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# A BRIEF INTRODUCTION TO SUSTAINABLE DEVELOPMENT

*Douglas R. Porter*

"Sustainable development"—a two-word phrase with a thousand meanings. "Sustainable" implies forever, perpetuity, constant rebirth and renewal, an inexhaustible system. "Development" connotes change, growth, expansion, production, movement. Both words speak of time, evolutionary processes, constructive adaptation. But each word modifies the other. Development, to be sustainable, must somehow incorporate renewal that ensures the continuity of matter, resources, populations, cultures. Sustainability, to incorporate development, must allow change and adaptation to new conditions. Today, the two ideas together speak of balancing economic and social forces against the environmental imperatives of resource conservation and renewal for the world of tomorrow.

That linkage between the works of humankind and the surrounding environment was articulated succinctly as early as 1864 when George Perkins Marsh observed, "Man everywhere is a disturbing agent. Wherever he plants his foot, the harmonies of nature are turned to discords."<sup>1</sup> Almost a century later,

Lewis Mumford reaffirmed Marsh's critique, writing that metropolitan growth "is fast absorbing the rural hinterland and threatening to wipe out many of the natural elements favorable to life. . . ."<sup>2</sup>

During the 1960s and 1970s, concerns mounted worldwide over the degradation of fundamental environmental qualities. The global population was expanding explosively, more than tripling in the 20th century. Significant declines in air and water quality and biodiversity were documented in many parts of the world. The alarming destruction of tropical rainforests and the effect of greenhouse gases on the earth's atmosphere were often cited as indicators of the problems at hand. Looking forward, these trends foretold of serious threats to the sustainability of life on the planet.

These anxieties came to a head in 1987 with the work of the Brundtland Commission, which was formed by the United Nations. The commission's report sounded a stern warning about the reality of the reduction in the

earth's capacity to sustain life in the face of overwhelming growth in world population. It called for major initiatives to reverse that decline by recognizing the intertwined relationships of environmental conservation, economic prosperity, and social equity—the essence of sustainable development.

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The commission defined sustainable development as "[d]evelopment which meets the needs of the present without compromising the ability of future generations to meet their own needs."<sup>3</sup>

Subsequent international and national conferences and commissions have continued to emphasize the critical importance of attending to this issue. They call for economic development that respects the integrity of natural systems and promotes social advancement.

They warn against development that consumes nonrenewable resources such as fossil fuels and poisons the air we breathe and the water we drink.

The ideals of sustainable development are stimulating a rethinking of many

facets of our lives, not the least of which is the tremendous growth and geographic spread of our communities. Of particular concern is the rapid expansion of the nation's 284 metropolitan regions into the countryside, converting farmlands and forests into suburban and exurban settlements. The spread of development intensifies pressures on vulnerable land and water resources while frequently leaving behind deteriorating neighborhoods and business centers in central cities and inner suburbs. Since 1940, half of all U.S. metropolitan population growth has occurred in suburban jurisdictions, much of it in forms of low-density development that consume land at a rapid rate and depend on resource-depleting automobiles for mobility. Though the discussion is subject to intense dispute, there seems to be plenty of land and oil to support current patterns of community development; nonetheless, many people are troubled by the downside—the effects of today's development practices on fundamental environmental qualities, the costs of supporting infrastructure systems, the economic vitality of our cities and towns, and the associated social and economic disparities.

Proponents of the "traditional neighborhood development," "new urbanism," and "smart growth" movements respond to these concerns with calls for creating more livable communities. They prescribe forms of development that are designed to maintain and enhance existing neighborhoods, business centers, and infrastructure systems; widen the range of transportation choices; provide a variety of housing and living environments; and conserve natural resources. The aims of these movements, which tend to dwell on the physical elements of community design, comport well with the goals of sustainable development. However, "sustainable" adds a dimension: a deep respect for long-term conservation of

natural resources and concern for economic and social advancement.

Translating the lofty ideals of sustainability into the rough-and-tumble world of everyday development can be a daunting task. Looming large are obstacles such as a business-as-usual mentality, cautions about innovative designs and technologies, regulatory and financial policies, and a marketplace steeped in visions of the low-density American dream. Nonetheless, many developers are already developing projects that exemplify some of the ideals of sustainable development. The innovative technologies of "green building" and resource-conserving forms of development are becoming more widely known and increasingly cost effective. Developers are also listening to advocates of sustainable and "smarter" growth; they understand the benefits of responding to these popular ideas about community development.

In addition, market demands are changing in the direction of more sustainable forms of development. A sizable niche market of consumers apparently values compact, mixed-use development that frees them from maintaining large houses and yards and depending on the automobile. Moreover, not only are households increasingly diverse, desiring a wider array of development products, but the aging of the baby boom segment of the population seems to be generating greater interest in returning to the city, or at least to established neighborhoods, thereby increasing interest in recycling buildings and urban land. Even in suburban locations, tightly knit traditional neighborhoods are attracting consumers.

Guided by its long-established principle of providing "responsible leadership in the use of land in order to enhance the total environment," the Urban Land Institute commissioned this publication to demonstrate the ways that develop-

ers can put into practice the concept of sustainable development. A roundup of the approaches available to developers and builders and described in the following chapters includes these opportunities:

- conserving natural resources by minimizing the consumption of land (through compact development, for example) and maintaining and restoring existing environmental attributes of development sites;
- developing sites and designing buildings to reduce the consumption of energy and nonrenewable materials and the production of waste, toxic emissions, and pollution;
- using existing and renewable urban resources such as underused buildings and sites, infrastructure systems already in place, and historic neighborhoods and structures;
- designing developments to enhance a community's sense of place, livability, and social and economic interaction;
- choosing and designing development sites in ways that increase access to jobs, affordable housing, transportation choices, and recreational facilities; and
- creating developments that expand the diversity, synergism, and use of renewable resources in the operation and output of local economic activities.

This publication explains sustainable development approaches in detail, reviews the issues associated with them, points out the cost differentials that some may pose, and describes numerous examples of developments already in place. It postulates that every developer can apply some elements of sustainability to every project. It also rec-

ognizes the corollary premise that no development can hope to achieve the ultimate in sustainability, certainly not in the context of today's economy and society. Much of the responsibility for progressing toward a sustainable future requires national and international attention and impetus. Reducing income and education disparities among peoples, groups, and communities, for example, demands collective, large-scale, long-term changes in society that go far beyond the obligations of individual real estate developers. Nevertheless, the ideas and approaches advocated in the following chapters are based

on the belief that every step taken toward more sustainable development is a step toward a sustainable planet.

Chapter 2, which analyzes the purposes, premises, and promises of sustainable development, introduces the discussions in chapters 3 through 5 of the broad environmental, economic, and social dimensions of sustainability that furnish the context for individual projects. Chapter 6 details the techniques and technologies available for siting, designing, and developing a variety of project types, from small- to large-scale developments in locations that range

from greenfields to "infields." Chapter 7 describes "green" building techniques, including energy efficiency, materials, and adaptable use. Finally, chapter 8 summarizes a list of "best practices" and outlines proposals for promoting support for those practices by the real estate industry and public agencies.

Through this publication, the Urban Land Institute hopes to influence the quality of future development to achieve the principles of sustainable development.

### Endnotes

<sup>1</sup> George P. Marsh, *Man and Nature*. D. Lowenthal, ed. (Cambridge: Harvard University Press, 1864/1965), p. 36.

<sup>2</sup> Lewis Mumford, "The Natural History of Urbanization," *Man's Role in Changing the Face of the Earth*. W.L. Thomas, Jr., ed. (Chicago: University of Chicago Press, 1956), p. 395.

<sup>3</sup> World Commission on Environment and Development, *Our Common Future* (Oxford, UK: Oxford University Press, 1987), p. 43.

# DIMENSIONS OF SUSTAINABILITY IN DEVELOPMENT

*Douglas R. Porter*

The principle of sustainability and the aims of sustainable development have only recently attracted broad public attention. The first international policy statement that pointed out the connection between economic wealth and environmental well-being was advanced in 1987 in the report of the Brundtland Commission. The commission, formally known as the United Nations World Commission on Environment and Development, brought the concept of sustainability to popular attention the world over. The commission's definition of sustainable development remains widely quoted:

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Development which meets the needs of the present without compromising the ability of future generations to meet their own needs.<sup>1</sup>

Expanding on this definition, the commission outlined five key principles of sustainability:

- Needs of the future must not be sacrificed to the demands of the present.

- Humanity's economic future is linked to the integrity of natural systems.

- The present world system is not sustainable because it is not meeting the needs of many, especially the poor.

- Protecting the environment is impossible unless we improve the economic prospects of the earth's poorest peoples.

We must act to provide as many options as possible for future generations since they have the right to determine their own needs for themselves.<sup>2</sup>

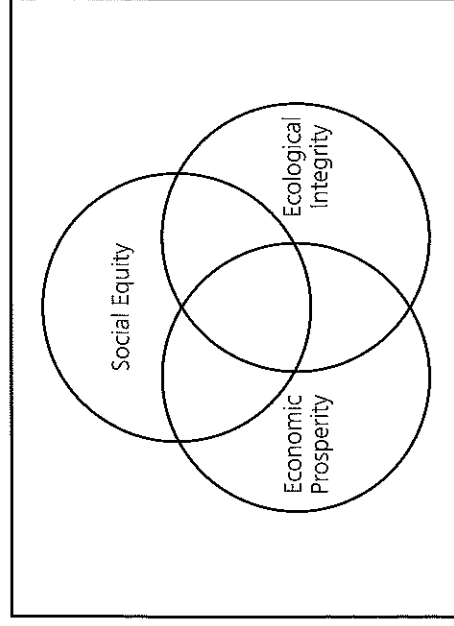
The concept of sustainable development, then, meshes the need for preserving, enhancing, and interrelating economic prosperity, the integrity of natural ecosystems, and social

equity, as depicted in the by-now famous diagram in figure 2-1.

Since the Brundtland Commission's report, a series of international conferences (the 1992 Earth Summit, the 1995 Women's Summit, and the 1996 Habitat II) have explored the concept of sustainability. Today, sustainability is a global concern that focuses on the enormous social, economic, and envi-

## The Concept of Sustainable Development

2-1



ronmental forces at play throughout all nations. Environmental phenomena such as the potential consequences of global warming, the depletion of the ozone layer, the destruction of tropical rainforests, and the continued decline in biodiversity are the subjects of almost daily news stories. Worrisome social and economic issues also stir debate, including the alarming increase in population, especially in developing countries whose economies can ill afford the stresses of such growth, and the widening gaps between the rich and poor in many nations.

