PART FIVE

Designing a More Humane Metropolis
This book closes with a survey of issues and techniques for designing a more “humane metropolis” drawing on a variety of disciplines. In so doing, the discussion cycles back to Holly Whyte through reference to some of his practical contributions to the practice of urban design. The opening essay by Andrew G. Wiley-Schwartz of Project for Public Spaces, Inc. (a design consulting office that Whyte helped to found) recalls Whyte’s “smile index” as a rough measure of a sense of well-being in shared urban spaces. (One can surmise that the “smile index” on today’s freeways during rush hour falls below the chart!) Wiley-Schwartz goes on to identify three “threads” in Whyte’s work: (1) sociability in urban space, (2) individuality afforded by cities, and (3) land conservation.

Next, Jerold S. Kayden, a professor of planning law at the Harvard Graduate School of Design, summarizes his study of “privately owned public spaces” in New York conducted on behalf of the city and the Municipal Art Society. His site-by-site survey of the design and management of more than public spaces procured through zoning incentives is reminiscent of Whyte’s earlier work in both method and subject matter.

“Green urbanist” Mary V. Rickel Pelletier (a graduate of Kayden’s school) explores some of Whyte’s design principles as applied to site and building design, particularly the need to protect access to sunlight and daylight. She identifies various criteria for contemporary green building (“LEED-certified”) that were anticipated in Whyte’s writings.

Green architect Colin M. Cathcart draws on some of his own designs, both realized and hypothetical, to expand upon Rickel Pelletier’s summary of green building criteria. As a resident of lower Manhattan with an office in Brooklyn Heights, Cathcart outdoes Whyte as a Big Apple–devotee by claiming—in common with a recent article in the New Yorker (Owen 2004)—that Manhattan is “greener” than the exurbs in terms of energy and time efficiency.

Finally, Timothy Beatley concludes the book, as he did the 2002 Humane Metropolis Symposium, with a review of the remarkable popularity and diversity of approaches to “green urbanism” found in most European cities today. Beatley argues that Europe offers an abundance of models for the United States. With the world just crossing the 50 percent urban threshold, these precedents need to spread quickly to the fast-growing megacities of Africa, Asia, and Latin America.

Reference
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If there is a single symbol that sums up the work of William H. Whyte Jr., then it could be of the green bistro chairs scattered over the lawn of midtown Manhattan’s Bryant Park. Whyte loved to watch people in a public park or plaza walk up to a movable chair, turn it an inch or two, and then sit down. The moves, he said, were important, not only allowing a person to express himself or herself in what is usually a proscribed environment, but also sending subtle social messages to those nearby. The message the chairs sent to the prospective sitter was even more important: this chair is here for you; do what you like with it. Like those movable chairs writ large, Whyte’s ideas about people and cities respect the individual, focusing on how people relate to their surroundings and are able to express their individualism in it.

Bryant Park is Whyte’s most enduring physical legacy. Known for decades as “Needle Park” owing to its pervasive drug trade, few New Yorkers entered it casually. Its main flaw was in its design: as a refuge from the city. To reinforce its separateness from the urban environment, the park sat several feet above street level, fenced off, and surrounded by high shrubbery. “The basic design. . . rested on a fallacy,” said Whyte in City: Rediscovering the Center (1988, 160); “People say they want to get away from the city, avoid the hustle and bustle of people, and the like. But they do not. They stayed away from Bryant Park.”

Whyte’s prescription for Bryant Park, brought sharply into focus by the meticulous observational methods he developed using time-lapse film, interviews, and mapping in the park (conducted by Project for Public Spaces, a nonprofit group he helped launch), was simple: remove the walls and fences, let the people in and let them see in, give them something to do there—eat, watch movies, listen to music. Keep it clean. Let people decide where they want to sit. Renovations based on Whyte’s recommendations have transformed that dangerous space into the grand, grass piazza that is Bryant Park today. Hundreds gather on summer weeknights to watch outdoor movies, and thousands use it every day. It is now New York’s village green, its best small gathering place. The increase in property values that has resulted from Bryant Park’s revitalization has been quantified at more than $20 million, but the intangible effect on the quality of life for New Yorkers is priceless.

It was Whyte’s life’s work to champion city life and demonstrate how we have continually acted to subvert it with poor planning and design. Whyte liked cities all through the 1940s, 1950s, and 1960s, decades during which cities experienced a
dramatic loss of population and when many architects and planners were busy tearing down and redesigning their best attributes. Whyte’s writings were a strong perspective shift for many readers. He saw city life as the sum of millions of marvelous interactions, each of which he sought to encourage. Businessmen returning from lunch linger at the top of a subway staircase, blocking traffic, deep in conversation. Lovers kiss, not in the shadows as one might expect, but in the most obvious place possible: right on the street corner. Lunchtime office workers defy convention, peel off their socks, and dip their feet into the pools at Seagram Plaza.

Ironically, it was at Seagram, that monument to internationalist style, where Whyte found his most successful plaza and the city found a reason to give incentives for plazas to other builders. Yet what Mies van der Rohe and Phillip Johnson had achieved by accident, other architects could not achieve even though they tried. Armed with the information and data he had collected observing the square day after day, Whyte concluded coldly, “It is difficult to design a place that will not attract people. What is remarkable is how often it’s been accomplished.”

Unlike the many critics who cast themselves as prophets but provide no solutions, Whyte searched for and gave answers. For more than sixteen years, as part of an ongoing investigation known as the “Street Life Project,” he meticulously watched New York’s public places, searching for the real reasons people gathered where they did. In one well-known study, the city asked him to study the bonus plazas of Sixth Avenue for signs of life. Finding few, Whyte offered deceptively simple prescriptive elements for their redesign. “This might not strike you as an intellectual bombshell,” he liked to say, “but people like to sit where there are places for them to sit” (1980, 28). That was particularly true, he added, if they can watch other people from that vantage point. He saw that people love to sit near, touch, and play in water and that the heights of benches and walls frequently deterred people rather than accommodating them. To prove it, Whyte could rattle off ideal sidewalk widths, stair depths, street densities, and bench heights, and he could give specific, successful examples of each. In 1971, the city asked him to edit the planning code, using what he had begun to learn about urban behavior as a guide.

Whyte’s scientific observations were coupled with a love for people and how they live and interact. He marveled at how people walk down a crowded street without bumping into one another. “The pace is set by New York’s pedestrians and it is fast, now averaging about three hundred feet per minute. They are skillful, too, using hand and eye signals, feints and sidesteps to clear the track ahead. They are natural jay walkers, streaking across on the diagonal while tourists wait docilely on the corner for the light. It is the tourists, moreover, who are vexing, with their ambiguous moves and their maddeningly slow gait. They put New Yorkers off their game,” he wrote in The Social Life of Small Urban Spaces (1980).

To Whyte, the vital city center was essential to a healthy civilization. It was as an editor of Fortune magazine in the 1950s that Whyte first called attention to the
dangers the interstate highway system presented to city centers, the flight of young professionals from previously tight-knit ethnic neighborhoods, and the attempts to build the “city of the future” on the bulldozed remains of the vibrant city of the past.

Reading through Whyte’s entire oeuvre reveals several threads winding through his work that indicate why he believed a vital urban core was so important. These thoughts are the underpinnings of his 1956 *The Organization Man* and the final conclusions of his 1988 *City: Rediscovering the Center*. The first thread is that the final revelation of Whyte’s work observing and documenting what people did in cities convinced him that we are, despite everything we say, social beings who gravitate toward one another, when given half the chance. Or, as Whyte put it (1980, 19), “What attracts people most, it would appear, is other people.” Seemingly obvious conclusions like this pepper Whyte’s work, but so much of what we build continues to rest on the principle of isolation and separateness. When one considers that beliefs related to the deleterious effects of “crowding” and high densities (such as the commonly held negative correlation between population density and incidences of crime or disease) were used as justification for leveling whole neighborhoods, Whyte comes into focus as a crusader.

One little-known 1977 essay comparing street life in New York and Tokyo demonstrates his sharply reasoned but completely accessible style: “In the U.S., the conventional image of the high density core city is of a bad place, and bad not simply for its defects but for its essential qualities. . . . The image, unhappily, affects the reality it misrepresents; it is widely believed in Washington, not only by rural moralists, but by progressives who would save the city from itself. With few exceptions federal aid programs for cities have been laden with anti-density criteria which make it difficult for center city projects to qualify.” To emphasize this point, Whyte toys with the idea of developing a “smile index” to prove that people are having a good time downtown:

It is no frivolous matter, then, to note that many people on the streets of New York can be observed smiling, even laughing, and on the most crowded streets and at times, like the rush hours, when there might not seem much to be smiling about. New Yorkers themselves fervently deplore the city, its horrendous traffic jams, the noise and litter, the crowding. It is their favorite form of self-praise. Only the heroic, they imply, could cope. But they are often right in the middle of it all, and by choice; stopping to have a street corner chat, meeting people, arguing, making deals, watching the girls go by, eating, looking at the oddballs and the freaks.

Here, in this litany of center city attributes, is the second reason Whyte loved the city: because the very anonymity that it bestows on its inhabitants also encourages them to be individuals. To the writer who raged against conformity in *The Organization Man* and ridiculed corporate personality tests that filtered out potential employees with any personality to speak of, “freaks and oddballs” are what make
city life interesting, especially in the form of street performers and vendors, whose cause Whyte routinely championed.

The third thread reveals itself in Whyte’s prescient writings on land conservation. It is that Whyte, although he never says this explicitly, saw the built environment as a kind of ecosystem. His constant repetition that people do, in fact, want to be around other people, although they say differently, was a plea for rational development that protected open spaces near cities and towns. If city centers could remain vital places, then people would remain anxious to live in them, releasing the pressures on our open spaces that sprawl continually attacks.

As early as the 1950s Whyte wrote on land use preservation and open space protection, describing and debating the merits of cluster development, conservation easements, urban sprawl (it is possible he introduced these terms to the public), and other still current issues. Then, the dangers that the interstate highway system presented to city centers and the flight of white middle-class families were new, shocking concepts, and current beliefs and legislation on protecting open spaces and controlling sprawl are just catching up to them.

Ironically, Whyte’s pleas for people-friendly environments were heard best by commercial developers with little or no interest in keeping urban neighborhoods or small towns intact. At any mall, one can see evidence of his prescriptions succeeding wildly. Unfortunately, malls are controlled, soulless environments, and they are in the suburbs, negatively charging the natural magnetism of the city center. Although Whyte had many offers to help guide the developments of malls and other private commercial places, he always turned them down.

Whyte understood that architecture and design were important, but he placed the people who had to live in the places they designed at the forefront of his analysis. These considerations, however, are still ignored by many architects and planners who are more concerned with the “statements” their buildings and public spaces make than the people who must live and work around them. “Architects and planners like a blank slate,” Whyte wrote in *The Social Life of Small Urban Spaces* (1980). “They usually do their best work, however, when they don’t have one. When they have to work with impossible lot lines and bits and pieces of space, beloved old eyesores, irrational street layouts, and other such constraints, they frequently produce the best of their new designs—and the most neighborly.”

With the rise of new urbanism and center city projects such as James Rouse’s festival marketplaces in Boston and Baltimore, one might suppose that Whyte’s ideas are now widely held. Yet we must look closely at these new downtown spaces to see if they are performing to their full potential. Most, it must be admitted, still fail the test. The new ballparks are expensive and are only in use for brief periods of time. Boston’s Quincy Market attracts tourists, but residents still shop at the Haymarket. So it is no stretch to see that the Organization Man would be happy in Celebration, Florida, which is essentially a company town peopled with Disney
employees. We know that there is something “wrong” with places like Seaside, Florida, a town planned around New Urbanist principles, but it is hard to put a finger on exactly what that thing is. If he were here today, William H. Whyte could do it for us. Instead, we must vigorously apply his litmus test of everyday, diverse use to all these new suburban and urban developments; otherwise, we will wind up with temporary places, places without the essential friendliness and easy qualities that allow us to endow them with our memories by encouraging and facilitating chance meetings, important milestones, weekday lunches, and weekend festivals. It is the accumulation of all these types of events that are, to paraphrase Jane Jacobs, the small change upon which our cultural wealth is built.

References


In 1961, the City of New York inaugurated a new concept of “privately owned public space” to be created by developers in exchange for zoning concessions. Through a legal innovation known as “incentive zoning,” the city granted floor area and height bonuses and other zoning concessions to office and residential developers who would agree to provide public spaces in the forms of plazas, arcades, atria, or other forms of indoor or outdoor space on their premises. Ownership of the space would remain with the developer and subsequent owners of the property, and access and use would be open to the general public, hence the term “privately owned public space.” Cities across the country followed New York City’s lead, encouraging their own contributions to this distinct category of urban space; see Lassar 1982, 17–18 (for Hartford, Seattle); Svirsky 1970, 139–58 (for San Francisco); and Getzels and Jaffe 1988.

How has this legally promoted marriage of private ownership and public use fared? This essay discusses the results of a three-and-a-half-year empirical study conducted by this author in collaboration with the New York City Department of City Planning and the Municipal Art Society of New York. The findings are fully reported in Privately Owned Public Space: The New York City Experience (Kayden 2000).

Most broadly, the study found that zoning incentives have had a considerable effect on the design of the city’s ground plane, particularly by encouraging interposition of public spaces adjacent to or inside new buildings at the developer’s expense. More specifically, the study found that although New York City’s law yielded an impressive quantity of public space—503 spaces at 320 office, residential, and institutional buildings—it failed to deliver a similarly impressive quality of public space in terms of both initial design and subsequent operation. At their best, the spaces have combined aesthetics and functionality, creating superior physical and social environments, set intelligently within their surroundings. Members of the public use the best spaces for social, cultural, and recreational experiences. At their worst, the spaces have been hostile to public use. Many are nothing more than hapless grass strips or expanses of barren pavement, while others are privatized by locked gates, usurpation by adjacent private uses, and diminution of required amenities, in violation of applicable legal requirements.
This essay first explains the legal framework responsible for creating privately owned public spaces in New York City. It next describes the principal findings of the empirical study. Finally, it proposes changes to the responsible legal and institutional regime likely to promote improvements in the quality of privately owned public spaces in New York City and elsewhere.

**Legal Framework**

Privately owned public space is a legal oxymoron. “Privately owned” refers to the legal status of the land, the building, or both where the public space is located. The nature of the space’s “publicness” is legally determined by the city’s zoning and related implementing legal actions. The zoning law establishes the framework within which developers and designers exercise their creative abilities. Specified design standards have incorporated diverse visions of public space held by urban planners and designers, civic organizations, and public officials as well as by developers, owners, and members of the public. The applicable law is amazingly detailed on some aspects and remarkably terse on others. The design standards have changed over time, reflecting an evolution in thinking about what makes public space succeed or fail and how demanding and precise legal standards need to be to secure good outcomes.

Since 1961, the Zoning Resolution has defined twelve discrete legal types of privately owned public space, including *plazas, arcades, urban plazas, residential plazas, sidewalk widenings, open-air concourses, covered pedestrian spaces, through-block arcades, through-block connections, through-block gallerias, elevated plazas, and sunken plazas.* In addition, the zoning has enumerated spaces that are geographically tailored to specific needs within special-purpose zoning districts. Regulatory flexibility allows “customized” public spaces not otherwise described in the Zoning Resolution to be accepted as a condition of development approval.

Although the level of detail and clarity vary greatly, the zoning provisions governing each public space type have specified (1) design standards, (2) the legal approval process, (3) the responsibilities of owners, and (4) the rights of members of the public to use the space. Sometimes the provisions have established mechanisms of enforcement to encourage owner compliance with the law. A three-tier set of legal actions under which spaces may be approved comprise (1) discretionary special permits and authorizations, (2) ministerial “as-of-right” approvals, and (3) an intermediate option called “certification.” The applicable level of review depends on the cost and magnitude of the proposed project. To grasp fully the “law” for a given space, it is necessary to scrutinize the relevant Zoning Resolution provisions as well as the conditions of approval for specific sites.

To obtain more than five hundred privately owned public spaces, the city principally has relied on a voluntary approach known as incentive zoning. This approach
offers a private developer the right to construct a building larger or different from what is otherwise permitted by the zoning; in return, the developer provides a privately owned public space. The social rationale for this exchange is that the public is better off in a physical environment replete with public spaces and bigger buildings than in one with fewer public spaces and smaller buildings. Essential to this approach are the assumptions that the zoning code is rigorously enforced and that variances of height and floor area are not otherwise obtainable.

Redolent of Nollan v. California Coastal Commission and Dolan v. City of Tigard, the legal rationale is that public space is “density mitigating” in that it counteracts the negative effects, such as street and sidewalk congestion and loss of light and air, potentially caused by larger buildings. For the developer, the rationale is pure real estate economics: when the value of the incentive equals or exceeds the cost of providing the public space, the transaction becomes financially attractive.

The Zoning Resolution announces the nature and extent of the incentive for each type of public space. The primary incentive has been the floor area bonus, usually measured in relation to one square foot of provided public space. For example, a developer may receive a floor area bonus of ten square feet for every square foot of plaza, so a five-thousand-square-foot plaza would generate an extra fifty-thousand square feet of buildable zoning floor area. Although the bonus multiplier for the different types of public space ranges from three to fourteen bonus square feet for every square foot of public space, proposed developments have always been subject to a bonus cap limiting the total bonus floor area earned from all provided public space to a percentage, usually 20 percent, of the base maximum zoning floor area. In zoning terminology, the bonus is an increased “floor area ratio” compared with what the zoning law would otherwise allow. For developments on large lots, the Zoning Resolution has also authorized the use of non-floor-area incentives, such as waivers of applicable regulations affecting the height and setback of a building or how much of the lot the tower portion covers, to encourage the provision of public space.

The metrics of incentives are conceptually straightforward. To attract developers, incentives must convey a financial benefit exceeding the cost incurred in providing the privately owned public space. Zoning incentives benefit developers either by increasing income or reducing overall building cost. For example, a floor area bonus increases a building’s cash flow or value through rental or sale of the extra space. Frequently, the ability to develop extra space allows the building to be taller, and the higher-story floors may be rented or sold at premium rates. Height, setback, and tower coverage rule waivers may allow a building design that is more in keeping with the tastes of the market or may decrease construction costs.

