safety, and general welfare, or under the war or taxation powers (Bauer 2003). The Constitution does not actually define “public use” with regard to the takings clause. State eminent domain statutes, to the degree that they provide lists of those activities for which eminent domain may be used, come closest to defining what is, or is not, a public use. As such, the lists of permissible public uses for purposes of eminent domain may vary somewhat from state to state.

The process by which a government or governmental entity appropriates land under eminent domain is typically referred to as a condemnation proceeding. Although the overall eminent domain process can vary significantly from state to state, it tends to follow a rather common pattern (Larson 2004). First, before resorting to eminent domain, the governmental entity (e.g., a municipality) tries to negotiate a fair purchase price with the property owner. If the owner refuses to sell the property, the governmental entity files a court action to exercise eminent domain and serves the owner with notice pursuant to state statutory requirements. A hearing generally follows in which the governmental entity must demonstrate the following: (1) that it engaged in a good-faith effort to arrive at a fair price but no agreement was reached and (2) that the taking of the property would be for a public use as defined under the applicable laws or eminent domain statutes. The property owner, in turn, is given the opportunity to respond to the governmental entity. If the governmental entity succeeds in its petition, proceedings are held to determine the property’s fair market value, which becomes the basis of the just compensation award. Once just compensation is paid, the governmental entity obtains title to the property. Affected private property owners can still appeal the condemnation and transfers of their properties by filing inverse condemnation actions.

Arguably, the use of eminent domain to facilitate infill development is an outgrowth of the evolution and expansion of the public-use doctrine to include economic development and urban redevelopment. In the first half of the nineteenth century, eminent domain was used primarily to acquire private property for the construction of roads, dams, sewers, parks, hospitals, and other tangible public works that directly benefited and were physically accessible to the general public. By the late nineteenth century, however, eminent domain was being used to acquire private property for rail and utility rights of way to improve access to the natural mineral and timber resources of the American West (Werner 2001). Accordingly, state legislatures broadened the concept of public use for eminent domain to include any use, or purpose, such as economic development, that would confer some type of public benefit, regardless of whether public access was guaranteed or whether the timing of the results could be ascertained. Late-nineteenth-century courts supported their legislatures in the expansion of the public-use doctrine, and that support was reflected in case law (Werner 2001).

In the opinion of many legal scholars, the Supreme Court's decision in *Berman v. Parker*, 348 U.S. 26 (1954) first crystallized this broadening of the public-use doctrine on a national level (Broussard 2000, Klemetsrud 1999, Kulick 2000, Malamut 2000, Posey 2003, Pritchett 2000, Werner 2001). In *Berman*, the Supreme Court noted that the concept of public welfare is "broad and inclusive," and it validated a District of Columbia urban renewal statute as meeting the public-use requirement, even though the statute permitted private dwellings and businesses deemed blighted to be condemned and transferred to private developers for redevelopment (Werner 2001). The Supreme Court did not consider the psychosocial and economic impacts of the displacement, reasoning that the affected residents and businesses had been justly compensated for the takings.

Poletown Neighborhood Council v. Detroit, 410 Mich. 616, 403 NW2d 455 (1981), is one of the most dramatic cases cited by legal scholars in commentaries on the accelerated use of eminent domain for economic development purposes (Broussard 2000, Klemetsrud 1999, Kulick 2000, Malamut 2000, Posey 2003, Pritchett 2000, Werner 2001). In *Poletown*, the Michigan Supreme Court validated Detroit's use of eminent domain to condemn an entire neighborhood to clear a site for General Motors Corporation's new plant, even though there was disagreement about the degree of blight and the condemnation displaced more than 3,000 households, hundreds of businesses, and dozens of churches. Although the immediate beneficiary would be General Motors, the Michigan Supreme Court cited the anticipated increase in jobs and tax revenues and the expected improvement in Detroit's economy as the public-use justification for the eminent domain action. As in *Berman*, the court minimized displacement concerns because the affected homeowners and businesses had received just compensation in the form of fair market value prices for their properties.

Certainly, acquisition of properties through eminent domain and condemnation can be advantageous for infill development. Specifically, eminent domain can facilitate the assemblage and transfer of a critical mass of contiguous parcels from private owners to developers. Improved land assembly, in turn, can help transform blighted, vacant, or underutilized lots into marketable areas ripe for infill development. Given the current climate of federal and state fiscal retrenchment, eminent domain is often an essential tool for facilitating local economic development in older urban areas with constraints on developable land (e.g., high costs or fixed municipal boundaries). In addition, eminent domain provides municipalities and other local governments with the power to overrule residents and businesses that refuse to leave.

There are several negative aspects and caveats associated with the use of eminent domain. Eminent domain is an exercise of police power that impacts property rights. Therefore, in theory, governments will tend to use it sparingly and only when it meets the public-use requirement and clearly furthers public health, safety, and welfare. Governments may not be so readily inclined to condemn property for the purposes of infill, even though the parameters of the public-use requirement have loosened and expanded to include economic development, urban redevelopment, and other tax-generating activities. There are also legal constraints that specify which parties may condemn properties and the conditions under which condemnation applies. These constraints and conditions, again, are usually specified by state eminent domain statutes. For example, some states limit condemnation to certain minimum sizes or classes of municipalities (e.g., cities of 10,000 population or more in Missouri and first-class townships in Pennsylvania). In addition, not all jurisdictions agree that condemning for acquisition-rehabilitation purposes satisfies the public-use requirement.

Cost also impedes the use of condemnation to acquire properties for infill. As noted above, most state statutes specify that the condemning authority must pay the owner the fair market value of his or her property at the time of the taking. Some states also require the condemning authority to pay the affected parties' relocation expenses. In addition, there may be considerable legal and appraisal costs.

Just compensation under eminent domain statutes may not always be just (Bauer 2003). At the very least, just compensation packages are designed to put the affected property owner in as good a position as he or she would have occupied had the taking never occurred (Bauer 2003). Transfers of property through eminent domain, however, are rarely simple and may be more time-consuming than originally anticipated. Compounding this is the fact that in some jurisdictions, the date of property valuation coincides with the governing body's decision to condemn, not the date that the government takes actual possession of the property. Just compensation issues can arise in these jurisdictions when there is a significant gap in time between the decision to condemn, when just compensation is set, and the time the government actually takes possession because land values can change significantly during that period. Under these circumstances, so-called just compensation packages may actually under-compensate an affected property owner because the increase in land value is not taken into account.

The statutes of a number of states, including New Jersey, California, Colorado, Florida, Kentucky, Maryland, and Virginia, provide multiple alternative valuation dates designed to reflect different circumstances (Bauer 2003). New Jersey, for example, provides that just compensation shall be determined as of the date of the earliest of the following events: (1) the date possession of the property being condemned is taken by the condemner in whole or in part; (2) the date of the commencement of the action; (3) the date on which action is taken by the condemner that substantially affects the use and enjoyment of the property by the condemnee; or (4) the date of the declaration of blight by the governing body upon a report by a planning board (*Eminent Domain Act of 1971,* N.J.S.A. 20:3–30). Such date-of-valuation statutes are designed to protect both parties—the governmental body and the private property owner—from fluctuations in land value

(Bauer 2003). If land values increase before compensation is determined but after a decision to condemn has been made, the affected private property owners (condemnees) will not have to receive inadequate compensation. Indeed, the statutes are designed to ensure, as much as practicable, that condemners (the condemning governmental entities) will not be able to take advantage of depreciations in value and that condemnees (the parties whose properties are condemned) will not be able to benefit unfairly from increases in land value (Bauer 2003).

New Jersey infill developers interviewed during the preparation of this study largely viewed the application of eminent domain as a valuable land-assembly tool. However, they acknowledged some implementation problems. One infill developer gave the following example:

> Land assembly is a huge challenge because of multiple owners. Fortunately, New Jersey has a strong redevelopment statute granting broad condemnation powers, but we need a more systematic approach to how properties are appraised. For example, in a phased infill development, the success of the initial phase can drive up the value of adjacent properties. So is this value for eminent domain purposes that of the baseline (low) or at time of development (high)? No industrywide or "ethical" standard exists. Valuing brownfields is another problem. Do you include the cost of remediation in fixing the value?

Others interviewed in New Jersey had a less positive view of the application of eminent domain for infill development. Affected property owners often criticize the action as a distortion of the police power for private gain and further say they are not fairly compensated.

Indeed, an anti–eminent domain backlash is currently under way throughout the country in many older communities undergoing redevelopment. Placards have sprouted in storefronts and residential windows, proclaiming "Stop eminent domain abuse" and "No eminent domain abuse." These sentiments reflect widespread concern that governments may be using eminent domain as the tool of first choice for redevelopment instead of relegating it to a mode of last resort. Moreover, concern is mounting about the tendency, seemingly on the increase, for municipalities to use their powers of eminent domain to transfer private properties from one group of private owners to another group of private owners; from residents and small-business owners to often large-scale private developers who then become the primary beneficiaries of redevelopment processes instead of the general public. This tendency is arguably the core complaint of many eminent domain abuse allegations.

At least some state courts have begun to respond to the concerns surrounding alleged abuses of eminent domain and the seemingly wide latitude accorded the public-use doctrine. In July 2004, the Michigan Supreme Court overturned its *Poletown* decision. Property rights advocates perceived the move as the beginning of a trend in their favor. However, in *Kelo et al. v. City of New London et al.*, No. 04-108 (2005), the United States Supreme Court determined that redevelopment constitutes a public use for purposes of eminent domain. In *Kelo et al.*, the Court held that the City of New London, Connecticut, could use eminent domain to seize homes and businesses and transfer them to private developers for purposes of economic and urban redevelopment. Justice Stevens, writing the majority opinion, viewed the promotion of economic development as no different "from other public uses the court has recognized." Nonetheless, the Court did note that state legislatures can amend their statutes to limit the reach of eminent domain. At the time of this writing, there were renewed anti–eminent domain rumblings, this time in the form of bills introduced in a few states (including New Jersey) to preclude the use of eminent domain for redevelopment. Time will tell if this becomes a nationwide trend.

In light of the above, it must be acknowledged that the concerns of affected property owners are not baseless. Although eminent domain can be a valuable tool for infill redevelopment and urban revitalization, common consequences of the condemnation process include the loss of property rights, displacement of residents and businesses, loss of affordable-housing units and, at least temporarily, some loss of personal liberty (Kulick 2000). As areas targeted for redevelopment often consist primarily of low-income and minority residents and businesses, the losses engendered by eminent domain tend to be disproportionately borne by the urban poor. These are populations for whom the creation of "webs of mutual support and the non-monetary exchange of goods and services" are often necessary for survival (Broussard 2000). Displacement and loss of community go hand in hand: displacement scatters the members of a community and breaks apart the "webs of mutual support" that may have taken years to form (Broussard 2000).

Studies following residents displaced by eminent domain have demonstrated that their new neighborhoods are often more expensive than their former neighborhoods and, therefore, their shelter costs tend to rise substantially (Hellegers 2001). Other studies have suggested that the business-displacement impacts of eminent domain actions associated with urban renewal can also be severe (Hellegers 2001). Business failure rates are generally high, even under the best of circumstances; however, one study of the impacts of urban renewal and condemnation in Providence, Rhode Island, found that 40 percent of displaced establishments ultimately went out of business. A national study of businesses displaced through urban renewal and eminent domain condemnations found that almost 26 percent either went out of business or left their communities (Hellegers 2001). Just compensation measures rarely compensate for the losses associated with disruptions in business ties and customer base.

In addition, scholars suggest that residents and business owners displaced by eminent domain takings may suffer long-term, adverse psychological impacts (Broussard 2000). In American society, individuals tend to equate their social status, economic power, and sense of control over their own destinies with property ownership. Social theorist Abraham Maslow has suggested that landownership, to the degree that it represents structure, order, law, undisputed routine, and a preference for the known over the unknown, falls just below self-actualization on his well-known hierarchy of needs pyramid (Broussard 2000). In essence, an individual's sense of self can be inextricably tied to the size of his or her estate, and since real property generally accounts for a large portion of an individual's estate, eminent domain condemnations may be experienced by an affected party as an injustice—a direct attack on the sense of self.

The literature also suggests that eminent domain condemnations can result in a reconcentration of poverty in other areas of a city or metropolitan area, as the poor are effectively forced to move into the remaining affordable neighborhoods (Broussard 2000). Thus, while eminent domain takings may benefit a city in the short run through the increased tax revenues associated with the ensuing higher-end development, such benefits may be overshadowed in the long run by the shift of high social costs from one area of the city to another. The areas where the displaced poor reconcentrate contain housing and physical infrastructure that are no better than, or perhaps worse than, that which existed in their former, now redeveloping, neighborhoods.

SITE PROBLEMS

The preceding discussion referred to several site constraints (cost, title, environmental contamination, and so on) that affect the acquisition of properties for infill. These site problems merit further analysis.

The Availability of Land for Infill

Before considering the specific site constraints, it is instructive to note that there appears to be a reasonable inventory of land or redevelopable sites for infill. A late 1990s analysis in Miami, Seattle, and Rochester found that the three cities contained 10,000 acres, 24,000 acres, and 13,000 acres of potentially suitable infill parcels, respectively, and that those parcels could satisfy all future residential growth in metropolitan Rochester and Seattle and two-thirds of the residential land needs in metropolitan Miami (Atlanta Regional Commission 2002, 10–11). Similar findings are observed in contemporary accounts. Sandoval and Landis (2000, 51) found there was ample land available for infill housing construction in the San Francisco Bay Area. "Depending on the development density, [this region] could accommodate between 890,000 and 1.39 million additional housing units within the existing urban footprint—that is without further greenfield development" (Sandoval and Landis 2000, 30). In a more geographically encompassing study Landis and Hood (2005, iii) found that "California's cities and urban neighborhoods are estimated to encompass nearly 500,000 potential infill parcels comprising approximately 220,000 acres of land." A recent study by the City of Ottawa, Canada (2004, 2), found that building on vacant land, surplus parking lots, or scattered parcels in the city's downtown alone could accommodate almost 12,000 housing units.

The impact assessment of the New Jersey State Plan (Burchell, Dolphin, and Galley 2000, 13) found that even in the nation's most densely settled state, there was ample acreage to accommodate projected growth under a smart-growth development framework that emphasized infill (see chapter 1). Under the PLAN scenario, 5,200 acres in New Jersey's urban communities (almost all of that composed of infill sites) were slated to accommodate about 150,000 new urban residents between 2000 and 2020 (Burchell, Dolphin, and Galley 2000, 126–127).

In short, there is not a lack of infill land and sites to accommodate growth. Rather, cost and other constraints present challenges to the use of the infill parcel inventory.

Cost Constraints

There are many factors that affect the value of a site. In general, however, land typically costs more at the core than it does at the periphery of a region. Since infill is disproportionately located in the core, while the opposite is the case for greenfields development, land costs will often be higher for infill. The Seattle-Rochester-Miami study cited earlier, which documented a large inventory of infill sites in those cities, also found that "infill land in stable, middle-income neighborhoods can be as much as 12 times more expensive per acre than raw land at the metropolitan fringe. Although the initial infrastructure and site development costs of infill development may be significantly lower than for greenfield sites, the increased cost of land for infill development often more than offsets these advantages" (Atlanta Regional Commission 2004, 11).

Others make similar observations. A study of the barriers to and opportunities for small-scale, mixed-use infill in California (Hamilton, Rabinovitz, and Alschuler, Inc. 1996, 10) found that "high land cost is a persistent and significant problem." Farris (2001, 9) observes that

> Developers would typically pay from $0.25 to $4.00 per square foot for open land in standard suburban residential sites. Site assembly (acquisition, relocation, demolition, clearance/environmental, site preparation) in a built-up urban environment for marginal or blighted areas might cost around $15 per square foot. Such assembly might also necessitate some residential and commercial relocation. Assuming that $2 is the reuse fair market value . . . then the $15 assembly cost suggests the need for a land writedown (grant) of $13 per square foot. Under this scenario, a 10-acre infill site for 150 garden apartments would necessitate a $5.7 million land writedown for a $9 million project.

How does the cost of land for infill development compare with the cost of land for greenfield development in New Jersey? There is no simple answer to that query because so much depends on individual circumstance. For example, in the infill Harborside Financial Center in Jersey City, land cost $10 million an acre (Bergsman 2001, 102)—at the time of acquisition (1998), the most expensive acre of land to change hands in New Jersey. For infill developments in Patterson, Trenton, and elsewhere, however, land was donated free of charge. While recognizing the range of infill land costs, it is instructive to quantify an order-of-magnitude comparison of land costs under a smart-growth land-use framework for New Jersey, emphasizing a comparison of infill (referred to as PLAN) and the state's historical development pattern of sprawl (referred to as TREND). To do so, we reference data assembled by the impact assessment of the New Jersey State Development and Redevelopment Plan (Burchell, Dolphin and Galley 2000), as well as data from other sources (e.g., local assessor-determined valuation of vacant parcels in New Jersey), and perform the following calculations.

New Jersey has a total land mass of 4.8 million acres; of that total, an estimated 1,761,229 acres are vacant (1995 land estimate). Vacant parcels in New Jersey had an estimated property valuation of $21,813,904,534, or $12,387 per acre (2002 data). As might be expected, land value per acre varies between communities. To illustrate, the 191.5 acres of vacant land in New Brunswick, an urban center, had a total value of $33,994,281, or $177,516 per acre, while its neighbor, South Brunswick—a once agrarian, but now rapidly developing community—had an average value per vacant acre of $21,112 ($171,043,538 total valuation of vacant parcels divided by 810.161 vacant acres).

PLAN directs a larger share of New Jersey's future population to urban centers, such as New Brunswick. TREND would continue the pattern of sprawl development in such communities as South Brunswick (table 3.1).

TABLE 3.1
PLAN Compared with TREND
Projected 2020 Population in New Brunswick and South Brunswick

	2020 Population	
Community	PLAN	TREND
New Brunswick	80,678	41,944
South Brunswick	45,134	59,762

The direction of growth to urban centers under PLAN embodies smart growth. However, it also means that, at least initially, PLAN, with its emphasis on infill, is directing development to places with higher land costs per acre.

A relatively higher land cost per acre for infill development (compared with the cost per acre for greenfield development) does not mean that the development "product"—housing units, retail and office space, and so on—is more expensive under infill; the higher density of infill development can offset the initially higher cost per acre. That, in fact, was the finding of the New Jersey impact assessment, which concluded that PLAN's decrease in housing affordability would be 6 percent less than the decrease in affordability under TREND development (Burchell, Dolphin, and Galley 2000, 18–19).

The comments above point to the importance of allowing infill to develop at sufficiently high densities to offset its higher land cost per acre. Density is thus key and is discussed in detail in chapter 3. However, it is important to note here that density is influenced by many factors, for example, environmental sustainability and development economics, and that the appropriate density to make infill viable remains a contentious subject. The last point is echoed in comments by Sandoval and Landis, who found, as noted earlier, that although the San Francisco Bay Area had ample land for infill construction, the process might require controversial upzoning. "Building at higher-than historical densities offers significant potential for increasing residential infill yields . . . [yet] advocating for expanded infill *and* for higher densities is likely to make the task of convincing suburban communities to accept more infill development all the more difficult" (2000, 51).

Other Zoning Challenges Affecting Infill Property Acquisition

In addition to securing reasonable density, other zoning hurdles may confront infill. Examples include the need for zoning that permits adaptive reuse or effecting a rezoning to allow infill-supportive land uses.

> Most of the land available for infill development is not currently vacant—that is, it is already developed and would have to be recycled. . . . Most recyclable sites are currently in non-residential use, and may therefore be difficult and/or expensive to make available for residential use. There are likely political difficulties as well. Cities hoping to expand their jobs base may be reluctant to release or rezone under-utilized commercial sites for residential use whatever the need for housing. (Sandoval and Landis 2000, 51)

Title Constraints

As described earlier, LHHA, Isles, and other nonprofits working on infill, new construction, and rehabilitation projects have confronted land-title problems extending from estate and other complications. For instance, LHHA could not obtain title insurance on properties that were tax-foreclosed by Miami-Dade County. Others involved in infill development confront title challenges. After noting the prevalence of unpaid taxes and other claims on abandoned properties, one study noted that "no one will invest in the property until title is cleared" (International City/County Management Association Smart Growth America 2004, 15). Sometimes, infill may involve unusual title problems. For example, the Gateway Project in Salt Lake City, Utah, a $375 million, urban entertainment-retail housing project on 60 acres of a former railroad facility, has confronted several title issues:

> For more than two months, agents analyzed 100-year-old documents and scoured old maps to unravel the history of the land. Not only did experts have to resolve intricate property ownership and usage issues and interpret indecipherable records, but also they had to repeat these steps almost 100 times. The site had consisted of 99 individual parcels of land—all assembled more than a century before for a very specific use, and all of which now had to be examined separately before redevelopment could begin. . . . Infill developments typically entail complex title searches because the land often has gone though more owners and more usages than outlying sites. (Sheridan 2002, 70)

Physical Site Constraints

Because infill sites are those remaining after the initial wave of development in an area, they may be irregularly sized or too small to meet current market tastes or land-use regulations (Municipal Research and Services Center of Washington 1997, 8; Landis and

Hood 2005, iii). At other times, the parcels have been purposely passed over because of physical site constraints, such as steep slopes, streams, or wetlands. As regulations governing such environmentally sensitive lands have become more stringent over time, infill sites with sensitive acreage have become that much harder to use.

Brownfields

Brownfields are abandoned, idled, or underutilized industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination (Moskowitz and Lindbloom 2004, 55). There are many possible sources of environmental contamination, for example, prior usage of a site when environmental controls and regulations were lax and leaky fuel tanks. In addition to the groundwater and soil contamination left behind, structures at brownfields often have to be cleaned of materials like lead paint, asbestos, and PCB-containing electrical transformers (Northeast–Midwest Institute and Congress for the New Urbanism 2001, 75). “Brownfield problems also raise litigation risks for developers, since under federal law, liability for these sites remains ‘strict, joint, and several’—meaning that any past or present owner of the site can be compelled to pay for cleanup” (Wheeler 2002, 41).

Not every contaminated site is a brownfield, as defined by federal law. New Jersey, for example has about 10,000 contaminated sites (down from 20,000 in 1985), and of the 10,000, about 1,100 sites are formally identified as brownfields. While a contaminated site might not have the nearly intractable cleanup and liability issues of a brownfield, it would nevertheless pose a daunting challenge.

Because infill occurs in already developed areas and/or previously used buildings, it often confronts the unfortunate legacy of past environmental abuse, whether in the form of a brownfield or a contaminated site. National and regional infill studies have frequently cited this issue; for example, “At their worst, [contamination] problems require cleanups . . . making infill projects financially infeasible” (Wheeler 2002, 41. See also Northeast–Midwest Institute and Congress for the New Urbanism 2001, 75). Milwaukee, Wisconsin, tried to revitalize its Thirtieth Street industrial corridor. City leaders and an industrial corridor corporation (ICC) believed that such infill revitalization would capitalize on the area’s ample infrastructure and reverse an exodus of jobs (almost 60,000 in a 10-year period) to Milwaukee’s suburbs. However, the industrial revitalization confronted contamination issues. “Even with the best marketing plan, the best infrastructure and the most accessible workforce, the ICC would be hard-pressed to compete with suburban greenfields because . . . you add the cost of cleanup and it kills every deal” (Henken 1997, 16–17).

The New Jersey infill developers interviewed in the course of this study often mentioned environmental contamination as a challenge. One developer said, “Cleanup and surcharging [removal of organic matter that will not support the weight of development] is yet again an additional expense in brownfields.” Another bluntly stated, “Remediation is a big issue.”

BEST-PRACTICE SOLUTIONS FOR PROPERTY ACQUISITION FOR INFILL

The private and public sectors, often in collaboration, have creatively responded to the challenge of property acquisition for infill (see table 3.2). In many instances, government redevelopment authorities acquire parcels suitable for infill and offer them to developers at or below their cost. This is a variation of the urban renewal model in which the federal government subsidized roughly a 90 percent write-down of land-purchase and building-demolition costs in order to spur revitalization. Examples of this strategy in a contemporary infill context include the following:

- To spur infill in downtown Stamford, Connecticut, the city, working with such private entities as Swiss Bank Corporation and the Hines Interests, assembled 33 parcels of land, relocated more than 100 commercial and residential tenants, and undertook environmental remediation (Lockwood 1997, 106). The city then resold a 12-acre portion of the site to an infill developer for one dollar.
- The Port Authority of New York and New Jersey acquired 22 acres and a shuttered newspaper plant in a former industrial neighborhood (Hunters Point) in Queens, New York, for about $25 million (Bressi 1997, 102) and offered the assemblage to developers. The goal was to encourage development of Queens West, a large mixed-use project comprising 6,385 housing units, 2.5 million square feet of nonresidential space, and schools, parks, and other public facilities.
- To jump-start infill development in downtown San Diego, California, $4 million was advanced to the city's redevelopment agency to assist and write down land assembly (Hamilton 1994, 33).
- The Northwest Inlet, a mixed-use infill project in Atlantic City, New Jersey, was aided by the Atlantic County Improvement Authority, using revenues from a luxury tax to assist and write down property acquisition (Kumar 1993, 221).

The subsidization of land acquisition (and other development costs) for infill, whether in the form of a direct write-down by a city or redevelopment authority or through other means, such as using tax-increment financing, is considered in chapter 4. The remainder of this chapter focuses on the following strategies to improve land acquisition for infill: (1) enhance the application of eminent domain; (2) foster the use of environmentally contaminated sites (collectively referred to as brownfields); and (3) effect other property acquisition and control strategies, such as receivership of deteriorated properties, land swaps, and landbanking.

Before considering the above in greater detail, it must be acknowledged that our discussion does not fully cover the breadth of the subject. In recent years, there has been a voluminous literature on the issue of property control and acquisition. Our objective is not to delve into the detail covered by the literature (see, for instance, Governor's Growth Planning Council 2003, International City/County Management Association 2004; Brophy and Vey 2002, Kromer 2002; Pagano and Bowman 2000). Rather, we synthesize best practices as they relate to infill and provide examples from New Jersey as well as other states.

TABLE 3.2
Examples of Property Acquisition Strategies for Infill Development

Strategy/Description	Example
Enhance property identification. Use GIS and other procedures to assemble and integrate property information.	*Philadelphia, Pennsylvania:* The Neighborhood Information System (NIS), housed at the Cartographic Modeling Lab (CML) at the University of Pennsylvania, contains address-level data for more than 560,000 Philadelphia properties. The ParcelBase application of the NIS includes information obtained from many city agencies, including the following: the Board of Revision and Taxes (owner name, property type, sale date, sale price, assessed value); the Department of Licenses and Inspections (demolition, clean and seal, housing code violations, vacancy status); and the Revenue Department (current tax bill, tax arrearages, lien sale). The data is also linked through a Geographic Information System (GIS) to parcel maps, allowing a user to examine the city of Philadelphia's cadastral data. *Genesee County, Michigan:* PropertyInfo, an online search service provided by Genesee County, Michigan, receives property information from local cities, villages, and townships in Genesee County. It is not password protected and provides accessibility to data about the taxpayer/owner, assessed and taxable values, delinquent tax information, and legal property descriptions.
Identify properties suitable for infill.	*Hartford, Connecticut*: The Local Initiatives Support Corporation (LISC), a nonprofit community development intermediary, created a catalog of buildings available for development in order to provide information for developers and encourage them to invest in city housing. LISC's Hartford Office sought a means to showcase and market to investors and community development corporations properties that were available for redevelopment. To that end, LISC, with the help of a consultant and an intern from a local college, developed a catalog of 125 vacant buildings available for renovation into homes. The 2001 catalog featured pictures of the vacant buildings and provided information about each one, including lot size, name and address of the owner, and tax-delinquency status.
Facilitate accelerated tax foreclosure. Properties with delinquent taxes may also be vacant and deteriorating structurally. Accelerated tax foreclosure allows the acquisition of tax-delinquent properties in an expeditious fashion. This strategy can accelerate property acquisition for rehabilitation and can also bring under reasonable management properties that often pose problems to public safety.	*Michigan:* Michigan's Public Act 123 of 1999 replaced the sale of liens to third parties with the direct foreclosure of the property by either the county treasurer or the State of Michigan (if the county opts out of the process). The power to directly foreclose on tax liens was decentralized to 30 counties, which reduced the time and legal process to foreclose on a property. Michigan properties are directly foreclosed once their taxes have been delinquent for two years. There is a 21-day redemption period after the circuit court has entered a judgment of foreclosure. After foreclosure is final, public auctions are held in July and September with minimum bids for foreclosed properties. The third sale is held in November and is an absolute sale, with no minimum bid. The first time Michigan counties could act upon this process was in 2002. Genesee County, Michigan, foreclosed on and took approximately 1,300 properties in March 2002. *Ohio:* Ohio's House Bill 603 (HB 603), approved June 24, 1988, streamlined the foreclosure process, abated delinquent taxes on properties deposited in the land bank, and eliminated *in rem* proceedings. Once taxes are delinquent for a year, foreclosure proceedings begin. Sheriff sales are held three times a year,

Strategy/Description	Example
	and owners have a 15-day redemption period for sold properties. If a property remains unsold after two sheriff sales, the property is deemed forfeited and is either deposited in the land bank or sold by the State of Ohio at an auditor's sale.
Address and reduce lienfields. Governments are able to address and reduce lienfields through the passage of legislation that allows the removal of tax liens.	*Philadelphia, Pennsylvania:* The Donor-Taker Program in Philadelphia allows property owners to deed their vacant or abandoned property to the city, which accepts it as a donation and waives all tax liens. The Redevelopment Authority (RDA) takes ownership of the property and has the ability to transfer it to individuals, community organizations, or city agencies under the Gift Property Program. The Donor-Taker Program and the Gift Property Program are relatively centralized and user-friendly. Applications are taken to a central city office that checks to see if there are other applicants and if there are existing public plans for the property. The applicant, or taker, submits a standardized rehabilitation plan. If the application is approved, the property is deeded to the taker for no cost. *Ohio:* Ohio's HB 603, passed in 1988, included a provision that permits the abatement of delinquent property taxes when a property is deposited into the land bank of any municipality. Before its passage, properties in the land bank carried the tax lien until purchase by a private owner.
Establish land banks. Land banks allow for the acquisition, management, and disposition of typically neglected properties, with the goal of returning them to use and tax revenue status.	*Cleveland, Ohio:* Ohio municipalities are able to establish land banks through an enabling 1976 statute. Properties are deposited either as a gift in lieu of foreclosure or after foreclosure and the failure of the property to be sold at a sheriff's sale. There are approximately 5,000 to 6,000 properties in the land bank, with 200 to 300 gifted annually. The city maintains property records for the entire land bank. Once a property has entered the land bank, title is cleared and private liens are removed. HB 603 allows the abatement of delinquent property taxes after the property is deposited in the land bank.
Swap properties. Entities owning different properties can swap their holdings in order to better serve their respective needs. This is a useful strategy, if the parties can be brought together and their mutual interests satisfied.	*Seattle, Washington*: In one instance, two nonprofits swapped properties because the properties each acquired through the swap better met their organization's mission and capabilities. In another case, a nonprofit joined forces with the Seattle Public Library to acquire a property that would be used to benefit both parties.
Conduct bargain sales. Through bargain sales, sellers of real estate can make a partial donation of equity to a nonprofit buyer. The seller then claims a charitable contribution to reduce tax liabilities. This is a useful strategy if the parties can be brought together and their mutual interests satisfied.	*Seattle, Washington*: The Capitol Hill Housing Improvement Program, a Seattle nonprofit, has negotiated transactions including nearly $1 million in such donations over the past five years. *Providence, Rhode Island*: Stop Wasting Abandoned Properties (SWAP), Inc., sells houses for a dollar and helps families renovate them for owner-occupancy. In addition to rehabilitating homes and building new homes on vacant lots, SWAP develops rental and cooperative-living opportunities.

Strategy/Description	Example
Negotiate bulk purchases. An infill developer may negotiate to acquire properties in volume from government and/or private sources (e.g., lenders). Negotiated bulk purchases provide a steady source of properties, and the bulk acquisition may realize a discount in property acquisition costs. However, bulk acquisition may pose financial, logistical, and other problems related to the higher volume of acquisition.	*Miami, Florida:* Greater Miami Neighborhoods (GMN) negotiated with HUD and Miami-Dade County for the right of first refusal of all properties disposed of by HUD and the county in certain zip codes. GMN was also given a discount of up to 50 percent of the nominal property values. GMN would rehabilitate the properties or transfer them to other nonprofits, such as the Little Haiti Housing Association.
Proactively favor infill in the disposition of foreclosed properties.	*Troy, New York*: Troy developed a system for the sale of tax-foreclosed properties that requires the review of a purchase proposal. The intended use is considered more important than the proposed purchase price. This process ensures that buyers put the properties to new uses that contribute to neighborhood revitalization. Under a local ordinance, Troy is required to offer foreclosed properties for sale by the proposal method. To promote the proposal process, the city hired the Troy Architectural Program (TAP), a private, nonprofit community design center, and assigned city staff to work specifically on promotion. The city and TAP photograph the available tax-foreclosed properties and prepare information sheets for each one. Foreclosure signs are displayed prominently on all properties, local news coverage is generated, and applicants are directed to TAP for assistance in completing the proposal application. The city also posts detailed property descriptions on its Web site. When proposals are reviewed, the intended use is considered more important than the bid price. A property will be offered at auction only if it has failed to sell though the proposal method.
Provide bridge loans and other financial supports for property acquisition. Provide "up-front" capital to permit timely property acquisition.	*Seattle, Washington:* The Seattle Office of Housing provides bridge loans for property acquisition. Loan terms are as follows: 100 percent loan-to-value (LTV), three-year term, 3 percent interest rate, and loan repayment can be deferred. *New Haven, Connecticut*: Connecticut passed the Livable City Initiative (LCI) in 1996. The LCI expands government support of rehabilitation in areas designated "neighborhood revitalization zones." The program provides acquisition funding for properties located in the designated zones.

Enhance the Application of Eminent Domain

Focus the Application

The use of eminent domain in infill has evoked growing criticism from both property owners affected by the eminent domain takings and many would-be infill developers. Property owners claim that eminent domain is being overused for infill and that, in any event, it is a protracted procedure that does not fully compensate them. Many developers welcome the property acquisition capability offered by eminent domain; however they also complain that it is a lengthy process that can be expensive or, at least, uncertain with respect to costs.

How can one balance the interests of the public and affected property owners? One answer is to focus the application of eminent domain, using it only to realize a purpose critical to furthering the public's welfare and when all other property acquisition strategies fail. Accordingly, state eminent domain statutes should be revised and amended to establish thresholds for using eminent domain for residential and nonresidential infill projects that facilitate economic development. For example, a two-threshold, "compelling reasons" and "reasonable and prudent alternatives" test could be implemented. The first threshold would require demonstration of a compelling reason to use eminent domain for projects that are vital to addressing the economic development needs of a community in fiscal or economic distress. Fiscal distress could be demonstrated through such common socioeconomic indicators as high tax rates combined with low valuation per capita, low valuation per student, falling municipal bond ratings, and high unemployment. The second threshold would require demonstration that there are no reasonable and prudent alternatives for meeting the community's economic development needs and that all other good-faith efforts to acquire property have failed or have been shown to be impractical or inadequate.

Property acquisition strategies that should be preferred over the application of eminent domain include negotiation with private owners, tax foreclosure, receivership of deteriorated properties, and land swaps. Each strategy has advantages and disadvantages, as illustrated in table 3.3. (One alternative to eminent domain, receivership, is considered shortly in greater detail.)

The cardinal objective in applying the police power of eminent domain is to further the public's welfare. In an infill situation, eminent domain should be applied only when the condemned property is a keystone to the infill, is immediately needed, and cannot be acquired through other means. Other strategies suggested in this study should also further the goal of focusing the application of eminent domain. These include allowing the redevelopment areas to include non-contiguous parcels instead of a larger area of contiguous parcels (thus reducing the geographic scale under which eminent domain can be applied), encouraging the designation of "areas in need or rehabilitation" (unlike the redevelopment area, the rehabilitation designation does not entail the application of eminent domain), and allowing for the cancellation of the redevelopment designation if conditions change or if satisfactory redevelopment progress is not made (thus removing the application of condemnation when unnecessary).

TABLE 3.3
Impact of Property Acquisition Strategies

Impact Measures	Eminent Domain Takings	Conventional Purchase	Receivership of Deteriorated Properties	Other Methods (e.g., Negotiated Purchase, Tax Foreclosure, Land Swaps, Joint Ventures)
Cost	Moderate	Highest	Low	Moderate
Time	Slower	Faster	Moderate	Faster
Certainty of acquisition	High	High	Moderate	Low
Flexibility	Low	Medium	Medium	High
Degree of encroachment on property rights	Maximum	Neutral	Minimal	Neutral

Expedite and Improve the Process

Two of the major complaints about the use of eminent domain for infill are that the process is lengthy and that the appraiser-determined values do not reflect local conditions. Responses include expediting the process and enhancing the valuation process. To accomplish that, the redevelopment authority can assemble information useful to property appraisers, including redevelopment area–specific data on recent sales, land and construction costs, and rent, vacancy, operating costs, and other information. As independent professionals, appraisers will use the data they determine to be most appropriate to their charge. However, redevelopment authorities that provide the information described above might very well aid appraisers in the valuation of properties for infill assignments. Assembling the data germane to infill should address errors in valuation that sometimes occur in infill situations.

In brief, professional valuations are conducted by appraisers who assign values to a given property (*subject property*) by considering (1) the cost to produce it (*cost approach*), (2) the price buyers have paid for comparable properties, typically referred to in an abbreviated fashion as *comps* (*sales approach*), and (3) what the property is worth as an investment (*income approach*). Any valuation is challenging; however, the appraisal in a rehabilitation context is even more so, and the appraisal of urban rehabilitation infill constitutes one of the most demanding appraisal assignments of all, and the experience of Little Haiti Housing Association illustrates how valuation can pose challenges to rehabilitation projects in urban areas.

Consider, for instance, the concept of "neighborhood." The location of a property has a significant influence on its value, and, for many years, neighborhoods such as Little Haiti were viewed deprecatingly by appraisers. That perspective made rehabilitation there harder because valuations were discounted accordingly. Recognizing the destructive influence of such a practice, the Government Sponsored Enterprises (GSEs)—Fannie Mae and Freddie Mac—have recommended that appraisers limit their neighborhood analysis to the immediate environs of the subjects and take into account improvements being made in the neighborhoods. In theory, then, a Little Haiti property to be rehabilitated by LHHA on a block of other LHHA-renovated units should not be negatively viewed by appraisers because of the presence of several abandoned, run-down buildings in the area; instead, appraisers should focus on the immediate environs of the subject and should acknowledge the rehabilitation projects and other investment undertaken in the area by LHHA and similar organizations. In practice, however, old prejudices against urban neighborhoods, such as Little Haiti, often linger.

The concept of neighborhood also influences the divergence between cost and value (Wiedlich 1999). In Little Haiti, single-family homes may trend to a $60,000 value, but rehabilitated units cost more; for example, LHHA units cost about $80,000. One can understand why appraisers would lean to a $60,000 valuation for homes in Little Haiti, including renovated units, because neighborhood values cluster at that value. However, appraisers should recognize that a renovated unit is more desirable than its unrehabilitated peers, and, as such, may very well constitute a distinct, supportable submarket. The rehabilitated unit is the “apple” among the neighborhood’s “oranges,” which often have fewer amenities. This “apples to oranges” distinction is often not made, however, and the rehabilitation outlay is labeled an “overimprovement” rather than an investment that proactively raises the neighborhood price threshold.

A similar difficulty affects the identification and adjustment of comparable properties. In new construction, especially in greenfield subdivisions, it is easier to identify comps because the new units sold tend to have generic standards (e.g., a 2,500-square-foot, four-bedroom, two-bath, detached single-family home), and may even be identical (e.g., if sales occurred in the same subdivision). Dissimilarities increase with older units, and when one is dealing with an older unit that has been rehabilitated, the issue of comps is even more complicated. Appraisers recognize the variability of real estate in the analysis of comps by factoring adjustments. Inherently, however, it is easier to make adjustments with newer units, which tend to an underlying standard yet differ in amenities, condition, and so on; it is especially problematical to make adjustments between the unrehabilitated older unit and renovated older housing.

Many of the issues raised above are illustrated in the appraisal assigned to a 14-unit, multifamily rental property located on Miami Place in Miami, Florida. The property was purchased by LHHA for $268,000, and, with rehabilitation and soft costs, it will comprise a total investment of $490,000. LHHA had to obtain a professional appraisal of the project, and the appraiser assigned a value of $310,000, *after the rehabilitation investment*. The $310,000 valuation was only slightly more than 60 percent of LHHA’s planned investment. Under normal circumstances, this much lower valuation would doom the project because financing at yet a lower share of the appraised value would cover only a small amount of the cost (e.g., at a 70 percent loan-to-value, a mortgage of only $220,000 would be obtainable). Although LHHA is proceeding with the job by deferring its soft costs and making other adjustments, the low appraisal presents a difficult problem.

The details of the $310,000 valuation reflect many of the rehabilitation appraisal hurdles noted earlier:

- giving no credit for improving conditions in Little Haiti through rehabilitation and other interventions;
- ignoring rehabilitation in analyzing and adjusting comparables in the sales approach and in determining a capitalization rate for the income approach;
- ignoring the impact of rehabilitation on such real estate fundamentals as vacancy and operating costs (i.e., a renovated building would benefit from lower vacancies and would also operate more efficiently, thus enhancing its value under the income approach).

The appraisal compounded errors. For example, the operating expense ratio of the rehabilitated building was *increased* rather than *decreased*. A more appropriate appraisal would value this 14-unit multifamily property at approximately $430,000, much closer to LHHA's project costs—but this is an after-the-fact academic exercise.

Some of the appraisal challenges confronted by LHHA stemmed from the fact that it was dealing with rehabilitation and affordable housing in the inner city. However, other infill projects may encounter similar questions. When building luxury infill housing in a previously industrial area, what are appropriate comps? When renovating a historic building, what are appropriate construction-cost factors? What vacancy and capitalization rates are appropriate when introducing an innovative infill product (e.g., building stacked townhouses over a parking garage or converting a closed mill to residential lofts)?

Valuation challenges need to be confronted by the development industry and appraisal professionals to avoid the infill valuation gaps that troubled LHHA and that contribute to the valuation controversies endemic to eminent domain. Assembling infill-sensitive data is a step in that direction. For example, the redevelopment authority can assemble redevelopment-area information on recent area sales (thus facilitating the identification of local comps), land and construction costs (useful for the cost approach), and rent, vacancy, and operating costs (useful for the income approach).

Limit Financial Exposure

Developers complain that the application of eminent domain for infill creates considerable uncertainty about the ultimate property acquisition cost. To limit the private financial exposure of infill projects, a reasonable limit or cap should perhaps be imposed on the property acquisition cost; an infill developer would be obligated to pay up to, for example, 120 percent of a "base" property valuation, with a public entity, foundation, insurance company, or other parties agreeing to absorb the financial liability of a property acquisition cost above the 120 percent level. This recommendation could be implemented as follows.

The infill developer and the redevelopment authority would authorize appraisers to conduct a good-faith reconnaissance valuation of the property to be acquired for infill through eminent domain. Two to three appraisers might be commissioned to provide valuations, and an average *base value* would be determined. Ultimately, the base value might very well be contested as inadequate by the affected property owners. However, the developer's financial exposure would be capped to, say, 120 percent of the base value. Who would absorb the "overage"—the added property costs above the amount to be assumed by the developer? There are a number of possibilities.

1. A public entity, possibly a local, county, or state government and/or the redevelopment authority could agree to assume the "overage" liability.
2. An insurance company could absorb the "overage." For example, all infill developers could pay premiums for infill financial liability concerning such matters as the "overage" on the property acquisition costs (i.e., above 120 percent of base value) or a similar run-up in cost for land cleanup.
3. Foundations and other parties interested in encouraging infill development could also participate.

There is no easy answer to "who pays," and in all likelihood, a combination of parties would contribute—the developer would absorb the "overage" up to 20 percent of the base value and then the developer, government, insurance companies, and others would share the remaining liability. If the financial exposure of infill-related property acquisition and cleanup costs can be capped, then remaining project-related expenses—for example, construction expenses—can be reasonably estimated by the development community.

Consider Other Forms of Property Control

Under current redevelopment practice, properties are condemned and acquired in redevelopment areas through eminent domain. In some instances, however, it may not be necessary to acquire properties outright but rather to control them to address a continuing pattern of deterioration and code violations. An example would be a single deteriorated property at the gateway to an infill project.

Receivership is a legal process in which a receiver is appointed to manage a deteriorated or dangerous property to abate a continuing nuisance and bring the property into conformity with applicable code requirements. Receivership can be used to gain greater flexibility in property control for infill purposes. A number of states authorize the appointment of receivers and provide financing and other support. In New Jersey, for example, a 2004 receivership statute broadened and strengthened the application of this strategy. Neighborhood organizations were authorized as receivers and were empowered to borrow funds. The receivers' liens were given priority status, and a $4 million reviver's revolving loan fund was established. New Jersey receivers could aid infill. Instead of infill developers having to purchase deteriorated properties at the gateway to their site in order to stabilize the area, a temporarily appointed receiver could abate the outstanding violations in the gateway parcels. While there are limitations to the use of receivership to foster infill in New Jersey and elsewhere (e.g., in New Jersey, a receiver can be appointed only for buildings that are at least 50 percent residential), the strategy offers benefits for infill that merit its consideration.

Foster the Use of Brownfields for Infill Purposes

Infill may involve development in brownfields, and that poses legal, economic, and other challenges. Yet, there are strategies in place to remedy the hurdles. Several examples are described below.

Cap Legal Liability

Development in brownfields has been thwarted by lawsuits against the many parties associated with such sites, including those having no connection with the original contamination, (e.g., lenders). Legislation has begun to curb this liability and to foster reuse of brownfields.

To limit federal "superfund" site liability, Minnesota enacted the Land Recycling Act in 1992. This statue, the first of its kind in the nation, created the VIC program (Voluntary Investigation and Cleanup) with the following components:

- The law provides assurance against legal liability to people who voluntarily investigate site contamination and clean it up to state standards. Liability protection is extended to other parties associated with the brownfield as well, such as owners, developers, lenders, and their successors.
- The law allows the state to approve partial cleanup plans when property owners who are not responsible for the pollution want to develop just a portion of larger site.

VIC helps buyers and sellers of possibly contaminated land resolve legal and financial clouds over brownfields while expediting cleanup of the site. Potential buyers willing to invest in reclamation are able to get assurance from an independent third party that they will not have to worry about future liability if they restore a site to the satisfaction of the authorities.

Other states have passed laws or created programs to facilitate the redevelopment of polluted sites. Delaware's law exempts new owners from future liability if they restore any of the state's 100 brownfields. Pennsylvania's Land Recycling Program limits future liability on sites where clean-ups meet certain standards. The New Jersey Brownfield and Contaminated Site Act (N.J.S.A. 58:10B-1 et seq.) protects buyers of tainted sites from private lawsuits related to past contamination problems if they agree to clean up the properties according to state requirements (Garbarine 1999). Once the site is remediated according to an approved cleanup plan, the state agrees not to sue. Further, the law exempts buyers from any new cleanup costs once environmental officials approve the cleanup job.

The various state laws have aided infill development in brownfields. At one time, the upper Mississippi River frontage area in Minneapolis, Minnesota, prospered as a heavy-industry powerhouse. Times changed, however; the industries closed and left a residue of pollution (Durrant and Biernat 2001, 72). This area, however, offers considerable potential for infill, and, to that end, the state's VIC program is being used. The Minnesota

Pollution Control Agency (MPCA), which administer the VIC program, is making available its database of contaminated areas and is working with potential infill developers to structure and monitor cleanup.

The New Jersey statute also has aided infill redevelopment. A 30-acre site in Edison, New Jersey, that had once housed a steel tubing manufacturer was a prime candidate for reuse. It was located near major highways (U.S. Route 1 and Interstate 287) and was in an area growing in population. Yet the potential liability of dealing with the site in any way dissuaded would-be developers and lenders. With the passage of the New Jersey Brownfield and Contamination Site Act, that threat was lifted and the site was developed as Edison Crossroads, a 285,000-square-foot shopping center housing Home Depot and other nationwide tenants (Garbarine 1999, 9). Similarly, the New Jersey law fostered the adaptive reuse of a contaminated 49,000-square-foot industrial structure in West Caldwell to infill office space. The developer stated, “Pre this legislation . . . that was an open ended invitation for legal fights. Now there is at least more certainty to the process” (Garbarine 1998, 6).

Although the New Jersey law provides safeguards from liability, it does not provide absolute immunity (Lyncott quoted in Garbarine 1998, 6). For example, the liability protection extends only to the purchased property; it does not take into account contaminants migrating off-site to adjacent properties that may be affected. New Jersey should thus consider extending its brownfields liability protections to that and other unprotected situations.

Allow Context-Sensitive Brownfields Remediation

Context-sensitive standards for cleanup are set according to the planned use of a brownfields site; for example, they require less cleanup for industrial redevelopment and greater cleanup for residential reuse. The New Jersey Brownfield and Contaminated Site Act requires different standards depending on the planned new use of the site and allows alternative remediation methods, such as installing impermeable caps to stop wastes from seeping out instead of the removal of industrial residue (Garbarine 1998, 6). Other states have similar measures, and these provisions have aided infill. The Tacoma, Washington, waterfront, once lined with busy mills, wharves, and railroad spurs, had deteriorated over time to an empty brownfield (Grogan 1999, 70). The revival of the shoreline with parks, housing, and other uses benefited from Tacoma “striking an agreement with . . . regulatory agencies to determine cleanup criteria according to the kind of development proposed for each site. [Accordingly], cleanup options . . . range from applying a three-foot cap of clean soil over contaminated ground to sealing a site . . . ” (Grogan 1999, 20). New Jersey infill developers contacted in the course of this study praised the state’s context-sensitive cleanup standards. For example, the Edison Crossroads site, reused as a shopping center, did not require the same remediation that would have been required if the parcel had been used for an elementary school.

Provide Financial Incentives for Brownfields Remediation

Federal, state, and other governments often provide grants and low-cost loans for remediating brownfields. Federal programs include the Superfund Trust Fund, the Brownfields Cleanup Revolving Loan Fund, the Environmental Cleanup Cost Deduction (a tax incentive for environmental cleanup costs at eligible sites), the Underground Storage Tank Program, and aid from federal transportation programs that can support brownfields reuse (e.g., TEA-21). States have cleanup financial aid programs of their own. For example, Wisconsin has a Petroleum Environmental Cleanup Fund (PECF) that was tapped to subsidize cleanup costs in Milwaukee's East Point Commons, a mixed-use housing and retail infill complex within walking distance of downtown Milwaukee (Rabinowitz 1994, 34).

New Jersey offers several financial incentives for brownfields cleanup. The state's Hazardous Discharge Site Remediation Fund offers grants and loans to municipalities (up to $1 million annually) for the investigation and remediation of contaminated sites. Its Brownfields Redevelopment Program allows developers to borrow up to $250,000 for up-front remediation funding. Additional financial aid programs available in New Jersey (e.g., Petroleum Underground Storage Tank Funding) are shown in table 4.1 (see chapter 4).

New Jersey also credits brownfields site–generated revenues for cleanup reimbursement. New Jersey developers who are willing to voluntarily remediate contaminated sites for which no responsible party is available can be reimbursed for up to 75 percent of the cleanup costs. The costs must be fronted by the developer, who is later reimbursed through new tax revenues received by the state as a result of the project. The reimbursement has aided several infill projects in the state. For example, Edison Crossroads faced a $6 million cleanup cost—an amount that would have been insupportable from the 285,000-square-foot retail mall that was ultimately built. The cleanup cost alone would have exceeded $20 per square foot. The state's 75 percent reimbursement program saved the project. The Edison Crossroads mall generated considerable state sales and other state taxes, and the developer was able to tap three-quarters of those resources to subsidize the environmental remediation of the site.

Port Imperial is a "poster child" example of a large and successful infill project (6,500 housing units and approximately 2 million square feet of commercial space on 200 acres). Located in two New Jersey communities (West New York and Weehawken), the project site affords a stunning view of Manhattan from its position on New Jersey's Gold Coast (a coastal stretch along the west side of the Hudson River facing Manhattan). Nevertheless, the development also faced daunting obstacles. Located at sea level and slated for high-rise development, the parcel required extensive site development (e.g., abandoned piers had to be removed and thousands of piles had to be pounded). New Jersey has the highest property taxes in the nation, and West New York and Weehawken have local property tax rates that are double that of the state average. There were also severe environmental challenges. The site had formerly been used for railroad shipment purposes (train cars had been loaded on barges enroute to New York City and elsewhere), railroad maintenance, and other industrial purposes and had suffered the environmental contamination residue of those uses. Environmental cleanup would cost about $15 million. That, and the threat of liability, could have sounded the death knell for the project. Yet the project came to fruition. According to its developer (Roseland Properties), the New Jersey Brownfield and Contaminated Site Act's curb on liability and the 75 percent reimbursement of remediation costs from site-generated state tax revenues were important to the development's success.

It is constructive to examine the economics of the Port Imperial reimbursement. We will consider that topic in detail for one component of the project—Port Imperial South. Located in Weehawken, Port Imperial South's planned development comprised 1,632 housing units, a 400-room hotel, 151,000 square feet of retail space, and 1,324,000 square feet of office space. Port Imperial South also faced a brownfields cleanup cost of about $10 million. At the time the reimbursement program was used for Port Imperial South, the New Jersey Brownfield and Contaminated Site Act listed eight state revenues against which a developer could obtain a credit (see the technical note at the end of this chapter). It was estimated that the eight state revenues would generate a minimum of $3.1 million annually, which could be applied to reimburse 75 percent, or $7.5 million, of the $10 million cleanup cost. Thus, the site-generated state tax revenues could reimburse the lion's share of Port Imperial's cleanup costs in less than three years. In an interview conducted for the study, a representative of Roseland Properties, the developer of Port Imperial, stated that the New Jersey reimbursement program was one of the "keys to the project."

Other New Jersey infill developers interviewed in the course of the study praised the various features of the New Jersey Brownfield and Contaminated Site Act—the curb on liability, the context-sensitive cleanup standards, and the reimbursement feature—as important to infill. However, they also mentioned lingering challenges. One challenge is the difficulty of accurately projecting cleanup costs. One developer said, "Insurance covers some [of the runup in cleanup cost] but not enough if the expenses mount way out of the budget." One response might be to cap the developer's potential financial exposure if the cleanup expense significantly exceeds the initial estimate. This could be done by applying the same strategy used to limit the developer's financial liability from an extreme runup in costs for property acquisition through eminent domain. In brief, a reasonable cap could be imposed on the developer's cleanup costs so that the infill developer would be obligated to pay up to, for example, 20 percent of the "base" determination of the remediation costs, with a public entity, insurance company, a foundation, or other parties agreeing to share the financial liability of the cleanup costs above the 20 percent level.

The New Jersey infill developers also recommended expanding the pool of brownfields site state tax revenues from which reimbursement of the cleanup costs could be made. There has, in fact, been some change in New Jersey law in this regard; a 2002 amendment added such state tax sources as the sales tax on the materials used for the construction of new residences (see table 3.4 in the technical note). The 2002 amendment may not suffice, however. For example, suppose a 200-unit apartment complex valued at

$20 million is planned for an infill brownfields site with a $2 million cleanup cost. The 2002 law would credit the New Jersey state sales tax (6 percent) imposed on the materials used in the project. If the construction materials cost $10 million, the credit would amount to $0.6 million—less than half the amount needed to reimburse 75 percent ($1.5 million) of the total $2 million cleanup expense. The technical note to this chapter describes other situations that would lead to a reimbursement shortfall. One solution would be to credit the following for reimbursement purposes: (1) the state income tax that would be paid by those living in the residential units constructed on the remediated contaminated sites and the state sales taxes generated from the consumption by those households; and (2) the state income taxes paid by the construction workers building projects on the remediated sites. These possibilities are discussed and illustrated in the technical note to this chapter.

Other states can learn from New Jersey's experience with the Brownfield and Contaminated Site Act. The legislation has accomplished much for fostering infill, yet continued modification is needed to realize the full potential impact of such statutes.

Effect Other Strategies for Infill Property Acquisition

Examples of other strategies to acquire property for infill include accelerated property tax foreclosure ("fasttake"); proactively favoring infill in disposing of surplus and foreclosed properties; forgiving back taxes that may hinder reuse; effecting landbanking; encouraging land swaps; and improving property identification. These strategies are summarized in table 3.2, and examples from New Jersey and other states are presented as well.

TECHNICAL NOTE: NEW JERSEY REIMBURSEMENT PROGRAM FOR BROWN-FIELDS CLEANUP

This technical note considers and illustrates the New Jersey program for reimbursing the cleanup costs of environmentally contaminated sites—an important strategy for fostering infill. It considers the program as originally enacted in 1997, as modified in 2002, and as it could be modified in the future.

Background

The Brownfield and Contaminated Site Act (N.J.S.A. 58: 10B-1 et seq.) reimburses developers who are willing to voluntarily remediate contaminated sites, for which no responsible party is available, for up to 75 percent of the cleanup costs. The remediation expenses are fronted by the developer, who is later reimbursed through the new tax revenues that are received by New Jersey as a result of the project. As originally enacted in 1997, eight state taxes could be credited for reimbursement (see the left column of table 3.4). A 2002 revision to the law modified the state taxes that could be credited for reimbursement (see the right column of table 3.4). These differences are illustrated by a New Jersey infill project, Port Imperial South, that used the reimbursement under the 1997 provisions.

TABLE 3.4
Tax Revenues for Brownfield Site Reimbursement Fund:
PL 1997 Ch. 278 vs. PL 2002 Ch. 87

PL 1997 CH. 278	PL 2002 CH. 87
1. Corporate business tax 2. Savings institution tax 3. Taxes imposed on and paid by marine insurance companies 4. Taxes imposed on and paid by fire insurance 5. Taxes imposed on and paid by insurance companies 6. Public utility franchise taxes, public utility gross receipt taxes, and public utility excise taxes 7. Taxes paid on certain types of gross income pursuant to the New Jersey Gross Income Act: a. Taxes paid with respect to net profits from business b. Taxes paid with respect to distributive shares of partnership income c. Taxes paid with respect to net pro rata shares of "S" corporation income 8. Sales and use tax	1. Corporate business tax 2. Taxes imposed on and paid by marine insurance companies 3. Taxes imposed on and paid by fire insurance 4. Public utility franchise taxes, public utility gross receipt taxes, and public utility excise taxes 5. Taxes paid on certain types of gross income pursuant to the New Jersey Gross Income Act: a. Taxes paid with respect to net profits from business b. Taxes paid with respect to distributive shares of partnership income c. Taxes paid with respect to net pro rata shares of "S" corporation income 6. Taxes derived from a business at the site of a redevelopment project that is required to collect the tax pursuant to the Sales and Use Tax Act, from the purchase of materials used for the construction of new residences at the site of a redevelopment project, or from the portion of the fee derived from the sale of real property at the site of the redevelopment project and paid to the state treasurer for use by the state, that is not credited to the Shore Protection Fund or the Neighborhood Preservation Nonlapsing Revolving Fund

Profile of Port Imperial Project

As indicated in the chapter text, Port Imperial is a model infill development along New Jersey's Gold Coast. The Port Imperial South portion of the project, located in Weehawken, New Jersey comprises residential and commercial components, as shown in table 3.5.

Port Imperial South confronted $10 million in remediation costs, and 75 percent of that amount ($7.5 million) was reimbursed from project-generated revenues. The project was built before the 2002 amendments to the reimbursement program, so the state tax revenues that could be credited for the cleanup are those shown in the left column of table 3.5. The revenue calculation is shown below.

TABLE 3.5
Profile of Port Imperial South

Project Component	Size	Value (1997 Values in $Millions)
Residential		
Flats	1,151 units	$163
Townhouses	163 units	98
Other	318 units	82
Total	1,632 units	$343
Nonresidential		
Office	1,324,000 ft^2	$265
Hotel	400 rooms	58
Retail	151,000 ft^2	26
Other	141,000 ft^2	17
Total	1,616,000 ft^2 and 400 rooms	$366

Brownfields Reimbursement for Port Imperial South under the 1997 Provisions

Sales and Use Tax

At full build-out, Port Imperial South will contain 151,000 square feet of retail space and a 400-room hotel. Sales per square foot vary tremendously depending on the location and tenant. In northern New Jersey, some tenants, for example, supermarkets, big-box retailers (e.g., Old Navy), and certain food establishments (e.g., Starbucks), can realize annual sales of $400 or more per square foot, whereas other retail establishments (e.g., a movie theater) may have yearly sales of $150 to $200 per square foot. In the absence of more specific information, the following factors were assumed in the calculations for Port Imperial South: (1) sales of $250 per square foot,[1] and (2) approximately two-thirds (67 percent) of the sales will be taxable. (Food and clothing purchases in New Jersey are not subject to the 6 percent sales tax.) Therefore, the 151,000 square feet of retail space in Port Imperial South should generate about $1.5 million annually [.06 x (151,000 x $250 x 0.67)] in sales taxes.

Sales tax also will be charged on the rooms rented in the hotel. The following factors were assumed:

- 400-room hotel
- 146,000 available rooms (400 rooms x 365 days)
- 70 percent occupancy
- 102,200 occupied rooms (146,000 x 0.7)
- $200 rate per room
- $20,440,000 occupied-room revenue (102,200 x $200)
- $1.2 million annual sales tax revenue ($20,440,000 x .06)[2]

[1] This figure is roughly the midway point in the range of annual sales per square foot noted for northern New Jersey ($150 to $400 per square foot).
[2] To be conservative in the projection of revenues, the calculation did not include sales taxes generated on catering and other hotel services or charges (e.g., telephone usage).

The estimated sales tax revenue from the Port Imperial South retail and hotel components, therefore, was $2.7 million annually ($1.5 million + $1.2 million).

Corporate Business Tax

The corporate business tax (for brownfields reimbursement purposes) is imposed at the rate of 9 percent on the entire net income allocated to New Jersey at the brownfields site. There is a minimum tax imposed on domestic corporations in the amount of $200.
The budget for the State of New Jersey notes that many New Jersey businesses pay little or no corporate business tax (CBT) and that revenues from this source have been flat for several years. Corporations occupying the roughly 1.3 million square feet of office space contained in Port Imperial South could pay either a high amount of CBT or no CBT. The tax estimate from this source proceeded as discussed below.

For the year in question, when the reimbursement analysis was conducted, the State of New Jersey projected CBT revenue of $1.8 billion. The CBT revenue that would be paid by corporations in a particular site (e.g., Port Imperial South) was projected using a gross estimation procedure.

All things being equal, corporations with “more employees” should have higher incomes and a higher CBT obligation than corporations with “fewer employees.” Therefore, one calculates the CBT per employee and estimates the CBT generated by a project according to its employee intensity. In other words, employee intensity is a proxy for corporate income and the attendant CBT.

At the time of the reimbursement analysis, there were approximately 4 million nonagricultural workers in New Jersey. Of those workers, about 0.6 million worked for government, leaving 3.4 million private (nongovernmental), nonagricultural workers. (Government workers were subtracted because government does not pay the CBT.) Dividing the $1.8 billion statewide CBT revenue by the 3.4 million private, nonagricultural workers in New Jersey yielded a CBT generation per worker of roughly $500 ($1.8 billion ÷ 3.4 million).

At buildout, Port Imperial South would contain about 7,900 workers. At a $500 CBT revenue per employee, approximately $3.9 million in CBT revenue would be generated annually. However, because of the uncertainty of this calculation, the analysis “credited” only 10 percent of that potential $3.9 million amount, or approximately $0.4 million per year.

Other Taxes

One could only speculate about the other state taxes that might be paid at Port Imperial South from such sources as the savings institution tax, the fire insurance tax, the public utility franchise tax, and other sources (see taxes 2–8 shown in the left-hand column of table 3.4). To be conservative in the projection of revenues, the reimbursement analysis did not include income from these sources.[3]

Total Estimated State Tax Revenue from Port Imperial South

The estimated state taxes pursuant to the Brownfield and Contaminated Site Remediation Act from Port Imperial South included, on an annual basis,

$2.7 million	SALES TAX
<u>$0.4 million</u>	<u>CORPORATE BUSINESS TAX</u>
$3.1 million	ANNUAL STATE REVENUE FOR BROWNFIELDS SITE REMEDIATION FUND

It was estimated that brownfields remediation at Port Imperial South would cost about $10 million; $7.5 million of that amount was reimbursed. Since annual state revenue for brownfields remediation would amount to about $3.1 million, the $7.5 million remediation expense will be recouped in less than three years.

Brownfields Reimbursement for Port Imperial South under the 2002 Provisions

The 2002 provisions deleted certain revenues from the credit, such as the savings institution tax (a minor source that was not even applied in the Port Imperial South calculations). More important, however, the 2002 provisions added new sources, such as the sales tax from the purchase of materials for the construction of new residences (see table 3.4). That provision was prompted by the perception that residential project–associated revenues were underrepresented. It would have dramatically increased the revenues from Port Imperial South, and that increased amount would have applied as a credit against cleanup costs. The project's residential units had a value of about $345 million. Assuming a 25 percent factor for land and developer markup, the residential units had an out-of-pocket improvement cost of about $259 million ($345 million x .75). About one-half of that amount in construction is paid for labor ($130 million), and the remaining half is applied to the purchase of materials ($130 million). Using the 6 percent New Jersey sales tax rate, the 2002 amendment crediting sales tax revenues would have increased the revenue creditable for site cleanup by $7.8 million ($130 million x .06). This would be a one-time credit, not an annually recurring revenue source, such as the sales tax.

Port Imperial South did not "need" the additional revenue to reimburse its cleanup costs because it already had uses, namely retail and the hotel, that generated taxes, which, in turn, could be tapped for the cleanup. However, other projects, for example, those largely or solely composed of residential uses, could very well need the new sources of revenue for cleanup.