In the United States, President Clinton established the President's Council on Sustainable Development in 1993 to recommend a national action strategy for sustainable development and to raise public awareness of the issues and opportunities associated with achieving sustainable development. In 1996, the council published a blueprint for achieving national sustainability that incorporated a vision statement, ten national goals covering a broad spectrum of topics, recommended policies for implementing these goals, and indicators of progress toward meeting the goals.<sup>3</sup> Goal 6, Sustainable Communities, states that Americans should:

Encourage people to work together to create healthy communities where natural and historic resources are preserved, jobs are available, sprawl is contained, neighborhoods are secure, education is lifelong, transportation and health care are accessible, and all citizens have opportunities to improve the quality of their lives.<sup>4</sup>

Meanwhile, the cause of sustainability has energized hundreds if not thousands of civic and special interest groups, each with a particular perspective on the issues at stake. Some emphasize close-to-

home concerns such as recycling, composting, use of solar energy, and reducing automobile emissions. Others push broad initiatives aimed at conserving forests and farmlands, employing water conservation measures, or preserving biodiversity. Still others promote programs to expand economic opportunities and redress social inequities. All, however, are working within the overarching concept of sustainable development, which places equal weight on the environmental, economic, and social components of sustainability. The concept offers a new way of thinking that stresses the interdependence of global forces, perhaps best explained by this stripped-down version of common ecological principles:

- Everything must go somewhere.
- Everything is connected to everything else.
- There is no free lunch.<sup>5</sup>

The concerns and ideas inherent in sustainable development are motivating a rethinking of our everyday ways of life, the use and abuse of natural and human resources, and, in particular, the forms of development we are creating for the places in which we live and work. The concept of sustainable development challenges how we approach the essential fabric and functioning of our communities.

### **Cause for Concern: The Case for Sustainable Development**

Concerns over the sustainability of development have mounted over recent decades as society has gradually come to recognize that we have populated much of the earth's habitable land and depleted much of the earth's resource base. In the process, we have altered fundamental qualities of the global environment. Published in 1962, Rachel Carson's *Silent Spring*<sup>6</sup> docu-

mented the harm the industrial age inflicted on air and water and biodiversity. A few years later, highly influential books such as Paul Erlich's *The Population Bomb*<sup>7</sup> and Herman Daly's *Toward a Steady State Economy*<sup>8</sup> warned of the dangers of increasing consumption in a world of limited resources. In recent years, we have heard and read much about the rapid destruction of tropical rainforests, the near-"deaths" of Lake Erie and the Caspian Sea, the draw-down of aquifers that supply water to many growing cities, increases in greenhouse gases that may drive up global temperatures, and rising threats to species diversity.

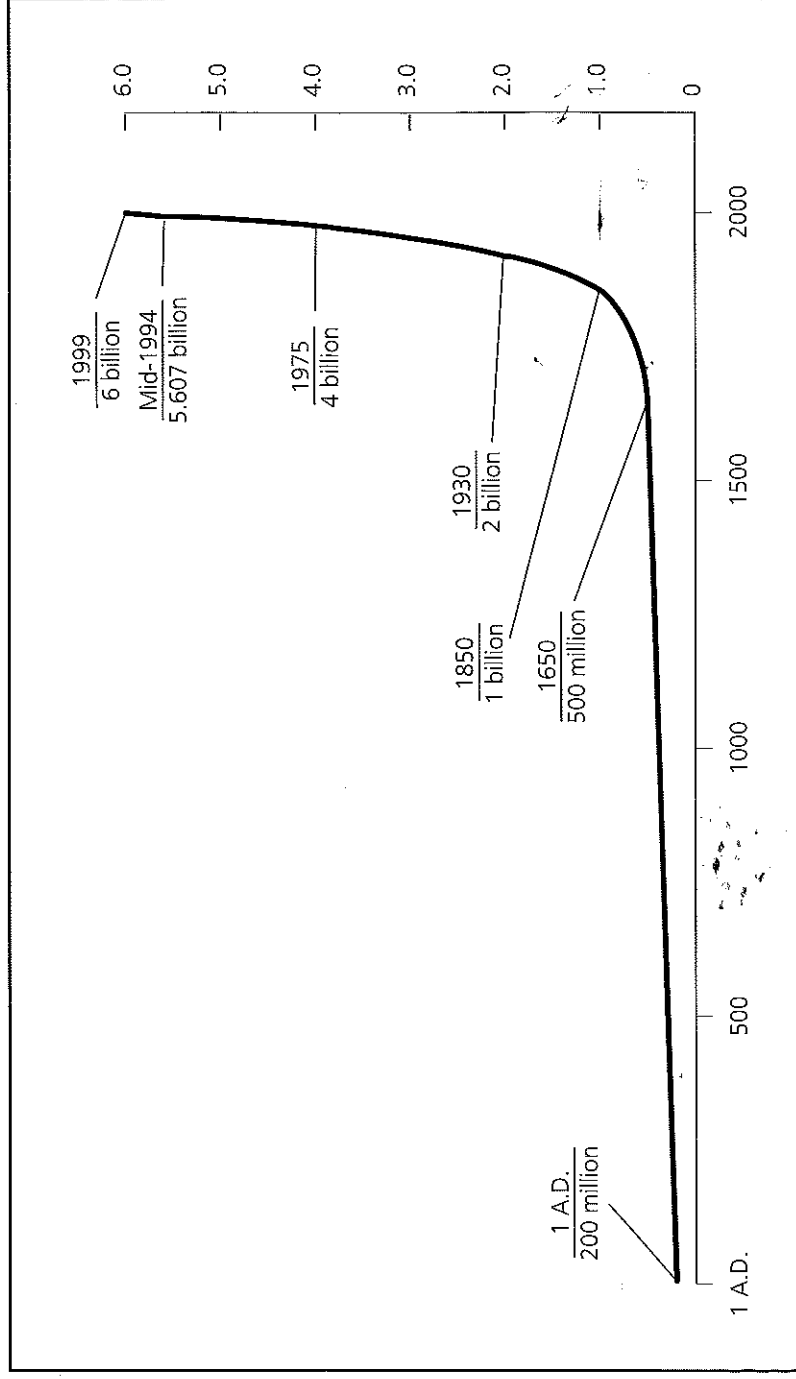
Meanwhile, the world's population is rising rapidly. Over two millennia, it has risen from about 200 million to 6 billion people. More troubling is the fact that 4 billion of that increase has occurred since 1930; in fact, the global population more than tripled in the 20th century.<sup>9</sup> Most of the population expansion is taking place in metropolitan areas that are growing larger by the minute. The world's urban population multiplied tenfold in the 20th century. Moreover, populations are shifting to coastal regions, where intensive urban growth is increasing pressures on sensitive shoreline ecosystems. All this in a world where only 29 percent of the earth's surface is land, just 16 times the area of the United States.

Is it any wonder, then, that many people are concerned that the pace of human population growth will overwhelm the natural assets and resources that people the world over depend on for sustenance? That even developed nations will find their economies and quality of life diminished by worldwide degradation of basic environmental resources?

These global trends are echoed in communities throughout the United States. The U.S. population is projected to

## World Population Growth (1 A.D. to 1999)

2-2



Source: *World Almanac and Book of Facts, 1996* (Mahwah, NJ: World Almanac Books, 1996).

grow from 260 million in 1998 to nearly 400 million by 2050.<sup>10</sup> The nation's 284 metropolitan regions, home to 80 percent of Americans, are pushing development out into hinterlands far from the central cities, converting farmlands and forests to suburban enclaves and exurban estates. Since 1940, half of U.S. metropolitan population growth has occurred in suburbs. From 1991 to 1998, more than 80 percent of new housing construction in the United States occurred in suburban communities.<sup>11</sup> By the early part of the 21st century, more than half of the nation's total population will live in suburbs.<sup>12</sup> And those suburbs are growing outward at an astounding pace. Atlanta's suburbanization, for example, is now occurring 45 to 70 miles north

of downtown, extending toward the South Carolina border.<sup>13</sup>

No matter how carefully development respects natural assets, the spread of urban development intensifies stresses on vulnerable landscapes and brings with it the detritus of urbanization—solid and toxic wastes, exhaust emissions, polluted stormwater runoff, and the like. The most rapid growth is occurring along the nation's coastlines. The 1990 census found half of all Americans living within 50 miles of a coast, a proportion expected to increase to 75 percent by 2010.<sup>14</sup> The population boom along the coasts is affecting beaches, dunes, estuaries, and coastal wetlands and, at the same time, is threatened by periodic storm damage,

shoreline erosion, and declining water quality.

All this comes about because Americans are great consumers. We delight in living in large houses on large lots, relying on individual "auto-mobility" for traveling great distances, and pampering ourselves with high-quality public services in the form of wide streets, grand sites for schools and other public buildings, and expansive parks and recreation areas. It is hardly surprising that our growing communities are consuming land at an unprecedented rate. Christopher Leinberger, a nationally respected real estate economist, predicts that "geometric increases in urbanized land will continue at a rate of at least eight to 12 times faster than the under-

lying employment and population growth.<sup>15</sup> A recent report by the U.S. Department of Agriculture—its five-year “natural resources inventory”—concluded that the rate at which farmland and forests are lost to development is accelerating. More land was developed between 1992 and 1997, the report says, than in the previous decade—16 million acres in five years versus 13.9 million acres in ten years. And this pattern is occurring in small and medium-sized cities such as Des Moines as much as in the New York metropolitan area.<sup>16</sup>

In the 45 years from 1950 to 1995, for example, the population of the Chicago area grew by 48 percent while land coverage jumped by 165 percent.<sup>17</sup> For the period between 1990 and 1996, the population of the Chicago urbanized area increased by 9 percent while the developed land area grew by 40 percent.<sup>18</sup> The population of the Los Angeles metropolitan area rose by 45 percent from 1970 to 1990 while developed land increased by 300 percent.<sup>19</sup> In the region southeast of Boston, more land has been converted to development in the last 40 years than in the preceding 330 years stretching back to the Pilgrims’ landing in 1620—a rate of land consumption two and one-half times the rate of population increase.<sup>20</sup>

To some extent, these startling statistics may be explainable by factors other than the spread of low-density development. In the Chicago area, for example, the Metropolitan Transportation Center (MTC) has tracked population and land trends and observed that the Chicago region’s proportion of homeowners compared to renters increased rapidly over the past decade or two. At the same time, household sizes were declining as traditional families gave way to one- and two-person households. In combination, these trends spelled a major increase in home con-

struction, much of it in suburban locations. Recently, says Slim Sööt of the MTC, these changes have moderated, suggesting that the ratio of land consumption per household may be dropping rather than climbing.