In return for the incentive, the developer agrees to allocate a portion of the lot or building for public use, to construct and maintain the space, and thereafter to allow
access use of the space by the public (figure 1). In effect, the developer “pays” for its bonus floor area or non-floor-area incentive by agreeing to these obligations. Although the space continues, by definition, to be “privately owned,” the owner has legally yielded certain rights, notably the right to exclude the public from the designated space. The space is thus effectively subject to an irrevocable easement of public access.

**Quantitative Results**

In return for more than sixteen million square feet of bonus floor area,⁹ the city obtained 503 privately owned public spaces at 320 commercial, residential, and institutional buildings. Categorized by the twelve legal typologies enumerated in the Zoning Resolution, the public space inventory includes 167 plazas, 88 arcades, 57 residential plazas, 32 urban plazas, 15 covered pedestrian spaces, 12 sidewalk widenings, 9 through-block arcades, 8 through-block connections, 3 through-block gallerias, 1 elevated plaza, 1 open-air concourse and 110 other spaces located in special zoning districts or uniquely defined by other legal means.¹⁰ Not surprisingly, the production of public space corresponded with cycles of real estate development that flourished from 1968 to 1974 and from 1982 to 1989. The total area of
privately owned public spaces was 3,584,034 square feet, or slightly more than eighty-two acres. To put this number in perspective, New York City’s privately owned public spaces would cover almost 10 percent of Central Park, or thirty average Manhattan blocks.11

The geographic distribution of spaces established under the New York City density bonus incentive is overwhelming skewed to Manhattan and particularly its highest value real estate districts. Of the 320 buildings with such public space, 316 are situated in Manhattan, three in Brooklyn, one in Queens, and none in the Bronx or Staten Island. Within Manhattan, most public spaces are clustered in four areas: the financial district, midtown, and the Upper East and West Sides. This pattern of spatial concentration is simply due to the influence of the real estate market. By definition, the bonus yields public spaces only where developers want to construct buildings larger than allowed by the existing zoning. In general, high-rise, high-density districts with strong demand for additional floor area will be the loci for zoning-generated public spaces, whereas low-rise neighborhoods lacking such demand will not.

Geographical clustering within high-density areas makes public policy sense. Privately owned public spaces work best in crowded commercial and residential districts. In older, lower-density neighborhoods, where private yards are more plentiful, the kinds of spaces under consideration may offer less benefit. Furthermore, residents of such neighborhoods may oppose the very scale of development necessary to generate public space under incentive zoning. The lack of a geographically equitable distribution of usable public space throughout all city neighborhoods, poor as well as a rich, however, indicates the need for conventional public open space programs where the incentive zoning strategy does not apply.

Qualitative Results

Although the quantity of privately owned public space produced under the program has been impressive, the qualitative record is disappointing. The study classified the 503 privately owned public spaces by five use categories: destination, neighborhood, hiatus, circulation, and marginal spaces.12 Based on a site-by-site survey, the study found that more than four out of ten spaces were marginal, that is, they did not serve any public use.

Destination space was defined as high-quality public space that attracts employees, residents, and visitors from outside as well as from the immediate neighborhood.13 Users socialize, eat, shop, view art, enjoy outdoor music, read, or just relax. The design appeals to a broad audience. Spaces are well-proportioned, lighted, climate-controlled if indoors, aesthetically interesting, and constructed with quality materials. Amenities may include a combination of food service, artwork, regu-
lar programs, restrooms, retail frontage, and water features as well as seating, tables, trees, and other plantings (figure 2). The space is well maintained and public use is generally steady.

Neighborhood space is high-quality public space that draws residents and employees on a regular basis from the immediate neighborhood, including the host building and its environs within walking distance. Neighborhood space is used for such activities as socializing, child care, reading, and relaxation. Neighborhood spaces are generally smaller than destination spaces, are strongly linked with the adjacent street and host building, are oriented toward sunlight, and are carefully maintained. Amenities typically include seating, tables, drinking fountains, water features, planting, and trees, but not food service or live entertainment.

Hiatus space is public space that accommodates passersby for a brief stop, but never attracts neighborhood or destination space use. Usually next to the public sidewalk and small in size, such spaces are characterized by design attributes geared to their modest function and include such basic amenities as seating.

Circulation space is public space that materially improves the pedestrian’s experience of moving through the city. Its principal purpose is to enable pedestrians to walk more pleasantly and quickly from one point to another. Indoor circulation

Figure 2  Mother and baby in SONY Atrium, New York City. (Photo by R. H. Platt.)
spaces provide weather protection and removal from traffic noise. Circulation space may be uncovered or covered, and sometimes fully enclosed. It is often one link in a multiblock chain of spaces. Size, location, and proportion all support its principal mission. It usually lacks seating and other amenities that invite lingering.

*Marginal space* is public space that lacks satisfactory levels of design, amenities, or aesthetic appeal, and thus deters public use for any purpose. Such spaces usually have one or more of the following characteristics: barren expanses or strips of concrete or terrazzo, elevations above or below the public sidewalk, inhospitable microclimates characterized by shade or wind, no functional amenities, spiked railings to deter sitting, dead or dying landscaping, poor maintenance, and no measurable public use.

The study classified the 503 spaces as follows:

- 15 destination spaces (3 percent of the total)
- 66 neighborhood spaces (13 percent)
- 104 hiatus spaces (21 percent)
- 91 circulation spaces (18 percent)
- 207 marginal spaces (41 percent).

Classifying each of the 503 spaces relied on visual observation and user interviews. Each space was visited more than once at different times of day and night and time of year. A subset of spaces was studied more intensively with additional visits and more rigorous documentation.

Visual observations for each space were documented in text and graphic formats, including written notes, tape recordings, photographs, hand-drawn site plans, and analytical sketches. Observations first focused on how many people were present, what they were doing, where they congregated, which amenities they used, how they entered and left the space, and their demographic characteristics. Next, salient aspects of design and operation were noted, with particular reference to how they supported or discouraged use. Design elements such as size, shape, orientation, location, materials, and amenities were noted in relation to which uses such elements would support. Operational elements involved how the space was maintained, how it was managed vis à vis responsiveness to the public’s right to use the space, and whether the space was in apparent compliance with applicable requirements.

User interviews were conducted at every space that had users. Users were asked whether they knew that it was a privately owned public space, why they were there, how often they came, where they had come from, what they were planning to do, and so forth. Users were also invited to make general comments about the space, including what they liked and disliked about it and how it compared with other public spaces.
Calibrating the Law to Improve Design

The record of outdoor privately owned public spaces (plazas, urban plazas, and residential plazas) convincingly demonstrates the power of law to fashion good and bad outcomes, and to be adjusted over time to reflect evaluation of results. The study revealed a chronological fault line in the quality of space created before and after the mid-1970s, when the city significantly amended the original 1961 zoning incentive resolution. To this day, most of the plazas of the 1960s and early 1970s are unusable, unaesthetic, or ill-situated. Of the 167 plazas, 105 (63 percent) are marginal spaces, 37 (22 percent) are hiatus spaces, and none is a neighborhood or destination space. The 1961 Zoning Resolution bears primary responsibility for this result. Although its original goals were to promote access to light and air and public use,17 the adopted plaza definition favored the former and ignored the latter. The minimal legal standard required only that the space be open and accessible to the public, along with modest design standards. Office and residential developers were allowed to install paving around the base of their buildings, call it a plaza, and collect the 10:1 or 6:1 floor area bonus as a matter of right. The record of these plazas unequivocally demonstrates how they could concurrently satisfy the “letter of the law” yet fall dramatically short of creating usable public places.18

Marginal plazas suffer from some or all of a variety of defects. They are environmentally and aesthetically hostile to public use and are typically described as barren, desolate, depressing, and sterile places.19 They are vacant strips or larger expanses, shaped and located indifferently, surfaced in inexpensive materials such as concrete or terrazzo.20 Slight elevation changes above or below the adjacent sidewalk often remove them from the life of the street.21 Their microclimates are unappealing, with surfaces frequently untouched by sunlight and sometimes subject to wind tunnels created by unfortunate juxtapositions of vertical and horizontal planes.22

Marginal plazas lack such basic functional amenities as seating, let alone tables, drinking fountains, food service, and programs. Of the 320 commercial and residential buildings with public spaces, the study found that 43 percent have public spaces without any required amenities whatsoever, mostly “as-of-right” plazas and arcades. Ledges that could serve as sittable surfaces often are aggressively detailed with metal spikes and railings or, if unadorned, are too narrow or awkwardly sloped for comfortable sitting.23 The plazas also lack such aesthetic amenities as landscaping, ornamental water elements, and artwork, which enrich the urban experience. Trees and shrubs are usually scraggly, displayed in unappealing concrete, plastic, or wood planters.24

Plazas in front of residential buildings often double as passenger drop-off driveways, entrances to an underground garage, or loading docks. Of the forty “as-of-right” plazas at residential buildings on the Upper East Side, for example, nineteen...
have driveways. For many years such “private” uses did not invalidate the qualification of that portion of the plaza for a zoning bonus. Plazas are not identified by plaques, signs, or other graphic materials as public spaces, so members of the public cannot know they are entitled to use the space in the unlikely case that they would want to do so.

Many plazas are “a-contextual,” randomly situated without due regard for adjacent sidewalks and streets, buildings, and other public spaces. The 1961 Zoning Resolution permitted this result, authorizing the placement of “as-of-right” plazas throughout most commercial and residential high-density districts. Although the goal of light and air in a dense urban setting is laudable, it is not automatically appropriate in every case. The Seagram Building with its celebrated plaza, one of the models for the 1961 Zoning Resolution, operates splendidly on its Park Avenue site between East Fifty-second Street and East Fifty-third Street in part because it is visually enclosed by other buildings. If adjoining sites did not provide a sense of counterpoint and enclosure, then the appeal of Seagram’s “tower in a park” would be severely diminished.

That is precisely what happened several blocks to the west, where three towers—1211 Sixth Avenue, 1221 Sixth Avenue, and 1251 Sixth Avenue—all developed as part of the Rockefeller Center complex and designed by the architectural firm Harrison & Abramovitz, planted three plazas in a row on the west side of Sixth Avenue between West Forty-seventh Street and West Fiftieth Street. Ranging in size from 20,000 to 30,000 square feet, these massive spaces provide much light and air, but their juxtaposition also demonstrated that “contiguous plazas which totally obliterate the street wall” and banish retail from the public sidewalk may harm urban vitality.

Zoning amendments in 1975 and 1977 prescribed detailed new design requirements for plazas affecting location, orientation, shape, proportion, elevation, functional and aesthetic amenities, and public identification. The quality of urban and residential plazas accordingly improved dramatically. Developers began to provide spaces that looked more like urban rooms than leftover strips or superfluous expanses. The study found that required seating, planting, trees, lighting, and plaques are located at roughly half of all buildings with public space, principally within the post-1975 urban and residential plazas. Drinking fountains and bicycle parking are found at roughly one of every five buildings. Decorative water features are found in about one-fifth of the sites. Thoughtful design by professionals specializing in public spaces enhances the aesthetic, as well as functional, experience. Sculptures and iconlike structures are commonly installed. Paving and building wall coverings are decorative and varied. Direct sunlight is enhanced through careful site design. New spaces do not create undesirable gaps in the enclosing street wall. As would be expected, post-1975 outdoor spaces are more heav-
ily used than pre-1975 spaces. Of the eighty-nine postamendment urban and residential plazas, the study classified thirty-five as neighborhood spaces, thirty-nine as hiatus spaces, and only six as marginal spaces. This contrasts sharply with 63 percent of pre-1975 plazas deemed to be marginal.

The eighty-eight “as-of-right” arcades have a similarly disappointing record; the study classified sixty-three (72 percent) of them as marginal. The partially or fully covered pedestrian spaces generally fared better. Of the fifteen covered pedestrian spaces, six were classified as destination spaces, three as neighborhood spaces, and none as marginal space. Of the twenty through-block arcades, connections, and gallerias, fourteen were listed as circulation spaces, two as destination spaces, and none as marginal space.

The better quality of these spaces was the result of detailed, case-by-case review by the City Planning Commission subject to legal standards initially more demanding than those for “as-of-right” plazas and arcades. Furthermore, most of these spaces are functionally integrated with their host building, ensuring high levels of usage and accountability by owners to their tenants.

Privatization and Legal Compliance

Although the mid-1970s zoning amendments improved the initial quality of most outdoor spaces and discretionary review generally enhanced the design of indoor spaces, neither arrested the problem of illegal privatization of public spaces. Based on field surveys during 1998 and 1999, roughly one-half of all buildings with public space were found to be noncompliant with legal requirements concerning public access, private use, or provision of amenities. Ironically, the better-designed, post-1975 outdoor spaces and the partially or fully indoor spaces were prominent in this category. Created under more demanding discretionary review, such spaces had more rules to follow and thus more rules to break.

The phenomenon of public space privatization, either intentional or inadvertent, is not surprising. Privately owned public space introduces tension between private and public interests. After receiving the floor area bonus, the owner is left with a space whose public operation may not please the building’s occupants. Some owners believe that the use of public space should be limited to the building’s office or residential tenants. Others see economic value in shifting physical use of the space to private enterprise. When ownership of a residential space passes to a condominium or cooperative association, the unit owners may not even realize that the original developer received a financial benefit for providing the public space.

The study found that privatization violations typically fall into three categories: denial of public access, annexation for private use, and diminution of required amenities.
Denial of Public Access

A public access violation occurs when legally required access to a space is impaired by management actions. The most typical circumstance has involved spaces behind fences or inside buildings, whose entry gates or doors were locked during hours when the space was legally required to be open.\textsuperscript{40} Public access to all or part of a space also has been diminished from time to time by placement of a physical barrier, such as a planter or dumpster, at a strategic entry or corridor location.\textsuperscript{41}

Another form of public access violation has occurred when building personnel misinform the user that the space is not public. The presence of guard dogs and security buzzer systems are additional deterrents.\textsuperscript{42} Access denials also have been accomplished when spaces are blocked repeatedly, or for extended periods of time, by construction or repair activities.\textsuperscript{43} Sometimes, the space is barricaded behind plywood walls, other times, underneath construction scaffolding for prolonged periods of time. The owner continues to profit from the bonus floor area received through the incentive zoning transaction yet is temporarily relieved of the obligation undertaken to obtain the bonus.

Annexation for Private Use

Annexation of public space for private use is a second form of privatization, occurring when an adjacent commercial establishment or other private use spills out without authorization into part of the public space for its private purposes. It is important first to distinguish between legal and illegal commercial uses in public spaces. The Zoning Resolution requires retail frontage along urban plazas and encourages the installation of open air cafés that serve a paying clientele. Commercial activities near or within public spaces can enliven a moribund space. Unauthorized commercial activities, however, may privatize portions of public space, as when an adjacent food establishment practices “café creep,” “brasserie bulge,” and “trattoria trickle.” Movable tables and chairs, waiter service, and, sometimes, planters defining the perimeter of a dining area illegally invade a portion of the public space, and members of the public are prohibited from sitting at the tables unless they purchase food or drink.\textsuperscript{44} Restaurants are not the only illegal privatizers; other examples have included a department store and automobile showroom uses.\textsuperscript{45} Public spaces have also served as private parking lots for office tenants of the host building.\textsuperscript{46}

The most extreme case of annexation occurs when an owner actually builds a permanent structure in the public space itself. When that happens, the space not only is privatized; it simply does not exist. One example involved a residential owner who allowed installation of a permanent structure used by a restaurant in the required plaza area. When the city finally learned about this violation, it de-
vised a plan that permitted the restaurant to remain in exchange for additional plaza space located elsewhere and supplemental amenities not otherwise required.

**Diminution of Required Amenities**

The third form of privatization, diminution of required amenities, arises when the owner impairs or removes a legally required amenity. In one extreme case, the owner provided no amenities from the beginning, as if the space were an “as-of-right” plaza, even though the owner was in fact required to construct a residential plaza. The space was eventually upgraded with required amenities. In another case, the owner removed all required amenities, degrading an urban plaza to an “as-of-right” plaza. That space is currently the subject of litigation. More commonly, however, violations involve incomplete compliance with requirements for such amenities as seating, tables, drinking fountains, water features, restrooms, and trees.

Movable chairs are also inherently removable. According to William H. Whyte Jr., when movable chairs were first proposed as a required amenity for urban plazas in the mid-1970s, the New York Department of Buildings objected that it would be hard to police such a requirement. In one especially well-documented case, the owner of a hotel removed some of the movable chairs, required by special permit, following a series of thefts from hotel guests that the owner attributed to perpetrators casing the hotel from the chairs! A series of enforcement actions and appeals ensued, eventually upholding the hotel.

Sometimes, existing amenities have been deliberately disabled by the site owner. Use by homeless people has motivated some site owners to install spiked railings and small fences. Other obstructions, such as planters strategically placed on required benches, have been removed following complaints from public space users. Required public restrooms have from time to time been unmarked and locked, rendering them practically unusable. Water features and drinking fountains are often turned off, and management explains they are under repair.

Further, amenities have been installed in ways that impair their usefulness. For instance, the Zoning Resolution requires urban and residential plazas to exhibit plaques that identify the plaza as a public space, list the most important amenities, and specify a contact number for management (figure 3). Required plaques and signs may be slowly obscured by growing vegetation or may never be installed in the first place. Finally, amenities can be impaired or incapacitated by failure of maintenance. The most common example involves trees and plantings, which may die through neglect.
Policy Implications: Enforcement and Improvement

This study highlighted the need to enforce legal obligations regarding existing privately owned public spaces. Prior to this study, however, policies concerned with such spaces focused more on revising standards for new sites than on enforcement of rules concerning spaces already created. Changing the political and economic culture that allowed such neglect of existing spaces for the first thirty-five years of the program remains an overarching challenge. Specific policy proposals to address the shortcomings identified by the study are discussed next.

Improvement of Spaces

Policies that encourage or require the improvement of existing public space should be explored. Under current zoning rules, owners seeking permission from the city to close their spaces at night or install an open-air café or kiosk are usually asked to upgrade their space in return. Owners who seek approval for other changes to their public space could be required to make similar improvements. Owners of existing spaces could be offered additional zoning incentives, such as permission to construct additional floor area, in exchange for public space improvements. For some, the idea of using new incentives to fix spaces that have already generated old ones...
may be disturbing. For others, it may constitute an acceptable trade-off that takes account of the zoning law’s underachieving demands from 1961 to 1975.

