

Visualizing Density

Julie Campoli • Alex S. MacLean





Visualizing Density

Julie Campoli • Alex S. MacLean

L LINCOLN INSTITUTE
OF LAND POLICY
CAMBRIDGE, MASSACHUSETTS

© 2007 by the Lincoln Institute of Land Policy, Julie Campoli, and Alex S. MacLean

Text, ground photographs, and diagrams © 2007 Julie Campoli
Aerial photographs © 2007 Alex S. MacLean
All rights reserved.

Library of Congress Cataloging-in-Publication Data

Campoli, Julie.

Visualizing density / Julie Campoli and Alex S. MacLean.

p. cm.

Includes bibliographical references.

ISBN-13: 978-1-55844-171-2

ISBN-10: 1-55844-171-9

1. Population density—United States. 2. City planning—United States. I. MacLean, Alex S. II. Title.

HB1965.C25 2007

307.3'316—dc22

2006039014

Designed by Peter M. Blaiwas, Vern Associates, Inc.

Composed in Joanna MT. Printed and bound by Capital Offset in Concord, New Hampshire.
The paper is Sterling Ultra Matte, an acid-free, recycled sheet.

MANUFACTURED IN UNITED STATES OF AMERICA

Cover: Somerville, Massachusetts

Title page: Phoenix, Arizona

Page vi: Glendale, Arizona

Contents

Foreword, Armando Carbonell vii

Growing Closer 2

The Count 4
The Coming Boom 5
Spreading Out or Growing In 5
Crosscurrents 6
The Benefits 8
Why We Hate Density 11
How We Can Love Density 13
Visualizing Density 21

Patterns of Density 22

Planning for Density 22
Designing for Density 36

The Density Catalog 62

References 150
Acknowledgements 151
About the Authors 151
About the Lincoln Institute
of Land Policy 152



Foreword

For many Americans density is associated with ugliness, crowding, and congestion, even though it can be shown that, when properly planned and executed, higher density can save land, energy, and dollars. Moreover, many people—including some trained planners and designers—have difficulty estimating density from visual cues or distinguishing quantitative (measured) and qualitative (perceived) density. We tend to overestimate the density of monotonous, amenity-poor developments and underestimate the density of well-designed, attractive projects, thereby reinforcing the negative stereotypes. A primary objective of this work is to correct these misperceptions.

This book was commissioned by the Lincoln Institute of Land Policy to help planners, designers, public officials, and citizens better understand—and better communicate to others—the concept of density as it applies to the residential environment. The need for such a work is borne out repeatedly by participants in our classroom courses, also titled *Visualizing Density*, who share stories of proposed residential developments of appropriate density that had been rejected outright or forced to reduce the number of housing units owing to public misconceptions about density. This is not to say that every residential project that has failed to win approval on account of its density was necessarily well conceived. To address this issue, the authors also discuss and illustrate the importance of good planning and design in gaining acceptance of density.

This book addresses both the “why” and the “how” of density. In the first chapter, “Growing Closer,” Julie Campoli describes the density challenge in the United States: Will we be able to accommodate significant growth in population and housing units while reversing the trend of increasing rates

of land consumption? The second chapter, “Patterns of Density,” can be used as a manual on planning and designing for “good” density, bringing together both quantitative and qualitative aspects of residential development. Finally, “The Density Catalog” is a set of reference images presented in order of increasing density, based on Alex MacLean’s superb aerial photography and clear diagrams of street patterns drawn by Julie Campoli.

I am very pleased to be adding this book to the body of materials on planning and urban form produced by the Lincoln Institute. It is the culmination of more than five years of collaboration with Alex and Julie, who have developed a classroom course offered at sites around the country, as well as illustrated working papers and a *Visualizing Density* Web site that can be accessed through www.lincolnst.edu. We have packaged this book with a CD of the images in the *Density Catalog* to facilitate their noncommercial use in public discussions and education programs.

We hope this dramatic visual material and explanatory text will provide a robust set of tools and techniques for those engaged in planning and designing the roughly 60 million housing units that we can expect to build in this country over the next 25 years. While all density may not be “good” density, it is time we redeem the word and reap the social, economic, and environmental benefits of creating the right density in the right places.