In addition, some recent “statistics” may be colored by the ideological stances of the organizations proclaiming them. The recent nationwide report of the Sierra Club, for example, was assembled from information provided by club members based in various metropolitan areas. Perhaps not surprisingly, they found massive increases in land consumption per capita in one region after another. For the Chicago region, the Sierra Club reported that, between 1990 and 1996, the population of the Chicago urbanized area increased by 9 percent while the developed land area grew by 40 percent—certainly a cause for concern. However, statistics analyzed by the Northern Illinois Planning Commission, the region’s official producer of metropolitan data, showed that population in the Census-defined metropolitan region had increased by 4.8 percent from 1990 to 1995 while land consumption rose by just 6 percent. Growth trends in other metropolitan areas may present different scenarios, but the Chicago example suggests that current figures on land consumption per capita may not necessarily be reliable.<sup>21</sup>

Americans’ love of low-density living brings with it a dependence on the automobile, which consumes gasoline and other nonrenewable resources. With one-twentieth of the world’s population, we own over one-third of the world’s motor vehicles and drive almost twice the distance per year (12,500 miles on average) as residents of other industrialized countries.<sup>22</sup> The number of motor vehicles is growing more than three times faster than the nation’s population. And we are driving more: from 1983 to 1990, as the population increased by 4 percent, the number of

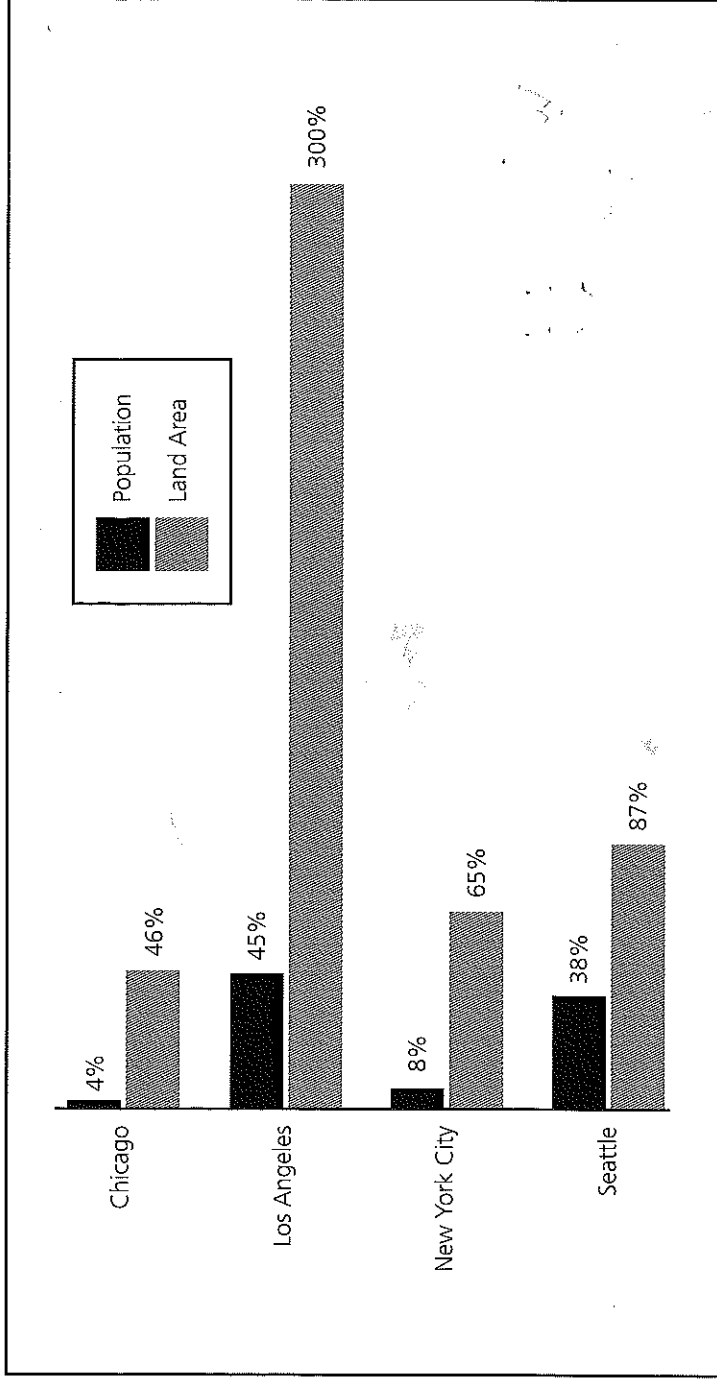
vehicle-miles jumped by 41 percent.<sup>23</sup> Despite the widespread suburbanization of jobs, services, and entertainment during the 1980s, commuting distances lengthened by more than 25 percent, accounting for 38 percent of the growth in vehicle-miles traveled.<sup>24</sup> Furthermore, the United States consumes 13 percent of the world’s oil production just to power automobiles.<sup>25</sup> Despite amazing reductions in toxic emissions over the past two decades, the continued rise in vehicle-miles is expected to begin elevating emissions through this decade.<sup>26</sup>

Associated with increased rates of land conversion and travel are other signals of resource consumption, such as drawdowns of aquifers in many metropolitan areas, deteriorating groundwater quality, persistent problems with air pollution, and the destruction of woodlands and wildlife habitats.

Beyond its impacts on natural systems and resources, our contemporary American lifestyle generates impacts on human ecosystems. With metropolitan edges pushing farther out, many central cities and older suburbs lose population and economic vigor as jobs and residents relocate to “greener fields.” Jobs continued to move out to suburban locations, even during the robust economy of the 1990s. Four out of five major cities, according to a Brookings Institution analysis, “were not able to stage a ‘comeback’ relative to their suburbs in one of the most exuberant periods of job growth in the post-war era.”<sup>27</sup> Anthony Downs observes that “the dominant growth pattern of American metropolitan areas sets in motion a major process of spatial resource reallocation that drains fiscal and human resources from older core areas and weakens the ability of governments there to provide key services.”<sup>28</sup> Even with promising signs of revitalization and renewal in some inner-city neighborhoods and business areas, the out-

## Expansion in Population and Land Area for Selected Metropolitan Areas, 1970-1990

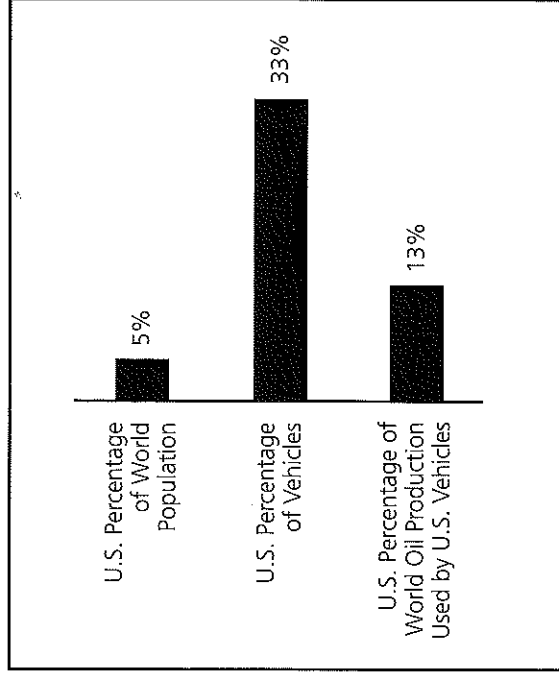
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Source: *Planning and Zoning News*, January 1993; Christopher B. Leinberger, "Metropolitan Development Trends of the Late 1990s: Social and Environmental Implications," in Henry L. Diamond and Patrick F. Noonan, *Land Use in America* (Washington, DC: Island Press, 1996).

## U.S. Percentage of World Population, Vehicles, and World Oil Production Used by U.S. Vehicles, 1995

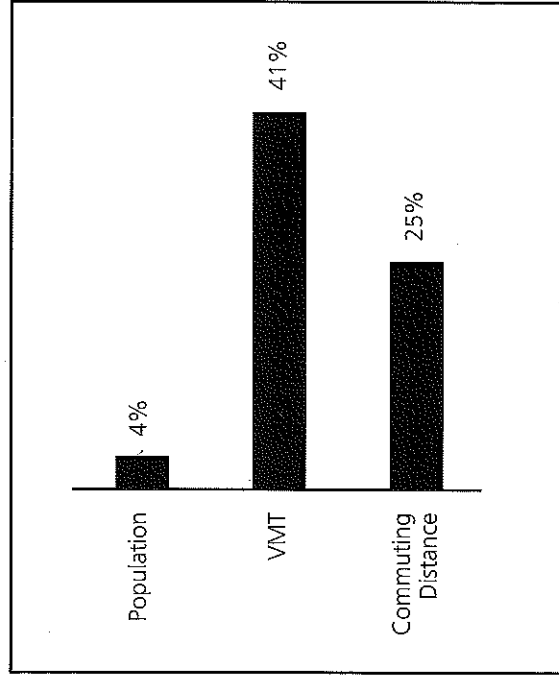
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Source: Florida Department of Environmental Protection, *You . . . Your Automobile . . . and Your Environment*, 1996.

## U.S. Increase in Population, Vehicle Miles Traveled (VMT), and Commuting Distance, 1983-1990

2-5



Source: Robert T. Dunphy, *Moving Beyond Gridlock* (Washington, DC: ULI—the Urban Land Institute, 1997).



ward shift of development leaves behind an urban underclass mired in hopeless poverty, beset by crime, poorly nurtured by public services, and increasingly divorced from job opportunities. Abandoned manufacturing sites lie vacant and unusable brownfields require expensive cleanup. The great infrastructure systems that supported intensive urban uses are ill-maintained and prone to the ills of disinvestment (except when they benefit suburban commuters).

Geographer John R. Borchert describes the incredible extent of urban disinvestment occurring in the nation's cities:

By the end of the 1920s boom the country had [built enough housing] to replace all of the stock that had been built before 1830 . . . . By the 1970s Americans were in a position to abandon the equivalent of all housing built before 1880 [and] . . . . [B]y the turn of the next century we could be abandoning most housing built before the rise of the automobile epoch in the 1920s.<sup>29</sup>

In industrial areas, he says, "railroad-era structures lie as accumulations of architectural solid waste . . . . In this process, the nation is not simply replacing an inventory of buildings . . . , it is also replacing the major part of the fabric three generations have taken for granted as the bedrock geographic pattern of American settlement."<sup>30</sup> The wasted social and economic resources present in once-thriving industrial areas compromise the sustainability of entire metropolitan regions.

The forces responsible for metropolitan growth are powerful and longstanding. They reflect the collective wishes of many American households for privacy, good schools, safe neigh-

borhoods, and unimpeded mobility. Our systems of funding, regulating, designing, and building new living and working areas all support one another to satisfy these wishes. Nevertheless, increasing numbers of people are persuaded that our community development process is not functioning in sustainable ways. They believe that to meet the challenges of sustainable development, we need to modify development practices at all levels—regions, communities, neighborhoods, projects, and even single buildings.

### Perspectives on Sustainable Development

Achieving the lofty ideals of sustainable development in the everyday world of community and real estate development may seem fanciful and impractical. Yet, as Timothy Beatley and Krisy Manning point out, "Questions of ecological sustainability are fundamentally and inextricably tied to patterns of human settlement—to metropolitan regions, cities, towns, and villages."<sup>31</sup> The processes of urbanization and community building, they say, can support and help achieve long-term ecological sustainability rather than work against it. Urban places can indeed use land and its resources more wisely, expand the choices associated with housing, jobs, transportation, and other services that meet the needs of *all* the populace, and function economically in ways that generate needed incomes while restoring the integrity of the social and natural environment. Sustainable development means creating "livable, inspiring, enduring, and equitable places . . . where the quality of life and the long-term quality of human existence will be enhanced rather than depleted."<sup>32</sup>

This broad characterization of how sustainable development goals can be achieved still allows for many interpretations. The following prescriptions for community-oriented sustainability illustrate the wide variety of perspec-

tives that inform today's discussion on sustainability.