The city could also compel owners to improve existing public spaces to remedy widespread deficiencies. For example, it might require installation of public space identification plaques in pre-1975 plazas and all arcades, even though they were created under legal standards that had not required plaques. Owners might complain that this step is an ex post facto imposition of a burden to which they never agreed. Of course, government imposes new burdens on existing property rights—or example, installation of fire detector alarms or tougher environmental standards—under circumstances in which existing conditions of property adversely affect public health, safety, morals, and general welfare. A new plaque requirement would promote awareness that a particular space is in fact public. More costly mandates, such as requiring owners to upgrade their pre-1975 plazas and arcades to post-1975 standards, would more likely incur a property owner legal challenge. Such a mandate would be easy to justify as promoting greater public use, but harder to justify as an attempt to secure the raw fundamentals of the original deal.

**Enforcement of Regulations**

Government programs that rely principally on the private sector to provide public goods and services may be co-opted by private interests if they lack precise documentation of legal obligations, regular monitoring for compliance, and vigorous reaction to violations. In New York, as mentioned previously, more attention was paid to reforming the zoning standards that created them than to ensuring that the public received the benefits it was promised. To plan is human, to enforce, divine!

An effective enforcement regime for privately owned public space requires five elements: reliable documentation, public knowledge, periodic inspections, meaningful remedies, and promotion of public use. In New York City, the first two elements are now in place. The assembly of comprehensive, accurate documentation involved a three-plus-year legal and planning exercise, best characterized as “forensic accounting,” to collect, research, and analyze the thousands of documents constituting the legal basis for the 503 spaces created over four decades. The study’s complete documentation now resides in a computer database and commercially published book; the database is to be regularly updated to reflect additions and changes to the public space inventory. Through the database and book, public space users have the underlying information necessary to monitor the spaces as supplemental “eyes and ears” to a more formal inspection process and, when necessary, to pursue legal remedies on their own.

The other three enforcement elements remain elusive in the case of New York City. Although periodic inspections of spaces to assess owner compliance with applicable legal obligations are essential, the city’s Department of Buildings is
unlikely to conduct them. Its approach to public space enforcement is complaint-driven. Only then do inspectors visit a space to determine whether a violation is, indeed, occurring. Given the enormous demands placed on the department to ensure that the city’s tens of thousands of buildings, elevators, boilers, and other facilities are structurally sound and safe, it is unlikely that a regime of self-initiated public space inspection will ever have a high priority.

Alternatively, the city could contract with a private organization to manage periodic inspections under standards promulgated by the Buildings Department. Although such inspections would be unofficial, they could motivate the Buildings Department to conduct an official inspection. Owners of public spaces could cover the administrative cost of such periodic inspections, as they do with elevator inspections. As with restaurants, the results of public space inspections could be posted on a Web site.

Another approach is to allow owners to engage design professionals approved by the city to certify that a public space complies with applicable requirements. Owner self-certification involving submission of checklist forms prepared under oath is another possibility, despite possible conflicts of interest. Local community boards and civic organizations could organize unofficial inspections of public spaces and report their findings to the Buildings Department and media.56

Enforcement requires meaningful remedies once violations of laws are uncovered. Owner complacency will likely change if lawsuits and penalties are credibly threatened. Based on apparent legal violations unearthed by the study’s field surveys, the city conducted additional inspections of selected spaces during the summer of 2000 and subsequently brought three civil lawsuits and eight administrative actions against public space owners.

Legal actions by parties other than the city may be helpful as well. Under New York state law, individuals who allege “special damage” resulting from violations of the Zoning Resolution may sue the property owner.57 (Suits to force the city to enforce the Zoning Resolution are not expressly authorized by New York state law, however.) The Zoning Resolution authorizes but does not require the Buildings Department to enforce the Zoning Resolution’s provisions.58 Private law instruments, including restrictive declarations and easements reiterating some or all of the legal obligations agreed to by public space owners as well as performance bonds, may be employed as part of a “belt and suspenders” approach to public space enforcement. Recording of restrictive declarations and filing of performance bonds are already required in certain circumstances.59

Penalties must be sufficiently onerous to convince owners they are not an acceptable cost of doing business. The city has already increased its schedule of fines pursuant to the study’s finding that roughly one-half of buildings with public spaces are not in compliance with applicable requirements. In the spirit of “let the
punishment fit the crime,” future penalties could be adapted to the violation. For example, if an owner privatizes public space, the city might impose a damages penalty equal to the owner’s financial earnings from the floor area improperly preempted. Alternatively, the city could temporarily revoke the certificate of occupancy for the bonus space. The city has employed such “literal” zoning enforcement in the past. In a notorious case, a developer was required to remove the top twelve stories from a newly constructed building after the courts ultimately determined that the extra floors violated height rules of the applicable zoning district.\textsuperscript{60} The city chose not to accept a cash payment for affordable housing as recompense for its transgression, even though such a solution was urged by parties at the time.\textsuperscript{61} The city also has the ability to seek injunctive relief and prison sentence if circumstances warrant.\textsuperscript{62}

The final element of effective enforcement is promotion of public use. Public use not only indicates that a space is performing well; it also helps a space perform well. As Whyte discovered in his studies of public space, use, even heavy use, almost never deters more use; instead, use begets more use.\textsuperscript{63} Members of the public often take a proprietary interest in public space and consider its legally mandated provision to be one of their rights. Public use makes it harder for owners to violate the law and thereby assists the enforcement regime. The city government and civic groups can facilitate use of public space by adopting a stewardship mentality toward its provision and by understanding and publicizing it as one of the city’s array of amenities. Is it too much to imagine New York City’s privately owned public spaces as a “decentralized Central Park”?

This essay has discussed the results of a study demonstrating how law can significantly affect, for better and worse, the design and use of the built environment. The study examined the effect of New York City’s Zoning Resolution on the provision and operation of 503 privately owned public spaces alongside or within commercial and residential skyscrapers. The study found that minimal design standards governing the program’s first fourteen years resulted in marginal outdoor spaces and that heightened design standards adopted in 1975 significantly increased quality. The study also found that owners frequently privatized public space in violation of applicable legal requirements and that existing institutional approaches to enforcement failed to arrest such problems. A series of policy changes aimed at improving enforcement of legal obligations were enumerated.

As Holly Whyte taught us, cities are about publicness, seeing and being seen, mixing and avoiding, accidental encounters and planned meetings. The social and practical functions of urban public spaces have lately been downgraded in many places in the face of rampant privatism and decline of civic values, as documented by Robert D. Putnam in his book \textit{Bowling Alone} (2000). Academic conferences now
ask the question, Is public space dead? Yet any observer of streets, sidewalks, parks, and plazas in the more vibrant cities understands that such public spaces effectively are the city.

Notes

1. Among his many contributions toward making cities more humane, William H. Whyte Jr. helped promote and refine New York City’s program of zoning incentives to encourage developers to establish and maintain various forms of public spaces at their own expense. As documented by Jerold Kayden in his book Privately Owned Public Space and this essay (using research methods developed by Whyte), the program has yielded more than five hundred public spaces of various types, but with mixed results in terms of public benefit. [Ed.]

2. The City of New York has also used incentive zoning to obtain other types of public benefits, including affordable housing, subway station improvements, and theaters. New York City Zoning Resolution, Sections 23-90 (housing); 76-634 (subway station improvements); 81-00 (for theaters).

3. Implicit in this rationale is that alternative methods for securing small public spaces, such as buying them with money from a city’s capital budget, would be less worthwhile or simply unrealistic. Indeed, incentive zoning is credited with being a marvelously creative solution for obtaining public benefits without expenditure of taxpayer dollars, at a time when public sector budgets are increasingly constrained. See Getzels and Jaffe 1988, 1.


6. Although the United States Supreme Court has never stated that incentive zoning in its purest, voluntary form is subject to the Nollan-Dolan line of the Fifth Amendment just compensation clause analysis, it is nonetheless heartening to be able to argue that there is, indeed, an “essential nexus” between the legitimate public interest in reducing congestion and a condition that secures density-ameliorating amenities, as well as a “rough proportionality” between the public space condition and any harmful impact caused by the bonus floor area. See Kayden 1996.

7. Zoning floor area is a defined term in the Zoning Resolution. See New York City Zoning Resolution, Section 12-10. The amount of zoning floor area in an office building is usually less than the amount of “net rentable floor area” as that latter term is used by New York City’s real estate industry.

8. The floor area ratio (FAR) is defined as the total zoning floor area on a zoning lot, divided by the area of the zoning lot. Thus, a ten FAR building is ten stories if it completely covers the zoning lot and rises straight up on all sides, is twenty stories if it covers half of the zoning lot and rises straight up, and so forth.

9. The sixteen million square feet of floor area is the equivalent of roughly six Empire State Buildings, the entire office stock of Detroit, 60 percent of Miami’s office stock, or more than one-quarter of Boston’s office space inventory.

10. The twelfth type, sunken plaza, was never provided by a developer.

11. For this calculation, an average city block is assumed to be two hundred feet by six hundred feet, totaling one hundred twenty thousand square feet.

12. Public space studies employ a variety of lenses to classify public space, and use is one of the most common. See, e.g., Marcus and Francis 1998, 20; and Carr et al. 1992, 79–86.

13. The immediate neighborhood is defined as the host building and other buildings within a three-block radius. See Whyte 1980, 16 (describing an effective market radius for public spaces of three blocks).
14. Each space was placed within one classification only. If the space met the criteria for more than one classification, it was placed in the one that best characterized it. A number of public spaces under construction or alteration at the time the study was completed were not classified.

15. The methodology for classification relied upon the approach of such researchers as William H. Whyte, who proved the value of “firsthand observation” and described how he “watched people to see what they did” (Whyte 1980, 10, 16; see also Jacobs 1985, 8–9, 133–41, describing more generally the value of observation for purposes of urban analysis). Basic aspects of post-occupancy evaluation techniques were followed. See, e.g., Marcus and Francis (1998, 345–56). Judgments about potential, as well as actual, use were made, especially in cases where it was probable that greater public knowledge about the space would result in greater public use.

16. Whyte’s study focused on a sample of eighteen public and private spaces. See Whyte 1980, 26–27. This project analyzed all 503 public spaces in the city in the belief that a comprehensive look would provide additional insights, and to fulfill the project’s public policy goal of documenting and publicizing the legal requirements attached to every space. Thus, although a core sample of spaces received observational analysis at the level of Whyte’s eighteen spaces, other spaces necessarily received less intense scrutiny. For an example of another study that trained its focus on eight public spaces, four in Los Angeles and four in San Francisco, see Banerjee and Loukaitou-Sideris 1992.

17. See Voorhees Walker Smith & Smith (1958, x) (referring to light and air and usable open space).

18. The occasional outdoor space rising above letter-of-the-law performance, either in initial execution or subsequent upgrading, proved to be the exception to the rule. See, for example, 747 Third Avenue (for initial quality) or One Penn Plaza (for voluntary, self-initiated upgrading).

19. As a City Planning Department report summarized in 1975, plazas can be “bleak, forlorn places. Some are hard to get to. Some, sliced up by driveways, are more for cars than for people. Some are forbidding and downright hostile” (New York City Department of City Planning 1975, 5). At least one owner’s representative shared that sentiment. In response to a 1986 Department of City Planning mailing about public spaces, with regard to the plaza at 160 East Sixty-fifth Street, he wrote, “I am compelled to advise you that our set-back is merely an enlarged sidewalk with no amenities whatsoever. Further, there are heavily trafficked store and building entrances and exits, and there are a series of steps that could be a trip hazard for people with vision impairment. Therefore, it would be ridiculous to encourage the use of this space” (letter from Robert Hammer, David Frankel Realty, Inc. to Herbert Sturz, Chairman of the City Planning Commission, 28 October 1986).

20. See, for example, the plazas at 95 Wall Street or 950 Third Avenue.

21. See, for example, the plazas at 200 East Thirty-third Street, 178 East Eightieth Street, or 301 East Eighty-seventh Street.

22. See, for example, the plaza at 1114 Sixth Avenue.

23. See, for example, the plazas at 200 East Thirty-third Street or 160 East Sixty-fifth Street.

24. See, for example, the plaza at 885 Second Avenue.

25. See, for example, the plazas at 200 East Sixty-second Street or 220 East Sixty-fifth Street.

26. As a matter of practice, the New York City Department of Buildings began to disqualify that portion of the plaza devoted to such uses for a zoning bonus in the early 1970s.

27. The Voorhees report reproduced a photograph of the Seagram Building and Plaza, with a caption underneath stating, “Open area at ground level permits a higher rise before a setback is required, as well as a bonus in Floor Area Ratio” (Voorhees Walker Smith and Smith 1958, 128).


29. New York City Department of City Planning 1975, 35. William Whyte commented, “The Avenue of the Americas in New York has so many storeless plazas that the few remaining stretches of vulgar streetscape are now downright appealing” (Whyte 1980, 57).
30. See, for example, the urban plaza at 535 Madison Avenue and the residential plaza at 200 East Thirty-second Street.

31. See, for example, the residential plaza at 301 East Ninety-fourth Street.

32. See, for example, the residential plaza at 630 First Avenue and the urban plaza at 40 East Fifty-second Street.

33. Landscape architect Thomas Balsley is the most prolific of the city’s public space design specialists, and a plaza he recently redesigned was named by the owner in his honor. (See his essay in this volume.) Other notable designers associated with public spaces in New York City include landscape architects M. Paul Friedman, Lawrence Halprin, Weintraub and di Domenico, Quennell Rothschild Associates, Zion & Breen, David Kenneth Spector, and Abel Bainnson and Associates.

34. See, for example, the plaza at 9 West Fifty-seventh Street and the residential plaza at 300 East Eighty-fifth Street. The role of physical “icons” in city life is interestingly described by Costonis (1989, 47–51); see also Fleming and von Tscharner (1987, 2–3, discussing “the landscape of the mind”).

35. See, for example, the residential plaza at 150 East Thirty-fourth Street.

36. See, for example, the residential plaza at 524 East Seventy-second Street.

37. In addition, owners of five “as-of-right” plazas have ameliorated conditions at their spaces—bringing them closer to an urban or residential plaza—as a condition for securing approval for a nighttime closing or installation of an open air café. See, for example, the plazas at 810 Seventh Avenue and 1370 Avenue of the Americas.

38. See, for example, the arcades at 180 Water Street and 489 Fifth Avenue.

39. The field surveys were conducted principally by staff for the New York City Privately Owned Public Space Project. Past data from 1900 to 2005, assembled from less systematic field surveys, inspections by the Department of Buildings, and complaints from citizens and community boards, show at least one-third of all public spaces with compliance problems.

40. See, for example, the through block galleria at 135 West Fifty-second Street, the mini-park and public open area at 240 East Twenty-seventh Street, the plaza at 330 East Thirty-ninth Street, and the residential plaza at 200 East Eighty-ninth Street.

41. See, for example, the residential plaza at 182 East Ninety-fifth Street.

42. This situation happened to the author of this article.

43. See, for example, the through-block galleria at 135 West Fifty-second Street, whose frequently locked gates are supplemented from time to time by construction scaffolding blocking access to the locked gates. Years ago, the escalators providing access to the elevated plaza at 55 Water Street would be regularly under repair, although this condition has improved in recent years.

44. See, for example, the plazas at 1700 Broadway and 211 West Fifty-sixth Street.

45. See, for example, the approved permanent passageway atrium at 712 Fifth Avenue or the arcade at 555 West Fifty-seventh Street.

46. See, for example, the arcade at 160 Water Street or the plaza at 299 Park Avenue.

47. See the public space at 340 East Ninety-third Street.

48. See the public space at 340 East Ninety-third Street.

49. See the urban plaza at 40 Broad Street.


51. See, for example, the residential plaza at 330 East Seventy-fifth Street for failure to provide most amenities, or the removals of water features at the otherwise fine residential plaza at 171 East Eighty-fourth Street and the plaza at 345 East Ninety-third Street.

52. Whyte 1980, 36.
53. In the 1980s, the management of Trump Tower placed a planter on a required marble bench that, following complaints, was removed.

54. See, for example, the covered pedestrian spaces at 60 Wall Street and 805 Third Avenue.

55. See, for example, the water feature at the covered pedestrian space at 805 Third Avenue.

56. The Municipal Art Society of New York City in 2002 arranged for a day of public space inspections by some of its members and has announced plans to make this event an annual occurrence. (These inspections are done by people called “Holly's Rangers” in tribute to Holly Whyte's interest in these spaces.)


58. New York City Zoning Resolution, Section 71-00.

59. See, for example, New York City Zoning Resolution, Section 37-06 (restrictive declarations for nighttime closings); Section 37-04 (k)(4) (performance bonds).


62. New York City Zoning Resolution, Section 11-61.


References


“Sun and Shadow,” “Bounce Light,” “Water, Wind, Trees, and Light,” and “Sun Easements” are poetic chapter headings under which William H. Whyte Jr. outlined the interplay of nature and urban life in his last book, *City: Rediscovering the Center*. To Whyte, the sensory qualities of our natural environment—especially sunlight—are public rights that ought not be carelessly lost to large private development projects. To raise public awareness, Whyte recognized the need for accurate representational models and rendered drawings of proposed buildings to evaluate the effect of new development projects on the local microclimate. Through movies, still photography, and audio recordings, he explored new techniques for documenting elusive social interactions as well as environmental qualities such as sunlight, shadows, noise level, and wind speed. Even as he urged greater architectural innovation and citizen participation in urban design, Whyte sought legal regulations to control the size of new buildings so as to preserve pedestrian experiences of nature throughout the city.