— Armando Carbonell
Chairman
Department of Planning and Urban Form
Lincoln Institute of Land Policy



Growing Closer

Newark, Ohio

This is where America lives—a neighborhood of free-standing homes built on half- to quarter-acre lots, each with a yard and a garage, located on a sparsely traveled street. It's a simple concept—one family per house, each occupying its own distinct realm defined by an expanse of lawn. When we think of housing, this image usually comes to mind. Many of us live in this type of place, and many others aspire to. It has become a symbol of comfort, security, and privacy.

Or maybe it's just where we think we live. Although most Americans occupy single-family homes, a full 40 percent of existing housing units are attached or multifamily structures (U.S. Census Bureau 2000). In fact, many Americans are living side by side in cities or dense suburbs. Their duplexes, townhouses, and apartments make up a substantial portion of the housing stock. Yet, despite its solid presence in the housing

market, the apartment building is far from reaching icon status in the American imagination.

We can't seem to get the low-density suburb out of our minds, which makes it easy to continue to build it. It's what everyone expects—the architects and engineers who design it, the bankers who finance it, the planners who approve it, the developers who build it, and the homeowners who move in. In the past 50 years, we've created tens of thousands of these neighborhoods. We can almost do it in our sleep. The low-density subdivision has achieved a kind of inevitability.

But despite its hold over our imagination, this type of neighborhood will not serve us well in the future. We simply cannot afford to use the land and resources required to house our growing population at such a low density.



■ THE COUNT

Every 10 years the U.S. Census counts Americans. In 2000 the count was 281 million. The Census also keeps track of many other details of our lives—where we live, how big our families are, what types of houses we occupy, what our ethnic backgrounds are, and how much money we make. To anyone even remotely interested in how we shelter ourselves and how we use land, the U.S. Census of 2000 revealed a startling fact: After dipping slightly in the past 50 years, our population growth rate has turned sharply upward. Between 1960 and 1989 it ranged from 22 to 24 million people added per decade. In the 1990s, however, we grew by 33 million. Each year we add about 4.7 million people. At this rate, by 2030 we will be a nation of roughly 350 million.

While the pace of population growth has accelerated, another fact remains constant—we have, and always will have,

the same amount of land. Whether this reality is problematic or not depends on our appetite for land. Census 2000 revealed that lately it has been voracious. In the past few decades we have combined steady population growth with unprecedented land consumption. Urbanized land, or land that is used for residential, commercial, industrial, or institutional purposes, increased by 47 percent in the 1990s while population expanded by only 17 percent (Fulton et al. 2001). In essence, we're taking up more space per capita than we used to.

Across the United States, suburbs grow faster than central cities, and jobs continue to migrate out of cities. As of 2000, more than half of the population in 46 metropolitan areas lived more than 10 miles from the city center; in 1970, this was the case in only 13 metropolitan areas. Boston, with its traditionally dense urban fabric, is a good example of this recent trend. Unlike in earlier years of settlement, one-third of Boston-area

Tualatin, Oregon



residents now live 30 miles or more from downtown. One-fifth live at least 40 miles away (Joint Center for Housing Studies 2005). An increasing number settle not in the city, or even in inner-ring suburbs, but on large parcels in emerging suburbs farther afield. This echoes the national trend—40 percent of new homes built between 1985 and 2001 were on lots of more than an acre (Nelson 2004).

■ THE COMING BOOM

To shelter a fast-growing population, the next few decades will bring a significant need for new housing. There were almost 116 million units of housing in the United States in 2000. By the time we reach 350 million people in 2030, we'll need a total of 155 million homes. Considering that about 18 percent of existing units will be lost to fire, natural disasters, or demolition in the next 25 years, we'll need to build about 60 million new units to house the population—that's more than half of the housing stock on the ground now. And that doesn't include the 104 billion square feet of new space that will be needed for commercial, industrial, and institutional uses. The next generation of Americans will face an unprecedented building boom (Nelson 2004).