[3] The analysis also does not include sales tax revenue on construction materials because these revenues currently are not counted for brownfields reimbursement.

The Need for Increased Reimbursement Revenues for Brownfields Remediation

Although the 2002 amendments are most welcome, there still may be a shortfall in the reimbursement revenues needed to subsidize the cleanup of polluted sites. Examples include the following:

1. Extremely contaminated sites with very high cleanup costs
2. Largely or solely residential projects that do not have the retail and other nonresidential uses that generate significant and recurring sales tax revenues to pay for cleanup. A shortfall for cleanup is especially likely for the following residential projects:
   a. Affordable housing: Because improvement expenses are modest, building materials expenses and the sales taxes paid on those materials will also be modest, therefore reducing the credit available for reimbursement revenues.
   b. Historic and adaptive reuse projects: A large share of the improvement expense comprises labor, which is not subject to the sales tax, as opposed to building materials expenses, which are subject to the sales tax. Again, this reduces the credit available for reimbursement revenues.

To address the potential shortfall, the state could expand the revenues creditable for brownfields remediation. Possible revenue sources include the following: (1) the state income taxes paid by the construction workers employed on the project, (2) the state income taxes paid by the households living in a residential project, and (3) the state sales taxes paid from taxable consumption by the households. These additions could generate considerable revenue. The Port Imperial South can be used to illustrate.

Port Imperial South had a total project value of $709 million. Assuming a 25 percent factor for land expenses and developer markup, an improvement expense of $532 million remains ($709 million x .75). Suppose one-half of that amount is for labor costs ($266 million). If an average state income tax of 5 percent is applied to those labor costs, a $13.3 million state income tax credit from the construction worker wages could be applied to cleanup reimbursement.

The state income tax on the household income of the 1,632 households living in Port Imperial South would add to that amount. Assuming earnings of $100,000 for each household, the average state income tax would be about $5,000 each, amounting to $8.2 million annually ($5,000 x 1,632) that could be tapped for cleanup reimbursement.

The annual taxable consumption by these households would further add to the reimbursement pool. Assuming consumption is 70 percent of income, or $70,000 for each Port Imperial South household, and assuming further that, in New Jersey, 25 percent of consumption is taxable ($17,500 for each household in the project), the state sales tax on consumption by each household would be approximately $1,050. The development’s 1,632 households would thus remit about $1.7 million annually ($1,050 x 1,632) in sales taxes on consumption. That amount would be credited for cleanup reimbursement under the proposals considered here.

As noted earlier, Port Imperial South did not need the additional reimbursements to pay for cleanup costs. However, other projects might face shortfalls. These could include developments on sites needing extremely expensive remediation relative to project scale, developments that are largely or solely residential, and those containing affordable housing or involving mainly rehabilitation work.

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Chapter 4
FINANCING INFILL PROJECTS

INTRODUCTION

The financing dimension of smart growth (including financing for infill projects) has, with few exceptions (Gyourko and Rybczynski 2000; Leinberger and Davis 1999; Leinberger 2001), received little attention. The smart-growth discussion has centered on such topics as urban growth boundaries and regional tax-base sharing but has largely omitted financing topics, such as how to secure construction and permanent financing for smart growth. Government officials, planners, neighborhood groups, and many others have participated in the smart-growth dialogue. However, local planning and zoning efforts and broader policy debates have not typically included representatives of the real estate finance community. The omissions are an oversight, for scholars do present evidence that smart-growth development projects (including infill) encounter financing problems (Nelson 2000, 4). This chapter addresses the financing challenges as well as strategies that foster the financing of smart growth and, especially, infill projects.

CHALLENGES TO FINANCING SMART GROWTH–INFILL

When a community embraces smart growth, banks are sometimes unwilling to underwrite it. The Ridenour development in suburban Atlanta has encountered this challenge. Located at the intersection of two major highways, the development site is on one of the largest tracts of vacant land in the vicinity (88 acres). Plans for Ridenour call for a mixed-use development of 64 single-family detached homes, 80 townhouses, 124 condominium units, 350 apartments, 500,000 square feet of office space, 112,000 square feet of retail space, and a village center containing a hotel, a nursing home, day-care facilities, and bed-and-breakfast establishments. The whole project will cost $280 million to build, but local banks are willing to finance only the residential element. The $32 million needed for the town center has not been secured.

Infill projects may face similar, if not more daunting financing challenges. The Belmont Dairy project in Portland, Oregon, embodies creative infill and adaptive reuse (Stern 1997, 60). The 133,000-square-foot project on a 2.5 acre site near Portland's central business district (CBD) blended market-rate and affordable housing and preserved and reused the original 80,000-square-foot dairy. However, lenders were willing to finance only 32 percent of the roughly $20 million project cost, forcing the developer to raise $14 million from a variety of sources, including the Network for Oregon Affordable Housing Fund and Oregon's Congestion Management and Air Quality Program.

The Belmont Dairy project's situation is not unique. Yerba Buena Commons, a $17 million infill housing project in San Francisco's downtown area "confused lenders," and the developer could secure only $6.5 million in conventional financing (Goff 1996, 18).

This chapter by David Listokin.

Pundits writing on infill have frequently cited financing as a challenge (Northeast–Midwest Institute and Congress for the New Urbanism 2001, 4; Leinberger 2001, 3; Hamilton, Rubinovitz and Alschuler 1996, 9; Wheeler 2001, 21). For example, Wheeler (2001, 21) notes the following financing hurdles:

> Financing has in the past often been a very large obstacle to infill development—in particular for affordable housing or mixed-use projects. During the recession of the early 1990s this was certainly the case. Developers interviewed for this report indicate that financing problems have eased somewhat in recent years, although at any time economic conditions could make loans scarce again. No one interviewed could cite a single recent worthy infill project that has not been built solely because of a lack of financing. Yet in the opinion of many experts, financing limitations restrict the amount and types of infill that developers are willing to undertake, even if funding difficulties do not by themselves derail projects.

The New Jersey infill developers interviewed in the course of this study echoed some of Wheeler's observations. Most were large, well-established companies with established lines of credit, access to Wall Street, and the like, so they did not view financing as a major problem. One developer observed that although his company had ready lines of credit, lenders had to finance only 40 percent of the cost of the infill projects because the company had 60 percent equity in them. Nevertheless, some developers do encounter financing problems. One developer observed that infill involving brownfields "made lenders wary." A number of the respondents further acknowledged that less experienced and capitalized developers would encounter more financing problems with infill projects than with greenfields construction."

We need to begin thinking about ways to bridge the gap between local leaders' vision for the development and redevelopment of their communities and the business realities and incentives and capital-market structure facing real estate lenders and investors. To do this, we first need to understand how smart growth–infill developments appear to those who evaluate and price risk. As a starting point, we suggest that *lenders and developers may shun smart growth–infill because, for a variety of reasons, they view it as riskier than and different from alternative investment opportunities.*

1. *Smart growth–infill embraces higher density and, in other ways, a different development pattern.* Smart growth–infill development—for example, higher-density single-family and multifamily mixed-use and "new urbanism" projects—runs counter to the traditional low-density, Euclidean-zoned tract model of development. This departure from the conventional suburban approach may evoke concern from the real estate community.

   Community groups may fight smart-growth development, such as higher-density suburban housing. In Charlotte, North Carolina, proposals for multifamily condominiums that would counter sprawl were contested by adjacent property owners—an example of NIMBYism (Not In My Back Yard). In Litchfield, Connecticut, a 138-unit townhouse development proposed for a 77-acre site located near the historical community's downtown area was opposed as being "too dense," even though the site was already zoned for multi-family housing—and this in a community of 51 square miles populated by 8,800 persons. The "safe" investment in places like Charlotte and Litchfield is single-family detached housing on large lots—but that perpetuates sprawl.

Infill typically is effected in metropolitan area locations with already relatively higher densities; however, infill proposals are often fought on that very issue. In San Francisco's Haight-Ashbury neighborhood, a developer proposed a mixed-use infill project comprising 162 residential units above 20,000 square feet of nonresidential space. Property owners near the 98,341-square-foot lot protested "the project's increased density" (Martin 2001, 34). The project was ultimately scaled back to 134 housing units and 53,000 square feet of commercial space—the latter representing only 30 percent of the 177,000 square feet of commercial development allowed by zoning.

2. *Smart growth–infill encourages mixed use and, in other ways, a different product type*. Smart growth–infill encourages mixed-use development and a variety of housing types. However, "the development of multiple uses—or multiple product types—in a single project is viewed (by developers, financiers, and investors) as inherently more difficult to evaluate and implement" (Gyourko and Rybczynski 2000, 723). The developer of the Belmont Dairy project in Portland, Oregon—a prototypical smart growth–infill development—complained that "debt lenders did not understand mixed-use projects" (Fannie Mae 2000, 4).

3. *Smart growth–infill projects often preserve and expand housing opportunities for traditionally underserved communities and families*. Two challenges emerge as a result. Such projects, by necessity, often involve subsidies—generally in short supply and difficult to secure—that must be incorporated in the underwriting process. These projects typically offer mixed-income housing, which also presents an underwriting challenge for many lenders. Affordable housing is typically produced in the United States through a layering of federal, state, and local government programs, as well as subsidies from foundations and other sources. Mixed-income housing preserves affordability for lower-income families by drawing on these subsidies, and often additionally cross-subsidizes the affordable units through the higher rents charged for the market-rate units. As a result, smart growth–infill development that includes affordable housing and/or mixed-income housing is a complicated endeavor. It involves many entities that impose varying and often conflicting requirements and submission schedules. Mixed-income housing also contains features, for example, long-term affordability restrictions, that make the underwriting of such projects challenging and different from the underwriting for more traditional projects.

4. *Smart growth–infill projects tend to be complex*. Multifamily, mixed-use, and mixed-income projects that typify smart growth tend to be more difficult to develop. Other smart growth–infill characteristics add to the complexity. For example, smart growth–infill development may require reclamation of brownfield sites, a process that is

inherently challenging (see chapter 3). Smart growth–infill also attempts, through rehabilitation, to maximize continued use of the existing building stock. However, rehabilitation is more difficult than new construction because one is dealing with a "used canvas" rather than a clean slate. Further, development-site assemblage for smart growth–infill is often more burdensome than site assemblage for conventional development or sprawl (see chapter 3). Conventional development is unfettered because it uses the most easily acquired and least expensive sites—often farmland at the metropolitan periphery. Smart growth–infill, however, targets specific areas, such as transit-served neighborhoods. For these reasons, smart growth–infill projects trend toward greater complexity. That complexity may be beyond the "comfort range" of standard mortgage underwriting.

5. *Smart growth–infill projects may involve legal complications that add to financing difficulties.* In urban neighborhoods, delinquent taxes, mechanics' liens, and estate and other legal issues commonly frustrate conveyance of clean title (see chapter 3). Brownfield sites may also present title problems. Other legal issues may add complications. For instance, to qualify for a payment in lieu of taxes (PILOT), a neighborhood may first need to be legally declared "blighted" (see chapter 3). To garner an investment tax credit for rehabilitating a historic property, a historic district may have to be "designated," and so on. Traditional investment opportunities do not typically face as many legal obstacles and procedures.

6. *Smart growth–infill projects typically have large up-front costs*. Infrastructure provision illustrates the nature of this problem. Porter (2000, 4) observes that "although infill sites supposedly are already served by basic infrastructure, builders frequently find it necessary to upgrade water and sewer lines, improve streets and sidewalks, and provide landscaping." Over the long term and from a broader societal perspective, smart growth–infill demands less infrastructure than that demanded by sprawl (e.g., fewer publicly supported roads need to be built in the region). However, in the short term, and from a developer's perspective, smart growth–infill may demand concurrent infrastructure and, therefore, more initial capital investment.

   Other smart growth–infill characteristics—an emphasis on better design (e.g., new urbanism), targeted site assemblage, brownfield reclamation, and rehabilitation holding costs—can increase the up-front expenses borne by the developer. Given the time value of money, the more substantial the up-front outlays, the greater the challenge to the developer and lender. If smart growth–infill is perceived as riskier for these reasons (e.g., the nurturing of a market, the complications of mixed use, and higher up-front expenses), developers and lenders will demand a higher rate of return—and that makes it harder for a project to pass financial muster.

7. *Smart growth–infill challenges the conventional wisdom about location, and that can give an underwriter pause*. Smart growth–infill encourages redevelopment in cities and older suburbs that the post–World War II era market has largely bypassed. A potentially large, latent consumer demand may exist for these close-in locations. Aging baby boomers, immigrants, and others are drawn to close-in areas proximate to

work and adult lifestyle amenities (e.g., museums, theaters, and restaurants). Despite the potential demand, however, these “new market” locations still must be nurtured—a daunting proposition. Underwriters may be uncomfortable—without compelling evidence of marketability—approving developments proposed for cities and older suburbs.

Cities and older suburbs confront staggering macro physical, economic, and social problems, for example, a rampant decline in population, tax base, and public-service quality. Rochester, New York, for example, lost one-third of its population between 1950 and 1990. The city’s property tax base has declined by $0.5 billion in the past 10 years, while the tax base of the surrounding suburbs has increased by $1.5 billion. The population of Camden, New Jersey, also decreased by one-third, from approximately 125,000 in 1950 to 79,000 in 2000, and the city had to be declared a financial ward of the state. Challenging macro forces fundamentally impede redevelopment in Rochester, Camden, and other older communities.

Micro quality-of-life (QOL) issues also constrain redevelopment. For instance, the need to concurrently provide urban retail stores, such as supermarkets and dry cleaners, can frustrate urban residential infill. Nationwide chains may be wary of urban locations. In contrast, retail generally is readily provided by the development community in greenfield, suburban locations. Therefore, it is understandable that, absent compelling evidence to the contrary (e.g., a nationwide chain committing to a downtown location), underwriters will tend to follow the conventional wisdom that favors suburban development and remain wary of proposals for projects in cities and older suburbs.

In sum, the fundamental challenge to financing smart growth–infill is the view that it is riskier and different from alternative investment opportunities. Smart growth–infill is riskier because it embraces higher-density, mixed-use, and mixed-income development, whereas the market is typically more comfortable with lower-density, single-use, and market-rate units.

Underwriters often manage risk through compensating rate adjustments where a premium is required for riskier investments. But that raises the question of the exact scalar of the heightened risk of smart growth–infill. How long will it take to bring back a city or older suburban neighborhood? How long will it take the National Park Service to approve the design for a historic investment tax credit, or for a state housing finance agency to grant a low-income housing tax credit, or for a redevelopment agency to declare a neighborhood blighted? How long will it take to clear title on a brownfield site? How much longer (or shorter) a time period will be needed to sell out a “new urbanism” project, compared with a conventional development? How much time will be needed to make significant gains in neighborhood QOL? Since the answers to these and other questions confronting smart growth–infill projects are not readily known, lenders may find it difficult to determine the appropriate risk premium.

Smart growth–infill finance also tends to be idiosyncratic rather than standardized, leading to further financing tensions. The lending industry is increasingly characterized by standardization and routinization. (These trends are most pronounced in underwriting single-family housing.) Making capital a commodity contributes to the efficiency of the current mortgage industry and explains such recent trends as automated underwriting with credit scoring. However, smart growth–infill projects, with their custom-crafting of mixed uses, mixed incomes, layered subsidies, and the like, run counter to a standardized financing regimen.

Thus, smart growth–infill financing faces the following challenges: a perception of greater risk and lenders' preference for investments that conform to the financing industry's standardized processes and whose risk can be more readily gauged. Multipronged strategies must be used to address these fundamental challenges.

BEST PRACTICES FOR FINANCING SMART GROWTH–INFILL

Lender Motivations and the Potential Scale of the Market

It is important for lenders to consider how they can become more actively involved in the financing of smart growth–infill. Such lending is key for both self-protective and business development reasons. Statutory, regulatory, and public pressure ("sticks" of different types) all compelled lenders to become more proactive in financing smart growth–infill, especially in urban areas. These sticks include the requirements of the Community Reinvestment Act (CRA) and other lending provisions; an invigoration of regulators' enforcement of those provisions; the release of Home Mortgage Disclosure Act (HMDA) data; the growth of community activist organizations, which became quite proficient in analyzing and presenting the HMDA information; and an industry-wide trend toward mergers, accompanied by a very public look at CRA fulfillment.

Although regulatory and related factors may have stimulated the initial expansion of smart growth–infill lending, the potential profitability of serving previously underserved markets has sustained it. Lenders should recognize the market potential of smart growth–infill. It will not replace traditional development, but a significant segment of current and future growth—and lenders' business—may potentially be conducted in a smart growth–infill context.

It is instructive to sketch the order-of-magnitude scale of the potential market of financing for smart growth–infill. If nationwide growth for the period 2000 to 2025 were shifted from a pattern of sprawl to that of smart growth–infill, then 1.8 million additional households with an aggregate income of $82 billion would be redirected to urban counties (see chapter 1). Since the housing of many of those urban households would be fulfilled through infill, that shift would represent an infill-related increase in demand for residential mortgages of about $250 billion.[1]

[1] This calculation assumes a 3:1 ratio between residential mortgage value and household income in the period 2000 to 2025.

In New Jersey, a shift from a pattern of sprawl to a pattern of smart growth over the period 2000 to 2025, would result in a sixfold increase in household growth in the state's urban communities. The new urban households would have an aggregate income of almost $3.1 billion. That shift would support roughly a $10 billion residential mortgage market in New Jersey's cities—a market that would be absent under sprawl. Much of that $10 billion mortgage market would involve infill development.

In short, smart growth–infill offers a multibillion-dollar business opportunity to lenders. Financing for smart growth–infill development encompasses the full range of financing requirements. It includes both construction and permanent lenders from the industry entities who originate the loans, as well as the various secondary-market businesses and enterprises that package and sell the mortgages. Activities that require financing include development, purchase, and rehabilitation.

The real estate finance industry should participate in smart growth–infill as a partner with other key players, including local, state, and federal governments, the full gamut of the real estate community, other private-sector entities, and community and nonprofit groups. Only a partnership arrangement can address the myriad challenges to financing identified in the preceding section. The following discussion explains how a strategic partnership can link the smart growth–infill vision with debt financing. We sketch a broad set of strategies for the real estate finance community and additional strategies for government and other entities. This is followed by discussion of potential future actions.

What Can the Real Estate Finance Community Do?

We first present a set of strategies for the real estate finance community.

1. *The real estate finance community can develop and disseminate information on appraisal techniques that capture the value of smart growth–infill development*. The financing of a proposed smart growth–infill project can be stopped in its tracks if the appraisal of the development falls short or, at the extreme, is less than the cost of construction. As explained in chapter 3, the comparable sales and income approaches used to estimate value may not capture the true value of a smart growth–infill project. The resulting appraisal gap is a particular problem when a pioneering smart growth–infill initiative is contemplated, for example, a new single-family subdivision planned in a city that has not witnessed such construction for years or an inner-city rehabilitation project (see the LHHA example in chapter 3).

   The private sector can help address the appraisal gap by developing and disseminating information on appraisal techniques that are appropriate for smart growth–infill projects. Major lenders and financial organizations, such as appraisal organizations and finance trade associations, can develop pilot programs that would explore alternative appraisal techniques in targeted smart growth–infill areas. For example, the area from which comparable sales ("comps") are selected may need to be expanded. When new for-sale housing was built in Detroit, Michigan, a few years ago, appraisers had to look at suburban comps. A pilot program could also consider the valuation of reclaimed brownfields and mixed-use, adaptive reuse, and rehabilitation projects. Appraisal organizations can create a brochure suggesting best practices (e.g., selecting comps and valuing brownfields) for smart growth–infill appraisal policies and procedures.

Major lenders and the Government Sponsored Enterprises (GSEs) can include procedures that recognize and further smart growth–infill techniques in their appraisal process guidelines. Lenders can establish an internal smart-growth quality-control function for appraisals ordered through their offices. Many lenders already have such mechanisms in place for fair housing and other concerns. For example, appraisal reports for denied loans could be selected randomly to check for patterns of criteria that might unnecessarily block sound smart growth–infill lending.

The public sector can promote innovation in appraisals by providing information on pending public infrastructure improvements, parallel private investments, and other data needed in making the accurate predictions crucial to the income approach to estimate value (see discussion in chapter 3). For example, information on the growing job market and public riverfront improvements in Rochester, New York, and Camden, New Jersey, can bolster the valuation of infill projects in those cities, including Chevy Place in Rochester, and the Victor in Camden. Housing-market studies commissioned by such cities as Columbus, Ohio, and San Antonio, Texas, and a homeownership Web site developed by Cincinnati, Ohio, demonstrate to builders and appraisers the reality of in-city demand for housing, helping to address appraisal shortfalls (Porter 2000).

2. *By participating in and expanding pilot programs, the real estate finance community can establish a track record for smart growth–infill financing and develop a model for regular loan programs*. There are several pilot programs designed to experiment with mortgage terms and to extend the reach of the mortgage industry. Freddie Mac and Neighborhood Housing Services of Chicago (NHS) developed the Family Plus program, which targets a significant portion of Chicago's inner-city neighborhood housing stock, specifically owner-occupied two-, three-, and four-unit flats (Listokin and Wyly 2000). There is no income ceiling for program participation. The program offers a 30-year, fixed-rate mortgage made by a participating lender and a 15-year second mortgage at 5 percent, made by NHSC. This combination enables the borrower to reduce the overall cost of his or her mortgage money and to avoid private mortgage insurance. Living in Philadelphia, a pilot program offered by Fannie Mae, makes available a market-rate first mortgage with a layering of assists, including a soft second mortgage from the City of Philadelphia and an unsecured bank loan granted by the Pew Trust. By sharing risk to stabilize and revitalize older neighborhoods, pilot programs like Family Plus and Living in Philadelphia foster smart growth. Pilot programs that support other characteristics of smart growth, such as transit-oriented development, also deserve consideration. The Location Efficient Mortgage℠ (LEM℠), which evolved from a pilot to a full-fledged product currently available in four metropolitan areas (Seattle, San Francisco, Los Angeles, and

Chicago), is a prime example. The LEM is a home-purchase loan that enhances the buying capacity of residents of location-efficient neighborhoods (e.g., those with mixed uses and mass transit). The assumption is that residents in these areas, by reducing their automobile expenses, free up household resources for buying a home. Accordingly, the LEM allows a greater share of household income to be applied for housing expenses. The standard mortgage typically has a guideline housing-expense-to-income ratio of 28 percent and a total debt-to-income ratio of 36 percent; the LEM allows the two ratios to climb to 35 percent and 45 percent, respectively. To illustrate the difference, a Seattle household with a $50,000 annual income can qualify under a standard mortgage for a $150,000 home; however, the LEM would allow that same household living in a location-efficient neighborhood, to qualify for a home purchase up to $190,000. The LEM offers a significant financial advantage to residents of compact, transit-served, mixed-use neighborhoods and similar areas favored by smart growth–infill.

3. *Lenders can develop new mortgage products tailored to the context of smart growth–infill situations*. The LEM, described above, is just one example of new products that could support smart-growth objectives.

4. *Enhanced loan and collateral flexibility can further smart growth*. For example, some lenders may have a minimum commercial loan amount reflecting underwriting and other origination costs. The minimum requirement may preclude lending for small-scale commercial infill projects. Other flexibilities can help, for example, the minimum housing unit size necessary to qualify for mortgage insurance or to be salable to the secondary-mortgage market. Housing unit size affects marketability, but the overall character of smart growth–infill endeavors may more than offset any perceived negative effect. For instance, studio apartments in a successfully revitalized downtown area may be in high demand.

5. *Flexibility in underwriting processes can increase smart growth–infill lending opportunities*. For instance, a report by the Federal Reserve Bank of Minneapolis indicated that mixed-use financing is sometimes impeded by the common practice of lenders having separate commercial and residential underwriting departments and/or appraisers (Bennett 1999). The Federal Reserve report notes that to take advantage of the business opportunity of smart growth, “Lenders with separate commercial and residential loan departments may need to develop a team with the expertise to analyze mixed-use projects” (Bennett 1999, 4).

6. *Lenders might also consider outsourcing specialized functions to oversee the loans for smart growth–infill projects more efficiently*. In Chicago, lenders were interested in doing purchase–rehab loans but were daunted by the construction oversight of the loans. These loans could cost a bank as much as $5,000 to $10,000 per loan to supervise the rehab, since they involved considerable administration and typically were made on a limited scale by any one lender (Listokin and Wyly 2000). To meet this challenge, Chicago lenders partnered with the Neighborhood Housing Services of Chicago (NHS), which conducted the rehab construction supervision for many banks.

Outsourcing this function to NHS, which did the work in volume, was a cost-efficient solution for the lenders.

7. *Allowing limited and targeted nonresidential components in loans primarily residential in nature also can promote smart growth–infill*. For example, the Federal Housing Administration (FHA) Section 221(d)(4) loan program allows nonresidential space to compose 10 percent of a residential project. The FHA Section 220 program allows nonresidential space to compose up to 20 percent of a project. The HUD regional offices can allow additional nonresidential cap flexibility through these programs. The additional flexibility could be used to promote smart growth–infill objectives.

   Although the GSEs, such as Fannie Mae and Freddie Mac, are limited by charter to residential lending, they do permit a limited fraction of space and rents to come from nonresidential uses of the collateral (Gyourko and Rybczynski 2000, 774). For example, Freddie Mac's Multifamily Streamlined Refinancing Program caps nonresidential rents and nonresidential square footage in eligible projects at 25 percent of the total effective gross revenue and 25 percent of total project improvement square footage, respectively. The GSEs could promote specific smart growth–infill objectives if they allowed additional cap flexibility to infill projects. Exceptions to the cap could be made for individual projects, or the GSEs could offer greater flexibility through pilot programs.

What Can Government and Others Do to Foster Smart Growth–Infill Financing?

The economic, legal, and institutional framework in which lenders operate is critical to their willingness to finance smart-growth projects. Thus, whenever governments and others can responsibly act, they should structure the lending environment to be consistent with reasonable underwriting standards and to provide lenders with a "clean" collateral position. Enhancing the lending environment entails a broad array of actions, some of which have been considered or will be considered in other chapters of this study.

1. *Policies can be established to address liability issues that stymie the reuse of such parcels as brownfields*. Governments have promoted brownfield reclamation through regulatory relief (e.g., liability limitations) and public subsidies (see chapter 3).

2. *Technology and innovative processes can address title problems that bedevil smart-growth redevelopment*. Computerizing title records can facilitate title searches. Accelerated property tax foreclosure by a city can wipe out tax, mechanics', and other liens that often cloud titles on inner-city properties (see chapter 3).

3. *Streamlining the development permitting process can enhance the flow of real estate finance to support smart growth–infill development*. Since time is money, regulatory efficiencies that cut time and add certainty make smart growth–infill development more attractive to lenders (see chapter 6).

4. *Shortening and simplifying the development process can make it easier to obtain real estate financing from lenders*. Particularly for urban redevelopment, land assembly has always presented a great deal of uncertainty, which can discourage financing. Government and others can help alleviate the problem through landbanking, accelerated tax foreclosure, and other approaches (see chapter 3) to acquire parcels, resolve legal and other issues, and make parcels available to infill developers.

5. *Local governments can locate and invest in infrastructure in ways that enhance the collateral values behind smart-growth loans*. Just as the private infusion of capital in adjacent areas can create and enhance property values, targeted public investment can reduce risk by creating greater potential for loan collateral. Localities often spatially target normal investments and services as well as special subsidies that enhance the value of specific properties. The enhanced value, in turn, makes lending in support of smart growth–infill objectives less risky for private lenders.

6. *Local governments can improve the quality of life (QOL) in areas targeted for smart growth–infill efforts, creating the environment where commercial and residential lenders can safely project sufficient economic activity to justify lending*. Quality-of-life investments—for example, new street furniture and plantings and enhanced police and educational services—create a more favorable climate for real estate finance in support of smart growth–infill activity. For example, as part of the Building Homes in America's Cities initiative sponsored by the National Association of Homebuilders, HUD, and the United States Conference of Mayors, Houston, Texas, developed a Neighborhoods to Standard program that focuses on improving public facilities and services, such as better trash removal and street repairs (Porter 2000). Other cities participating in the initiative have taken similar actions to improve neighborhood QOL: San Antonio's Neighborhood Sweeps program combines city cleanup and improvements, and Chicago provides grants for home façade improvements.

7. *Placing public employment and facilities in targeted areas also can revitalize community economies, making adjacent properties and businesses stronger candidates for financing*. All levels of government can locate facilities in areas targeted for smart growth–infill investment measures. By enhancing the economic viability of the surrounding properties and businesses, the government actions facilitate additional lending in the targeted areas. The federal government has existing directives to locate facilities in or otherwise support urban, central business district (CBD), historic, and other areas that smart growth–infill measures typically seek to revitalize. These federal mandates include the following: the 1976 Public Buildings Cooperative Use Act, which states that General Services Administration should acquire space in historic properties; Executive Order 12072 (1978), which gives first consideration to space needs in CBDs; and Executive Order 13006 (1996), which includes a directive to locate federal facilities in urban or historic locations.

   State governments can also consider enacting mandates to locate state facilities in CBDs. Maryland, Oregon, and Vermont have enacted executive orders and legislation to do so. For example, a 1994 executive order in Oregon directed all state agencies to give preference to downtown locations.

8. *Government and other entities (e.g., foundations) can provide subsidies and other support, such as risk sharing, to bolster the economics of smart growth–infill development*. Public-sector and other subsidies (e.g., from foundations) are especially important to more challenging smart growth–infill projects. These may include development in brownfields and similar areas with extensive environmental issues; development in locations requiring extensive infrastructure improvements; "pioneer" developments in untested markets; and developments containing mixed-income and affordable housing. Financial assistance may take many forms, including direct below-market interest rate financing; insurance or guarantees of privately made loans; property tax abatement and other property tax support, such as tax-increment financing (see chapter 5); land assembly and write-downs; subsidy of infrastructure; provision of professional and technical assistance; and density bonuses.

Examples of Infill Financing

There is considerable variation in how infill projects are financed. Experienced developers dealing in established markets served by transit and other amenities and providing a largely market-rate product in a locally supportive environment (e.g., areas in which the local government advocates infill and property and other taxes are moderate) have reasonable access to conventional financing. Researchers at the University of Denver found the following project characteristics give lenders confidence in an infill project seeking financing (Northeast–Midwest Institute and Congress for the New Urbanism 2001, 86):

- Demonstrated strength of location and neighborhood context, especially neighborhood safety
- Demonstrated pent-up demand in the market
- More than 60 percent of the project leased in advance
- An experienced developer included as a principal on the project team
- Excellent access to jobs and transit availability
- City policies will support the project
- City has a reputation for supporting the type of infill proposed
- Incorporate tax incentives

Lenders have less confidence in infill projects in inchoate markets and in locations with severe environmental, infrastructure, and other hurdles. Here, infill financing often entails a partnership of private and public entities. The following examples are illustrative.

- Lenders would only finance about one-third of the previously mentioned Belmont Dairy infill project in Portland, Oregon. The development was brought to fruition with $14 million in financing from public and private sources, including the City of Portland, the State of Oregon, federal low-income housing tax credits, the Fannie

Mae Foundation, the Bank of America, and the Network for Oregon Affordable Housing (Stern 1997, 60-61).

- The Montgomery Ward project in Chicago adaptively reused a 28-acre site that had previously contained office (400,000 square feet) and warehouse space (2.2 million square feet). The project, a mixed-use development encompassing housing (2,000 units), retail (100,000 square feet), and other uses, was aided by public support for river-walk improvements ($31 million), housing subsidies ($27 million), and other purposes (Marsh 2000, 101–102).

- To help Pittsburgh, Pennsylvania, transition from a manufacturing economy to a high-tech economy, several public, private, and university entities collaborated to develop the Pittsburgh Technology Center. The $25.2 million cost was raised from the state government ($18.3 million), the City of Pittsburgh and its Urban Renewal Authority ($9.8 million), the Pittsburgh Water and Sewer Authority ($2.9 million), and private foundations ($0.2 million) (Porter 1993, 21).

- Uptown Dallas, once a 100-acre desolate, urban renewal–cleared site, has blossomed into an in-town neighborhood with the assistance of $2 million in city seed money and $20 million in drainage systems and other publicly funded improvements (Northeast–Midwest Institute and Congress for the New Urbanism 2001, 55).

- The revitalization of downtown Cleveland was financed with $275 million in bonds backed by area revenues from parking, cigarette-alcohol taxes, and other sources (Hirzel 1993, 36).

- Chattanooga, Tennessee, invested $335 million in its downtown. Almost $70 million of the total came from city, county, state, federal, and other sources (e.g., the Lyndhurst Foundation). Improvements included making the Tennessee River accessible to the public (Jacobson 1997, 20).

- Transit-related infill projects in Atlanta, Georgia, and San Francisco, California, benefited from the billions of dollars invested in the cities' transit systems through the ISTEA, the TEA-21, and other sources (Kreyling 2001, 4). For example, the Lindbergh Center, a 51-acre TOD site that will encompass 4.8 million square feet of mixed-use development, is adjacent to the (Atlanta) Metropolitan Area Rapid Transit Authority's (MARTA) second-busiest stop, which serves 26,000 riders daily (Kreyling 2001, 6).

Infill involving affordable housing and historic preservation may require layers of public and other subsidies. To limit sprawl, Seattle, Washington encourages growth in its urban centers and urban villages, such as Capitol Hill. The housing rehabilitation and new construction activities undertaken by the Capitol Hill Housing Improvement Program (CHHIP), a nonprofit organization, exemplify that effort. To provide affordable housing, CHHIP taps the following sources of aid (Weinstock 1999): federal low-income housing tax credits (LIHTC); Affordable Housing Program (AHP) moneys from the Federal

Home Loan Bank (FHLB); Local Initiatives Support Corporation (LISC) investment; assistance from the Washington State Housing Trust Fund, the City of Seattle, and the U.S. Department of Housing and Urban Development (e.g., HUD's Community Development Block Grant and Section 8 programs); CRA-inspired, low-cost loans from Washington Mutual Savings Bank, First Interstate Bank, Pacific First Bank, Sea First Bank, and other lenders; "creative financing" (e.g., the sale of development rights); and foundation support (e.g., from the Merrill and Skinner foundations).

Providing affordable housing in downtown Seattle is especially challenging. To adaptively reuse Seattle's historic Pacific Hotel for low-income housing, an $8.5 million project, a nonprofit tapped $2.7 million in equity from the low-income housing tax credit (LIHTC) and $0.9 million in equity from the federal historic rehabilitation investment tax credit program (ITC), leaving only $4.9 million in debt financing. The cost of the debt was further reduced with subsidies received from the FHLB, the AHP, the Washington State Housing Trust Fund, and the City of Seattle. The project's operating costs were further subsidized by HUD's McKinney SRO MOD REHAB program (Listokin, Listokin, and Crossney 2004, 139).

A study by Listokin, Listokin, and Crossney (2004) noted a similar layering of subsidies in the financing for 20 projects in various states involving the rehabilitation of historic buildings for use as affordable-housing. All of the projects involved some manifestation of infill. Examples of the 20 of the projects are shown in table 4.1.

TABLE 4.1
Rehabilitation of Historic Buildings for Affordable Housing
Using a Variety of Funding Sources

Location	Project
Irvington, NY	Adaptive reuse of an industrial building to housing
Sioux City, IA	Adaptive reuse of a former department store to housing
Wichita, KS	Adaptive reuse of a hotel to a mixed-use development (housing, commercial, and retail)
Los Angeles, CA	Rehab of a mixed-use building
Two Rivers, WI	Adaptive reuse of a surplus school to senior housing
Waterloo, IA	Adaptive reuse of an office building to a mixed-use development

Following is an economic and financing profile of the projects, all of which provided affordable housing (Listokin, Listokin, and Crossney 2004, 208). In the aggregate, the 20 projects had total costs of $116,050,959. Of that total, construction-rehab accounted for the most significant outlay, at $87 million (75 percent of the total), followed by $24 million (20 percent of the total) for soft costs and $5 million (4 percent) for acquisition costs. Project funds—$117 million total—came from a variety of sources, including $55 million in equity (47 percent), $38 million (32 percent) in debt, $10 million (9 percent) in federal (non–tax credit) assistance, and $7 million from other sources, such as foundations.

The lion's share of the $55 million in equity came from tax credits. The tax credits included $19 million in low-income housing tax credits (LIHTC), $7 million in historic rehabilitation investment tax credits (ITC), and $28 million in combined LIHTC-ITC resources. Tax-credit assistance was thus crucial for the financing of the infill projects encompassing historic preservation and affordable housing. Other major sources of funds included bank debt, which accounted for $28 million of the total $38 million debt, and HUD HOME and CDBG subsidies, which composed almost all of the $10 million in federal aid.

Financing Infill in New Jersey

The financing situation in New Jersey is similar to the situation nationwide. Experienced developers dealing in established markets served by transit and other amenities and providing largely market-rate residential and nonresidential product have reasonably ready access to largely conventional financing (e.g., much of the Gold Coast development). In contrast, less experienced developers find that financing is more difficult to secure for infill projects in inchoate markets and those facing other challenges (e.g., brownfield sites). Additional financing hurdles confront New Jersey infill proposals involving affordable housing or historic preservation. Like similar projects nationwide, the New Jersey developments address financing challenges through public and other sources of funding.

Several public projects were implemented to foster infill along Camden's waterfront: demolition of vacant industrial buildings; construction of structured and surface-level parking with more than 2,000 spaces; provision of 50 acres of public parks and other recreational facilities (e.g., the New Jersey State Aquarium); road and utility improvements; and construction of a pier that jump-started ferry service to Philadelphia for the first time in 40 years (Corcoran 1995, 12).

Infill housing in Atlantic City's Inlet area, a $65 million project, was supported by $50 million in casino moneys,[2] $4.9 million from HUD, $3.7 million from the Atlantic City Improvement Authority (from casino luxury taxes), $2.6 million in land and other donations from Atlantic City, $1.0 million in a Balanced Housing Grant (BHG) from the New Jersey Department of Community Affairs, $0.6 million from the New Jersey Casino Reinvestment Development Authority (CRDA), and $0.5 million from the New Jersey Housing and Mortgage Finance Agency (Kumar 1993, 21). This partnership helped produce several infill developments, including Harbour Pointe (130 townhouses built at a density of 19.3 units per acre), Harbour Pointe Square (a convenience retail center), and Ocean Terrace (a 109-unit mid-rise apartment building). The housing largely contains market-rate units with some affordable-housing units (e.g., 42 of Harbour Pointe's townhouses are reserved for low-income residents, with some of those units set aside for former residents of the Inlet in order to lessen displacement).

New Jersey infill projects primarily composed of affordable-housing units must tap a variety of government-subsidized financing and other sources of support. For example, Isles (short for "islands of redevelopment")—a nonprofit community development and

[2] Casinos in Atlantic City are required to make public-interest investments. The casino's investment in the Inlet was credited toward the required New Jersey Casino Reinvestment Development Authority (CRDA) investment.

environmental organization active in Trenton, New Jersey, and its environs—uses creative grantmanship to fund its scattered-site rehabilitation projects and some new construction, all for low-income households. Isles has tapped a potpourri of federal housing programs, including HOME, HOPE 3, the low-income housing tax credit (LIHTC), and the historic rehabilitation investment tax credit (ITC). It has also obtained Affordable Housing Program (AHP) funds from the Federal Home Loan Bank (FHLB).

In addition to the federal sources of funding, Isles has used a variety of New Jersey–specific housing subsidies, including Balanced Housing Assistance (BHA). Funded by the New Jersey Realty Transfer Tax, the BHA provides grants and loans on a competitive basis to foster low- and moderate-income (LMI) housing. BHA is always used in conjunction with the LIHTC. Several other state programs support the development of affordable housing. The Urban Home Ownership Recovery Program (UHORP) provides low-cost financing to developers of mixed-income, urban, for-sale homes. The Regional Contribution Agreement (RCA) is a program authorized under the New Jersey Fair Housing Act. Promulgated in response to the *Mount Laurel I*, 67 N.J. 151 (1975), and *Mount Laurel II*, 92 N.J. 158 (1983), decisions, the Fair Housing Act permits municipalities to transfer up to 50 percent of their fair-share obligations to one or more municipalities within the applicable housing region.[3] The sending municipality must transfer a negotiated payment (the RCA) of roughly $20,000 to $30,000 per unit as a minimum contribution. The receiving municipality may use the funds to subsidize new construction or to rehabilitate existing units for occupancy by LMI households. Urban areas have received more than $200 million in RCA payments; Trenton has received $20 million.

The subsidies described above are often combined. For example, Isles's Academy Place rehabilitation project, which provides 40 very low income housing units at a total project cost of $4,815,000, was made possible by layering $3,015,000[4] from the LIHTC and ITC, $1,560,000 from New Jersey's BHA moneys, and $240,000 in AHP funds from the Federal Home Loan Bank of New York. The $4,600,000 Wood Street Isles rehabilitation project layered the LIHTC and ITC, BHA and AHP support, and an Inner City Ventures Fund grant from the National Trust for Historic Preservation. Isles's low-income homeownership rehabilitation project was made possible by aggregating $219,000 from BHA, $109,000 from the AHP, $202,000 from a Trenton RCA, and the remaining $428,000 from the homeowners' down payments and mortgages.

The above examples illustrate just a few of the ways infill is being financed in New Jersey. Table 4.2 lists additional programs that support smart growth–infill in the state. Some of the aids are directly applicable to smart growth–infill projects, for example predevelopment funding for smart growth. Other programs indirectly benefit smart growth–infill projects, for example, funding for brownfields cleanup and various property tax incentives. These other forms of assistance are considered in detail in chapter 3 (property acquisition), chapter 5 (property tax), and elsewhere in this study.

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[3] The region within New Jersey for which the Mount Laurel fair-share system calculates housing need, fair-share responsibilities, and other matters, including RCA transfers.
[4] This equity amount was received from selling the tax credits.

TABLE 4.2
Selected Programs that Support Smart Growth–Infill

Program	Description
Smart–growth predevelopment funding	Loans and guarantees up to $1 million are provided for site preparation costs not related to contamination, including land assemblage, demolition, removal of waste materials, and engineering. Qualifying commercial, industrial, office, or mixed-use projects must be part of a local development plan.
Redevelopment areas	Municipalities may designate publicly or privately owned lands that are abandoned or underperforming as redevelopment areas. This designation provides the municipality with various tools that spur redevelopment, including the condemnation of property, the use of tax exemptions, favorable bond financing, and the creation of revenue allocation districts.
Redevelopment-area bond financing	Municipalities are allowed to issue tax-exempt bonds for projects within a redevelopment area; the bonds are secured by PILOTs and/or special assessments on the property benefiting from the improvements.
Revenue Allocation Districts (RAD)	The creation of a RAD within a redevelopment area provides a municipality with a unique financing alternative for redevelopment. Bonds or notes may be secured by a number of revenue sources, including the property tax increment, incremental revenue from PILOTs, parking taxes, and sales and use taxes retained by the municipality.
Long-term tax exemption	This incentive authorizes municipalities to exempt redevelopment projects from local property tax for a term of up to 35 years. Municipalities may enter into financial agreements with redevelopers, exempting the property from taxation; the property owner agrees to pay an annual service charge for municipal services in lieu of taxes (a PILOT).
Short-term tax exemption	A five-year exemption is available for projects not located in redevelopment areas, but in areas that are deemed to be in need of rehabilitation.
Brownfield development	Significant incentives are provided to developers who remediate and develop contaminated sites. A developer may enter into a redevelopment agreement with the secretary of commerce that allows for recovery of up to 75 percent of the cost of remediation once the redevelopment project has begun to realize the new tax revenues in an amount sufficient to cover the cost of remediation. The developer must not be the party responsible for the contamination but must agree to undertake and complete cleanup of the site to the satisfaction of the New Jersey Department of Environmental Protection.
Technical assistance to brownfields	Provides technical assistance and outreach through the Technical Outreach Services for Communities (TOSC) program. Funded by the U.S. Environmental Protection Agency, TOSC provides technical and outreach services to help communities clean and redevelop properties that have been damaged or undervalued by environmental contamination.

Continued on next page

TABLE 4.2, continued

Program	Description
Brownfields redevelopment	This program offers information on the various incentives for brownfields redevelopment and coordinates projects among appropriate state agencies for the expeditious reuse of the sites.
Environmental Opportunity Zones (EOZ):	Created through a municipal ordinance, EOZs allow municipalities to offer tax abatements for up to 15 years. In exchange, the owner/developer must remediate the property. The municipality receives incremental payments in lieu of taxes based on a premeditation assessment.
New Jersey Urban Site Acquisition Program	This program provides financial assistance to acquire vacant, abandoned properties that are part of a larger comprehensive urban redevelopment effort. The program will identify state and other funding sources for site preparation, construction, and all other aspects of redevelopment.
Economic Development Authority (EDA) bond financing	Bonds are issued to provide long-term loans at attractive rates for real estate acquisitions, equipment, machinery, building construction, and renovations. Working capital and debt refinancing are permitted uses for taxable bonds. Funds are available for manufacturing, public airports, docks, wharves, water, sewer, sold-waste disposal, and many other facilities, including certain assisted-living rental facilities.
New Jobs Investment Tax Credits	Companies that make certain investments in new or expanded facilities that are directly related to the creation of new jobs are eligible for credits against their New Jersey corporation tax liability. Other significant job tax credits are available for expanding, retaining, or relocating new jobs in New Jersey.
Urban Enterprise Zones (UEZ)	The New Jersey Urban Enterprise Zone Program was created to stimulate economic development and job creation in the designated areas. Benefits to qualified businesses include reduced sales tax (3 percent compared with 6 percent outside the UEZ); subsidized unemployment insurance costs; sales tax exemptions; priority financial assistance for labor training; and corporate tax credit for the hiring of certain designated employee groups. Receipts from retail sales are deposited into a Zone Assistance Fund to which zone municipalities may apply for funding for projects in the urban enterprise zones.

Tax Credits and Other Incentives for Green Building

Other potential sources of infill funding, often combined with affordable housing infill projects—such as Bellevue Court in Trenton, which also contains historic preservation elements—include various financial incentives for green building that the State of New Jersey has adopted. Some of these are intertwined with the financial instruments described above. For example, the New Jersey Green Homes Office through its New Jersey Affordable Green (NJAG) Program works with developers building projects in coordination with the state Balance Housing program, state HOME funds, Low Income

Housing Tax Credits (LIHTC), and HMFA Home Express. In particular, a developer can obtain an additional point for green building and/or solar technologies on the 2006 LIHTC Qualifying Allocation Plan. This extra point provides a valuable incentive for affordable housing developers to build to "premium" green standards. The program also offers technical and financial assistance, as well as advocacy and education programs, to encourage the use of green technologies in New Jersey homes.

Among the primary objectives of NJAG are the following:

- Reduce sprawl, reduce the impact on vehicular traffic
- Encourage superior land use that minimizes damage and, where possible, improves environmental quality
- Promote infill development and the use of brownfield sites and urban areas; avoid currently usable agricultural land
- Reduce the dependence on automobiles and encourage mass transit
- Build community and promote security by means of site and building design
- Foster the appreciation of, and connection to, the natural world through land use and building design

The Brownfields program of the Office of Smart Growth, New Jersey Department of Community Affairs, includes green building as a competitive criterion in making awards decisions. In addition to these examples, the Office of Clean Energy, New Jersey Board of Public Utilities, offers among the nation's most generous grants to encourage energy efficiency and the use of renewable energy sources in new and existing building.

ADDING NEW FINANCIAL AID AND MODIFYING EXISTING PROGRAMS TO FINANCE SMART GROWTH–INFILL

Although the private financing community and the public sector and others (e.g., foundations) have made progress in collaborating with one another and fostering financing for smart growth–infill, more can be done. This section considers two new aids that offer tax credits for smart growth–infill and evaluates strategies to make existing financial programs more useful for assisting such development. The discussion focuses on New Jersey, but it is applicable nationwide.

New Jersey Smart Growth Tax Credit

Since the demise of major federal categorical programs for community development, subsidized housing, and other purposes (e.g., urban renewal), government has often turned to tax credits to foster socially desirable investment. Examples include the federal LIHTC to promote production of low-income housing and the federal historic rehabilitation Investment Tax Credit (ITC). The tax credit concept could be extended to smart growth–infill investment, either directly through a targeted smart growth–infill investment credit or indirectly by making the LIHTC and ITC more conducive to smart growth–infill. The direct or indirect tax credits could be offered by the federal and/or state governments. We will discuss a state application of this strategy.

If enacted, the Smart Growth Tax Credit Act (S.274, 2004) would provide tax incentives against the state corporation business tax (section 5 of P.L. 1945, c.162) and the gross income tax for developers and owners who design and build residential and mixed-use developments that meet specific smart-growth and green building criteria. These criteria ensure that participating developments are appropriately located, resource efficient, pedestrian friendly, adequately served by mass transit, and constructed using materials that minimize environmental impact, and that they provide a healthier built environment. The proposed legislation also provides additional incentives for designing and building developments that exceed the required smart-growth and green-building standards (Smart Growth Tax Credit Act, 211th Legislature, S.274). The act was sponsored by Senator John H. Alder (District 6, Camden) and Senator Barbara Buono (District 18, Middlesex) and would be administered by the Department of Community Affairs in consultation with the Department of Environmental Protection.

The details of the proposed legislation are given below. In brief, under the legislation, a smart-growth development must meet specified criteria with respect to *location* (e.g., a "center" designated by the State Planning Commission [see chapter 1]), *transit access* (e.g., the site must be served by bus, train, or ferry), *infrastructure* (e.g., the development must not require a sanitary-line extension of 1,000 feet or more or new streets with more than two traffic lanes), *density* (e.g., a minimum residential density of six units per acre), *subdivision* (e.g., maximum parking standards are set), and other characteristics. If the threshold criteria are met, a varying scale of state tax credits is made available, depending on the development's smart growth–green building performance. The base credit is 4 percent of allowable project costs. Additional credits are extended for mixed use, brownfields location, curtailed parking provision, higher density, enhanced transit access, and so on. For instance, an additional credit of up to 2.4 percent is available for developments with higher residential density (see table 4.3).

Restrictions

Under the proposed legislation, smart-growth buildings and developments may receive tax credits if they

1. are located in Planning Areas 1,2, or 5b as defined by the State Plan, located in centers designated by the State Planning Commission, or located in municipalities or portions of municipalities identified by the New Jersey Office of Smart Growth as being substantially in conformity with the State Plan or smart-growth principles;

2. are served by adequate bus, rail, or ferry transit service;

3. are not located in the Pinelands National Reserve (with some exceptions), in public parkland or within 1,000 feet of any critical habitat site within public parkland, within 300 feet of a wetland, within 100 feet of a critical slope area, within the 100-year floodplain, within 1,000 feet of the mean high-water mark for any saltwater body—unless the site is located on a brownfield site or within a highly urbanized area—nor

in an area designated as a water supply deficit area in the Statewide Water Supply Plan (with some exceptions);

4. do not require a sanitary-line extension of 1,000 feet or greater, with some exceptions;

5. meet the standards for energy efficiency, building materials, wood use, water efficiency, indoor air quality defined by the act.

Schedule of Credits

Under the proposed legislation, a taxpayer may apply for a credit for allowable costs paid or incurred from the construction or rehabilitation of a smart-growth development. The Department of Community Affairs can grant each eligible taxpayer a credit of up to $20 million for the first fiscal year and up to $50 million in the next six fiscal years.

Taxpayers receive credits according to the following schedule:

1. 4.0 percent of allowable costs
2. 0.5 percent, 1.0 percent, 1.5 percent, or 2.0 percent of allowable costs attributable to buildings—but not to other site improvements—qualifying as certified, silver, gold, or platinum status, respectively, under the LEED® Green Building Rating System or the LEED Residential Green Building Rating System
3. 0.5 percent of allowable costs for mixed-use developments
4. 0.5 percent of allowable costs for developments located on brownfield sites
5. 0.1 percent of allowable costs for developments in which less than 10 percent of the land, not including shared open spaces, is devoted to parking areas, garages, and driveways
6. 0.1 percent of allowable costs for developments that secure municipal variances permitting a reduction of at least 50 percent in the number of parking spaces normally required by the local zoning codes and that are built in accordance with such variances
7. Up to 2.4 percent of allowable costs for developments with higher-than-required residential density levels, as shown in table 4.3.

TABLE 4.3
Additional Tax Credit Allowed by Dwelling Units per Residential Acre

Dwelling Units per Residential Acre	Multiplier Value	Additional Credit, as Percentage of Allowable Costs
7–10	.05	0.2%
11–17	.10	0.4%
18–29	.30	1.2%
30–39	.50	2.0%
40 or more	.60	2.4%

8. Up to 1.4 percent of allowable costs for developments with higher-than-required levels of transit service, as measured by the number of cumulative rides available each weekday (table 4.4).

TABLE 4.4
Additional Tax Credit Allowed by Number of Cumulative Rides Available per Weekday

Number of Cumulative Rides Available per Weekday	Multiplier Value	Additional Credit, as Percentage of Allowable Costs
60–124	.05	0.2%
125–249	.10	0.4%
250–499	.15	0.6%
500–999	.20	0.8%
1,000 or more	.35	1.4%

If adopted, the Smart Growth Tax Credit Act would provide a direct tax incentive for smart growth–infill. To the author's knowledge, no other state offers such a powerful financial incentive to reverse course from sprawl. New Jersey can be a leader in that regard, but it can also consider the financing strategies used in other states. One example is the use of a state historic preservation tax credit, a strategy discussed below.

State Tax Credit for Historic Preservation

In addition to the federal historic rehabilitation investment tax credit, about 25 states have enacted investment tax credits for rehabilitating historic properties. Included in the list of states with such programs are Missouri, Colorado, Indiana, Maryland, New Mexico, Rhode Island, Utah, Virginia, West Virginia, and Wisconsin. The specific state provisions vary. The investment tax credit ranges from 10 percent to 50 percent of the total cost of the rehabilitation, and there are variations in other program characteristics, including required investment amounts and property eligibility requirements.

Missouri has one of the most extensive tax credits for historic rehabilitation. To create incentives for historic preservation and rehabilitation activities, the Missouri General Assembly passed Senate Bill 1 in September 1997. Pursuant to this bill, the Historic Preservation Tax Credit Program was put into effect on January 1, 1998. The program allows Missouri taxpayers (except not-for-profit entities) a state tax credit for costs associated with the rehabilitation of certified historic structures. Unlike the federal tax-credit program, the site may be a personal residence as well as an income-producing property. The credit amounts to 25 percent of the total cost of a rehabilitation project; however, the credit applies only to substantial projects that cost the taxpayer more than 50 percent of the taxpayer's basis in the subject property.[5] Furthermore, the tax is applicable only to a rehabilitation project that conforms to the historic rehabilitation standards issued by the secretary of the U.S. Department of the Interior, as determined by the Missouri Department of Natural Resources State Historic Preservation Office (SHPO). Missouri's program is administered by the state's Department of Economic

[5] The taxpayer's basis is the value of the purchased improved property, less depreciation, plus any improvements.

Development (DED) in cooperation with the SHPO. The DED issues the tax credits based upon certification by the SHPO.

The Missouri Historic Preservation Tax Credit (MHPTC) is, in many respects, more generous than the historic tax credits offered by the federal government (table 4.5). In practice, the state and federal tax credits are combined, creating a powerful incentive for rehabilitation of historic structures, especially in the state's urban areas.

TABLE 4.5
Comparison of Federal and Missouri Historic Preservation Tax Credits

Characteristic	Federal Credit	Missouri Credit
Maximum per program	None	None
Annual credit limitations	None	None
Commercial buildings	Qualify	Qualify
Residences	Do not qualify	Qualify
Restoration period	24 months or 60 months	24 months
Holding period	5 years	None
Reduction of basis by amount of credit	Yes	No
Recapture[a]	Yes	No
Carry-back period	1 year	3 years
Carry-forward period	20 years	10 years
Partnership allocations	Pro rata	Pro rata or based on agreement
Transferable	No	Yes
Subject to post-issuance audit	Yes	No
Requires audit of expenses <$500,000	No	Yes

[a]Tax penalty triggered by sale or other event.
Lohman et al. 2000.

As of August 2001, almost $295 million ($294,301,643) of historic rehabilitation had been effected under the auspices of the MHPTC program. A 25 percent state tax credit amounting to about $74 million ($73,614,423) encouraged the MHPTC investment.

Completed MHPTC projects are concentrated in the city of St. Louis and, to a lesser extent, in Kansas City, Lexington, and Jefferson City. Projects outside of these cities are located in 20 other towns, dispersed throughout the state. MHPTC projects are concentrated in areas with higher population densities, a significant minority presence, and lower household incomes. MHPTC recipient areas tend to have an older housing stock, higher vacancy rates, and lower owner occupancy rates than the state of Missouri as a whole. Many MHPTC locations are classified by the Missouri Department of Economic Development as distressed. Credit-inspired historic preservation investment in these areas is thus quite welcome—and it fosters smart growth–infill.

New Jersey should consider a Missouri-type state tax credit for historic preservation. Missouri's program prompted a dramatic increase in investment in St. Louis, Kansas City, and other urban centers. A similar program in New Jersey could prompt infill investment in Newark, Camden, Trenton, and other cities and older suburbs.

Enhancing the Usefulness of Existing Programs for Financing Smart Growth–Infill

As described earlier, the federal low-income housing tax credit (LIHTC) and the federal historic rehabilitation investment tax credit (ITC) have frequently been tapped, in New Jersey and in other states, to aid smart growth–infill investment. Both subsidies can be used more effectively to aid smart growth–infill investment, and strategies to that end are outlined below.

Increasing Assistance for Smart Growth–Infill Investment through the LIHTC

The LIHTC is administered jointly by the Internal Revenue Service (IRS) and state agencies. Each state receives an annual allocation from the IRS equal to an amount per state resident. New Jersey's 2004 LIHTC allocation was $15.2 million compared with $1.2 million for Rhode Island and $39.3 million for Texas. The process for securing tax credits is competitive, and awards are made according to project criteria specified in a Qualified Allocation Plan (QAP).

The state QAPs include federal mandates (e.g., low income occupancy test and general categories of selection criteria) and specific criteria that reflect each state's affordable-housing priorities. The synthesis of the federal and state requirements results in scoring or other selection criteria used in the evaluation of LIHTC project applications. The competition is popularly referred to as a "beauty contest."

Drawing on an Urban Institute study (Gusafson and Walker 2002), we find eight state QAP scoring criteria that may affect LIHTC applications from smart growth–infill projects. The following four criteria may be supportive of smart growth–infill:

1. *Points for rehabilitation.* Thirteen states have set-asides or preferences for rehabilitation, a housing strategy that furthers infill. Many states, however, give an equal number of points or more points to new construction, thus putting rehabilitation at a disadvantage. Therefore, the set-aside for rehabilitation is often less advantageous than might be expected.
2. *Points for historic rehabilitation.* At least eight states give points for historic rehabilitation, in addition to the points granted for rehabilitation in general: Indiana, Louisiana, Oklahoma, Rhode Island, Texas, Vermont, Virginia, and Washington. The historic rehabilitation criterion is directly supportive of infill.
3. *Points for small-scale projects.* States sometimes award points for smaller-scale projects, which should tend to favor infill.
4. *Points for location in challenging areas.* Many states award points for projects located in such challenging locations as targeted community revitalization or improvement areas and difficult development areas. While these locations are not exclusive to infill, they very likely support such development.

In contrast, the following QAP criteria may work, at least indirectly, to the disadvantage of infill applications.

1. *Points for lowest cost per unit.* In an attempt to maximize the LIHTC, many states give additional points to those applications showing the lowest cost per unit. Because costs per unit can be higher in infill developments than in sprawl developments in greenfields, this criterion may negatively affect infill projects in the LIHTC competition. In many states, this variable is one of the threshold criteria. As a result, if project costs are too high, infill applications are immediately disqualified from further consideration.
2. *Considering LIHTC application by geographic area.* Some states bifurcate the LIHTC applications into urban and suburban pools. The urban pool tends to receive more applications, and it, therefore, also tends to have the most competitive "beauty contest." At the same time, the urban locations are often the most promising for furthering infill.
3. *Limitations on fees and overhead.* In addition to considering total cost per unit, states commonly set a maximum allowable percentage of costs for fees and overhead. Unfortunately, infill projects often incur high soft costs because of their smaller scale (overhead is amortized over fewer units) and the need for greater individualization (higher fees and overhead may be charged). Therefore, the limitation on soft costs may have a negative impact on infill applications.
4. *Points for "ready go."* Some states give points for this criterion. Because infill projects are complex (e.g., the need for environmental clearances, the mixing of uses, the tapping of layered subsidies, and so on), they may be less "ready to go" than a greenfields project. As a result, "ready to go" points can negatively affect infill projects in the competitive LIHTC application process.

In short, the QAP criteria may "stack the deck" for or against smart growth–infill projects. States wishing to foster such activity should therefore consider adopting QAP criteria that support smart growth–infill project applications for LIHTC assistance. They should also eliminate, or at least reconsider, QAP criteria that either directly or indirectly discourage smart growth–infill.

States can also be proactive in this regard and award points for or in other ways further the priority of LIHTC applications that foster smart growth–infill development. To illustrate, California offers state low-income housing tax credits that parallel the federal program. As the demand for such credits in California exceeds the supply by a ratio of 3 to 1 (Listokin, Listokin, and Crossney 2004, 4), the state has a formula that awards funding priorities on the basis of several criteria. One criterion awards points for projects that adhere to the state's smart-growth policies. Points are awarded for projects with densities greater than 25 units per acre that are part of a transit-oriented development strategy within a quarter mile of a transit stop. Projects also receive points if they are within a locally designated revitalization area or within a quarter mile of a public park, a grocery store, a library, a medical clinic, a hospital, or a pharmacy. In addition, projects that utilize materials that increase energy efficiencies are awarded bonus points.

Does New Jersey's QAP encouraging or hamper smart growth–infill? The tentative answer is neutral to mixed. The state's QAP is formulated by the New Jersey Housing and Mortgage Finance Agency (NJHMFA). Many New Jersey QAP factors, for example, those that award additional points for such project characteristics as "additional income restrictions" or "increase in low-income compliance period" (from the minimum 30 years), quite likely have little bearing on supporting or hindering smart growth–infill applications in competition with greenfields applications. Some NJHMFA criteria, for example, those that award extra points for projects with property tax abatement, may favor infill projects. Other criteria, however, may have the opposite effect. New Jersey LIHTC applications compete in a separate urban pool, and, as previously discussed, that slotting may work to the disadvantage of infill projects. Cost ceilings in the New Jersey QAP may also have a negative impact.

Isles' experience is illustrative. In 2001, Isles adaptively reused a multistory concrete building in Trenton, donated by Bell Telephone, to create 50 housing units—a model of infill development in an urban center. However, the cost of converting the concrete industrial building to housing units was high ($142,000 per unit). The cost exceeded the NJHMFA cost ceilings for LIHTC developments (from $122,000 to $129,000 per unit for one-, two-, and three-bedroom units, respectively).[6] Isles estimates that suburban greenfields construction at the time (2001) would cost $100,000 to $110,000 per housing unit. Thus, while sensible, the NJHMFA cost ceiling for the LIHTC might penalize infill and favor to less costly sprawl development.

New Jersey, as other states, should evaluate its QAP criteria. At minimum, the criteria should not encourage sprawl over smart growth–infill. Therefore, an evaluation should call into question criteria that are insensitive to potential cost-inflating infill influences, for example, those that segregate LIHTC applications into an urban pool and impose cost ceilings. New Jersey and other states should further consider proactively favoring smart growth–infill in their QAP criteria. For example, the New Jersey QAP could award bonus points to LIHTC applications meeting the smart-growth criteria specified in the proposed Smart Growth Tax Credit Act (S.274).

Enhancing the Usefulness of the Federal Rehabilitation Investment Tax Credits for Smart Growth–Infill

A 10 percent federal investment tax credit (ITC) can be applied to the rehabilitation of nonresidential properties built before 1936. A 20 percent ITC can be applied for the renovation of historic residential or nonresidential properties. Various criteria must be satisfied; for example, the project must entail substantial rehabilitation (described shortly) and must satisfy other construction and financial tests (e.g., the project must retain a specified percentage of outer walls and adhere to limitations on applying tax credits to passive income, such as wages).

The ITC offers a major financial incentive for rehabilitation, especially rehabilitation of historic neighborhoods, for example, a $100,000 historic rehabilitation project would qualify for $20,000 in federal tax credits. The historic rehabilitation ITC has been used

[6] These amounts are the maximum "cost basis" figures from which the tax credit is calculated. State moneys, such as the Balanced Housing Act program, have similar "reasonable cost limit" penalties; a dollar of subsidy is subtracted for each dollar exceeding the reasonable cost limit.

extensively for affordable housing (23 percent of the 325,411 housing units aided by the ITC as of 2003) and mixed-use development (25 percent of production), and, thus, it is quite useful for infill. The Internal Revenue Service has various restrictions that govern use of the ITC (e.g., passive income limitations). For the historic rehabilitation ITC, the property must be designated as a landmark and the National Park Service (NPS) must review the appropriateness of the planned renovation. The Secretary of the Interior Standards are used as a guide for historically appropriate rehabilitation.

The support of rehabilitation, mixed-use, and affordable housing makes the ITC an important tool for financing smart growth–infill projects. The ITC could be modified to further improve its utility as a source of financing for smart growth–infill projects. The following recommendations are offered as examples of what might be done to further this goal.

Allow for Flexibility and a Broader Context in Smart Growth–Infill Situations

The need for flexibility is illustrated by Isles's experience with historic rehabilitation projects. The historic character of the neighborhoods where Isles is working contributes to their distinctiveness and appeal. Isles respects that ambience and tries to protect historic flavor in its rehabilitation work. For example, Isles spent about $15,000 extra for the rehabilitation of a property on West Stockton Street in order to restore the building's distinctive metal mansard roof, stockade fence, and other features. Additionally, preservation offers the potential of drawing upon the historic rehabilitation ITC and in fact, Isles has combined the LIHTC and the historic rehabilitation ITC on some occasions.