Whyte’s insights into the value of sunlight and his interest in the ways zoning regulations shape urban environmental qualities and how that environment may be enhanced through sensitive building and zoning regulations resonate with contemporary efforts to assess the effect of building construction on human health and the natural environment. Such efforts aim to verify what is today referred to as “sustainable” and “high-performance” “green” building. The Leadership in Energy and Environmental Design (LEED™) rating system—established by the U.S. Green Building Council (USGBC)—has set measurable standards for these design and construction practices that exceed conventional building codes and industry standards. Case studies reveal the numerous diverse benefits of high-performance buildings, including substantial energy savings, positive influences on human health, and conservation of natural resources. Increasingly, progressive cities such as Seattle, Austin, San Francisco, Chicago, and Portland (Oregon) are now requiring LEED rating for public buildings such as schools, libraries, and government offices. LEED rating, however, assesses the qualifications of individual buildings rather than the whole urban infrastructure. This essay reflects on Whyte’s foresight and notes recent advances in the evolution of “green” criteria for cities.
Sunlit Streets through Building Shape

In his 1988 capstone book *City: Rediscovering the Center*, Whyte explains that a primary goal of New York City’s 1916 Zoning Resolution—the nation’s first such ordinance—was to preserve sunlight at the street level. Circa 1900, building height was limited by the structural limitations of masonry. Because ongoing improvements in steel frame structures and passenger elevators enable ever-taller buildings, appropriate height limits must now be established legally, according to prevailing cultural values. Whyte recognized that the original premise of zoning was to control building heights so as to ensure daylight at the street level:

Let us start with a look at the antecedents to incentive zoning. In its earliest form, zoning was for the provision of light. In eighteenth-century Paris the height of buildings was limited to a multiple of the width of the streets—low on narrow streets, higher on wide streets. When New York City instituted zoning in 1916, the same principle was applied. (Whyte 1988, 230)

Yet rather than setting an absolute building height limit (as did cities such as Paris and, at the time, Philadelphia), New York City established a setback approach. These laws allowed building height to increase dramatically provided it tapered in bulk, stepping back away from the street as it rose higher. The setbacks sought to prevent narrow residential streets from becoming dark canyons while allowing taller buildings along wider commercial avenues. Tall buildings, however, filled what had been the open space backyards and alley areas of smaller buildings.

Although the original intent of New York City zoning was to ensure daylight at street level so as to improve the pedestrian experience, over time buildings with a ziggurat or “wedding cake” form became common. The mass of these ziggurat buildings, still seen throughout the city, fill the site to the property line at the street easement, rise straight up to the legal height limit, and then step back and up in successively smaller increments as determined by the zoning formulas. By the late 1940s, several decades of compliance to the city’s zoning regulations had resulted in predictably uniform building infill throughout the city. Because few building owners and architects were willing to experiment with architectural form, pedestrians were confined to sidewalks along an increasingly monotonous street grid.

The Lever House, constructed in 1952, altered the formal conventions by providing public space at the street level. A milestone in modern architecture, the Lever House’s innovative asymmetrical composition, wrapped in an elegant stainless steel glass curtain wall, was a stunning contrast to the familiar stone facades along Park Avenue (figure 1). Rather than filling the site with the massive building base of a ziggurat, the second floor of the Lever House hovers above street level, allowing public passage beneath the building’s mass (Krinsky 1988, 40–45). In addition to ample public open space at the street level, a roof terrace enabled private
access to an outdoor terrace that included planting boxes and shuffleboard. Although innovative, the project complied with the city’s then current zoning law. Because the Lever House tower occupies only one-quarter of the site, no setbacks were required under the 1916 zoning law. Notably, Charles Luckman, then president of Lever Brothers, was a progressive client willing to embrace the smaller, unprecedented design solution presented by the architect Gordon Bunshaft of Skidmore Owings & Merrill.

In 1958, another innovation in urban design, the Seagram Building and plaza, furthered the appeal of public spaces and spurred subsequent changes to New York City zoning. Architect Mies van der Rohe received a zoning variance that allowed a taller building in exchange for a generous public plaza on Park Avenue. Here again the client’s commitment of a key client representative, Phyllis Lambert, the project’s director of planning, was essential to achieving this unprecedented relationship between a skyscraper and the city street. In 1961, the City of New York amended its zoning ordinance to provide a case-by-case permitting approach that could respond flexibly to such new design proposals. Building owners and developers were encouraged to include public spaces in their projects through an incentive increase
in rentable floor area: ten square feet of office space per one square foot of public plaza provided. This incentive bonus generously allowed building size to increase by 20 percent over the regulated size ratio. Ironically, the Lever House, referenced as an exemplary building by advisors to the 1961 zoning reforms, did not require a zoning variance, as did the Seagram Building. The exceptional architectural form of the Lever House and the resulting open space were dependent on the architect’s vision and the property owner’s willingness to accept a smaller, unique architectural design.1

Within less than a decade, astute observers noticed how incentive bonuses were routinely awarded to mediocre public spaces. Developers profited as floor area increases were granted in exchange for “public” spaces with limited natural attributes such as through-block circulation areas, covered sidewalks, and interior shopping arcades (see the essay by Jerold S. Kayden in this volume). The appeal of a unique pocket of public space within an otherwise consistent urban fabric gave way to an alarming new norm as large, new development projects swept away whole blocks of older, smaller buildings.

In an effort to determine how urban density is rendered desirable through design and how zoning positively shapes the city, Whyte developed empirical study methods that documented the relationship of human activity to specific design features within the urban context. As a consultant to the city government, he demonstrated the need for additional zoning reforms to explicitly require signage, trees, lighting, and seating as legal conditions for public areas given in exchange for bonus incentives. Although the city passed these revisions in 1975, Whyte lamented the lasting environmental damage caused by buildings made bigger by incentive bonuses. As he wrote, “But the larger costs of incentive zoning have been in the loss of the most basic amenities—sun and light. It is a loss that is rarely counted” (Whyte 1988, p. 251).

**Accounting for Daylight**

With an eye to sunlight, shadow, and the nuances of reflected light, Whyte noted the symbiotic relationship of building size to the successful social atmosphere of sunlit public parks and plazas. Dispelling developers’ claims that shadows cast upon the shadows of other buildings were inconsequential to the quality of urban light, Whyte demonstrated how the shadows of each new building cumulatively darken the surrounding cityscape. In response to rampant real estate speculation, he insisted that zoning regulations were needed to protect the public right to sunlight at the street level. He wrote:

> Sun is money. To be able to take away so many units of sunlight is the other side of the coin of being able to put up that many more feet of commercial space. An architect can modify this equation somewhat by the way he configures the building. But the key
Criteria for a Greener Metropolis

factor is bulk. To repeat: big buildings cast big shadows. Bigger buildings cast bigger shadows. And make more money. Unless the city has rigorous guidelines for bulk and sun and light—and the mettle to stick to them—money will win out over sun. (Whyte 1988, 261)

Exploring ways to assign value to sunlight so that it could not be overlooked in development transactions, Whyte considered legal options such as the “transfer of development rights” (used to protect historic landmark properties) and “prior appropriation” (the law governing western water rights), yet he preferred solar easements (Whyte 1988, 277). Easements neither shift increases in building size to other parts of the city nor designate first-come, first-served, priorities. Recorded easements “run with the land” and subsequent owners of the property are bound by them. In recognizing solar easements as essential to the long-term success of solar energy collection systems, Whyte foresaw the basis for emerging solar access laws. Since then, such laws have evolved with respect to solar energy systems. The Database of State Incentives for Renewable Energy (www.dsireusa.org), for instance, currently lists thirty-three state solar access laws and guidelines.

Seeking appropriate legal regulations, Whyte simultaneously envisioned innovations in architectural form that could delightfully increase urban density. Enthusiastically he promoted their potential:

What is needed is solar zoning. Given a sensible limitation on bulk, we can not only reduce materially the blocking of sunlight but increase the beneficent reflection of it. We can even manipulate and redirect it to places that had no sun before. In the process we may produce some new building shapes, eccentric and effective. (Whyte 1988, 258)

He pointed out how zoning ordinances can be based on calculations of daily and seasonal exposure to sunlight. Rather than approximating pedestrian exposure to sunlight with building setbacks based on street grid geometry, solar zoning specifies setback parameters according to a “solar envelope,” calculated with respect to the changing path of the sun throughout the year. Thus, a solar envelope can scientifically shape the seasonal impact of a building’s shadow on the local microclimate and thereby specify amounts of sunlight for unique public places within the city.

The solar envelope concept was outlined by Ralph Knowles as an architectural design tool in response to the energy crisis of the late 1970s. At that time, Knowles summarized those interests: “New values emphasizing energy conservation and the effective use of solar resources require a new kind of zoning envelope based on the geometry of the sun’s path” (Knowles 1981, 40). Solar envelope calculations can optimize building orientation with respect to solar energy collection systems, and calibrate daylight within interiors. Because of shifts in federal government priorities, however, U.S. national interests in solar energy waned during the 1980s. Today, Knowles emphasizes the human health gains from physical exposure to the daily and seasonal sun cycles. Although there is increasing evidence that the solar
envelope can accurately calibrate sunlight to benefit building owners, occupants, and city dwellers, solar envelope calculation guidelines for high-density urban areas have yet to be developed.

Temporal urban environmental qualities, such as how the building’s shadow will be cast across city neighborhoods, are rarely depicted in architectural design drawings or addressed within the design process. In 2003, the National Building Museum presented state-of-the-art building projects in an exhibit and book titled *Big and Green: Towards Sustainable Architecture in the Twenty-first Century*. Although the fifty projects presented important achievements in energy efficiency and indoor environmental qualities, none of them provided graphic analysis, such as sun studies, of the effect “big and green” buildings have on their surrounding environments (Gissen 2002). Yet by being bigger, even green buildings impact the ambient environment experienced by urban residents: wind speeds, air quality, rainwater runoff, and a view to the blue of the sky.

In 1988, Whyte noticed that most graphic analysis, such as sun studies, delivered to the New York City Planning Commission for new building permits were incomplete or incorrect. Recognizing that developers, architects, and city planners do not evaluate the effect of building project proposals on the city, Whyte envisioned a financially independent urban research center that could facilitate objective public review of new development projects, so as to improve the urban environment:

Such a center would be staffed and equipped to apply a wide range of techniques. It would do sun studies using the models and before-and-after methods pioneered by Berkeley; it would do computer mapping of sun and shadow patterns as practiced by several architectural firms. . . . The center would do wind-tunnel testing to determine the drafts a building might induce and the measures that would modify them. It would also study the winds generated by nature and some microclimatic defenses. (Whyte 1988, 269)

Whyte continued, “Its best research tack will be exploring new possibilities, new ways of making microclimates more benign, sun and light more pervasive” (Whyte 1988, 269). Whyte’s concept was based in part on the work of the Environmental Simulation Laboratory (ESL) headed by Peter Bosselmann at UC Berkeley (Whyte 1988, 268). Commissioned by the Municipal Arts Society in 1985 to study Times Square, ESL constructed a crude cardboard model for “walk-through” movies, simulating both existing conditions and future development changes allowable by the 1982 zoning laws. After attracting considerable attention, the public presentations prepared by ESL resulted in subsequent zoning laws revisions. The revised zoning regulations aim to preserve and enhance the unique characteristics of Times Square by establishing building height setbacks that widen pedestrian exposure to the sky (Bosselmann 1998,109). Whyte insisted on the value of providing the public with accurate analysis of proposed building projects so as to balance private interests, architectural innovation, and zoning requirements with community rights.
Today’s sophisticated computer programs are able to simulate urban microclimates and render three-dimensional “fly-throughs” in highly detailed cityscapes. Yet the most advanced computer imaging programs readily available for Hollywood movie productions, such as Spider-Man, Gladiator, and The Matrix, are far too costly for community groups, city planners, and even most public universities. Although the impact of big buildings on the urban infrastructure and atmosphere can be carefully studied during the design process, city planning offices rarely have the resources or staff to prepare accurate analysis. Architectural firms working on big development projects strive to present favorable views, not an analysis that might raise concerns about the urban effects of a design proposal. Project teams are paid to successfully present a project to city officials through compelling, often intentionally impressionistic images (Dunlap 2003). New development projects routinely replace the material and formal variations of a cluster of small buildings with the monolithic conditions of bigger buildings. Bigger, often flat building surfaces uniformly reflect and at times intensify microclimate conditions, such as wind tunnels, glare, urban heat islands, and stormwater runoff.

In 1991, ESL prepared an extensive analysis of urban form on Toronto’s microclimatic conditions. Bosselmann’s research synthesized diverse data from seasonal natural microclimate conditions with the formal characteristics of existing and proposed buildings into a simulation of pedestrian views, wind speed, and thermal conditions. This research informed the Toronto City Plan. Recently, Kevin Settlemyre of the Green Roundtable worked with students to collect and document empirical data on the microclimates of Boston Common and Back Bay to outline beneficial variations in climate-sensitive design (Settlemyre and Thomson 2005). Settlemyre and Thomson used ECOTECT, a computer program developed in Australia by Andrew Marsh. This program synthesizes urban microclimate information with computer programs that analyze interior building daylighting. As Whyte had anticipated, there are ways to analyze the physical repercussions of new building projects on the city’s ever-changing infrastructure, yet to date there are no shared sources of such information available to citizens, city staff, designers, or the developers.

**Green Roofs**

Emerging architectural features such as green roofs demonstrate an impressive range of benefits for urban environments as well as building owners and occupants. Contemporary garden roofs (or green roofs), as refined and tested in Europe, have evolved beyond heavy planter boxes into lightweight roof systems using a granular growing medium formulated to support a thin layer of vegetation. Studies show that vegetation filters air pollutants such as heavy metals, diesel soot, and dust that settle onto rooftops. Absorptive green roofs retain rainwater, thereby
reducing the runoff that causes combined sewer overflows in municipal storm drainage systems. By minimizing solar heat gain, green roofs mitigate urban heat island effects, while providing habitat for birds and airborne insects.

In addition, temperatures stabilize beneath the vegetation layers where waterproofing products are protected from the harsh ultraviolet rays of sunlight, which could result in increased product durability. During hours of peak electricity demand, less energy is required for air conditioning below green roofs. Because green roofs absorb external noises, interiors are quieter. Visually delightful, green roofs improve the sensory qualities of interior and exterior building environments.

The U.S. Environmental Protection Agency (EPA) and Lawrence Berkeley National Laboratory, along with nonprofit organizations such as Green Roofs for Healthy Cities and the Earth Pledge Foundation, are promoting interdisciplinary research and discussion among product manufacturers, designers, installers, and city planners. Demonstration projects in various cities are collecting performance data to determine appropriate municipal policies and incentives.

City officials in Portland, Oregon, have initiated an aggressive “Ecoroofs Program” to alleviate combined sewer overflow problems. Drought-tolerant vegetated roofs that are not irrigated (thus the nomenclature “ecoroof” rather than “green”) are an approved stormwater management technique under Portland’s Stormwater Management Manual of requirements for new construction or redevelopment. Since 1999, about a dozen demonstration ecoroof projects have received municipal grant funding. The Ecoroof Program of Portland Environmental Services provides guided tours of these ecoroofs as well as technical assistance to residential, commercial, and industrial property owners. In addition, the city has provided economic incentives. Ecoroofs meet Portland’s public works code requirements for on-site management of stormwater runoff. In specified districts, developers may apply for a floor area ratio bonus incentive of up to three additional square feet for every one square foot of ecoroof.

In 2001, Chicago City Hall was transformed by a 20,300-square-foot demonstration roof garden designed by William McDonough + Partners (figure 2). Half of the building is used as City Hall; the other half is used for Cook County government offices. Scientists are currently collecting data on the green roof above City Hall to compare with data collected from the conventional tar roof covering the Cook County half of the building (see City of Chicago’s website, http://egove.cityofchicago.org, for data). On average, between 10 a.m. and 1:00 p.m. City Hall green roof temperatures are 20 degrees Fahrenheit less than the adjacent conventional roofing surface. On an August day, however, the conventional black tar roof temperature becomes as much as 50 degrees Fahrenheit warmer than the adjacent green roof. At a 2004 conference, “Greening Rooftops for Sustainable Communities,” the Chicago Department of Planning and Development reported that more than eighty green roofs covering one million square feet of roofing have now been
constructed or are being planned for public and private properties within Chicago’s city limits. Chicago’s green roofs program began in 1998 when the city was one of five cities selected by the EPA to receive funding and technical assistance for pilot projects intended to mitigate urban heat island effects (the other cities selected for this program were Baton Rouge, Houston, Sacramento, and Salt Lake City). City officials in Chicago now actively promote green roofs and are considering various financial incentives for building owners. Yet green roofs are just one of many available design advances that are environmentally sensitive, energy efficient, and more enjoyable.

**Greening the Building Industry**

In 2000, the USGBC introduced the Leadership in Energy and Environmental Design (LEED) rating system to provide third-party verification for “green” buildings qualifications. LEED has proven to be an effectively simple means to verify a
project achieves an array of advanced design and construction practices. Building owners sensitive to annual energy costs, long-term maintenance expenses, and the increasing threat of liability from “sick building syndrome” are able to require LEED rating, so as to achieve the comprehensive benefits of high-performance design. LEED points are available by meeting the design and construction criteria specified in six categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation and design process. Points within each category detail strategies that support environmentally sensitive building conditions. For example, sustainable site points are awarded for the redevelopment of brownfield sites, bicycle storage areas, restoration of natural habitat, on-site stormwater management, and light pollution reductions.

Points are received for quantitative achievements, such as reductions in energy use, as well as for measurable qualitative conditions, such as providing daylight and views to 75 percent of the worker-occupied spaces. LEED is now developing rating systems that refine point specifications with respect to different building projects. For example, the LEED rating system requirements for new construction vary from the requirements specified in the LEED rating system requirements for existing buildings. Written verification of project work related to point specifications is submitted to the USGBC. One of four LEED certification levels—certified, silver, gold, platinum—is achieved according to the number of total points earned.5

By setting higher building standards, LEED aims to transform the market culture by integrating the diverse interests of stakeholder concerns within the building industry, including the views of building owners, occupants, architects, real estate agents, environmentalists, industrial hygienists, developers, contractors, manufacturers, and product suppliers LEED even includes astronomers within its diverse coalition of proponents by awarding points to outdoor lighting fixtures that reduce night light pollution.