Given this need for housing, our tendency to sprawl will place a great strain on our environment and our future economy. How long we can sustain ourselves on our finite land mass will depend on how carefully we use land in this new century. As we face the coming boom, we can choose between two basic approaches to land development—spreading out or growing in and up.

■ SPREADING OUT OR GROWING IN

For the past 50 years we've been growing out—extending beyond the limits of existing settlements and converting farmland, deserts, and forests into building sites. Expansion outward is nothing new. The edges of our cities and towns have tradi-



Buckeye, Arizona

tionally shifted to accommodate the need for built space. It's the density of that new growth that has changed. The rapid pace of conversion from resource land to suburb is due not to the amount of development, but to its low density. We are spreading fewer people across each square mile and using up more land in the process.

The alternative to spreading out is to concentrate—to grow in and up. This is the way we grew before the automobile age transformed our sense of scale and distance. Before World War II, cities expanded outward in small increments in a dense fabric. Developers filled in vacant parcels and rebuilt existing structures, making room for newcomers within an area limited by pedestrian access and public transportation. As they added



*Above: Seattle, Washington
Opposite: Chicago, Illinois*

population, cities grew more dense as an increasing number of people shared each square mile of land.

As we confront dwindling land and energy resources, this concentrated growth pattern makes more and more sense: reuse land that has already been altered; limit the range of new development to an area that is easily accessible; and build up, not out. It is becoming clearer that these ideas should not be relegated to our past, but are the key to our future.

■ CROSSCURRENTS

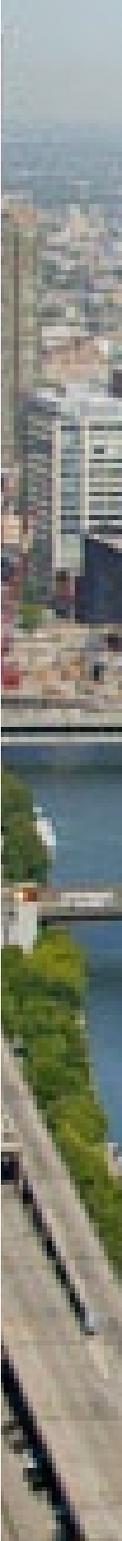
Along with the sprawl trends evident in the Census 2000 statistics, researchers have detected some interesting crosscurrents. It seems that not every corner of the nation sprawled in

the 1990s. Several cities and suburbs in the West grew in rather than out. People returned to the central cores of a few cities. The market for multifamily homes grew. The movement toward greater density is mostly evident in the West, where land costs are high or water is scarce. Although this countertrend was minor in relation to the amount of sprawl overall, it may well point to a future direction.

One indicator is that a small minority of metropolitan areas became more concentrated in the last decade of the twentieth century. These cities used less land per capita to accommodate their fast-growing populations (Fulton et al. 2001). Areas that were originally built to a low density filled in at a faster rate than they expanded outward. Phoenix is a good example of this trend. Density in Phoenix increased from 2,228 persons per square mile in the 1970s to 2,707 in the 1990s. Unlike other cities, population and employment grew and remains concentrated in the center. Density in Los Angeles increased by 8 percent between 1982 and 1997 (Fulton et al. 2001).

People are moving back into the hearts of some cities in search of an urban lifestyle. Despite the fact that their larger metropolitan areas sprawled, many downtowns grew denser. Central districts of downtown Chicago, Denver, Seattle, and Houston, among others, grew at a faster rate in the 1990s than the cities around them (Liu 2003). Demographic trends indicate an emerging market for urban locations and city housing, due in part to an aging population and declining family size. Empty nesters and young singles, two of the faster growing segments of the population, are choosing multifamily housing over single-family options. Immigrants, who made up 34 percent of new U.S. residents in the 1990s and represent a growing presence in the housing market, also tend to seek out urban settings.

This new market for density has emerged in places like Washington, DC, and its suburbs, where the demand for multifamily housing is high. Developers have stepped up production of apartments and condominiums and are having little trouble renting and selling them to residents of all incomes. Sales





are highest in the upper-income groups, which are choosing luxury condos in mixed-use locations over detached homes in outer suburbs. Loft-style high rises and mid-rise buildings built near metro stations are also increasingly popular (Allen 2005). In the Seattle area, between 1996 and 1998, half of all new suburban housing was made up of multifamily dwelling units.