Preservation has a price, however. A vinyl replacement window for a Trenton row house costs about $115. A wooden replacement window, required in Trenton's historic districts, costs $400, a difference of nearly $300 per window. In addition, the wooden windows are harder to install than the vinyl, adding nearly $50 more in expense, for a $350 differential. A Trenton row house has about six windows on its façade (the area regulated by historic preservation), so opting for the historically appropriate wooden windows over the vinyl results in $2,100 in additional expenses. Isles wonders if that is money well spent, "as the difference (in windows) may not be apparent from more than a few feet away" (Kasabach 1999). In addition, the wooden windows have a higher long-term maintenance expense for painting.

Windows were also an issue in Isles's Wood Street project. This project involved an adaptive reuse of a former industrial building into apartments and Isles headquarters—another project exemplifying smart growth and infill. The building once housed a prominent Trenton printer, and its age, style, and usage gave it historic character. Isles secured a historic rehabilitation tax credit for the adaptive reuse of Wood Street, yet, with that, came a debate over how the building's windows were to be treated. At first, the State Historic Preservation Office (SHPO) demanded that the original windows be kept, but because the original windows were in poor shape and were not insulated, that demand was rescinded. Next, the SHPO required that any replacement windows be exact replicas of the original windows. Isles argued against the need for and practicality of that request because it would entail the custom crafting of oversized and uninsulated windows. Instead, Isles countered with a proposal for insulated aluminum windows that were half the price of the custom-crafted units. Isles's proposal was at first denied by the SHPO because the aluminum windows were one-eighth of an inch smaller than the original windows. Ultimately, after considerable negotiation, the SHPO accepted the installation of replacement aluminum double-pane, insulated windows.

Isles received a historic rehabilitation tax credit on its Academy Street project that added about $300,000 in equity. However, there were several trade-offs:

1. Isles had hoped to reconfigure the small apartments on the first floor into two, larger, more desirable units. However, the building had large open hallways and a staircase that had to be preserved, thus thwarting the apartment reconfiguration.
2. The building was found to have lead paint on much of its ornamentation (e.g., sills, balusters, and windows). Because these features contributed to the property's historic character, they could not be removed. Instead, Isles had to strip and repaint the ornamentation, an expensive proposition.
3. Because of the building's historic character, utility lines were installed in the rear of the structure instead of the front, further adding to project costs.
4. Keeping historic exterior and interior doors interfered with security.
5. Other preservation work (e.g., repairing tiles) also was expensive.

Isles estimates that the preservation-related outlays amounted to $200,000 to $300,000, about equal to the historic rehabilitation tax credit received (net of the LIHTC). Academy Place is a more desirable place to live because of the historic preservation. Isles acknowledges that and strongly supports attention to historic details on the exterior of the buildings. At the same time, Isles calls for more flexibility in interpreting historic preservation standards on the interior of a building, especially when a project involves housing.

Isles's experience is not unique. This chapter previously described how the adaptive reuse of the Pacific Hotel—a former single-room occupancy (SRO) hotel in Seattle—which used the historic rehabilitation ITC and furthered that city's smart growth–infill goals. Other Seattle developers report confronting greater challenges when conducting this type of activity. The experience of a developer seeking to convert another downtown Seattle hotel (also formerly used as an SRO hotel) to market-rate housing illustrates the challenges encountered. The original interior of the SRO had narrow hallways, reflecting the historical, modest housing amenity of the property. The original apartments were also "bare bones," essentially single rooms off a corridor. To modernize the SRO and to produce the kind of unsubsidized units that are in demand in Seattle's marketplace, the developer proposed altering its interior. The units would be enlarged and new corridors would be built. However, the exterior features of the property would be left intact. The developer sought a historic ITC, claiming that the proposal satisfied the Secretary of the Interior Standards. The NPS rejected the argument. The developer then proposed leaving the interior of the first floor as is, thus preserving its historic character. The interior of the upper floors, however, would be remodeled as described. The exterior of all floors would be left intact. The second proposal was considered by the NPS, and discussions took place between the developer and the agency during the next few months. Ultimately, the developer opted to cease negotiating over the historical appropriateness of the rehabilitation approaches. He dropped the historic rehabilitation ITC application, made the interior changes he wanted, and kept the exterior largely as it had been.

Other Seattle developers described variations of the same theme. A historical school was being renovated to market-rate housing (Thomas 1999). The original corridors were too wide, so it was proposed that they be narrowed and the classrooms remodeled in order to provide market-attractive housing. The school's distinctive original windows were kept intact, though they were made more energy efficient through the installation of interior storm windows. The project was approved for a historic rehabilitation tax credit, but only after months of deliberations.

To enhance the potential of the historic rehabilitation ITC to further smart growth–infill, greater flexibility is needed in the interpretation of historic rehabilitation standards by the NPS, the SHPO, and other administering officials. For example, officials should consider allowing replacement vinyl windows if the replacements further affordability and respect the historic fabric. In the same spirit, greater interior changes should be permitted (e.g., modifying corridor widths, if these are needed for adaptive reuse purposes).

Adjust the Substantial Rehabilitation Test

To qualify for the historic rehabilitation ITC, a building must be "substantially rehabilitated"; that is, there must be a qualified rehabilitation over a 24-month period that exceeds the *greater* of the adjusted basis of the building (building value [excluding land] plus improvements, less depreciation) or $5,000. The problem is that in "hot" infill markets with high property values, the effective test for substantial rehabilitation will often be the building's adjusted basis—which can be quite high. The building may not need an extensive rehabilitation, or it may not offer a large enough economic return to support such a large investment. One potential solution is to lower the required investment for the historic rehabilitation ITC to the rehabilitation investment standard employed in the LIHTC—the greater of $3,000 per unit or 10 percent of the adjusted bases. This change would open more opportunities for using the rehabilitation ITC for infill needing moderate instead of substantial renovation.

Several other amendments would make the rehabilitation ITC more supportive of smart growth–infill. These are summarized in table 4.6.

TABLE 4.6
Strategies to Enhance the Support of the
Historic Rehabilitation Investment Tax Credit for Infill

Strategy/Impact	Detail
Strategy: Eliminate or lessen the basis-reduction rule, which lowers tax benefits dollar-for-dollar according to the amount of credit taken when using the historic rehabilitation tax credit. *Impact:* This change would increase the tax benefit when the rehabilitation ITC is combined with the LIHTC in infill situations.	Section 50(c) requires that when a project benefits from investment tax credits, such as the Section 47 (of the Internal Revenue Code or IRC) historic rehabilitation investment tax credits (ITC), its tax basis for depreciation purposes must be reduced by the amount of the investment credit taken. By contrast, the tax basis of a low-income housing tax credit (LIHTC) project, authorized by Section 42 of the IRC, does not have to be reduced by the amount of the allowable LIHTC. Nonetheless, because the LIHTC is calculated as a percentage of the qualified basis of a property, Section 50(c) has the effect of significantly reducing the amount of equity that otherwise could be made available to a project when the LIHTC is combined with a historic rehabilitation investment tax credit. One solution would keep Section 50(c) intact but amend the LIHTC rules to provide that any basis reduction required by Section 50(c) be ignored for purposes of calculating the LIHTC. This approach would preserve the reduction in depreciation that appears to have been the goal when Congress enacted the basis-reduction rule in 1986, but it would also eliminate the affordable-housing disincentive, which, presumably, Congress did not intend to create. A second reform would eliminate Section 50(c) or reduce the basis reduction to 50 percent as was the case before 1986.
Strategy: Increase the historic rehabilitation investment tax credit in the most difficult to develop and disinvested locations (e.g., socially distressed or high-cost areas) *Impact:* This change would provide greater tax benefits when effecting infill in the inner city, in deteriorated suburbs where development is costly, and in many other locations.	Qualified Census Tract (QCT) and Difficult-to-Develop Area (DDA) designations—concepts borrowed from the low-income housing tax credit program—could be requested to assist historic rehabilitation projects in neighborhoods facing social distress and/or higher-than-usual development costs. This change would provide a "basis boost" for QCT–DDA projects by providing tax credits on 130 percent of a historic rehabilitation project's qualified rehabilitation expenditures.
Strategy: Increase the historic rehabilitation credit on small projects. *Impact:* This change would broaden the usefulness of the rehabilitation ITC to more modest infill projects.	The Section 47 credits create a comparatively shallow subsidy. The shallowness disproportionately affects smaller developments because the potential tax credit from such projects (particularly net of transaction costs) is simply too small to warrant syndication to institutional investors. Meanwhile, the passive-loss rules and other limitations often prevent community businesses and individuals from claiming the credit themselves. The result is a credit that no one can or will take. One proposed solution would be to make Section 47 credits *attributable to smaller developments* freely transferable. The transaction costs associated with syndication are often prohibitively expensive for smaller projects. Several states have had good experiences with assignable or transferable credits. Another proposed solution is to increase the historic investment tax credit to 40 percent for small historic rehabilitation projects (under $2.5 million in total development costs) to ensure that there can be enough equity raised to cover the related transaction costs.

Continued on next page

TABLE 4.6, continued

Strategy/Impact	Detail
Strategy: Ease the rules governing nonprofit deals so that more community-oriented projects move forward. *Impact:* This change would encourage more nonprofit organizations to participate by using the rehabilitation ITC for infill investment.	The tax-exempt use property rules contained in Section 168(h) of the Internal Revenue Code (IRC) severely complicate efforts to use the Section 47 credits in the rehabilitation of properties owned by or leased to schools, churches, or other nonprofits. Properties owned by or leased to state, local, and federal government entities are similarly affected. Several solutions for these problems have been proposed. One proposal is to simply exempt transactions involving Section 47 credits from the tax-exempt use rules. Another proposal is to exempt only the transactions involving government entities while putting all other Section 47 projects on the same footing as LIHTC transactions (i.e., a depreciation but not a credit penalty).
Strategy: Foster secondary-market financing for historic rehabilitation credit projects. *Impact:* An enhanced secondary market for the ITC would expand the liquidity of this aid for infill purposes.	The disposition and recapture rules applicable to Section 47 credit projects require that the original investor in a transaction hold most of its investment throughout the recapture period. There is no similar prohibition on transfers of interest in LIHTC properties. As a result, a secondary market in Section 47 properties is currently impossible. This depresses investor interest and also prevents the pooling of transactions. Pooling, if permitted, could be another solution to the current problems faced by small developments. Making the ITC transferable to a new investor, in a manner similar to the way the LIHTC can be resold, would facilitate a secondary market for combination LIHTC/ITC deals. This in turn would make combination deals more attractive to investors and increase the availability of investment capital for the adaptive reuse of historic resources as affordable housing.
Strategy: Adjust the substantial rehabilitation test by allowing the historic rehabilitation tax credit to be used with less extensive rehabilitation. *Impact:* This change would broaden the application of the ITC to more modest infill projects and for infill projects developed in areas with high real estate values.	Current law creates a mismatch between the substantial rehabilitation requirements of Section 42 and Section 47. Both the ITC and the LIHTC require that a building be substantially rehabilitated in order to qualify for the respective credits. Under Section 47, a building is deemed to have been substantially rehabilitated if, during a 24-month period selected by the taxpayer (which must end during the year in which the rehabilitation will be placed in service), qualified rehabilitation expenditures exceed the greater of the adjusted basis of the building and its structural components or $5,000. The basis of the land is not taken into consideration. Under Section 42, however, an owner need only expend the greater of $3,000 per unit or 10 percent of the adjusted basis in order to be eligible for the rehabilitation component of the LIHTC. This mismatch has the effect of precluding a category of LIHTC projects (that is, those with "lighter" rehabilitation programs) from also benefiting from the ITC. One solution is to replace the ITC substantial rehabilitation test with the LIHTC standard. The current requirement that rehabilitation expenditures exceed 100 percent of the adjusted basis has a particularly harsh result in the case of buildings in areas with high real estate values. When owners acquire such a building, their basis in the building and its structural parts may be very high (depending somewhat on the allocation of value between land and building). If a building is in relatively good condition, the owner is precluded from using Section 47 credits because it is unlikely that the rehabilitation expenditures will exceed the basis. This requirement encourages such owners to disinvest in their buildings and to wait until a gut rehabilitation is in order, rather than to continually perform more modest rehabilitation projects.

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Chapter 5
THE PROPERTY TAX AND INFILL

INTRODUCTION

This chapter examines the relationship between the property tax and smart growth, especially infill. It begins by presenting background on the property tax, including an historical overview of the levy, a review of the contemporary varying dependence on the property tax across states, and identification of the differing ensuing property tax rates in varying locations. This background establishes the basis for the challenge that property taxes pose to smart growth. *Smart growth-furthering development, such as infill in cities and older suburbs, may be discouraged because it is precisely such locations that have a higher property tax burden.* Consequently, new construction or rehabilitation that furthers smart growth will face higher property taxes than sprawl development in greenfields in exurbia—thereby discouraging smart growth–infill and prompting the sprawl model of growth. The chapter concludes with property tax strategies to foster smart growth. By necessitating costly infrastructure, sprawl ultimately raises the taxes in its host communities; however, this may be a lagged response and even with a tax increase, the sprawl communities may still have a lower property tax rate than the levy in cities and older suburbs where infill will cluster.

INTRODUCTION TO THE PROPERTY TAX: SOURCES OF LOCAL REVENUE

Local governments in the United States are defined by the United States Bureau of the Census as encompassing the entire public sector, with the exception of the state and federal levels. Thus, local governments include counties, municipalities, townships, school districts, and special districts. Local governments receive the wherewithal to finance their operations primarily from general revenues.[1] The basis for this income encompasses a mosaic of both extralocal and local sources. Extralocal sources pertain to intergovernmental transfers from the state and federal governments, whereas local sources comprise a variety of taxes and charges.

Intergovernmental Revenues

Intergovernmental revenues include income received by local jurisdictions from state and federal governments for general financial support or for use in performing specific functions. Direct federal and state grants to local governments come in the form of aid for selected

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This chapter by David Listokin.

[1] The Census recognizes four major types of local government revenue sources: utility, insurance trust, liquor, and general (all revenues except those from the utility, insurance, and liquor categories). Most analyses on public finance, including this study, focus on *general revenues* because the other sources are not major contributors to a local government's ability to provide general public services. Utility revenue—the receipts from sales of water, electric, transit, and gas services—is often a large part of a municipality's gross revenues, but an insignificant portion of net revenues. Furthermore, utility charges typically reflect the unit cost of utility operations and do not provide significant local revenue outside the general fund. Insurance trust revenue, which comes from contributions from both employers and earnings on assets, can usually only be used to increase the insurance trust fund. Therefore, this type of revenue is also excluded from the discussion. Finally, liquor store revenues (in jurisdictions that operate public liquor stores) provide such a small proportion of local revenues that they too have been excluded.

projects of joint interest (e.g., waste treatment facilities and pollution control), assistance for vital services such as education and housing, and unconditional or general revenue grants.

State government transfers are by far the more important source of intergovernmental transfers for local governments. They consist of two basic types: (1) grants (e.g., a per student stipend), and (2) state-levied, locally shared taxes (e.g., redistribution of the state sales tax). As with federal government grants, state grants are also generally for public works, manpower assistance, redevelopment, and education. They are usually for specific activities of joint state–local interest (e.g., economic development).

Own-Source Revenues

Local general revenues not derived from state and federal transfers fall into the own-source group, which, in turn, comprises three primary types of taxes—property tax, sales tax, and income tax, of which, the property tax is the most significant—and charges and miscellaneous income.

Property Taxes

The property tax is a levy on wealth held in the form of property. Property is divided into two main categories—real and personal. Real property consists of land and the improvements on it, including structures. All other property is considered personal property. Personal property includes both tangible (e.g., machinery, equipment, inventory, furniture, motor vehicles, and so on) and intangible (e.g., stocks and bonds) items. Legally, the property tax base in a particular state may include all or some of these property categories. New Jersey, for example, does not tax automobiles as personal property, while Connecticut does. Practically, however, the tax base is almost always composed primarily of real property.

Sales, Income, and Other Taxes

While not as significant as the property category, local governments also turn to numerous other taxes. These may include a sales tax, income tax on the earnings of individuals or corporations, and myriad other taxes (e.g., per capita, occupation or business privilege, and real estate transfer taxes).

Charges and Miscellaneous Revenues

This is the final category of own-source revenues and consists of numerous individual levies. User charges are received for the performance of a service or provision of a product. Examples include municipal court fees, charges for sewage disposal and medical services, and fees for school lunches and extracurricular activities and recreational services, such as golf course or tennis court use. Miscellaneous revenues come from special assessments, sales of property, interest earned on idle cash balances, and fines and forfeitures, and so on.

In short, local governments rely on a wide range of income to fund their expenditures. Over time there has been a change in the dependence on these different sources, an evolution described below.

EVOLUTION OF AND INFLUENCE ON LOCAL GENERAL REVENUE SOURCES

Mirroring the expansion of local services and inflationary forces, local governmental general revenues have increased dramatically over time (table 5.1). In 1950, these amounted to $14 billion. By 2002, they amounted to almost $1 trillion (not adjusting for inflation; see table 5.1 for details).

Accompanying these significant increases in the financial scale of the local public sector have been dramatic shifts in the dependence on the different revenue sources described above. One change has been the rise and fall of intergovernmentalism. In 1950, of the total $14 billion in local general revenues, $4.4 billion, or 32 percent, came from state and federal government transfers, with the remaining $9.6 billion funded from own sources. Over time, the state and federal government largesse increased. By 1980, with total local general revenues at $232 billion, $102 billion—or just shy of 45 percent—came from intergovernmental transfers, with $130 billion, or 56 percent, funded locally. (See tables 5.1 and 5.2.)

This, however, was the high point of intergovernmentalism. With the advent of the Reagan years, many federal programs were scaled back or eliminated; in addition, many states—themselves the targets of federal cutbacks—reduced their support of local governments. The net result was considerably lower outside support to municipalities, counties, and school districts (tables 5.1 and 5.2). By 1990, intergovernmental aid dropped to 37 percent of total local general government revenues, from the 44 percent ten years earlier. This figure rose some over time but never reached the high water mark of 1990. Thus, by 2002, of the total $996 billion in local general revenues, intergovernmental support amounted to $398 billion, or 40 percent, with own-source revenue at $597 billion, or 60 percent of the total. In short, over time and to a modulating degree, the responsibility for paying for local services was being increasingly borne by local taxpayers in the form of own-source revenues.

As noted earlier, own-source income is comprised of numerous components, and over the past five decades there were shifts in emphasis within this group. In 1950, of the total own-source income category (then comprising 68 percent of total general revenues), taxes dominated (amounting to 57 percent of total general revenues), with charges and miscellaneous income a distant second contributor (adding 11 percent to total general revenues). Furthermore, within the tax category, the property tax was preeminent, contributing by itself 50 percent of total general revenues and 88 percent of the tax category alone.

Over time there have been two noticeable changes (tables 5.1 and 5.2). First, spurred by taxpayer revolts, tax limitations (i.e., California’s Proposition 2-1/2), and changes in perspective on how to pay for services—from everyone paying a share to only users shouldering the burden—there has been growing reliance on charges and miscellaneous income as opposed to taxes. Whereas in 1950 this revenue group (charges and miscellaneous) amounted to 11 percent of total local general revenues and 16 percent of own-source income, by 1980 charges and miscellaneous income comprised 19 percent of total local general revenues and 33 percent of own-source funds. The growing reliance on charges and miscellaneous levies has continued to 2002, where it now raised about one-quarter (23 percent) of all local general revenues and contributed almost four-tenths of all own-source monies.

TABLE 5.1
Local General Revenue, by Source
United States Total, 1950-2002 (in $ billions)

Year	Total	Intergovern-mental	OWN-SOURCE Total Own-Source	TAXES Total	Property	Individual Income	Sales, Other Income	Other	Charges and Miscellaneous
1950	$ 14.014	$ 4.428	$ 9.586	$ 7.984	$ 7.042	$ 0.064	$ 0.484	$ 0.394	$ 1.602
1955	21.092	6.355	14.737	11.886	10.323	0.143	0.779	0.641	2.851
1960	33.027	10.114	22.912	18.081	15.798	0.254	1.339	0.690	4.831
1965	47.528	15.165	32.362	25.116	21.817	0.433	2.059	0.807	7.245
1970	80.916	29.525	51.392	38.833	32.963	1.630	3.068	1.172	12.558
1975	146.307	61.954	84.353	61.310	50.040	2.635	6.468	2.167	23.043
1980	232.452	102.425	130.027	86.387	65.607	4.990	12.072	3.718	43.640
1990	512.322	190.723	321.599	201.130	149.765	9.563	30.815	10.985	120.469
1992	573,255	215,987	357,268	227,099	171,723	10,225	25,477	19,675	130,169
1994	639,242	242,027	397,215	252,207	188,754	11,682	28,661	23,111	145,008
1996	709,216	270,480	438,736	270,602	199,467	13,296	32,403	25,436	168,135
1998	794,250	306,270	487,980	300,912	219,492	15,515	36,804	29,101	187,068
2000	888,865	349,894	538,971	332,696	238,182	17,088	44,188	33,238	206,275
2001	955,428	375,977	579,451	354,439	253,259	18,254	47,719	35,208	255,011
2002	995,856	398,497	597,359	369,730	269,419	17,162	46,350	36,800	227,629

Sources:
1950-1990 U.S. Department of Commerce, Bureau of the Census, Historical Statistics of the United States, Table Series Y 796-816; Historical Statistics on Governmental Finances and Employment, Census of Governments, various years; Government Finances in [year]. Information compiled by the Advisory Commission on Intergovernmental Relations.
1992-2002 www.census.gov - select government/ under finance select State & Local Government finances http://www.census.gov/govs/www/estimate.html.

TABLE 5.2
Local General Revenue, by Source
United States Total, 1950-2002 (in percentages)

Year	Total	Intergovern-mental	OWN-SOURCE Total Own-Source	TAXES Total	Property	Individual Income	Sales, Other Income	Other	Charges and Miscellaneous
1950	100.0%	31.6%	68.4%	57.0%	50.2%	0.5%	3.5%	2.8%	11%
1955	100.0%	30.1%	69.9%	56.4%	48.9%	0.7%	3.7%	3.0%	14%
1960	100.0%	30.6%	69.4%	54.7%	47.8%	0.8%	4.1%	2.1%	15%
1965	100.0%	31.9%	68.1%	52.8%	45.9%	0.9%	4.3%	1.7%	15%
1970	100.0%	36.5%	63.5%	48.0%	40.7%	2.0%	3.8%	1.4%	16%
1975	100.0%	42.3%	57.7%	41.9%	34.2%	1.8%	4.4%	1.5%	16%
1980	100.0%	44.1%	55.9%	37.2%	28.2%	2.1%	5.2%	1.6%	19%
1990	100.0%	37.2%	62.8%	39.3%	29.2%	1.9%	6.0%	2.1%	24%
1992	100.0%	37.7%	62.3%	39.6%	30.0%	1.8%	4.4%	3.4%	23%
1994	100.0%	37.9%	62.1%	39.5%	29.5%	1.8%	4.5%	3.6%	23%
1996	100.0%	38.1%	61.9%	38.2%	28.1%	1.9%	4.6%	3.6%	24%
1998	100.0%	38.6%	61.4%	37.9%	27.6%	2.0%	4.6%	3.7%	24%
2000	100.0%	39.4%	60.6%	37.4%	26.8%	1.9%	5.0%	3.7%	23%
2001	100.0%	39.4%	60.6%	37.1%	26.5%	1.9%	5.0%	3.7%	27%
2002	100.0%	40.0%	60.0%	37.1%	27.1%	1.7%	4.7%	3.7%	23%

Sources:
1950-1990 U.S. Department of Commerce, Bureau of the Census, Historical Statistics of the United States, Table Series Y 796-816; Historical Statistics on Governmental Finances and Employment, Census of Governments, various years; Government Finances in [year]. Information compiled by the Advisory Commission on Intergovernmental Relations.
1992-2002 www.census.gov - select government/ under finance select State & Local Government finances http://www.census.gov/govs/www/estimate.html.

Another change is that within the tax group, the preeminent reliance on the property tax has lessened. In 1950, the property tax amounted to 57 percent of total local general revenues, 73 percent of own-source revenues, and 88 percent of tax income. By 1970, its contribution across these three sectors dropped to 41 percent of all local general revenues, 64 percent of own-source revenues, and 85 percent of tax revenues. By 2002, the property tax amounted to 37 percent of all local general revenues, 45 percent of own-source revenues, and 73 percent of taxes (table 5.2).

These changes reflected some of the forces described earlier. Governments tended more and more to charge for services, and where taxes were resorted to, they were limited by either citizen sentiment or by statutory limitations to lessen the burden on the property tax. Yet, while recognizing these influences and the historical shifts that have occurred, the preeminent significance of the property tax remains. It is by far the single most important source of income for local government. It generates almost half of every dollar of own-source general revenues and an even higher share, nearly three-quarters, of tax income. The importance of the property tax is considered again shortly.

STATE AND LOCAL GENERAL REVENUE PROFILES

Thus far, the analysis has examined historical shifts and forces affecting local general revenue sources looking at the nation as a whole. Many of these changes and influences, such as reduced intergovernmental aid, affect local governments throughout the United States. It is important to realize, however, that within the national profile there are state and regional variations (table 5.3).

Of total local general revenues in the nation as of 2002, 40 percent, on average, were derived from state and federal aid. In Arkansas, New Mexico, and Vermont, however, intergovernmental support amounted to almost 60 percent of total local general revenues, while in Hawaii and Colorado, it was about 25 percent. Similarly, while nationwide the property tax contributed almost 30 cents of every local dollar of local general revenues, in Arkansas, ad valorem income amounted to 9 cents, while in Connecticut it was 56 cents.

The following are states with a relatively a higher level of dependence on the property tax rate as of 2002:

State	Property Tax as a Percentage of Local General Revenues (2002)
1. Connecticut	56%
2. Rhode Island	54%
3. Maine	53%
4. New Jersey	51%
5. New Hampshire	49%
6. Massachusetts	42%

TABLE 5.3
Local Government Finances by State, 2001—2002

	General Revenue (in $ billions)	General Revenue (%)	Intergovern-mental Revenue (%)	Own Source Revenue (%)	Taxes	Property	Other Taxes	Charges and Miscellaneous
United States	995,856	100.0%	40.0%	60.0%	37.1%	27.1%	10.1%	22.9%
Alabama	12,486	100.0%	37.8%	62.2%	25.7%	10.2%	15.5%	36.5%
Alaska	2,678	100.0%	42.0%	58.0%	36.6%	29.1%	7.5%	21.4%
Arizona	16,455	100.0%	44.1%	55.9%	36.1%	23.9%	12.3%	19.8%
Arkansas	5,690	100.0%	55.9%	44.1%	21.7%	9.1%	12.6%	22.4%
California	159,820	100.0%	49.5%	50.5%	26.7%	17.7%	9.0%	23.8%
Colorado	16,154	100.0%	27.2%	72.8%	43.2%	25.8%	17.4%	29.6%
Connecticut	10,679	100.0%	33.0%	67.0%	57.0%	56.1%	0.9%	9.9%
Delaware	1,889	100.0%	50.8%	49.2%	27.2%	21.2%	6.0%	22.0%
District of Columbia	6,922	100.0%	41.0%	59.0%	46.6%	11.6%	35.0%	12.3%
Florida	54,956	100.0%	31.1%	68.9%	35.5%	27.9%	7.6%	33.4%
Georgia	26,908	100.0%	35.0%	65.0%	38.2%	24.5%	13.8%	26.8%
Hawaii	1,543	100.0%	21.8%	78.2%	53.1%	39.9%	13.2%	25.1%
Idaho	3,699	100.0%	41.6%	58.4%	27.6%	25.9%	1.7%	30.8%
Illinois	42,484	100.0%	35.3%	64.7%	44.9%	37.2%	7.7%	19.7%
Indiana	18,539	100.0%	34.7%	65.3%	36.6%	32.2%	4.4%	28.6%
Iowa	9,118	100.0%	37.9%	62.1%	36.5%	31.6%	4.9%	25.7%
Kansas	8,469	100.0%	36.8%	63.2%	37.4%	29.2%	8.2%	25.8%
Kentucky	8,732	100.0%	41.3%	58.7%	32.1%	17.6%	14.5%	26.6%
Louisiana	12,648	100.0%	37.1%	62.9%	38.1%	15.1%	23.1%	24.7%
Maine	3,531	100.0%	31.9%	68.1%	54.2%	52.8%	1.4%	13.9%
Maryland	17,657	100.0%	32.4%	67.6%	51.3%	29.1%	22.2%	16.3%
Massachusetts	20,913	100.0%	43.7%	56.3%	43.4%	41.7%	1.7%	12.9%
Michigan	34,134	100.0%	53.1%	46.9%	25.7%	23.2%	2.6%	21.2%
Minnesota	19,724	100.0%	46.1%	53.9%	26.5%	24.9%	1.6%	27.3%
Mississippi	7,394	100.0%	43.8%	56.2%	24.3%	22.3%	2.0%	32.0%
Missouri	15,183	100.0%	34.8%	65.2%	42.1%	25.4%	16.7%	23.1%
Montana	2,219	100.0%	44.2%	55.8%	31.2%	30.2%	1.0%	24.6%
Nebraska	5,392	100.0%	31.7%	68.3%	43.1%	32.3%	10.8%	25.2%
Nevada	7,998	100.0%	38.0%	62.0%	31.1%	19.9%	11.2%	30.9%
New Hampshire	3,441	100.0%	38.7%	61.3%	49.5%	48.5%	1.0%	11.8%
New Jersey	31,721	100.0%	33.5%	66.5%	51.4%	50.6%	0.8%	15.1%
New Mexico	5,163	100.0%	58.9%	41.1%	24.2%	13.6%	10.6%	16.9%
New York	105,032	100.0%	38.9%	61.1%	43.4%	25.5%	17.9%	17.7%
North Carolina	24,592	100.0%	42.4%	57.6%	28.6%	22.0%	6.6%	28.9%
North Dakota	1,683	100.0%	39.8%	60.2%	36.3%	31.6%	4.8%	23.8%
Ohio	40,285	100.0%	40.1%	59.9%	39.8%	26.4%	13.4%	20.1%
Oklahoma	8,455	100.0%	40.8%	59.2%	32.3%	17.5%	14.7%	26.9%
Oregon	12,118	100.0%	45.6%	54.4%	31.7%	25.7%	6.0%	22.7%
Pennsylvania	38,501	100.0%	39.9%	60.1%	40.2%	28.2%	12.0%	19.8%
Rhode Island	2,707	100.0%	35.2%	64.8%	55.2%	54.0%	1.2%	9.6%
South Carolina	10,911	100.0%	37.1%	62.9%	33.6%	28.3%	5.3%	29.3%
South Dakota	1,812	100.0%	33.2%	66.8%	47.7%	36.9%	10.9%	19.1%
Tennessee	14,333	100.0%	33.2%	66.8%	36.1%	24.1%	12.0%	30.7%
Texas	64,879	100.0%	30.0%	70.0%	46.7%	37.8%	8.9%	23.3%
Utah	6,017	100.0%	41.1%	58.9%	34.9%	23.6%	11.3%	23.9%
Vermont	1,511	100.0%	58.4%	41.6%	29.6%	28.7%	0.9%	12.0%
Virginia	21,735	100.0%	38.0%	62.0%	43.0%	30.8%	12.2%	19.0%
Washington	21,262	100.0%	39.4%	60.6%	32.4%	20.4%	12.0%	28.2%
West Virginia	3,783	100.0%	48.2%	51.8%	28.8%	23.7%	5.1%	23.0%
Wisconsin	19,507	100.0%	47.4%	52.6%	34.8%	32.7%	2.2%	17.7%
Wyoming	2,394	100.0%	39.4%	60.6%	30.2%	22.9%	7.3%	30.3%

In contrast, are the following states with a low level of draw on the property tax as of 2002:

State	Property Tax as a Percentage of Local General Revenues (2002)
1. Arkansas	9%
2. Alabama	10%
3. New Mexico	14%
4. Louisiana	15%
5. Kentucky	18%
6. California	18%

Evident from the above are regional variations concerning reliance on the property tax—generally higher in the Northeast, and lower in the South and the West.

THE PROPERTY TAX RATE

The property tax rate of a given jurisdiction is derived by dividing the dollars raised from the property tax by the jurisdiction's total property valuation. The dollars raised from the property tax is equal to total local government spending, less the sum of all other non-property sources of local revenue, namely, the aggregate of intergovernmental aid, local non-property taxes, and charges and miscellaneous income.

Local government spending—where the property tax derivation begins—is affected by many factors, such as governmental priorities (e.g., whether to spend on parks versus education), local needs, expected services by citizens, the cost of labor and materials, and the availability of local resources. The confluence of all of these factors leads to a year-by-year decision by local government as to its level of spending; that outlay is often expressed on a per capita and per pupil basis. In 2000, the average local government spending in the United States amounted to about $1,300 per capita and $6,700 per pupil (table 5.4).

Local government spending varies tremendously by state. Since educational costs dominate local outlay in many jurisdictions, it is instructive to consider the variation in the local government outlay per pupil. As against the national average outlay of $6,700 per pupil in 2000, per student spending is far higher in New York ($9,273), New Jersey ($8,678), Connecticut ($8,154), and Massachusetts ($7,718). In contrast are states spending far less per pupil, such as Utah ($4,746), Mississippi ($5,044), Louisiana ($5,144), and Kentucky ($5,345).

Although there are exceptions, in general, northeastern states tend to spend more per pupil than their southern counterparts. Similarly, northeastern and western states generally spend more per capita for non-educational purposes. For instance, as against a per capita outlay for non-educational purposes of $617 in West Virginia and $652 in Arkansas, New Jersey spent about double those amounts ($1,301), and New York ($2,057) and California ($1,749) expended about triple the per capita outlays of West Virginia and Arkansas.

TABLE 5.4
Local Governmental Spending in the United States, 2000

	Per Person Cost	Non-School Spending Per Worker	Educational Spending (K-12) Per Pupil
Alabama	$ 1,089	$ 374	$ 5,924
Alaska	1,984	703	7,708
Arizona	1,399	483	5,172
Arkansas	652	226	5,157
California	1,749	604	6,139
Colorado	1,475	535	6,445
Connecticut	1,100	392	8,154
Delaware	657	237	6,991
Florida	1,494	516	6,057
Georgia	1,075	381	6,629
Hawaii	1,003	354	NA
Idaho	973	340	5,199
Illinois	1,484	523	6,897
Indiana	1,039	368	6,436
Iowa	1,198	432	6,552
Kansas	1,257	450	5,823
Kentucky	854	297	5,345
Louisiana	1,094	373	5,114
Maine	841	298	7,032
Maryland	1,220	424	6,555
Massachusetts	1,045	377	7,710
Michigan	1,460	512	7,657
Minnesota	1,490	543	7,342
Mississippi	1,082	366	5,044
Missouri	976	348	6,123
Montana	813	287	5,865
Nebraska	1,064	388	6,119
Nevada	1,684	597	6,292
New Hampshire	793	283	6,440
New Jersey	1,301	451	8,678
New Mexico	1,095	374	5,542
New York	2,057	718	9,273
North Carolina	1,145	408	6,227
North Dakota	1,150	418	5,990
Ohio	1,293	458	6,717
Oklahoma	866	301	5,683
Oregon	1,561	556	6,797
Pennsylvania	1,157	405	7,311
Rhode Island	743	258	6,761
South Carolina	937	327	6,151
South Dakota	860	310	5,648
Tennessee	1,059	374	5,493
Texas	1,110	386	6,479
Utah	975	344	4,746
Vermont	576	208	7,711
Virginia	1,065	379	7,038
Washington	1,404	496	6,658
West Virginia	617	207	7,060
Wisconsin	1,449	520	7,425
Wyoming	1,679	601	7,668
U. S. Overall	1,332	470	6,676

NA = Not Available

Total local government spending, less all non-property sources of revenue, leaves the amount to be raised from the property tax. For example, if a local government spends $5 million and receives $1 million in intergovernmental revenue, $1 million in non-property taxes, and $1 million in charges and miscellaneous income, then it would have to raise $2 million from the property tax. If the example community had a total tax base of $100 million, then the property tax rate is $2.00 per $100 of valuation. This rate may be expressed alternatively as $20 per $1,000 of valuation, or twenty mills, or .0200, or 2 percent. We shall use the percentage nomenclature, as it is readily understood. In the example community, a house valued on the open market at $100,000 would, on average, be obligated to pay $2,000 yearly in property taxes.

If all communities assessed properties for taxation purposes at 100 percent of their market value, then a property tax rate of 2 percent in one community would be the same as a 2 percent rate in another jurisdiction. In reality, however, a local government may value property for tax purposes at a rate less than 100 percent, and that percentage (or assessment, or equalization ratio) may differ widely between one government and its neighbors. The $100,000 home cited above might be assessed at only $50,000 in one community if it had a 50 percent assessment ratio and $100,000 in another jurisdiction with a 100 percent assessment ratio.

Because of the different assessment ratios, the only meaningful way to express, and especially to compare, a property tax rate with respect to its relative burden is in its equalized or effective form. The effective property tax rate (EPTR) is equal to the dollars raised by a local government from the property tax divided by that jurisdiction's total real market (or equalized) property value. Expressed another way, the EPTR is equal to the nominal or posted property tax rate multiplied by the equalization (or assessment) ratio. For instance, say the example community described earlier had a 50 percent assessment ratio. In that case, its $100 million of assessed valuation would actually have a market value of $200 million. Its EPTR is therefore 1 percent ($1 million divided by $200 million) instead of the 2 percent nominal rate cited earlier. The same result is achieved by multiplying the 2 percent nominal rate in the example community by its 50 percent assessment ratio.

Jurisdictions with a higher EPTR have a more burdensome property tax obligation than their counterparts with a lower EPTR. Unlike the nominal tax rate, which, because of variations in local assessment ratios, is not very meaningful onto itself and leads to "apples versus oranges" comparisons, the EPTR allows for a meaningful "apples to apples" comparison.

Effective Property Tax Rates in the United States

The Public Use Microdata Sample (PUMS) (or "long form") from the decennia census contains information on the amount of annual property taxes paid per housing unit as well as the estimated value of the housing unit. Dividing the former by the latter yields the estimated EPTR.[2] This study analyzed the 5 percent sample PUMS for the 2000 census, and derived the EPTR in the manner described above for every state (table 5.5). For the United States as a whole, the average EPTR is $1.23 per $100 of market value or 1.23 percent. The EPTR differs markedly by location, however.

[2] We say estimated because both the housing unit value and the annual property taxes may not be accurately specified by the householder responding to the PUMS long form questionnaire.

TABLE 5.5
Effective Property Tax Rates (EPTR) in the United States and Illustrative Annual Property Taxes on Single-Family Detached (SFD) Homes (2000)

	EPTR			Annual Property Taxes (SFD)			
		National		SFD	Annual Property Tax	National	
State	State	Average	Difference	Value [a]	State	Average	Difference
Alabama	0.47	1.23	-0.76	$160,050	$746	$1,961	-$1,215
Alaska	1.37	1.23	0.14	$181,574	$2,483	$2,225	$259
Arizona	0.88	1.23	-0.34	$194,999	$1,719	$2,389	-$670
Arkansas	0.89	1.23	-0.34	$131,918	$1,170	$1,616	-$447
California	0.86	1.23	-0.37	$296,141	$2,546	$3,628	-$1,082
Colorado	0.73	1.23	-0.49	$274,150	$2,011	$3,359	-$1,348
Connecticut	1.79	1.23	0.56	$313,101	$5,590	$3,836	$1,754
Delaware	0.76	1.23	-0.46	$197,147	$1,504	$2,415	-$911
Florida	1.17	1.23	-0.06	$183,689	$2,147	$2,250	-$103
Georgia	0.93	1.23	-0.30	$180,195	$1,673	$2,208	-$535
Hawaii	0.37	1.23	-0.86	$275,692	$1,020	$3,378	-$2,358
Idaho	1.05	1.23	-0.18	$170,709	$1,785	$2,091	-$306
Illinois	1.70	1.23	0.47	$243,239	$4,123	$2,980	$1,143
Indiana	1.06	1.23	-0.17	$174,837	$1,845	$2,142	-$297
Iowa	1.40	1.23	0.18	$186,245	$2,615	$2,282	$333
Kansas	1.34	1.23	0.11	$179,395	$2,398	$2,198	$201
Kentucky	0.82	1.23	-0.40	$148,032	$1,221	$1,814	-$593
Louisiana	0.43	1.23	-0.80	$159,159	$680	$1,950	-$1,270
Maine	1.48	1.23	0.26	$161,257	$2,388	$1,976	$412
Maryland	1.32	1.23	0.09	$256,035	$3,375	$3,137	$238
Massachusetts	1.25	1.23	0.02	$303,166	$3,787	$3,714	$73
Michigan	1.44	1.23	0.21	$224,748	$3,233	$2,753	$480
Minnesota	1.18	1.23	-0.04	$211,366	$2,498	$2,590	-$91
Mississippi	0.81	1.23	-0.41	$131,018	$1,062	$1,605	-$543
Missouri	1.04	1.23	-0.19	$172,014	$1,789	$2,107	-$319
Montana	1.31	1.23	0.09	$193,972	$2,547	$2,376	$171
Nebraska	1.82	1.23	0.60	$178,475	$3,254	$2,187	$1,068
Nevada	0.88	1.23	-0.34	$190,625	$1,680	$2,335	-$655
New Hampshire	2.26	1.23	1.04	$213,152	$4,818	$2,611	$2,206
New Jersey	2.38	1.23	1.16	$311,047	$7,406	$3,811	$3,595
New Mexico	0.77	1.23	-0.45	$182,555	$1,407	$2,237	-$830
New York	2.09	1.23	0.87	$225,802	$4,730	$2,766	$1,963
North Carolina	0.91	1.23	-0.32	$181,696	$1,645	$2,226	-$581
North Dakota	1.87	1.23	0.64	$156,176	$2,919	$1,913	$1,005
Ohio	1.30	1.23	0.07	$203,648	$2,643	$2,495	$148
Oklahoma	0.85	1.23	-0.38	$143,011	$1,215	$1,752	-$537
Oregon	1.14	1.23	-0.09	$225,519	$2,561	$2,763	-$202
Pennsylvania	1.76	1.23	0.53	$207,590	$3,648	$2,543	$1,104
Rhode Island	1.85	1.23	0.62	$218,259	$4,029	$2,674	$1,355
South Carolina	0.72	1.23	-0.50	$178,450	$1,288	$2,186	-$899
South Dakota	1.97	1.23	0.75	$157,819	$3,112	$1,933	$1,179
Tennessee	0.86	1.23	-0.37	$165,065	$1,412	$2,022	-$610
Texas	1.74	1.23	0.52	$166,003	$2,891	$2,034	$858
Utah	0.71	1.23	-0.52	$225,674	$1,599	$2,765	-$1,166
Vermont	1.98	1.23	0.76	$184,101	$3,646	$2,255	$1,391
Virginia	0.96	1.23	-0.27	$209,079	$2,006	$2,561	-$555
Washington	1.14	1.23	-0.08	$239,829	$2,741	$2,938	-$197
West Virginia	0.75	1.23	-0.48	$132,685	$990	$1,626	-$635
Wisconsin	1.98	1.23	0.76	$196,794	$3,905	$2,411	$1,494
Wyoming	0.74	1.23	-0.48	$232,468	$1,723	$2,848	-$1,125
U.S. Overall	1.23	1.23	0.00	$205,021	$2,512	$2,512	$0

a Average value of housing units built 1990-2000 and monitored by the 2000 Census (Source 1% PUMS).

There is a tremendous variation across states. One would anticipate that states spending relatively greater sums for local government purposes and relying more on the property tax to pay for that public spending (e.g., New Jersey and New York) would have higher EPTRs.[3] Conversely, lower EPTRs should be found in jurisdictions spending relatively modest sums for local government and relying less on the property tax as opposed to other sources of local government revenues—intergovernmental aid, local non-property taxes, and charges and miscellaneous income (e.g., jurisdictions like Alabama and Arkansas). The above described pattern is generally the case: the states with the highest EPTRs are New Jersey, New Hampshire, and New York (2.38 percent, 2.26 percent, and 2.09 percent, respectively), while the states with the lowest EPTRs are Hawaii, Alabama, and Louisiana (0.37 percent, 0.47 percent, and 0.43 percent, respectively) (see table 5.5).

THE PROPERTY TAX AND SMART GROWTH

To the extent that the property tax burden influences where investment is made, areas with higher tax rates may be less attractive for development while the opposite is the case for lower tax jurisdictions.[4] Variations in the property tax burden, amongst many other factors, contribute to the flight of population, manufacturing, and other development from the Northeast to the Sun Belt. Senior citizens leave New Jersey with its 2.38 percent EPTR for the lower property tax states of Florida and Arizona with EPTRs of 1.17 percent and 0.88 percent, respectively. Similarly, the property tax differential contributes to the closing of automobile manufacturing plants in New Jersey and New York (e.g., in Edison and Linden, New Jersey, and in Sleepy Hollow, New York) and the opening of new auto assembly plants in Alabama and Kentucky.

If locations that are conducive to smart growth, including infill, have a higher property tax burden, investment in such locations could be discouraged. First, let us review the characteristics of smart growth:

1. Smart growth redirects growth from exurbia to older suburbs and cities.
2. As opposed to sprawl, which focuses on single-family detached housing largely catering to upper-income, nonminority households, smart growth encourages a variety of housing types (detached and attached) that serve a broad array of households in terms of their socioeconomic profile.
3. As opposed to sprawl, which emphasizes new construction instead of renovating the existing stock, smart growth incorporates both new construction and rehabilitation.
4. Reflecting some of the other characteristics listed, such as building higher density housing in older centers, smart growth enables households to reduce their automobile dependence.

In summary, as opposed to sprawl, smart growth orients more to cities and older suburbs, includes a larger share of attached housing, responds better to the needs of a greater array of households, and reduces auto use. What is the relationship between these smart growth characteristics and the EPTR? Table 5.6, based on an analysis of the national 2000 PUMS, shows a cross-tabulation of EPTR and various locational and housing-household characteristics.

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[3] Other variables also influence the EPTR, such as the value of properties across jurisdictions.

[4] Many factors influence where development occurs, including the quality of the labor force and the residence of the chief executive officer. See Anderson and Wassmer 2000, Fisher and Peters 1997, and McHone 1984).

TABLE 5.6
Effective Property Tax Rates (EPTR) in the United States
by Housing Unit Characteristics and Illustrative Annual Property Taxes (2000)

Group	EPTR			Annual Property Taxes			
				All	Annual Property Tax		
		National		Units'		National	
	Group	Average	Difference	Value [a]	Group	Average	Difference
Location							
Central City	1.33	1.27	0.06	$161,547	$2,149	$2,057	$92
Suburban	1.31	1.27	0.04	$164,710	$2,158	$2,098	$60
Nonmetropolitan	1.10	1.27	-0.17	$98,406	$1,085	$1,253	-$168
Region							
Northeast	1.91	1.27	0.63	$178,755	$3,409	$2,277	$1,133
Midwest	1.43	1.27	0.15	$129,306	$1,843	$1,647	$196
South	1.06	1.27	-0.21	$118,931	$1,263	$1,515	-$251
West	0.90	1.27	-0.37	$217,816	$1,959	$2,774	-$815
Income Level							
Very low income	1.33	1.27	0.06	$94,789	$1,265	$1,207	$57
Low income	1.31	1.27	0.04	$97,823	$1,283	$1,246	$37
Moderate 50-80 income	1.30	1.27	0.02	$109,425	$1,417	$1,394	$24
Middle income 80-120	1.28	1.27	0.00	$128,942	$1,646	$1,642	$4
High income 120+	1.24	1.27	-0.03	$210,924	$2,613	$2,686	-$73
Race of head							
Non-Hispanic White	1.27	1.27	-0.01	$156,318	$1,981	$1,991	-$10
Non-Hispanic Black	1.28	1.27	0.01	$99,318	$1,274	$1,265	$10
Hispanic	1.38	1.27	0.11	$126,041	$1,741	$1,605	$136
Other	1.22	1.27	-0.05	$203,043	$2,477	$2,586	-$109
Year Structure Built							
1996-2000	1.10	1.27	-0.17	$186,446	$2,050	$2,374	-$324
1980-1995	1.23	1.27	-0.04	$161,968	$2,000	$2,063	-$63
1970-1979	1.25	1.27	-0.02	$137,527	$1,722	$1,751	-$29
1940-1969	1.31	1.27	0.04	$141,306	$1,852	$1,800	$53
1939 or earlier	1.41	1.27	0.14	$150,888	$2,130	$1,922	$209
Age of Head							
Under 35	1.29	1.27	0.02	$123,660	$1,600	$1,575	$25
35-64	1.29	1.27	0.01	$163,788	$2,105	$2,086	$19
65-74	1.23	1.27	-0.05	$143,131	$1,758	$1,823	-$65
75+	1.24	1.27	-0.03	$130,787	$1,625	$1,666	-$41
Education of Head							
8th grade or less	1.27	1.27	-0.01	$91,881	$1,163	$1,170	-$7
Some high school	1.28	1.27	0.01	$98,838	$1,269	$1,259	$11
High school grad	1.29	1.27	0.02	$115,215	$1,488	$1,467	$21
Some college or assoc	1.26	1.27	-0.01	$145,036	$1,828	$1,847	-$19
Bachelors or more	1.27	1.27	-0.01	$227,069	$2,876	$2,892	-$16
Vehicles Available							
None	1.38	1.27	0.11	$113,559	$1,572	$1,446	$126
One	1.32	1.27	0.05	$119,650	$1,583	$1,524	$60
Two	1.27	1.27	0.00	$161,672	$2,057	$2,059	-$2
Three or more	1.19	1.27	-0.08	$179,863	$2,145	$2,291	-$146
Structure Type							
SFD	1.25	1.27	-0.03	$162,527	$2,024	$2,070	-$46
SFA	1.41	1.27	0.14	$143,383	$2,022	$1,826	$196
Multi-family	1.43	1.27	0.16	$171,344	$2,453	$2,182	$271
Mobile	1.35	1.27	0.08	$44,285	$597	$564	$33
US Total	1.27	1.27	0.00	$151,908	$1,935	$1,935	$0

a Average value of all housing units in group monitored by the 2000 Census (Source 5% PUMS).
Source: 5% PUMS.

Evident in table 5.6 is a higher EPTR in precisely the set of characteristics associated with smart growth. Nonmetropolitan locations in the United States have the lowest EPTR (1.10 percent); the tax burden increases in suburbs (1.31 percent), and yet again in cities (1.33 percent). In part because higher-density housing is concentrated in cities as opposed to exurbia, single-family attached housing and multifamily housing in the Unites States have higher EPTRs (1.41 percent and 1.43 percent, respectively) compared with the EPTR for single-family detached homes (1.25 percent). Again, because they are more likely to be located in cities, older housing and units serving the less economically advantaged, minorities, and those with fewer automobiles tend to have relatively higher EPTRs. The EPTR of housing units in the United States built in 1939 or earlier is 1.41 percent, compared with an EPTR of 1.10 percent for the most recently constructed homes (1996–2000). Very low-income households have an EPTR of 1.33 percent versus 1.24 percent for high-income households. Hispanic households bear a 1.38 percent EPTR compared with an EPTR of 1.27 percent for non-Hispanic whites. Households with no vehicles confront an EPTR of 1.38 percent as opposed to the lesser EPTR of 1.19 percent for their counterparts with three or more vehicles.

The above tax differentials reflect a complex underlying dynamic that we can only sketch here. Smart growth orients to locations, such as cities and older suburbs, which often have higher local government spending, lower property tax wealth, possibly less than a fair share of intergovernmental aid, less ability to impose charges for services, and other disadvantages—all of which pose upward pressure on the EPTR. As smart growth builds in critical mass and cities and older suburbs experience more development than they did under sprawl, some of the underlying forces (e.g., a stagnant tax base) contributing to the higher EPTR in the smart growth-oriented locations will abate and hopefully reverse. Yet, that shift takes time, and, in the interim, the smart growth pioneers confront the harsh reality of higher property taxes.

The property tax challenge to smart growth will be greatest in those jurisdictions with the highest EPTRs. That suggests regional and state-by-state differences. Locations in the Northeast and Midwest, with regional EPTRs of 1.91 percent and 1.43 percent respectively, are more vulnerable than their counterparts in the south and west with much lower regional EPTRs of 1.06 percent and 0.90 percent, respectively. States with the greatest reliance on property tax and states with highest EPTRs may face a particularly challenging tax hurdle to smart growth. Of the 50 states, New Jersey has one of the heaviest dependencies on the property tax (4th highest) and has the nation’s highest EPTR. To the extent that the property tax burden influences development, smart growth will be particularly challenged in New Jersey by this state’s tax environment.

Some of the parameters of that challenge in New Jersey are shown in table 5.7 (see tables 5.8 and 5.9 for a comparison of New Jersey’s parameters compared with those for Alabama, a low property tax reliant state, and those for Maryland, a moderately high property tax reliant state). Developers may be dissuaded from doing infill in New Jersey’s cities because they have an average EPTR (2.78 percent) almost one-fifth higher than the ETPR in New Jersey’s suburbs (2.37 percent). Similarly, the EPTRs for New Jersey single-family attached (2.49 percent) and multifamily housing (2.63 percent) are considerably higher than the ETPR for the state’s single-family detached homes (2.32 percent)—yet it is precisely the single-family attached and multifamily housing types that will benefit smart growth.

TABLE 5.7
Effective Property Tax Rates (EPTR) in New Jersey
by Housing Unit Characteristics and Illustrative Annual Property Taxes (2000)

Group	EPTR			Annual Property Taxes			
				All	Annual Property Tax		
	Group	State Average	Difference	Units Value [a]	Group	State Average	Difference
Location							
Central City	2.78	2.38	0.40	$149,091	$4,141	$3,550	$591
Suburban	2.37	2.38	-0.01	$210,995	$5,004	$5,024	-$20
Income Level							
Very low income	2.57	2.38	0.19	$152,535	$3,917	$3,632	$285
Low income	2.55	2.38	0.17	$148,691	$3,792	$3,540	$252
Moderate 50-80 income	2.52	2.38	0.14	$156,122	$3,942	$3,717	$224
Middle income 80-120	2.46	2.38	0.08	$171,856	$4,236	$4,092	$144
High income 120+	2.25	2.38	-0.13	$259,332	$5,833	$6,175	-$341
Race of head							
Non-Hispanic White	2.32	2.38	-0.06	$217,193	$5,049	$5,171	-$122
Non-Hispanic Black	2.85	2.38	0.47	$135,942	$3,876	$3,237	$639
Hispanic	2.62	2.38	0.24	$172,017	$4,508	$4,096	$412
Other	2.36	2.38	-0.02	$231,329	$5,463	$5,508	-$45
Year Structure Built							
1996-2000	2.05	2.38	-0.33	$293,908	$6,018	$6,998	-$980
1980-1995	2.22	2.38	-0.16	$225,095	$5,001	$5,359	-$358
1970-1979	2.34	2.38	-0.04	$197,224	$4,612	$4,696	-$84
1940-1969	2.44	2.38	0.05	$196,707	$4,790	$4,683	$107
1939 or earlier	2.56	2.38	0.18	$202,311	$5,180	$4,817	$363
Age of Head							
Under 35	2.36	2.38	-0.02	$181,656	$4,290	$4,325	-$35
35-64	2.35	2.38	-0.03	$225,274	$5,298	$5,364	-$66
65-74	2.44	2.38	0.06	$192,621	$4,706	$4,586	$119
75+	2.48	2.38	0.10	$171,680	$4,257	$4,088	$169
Education of Head							
8th grade or less	2.60	2.38	0.22	$155,037	$4,028	$3,691	$336
Some high school	2.59	2.38	0.21	$146,749	$3,803	$3,494	$309
High school grad	2.48	2.38	0.09	$168,312	$4,167	$4,007	$160
Some college or assoc	2.41	2.38	0.03	$189,693	$4,572	$4,516	$56
Bachelors or more	2.21	2.38	-0.17	$276,649	$6,111	$6,587	-$476
Vehicles Available							
None	2.65	2.38	0.27	$142,423	$3,776	$3,391	$385
One	2.51	2.38	0.13	$162,255	$4,071	$3,863	$208
Two	2.32	2.38	-0.06	$227,495	$5,270	$5,416	-$146
Three or more	2.28	2.38	-0.10	$252,307	$5,751	$6,007	-$256
Structure Type							
SFD	2.32	2.38	-0.06	$226,620	$5,261	$5,396	-$135
SFA	2.49	2.38	0.11	$142,290	$3,545	$3,388	$157
Multi-family	2.63	2.38	0.25	$165,868	$4,360	$3,949	$411
Mobile	3.03	2.38	0.64	$50,633	$1,532	$1,206	$326
NJ Total	2.38	2.38	0.00	$209,544	$4,989	$4,989	$0

a Average value of all housing units in group monitored by the 2000 Census (Source 5% PUMS)
Source: 5% PUMS

TABLE 5.8
Effective Property Tax Rates (EPTR) in Alabama
by Housing Unit Characteristics and Illustrative Annual Property Taxes (2000)

Group	EPTR			Annual Property Taxes			
				All	Annual Property Tax		
	Group	State Average	Difference	Units Value [a]	Group	State Average	Difference
Location							
Central City	0.47	0.47	0.00	$112,695	$530	$525	$5
Suburban	0.48	0.47	0.01	$108,695	$522	$507	$15
Nonmetropolitan	0.47	0.47	0.00	$79,133	$372	$369	$3
Income Level							
Very low income	0.58	0.47	0.11	$60,482	$351	$282	$69
Low income	0.51	0.47	0.04	$66,386	$339	$309	$29
Moderate 50-80 income	0.45	0.47	-0.02	$73,563	$331	$343	-$12
Middle income 80-120	0.45	0.47	-0.02	$86,783	$391	$404	-$14
High income 120+	0.42	0.47	-0.05	$138,934	$584	$647	-$64
Race of head							
Non-Hispanic White	0.44	0.47	-0.03	$109,735	$483	$511	-$29
Non-Hispanic Black	0.56	0.47	0.09	$65,087	$364	$303	$61
Hispanic	0.53	0.47	0.06	$91,886	$487	$428	$59
Other	0.47	0.47	0.00	$101,563	$477	$473	$4
Year Structure Built							
1996-2000	0.42	0.47	-0.05	$122,901	$516	$573	-$57
1980-1995	0.47	0.47	0.00	$110,730	$520	$516	$4
1970-1979	0.48	0.47	0.01	$94,228	$452	$439	$13
1940-1969	0.47	0.47	0.00	$87,737	$412	$409	$4
1939 or earlier	0.49	0.47	0.02	$94,470	$463	$440	$23
Age of Head							
Under 35	0.53	0.47	0.06	$78,152	$414	$364	$50
35-64	0.45	0.47	-0.02	$108,946	$490	$508	-$17
65-74	0.45	0.47	-0.02	$100,741	$453	$469	-$16
75+	0.47	0.47	0.00	$91,503	$430	$426	$4
Education of Head							
8th grade or less	0.52	0.47	0.05	$60,597	$315	$282	$33
Some high school	0.50	0.47	0.03	$69,427	$347	$324	$24
High school grad	0.46	0.47	-0.01	$84,564	$389	$394	-$5
Some college or assoc	0.45	0.47	-0.02	$102,524	$461	$478	-$16
Bachelors or more	0.45	0.47	-0.02	$161,769	$728	$754	-$26
Vehicles Available							
None	0.60	0.47	0.13	$63,715	$382	$297	$85
One	0.53	0.47	0.06	$75,808	$402	$353	$49
Two	0.45	0.47	-0.02	$106,844	$481	$498	-$17
Three or more	0.41	0.47	-0.06	$123,186	$505	$574	-$69
Structure Type							
SFD	0.43	0.47	-0.04	$114,330	$492	$533	-$41
SFA	0.53	0.47	0.06	$107,587	$570	$501	$69
Multi-family	0.62	0.47	0.15	$99,491	$617	$464	$153
Mobile	0.64	0.47	0.17	$39,000	$250	$182	$68
AL Total	0.47	0.47	0.00	$101,083	$475	$471	$4

a Average value of all housing units in group monitored by the 2000 Census (Source 5% PUMS)
Source: 5% PUMS

TABLE 5.9
Effective Property Tax Rates (EPTR) in Maryland
by Housing Unit Characteristics and Illustrative Annual Property Taxes (2000)

Group	EPTR			Annual Property Taxes			
				All Units' Value [a]	Annual Property Tax		
	Group	State Average	Difference		Group	State Average	Difference
Location							
Central City	2.02	1.32	0.70	$86,045	$1,738	$1,134	$604
Suburban	1.25	1.32	-0.07	$190,220	$2,378	$2,507	-$130
Nonmetropolitan	1.00	1.32	-0.32	$123,860	$1,239	$1,633	-$394
Income Level							
Very low income	1.54	1.32	0.22	$114,948	$1,770	$1,515	$255
Low income	1.46	1.32	0.14	$115,892	$1,692	$1,528	$164
Moderate 50-80 income	1.42	1.32	0.10	$124,512	$1,768	$1,641	$127
Middle income 80-120	1.37	1.32	0.05	$139,035	$1,905	$1,833	$72
High income 120+	1.25	1.32	-0.07	$214,834	$2,685	$2,832	-$147
Race of head							
Non-Hispanic White	1.24	1.32	-0.08	$189,265	$2,347	$2,495	-$148
Non-Hispanic Black	1.59	1.32	0.27	$130,702	$2,078	$1,723	$355
Hispanic	1.41	1.32	0.09	$168,208	$2,372	$2,217	$154
Other	1.36	1.32	0.04	$208,504	$2,836	$2,748	$87
Year Structure Built							
1996-2000	1.16	1.32	-0.16	$229,093	$2,657	$3,020	-$362
1980-1995	1.28	1.32	-0.04	$197,446	$2,527	$2,603	-$75
1970-1979	1.27	1.32	-0.05	$173,501	$2,203	$2,287	-$84
1940-1969	1.37	1.32	0.05	$154,695	$2,119	$2,039	$80
1939 or earlier	1.44	1.32	0.12	$163,314	$2,352	$2,153	$199
Age of Head							
Under 35	1.36	1.32	0.04	$146,217	$1,989	$1,927	$61
35-64	1.30	1.32	-0.02	$188,989	$2,457	$2,491	-$34
65-74	1.33	1.32	0.01	$168,516	$2,241	$2,221	$20
75+	1.35	1.32	0.03	$155,763	$2,103	$2,053	$50
Education of Head							
8th grade or less	1.47	1.32	0.15	$111,282	$1,636	$1,467	$169
Some high school	1.47	1.32	0.15	$120,446	$1,771	$1,588	$183
High school grad	1.34	1.32	0.02	$139,092	$1,864	$1,834	$30
Some college or assoc	1.33	1.32	0.01	$161,315	$2,145	$2,126	$19
Bachelors or more	1.24	1.32	-0.08	$235,998	$2,926	$3,111	-$185
Vehicles Available							
None	1.69	1.32	0.37	$102,575	$1,734	$1,352	$381
One	1.45	1.32	0.13	$136,185	$1,975	$1,795	$179
Two	1.27	1.32	-0.05	$191,358	$2,430	$2,522	-$92
Three or more	1.18	1.32	-0.14	$216,769	$2,558	$2,857	-$300
Structure Type							
SFD	1.19	1.32	-0.13	$207,367	$2,468	$2,734	-$266
SFA	1.62	1.32	0.30	$109,376	$1,772	$1,442	$330
Multi-family	1.48	1.32	0.16	$117,810	$1,744	$1,553	$191
Mobile	2.21	1.32	0.89	$44,925	$993	$592	$401
MD Total	1.32	1.32	0.00	$177,958	$2,349	$2,346	$3

a Average value of all housing units in group monitored by the 2000 Census (Source 5% PUMS)
Source: 5% PUMS

Smart growth must confront the challenge of rehabilitating the existing stock, but the older the housing stock in New Jersey, the higher the property tax rate. The EPTRs for housing units in New Jersey built in the time periods 1939 or earlier, 1940–1969, 1970–1979, 1980–1995, and 1996–2000 are 2.56 percent, 2.44 percent, 2.34 percent, 2.22 percent, and 2.05 percent, respectively. The tax burden thus rises from the youngest to oldest housing age cohorts. In a similar vein, the housing in New Jersey serving the economically disadvantaged, minorities, and those with fewer automobiles has the highest tax burdens. These differences are detailed in Table 5.7. To illustrate, the EPTRs of New Jersey households with 0, 1, 2, or 3 or more automobiles are 2.65, 2.51, 2.32, and 2.28, respectively.

Like EPTRs nationwide, the higher New Jersey EPTRs associated with the smart growth-furthering housing type and occupant characteristics are locationally linked: New Jersey's cities have higher EPTRs than their suburban counterparts, and, in turn, attached, older housing and the poor, minorities, and households with fewer automobiles are disproportionately clustered in New Jersey's urban centers. Yet, whatever the underlying cause for the higher EPTR, it is just the smart growth-furthering locations and situations that confront New Jersey's highest property tax burdens. To the extent that property taxes influence where development is sited, then smart-growth will be discouraged in New Jersey. The same situation is found in Maryland (table 5.9) and to a lesser extent in Alabama (table 5.8).

ADDRESSING THE PROPERTY TAX CHALLENGE TO SMART GROWTH

The remainder of this chapter considers ways at minimum to neutralize the property tax challenge to smart growth or, more proactively, to apply the property tax to encourage smart growth, including infill.

Three broad strategies are evaluated. The first is general public finance reform (PFR), such as state—as opposed to local—financing of schools. Included in the PFR discussion is the application of regional tax sharing to encourage smart growth and infill. A second major approach, less comprehensive than PFR, is reducing property taxes for smart growth and infill projects, such as by a temporary abatement, as a means to encourage such development. A third strategy, actually a variant of the second, is to creatively apply the higher property tax burden nominally associated with smart growth and infill to precisely encourage such development. Illustrative is applying tax increment financing (TIF) for an infill project in a city with high property taxes. In this instance, the TIF is worth more or, put another way, creates more value in the higher tax jurisdiction, as we shall detail in our discussion.