All too often, building design and construction are driven by market conventions. Dressed in decorative finishes, familiar plans for standardized programs are built for the cost per square footage resale profits without consideration of energy efficiency, healthy interiors, or the surrounding urban environments. The architect and client focus on architectural appearances, while assuming environmental health issues will be resolved by engineering systems. LEED accounts for the less obvious ambient qualities such as energy, indoor air quality, and acoustics that affect human health and productivity. These shared conditions—our “atmospheric commons”—are easily overlooked in the design process.
Scientific Basis for Better Building

High-performance design requires quantifying sensual environmental qualities within the design development process of each new project. Evaluations such as analysis of daylight and energy modeling reveal ambient conditions not depicted in conventional architectural drawings. LEED rating requires computer modeling studies to verify energy efficiency by illustrating the effects of mechanical heating, ventilation, and cooling within simulated spaces.

With such analytical information, designers can measure how distinct parts affect the whole building as a system. The effect of a south-facing window on the heating and cooling system within a specific room can be evaluated with respect to the size of the window; its frame, glass, curtains, and exterior awnings; the orientation of the window; and the proximity of shade trees. Even the effects of paint color can be analyzed and calibrated in relationship to factors such as sunlight and electric lighting so as to optimize energy performance.

Although criticized as a checklist approach to design, LEED rating provides third-party verification of measurable green qualities. A number of LEED points are awarded by achieving higher technical standards than are specified by most state and municipal building codes. Without quantifiable criteria, manufacturers, contractors, architects, and building owners can easily “greenwash” by claiming to be environmentally friendly in promotional presentations without adhering to the values of environmental science during the design and construction process. Most building industry professionals, comfortable with conventional technologies and their own intuitive design approach, resist change by persuading clients that environmentally sensitive design costs more, looks bland, or is not necessary. Yet willing designers have demonstrated an ability to merge high-performance building qualifications into a spectrum of building projects, including surprisingly new architecture. For example, the innovative folded form of the Central Seattle Public Library, by maverick architect Rem Koolhaas, achieved thirty-four LEED points. Whatever the appearance, the City of Seattle requires that all city-funded projects of more than five thousand square feet achieve enough LEED points for the “silver” rating. Projects such as Seattle Central Library demonstrate that higher design and construction standards of LEED are available to buildings of all types and that better building science is not style dependent.

The values of high-performance design and construction are especially significant to schools, where better environments provide measurable benefits to human physiology and thus the learning process. A 1999 study conducted by the Heschong Mahone Group for Pacific Gas and Electric demonstrates improved student performance to daylighting. Test scores for more than twenty-one thousand students from three school districts, located in three different geographic regions, were analyzed in relation to the quality of classroom daylight. Students with ample ambient
daylight progressed up to 26 percent faster on reading tests and 20 percent faster on math tests than students in classrooms with inadequate daylight. Although further studies are needed to better define the effect of indoor environmental qualities such as daylighting and air quality on student health, attitude, and test scores, numerous studies document the undesirable effects of substandard school buildings on student test scores and behavior. As a Massachusetts Multi-Agency Task Force reported:

Poor school building conditions have a negative impact on student performance. Thus the debate is not whether a correlation exists—between a better environment and improved learning—but just how severe the correlation is. (Aguto et al. 2000, 12)

Unlike commercial buildings, high-performance green schools can be designed to supplement the K through 12 learning process. For example, the front façade of Clearview Elementary School in Hanover, Pennsylvania, has a large sundial that reflects daily and seasonal changes in the sun’s path across the sky. On Commonwealth Avenue in Boston, students at the Media and Technology Charter (MATCH) school monitor solar energy collection data from classroom computers (Gould 2003; Pelletier 2003). (Real-time data on the 20-kilowatt photovoltaic system mounted on the MATCH roof is available online at www.matchschool.org.)

Funding for design and installation of the MATCH school’s solar roof and classroom monitoring program was provided by the Massachusetts Technology Collaborative, which selected twenty K–12 public schools to receive supplemental funding for the design and installation of renewable energy systems. To be eligible for as much as $650,000 in additional funding, each school district demonstrated had to abide by high-performance design guidelines from the Massachusetts Collaborative for High Performance Schools Best Practices Manual, referred to as MASS-CHPS. Based on the LEED rating system that MASS-CHPS is similar to, this program refines the criteria with respect to Massachusetts building codes, climate conditions, school activities, and environmental priorities. California, the first state to outline higher standards for schools, has developed extensive online resources available to professionals and the public. In fact, detailed information about better school buildings is available from numerous resources, including the U.S. Department of Energy’s Rebuild America program (www.rebuild.gov).

For school districts where new construction or major renovation projects are not pending, educational programs developed for the Green School Project by the Alliance to Save Energy (based in Washington, D.C.) and Youth for Environmental Sanity (based in Santa Cruz, California), teach students to evaluate their own school buildings, and then implement energy conservation strategies. In Berkeley, California, Alice Waters of Chez Panisse Restaurant has worked with the Martin Luther King Jr. Middle School to develop “the Edible Schoolyard” program, which teaches children how to grow and cook their own food. These students host com-
Community dinners that reflect the diverse cultural heritage of their neighborhood. Shifting away from “warehousing” education, all these learning programs involve empirical analysis of actual school building environments that often result in physical improvements.

**Greening Cities**

Increasingly, ordinary citizens are seeking ways to raise awareness about the ways buildings affect nature. The accumulated magnitude of apparently benign norms, such as electric lighting, is causing insidious environmental problems. Research now points to night light pollution as a serious disturbance to the biological clocks of humans as well as the nesting and migration habits of birds and animals. Airborne emissions from midwestern coal-fired power plants used to supply electricity is linked to mercury contamination of freshwater rivers, streams, and lakes throughout the northeastern United States. Dated technology embedded within the design of household goods, neighborhoods, and power plants burden the public with health detriments and unnecessary energy costs. Yet tested improvements that can increase energy efficiency are available.

Changing leadership is emerging at local levels, within schools, universities, neighborhoods, corporations, and cities. In addition to numerous public education programs, government initiatives for LEED rating have been enacted in forty-two cities across the United States, including Seattle, San Diego, Phoenix, Arizona, Princeton (New Jersey), and Chicago, (Herren and Templeton 2006). Seven federal government agencies, including the U.S. Department of State, Air Force, Army, and Navy, now require LEED certification for new construction projects. Governors of nine states, including those of California, Colorado, Michigan, and Maryland, have signed executive orders calling for LEED certification of state-funded buildings. Other states are currently considering similar legislation (Herren and Templeton 2006). These high-performance requirements for civic buildings such as police and fire stations, schools, courthouses, libraries, and government offices will reduce future taxpayer costs for building energy, operation, and maintenance.

The adoption of LEED ratings for public, institutional, and commercial buildings will advance building industry practices and thus benefit building owners and occupants. Yet the accumulated effect of building development has fostered an array of diverse concerns such as open space fragmentation due to sprawl, non-point source pollution within water supplies, loss of family farms, increased rates of childhood obesity and diabetes, increased rates of asthma, night light pollution, and extended driving commutes due to the lack of affordable housing and public transportation. Numerous nongovernmental organizations have prepared practical planning recommendations to mitigate the effect of development on natural environments. For example, the International Dark Sky Association (www.dark
sky.org) offers detailed specifications for urban and rural street lighting. The Trust for Public Land outlines equitable distribution of parks, open space, and greenways within urban areas. The International Council for Local Environmental Initiatives (www.iclei.org) provides guidelines to reduce greenhouse gas emissions.

These guidelines are beginning to influence efforts to rank cities according to quality of life and policies that promote sustainability. The 2005 SustainLane U.S. City Rankings (www.sustainlane.com/cityindex/citypage/ranking/) evaluated twenty-five cities with respect to conditions such as the availability of farmers’ markets, recycling, air and tap water quality, the percentage of parks to the total urban land area, and the number of LEED buildings. One of the first rating guides, *The Rating Guide to Environmentally Healthy Metro Areas* (Weinhold 1997), ranks 317 metropolitan areas according to thirteen categories of data.10 These data, compiled to assist persons with health problems triggered by pollution, identify toxic sites rather than lifestyle amenities such as recreational benefits.

Establishing appropriate policies to balance economic interests, industry conventions, public health, and higher living standards is an evolutionary process. Recent efforts to rank cities can be further synthesized with outside research and EPA data into a comprehensive rating system. As a supplement to zoning and building code requirements, a city rating system will give voters and elected officials a criteria through which to assess shared values and provide incentives for environmentally sensitive development practices.

**Designing Civic Delight**

As an astute observer and critic of city design, William H. Whyte sought to describe the sources of delightful urban experiences, even in the context of higher levels of density. While advocating government policies to control development, he nevertheless championed architectural innovation and public participation in place of uniform regulatory conventions. Whyte called for comprehensive analysis of urban conditions through empirical observation of site-specific conditions, scientific data, and the use of computer (well ahead of his time). He clearly recognized, however, the urgent need to implement change through experimental design, rather than simply study the future. Optimistically, he noted the possibilities of shaping cities by merging scientific precision with unprecedented design flair, as in this remarkable observation:

If only we think of them, there are all sorts of things we can do to bend light and reflect it to felicitous effect: a slight canting of a façade to catch the late afternoon sun across it; a panel of white canvas up high to light the dark part of a small park; a spire such as that of the Chrysler Building, which glints at you wherever you are and makes you feel the better for it. We need more follies like this. (Whyte 1988, 275)
Notes

1. According to the October 2002 Vanity Fair: “Economically investing in an architectural sensation served the Lever Brothers well. Extensive media coverage and critical acclaim drew visitors to the Lever House where Lever Brothers Company products were on display in the lobby.”


3. According to this analysis:

The methods used, in combination, to study the effect of buildings on Toronto’s climate included modeling existing and potential development for wind tunnel experiments and mathematical modeling of the human body’s thermoregulatory system. An important step in the research was to prepare seasonal maps that noted the exact location where wind and comfort measurements had been taken. The research team analyzed these maps and then changed the model to show potential development under existing planning controls on selected sites. (Bosselmann 1998, 149)

Also see City of Toronto, Department of Planning and Development, City Plan 91, Report 25, June 1991.

4. A rapidly expanding nongovernmental organization, the USGBC provides useful information on high-performance design and construction practices for all types of green building projects. Introduced in 2000, LEED-registered buildings now account for approximately 200 million square feet or 6 percent of U.S. commercial construction (A. Wilson, Environmental Design + Construction, January/February 2005). Recently, LEED has developed specialized point requirements for existing buildings and commercial interiors in addition to application guides for schools, laboratories, and retail and health-care facilities.

LEED was preceded by the Building Research Establishment Environmental Assessment Method, a voluntary rating system that had been available in United Kingdom since 1993, and the Building Environmental Performance Assessment Criteria, which was developed in British Columbia. The LEED rating system, however, evolved substantially through years of volunteer effort by diverse professionals in the building industry as well as representatives from government agencies and nonprofit organizations (Malin 2000). For additional information see www.usgbc.org.

5. For a thorough definition of the current point system, see www.usgbc.org.


7. See www.ase.org and www.yesworld.org/resources. Other school building learning activities are available through the U.S. Department of Energy’s Rebuild America program and the EPA’s Energy Smart Schools program.

8. Rating requirements are typically for projects larger than 5,000 square feet that receive public funding.


10. The thirteen categories are air quality; drinking water quality; toxic releases; vehicle travel; aircraft operations; manufacturers; agricultural acreage; military facilities; population density; Superfund sites; toxic transfers; heating and cooling demand. This guide is available only in print.

References


**Websites**

Alliance to Save Energy: Green Schools Project
www.ase.org/greenschools/newconstruction.htm
The Green Schools program offers extensive resources, and learning activities.

City of Chicago
www.egov.cityofchicago.org

Collaborative for High Performance Schools
www.chps.net
This website contains information on high-performance green schools, including a Best Practices Manual with details for designers and guidelines for school districts.

Database of State Incentives for Renewable Energy
www.dsireusa.org

The Green Roundtable
www.greenroundtable.org/
Along with other resources, the Green Roundtable website posts the Executive Summary of Boston Mayor Thomas Menino’s Green Building Task Force Report.

Green Roofs for Healthy Cities
www.greenroofs.org

Earth Pledge Foundation
www.earthpledge.org
and the green roof resources:
www.greeninggotham.org
Ecoroof Program of Portland Environmental Services
www.portlandonline.com/bes

ECOTECT
www.squ1.com/ecotect/ecotect.html

Edible School Yard Program
www.edibleschoolyard.org

Heschong Mahone Group: Daylighting and Productivity Study
www.h-m-g.com
This frequently cited study shows correlation between daylighting and human productivity.

International Council for Local Environmental Initiatives (ICLEI)
www.iclei.org
This website offers information about what local governments can do about sustainability. ICLEI provides guidelines on reducing greenhouse gas emissions.

International Dark-Sky Association
www.darksky.org
Guidelines for street lighting that reduces night light pollution as well as links to research.

Massachusetts Technology Collaborative Green Schools Initiative
www.mtpc.org/renewableenergy/Green_Schools.htm
Detailed, case study information on more than fifteen pilot green school projects (including the MATCH School) for new construction and major renovations are listed on this website.

The Municipal Arts Society
www.mas.org/
The Municipal Art Society is a private, nonprofit membership organization whose mission is to promote a more livable New York City. Since 1893, it has worked to enrich the culture, neighborhoods, and physical design of the city.

New York City Department of City Planning
A brief history of New York City zoning as well as current regulations are posted on this website.

Solar Envelopes: Ralph Knowles, School of Architecture University of Southern California
www.rcf.usc.edu/~rknowles/
The Solar Envelopes website includes papers about the solar envelope and other related topics, with graphics.

SustainLane
www.sustainlane.com/cityindex/citypage/ranking/
In addition to the SustainLane U.S. city rankings, this website offers a spectrum of other resources.

U.S. Green Building Council: LEED (Leadership in Energy and Environmental Design)
www.usgbc.org/LEED
LEED Green Building Rating System(tm) is a program of the U.S. Green Building Council.
Building the Right Shade of Green

Colin M. Cathcart

Frodo looked and saw, still at some distance, a hill of many mighty trees, or a city of green towers: which it was he could not tell. J. R. R. Tolkien

Green architecture seems to be a contradiction in terms. By definition, architecture is opposed to nature, because it is through architecture and urban design that we cope with our discomfort here on this earth, keep one another company, and together confront an otherwise inhospitable wilderness. Nevertheless, our design responses are instinctive. Humanity has been successful as a species because architecture lies deep within our nature.

No doubt, there are limits. Over the next century, the builders, designers, and maintainers among us will confront our next great challenge, to tailor our constructed habitat to the now apparent finitude of our earthly context. What might this sustainable habitat look like? Although we seem to retain an aesthetic preference for the landscapes of our evolutionary heritage, we have seldom hesitated to congregate in cities, sometimes very large cities, with populations limited only by contemporary infrastructural technologies.

Green design has often been conflated with wilderness appreciation, grass-roots activism, and “back-to-the-land” austerity, but it is arguable that sustainable design will be practiced in its most radical form in the very center of our cities. When we challenge preconceptions of what is natural, what is green, and what is to be done, the ironic but inevitable outcome is that green architecture will become urban architecture.

Sometimes, sustainable design decisions—taken in light of such considerations as practicality, cost, durability, aesthetics—deny familiar images and traditional solutions. Take a simple example: a camel driver’s daughter, trying to do her homework at night in the middle of the desert. We might expect to find her using a candle or a kerosene camp light, both of which are dirty, dangerous, and in the long run quite expensive. She would be much better off with a photovoltaic powered fluorescent light, however incongruous that might seem. Many people dislike fluorescent light. Its color temperature is alien to that of the firelight we have known for thousands of years. Despite its energy efficiency, fluorescent light seems unnatural.

Photovoltaics also seem unnatural; they convert sunlight into electrical power, invisibly, without effluent, forever. Photovoltaics are clearly high tech: photons
dislodge electrons in a semiconducting film on a glass surface. They were not invented by local action or by thinking small; rather, they were initially developed by big science for the U.S. space program, and big international oil companies like BP and Shell now dominate their production. Photovoltaics are sleek, glassy, and as a power source, strangely motionless. We are much more familiar and comfortable with our traditional sources of energy—muscle power, wind and river currents, wood, coal, and gas—which may all be traced back to the sun over longer and longer periods of renewal. Photovoltaics “short-circuit” this whole chain and convert sunlight directly into electricity wherever it is needed. Utility thus contradicts image. This statement, however, is not to suggest that the other sources of energy don’t still have their appropriate applications. A romantic evening should still be spent in candlelight. Yet we may have to reconsider our prejudices, for truly green design may neither look “green” nor feel “natural.”

This essay categorizes green design in three “shades”: pale green, intense green, and extreme green. It will first offer some criticisms of conventional practices of green architectural design, public park design, and New Urbanist design (pale green). The next section (intense green) turns to a discussion of examples where green design is intensified by simultaneously promoting (1) sustainable building design and maintenance, (2) a distilled and heightened experience of nature, and (3) an environmentally responsible urbanism. Then these hypotheses will be tested against the maximum case (extreme green). Could a skyscraper—the most intensive use of land ever invented—be designed as a green building? Finally, which of these shades is the right shade of green for a particular purpose and locality?

**Pale Green**

To many, the most “green” house is the most apparently “natural” house. Picture a log cabin in winter. There may be snow all round, but it’s warm inside: the eaves carry long icicles, reassuring frost forms on the windowpanes, and welcoming smoke curls up from a woodstove within. Perhaps there is a simple outhouse by a stream out back, with firewood stacked beside it, and a rude shelter for a jeep. What could be more sustainable, more green? Well, most readers will realize what’s wrong with this picture.

Better might be a house that is consciously designed to be sustainable, like the one shown in figure 1, which my firm designed in 1994 for a mountainside near Woodstock, New York. Many of the cabin’s problems are immediately corrected. Instead of leaky log construction, the house’s shell is made with airtight structural insulated panels (Cathcart 1996). A curving metal roof protects against winter winds by bending low over the north side, while exposing a full three stories of glass to warming sunlight on the south side. Heat recovery ventilation permits fresh incoming air to be warmed by exhaust air. Gray-water heat recovery from
showers and sinks preheats domestic hot water and the radiant floors. And in the summertime, the overhanging roof shades the glass, great thermal mass keeps the house cool, and dozens of sashes can be opened to the breezes. Because the owners were willing to push the implications of sustainable design to their formal conclusions, the house does not look much like a traditional country house, much less like a log cabin.