■ "Sustainability implies . . . a vastly reduced energy budget for cities and a smaller, more compact urban pattern interspersed with productive areas to collect energy, grow crops for food, fiber and energy, and recycle wastes . . . ."<sup>33</sup>

■ "Sustainable communities acknowledge environmental constraints—from limited groundwater and wetlands to global climate change . . . ."

■ Sustainable communities work to live within physical and biological limits."<sup>34</sup>

■ "A true 'sustainable community' or 'ecological city' is much more than a dense, efficient land-use pattern. It incorporates local food production and waste recycling. Its size is limited to its watershed and its capacity to recycle wastes without damage to the environment. Local economic value created stays largely in the community. Dollars are recycled locally."<sup>35</sup>

The range of concerns reflected in these perspectives indicates that cities, towns, and metropolitan regions should account for all three interlocking circles of sustainability—environment, economy, and society (see figure 2-1). In each of these realms, sustainable approaches can make a difference in community development.

**Sorting Out the Terminology.** Among the several prescriptions for "good" development, terms and concepts such as "smart growth," "new urbanism," traditional neighborhood development (TND), and "green" development have all entered today's development lexicon. All are subsumed under the heading of sustainable development.

Smart growth seeks to identify a common ground where developers, environ-

mentalists, public officials, citizens, and financiers can find ways to accommodate growth. The smart growth prescription encourages consensus on development decisions through inclusive and participatory processes and, in that sense, is a snappy euphemism for consensus-driven growth management. It promotes compact, mixed-use development that offers a high-quality living and working environment. It encourages choice in travel mode—walking, cycling, and transit—as well as the automobile—by coordinating transportation and land use. It offers a wide variety of housing opportunities and gives priority to maintaining and enhancing existing neighborhoods and business centers. Smart growth protects valued environmental features and resources and makes efficient use of existing infrastructure systems. It stresses regional cooperation and local decision making. Concerns for economic opportunity and social equity are beginning to emerge within the smart growth dialogue, taking it closer to the principles of sustainable development.

New urbanism espouses neighborhood and community design principles that were informally codified as the Ahwahnee Principles by a group of architects in 1991. The 23 principles call for planning “complete and integrated communities” that locate housing, jobs, daily needs, and other activities within easy walking distance of each other and, to the extent feasible, transit stops. New urbanism communities offer a diversity of housing types and jobs; provide a center that combines commercial, civic, cultural, and recreational uses; incorporate public and open spaces designed to encourage use “at all hours of the day and night”; feature well-defined edges and preserve natural terrain wherever possible within parks or greenbelts; provide a system of streets and pathways that fully connect all destinations; and conserve resources, including water and energy, and mini-

mize waste. The principles of the new urbanism urge a regional approach to planning that focuses on a transit rather than highway network, a continuous system of greenbelts and wildlife corridors, concentration of regional institutions and services in a central core, and use of construction materials and methods that reinforce a community identity compatible with a region's history, culture, and climate.<sup>36</sup>

Peter Calthorpe expanded on the Ahwahnee Principles in *The Next American Metropolis*,<sup>37</sup> which lays out systems of urban and neighborhood “transit-oriented developments” (TODs) that largely follow those principles (to which he contributed). Calthorpe's concerns for community design explicitly focus on alternatives to the automobile-oriented urban sprawl that is characteristic of many suburbs and metropolitan fringe areas. His designs emphasize streets as public spaces and walking environments and formal circulation patterns that lead pedestrians to central commercial areas, parks, and transit stops. Calthorpe, however, pays little attention to nonneighborhood forms of development such as downtown cores and densely built employment centers. Both the Ahwahnee Principles and Calthorpe's TODs, like the initial versions of smart growth, give short shrift to the broader goals of sustainable development, particularly those related to economic development and social equity.

Calthorpe's building blocks for his community designs are “traditional neighborhood developments” or the neotraditional neighborhoods espoused by architects such as Andres Duany and Elizabeth Plater-Zyberk. The neighborhoods' well-publicized features include gridiron street patterns, porches and back-alley garages, small lots, and pedestrian-oriented streetscapes, all supposedly harkening back to the small towns of yesteryear. As residential and

neighborhood designs, neotraditional neighborhoods promise more walkable, friendly communities, although most such communities developed to date are located in remote areas inaccessible by transit. Nonetheless, they offer one model for residential development that is more sustainable than the conventional subdivision.

In its concern for resource conservation and sensitivity to the financial and social aspects of real estate development, green development is much closer to sustainable development than the new urbanism and neotraditional neighborhood development. The Rocky Mountain Institute's *Green Development* cites three common elements found in many green development projects: environmental responsiveness, resource efficiency, and community and cultural sensitivity.<sup>38</sup> Green development, it says, “integrates social and environmental goals with financial considerations in projects of every scale and type.”<sup>39</sup>

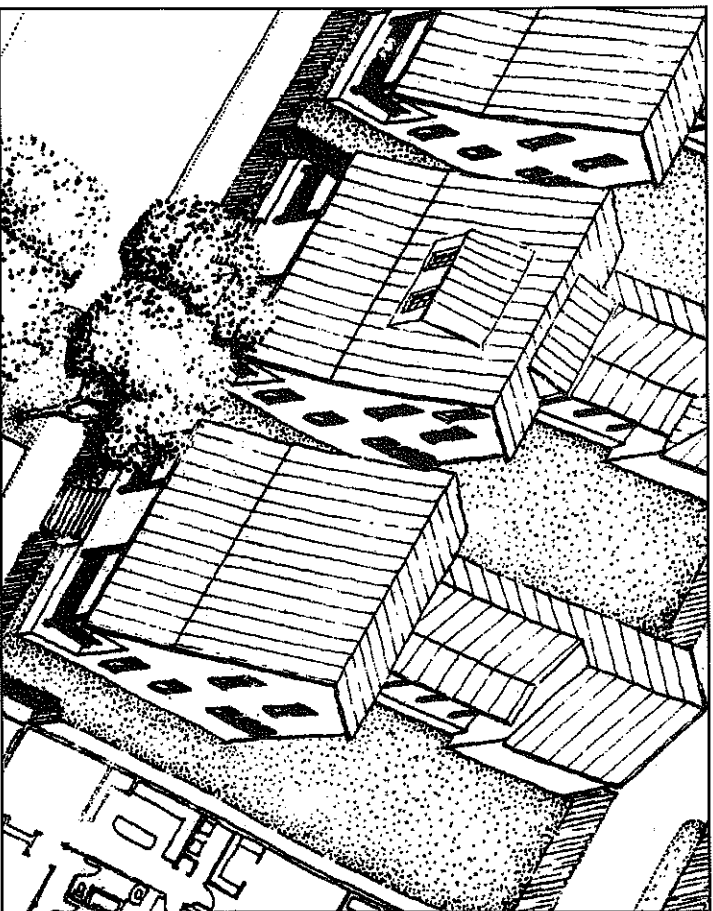
While the authors include some green aspects of community development and design—enhanced natural habitats and clustered building patterns, for example—they nonetheless focus largely on specific resource-conserving techniques for developing real estate projects and buildings.

**Beyond Buildings, Designs, and Land Use Patterns.** As the subsequent chapters of this book demonstrate, sustainable development is all the above development models and more. It is comprehensive and holistic in considering ways in which communities and real estate developments can respond to environmental, social, and economic needs. “Creating sustainable communities,” write Beatley and Manning:

is not simply a matter of avoiding a few wetlands, or saving a few acres of open space, or putting in place a few nonpoint best management practices.

## The New-Old Neighborhood Pattern

2-0



Houses close to the street on small lots, with garages in the rear and trees and sidewalks along the street.

Source: Armando Montero/Geoffrey Ferrell and Suzanne Askew, in *Building Plans and Urban Design Principles for Towns, Cities & Villages in South Florida*, Florida Department of Community Affairs and the Treasure Coast Regional Planning Council, 1999.

- Rather, it is a matter of considering ecological limits and environmental impacts at every aspect of community design, from the energy efficiency of buildings to the regional transportation system to how the industrial and commercial sectors go about business.<sup>40</sup>
  - make cost-effective use of existing and renewable resources such as infrastructure systems, underused sites, and historic neighborhoods and structures;
  - contribute to community identity, livability, social interaction, and sense of place;
  - widen access to jobs, affordable housing, transportation choices, and recreational facilities; and
  - expand diversity, synergism, and use of renewable resources in the operation and output of the local economy.
- For developers and builders, moving toward sustainable development means designing projects and buildings in ways that
- conserve energy and natural resources and protect air and water quality by minimizing the consumption of land, the use of other nonrenewable resources, and the production of waste, toxic emissions, and pollution;
- In a white paper prepared for the Urban Land Institute, George Brewster captured these ideas in one pithy state-

ment: Sustainable developments are designed to integrate natural systems, urban systems, site characteristics, buildings, energy use, economic considerations, and the human community into one permanent, mutually supportive, and economic whole.<sup>41</sup>

**Community Development and Environmental Sustainability.** In the century and a half since Marsh's and Mumford's observations, environmentalists championing the cause of sustainable development have emphasized the need to rescue and protect environmental resources from the adverse effects of humans' physical, economic, and social pursuits. Indeed, the concept of sustainability has been first and foremost a watchword among environmentalists concerned with forest management, fisheries, water resource management, air quality, biodiversity, and the like. Curiously, however, environmentalists paid little attention to environmental sustainability in cities or, more generally, to the sustainability of human systems. Rutherford Platt notes that Edwin O. Wilson's now-classic tome on biodiversity published in 1988 devoted only six of 496 pages to urban biodiversity.<sup>42</sup> *Agenda 21*, the principal product of the Environmental Summit held in Rio de Janeiro in June 1992, discussed urban issues in only one of 40 chapters and made no reference to urban ecological concerns.<sup>43</sup> Even after the Brundtland Commission broadened the concept of sustainability to embrace economic and social components, environmentalists have generally continued to view the urban realm as essentially a destructive mechanism that overwhelms natural assets and consumes resources such as food, water, and building materials drawn from outside sources. Perhaps most notably, Vice President Al Gore's recent book *Earth in the Balance*, Rutherford Platt observes, "omits any direct discussion of cities and their habitability."<sup>44</sup>

Even when they recognize the significance of sustainability in human communities, particularly urban communities, environmentalists typically focus on the conservation of natural resources.

For most environmentalists, communities are sustainable to the extent that they recognize and protect irreplaceable natural assets or, by extension, capitalize on those assets to improve the quality of life for their residents. In chapter 3, Rutherford Platt explains the significance of retaining natural systems as an integral part of the community: hills and ridgelines, rivers and ponds, floodplains and wetlands, species habitats and wildlife corridors, forests and farmlands.