The property tax discussion focuses on New Jersey because no other state has a local property tax system that so challenges smart growth and infill. Yet, while focusing on New Jersey, the strategies discussed for this state have national applicability. Further, each of the three property strategies is set in a broader context by reviewing national examples.

PUBLIC FINANCE REFORM

This chapter's earlier discussion on the property tax frames consideration of how this tax can be reduced. Recall that the property tax rate is equal to local government expenditures, minus the sum of all non-property revenues (intergovernmental revenues, local non-property taxes, and local charges and miscellaneous revenues). That "remainder amount," as it is termed, is divided by the local jurisdiction's total property tax base in order to derive the property tax rate.

Given the above, the property tax burden can be reduced through various means. Since expenditures are a starting and primary influence on the property tax rate, then lowering local government spending—or at least moderating the growth of these outlays—should reduce the property tax burden. An example is California's Proposition 13 which limited property tax increases as long as a property was not sold. This strategy has some, but not major, practical utility. New Jersey and many other states already have severe limits or "caps" on increases in spending by local governments. More fundamentally, if local government spending already truly reflects an objective assessment of local needs, priorities, and capabilities, then arbitrary cuts or caps on spending are inappropriate and harmful. California has experienced difficulty in funding local services post-Proposition 13, and that law has created other problems (e.g., discouraging homeowners from moving so as to keep their artificially low property tax windfall). Cuts in local outlays for improving schools, public safety, and the quality of the infrastructure can be especially harmful to infill because such investments are precisely the ones needed to improve the climate for smart growth-oriented development in cities and older suburbs.

Other options have challenges of their own. Increasing local non-property taxes, such as imposing or raising levies on individual or corporate incomes, or assessing higher charges for services, may similarly be problematical in the cities and older suburbs conducive to infill. Local residents and businesses in these jurisdictions may be stretched to pay these new or increased assessments. In addition, higher non-property taxes and charges in cities and older suburbs may discourage the entry of new businesses and residents essential to realize the infill investment within their borders.

Given these constraints to what local governments can do on their own leaves the option of increased intergovernmental aid, especially for such basic services as education. In fact, such a shift has occurred in numerous jurisdictions across the United States in recent years, including New Jersey. The reorientation in the funding for local government services, especially that concerning intergovernmental assistance, can generically be referred to as local public finance reform (PFR).

PFR Nationwide and Smart Growth

The broad policy and economic considerations that underlie PFR, such as the topics of equity, governmental responsibility, and the relative merits of different taxes related to their stability, predictability, and regressiveness, go beyond the current study on smart growth and infill. Yet, PFR has an important bearing on the current subject matter that merits discussion.

A prominent component of PFR has been the growing state assumption of local school costs. Litigation has been brought in numerous states, including Kentucky, Michigan, New Jersey, New York, Texas, and Vermont, arguing that the historical reliance on local resources to pay for schools and the tremendously varying resources across local jurisdictions violate the public's responsibility and constitutional mandate to ensure a "basic" or "thorough and efficient" education. Many of the suits have been successful, at least on state constitutional grounds, and, in response, greater intergovernmental aid for local school spending has been tendered, along with other changes (e.g., placing limits on what more advantaged school districts can spend on education). The added state aid has taken many forms, such as increasing the state-guaranteed "foundation" spending amount for each pupil, or making "percentage equalizing" formulas more sensitive to local wealth so that school districts with fewer resources, as measured by equalized property valuation or income per student, receive a higher percentage of state school aid.

The extensive literature examining the nature and impact of school financing reform shall not be reviewed here (Biddle and Berliner 2003, Citizens Budget Commission 2004, Fowler 2004, Staley 2003, Downes 2003) other than to note that noticeable reform has occurred, at least in some states. Michigan approved Proposal A in 1994, which significantly reduced local property taxes (Brouillete 2001) with that shortfall made up with an increased state sales tax. The result was a dramatic shift in how local government spending was funded. In 1993, 35 percent of local government revenues in Michigan came from intergovernmental sources, leaving 65 percent to be paid from own sources—primarily from the property tax (44 percent). A decade later, intergovernmental sources funded 53 percent of local government revenues, dropping the reliance on local own source revenues to 47 percent. Since 2002, the property tax in Michigan has funded only 23 percent of local general revenues—about half its share pre-Proposal A. These changes led to dramatic reductions in the local property tax rate. While the EPTR in Detroit before Proposal A was 3 percent, it is half that rate today. To the extent that property taxes influence the locus of development, then Proposition A has made infill much more supportable in Michigan's cities and older suburbs—which heretofore had extremely high property tax burdens.

PFR in New Jersey and Smart Growth

The distribution of local government revenues in New Jersey in 2000 (table 5.3) resembles that of the United States in 1950. An emphasis on own source revenues, primarily the property tax, characterized the nation 50 years ago and characterizes New Jersey today. This situation contributes to New Jersey's having the nation's highest EPTR, a burden that challenges infill.

To be certain, New Jersey has wrestled with PFR, including a multi-decade effort to guarantee a state constitutionally mandated "thorough and efficient" education by increasing state support to New Jersey's poorest school districts (White 2000). New Jersey has increased state school aid through invigorated foundation and percentage equalizing programs, most notably through "Core Curriculum Standards Aid" (CCSI), and has also worked to ensure that 28 low wealth urban school districts ("Abbott" districts[5]) can spend at a level that is substantially equivalent to the level of spending in the most affluent districts in the state (White 2000).

Despite these changes, areas ripe for infill in New Jersey still confront dauntingly high property taxes. For example, prime area for infill in New Jersey is along what is referred to as its "Gold Coast"—communities in the inner ring area of Bergen and Hudson counties that front the Hudson River (see chapter 4). Although these largely developed communities have unmatched access to Manhattan, and thus are attractive for infill development, such development can be thwarted by numerous challenges, including brownfields and extremely high taxes. West New York is in the heart of the Gold Coast, yet when developers sought to do

[5] Named after the 1990 NJ Supreme Court decision *Abbott v Burke* 575 A. 2d 35a (N.J. 1990).

infill there in the mid-1990s they were confronted by some of the highest property tax burdens in the state. Despite having 70 percent of its school spending funded by the state (West New York was one of the Abbott districts), compared with a statewide average at the time (1995) of 38 percent, the local property tax base per capita in West New York ($28,928) was so low relative to the state average property resources per person ($68,498), that West New York had a 4.12 EPTR compared with a statewide average EPTR at the time of 2.29 percent. A major builder interested in the Gold Coast told the author that “development can’t proceed in West New York with that rate . . . banks won’t lend, and people can’t buy, rent or develop with taxes double the state average” (Roseland 1996).

The situation has not dramatically improved in recent years. Three examples of other New Jersey communities ripe for and experiencing some infill—all with waterfront and locational advantages (e.g., access to New York City or Philadelphia)—include the cities of Asbury Park, Camden, and Perth Amboy. As Abbott districts, these cities had 87 percent, 95 percent, and 82 percent, respectively, of their school budgets funded by the state, compared with a New Jersey average of 39 percent state school aid. (All fiscal figures in this paragraph are as of 2002.) Yet, because the equalized property tax base per person is so low in Asbury Park ($26,761), Camden ($64,581), and Perth Amboy ($35,539) compared with the statewide average property resources per capita of $85,843, the EPTRs in these three communities—3.12, 3.93, and 2.41, respectively—far exceed the statewide average EPTR of 2.22.

Without the Abbott and other school funding decisions that led to increased state school aid to New Jersey’s most impoverished school districts, the fiscal situation in Asbury, Camden, Perth Amboy, West New York, and other communities ripe for infill would have been much worse. Yet, as demonstrated above, even with Abbott, infill-promising locations in New Jersey still face a daunting challenge of extremely high property taxes.

More far-reaching public financing reform in New Jersey that would lessen the reliance on the local property tax is thus a fundamentally important strategy to foster smart growth–infill. This change could take many forms, such as reducing local school property taxes while increasing state sales tax (the Michigan Proposition A solution) or other state sources (e.g., hiking personal or corporate income taxes). However accomplished, reducing New Jersey’s reliance on the local property tax to fund local services will not only ameliorate the regressive burden of the current property tax-dominant situation, but will further the land-use objectives of smart growth and infill.[6]

[6] New Jersey Future (2003) reports the following data pointing to the regressiveness of the New Jersey property tax:

EPTR (1999)	Number of Towns	Median per Capita Income (1999)
Less than 1.5%	32	$35,382
1.50%–1.99%	87	$31,937
2.00%–2.39%	164	$24,282
2.40%–2.59%	94	$21,704
2.80%–2.99%	101	$19,193
3.00%–3.49%	64	$18,300
3.50% or more	24	$14,070
Total (NJ statewide)	566	$24,146

Major changes concerning New Jersey's property tax may be in the offing in the future. In 2004, a proposal was made to convene a state constitutional convention to consider this subject and the broader issue of how to fund local government services in New Jersey (Schwaneberg 2004). If such a convention is held, it would be useful for it to consider how New Jersey's public finance system affects smart growth and infill and what can be done in the public finance realm to encourage implementation of the State Development and Redevelopment Plan.

A Fiscal Proposal to Further Smart Growth and Infill in New Jersey

To further the discussion above related to New Jersey's tax situation, the following proposal is presented: *tax vehicles as personal property*. This change offers fiscal, housing, and smart growth benefits.

Unlike many other states (e.g., Connecticut, Colorado, and Virginia), New Jersey currently does not consider personal vehicles as personal property for the purposes of property taxation. That leaves an untapped source of considerable value. According to the 2000 census, there are about 5 million (4,907,939) vehicles in New Jersey. At an estimated conservative worth of $15,000 each, 5 million vehicles have an aggregate value of $75 billion—equal to approximately 10 percent of the $718 billion total New Jersey real property value as of 2002.

Imposing a property tax on New Jersey's vehicles would, first, have the benefit of potentially lowering the real property taxes by one-tenth, from an EPTR of about 2.4 percent to roughly 2.1 percent. Second, a lowered real property tax burden would further the ability to purchase a home in New Jersey. When mortgage underwriters consider the principal, interest, taxes, and insurance (PITI) costs of a home purchase and relate the PITI to the prospective buyer's income according to mortgage industry ratios, the underwriters count only the real property tax as the tax (T) obligation—not personal property.[7] Since taxing vehicles would allow for a one-tenth reduction in real property taxes across the state, then the mortgage-related PITI amounts would be lowered in tandem, and, as such. somewhat lower-income households could afford to purchase a home in New Jersey than is currently the case.[8]

A third benefit of treating vehicles as property is that such a levy would tax automobile consumption on an annual basis, not just at the initial sale through the sales tax. A $35,000 SUV would now have an annual personal property tax of $740 (at a 2.1 percent EPTR). Since smart growth reduces the need for automobiles, then taxing automobile ownership, such as that proposed here, would add to the benefit of residing in a smart-growth development (e.g., TOD). That appeal would be greater in an infill project, especially one with transit access.

[7] It is commonly accepted that the PITI should not exceed about 33 percent of the homebuyer's income.

[8] To illustrate, the average single-family detached home built between 1990 and 2000 in New Jersey had a price of $311,651. At the current New Jersey real property tax rate, the PITI on that home would amount to $26,624 (assuming 20 percent down payment and a 30-year mortgage rate with a 6 percent interest rate), implying that a household would need a minimum income of $79,872 to afford the average single-family home in New Jersey. If automobiles were taxed in New Jersey, thereby reducing the real property tax burden by about one-tenth, then the PITI on the average $311,651 home would drop to $25,882, implying that a household would need a minimum income of $78,430 to afford the average home—about $1,500 less than the base case.

This proposal needs much more refinement and legal examination, and it does not address the fundamental fiscal questions that must be considered by a New Jersey's constitutional convention (should one occur), such as which government has the responsibility for funding education.[9] We present the auto tax proposal as an example of how public finance and smart growth and infill must be considered in an integrated fashion.

Tax-base Sharing: A Subset of Public Finance Reform

Tax-base sharing (TBS) is a mechanism designed to share revenues—often property income introduced by development—on a regional basis. TBS stands in distinction to the usual situation of a host community receiving all of the benefits derived from growth, such as added property ratables, while the negative externalities of development, namely added congestion and pollution, impact the entire region. That dynamic fosters a "ratable chase" by local governments seeking to maximize their benefits, often to the disadvantage of their neighbors. While the ratable chase is viewed as a spur to sprawl, TBS is envisioned as supporting smart growth (Minnesota's Smart Growth Network 1999; American Planning Association 2002). As one pundit observed (New Rules Project 2004),

> The drive for increased property tax revenue, and in some cases sales tax revenue, can lead local governments to make land use decisions that conflict with other planning and economic development goals. . . . In metro areas, the "fiscalization of land use" . . . fosters sprawl and polarization. Some jurisdictions [new suburbs on the urban fringe] are winners; others [central city and older suburbs] are losers. . . . This disparity tends to snowball and engender a cycle of sprawl as more middle-income families flee to the suburban fringe. Regional tax-base sharing offers one way to alleviate this problem. Under tax-base sharing, all of the municipalities within a metropolitan area agree to share tax proceeds from new development. This eliminates interregional competition; facilitates other planning goals such as preserving open space or maintaining a vibrant downtown; encourages suburbs and central cities to cooperate on regional economic development goals; and leads to a more equitable distribution of tax burdens and public services.

Table 5.10 summarizes a survey conducted by the research team of two major types of tax-base sharing—those sharing the property tax base and those sharing other regional resources, such as sales tax revenues. Our survey finds that although there is considerable interest in and advocacy for tax-base sharing, this mechanism has been used only modestly. Approximately 10 jurisdictions in the United States use or enable tax-base sharing; two entities have the longest-running "classic" tax-base sharing programs—one in the New Jersey Meadowlands and the second in a seven-county area around Minneapolis-St. Paul, Minnesota (see table 5.10).

Tax-base sharing is a subset of broader public finance reform. Tax-base sharing is a creative mechanism that allows a region to share in both the financial resources and the fiscal consequences of development; TBS stands in contrast to the "beggar-thy-neighbor" approach of the ratable chase. By attenuating a locally oriented, short-term-focused ratables mentality,

[9] Other refinements, for example, include whether exemptions to automobile taxation should be given to lower-income households, so as to reduce a regressive impact on the poor. Further, does taxing automobiles as personal property require a constitutional amendment in New Jersey?

TBS should be conducive to the long-term and regionally focused perspectives of smart growth.

How great a land-use change can one expect from TBS, and what are its implications for infill? Although empirical answers to these queries are lacking, some perspective is gained by examining the New Jersey Meadowlands (NJM) TBS administered by the New Jersey Meadowlands Commission. The NJM involves 14 communities in Bergen and Hudson counties. Table 5.11 lists these communities, identifies their current EPTRs, and quantifies whether the jurisdictions either receive moneys from the regional pool (indicated by a plus), or whether they contribute to that pool (indicated by a minus). TBS in the Meadowlands generally does transfer resources from the growing, more fiscally advantaged communities of the region, (e.g., those with a lower EPTR) such as Carlstadt and Secaucus, to the needier, slower growing, and higher-tax rate jurisdictions of the region, such as Kearny. Absent Kearny's receipt of about $3.8 million from the regional pool, its EPTR—already high at 3.12 percent—would be even higher—3.29 percent. Thus, the Meadowlands TBS makes Kearny, a prime community ripe for infill, somewhat more financially attractive for development. Yet, even with TBS, Kearny remains a municipality with a property tax rate well above the state EPTR average of about 2.4 percent. The Meadowlands TBS has even less of an impact on other communities in the region that are also ripe for infill. For instance, Jersey City receives moneys from the regional pool, yet this amount ($0.8 million) is so modest that there is little discernable impact on that community's property tax.[10] The actual EPTR in Jersey City is 2.78 percent, a savings of only 0.01 percent when compared with the imputed rate had Jersey City not received moneys from TBS.

In short, the Meadowlands TBS provides a generally supportive environment for infill in that some infill-candidate communities, such as Kearny, benefit financially from the regional tax sharing. Meadowlands land-use policies, such as support in the regional master plan for transit-oriented development, can further attract infill to the area. Yet, as currently constructed, the Meadowlands TBS does not appear to provide a powerful and direct financial mechanism for smart growth and infill.

That outcome is due to a number of reasons. First, the Meadowlands area is relatively compact compared with other TBS locations, such as the six-county Twin Cities region. Consequently, the Meadowlands does not bring into the regional pool the torrid growth that has until recently characterized New Jersey's exurban municipalities and some urban communities, such as those along the state's Gold Coast. Second, created more than three decades ago and in response to a unique set of circumstances (e.g., land-title issues), the Meadowlands TBS precedes the current planning emphasis on smart growth. Third, TBS generically as a strategy may not be able to equalize stark fiscal inequalities (e.g., Kearny having an EPTR more than twice the EPTR in Ridgefield and Teterboro) in a region because TBS only redistributes the resources from *new* development as opposed to redistributing *all* the historically accumulated resources of the region's municipalities. Unlike more far-researching public financing reform altering the way that states fund education, such as Michigan's Proposition A, TBS deals with fiscal tinkering at the margin, namely, affecting how the resources from only *new* development are allocated.

[10] One reason for the small amount received by Jersey City from the regional pool is that only a small portion of Jersey City is located within the Meadowlands boundaries.

TABLE 5.10
Summary of Tax Base/Revenue Sharing Programs Nationwide

Region	Status	Timeline	Jurisdictions Included	Tax Shared	Allocation Factors	Range of Allocation Amounts
Property Tax Sharing Programs and Proposals						
Meadowlands, NJ	In effect	Enacted 1970	Portions of 14 municipalities in Hudson and Bergen Counties	Property	Growth in Value; percent of sharing district land area within municipality	2003: -$3.1 million (Secaucus) to + $3.8 million (Kearny) (number is revenue)
Twin Cities, MN	In effect	Enacted 1971, implemented 1975	7 county area around Minneapolis-St. Paul	Property	Growth in commercial/industrial value; population; local property value	2002: -$14.6 million (Bloomington) to + $18.9 million (St. Paul) (number is “tax capacity,” 1–3% of assessed value)
Iron Range, MN	In effect	Implemented 1996	Parts of 7 counties in northern Minnesota	Property	Identical to Twin Cities	N/A
Connecticut	Enabling legislation passed, no implementations	Enacted 2002	No specific area	Property	No specific formula	N/A
Illinois	Legislation mandating study defeated	Proposed 2002	All counties with population over 3 million and all adjacent counties	Property	Identical to Twin Cities	N/A
Sales/Other Tax Sharing Programs and Proposals						
Allegheny Regional Asset District (Pittsburgh, PA)	Active sharing	Legislation passed 1993, implemented 1994	129 local governments is Allegheny County, PA	1% regional sales tax	50% to district, 25% to county, 25% to munis; muni shares by aggregate true property value, population, total municipal tax revenues	2002 distribution: county = $36.3 million; munis = $19.6 million (Pittsburgh) to $997 (Haysfield Boro) (no data on where sales tax collected)
Sacramento, CA	Legislation defeated	Proposed 2002	All local governments in 6 county greater Sacramento region that levy optional 1% local sales tax	1% local sales tax	Growth in local sales tax revenues, 1/3 returned to generating government units, 1/3 returned conditionally (if muni has affordable housing, homeless shelters, pro-infill policies), 1/3 pooled, distributed by population	N/A
Louisville and Jefferson County, KY	No longer active	Implemented 1986, ended 2003 (governments merged)	Louisville and Jefferson County, KY	Occupational tax (1.25% tax on wages, net business profits)	Growth in occupational tax divided by base year ratio of collections, base year ratio of growth in collections	Data not available

N/A: no tax revenues have been shared in these jurisdictions to date.

TABLE 5.11
Tax Base Sharing in the New Jersey Meadowlands (NJM)

NJM Community	Current (2003) Tax Situation and Levy				Current Tax Base Sharing (TBS)	Current Tax Sharing's Effect on the Property Tax Rate				
County	General Tax Rate	Equalization Rate	Total Equalized Property Tax Rate	Total Property Levy for all Governmental Purposes	2004 Payment (PAP)	Total Property Tax Levy without PAP	PAP as % of Total Existing Property Tax Levy	Imputed Total Equalized Property Tax Rate without PAP	Actual Equalized Property Tax Rate	Rate Difference
Bergen County										
Carlstadt	2.370	0.68	1.613	24,715,350.37	-1,191,464.00	23,523,886.37	-0.05	1.535	1.613	-0.078
East Rutherford	2.240	0.81	1.820	18,855,706.13	435,303.00	19,291,009.13	0.02	1.862	1.820	0.042
Little Ferry	3.470	0.77	2.656	20,007,628.41	-286,876.00	19,720,752.41	-0.01	2.618	2.656	-0.038
Lyndhurst	2.990	0.78	2.345	41,970,278.92	-95,391.00	41,874,887.92	0.00	2.339	2.345	-0.005
Moonachie	2.460	0.69	1.702	9,812,244.03	-174,535.00	9,637,709.03	-0.02	1.671	1.702	-0.030
North Arlington	3.370	0.80	2.691	26,829,930.31	607,863.00	27,437,793.31	0.02	2.752	2.691	0.061
Ridgefield	1.900	0.69	1.313	15,330,014.35	956,214.00	16,286,228.35	0.06	1.395	1.313	0.082
Rutherford	3.410	0.74	2.539	42,161,160.55	-145,521.00	42,015,639.55	0.00	2.530	2.539	-0.009
South Hackensack	2.330	0.98	2.288	8,944,200.64	-133,067.00	8,811,133.64	-0.01	2.254	2.288	-0.034
Teterboro	1.360	1.02	1.381	3,147,208.91	0.00	3,147,208.91	0.00	1.381	1.381	0.000
TOTAL				2,220,554,662.61						
Hudson County										
Jersey City	4.606	0.60	2.779	239,815,619.51	775,754.00	240,591,373.51	0.00	2.788	2.779	0.009
Kearny	6.608	0.47	3.123	69,958,759.29	3,842,307.00	73,801,066.29	0.05	3.294	3.123	0.172
North Bergen	3.832	0.77	2.961	90,005,351.16	-1,436,338.00	88,569,013.16	-0.02	2.913	2.961	-0.047
Secaucus	2.682	0.88	2.355	66,705,456.09	-3,154,249.00	63,551,207.09	-0.05	2.243	2.355	-0.111
TOTAL				819,610,467.34						

Although TBS may not be as powerful a mechanism to encourage smart growth as fundamental public financing reform, it nonetheless is a welcome supportive tool. Further, it can be modified to be an even more direct and useful support for smart growth. This goal can be accomplished by altering the TBS formula for allocating regional revenues.

Reflecting the current TBS orientation as a fiscal, and not a land-use tool, the current TBS allocation factors are similarly financially oriented (see table 5.10). The allocation factors for the Meadowlands TBS include such criteria as a municipality's growth in local property value (since a base year), a municipality's share of the district's land area, and the growth in student enrollment from the base year (indicating a need for revenues). The Twin Cities' TBS allocation factors encompass growth in commercial and industrial ratables, local population (a proxy for the demand for services), and other criteria that are similarly rooted in public-finance, not land-use, considerations.

Yet, land use can be incorporated into TBS to encourage smart growth. A community's draw on the regional ratables growth could be increased in the TBS formula if the jurisdiction preserved wetlands and open space and encouraged development that lessened dependence on the automobile. The New Jersey Meadowlands Commission (NJMC) is, in fact, contemplating changes in its TBS allocation factors to encourage smart growth. The NJMC already makes Payment in Lieu of Taxes (PILOT) payments to some communities in which it has taken over ownership of wetlands areas. A new system for protecting wetlands has been proposed. Under the new system, municipalities would receive a credit in the tax-base sharing formula for every acre of wetlands they transfer to the Meadowlands Conservancy Trust (MCT) for preservation. The authors have calculated the impact if all 8,099 acres of wetlands in the Meadowlands were protected through transfer to the MCT. For example, if Carlstadt and Secaucus preserved their wetlands (1,260 acres and 1,168 acres, respectively), then Carlstadt would receive an annual benefit of $55,000, and Secaucus would receive an annual benefit of $85,000 from the Meadowlands TBS. More technically, their payment into the regional pool would be reduced by the above citied amounts. Although the wetlands preservation benefit would not have a large effect on the overall EPTRs of the Meadowlands communities (table 5.11), it would nonetheless provide a welcome incentive for such preservation.

The NJMC is also considering rewarding smart growth more aggressively through its TBS. One approach is to increase the local retention rate of new development ratables from the current 60 percent to 75 percent for developments officially flagged as furthering smart-growth principles. To illustrate, a transit-oriented development (TOD) called "Transit Village" has been proposed in Secaucus. Increasing the retention rate from 60 percent to 75 percent on this TOD—an exemplar of smart growth—would result in an annual benefit of $400,000 for Secaucus (its contribution into the pool would be reduced by $400,000). Although the $400,000 would have only a small impact on the Secaucus property tax rate, which is based on a levy of almost $67 million (table 5.11), the change would nonetheless represent an acknowledgment by the Meadowlands TBS that smart growth should be rewarded. In addition, Secaucus will receive other rewards from the Transit Village TOD, namely, an annual fiscal impact surplus (local development-induced revenues minus development-generated costs) of about $2 million annually, and future Transit Village citizens will profit from an $800 million investment by New Jersey on a new Secaucus transfer station providing 10 minute access to midtown Manhattan.

In summary, TBS is a fiscal mechanism generally supportive of smart growth and infill. That support can be made stronger and more direct by modifying the TBS formula to provide a specific financial incentive for smart growth and infill—as is being contemplated by the NJMC.

PROPERTY TAX REDUCTION

Public finance reform and TBS are major, long-term actions to foster smart growth in higher-tax locations. More common and a short-term action is the incremental step of reducing the property tax obligation through a variety of incentives.

Property Tax Incentives: National Perspective

Many states have enabled local governments to offer property tax incentives to encourage a variety of socially desirable investments—building manufacturing plants that provide industrial jobs and improving historic properties are two examples. Although the empirical evidence is mixed concerning the practical effect of such investments (McHone 1984; Bartik 2001; Anderson and Wassmer 2000), reducing property taxes to foster desired investment nonetheless remains popular.

Property tax incentives for historic properties illustrate the variety of property tax incentives that can be offered. A national study (Listokin, Listokin, and Crosney 2004) identified the following property tax supports for historic landmarks.

1. *Property Tax Exemption/Reduction.* Property taxes are exempted (no property taxes are paid) or reduced on historic properties. These provisions do not require investment (e.g., rehabilitation) but are extended solely on the basis that preserving a landmark is socially desirable and a property tax break is one means to realize such preservation. To illustrate, Connecticut and New York allow tax exemption or reduction where tax relief is necessary to permit continued operation or maintenance. Alabama's Constitutional Amendment No. 373 classifies historic buildings as Class III structures, a category of structures that are assessed at 10 percent of fair-market value. Without this special provision, certain types of Alabama landmarks, such as nonresidential structures or residential buildings that are not owner-occupied, would be assessed at 20 percent of fair-market value. Amendment No. 373 thus reduces the assessment and therefore the property taxes of affected historic structures by one-half.

2. *Property Tax Rehabilitation Incentives.* These programs accord favorable property-tax treatment to historic buildings undergoing renovation. The provisions range from reducing the existing property taxes (*rehabilitation refund*), to not reassessing following rehabilitation (*rehabilitation assessment*), or to increasing the assessment

of the rehabilitated landmark only partially (*rehabilitation abatement*). All of these treatments convey property-tax relief, for rehabilitating the historic property improves its value and therefore should result in an increased, rather than a decreased/frozen, property assessment/tax obligation.

About 15 states provide for various types of rehabilitation incentives. Five permit refunds. New Mexico Statute §18-6-13, for example, provides that "local, city, county and school property taxes assessed against the property shall be reduced by the amount expended for restoration preservation and maintenance." The amount of the refund varies across jurisdictions. New York allows a credit against taxes equal to almost the full amount expended on rehabilitation. In contrast, Maryland limits the refund to 10 percent of rehabilitation expenditures. There are also variations in the time span over which the refund is in effect, ranging from 5 years in South Dakota and Maryland to a generous 12 years in New York.

Rehabilitation refunds are quite expensive since the taxing jurisdiction is precluded from reaping any gains from higher assessments or additional tax revenue on rehabilitated properties. The jurisdiction also suffers an absolute loss in its tax base for varying periods of time. It is perhaps for this reason that rehabilitation incentive and abatement programs are more popular—they have been adopted in a total of about 10 states. These statutes typically allow a one- to five-year period during which the rehabilitated historic building will either not be revalued or will be reassessed by only a fraction of the true value added by the renovation. Some states combine rehabilitation assessment and abatement provisions. Maryland provides a two-year period after renovation of a landmark when there is no increase in assessed value. Afterwards, the following schedule is maintained: in year three, the upward reassessment is limited to 20 percent of the improvement; in year four, it is limited to 40 percent of the improvement; in year five, it is limited to 60 percent; in year six, full upward reassessment is permitted. Other combinations are also found. New York, for example, combines a rehabilitation assessment and refund.

3. *General Assessment Provisions.* These provisions, adopted by more than 25 states, specify that landmarks be assessed at their "true" value. Two types of assessment provisions are included: assessment to reflect encumbrances (18 states) and assessment at current use provisions (8 states).

   Assessment to reflect encumbrances typically requires that the assessor consider either landmark status or the presence of a historic easement, or both, in determining value for real-taxation purposes. In most cases, these measures call for the assessor to consider only the presence of a designation or easement and leave the question of how these factors affect value to the assessor's discretion. Some jurisdictions, however, specify the impact of the designation or easement, stipulating that their presence always affects property value in a certain manner.

   Another assessment provision is that landmarks be valued at their current use rather than at their highest and best use. For example, historic buildings in the District of

Columbia are assessed at their highest and best use and at their current use. If the current-use value is lower than the highest-and-best-use value, then the current-use value is the basis for assessment.

To our knowledge, no state authorizes the granting of a property tax incentive solely on the grounds that a development furthers smart growth or infill. A property tax incentive would only be available to such development if it contained properties or activities generally eligible for a property tax break (e.g., a smart-growth project containing historic properties or economic uses for which a state has authorized a property tax exemption, a property tax reduction, or a rehabilitation incentive).

Property Tax Incentives: New Jersey Perspective

Like other states, New Jersey does not offer targeted property tax relief for smart growth. Instead, it offers a number of more broad-based property incentives that can be applied to smart growth and infill. For example, New Jersey authorizes local communities to defer property tax increases attributable to rehabilitation on homes at least 20 years old. For five years, this half-decade "rehabilitation assessment," to use our terminology, is provided by many municipalities and certainly would be of value to New Jersey infill projects involving the renovation of the existing housing stock.

Practically, much infill in New Jersey is done within the framework of the state's Local Redevelopment and Housing Law (LRHL). In brief, under the LRHL, municipalities may designate publicly or privately owned lands that are abandoned or underperforming as redevelopment areas. This designation provides the municipality with various tools to spur redevelopment, including the condemnation of property, favorable bond financing, and the use of tax exemptions. The use of tax exemptions are detailed below.

Along with the LRHL, the New Jersey legislature passed the Long Term Tax Exemption Law (P.L. 1991, c.431, N.J.S.A. 40A:20-1 et seq.) which authorizes municipalities to grant private entities effecting redevelopment and housing projects an exemption of property taxes on the improvement value (the property taxes on the land remains) for a term of up to 30 years from the project's completion (up to 35 years from the execution of the tax exemption agreement) (International City/County Management Association Smart Growth America 2004). Although exempt from paying conventional property taxes for roughly three decades, the redeveloper pays an annual service charge, commonly referred to as a payment in lieu of taxation (PILOT). The PILOT can never be less than the property taxes generated from the redevelopment site prior to the redevelopment. The Long Term Tax Exemption Law provides a formula for regulating the PILOT. Other than for projects providing housing for income-restricted households, the service charge, or PILOT, can be negotiated as a "floor" (not less than) of either 2 percent of total project costs (e.g., construction, permits, fees) or 15 percent of gross annual revenues defined in the statute (International City/County Management Association Smart Growth America 2004). For income-restricted housing projects, the "floor" becomes a ceiling (not more than), and the service charge can be negotiated down to zero.

Along with the LRHL and the Long Term Tax Exemption Law, the New Jersey legislature also passed the Five Year Exemption Law (P.L. 1991, c.441; N.J.S.A. 40A:21-1 et seq.), which authorizes municipalities to grant short-term (half-decade) tax abatement in areas designated "in need of rehabilitation" and exemptions for home improvements, commercial and industrial development, and the improvement or conversion of a multifamily dwelling (International City/County Management Association Smart Growth America 2004).

These New Jersey property tax incentives can provide significant tax reduction. Illustrative is a large mixed use development (4,000 housing units and 100,000 square feet of retail space) currently under construction in West New York (hereafter the WNY project). At the time of the initiation of the WNY project in the mid-1990s, West New York had an extremely high EPTR of more 4 percent—about double the state average EPTR at the time (see earlier description). The project developer described to the author the problem of such a high EPTR (Roseland Properties 1996):

> You can't develop with a 4 percent tax rate. First, the most critical element to ensure the economic viability of the development is to secure the confidence of the lending community. Potential lenders need absolute certainty as to the project's ability to service its debt—and it cannot do that at a 4 percent tax burden. With tax abatement in the form of a PILOT, the obligation to the municipality is lower and it always remains constant in relation to the project's income stream. Changes in the municipal tax rate in excess of rental increases do not affect the project's ability to make its mortgage payments, giving lenders the certainty they require to underwrite the massive financial commitment necessary to make this size project a reality.
>
> Similarly, to effectively market "for sale" product at the project, the developer must secure the confidence of the potential purchaser. A tax abatement as a percentage of the initial sales price does so in a way that is comforting to both the buyer and its mortgagee. Additionally, it allows the carrying cost of the "for sale" townhome to be competitive with other purchase options in Hudson County, facilitating good absorption rates and quick entry of these ratables onto the West New York tax roll.
>
> Last, and most important, a thoughtful approach to tax abatement creates competitive pricing for all aspects of the proposed development. Historically, those communities in Hudson County that have granted abatements have seen their development plans for the waterfront come to fruition. Competitive pricing driven by abatement is the catalyst that allows all the disparate elements required for the onset of construction to come together: financing commitments, private investment, and a motivated consumer marketplace.

Let us consider the WNY project with and without a tax reduction. The WNY project contained 3,800 rental apartments valued at about $400 million—or $105,000 apiece—and 260 townhouses valued at $62 million, or $238,000 apiece (all values as of the mid-

1990s).[11] With conventional property taxation and a local EPTR of 4 percent, the annual property taxes on the rental unit would have been $4,200 each ($105,000 x .04)—an unsustainable burden on units with a slated mid-1990s annual rent of about $16,000. Taxes on the townhouses would have been about $9,500 ($9,520) annually ($238,000 x .04), an amount that would have discouraged would-be buyers in a then untested market. Without a property tax reduction, the WNY project would have faced annual taxes of about $18.4 million ($4,200 x 2,800 units + $9,520 x 260 townhouses).

The WNY project, however, was able to secure tax relief. The annual PILOT on the rental unit was about $2,400, while the townhouse had to remit only about $5,000 yearly. Instead of an annual tax bill of $18.4 million, the West New York project had a more manageable $10.4 million tax obligation—a difference of $8 million annually. This tax relief contributed to the ultimate considerable success of the West New York development. In a model of smart growth, the project reclaimed a brownfields area, and thousands of units have been rented and sold in an infill Gold Coast location.

The PILOT extended to the WNY project was a key financial aid and offered numerous benefits besides the reduced payments. Because a PILOT was remitted, under the New Jersey law, the municipality received the entire payment[12]; it did not have to share the payment with other units of government, such as the county, as it would have had to do with conventional property taxes.[13] With conventional property taxes, the West New York municipality would have received only 50 percent of all property taxes, while with the PILOT it received 100 percent of the income. Second, under New Jersey law, the PILOT contribution (as opposed to having the project remit conventional property taxes) protected the considerable dollar amount of state school aid received by West New York—a subject considered below.

At the time of the inception of the WNY project, the major New Jersey state school aid program for operating purposes was termed "Foundation Aid." Foundation Aid was granted inversely to local wealth, where wealth was measured by the equalized valuation per pupil (EVPP). West New York had a low EVPP and it therefore received a considerable amount of Foundation Aid—$30 million in 1995, or three-fifths of its total school budget.

Had the WNY project paid conventional property taxes, the addition of this $400 million ratable would have so raised the community's EVPP that it would have lost a large share of its $30 million in Foundation Aid. This did *not* happen with the PILOT. Under New Jersey law, a PILOT does *not* count as a resource measured in the state school aid

[11] These were the estimated values as of the mid 1990s—when the Gold Coast market was largely unproven. When the project was actually built, these price points were exceeded.

[12] This is not the law in all states. For example, to foster the development of a former General Motors infill site in Sleepy Hollow, New York, the developer will seek a PILOT. Under New York State law, however, the PILOT will be shared among the county, school district, and other jurisdictions in the same manner as property taxes are allocated.

[13] This was true at the time of the development of the West New York project. In 2003, however, a law was passed (S.2452 and A.3404) directing that 10 percent of PILOT amounts in New Jersey would be given to the host county.

formula, that is, for determining the EVPP. Consequently, the project PILOT did not increase West New York's EVPP, and, as such, its state school aid support was not reduced. (As of 2001-2002, 81 percent of West New York school budget was paid by the state.)

Atlantic City provides an interesting contrast. That community commenced massive infill construction of casinos along its boardwalk in the 1970s. As an economically depressed municipality at that time—a feature that prompted opening the city to casino investment—Atlantic City had a low EVPP ($45,710 compared to a state average EVPP of $86,000) and therefore had a high share of its school spending (47 percent) paid for by the state. In the 1976–1977 school year, Atlantic City received $3.8 million in state school aid, 47 percent of the school district's $8.1 million budget.

That fiscal situation changed dramatically with the influx of the casino, and we shall consider the effects in the first decade of Atlantic City opening its doors to casinos. The massive casino investment increased Atlantic City's property valuation from $27 million in 1977 to $4 billion a decade later. At the same time, Atlantic City's EVPP rose to $1,042,538 by 1988–1989, or 250 percent the state average EVPP, which was $422,369 at the time. With the dramatic increase in EVPP, Atlantic City's share of state school aid dropped considerably, from 47 percent to 6 percent of school expenditures. From 1978 through 1988, the cumulative impact of lower state school aid was an aggregate loss to the city of $61 million.

Had Atlantic City declared the casino boardwalk sites as a redevelopment area and had the casinos made a PILOT instead of remitting conventional property taxes, that loss could have been avoided. West New York opted for a PILOT and sidestepped losing millions in state school aid. Since Atlantic City did not use a PILOT arrangement, the $463 million in property taxes paid by the city's casinos between 1978 and 1988 was in part offset by a reduction of $61 million in state school aid.

It therefore behooves communities doing infill to examine the consequences of having the infill be treated conventionally with respect to property taxation or to remit a PILOT.[14] Also, in situations where infill development can lead to a significant loss in state school aid or intergovernmental support (e.g., a loss of 25 percent or more), the state should consider cushioning that loss by capping the reduction or by phasing in the change over time. For example, if infill will lead to a formulaic reduction in state intergovernmental aid of 30 percent or more, then that reduction can be capped at 20 percent (e.g., by imposing a "hold harmless" provision), or it can be introduced in increments over five years.

[14] The author has examined this effect in other settings. For example, a large infill development in Perth Amboy, New Jersey, which currently pays property taxes as opposed to a PILOT, could result in a loss of state school aid to this Abbott district. A proposed infill development on a former General Motors auto assembly plant site in Sleepy Hollow, New York, could result in a reduction of about $0.7 million in state school aid annually.

Evaluating Property Tax Reductions

The PILOT and other property tax incentives extended to the WNY project have also been productively applied in many other infill situations in New Jersey and nationwide. Yet, it is important to keep this strategy in perspective and to consider ways to improve its implementation.

One measure of perspective is afforded by considering the empirical evidence on the efficacy of financial inducements, such as property tax reduction, to foster investment. The evidence is mixed. A survey of 34 factors prompting businesses to invest in a given enterprise found that financial incentives were not as important as a city's general business climate, or distance to customers (Schmitt et al 1985). On the other hand, regression analyses conducted by Anderson and Wassmer (2000), Bartik (1991), and Maltone, Anderson (1984) all found that property tax incentives were a statistically significant positive influence on investment.

There is a further fundamental fiscal conundrum. A PILOT, a property tax abatement, or their equivalent, although often necessary to spur development in a given situation, nonetheless removes property tax resources that would ordinarily be available to the community at large. Since a community's tax rate is directly influenced by its overall property tax base, removing ratables from the base, such as through a PILOT or by some other means to help a project, inevitably poses an upward pressure on the tax rate confronting non-project businesses and residents. In practice, the decision is often made that the fiscal pressure is temporarily bearable for the ultimate good of the community. That was the thinking that prompted West New York to grant the property tax reduction—and, in fact, in large part due to the property tax incentive-supported success of the waterfront project there, the EPTR in this community dropped from 4.0 in the mid 1990s to about 3.0 several years later—still well above the state average, yet nonetheless a dramatic improvement.

If, as is likely, property tax reduction continues to be applied to support infill, how can it be improved? One way is to *allow greater flexibility as to the amount of the reduction that is allowed, the development product to which it can be extended, and the geographic area in which the property tax incentive can be granted*.

New Jersey is illustrative. This state's PILOT guidelines in a redevelopment area are currently 15 percent of project revenues, or 2 percent of project costs. Yet, that payment may be too high to encourage "pioneer infill" in very challenging locations (e.g., inner cities). Here, difficult conditions, including brownfields and the need to establish a viable market in communities with high crime rates and decades of disinvestment, may require a lower PILOT. Conversely, a higher PILOT may suffice in a more promising infill situation. Further, more promising infill situations may not necessarily be in a redevelopment area; nevertheless, a PILOT or other property tax reduction mechanism should be available upon showing that "but for" the incentive, the infill project would not be economically feasible (e.g., when infill involves affordable housing). Yet, under current New Jersey law, the PILOT is available only in a redevelopment area.

Another inhibition is that under current New Jersey law, a long-term property tax abatement is clearly authorized in redevelopment areas for rental and condominium properties, but the law is unclear regarding fee simple uses—despite the fact that condominiums are essentially a form of fee simple ownership. This "grey area" may reflect a vestigial, narrow concept of the type of development that would take place in redevelopment locations (i.e., rental units as opposed to fee simple homes). The New Jersey statute should therefore be clarified to allow the granting of long-term tax abatement for fee simple uses.

More property tax tools should be offered in New Jersey in areas designated "in need of rehabilitation," which, incidentally, is an underutilized designation (again, likely reflecting a vestigial concept that redevelopment would entail largely new construction as opposed to renovation of the existing stock). Under current New Jersey law, a five-year property tax abatement is available in areas in need of rehabilitation. A longer-term property tax abatement (or a deeper property tax reduction), however, may be called for here if "but for" that incentive the infill could not proceed.

Property tax programs in an infill context should also consider the issue of how to treat and tax the value created by the very act of infill. (This is related to, yet distinct from, tax increment financing considered later in this chapter.) To illustrate, say an infill developer begins work on a large tract in Newark, Trenton, Perth Amboy, or other city where land values may be low at the onset because of adverse conditions. As infill proceeds, these adverse conditions may be ameliorated and a market niche established so as to increase land values. There is both a plus and minus to such appreciation: the infill developer has created value in the parcel slated for development; yet, if this appreciation is immediately taxed, the developer's holding costs will increase. This problem is accentuated in a large, long-term infill project because the inventory of parcels yet to be developed will be considerable and expensive to carry if taxed at their future development potential.

The solution in this case may be to assess the unimproved portions of the infill site at their current use and not at their highest and best use. There is precedent for such treatment. In order not to burden landmarked properties, assessors are directed to value such holdings at their current use. (See prior discussion in this chapter.) Similar treatment is accorded to farmland in order to encourage the preservation of that resource. Valuing the yet-to-be-developed portions of an infill site at their existing use and not at their future anticipated highest and best use, will reduce the carrying costs of the infill developer and thus can support long-term infill.

There is room for other property tax programs to encourage infill. For example, when a PILOT or a property tax abatement cannot be extended for whatever reason, then an infill developer confronting high property taxes can capitalize on that situation by redirecting a portion of the high property tax payments for the purposes of the infill project itself through means discussed below.

SLOTTING PROPERTY TAX AND OTHER REVENUES FOR INFILL PURPOSES

The objective of the strategies discussed here is to turn the "lemon" of property taxes, especially high taxes that can discourage development, into the "lemonade" of a resource that can support development. A prime example of this is tax increment financing (TIF). TIF involves financial separation of a designated area (TIF district) within a municipality where some form of new development or redevelopment is about to occur. By designating a TIF district, the property tax assessments in this district before the improvements are frozen; after these property valuations increase, the incremental tax revenues to local jurisdictions (theoretically resulting from these improvements) are allocated to the TIF district to pay for either related additional public servicing costs ("pay-as-you-go" approach) or to pay periodic debt service on any bond issues that may have been used to finance the project ("front funding" approach). This financing arrangement is intended to be used to target "blighted" or economically distressed urban areas and was designed as a measure of last resort on the part of municipalities that wanted to redevelop such areas without raising property tax rates.

TIF projects are generally quasi-public or public-private partnerships and their designation is for some specific period of time, usually ranging from 7 to 30 years, depending on the state enabling legislation, among other factors. Since this financing can sometimes take the form of a subsidy to the private developer, the logical threshold used to justify this arrangement is usually referred to as the "but for" test—in other words, if the project would not have been developed *but for* this subsidy or financing method, then the decision to adopt TIF is justified. In addition, the standards for an area to be designated as "blighted" and qualifying for TIF are usually set out at the state level. There is usually an extensive multi-jurisdictional oversight process that designates that an area is blighted enough to qualify to be a TIF district. However, the decision to set up the TIF district is usually made at the municipal level. Since there are other tax revenue stakeholders besides the municipality affected by this decision, TIF adoption can be controversial.

A TIF district can yield a substantial amount of revenues for such project-related purposes as land acquisition and write-down, infrastructure improvements, and below-market-rate financing. For example, predevelopment, the West New York project site had a land value of about $25 million; postdevelopment, at build-out, the site would have a value of about $470 million—or a $445 million increment from the starting valuation (all figures in 1995 dollars). Assuming the TIF applied the full property tax rate (about 4 percent in West New York) to the full increment in value ($445 million), this mechanism would yield a resource of about $18 million annually that could be applied for clean-up, improving the infrastructure, or for other actions to foster the infill. While TIFs have only recently been available in New Jersey (the WNY project, begun in the mid 1990s, could not avail itself of a TIF), the TIF strategy has been extensively used nationwide.

TIF and Infill: National Overview

There have been many studies on the factors influencing TIF adoption. According to Dye and Merriman (2000), there are four categories of incentives for municipalities to adopt a TIF district: (1) market failure, (2) blighted areas, (3) bidding wars, and (4) intergovernmental revenue shifting. Since infill may take place in blighted areas, and infill in inner cities may confront market failure without extensive assistance, it is not surprising that TIFs have often been used to assist infill projects nationwide. Examples in Minneapolis, Chicago, and Boca Raton are described below.

Block E is a $134 million redevelopment project in downtown Minneapolis involving hotel, entertainment, and retail uses. The project utilizes substantial TIF revenues ($39 million) and, as such, is controversial. Prior to development, the land was vacant for at least a decade. The project now consists of 210,000 square feet of retail space, including retailers like Borders Books and Music, Hard Rock Café, Universal Studios' GameWorks, and other tenants, such as a Crown Theatre complex and the 260-room Le Meridien Hotel. The TIF district management in Minneapolis is handled by the Minneapolis Community Development Agency (MCDA). As a part of the redevelopment agreement, the MCDA will receive a share of the development's retail and parking operation profits. This project is a significant part of the downtown revitalization effort; however, since it is still in an early stage of its TIF life, it is too early to tell whether it was a prudent long-term financing decision from the municipality's standpoint.

Of longer duration is Chicago's North/Central Loop TIF—the first and largest (both in terms of land area and equalized value of property) TIF project in Chicago. In order to revitalize the declining downtown area in the mid-1980s, the City of Chicago initiated the North Loop Tax Increment Financing (TIF) project. The original project, the North Loop covering about 32 acres of total property valued at about $53 million, was undertaken in 1984. Subsequently, in 1997, a considerably larger Central Loop extension was added to the project. Today, the entire project is generally referred to as the Central Loop. The Central Loop TIF district currently covers 171 acres of land and as of 2001, incorporates 22 redevelopment agreements where TIF subsidies were paid. Since inception, the total dollar amount of TIF allocations has been about $273 million, of which $183 million were developer subsidies and $91 million were public works or infrastructure expenditures. The total amount of private investment in the North/Central Loop TIF has been $1.153 billion. Some of this area's major projects included renovation of the Blackstone Hotel and Palace Theatre ($65 million presale investment aided by a $17 million TIF) and the historic rehabilitation of the Chicago Theater ($42 million private investment aided by a $16 million TIF).

With respect to financing options, the Central Loop TIF has had the advantage of being able to "front fund" its subsidies and public works expenditures with tax-exempt bond issuance rather than rely on incremental tax revenue streams to time spending decisions. After the first bond issue for the North Loop TIF in December 1986 for $58 million, a second bond issue for $187 million was made in November 1997 after the approval of the

Central Loop expansion. Finally, a third bond issue for $250 million was made in May 2000 to complete the last phase of the Central Loop redevelopment.

In addition to hotel, theater, retail, and office restoration projects, the Central Loop TIF has also enjoyed tremendous residential development, thereby realizing Mayor Daley's concept of a "24-hour downtown." Since there is very little open land for new construction in Chicago's downtown, many office buildings have been converted to residential uses with the assistance of the Central Loop TIF.

How can a center in a community's older core be encouraged in a rapidly growing region that is experiencing sprawl? The City of Boca Raton, Florida, applied a TIF to help finance a mixed-use anchor called Mizner Park in the city's downtown. The Mizner Park project consisted of the acquisition of approximately 30 acres of land centrally located in downtown Boca Raton and the construction of a mixed-use urban village incorporating public park facilities, retail-office development, residential development, and cultural facilities.

The goal of Mizner Park was to create a distinctive environment that complemented other commercial facilities in the regional marketplace and provided a gathering place that focused people's attention on Boca Raton's downtown. The project featured public and private development surrounding a heavily landscaped, tree-lined plaza, with building arcades, fountains, gazebos, outdoor furniture, and special street lights.

The development of Mizner Park was accomplished through a public-private partnership among the city of Boca Raton, the Boca Raton Community Redevelopment Agency (CRA), a developer of mixed-use facilities, and cultural users. To "jump-start" Mizner Park financially, the CRA issued about $57 million in notes—$38.6 million for land acquisition, $3.5 million for construction and public infrastructure and park improvements, and $14.6 million for capitalized interest and costs of issuance—backed by tax increment revenues and the city's guarantee.

The Boca Raton Community Redevelopment Plan—the guiding document for the city's CRA—was adopted in 1982; thus, the TIF base year was set as of 1982 (Mizner Park was begun a few years later.) Let us examine the TIF's operation in its first decade. Assessed values in the Boca Raton Downtown Tax Increment District increased from $73.4 million in 1982 to $176.2 million in 1992, a gain of about $103 million over a decade. Almost all of this appreciation—95 percent, or $98 million—was captured for the tax increment. The tax increment moneys made available to the Boca Raton Community Redevelopment Agency were equal to the appreciated value ($98 million) multiplied by the sum of the tax rates of the City of Boca Raton, Palm Beach County, and Greater Boca Raton Beach Taxing District (0.0085810). The last calculation ($98 million x 0.095910) resulted in an annual tax increment of about $850,000. That amount was used to repay the $57 million in CRA notes that jump started Mizner Park.

TIF and Infill in New Jersey

For many years, the state of New Jersey did not permit TIF districts. That changed, however, with the passage in 2002 of the Revenue Allocation District Financing Act (N.J. Stat. E52:270-459 et seq.). The details of New Jersey's Revenue Allocation District Financing (RADF) are shown below.

Purpose

- "To encourage private investment within areas that are blighted or in need of redevelopment or would otherwise remain unused."

Establishment of Districts

- The total taxable value of the land in all districts designated shall not exceed 15 percent (or 20 percent with approval by the local finance board) of the total taxable property assessed in the municipality.
- The lots and streets to be designated as part of the plan shall be designated as a Revenue Allocation District as part of a duly adopted redevelopment plan approved by the governing body.
- A "District Agent," which may be a municipality, county, county improvement authority, the New Jersey Economic Development Authority, or a regional planning commission, is designated.

Types of Eligible Projects

- Acquisition of land, demolition, renovation, or construction of improvements to effectuate the plan, including highways, utilities, mass transit facilities, infrastructure, public facilities and housing.
- Infrastructure improvements outside of the District if integral to the plan.
- Soft costs, such as engineering, architectural, legal, appraisals, and feasibility studies, may be financed.

The district is designated as part of a duly adopted redevelopment plan approved by the local governing body. As a TIF, the RADF captures the increment of revenues from a base year from property taxes and other sources, such as payroll, parking, and sales taxes. That increment can be quite substantial since the district can encompass up to 20 percent of a municipality's total assessed property value. Money from the RADF can be used for many purposes of value to infill and other projects, such as land acquisition, demolition, and renovation or construction of infrastructure, public facilities, and housing.

Just as TIFs have aided infill nationwide, the RADF can foster infill in New Jersey. To illustrate, a RADF is being applied to assist an ambitious infill project on West Main Street in downtown Somerville, New Jersey. The site currently contains an obsolete shopping center. To add density and diversity to the downtown, to better connect the site to the main street, and to add people on a 24/7 basis, the existing obsolete shopping center will be replaced by modern retail space (147,000 square feet), office space (73,000 square feet), housing (256 attached units), and a parking structure for 500 cars (Atlantic Group 2003). The site will allow mixed uses and multi-use structures (e.g., 35,000 square feet of retail space with residential flats above the retail space), and offers many amenities (e.g., a swimming pool and fitness center).

An array of public improvements will be necessary to realize the project. These include a new $4 million street to add retail frontage and connect the site to Somerville's main street, as well as the construction of a structured parking garage. These improvements will cost about $9 million. Revenue Allocation District Financing is being applied to fund these improvements.

A TIF-RADF Variation to Aid Infill in New Jersey

A variation of a TIF-RADF is being applied in New Jersey to help finance infill. The variation involves a PILOT and crediting a portion of that payment to the infill developer to help pay for such costs as land acquisition and clean-up. To illustrate this arrangement, the following hypothetical example is presented. Assume that a $500 million infill project involved $100 million in clean-up expenses that could not be recovered from the sale or rental of the project's improvements or from other sources (e.g., project-linked resources specified by the New Jersey Brownfield and Contaminated Site Remediation Act; see chapter 4). Assume further that this development negotiated a $2 million annual PILOT. Under current New Jersey law, 5 percent of that PILOT, or $0.1 million annually, would be remitted to the county leaving $1.9 million of the annual payment. Typically, the $1.9 million would be paid to the municipality; however, that arrangement leaves the developer with a $100 million uncompensated expense for clean-up.

To deal with this $100 million challenge, a portion of the PILOT, say 30 percent, can be credited to the infill developer. That means for the period of the PILOT, say 20 to 30 years, the infill developer would be paid 30 percent of the net local (non-county) portion of the PILOT ($1.9 million) remitted by the ultimate renters or buyers of the completed infill project, or about $0.6 million annually. The portion of the PILOT slotted to the developer would reflect such factors as the scale of the clean-up and other expenses encountered, the PILOT's time period, the time value of money, and other factors. With that dedicated portion of the PILOT slotted annually to the infill developer, the developer now has a secure resource, with the capital so raised applied to the clean-up or other expenses.

The above arrangement, although applied to the PILOT, is simply a variation of TIF–RADF. With TIF–RADF, a share of the increment in value and attendant added property taxes brought about by the redevelopment is tapped to fund project-related expenses. With the PILOT-sharing strategy, project-related expenses are funded by the developer tapping a share of the annual PILOT contribution.

Evaluating the Slotting of Property Tax and Other Revenues to Aid Infill

There is a growing body of literature on TIFs that is germane for our consideration.

Where are TIFs adopted? Byrns (2002) finds a higher propensity of TIF adoption in areas with higher equalized property valuation and greater fiscal stress. Dye and Merriman (2000) found that higher municipal property tax rates, larger population numbers, and a higher proportion of non-residential property have a positive relationship with TIF adoption. These findings suggest a reasonable "fit" between TIFs and infill.

What is the empirical effect of TIFs on stimulating investment? This is inherently a difficult query to answer because it involves trying to model what would have happened in the absence of the TIF. Understandably, then, there is no definitive answer to whether TIFs work. The weight of the evidence leans to the affirmative, however. Although Dye and Merriman (2000), Hinz (2002) and Weber (forthcoming) conclude that TIFs have a negative or mixed outcome (e.g., Dye and Merriman find that TIFs have a dampening effect on the growth of city-wide property values), such studies are in the minority. Man (2001), Man and Rosentraub (1998), and Anderson (1990) report that TIFs enhance community property values. Dardia (1998) and Ritter and Oldfield find that TIFs stimulated economic development; Huddeleston (1982) found that TIFs had a positive fiscal impact on the host jurisdiction and Lawrence and Stephenson (1995) found that TIFs ultimately benefited local tax payers in the form of lower city wide property taxes after a initial period when the opposite was the case. This largely positive view of TIFs supports the use of this mechanism for infill purposes.

Yet, there is no "free lunch" from the application of a TIF for infill or for other reasons. Grueling (1987) provides a very good summary of the many advantages, as well as the disadvantages of a TIF. The advantages include providing significant capital for project investment, while not increasing the normal tax burden; the disadvantages include periodic abuses (e.g., using a TIF to aid bankable investments in affluent areas) and a higher cost for raising moneys than the cost for other strategies (e.g., a TIF-backed bond has a higher risk and therefore must pay a higher interest rate than a city-issued general obligation bond).

There is a further TIF disadvantage that harkens back to the discussion at the beginning of this chapter. Although a TIF is quite useful for aiding development in infill and other situations, this mechanism removes property tax resources that would otherwise be available to the community at large. Removing those resources depletes the property tax base, at least in the short term, and a depleted base poses upward pressure on community's property tax rate, albeit perhaps temporarily. The same condition was described in evaluating property tax incentives, such as PILOTs or tax abatements. TIFs and property tax incentives are invaluable tools for infill; yet, they are no "free lunches" and do not replace the fundamental need to implement public finance reform as the ultimate solution for creating a fiscally hospitable environment for infill.

THE PUBLIC FINANCE AND SMART GROWTH COMMUNITIES: THE NEED FOR SYNTHESIS

An underlying theme of this chapter's discussion is the need to integrate the public finance and the smart-growth communities. While it oversimplifies matters, these communities are currently distinct from one another in terms of their respective perspectives and priorities. They stand apart at their own peril.

The public finance community is not sufficiently monitoring such smart growth–infill tools as PILOTs, TIFs, and the like. This can be problematical. To illustrate, large developments in New Jersey are increasingly being implemented under a PILOT arrangement, which, in this state, effectively cuts out school districts[15] (which traditionally receive about 60 percent of conventional property taxes) and dramatically reduces[16] county revenues (which traditionally receive about 20 percent of conventional property taxes in this state).

A PILOT muddles the allocation of state school aid, which is often distributed inversely to local wealth, where local wealth is measured by the property tax resources per pupil, not a PILOT amount per student. A PILOT muddles the apportionment of the county property tax obligation to individual communities since that operates on a property tax model. A PILOT also muddles tax-base sharing, which is also oriented to the regional distribution of property tax resources, not a PILOT. To illustrate, the New Jersey Meadowlands Commission was confronted with how to "fit" "Xanadu"—a $1 billion project that would pay a PILOT—into its tax-sharing formula, which only counted property taxes. In short, the public finance community needs to better attune itself to the emerging smart growth–infill world of PILOTs, TIFS, and similar mechanisms.

In a parallel vein, smart growth–infill practioners need to be better attuned to public finance. The fiscal facts are stark. In contrast to sprawl, smart growth–infill is placing much future growth in cities and older suburbs—just those places with the highest property tax rates. The interventionary mechanisms used to counter the high tax challenge, such as PILOTs and other property tax reductions, work in the short term, yet may cause issues in the long term. With a PILOT and the like, the high tax burden of cities and older suburbs are simply transferred to other taxpayers in these communities. TIFS have a similar effect.

What is needed is fundamental public finance reform and that should be common ground for both the public finance and the smart growth communities.

[15] A municipality can share a portion of its PILOT with the school district; however, that is a local option.
[16] Until 2004, county government did not receive any portion of a PILOT in New Jersey. A 2004 state statue gave counties a 5 percent share of the PILOT.

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Chapter 6
PROCEDURE AND INFILL

INTRODUCTION

Section VI of the infill ordinance and policy guide specifies the procedure to be followed in seeking approval for infill projects. This chapter presents the background for the procedural provisions included in that section. A review of the literature shows that the approval process as presently structured has become a problem with far-reaching consequences. After defining and illustrating the problem of processing, the chapter explores various avenues of relief. Procedural and substantive changes recommended in the national literature to expedite and in other ways to improve the development review process are highlighted, and field-level experience in initiating procedural reforms is reviewed. With this as background, specific provisions incorporated in the infill ordinance and policy guide are listed and explained.

DEVELOPMENT APPROVAL PROCEDURE: THE PROBLEM DEFINED

Development costs are influenced not only by the physical standards that must be adhered to, but also by the approval process through which development must proceed. Given the highly leveraged nature of most development ventures, coupled with steep financing charges, the time elapsed in securing development approval can increase development costs significantly. Higher density, efficient construction techniques, and other frequently turned-to remedies for reducing development costs will not suffice in the face of a protracted development process.

Delays in the permitting and approval process lead to increased development costs. This is due to the unnecessarily complex and time-consuming permitting and regulatory processes in many jurisdictions. Regulations vary by state, but land-use and zoning provisions, environmental impact assessments, building safety regulations, disability provisions, energy codes, historic preservation requirements, asbestos and lead paint abatement provisions, and housing codes can all affect development costs for infill projects. When a development proposal is tied up in the permitting process, developers bear the cost of delays. These costs are inevitably passed on to the consumer in the form of higher housing costs.

Infill development may be more susceptible to the financial impacts of a protracted regulatory process than greenfield development because infill projects may disproportionably involve public sector review regarding requests for higher densities, brownfields remediation, tax credits, and other matters. Due to these factors, it is often easier to gain approval for greenfield development than for infill development (Dekle and Mofson 1997).

This chapter by David Listokin.

The increasing complexity of government regulations causes more potential for delays during the approval process (Schill 2004, 10). Delays can result from insufficient staffing of government agencies, processing backlogs, redundant processes, and antiquated procedures and forms. Inefficiencies in the process are multiplied by multiple agency jurisdictions (i.e., planning board, zoning board, Department of Environmental Protection, and so forth) and multiple levels of government responsible for different aspects of permitting. Vertical and horizontal fragmentation of government functions is inevitable in the American system of government, but it can often lead to unnecessary redundancy and overlap in functions (May 2004, 9-10).

The issue of process has received long and widespread attention. A 1978 U.S. Department of Housing and Urban Development (HUD) task force on housing costs observed that "the American developer is confronted with a bewildering and time-consuming proliferation of development approval regulations at virtually every level of government. These costs are passed through to the consumer in the form of higher costs" (HUD 1978, 28). Builders associations have also voiced their concern. A 1980 statement by the Urban Land Institute (ULI) declared that "local and state governments should simplify and clarify the development review and permitting process in order to reduce the delays, uncertainty, and risk to which the housing production process is exposed" (ULI 1980, 14). The travails of securing development approval were graphically summarized in a study by the Building Industry Association of Philadelphia (Black 2004).

If we want Philadelphia to grow, we must modernize the city's antiquated and cumbersome development process. A developer who wants to build new housing on blighted and abandoned land should not be asked to satisfy a 40-year old Zoning Code and follow a permitting procedure that involves up to 14 different city agencies and boards.

NATIONAL RECOMMENDATIONS AND ACTIONS TO EXPEDITE PROCESSING

The growing complexity of land-use development procedures has induced calls for reform. The following recommendation from an Urban Land Institute task force reflects such concern (ULI 1980, 14):

American developers must deal with an expanding array of regulations at every level of government. Unreasonable regulations on development inevitably inflate paperwork required for a project and intensify the complexity of data, analysis, and review procedures for both public and private sectors. Ultimately, the delay caused by the regulatory maze produces higher cost housing through holding costs, increased expenses due to risk, uncertainty, overhead, and inflated costs of labor and materials, and other more hidden costs. Actions to improve the predictability and continuity of requirements and procedures can reduce these costs.

Numerous task forces and studies have examined specific avenues of land-use processing reform. Reports resulting from some of these task forces and studies include *Model*

Zoning Technical Advisory Group Report (Minnesota Housing Finance Agency 2003)), *If We Fix It, They Will Come* (Black 2004), and *Land Use, Growth and Taxes: What to Do* (Home Builders Association of Connecticut 2004). In addition, the National Conference of States on Building Codes and Standards (NCSBCS) provides information on numerous models of streamlined procedural processes that have been implemented at different levels of government. Streamlined models are provided for zoning and land use, environmental issues, and building approval. These models serve as examples that can be adapted by municipalities to fit their needs. (Information on the model procedures, including contact information, is available electronically from www.ncsbcs.org.)

The growing complexity of land-use development procedures has induced calls for reform. Various ways of improving the development application process, specifically for infill development, are listed below.