Nevertheless, all four walls of this house are exterior walls, prone to heat loss. I live in an old loft building in lower Manhattan and I need no superinsulation, no “earth sheltering.” My dwelling unit is already warmed by my neighbors above, below, and on either side. Run down the list of all the very efficient design systems described in the last paragraph, and a townhouse or an apartment will be more efficient than a single-family house in every case. The efficiencies can be even greater with mixed use, where different functions, staggered over time, can reduce peak loads. This house may be innovative, but the innovations merely serve to mitigate its relative isolation.\(^6\)

Of course, the house is isolated for a very good reason: it offers a direct experience of nature. Its occupants enjoy winter sunrises from sunspaces designed to warm the house passively. A screen porch for family dinners seems tucked into the forest, but affords views of distant mountains. A half-mile driveway and power lines had to be carved through the forest to get here, however, and a quarter-mile
curtain trench was dug to protect the house from runoff. Several acres of forest have been cleared for the house, for its large septic field, and to open the view of the mountains. An old swamp at the bottom of the hill was excavated to provide a more picturesque pond. Human contact with nature is rarely without environmental impact: people cannot help “improving” their land to suit their tastes.

The owners are refugees from lower Manhattan, and they often drive considerable distances to enjoy the cosmopolitan atmosphere of Woodstock and New York City. Both adults will use their cars many times a day, sometimes just to get coffee, and nondrivers (children, visitors, the elderly) must be chauffeured to all their activities outside the house. Still, this house is a good example of “green design” as it is conventionally practiced. There are many other good examples on the website of the U.S. Green Buildings Council located way out in the country or locked in the midst of sprawl, hopelessly compromised by their beautiful locations. These buildings exemplify pale green design.

By contrast, New Yorkers use their subways at a fraction of the environmental impact, with convenient access to all the services of the metropolis. The young and the elderly can get around on their own. Environmental impacts are moderated dramatically—in terms of energy efficiency, habitat conservation, walking and transit use—simply by living in a city (Owen 2004). In postwar America, the most acute observers have shown the present limitations on urban density as having to do with the balance between personal privacy and passively regulated public space (Jacobs 1961; Whyte 1980). New Urbanist and smart growth advocates (Calthorpe 1993; Yaro and Hiss 1996; Duany, Plater-Zyberk, and Speck 2000) contrast sprawl and auto dependence with the attractions of traditionally compact U.S. towns and cities. Gasoline consumption, to take just one example, appears to decline exponentially with increased urban density (Newman and Kenworthy 1989). But the urban lifestyle isn’t consciously green. The casual experience of nature is denied to most city dwellers. Dense urban areas will often have minimal daylight. Without green building design and without access to natural experience, existing cities must be considered “pale green” too.

City residents can get a good dose of nature in public parks. The pioneers of modern park design—such as Joseph Paxton, Andrew Jackson Downing, and Fredrick Law Olmsted—intended them to be restorative, palliative, a peaceful contrast to the jangle of industrial city life. Parks, though, are by no means “natural.” The best parks exaggerate nature. They are almost “hypernatural”: artful concentrations of plantings and landforms, designed professionally, maintained with great care and expense, and used intensively. Many city parks are happily crowded every day. Whatever the intentions of their designers, these parks inevitably trigger memories of picturesque landscapes, of countryside once glimpsed from a car window, of nature witnessed on television, or stories told of pioneering ancestors. They fulfill a need as essential as our need to congregate in cities. Parks
represent an urbanized intensification of nature. If located in the city, an actual prairie, an actual forest or tundra or jungle would be far too fragile if it was small enough to fit and far too boring if made large enough to be self-sustaining. A park’s esthetic contrast between living nature and its urban context holds drama and meaning. A nice green park, though, if it remains locked within an environmentally noxious industrial city, can represent only a part of the solution. So by themselves, parks, too, are only “pale green.”

All three aspects—sustainable building design, natural experience, and urban density—must be pursued together. So rather than extending our sprawling habitats, we should instead intensify the use of lands we have already claimed, reducing auto dependence, building community and public health with opportunities for outdoor exercise and intensified contact with civilized nature. Not only is the urban experience most entertaining when it is most intensive (Whyte 1980), but true sustainability will be most easily achieved in this setting.

**Intense Green**

This section reviews four specific examples of green architecture at urban densities, two in Europe and two in New York, where all three of the following aspects are in evidence:

1. **Sustainable architecture** strives for a functioning building stock that does not impose a net environmental cost on future generations or elsewhere in the region or on the globe, minimizing ecological footprint effects in both space and time. Sustainable buildings encourage physical health through their design and promote energy efficiency, water conservation, renewable energy use, material recycling, and indoor environmental quality and comfort by taking passive and active advantage of bioclimatic resources, reducing effluents, and allowing buildings to participate in “natural” cycles. Sustainable buildings, however, are not good design if they do not also contribute to the hypernatural experience.

2. **Hypernatural experience** is the intensive, designed, and often quite urban experience of flora, fauna, and the outdoors; recreation grounds testing our own bodies against time, space, and the bodies of others; and parks and compacted landscapes, including the contemplative value of distant views of sky, celestial objects, changes in the weather, water currents and sounds, the rain, and the hydrological cycle. A modest window box is hypernatural, as are community gardens, indoor plants, botanical gardens, and even zoos. This aspect of green is clearly palliative and artificial, but it cannot be faked. Human nature being what it is, hypernatural experience is essential to render green design attractive, ultimately producing ecological urbanism.

3. **Ecological urbanism** is an environmentally responsible pattern of human settlement, which manages territorial resources, traffic flows, and infrastructural sys-
tems in a clear and visible relation to natural systems. One could say that it is humanizing nature; more accurately, it could be termed the rendering of a natural ecology as human artifice (Ingersol 1996). Ecological urbanism is the sustainable habitat of a human-centered ecology. This notion may be simply the well-designed product of the prior two green aspects \((a \times b = c)\), but a certain vital density is also required.

The synthesis of these concepts may be exemplified by four projects. The first is a housing project in Isselstein, near Utrecht in the Netherlands (figure 2). The Dutch have designed every inch of their little country, claiming new land from the sea and creating dense, sustainable landscapes. “What is nature and what is artifical?” asks landscape architect Dirk Sigmons, “You can’t say. The landscape is an abstraction. . . . It is a form of degenerated nature, but at the same time it is a beautiful landscape” (Winner 2002, 48). This paradox typifies intensive green design.

Each townhouse has a solarium clad with photovoltaic glass panels, endowing a sun-space with sun power. Each dwelling has a little garden, and also a little bicycle shed. There are more bicycle parking spots in the Netherlands than car parking spots, in part because everything you need is designed to be within biking range. The Dutch design new neighborhoods in terms of transit, mixed use, and open

\[ \text{Figure 2} \quad \text{Intense green: Isselstein townhouses (built 2002).} \]
space preservation (Beatley 2000; see also Beatley’s essay in this volume). Nothing is left to chance or to change, and with such a static human ecology, a certain cultural sterility results. The architecture is sustainable, the landscape is hypernatural (as is all the Netherlands), but ecological urbanism should invite more of the kinds of choice, conflict, open-ended change, and quick reallocation of resources found in nature. Any given street corner in New York City is far riskier, far more like a natural ecology, with much more to gain or to lose, than this deliberately predictable new town.

In Hamburg, Germany, the original street façade of this office block had begun leaking. The owners were going to replace it, a very disruptive process. We said, don’t replace it; just hang a veil of photovoltaic glass in front of it. Not only is the leakage problem solved, but solar electricity is generated along with passive heating and ventilation, and natural light levels are maintained inside the building. Daylight is law in Germany. Office workers may only work where there are certain levels of natural light. Between the building’s “skins,” the old and the new, two spaces were designed: a second floor winter garden and a street-level sidewalk café. Our buildings and cities must undergo just this sort of green retrofit, where building systems are made more efficient and sustainable and at the same time better attuned to their urban context.

The third example is a new photovoltaic glass canopy for the Stillwell Avenue subway terminal on Coney Island in New York City (figure 3). The design is both old and new, with photovoltaic glass panels mounted into a neo-Victorian steel structure. The expansive daylighted space celebrates mass transit and marks the island’s economic revival. With all the honky-tonky thrills Coney Island now stands for, let’s not forget what started it all: a broad ocean beach within a subway token’s reach of every city family. It’s a hypernatural experience on a budget.

As a fourth example, we are designing an environmental learning center in a new waterfront park at Stuyvesant Cove on Manhattan’s East River, where we hope to blur the boundaries between building, water, city, and landscape (figure 4). The building is to be passive solar, well insulated, and substantially daylighted; powered by sun, water, and wind. A screen of deciduous vines surrounds the second floor, controlling solar gain according to the seasons. The roof sawtooths are made with photovoltaics on the south-facing slopes; the north faces are ventilating clerestory windows. By generating all the power it needs and treating all the effluent it generates, the building will have net zero environmental impact.

The design also endows an old industrial landfill with rare urban views of sky and water. It creates a place for an artificial wetland to be used as a recreational water park. An atrium greenhouse allows the park to pass indoors, and a café underneath the building allows views of the river and the new landscape.

Because the building is just a little bigger than a New York brownstone and a little smaller than a tenement apartment building, it provides a familiar scale for
Figure 3  (Top) Exterior and (bottom) interior of photovoltaic glass enclosure above Stillwell Avenue subway station, Coney Island, New York.
urban ecological education. On the second floor of the building is its major display, an “eco-neighborhood” where all the environmental impacts of everyday urban life will be demonstrated. Outside, the waterfront esplanade connects all the way from downtown to Manhattan’s Upper East Side, a new thoroughfare for health-conscious commuters, joggers, and roller-bladers. Net-zero sustainability, hyper-natural wetland landscaping, and the explicit demonstration of urban ecology qualify this design as “intense green.”

All four examples are located in the middle range of the scale of urban density. One of the measures of density is floor area ratio (FAR), the ratio of a building’s total floor area to that of the plot of land upon which it sits. For example, if a five-story loft building is built right up to the lot lines on all sides, it would have an FAR of 5. Brownstone neighborhoods have about a 2.0 FAR. Suburban neighborhoods are often built below 0.1 FAR. The house near Woodstock, New York, at the rural extreme, has an FAR of less than 0.01.

The Empire State Building has a floor area thirty-two times its plot area (32.0 FAR). Maximum urban densities since the 1960s are often set at 15.0 FAR, which is still very high. Could extremely high densities such as these ever be considered “green”? 
Extreme Green

The curators of the National Building Museum in Washington, D.C., invited our firm to speculate on the environmental design of very large buildings for an exhibition they were planning entitled “Big and Green.” Given the timing of this assignment, we could not help but be influenced by the design of the World Trade Center, whose destruction our entire staff had witnessed. Despite the ensuing skepticism concerning tall buildings in terms of safety, desirability, and symbolism, we remembered Louis Sullivan’s artistic appraisal of the skyscraper:

It is not my purpose to discuss the social conditions; I accept them as a fact, and say at once that the design of the tall office building must be recognized and confronted at the outset as a problem to be solved—a vital problem, pressing for a true solution. (Sullivan 1896)

We decided to investigate the trajectory of environmental technologies as applied to tall buildings. Pushing to the extreme, what might a green skyscraper look like in the year 2020?

The invitation from the National Building Museum stemmed from our role as solar design consultants for the Condé Nast tower at Four Times Square. The developer, the Durst Organization, was determined that this building would be the first green skyscraper in the country. The design, by Fox and Fowle Architects, deployed an impressive array of sustainable design techniques: recycled construction materials, efficient and finely tuned mechanical systems, water conserving bathroom fixtures, fuel cells providing power for energy-efficient lighting at night, high fresh air rates for excellent indoor air quality; it would take a book to describe all these strategies (Lippe 1998).

Although photovoltaics on the roof had been rejected as too costly, the design envisioned expensive spandrel panels for the glass exterior wall. Working with the construction contractor, Tishman Construction Corp., and the New York State Energy Research and Development Authority, we demonstrated that substituting photovoltaic panels for these spandrel panels could be cost effective.

This building’s cylindrical electronic billboard participates in the gaudy light show of Times Square, and with an FAR above 30, it is certainly a high-density urban structure. In terms of the hypernatural and ecological urban aspects just defined, however, this building earns little credit. Because it is a large, monofunctional office block, its mechanical systems can be finely tuned for its use, but there are external inefficiencies; large single-use buildings contribute to overloaded transit systems (rush hour congestion) and utility services (peak cooling demands) during weekdays, followed by extended periods of underuse. Even if an office building is fully rented, it is nearly empty all night and on weekends (that is to say,
most of the time). Mixed-use buildings and neighborhoods produce a far better, greener use of urban infrastructure.

This building’s experience is not hypernatural either; many people work inside without the daylight and views that are every German worker’s legal right. Because it occupies a small lot, hemmed in by Broadway, Forty-second Street, and Forty-third Street, the building makes no contribution to urban open space. Transit access is very good here, and so the density permitted under the zoning is very high.

Farther east on Forty-second Street, an even better office tower is now under construction at One Bryant Park (figure 5) (see figure 2 in Eugenie Birch’s essay in this volume). After ten years of experience, green architecture is now practiced on an expert level, and recycled building materials, renewable and cogenerated energy, peak cooling load reductions, rain and gray-water harvesting, and so forth—all the good green strategies—are represented in this design. The designers, Cook and Fox, have not neglected natural experience. A winter garden fills the lobby, and there are wonderful views of Bryant Park to the south. With careful accounting, this new building can aspire to the highest USGBC rating. With both these towers, however, their small properties precluded the creation of significant open space at street level. That is unfortunate in terms of both policy and design.

Why can’t we build parks with our towers? The early modernists made exactly this argument: dense cities should be built vertically, with the ground cleared for greenery, parkland, and public amenities (Le Corbusier 1925). At the other end of Forty-second Street, Le Corbusier left a generous plaza for the United Nations’ headquarters, as did Mies van der Rohe at the Seagram Plaza on Park Avenue. Despite New York’s narrow street grid of 1811 (Plunz 1990)—which assumed brownstone development, not high-rises—both architects designed high-rises with magnificent open spaces. Indeed, Le Corbusier’s famous criticism of lower Manhattan (Koolhaas 1979) was not that it was too dense, but that its skyscrapers were too small and too close together. Mies’s and Le Corbusier’s vision was enshrined in the plaza bonus of New York’s 1961 zoning law, but the buildings and projects that resulted—often combining several blocks into “superblocks”—were usually monofunctional housing or office developments (see the essay by Jerold S. Kayden, this volume). And like any other monofunctional project, for more than half the time they were deserted. Observing this desolation, Jane Jacobs’s devastating critique of modern high-rise plazas and “tower-in-the-park” developments led her to recommend that cities have many short blocks instead (Jacobs 1961). Reinforced by the New Urbanism’s preference for traditional street patterns, the small urban block has become dogma. Misguided by these misaligned principles, we do not build parks with our towers because we have decided that streets are more important. One area of popular consensus for the redevelopment of the World Trade Center site (15 FAR), for example, is that the pre-1970 grid of streets should be reinstated across the site.
That would be fine if we were going to build brownstones there. Some of the conflicts between high density and small blocks are illustrated by my proposal for loft development west of New York’s garment district (Yaro and Hiss 1996, 122ff). We postulated that the transport infrastructure west of the garment center could easily support higher-density development, if that density were to support an intensive mixed-use district. You can convert a loft building to just about anything. Loft apartments, hotels, offices, and industry can all be accommodated in the same loft building type.
The problem, at this density, is the streets. There is no relief here from chock-a-block bulk. Under conditions of increased urban density, streets become increasingly dark. Even on a sunny day, approaching the garment center from the west is like going into a basement; you proceed from sunlight into darkness and from open streets to anarchic congestion. At this FAR, superblocks provide superior design possibilities—just as Le Corbusier and the early modern architects always said—for good-quality public space, more natural light and greenery, and better traffic management.

There are positive examples in most cities. In New York, Bryant Park is on a superblock, and Rockefeller Center is a megastructure. Park bonuses on superblocks can do for urban development what cluster zoning does for suburban development: preserve significant areas of open space for the public to enjoy, while still satisfying Jacobs’s concerns about scale.

Superblocks also allow urban designers better access to on-site natural resources. Nature does not stop at the city limits. Sunlight falls with more than a thousand watts of power on every square meter on earth, cities included. Wind is another powerful resource, especially at high elevations. And just because we intend to use these resources intensively does not make that use any less “natural” (or “hypernatural?”). Other species also use resources intensively. The barossa termite of South Africa, for example, occupies anthills of far greater density than any human city and designs those anthills for completely passive solar heating and earth cooling.

Central locations are often well served by transit, and where human cities approach anthill densities it must be considered the equivalent of a natural resource, to be managed, harvested, and improved with care. So the three aspects of intensive green still apply at this extreme end of the scale: sustainable architecture, ecological urbanism, and hypernatural experience.

Our tall building design for the National Building Museum did not apply to any specific site; figure 6 shows a generic large city, with both Chicago’s Sears and Malaysia’s Petronas Towers on the skyline. Instead, the design focused on the issue of great height: one hundred and fifty floors. The building must be as safe, or safer, than a conventional building, so instead of two fire stairs, this building would have seven. Our engineers, Ove Arup and Partners, modeled a ductile, triangulated structure to withstand the stresses of a major disaster, whether natural or man-made.

By 2020, many trends in technology will achieve complete sustainability. New glass coatings and suspended films—photovoltaics are just one of many—are steadily rising in efficiency and dropping in cost. They suggest new design paradigms. Conventional sustainable buildings are “fat,” with as little skin area as possible in relation to cubic volume, so as to minimize heat loss in the winter and solar gain in the summer. If progress on advanced coatings continues, then this principle will be reversed. Buildings will be “skinny” so that selective cladding systems can
Figure 6
Extreme green: The 2020 Tower (project).
provide daylight, ventilation, and solar energy to every square foot of interior space. Natural lighting, insulating films, and super-efficient mechanical systems will in turn reduce energy consumption. With photovoltaic coatings on vision glass and spandrels and a “tiara” of wind turbines crowning the top (shielded by photovoltaic louvers to eliminate strobe effect), the building will create as much power as it consumes. So, even in the heart of the big city, energy demand may converge with renewable on-site resources, and this big building would operate without any energy impacts.