■ THE BENEFITS

Just as we've discovered the specific negative impacts of sprawl in recent years, we are now beginning to understand the particular ways in which arranging our towns in a compact pattern can provide benefits. A growing body of research shows that concentrating homes, jobs, schools, and shops into a smaller area will help us prosper, protect our environment, and strengthen our communities.

Building at a higher density boosts the economy because it saves money for governments, developers, and consumers. One study analyzing the fiscal benefits of channeling higher den-

sity growth into existing areas of Massachusetts found that \$11 billion could be saved over the course of 25 years. Most of the savings would go to homebuyers and developers, but local and state governments also stood to gain (Burchell 2003).

When it comes to sewer, water, roads, electric, and other infrastructure elements, compact form equals fewer pipes and poles, and less asphalt and concrete per unit of housing. Adding population to existing service areas creates an economy of scale that translates into lower installation costs for developers and lower operational costs for municipalities. Consumers and taxpayers save money, too. Although the amount of the savings varies from study to study, research over the past decades has consistently shown that low-density development leads to higher public and private development costs (Muro and Puentes 2004).

Transportation savings is one of the biggest benefits of concentrating people and jobs into a smaller geographic area. Households can save thousands of dollars a year if they drive less because the services they need are nearby. One recent study

Olympia, Washington



found that families in low-density regions like Houston and Atlanta spend more than \$8,000 per year to get around, while those in Chicago average \$5,000 (McCann 2000). Chicago residents, who have less expensive travel options such as walking, biking, and public transit, are able to translate their transportation savings into better-quality housing through the Location Efficient Mortgage program. Lenders recognize the efficiency and cost effectiveness of urban locations and are willing to extend more credit to those buying homes in dense areas served by public transportation.

Where homes are spread out, more energy must be expended to serve them: more gasoline to access them; more oil or natural gas to heat them; and more electricity to cool them. Freestanding or “detached” homes consume 85 to 99 percent more energy than houses of equal size that share a common wall. Combining energy used for travel, home, and an individual’s portion of what is used for community infrastructure, the contrast in energy consumption between low-density and high-density housing is striking. The owner of a 3-units-per-acre, detached, suburban house uses an average of 440 million British thermal units (Btus) per year compared to 360 million Btus per year for his urban counterpart living in an attached townhouse at a density of 24 units per acre (Allen and McKeever 1996).

We don’t often think of cities as environmentally friendly places, but by most significant measures they are. City dwellers use fewer energy resources and generate less pollution than their suburban and rural neighbors. People drive less in places where densities are high, streets are interconnected, and jobs are interspersed with housing. They take fewer trips, and the ones they take are shorter. They don’t start up their cars—a significant source of harmful emissions—as frequently because they have other travel options. Fewer vehicle miles traveled translates into lower amounts of volatile organic compounds, nitrogen oxides, and particulates that pose risks of asthma and cancer.



An urban resident living at a density of 12 units per acre generates about one-third less of these harmful emissions than someone driving the miles necessary to live at a density of 3 units per acre. She is also responsible for emitting a lower amount of the pollution that causes global warming—10.4 tons of greenhouse gases per year at 12 units per acre versus 16 tons at 3 units per acre (Holtzclaw n.d.). Cities generate high concentrations of pollutants, but on a per capita basis residents of leafy suburbs are far more responsible for air pollution and global warming than their urban neighbors.

Reading, Pennsylvania

Living closer together helps save agricultural and resource land. The typical suburban density of 3 units per acre requires four times as much land as a medium density of 12 units per acre. At a small development scale, this may seem like a negligible difference. To build 10 houses at the lower density, only 29 more acres of land would be needed. But when the growth rate



is high and the number of households rises, the need for land also rises dramatically. One thousand new homes at a suburban low density would consume 250 more acres of land than they would at a medium density; 5,000 new homes would require 1,250 more acres of land. That development would most likely be on soils suitable for agriculture or on land that provides an important ecological function.