Codify/simplify local land-use regulations. Many communities are overdue for such revision, as their land-use regulations are dispersed, vague, and sometimes contradictory.
Prepare a permit register or checklist. This may consist of a directory or checklist of all permits required, information about departments and regulations, and/or a manual or instruction sheet(s) on steps for obtaining approvals.
Standardize and update application forms. Well-designed, up to date forms are tools for increasing efficiency.
Provide all necessary permit forms on the Internet for easy access. By making all necessary application forms available over the Internet, developers can download and complete the forms from their own office. Allowing developers to submit completed forms electronically would also save time.
Allow preliminary informal conference/general concept approval. Pre-application meetings provide an opportunity to iron out difficulties with the planning or other staffs before the developer has prepared expensive technical, engineering, and other submission materials. Allowing for general concept or development plan approval has a similar beneficial effect.
Consolidate or abbreviate commission review. If the professional staff has done its homework, expedited review by planning and other boards should suffice.
Appoint a review subcommittee. A subcommittee appointed by the planning or other review board may be given responsibility for routine development applications. The full board would then consider the most significant and controversial applications.
Classify development by level of significance (i.e., "minor" versus "major"). Such a strategy separates projects with minor impacts and processes them through an abbreviated approval routine.
Allow simultaneous permit processing. When applications require review by multiple boards (i.e., planning and zoning), allow simultaneous rather than sequential consideration. The review process would be further expedited if, in certain cases, one board could be authorized to consider numerous issues (i.e., planning, zoning, variances, and so forth).
Provide processing deadlines. Many phases of the approval process are legislatively mandated, some at the state level. However, time overruns are common. One widespread

practice, frequently an abuse, is for communities to ask developers to waive adherence to deadlines. Realistic deadlines should be given and adhered to in practice.
Create a fast track approval process for infill projects. This will give infill projects precedence over greenfield development.
Improve public hearing procedures. Much time at public hearings is lost in wrangling over misunderstandings and non-substantive procedural questions. This could be avoided by adopting fair and consistent rules about who is to be heard, when and for how long, and how decisions are to be made.
Improve the scheduling cycle. Infrequent board meetings in communities with a high volume of development result in delays just in getting onto the agenda. The obvious solution is to hold more frequent meetings.
Provide "one-stop" permitting, such as a centralized department or office that accepts and processes applications and maintains central files.
Appoint an individual or agency to be responsible for orderly and expeditious processing of development applications.
Board quorums. Adherence to board by-laws regarding excessive board member absences that lead to delays.
Standardize zoning ordinances according to a basic statewide framework and require that they be made available to the public on the internet

Examples of Streamlined Regulatory Procedures for Infill Development

Numerous jurisdictions across the country have enacted many of the substantive and procedural changes discussed above to expedite development processing. A brief sampling follows:

San Diego, California: Affordable/In-fill Housing and Sustainable Buildings Expedite Program

The Affordable/In-fill Housing and Buildings Expedite Program is an optional service available to applicants who desire expedited permit processing (table 6.1). An expedited review process is achieved by providing mandatory preliminary review meetings, significantly reducing review cycles, funding the environmental initial study at the preliminary review stage, and scheduling public hearings after both the third review cycle and upon completion of the environmental document. The goal of this program is to reduce the time it takes to process affordable housing or infill project permits by half. The fee for this service is $500 per housing unit, capped at $40,000 for any single project. In addition, the majority of necessary forms are available online.

Eligible San Diego projects include mixed-use developments and urban infill housing development projects of ten units or more within "urbanized" areas of the city—subject to affordability requirements.

TABLE 6.1
San Diego, California
Affordable/Infill Housing and Sustainable Buildings Expedite Program

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Goals / Objectives:
To establish a system of permit processing that reduces the time it takes to process affordable housing applications by half.
Assist in the development of over 2,100 new affordable housing units within 5 years.
Strategies Employed:
Preliminary Review
Process checklist
"Fast Track" processing for affordable and infill projects
Processing deadlines
Improved public hearing cycle
One Stop Permitting
Forms available over the internet
Additional Information:
Optional program
Additional fee required
Contact Information:
City of San Diego Development Services
(616) 446-5000
www.sandiego.gov/development-services

Sources: City of San Diego Development Services. 2004; San Diego Housing Federation. 2003.

Austin, Texas: S.M.A.R.T. Housing Initiative

The S.M.A.R.T. Housing Initiative (**S**afe **M**ixed-Income, **A**ccessible, **R**easonable Priced and **T**ransit-Oriented) offers development fee waivers and expedited review to developers who turn vacant property into reasonably priced housing (table 6.2).

The goals of the S.M.A.R.T. Housing Initiative are:

To stimulate the production of reasonably priced housing for low- and moderate-income residents of Austin
To increase the standard of Austin's housing supply
To improve accessibility standards
To improve energy efficiency
To increase transit-oriented housing options

The program fosters collaboration between city departments to reduce costs through fast-track review of targeted subdivision and site plans, namely those involving "reasonably priced housing." The program provides consistent interpretation of city codes, ordinances, and technical standards. On average, S.M.A.R.T housing development reviews take approximately half the time of conventional development reviews. Although the main goal of the S.M.A.R.T Housing Initiative is to increase the supply of reasonably-priced housing, the program encourages infill and mixed-use development, including live-work space. Eligible projects must be outside of the 100-year floodplain and within a quarter-mile of a transit stop. The Austin Housing Finance Corporation estimates that projected tax revenue will exceed fee waivers by $1.3 million over five years.

TABLE 6.2
Austin, Texas
S.M.A.R.T. Housing Initiative

Goals / Objectives
To stimulate the production of reasonably priced housing for low and moderate-income residents of Austin
To increase the standard of Austin's housing supply
To improve accessibility standards
To improve energy efficiency
To increase transit-oriented housing options
Strategies Employed
Fee Waivers
"Fast track" processing
Process checklist
One agency responsible for processing of development applications
Additional Information
The Austin Housing Finance Corporation estimates that projected tax revenue will exceed fee waivers by $1.3 million over five years.
In FY 02-03, the average completion time for S.M.A.R.T. Housing reviews was approximately half the time of conventional reviews.
Contact Information
City of Austin Neighborhood Housing and Community Development Department
(512) 974-3100
http://www.cityofaustin.org/ahfc/smart.htm

Sources: City of Austin Neighborhood Housing and Community Development Department. 2004; City of Austin S.M.A.R.T. Housing Program. 2004.

State of Massachusetts: Smart Growth Zoning Districts

In the state of Massachusetts, Smart Growth Zoning Districts may be adopted by municipalities (table 6.3). These districts are superimposed over one or more existing zoning districts, thus allowing developers to follow either the underlying zoning or the smart growth zoning district requirements. Eligible locations are:

Areas near transit stations, including rapid transit, commuter rail, and bus and ferry terminals
Areas of concentrated development, including town and city centers, other existing commercial districts in cities and towns, and existing rural districts
Areas that by virtue of their infrastructure, transportation access, existing underutilized facilities, and/or location make highly suitable locations for residential or mixed use smart growth zoning districts

TABLE 6.3
State of Massachusetts
Smart Growth Zoning Districts

Goals / Objectives
To encourage smart growth
To increase housing production in the state of Massachusetts
Strategies Employed
Processing deadlines
Application checklist
One agency responsible for processing of development applications
Incentive payments from the state to municipalities
Additional Information
Smart Growth Zoning Districts must adhere to minimum density requirements
Residential development within Smart Growth Zoning Districts is subject to affordability requirements
Smart Growth Zoning Districts must permit infill housing
The zoning ordinance must provide for a mix of residential housing types
Development in the district can not be subject to any limitation on the issuance of building permits for residential uses
Contact Information
Massachusetts Department of Housing and Community Development
(617) 573-1250
http://www.mass.gov/dhcd/40R/default.htm

Source: Metropolitan Area Planning Council. 2004.

Applications for smart growth zoning districts must, amongst other requirements, identify residential development opportunities for infill housing and the residential reuse of existing buildings. At a minimum, smart growth zoning districts must permit a mix of housing types, permit infill housing, follow minimum density requirements, and must not be subject to any limitation on the issuance of building permits for residential uses.

There is an expedited project review process for smart growth zoning districts. When a municipality refers the contents of an application for project approval, municipal entities, in addition to the approving authority, have 60 days to comment. The approving authority must hold a public hearing and a decision must be made within 120 days of filing, or it is automatically deemed approved.

Funding is also provided to municipalities to encourage development in smart growth zoning districts. In addition to a one-time density bonus of $3,000 for each unit of new construction, housing incentive payments ranging from $10,000 for up to 20 housing units to $600,000 for 501 or more units of housing are awarded to municipalities with approved smart growth zoning districts.

Columbus, Ohio: Downtown Commission

The Downtown Commission was created in 1997 to uphold the new Columbus city code. The new code replaced a suburban-style zoning ordinance in downtown Columbus with one 170-acre mixed-use downtown district (table 6.4). The zoning in this district allows for all land uses downtown, except for billboards, junkyards, and free-standing communication towers. The Downtown Commission functions as the board of zoning and adjustment, planning commission, and graphics commission within the boundaries of the downtown district. This "unibody" function facilitates a streamlined review process. The commission is authorized to issue a certificate of appropriateness within 30 days. Before the creation of the commission, the same process often took six to eight weeks (Williams 2004).

Since 2000, Downtown Columbus has seen $1.7 billion in private and public investment, up from $1.4 billion between 1994 and 1999, much of it on surface parking lots (Williams 2004). The Downtown Commission, which bases its decisions on the quality of design, encourages well designed, mixed-use infill development in downtown Columbus.

TABLE 6.4
Columbus, Ohio
Downtown Commission

Goals / Objectives
To uphold the zoning code
To demand better design
To promote new construction
Replace a traditional zoning ordinance with a design review process
Strategies Employed
Expedited review process
Simultaneous permit processing
Codify/simplify local land-use regulations
Consolidate or abbreviate commission review
One agency responsible for processing of development applications
Additional Information
The Downtown Commission functions as the board of zoning and adjustment, planning commission, and graphics commission within the boundaries of the 170-acre downtown district
Since 2000, Downtown Columbus has seen $1.7 billion in private and public investment, up from $1.4 billion between 1994 and 1999.
The commission is authorized to issue a certificate of appropriateness within 30 days. Before the creation of the commission, the same process often took six to eight weeks.
Contact Information
Downtown Development Resource Center
(614) 645-6305
http://www.downtowncolumbus.com/economic_development.php?category=2

Source: Williams, Brian. 2004.

State of Oregon: Tri-County Service Center

The Tri-County Service Center was formed to foster cooperation between industry and building officials in order to develop uniform practices and procedures for the building and construction industries in Clackamas, Multnomah, and Washington Counties (table 6.5). The Tri-County Service center has established standardized permit application processes and fee methodologies, a process for consistent code application, a local dispute-resolution service for industry and building departments, and standardized permit forms for the 27 jurisdictions in the tri-county Portland area. A majority of these forms are available online for printing. However, they currently can not be submitted electronically.

TABLE 6.5
State of Oregon
Tri-County Service Center

Goals / Objectives
To foster cooperation between industry and building officials
To develop uniform practices and procedures for the building and construction industries in Clackamas, Multnomah and Washington Counties
Strategies Employed
Application checklist
Standardized application forms
One Stop Permitting
Forms available over the internet
One agency responsible for processing of development applications
Additional Information
The Oregon State Building Codes Division has proposed a statewide, one-stop e-permitting system which would provide standardized forms for the entire state of Oregon. These forms could also be submitted electronically.
The Building and Codes division has proposed piloting the project at the Tri-County Service Center, before implementing the system statewide.
Contact Information
Oregon State Building and Codes Division
Tri-County Service Center
(503) 872-6731
http://www.cbs.state.or.us/external/bcd/tricounty.html

Sources: Oregon Department of Consumer and Business Services. 2004; Oregon State Building and Codes Division. 2005.

State of New Jersey: "Fast-Track" Building and Environmental Permitting Law

This law would allow for "fast-tracked" building and environmental permitting in urban areas and other state-designated growth areas (about 30 percent of the state) as specified in the New Jersey State Development and Redevelopment Plan. Under the law, responses to applications for environmental permits must be given within 45 days, or they are automatically approved (table 6.6). In addition, the law would create a Division of Smart Growth in the Department of Environmental Protection and Division of Smart Growth in the Department of Transportation.

TABLE 6.6
State of New Jersey
"Fast-Track" Building and Environmental Permitting Law

Goals / Objectives
To expedite permitting of development projects within state-designated smart growth areas
Strategies Employed
Appointment of an individual to oversee an orderly and expeditious processing of development applications.
"Fast track" review process in "smart growth" areas
Processing deadlines
Simultaneous permit processing

Additional Information
This law does not apply to the Highlands Preservation Area.
Implementation delayed by executive order; under review to be repealed.
Contact Information
Office of Smart Growth
New Jersey Department of Community Affairs
(609) 292-7156
http://www.state.nj.us/dca/osg/

Source: Chambers 2004.

The law calls for the creation of a smart-growth "ombudsman" in the Department of Community Affairs and for a specific smart-growth appeals court. The ombudsman would make recommendations to the governor and the departments concerning ways to expedite permit decisions, would be authorized to participate in the permit application and review process to ensure compliance with the expedited time frames, and would maintain an informational Web site. The ombudsman would also review any new rules or regulations proposed by any state agency to determine whether the proposed rules or regulations are consistent with the smart-growth principles in the State Development and Redevelopment Plan.

Implementation of the New Jersey Fast-Track law has been delayed by executive order, and the statute is under review to be repealed. A smart-growth ombudsman has been appointed, however.

While the "Fast-Track" law is in limbo, New Jersey in other ways, has attempted to expedite permitting to encourage infill. An example is the sector Permit" based on Long Branch pilot of CAFRA General Permit delegation. The city of Long Branch worked with the New Jersey Department of Environmental Protection (NJDEP) to obtain the then-pilot Sector Permit (Source:http://www.smartgrowth gateway.org/caselongbranch.shtml). The NJDEP, under Governor Whitman then adopted a rule to enable other towns within the CAFRA zone to make application for a Sector Permit provided they had either a master plan or urban revitalization plan endorsed by the State Planning Commission.

The NJDEP then proposed rules in 2001 that would have enabled the grant of a "Statewide Sector Permit" to municipalities with endorsed plans. The proposed rule would have extended the Sector Permit concept to other NJDEP permits such as Waterfront Development and Wetlands. The permit reduces the usual, lengthy NJDEP project review to a quicker oversight of the local approval. The adopted CAFRA Sector Permit and proposed Statewide Sector Permit rules were shelved under Commissioner Campbell and have not resurfaced since. An excerpt of a description of the Statewide Sector Permit rule proposal taken from the NJDEP website is shown below. As the sector permit approach would facilitate infill and other goals of the New Jersey state plan, it warrants consideration and implementation.

New Jersey
Statewide Sector Permit
Background and Requested Comments
Interested Party Review
General

The Department of Environmental Protection is seeking input and requesting your comments to help guide the preparation of a proposed regulation that would establish a Statewide Sector Permit for development and redevelopment in designated centers and in municipalities with master plans which have been endorsed by the State Planning Commission. The Department believes that establishing a Statewide Sector Permit would help…expedite State approvals for development in municipalities that are encouraging appropriate development.

Background

The proposal would allow for municipalities that either contain a Governor's Designated Urban Coordinating Council neighborhood or have gone through the center designation, endorsed plan, or regional plan process with the State Planning Commission, to obtain Department approval of a Sector Permit and to incorporate the State authorization under the permit into their actions under the Municipal Land Use Law.

The Sector Permit concept was initiated with the City of Long Branch as a CAFRA permit pilot project and has recently been expanded, by regulation, to allow any municipality with a designated center in the CAFRA zone to apply for a sector permit for CAFRA regulated activities.

The statewide sector permit will facilitate development and redevelopment in areas where State agencies and local governments have determined that development and redevelopment should be encouraged. In tandem with the regulatory benefits afforded to appropriate development in Sectors, the Department, by creating partnerships with participating municipalities, will guide new land development in these communities away from areas unsuitable for development such as sensitive natural areas and gain better protection of our State's natural resources. This will be accomplished by requiring municipalities to demonstrate that environmentally sound land use planning is a foundation for their land use ordinances as a qualifying prerequisite for Statewide Sector Permit.

Source: NJDEP 5, February 2001.

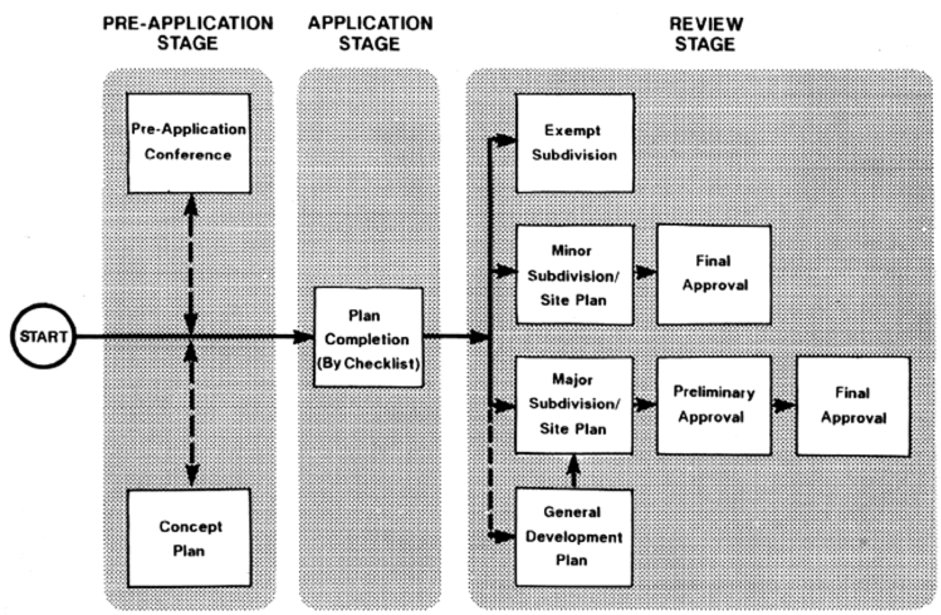
RECOMMENDATIONS AND PROVISIONS TO EXPEDITE DEVELOPMENT PROCESSING IN THE INFILL ORDINANCE AND POLICY GUIDE

Section VI of the ordinance and policy guide incorporates many national recommendations and procedures to expedite review and in other ways to improve development processing. Examples include:

Informal Plan Review between the Applicant and the Municipality and Other Review Jurisdictions

The document encompasses pre-application, application, and review steps as outlined in figure 6.1. The pre-application stage is designed to "expedite applications and reduce design and development costs." To this end, it provides (at the request of the applicant) for both a pre-application conference and a concept plan review. The pre-application stage is envisioned as a forum for both the developer's and the municipality's technical staffs to meet informally; the concept plan is a forum for informal presentation to the planning board (or subdivision and site plan committee). This procedure is similar to those adopted elsewhere in the country. For example, the Affordable/In-fill Housing and Sustainable Buildings Expedite Program in San Diego employs preliminary reviews.

FIGURE 6.1
Infill ordinance and Policy Guide Approval Procedure



Graphic by Carl Lindbloom, PP, AICP

Subdivision and Site Plan Committee

The infill ordinance and policy guide also provides for establishment of a subdivision and site plan committee. Its purpose is to assist the planning board in performing its subdivision and site plan deliberative functions. Such committees have effectively served this role in many localities. It is important, however, that this committee not add an extra, non-functional step to the regulatory process. For example, under the infill ordinance and policy guide, the committee is empowered to approve, under certain conditions, minor subdivision and site plan applications—freeing the full board to focus on major applications.

Administrative Officer

The document also provides for the position of an administrative officer, who is assigned numerous administrative functions (i.e., receiving applications, issuing a certificate if a board does not act within prescribed time limits, and so forth). The position of an administrative officer—or another individual appointed by the mayor and governing body—is included to help ensure the "orderly and expeditious processing" of subdivision and site plan applications. Designating an administrative officer is prompted by the belief that such an appointment will focus attention on the subdivision and site plan approval process and contribute to an ongoing effort to search for ways to improve it. The smart growth ombudsman created by the New Jersey fast track law performs a similar role with respect to state level environmental and building permits.

Differentiation of Development Applications

Development applications are divided into "minor" and "major" categories (certain applications are also exempt from review.) A more expedited single-stage procedure is provided for applications classified as minor, while those classified as major are reviewed in a two-stage process—"preliminary" and, then, "final." This provision allows infill developers of major applications to proceed in a step-by-step fashion. First, they obtain preliminary approval. Only when this approval is secured are they required to post bonds and to take other action to secure final approval.

General Development Plan

The document provides for General Development Plan (GDP) approval for infill developments. Since infill developments are often complex, it is extremely costly to prepare the full engineering work for them, which would ordinarily be required at the first part of the formal review stage—the preliminary review stage (see figure 6.1). Instead, the GDP is introduced as a stage before preliminary subdivision or site plan review. It is designed to permit the developer of an infill project to go before the planning board with a description, but not full engineering details, of the development, and secure formal approval of basic development parameters, such as the total number of residential units and major circulation patterns. Similarly, the GDP can offer a point in the project timeline for any LEED®-based initiatives to be discussed. It is beneficial for developers to implement sustainable design elements in the project before investing in full engineering and architectural details.

Once having secured such approval—an agreement which cannot be obtained in a binding manner at the informal or pre-application stage—the developer proceeds with full engineering plans to be considered at length at the preliminary subdivision and site plan review stage. The ordinance and policy guide thus expands on the use of GDP. In New Jersey, GDP is currently limited to projects of at least 100 acres. The current proposal enables developers of smaller scale infill projects to take advantage of the GDP flexibility.

Time Limits for Public Response

A time limit of 45 days is set for declaring a submission "complete." To make this provision more effective, municipalities specify a "checklist" of items that applicants must submit for an application to be considered complete. Following submission of a complete application, further time limits of 45 to 90 days are established, depending on the nature of the application (i.e., the longer 90-day period applies for submissions involving a variance or encompassing a larger number of units).

Protection of Applicants

Applicants are protected by giving them a reasonable period through which to proceed and during which they are safeguarded from zoning changes that may affect development economics. For example, a multi-year protection period is granted following final approval of a major subdivision or site plan. This provision is similar to regulations adopted elsewhere in the county. For example, in Massachusetts Smart Growth Zoning Districts, project approvals remain valid and run with the land indefinitely—provided that construction has commenced within two years after the decision is issued

Single Review Body Jurisdiction

Applicant review by a single jurisdictional body is permitted to minimize the necessity for applicants to go before multiple boards. For example, the zoning board is empowered in certain instances (i.e., on applications involving a request for variances) to grant, to the same extent and subject to the same restrictions as the planning board, subdivision and site plan approval. This provision obviates the need for an applicant to go before both the planning board and the zoning board. Again, similar provisions have been successfully effected elsewhere in the United States. For instance, the Columbus, Ohio, Downtown Commission acts as the board of zoning and adjustment, planning commission, and graphics commission in the 170-acre downtown district.

Applicant review by a single jurisdictional body has been the case in New Jersey since the adoption of the Municipal Land Use Law (MLUL) in the 1970s. As per the MLUL, the Zoning Board of Adjustment has the power to grant development approvals when a "d" (Use) variance is required. Planning Boards are empowered to grant "c" (bulk) variances associated with applications for development involving a permitted use.

Applicants in New Jersey do not have to go to the Zoning Board of Adjustment to get approval for a “d” variance and then to the Planning Board to get approval of “c” variances.

Expedited Processing

Infill development receives expedited review and approval at all governmental levels: federal, state, regional, county, and local. In addition to offering expedited review and approval for infill development, municipalities may also incorporate sustainable design principles into the fast tracking process. The document purposely does not assign a mandatory period for governmental action on the infill application, but rather gives priority to the infill application. The intent of the document’s fast tracking language is to move infill projects to the head of the queue. Expedited review of permit applications, in one form or another, is a component of the New Jersey fast track law, the Affordable/Infill Housing and Sustainable Buildings Expedite Review Program in San Diego, the S.M.A.R.T. Housing Initiative in Austin, Smart Growth Zoning Districts in Massachusetts, and the Columbus Downtown Commission.

Reduced Fees

Infill development may be charged reduced fees [or fees may be waived] for governmental review and other services. Reduced fees are an incentive to infill projects. To illustrate, reduced fees are one component of the S.M.A.R.T. Housing Initiative in Austin, Texas.

Appropriate Development Impact Assessment of Infill Proposals

Development Impact Assessment (DIA) includes such analyses as traffic, environmental, and demographic impacts. The “standard” multipliers associated with such impact studies, such as the trip generation and average household size–school age children per housing unit may overstate the effects from an infill project since these developments are less auto-dependent and attract smaller households with fewer school children. Applying the standard DIA multipliers, rather than infill-specific parameters, will thus tend to overstate the actual infill project impacts. The infill ordinance and policy guide therefore calls for the DIA of infill projects to reflect the unique traffic, environmental, demographic and other characteristics of such developments. Illustrative are estimating the number of school-age children generated by development. By way of background, school-age multipliers are the average number of persons of elementary and secondary school age (roughly ages 5 through 18) found in a housing unit. In general, the Public Use Microdata Sample (PUMS) of the decennial census is the best overall source for calculating school-age children multipliers. Although the census is the best overall demographic source, the PUMS may not be accurate for certain specialized housing developments, such as those found in infill projects.

An analysis of 14 infill developments in New Jersey, with a total of 2,201 housing units, indicates that they generated 60 school-age children (see table 6.7). That represents a school-age children multiplier of 0.03. In other words, every 100 housing units in infill developments generated only about 3 school-age children. The school-age children multipliers for the infill projects are substantially lower than those indicated by the PUMS for housing in general. Based on the PUMS, the analysis would have projected that the 14 New Jersey infill developments would have generated 359 school-age children. That is far higher than the infill developments' actual school children yield of 60.

TABLE 6.7
School-Age Children Generation from Selected Infill Developments in New Jersey

Project Profile			Size	Pupil Generation		Pupil Multipliers	
Project Name	Location	Tenure	Number of Units	Pre-School (0–4 years)	School-Age (5–19 years)	Pre-School (0–4 years)	School-Age (5–19 years)
1. Jacobs Ferry	West New York	Rental	254	0	0	0.00	0.00
2. Hickory Manor	Union	Rental	225	8	12	0.04	0.05
3. Riverwalk I	Clifton	Rental	203	6	4	0.03	0.02
4. Riverwalk II	Passaic	Rental	37	2	4	0.05	0.00
5. Riverwatch	New Brunswick	Rental	200	0	1	0.00	0.01
6. Chancery Square	Morristown	Rental	131	0	1	0.00	0.01
7. Station Court	Berkeley Heights	Rental	65	1	0	0.02	0.00
8. Bellclair	Montclair	Rental	70	3	1	0.04	0.00
9. Willows	Chatham	Sale	48	0	0	0.00	0.00
10. Jefferson	Aberdeen	Rental	290	12	6	0.04	0.02
11. Traditions	South Plainfield	Sale	355	0	20	0.00	0.06
12. Franklin Square	Metuchen	Rental	200	15	6	0.08	0.03
13. Gaslight Commons	South Orange	Rental	200	15	6	0.08	0.03
14. Dunellen	Montvale	Rental	18	0	0	0.00	0.00
Total			2,201	47	65	0.02	0.03

Although this analysis is preliminary—and the demographics of infill projects should be monitored over time—the evidence cited above suggests that infill developments generate relatively few school-age children. That is of benefit to the host communities containing infill projects because few school-age children from infill mean that the infill poses only modest demand on local school districts. A DIA of an infill project should therefore incorporate infill-specific school-age children multipliers.

Appropriate Exactions Charged to Infill Development
As well as urging that DIA incorporate infill-specific multipliers, the infill ordinance and policy guide also calls for infill-sensitive determination of the impact fees to be charged to infill projects, By way of background, whether termed “development exactions,” “impact fees,” “capacity fees,” “system development fees,” “capital recovery fees,” “proffers,” or other nomenclature, these generic charges all refer to exactions placed on new growth to fund a proportionate share of the infrastructure costs engendered by development. An appropriate framework for determining impact fees is summarized in table 6.8. That framework encompasses (1) a projection of the marginal infrastructure costs engendered by growth in a “rational nexus” fashion, and (2) a credit mechanism for the taxes paid by incoming development, which funds capital outlays (“equity adjustment”), as well as the net fiscal impact of the development (“fiscal impact adjustment”).

Because of its lesser impacts, (e.g. fewer auto trips and fewer school children generated) and typically higher values and positive fiscal impacts relative to greenfields development, infill projects should generally be charged a relatively lower fee. That more modest charge is a direct result of the application of the factors shown in table 6.8.

In sum, the model infill ordinance and policy guide incorporate many of the innovative procedures recommended in the national literature and adopted in many places across the United States to provide for more rational, accurate, and efficient processing of development applications.

TABLE 6.8
Development Exaction Framework, Principles, and Procedures

Framework	Guiding Principles	Operational Procedures
I. "Rational Nexus" between growth, infrastructure cost, and exactions	1) Linkage between imposed exaction and marginal capital improvement	1a) Exactions cover only planned or necessary improvements 1b) Exaction must not be used to compensate for existing deficiencies or to upgrade existing standards. 1c) Exaction totals must not exceed facility cost. 1d) Fund segregation.
	2) Proportionality between exaction and benefit	2a) Exactions must be allocated according to facility usage by different types and size development. 2b) Estimates of facility usage (e.g., trip generation tables, school-age population multipliers) should be the most current available, and based on local or regional studies. studies.
II. "Fair Taxation" of growth	3) EQUITY ADJUSTMENT Exaction must reflect the net cost of infrastructure provision engendered by development	3a) Tally all development-generated revenues. 3b) Determine that the share of total revenues assignable to infrastructure financing revenues has been credited. 3c) Subtract this amount (capitalized) from the development-associated infrastructure costs to determine the net assignable development exaction.
	4) FISCAL IMPACT ADJUSTMENT Exaction should reflect the net fiscal impact of development. and infrastructure costs.	4a) Determine development-generated operating and infrastructure costs. 4b) Determine development-generated total revenues. 4c) Subtract development-generated total costs from total revenues to yield the net fiscal impact. 4d) Subtract the net fiscal impact (capitalized) from the development-associated infrastructure cost to determine the net assignable development exaction.

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Chapter 7
INFILL DESIGN

DESIGNING INFILL PROJECTS: THE CHALLENGE

Good design is a key factor in achieving successful infill development. Since infill takes place in established areas, an infill site will likely have functioning buildings nearby, an existing street network, and an established environment into which the new project must fit. Sensitivity to the surrounding character and design context helps to establish that fit. Too often, however, infill development has not been designed in ways that enhance the overall quality of the community. Instead, development has been piecemeal and uncoordinated, and the design is incompatible with the surrounding area. New buildings are out of scale with the neighborhood, they ignore the local architectural and historical context, they block sun and views, and they feature boring, monotonous façades.[1]

This is unfortunate because infill development offers an excellent opportunity to strengthen development patterns, fill in gaps, and restore the urban fabric. "Vacant and underdeveloped lands interrupt the street wall and prevent suitable definition of the street, a condition commonly referred to as 'missing teeth.' Infill projects can visually unify the street through the development of these properties."[2] Although design, by itself, cannot make an infill development a success, it plays a significant role in the quality of a project and whether it makes a positive contribution to the neighborhood. The best infill projects are characterized by good design—both in terms of architecture and linkages with the surrounding neighborhood. With good design, these projects can help improve an area that is thriving or reinvigorate one that has declined over the years.

Developers have an obvious stake in delivering a well-designed product. The public sector also plays an important role, with cities realizing that high-quality development contributes to the economic development of the city, protects access to sites, improves mobility, protects property values and the natural environment, enhances cultural and historic resources, and helps ensure the efficient use of infrastructure. Cities concerned about the impacts of new projects are seeking higher standards for design.

This is not a new concern: there is ample historical precedent for the involvement of the public sector. As urban historian John Reps pointed out:

> The examples of Annapolis, Williamsburg, Savannah, Washington, and many of the 19th century planned state capital cities remind us that public initiative and investment for the planning of cities once served to create an urban environment superior in quality to that of the present. . . . If American urban history has anything to contribute to the modern world . . . it is that good cities—beautiful, as

This chapter by Carole C. Walker.

[1] See Wheeler 2002, 36. See, also, Gibbs, n.d., 4.
[2] Pasadena 2002, Section 8, Guideline 6.

> well as safe and efficient—will arise only when it is the city itself that assumes the obligation for its own destiny.[3]

This chapter presents an overview of the design of infill development. It considers the essential qualities characterizing urban design, spells out the municipality's role in planning for infill development, describes the review process in evaluating development projects, and examines design controls intended to achieve better design of infill projects. With this as background, the chapter then describes the steps in planning an infill project, pointing out elements of good design with the objective of encouraging higher quality development.

ISSUES IN URBAN DESIGN

In response to concerns about the appropriate design of new projects, design review has become an increasingly large part of the development control process in cities across the country. Design review provides an opportunity for the local government to examine projects for their design quality and compatibility with nearby development. Design review focuses on the appearance of new construction, site planning, landscaping, signage, and other site details. Whereas zoning defines the uses allowed on a given piece of property, along with other basic requirements such as parking ratios and height limitations, design review addresses "the how rather than the what."[4] Its intent is to direct allowed development into more acceptable forms.

To undertake design review, however, a municipality must first define its development goals and establish design criteria for accomplishing those goals. What is the community trying to accomplish, what qualities are being sought in new development, and what requirements should be adopted to achieve those qualities? For infill development, this means identifying the qualities in the urban environment that are critical to the public's use and comfort and determining how a project can bring about those qualities.

Unique Qualities of the Urban Environment

Two qualities of the urban environment underlie essential requirements for infill design: first, city streets are "the common realm, shared by all."[5] As such, their quality and character should be maintained to be accessible and enjoyable by their users. Streets in the urban context place particular emphasis on the pedestrian; they permit passage by vehicles, but they also allow, invite, and encourage people to walk. Fostering pedestrian usage requires a pleasing interaction between the buildings and the street. This interaction determines the character of the street and the quality of the larger neighborhood.[6]

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[3] Reps 1981, 295.

[4] Gibbs n.d., 10. The discussion on design review is based on a paper, entitled, "Design Review in the Urban Context: Denver's Experience," by Tyler B. Gibbs, Director of Urban Design, Community Planning and Development, City and County of Denver.

[5] Gibbs, n.d., 6–7.

[6] Six to eight draft LEED®-ND credits can be obtained through the design and character of the streetscape. See introduction to the LEED rating system and table 7.1 below.

Second, a tight urban environment requires a level of respect for neighbors. Compatible neighbors adopt some of the same customs or reference points. In architecture, this is referred to as contextualism. Contextualism is not mimicry of style; instead it is found in basic design principles that influence the way buildings relate to their environment as well as to each other. Great architecture, though of course desirable, is not the objective per se. What is sought are well-designed infill projects that accommodate human activity and make cities more livable.[7]

Basic Urban Design Elements

Achieving infill development that fits in to its environment successfully is related to three fundamental urban design elements:

- *Building placement:* The placement of buildings relative to the street, i.e., the set-back line, sets the basic interaction between the street and the building and establishes the character of the street and neighborhood.
- *Building access:* The frequency and placement of doors relative to the sidewalk influences ease of building use and support for street activity.
- *Architectural scale and appearance:* (1) The relationship of the building(s) to the pedestrian environment (does the building's street façade promote pedestrian enjoyment?); and (2) the appearance of the building in relationship to the larger context of the street and neighborhood (does the building complement the character of neighboring structures?).

Requirements related to these three elements translate into a design strategy for infill development: ensuring that new development continues the scale, contributes to pedestrian character of an area, and reinforces any special design elements. None of these criteria dictate a preferred or mandated architectural style. "The design criteria are primarily focused on avoiding the willful neglect of urban values that may result in the imposition of arbitrary styles or inappropriate prototypes."[8] Varied and creative design is possible as long as existing development is respected.

Compatibility with LEED®-ND Objectives

The U.S. Green Building Council (USGBC), Congress for New Urbanism (CNU), and Natural Resources Defense Council (NRDC), have come together to develop a national standard for neighborhood design that integrates the principles of green building and smart growth. This partnership is developing consensus-based standards for assessing the impacts of development projects using the rating framework of the LEED® (Leadership in Energy and Environmental Design) green building rating system. LEED for Neighborhood Developments (LEED-ND) will emphasize smart growth aspects of development while still incorporating the most important green building practices. Smart-growth design will be guided by the Smart Growth Network's ten principles of smart

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[7] Contextualism earns an additional point in the "compact, complete, and connected neighborhoods" category of the draft LEED-ND standards (see table 7.1 below).

[8] Gibbs, n.d., 9.

growth and include density, proximity to transit, mixed use, mixed housing type, and pedestrian- and bicycle-friendly design. LEED-ND will provide an objective basis on which to certify developments as smart growth and serve as an incentive for better location, design, and construction of neighborhoods and buildings. The expectation is that LEED-ND, like other existing LEED rating systems, will have a positive effect on development trends—in this case, to revitalize existing urban areas, decrease land consumption, decrease vehicles miles traveled, improve air quality, decrease polluted stormwater runoff, and build communities where people of a variety of income levels can coexist and where jobs and services are accessible by foot or transit.

The draft LEED-ND criteria (launching of the criteria following final approval is scheduled for 2008) reflect the elements that constitute good design in infill development. They emphasize the basic practices that bring buildings together into a neighborhood and relate the neighborhood to its larger region and landscape. The draft rating system is organized into four categories containing "prerequisites" and "credits." In order to be LEED-certified, a development will have to meet all of the prerequisites. Each credit is optional, but contributes to the project's point total, with a certain point total required for certification. The draft ND categories, prerequisites, and credits are shown in table 7.1, with the caveat that they are likely to be revised "significantly" before being tested and implemented (U.S. Green Building Council 2005).

TABLE 7.1
LEED-ND Draft Rating System Standards

- **Location Efficiency**
  Transportation efficiency (prerequisite)
  Water and stormwater infrastructure efficiency (prerequisite)
  Contaminated brownfields redevelopment (credits 4 points)
  High-cost contaminated brownfields redevelopment site (credit: 1 point)
  Adjacent, infill, or previously developed site (credit: 3 to 10 points)
  Reduced automobile dependence (credit: 2 to 6 points)
  Contribution to jobs-housing balance (credit: 4 points)
  School proximity (credit: 1 point)
  Access to public space (credit: 2 points)
- **Environmental Preservation**
  Imperiled species and ecological communities (prerequisite)
  Parkland preservation (prerequisite)
  Wetland and water body protection (prerequisite)
  Farmland preservation (prerequisite)
  Erosion and sedimentation control (prerequisite)
  Support off-site land conservation (credit: 2 points)
  Site design for habitat or wetlands conservation (credit: 1 point)
  Restoration of habitat or wetlands (credit: 1 point)
  Conservation management of habitat or wetlands (credit: 1 point)
  Steep slope preservation (credit: 1 point)
  Minimize site disturbance during construction (credit: 1 point)
  Minimize site disturbance through site design (credit: 1 point)
  Maintain stormwater runoff rates (credit: 1 point)
  Reduce stormwater runoff rates (credit: 2 points)
  Outdoor hazardous waste pollution prevention (credit: 2 points)

Continued on next page

TABLE 7.1, continued

- **Compact, Complete and Connected Neighborhoods**
  Open community [all streets, sidewalks, and public spaces open for general use] (prerequisite)
  Compact development [basic density and floor area ratio requirements] (prerequisite)
  Diversity of uses [basic requirements] (prerequisite)
  Compact development [additional density and floor area ratio requirements] (credit: 1 to 5 points)
  Transit-oriented compactness (credit: 1 point)
  Diversity of uses [additional list of uses] (credit: 1 to 3 points)
  Housing diversity (credit: 4 points)
  Affordable rental housing (credit: 1 to 2 points)
  Affordable for-sale housing (credit: 1 to 2 points)
  Reduced parking footprint (credit: 2 points)
  Community outreach and involvement (credit: 1 point)
  Block perimeter [limits average block perimeter to promote connectivity] (credit: 1 to 4 points)
  Locating buildings to shape walkable streets (credit: 1 point)
  Designing building access to shape walkable streets (credit: 1 point)
  Designing buildings to shape walkable streets [includes street- or plaza-facing façade, transparent glass on at least 33 percent of the ground-level façade, no blank walls longer than 50 feet along sidewalks, and binding agreement by owner(s) that ground-level nonresidential spaces will remain unshuttered at night] (credit: 1 point)
  Comprehensively designed walkable streets (credit: 2 points)
  Street network [direct and safe street connections to destinations] (credit: 1 point)
  Pedestrian network [direct and safe pedestrian connections to destinations] (credit: 1 point)
  Maximize pedestrian safety and comfort [includes on-street parking, low speed limits, street trees, and dwelling unit finished floor elevated no less than 24 inches above sidewalk grade] (credit: 1 point)
  Superior pedestrian experience [includes ground floor retail in office buildings, direct access from public area to all ground floor businesses, and/or trees or structures to provide shade] (credit: 1 to 2 points)
  Applying regional precedents in urbanism and architecture (credit: 1 point)
  Transit subsidy (credit: 3 points)
  Transit amenities (credit: 1 point)
  Access to nearby communities (credit: 1 point)
  Adaptive reuse of historic buildings (credit: 1 to 2 points)

- **Resource Efficiency**
  Certified green building (credit: 1 to 5 points)
  Energy efficiency in buildings (credit: 1 to 3 points)
  Water efficiency in buildings (credit: 1 to 2 points)
  Heat island reduction (credit: 1 point)
  Infrastructure energy efficiency (credit: 1 point)
  On-site power generation (credit: 1 point)
  On-site renewable energy sources (credit: 1 point)
  Efficient irrigation (credit: 1 point)
  Greywater and stormwater reuse (credit: 2 points)
  Wastewater management (credit: 1 point)
  Reuse of materials (credit: 1 point)
  Recycled content (credit: 1 point)
  Regionally provided materials (credit: 1 point)
  Construction waste management (credit: 1 point)
  Comprehensive waste management (credit: 1 point)
  Light pollution reduction (credit: 1 point)
  Contaminant reduction in brownfields remediation (credit: 1 point)

Source: U.S. Green Building Council 2005.

THE ROLE OF THE MUNICIPALITY

Credits will be awarded, for example, for neighborhoods that have a mix of land uses, accommodate a diversity of household types, have an integrated network of walkable streets, and have special sites reserved for public spaces and civic buildings.

Well-designed infill projects are much more likely when the municipality takes the lead in identifying areas with potential for infill development, develops plans for targeted areas, prepares design regulations guiding development, and works with the surrounding community. Undertaking a planning process demonstrates a community's commitment to achieving quality development and provides clearer and more predictable requirements for a developer. Table 7.2 shows the steps to follow in a planning process.

Table 7.2
Steps in Infill Development Planning

1. The municipality (or an appropriate city authority) should survey areas to identify potential infill opportunities. Signs of potential sites, for example, might include parcels whose assessed property tax valuation of land exceeds that of the buildings, parcels where buildings only cover a fraction of the site, or downtown parcels where buildings are one-story or have low floor–area ratios.

2. With information from the land survey, the next step is to target specific areas for redevelopment or rehabilitation.

3. A site analysis should then be performed to determine conditions in the targeted area and to assess conditions possible blighted conditions. For example, in New Jersey, analyze whether the site meets the applicable criteria of sections 5 or 14 of the Local Redevelopment and Housing Law (NJSA 40A:12A-1, et. seq.) for designation as either a Redevelopment Area or Rehabilitation Area.

4. Once the municipality has designed an area with infill potential to be a rehabilitation or redevelopment area, the municipality begins the planning process.

5. Typically, the municipality will adopt a redevelopment plan with design standards. The redevelopment plan will either supercede or constitue an overlay of the local zoning ordinance.

6. A municipality may choose to recruit and bring in potential developers at this point to solicit their input in bringing the vision into reality.

7. Alternatively, the municipality may choose to involve the public before bringing in potential developers. Key stakeholders should be identified and workshops held. It is often desirable to hire consultants to coordinate public involvement and prepare design guidelines, prepare an environmental impact report, and to make zoning changes, if necessary.

8. Once an overall plan has been agreed on, the redevelopment plan is adopted by ordinance of the governing body and is used as the regulating framework for future development. The design guidelines will help developers know what to expect as they prepare their plans.

9. The municipality then works with the developer to coordinate infill development, sometimes helping to acquire and assemble infill parcels. State law must be followed. For instance, New Jersey municipalities can use the powers of Section 8 of the Local Redevelopment and Housing Law, but only after adoption of a redevelopment plan that identifies such parcels as being necessary for acquisition.

10. Finally, for large projects, the municipality may use its redevelopment powers to acquire land, improve infrastructure, and add amenities to the designated area.

Source: Adapted from Listokin and Walker 1989, and Moskowitz and Lindbloom 2004. See also Stan Slachetka and David Roberts 2003.

In many instances, however, an infill site may not be part of a larger planning area or a neighborhood targeted by a community for special treatment. Instead, a developer will submit a development plan for the site to the municipality for review. Whether or not a community undertakes a formal planning process or adopts a redevelopment plan encompassing a designated area, design review provides an opportunity for municipalities and developers to work together to ensure that a proposed infill development meets both the design goals of the community and the requirements of the developer.

REVIEWING INFILL DEVELOPMENT PROJECTS

Because infill development takes place in built-up areas, a project's relationship to the surrounding environment is a key consideration in reviewing this type of development. Generally, site plan review tends to focus on the functional systems shown on the site plan of a proposed development. These include the arrangement of buildings, structures, roads, utilities, and plantings. But limiting review to two-dimensional considerations is inadequate for in infill development. Instead of site plan review, this document uses the terms "development review" and "design review" to convey that broader review is required. Development review considers the project's design within its contextual setting, evaluating the location and placement of buildings, infrastructure, roads and walkways, landscaping, and other features in relation to the surrounding area.

The Review Procedure

The review procedure is a systematic process that begins with the overall design concept and ends with the consideration of site details. The development plan shows existing conditions on the parcel (or parcels) of land as well as details of the proposed development.[9] Among the items scrutinized during development review are the bulk, height, number of stories, orientation, and arrangement of all structures on the site. The structures' relationships to the site's environmental features and to surrounding land uses are examined. Provision for vehicular and pedestrian circulation, access to the site, and parking and loading are reviewed. Proposed sewer and water facilities are considered, as well as the impact of the development on existing municipal facilities. The plan is checked for proper drainage and minimization of runoff. The landscaping, signage, lighting, and other site details are reviewed to ensure compliance with regulations and community design objectives.

[9] See Schultz and Kasen 1984, 362.

The elements considered in development review thus follow a logical sequence, as shown in table 7.3, from noting existing conditions, to considering the functional systems of the proposed development and overall layout, and finally, to specific design details, such as types of street trees or the design of lighting fixtures. Particularly important for infill development review is consideration of the relationship of the new development to surrounding land uses and design. The review process is an opportunity for municipalities and developers to work together to ensure that a proposed infill development meets both the design goals of the community and the requirements of the developer. The review process works best when (1) interaction between the municipality and the developer begins during the planning stages of the project; (2) the municipality has clearly defined design standards, with planning board members or review staff in general agreement on design goals; (3) application of design standards is consistent; and (4) the reasons for exceptions are open to public examination.[10]

Table 7.3
Steps in Development Plan Review

Step 1:	Site inspection—existing conditions and site context
Step 2:	Overall design concept
	• Land use relationships with adjacent and nearby areas
	• Conformance with local master plan
	• Utility considerations (need and available capacity)
	• Neighborhood circulation patterns (site access)
Step 3:	Site design
	• Building layout
	• Provisions for vehicular and pedestrian circulation
	• Provisions for parking and loading
	• Parking layout
	• Bulk, height, and design of all structures
	• Environmental impact; drainage and minimization of runoff
	• Relationships with adjacent and nearby areas
Step 4:	Site design details
	• Landscape design
	• Lighting
	• Signage
	• Street hardware/street furniture

Source: Adapted from Moskowitz and Lindbloom, 369.

DESIGN CONTROLS

Efforts to improve development design have led to increasing interest in design controls, and design controls have become the generally accepted tool used by communities to control appearance.[11] Adopting design controls lets developers know what to expect and encourages better-quality development. Without them, design issues are reviewed on a project-by-project basis, which can lead to decisions that appear arbitrary. "It is far better for all interested parties to clearly state the criteria for development up front."[12] It is also

[10] Listokin and Walker 1989, 192; adapted from Hedman 1984, 136-137.
[11] NJOSP 2000, 73.
[12] Gibbs, n.d., 5.

important for all interested parties, including the community, the public, and developers, to be involved in drawing up design standards. Otherwise, design controls could include provisions that would effectively prohibit development of land that is otherwise permitted by zoning.

Design controls are best adopted as part of a community's overall design plan. They are used to implement the community vision, which is typically expressed in a master plan or a design concept plan. They set forth requirements for development to ensure that the community's design goals and objectives are carried out in the development of projects. Their overall purpose is to protect community character, ensure consistency in local decision-making, and help developers by clarifying community expectations. More specifically, communities develop and use design guidelines to:

1. clarify aspects of the community's existing character that are valued by the community;
2. make clear the community's expectations for new development;
3. ensure that new development complements rather than disrupts existing neighborhood character;
4. ensure that new development is well connected to the larger neighborhood through continuous streets and sidewalk patterns and other visual and functional linkages; and
5. raise the quality of neighborhoods.[13]

Standards may be voluntary, alerting developers about the type of development desired by the community so developers will incorporate desired features, or they may be required, calling for developers to conform to specific, nondiscretionary design standards. In the latter case, required standards are administered by staff with limited discretion.[14] Sometimes municipalities offer incentives, such as tax abatements, to developers who conform to design guidelines in target areas.

Compared with Zoning Controls

Design guidelines are used in conjunction with zoning controls. Zoning regulates the development of land through the division of a community into various districts and specifies permitted and/or prohibited uses for each district. Zoning controls govern density and dimensional regulations such as lot size, setbacks, building height, building lot coverage, frontage, and so forth. Regulations implemented by zoning controls can help ensure infill sites will be developed while respecting the scale of their context. Furthermore, the use of zoning controls may result in more accurate projections of population growth.

Design controls, by contrast, generally focus on the details of a project and its design, such as the massing of structures, scale, size, roof design, façade treatments, architectural details, materials, and colors.[15] They also focus on site details such as landscaping,

[13] MRSC 1997, 61.
[14] MRSC 1997, 62.
[15] Kruse, Radzevich, and Jerman 2004.

paving, fences, lighting, signs, and the like. They are most often used to regulate the development of commercial and multifamily structures; their use to regulate single-family dwellings is less common. In infill development, however, where new construction takes place in the context of existing development, standards applying to all types of residential uses are appropriate.

Geographic Scope of Design Controls

Design controls may apply to entire municipalities or to particular areas. They may be imposed as an overlay or replacement of existing zoning in special districts, such as in designated rehabilitation areas and/or redevelopment areas, either of which may include one or more historic districts. Design controls can be customized to the specific needs of a community. Design controls applying to an historic district, for example, can be a powerful tool to maintain the architectural or historic characteristics of a particular district. For areas that do not have an historic designation, the goal is less about preserving a specific architectural style as it is in maintaining the general character of the neighborhood in which a new infill project is proposed.

Format of Design Controls

Design controls come in various forms and levels of specificity; some include graphics and photos, while others are purely textual. Municipalities generally include language to distinguish between required and flexible controls. For example, an ordinance may specify that required standards are indicated by the use of terms "shall be" or "are to be." Standards that allow some flexibility in meeting the intent of the standard are indicated by the use of the terms "should" or "may."[16] The waterfront redevelopment plan for Asbury Park, New Jersey, goes one step further and lays out three degrees of "importance" for its design controls:

> Those [standards] that are activated by the verb "shall" are considered the most valuable to the purpose of these guidelines. Those activated by the verb "should" are preferred but discretionary. Those activated by the verb "may" are considered good practice but remain entirely optional.[17]

In Denver, design controls are organized as a "system of criteria" comprised of intent statements, design standards, and design guidelines.[18] The intent statements define design goals for each area and are followed by a series of design standards and guidelines related to each goal. Standards provide clear, objective, and quantifiable criteria required to meet each goal; the term "shall" is used to indicate that compliance is expected. Guidelines follow each intent statement and group of standards. They provide a more flexible interpretation of the goal and may present additional considerations related to the goal. Guidelines use the term "should" to indicate that compliance is desirable, but recognizes that there may be several ways to achieve the goal.

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[16] See, for example, City of Sumner 2003, 29.
[17] City of Asbury Park 2002, 63.
[18] Gibbs, n.d., 11.

In designated areas, such as in an historic or other special design district, design standards can be quite specific and include, for example, customized site development standards for an overlay district. (See the Technical Note to this chapter for a detailed discussion of historic preservation and infill.) In many cases, however, set or prescriptive design standards do not take into account conditions that vary from site to site. They may be particularly difficult to apply in infill situations.[19] Design controls regulating infill projects may have to be flexible and allow choices in areas where prescriptive zoning standards are difficult to quantify.[20]

Format of Design Controls in the Infill Model Ordinance

The infill model ordinance specifies design standards and guidelines with an accompanying commentary that explains the intent of each provision and the factors to consider in its implementation. These standards and guidelines include principles of design and steps to follow that can be applied in planning and laying out all types of developments, including infill. Required standards in the ordinance are indicated by the term "shall"; guidelines allowing for flexibility are indicated by the term "may." By clearly stating development criteria up front, all interested parties are assured a higher degree of predictability.

Municipalities are encouraged to prepare, adopt, and enforce their own set of design guidelines that are clear, concise, reasonable, based on local conditions, and related to the municipal master plan and development regulations. Each community should develop its own set of "shall," "should," and "may" guidelines. The guidelines and standards contained in the infill model ordinance can be used as a starting point, but they should be customized to reflect the needs and objectives of the community. Successful guidelines are developed through open discussions with representatives of all pertinent community stakeholders—local officials, business owners, residents, property owners, developers, interest group representatives, and others. They should promote the interest of the community as a whole and seek to achieve a balance among these diverse groups.[21]

Topics Covered by Design Controls

Although design is often thought of as subjective and difficult to regulate, many essential features of compatibility, such as the degree to which new and existing developments share patterns of alignment, scale, shape, textures, and color, can be managed through regulation. Design controls for infill development typically include provisions that reflect community goals, respect the neighborhood context, and encourage pedestrian activity. They spell out the requirements to implement the three design elements identified as essential to the urban environment: building alignment, building access, and architectural scale and appearance. Their purpose is to ensure that a project is designed in such a way

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[19] MRSC 1997, 61.
[20] MRSC 1997, 61. Specific landscape requirements calling for a certain number of shrubs, for example, may be appropriate in some urban settings, but not in others.
[21] NJOSP 2000, 73–75.

that it is harmonious with its environment and does not adversely affect the character of the existing neighborhood.

With an increased emphasis on sustainable building practices, design controls may also work to encourage new infill developers to incorporate aspects of LEED's building standards. For example, design controls make it possible to prescribe the type of materials used at a site. If a municipality concludes that local or regional materials should be used in order to respond to the context of the community, this municipality would be working toward sustainable design while simultaneously respecting the character of the existing neighborhood. In landscaping the streetscape, a municipality can require water-efficient plantings that would not require irrigation. A developer supplying water-efficient plantings would then be meeting LEED requirements.

Design standards relating to such areas as façade treatment, use of graphics or landscaping allow for a degree of design continuity that contributes to the architectural quality and very often to the commercial viability of a project. Standards often cover consistency of materials, colors, building elements, building mass, rooflines, and other constructed elements of the urban environment so that abrupt or severe differences are avoided. In a residential area, developers may be encouraged to include key features, such as detached garages, wrap-around porches, step-backs to diminish building height, and distinctive architectural features, in order to complement existing housing.

Balancing Certainty with Flexibility

Although controls for infill development should encourage design based on the existing context, they should not rigidly attempt to recreate the past. The objective is compatibility, not a carbon copy of adjacent development. Repetition of patterns should be tempered with allowance for variation and creativity of design elements—or they will produce boring results. In addition, design controls should be adjusted to accommodate new trends and needs. Changing lifestyles, demographics, the availability of building materials, and issues of affordability will require some flexibility to address. Simply being older does not assure that something is better. Communities will need to determine what aspects of their existing neighborhoods they value and wish to continue as a template for the future.[22]

The bottom line is that there is no right answer every time when it comes to design. "To try to impose a single, one size fits all solution on every development would likely impose the wrong solution the majority of the time. The goal is to try to achieve the greatest degree of certainty with appropriate flexibility." [23]

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[22] MRSC 1997, 64–65.
[23] Gibbs, n.d., 11.

Legal Issues Related to Design Controls

States have the constitutional authority under their police powers to plan and regulate the use and development of land.[24] Under that authority, states have legislated the structure within which land-use planning and regulation take place, enacting laws that "enable, mandate, or guide local governments in their adoption of local land-use plans and regulations."[25] At the same time, the U.S. Constitution provides in the Fifth Amendment an injunction against takings for public use without just compensation.[26] The just compensation clause has been used by property owners to challenge local zoning regulations, development controls, and similar restrictions on property development.

At first, the extension of the police power into the built environment was not construed to apply to the appearance of a development—i.e., to its design or "aesthetics."[27] It was not until the Supreme Court took up urban renewal that "the lid was inadvertently opened on aesthetic control."[28] In Berman v. Parker, the Court expounded on the purview of the public welfare:

> The concept of public welfare is broad and inclusive. . . . The values it represents are spiritual as well as physical, aesthetic as well as monetary. It is within the power of the legislature to determine that the community should be beautiful as well as healthy, spacious as well as clean, well-balanced as well as carefully patrolled (348 U.S. 26 [1954]).

Since protection of the public welfare was within the municipal police power, aesthetics were ushered in as subject to that same regulatory power. Legislatures were empowered to determine what was beautiful.[29] Then, in Penn Central Transportation Co. v. New York City 438 U.S. 104 (1978), the Supreme Court held that cities and states could enact land use restrictions or controls to enhance the quality of life by preserving the character and desirable aesthetic features of the city.

Since then, aesthetics have "regularly been held to be subject to regulatory control in many jurisdictions."[30] In 1994, for example, the California Supreme Court stated that restrictions on a property contained in a covenant were presumed reasonable and would be enforced unless they were arbitrary, imposed burdens that substantially outweighed

[24] Although the police power is not mentioned in the U.S. Constitution, "'police power'" refers to the residual power of state government to enact laws that promote or protect the health, safety, morals, and general welfare of its citizens" (Kayden 2000, fn 9).
[25] Kayden 2000, 449.
[26] "Nor shall private property be taken for public use, without just compensation." U.S. CONST. AMEND. 5.
[27] E.g., Woman's Kansas City St. Andrew Society v. Kansas City, MO 58 F.2d 593, 603 (8th Circuit 1932): "Mere aesthetic considerations bear no such relationship to public welfare as to sustain restrictions of zoning ordinances." See, also, Spann v. City of Dallas, 235 S.W. 513, 516 (Texas 1921): "It is not the law . . . that a man may be deprived of the lawful use of his property because his tastes are not in accord with those of his neighbors." Cited by Gill 2003, fn. 20.
[28] Gill 2003, 399.
[29] Gill 2003, 398.
[30] Gill 2003, 399.

the benefits conferred, or violated a fundamental public policy.[31] In 1984, in Village of Hudson v. Albrecht, Inc. the Supreme Court of Ohio found that “there is a legitimate governmental interest in maintaining the aesthetics of a community” because “the appearance of a community relates closely to its citizens’ happiness, comfort and general well-being.” The court held that, where a municipal legislature passed an ordinance regulating aesthetics, and that ordinance supposedly “reflects a concern for the monetary interests of protecting real estate from impairment and destruction of value,” without any further showing, the ordinance was a reasonable exercise of police power.[32]

New Jersey courts, as well, have held that aesthetics is an appropriate concern of land use regulation. In Vickers v. Gloucester Twp., for example, the appellate court stated, “aesthetics may properly be considered in establishing a zoning scheme” with the view of “conserving the value of property and encouraging the most appropriate use of land."[33] Similarly, in 1997, in Damurjian v. Board of Adjustment of Twp. of Colts Neck, the supreme court stated,

> There is nothing improper about municipal concern with aesthetics. Creation of a desirable visual environment is a zoning purpose specified by N.J.S.A. 40:55D-2(i) [“to promote desirable visual environment through creative development techniques and good civic design and arrangements”] and municipalities have ample authority under the MLUL [Municipal Land Use Law] to work toward that purpose.[34] But municipalities must do so with reasonable precision and without blanket delegation (23 1 299 N.J. Super. 84; 690 A2d 655; 1997 N.J. Super. LEXIS 134).

Nevertheless, legal issues have arisen in judging the “aesthetics” of an application, particularly with respect to building design.[35] Architectural design control remains difficult to achieve unless “the architectural standard . . . can be objectively administered and judiciously reviewed for arbitrariness, and yet not so confining as to unlawfully inhibit expression through architectural design.”[36] To regulate a broad diversity of property, such as that in infill development, the ordinance’s language must provide an implementing commission with sufficient guidance to know what is being prohibited, yet with enough flexibility to address the variety of problems that may arise.

The criteria for reviewing and evaluating claims of unconstitutional vagueness were set forth by the U.S. Supreme Court in Grayned v. City of Rockford (1972):

> . . . we insist that laws give the person of ordinary intelligence a reasonable opportunity to know what is prohibited. . . . Second, if ordinary and

[31] Cited by Gill 2003, 400.
[32] Cited by Gill 2003, 403.
[33] 181 A.2d 129 (1962). See, also, Napierkowski v. Township of Gloucester, 494; Pierro v. Baxendale, 28; and Point Pleasant Beach v. Point Pleasant Pavilion, 3 N.J. Super. 222, 225 (App. Div. 1949).
[34] Cox 1996, § 34-8.6.
[35] Moskowitz and Lindbloom 2004, 13.
[36] Frizell and Pozycki 1989, 117, cited in Moskowitz and Lindbloom 2004, 14.

> discriminatory enforcement is to be prevented, laws must provide explicit standards for those that apply them (408 U.S. 108).

"Thus, the vagueness doctrine requires that citizens be apprised of what is legal and what is illegal, and that government officials and administrators apply the law in a uniform manner."[37] Nevertheless, Grayned recognized that "we can never expect mathematical certainty from our language" (408) and that laws marked by "flexibility and reasonable breadth, rather than meticulous specificity" have been upheld.[38]

In a 1993 decision, a Washington state court of appeals spelled out the requirements for drafting such standards. After agreeing that "aesthetic standards are an appropriate component of land use governance," the court went on to describe how they should be written. "Whenever a community adopts such standards, they can and must be drafted to give clear guidance to all parties concerned. Applicants must have an understandable statement of what is expected from new construction. Design professionals need to know in advance what standards will be acceptable in a given community." [39] The decision indicated that guidelines should be written and preferably illustrated, formally adopted, published, and readily available to the public.

Procedural safeguards should also be included in ordinances so that decisions made by the administrative body administering the ordinance will be consistent. Procedural safeguards include 1) requiring local officials to have specific professional expertise, which helps to ensure that the local ordinance is applied in a rational and well-informed manner; 2) providing the right to appeal decisions, which affords property owners the opportunity to offer expert witnesses, inspect documents, and offer rebuttal evidence; and 3) providing the right to an informal review "so that a preliminary assessment of the project's compliance with standards and suggestions for modifications can be made."[40] Furthermore, in Nadelson v. Township of Millburn, the court "expressed little sympathy for individuals who challenge an ordinance as impermissibly vague, but who began their particular construction project . . . without first seeking preapplication review."[41]

In sum, a well-prepared community design plan that provides policy guidelines for design-related regulations, clear procedures, and supporting data, such as photographs of the neighboring area or illustrations showing preferred styles and designs offers the best chance for a design ordinance to be upheld by the courts. Terms that do not have generally settled meanings, or which are not widely-accepted technical terms, such as "harmonious," should be avoided or defined to provide specific guidance. Standards should be clear and specific enough to provide clear direction. Further, to be legally defensible, they should be tied to legitimate public purposes, for instance, the maintenance of property and other economic values or historic preservation.[42]

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[37] Abney 1998, 1024.
[38] Essteban v. Central Mo. St. College, 415 F.2d 1077, 1099 (8th Cir. 1969), cited by Abney 1998, 1025.
[39] Anderson v. City of Issaquah, 70 Wn. App. 64; 851 P.2d 744; 1993 Wash. App. LEXIS 234.
[40] Burke v. City of Charleston, 893 F. Supp. 598, 611 (D.S.C. 1995), cited by Abney 1998, 1030.
[41] 688 A.2d 672, 678–79 (N.J. Super. Ct. Law Div. 1996), cited by Abney 1998, 1030.
[42] MRSC 1997, 62.

Legal Authority for Design Controls

The legal authority to adopt design standards is found in state enabling statues authorizing zoning and subdivision ordinances. In New Jersey, the New Jersey *Municipal Land Use Law* (N.J.S.A. 40:55D–1 et seq.) is the legal vehicle that delegates some of the state's land use regulatory authority to counties and municipalities.[43] The MLUL assigns planning and regulatory authority primarily to municipalities. The MLUL lists the purposes of the law, all based on protecting the public health, safety, welfare, and morals. Design standards, therefore, must have a reasonable relationship to the public health, safety, or general welfare, or other proper police power objectives. Among the stated purposes is the provision related to design: "to promote a desirable visual environment through creative development techniques and good civic design arrangements."[44]

Municipalities in New Jersey derive broad authority to shape development growth and control appearance from the following sources:

- *Site plan ordinance discretionary contents.* The MLUL permits municipalities to regulate various aspects of site design through the discretionary contents of a site plan ordinance, such as preservation of existing natural resources on the site; safe and efficient vehicular and pedestrian circulation, screening, landscaping and location of structures; exterior lighting needed for safety reasons in addition to street lighting; conservation of energy and use of renewable energy sources; recycling of designated recyclable materials.[45]
- *Site plan review.* Under the broad power of site plan review, "in addition to the shaping of physical form, municipalities have some latitude to control appearance, that is, to regulate or guide the way buildings and places look. Planning boards . . . or Zoning Boards . . . have this authority under their broad powers of site plan review, which tends to focus on the functional aspects of design, rather than aesthetics."[46] Specialized design review is performed by agencies with specific functions, such as the environmental commission or the historic preservation commission for projects within designated historic districts (see below).
- *Special Improvement Districts (SIDs).* The enabling legislation for New Jersey SIDs specifically authorizes towns to adopt "criteria to regulate the construction and alteration of façades of buildings and structures in a manner that promotes unified or compatible design."[47] Towns with SIDs have been particularly energetic in developing and implementing downtown design guidelines.
- *Zoning.* The MLUL allows municipalities to regulate through their zoning ordinances the character, intensity, and placement of development. Zoning ordinances may:

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[43] "A key tenet of planning law in general, and of the MLUL specifically, is that unless they are specifically given power . . . by the MLUL, *counties and municipalities may not engage in that activity* (Zorn 2004, 4-1, italics in the original).
[44] N.J.S.A. 40:55D–2(i); cited by the New Jersey Supreme Court in Damurjian v. Board of Adjustment of Twp. of Colts Neck. See, also, NJOSP 2000, 66–77.
[45] N.J.S.A. 40:55D–41; see also, Zorn 2004, 4–7.
[46] NJOSP 2000, 72.
[47] N.J.S.A. 40:56–70; see also, NJOSP 2000, 72.