To purify wastewater, there would be a Living Machine® system at every thirty stories, greening the edge of each setback terrace and public upper floor with pleasing foliage. The plant and bacterial life in these Living Machines would treat, purify, and recycle all water-borne effluents from toilets, sinks, and baths in the building through a series of hydroponic biological processes. These processes also support lush tropical plant life. Water can be used, treated, and reused within the building so that the only losses would be from evapotranspiration and the occasional spill. Now that’s extreme green!

On sunny summer days, this building would have to sell the extra power it generates to its neighbors. At night, it would have to buy it back. It would therefore depend on a distributed local network of energy production and delivery. On-site water supply will not always be balanced with on-site water demand, either. In other words, the building design implies a symbiotic relationship with its bioregion.

It would not be just an office building. Most floors measure only fifty feet from window wall to window wall, partly for sustainability but also for multiuse flexibility. As the market for citywide space demands, the building will easily accommodate an ever-fluctuating mix of commercial and residential uses. It is an open urban ecology.

The elevator systems also permit great flexibility, with express stops (like the New York subway) every thirty stories. The “sky-lobbies” at these stops could be public places, rimmed with the luxuriant plant growth of Living Machines, multi-storied, ramped, with access to generous exterior terraces. On 30, there could be a major hotel lobby; on 60, a multiplex cinema; on 90, a health club; on 120, a winter garden. Mixed use would make this megastructure lively, public, and efficient to run around the clock.

The mixed use is not only vertical; it is also horizontal because the building’s footprint is far larger than a city block. It would be knitted into the fabric of a typical urban grid, extending the streets with a system of commercial skylit pedestrian gallerias for ground-floor retailing and multiple points of access, and major subway station hall.

Why go 150 stories? Most downtowns are already heavily shaded, so this additional impact would be marginal. Perhaps the most important potential benefit is that tall buildings can save space for parks large enough to permit sunlight to again
penetrate to street level. This fourteen million square foot complex on a superblock of nine hundred thousand square feet represents an FAR of 15.5, which is very high density, as befits a big city center. Yet because all this space is distributed over 150 skinny stories, the building leaves public space for courtyards and gallerias, and best of all, for a public park of some seven acres, with neighborhood parking and loading areas located underground. This precious green space in the very center of the city would go a long way to producing a hypernatural experience both outside and inside the building. Because the building is “skinny,” no one can get more than twenty-five feet from natural light, operable windows, and spectacular views. Unlike in many office towers, its occupants would know when it rains or when a storm front grows on the western horizon. Doesn’t everyone want an outside office or a bedroom with a view?

So, although it’s a bit of a stretch, extreme green can be done, even in the busy centers of very large cities. This building would have zero off-site energy and effluent impacts. And a new park could come with it.

Environmental values must inform our technological choices, whether in thoughtful design decisions on specific projects or in the mass-scale decisions we make together, as citizens and consumers. Not all technologies are created equal. As we have seen, technology strains to resolve ecological concerns at both ends of the density spectrum; a house in the country and a skyscraper downtown must both go to heroic lengths to be green. Stand-alone houses must be heavily insulated and sealed against weather extremes, must achieve energy efficiency despite low occupancy levels, and the automobile dependency they encourage must be somehow offset or mitigated. At very urban densities the design challenges are different but equally pressing; here designers must consider abandoning traditional street grids, forgo the conventional wisdom of “fat” energy conservers in favor of “skinny” energy producers, and invent elaborate means to introduce greenery and daylight.

Between these extremes, the “intense green” projects—urban, but not downtown—represent the most reasonable (and, presently, the cheapest) focus for sustainable design. Between 0.5 to 3.0 FAR, buildings can be optimized for daylight, solar power, energy conservation, rainwater collection, and waste collection and treatment. At these densities, simple sustainable strategies may resolve multiple issues, including the provision of hypernatural experience: Ijsselstein’s solaria, Hamburg’s winter garden, Coney Island’s subway to the beach, and Stuyvesant Cove’s wetland water park. At these densities, people can choose between multiple transit modes and housing types, and urban habitats can be harmonized with renewable resources. The examples given in this essay are admittedly anecdotal—just a half a dozen projects—but it would appear that green design should be neither pale nor extreme. Intense green is the Goldilocks solution—it’s just right—the right shade of green.
We humans are not like termites, beavers, or bees. Our energy and infrastructural technologies are still evolving. As a result, we have not yet settled on the design or the distribution of our “native” habitat, and it is difficult to forecast any final point of equilibrium. Over the next century, the edges of our cities may densify; the centers may diversify. Some of us will still want to live in isolation, despite the environmental damage we tend to do there, and some will want to crowd together in the very centers of our cities. Whatever a sustainable human habitat will look like, it is likely to be ecologically urban, architecturally sustainable, and intensively natural. Our skylines will then seem as “natural” as that of Tolkein’s mythical City of Lothlorien, which at first sight so confused Frodo: Are those naturalized buildings, or humanized trees? Ultimately, whatever defines our cities will define our species. We will finally recognize our cities as our wilderness, our habitat, our very nature.

Notes

1. Meeting the needs of the present generation without compromising the ability of future generations to meet their needs (WCED 1987). Donald Watson (Watson 2001) discusses the origins of the notion of sustainable development and its official and evolving definitions. Clare Palmer (Palmer 2003, 18) summarizes objections. Human societies have confronted finitude before—the Greek polis, for example (Kitto 1951, 64–79), and the Easter Islanders (Ponting 1991, 1–7)—and this current confrontation is real: we do not have a second or third biosphere to absorb our environmental impacts, as would be necessary if the whole world adopted the current “first world” footprint (Rees and Wackemagel 1991).

2. Although our species evolved in a natural setting—the savannahs and forests of Africa—humans have always tended to live together in ever-larger cities. Aristotle believed that true humanity was only possible in cities (Aristotle’s Politics 1253), and now half of all Greeks live in Athens. Not everyone will want to live in cities (many have no choice about where they live), but that is now the norm for the majority of the earth’s human population (Davis 1966). This “natural” tendency has always been limited: first there were food and transportation limitations, then sewage treatment and public health issues, and now public order and perceived congestion. There have been other hesitations, too. Europe in the Dark Ages was antiurban because cities were considered not only vulnerable to barbaric invasion, but also congenitally sinful (Augustine, City of God, Book XXI, 1958).

3. Although there are many architects whose work could as easily illustrate this chapter, all these examples are taken from the work of my design firm, Kiss + Cathcart, Architects (www.kisscathcart.com), if only because I am most familiar with both its strengths and weaknesses. My thanks to Gaby Brainard, Ryan Byrnes, Tony Daniels, Brooks Dunn, Luis Estrada, Kimbro Frutiger, Robert Garneau, and Claire Mifflin of Kiss + Cathcart, Architects, and their consultants Arup, Drew Gillette, Atelier Ten, Goldstein Associates, and Judith Heinz. Most of all, thanks to Gregory Kiss, who served as principal-in-charge for many of the projects shown and described here.

4. Logs look natural, but in a cold climate, they are neither airtight nor sufficiently insulating. Icicles indicate insufficient roof insulation and ice-damming. Windowpane frost indicates condensation on too-cold interior surfaces. Wood stoves pollute. The outhouse will poison everyone downstream, and the jeep is exempted from current fuel consumption regulations.


6. Relative data on the environmental effects of various consumer behaviors, transportation, housing, and design choices can be found in Brower and Leon 1999.
7. U.S. Green Buildings Council (USGBC) certifies building designs as being “green” through the use of a checklist called LEED (Leadership in Energy and Environmental Design). Each green design strategy is awarded credits, and the credit totals allow a building design to be “certified,” “silver,” “gold,” or “platinum.” One difficulty with LEED is that the relative economic costs and environmental benefits of the various green strategies are not further weighted. A list of USGBC certified projects may be found at www.usgbc.org. More extensive case studies of these and other green designs may be found at www.eren.doe.gov/buildings/highperformance/projects_list.html.


14. Fox and Fowle Associates, Architects; Cosentini Associates, LLP, Engineers.

15. Spandrel panels are opaque glass panels between the top of a window and the sill of the next window above, sometimes giving the appearance of a sheer all-glass skin.

16. For just one example referring to this consensus, see D. W. Dunlap, “21st-century plans, but along 18th-century paths,” New York Times, 17 July 2002. The plans for the rebuilding of the World Trade Center will create much welcome open space around the footprints of the old towers, but at this writing will not achieve mixed use to any significant degree.

17. Cluster zoning defined in Whyte 1964 and further in Whyte 1968.

18. Paul Stoller, consulting energy engineer, suggested this reference.


20. The old World Trade Center had just about this same usable floor depth, except that in that case (as in most conventional buildings), this depth was from elevator core to windows.

References


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In few other parts of the world is there as much interest in urban sustainability as in Europe, especially northern and northwestern Europe. Many European cities are pushing the envelope of urban sustainability, undertaking a variety of impressive actions, projects, and innovative policies to reduce their ecological footprints as well as to enhance long-term livability. For several years, I have been researching innovative sustainability practices in European cities, with many of the exemplary cases described in the book *Green Urbanism: Learning from European Cities* (Beatley 2000). What follows is a summary of some of the key themes from this research and most promising ideas and strategies found in these more than thirty cities, scattered across eleven countries.

Sustainability is an increasingly common goal at the local or municipal level in Europe and especially in the cities selected for study. The concept of sustainable cities or ecological cities resonates well at this local level and has important political meaning and significance in these cities and on the European urban scene in general. One measure is the success of the Sustainable Cities and Towns campaign, a European Union–funded informal network of communities pursuing sustainability begun in 1994. Participation has been great, with more than two thousand local and regional authorities having signed a sustainability charter (the so-called Aalborg Charter, after the Danish city that hosted the first campaign conference). Among the activities of this organization are the publication of a newsletter, networking between cities, and convening conferences and workshops. The organization has also created the European Sustainable City award, and it is clear that these awards have been coveted and highly valued by politicians and city officials. These European cities demonstrate serious commitment to environmental values and have much to teach about how to put them into practice.

European cities have also gone through or are going through extensive local Agenda 21 activities, typically resulting in the preparation of a local sustainability action plan and a host of tangible actions for making these communities more sustainable. These actions range from composting and recycling initiatives, to urban ecosystem restoration, to establishment of neighborhood sustainability centers. European city participation has been relatively high, with nearly 100 percent of municipalities participating in countries such as Sweden, for example. (For a review of Local Agenda 21 experience in Europe, see Lafferty 2001.)
Green Urbanism: Compact and Ecological Urban Form

Although European cities have become more decentralized, they are typically still more compact and dense than U.S. cities. This tighter urban form helps make local sustainability initiatives more feasible in terms of, for example, public transit, walkability, and energy efficiency. There are many factors that explain this urban form, including an historic pattern of compact villages and cities, a limited land base, and different cultural attitudes about land. Nevertheless, in the cities studied there are conscious policies aimed at strengthening a tight urban core. Indeed, the major new growth areas in almost every city studied are situated within or adjacent to existing developed areas and are designed at relatively high densities. Moreover, these new growth areas are incorporating a wide range of ecological design concepts, from solar energy to natural drainage to community gardens, and effectively demonstrate that ecological and urban can go together. Good examples of this compact green development can be seen in the new growth areas planned in Utrecht (Leidsche Rijn), Freiburg (Rieselfeld), Kronsberg (Hannover), Amsterdam (e.g., IJburg), Copenhagen (Ørestad), Helsinki (Viikki), and Stockholm (Hammerby Sjöstad). (See Beatley 2000 for further discussion of each area.)

Leidsche Rijn, a new growth district in Utrecht, incorporates a mixed-use design and a balance of jobs and housing (thirty thousand dwelling units and thirty thousand new jobs) as well as a number of ecological features. Much of the area will be heated through district heating supplied from the waste energy of a nearby power plant, a double-water system that will provide both potable and recycled water for nonpotable uses and stormwater management based on a system of natural swales (what the Dutch call wadies). Higher-density uses will be clustered around several new train stations, and bicycle-only bridges will provide fast, direct connections to the city center. Homes and buildings will meet a low energy standard and must use certified sustainably harvested wood. At Kronsberg, a host of green urban elements are integrated into this new ecological district, including three wind turbines, solar panels, district heating, onsite stormwater collection, green rooftops, and green courtyards and community gardens, all within a car-limited, pedestrian-friendly environment served by a new high-frequency tram line.

The new redevelopment of the Western Harbor (Västra Hamnen) in Malmö is another model example. Here, a former industrial area is being converted to a new living district, with sustainability as the key organizing principle. One of the main goals is to provide for 100 percent of the energy needs of the district from locally-generated renewable energy. Through the installation of a 2 megawatt wind turbine, and photovoltaics and solar hot water heating panels on building rooftops, this goal has already been achieved (see European Academy for the Urban Environment 2001). Other important ecological elements include a circular waste treatment system in which biogas is extracted from organic waste and returned to
the district through the natural gas grid, on-site collection of rainwater (and creative urban design that marvelously integrates water into the district and makes it visible throughout), and extensive natural habitat creation (figure 1). These new developments show convincingly that green and urban go together, indeed are complementary and mutually reinforcing, creating compelling and highly livable communities that exert an impressively small demand on the earth’s resources.

These cities also provide examples of redevelopment and adaptive reuse of older, deteriorated areas within or near the center city. In Amsterdam’s eastern docklands, eight thousand new homes have been constructed on recycled land. In one part of this project, Java-eiland, design diversity has been encouraged through the use of multiple architects. The overall plan for this island district successfully balances connection to the past (a series of canals and building scale reminiscent of historic Amsterdam) with unique modern design (each of the pedestrian bridges crossing the canals offers a distinctive look). Java-eiland demonstrates that city building can occur in ways that create interesting and organically evolved places and that also acknowledge and respect history and context, and overcome monotony.

One of the boldest ecological restoration and land recycling initiatives has taken place in the industrial Ruhr Valley of northwestern Germany, consisting of former coal mines and steel mills. Here a regional regeneration strategy has been implemented, including seventeen municipalities and an urban agglomeration of two million people. The bold effort involved formation of IBA-Emshcher Park, an international exhibition, comprising some 120 different reuse projects over an eight-hundred-square-kilometer area. The projects range from the conversion of a large gasometer to exhibition space, to transforming slag heaps into parks and public art. In the process, these bold initiatives have fundamentally reshaped the local perception of this formerly bleak, industrial landscape. One spectacular example is the Duisberg-Nord Landscape Park, where a former steel mill has been miraculously transformed into a unique city park (figure 2). Formal gardens have been carved out of coal and coke storage areas, foundation walls are turned into climbing and repelling areas, and the blast furnace a kind of industrial Eiffel Tower. Here visitors “cannot help but be awed by the skill and strength demanded of the men who once produced iron and steel here” (LaBelle 2001, 225).

It is an odd landscape of “industrial monuments” and landscape art, the latter converting negative remnants of the industrial landscape into a most interesting and positive aesthetic. As Judith LaBelle notes, the art was important for signaling a new direction:

The art has helped to signal the forward-looking nature of the initiative and to provide a system of new landmarks through the landscape. Several large sculptures have been installed atop slag heaps, including the towering Tetrahedron at Bottrop. Lighted at night, they provide new reference points in the night landscape. Smaller, more intimate sculptures have been created in areas newly used for parks and recreation. They serve to draw
Figure 1  Vertical solar hot water panels in the sustainable planned district Vastra Hamnen, in Malmö, Sweden. (Photo by Tim Beatley.)
Figure 2  The Landscape Park in Duidberg-Nord in Germany’s Ruhr Valley includes creative reuse of a former steel mill. (Photo by Tim Beatley.)
this visitor into a landscape that has hitherto been off-limits and foreign. Some are composed of industrial artifacts found on the site, providing a more intimate connection with the site’s history. (LaBelle 2001, 226)

These European cities have also undertaken numerous efforts to enhance the quality and attractiveness of their city centers. In the cities studied, the center has remained a mixed-use zone, with a significant residential population. Groningen, for instance, has created new pedestrian-only shopping areas (a system of two linked circles of pedestrian zones) and has installed yellow brick surfaces and new street furniture. Committed to a policy of compact urban form, Groningen has made a strong effort to keep all major new public buildings and public attractions close to the center. A new modern art museum in that city has been sited and designed to provide an important pedestrian link between the city’s main train station and the town center.

Freiburg has done much to improve the attractiveness of its center: gradually making much of the core more available to pedestrians, maintaining housing and people living in the center (e.g., forbidding the conversion of existing downtown housing to commercial and other uses), and strengthening the visual landmarks and aesthetic qualities of the old city center. Especially unique is the city’s network of small water channels in the city’s streets (so-called bächle), which add a special flavor and enjoyable quality to this place. Developers of new projects in the city are now asked to build onto and expand this unique system, furthering strengthening these unique and special qualities.

Many reasons help explain why these European cities are able to achieve a more compact urban form. In countries such as the Netherlands, there are clearly stronger public planning systems in place, with a considerably greater role for provincial and national governments (e.g. see Van den Brink and Van der Valk, 2002). A generally greater public-sector role in shaping development and growth, restrictions on private land use, and economic incentives that encourage cooperation and more sustainable outcomes (e.g., much higher gasoline and energy prices, carbon taxes) is also a significant factor. A different attitude about land—one that views it as a precious and limited resource—and a cultural affinity for urban settlements and living are, to be sure, also important factors.

**Sustainable Mobility**

Achieving a more sustainable mix of mobility options is a major challenge, and in almost all the cities studied in *Green Urbanism*, a very high level of priority is given to building and maintaining a fast, comfortable, and reliable system of public transport. Zürich, for instance, gives priority to its transit on streets with dedicated lanes for trams and buses and numerous improvements to reduce the interference of autos with transit. A single ticket is good for all modes of transit—including
buses, trams, and a new underground regional metro system—in the city. The frequency of service is high and the spatial coverage extensive. Cities like Freiburg and Copenhagen have made similar strides (figure 3).

Commitment to excellent public transit services is a hallmark of many European cities. Cities like Zürich, where public transit has been given official priority over cars, seek to make transit faster, easier, and more pleasant to ride and to coordinate service extensions with new housing. Integrated transport systems, where movement from one mode to another is made easy and where riders have real-time information on when the next train, tram, or bus will arrive, are consistent qualities. (See Newman and Kenworthy 1999 for a good discussion of European public transit systems.)