Increasing the density in urban areas while restricting growth on resource lands prevents this loss of crucial land. Oregon has pursued this policy for the past 30 years. In 1973, 300,000 acres of productive farmland in the Willamette Valley were rezoned from rural residential to agricultural use. During the same period, urban growth boundaries around Portland directed growth inward. The results have been encouraging. Only 1 percent of the farmland in the valley was lost between 1987 and 1999, while the population of nearby Portland rose by 23 percent. Compare this to a productive region of another state without a similar policy: California's rich Central Valley loses 15,000 acres of farmland every year (1000 Friends of Oregon n.d.). Other studies have calculated the potential land savings of following a similar course. For example, Massachusetts could save 51,000 acres of land by switching to a smart growth development pattern for the next 25 years (Burchell 2003).

In addition to economic and environmental benefits, density offers the advantages of urban life, namely the choices and options available wherever people live and work in close proximity. Cities generate diverse and specialized services that are not possible in places with smaller populations—things like cultural events, medical services, shopping, and dining options. At higher densities, it's possible to offer more of these amenities within a smaller geographical area.

Many people like the idea of having a corner store or café in their neighborhood. In housing surveys, homebuyers regularly express a preference for “shops within walking distance.” But retail businesses need residents to survive. The larger a grocery store is—and the more extensive its selection—the more customers it needs to stay in business. For example, a neighbor-

hood shopping center with local goods such as convenience items, videos, or a dry cleaner needs a minimum of 3,000 people within a three-mile radius to be viable; a supermarket requires far more—40,000 residents within three to six miles (Beyard and O'Mara 1999).

■ WHY WE HATE DENSITY

Despite all the advantages of building closer, resistance to density is widespread, to say the least. One reason is cultural. Unlike other nations that developed over a millennium, we don't have a long-standing tradition of designing cities and sharing close quarters. Our cities and villages were dense for a mere 150 years before losing population to the suburbs in the middle of the twentieth century. Psychologically, we're a nation of single-family homeowners. We're accustomed to a lot of space between our neighbors and ourselves. This cultural bias often underlies discussions of growth and development and merges with negative stereotypes of recent public housing failures. Many people view density as a threat, believing that it leads to sinking property values, rising crime, and traffic congestion.

CROWDING Although skepticism toward density is often based on fear and misconceptions, not all opposition is unjustified. There is such a thing as “bad” density—that which is poorly planned and designed without an understanding or concern for human needs. Much recent development has proven to be a poor model of how to live closer together. Many new subdivisions create density without amenities. They are crowded and monotonous, offering few of the environmental or economic benefits described above.

Density is often associated with crowding, but it is important to distinguish between the two. Density is the number of people in a given space, while crowding is the subjective perception that that number is too high. Places can be very dense, but may not be perceived as overcrowded if they are designed



to comfortably accommodate many people. William H. Whyte's research into the use of public spaces revealed how this can be true. The two plazas that New Yorkers cited as the most pleasing and the least crowded—Paley Park and Greenacre Park—were also the most heavily used per square foot (Whyte 1980). They attracted and held the highest density of users, but left people with the impression that there was plenty of room.

Livable, or “good,” density requires a state of balance between housing and population. Even if many people live within an acre or square mile, enough housing units are available to shelter them comfortably. In residential settings, the perception of crowding may be the result of too many people trying to fit into too few housing units. Measured in persons per square mile, some areas of South Central Los Angeles are the densest neighborhoods in the country, but measured in units per acre they have a relatively low density. They are dense in population, but not in housing units.

Another phenomenon, known as “dense sprawl,” is growth that is simultaneously dense and sprawling. Recent growth in desert cities like Las Vegas and Phoenix has forced us to rethink our assumptions about density and sprawl. The word “sprawl” means spread out, so it's natural to assume that density is its opposite. In fact low-density development has long been a key component of the standard sprawl definition. But sprawl as a land use pattern is defined by other characteristics as well.