To recognize natural systems in community development, environmentalists invoke approaches such as Ian McHarg's analysis of natural processes in metropolitan areas and the related concept of carrying capacity. McHarg's groundbreaking publication *Design with Nature*, published in 1969, laid out a procedure for identifying and preserving sensitive environmental features:

Within the metropolitan region natural features will vary, but it is possible to select certain of these that exist throughout and determine the degree to which they allow or discourage contemplated land uses. While these terms are relative, optimally development should occur on valuable or perilous natural process land only when superior values are created or compensation can be awarded.<sup>45</sup>

The carrying capacity concept builds on McHarg's system and permits an assessment of the levels of development that can be sustained by the capacity of natural systems—soils, geology, water features, and so forth. For example, guided by the notion of carrying capacity, local planning departments can identify areas such as stream valleys, steep slopes, and

## Ian McHarg's Summary of Physiographic and Ecological Factors Affecting Development in the District of Columbia

2-7



This "physiographic expression" of significant landscape features identifies the rivers, the flats (central white space), and the backdrop of hills and summits that guided L'Enfant's layout of the Mall, placement of major government structures, and design of Washington's system of avenues and streets.

Source: Ian L. McHarg, *Design with Nature*, 25th Anniversary Edition (New York: John Wiley & Sons, 1992).

wildlife habitats that should not be developed, areas that may be developed with special care to avoid adverse impacts on natural features, and areas best suited for development.

Many developers incorporate natural resource preservation measures into their projects as a matter of course, prompted in part by local, state, and federal regulations intended to prevent degradation of natural systems and in part by the growing public consciousness of the values of environmental features. Large-scale community builders, in particular, have made giant strides over the past half-century in identifying and protecting natural systems such as erodible hillsides, stream valleys, wetlands, and wildlife habitats and corridors, weaving these features into land

plans in ways that generate amenities for community residents. To limit the effects of erosion, stormwater runoff, and other aspects of development on natural systems, land planners and project designers routinely take account of a site's natural assets in working out development patterns and infrastructure systems. ULI's *Residential Development Handbook* advises designers to "erect a landscape that not only is functional and attractive but also gives the site its character or sense of place. Successful landscape planning and design require an understanding of a site's natural characteristics and the natural processes at work in the local environment."<sup>46</sup>

Taking the next step toward sustainable practices, however, will require even greater efforts to understand

and protect natural systems, that is, to integrate natural and human ecosystems. Ori L. Loucks suggests that as environmentalists focus on sustainability in cities:

it is no longer useful merely to inventory the ecological resources and processes of the urban environment, or list and summarize what has been ecologically reengineered in the urban system. What we need now is to understand and consider the consequences over long periods of modifications being made in urban ecosystems and urban landscape processes.

[We need to focus] attention on regenerative capacities of renewable urban elements such as forests, wetlands, streams, and gardens, and their linkage to urban-rural systems. We need to consider how the physical resources of the urban environment interact over long periods with human society and its institutions and commerce.<sup>47</sup>

Platt's discussion in chapter 3 and Porter's in chapter 6 describe techniques and processes for integrating natural and human ecosystems.

The carrying capacity concept lies at the heart of the great debate over the sustainability of environmental resources in the face of continuing development. On one hand, environmentalists and allied interests assert that the earth's environment has a finite capacity to support the growth of human settlements—the central theme of sustainable development. In fact, local antidevelopment interests frequently seize on the carrying capacity concept and claim that, despite technological advances that can expand capacity or even reduce demands on capacity, natural resources are sacrosanct.<sup>48</sup> As well, population control groups empha-

size the limits of the earth's carrying capacity and call for a halt to population growth. Citing classical economists such as John Stuart Mill and Malthus—the latter claimed in 1798 that populations inevitably outrun their food supply—population control groups view growing populations as inimical to preserving essential environmental qualities (as well as responsible for aggravating territorial disputes and creating violent conflict). They regard growth management as a temporary panacea and methods for dealing with environmental effects of development as cosmic solutions.<sup>49</sup>

On the other side of the debate are economists and others who assert that the adverse effects of development on the environment are either overstated or capable of redress through technological innovations. A case in point is the conversion of farmland by urban or suburban development. While the American Farmland Trust and other groups decry farmland conversion as a threat to the future supply of food,<sup>50</sup> some economists argue that, historically, technological advances have increased crop yields, making restrictions on farmland conversion unnecessary. Professor Tom Daniels, although a supporter of farmland preservation, notes that "the cornucopians, in the tradition of Julian Simon [a well-known critic of the farmland preservation movement], believe there is no shortage of farmland, that the land market is capable of efficiently allocating land resources among competing uses, and that technological advances will continue to generate more food even as human populations increase."<sup>51</sup> Such doubters of farmland "shortages" cite U.S. Department of Agriculture (USDA) statistics indicating that the amount of cropland nationwide is not declining; indeed, cropland acreage in 1992 was the same as in 1945.<sup>52</sup> The figures suggest that croplands are being replaced (apparently from grasslands and forests) as rapidly

as they are converted to urban and suburban uses. In addition, farmland prices dropped slightly rather than rising during the 1945–1992 period, attesting to available supply rather than scarcity.<sup>53</sup> Daniels finds that "alarmist claims of impending threats to food supplies appear unwarranted. Food is relatively cheap and abundant. Chronic overproduction and low commodity prices are the main farm problems, even while federal farm programs are idling over 30 million acres."<sup>54</sup>

When measured against sustainability principles, however, the various arguments on both sides of the farmland loss issue are not fully persuasive. For growing metropolitan areas that can boast of prime farmlands at their exurban fringe, the replacement of that acreage with less fertile lands located elsewhere is not necessarily a sustainable practice, particularly when the land is made productive through irrigation, massive applications of nutrients, and other technological "fixes."

In an article entitled "Economics and 'Sustainability,'" Michael Tolman explores the question of whether resource use can be offset by compensatory investments that flow to future generations.<sup>55</sup> He observes that the answer depends on assumptions regarding the substitutability between services provided by natural capital (such as material resources, waste absorption, and aesthetic and cultural values) versus other forms of capital (such as physical plant, equipment, knowledge, and social institutions). Many economists, he says, view all resources as relatively interchangeable sources of well-being, especially if technological progress is sufficient to offset the depletion or degradation of natural resources. Damage to ecosystems such as loss of species diversity is not intrinsically unacceptable if compensatory investments in other forms of capital (such as human knowledge,

production techniques, or social organization) are feasible and intended as compensation.

On the other hand, Tolman explains, many ecologists and some economists argue that compensatory investments "often are infeasible as well as ethically indefensible."<sup>56</sup> Resource substitutability is limited by physical laws (such as minimum energy requirements for transforming matter), by the environmental capacity to process wastes, and by the need for the resilience of natural systems against unexpected changes (such as in biodiversity). Technology can do only so much to overcome or substitute for natural forces, as demonstrated by our experience with floods, hurricanes, and other natural disasters. The chair of a National Science Foundation study of natural hazard prevention points out, "One central problem is that many of the accepted methods for coping with hazards have been based on the fantasy that people can use technology to control nature. We will never be totally safe because the world is the way it is."<sup>57</sup> William Rees, the doyen of sustainability, states that the operation of technical advances and market mechanisms may take too long to permit recovery of overused ecological resources. They do not repair pollution damage from waste materials or even recognize some critical resources such as the ozone layer.<sup>58</sup>

Tolman observes that physical scale—local versus global—is important in making judgments about substitutability between natural and capital resources. He comments:

Sustainability ultimately is intimately wrapped up with human values and institutions, not just ecological functions. An entirely ecological definition of sustainability is inadequate; guidance for social decision making also is required.<sup>59</sup>

Tolman's statement, which reflects the uncertainties inherent in both the scientific method and currently available data, is indicative of the continuing argument over the realities of sustainable development. A return to the farmland issue illustrates the point. *Land Use in America*, the 1996 report of the Sustainable Use of Land Project, cites a set of numbers obtained from the U.S. Soil Conservation Service (SCS) that points to a trend in direct opposition to that disclosed by the aforementioned USDA statistics. The SCS figures show a loss of almost 39 million acres in cropland from 1982 to 1992 as well as a 16 million-acre decline in range and pasture lands.<sup>60</sup> With so much uncertainty about *existing* conditions, how can long-range projections be credible? Mixed in the brew, of course, are tendencies for ideological stances that complicate our understanding and color the public debate.

Tolman advises a middle course that considers tradeoffs among natural and capital resources when potential consequences are small and reversible and a more cautious course when potential consequences become larger and more irreversible.

### **Economic and Social Dimensions of Sustainability.**

Internationally, most concerns about economic and social sustainability have focused on developing countries whose burgeoning populations frequently are poorly served by dysfunctional economies and unstable social and political institutions. The Brundtland Commission's pronouncements on sustainable development recognized that protection of environmental resources in developing nations depends on upgrading social and economic conditions. Nevertheless, although better off in relative terms, plenty of communities in the United States have documented the need for economic and social uplift. As a nation,

we are still struggling to equalize opportunities for economic and social advancement and for sharing in the nation's wealth. Recognizing this, many communities have pursued economic development and social welfare programs to improve the well-being of their citizens. Public and private programs have attempted to attract new jobs and broaden and stabilize bases of economic activity. Federal, state, and local governments have established programs that support citizens with special needs and expand opportunities for economic and social improvement, including job training, income assistance, child and senior care, special education, and affordable housing programs.

Increasingly, developers have played significant roles in these efforts. They have joined with public agencies to develop public/private projects that help foster downtown and neighborhood revitalization. One notable example is the Can Company in Baltimore. With substantial financial and other incentives from city and state agencies, developer Struever Bros. Eccles & Rouse renovated an abandoned industrial complex, providing retail and service activities in support of a reviving waterfront neighborhood. In other projects around the country, developers have provided on-site amenities and extended off-site connections to surrounding neighborhoods to benefit area residents; amenities include parks and playgrounds, child care centers, and job training programs. As a condition of project approval, some cities require developers to contribute to affordable housing programs, transit improvements, public open space, and other facilities and amenities.

The tripartite concept of sustainability—interlocking economic, social, and environmental goals—encourages developer involvement that goes beyond the construction of physical improvements and the provision of social services. To be

*sustainable*, activities intended to bolster economies and societies require linkages to the protection, restoration, and enhancement of natural resources and environmental attributes. The sustainability concept challenges community economies to function in a way that reduces the consumption of land, energy, ground- and surface water, and other resources; that recycles wastes; and that incorporates farming to produce food, fiber, and energy. At one extreme, some advocates of economic sustainability argue for a return to a sustenance-based local economy. To keep dollars recycling within the community, they lean toward producing food from home and community gardens (rather than importing it over great distances), supporting the growth of local businesses, and even engaging in home-based piece work and crafts instead of mass production.<sup>61</sup> Many communities are promoting local agriculture by reviving moribund farmers' markets and providing public spaces for community gardening.<sup>62</sup> And many are underwriting the establishment of business incubators to stimulate formation of local trades, crafts, and technology.

In these times, however, community economic activities are already interconnected with and even subsumed under regional, national, and global economic systems. Food production is now international in scope and unlikely to return to pre-20th century practices. And although home-based telecommuting is gaining popularity, it is hardly likely to replace corporate workplaces as employment centers. Nevertheless, sustainability calls for local as well as larger-scale initiatives to curb resource consumption and waste.