> Regulate the bulk, height, number of stories, orientation, and size of buildings and other structures; the percentage of lot or development area that may be occupied by structures; lot sizes and dimensions; and for these purposes may specify floor area ratios and other ratios and regulatory techniques governing the intensity of land use and the provision of adequate light and air, including, but not limited to the potential for utilization of renewable energy source.[48]

Municipalities may also establish standards for the provision of adequate physical improvements for parking, loading, access roads, circulation, and utility infrastructure.[49] In addition, they may provide for historic districts and associated design guidelines if an historic preservation plan element has been adopted as part of the comprehensive master plan.[50]

- *Redevelopment Plan.* Finally, in New Jersey, the mandatory elements of the LRHL, 40A:12A-1 et seq enables municipalities a variety of powers (Section 8) through the adoption of a redevelopment plan, including acquisition of properties by eminent domain, conveyance of publicly-owned land without public bid, and entering into redevelopment agreements to implement projects and, following public hearings, adopt a redevelopment plan.[51] A designated redevelopment district provides local authorities with an ideal framework for implementing physical planning objectives, including design guidelines. Towns can undertake a variety of initiatives such as restoring a pedestrian environment, redeveloping brownfields sites into mixed-use projects, or restructuring circulation systems into more logical arrangements.

Design Controls: Two Examples

In line with the goal of achieving the greatest degree of certainty with appropriate flexibility, many communities have chosen to adopt urban design principles that present the city's vision for its future and provide guidance for new development. Then, to supplement the design principles, the communities also specify design guidelines that offer more direction for the design of projects. Developers first review the design principles and then move to the design guidelines. The city and developer work collaboratively to create a project that satisfies the city's vision and the more specific guidelines.

Pasadena, California

An example of this approach can be found in the city of Pasadena, California, which has adopted both design principles and design guidelines. The Pasadena's three design principles state what the city hopes will be achieved by new development:

[48] N.J.S.A. 40:55D–65b; see also, NJOSP 2000, 68.
[49] N.J.S.A. 40:55D–65d; see also, Zorn 2004, 4–16.
[50] N.J.S.A. 40:55D–65.1; also cited in Zorn 2004, 4–16.
[51] See Zorn 2004, chapter 7, "Local Redevelopment and Housing Law."

1. Buildings and landscapes [that are] particular to Pasadena—designs that complement their settings and enhance the community's unique character and special qualities.
2. Development projects that contribute to an identifiable and coherent city form—a place that is both visually appealing and comfortable to use.
3. Creative architectural solutions that acknowledge the surrounding context without direct mimicry of historical styles.[52]

The principles are written to "establish a dialogue among designers, developers, and the local community."[53] The city has more than thirty sets of adopted design guidelines for areas with plans (i.e., specific plans, redevelopment plans, master plans), historic properties, special uses, public alleys, signs, and commercial areas. In some cases, individual guidelines may be waived for a specific project if the waiver achieves a better design solution than strict application of the guidelines."[54] For the project to be approved, however, the design commission must adopt a finding of overall consistency with the guidelines. The city stresses that the success of this approach in achieving good design depends on the city's commitment as well as on collaboration with designers and developers.

Raleigh, North Carolina

Similarly, the city of Raleigh, North Carolina, has adopted urban design guidelines that can be used by (1) citizens, developers, and decision makers to incorporate specific approaches and techniques that will achieve the city's design objectives, and (2) the city council and advisory commissions as a basis for uniform and consistent review of development proposals.[55] Raleigh's guidelines are notable because they recognize the three-dimensionality of the built environment and the challenge when incorporating new development. As the introduction to the city's urban design guidelines explains, the clearly defined public spaces and the denser arrangement of buildings in built-up areas:

> create a system of relationships that is larger and more comprehensive than the design of original buildings and that requires special consideration for best results. The organization of these various factors, including building design, landscape, open space and transportation is referred to as "urban design," and these guidelines provide clear examples of the standards and good practices that are necessary for the creation of successful, memorable places.[56]

The introduction further defines the objectives and scope of urban design guidelines:

> Urban design is intended to bring order, clarity and a pleasing harmony to the public realm of towns and cities. . . . [The] character of public spaces is primarily formed by the arrangement and details of the elements that define them—the

[52] Pasadena Citywide Design Principles 2002, 3.
[53] Pasadena Citywide Design Principles 2002, 3.
[54] Pasadena Citywide Design Principles 2002, 1.
[55] City of Raleigh 2002a; City of Raleigh 2002b.
[56] City of Raleigh 2002a, 1.

> walls of buildings that enclose a public square, for example; or the storefronts along a commercial street; or the dwellings that line a residential avenue.[57]

The city of Raleigh believes that good design is fundamental to successful urban places but points out that many of the world's best examples have been achieved by the order of a king, a duke, or a dictator. "Creating good design in a democracy is much harder, for while everybody's opinion is valued, not all may always be informed." The city's design guidelines are therefore "as much educational as regulatory in their ambition and their scope."[58] Nevertheless, the application of Raleigh's guidelines is meant to allow for experimentation and flexibility in design approaches.

The Infill Ordinance and Policy Guide

The infill ordinance takes the view that there are certain fundamental principles of design that will increase the likelihood that an infill project will be an asset to the surrounding neighborhood and community. Article VII, site design standards, sets forth these principles and the steps that should be followed in laying out an infill development.

[57] City of Raleigh 2002a, 1.
[58] City of Raleigh 2002a, 3–5.2.

Technical Note
HISTORIC PRESERVATION

PURPOSE OF HISTORIC DESIGN GUIDELINES

This technical note provides guidance for the harmonious interaction between infill and existing properties in an historic district. The first section outlines basic design guidelines and highlights specific strategies to foster historically sensitive new infill construction in historic areas. The second section focuses on the rehabilitation of existing historic properties in infill locations. The technical note begins by summarizing the communal benefits from preservation. In addition, a brief review of historical styles and their features is provided. This review is intended to assist relevant parties (public officials, property owners, tenants, developers, contractors, and so forth) to understand the historic character of existing buildings and to guide them when they are faced with decisions about the repair, maintenance, and rehabilitation of existing structures in historic neighborhoods.

NEW INFILL CONSTRUCTION DESIGN GUIDELINES IN HISTORIC AREAS

This section offers a broad set of guidelines that simultaneously encourage good design for new infill construction as well as design that respects the historic and architectural character of the surrounding area. The harmonious interchange of new infill development and the existing structures is vital in maintaining the unique sense of place within each community.

While visual compatibility is important, replication and imitation of the existing architecture is discouraged. The goal of new infill development is to produce a contemporary addition to the existing neighborhood fabric that is able to reinforce the basic visual characteristics of the area. New development is able to do so by taking into account existing features such as building alignment and orientation, mass and scale, building height, building and roof form, building materials, architectural details, and windows and doors. If these features are incorporated in new development and appear to be similar to those seen traditionally in the area, visual compatibility results. The end product is new infill construction that both distinguishes itself as a contemporary building and promotes the historic context of the neighborhood.

However, no two communities are alike, and design guidelines will differ according to district. Local preservation ordinances and historic preservation commissions may provide design guidelines for construction specific to each community. In cases where no design guidelines exist, the following information has been compiled to guide new infill development. These guidelines are deliberately written in a broad and general fashion to allow for flexibility and creativity in infill design.

This technical note by David Downs and Tim McManus.

Building Alignment and Orientation

One of the major goals of infill design is to maintain historic setback patterns. In order to maintain the continuity of the streetscape, setbacks for infill development should either match that of adjacent buildings where all share the same setback or be within 20 percent of neighboring structures in areas with varied setbacks.

The primary entrance to a building was traditionally oriented to the street. This helped establish a pedestrian-friendly environment. This characteristic should be encouraged where it exists, as well.

Strategies

- Maintain the pattern in which buildings relate to the street
- Fit new buildings within the range of yard dimensions seen in the block
- Maintain the spacing of side yards
- Locate buildings within the average setback
- Orient the front of a house to the street and clearly identify the front door
- Consider use of a prominent entry, which will contribute to the "pedestrian-friendly" character of the street
- If historically appropriate, avoid the use of fencing or similar barriers that may communicate a delineation of public versus private space on the street level

Mass and Scale

The scale of infill design should not conflict with the historic character of the neighborhood. It should be compatible with the average height and width of the surrounding buildings and reinforce the human scale of historic districts where this is a character-defining feature. In situations where the infill development will exceed traditionally established widths, it should be divided into modules that appear similar in width to the existing buildings.

There are many techniques available to reduce the visual bulk and height of large structures. Examples include horizontal banding, material and/or texture change, windows, color variation, landscaping, setbacks, and wall modulating.

Strategies

- Use building materials that are of traditional dimensions
- Use a building mass similar in size to that seen traditionally on the block
- Use window openings similar in size to those seen traditionally
- Front elevation should appear similar in scale to those seen traditionally
- Encourage a building step-down in height as it approaches smaller structures
- Single wall planes should not exceed the typical maximum width as seen in the adjacent context (i.e., façades shall have no wall plane wider than 2.5 times the height of the wall plane)

Building Height

The heights of new buildings should be similar to the heights of existing adjacent buildings so that design relationships are reinforced and new buildings are visually compatible with existing structures.

Strategies

- A front elevation should appear similar in scale to those seen traditionally in the block
- Stepping a building down in height as it approaches smaller structures on adjacent lots is encouraged
- The back side of a building may be taller than the front and still appear to be in scale

Building and Roof Forms

Building and roof forms can be a very distinctive feature in a neighborhood. When repeated along the street, the recurrence of similar building and roof forms also contributes to the sense of visual continuity. Infill development should avoid exotic building forms that would detract from the visual continuity of the streetscape. The roof forms of new infill structures should relate to those of neighboring historic structures in pitch, complexity, and visual appearance of materials.

Strategies

- A new building should have basic roof and building forms that are similar to those seen traditionally in the neighborhood
- Overall façade proportions also should be in harmony with the neighborhood context

Building Materials

The materials used in new infill development should be compatible with the existing historic character. Natural materials (wood, brick, and stone) will best match those found in historic districts. This may prove advantageous when considering green design since historic buildings were commonly constructed of regional materials. In most cases, it is difficult to achieve an exact match. In this case, new materials that are similar to traditional materials may also be considered.

Strategies

- Wood siding is appropriate in most applications
- Wood siding should have lap dimensions similar to those seen historically
- Wood shingles may also be considered if integral to an architectural style
- All wood siding should have a weather-protective finish
- Use of highly reflective materials, such as glass or polished metal, is inappropriate as a primary building material

- Use of masonry that appears similar in character to that seen traditionally is also appropriate
- Brick should have a modular dimension similar to that used traditionally
- Stone and stucco, similar to that used traditionally, is also appropriate
- Alternative materials can be considered and should appear similar in scale, proportion, texture, and finish to those used traditionally
- Alternative materials should have a proven durability for the specific regional climate
- Roof materials should be composite shingles and convey a scale and texture similar to those used traditionally
- Typically, roof materials should be earth tones and have a matte, non-reflective finish.
- Tile may also be considered on building styles that incorporate this material.

In addition, ornamental pierced-concrete masonry screens and walls, "antiqued" brick, wrought-iron porch columns, chain-link fencing, exterior carpeting, jalousie windows, glass block, picture windows, unpainted wood, asphalt siding, and other irreverent materials should generally be avoided. Aluminum siding, metal panels at the ground floor level, and mirrored glass surfaces are also discouraged.

Architectural Details

Architectural details, such as dormers, bays, columns, chimneys, and cornices help to provide visual interest in a community. Some structures have simple, vernacular details for window and door moldings and cornices, while others are more elaborate, with cornices, deeply projecting moldings, bay windows, and ornamental accents. A new design that draws upon the fundamental similarities among historic buildings in the community without copying them is preferred. This will allow new buildings to be seen as products of their own time, yet compatible with their historic neighbors.

New design should attempt to include features common to the surrounding area to promote visual cohesion. False historical designs that do not have a relationship to the region should not be included. Other architectural details may include: treatment of masonry (such as ceramic tile inlay, paving stones, or alternating brick patterns); treatment of siding (such as wood siding combined with shingles to differentiate floors); articulation of columns, sculpture or art work, architectural lighting, detailed grilles and railings, special trim details and moldings, or a trellis or arbor.

Strategies

- Exact copying or replication of historic styles is discouraged
- Avoid architectural details that confuse the history of an historic district
- Use ornamental details with constraint
- Historical details not found in the specific region are inappropriate
- Maintain the alignment of horizontal elements along the block
- Window sills, moldings, and eave lines are among those elements that should align whenever possible with similar elements on adjacent historic properties

Windows and Doors

The historic character of the streetscape is largely dependent on the visual continuity and patterns of similarly-designed façades. The size and location of window and door openings should be similar to those of their historic counterparts. In addition, new design should be sensitive to the proportion of window-to-wall space. These elements are important to maintaining the historic rhythm of the streetscape.

Strategies

- Windows should be simple in shape, arrangement, and detail
- Unusually shaped windows, such as triangles and trapezoids, may be considered as accents only
- The number of different window styles should be limited
- Trim should have a dimension similar to that used historically
- Window, door, and corner-board trim should be consistent with that found in the character area
- Proportions of doors, windows, and entries should match those found in adjacent buildings
- Maintain consistency with awning design

Landscaping, Walls and Fences

Generally, infill development occurs in more developed areas. New infill structures should not disrupt important public views or vistas, but should reinforce existing patterns of open space and enclosure created by circulation routes, fences, walls, lawns, and alleys of trees.

Strategies

- Structures should be designed to fit natural slopes
- Buildings should be designed to solidly meet the ground

HISTORIC PRESERVATION OF EXISTING PROPERTIES

Why Preserve Historic Resources?

Preservation of the built environment provides a fundamental link to the past. Across the country, communities are overwhelmingly turning to the past for clues to an improved future. Preservation began initially as a reaction to the rapid loss of historic buildings during the urban renewal period. Today, preservation has a much broader application, which can improve overall livability and quality of life and increase economic development opportunities.

Historic resources can come in all shapes and sizes, but the overall network of buildings in a neighborhood is often referred to as the “fabric.” Neighborhood fabric provides a connection to the past, but it also serves as an impetus for future development. The preservation of the fabric in a neighborhood is essential to the continued livability (i.e., the comfort, convenience, and security) within a community. Historic resources can also contribute to the quality of life by providing opportunities to connect with the past through cultural heritage as embodied by the built environment.

The preservation of historic resources can also provide opportunities for community economic development. Preservation of historic resources can boost local economies with additional consumer spending, tax revenue, and employment. Through savvy adaptive reuse strategies, vacant and underutilized buildings can foster new industries and services, provide upgraded public housing, and promote smart-growth initiatives like infill development.

In order to maintain a neighborhood's historic fabric, owners are encouraged to preserve key character-defining features. A list of characteristics for common residential building styles and types are presented on the following pages; they should be used to identify those features that should be preserved. In addition, the Secretary of the Interior's Standards for Rehabilitation, used by the National Park Service and many other preservation entities, have been included at the end of this document to further assist and guide preservation activities in historic districts.

Styles

The design guidelines encourage the harmonious interaction of new infill development with the existing environment, as well as visual cohesion and historical accuracy in exterior alterations or additions, or in the rehabilitation of existing buildings. The following are descriptions of the characteristics of sample building styles and types found throughout the United States; they should be used to identify those features that should be emulated and/or preserved.

Georgian (1720-1795)

The Georgian style gets its name from the English monarchs that ruled during the 18th century. The style was made popular—first, in England and, then, in America—by Sir Christopher Wren and his followers. The style reflects classical Renaissance ideals such as symmetry, axiality, and clarity and draws strongly on the designs of the 16th century Italian architect, Andrea Palladio (1508–1580), who, in turn, based his country villas on ancient Roman forms. Features of Palladian design that are prevalent in Georgian design include the Palladian window, giant pilasters marking the center or corners of buildings, and the centralized double or two-story portico. Characteristics of the Georgian style include the following elements:

- Strict symmetrical façades
- Typically five bays that include a central doorway
- String course delineating floors
- Red brick is featured material

- Hipped roofs
- Quoins
- Axial entrances
- Sash windows—glazed wooden frames that slide up and down in vertical groves by means of counterbalance weights

Later Georgian characteristics include:

- Palladian windows—large arched central windows flanked by smaller rectangular windows
- Pedimented and segmented arches, sometimes together, above windows
- Pronounced central section; sometimes with a pediment and/or pilasters

Federal (1790–1820)

Federal-style buildings are found throughout the cities and towns of the Eastern seaboard, particularly in New England. Most Federal-style buildings are square or rectangular, brick or frame, and three stories high, topped with low hip roofs, often with a balustrade. Door and window openings are scaled and articulated with fan and oval forms. Columns and moldings are delicate and refined compared with the earlier robust Georgian forms, and, in general, most decoration is confined to the porch or entrance area of the façade. This style was a reactionary movement against England. Characteristics of the Federal style include the following elements:

- Symmetrical facades
- Square or rectangular brick for frame
- Three or two-and-one-half stories
- Window and doorway trim, as well as columns and pilasters, are usually narrow, classically-derived elements
- Doorways have fanlights and sidelights
- Most decoration confined to the porch or entrance area of the façade
- Elongated and elegant entryway raised on a platform
- Chimneys are generally positioned at or near the end walls of the building
- The eaves are relatively plain, or perhaps simply ornamented
- Low hip roofs, often with balustrade

Greek Revival (1818–1850)

The most easily identifiable elements of the Greek Revival style are columns and pilasters. Other hallmarks of the style are bold, simple moldings, pedimented gables, heavy cornices with unadorned friezes, and horizontal transoms above entrances. Characteristics of the Greek Revival style include the following elements:

- Heavy emphasis on columns and pilasters mimicking ancient Greek temples
- Bold and simple moldings

- Pedimented gables
- Heavy cornices with unadorned friezes
- Horizontal transom above entrances (transom—a horizontal crossbar in a window, over a door, or between a door and a window above it. A transom is the horizontal, as mullion is the vertical, bar across an opening.)

Italianate (1837–1860)

Early Italianate-style residences in the United States are based on the forms of rural Italian farmhouses and villas. Both the round-headed windows of Tuscan villas and the classical architraves of Renaissance places were frequently used to ornament the façades of urban row houses and commercial buildings.

Like most borrowed architectural styles, a variety of Italianate-style buildings exist, ranging from simple to most ornate. In the simplest form, the Italianate style is represented by a square house with low pyramidal roof, bracketed eaves and perhaps a cupola or lantern. In the most ornate form, the Italianate style is expressed by a low roof, overhanging eaves with decorative brackets, an entrance tower, round-headed windows with hood moldings, corner quoins, arcaded porches and balustraded balconies. Characteristics of the Italianate style include the following elements:

- Square house with a low pyramidal roof
- Tower placed asymmetrically in the overall composition
- A cupola, lantern, or belvedere on the roof, instead of a tower
- Wide overhanging eaves supported by single or paired brackets
- Round-arched windows, sometimes in groups of two or three, and projecting bay windows are common
- Windows may have heavy "hood moldings" in cast iron or stone
- Balconies and porches (or verandahs) are also prevalent
- Main doorway, positioned in a round-arched opening, has heavy, paired doors and transom
- Later Italianate-style structures are known to have greater symmetry and more profuse decoration

Queen Anne (1875–1890)

The Queen Anne style emphasizes irregularity of plan and complexity of form. Structures in this style generally exhibit a variety of building materials, creating a myriad of surface treatments. Windows are used in a mixture of sizes and shapes, including several variations on a multi-pane version that is called the Queen Anne window. Characteristics of the Queen Anne style include the following elements:

- Irregular plan and asymmetrical massing
- Brick, clapboards, and shingles are all used in one design
- Projecting and overhanging gables

- Corner towers or turrets
- Oriel and bay windows
- Large, patterned-brick chimneys
- Wraparound porches
- Clipped corner—or “cutaway bay”—with brackets
- Gable end detailing
- Spindlework on porches, balconies, and other locations

Shingle Style (1879–1900)

The Stick style preceded the Queen Anne style, but, nonetheless, the two styles have much in common. The Stick style makes use of the same complex massing and irregular plan and incorporates many of the same design elements as the Queen Anne style. The most notable identifying feature of the Stick style is the use of clapboards positioned horizontally, vertically, and diagonally to express the building’s unseen structural system. This wall treatment is similar to the medieval half-timbering seen on Tudor Revival buildings. The Stick style is used almost exclusively for residences, and these are invariably of frame construction. The porches of Stick-style houses are easily recognized, as they have square posts (sometimes turned posts) with simple, unornamented, diagonal braces. The gable ends are also decorated with stick-like elements in patterns that feature diagonal braces. Characteristics of the Shingle style include the following elements:

- Shingles covering most of the exterior
- Prominently recessed porches and verandas integrating interior and exterior spaces
- Bay windows
- Clipped corners with brackets
- Gable end detailing
- Strong horizontal and vertical traits
- Asymmetrical massing
- Strong pronounced triangular features
- String of attached windows
- Dominating gable

Colonial Revival Style (1880–1930 or later)

The Colonial Revival style is a broad category incorporating a variety of forms and designs, including the Georgian Revival, the Federal Revival and the Dutch Colonial Revival. Elements of this style are often found on structures with Queen-Anne massing. While in most instances the ornamentation of the Colonial Revival can clearly be seen as an exaggeration of that of the Federal or Georgian styles, in some cases a Colonial Revival building is built with such historical accuracy that is difficult to distinguish it from an original. The colonial revival style is sometimes referred to as *neo-Georgian*, due to its striking resemblance to the earlier Georgian and federal styles. Characteristics of the Colonial Revival style include the following elements:

- Usually symmetrical, possibly rectangular in plan
- Identifying features are classical details: dentils, swags and modillions, found under the eaves of the main roof and porch roofs, along with paired or tripled porch columns
- Three-part Palladian-style window often used

Tudor/English Cottage Revival Style (1920–1940)

The Tudor Revival style is easily distinguished by its decorative half-timbering or its sharply-pitched roof forms. Because it grew in popularity after the development of modern construction techniques, many examples of the Tudor Revival style are brick or stone veneer. Many features of the Tudor Revival style are derived from medieval precedents. Characteristics of the Tudor Revival style include the following elements:

- Asymmetrical massing with irregular plan
- Steeply pitched roof with little or no eave extension, sometimes with rolled edges on roofing to imitate thatch
- Elaborate end chimney with multiple flues, patterned brickwork and stylized chimney pots
- Casement windows in pairs or bands
- Carved wood gable vergeboards
- Recessed entry, usually under a primary front facing gable but sometimes under small gable-roof portico

Gothic Revival (1885–1930)

Gothic Revival buildings are reminiscent of Gothic structures found in Europe. The Gothic Revival of the late 19th and early 20th centuries was initiated by theorists Augustus Welby Northmore Pugin (1812–1852) and John Ruskin (1819–1900) who touted the return to naturalism and truth to nature in architecture. The style is primarily restricted to religious buildings in accordance with Ruskin's preaching that a building's true spiritual desire is to honor God. These initiatives resurrected more reliance on hand-craftsmanship and true or natural materials in opposition to the rampant industrialization of the time. Characteristics of the Gothic Revival style include the following elements:

- Asymmetrical massing with a strong vertical emphasis
- Pointed or Gothic arch is the trademark ornament
- Steeply pitched roofs
- Elaborate "gingerbread" bargeboards—cut or carved boards that cover the ends of roof rafters
- Doors and windows may have projecting label moldings
- Most commonly constructed in wood, with board and batten siding
- May also have bay windows with wraparound porches
- Flying buttresses (for taller cathedral-like buildings)
- Tall spires

- Emphasis on height and light

Prairie Style (1900-1920)

This style is largely developed out of the Shingle style and was first pioneered by Frank Lloyd Wright. The Prairie style is a conscious rejection of the academic revival styles and sought to create buildings that evoked the flat midwestern landscape. The Prairie style exhibits a strong horizontal tendency through its low overpowering roof-lines and features interplay between interior and exterior spaces reminiscent of the Stick style. Characteristics of the Prairie style include the following elements:

- Strong overpowering and low roof-line
- Multi-polygonal rooms
- Predominantly symmetrical plan and massing
- One or two stories
- Low pitched truncated hip roof with tile and extended boxed eaves or flat roof with parapet (usually with tiled visor roof)
- Stucco exterior walls (smooth or sand finish)
- Fixed window with decorative transom and sidelights, bands of windows (usually casement) are typical; art glass or other ornamental glass in accent windows
- Wide front door, usually with decorative glass panel or panels
- Front porch spanning most of front with flat roof and large, plain support piers
- Porte cocheres and sun room additions on side elevations

Spanish Colonial Revival/Spanish Eclectic Style (1910-1929)

The Spanish Colonial Revival—or Spanish Eclectic—style was inspired by the architecture of Spain and Latin America, emphasizing their rich stylistic details. Due to the early influence of New Spain in the Southwest and Southeast, the style is rare outside the Southwest, Texas and Florida. Characteristics of the style include the following elements:

- Usually an asymmetrical façade
- Low-pitched gable or cross-gable roof with little or no eave overhang, or flat roof with parapet usually with tile coping
- Red-tiled roofs
- Flat stucco walls with smooth or textured finish
- Prominent arch over the door, window, or porch
- Porches supported by large, square piers, or simple tile-roof hood over door
- Recessed windows and doors
- Wood casement windows, often in groups
- Classical ornamentation around front entry
- Front and/or interior patios, often surrounded by stucco walls
- Decorative details that might include quatrefoil windows, vigas, heavy wood structural elements, and buttressed corners

Pueblo Revival Style (1912–present)

The Pueblo Revival style emerged in Santa Fe in 1912 as a reaction to the encroaching Mission style of southern California. The new style was thought of as a method primarily to attract tourists and distinguish the culture of the newly recognized state of New Mexico from its neighbors. The Pueblo Revival style is basically a mix of Spanish Colonial and Indian Pueblo architectural forms. Characteristics of the style include the following elements:

- Flat roof with parapet, stepped back roof line
- Smooth stucco exterior walls with edges that are rounded
- Vigas (round roof beams) extended through walls to the exterior
- Double-hung or casement, multi-light windows within deeply recessed openings and/or openings with rounded edges
- Porches may have wood bracket columns on posts or other hand-hewn ornament

Standards for Historic Rehabilitation

The Secretary of the Interior's Standards for Rehabilitation (Department of Interior regulations, 36 CFR Part 67) pertain to historic buildings of all materials, construction types, sizes, and occupancy. They encompass the exterior and the interior of historic buildings, related landscape features, and the building's site and environment, as well as attached, adjacent, or related new construction. The standards, which are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility, consist of ten basic principles, as follows:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archaeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertake in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The Secretary of the Interior's Standards for Rehabilitation are a good starting basis to guide historically appropriate rehabilitation.

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Chapter 8
ZONING AND INFILL DEVELOPMENT

INTRODUCTION

Infill development, which seeks the construction or redevelopment of homes, businesses, and public facilities on unused and underutilized lands within existing urban areas, offers many advantages. It keeps resources where infrastructure, jobs, and housing already exist and allows reinvestment and reuse. Infill is a key ingredient in accommodating growth and designing communities to be environmentally and socially sustainable. A mix of housing types and land uses provides a diversity of residents, enhances community vitality, and increases the flexibility of developers to make infill development work financially. "The goal [of infill] is to encourage more compact and interconnected urban development which is better able to meet community needs—affordable, walkable, safe, cohesive, [and] socially supportive" (Triangle Smart Growth Coalition n.d.). Zoning codes, however, which were originally enacted to separate factories and meatpacking plants from homes, "have made many of the nation's favorite postcard cities impossible to build today" (Wasserman 2004).

This chapter reviews conventional zoning regulations and alternative schemes for regulating land use, discusses their limitations, and explains the benefits of the approach to zoning adopted by the model infill ordinance. It then examines the extent to which this approach offers the best strategy for designing zoning requirements that ensure that infill development will (1) be context-sensitive, (2) promote environmental sustainability, (3) support projects with a sense of place fostered by mixed uses, (4) provide affordable housing, and (5) be economically feasible. The chapter concludes with a model showing the density required to support infill projects given varying land prices, differing values of housing being produced, and other factors. The financial density model is intended to add to the many considerations, such as context sensitivity and environmental sustainability, that inform what is appropriate density for infill.

LAND-USE REGULATORY APPROACHES

Conventional Euclidean Zoning

In *Village of Euclid v. Ambler Realty Co.* 262 US 365 (1926), the United States Supreme Court ruled that the segregation of residential uses through zoning to minimize nuisances and protect property values was a reasonable exercise of the police power. Since *Euclid* courts throughout the United States have supported municipalities in their efforts to create single-use districts though zoning. This practice, termed Euclidean zoning, is still common in conventional zoning ordinances. In such codes, the land in a municipality is divided into distinct districts and subdistricts according to use: agricultural, residential, commercial, industrial, institutional, park and recreational, and so forth.

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Larger communities may contain special districts for downtown areas, hospitals, and universities. In addition to setting forth the permitted land uses within each district, conventional zoning codes typically contain regulations governing area and bulk standards, review and approval procedures, and improvements. Use and area and bulk requirements are often conveyed in tabular form to clarify the written regulations. For example, area and bulk tables may contain the following information, by district: minimum lot size; maximum height; minimum lot width; minimum front, rear and side yard setbacks; maximum impervious coverage per lot; maximum density of dwelling units per acre for residential uses; and maximum floor area ratio (FAR) for nonresidential uses. Procedural language generally specifies the different required submissions for each stage of the development, redevelopment, or infill process and sets forth the review, approval, and appeal standards by which the various reviewing and approving bodies are bound. Sections in the zoning code concerned with improvements generally set forth the minimum additional infrastructure—or payments in lieu of physical improvements—that must be provided for various types and levels of development.

Conventional, single-use zoning has achieved some of the intended objectives. Indeed, conventional zoning has often been successfully used to mitigate or minimize public nuisances by ensuring adequate separation of residential and industrial and other nonresidential uses. Moreover, the relative rigidity of conventional zoning regulations has tended to provide a certain degree of predictability relative to future land uses and for the review and approval process (Burdette 2004, 10). Too, the rigid separation of uses, including the separation of single-family from multi-family uses, for example, has helped maintain or enhance property values in many communities.

However, conventional single-use district, or Euclidean, zoning has also proven to be very problematic. In minimizing densities and separating uses, it has contributed to the following woes: decreased neighborhood walkability, increased traffic congestion, decreased housing affordability, and increased sprawl. Rigid use separation, prohibitions on mixing of uses, low maximum densities, height limitations, and excessive setback requirements have been especially proscriptive of infill development (Wheeler 2002). Specifically, Euclidean zoning codes tend to limit, or restrict, infill development in the following ways:

- maximum density regulations inappropriately restrict densities in urban areas, where many infill sites are located;
- development regulations restrict development to single uses, such as residential, commercial, or office, which can limit a developer’s ability to make projects financially successful;
- one- to two-story height restrictions, particularly in town centers, hamper development of economical infill projects; and
- excessive front and side setbacks prevent the development of infill projects that promote a denser urban fabric.

In response to the limitations posed by conventional zoning, local governments, planners, and academics have advanced a number of alternative land use regulatory schemes to promote infill development. Many of these mechanisms, while intended to function within the framework of existing Euclidean zoning, are also designed to increase its flexibility and adaptability to more innovative development, including infill. Among the alternative regulatory mechanisms commonly associated with infill development are overlay zoning, density bonuses, inclusionary zoning, planned unit development (PUD), transfer of development rights (TDR), smart codes, and performance zoning. Form-based codes represent a somewhat newer, non-Euclidean alternative. These alternatives are briefly defined and assessed in the next few pages.

Overlay Zoning

An overlay zone is a mapped area superimposed over an existing zoned area that establishes additional regulations or reduces or extends existing uses. Municipalities might use overlay zoning to accommodate a specific public interest or goal, such as historic preservation, economic development, or the provision of affordable housing, or to encourage higher-density, mixed-use infill development not permitted in the underlying zone. Additional regulations commonly provided by overlay zones typically concentrate on physical improvements involving such elements as lighting, vegetation and streetscaping, pedestrian access, signage, exterior building materials, building lines, and setbacks. In order to promote public or aesthetic goals, such as the ones mentioned above, municipalities may use overlay zones can to provide exceptions to the underlying zoning district that could, for example, permit higher densities, additional floor area ratios, reduction in parking requirements, and additional uses not otherwise permitted. Generally, the imposition of overlay zones minimizes the need for the developer or landowner to obtain a variance from the standards of the underlying zoning district.

However, overlay zones can be problematic. Perhaps the chief caveat is that overlay zones add an extra layer of regulation. Conflicts can arise between the standards and requirements of the overlay zone and those of the underlying, traditional zoning district. This is often the case with aesthetic regulations such as signage. Generally, such conflicts are decided in favor of the standards of the overlay zone because of the greater flexibility and because the overlay zone more nearly meets a municipality’s land use, aesthetic, or public interest goals.

Density Bonuses

Density bonuses permit the construction or rehabilitation of residential or nonresidential buildings at higher densities (dwelling units per acre) and intensities (FAR) than would otherwise be permitted under exiting zoning. The accompanying higher densities and intensities can be used to encourage infill development, the prospect of more units and more square footage of leasable area providing a higher profit potential that can help offset generally high startup costs associated with land acquisition and cleanup. Frequently, municipalities tie the granting of density bonuses to the provision of affordable housing. For example, in the case of residential development, a municipal zoning ordinance may ordinarily permit a density of seven or eight dwelling units per acre, but the imposition of a density bonus can increase the density permitted within a specified area up to 15 or more dwelling units per acre. In return, the developer would be required to reserve a specified percentage of housing units for low- and moderate-income households. Similarly, in the case of nonresidential development, bonus provisions may permit floor area ratios (FAR) to be raised with a corresponding easing of height restrictions.

Although density bonuses can encourage infill development they are not without caveats. In the first place, any set of provisions that tends to increase densities or provides incentives for the provision of affordable housing is almost invariably politically unpopular with certain segments of the population. Existing residents and businesses may express disapproval of density bonuses because of the potential to change the character of the neighborhood. Specifically, they may fear that the easing of density and height restrictions associated with density bonuses can result in infill development that does not mesh well with the character, context, and scale of the existing neighborhood. In addition, there is often concern, even when unfounded, that the implementation of higher densities and the creation of more affordable housing will lower the values of existing adjacent properties. Conversely, existing residents may also fear that higher densities and intensities will raise property values and taxes, especially if the infill product includes higher-end housing and retail, which will price them out of their neighborhood.

Inclusionary Zoning

Another regulatory mechanism used by municipalities to promote affordable residential infill development is inclusionary zoning. Commonly, under an inclusionary zoning scheme, developers who build more than a specified number of units within certain zoned areas must provide, or set aside, some number or percentage of these units for low- and moderate-income households. A major difference between inclusionary zoning and density bonuses is that in density bonus schemes, the provision of affordable housing is discretionary, whereas in inclusionary zoning it is mandatory. As with density bonuses, the inclusion of affordable units tends to create political problems between the infill development area and the surrounding landowners.

Planned Unit Development (PUD)

Under a PUD scheme, a contiguous area is developed as a unified whole with a mix of residential and nonresidential uses that generally permits a greater variety of single-family and multifamily housing options than would be permitted under conventional, Euclidean zoning. A PUD can exist as a separately zoned area or as an overlay zone. In the latter case, net densities may exceed those normally permitted, but no more dwelling units are permitted than would be allowed under the underlying zone. Usually, there is a minimum total acreage requirement for the area covered by the PUD. Most PUD regulations also require that some percentage of the land within the PUD be dedicated as common open space for active and passive recreational uses. The layout of the PUD, including the location of the different mixed uses, open space areas, and vehicular and pedestrian access, is often the subject of negotiation between the developer and the municipality. Although the planned unit development (PUD) concept is more frequently encountered in suburban jurisdictions, it can be used to facilitate infill development in older urban areas.

PUDs can be problematic. They tend to be master-planned and developed as unified wholes almost in spatial isolation from the rest of the community. The danger is that an infill PUD can facilitate infill development that provides a healthy mix of residential and nonresidential uses at appropriately higher densities that nevertheless relates rather poorly to the physical context and scale of the surrounding neighborhood. As well, the PUD concept, which is closely related to the suburban garden city concept and generally requires considerable set asides for open space, may not be appropriate or realistic for urban infill development where space is at a premium.

Transfer of Development Rights (TDR)

A transfer of development rights (TDR) program permits the development rights on a site (the sending site) to be sold, or transferred, to another site (the receiving site). TDR schemes often function as overlay zones. Commonly, under a TDR program, a sending landowner (Landowner A) maintains her land (Site A) at a lower density or intensity of development by selling her development rights to a receiving landowner (Landowner B). Landowner B then develops her site (Site B) at a higher density or intensity than otherwise permitted by the underlying zoning. In effect, the development rights that would have been applied to Site A are transferred to Site B. The payment for the transferred development rights compensates Landowner A for limiting development on Site A. Landowner B effectively receives a density bonus for Site B. Ideally, TDR enables new development, or redevelopment, to be concentrated in areas with adequate existing infrastructure and a ready market that can accommodate the increased densities and intensities. Infill sites in core areas of cities often provide such opportunities. Within this framework, TDR programs have been implemented to preserve open space, limit development where there are environmental constraints, and to preserve historic structures. A major caveat is that in many seemingly promising infill areas, the market for higher-density development is not sufficiently strong to make TDR programs viable. In addition, TDR programs tend to be rather complicated and cumbersome and not easily understood by the general public (Burdette 2004, 31).

Smart Codes

A “smart code” is an ordinance that uses the transect concept, borrowed from ecological science, to create a system of zoning districts that appropriately locates land uses according to a gradient in which densities decrease with increasing distance from the center of the community and also in conjunction with environmental constraints and infrastructure capacity. An underlying principle is that different types of development are not inherently bad, but they must be located to create an urban fabric that reflects a logical density gradient and respects the constraints. Accordingly, smart codes encourage new and infill development to be located in areas with adequate public infrastructure and all development is steered away from sensitive features like wetlands, mature forest, prime agricultural land, and steep slopes. Smart codes generally emphasize New Urbanist, traditional neighborhood design principles to encourage compact, mixed-use development that is walkable, pedestrian-friendly and transit-oriented. Within this framework, setbacks and lot sizes shrink as development progresses from rural to more urban development districts and all other building, bulk, street, lighting, sidewalk, parking, and landscaping standards reflect the logic of the density gradient and urban fabric.

Nonetheless, smart codes have potential weaknesses (Duerksen and Sitkowski 2004). In the first place, they can be rather prescriptive, dictating that development must occur within a narrow framework of uses and densities rigidly tied to the linear transect concept. Secondly, recent smart codes have thus far tended to be weak on process, creating legal issues revolving around due process and takings. Third, smart codes tend to ignore the need for regulations governing rural development. Finally, they tend to be less than comprehensive, often not adequately covering many uses and inadequately addressing environmental standards and sustainability.

Performance Zoning

Performance zoning schemes are based on the notion that seemingly incompatible uses may be located adjacent to, or near, one another as long as the external impacts of the uses are minimized or negated. For example, a light industrial area may be permitted to locate next to a single-family detached residential subdivision as long as the uses are properly buffered from one another, commonly through the use of appropriately placed vegetation, walls, and fences. Indeed, performance zoning is particularly useful for addressing the environmental impacts of new development on adjacent properties. This is one of its great benefits. On the other hand, as virtually any use may locate next to another as long as the impacts are mitigated, there is correspondingly less predictability about the future development of any area. In infill areas, many of which are small and contain existing, tightly knit urban fabrics, the lack of predictability associated with performance zoning can play havoc with public acceptance and property values. Further, in tight urban locations, buffering incompatible uses may not be feasible.

MODEL INFILL ORDINANCE

Introduction

As discussed earlier, a major objective of the Model Infill Ordinance is to provide strategies to ensure that infill development will be context-sensitive, environmentally sustainable, foster a sense of place through innovative design elements and mixed uses, provide affordable housing, and be economically feasible. The following sections explain how this is accomplished on a broad level throughout the Ordinance. Specific standards of the Ordinance, especially from Section VIII concerned with proposed infill development submission requirements, floor area ratio (FAR) bonuses, mixed-use standards, phasing, affordable housing density bonuses, and environmental requirements, are cited for illustrative purposes.

Context Sensitivity

An infill development project is context-sensitive when (1) in its overall physical design, including the placement of buildings, roads, pedestrian access, and open space, it maintains connectivity to the surrounding neighborhood; and (2) in its scale, density, and exterior architecture, it reflects, relates to, or is in proportion to the scale, density, and exterior architecture in the surrounding neighborhood. Context-sensitive design permits an infill development project to blend in with the adjacent residential and nonresidential uses so that it becomes part of and enhances the existing urban fabric. This design-based sensitivity to the size, shape, and architecture of existing nearby buildings, as well as existing open space, roads, and pedestrian access can make the infill development area more visually attractive and liveable, which, in turn, can increase its physical and economic feasibility.

The model infill ordinance is designed throughout to address context sensitivity and to ensure that infill development projects reflect this concern from conceptualization through construction of the finished product. Many provisions in the design section deal directly with context sensitivity (see section VII and chapter 7). Several zoning provisions do, as well. For example, Section VIII.A.3.a. requires that all infill development applicants supply detailed site plans and other supporting materials that demonstrate, among other requirements, the following: physical relationships to surrounding development; the location, amount, character, and continuity of open space; and the protection of desirable views. Similarly, Section VIII.A.3.b. mandates that all governing body reviews of site plans for proposed infill developments consider whether said site plans have addressed the following criteria: preservation of historic buildings and the significant features of existing buildings when such buildings are to be renovated; location, design, landscaping, and other significant characteristics of open space within the development, and its relation to nearby public and private open spaces; architectural relationships to surrounding buildings, including building siting, massing, proportion, scale, color, fenestration, and façade articulation; and the protection of significant views and view corridors. The commentary accompanying this portion of the model infill ordinance reflects this emphasis on context sensitivity, noting that the criteria in these sections enable the planning director to consider the application in light of existing conditions.

In addition, several provisions in the zoning section incorporate LEED-ND standards that relate new projects to the surrounding neighborhood and bring buildings together. In fact, one of the four categories of ND standards lists criteria under the objective of creating "compact, complete and connected neighborhoods" (see table 7.1 in chapter 7). The model ordinance calls for "transparent windows" (VIII.A.13.b), entrances that face the street (VIII.A.1.4), and provision of open space. LEED-ND provides credits to developers incorporating these elements into their projects as well.

Environmental Sustainability

In 1987, the United Nations-convened World Commission on Environment and Development (WCED) issued a report, commonly referred to as the Brundtland Report, that recommended that long-term environmental strategies be investigated on an international level to achieve sustainable development to the year 2000 and beyond (Brundtland 1987). Specifically, the Brundtland Report defined sustainable development as development "meeting the needs of the present generation without compromising the ability of future generations to meet their needs" (Brundtland 1987). Within this framework, environmentally sustainable infill development should not only reduce or minimize impacts on scarce natural resources and ecosystems, but also help achieve community and citizen well-being. Thus, infill development should be designed to help meet social and economic goals, including the facilitation of neighborhood revitalization and redevelopment and greater socioeconomic diversity of residents and lifestyles. At the same time, infill development must be designed and carried out in such a way that it does not outstrip the carrying capacity of the municipality and region relative to air and water resources, open space and vegetation, public infrastructure, and vehicular and pedestrian patterns.

In light of the above, various sections throughout the model infill ordinance have been designed to address environmental sustainability issues, including a number of zoning requirements. For example, section VIII. A.3.b. requires the planning director or governing body, in reviewing infill development applications, to consider whether such proposals adequately consider potential impacts on microclimate effects, including wind velocities and sun exposure.

Sense of Place Fostered by Mixed-Use Development

Sense of place can be defined as "the quality of a location that makes it readily recognizable as being unique and different from other locations" (Schultz and Kassen 1984). Within the context of urban areas, which is where much infill development occurs, the creation of a sense of place is commonly achieved through a unique combination of mixed residential and nonresidential uses and architectural elements, emphasizing building scale and mass, building material, façades , rooflines, and signage, which are often enhanced through tree plantings and lighting, unique paving, plazas, public art, and fountains that encourage pedestrian use, provide gathering points, and serve as visual landmarks.

Creating a sense of place is desirable in the design of infill development projects for a variety of reasons. First, it enables residents, visitors, workers, and shoppers to orient themselves to a unique area within the larger framework of surrounding neighborhoods and land uses. Secondly, it can enable identification with specific visual qualities through the above-mentioned architectural and physical enhancements. Thirdly, the creation of a unique and specific ambience—or character—can act as a powerful draw for visitors and shoppers adding to an infill neighborhood's overall social and economic vitality.

The model infill ordinance contains a number of subsections that address the creation of a sense of place. Within the zoning section, the subsection that most nearly addresses sense of place issues is section VIII.A.4., which mandates that mixed-use developments be phased and that each mixed-use development be designed and planned as a unified whole. The commentary to that subsection notes that mixed commercial, residential and business uses draw people to an infill district at different times and for different reasons and this helps create vitality and enhances economic activity as well as providing interest and enjoyment for pedestrians. Furthermore, the commentary indicates that an underlying purpose of the model infill ordinance is to ensure that infill development occurs as part of an overall attempt to create a complete, balanced, mixed-use community. Facilitating simultaneous completion and occupancy of both residential and nonresidential uses can help ensure that infill development is planned and built as a balanced community.

Accordingly, section VIII.A.4. of the ordinance mandates that no certificates of occupancy for residential units in mixed-use infill developments shall be issued until there is an approved schedule for completing the nonresidential portion of the project and not until substantial construction of the nonresidential portion has occurred. Furthermore, section VIII.A.5. requires that all multiple-lot mixed-use developments must be planned and developed under a unified development plan. These are essentially mini-master plans designed to ensure that such a mixed-use development proceeds as a unified whole relative to aesthetics, building placement, pedestrian and vehicular access and the creation of a true community with a sense of place.

Affordable Housing

For a variety of reasons, providing affordable housing in infill development projects can be difficult. In the first place, much infill development occurs within the core areas of older urban communities where land and space are at a premium and this tends to inflate infill housing values and rents past levels affordable for low and moderate-income households. Too, many infill development projects are adjacent to, or associated with, urban redevelopment and revitalization initiatives and this places pressure on communities to attract higher income residents and higher end retail concerns to bring in tax revenues. These economic pressures tend to limit the likelihood and feasibility of providing affordable housing in infill areas.

In response, section VIII.A.9 of the model infill ordinance permits developers in infill development districts to increase their floor area ratios (FARs) above the base levels in return for setting aside a percentage of all housing units in their infill projects for low- and moderate-income households, as those income groups are defined by state statute or local code. Affordable housing FAR bonuses are set forth in table VIII.3 of the model infill ordinance. Similarly, LEED-ND provides green building credits to developers who provide affordable rental and for-sale housing.

Economic Feasibility

Infill development may pose economic challenges. An otherwise attractive downtown site may well be contaminated. Water and sewer lines whose availability was supposed to reduce costs may need to be upgraded. The space for building may be cramped, calling for expensive custom building techniques. The building's design needs to complement its surroundings. All of this can make infill construction risky and expensive. As a result, infill developers sometimes need to build additional housing units to make infill projects financially appealing.

The infill developer's desire for density may often conflict with citizens' and officials' concerns about quality of life. There is evidence that higher-density housing can be a boon to quality of life for the development's residents and neighbors alike. Nonetheless, disagreements about the appropriate development density for infill construction persist. Citizens perceive, often correctly, that the developer's overriding interest is in maximizing profit. Given that the developer is the only party to the discussion with cost data in hand, citizens and officials are left with little choice but to trust the developer's assertions about the densities necessary for development. Without independent information about how much it costs to build infill housing, any negotiation tends to be driven by an uneasy sense of what is "too much" density.

The remainder of this chapter is aimed at beginning to fill that information vacuum. It presents a development cost model for multifamily, for-sale housing (commonly known as condominiums). The model has been developed from industry-standard books and databases on development cost, with significant input from developers and their project analysts. It has been tuned and compared against cost data for particular projects. It is not, however, a blueprint for the proper development density for any situation.

DEVELOPMENT DENSITY MODEL

Setting development density for any parcel is a complicated task that touches on environmental sustainability, context-design sensitivity, fiscal effects, urban redevelopment strategy, transportation, as well as real estate return. No model can do all that—this model included. Its predictions are estimates only and must be taken as such. Further, the model concerns itself only with real estate financial considerations—which are only one of many factors that should influence density, albeit a fundamental consideration to the private sector. Our hope is that the issues raised in this chapter, and the model included here, can inform future discussions between developers, municipal officials, and citizens. Improving communication should accelerate smart growth and infill in places where it is needed and enhance the quality of projects in the process. That is our ultimate goal.

Methods

Framework

The development cost model starts with a pro forma analysis drawn from the Urban Land Institute's (ULI's) *Professional Real Estate Development* (Peiser 2003). A residential development project is specified in broad terms of acres, units, and expected sale price, as illustrated in figure 8.1. After adding a few more details, the spreadsheet handles the rest to compute a first-order estimate of the project development costs. This analysis is akin to the "back-of-the-envelope" sort of check that a developer does before investing time and money to see with more certainty whether a project is financially feasible.

FIGURE 8.1
Real Estate Model and Illustrative Project

Project Characteristics					
Number of Units	260		65 units/acre		
Net residential area	1500	net sf/unit			
Gross residential area	1714	gross sf/unit	13% loss factor		
Residential stories	3				
Parking ratio	1.5	spaces/unit			
Parking stories	1				
Urban? (1=yes, 0=no)	1				
Project Revenue					
Average sale price per unit	$ 450,000				
Total revenue					$ 117,000,000
Project Costs					**Subtotals**
Land					
Raw land	4	acres	$ 3,500,000 $/acre	$ 14,000,000	
Land carry	8%	of land	3 months	$ 280,000	
Approval fees	$ 300	per unit		$ 78,000	
Land subtotal					$ 14,358,000
Construction					
Site improvement	11.0%	of revenue	urban increment -20%	$ 10,296,000	
Construction hard cost	$ 91	per gross sf	urban increment +30%	$ 52,948,907	
Construction subtotal					$ 63,244,907
Soft Costs					
Processing					
Architecture and eng.	$ 3.55	per gross sf	nonurban inc +0%	$ 1,583,093	
Legal	0.74%	of developer's cost		$ 771,369	
Permits	$ 1,000	per unit		$ 260,000	
Appraisal and title	0.50%	of hard cost + $20k		$ 284,745	
Marketing	3.00%	of revenue		$ 3,510,000	
Taxes during const	2.60%	of land value per year		$ 728,000	
Insurance during const	0.20%	of project revenue, per yr		$ 468,000	
Loan origination costs	2%	of permanent loan amount +	$0	$ 1,676,843	
COAH impact fee	1%	of revenue		$ 1,170,000	
Construction Interest					
Permanent loan	$ 83,842,145	80% of developer's cost			
Construction interest rate	5.00%				
Construction period (mo)	24				
Average draw	65%				
Construction loan interest during construction				$ 5,449,739	
Costs to complete sales					
Time from end of const to end of sales	12	months			
Average inventory of unsold units	37.5%				
Construction interest during sales	$ 1,572,040				
Insurance during sales	$ 87,750				
Real estate taxes during sales	$ 1,140,750				
Cost to sell				$ 2,800,540	
Development					
Developer overhead	5%	of revenue		5,850,000	
Contingency	5%	of const. hard cost		$ 2,647,445	
Developer's cost	$ 104,802,682				
Soft cost subtotal					$ 27,199,774
Developer's profit					$ 12,197,318

Diagnostics

			% of revenue
Cost per nsf	$268.72	land (acq+imp+app)	21%
Cost per gsf	$235.13	construction	45%
Cash on cost ((R-C)/C)	11.6%	dev fee	10%
Fee as % of revenue	10.4%	other	23%

The Influence of Different Line Items

Sensitivity Analysis. Table 8.1 indicates the sensitivity of a particular project's profitability to its design variables and economic context. The table lists the percentage change in dollars of profit due to a 1 percent increase change in each listed item, for the project depicted in figure 8.1 above. Beware: These sensitivities are presented merely for exploratory and expository purposes. Because the cost relationships underlying these results are not smoothly varying, the sensitivities in the table must be used with care.

TABLE 8.1
Change in Profit for a $117 Million Project
Due to a 1-percent Increase in the Given Variable

Variable	Baseline Value	Impact
Development density (units/acre)	65	2.29%
Net residential area (sf/unit)	1500	-5.22%
Loss factor (=1-nsf/gsf)	13%	-0.75%
Parking ratio (spaces/unit)	1.5	0.00%
Average sale price ($/unit)	$450,000	7.54%
Lot size (acres)	4	0.93%
Land price ($/acre)	$3,500,000	-1.36%
Land carry (fee as % of land)	2%	-0.03%
Approval fees ($/unit)	$300	-0.01%
Site improvement (% of revenue)	11.0%	-0.94%
Construction hard cost ($/gsf)	$91	-5.08%
Architecture and eng. ($/gsf)	$3.55	-0.29%
Legal (% of dev. cost)	0.74%	-0.07%
Permits ($/unit)	$1,000	-0.02%
Appraisal and title	0.5% of hard cost + $20k	-0.03%
Marketing (% of revenue)	3.0%	-0.64%
Taxes during const (% of land, per yr)	2.6%	-0.17%
Insurance during const (% of rev, per yr)	0.2%	-0.05%
Loan origination (% of loan amt)	2.0%	-0.15%
COAH impact fee (% of revenue)	1.0%	-0.11%
Loan amount (% of dev. cost)	80%	-0.79%
Construction loan interest rate	5.0%	-0.64%
Construction period (mo)	24	-0.60%
Average loan draw	65%	-0.50%
Time: end of const to end of sales (mo)	12	-0.25%
Average inventory of unsold units after const.	37.5%	-0.25%
Developer overhead (% of revenue)	5%	-0.53%
Contingency (% of hard cost)	5%	-0.24%

The variables that most influence project profit are the following:

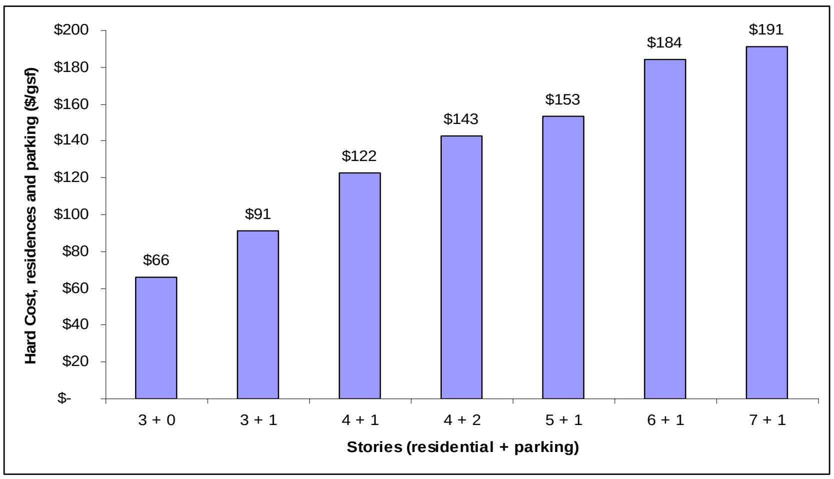
- average sale price,
- unit size, in net square feet,
- construction cost rate, in dollars per gross square foot, and
- development density, and land price.

The importance of sale price, construction cost, and land price is obvious. Other relationships are less clear. Unit size is important because larger units cost more to build—a bigger unit for the same price means less profit. In practice, of course, larger units command higher prices. Increasing development density, up to a point, means higher profits by spreading the land cost among more units. In practice, though, land for multifamily housing is sometimes priced on a per unit basis, making this analysis less relevant. Note that increasing the amount of land is less damaging to profit than increasing its price per acre, even though the two are multiplied together to compute total land cost, because increasing land area while keeping density constant increases the number of units. Revenues are increased as well as costs in this case.

Increasing the parking ratio incrementally does not affect costs or profit in this version of the model. Parking construction costs are incorporated by making the total construction cost sensitive to the number of parking stories, as discussed in the next section. Future refinements to the model will include a more detailed treatment of parking costs.

Submodels: 1. Construction cost. The model used in the spreadsheet fits the developer-provided data for non-concrete construction with an r^2 of 0.985. The model assumes concrete construction at $230 per net square foot for developments with more than five residential stories. The difference in hard cost between the "6 + 1" and "7 + 1" story cases in figure 8.2 is due to different assumed loss factors. At eight total stories (residential and parking) and more, $191/gsf is assumed.

FIGURE 8.2
Hard Cost to Construct Residences and Parking, per Residential Gross Square Foot



The detailed cost data discussed in the "model tuning" section below led us to apply a 30 percent increment to construction costs for non-concrete projects on fewer than three acres in downtown locations. This increment is to account for the added expense of working in cramped and/or oddly shaped sites.

2. Land allocation: Residential and parking stories. The model computes the number of residential and parking stories, using an iterative procedure. The number of residential stories is minimized by making the building footprint as large as is allowed, where maximum allowed lot coverage is a function of the number of residential stories. Then, the minimum number of parking stories is constructed to ensure that all required parking will fit on the lot as surface or structured parking.

3. Other. Most other line items in the pro forma spreadsheet model are constants, taken from *Professional Real Estate Development*, ULI case studies, and/or developer input. Legal and architectural and engineering costs are increasing functions of project size.

Model Tuning

After developing a spreadsheet-based pro forma model, drawing on *Professional Real Estate Development*, the ULI case study database, and developer input for the framework and estimates for the constituent costs, we tuned the model to two New Jersey projects. A New Jersey developer shared cost projections for two infill projects that are currently underway: one in an urban environment and one on a reclaimed landfill site. Table 8.2 summarizes the agreement between the tuned spreadsheet model and the cost data.

TABLE 8.2
Model Tuning Results

Case 1: Reclaimed landfill site 4 residential stories and 1 parking story Units selling for approximately $750,000 Model overestimates costs by 0.1% RMS error for eight cost categories is 2.0% of project revenue
Case 2: Urban infill site 4 residential stories and 1 parking story Units selling for approximately $600,000 Model overestimates costs by 0.7% RMS error for eight cost categories is 2.4% of project revenue

Estimated project costs were roughly in line with the data provided before the tuning, with the major exception being the construction costs for the urban infill project. The necessary adjustment is noted above. In general, we endeavored to make only modest and reasonable changes in the assumptions in the spreadsheet model to achieve the item-by-item and overall cost and profit fit shown in table 8.2. Some uncertainty in the tuning process was introduced by differing and sometimes unclear accounting for costs, regarding which costs fit in which categories. We are satisfied with the degree of fit between the model and data for these two cases.

Results and Discussion

The tables below indicate the *minimum* development density (units/acre) for a financially feasible project given average unit sale prices, listed down the side of the table, and raw (unapproved, unimproved) land prices, listed across the top. Financial feasibility is first defined as a developer fee of 15 percent of revenue (table 8.3) and then, for comparison, applying a developer fee of 10 percent (table 8.4)[1]. Developer overhead and contingencies are counted separately. Characteristics not specified in tables 8.3 and 8.4 are as listed in table 8.1, or as described in previously in this chapter. In addition, loss factor is a generally increasing function of the number of total stories in the building, taking a value of 17 percent at more than 7 stories of residences and parking.

Tables 8.5 (15 percent profit margin) and 8.6 (10 percent profit margin) list the residential floor area ratios (FARs) corresponding to the development densities in tables 8.3 and 8.4.[2] The residential FAR is defined as the gross floor area of the building, which includes common areas in the building and structured parking, divided by the lot area. The number of floors in the building must be greater than the FAR, unless the entire lot area is occupied by the building, in which case they are equal.

[1] A technical note to this chapter provides units per acre densities for a wider range of developer profits or fees (from 5 to 40 percent).
[2] A technical note to this chapter provides FARs for a wider range of developer profits or fees (from 5 to 40 percent).