In sprawling environments, uses are separated by geographic area, and the circulation and storage of vehicles are prime generators of form. Development gathers along highway corridors and leapfrogs across open space in a haphazard pattern. Growth in the desert Southwest fits this description, but it's occurring at a higher density. A remote 500-acre subdivision of single-family homes on cul-de-sac streets, located near a highway interchange, but with a relatively high density of 8 units per acre, could be accurately described as sprawl. It's just a denser version of sprawl.

MONOTONY Many examples of “bad” density arise from the “stack ’em and pack ’em” approach to housing design, which is tempting to developers in our age of mass production. This option has been available since the 1940s, when William Levitt built 17,000 homes seemingly overnight on a Long Island potato field. Applying factory techniques to on-site construction and working at a large scale, his development company created an instant suburb of affordable homes, which sold quickly to first-time homebuyers. Levitt’s strategy relied on speed and standardization. He offered only one model—a 30-by-20-foot Cape Cod–style house—that stood in a uniform location on a standardized lot. By eliminating variety and employing an assembly-line construction method, Levitt produced thousands of homes in record time. Levittown became a model for the successful mass production of housing. It also became an icon of 1950s uniformity.

While large-scale standardization brings down the cost of construction and makes housing more affordable, it also breeds monotony. When the same building form is repeated relentlessly across a broad area, it provokes a response that there are “too many” structures, regardless of the actual number. Density is perceived to be greater than it is.

All too often, the term “density” evokes an image of repetitive, featureless housing developments with little greenery and no privacy. Some dense neighborhoods are bleak, but it’s not a function of how many housing units are built on each acre. Crowding and monotony are the consequences of poor design, not the inevitable results of density.

■ HOW WE CAN LOVE DENSITY

If the next 25 years are like the past quarter-century, we will continue to spread ourselves thin across a diminishing landscape. If our fear of density persists and we build the next 60 million housing units at 3 to 5 units per acre, the costs will be huge. To maintain the low-density lifestyle in this new era



Top and bottom: Las Vegas, Nevada
Opposite: Chicago, Illinois



of rising energy costs and shrinking budgets, we will consume significant energy resources and require government subsidies. Our supply of resource land will shrivel within a generation.

What type of pattern will and should dense growth take? What will it look like? Depending on the pattern it fits within and the form it takes, density can be a blessing or a curse. Despite the word's power to provoke emotional responses, density merely expresses a numerical ratio—typically the number of housing units to the acre of land. Examined rationally, it tells us something about how much activity is compressed into a given area, but it reveals nothing about physical form.

Two neighborhoods with the exact same density can look as different as night and day. Although they measure out at the same density, they are not necessarily perceived to be equally dense. What really matters is how the streets are laid out, how

the land is subdivided, how the buildings are arranged and detailed, whether trees are planted, and where the sidewalks lead. These are all functions of design.

Living closer together is more appealing when the built environment is designed well and cared for. Dense urban neighborhoods such as Chicago's Oak Park, Seattle's Capital Hill, and Brooklyn's Park Slope have been valued over time for their high quality of life. These places offer the benefits of density without negative aspects like overcrowding or monotony. Not limited to big cities, dense, livable neighborhoods are common in settings as diverse as Boise, Idaho; Sandusky, Ohio; and St. Johnsbury, Vermont. There are many historic examples to serve as models, as well as newer places that combine the best attributes of the old. The key to creating new, high-quality density lies in how we plan and design communities.



Pittsburgh, Pennsylvania

DENSITY IN THE REGION Planning for density should begin at the regional level with a fundamental question: Where should growth go? Densities should vary across a town as well as throughout a region. Determining which areas can accommodate more intense development and which should be protected is a good first step. Density is appropriate in built-up areas where infrastructure and services are already in place to serve a growing population. Underused urban sites with access to public transportation and nearby jobs and commercial services are also a good choice. Density neither belongs in remote locations, where a substantial investment in new roads, sewer, water, and electric lines is required, nor on natural resource land or fragile soils.

Successful density requires a major shift in our thinking about how we get around. Currently, we rely almost exclu-

sively on private automobiles. At very low densities this mode of transportation works well. There are few people per mile of roadway and plenty of space to store vehicles. Parking is plentiful and highways are clear. At the other end of the transportation spectrum, urban densities support a mix of alternatives, including walking, biking, buses, and trains, in a setting with little room for private automobiles.