One means of achieving the goal of sustainability is for communities and developers to invest in the nurture and maintenance of existing business areas and firms, not instead of but in addi-

tion to developing outlying shopping centers and luxurious new office parks lured by lavish tax and subsidy packages. Adding value to existing business areas through economic development makes sense for new and old businesses alike. In Carroll, Iowa, for example, Wal-Mart agreed to locate its new store downtown and to pay half the cost of constructing a new parking lot to serve its store and others, thus strengthening downtown businesses.<sup>63</sup>

The lesson is that developers who want to promote sustainable development can look for opportunities in established areas rather than focusing exclusively on greenfield sites. For example, as developer Charles Shaw was constructing housing in Prairie Crossing, an innovative suburban residential project north of Chicago (described below), he was also engaged in developing Homan Square, about 600 affordable homes, and Orchard Park Townhomes, a 54-unit mixed-income development, both located near Chicago's downtown business district. In addition, developers can and usually do seek out local suppliers of materials and services, thereby helping to keep dollars recycling within the community.

Another approach focuses on cutting back on the use of natural resources through the careful selection of development sites and thoughtful specification of building features and construction processes (see chapter 7). Energy consumption, for example, can be reduced by relying to some extent on solar energy and energy regeneration processes, by specifying designs that cut demand for artificial lighting, heating, and cooling, and by designing development patterns that promote more walking, cycling, and use of transit. All of these energy-reducing techniques illustrate ways that developers can limit resource consumption. In addition, recycling materials helps reduce waste. Each year, for example, a nonprofit

company in Baltimore collects building materials from landfills and then redistributes over \$1 million of building supplies.<sup>64</sup> Several communities, some in partnership with developers, are creating industrial parks that bring together companies that can collaborate in curbing consumption of raw materials and energy by exchanging and recycling waste products. Although facing formidable legal and managerial obstacles, waste disposal is a lost opportunity whose benefits are only now beginning to seep into boardroom thinking.<sup>65</sup>

Still another means of connecting economic activity with environmental conservation is recognizing that natural resources are a salable asset. Communities interested in "greening the city" by protecting and restoring important ecological features such as streams and wooded areas can highlight the features' contributions to community livability by making natural assets visible and accessible—and increase property values in the process. Developers long ago came to understand the marketing benefits of retaining significant natural features, providing attractive landscapes, and incorporating greenways and parks into project designs. Communities that embrace nature gain value.

It must be said, however, that the association between local economic functions and the concept of sustainable development has not been fully explored. The gap between sustainability goals and day-to-day economic activities remains wide, and specific steps toward closing that gap, short of a complete reordering of current economic forces, are difficult to define. In chapter 4, Christopher Leinberger sheds some light on new ways of thinking about real estate and public capital financing that can help realize the goals of sustainable development.

So, too, with the social side of sustainable development, particularly on a

national scale. The general goal of equal opportunity and equitable sharing in the nation's wealth appears elusive in light of the many past and present attempts to move in that direction. Add the factor of avoiding further degradation of natural systems while attaining that goal and the target seems to recede even further.

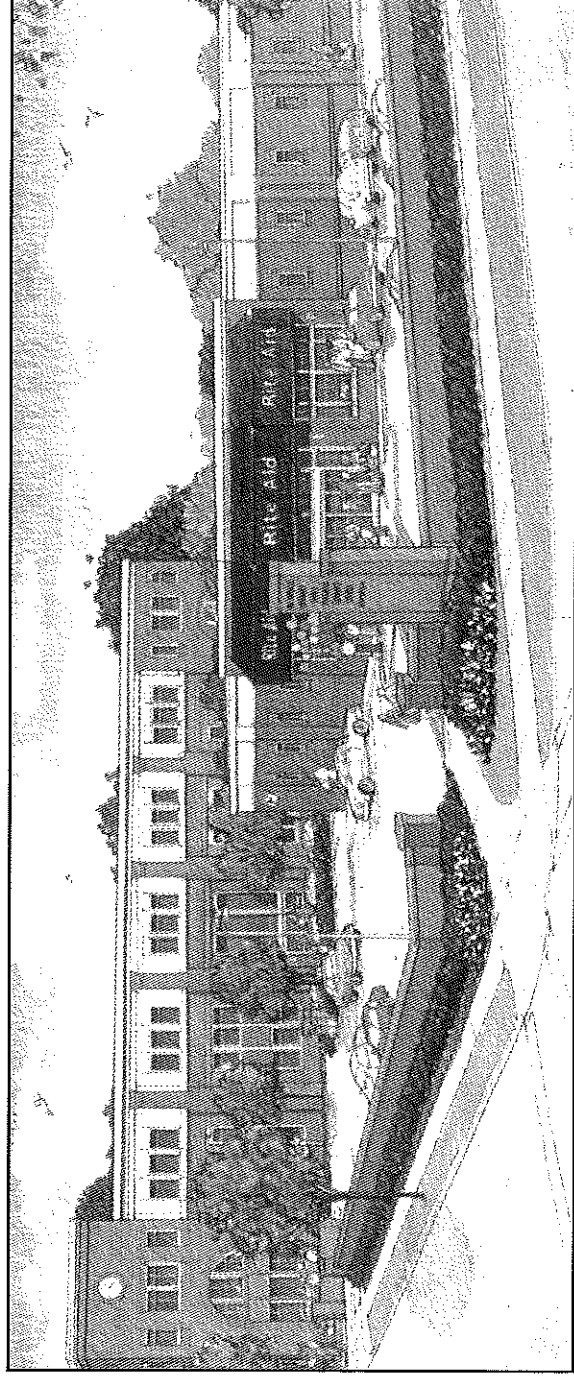
At the scale of the community and local real estate development, however, the aims of social sustainability seem more achievable. With community support, there are ways for developers to make more efficient, humane, and equitable use of human resources while creating livable and stimulating environments that contribute to sustainability. Strategies range from reducing or mitigating the undesirable consequences of public and private development on the residents of affected areas, to expanding opportunities for employment, affordable housing, and inexpensive travel, to providing enjoyable and safe neighborhoods. In chapter 5, Edward Blakely emphasizes the scale of the problem in setting forth ten "rules for the new game" for socially conscious development.

**NIMBYism** plays a large part in most developers' lives but is seldom an impediment when the people affected by proposed developments are poor and relatively powerless. Such is the case with "gentrification," the term that came into use in the 1980s to describe the supposedly desirable makeover of once-slummy neighborhoods into attractive residential areas. Infill and restoration efforts are welcomed as an economic stimulus for aging cities and suburbs; they upgrade existing structures and promise to diminish pressures for outward expansion of urban areas—significant aims of sustainability. And developers and builders make substantial profits on such makeovers, unless they find themselves caught in an economic downturn or stymied by a recalcitrant permitting bureaucracy. Frequently, as well, they rescue from destruction historically or architecturally significant buildings and areas.

But gentrification frequently masks a win/lose scenario in which relatively well-off people displace existing residents unable to afford the newly reno-

vated housing. Displaced people must search for homes in a market already constrained by a limited supply of low-rent units often located in less desirable neighborhoods. At the same time, in almost every metropolitan area, community and neighborhood housing organizations, sometimes with private developer participation, struggle to rehabilitate homes for low- and moderate-income households. Though assisted by public loan and grant programs and nonprofit groups of all kinds, these organizations never come close to meeting demands for affordable, decent housing, especially amid rampant gentrification.

To be sure, developers can contribute to economic and environmental sustainability by restoring existing buildings, but they also can fulfill the social aims of sustainability by supporting or participating in programs that build or rehabilitate affordable housing and stabilize neighborhoods. Struever Bros. Eccles & Rouse, for example, moved on from the Can Company office/retail development in Baltimore (described in chapter 6) to developing The Terraces, a HUD-backed HOPE VI project (a U.S. Department of



**The Terraces, Baltimore.** On a site formerly occupied by deteriorating public housing, Struever Bros. Eccles & Rouse, Inc., developed 391 housing units and this neighborhood retail-office center in collaboration with city and community agencies.



Housing and Urban Development housing subsidy program). Working with the city's housing authority and community groups, the developers built a new mixed-income community of 203 rental townhomes, 100 for-sale townhomes, an 88-unit seniors' building, a business center, and a community recreation and day-care center on land formerly occupied by ramshackle public housing towers.

In what often proves to be a time-consuming effort, such programs require close collaboration with neighborhood and tenant groups, nonprofit corporations, and public agencies. In fact, developers frequently find themselves responding to demands for upgrading social institutions such as schools, churches, community centers, and even neighborhood retail shops, thus providing the social infrastructure needed for a stable living environment. In addition, residents may need assistance in dealing with or fending off undesirable uses—waste transfer stations, abandoned brownfield sites, unsuitable industries—that often plague low-income neighborhoods. Revitalization efforts may not generate a huge profit or much at all, but they can single out developers as contributors to the civic good, perhaps an asset in securing approval for the next for-profit project.

Another aspect of social sustainability is income-generating employment that involves both physical and educational access to jobs. Employers locating in areas remote from sources of labor seldom give adequate consideration to either employee costs of commuting to work or the economic costs to a business of an inadequate labor supply. Communities can tackle the job/location imbalance by planning and regulating the distribution of employment centers served by public transit corridors. Developers, of course, cannot and should not be expected to counsel their tenants about socially correct locational choices but, as employers themselves,

they can participate in job training programs and equalize any transportation benefits awarded to employees.

To win regulatory approval for many projects, developers have grown accustomed to currying the support of or at least softening outright opposition from neighborhood residents. Typically, developers hold meetings to describe a project's benefits to a community and area and to report on measures for offsetting any potential impacts. They produce flyers and other literature to explain their proposal and, at the same time, allow for neighborhood input into design changes. To further the social aims of sustainable development, developers can expand community participation by involving project neighbors in key design and development decisions and optimizing project benefits for surrounding areas. Although a risky process—neighbors often do not speak with one voice—a skillfully planned citizen involvement program can result in a development that is carefully woven into the physical and social fabric of the surrounding community, a plus for both project and neighborhood value. For example, the designers of the Village Green residential infill development (profiled in chapter 7) designed homes similar in scale and appearance to those in the adjoining neighborhood.

Developers can derive satisfaction from developing projects that fit compatibly into their surroundings and contribute to positive social interaction and a sense of place—mixed-use centers that provide convenient and attractive places for working, shopping, living, and recreation; residential and business projects that are designed to be compatible with and connected to surrounding development; housing that serves a range of household types and income levels; designs that recognize local cultural symbols and values; and public amenities that provide benefits such as child care, civic spaces, streetscapes, facilities,

and art for public enjoyment. Chapter 5 describes some of the ways sustainable projects can help achieve communities' social objectives.

### Practical Considerations

Although the aims and techniques of sustainable development make sense in concept, their application to the practice of community and real estate development remains problematic in several respects. First, the all-encompassing nature of the concept itself tends to foster confusion and stasis concerning needs and responsibilities. Most people find it difficult to grasp the significance of the interrelationships of the vast global forces at work, much less perceive how individual actions affect those forces. When we turn to science for assistance in understanding science-related forces, we encounter disagreements among experts as to the reality, causes, or consequences of, for example, global warming or decreasing biodiversity.