TABLE 8.3
Minimum Residential Densities by Varying Land Prices, and Housing Unit Characteristics (size and value)
(15% return—units per acre)

1000 net sf per unit — Unapproved, unimproved land price: $1,000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	6	12	19	25	31	37	46	52	59	
300	5	9	14	18	23	28	32	37	43	48
350	4	7	11	15	18	22	26	29	33	37
400	3	6	9	12	15	18	21	24	27	30
450	3	5	8	10	13	16	18	21	23	26
500	2	5	7	9	11	14	16	18	20	23
550	2	4	6	8	10	12	14	16	18	20
600	2	4	5	7	9	11	13	14	16	18
650	2	3	5	7	8	10	11	13	15	16
700	2	3	4	6	7	9	10	12	13	15
750	1	3	4	6	7	8	10	11	12	14
800	1	3	4	5	6	8	9	10	12	13
850	1	2	4	5	6	7	8	10	11	12
900	1	2	3	4	6	7	8	9	10	11
950	1	2	3	4	5	6	7	8	9	11
1000	1	2	3	4	5	6	7	8	9	10

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	10	19	29	44						
300	6	13	19	25	34	41	48			
350	5	9	14	18	23	28	34	39	44	
400	4	7	11	15	18	22	26	30	35	39
450	3	6	9	12	15	18	21	24	27	32
500	3	5	8	10	13	16	18	21	23	26
550	2	5	7	9	11	14	16	18	20	23
600	2	4	6	8	10	12	14	16	18	20
650	2	4	5	7	9	11	13	14	16	18
700	2	3	5	7	8	10	12	13	15	16
750	2	3	5	6	8	9	11	12	14	15
800	1	3	4	6	7	8	10	11	12	14
850	1	3	4	5	6	8	9	10	12	13
900	1	2	4	5	6	7	8	10	11	12
950	1	2	3	4	6	7	8	9	10	11
1000	1	2	3	4	5	6	7	8	10	11

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	23									
300	10	20	36							
350	6	13	19	29	36					
400	5	9	14	19	24	31	36			
450	4	7	11	15	18	22	28	32	36	
500	3	6	9	12	15	18	21	25	29	32
550	3	5	8	10	13	16	18	21	24	27
600	2	5	7	9	11	14	16	18	21	23
650	2	4	6	8	10	12	14	16	18	20
700	2	4	5	7	9	11	13	15	16	18
750	2	3	5	7	8	10	12	13	15	16
800	2	3	5	6	8	9	11	12	14	15
850	1	3	4	6	7	8	10	11	13	14
900	1	3	4	5	6	8	9	10	12	13
950	1	2	4	5	6	7	8	10	11	12
1000	1	2	3	5	6	7	8	9	10	11

TABLE 8.4

Minimum Residential Densities by Varying Land Prices, and Housing Unit Characteristics (size and value)
(10% return—units per acre)

1000 net sf per unit — Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	6	11	17	22	28	34	41	47	53	59
300	4	8	13	17	21	25	29	34	38	43
350	3	7	10	13	17	20	23	27	30	34
400	3	6	8	11	14	17	20	22	25	28
450	2	5	7	10	12	14	17	19	22	24
500	2	4	6	8	11	13	15	17	19	21
550	2	4	6	7	9	11	13	15	17	19
600	2	3	5	7	8	10	12	13	15	17
650	2	3	5	6	8	9	11	12	14	15
700	1	3	4	6	7	8	10	11	13	14
750	1	3	4	5	6	8	9	10	12	13
800	1	2	4	5	6	7	8	10	11	12
850	1	2	3	4	6	7	8	9	10	11
900	1	2	3	4	5	6	7	8	9	11
950	1	2	3	4	5	6	7	8	9	10
1000	1	2	3	4	5	6	7	7	8	9

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	8	17	25	37	47					
300	6	11	17	22	28	36	42	48		
350	4	8	13	17	21	25	29	35	40	44
400	3	7	10	13	17	20	23	27	30	35
450	3	6	8	11	14	17	20	22	25	28
500	2	5	7	10	12	14	17	19	22	24
550	2	4	6	8	10	13	15	17	19	21
600	2	4	6	7	9	11	13	15	17	19
650	2	3	5	7	8	10	12	13	15	17
700	2	3	5	6	8	9	11	12	14	15
750	1	3	4	6	7	8	10	11	13	14
800	1	3	4	5	6	8	9	10	12	13
850	1	2	4	5	6	7	8	10	11	12
900	1	2	3	4	6	7	8	9	10	11
950	1	2	3	4	5	6	7	8	9	10
1000	1	2	3	4	5	6	7	8	9	10

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	16									
300	8	16	29	38						
350	6	11	17	22	31	37				
400	4	8	12	17	21	27	31	36		
450	3	7	10	13	17	20	23	28	32	35
500	3	6	8	11	14	17	19	22	25	29
550	2	5	7	10	12	14	17	19	21	24
600	2	4	6	8	10	13	15	17	19	21
650	2	4	6	7	9	11	13	15	17	19
700	2	3	5	7	8	10	12	13	15	17
750	2	3	5	6	8	9	11	12	14	15
800	1	3	4	6	7	8	10	11	13	14
850	1	3	4	5	6	8	9	10	12	13
900	1	2	4	5	6	7	8	10	11	12
950	1	2	3	4	6	7	8	9	10	11
1000	1	2	3	4	5	6	7	8	9	10

TABLE 8.5
Minimum Residential Floor Area Ratios (FAR) by Varying Land Prices and Housing Unit Characteristics (size and value)
(15% return – FAR)

1000 net sf per unit Unapproved, unimproved land price: $1,000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.1	0.3	0.4	0.6	1.2	1.4	1.6	1.8	2.0	
300	0.1	0.2	0.3	0.4	0.5	1.0	1.2	1.4	1.5	1.6
350	0.1	0.2	0.3	0.3	0.4	0.5	0.6	1.1	1.2	1.4
400	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	1.0	1.1
450	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
500	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
550		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
600		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
650		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
700		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
750		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
800		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
850		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
900		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
950			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1000			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.3	0.7	1.0	2.2						
300	0.2	0.4	0.6	1.2	1.7	2.0	2.4			
350	0.2	0.3	0.5	0.6	1.1	1.0	1.7	2.0	2.2	
400	0.1	0.3	0.4	0.5	0.6	1.1	1.3	1.0	1.7	1.9
450	0.1	0.2	0.3	0.4	0.5	0.6	1.1	1.2	0.9	1.6
500	0.1	0.2	0.3	0.4	0.4	0.5	0.6	1.0	1.2	1.3
550	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	1.0	1.1
600	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7
650	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6
700	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
750	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
800		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
850		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
900		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
950		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
1000		0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	1.0									
300	0.5	0.9	2.2							
350	0.3	0.6	1.2	1.7	2.2					
400	0.2	0.4	0.6	1.1	1.1	1.9	2.2			
450	0.2	0.3	0.5	0.7	1.1	1.0	1.7	1.9	2.2	
500	0.1	0.3	0.4	0.6	0.7	1.1	1.0	1.1	1.8	2.0
550	0.1	0.2	0.4	0.5	0.6	0.7	1.1	1.0	1.1	1.7
600	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	0.9	1.1
650	0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.7	1.1	0.9
700	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	1.1
750	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	1.0
800	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7
850	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
900	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
950	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
1000	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5

TABLE 8.6
Minimum Residential Floor Area Ratios (FAR) by Varying Land Prices and Housing Unit Characteristics (size and value)
(10% return – FAR)

1000 net sf per unit Unapproved, unimproved land price: $1,000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.1	0.3	0.4	0.5	1.1	1.3	1.4	1.6	1.8	2.0
300	0.1	0.2	0.3	0.4	0.5	0.6	1.1	1.3	1.4	1.5
350	0.1	0.2	0.2	0.3	0.4	0.5	0.5	1.0	1.1	1.3
400	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	1.1
450	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
500		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
550		0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4
600		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
650		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
700		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
750		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
800		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
850		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
900			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
950			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1000			0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.3	0.6	1.2	1.8	2.3					
300	0.2	0.4	0.6	1.1	1.0	1.8	2.1	2.4		
350	0.1	0.3	0.4	0.6	1.0	1.2	1.0	1.7	2.0	2.2
400	0.1	0.2	0.3	0.5	0.6	0.7	1.2	0.9	1.0	1.7
450	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	1.2	1.0
500	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	1.1	1.2
550	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	1.0
600	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
650	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
700	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
750		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
800		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
850		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
900		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
950		0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
1000		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3

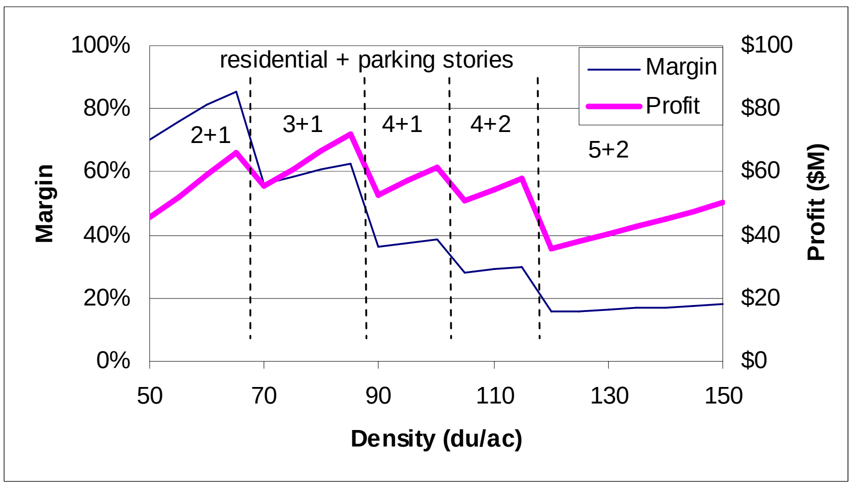
2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.7									
300	0.4	1.0	1.7	2.3						
350	0.3	0.5	1.0	1.0	1.9	2.2				
400	0.2	0.4	0.6	1.0	1.0	1.6	1.9	2.2		
450	0.2	0.3	0.5	0.6	1.0	0.9	1.1	1.7	1.9	2.2
500	0.1	0.3	0.4	0.5	0.6	1.0	1.2	1.0	1.2	1.8
550	0.1	0.2	0.3	0.4	0.5	0.7	1.0	1.2	1.0	1.1
600	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.0	1.1	1.0
650	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	1.0	1.1
700	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	1.0
750	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7
800	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
850	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
900	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
950	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
1000		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5

No development in our calculations stands higher than three stories. The model indicates that if a project cannot be profitable at building heights of three or four total floors, adding floors will not make it profitable, in the sense of offering a profit of 15 percent (or, alternatively, 10 percent) of revenue. When land prices reach the neighborhood of $10 million per acre, this ceases to be true. Construction of high-rise housing begins to make sense at such high land prices. This suggests the possibility that the model should include more fixed costs and less size-dependent costs. Adding $2 million in fixed costs to the model brings the minimum land price for high rises to about $8 million per acre; adding $20 million in fixed costs brings the threshold land price to $5 million per acre. However, the detailed cost data used for tuning the model is inconsistent with either change. The reason for this behavior is the sensitivity of construction cost to the number of floors in a building. After a point, adding floors requires different building materials—steel and then concrete—and added auxiliary items such as elevators and sprinklers. In many cases, the model tells us, adding stories does not pay.[3]

Figure 8.7 shows how two profitability criteria vary for a hypothetical development. The number of floors strongly influences profitability.

Figure 8.7
Profit Margin and Profit versus Density



Note: Development is on a 4-acre lot, with land at $5 million per acre. Average unit price is $550,000. Units are 1,200 square feet in size, and have one parking space each.

Conclusion

Many factors and many actors come together in the final decision on how much housing to build at a given site—profitability is but one. Moreover, the estimates and predictions resulting from this model are only as good as the assumptions embodied in it. Even if all of the model's submodels were perfectly accurate at any time, the markets for materials, labor, land, and capital that are fundamental to the development process are constantly in flux. Uncertainty in the model's projections is assured, and they must be used cautiously.

[3] Bear in mind that developers choose appropriate densities according to many criteria other than percentage profit. Total profit is important, as is internal rate of return, which takes into account the time value of money. Of course, consistency with the surroundings is important as well—for marketability and to gain approvals.

That said, a distinctly unprofitable project has a slim chance of being built. This model can and should be used to identify the financial real estate challenges to the construction of infill projects. It should also be used to explore the cost tradeoffs in residential development and to facilitate discussions among government officials, citizens, and developers regarding appropriate densities for infill.

Technical Note

Additional Density Calculations
(for 5 percent through 40 percent profit margins)

Units per Acres
40% profit margin – table 8.8
30% profit margin – table 8.10
20% profit margin – table 8.12
10% profit margin – table 8.14
5% profit margin – table 8.16

Floor Area Ratios
40% profit margin – table 8.9
30% profit margin – table 8.11
20% profit margin – table 8.13
10% profit margin – table 8.15
5% profit margin – table 8.17

TABLE 8.8
Minimum Residential Densities by Varying Land Prices, and Housing Unit Characteristics
(size and value)
(40% return—units per acre)

1000 net sf per unit Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	10	21	31	46	58					
300	7	14	22	29	36	46	54	62		
350	6	11	17	22	28	33	39	46	52	58
400	4	9	13	18	22	27	31	36	42	46
450	4	7	11	15	19	22	26	30	34	37
500	3	6	10	13	16	19	23	26	29	32
550	3	6	8	11	14	17	20	23	25	28
600	3	5	8	10	13	15	18	20	23	25
650	2	5	7	9	11	14	16	18	21	23
700	2	4	6	8	10	12	15	17	19	21
750	2	4	6	8	10	11	13	15	17	19
800	2	4	5	7	9	11	12	14	16	18
850	2	3	5	7	8	10	11	13	15	16
900	2	3	5	6	8	9	11	12	14	15
950	1	3	4	6	7	9	10	11	13	14
1000	1	3	4	5	7	8	9	11	12	14

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	10	21	31	46	58					
300	7	14	22	29	36	46	54	62		
350	6	11	17	22	28	33	39	46	52	58
400	4	9	13	18	22	27	31	36	42	46
450	4	7	11	15	19	22	26	30	34	37
—500	3	6	10	13	16	19	23	26	29	32
550	3	6	8	11	14	17	20	23	25	28
600	3	5	8	10	13	15	18	20	23	25
650	2	5	7	9	11	14	16	18	21	23
700	2	4	6	8	10	12	15	17	19	21
750	2	4	6	8	10	11	13	15	17	19
800	2	4	5	7	9	11	12	14	16	18
850	2	3	5	7	8	10	11	13	15	16
900	2	3	5	6	8	9	11	12	14	15
950	1	3	4	6	7	9	10	11	13	14
1000	1	3	4	5	7	8	9	11	12	14

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250										
300										
350	15									
400	9	18	33							
450	7	13	20	30	38					
500	5	10	15	21	28	34				
550	4	8	13	17	21	27	32	37		
600	4	7	11	14	18	21	27	31	34	38
650	3	6	9	12	15	19	22	25	30	33
700	3	5	8	11	14	16	19	22	25	29
750	2	5	7	10	12	15	17	20	22	25
800	2	4	7	9	11	13	16	18	20	22
850	2	4	6	8	10	12	14	16	18	20
900	2	4	6	7	9	11	13	15	17	19
950	2	3	5	7	9	10	12	14	16	17
1000	2	3	5	6	8	10	11	13	14	16

TABLE 8.9

Minimum Residential Floor Area Ratios (FARs) by Varying Land Prices and Housing Unit Characteristics (size and value)
(40% return—units per acre)

1000 net sf per unit — Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.2	0.5	1.2	1.6	2.0					
300	0.2	0.3	0.5	1.1	1.4	1.6	1.9	2.1		
350	0.1	0.3	0.4	0.5	1.0	1.3	1.5	1.6	1.8	2.0
400	0.1	0.2	0.3	0.4	0.5	1.0	1.2	1.4	1.4	1.6
450	0.1	0.2	0.3	0.3	0.4	0.5	0.6	1.1	1.3	1.4
500	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	1.1	1.2
550	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	1.1
600	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
650	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
700		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
750		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
800		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
850		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
900		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
950		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
1000		0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.9									
300	0.4	1.2	2.2							
350	0.3	0.6	1.2	1.8	2.2					
400	0.2	0.4	0.6	1.2	1.6	1.9	2.3			
450	0.2	0.3	0.5	0.7	1.2	1.0	1.8	2.0	2.3	
500	0.1	0.3	0.4	0.5	0.7	1.2	1.0	1.7	1.9	2.1
550	0.1	0.2	0.4	0.5	0.6	1.0	1.2	0.9	1.6	1.8
600	0.1	0.2	0.3	0.4	0.5	0.6	1.0	1.2	0.9	1.0
650	0.1	0.2	0.3	0.4	0.5	0.5	0.6	1.0	1.2	0.9
700	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	1.1	1.2
750	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	1.1
800	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
850	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6
900	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
950	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
1000	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250										
300										
350	0.7									
400	0.4	1.1	2.0							
450	0.3	0.6	0.9	1.8	2.3					
500	0.2	0.5	0.7	0.9	1.7	2.1				
550	0.2	0.4	0.6	1.0	1.0	1.7	1.9	2.2		
600	0.2	0.3	0.5	0.7	1.1	1.0	1.6	1.9	2.1	2.3
650	0.1	0.3	0.4	0.6	0.7	1.1	1.0	1.1	1.8	2.0
700	0.1	0.3	0.4	0.5	0.6	1.0	1.2	1.0	1.1	1.8
750	0.1	0.2	0.3	0.4	0.6	0.7	1.0	1.2	1.0	1.1
800	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	0.9	1.0
850	0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.7	1.1	0.9
900	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	1.0	1.1
950	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	1.1
1000	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7

TABLE 8.10
Mimimum Residential Densities by Varying Land Prices, and Housing Unit Characteristics
(size and value)
(30% return—units per acre)

1000 net sf per unit

Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	8	17	25	34	45	54	64			
300	6	12	18	24	30	36	44	51	57	63
350	5	9	14	19	23	28	33	37	44	49
400	4	8	11	15	19	23	27	31	34	38
450	3	6	10	13	16	19	23	26	29	32
500	3	6	8	11	14	17	20	22	25	28
550	2	5	7	10	12	15	17	20	22	25
600	2	4	7	9	11	13	15	18	20	22
650	2	4	6	8	10	12	14	16	18	20
700	2	4	5	7	9	11	13	15	16	18
750	2	3	5	7	8	10	12	13	15	17
800	2	3	5	6	8	9	11	12	14	16
850	1	3	4	6	7	9	10	12	13	14
900	1	3	4	5	7	8	9	11	12	14
950	1	3	4	5	6	8	9	10	11	13
1000	1	2	4	5	6	7	8	10	11	12

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	16	42								
300	9	18	28	42						
350	6	13	19	26	35	42				
400	5	10	15	20	25	30	37	42	47	
450	4	8	12	16	20	24	28	34	38	42
500	3	7	10	13	17	20	23	27	32	35
550	3	6	9	12	14	17	20	23	26	29
600	3	5	8	10	13	15	18	20	23	25
650	2	5	7	9	11	14	16	18	20	23
700	2	4	6	8	10	12	14	16	18	20
750	2	4	6	7	9	11	13	15	17	19
800	2	3	5	7	9	10	12	14	15	17
850	2	3	5	6	8	9	11	13	14	16
900	1	3	4	6	7	9	10	12	13	15
950	1	3	4	6	7	8	10	11	12	14
1000	1	3	4	5	6	8	9	10	12	13

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250										
300	20									
350	10	20	37							
400	7	14	21	31						
450	5	10	16	21	28	34				
500	4	8	12	17	21	27	31	36		
550	3	7	10	14	17	21	24	30	33	37
600	3	6	9	12	15	18	21	24	28	31
650	3	5	8	10	13	16	18	21	24	27
700	2	5	7	9	12	14	16	19	21	23
750	2	4	6	8	10	13	15	17	19	21
800	2	4	6	8	9	11	13	15	17	19
850	2	3	5	7	9	10	12	14	16	17
900	2	3	5	6	8	10	11	13	14	16
950	2	3	4	6	7	9	10	12	13	15
1000	1	3	4	6	7	8	10	11	13	14

TABLE 8.11
Minimum Residential Floor Area Ratios (FARs) by Varying Land Prices and Housing Unit Characteristics (size and value)
(30% return—units per acre)

1000 net sf per unit

Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.2	0.4	0.6	1.3	1.6	1.9	2.2			
300	0.1	0.3	0.4	0.6	1.1	1.4	1.5	1.7	2.0	2.2
350	0.1	0.2	0.3	0.4	0.5	1.1	1.2	1.4	1.5	1.7
400	0.1	0.2	0.3	0.4	0.4	0.5	1.0	1.2	1.3	1.5
450	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	1.1	1.2
500	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	1.1
550	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
600	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
650		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
700		0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4
750		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
800		0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
850		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
900		0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
950		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
1000		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.6	2.1								
300	0.3	0.6	1.0	2.1						
350	0.2	0.4	0.7	1.3	1.7	2.1				
400	0.2	0.3	0.5	0.7	1.2	1.0	1.8	2.1	2.3	
450	0.1	0.3	0.4	0.5	0.7	1.2	1.0	1.7	1.9	2.1
500	0.1	0.2	0.3	0.5	0.6	0.7	1.2	0.9	1.6	1.7
550	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	1.3	1.0
600	0.1	0.2	0.3	0.3	0.4	0.5	0.6	1.0	1.1	1.3
650	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	1.0	1.1
700	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	1.0
750	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
800	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
850	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
900	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
950		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
1000		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250										
300	0.9									
350	0.5	0.9	2.3							
400	0.3	0.6	0.9	1.9						
450	0.2	0.5	0.7	1.0	1.7	2.1				
500	0.2	0.4	0.6	1.0	1.0	1.6	1.9	2.2		
550	0.2	0.3	0.5	0.6	1.1	1.0	1.1	1.8	2.0	2.3
600	0.1	0.3	0.4	0.5	0.7	1.1	1.0	1.1	1.7	1.9
650	0.1	0.2	0.4	0.5	0.6	0.7	1.1	1.0	1.1	1.7
700	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	1.0	1.1
750	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.0	1.1	1.0
800	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	1.0	1.2
850	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	1.1
900	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7
950	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
1000	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6

TABLE 8.12
Minimum Residential Densities by Varying Land Prices, and Housing Unit Characteristics
(size and value)
(20% return – units per acre)

1000 net sf per unit

Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	7	14	20	27	34	43	51	58		
300	5	10	15	20	25	30	35	42	47	52
350	4	8	12	16	20	24	28	32	36	41
400	3	7	10	13	16	20	23	26	29	33
450	3	6	8	11	14	17	20	22	25	28
500	2	5	7	10	12	15	17	19	22	24
550	2	4	6	9	11	13	15	17	19	22
600	2	4	6	8	10	12	14	15	17	19
650	2	4	5	7	9	11	12	14	16	18
700	2	3	5	6	8	10	11	13	14	16
750	1	3	4	6	7	9	10	12	13	15
800	1	3	4	5	7	8	10	11	12	14
850	1	3	4	5	6	8	9	10	12	13
900	1	2	4	5	6	7	8	10	11	12
950	1	2	3	4	6	7	8	9	10	11
1000	1	2	3	4	5	6	7	8	10	11

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	11	23	40							
300	7	14	21	28	39	47				
350	5	10	15	21	26	33	39	44		
400	4	8	12	16	20	24	28	34	38	43
450	3	7	10	13	17	20	23	27	30	35
500	3	6	8	11	14	17	20	23	25	28
550	2	5	7	10	12	15	17	20	22	25
600	2	4	7	9	11	13	15	17	20	22
650	2	4	6	8	10	12	14	16	18	20
700	2	4	5	7	9	11	12	14	16	18
750	2	3	5	6	8	10	11	13	15	16
800	1	3	4	6	7	9	10	12	13	15
850	1	3	4	6	7	8	10	11	12	14
900	1	3	4	5	6	8	9	10	12	13
950	1	2	4	5	6	7	8	10	11	12
1000	1	2	3	5	6	7	8	9	10	11

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250										
300	12	30								
350	7	15	22	34						
400	5	11	16	21	29	35				
450	4	8	12	17	21	27	31	36		
500	3	7	10	14	17	20	24	29	32	36
550	3	6	9	11	14	17	20	23	27	30
600	3	5	7	10	12	15	17	20	23	25
650	2	4	7	9	11	13	15	18	20	22
700	2	4	6	8	10	12	14	16	18	20
750	2	4	5	7	9	11	12	14	16	18
800	2	3	5	7	8	10	11	13	15	16
850	2	3	4	6	7	9	11	12	13	15
900	1	3	4	6	7	8	10	11	13	14
950	1	3	4	5	6	8	9	10	12	13
1000	1	2	4	5	6	7	8	10	11	12

TABLE 8.13

Minimum **Residential Floor Area Ratios (FARs) by Varying Land Prices and Housing Unit Characteristics (size and value)**

(20% return – units per acre)

1000 net sf per unit

Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.2	0.3	0.5	1.0	1.3	1.5	1.7	2.0		
300	0.1	0.2	0.3	0.5	0.6	1.1	1.3	1.4	1.6	1.8
350	0.1	0.2	0.3	0.4	0.5	0.5	1.1	1.2	1.4	1.4
400	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	1.1	1.2
450	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	1.1
500	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
550		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
600		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
650		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
700		0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
750		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
800		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
850		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
900		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
950		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
1000			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.4	1.1	2.0							
300	0.2	0.5	1.0	1.0	1.9	2.3				
350	0.2	0.4	0.5	1.0	1.3	1.6	1.9	2.2		
400	0.1	0.3	0.4	0.6	0.7	1.2	1.0	1.7	1.9	2.1
450	0.1	0.2	0.3	0.5	0.6	0.7	1.2	0.9	1.0	1.7
500	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	1.3	1.0
550	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	1.1	1.2
600	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	1.1
650	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
700	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
750	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
800	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
850		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
900		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
950		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
1000		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250										
300	0.6	1.9								
350	0.3	0.7	1.0	2.1						
400	0.2	0.5	0.7	1.0	1.8	2.1				
450	0.2	0.4	0.6	1.0	0.9	1.6	1.9	2.2		
500	0.2	0.3	0.5	0.6	1.0	0.9	1.1	1.8	2.0	2.2
550	0.1	0.3	0.4	0.5	0.7	1.0	0.9	1.1	1.7	1.8
600	0.1	0.2	0.3	0.5	0.6	0.7	1.1	0.9	1.0	1.2
650	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	0.9	1.0
700	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	1.1	0.9
750	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	1.1
800	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7
850	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7
900	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
950	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
1000	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6

TABLE 8.14
Minimum Residential Densities by Varying Land Prices, and Housing Unit Characteristics
(size and value)
(10% return – units per acre)

1000 net sf per unit

Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	6	11	17	22	28	34	41	47	53	59
300	4	8	13	17	21	25	29	34	38	43
350	3	7	10	13	17	20	23	27	30	34
400	3	6	8	11	14	17	20	22	25	28
450	2	5	7	10	12	14	17	19	22	24
500	2	4	6	8	11	13	15	17	19	21
550	2	4	6	7	9	11	13	15	17	19
600	2	3	5	7	8	10	12	13	15	17
650	2	3	5	6	8	9	11	12	14	15
700	1	3	4	6	7	8	10	11	13	14
750	1	3	4	5	6	8	9	10	12	13
800	1	2	4	5	6	7	8	10	11	12
850	1	2	3	4	6	7	8	9	10	11
900	1	2	3	4	5	6	7	8	9	11
950	1	2	3	4	5	6	7	8	9	10
1000	1	2	3	4	5	6	7	7	8	9

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	8	17	25	37	47					
300	6	11	17	22	28	36	42	48		
350	4	8	13	17	21	25	29	35	40	44
400	3	7	10	13	17	20	23	27	30	35
450	3	6	8	11	14	17	20	22	25	28
500	2	5	7	10	12	14	17	19	22	24
550	2	4	6	8	10	13	15	17	19	21
600	2	4	6	7	9	11	13	15	17	19
650	2	3	5	7	8	10	12	13	15	17
700	2	3	5	6	8	9	11	12	14	15
750	1	3	4	6	7	8	10	11	13	14
800	1	3	4	5	6	8	9	10	12	13
850	1	2	4	5	6	7	8	10	11	12
900	1	2	3	4	6	7	8	9	10	11
950	1	2	3	4	5	6	7	8	9	10
1000	1	2	3	4	5	6	7	8	9	10

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	16									
300	8	16	29	38						
350	6	11	17	22	31	37				
400	4	8	12	17	21	27	31	36		
450	3	7	10	13	17	20	23	28	32	35
500	3	6	8	11	14	17	19	22	25	29
550	2	5	7	10	12	14	17	19	21	24
600	2	4	6	8	10	13	15	17	19	21
650	2	4	6	7	9	11	13	15	17	19
700	2	3	5	7	8	10	12	13	15	17
750	2	3	5	6	8	9	11	12	14	15
800	1	3	4	6	7	8	10	11	13	14
850	1	3	4	5	6	8	9	10	12	13
900	1	2	4	5	6	7	8	10	11	12
950	1	2	3	4	6	7	8	9	10	11
1000	1	2	3	4	5	6	7	8	9	10

TABLE 8.15
Minimum Residential Floor Area Ratios (FARs) by Varying Land Prices and Housing Unit Characteristics (size and value)
(10% return—units per acre)

1000 net sf per unit

Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.1	0.3	0.4	0.5	1.1	1.3	1.4	1.6	1.8	2.0
300	0.1	0.2	0.3	0.4	0.5	0.6	1.1	1.3	1.4	1.5
350	0.1	0.2	0.2	0.3	0.4	0.5	0.5	1.0	1.1	1.3
400	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	1.1
450	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
500		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
550		0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4
600		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
650		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
700		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
750		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
800		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
850		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
900			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
950			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
1000			0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.3	0.6	1.2	1.8	2.3					
300	0.2	0.4	0.6	1.1	1.0	1.8	2.1	2.4		
350	0.1	0.3	0.4	0.6	1.0	1.2	1.0	1.7	2.0	2.2
400	0.1	0.2	0.3	0.5	0.6	0.7	1.2	0.9	1.0	1.7
450	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	1.2	1.0
500	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	1.1	1.2
550	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	1.0
600	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
650	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
700	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
750		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
800		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
850		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
900		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
950		0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
1000		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.7									
300	0.4	1.0	1.7	2.3						
350	0.3	0.5	1.0	1.0	1.9	2.2				
400	0.2	0.4	0.6	1.0	1.0	1.6	1.9	2.2		
450	0.2	0.3	0.5	0.6	1.0	0.9	1.1	1.7	1.9	2.2
500	0.1	0.3	0.4	0.5	0.6	1.0	1.2	1.0	1.2	1.8
550	0.1	0.2	0.3	0.4	0.5	0.7	1.0	1.2	1.0	1.1
600	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.0	1.1	1.0
650	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	1.0	1.1
700	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	1.0
750	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7
800	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
850	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
900	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
950	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
1000		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5

TABLE 8.16
Minimum Residential Densities by Varying Land Prices, and Housing Unit Characteristics
(size and value)
(5% return—units per acre)

1000 net sf per unit

Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	5	10	15	20	25	30	35	42	48	53
300	4	8	12	15	19	23	27	31	35	38
350	3	6	9	12	15	19	22	25	28	31
400	3	5	8	10	13	16	18	21	23	26
450	2	4	7	9	11	13	16	18	20	22
500	2	4	6	8	10	12	14	16	18	19
550	2	3	5	7	9	10	12	14	16	17
600	2	3	5	6	8	9	11	13	14	16
650	1	3	4	6	7	9	10	11	13	14
700	1	3	4	5	7	8	9	10	12	13
750	1	2	4	5	6	7	8	10	11	12
800	1	2	3	4	6	7	8	9	10	11
850	1	2	3	4	5	6	7	8	9	10
900	1	2	3	4	5	6	7	8	9	10
950	1	2	3	4	5	6	6	7	8	9
1000	1	2	3	3	4	5	6	7	8	9

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	7	14	22	29	40	48				
300	5	10	15	20	25	32	37	42	48	
350	4	8	11	15	19	23	26	32	36	40
400	3	6	9	12	15	18	21	24	27	32
450	3	5	8	10	13	15	18	20	23	26
500	2	4	7	9	11	13	15	18	20	22
550	2	4	6	8	10	12	14	15	17	19
600	2	3	5	7	9	10	12	14	15	17
650	2	3	5	6	8	9	11	12	14	16
700	1	3	4	6	7	8	10	11	13	14
750	1	3	4	5	6	8	9	10	12	13
800	1	2	4	5	6	7	8	10	11	12
850	1	2	3	4	6	7	8	9	10	11
900	1	2	3	4	5	6	7	8	9	10
950	1	2	3	4	5	6	7	8	9	10
1000	1	2	3	4	5	6	6	7	8	9

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	12	32								
300	7	14	21	32						
350	5	10	14	19	24	32	37			
400	4	7	11	15	18	22	28	32	36	
450	3	6	9	12	15	18	21	24	29	32
500	3	5	8	10	13	15	18	20	23	25
550	2	4	7	9	11	13	15	17	20	22
600	2	4	6	8	10	11	13	15	17	19
650	2	3	5	7	9	10	12	14	15	17
700	2	3	5	6	8	9	11	12	14	15
750	1	3	4	6	7	8	10	11	13	14
800	1	3	4	5	6	8	9	10	12	13
850	1	2	4	5	6	7	8	10	11	12
900	1	2	3	4	6	7	8	9	10	11
950	1	2	3	4	5	6	7	8	9	10
1000	1	2	3	4	5	6	7	8	9	10

TABLE 8.17
Minimum Residential Floor Area Ratios (FARs) by Varying Land Prices and Housing Unit Characteristics (size and value)
(5% return – units per acre)

1000 net sf per unit

Unapproved, unimproved land price: $1000s per acre

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.1	0.2	0.3	0.5	0.6	1.2	1.3	1.5	1.6	1.8
300	0.1	0.2	0.3	0.4	0.4	0.5	1.0	1.2	1.3	1.5
350	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	1.1	1.2
400	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
450	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
500		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
550		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
600		0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
650		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
700		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
750		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
800		0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
850			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
900			0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
950			0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
1000			0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2

1500 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.2	0.5	1.1	1.0	2.0	2.4				
300	0.2	0.3	0.5	0.7	1.2	1.6	1.8	2.1	2.4	
350	0.1	0.3	0.4	0.5	0.6	1.1	0.9	1.6	1.8	2.0
400	0.1	0.2	0.3	0.4	0.5	0.6	1.1	1.2	0.9	1.6
450	0.1	0.2	0.3	0.4	0.4	0.5	0.6	1.0	1.1	1.3
500	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	1.1
550	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
600	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
650	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
700		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
750		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
800		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
850		0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
900		0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
950		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
1000		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3

2000 net sf per unit

k$ \unit	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
250	0.6	1.9								
300	0.3	0.6	1.0	1.9						
350	0.2	0.4	0.7	1.2	1.1	1.9	2.3			
400	0.2	0.3	0.5	0.7	1.1	1.0	1.7	1.9	2.2	
450	0.1	0.3	0.4	0.6	0.7	1.1	1.0	1.1	1.7	1.9
500	0.1	0.2	0.3	0.5	0.6	0.7	1.1	0.9	1.0	1.2
550	0.1	0.2	0.3	0.4	0.5	0.6	0.7	1.1	1.2	1.0
600	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	1.0	1.2
650	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	1.0
700	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7
750	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.6
800	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
850	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
900	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
950		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
1000		0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4

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Chapter 9
SUBDIVISION STANDARDS—PARKING AND INFILL

INTRODUCTION

In a fierce infill controversy in St. Louis, Missouri, one building on the National Register of Historic Places was destroyed to support the revitalization of a neighboring landmark—the St. Louis Post Office. The National Register building was imploded to provide parking for the retail and office facilities in the adaptively reused Post Office.

Although parking is usually an arcane subject, the St. Louis example illustrates that it can have important consequences that literally shape our environment. Parking also has a significant financial bearing on the cost of residential and nonresidential development and, indeed, whether development proceeds at all; many a potential project has been stopped in its tracks because the development site could not “fit” the required parking.

The importance of developing appropriate parking standards is especially critical for smart growth-furthering development, such as infill and TODs, because although such projects offer many societal benefits, they may face various constraints. First, development space (e.g., for infill) is at a premium, and development conditions may be otherwise constrained because of soil or environmental problems. As such, providing parking is often more problematical than in a greenfields context. The second constraint is economic. Greenfield development typically provides surface parking, which is much less expensive than the structured parking common in infill and other smart-growth projects. Further, land consumed for parking takes away from land used for the building of income-producing residential units and nonresidential space. The third consideration relates to “place-making.” Many passed-over infill and other smart-growth sites are not initially attractive, and it is incumbent to transform such sites to as attractive a location as possible. The last thing one should do in such place-making is providing unattractive and unnecessary parking.

This chapter first considers the challenge to developing appropriate parking standards for residential and nonresidential development, especially in a smart-growth and infill context. It then describes data and procedures for formulating project-and location-sensitive parking requirements for both residential and nonresidential land uses with a focus on smart growth and infill situations. The chapter concludes with flexible strategies for satisfying any given parking standard, again of particular value to smart growth and infill.

BACKGROUND

The costs of providing parking are often little considered and poorly understood, in large part because parking in the United States is usually “free.” However, up-front costs can

This chapter by Matt Cuddy and David Listokin.

range from approximately $2,000 per space of surface parking in the suburbs to more than $25,000 per space for structured parking in central business districts (VTPI 2003b). Rather than being borne directly by the driver that uses the spot, these costs are borne by all the users of a facility—employees at a firm or residents of a complex—regardless of whether they use parking. This distorts the market for parking, ultimately leading to its overprovision: because parking may be overprovided, driving is encouraged. Parking demand increases, and the perceived need for parking does as well (Shoup 1999).

Planners are generally unsophisticated in their approach toward parking requirements. Despite parking researchers' agreement that an array of local variables influence parking demand (ITE 1995; California Department of Transportation 2002a), municipal planners often use neighboring towns' standards, or statewide or even general national standards as their own. In a study of suburban office parking requirements, Richard Wilson found that planners tend to use "rules of thumb" to set standards (Wilson 1995). In a later study, he surveyed the planning departments of 138 southern California cities to clarify this finding (Wilson 2000). He found that the most common source of information to set minimum parking standards was a survey of nearby cities' standards. National standards were used almost as often. Commissioning parking studies, the best approach for setting standards—nearly every source of parking standards recommends studying parking on a project-by-project basis wherever feasible—came next on the list, scoring only about one-tenth as important an approach as surveying nearby cities. Planners appear overwhelmingly likely to use parking standards of perhaps limited applicability to the project being regulated (e.g., applying a greenfields-based and automobile-dependent parking requirement on an infill project located near transit).

The work of transportation modelers suggests there is room to refine the standards significantly. Researchers in metropolitan planning organizations and elsewhere have developed sophisticated nonlinear models, at scales from zip code areas down to households, using as independent variables for automobile ownership a range of causal factors such as household income, family size, number of workers in the household, residential density, transit access, and land use mix (Cambridge Systematics 1997; Chu 2002; Hess and Ong 2002; Kockelman 1997; Schimek 1996; Holtzclaw et al. 2002). They have found numerous statistically significant predictors of automobile ownership in their models. Although, optimally, the results from these statistical studies would be incorporated in the standards setting for parking, as noted above, this more refined approach is rarely done.

The situation is yet more vexing concerning developing parking standards for infill, TODs, and other smart growth-furthering developments. Although such developments are often near transit and compared with greenfields development are much less auto dependent—and hence require less parking—they are nonetheless saddled with the same higher parking requirements as those typical of greenfields projects. How should one then develop appropriate parking standards that differentiate between greenfields and smart-growth project characteristics? One could begin responding to that charge by considering such data as national parking studies and recommendations, but there are severe limitations to using these national templates for smart growth and infill, as we explain below.

National and New Jersey Benchmarks

There are numerous national parking references, including:

- Institute of Transportation Engineers, *Parking Generation*, 1987: Presents peak parking occupancy ratios for 64 land uses. The vast majority of the data are from suburban developments. Average values are reported.

- American Planning Association, *Off-Street Parking Requirements*: 1991. Presents parking requirements for selected localities by land use. One hundred twenty seven zoning ordinances were reviewed for this study. The APA analysis was updated in 2002 by Davidson and Dolnick.

- Urban Land Institute, *Parking Requirements for Shopping Centers*, 1999: Presents peak parking occupancy ratios and recommended parking requirements for shopping centers of different sizes with different proportions of entertainment uses. The recommended rates are deemed adequate for the 20th busiest hour of the year.

- Urban Land Institute, *Shared Parking*, 1983: Presents peak parking occupancy ratios for six individual uses and various mixed-use combinations in central business district (CBD) and suburban locations. The single-use projects were mostly suburban. The 90th percentile parking occupancies are reported for retail and office uses (that is, values higher than 90 percent of cases in the samples).

These publications provide the benchmarks shown in tables 9.1. through 9.4. The tables summarize the parking standards, which are presented in considerably greater detail in the national literature. For instance, the Davidson and Dolnick (2002) survey for the American Planning Association (APA) indicated parking requirements for scores of nonresidential uses that ranged from roughly 0.5 to 8.0 spaces per 1,000 square feet of space. These more detailed requirements are shown in table 9.5.

TABLE 9.1
ITE's Parking Requirements

Peak Occupancies (average of studies)	
Retail (shopping centers on Saturdays)	3.97 spaces per 1,000 square feet of GLA
Office (office parks on weekdays)	2.52 spaces per 1,000 square feet of GLA
Hotel (convention hotels on Saturdays)	1.03 spaces per room
Single-family residential	NA
Multifamily residential (low-/mid-rise apartments on Saturdays)	1.21 spaces per dwelling

Notes: GLA= Gross leasable area; NA= Not applicable or available.

TABLE 9.2
APA's Parking Requirements

Requirements (median values)	
Retail (shopping centers)	5.5 spaces per 1,000 square feet of GLA
Office	4 spaces per 1,000 square feet of GLA
Hotel	1 space per room
Single-family residential	2 spaces per dwelling
Multifamily residential	1.6 spaces per dwelling unit

Note: GLA= Gross leasable area.

TABLE 9.3
ULI's Parking Requirements for Shopping Centers

Size	Peak Occupancies (average of studies)	Recommended Parking Ratios
Shopping centers (less than 400,000 square feet)	3.7 spaces per 1,000 square feet of GLA	4 spaces per 1,000 square feet of GLA
Shopping centers (400,000-600,000 square feet)	4.0 spaces per 1,000 square feet of GLA	4.0-4.5 spaces per 1,000 square feet of GLA
Shopping centers (600,000 square feet and over)	4.5 spaces per 1,000 square feet of GLA	4.5 spaces per 1,000 square feet of GLA

Note: GLA= Gross leasable area.

TABLE 9.4
ULI's Shared Parking Standards

Peak Occupancies (average of studies)	
Retail (suburban shopping centers on Saturdays)	5.0 spaces per 1,000 square feet of GLA
Office (suburban office buildings on weekdays)	3.0 spaces per 1,000 square feet of GLA
Hotel (major suburban hotels)	1.0 space per room
Single-family residential	NA
Multifamily residential (remote suburban developments)	1.5 spaces per dwelling

Notes: GLA= Gross leasable area; NA= Not applicable or available.

TABLE 9.5
American Planning Association Nonresidential Parking Standards by Detailed Categories

Nonresidential Use	N=	Parking Requirements A. Average	B. Minimum	C. Maximum
Commercial Uses				
Banks/Financial Institute	4	3.9 per 1,000 SF GFA	1.7 per 1,000 SF GFA	5 per 1000 SF GFA
w/ Drive Through	2	3.7 per 1,000 SF GFA	3.3 per 1,000 SF GFA	4 per 1,000 SF GFA
w/o Drive Through	3	3.2 per 1,000 SF GFA	.63 per 1.000 SF GFA	5 per 1,000 SF GFA
Bar	3	9.6 per 1,000 SF GFA	6.7 per 1,000 SF GFA	13.3 per 1,000 SF GFA
	3	.41 per seat	.25 per seat	.57 per seat
Full Service Car Wash	2	2.3 per washing lane	2 per washing lane	2.5 per washing lane
Hotel/Motel				
w/ Restaurant/Lounge		(measured in combinations of SF and # of rooms)		
w/ Banquet/Meeting Rooms		(measured in combinations of SF and # of rooms)		
w/ Conference Facility		(measured in combinations of SF and # of rooms)		
Restaurant	6	.29 per seat	.25 per seat	.33 per seat
Drive Up		(measured in different units)		
Fast Food w/ drive thru	1	.4 per seat		
Fast Food w/o drive thru		N/A		
Quality - High Turnover		N/A		
Quality - Lower Turnover		N/A		
Retail Store (Freestanding)	5	4.2 per 1,000 SF **GFA**	3.3 per 1,000 SF **GFA**	5 per 1,000 SF **GFA**
Service Station				
Gas Only	3	4.7 per 1,000 SF GFA	2.3 per 1,000 SF GFA	6.7 per 1,000 SF GFA
Gas and Convenience	5	4.9 per SF GFA	2.6 per 1,000 SF GFA	8 per 1,000 SF GFA
Gas, Convenience, Service Bays		N/A		
Gas, Convenience, Car Wash		N/A		
Shopping Center				
Under 600,000 SF	3	4.1 per 1,000 SF **GFA**	3.6 per 1,000 SF **GFA**	4.4 per 1,000 SF **GFA**
Over 600,000 SF	1	5.5 per 1,000 SF GLA		
Supermarket (Freestanding)	3	5 per 1,000 SF GFA	3.4 per 1,000 SF GFA	6.7 per 1,000 SF GFA
Theatre	8	.24 per seat	.17 per seat	.35 per seat
Office Uses				
General	3	3.4 per SF GFA	3.3 per 1,000 SF GFA	3.6 per 1,000 SF GFA
Medical	4	4.3 per SF GFA	3.3 per 1,000 SF GFA	5 per 1,000 SF GFA
Industrial Uses				
Assembly Operations		N/A		

Table continued on next page

TABLE 9.5, continued

Nonresidential Use	N=	Parking Requirements A. Average	B. Minimum	C. Maximum
Industrial - Light	3	1.6 per 1,000 SF GFA	.7 per 1,000 SF GFA	2.5 per 1,000 SF GFA
Heavy Manufacturing	1	.5 per employee		
Research Lab	1	1.4 per employee		
Warehouse	3	1.3 per 1,000 SF GFA	.5 per 1,000 SF GFA	2 per 1,000 SF GFA
High Tech or Flex Space		N/A		
Recreational Uses				
Bowling Alley	7	3.8 per lane	2 per lane	5 per lane
Golf Course	6	4.6 per hole	2.8 per hole	6 per hole
Golf Range		(measured by space per tee)		
Health Club	6	7 per 1,000 SF GFA	5 per 1,000 SF GFA	10 per 1,000 SF GFA
Marina	8	1.2 per boat slip	.5 per boat slip	2 per boat slip
Miniature Golf	5	1.8 per hole	1 per hole	3 per hole
Pool Hall/Arcade	2	9.4 per 1,000 SF GFA (pool hall)	5.5 per 1,000 SF GFA (pool hall)	13.3 per 1,000 SF GFA (pool hall)
	2	3.8 per 1,000 SF GFA (arcade)	2.5 per 1,000 SF GFA (arcade)	5 per 1,000 SF GFA (arcade)
Skating Rink	5	5.2 per 1,000 SF GFA (roller)	4.4 per 1,000 SF GFA (roller)	6 per 1,000 SF GFA (roller)
Stadium	8	.27 per seat	.2 per seat	.35 per seat
Swimming Pool		(most measured by pool area)		
Tennis Court	5	3.6 per court	2 per court	5 per court
Institutional Uses				
Church	12	.3 per seat	.1 per seat	.7 per seat
Convalescent Home	7	.4 per bed	.2 per bed	.6 per bed
Funeral Home	4	.3 per **seat**	.2 per **seat**	.5 per **seat**
Hospital	4	1.7 per bed	.5 per bed	3 per bed
Library Museum	7	4.3 per 1,000 SF GFA (library)	2 per 1,000 SF GFA	8 per 1,000 SF GFA
Schools				
Nursery/Elem/Intermediate	7	2.5 per classroom (elem)	2 per classroom (elem)	3 per classroom (elem)
High School		(measured multiple ways)		
College	3	.4 per student	.25 per student	.5 per student

Source: Davidson and Dolnick, 2002.
Notes: N = Number of ordinances cited by Davidson and Dolnick (2002); NA = Not Available.

Although—as tables 9.1 through 9.5 indicate—there is far from unanimity in the data, the national parking publications suggest the order of magnitude values with respect to parking standards for major land uses. These are shown in table 9.6.

TABLE 9.6
National Parking Standards

Use type	Peak Occupancy Ratios (demand)	Parking Ratio Requirements (supply)
Retail	3.97 spaces per 1,000 square feet[1]	
	3.7 to 4.5 spaces per 1,000 square feet[2]	5.0 spaces per 1,000 square feet[4]
	5.0 spaces per 1,000 square feet[3]	
Office	2.52 spaces per 1,000 square feet[1]	4.0 spaces per 1,000 square feet[4]
	3.0 spaces per 1,000 square feet[3]	
Residential	1.21 spaces per multifamily unit[1]	1.5 spaces per multifamily unit[4]
	1.5 spaces per multifamily unit[3]	

Notes: [1]ITE 1987. [2]ULI 1999. [3]ULI 1983. [4]Medians of values in Davidson and Dolnick, 2002; for the residential case, standards for units with three or more bedrooms are excluded from median calculation.

In New Jersey, residential parking requirement, are guided by the Residential Site Improvement Standards. (Nonresidential parking requirements in New Jersey are individually determined by the state's municipalities.) RSIS was largely based on a comprehensive study conducted by Rutgers University (Listokin and Walker 1989) that attempted to develop "rationally based" subdivision requirements. With respect to residential parking, the Rutgers study developed standards from the then latest census (1980) by empirically examining the actual number of automobiles found in different types and sizes of housing units that had recently built at that time (between 1975 and 1985) in New Jersey. An increment for visitor parking (0.5 spaces per housing unit) was added where appropriate (i.e., for multifamily housing) to derive the total recommended parking requirements by type and size of housing unit. The Rutgers recommendations were incorporated into the RSIS parking requirements, which are shown in table 9.7.

The national parking standards and RSIS provide instructive background. Yet, they are not an adequate source for developing contemporary parking standards, especially for smart growth and infill, for a number of reasons.

1. The data are often dated. Although RSIS incorporated the latest information available at the time of its promulgation, the data (from the 1980 census) are describing conditions from yesteryear. Similarly the ITE (1987) and ULI (1983) sources cited here similarly date from the 1980s. Dated data do not convey a contemporary basis for parking standards. From the 1980 census (the RSIS data base), to the 2000 census, the number of vehicles per household in New Jersey has changed; it has increased for single-family detached homes and decreased for townhouses, as is illustrated below, in table 9.8.

TABLE 9.7
Residential Site Improvement Standards—Parking

Housing Unit Type/Size [a]	Existing RSIS[1] Parking Requirement	Updated (to 2000) RSIS Parking Requirement[2]
Single-family detached		
2-bedroom	1.5	1.5
3-bedroom	2.0	1.9
4-bedroom	2.5 [a]	2.2
5-bedroom	3.0	2.4
Two-family (duplex)		
2-bedroom	1.5	1.4
3-bedroom	2.0	1.5
4-bedroom	2.5 [a]	1.6
Garden apartment (and mid-rise)		
1-bedroom	1.8	1.2
2-bedroom	2.0 [a]	1.6
3-bedroom	2.1	1.8
Townhouse		
1-bedroom	1.8	1.6
2-bedroom	2.3 [a]	1.9
3-bedroom	2.4	2.1
High rise		
1-bedroom	0.8	N/A
2-bedroom	1.3 [a]	N/A
3-bedroom	1.9	N/A
Mobile home		
1-bedroom	1.8	N/A
2-bedroom	2.0 [a]	N/A

Notes: [a]If applicant does not specify the number of bedrooms per unit, this parking requirement shall apply. NA= Not applicable or currently available.
Source:
1. Modified and adapted from U.S. Department of Commerce, Bureau of the Census, Public Use File-New Jersey (cross-tabulation of vehicles by housing unit for units constructed 1975–1980).
2. Table 9.10 in this study, with the addition of 0.5 parking space per unit for visitor parking for all housing except single-family detached.

It is possible to readily update RSIS to 2000 by, first, ascertaining the automobile ownership by type and size of housing unit from the latest census (as was done in table 9.8) and, then, simply adding a 0.5 visitor parking space for attached housing—as was done in the original RSIS. The resulting figures for the updated (2000) version of RSIS are shown in table 9.7, but even an updated RSIS suffers from numerous drawbacks, elaborated below.

TABLE 9.8
New Jersey Statewide Vehicles per Housing Unit

Housing type/size (number of bedrooms)	Average vehicles per housing unit 1980	2000
Single-family detached		
2-bedroom	1.4	1.5
3-bedroom	1.9	1.9
4-bedroom	2.0	2.2
5-bedroom	2.3	2.4
Single-family attached		
1-bedroom	1.3	1.1
2-bedroom	1.8	1.4
3-bedroom	1.9	1.6

Source: U.S. Department of Commerce Bureau of the Census Public Use Microdata File—New Jersey for 1980 and 2000.

2. The national and New Jersey parking standards largely reflect suburban–exurban development, which is mostly lower-density, Euclidian-zoned (i.e., different land uses are segregated from one another), and auto-dependent—factors increasing the need for parking—rather than smart growth-furthering development (e.g., infill and TODs), which leans to urban and older suburb locations, is often higher-density and mixed-use, and typically benefits from transit access—characteristics diminishing parking need.

   To illustrate, housing units in neighborhoods around three TODs built in New Jersey (in Metuchen, South Amboy, and South Orange) have about two-thirds as many automobiles as is average for New Jersey (controlling for housing, type size and other variables)[1]. They have fewer automobiles in part because of these neighborhoods' access to transit—the very reason why smart growth tries to encourage development

[1] Household surveys were conducted in three of New Jersey's Transit Villages as part of an evaluation of the New Jersey Transit Village Initiative by the Alan M. Voorhees Transportation Center (VTC) at Rutgers University. The questionnaire asked a variety of questions (37 in total) about opinions on growth and development within their town, household and housing characteristics, and travel and transportation-related questions, including vehicle availability.

The Eagleton Institute of Politics was contracted by VTC to administer the surveys in the Transit Villages of Metuchen, South Amboy, and South Orange in July and August 2003. Census block groups were identified that best represented a half-mile radius around the train station in each town. Households were then identified as to whether or not they fell inside or outside this Transit Village area by matching addresses with the chosen block groups. For each town, 1,500 households were randomly selected and sent surveys (1,000 in the Transit Village area and 500 households outside the boundary). Each household was mailed a packet that included a cover letter, explaining the purpose of the questionnaire, instructions about how to fill out the questionnaire, the questionnaire itself, and a return envelope with postage paid. Residents were also asked to return a separate postcard that tracked each address. This allowed for the complete anonymity of the responses, while still allowing each address to be tracked for a response. A second mailing was sent to each address for those that did not respond to the first round of surveys within three weeks. The response rate for Metuchen was 30 percent, South Amboy—33 percent, and South Orange—41 percent. These rates are fairly comparable with other studies of similar scope.

For the purposes of this study, the variables analyzed from this questionnaire are: number of vehicles available for regular use (dependent variable), building type, number of bedrooms, tenure, age of respondent, and whether the household is located inside or outside of the Transit Village area.

in such locations. Similarly, Cervero's analysis of 12 housing projects near BART stations found that TODs have an average of 1.66 people and 1.26 vehicles per household, whereas all households in the TODs' census tracts averaged 2.4 people and 1.64 vehicles (1996, cited in California Department of Transportation 2002a). Yet, RSIS and the national parking standards are typically not sensitive to these smart-growth and infill differentiating characteristics that bear on the appropriate level of parking that should be provided. This has real world consequences. For example, Gaslight Commons, a 200-unit TOD built in South Orange, New Jersey, would have been required by RSIS to provide 380 parking spaces. In actuality, the occupants of Gaslight Commons only have about 200 vehicles, so RSIS would have required a considerably excessive parking provision.

3. Lastly, even were the national and RSIS data a better fit, simply mimicking the standards contained in these sources would fall short in not capitalizing on the emerging, more sophisticated, statistical studies regarding the density, income, and other influences on automobile ownership—and, ultimately, on the amount of parking required. This has implications for all parking requirements and is especially relevant for smart-growth and infill projects as the statistical models can relate automobile ownership and, ultimately, parking standards to the unique density, location, and other housing characteristics that typify smart-growth and infill development.

An approach to developing parking standards for smart growth and infill-furthering projects is to examine what in fact have been the requirements in such projects to date, such as in completed TODs. For illustrative purposes, table 9.9 summarizes the parking requirements by land-use type in scores of TODs in California and the nation at large. Comparing the TOD parking figures in table 9.9 to the national parking standards summarized in table 9.6 shows that the TOD parking figures are generally lower—an expected result since TODs should demand less parking because of their transit proximity. Yet this was not always the case; for instance, the Ohlone-Chynoweth TOD in San Jose, California, had to comply with that city's standard prevailing parking requirements. A more striking finding from table 9.9 is the range of TOD parking requirements. The parking requirements per 1,000 square feet of retail space in the TODs ranged from 0 spaces to more than 4 spaces. For residential developments, the parking mandate per housing unit ranged from 0 spaces to 2.25 spaces.

There are numerous reasons for such variability. Including differing situations (e.g., whether shared parking was available and the quality of local transit) and, more often than not, the ad hoc negotiation between the TOD developer, host community, lender, and others, that resulted in different outcomes. To illustrate, the Pacific Court TOD arrived at its parking requirement through negotiation between the developer and the city of Long Beach, California. Parking requirements at the American Plaza TOD in San Diego were driven by this project's bank underwriter and by office space marketing concerns. The method used to develop parking standards at the Lindbergh City Center TOD was an extended series of facilitated negotiations that included the developer, the city of Atlanta Department of Planning, Atlanta's transit authority (MARTA), and representatives of five surrounding neighborhoods. Parking negotiations similarly characterized Reston Town Center, as did experimentation. Reston, Virginia, initially required that this 1.3-million square-foot mixed-use project provide 3,063 parking spaces;

after a few years test period of actual parking utilization, this standard was reduced to 2,800 spaces. An opposite situation occurred at The Yards at Union Station, a Portland, Oregon, TOD, where parking provision of 267 off- and on-street parking spaces for the 500-housing-unit project proved inadequate. (More parking had been planned but could not be built because of contaminated soils found on site once construction began.)

TABLE 9.9
Parking Ratios in Selected National TOD Communities

Project	Location	Land use	TOD parking ratios
Pacific Court	Long Beach, CA	Retail	2 spaces per 1,000 sf
Hollywood/Highland	Los Angeles, CA	Retail	2 spaces per 1,000 sf
North Hollywood (NoHo)	Los Angeles, CA	Retail	2 spaces per 1,000 sf
Uptown District	Los Angeles, CA	Retail	3.5 spaces per 1,000 sf
Rio Vista West	San Diego, CA	Retail	2.1 to 4.3 minimum, 6.5 maximum spaces per 1,000 sf
Ohlone-Chynoweth	San Jose, CA	Retail	No special, standard = 4.3 spaces per 1,000 sf
Moffett Park	Sunnyvale, CA	Retail	Negotiated. In this case, it was 3.2 spaces per 1,000 sf of office
Emeryville	Emeryville, CA	Retail	Negotiated on case-by-base basis. Standard is 3 spaces per 1,000 sf
Pleasant Hill	Contra Costa County, CA	Retail	4 spaces per 1,000 sf
Fruitvale Transit Village	Oakland, CA	Retail	No spaces required
Dr. Martin Luther King Jr. Plaza	Miami, FL	Retail	Negotiated on case-by-case basis using the ULI shared use parking methodology
Arlington, Virginia	Virginia	Retail	1.7 spaces per 1,000 sf
Lindbergh City Center	Atlanta, GA	Retail	3.7 spaces per 1,000 sf
Alexandria	Virginia	Retail	“Negotiations permitted within transit zones”
Pacific Court	Long Beach, CA	Residential	1 space/studio; 2 spaces/1+ bedroom unit
Uptown District	San Diego, CA	Residential	2.25 spaces/unit
Rio Vista West	San Diego, CA	Residential	Single family units: 2 spaces/unit; senior citizen (1-BR units): 1 space/unit; multiple dwelling units: 1 to 2 spaces/unit
Ohlone-Chynoweth	San Jose, CA	Residential	No special, standard=1.7 spaces/unit
Moffett Park	Sunnyvale, CA	Residential	None
Emeryville	Emeryville, CA	Residential	Negotiated on case-by-case basis. Standard is 1 space per 1-BR unit, 1.5 for live/work and multi-BR units.
Pleasant Hill	Contra Costa County, CA	Residential	1.35 spaces per residential unit
Fruitvale Transit Village	Oakland, CA	Residential	.5 space/unit
Dadeland South	Miami, FL	Residential	1 space/unit
Dadeland North	Miami, FL	Residential	1 space/unit
Arlington, Virginia	Virginia	Residential	1 space/unit (high-rise); 2 spaces/unit (townhouse)
Lindbergh City Center	Atlanta, GA	Residential	1.85 spaces/unit (condominiums); 1 to 1.5 spaces/unit (apartments)
Mockingbird Station	Dallas, TX	Residential	1.16 spaces/unit

Source: California Department of Transportation 2002b.

The above cases are informative; however, they are too site-specific and specialized (all are TODs) to develop parking requirements for a broad array of smart-growth and infill development, which will vary by development composition, location, transit access, the income and size of the housed families, and many other factors. We need to develop a model-driven approach for parking requirements that is sensitive to project, occupant, and locational diversity.

The following sections present empirically driven approaches for developing parking standards appropriate to smart growth and infill. The discussion first considers residential and, then, nonresidential land uses.

ESTIMATING RESIDENTIAL PARKING DEMAND AND DATA REQUIREMENTS

Background

As indicated earlier, the current residential parking standards in New Jersey contained in the Residential Site Improvement Standards (RSIS) should be updated (i.e., to incorporate the 2000 census information on contemporary auto ownership) and refined to incorporate sensitivity to location and other variables. These goals guide our research.

Table 9.10 presents the results of an analogous contemporary analysis, which differs from the original Rutgers–RSIS work in four respects. First, since 1980 (recall that the original Rutgers-RSIS research was based on the 1980 census) the Census Bureau has stopped collecting information on the housing style or type—effectively the number of stories—of units in multifamily developments. Instead, it only indicates the number of units in a given multifamily development. Consequently, today we cannot differentiate high-rise from garden apartments as was done in the original Rutgers-RSIS study. Second, our current analysis includes all households, regardless of the year of the unit's construction. Limiting the analysis to newly constructed homes, as was done by Rutgers–RSIS, possibly introduces a difficult-to-quantify bias, in that housing-unit age may not directly influence vehicle ownership, but does so indirectly, through household demographics and location. Third, table 9.10 draws on data from the 2000 decennial census. Fourth, it does not include allowances for visitor parking.

TABLE 9.10
Average Vehicles per Household in New Jersey

Unit Type	Bedrooms					
	0	1	2	3	4	5+
Single-family, detached	1.29	1.31	1.49	1.92	2.20	2.42
Single-family, attached	0.98	1.05	1.36	1.60	1.77	1.74
Two-family	0.81	1.03	1.27	1.56	1.73	2.00
3- to 4-family	0.71	0.93	1.10	1.29	1.49	1.80
5- to 9-family	0.73	0.91	1.11	1.11	1.31	1.78
10- to 19-family	0.67	0.97	1.22	1.18	1.40	1.18
20- to 49-family	0.68	0.85	1.12	1.08	1.06	1.29
50+ -family	0.46	0.70	1.12	1.20	0.77	1.00

Source: U.S. Census Bureau, 2000 Decennial Census Public Use Microdata Samples, downloaded from www.ipums-usa.org.

Table 9.11 presents standard deviations about the means in table 9.10, which are comparable to the means themselves. This implies significant uncertainty in using these values. About 63 percent of the sample lies within one standard deviation of the mean, and about 95 percent lies within two standard deviations. For example, this implies that we can be about 63 percent certain that any given 3-bedroom single-family detached household in New Jersey as of 2000 will own between 1.02 (= 1.92 – 0.90) and 2.82

(=1.92 + 0.90) vehicles, and 95 percent certain that the household will own between 0.12 (=1.92 - 1.80 [0.90 x 2]) and 3.72 (= 1.92 + 1.80 [0.90 x 2]) vehicles.

TABLE 9.11
Standard Deviation in Vehicles per Household in New Jersey

Housing Type	Bedrooms					
	0	1	2	3	4	5+
Single-family detached	1.04	0.87	0.85	0.90	0.93	1.05
Single-family attached	0.87	0.77	0.78	0.88	1.05	1.26
Two-family	0.79	0.80	0.90	1.02	1.13	1.36
3- to 4-family	0.84	0.74	0.85	1.08	1.18	1.30
5- to 9-family	0.83	0.78	0.83	0.92	1.10	1.65
10- to 19-family	0.75	0.78	0.82	0.98	1.43	1.17
20- to 49-family	0.90	0.75	0.83	0.90	1.00	0.95
50+ -family	0.71	0.73	0.82	1.05	0.91	1.00

Source: U.S. Census Bureau, 2000 Decennial Census Public Use Microdata Samples, downloaded from www.ipums-usa.org.

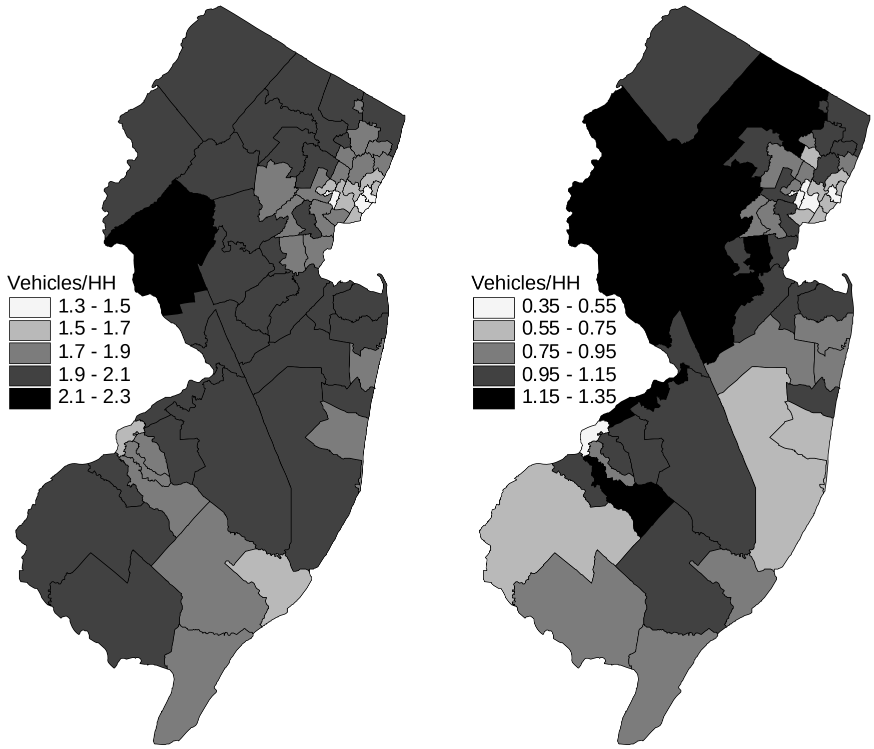
We can condense these tables into two typical measures of their sensitivity and precision in estimating household vehicles. The typical goodness-of-fit measure r^2 for the tables is 0.234, which means that the variables of units-in-structure and bedrooms together account for 23.4 percent of the variability in household vehicles in New Jersey. The standard error of the estimate for the tables is 0.892, which means that a New Jersey household chosen at random in 2000 will have the number of vehicles shown in table 9.10, plus or minus 0.892, about 63 percent of the time. This is a considerable “spread” in vehicle ownership, so we introduce geographic location to “tighten” our ability to relate housing units and vehicles.

Introducing Location

A simple way to refine the RSIS approach is to prepare a table, such as table 9.10, for each of the Public Use Microdata Areas (PUMAs) in New Jersey. By way of background, a PUMA is a Census Bureau-defined area that must contain at least 100,000 people; to protect respondents’ confidentiality, the PUMA is the smallest geographic unit linked with household-level responses. There are 61 PUMAs in New Jersey. The state’s PUMAs have an average population of 137,940, and an average land area of 121.6 square miles. (For further detail, use the American Factfinder at http://factfinder.census.gov and select the address search function from the bottom list on the left-hand side.)

Our analysis accesses the 5 percent PUMA sample file for New Jersey to quantify the number of vehicles by housing type and number of bedrooms for New Jersey’s 61 PUMAs. For illustrative purposes, figure 9.1 shows the PUMA-to-PUMA variation in household vehicle ownership for two combinations of bedroom sizes (one and three bedrooms) and number of units in the structure (single-family detached and 5–9 unit). It suggests that vehicle ownership differs across the state, and not only because of differences in unit type.

FIGURE 9.1
Average Vehicles per Household by New Jersey PUMA



1-bedroom units in a 5- to 9-unit structure | 3-bedroom, single-family detached unit

Tabulating average household vehicle ownership by PUMA offers improved performance. In an analysis not shown here, a dataset similar to that contained in tables 9.10 and 9.11 was developed for each PUMA in New Jersey. The tabulated averages were then used as estimates for every household's vehicle ownership. This PUMA sensitive approach increases the r^2 to 0.278 (from an r^2 of 0.234 for the statewide tabulation), meaning that the set of tables account for 27.8 percent of the variation in household vehicle ownership. The standard error of the estimate of the PUMA-sensitive tabulation falls to 0.866 from 0.892 for the statewide tabulation. Thus, there is improvement in our ability to model household vehicle ownership by adding a PUMA-sensitive geography, rather than a statewide average, yet the statistical gain is modest.

Why is that the case? The answer is that vehicle ownership predictors, such as income, development density, transit access, and walkability vary widely in many PUMAs. For example, PUMA 2302 is home to Ewing, Hopewell, Princeton, and West Windsor amongst other places in Mercer County—communities differing in density, transit access, and numerous other factors. [2] This suggests that further geographical refinement could offer improvements in the estimation method.

[2] PUMA 2302 encompasses East Windsor, Ewing, Hightstown, Hopewell, Pennington, Princeton, West Windsor, and other areas.