Numerically speaking, there is not a large gap between these two ends of the spectrum. Rural densities are typically less than 1 unit per acre; transit-friendly densities begin at 6 units per acre and extend into the hundreds. Given the broad continuum of possible densities, this span of 1 to 6 units per acre is small, but it represents a huge portion of the housing stock and a very common density for new construction.



As a region is solidly built out at densities of 1 to 6 units per acre, the demand for space on roads and highways often exceeds the supply. This explains the epidemic of traffic congestion across the country that has accompanied widespread suburban development. Depending on the extent of the developed area and road network, densities of fewer than 6 units per acre are often too high for the cars-only approach, but too low to support alternatives, resulting in a transportation limbo between rural and urban.

Density goes hand in hand with alternative transportation. Higher concentrations of people make mass transit feasible, and transit is the most efficient way to move larger numbers of people. As communities grow denser, they should invest more

in alternative transportation and less in auto-oriented infrastructure. Transportation funding in projects such as transit centers, bike lanes, sidewalks, ride-sharing programs, and bus shelters should begin to take precedence over roadways and parking lots. In addition to this shift toward alternatives, land use decisions should complement transportation investments. The maximum distance people are willing to walk to catch a bus or train is about half a mile. It makes sense to concentrate housing within that radius around transit centers, allowing more people to take a shorter walk.

Planning for high-density development requires two different leaps of imagination. It involves sacrificing the primacy of both the car and the big yard—each dear to American hearts—



San Francisco, California

to achieve a different sort of mobility and convenience. It compels us to embrace alternative transportation at a policy level and to choose it on a personal level. In this sense the psychological gap between 1 and 6 units an acre can be immense. But in order to make density fulfill its promise of a better living environment, living closer together must be accompanied by a willingness to drive less and walk or ride more.

One of the most significant benefits of density is the potential to save open land from development. Homeowners may be more willing to forgo a big yard if they have access to large tracts of natural land for recreation. Like context and transportation, open space is a key issue in planning for density. Which

areas are protected, where they are located, and how they are managed are decisions that need to be addressed through town and regional planning. Like a good transportation system, open space should be extensive, varied, interconnected, and accessible to all neighborhoods.

This is not a new concept. Frederick Law Olmsted advocated for open space networks in the nineteenth century and convinced many cities to build them. He believed that dense urban environments required the counterbalancing effects of green oases and that the restorative power of nature must be available to all city dwellers. Olmsted designed city parks to fill this need, but also suggested they be linked across a city or region by greenways. His advice that no neighborhood be more



than a few minutes walk from a greenway or park extension is worth heeding if cities and towns are to grow inward.

DENSITY IN THE NEIGHBORHOOD Living closer together has some negative aspects—less private space, fewer parking spaces, and more noise, to name a few—but good design can help overcome some of these drawbacks. Specific design elements, or amenities, should be present in all dense neighborhoods. Carefully placed and proportioned public spaces often compensate for the loss of large lots. Clearly defined private gardens can be more appealing outdoor spaces

than large, blank lawns. Diversity in architecture is key. Green infrastructure in the form of parks, greenways, or tree-lined streets offers the connection with the natural world we all crave. An interconnected street network that serves both vehicles and pedestrians can make neighborhood life more community oriented and convenient. These are the amenities that make people forget, or not even notice, that a neighborhood is high-density.

Dense housing can be bleak if it's architecturally monotonous. When the same building type is repeated up and down identical streets, the result is tedious to look at. Density can also be boring to live in if there is only one type of use and one

type of housing. The best dense neighborhoods include a lively mix of uses, housing types, architectural styles, and public spaces. There is more to observe and more to do. Most important, a broad range of people lives in them. Variety on every level is what keeps dense neighborhoods from feeling oppressive. It helps create places that are both visually stimulating and socially dynamic.