Even at the regional or community level, most of us balk at making the connection between starting the car in the morning or lighting a wood fire at night and the declining quality of air across a metropolitan area. We refuse to believe that the septic tank on our two-acre lot may threaten groundwater quality in years to come. And although large-scale or long-term effects may concern us, we are wary of acknowledging that our individual, incremental actions contribute to undesirable environmental effects.

Through experience, moreover, we understand the intractability of the many social and economic forces that buffer our communities and neighborhoods—the difficulties inherent in maintaining or restoring decent school systems, livable neighborhoods, thriving business centers, and crime-free parks and streets. In other words, the long-term, large-scale nature of sustainability itself poses obstacles to

## Development-Related Priorities for Consumer Actions Recommended by the Union of Concerned Scientists

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1. Choose a place to live that reduces the need to drive.
2. Think twice before purchasing another car.
3. Choose a fuel-efficient, low-polluting car.
4. Set concrete goals for reducing your travel.
5. Whenever practical, walk, bicycle, or take public transportation.
6. Choose your home carefully.
7. Reduce the environmental costs of heating and hot water.
8. Install efficient lighting and appliances.

Source: Michael Brower and Warren Leon, *The Consumer's Guide to Effective Environmental Choices*. Published for the Union of Concerned Scientists (New York: Three Rivers Press, 1999).

taking short-term, small-scale actions toward its fulfillment.

A second hurdle is the inertia built into the present development process. We have constructed transactional systems of finance, construction, public regulation, and consumer expectations that generate conventional projects satisfying many of our wants. Developers and builders have gained considerable experience in delivering products that appeal to the marketplace while consumers have developed a set of expectations and values that are expressed as marketplace demands. Bankers and carpenters and appraisers know their jobs and understand their roles in the current process of community building. Lenders cringe at the prospect of financing anything out of the ordinary; they base construction loans on appraisals by appraisers who reduce comparable developments to a price per square foot regardless of real value. Building officials adopt progressively more stringent and inflexible standards that increase resource consumption. Contractors base construction bids on known or least-risk materials and techniques.

Altering or redirecting these complex economic and social structures and interrelationships is an enormous task. It requires changes in the way we recognize and measure costs and benefits of development and its associated effects.

It also means overcoming the sometimes higher initial costs of innovative technologies and unfamiliar procedures and bridging gaps between the long- and short-term beneficiaries of the development process. For example, despite decades of technical development of solar energy systems, developers and builders know that the increased cost of installing residential solar energy systems requires several years for payback in the form of lower heating and cooling expenses. They also know that consumers resist higher front-end costs and discount the value of long-term reductions in operating costs, especially for what many perceive as untried or unproven technologies.

Technological advances, capital cost accounting methods, consumer education, oil price levels and trends, tax incentives and disincentives, and other concerns affect decisions on sustainable products and practices. Even passive solar design, for which initial cost margins are relatively minor, generally goes ignored as a marketable feature. As a result, developers create site plans without regard to the potential solar orientation of buildings, public planners approve such plans according to conventional layout requirements, and builders acquire finished lots that may or may not optimize opportunities for solar design. Frequently, developers' and builders' lack of familiarity with solar

energy technology and energy-efficient home design either forecloses consideration of energy-saving options or heightens the perception of associated risk.

Another example concerns septic tanks. Almost automatically a symbol of sprawl, septic tanks are widely used for low-density development where the extension of sewer service is deemed too expensive. In fact, the United States now counts 22 million septic systems that introduce over 1 trillion gallons of effluent annually into subsurface aquifers. The nitrogen, phosphorous, bacteria, viruses, detergents, solvents, and other chemicals in the effluent can contaminate groundwater and affect water quality in nearby lakes, rivers, and ponds. Even though standards for drain field percolation and size have grown more rigorous in many areas, the effectiveness of underground filtering on effluent quality is seldom monitored or controlled—short of a backup in the house—while impacts on aquifers are difficult to trace. Often, however, alternatives to individual septic systems run into massive opposition. Although much more conducive to effective management than individual systems, so-called package plants that treat sewage from development in small areas have earned nothing but scorn from many health departments and local public works departments. Moreover, public officials rarely acknowledge much less evaluate alternative approaches such as constructed wetlands and solar aquatic systems that purify pollutants through physical, biological, and chemical processes.

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achieving significant energy savings and presumably improving occupant comfort. As new tenants signed leases, however, they uniformly rejected the controls in favor of conventional systems that are off limits to employees.

As the various examples demonstrate, putting sustainable principles into practice may seem like swimming upstream. Nevertheless, process and product barriers are being whittled away, and lenders and public officials and consumers are growing more sensitive to the long-term rather than just short-term benefits of sustainable practices. Furthermore, as spelled out in chapters 6 and 7, developers can enhance their bottom line by approaching project and building development through whole-systems thinking, understanding the ways sustainable practices can be mutually supportive.

More efficient office lighting, for example, reduces heating and cooling loads and thus reduces the requirements for heating, ventilating, and cooling systems and lowers construction and operating costs. The ripple effect at the community level is a reduction in electric power generation and its impact on air and water quality. Compared with standard lighting, a single compact fluorescent light bulb in a New York City office building can, over its life, keep three-quarters of a ton of carbon dioxide out of the earth's atmosphere.<sup>66</sup>

*What about research?*  
Experience has shown that developers

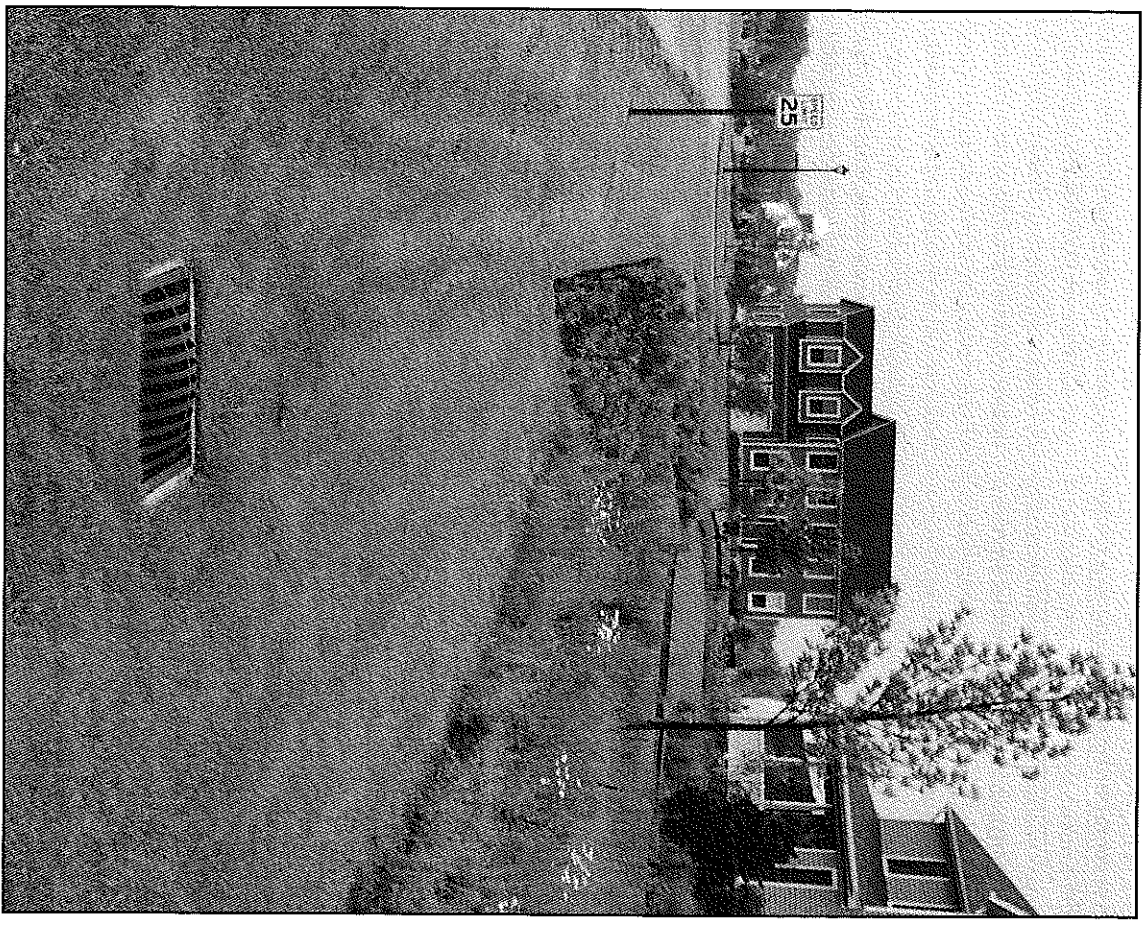
can produce profitable developments by following principles of sustainability. Designers of Prairie Crossing, a 667-acre residential development north of Chicago, mitigated the project's environmental impacts by planning narrower streets and minimizing the area devoted to sidewalks, thus reducing stormwater runoff and allowing the use of vegetated swales and detention basins—rather than conventional storm sewers—for stormwater filtration. The infrastructure cost savings helped finance landscaping and

other project amenities.<sup>67</sup> The development demonstrates that integrated planning and design can yield multiple benefits from individual changes.

The public/private team developing the Civano community in Tucson, Arizona, has quantified many of the financial benefits associated with Civano's sustainable features. The development incorporates passive solar design, high-efficiency windows and HVAC (heating, ventilating, and air conditioning) equipment, options for walking, cycling, and alternative-

fuel vehicles, use of harvested and reclaimed water for irrigation, enhanced recycling and composting of waste, and the creation of nearby jobs and telecommuting opportunities. The community is designed with higher densities and narrower streets than conventional development, saving open space and reducing travel demands. Some of the financial benefits include the following:

- \$500,000 in annual savings for city services (for water, landfills, and road construction and maintenance);



Stormwater drainage swales in Prairie Crossing, Graylake, Illinois.

## Financial benefits

- \$250,000 in annual community health benefits from improved air quality;
- \$37 per month in savings to households from lower utility costs, which permits a \$5,000 increase in a mortgage loan;
- \$6,000 lower home cost (for a 100-square-foot reduction in home size) that offsets costs of generous amenities not usually available in conventional development; and

- a projected 23 percent internal rate of return to the city on its initial \$3 million cash investment, repaid within six years.

To these savings should be added environmental benefits from reductions in land and water use, air pollution, and energy consumption.