Proposed Residential Methodology

We recommend a layered approach, relying on public data, to move forward. Using census data, rather than a custom survey, ensures that this method can used for future updates. Because household-specific data from the census is linked only to its PUMA of residence, we will also incorporate area-aggregate data, which is released for very small geographies, such as blocks (which have an average population of 67 in Mercer County for 2000). We use aggregate data from New Jersey's block groups, which have a target population of 1,500, and an average area of 1.1 square miles, as follows:

Concept

1. Use tabular household vehicle data from a larger area—the PUMA—combined with aggregate household characteristics of the smaller area—the block group—to "look up" how many vehicles would be in the block group if it were perfectly characterized by the table from the PUMA.
2. Subtract the resulting computed PUMA-based average number of vehicles per household for the block group from the actual average vehicles per household published by the census for the block group.
3. Use the difference from calculations 3 as the "local effect" on vehicles per household in the given block group The "local effects" factor can be viewed as the difference between the inter-relationship of housing-unit type (units in structure), bedrooms, and household vehicles at the block group level compared with the PUMA level.

Procedure

Operationally, we proceed as follows:

1. Look up the number of vehicles in a given household (according to its number of bedrooms and units-in-structure) and given location, by using the table for its PUMA (contained in materials prepared by Matt Cuddy of Rutgers University). Then, add the "local effect" corresponding to its block group (also contained in materials prepared by Matt Cuddy).
2. To the figure obtained from calculation, add a factor for visitor parking, as indicated in table 9.12.

Tables 9.13 and 9.14 illustrate the above-described approach for two contrasting locations: Gaslight Commons, a TOD in South Orange in higher-density Essex County (PUMA 1402—Central Essex County—census tract 193, block group 2), and a Boonton condominium complex in lower-density Morris County (PUMA 1503—West Morris County—census tract 416.03, block group 1). The parking calculation for the South Orange example (1.00 per housing unit) is substantially lower than the parking figure obtained for the Morris County example (1.38 per housing unit) because car ownership is lower in the South Orange case and there are other distinguishing features.

TABLE 9.12
Recommendations for Visitor Parking

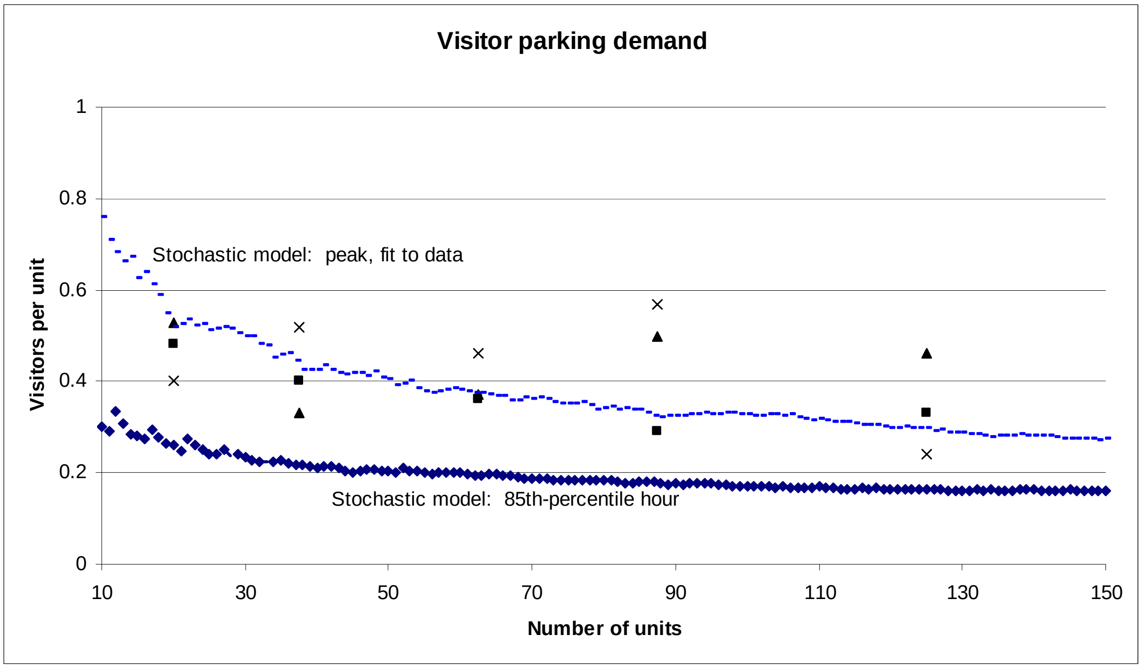
The American Planning Association's Planners Advisory Service Report Number 377, *Flexible parking requirements,* cites a resident survey-based study in which peak visitor parking demand is computed for weekend use (Smith, 1983; MAH, 1981). (Table 2B from PAS 377, page 17, is reproduced here.)

Visitor parking demand
Peak visitor parking demand by size of project

Form	Number of units per project					
	0-25	25-50	50-75	75-100	100-150	150+
Townhouse rental	0.489	0.40	0.36	0.29	0.33	0.25
Townhouse condo	0.53	0.33	0.37	0.50	0.46	0.33
Apartment rental	0.40	0.52	0.46	0.57	0.24	--
Apartment condo	--	0.33	0.33	--	0.41	--

Figure 2 shows the values for the first three forms, using the midpoint of the range, except for the lowest range. A reasonable fit to these data was obtained using a stochastic model that assumes that each unit had a 50% chance of being visited in any given hour, and a 40% chance of being out visiting, shopping, etc. The model results plotted are the peak visitor parking demand in an "average" 500-hour period, which is computed by averaging the predictions of five independent runs, hour by hour.

Figure 2. Visitor parking demand, measured and modeled



The model developed to fit the data was then used to estimate the parking demand at the 85th-percentile busiest hour (85% of the 500 weekend hours modeled have visitor parking demand equal to or less than this value). Based on this work, the following guidelines are recommended for visitor parking for multifamily complexes:

Visitor parking demand for the 85th-percentile hour

	Number of units per project				
	0-30	30-60	60-90	90-120	120+
Peak visitor parking demand, spaces per housing unit	0.27	0.22	0.19	0.17	0.16

To be conservative, in the current parking standards document, a visitor parking requirement of 0.27 per housing unit—the highest factor noted above—will be incorporated.

REFERENCES

Smith 1983; Ontario Ministry of Municipal Affairs and Housing (MAH) 1981.

TABLE 9.13
South Orange, Essex County, Parking Calculation Illustration

Gaslight Commons is a 200-unit, two-building complex at 28 West 3rd Street in South Orange that includes 72 1-BR units and 128 2-BR units. We take these steps to estimate the number of vehicles owned by the 1-BR units.

1. Use American Factfinder at the Census Bureau's website to get the development's Census geography information. Go to http://factfinder.census.gov and select the Address Search function from the bottom of the list on the left-hand side. The development is in Essex County, Census tract 193, Block group 3, and 5% Public Use Microdata Area 01402.

2. From a list of tables prepared by Matt Cuddy of Rutgers University, find the average vehicles per household by household characteristic for PUMA 1402. For 1-BR units in a 50-or-more-unit building, the average is 0.51 vehicles per household.

PUMA 1402: Average vehicles per household

	Bedrooms					
	0	**1**	2	3	4	5+
Single-family detached	0.50	1.22	1.14	1.58	1.65	1.87
Single-family attached		0.83	1.27	1.13	1.33	1.00
Two-family	0.60	1.02	1.07	1.47	1.23	1.67
3- to 4-family	2.00	0.79	0.78	1.28	1.00	1.53
5- to 9-family	0.33	0.80	0.85	0.71		
10- to 19-family	0.20	0.64	0.50	0.75		
20- to 49-family	0.61	0.58	0.90	1.12	0.75	
50+ -family	0.32	0.51	0.73	0.86	0.00	

3. From another list of tables prepared by Matt Cuddy of Rutgers University (see also table 9.13A), find the block group-level correction for census tract 193, block group 3. It is 0.12.

Essex County: Block-group-to-PUMA correction

Tract	Block group	Local effect
191	1	0.31
	2	0.21
	3	0.28
	4	0.56
	5	0.11
	6	0.24
192	1	-0.06
	2	0.14
	3	0.15
193	1	0.01
	2	0.71
	3	**0.12**

4. Adding the results from steps 2 and 3, estimate that the development will have 0.63 vehicles per 1-BR household.

5. The estimated vehicle ownership result found in 4, above, plus an additional data factor for visitor parking (0.27 vehicles per unit; see table 9.12) is the residential parking requirement—1.00 per housing unit.

TABLE 9.13A
Illustrative Local Effect of Selected Block Groups in Essex County
Including Study Block Group 3 in Tract 193

Tract	Block Group	Local Effect	Tract	Block Group	Local Effect	Tract	Block Group	Local Effect
170	1	-0.04	183	1	0.13	197	3	-0.30
170	2	0.02	183	2	0.06	197	4	-0.26
170	3	-0.13	183	3	0.03	197	5	0.13
171	1	-0.55	184	1	0.17	198	1	-0.18
171	2	-0.16	184	2	-0.36	198	2	-0.14
172	1	-0.14	186	1	-0.30	198	3	0.05
172	2	-0.24	186	2	0.02	199	1	-0.14
172	3	0.00	186	3	-0.29	199	2	-0.22
172	4	0.08	186	4	0.16	199	3	-0.07
173.01	1	0.22	186	5	-0.03	200	1	0.03
173.01	2	0.11	187	1	-0.26	200	2	0.03
173.01	3	-0.15	187	2	0.07	200	3	0.27
173.02	1	0.39	187	3	0.20	200	4	0.35
173.02	2	0.10	187	4	0.11	200	5	0.06
173.02	3	0.11	188	1	0.49	200	6	0.27
173.02	4	0.18	188	2	0.08	200	7	0.54
174	1	0.07	188	3	0.31	200	8	0.00
174	2	-0.15	188	4	0.23	201	1	0.37
174	3	0.20	189	1	0.26	201	2	0.20
174	4	-0.07	189	2	-0.11	201	3	0.22
175	1	-0.11	189	3	0.05	201	4	0.20
175	2	0.29	189	4	0.05	202	1	-0.08
175	3	0.03	190	1	0.28	202	2	-0.10
175	4	0.09	190	2	0.37	202	3	0.06
175	5	0.21	190	3	0.26	202	4	0.06
176	1	0.14	190	4	0.52	202	5	0.07
176	2	0.06	191	1	0.31	203	1	0.04
176	3	-0.09	191	2	0.21	203	2	0.00
176	4	0.07	191	3	0.28	203	3	0.09
177	1	0.10	191	4	0.56	203	4	0.17
177	2	-0.15	191	5	0.11	203	5	0.18
177	3	0.22	191	6	0.23	204	1	-0.07
177	4	0.08	192	1	-0.06	204	2	0.13
178	1	-0.19	192	2	0.14	204	3	-0.05
178	2	0.47	192	3	0.15	204	4	0.03
178	3	0.42	193	1	0.01	205	1	0.18
178	4	-0.01	193	2	0.71	205	2	0.11
179	1	0.02	193	3	0.12	205	3	-0.04
179	2	0.09	194	1	0.14	205	4	0.05
179	3	-0.01	194	2	-0.06	205	5	-0.20
179	4	0.18	194	3	-0.07	206	1	0.22
180	1	0.08	195	1	-0.04	206	2	0.42
180	2	0.05	195	2	-0.17	206	3	0.16
180	3	0.20	195	3	-0.05	206	4	-0.01
180	4	0.49	195	4	-0.21	206	5	-0.11
180	5	-0.03	195	5	0.14	207	1	0.11
180	6	0.11	196	1	0.01	207	2	-0.11
181	1	0.14	196	2	-0.06	207	3	-0.13
181	2	0.17	196	3	-0.11	207	4	-0.19
182	1	0.07	196	4	-0.13	207	5	0.16
182	2	-0.17	196	5	0.00	208	1	0.08
182	3	0.00	197	1	0.25	208	2	0.21
182	4	0.35	197	2	0.04	208	3	0.16

TABLE 9.14
Boonton, Morris County, Parking Calculation Illustration

A hypothetical condo building in Boonton has 60 1-BR units.

1. Use American Factfinder at the Census Bureau’s website to get the development’s Census geography information. Go to http://factfinder.census.gov and select the Address Search function from the bottom of the list on the left-hand side. This hypothetical development is in Morris County, Census tract 416.03, block group 1, and 5% Public Use Microdata Area 01503.

2. From a list of tables prepared by Matt Cuddy of Rutgers University, find the average number of vehicles per household by household characteristic for PUMA 1503. For 1-BR units in a 50-or-more-unit building, the average is 1.09 vehicles per household.

PUMA 1503: Average number of vehicles per household

	Bedrooms					
	0	1	2	3	4	5+
Single-family detached	1.00	1.72	1.89	2.06	2.40	2.64
Single-family attached		1.09	1.61	1.91	1.88	3.00
Two-family	1.00	1.23	1.70	2.21	2.00	1.50
3- to 4-family		1.08	1.39	1.29		
5- to 9-family	0.75	1.07	1.24	2.00		1.00
10- to 19-family	0.83	1.31	1.28	1.50		
20- to 49-family		1.22	1.75	1.00		
50+ -family	0.67	1.09	1.63	1.50		

3. From another list of prepared by Matt Cuddy of Rutgers University (see also table 9.14B), find the block group-level correction for census tract 416.03, block group 1, in Morris County. It is 0.02.

Morris County: Block-group-to-PUMA correction

Tract	Block group	Local effect
416.01	7	0.18
	8	-0.02
	9	0.09
416.02	1	-0.08
	2	-0.36
	9	0.02
416.03	**1**	**0.02**
	2	0.01
416.04	1	0.11
	2	-0.03
	9	0.18

4. Adding the results from steps 2 and 3, estimate that the development will have 1.11 vehicles per 1-BR household.

5. The estimated vehicle ownership result found in 4, above, plus an additional data factor for visitor parking (0.27 vehicles per unit; see table 9.12), is the residential parking requirement—1.38 per housing unit.

TABLE 9.14B
Local Effect of Selected Block Groups in Morris County
Including Study Block Group 1 in Tract 416.03

Tract	Block group	Local effect	Tract	Block group	Local effect	Tract	Block group	Local effect
401.01	1	0.07	412	2	-0.16	420	9	0.05
401.01	2	-0.05	412	3	0.06	421	1	0.13
401.01	3	0.00	413	1	-0.24	421	2	0.09
401.02	1	-0.09	413	2	0.03	422	1	0.14
401.02	2	0.03	413	3	0.03	422	2	0.20
401.02	3	-0.20	413	7	-0.24	422	3	0.13
401.02	9	-0.12	413	9	-0.02	422	9	0.11
402	1	-0.11	414	2	0.07	423.01	1	-0.13
402	2	-0.08	414	3	-0.06	423.01	2	0.04
402	3	0.28	414	4	-0.07	423.02	1	0.15
402	4	-0.04	414	5	0.16	423.02	2	-0.02
402	5	-0.12	415	1	-0.20	425	1	-0.04
402	6	0.08	415	2	0.09	425	2	0.16
402	7	-0.07	415	9	0.09	425	3	-0.11
403	1	0.00	416.01	7	0.18	425	4	-0.09
403	2	-0.11	416.01	8	-0.02	426	9	0.03
403	3	0.17	416.01	9	0.09	427	1	-0.23
403	9	0.02	416.02	1	-0.08	427	2	-0.14
404	1	0.15	416.02	2	-0.36	427	3	0.04
404	9	0.02	416.02	9	0.02	428	1	0.07
405	1	-0.08	416.03	1	0.02	428	2	-0.08
405	2	0.11	416.03	2	0.01	428	3	-0.03
405	3	-0.09	416.04	1	0.11	428	4	0.05
406	1	0.30	416.04	2	-0.03	428	5	-0.19
406	2	0.13	416.04	9	0.18	429	1	-0.11
407.01	1	0.08	417.01	1	0.09	429	2	0.05
407.01	2	0.15	417.01	2	-0.04	429	3	-0.11
407.01	9	0.24	417.02	1	0.02	430	1	-0.17
407.02	1	-0.02	417.02	2	0.12	430	2	0.00
407.02	2	0.15	417.02	3	0.23	430	3	-0.06
407.02	9	0.13	417.02	4	-0.16	430	4	-0.03
408.01	1	0.35	417.03	1	-0.01	431	1	0.16
408.01	2	0.02	417.03	2	-0.02	431	2	-0.09
408.01	9	0.07	417.04	1	0.12	431	3	-0.03
408.03	1	-0.02	417.04	9	-0.17	432	1	-0.22
408.03	2	-0.06	418.01	1	0.04	432	2	-0.08
408.03	7	0.29	418.02	1	0.07	432	3	0.06
408.03	9	0.17	418.02	2	0.10	433.01	1	0.10
408.04	1	0.04	418.02	3	-0.07	433.01	2	0.19
408.04	2	-0.13	418.02	4	-0.24	433.02	1	-0.12
408.05	1	0.05	418.02	5	-0.10	433.02	2	0.01
408.05	2	0.04	418.02	7	0.08	433.03	1	-0.02
409	1	0.01	418.03	1	-0.14	433.03	9	-0.12
409	9	0.13	418.03	7	0.00	434.01	1	0.21
410	1	-0.28	418.03	9	-0.03	434.01	2	0.03
410	2	-0.20	419.01	1	0.00	434.01	3	0.02
410	3	-0.24	419.01	2	0.05	434.01	4	0.13
410	4	-0.37	419.01	9	-0.15	434.01	5	-0.12
410	5	-0.37	419.02	1	0.25	434.02	2	0.07
411	1	-0.25	419.02	2	-0.12	434.02	3	0.12
411	2	-0.29	419.02	3	0.11	434.02	7	0.06
411	3	-0.36	420	1	-0.08	434.02	9	0.22
412	1	-0.13	420	2	0.39	435	1	-0.07

Evaluating the New Approach

Adding “local effects” corrections has some intuitive appeal. PUMAs are large enough to admit variation in demographic and environmental variables that are widely believed to influence household vehicle ownership. The difference between a block group’s measured average household vehicle ownership and the amount calculated from PUMA-level averages tabulated by number of bedrooms and units in a structure can be interpreted as the effect of variables other than PUMA, bedrooms, and units in structure. Using that residual, calculated from the (census) data used to construct the model, should improve the model’s fit. But does it? Statistical analysis conducted by Matt Cuddy of Rutgers University (not shown here) shows conclusively that adding “local effects” improves the model.

To illustrate the practical benefit of the proposed approach, we shall refer to the case of Gaslight Commons, the TOD project referred to in the earlier example shown in table 9.13. According to our methodology, the 200 unit Gaslight Commons would require 1.00 parking spaces per unit (table 9.13), or a total of 200 spaces. That comports very closely to the 202 vehicles actually registered with the Gaslight Commons property management company. In fact, Gaslight Commons was mandated (based on RSIS with some modification) to provide 338 parking spaces: 162 on the surface and 176 underground. If the approach for determining parking described in this study had been applied, the Gaslight Commons developer could have provided 138 fewer parking spaces (338-200). That differential would have saved from about $1.0 million to $4.0 million in construction costs (depending on whether the spaces were underground or on the surface) and would have freed up to two acres for enhanced open space or added development (from the reduced parking spaces).

ESTIMATING NONRESIDENTIAL PARKING DEMAND AND REQUIREMENTS

Data and Concept

There is no analogous data, such as those derived from the PUMS, that quantify vehicles associated with different types of nonresidential land uses at varying locations. Instead, we quantify the number of workers associated with different nonresidential uses and, then, by empirically determining how many of them arrive by automobile rather than by another means of transportation (i.e., the “modal split”), plus including a factor for visitor parking and other influences, ultimately derive a nonresidential parking standard sensitive to the locational attributes (e.g., transit access and use) that affect the demand for nonresidential parking.

From numerous sources, we estimate employee density for different types of nonresidential uses, shown in table 9.15.

TABLE 9.15
Employee Density by Nonresidential Land Use

Nonresidential Category	Employees per 1,000 square feet of Gross Floor Area
I. Commercial	
A. Office	3–4
B. Retail	1–2
C. Eating and drinking	3–4
II. Industrial	
A. Warehouse	.5–1
B. Manufacturing and industry	1-3
III. Hospitality and health	
A. Lodging	.5–1
B. Health	2–3

Source: See text.

Sources include the *Commercial Buildings Energy Consumption Survey (CBECS)* administered every two years by the U.S. Department of Energy; *the Census of Retail Trade*, a census survey administered every five years; and *Trip Generation*, a publication from the Institute of Transportation Engineers. (For a more detailed explanation, see *New Jersey Demographic Multipliers: The Profile of the Occupants of Residential and Nonresidential Development*—a study prepared by Rutgers University for the New Jersey Office of Smart Growth.)

The above employee density is a general guide. To determine the parking requirement at any given smart-growth or infill location, the most accurate results will be obtained by determining the specific employee density at the site in question. For example, office space for a corporate headquarters at an infill location may house 2.5 workers per 1,000 square feet of space as compared with double to triple that figure for a back office or call center.

However derived, to the starting figure of employee density must be factored such considerations as the share of time any given employee will be at the location at any given time, or as it is termed "percent present at one time," (PPOT), the modal split of the employee (i.e., the employee's means of transportation to work, whether by transit, vehicle, walk or bike), and the need for visitor parking. To organize these and other influences, we use an innovative template developed by the State of Washington Department of Transportation (available at http://www.wsdot.wa.gov/tdm/tripreduction/CTRguide/Appf-Worksheets.cfm) as part of that state's Commute Trip Reduction Program, explained below.

The Commute Trip Reduction Program

Washington State's Commute Trip Reduction (CTR) Law was passed in 1991 and was incorporated into the Washington Clean Air Act. The primary intent of this law is to improve air quality, reduce traffic congestion, and reduce the consumption of petroleum fuels through employer-based programs that encourage the use of alternatives to the single-occupant vehicle (SOV) for the commute trip. (Parallel efforts were affected in New Jersey.) The CTR law applies specifically to employers with 100 or more full-time employees at any single worksite who begin their workdays between 6:00 a.m. and 9:00 a.m. on weekdays and that are located in counties with populations of more than 150,000.

The CTR program is administered by a task force whose primary responsibility is to establish guidelines for the development of CTR plans by affected local jurisdictions. Each city and county that is affected by the CTR law develops ordinances based on the model ordinance produced by the CTR task force. These ordinances establish CTR zones. Different zones are established because employers located in different areas may have different opportunities for affecting the commute behavior of their employees because of such factors as transit service, employment, and population density. CTR zones are delineated based on Transportation Analysis Zones that have similar values for vehicle miles traveled (VMT) per employee and SOV rate. All affected employers within each zone are required to work toward the same goals for reductions in VMT per employee and proportion of SOV trips.

These ordinances also require employers to implement CTR programs and establish mechanisms for the government to provide assistance to employers in meeting their CTR goals. The employers then designate an Employee Transportation Coordinator to manage and track the success of the programs. Once an employer's CTR program is initiated, the trip reduction goals are 15 percent after two years, 25 percent after four years, and 35 percent after 12 years.

The CTR task force found that local parking policy was critical to the success of the CTR law because of the close relationship between commuter behavior and the supply and cost of parking. Ample research demonstrates that employee parking is oversupplied, both locally and nationwide, particularly at office and industrial developments. A survey sent to planning officials of 29 Washington local jurisdictions indicated that a significant number receive requests from developers to supply less than the minimum parking required in the local code. However, the need to go through a lengthy variance process discourages many developers from providing less parking than required.

To address the problem of an oversupply of parking, the task force suggested that requests for reduced parking be considered through administrative review rather than through the variance process. The task force also generated a method for determining parking demand that reflects the modal split in the given area, thus creating a more realistic estimate of minimum parking demand. The calculation takes the size of the establishment in thousands of gross square feet and multiplies it by the average occupancy rate. This gives the occupied area. The occupied area is then multiplied by the average employee density (employees per 1000 square feet) for the pertinent industry to arrive at the total number of employees. The number of employees is then multiplied by the percent of employees present at one time to arrive at the maximum number of employees that will be present at one time (PPOT).

Next, the modal split is used to determine the number of vehicles that employees will bring to the site. To do this, the maximum number of employees present at one time is first multiplied by the percentage that arrives in a SOV. This maximum number of employees is also multiplied by the percentage that arrives by carpool/vanpool, and the result is then divided by the average occupancy of the carpool. These two numbers added together total the number of vehicles that employees contribute to the site. The result of this calculation is then inflated by 10 percent as a safety margin. Those employees who arrive by means of transit, walking, bicycling, and the like do not bring vehicles and so do not contribute to this total. Visitor parking is determined as a percentage of employee spaces, including a similar 10 percent safety margin.

The total number of vehicles calculated above is finally divided by the occupied area to arrive at the number of spaces per 1000 square feet of occupied area. This figure is multiplied by the occupancy rate to arrive at the number of parking spaces per 1,000 square feet of gross floor area.

Application of the above-described calculation template in the state of Washington results in the following illustrative parking standards:

TABLE 9.16
State of Washington Illustrative Parking Standards

Jurisdiction	Minimum Spaces Required per KGSF Office Space
Large cities	
Bellevue	
In CBD	1.6
Outside CBD	2.4
Seattle	
In CBD	0.67–1.0
Outside CBD	2.7
Tacoma	3.5
Yakima	5.0
Medium cities	
Bremerton	1.25–2.5
Kent	4.0
Small cities	
Issaquash	4.0
Marysville	2.5

The state of Washington template can be applied in New Jersey. To illustrate, this study examined the modal split profile for workers by industry category (e.g., manufacturing, retail, or finance) for 12 communities in New Jersey—six urban communities (and ones that would likely experience infill development) and six suburban communities (and ones that likely would experience greenfields development). [3] The six urban communities are Camden, Elizabeth, Jersey City, Newark, Paterson, and Trenton; the six suburban

[3] The modal split by the different industries can be related to different nonresidential land uses. For example, finance and information workers are often found in office buildings, retail workers in retail facilities, wholesale workers in warehouses, and manufacturing workers in industrial facilities. See table 9.22.

communities are Franklin (Hunterdon County), Hopewell (Mercer County), Lumberton (Burlington County), Monroe (Middlesex County), and Washington (Morris County).

As expected, the urban communities have a higher transit utilization relative to that of the suburban communities, with the overall community results summarized in table 9.17. That difference, in turn, has significant bearing on the amount of parking that is necessary. If we incorporate the overall urban and suburban community-wide results (table 9.17) to the state of Washington template (shown in tables 9.18 and 9.19) for finance workers, then every 1,000 square feet of office space containing such workers would require 1.89 parking spaces in the urban setting (table 9.18) and 2.76 parking spaces in the suburban setting (table 9.19). This difference reflects the modal split variation indicated earlier where there was less auto-dependency in urban places than in suburban locations (table 9.19).

TABLE 9.17
Summary of Modal Split Information for Six Urban and Six Suburban Communities in New Jersey

Urban Community Sample

Industrial Category	Total Workers	Drove alone	Carpool	Transit	Bike, Walk, Work at Home, etc.	Carpool Density
Agriculture, forestry, fishing and hunting and mining	252	85.71%	6.35%	3.97%	3.97%	2.75
Construction	17,530	60.15%	24.31%	9.37%	6.17%	2.55
Manufacturing	35,777	63.81%	14.80%	13.04%	8.35%	2.37
Wholesale	25,742	67.49%	13.79%	11.64%	7.09%	2.42
Retail	50,957	54.08%	12.91%	19.10%	13.91%	2.24
Transportation and warehousing and utilities	50,957	68.64%	11.38%	13.32%	6.66%	2.33
Information	11,715	65.62%	10.11%	18.57%	5.71%	2.32
Finance	36,359	48.95%	9.89%	35.49%	5.67%	2.25
Professional, scientific, management, administrative, and waste management services	28,689	56.20%	11.87%	23.00%	8.93%	2.42
Educational, health and social services	93,515	66.85%	12.41%	12.35%	8.38%	2.25
Arts, entertainment, recreation, accommodation and food services	17,429	49.10%	12.75%	21.36%	16.79%	2.14
Other Services	17,945	59.02%	13.52%	13.83%	13.62%	2.43
Public Administration	49,613	76.80%	11.96%	8.68%	2.57%	2.31
Armed Forces	151	81.46%	9.27%	2.65%	6.62%	2.50
All workers	436,631	62.98%	12.80%	15.93%	8.28%	2.38

Table continued on next page

TABLE 9.17, continued

Suburban Community Sample

Industrial Category	Total Workers	Drove Alone	Carpool	Transit	Bike, Walk, Work at Home, etc.	Carpool Density
Agriculture, forestry, fishing and hunting and mining	526	52.09%	14.64%	0.00%	33.27%	2.89
Construction	1,539	76.35%	13.39%	0.00%	10.27%	2.09
Manufacturing	3,865	86.13%	8.54%	0.41%	4.92%	2.56
Wholesale	2,735	84.36%	11.94%	1.00%	2.70%	2.94
Retail	981	81.54%	10.02%	0.51%	7.93%	2.23
Transportation and warehousing and utilities	981	86.65%	5.91%	0.00%	7.44%	2.70
Information	349	67.91%	9.46%	0.00%	22.64%	2.25
Finance	1,020	79.41%	3.73%	0.00%	16.86%	2.50
Professional, scientific, management, administrative, and waste management services	2,162	58.74%	12.35%	0.65%	28.26%	2.44
Educational, health and social services	3,603	80.35%	9.38%	1.25%	9.02%	2.18
Arts, entertainment, recreation, accommodation and food services	1,309	74.79%	6.65%	2.60%	15.97%	2.08
Other Services	980	75.41%	12.65%	0.00%	11.94%	2.00
Public Administration	508	89.57%	8.07%	0.00%	2.36%	2.25
Armed Forces	34	88.24%	0.00%	0.00%	11.76%	0.00
All workers	20,592	78.43%	9.83%	0.69%	11.06%	2.39

Although modular community category (i.e., urban compared with suburban) analyses are informative, there is considerable modal split variation *within* a given modular category of community. For instance, there is considerable variation in the transit use within the urban example communities just observed, as the following figures illustrate. The percentage of finance workers (who would typically work in offices) using transit was 5.9 percent in Elizabeth, 6.5 percent in Camden, 7.3 percent in Trenton, 8.5 percent in Paterson, 27.5 percent in Newark, and 48.5 percent in Jersey City. These individual community data can refine the modal split information incorporated into the nonresidential parking calculation template based on the state of Washington methodology.

TABLE 9.18
Parking Demand Calculations—Office Space Containing Finance Workers in an Urban Community [a]

1. General Assumptions: Gross Square Feet of space:	100,000
2. Average Occupancy Rate:	95%
3. Occupied Area (1 x 2):	95,000
4. Average Employee Density per kGLSF:	3.5
5. Percent Present at one Time (PAOT):	85%
6. Visitor Parking Rate (spaces/employee):	25%
7. Total employees (kGSF x Emp Density; 3 x 4):	333
8. <u>X 85%</u> PAOT (7 x 6):	283
9. Peak Present at one Time:	283 employees

10.

Transportation Mode	Modal Split	Persons	Person Trips	Avg. Vehicle Occupancy	Vehicles
Single occupant vehicle	48.95%	283	139	1.00	139
Carpool/vanpool	9.89%	283	28	2.25	12
Transit	35.49%	283	100		
Walk/bike/ telecommute	5.67%	283	16		
Total	100.00%	283	283		151

11.	Total Employee Parking Demand (from 10)	151
12.	+ 10% (practical capacity) (11 x1.1)	166 Total Employee Spaces
	Peak Visitor Demand	
13.	Total employees x visitor spaces per employee (7 x 6)	83
14.	Divided by the turnover rate (4 /.25)	21
	+ 10 % (practical capacity) (14 x 1.1)	23 Total Visitor Spaces
15.	Total Peak Parking Demand (12 + 15):	189
16.	Employee Parking Rate (12/3) Employee spaces/Occupied Area	1.74 spaces per kGSF
17.	Total Parking Rate (15/3)	
18.	Total Parking Demand/Occupied Area	1.99 spaces per kGSF
19.	Final Parking Demand Rate (18 x 2) Total Parking Rate x Occupancy Rate	1.89 spaces per kGSF

[a] utilizes urban modal split profile for finance workers shown in table 9.17.

Source: http://www.wsdot.wa.gov/tdm/tripreduction/CTRguide/AppF-Worksheets.cfm

TABLE 9.19
Parking Demand Calculations—Office Space Containing Finance Workers in a Suburban Community [a]

1. General Assumptions: Gross Square Feet of space:		100,000
2. Average Occupancy Rate:		95%
3. Occupied Area (1 x 2):		95,000
4. Average Employee Density per kGLSF:		3.5
5. Percent Present at one Time (PAOT):		85%
6. Visitor Parking Rate (spaces/employee):		25%
7. Total employees (kGSF x Emp Density; 3 x 4):		333
8. X 85% PAOT (7 x 6):		283
9. Peak Present at one Time:		283 employees

10.

Transportation Mode	Modal Split	Persons	Person Trips	Avg. Vehicle Occupancy	Vehicles
Single occupant vehicle	79.41%	283	225	1.00	225
Carpool/vanpool	3.73%	283	11	2.25	5
Transit	0.00%	283	0		
Walk/bike / telecommute	16.86%	283	47		
Total	100.00	283	283		230

11.	Total Employee Parking Demand (from 10)	230
12.	+ 10% (practical capacity) (11 x1.1)	253 Total Employee Spaces
	Peak Visitor Demand	
13.	Total employees x visitor spaces per employee (7 x 6)	83
14.	Divided by the turnover rate (4 /.25)	21
	+ 10 % (practical capacity) (14 x 1.1)	23 Total Visitor Spaces
15.	Total Peak Parking Demand (12 + 15):	276
16.	Employee Parking Rate (12/3) Employee spaces/Occupied Area	2.67 spaces per kGSF
17.	Total Parking Rate (15/3)	
18.	Total Parking Demand/Occupied Area	2.91 spaces per kGSF
19.	Final Parking Demand Rate (18 x 2) Total Parking Rate x Occupancy Rate	2.76 spaces per kGSF

[a] utilizes suburban modal split profile for finance workers shown in table 9.17.

Source: http://www.wsdot.wa.gov/tdm/tripreduction/CTRguide/AppF-Worksheets.cfm

Although the community-specific modal split profile and differences in the profile used in the state of Washington are informative, even the community-specific average may be too gross a geographic scale for calculating what the nonresidential parking standard should be. For example, although about 49 percent of all finance industry workers in Jersey City on average use mass transit, that figure is higher in that city's "Gold Coast" area (by the Hudson River and served by PATH) than elsewhere in Jersey City (e.g., the "Heights" neighborhood). Ideally then, we should ratchet down the geographic scale to a finer grain micro level—much as we incorporated local effects for determining the residential parking requirements.

To begin that process, this study compiled modal split data for every census-defined industry (e.g., finance) for every census tract in New Jersey—information derived from the 2000 census. For the Jersey City Gold Coast area by the Hudson River (census tract 340170039), the percentage of finance workers using transit is 61 percent, while only 22 percent of finance workers in the Jersey City Heights area (census tract 340170006) draw on transit. The census tract-level modal split information can incorporate place sensitivity to the nonresidential parking calculation template. To illustrate, per 1,000 square feet of office space containing finance workers, the state of Washington template suggests that the parking standard should be 1.2 spaces in the Jersey City Gold Coast compared with 2.0 spaces in the Jersey City Heights. The census-based modal split information can be related to different nonresidential land uses, with the following shown as examples.

TABLE 9.20
Nonresidential Land Use and Industry Matrix

Nonresidential Land-use Category	Industry Category (examples)
Office	Finance; information; professional, scientific, management and administration; public administration
Retail	Retail trade
Services	Education, health and social services; other services
Warehouse	Wholesale trade; transportation and warehousing
Industrial	Manufacturing
Entertainment, food, and hospitality	Arts, entertainment, recreation, accommodation, and food services.

The analyst would first determine what industry category best relates to the nonresidential facility for which the parking calculation is being undertaken. Then, by looking up the industry-appropriate modal split data for the census tract location where the facility in question is located, the analyst can calibrate the parking model to yield the number of parking spaces that are needed.

As a rough approximation, application of the state of Washington-developed template suggests parking demand figures indicated in table 9.21. Many smart-growth, and especially infill, locations will most closely approximate the "urban scenario" and, as such, will have parking requirements of approximately 1.0 to 2.5 per 1,000 square feet of space. (*More project- and place-sensitive results are obtained by using the template on a development and site-specific basis,* e.g., the 0.7 parking standard per 1,000 square feet of office space in high-transit zones in Seattle's CBD, or the 1.2 parking-space standard per 1,000 square feet of office space in Jersey City's Gold Coast.)

TABLE 9.21
Parking Demand by Employee Density and Location

Employees per 1000 GLSF	Parking Demand per 1,000 GLSF		
	Rural/Suburban	Intermediate	Urban
5	4.5	3.92	2.56
4.75	4.28	3.73	2.44
4.5	4.05	3.53	2.31
4.25	3.83	3.34	2.18
4	3.6	3.14	2.05
3.75	3.38	2.94	1.92
3.5	3.15	2.75	1.79
3.25	2.93	2.55	1.67
3	2.7	2.35	1.54
2.75	2.48	2.16	1.41
2.5	2.25	1.96	1.28
2.25	2.03	1.77	1.15
2	1.8	1.57	1.03

The 1.0 to 2.5 parking space figure per 1,000-square foot increment of nonresidential use in smart-growth and infill situations is a threshold lower than the approximately 3.0 to 5.0 parking space standard found in the national parking literature (tables 9.1 through 9.6)—an expected differential, given the reduced auto dependence in smart growth–infill developments and given other distinguishing characteristics.

More work needs to be done to refine the proposed methodology for calculating nonresidential parking standards. First, there is uncertainty and considerable variation in the worker density by nonresidential land use category. Recall that office space could house from approximately two to five workers per 1,000 square feet—a considerable spread in the starting figure for calibrating the state of Washington template. Second, the state of Washington approach works best when the parking demand of a given use is driven mainly by the need to accommodate the automobiles of those working at that use, such as an office building. The model does not work for those uses where parking demand is generated mainly by visitors rather than workers, such as a retail facility. Even were that not an issue, workers at a given facility do not fall into neatly segregated categories by industry; table 9.20 thus oversimplifies the real world. The U.S. Census segregates the modal split by 14 industry groupings, such as finance, information, and professional-scientific-other. An office building can contain workers from any or all of these categories, and the type of employees housed can change over time. That variation introduces uncertainty concerning exactly how the modal split component of the parking calculation template should be calibrated.

Further, there is limited literature on nonresidential parking and transit access. The California Department of Transportation observes that

> Compared with the topic of residential auto ownership rates, no studies available in the literature have systematically estimated optimal office or retail parking requirements while accounting for level of transit service across several locations (California Department of Transportation 2002a, 7).

No meta-analyses of commercial parking demand emerged from the literature. This is likely due to the variety of commercial development and the expense of collecting parking demand data. Whereas good sources of secondary data exist on vehicle ownership—a good proxy for residential parking demand—no such data exist for commercial parking: cars must be counted by hand. The ongoing updates to ULI's *Shared Parking* and ITE's *Parking Generation* rely on hand counts, and the generated data will be invaluable when they are released.

For now, our best information comes from automobile trip-reduction studies. Reductions in automobile trips translate directly into reductions in parking requirements, assuming that the average parking duration remains unchanged. Table 9.22 indicates trip reduction rates as it relates to density (proxied by minimum floor area ratio [FAR]), type of development, and availability of transit.

TABLE 9.22
Trip Reduction of Development Location, Design and Density

Minimum Floor Area Ratio	Mixed-Use	Commercial Near Bus	Commercial Near LRT Station	Mixed-Use Near Bus	Mixed-Use Near LRT
No minimum	–	1.0%	2.0%	–	–
0.50	1.9%	1.9%	2.9%	2.7%	3.9%
0.75	2.4%	2.4%	3.7%	3.4%	4.9%
1.00	3.0%	3.0%	5.0%	4.3%	6.7%
1.25	3.6%	3.6%	6.7%	5.1%	8.9%
1.50	4.2%	4.2%	8.9%	6.0%	11.9%
1.75	5.0%	5.0%	11.6%	7.1%	15.5%
2.00	7.0%	7.0%	15.0%	10.0%	20.0%

Source: City of Portland 1995, presented in VTPI 2003c.
Note: Mixed-use means commercial, restaurants and light industry uses with 30 percent or more floor area devoted to residential uses. Near bus or LRT (light rail transit) means location within ¼ mile of a bus corridor or LRT station. Floor Area Ratio (FAR) = ratio of floor space to land area.

Table 9.23 presents similar data from a different study that does not include the effect of density explicitly.

TABLE 9.23
Travel Impacts of Land Use Design Features

Development Type	Mixed Uses	Transit Access	Per Capita Trip Reduction
Residential	No	Transit center	10%
		Transit corridor	5%
	Yes	Transit center	15%
		Transit corridor	7%
		Less transit access	5%
Commercial	No	Transit center	15%
		Transit corridor	7%
	Yes	Transit center	20%
		Transit corridor	10%
		Less transit access	7%

Source: Dagang 1995, presented in VTPI 2003c.

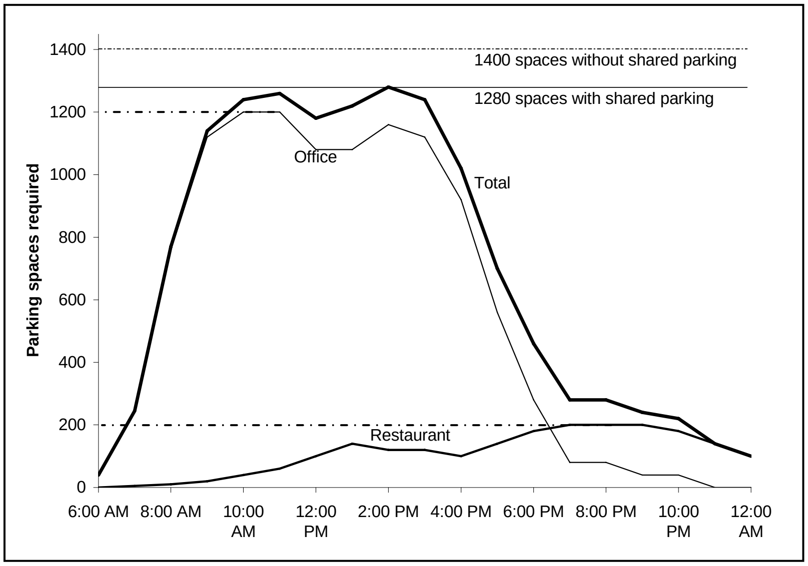
Our knowledge of the situation will be enhanced by relating the findings of the above studies to the results obtained from the application of the state of Washington template.

The discussion thus far has considered parking requirements for infill and smart growth. The final section of this chapter examines flexible means for satisfying those requirements (as well as influencing the need) through shared parking, and demand management. Flexible approaches are called for since unlike the “blank slate” of a greenfield, smart growth and infill may be constrained to provide parking. Further, we wish to avoid providing unnecessary parking for smart growth and infill since surplus parking is expensive and has adverse environmental and aesthetic effects.

PARKING DEMAND AND RESPONSE: SHARED PARKING

If different nearby uses share a parking lot and the uses have peak parking demands that occur at different times, then a shared parking resource can be smaller than the dedicated parking facilities it replaces. For example, an office building and a restaurant could share a lot: the office building’s maximum parking need would come between 8 a.m. and 5 p.m., and the restaurant’s maximum parking need would arrive during the dinner hour. Each could fill the other’s vacancies, increasing the efficiency of the parking lot and reducing the total requirement. Figure 9.2 demonstrates this effect.

FIGURE 9.2
Parking Requirements for a Restaurant with 10,000 Square Feet Gross Leasable Area and an Office Building with 400,000 Square Feet Gross Leasable Area

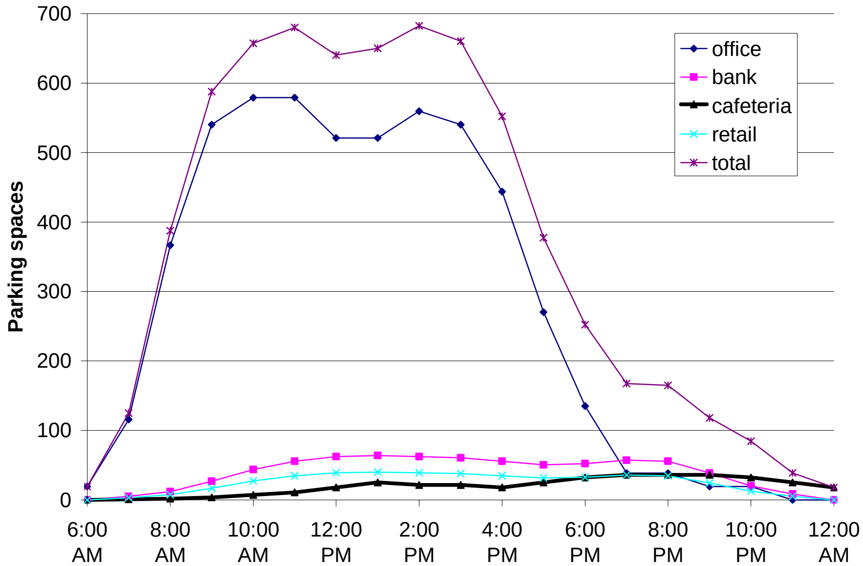


Source: Calculation by Matt Cuddy of Rutgers University, using default data from ULI 1983, 86, for a weekday in June.

In the shared parking situation depicted in figure 9.2, the development requires a total of 1,280 spaces. If shared parking were not allowed, the development would require 1,400 spaces—the sum of the peak demand for the offices and the peak demand of the restaurant. The parking reduction due to shared parking is 1,400-1,280 = 120, or 9 percent.

An example of shared parking in a mixed-used situation is given by Pasadena (California) Towers (ITE 1995). The first phase of this mixed-use project includes 193,000 square feet of offices, a 10,000-square-foot bank, a 15,000-square-foot cafeteria, and 16,000 square feet of retail space ITE 1995, 47). According to City of Pasadena standards, 952 spaces were required. Using demand by time, day, and month data from the standard reference on shared parking, ULI's 1983 *Shared Parking*, we estimate that the peak parking demand for the uses in Phase I is 683 spaces, and it occurs on a December weekday at 11 a.m.. The parking use attributable to each use on that day is shown in figure 9.3.

FIGURE 9.3
Parking Demand by Time of Day for Phase I of Pasadena Towers



Source: Calculations by Matt Cuddy using data from ITE 1995, 47 and ULI 1983, 86). The parking reduction due to shared parking in this instance is 952 – 683 = 269, a 28 percent reduction.

The shared parking approach to reducing parking provision is applicable to smart-growth and infill development that is nestled among other uses with existing parking lots. To the extent that the smart growth–infill can share nearby lots (and the assigned parking can be shared by others), the infill development can include less on-site parking than its users nominally require. Smart-growth and infill developments can also benefit from shared parking because they, themselves, may include mixed uses.

Success Factors for Shared Parking

The two keys to effective parking sharing are the complementarily of the uses sharing the parking, and the ease of accessibility of those uses from the parking lot. Uses that work best together to maximize the efficiency of parking are

- Residential, combined with daytime employment uses
- Nighttime, entertainment with daytime employment uses
- Suburban mass transit stations, with weekend-oriented uses
- Weekend (for example, church), with weekday daytime use such as employment uses
- Retail/restaurant/support uses in large employment centers (ITE 1995, 18)

ULI's *Shared Parking* (1983), JHK's study of shared parking in San Diego (1996), and, especially, the update of *Shared Parking* (ULI 2005) provide more detailed guidance about how uses can be best combined. The reader can also benefit from a model shared parking ordinance published by the Victoria Transport Policy Institute (VTPI 2003a). All else being equal, increasing the variety of shared uses improves parking lot utilization.

Accessibility of uses by a shared lot is a function of both distance and design. For the 17 Oregon and Washington State local ordinances surveyed by Stein Engineering (1997, 8), the range of maximum allowable distance from parking to the land use it serves can be described as follows: minimum, 100 feet; maximum, 700 feet; mean, 316 feet; median, 275 feet. ITE's model shared parking ordinance specifies a 300-foot maximum distance between shared spaces for residences and the residential entrances. For other uses, shared spaces must be within 500 feet of principal entrances, except that up to 20 percent of spaces may be between 500 feet and 1000 feet from entrances (ITE 1995, 55). In its model ordinance, VTPI recommends maximum distances of 300 feet for residential uses and 600 feet for other uses (VTPI 2003a). Other parking experts specify appropriate walking distances from parking according to specific uses, such as 400 feet to 800 feet for grocery stores, 800 feet to 1,200 feet for general retail, and 1,200 feet to 1,600 feet for airport parking (VTPI 2003b).

Design elements that facilitate shared parking ensure that the parker can walk safely, comfortably, and easily to any of the uses sharing the lot. Clearly marked crosswalks, level and unbroken walkways, and a direct walking route are important. Because of the subjective nature of these criteria, parking lot access design is rarely specified in ordinances.

Barriers to Shared Parking

Most of the stakeholders in the development process are likely to resist reducing parking requirements by sharing parking. Lenders approached to finance development must be convinced that the development is viable. Understanding that free, or at least sufficient, parking makes a business (including residential development) more attractive, lenders usually want to see plenty of parking in a project they finance. Shared parking situations may render ambiguous the availability of parking to a particular development to be financed, so dedicated parking is often preferred (EPA 1999, 2; Schwanke 2003, 79; Stein 1997, 17).

Developers likewise see some risk in shared parking. They also want their project to be viable, and that depends on revenue once the development is operating and also on the duration of the approval process. Abundant parking supposedly attracts shoppers for the convenience it suggests: potential customers appreciate both the ease of parking, unloading, and loading again and the uncrowded in-store conditions excess parking implies (Schwanke 2003, 79; Stein 1997, 16). Some developers fear the complications introduced by having to negotiate with other developers on the shared use of a parking lot (ITE 1995, 17). They also want to avoid complicating and extending the approval process, as shared parking may do (Stein 1997, 17).

Residents want reliable access to their parking. For residents of residential smart-growth and infill developments, this may manifest as a desire for an assigned space (Schwanke 2003, 79). Shared spaces cannot also be assigned spaces, of course. The result is that residential developments with shared parking may be at a nominal competitive disadvantage. For residents near a smart-growth and infill development, the desire for reliable access translates into concern about spillover parking (EPA 1999, 2; Schwanke 2003, 79).

City officials want livable, vibrant cities with growing tax bases. They tend to welcome proposals for smart growth and infill projects. However, review of developments with shared parking can be complicated and burdensome. Likewise, municipal administration and monitoring of shared parking situations can be difficult and expensive.

Although shared parking faces numerous challenges, this strategy is an important approach to address parking needs of smart-growth and infill development.

PARKING DEMAND AND RESPONSE: PARKING MANAGEMENT

Shared parking works to reduce parking demand in many smart-growth and infill development contexts. However, these reductions may not be enough. Sometimes more active parking management is necessary to make an otherwise well-fitting use feasible in an infill location—a strategy undertaken in many jurisdictions throughout the United States (see table 9.24). We review below the advantages and disadvantages of various means of managing parking.

Parking demand management policies lack the certainty and finality of simply constructing ample parking. Once a parking space is built, it will produce a knowable supply of parking for the life of the lot. On the other side of the supply-and-demand equation, reducing demand by making parking more expensive (in a full cost, time, and "hassle" sense) or by making the alternatives to driving less expensive is a more complicated job. Demand reductions are not assured. Rather, some monitoring system is required to confirm that the enacted demand reduction policies are having the intended effect.

On the other hand, because parking management policies do not necessarily require significant physical infrastructure, they may be implemented flexibly and quickly. In the event that an existing management approach is inadequate, it can be changed. And most importantly for our discussion here, if the resources for additional parking—sufficient land or profit margin—are simply unavailable, parking management policies may be enacted to obviate the added parking requirement.

Bearing in mind that parking demand management is a far from certain process, even as it offers the flexibility to make possible otherwise infeasible smart-growth or infill projects, we next consider parking demand management strategies best suited to such development. These strategies fall into three categories: pricing parking, improving alternatives to driving, and preventing spillover.

TABLE 9.24
Examples of Innovative Parking Management Strategies in the United States

Cash-out Option
Los Angeles, CA (EPA 1999)
Santa Monica, CA (EPA 1999)
Eight CA cities (Shoup 1997)

In-lieu Fees
Bend, OR (VTPI 2003d)
Berkeley, CA (EPA 1999)
Coconut Grove, FL (EPA 1999)
Jackson, WY (VTPI 2003d)
Kirkland, WA (VTPI 2003d)
Lake Forest, IL (EPA 1999)
Long Beach, CA (EPA 1999)
Orlando, FL (EPA 1999)
Palo Alto, CA (EPA 1999)
Skokie, IL (VTPI 2003d)
24 US cities, mostly in California (Shoup 1999)

Multifaceted Parking Management
Bay Ridge, NY (VTPI 2003d)
Portland, OR (multiple sources)

Shared Parking
Gresham, OR (Stein 1997)
Hillsboro, OR (Stein 1997)
Indianapolis, IN (EPA 1999)
Los Angeles, CA (ITE 1995)
Missisauga, ON (ITE 1995)
Monrovia, CA (VTPI 2003a)
Montgomery County, MD (EPA 1999)
Portland, OR (ITE 1995, Stein 1997, VTPI 2003a)
San Diego, CA (ITE 1995)
Toronto, ON (ITE 1995)

Transit Improvements
Chattanooga, TN (EPA 1999)
Portland, OR (EPA 1999)

Transit Subsidies
Boulder, CO (EPA 1999, VTPI 2003g)
San Bernardino County, CA (EPA 1999)
Alameda County, CA (VTPI 2003f)

Vehicle Trip Reduction
Bellevue, WA (Listokin et al. 1992)
Cambridge, MA (EPA 1999)
Dallas, TX (Listokin et al. 1992)
Foster City, CA (Listokin et al. 1992)
Hartford, CT (Listokin et al. 1992)
Los Angeles, CA (Listokin et al. 1992)
Montgomery County, MD (EPA 1999, Listokin et al. 1992)
Orlando, FL (Listokin et al. 1992)
Palo Alto, CA (Listokin et al. 1992)
Sacramento, CA (Listokin et al. 1992)
St. Petersburg, FL (Listokin et al. 1992)
Schaumburg, IL (Listokin et al. 1992)
Seattle, WA (EPA 1999, Listokin et al. 1992)
Stamford, CT (Listokin et al. 1992)

Pricing Parking

By putting a price tag on parking, we make it a tradable commodity: we can consider exchanging one parking space for another or exchanging driving for another mode of transportation. There are several stages in the development and operation of a smart-growth and infill use that are disposed to pricing. In the chronology of a site's development, an in-lieu fee is the first approach available.

In-lieu Fees

A developer may have the option to pay an in-lieu fee rather than provide the full amount of parking that the city would normally require. The city would then use the fee to provide public parking, in the amount of the reduction in the requirement, to serve the development in question. Theoretically, the amount of the in-lieu fee approximates the expense the developer avoids by providing fewer than the required number of spaces.

Shoup (1999) surveyed in-lieu parking programs in 46 cities to understand the benefits of and the problems with the use of such programs. City officials cited five benefits of in-lieu fee programs:

1. They offer developers flexibility in meeting parking requirements.
2. They facilitate shared parking (and therefore more efficient use of parking space) by replacing spaces dedicated to particular developments with public spaces.
3. They allow cities to put parking where it has minimum impact on pedestrian and automobile traffic and the streetscape.
4. They simplify the approval process by reducing variance requests.
5. They facilitate historic preservation: new uses with parking requirements otherwise too great for the lot can be accommodated.

In the same article, Shoup lists the problems with in-lieu fee programs that developers cited:

1. The resulting lack of on-site parking may make the development less attractive and viable.
2. Cities' fees may be too high because of inefficiencies in construction.
3. Cities sometimes do not guarantee that the public parking funded by the fees will be within reasonable walking distance of the development.
4. The program may lead to an overall reduction in an area's parking supply, reducing the area's competitiveness.

There is no theoretical limit to the amount by which parking requirements can be reduced by in-lieu fees: A development's competition and its physical context must guide decisions. However, for an infill development too small to afford its own parking, where only a small number of spaces are replaced with in-lieu fees, it may well be impossible for the city to create public parking near the development. In this case, the lessons from Shoup's survey may be of limited applicability. However, it may be as good for a city to fund transportation demand management (TDM) to reduce parking demand as it would be for the city to provide additional parking. Shoup (1999) discusses the favorable economics of employer-funded TDM in the form of bus passes, but the economic benefit should accrue regardless of who buys the passes. The "transit benefits" section below reviews TDM programs that could be developer- or city-funded through in-lieu fees or otherwise.

Unbundling Parking

In unbundling parking, property owners lease parking spaces separately from their office, retail, or residential projects. This allows users to pay for the parking they need and avoid paying for parking that they do not need. Such a strategy is most efficient when developers can rent out extra parking spaces (VTPI 2003d). The approach can be applied to residential or commercial properties and can be used most effectively to influence the parking behavior of residents and commuters who have regular travel plans, rather than the behavior of shoppers and visitors who do not. For example, renters who pay $1,200 per month for an apartment with two spaces included could instead pay $800 per month for the apartment and $200 per parking space. Commuters to a particular office building or complex could choose to park for free, or accept the cash value of the parking space they do not use. More detail on the commuter case, which has been considered extensively, is in the next section.

Unbundling parking expenses for customers requires that customers pay directly for parking, and this poses numerous problems. With meters, the customer needs correct change and must pay for more parking than is used or risk a ticket. In a pay lot, the customer needs to keep track of the ticket and pull out some money a second time (the first being at the store to make a purchase) to pay the attendant. Because of the second payment required, shopping at a store that does not have “free” parking appears to be more expensive, when, in reality, the customers of every store pay for parking, either directly or indirectly. The potential to unbundle parking to change customer parking behavior depends on the market. To the extent a business has limited competition from businesses that offer free parking because of its unique offerings or captive markets or whatever else, it can afford to charge for parking. Otherwise, retail parking demand may be difficult to manage.

Generally, the effectiveness of unbundling parking depends on the parking sensitivities to price of various types of user. Table 9.25 indicates how the mode selection for trips for different purposes responds to changes in parking price.

TABLE 9.25
Elasticities: Sensitivity of Number of Trips to Parking Price

Purpose	Car Driver	Car Passenger	Public Transport	Walking and Cycling
Commuting	-0.08	0.02	0.02	0.02
Business	-0.02	0.01	0.01	0.01
Education	-0.10	0.00	0.00	0.00
Other	-0.30	0.04	0.04	0.05
Total	-0.16	0.03	0.02	0.03

Source: TRACE 1999; tables 32 and 33, presented in VTPI 2003e.

Elasticities are difficult to use when the base parking price is zero, however, which is the case for commuters more often than for customers. Table 9.26 presents in another form the sensitivity of commuters' parking behavior to price.

TABLE 9.26
Commute Trip Reductions from Daily Parking Charges

Location	$1	$2	$3	$4
Suburb	6.5%	15.1%	25.3%	36.1%
Suburban Center	12.3%	25.1%	37.0%	46.8%
CBD	17.5%	31.8%	42.6%	50.0%

Source: Comsis 1993, presented in VTPI 2003e.

If economic efficiency is our goal, then the charge for parking should cover its full cost. Table 9.27 presents estimates of the cost of parking in a range of situations.

TABLE 9.27
Estimates of Parking Costs

Type of Facility	Land Costs per Acre	Land Costs per Space	Construction Costs per Space	O & M Annual Costs per Space	Total Annual Cost per Space	Monthly Cost per Space
Suburban, surface, free land	$0	$0	$1,500	$100	$242	$20
Suburban, surface	$50,000	$455	$1,500	$100	$284	$24
Suburban, 2-level structure	$50,000	$227	$6,000	$200	$788	$66
Urban, surface	$250,000	$2,083	$2,000	$150	$535	$45
Urban, 3-level structure	$250,000	$694	$8,000	$250	$1,071	$89
Urban, underground	$250,000	$0	$20,000	$350	$2,238	$186
CBD, surface	$1,000,000	$7,692	$2,500	$200	$1,162	$97
CBD, 4-level structure	$1,000,000	$1,923	$10,000	$300	$1,425	$119
CBD, underground	$1,000,000	$0	$22,000	$400	$2,288	$191

Source: VTPI 2003h.

Shoup (1999) uses in-lieu fees to infer the cost of creating parking. For the 26 U.S. cities he surveys, in-lieu fees range from $5,850 in State College, Pennsylvania, to $27,520 in Carmel, California.

Transit Benefits

The need for employee parking can be reduced at a work site by recognizing the cash value of a parking spot and offering the employee choice in how that money is spent. Cash-out programs offer the cash value of an employer-subsidized parking space to employees who do not drive. As of 1992, California law requires certain employers to offer cash-out programs (EPA 1999, 22). Shoup (1997) reviewed eight such programs and found that they reduce drive-alone commuting by 17 percent.

There are many such success stories. For example, upon moving into new offices in the Seattle suburb of Bellevue, Washington, the 430 employees of the engineering firm of CH2M Hill were offered $40 per month if they walked, bicycled, carpooled, or took transit to work, or they were offered free parking if they drove alone. The firm's drive-alone rate declined from 89 percent to 54 percent, and stayed there, while the percentage biking or walking increased from 1 percent to 17 percent. With parking demand down by 39 percent, the firm's problem of "too many parkers for too few spaces" disappeared. This approach reduced costs to the company and reduced traffic and pollution, while increasing tax revenue.

Transit and rideshare benefits, in the form of subsidies or free passes, can be offered to all employees as a way to save the expense of providing on-site parking. In such an approach, transit agencies offer greatly reduced fares to the entire employee population, knowing that only a fraction of the passes will be used. Those who choose to drive and forego the benefit subsidize those who choose the free or low-cost transit. These programs are fairly common among universities. The University of Colorado in Boulder runs such a program. Boulder is unique in that it also allows neighborhoods to buy EcoPasses in bulk as an employer or university would (McKay 2001, reprinted in VTPI 2003g).

Cash-out programs should work better than transit benefits as a way to reduce parking requirements for smart growth and infill. Cash-out programs have a monitoring and enforcement component that is inherent or, at least, implied—the cash value of the parking subsidy is available *only* to those who do not bring a car to work, and parking reductions are quantifiable and certain. A transit benefit approach relies on reducing the *tendency* of all employees to drive alone to work. It does not ensure a reduction in parking use, but only makes it likely. In practice, of course, the cash-out program must be monitored and enforced as well, but the fact that such a program requires participating employees to agree not to drive should reduce that burden.

Improving Transportation Alternatives

Improving transportation alternatives is often key to get people out of their cars and reduce the need for parking. All else being equal, making it easier, cheaper, or more pleasant to walk, ride a bike, or take a bus should decrease single-occupancy vehicle (SOV) use and, therefore, the demand for parking. (That thinking underlies the state of Washington's CTR program described earlier.) The extent of service is obviously very important as well: no matter how cheap and clean the bus is, if it does not go where a rider needs it to go, the rider cannot use it.

This is especially important for residents, who must have a space for every car they own. Their key decision is not whether to take a *given trip* by transit or human power, but whether they can forego the use of a car for *all* trips. Cost and cleanliness affect this decision to be sure, but the extent of the transit system seems much more important. Who would give up their car if it were the only way they could get to work?

However, improving a city's transportation system beyond incremental changes (e.g., adding a bus stop or shelter) is quite expensive. Encouraging ridesharing may be the most realistic approach to improving transportation alternatives for smart growth and infill development. Ridesharing requires as infrastructure only the roads required for single-occupancy vehicle commuting. Developers, employers, and/or city agencies can encourage ridesharing by coordinating drivers and passengers, suggesting standards for sharing the cost of automobile operation and maintenance, and subsidizing those costs. Some transit benefits, such as the cash-out option, apply to ridesharing as well as transit.

Preventing Spillover

Preventing troublesome or unauthorized use of subsidized or otherwise committed parking is an important element of managing a limited parking supply. Those who live and work near a development should not be put in the position of supporting the development by bearing parking inconvenience. Residents' fear of spillover parking in their neighborhoods is the most commonly cited reason for requiring ample off-street parking for developments.

Spillover parking problems can be addressed with regulation and/or compensation (VTPI 2003d). Cities can relatively easily increase enforcement of existing parking laws or create permit parking districts in areas where spillover parking is problem. The offending destination development can also offer compensation to those who are inconvenienced during peak parking demand times. For example, a movie theater might offer free tickets to nearby residents whose streets are used for parking by movie-goers. Shoup (1995, cited in VTPI 2003d) suggests that on-street parking revenues be directed to benefit neighborhood residents.

As is indicated above, managing parking demand poses numerous challenges. Yet, it is often essential in smart-growth and infill situations. In addition, managing parking demand offers significant potential savings in the capital cost of providing on-site parking. The following case study illustrates how parking management strategies can reduce firms' net costs.

SAFECO Insurance Company's Redmond Campus sits on 48 acres in Redmond, Washington, in an area affected by that state's previously described Commute Trip Reduction Law (CTR). In 1999, SAFECO was expanding its corporate headquarters in Redmond, adding 385,000 square feet of office space. To preserve the character of the campus, it chose to build underground parking for the new offices. Responding to reduced parking demand and cost considerations, it chose to construct 843 spaces. If SAFECO had built all the spaces the City of Redmond called for—3 spaces per 1,000 square feet, or in SAFECO's case, 1,155 spaces (3 x 385)—it would have spent an additional $5.6 million, which, when amortized, comes to $491,000 annually. (At a national parking standard of 4 spaces per 1,000 square feet, SAFECO would have provided 1.540 spaces [4 x3 85].) SAFECO invests about $261,000 annually on its transportation management program, so it saves $230,000 a year by reducing its parking demand.

CONCLUSION

To encourage smart growth and infill, this chapter proposes an empirically driven and location-sensitive methodology, albeit exploratory in nature, for calculating residential and nonresidential parking standards. To facilitate the realization of these parking standards, especially in a smart-growth and infill context, this chapter further examined a menu of strategies to flexibly "provide" parking through such means as shared arrangements and parking management.

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