One byproduct of monotony is an uneasy sense of disorientation that one feels moving through a setting where every-

thing looks the same. The architecture is not distinctive enough to register in our memories and serve as landmarks. As human beings, we have an innate desire to know where we are and how to find our way around. This is easier when our environment is varied and has a comprehensible structure. In a neighborhood setting this requires an assortment of buildings and a coherent street network. Distinctive elements such as a unique building or a view of a distant mountain provide landmarks. Neighborhood design should take this into account, not only



Camden, New Jersey

in the design of buildings, but also in the layout of streets and public spaces.

One of the great benefits of density is that it brings people close enough together that they can interact without traveling far. The higher the density, the more people and activities there are within walking distance. This proximity shrinks the proportions of a place from a scale oriented to vehicles to one suited to pedestrians. Since we perceive the world at the size of a human being and not a car, this is an inherently more comfortable scale in which to exist. The design of dense neighborhoods should take full advantage of this, by locating a mix of uses and public spaces within an optimal walking distance from homes,

arranging buildings to create well-proportioned outdoor spaces, and designing streets to encourage human interaction.

Street trees, narrow roadways, wide sidewalks, prominent crosswalks, bike lanes and racks, and bus shelters are some of the design elements of a pedestrian-friendly street. As pedestrians, we like buildings that are a few footsteps away, walls that don't dwarf us, windows that reveal a glimpse of life within, and doorways that invite us. We move slowly and appreciate details that are lost to drivers. We may not consciously notice the well-trimmed cornice or gracefully proportioned fenestration, but our experience of it makes walking a pleasure rather than a chore.



Density increases the need to formalize and strengthen our connection to nature. Just as all cities need infrastructure in the form of roads, pipes, and wires, healthy cities need a green infrastructure. Such a system of open spaces and natural elements would reach into every neighborhood. Green infrastructure could include natural features like riparian stream edges and wooded tracts, but it also might contain formal elements like pocket parks and tree-lined boulevards. The greenspace system should weave through town, offering every resident a direct connection to nature and natural processes. Trees, which fit in the smallest of spaces, play an indispensable role. Green infrastructure offers many environmental benefits—cleaner air, better water quality, cooler summer temperatures—but the main advantage is that it provides an element of tranquility to areas of high activity. It satisfies a human need that is often denied in urban life.

In dense neighborhoods, architectural design matters down to the last detail of construction. It is just as important to add sound insulation to apartment walls as it is to build a parking garage. High ceilings add a sense of spaciousness. Large windows let in more daylight. A balcony offers a place to eat outdoors. One large tree in the back patio can make the neighbors seem twice as far away. Shielded streetlights help keep the night sky dark. Living close together should not mean saying goodbye to privacy and quiet.

■ VISUALIZING DENSITY

Americans will be wrestling with issues of growth and density for generations. We are growing rapidly and are not sure we want to continue to sprawl. We can learn something from Oregon, a state that chose density 30 years ago. After decades of brisk growth and a land use policy mandating density, the state has experienced both successes and failures. Compared to other regions, sprawl has been curtailed and open land protected. But Oregonians give mixed reviews of the density they're now living in. Some love it; others are skeptical. In the public dialogue

about density, there is a growing realization that design and planning are at the heart of the issue—that people's attitudes, pro and con, reflect the quality of the housing around them, rather than the concept of density (Oppenheimer 2006). Many Oregonians now recognize they need to determine why some density appeals, while other density disappoints, so they can learn to do it better.

Which is what this book is all about—showing density and the design behind it to help you decide what works and what doesn't. When you examine the many ways to achieve density, you can begin to understand how different design approaches create different results.

Chapter 2 presents "Patterns of Density," a selection of photographs that illustrate the points made in this introduction. The accompanying images show examples of monotony, diversity, amenities, open space, and other elements to demonstrate how they contribute to or detract from an environment. They highlight the differences among various planning and design strategies, showing how town and neighborhood layout, building design, and landscaping affect the quality of living spaces.

Chapter 3 is a "Density Catalog." This collection of neighborhood photographs represents a broad sampling of density at many levels, from rural low to urban high. It will help you get a feel for what different densities look like. And it will show how design, much more than density, is what shapes the physical character of a place.