Less quantifiable but highly marketable benefits derive from Civano's sense of

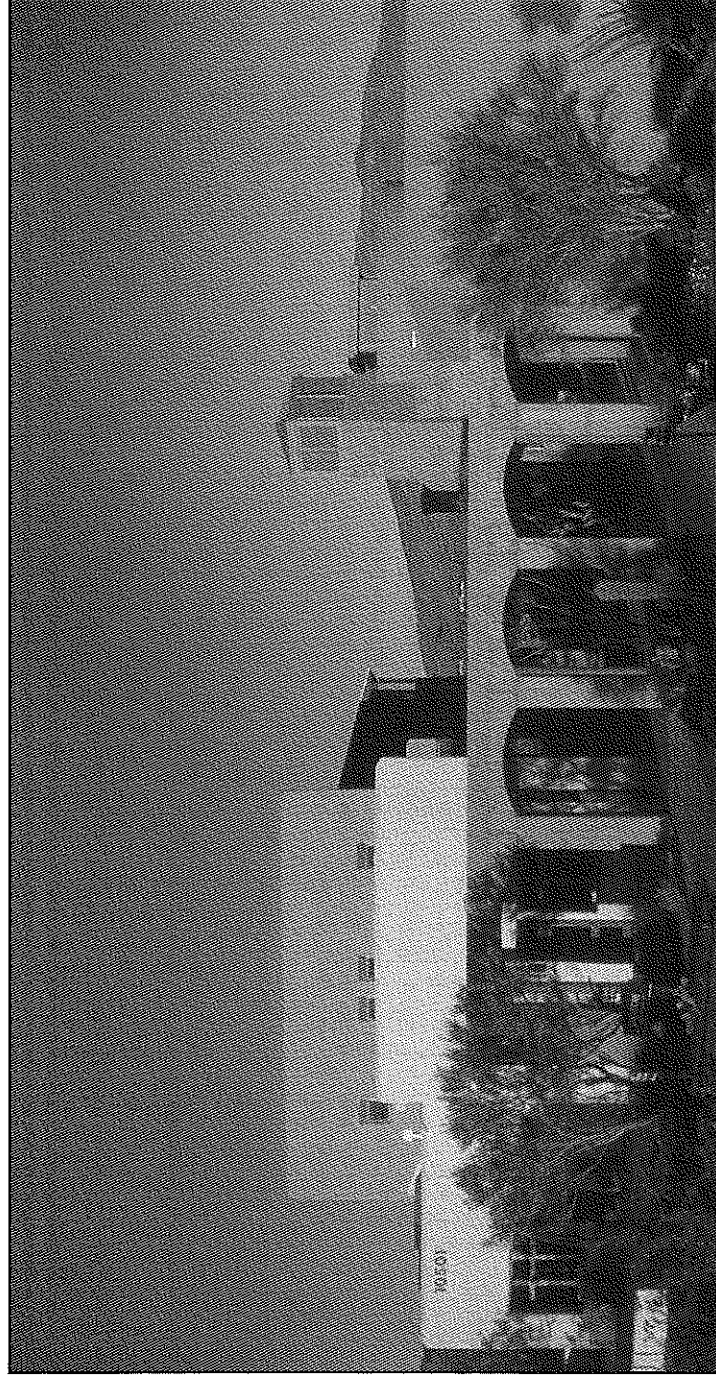
community. Surveys of the first homebuyers indicate that they value the community's quality of place and neighborliness as much as its respect for the environment. Buyers appear much less price-sensitive than is typical for production housing in Tucson, as evidenced by the number of upgrades purchased. The community stability implied by homeowner responses should also reduce demand for police and social services. In Civano, the city, developer, and residents all come out ahead.<sup>68</sup>

## **Achieving Sustainability**

One product of the Earth Summit in Rio de Janeiro in 1992 was the *Agenda 21* action plan for pursuing worldwide sustainable development through global, national, and local government actions. Subsequently, a group of researchers published a report on progress toward sustainability. The book established a set of criteria for measuring achievements in applying sustainability ideals to everyday activi-

ties. Although addressed mostly to public officials, the criteria suggest how developers can respond to those ideals when considering where, how, and what to develop. The criteria urge:

1. A more conscious attempt to relate environmental effects to underlying economic and political *pressures* (which in turn derive from political decisions, non-decisions, and markets.)
2. A more active effort to relate local issues, decisions, and dispositions to *global impacts*, both environmentally and with respect to global solidarity and justice.
3. A more focused policy for achieving *cross-sector integration* of environment-and-development concerns, values and goals in planning, decision-making and policy implementation.
4. Greater efforts to increase *community involvement*, i.e., to bring both average



**Neighborhood center in Civano, Tucson, Arizona.** The center incorporates passive solar design and active solar systems, recycled materials, and other environmentally friendly features. Photo by Haskell Photography, Tucson, Arizona.

citizens and major stakeholder groups, particularly business and labor unions, into the planning and implementation process with respect to environment-and-development issues.

5. A commitment to define and work with local problems within: (a) a broader ecological and regional framework, as well as (b) a greatly expanded time frame (i.e., over three or more generations).<sup>69</sup>

The operative notion in each statement describes movement toward an objective, not an absolute or immediate outcome. Developers who specialize in major, long-term, multiphase developments, in which they have a long-term stake in maintaining value, are probably already putting into practice many elements of sustainability. Other developers embarking on smaller projects, however, can adopt designs and techniques that embody sustainability principles.

The vision of sustainable development reflected in this book aims at creating and nurturing sustainable communities through sustainable development practices that make sense economically, socially, and environmentally. The next six chapters describe the types of approaches and techniques that developers can adapt and apply to their developments.

As an overview of the remainder of the book, the following points summarize practices appropriate for entire communities, individual developments, and buildings.

At the *community* level, as further discussed in chapters 3, 4, and 5, it makes sense to

- use land wisely and reduce the risks of adversely affecting natural resources by taking a conservative approach when converting land to urban uses, maintaining the integrity of natural

systems in urban settings, and protecting and restoring valued natural resources, features, and qualities;

- maintain, recycle, and build on existing urban structures and systems by leveraging previous investments to optimize locational efficiencies, enhancing and restoring place-making historic and architectural qualities, and integrating new with existing development;

- expand the range of and increase access to economic and social opportunities by recognizing the increasing diversity of needs, stimulating interaction within the community, and connecting to existing communities and neighborhoods; and

- integrate development with transportation and other infrastructure systems by expanding travel options and access to them, recognizing the need for expanding public facility capacities as development occurs, and focusing on public facility investments that promote compact forms of development.

At the *project* level, as further discussed in chapter 6, it makes sense to

- take advantage of a site's natural systems and assets by preserving and restoring natural systems as an essential component of development, maintaining and restoring natural systems to reduce runoff and pollution, maintaining and restoring native vegetation and landforms, and maintaining and restoring landscapes to enhance associated development;

- design infrastructure systems to optimize efficient use by reusing or connecting to existing systems when feasible, minimizing impermeable surfaces and site disturbance, and planning for walking,

cycling, and transit as well as for cars;

- recycle urban land through infill and redevelopment; and

- plan for diverse and adaptable neighborhoods and business centers by providing a mix of uses and a broad range of housing choices, allowing for individual expression and change, promoting the evolution of a unique character or sense of place, and providing beneficial economic and social connections and interaction.

For *individual buildings*, as described in chapter 7, it makes sense to

- minimize the impact of buildings on their sites by limiting the building "footprint," retaining trees and natural landforms, and minimizing paving and use of permeable materials; and

- design buildings for resource efficiency by recycling materials and using local materials whenever possible, adapting and reusing existing buildings, maximizing opportunities for using solar energy, using water-conserving fixtures, appliances, and landscaping, and minimizing or recycling waste during construction.

In *conceiving and designing development*, as discussed in chapter 8, it makes sense to

- select sites that balance use of land and other nonrenewable resources with expanding social and economic opportunities;

- connect new developments and on-site systems to surrounding developments and sites;

- tailor site and building designs to add value to surrounding uses;

■ design and use natural and built systems in a holistic manner that considers interactions and tradeoffs; and

■ plan in coordination with communitywide and neighborhood expectations and values.

*The Practice of Sustainable Development* describes how these concepts and

approaches to sustainable development can be feasibly applied in the here-and-now, how they can make bottom-line sense for developers and builders, and, at the same time, how they can make a significant contribution to community and global sustainability.

Like Ebenezer Scrooge, we have seen the ghost of things to come. However, we

have the opportunity to change the present before it becomes the immutable past. There is a better way to build that recognizes stewardship of the land and its resources. As stated in the Urban Land Institute's Code of Ethics, development efforts "will be judged by the integrity and permanence of my developments, which will survive my lifetime . . ."

## Endnotes

- 1 World Commission on Environment and Development, *Our Common Future* (Oxford, UK: Oxford University Press, 1987), p. 43.
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- 7 Paul Erlich, *The Population Bomb* (New York: Ballantine Books, 1968).
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- 13 Christopher B. Leinberger, "The Changing Location of Development & Investment Opportunities," *Black's Guide* (1996), p. 22.
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- 16 Reported by William K. Stevens, "Sprawl Quickens Its Attack on Forests," *New York Times*, December 7, 1999, p. D6.
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- 18 Sierra Club, *The Dark Side of the American Dream: The Costs and Consequences of Suburban Sprawl* (San Francisco: Sierra Club, 1998).

<sup>19</sup> Ibid.

<sup>20</sup> *Southeastern Mass: Vision 2020 An Agenda for the Future*. Report of the Southeastern Massachusetts Vision 2020 Project (Taunton, MA: Southeastern Regional Planning and Economic Development District, 1999), p. 2.

<sup>21</sup> Preliminary conclusions from a current (Spring 2000) Brookings Institution study of housing development and land consumption in metropolitan areas suggest that although urban densities have dropped significantly across the nation, trends vary among the areas. In some metropolitan areas, average densities have either remained fairly constant or actually increased, while in others, densities are declining, particularly in outer counties. It is also possible that counties just beyond the census-defined metropolitan area are experiencing very low-density growth that would color average densities if included in overall development trends.

<sup>22</sup> See Florida Department of Environmental Protection, *You . . . Your Automobile . . . and Your Environment* (Tallahassee: Florida DER, 1996), p. 12.

<sup>23</sup> Robert I. Dunphy, *Moving Beyond Gridlock* (Washington, DC: Urban Land Institute, 1997), p. 4.

<sup>24</sup> Ibid.

<sup>25</sup> Florida Department of Environmental Protection, p. 12.

<sup>26</sup> U.S. Department of Transportation, *1995 Status of the Nation's Surface Transportation System: Conditions and Performance* (Washington, DC: US DOT, 1995), p. 149.

<sup>27</sup> John Brennan and Edward W. Hill, "Where Are the Jobs? Cities, Suburbs, and the Competition for Employment," *The Brookings Institution Center on Urban & Metropolitan Policy Survey Series*, November 1999, p. 8.

<sup>28</sup> Anthony Downs, "The Challenge of Our Declining Big Cities," *Housing Policy Debate*, Vol. 8, Issue 2, 1997, p. 383.

<sup>29</sup> John R. Borchert, "Futures of American Cities," *Our Changing Cities*. John Fraser Hart, ed. (Baltimore: Johns Hopkins University Press, 1991), p. 233.

<sup>30</sup> Ibid., p. 295.

<sup>31</sup> Timothy Beatley and Kristy Manning, *The Ecology of Place* (Washington, DC: Island Press, 1997), p. 2.

<sup>32</sup> Ibid.

<sup>33</sup> Sym Van der Ryn and Peter Calthorpe, *Sustainable Communities* (San Francisco: Sierra Club Books, 1986), p. ix.