In most of the cities studied, regional and national trains systems are fully integrated with local routes. It is easy to shift from one mode to another. And, with the continuing commitment to the development of a European high-speed rail network, modal integration is becoming even greater.

Furthermore, transit investments complement, and are coordinated with, important land use decisions. The new development Rieselfeld in Freiburg, for instance, has a new tram line even before the project has been fully built. In Amsterdam’s new neighborhood of Nieuw Sloten, tram service began when the
first homes were built. In the new ecological housing district *Kronsberg*, in Hanover, three new tram stops ensure that no resident is farther than six hundred meters away from a station. There is a recognition in these cities of the importance of providing new residents with options and establishing mobility patterns early.

*Car sharing* has become a viable and increasingly popular option in Europe cities. Here, by joining a car-sharing company or organization residents have access to neighborhood-based cars on an hourly or per kilometer cost. There are now more than one hundred thousand members served by car-sharing companies or organizations in more than five hundred European cities. Some of the newest car-sharing companies, such as *GreenWheels* in the Netherlands, are also pursuing some creative strategies for enticing new customers. GreenWheels has been developing strategic alliances, for example with the national train company, to provide packages of benefits at reduced prices. A key issue for the success of car-sharing is the availability of convenient parking spaces, and a number of cities, including Amsterdam and Utrecht, set aside spaces for this purpose. In cities such as Hanover, Germany, the car-sharing organization there (a nonprofit called Okostadt) has strategically placed cars at the stations of the Stadtbahn, or city tram, further enhancing their accessibility.

**Taming the Automobile**

Many of these cities are on the vanguard of new mobility ideas and concepts and are working hard to incorporate them into new development projects. Amsterdam, for example, has taken an important strategy in developing *IJburg*, its newest growth area. It is working to develop a comprehensive mobility package that all new residents will be offered and that include, among other things, a free transit pass (for certain specified period) and discounted membership in local car-sharing companies. Minimizing from the beginning the reliance on automobiles and giving residents more mobility options are the goals. Eventually this new area will be served both by an extension of the city’s underground metro and fast tram (Beatley 2000).

An increasing number of car-free housing estates are being developed to further reduce auto dependence. The *GWL-Terrein* project, built on Amsterdam’s old waterworks site, incorporates only limited peripheral parking. Mobility is assisted by good tram service and, when a car is needed, an on-site car-sharing company. The interior of the project incorporates extensive gardens (with 120 community gardens available to residents) and a pedestrian-friendly environment, with key-lock access for fire and emergency vehicles.

Freiburg’s *Vauban*, another car-free district, charges residents approximately $18,000 for the cost of a space in the local parking garage (about one-tenth the cost of the housing units), a strong disincentive to car ownership. Projects like *Vauban* challenge new residents to think and act more sustainably (figure 4).
Many of the cities studied have made tremendous efforts to expand bicycles facilities and promote bicycle use. Berlin has eight hundred kilometers of bike lanes, and Vienna has more than doubled its bicycle network since the late 1980s. Many actions have been taken by these cities to promote bicycle use, such as separated bike lanes with separate signaling, priority at intersections, signage, and provision of extensive bicycle parking facilities, including minimum bicycle storage and parking standards for new development.

Some cities actively promote “public bikes.” The most impressive is Copenhagen’s City Bikes program, which makes available some two thousand public bicycles throughout the center of the city. The bikes are brightly painted (companies sponsor and purchase the bikes in exchange for the chance to advertise on their wheels and frames) and can be used by simply inserting a coin as a deposit. The bikes are geared in such a way that the pedaling is difficult enough to discourage their theft. The program has been a success, with the number of bikes increasing. More recent have been efforts at developing higher-tech systems of “smart bikes.” For instance, Deutsche Bahn, the German train company, has been experimenting with a system of bikes available at major train stations, such as Frankfurt. The bikes can be reserved by phone or on line and can be accessed through electronic locking pads installed on the bikes. These bikes are easily dropped off at one of a number of
points around the city, and a rider’s credit card is charged for the actual time the bike is used (figure 5).

**Greening the Urban Environment**

Ensuring that compact cities are also green cities is a major challenge, and there are a number of impressive greening initiatives among the study cities. First, in many of these cities there is an extensive greenbelt and regional open space structure, with a considerable amounts forest and natural land owned by cities such as Vienna, Berlin, and Graz. Cities such as Helsinki and Copenhagen are spatially structured so that large wedges of green nearly penetrate the center for these cities. Helsinki’s large *Keskuspuisto* central park extends in an almost unbroken wedge from the center to an area of old growth forest to the north of city, one thousand hectares large and eleven kilometers long.

Hannover boasts an extensive system of protected greenspaces, including the *Eilenriede*, a 650 hectare dense forest located in the center of the city. Hannover has also recently completed an eight-kilometer-long green ring (*der Grüne Ring*) that circles the city, providing a continuous hiking and biking route and exposing residents to a variety of landscape types.

Ecological networks are being developed within and between urban centers. They are perhaps most evident in Dutch cities, where extensive attention to ecological networks has occurred at the national and provincial levels. Under the national government’s Nature Policy Plan, a national ecological network has been established consisting of core areas, nature development areas, and corridors, which must be more specifically elaborated and delineated at the provincial level. In turn, cities are attempting to tie into this network and build upon it.

Greening initiatives may be mandated or subsidized by public authorities. German, Austrian, and Dutch cities are especially proactive concerning ecological or green roofs. Linz, Austria, for instance, has one of the most extensive green roof programs in Europe. Under this program, the city frequently requires building plans to compensate for the loss of greenspace taken by a building, resulting in the creation of many green roofs. The city also will pay up to 35 percent of the costs and provide technical assistance to facilitate green roofs. Some three hundred green roofs are now scattered around the city atop many kinds of buildings, including a hospital, a kindergarten, a hotel, and even a gas station. Green roofs have been shown to provide a number of important environmental benefits and to accommodate a surprising amount of biological diversity (figure 6). Many other innovative urban greening strategies can be found in these cities, from green streets to green bridges to urban stream daylighting (see Beatley 2004).
The Deutsche Bahn, Germany’s national train system, has been experimenting with a unique system of “smart bikes” at train stations equipped with electronic locking pads that can be reserved in advance. (Photo by Tim Beatley.)
A number of the cities seek to promote a more closed-loop or natural urban metabolism in which wastes become inputs or food for other urban processes. Stockholm has administratively reorganized its departments of waste, water, and energy into a combined ecocycles division. A number of actions have already been taken, including the harvesting of bio-gas from sewage sludge and its use as a fuel for the city’s combined heat and power plants. A number of Swedish cities also are using bio-gas from household waste as a fuel for buses and other public vehicles (Swedish Ministry of the Environment, undated; for a review of environmental vehicle programs in European cities, see European Commission 2001). Experience to date suggests that in addition to recycling waste there has been a dramatic reduction in conventional air pollutants as well as in carbon dioxide emissions in these cities. Another powerful example of the closed-loop concept can be seen in Rotterdam’s Roca3 power plant, which supplies district heating and carbon dioxide to 120 greenhouses in the area (figure 7). A waste product becomes a useful input and in this case prevents some 130,000 metric tonnes of carbon emissions annually.

Important strategies in northern European cities are combined heat and power
generation and district heating. More than 91 percent of Helsinki’s buildings, for instance, are connected to district heating systems, resulting in a substantial increase in fuel efficiency and reductions in pollution emissions. In Kronsberg, in Hannover, heat is provided by two combined heat and power plants, one of which, serving about six hundred housing units and a school, is actually located in the basement of a building of flats (see Landeshaupt Stadt Hannover 2000; Beatley 2004).

Heidelberg and Freiburg, among other cities, have set ambitious maximum energy consumption standards for new construction projects. Heidelberg has recently sponsored a low-energy social housing project to demonstrate the feasibility of very low energy designs (specifically, a standard of 47 kilowatt-hours per square meter per year). The Dutch have been promoting the concept of “energy-balanced housing”—homes that produce at least as much energy as it uses over the course of a year—and have built them in new development areas such as Nieuwland in Amersfoort (see figure 8). In Leeuwarden in the Friesland region of the Netherlands, Europe’s first energy-balanced street has been completed. More recently,

Figure 7  The Roca-III power plant in Rotterdam supplies heating and carbon dioxide to some 120 greenhouses in its vicinity. (Photo by Tim Beatley.)
Stad von de Zon (City of the Sun), a new community north of Amsterdam, has been designed to be both energy balanced and carbon neutral. Solar energy and other renewable energy sources are of great importance at the city or municipal level, and there is increasingly the view that cities must lead the way in charting a new path beyond and away from fossil fuels. Cities like Freiburg and Berlin have been competing to be known around Europe and the world as “solar cities,” with each providing significant subsidies for solar installations. In the Netherlands, major new development areas have incorporated both passive and active solar energy. In Nieuwland, nine hundred homes have rooftop photovoltaics, eleven hundred homes have thermal solar units, and a number of major public buildings (including several schools, a major sports hall, and a child care facility) produce power from solar energy.

**Green Cities, Green Governance**

Many of the cities studied seek to set their own environmental houses before asking their citizens to act more sustainably. Some are looking at how their own operations and management can be more environmentally responsible. Albertslund, Denmark, for example, has developed an innovative system of “green accounts” used to track and evaluate key environmental trends at city and district levels. Den Haag has calculated the average ecological footprint of its residents and begun using it as a policy guidepost. Several German cities are using ecological budgets alongside their conventional fiscal budgets, and Rome has been developing a similar system of environmental accounts. The Swedish city of Sundsvall has since 1991 published an annual “environmental balance sheet” (or Mijöboksut), which takes stock of current environmental conditions in the city and actions taking over the course of the year (UBC 2002).

Municipal governments have taken a variety of measures to reduce the environmental impacts of their actions. A number of communities have adopted environmental purchasing and procurement policies. Albertslund, Denmark, mandates that only organic food can be served in schools and child care facilities, and the city restricts the use of pesticides in public parks and grounds. Several cities promote the use of environmental vehicles, and some, like Saarbrucken, Germany, have made great progress in reducing energy, waste, and resource consumption in public buildings.

Some communities have engaged in extensive community involvement and outreach on sustainability. Leicester, England, for instance, has developed alliances with the local media and has sponsored a series of educational campaigns on particular community issues. As a further example, it also runs a demonstration ecological home and garden. Cities like Albertslund have opened neighborhood environmental centers as an effective way to engage and educate the community.
Some Lessons and Observations

European cities thus offer inspiration and lessons for cities elsewhere, including the United States. A few observations and lessons follow.

*Government as catalyst and leader.* European cities display a strong role for municipal governments in shaping sustainable futures. They tend to assume activist and catalytic roles in diverse ways. For instance, they exert considerable control over the use of land and the type, quality, and nature of private development. They typically acquire or already own the land for large new housing areas, prepare detailed plans, install the infrastructure, and establish very specific contractual requirements for builders and developers to follow.

They often use the city’s purchasing power to support sustainable technologies, to educate consumers, and to help local businesses become more sustainable. Sustainable technologies are commonly subsidized and underwritten by cities as, for instance, grants for the installation of green rooftops. Thus, these cities actively support and promote a vision of a more ecological or humane urban community.

*Pushing the ecological design envelope.* Many European cities are promoting green technology and new ecological living ideas on an unprecedented scale. New urban districts like Leidsche Rijn and IJburg in the Netherlands are applying green urban ideas to thousands of new homes. New solar projects like the Stad van de Zon, in Heerhugowaard, are aspiring to be carbon neutral, and projects like the Western Harbor in Malmö are already achieving the goal of 100 percent locally produced, renewable energy. They are bold goals and visionary plans, indeed, for how to craft humane, sustainable places for our future.

*Comprehensive green strategies.* European cities treat sustainability comprehensively. Cities like Freiburg are simultaneously implementing programs to promote solar energy, walking, bicycling and transit use, car-free living, and ecological landscape management. Such green initiatives tend reinforce each other. Strengthening public transit and pedestrian and bicycle use undergirds car-free housing development. Green building and ecological regeneration may help stabilize neighborhoods and reduce turnover in social housing. Thus, one green urban policy can strengthen and complement other social objectives. Moreover, every major building project in these cities is viewed as a chance to promote experimentation, to set and reach new ecological goals, and to demonstrate the integration and application of new ecological ideas and technologies.

*New ways of seeing cities.* Cities and city life are viewed in new ways in Europe. rooftops of sports halls and schools in Nieuwland, in Amersfoort, are viewed as opportunities to generate power as well as opportunities to educate children and the community about energy issues. Cities are viewed not simply as points of consumption but as places where renewable energy can be produced (and consumed).
and integrated into the built fabric. Many of these cities are redefining themselves in terms of a circular metabolism: the Swedish refer to this as ecocycle balancing (Girardet 1999; Rogers 2000).

The perspective of cities as places of nature and as organic natural systems is also taking hold. Cities need not be opposed to or in conflict with nature. Rather, they can and should be seen as inherently embedded in a natural system and condition. Nature in cities is being enhanced by such features as ecological rooftops, green streets, and stream daylighting.

**Changing economic incentives.** On many levels and in many ways, Europeans recognize the importance of leveling the economic playing field to support green urban ideas and technologies. Such leveling takes many forms. Many cities charge homeowners for the extent of impervious surfaces while reducing stormwater fees for homes with green rooftops and permeable driveways, for instance. Subsidizing and investing heavily in nonautomobile infrastructure as well as charging (closer to) the full cost of auto ownership and use (e.g., the experience of the Vauban car-free housing estate in Freiburg) are also examples of this philosophy. Subsidies for green projects and practices often work in tandem with stronger regulations in these European countries. Barcelona’s municipal solar ordinance, for instance, mandates that solar panels provide at least 60 percent of the hot water needs of new and renovated buildings, but at the same time the city provides significant subsidies to encourage installation of solar panels.

**The importance of networks.** Cities are not only operating in different ways within their borders; they are also operating in creative ways among and between themselves. Especially impressive is the extensive use of networks and association of cities. The Sustainable Cities and Towns campaign is an excellent example. On a smaller scale, the Union of Baltic cities (UBC) provides a similar technical and peer support function. Today, more than one hundred Baltic cities participate in the UBC. Through the UBC, meetings, workshops, and seminars are convened, and municipalities share information and insights and provide mutual support. An initiative called the Best City Practices Project, as one example, has paired Baltic cities together in an exchange of knowledge and experience on sustainable development issues (see UBC 2002). A Best Environmental Practice in Baltic Cities Award is also given each year to support good ideas and practice.

Many European cities are facing serious problems and trends working against sustainability: a dramatic rise in auto ownership and use and a continuing pattern of deconcentration of people and commerce. European cities also exert a tremendous ecological footprint on the world. Yet these most exemplary cities provide both tangible examples of sustainable practice and inspiration that progress can be made in the face of these difficult pressures.

Moreover, these examples demonstrate the critical role that cities can and must
play in addressing the serious global environment problems, including overreliance on fossil fuels and global climate change. Innovations in the urban environment offer tremendous potential for dramatically reducing our ecological impacts, while at the same time enhancing our quality of life (e.g., expanding personal mobility options with bicycles and transit). The experiences demonstrate clearly that it is possible to apply virtually every green or ecological strategy or technique—from solar and wind energy to gray-water recycling—in very urban, very compact settings. *Green urbanism is not an oxymoron.* Moreover, the lesson of these European cities is that municipal governments can do much to help bring these ideas about, from making parking spaces available for car-sharing companies to providing density bonuses for green rooftops to producing or purchasing green power.

It is important to recognize that the lessons are not just in one direction. Increasingly, European cities recognize that there are aspects of U.S. planning and policy that are helpful and can provide useful lessons for them as well. Ari Van den Brink and Arnold Van der Valk (2002), for instance, argue that European planning systems have historically tended to be more technocratic (more top down, with greater power given to plans and planners), whereas the U.S. system is more “socio-cratic” (bottom up, participatory, deferential to the wishes of individuals). European planners recognize the need to be more participatory. Techniques such as community visioning tools and citizen design charrettes represent ideas that Europeans increasingly find useful and interesting. There is much, then, to share in both directions.

**References**


William H. Whyte’s 1957 essay “Urban Sprawl” was indeed prescient: despite the open space movement of the 1960s (which he helped to nurture) and its outgrowths—growth management, smart growth, and New Urbanism—metropolitan expansion has continued relentlessly. In 1961, geographer Jean Gottmann defined “Megalopolis” as a region of more or less continuous urbanization extending along the northeastern seaboard from just north of Boston to the Virginia suburbs of Washington, D.C. Since then, Megalopolis has sprawled north, west, and south beyond its 1960s geographic size.

Megalopolis today would include southeastern New Hampshire and the southern Maine coast, Massachusetts west to the Berkshires, the Hudson River Valley north to Lake George, much of New Jersey and eastern Pennsylvania, most of Maryland, portions of West Virginia, and the I-95 corridor south at least to Richmond, Virginia, a vast megaregion covering parts of thirteen states and containing nearly fifty million people. Just southwest of that, a new complex following I-85 and I-40 connects the North Carolina metro areas of Charlotte, Greensboro, and Raleigh–Durham–Research Triangle. Greater Atlanta now reaches more than 110 miles north to south, compared with 65 miles in 1990 (Bullard, Johnson, and Torres 2000, 9). Both coasts of Florida are solidly lined with metropolitan areas. Greater Chicago extends well into northwestern Indiana and southeastern Wisconsin. The Colorado “Front Range urban corridor” reaches from Pueblo northward to Fort Collins and Greeley, encompassing metropolitan Denver, Colorado Springs, and Boulder. Greater Los Angeles is spilling eastward across the “inland empire” of Riverside and San Bernadino counties into the Mojave Desert. Irrigated farms of California’s Central Valley are disappearing under pavement, and the fringes of Portland and Seattle are flirting with each other along the foothills of the Cascades. (These trends have been recently analyzed by Robert E. Lang and Dawn Dhavale (2005a, 2005b).

As discussed in the introduction of this book, metropolitan areas (central cities plus their suburbs) nearly doubled in population, from 118 million in 1960 to 226 million in 2000: 80 percent of Americans now live and work in metropolitan areas, which themselves have about doubled in total geographic area since the 1960s. Perversely, the fastest population growth has occurred where nature is least
welcoming: the desert settings of metropolitan Las Vegas (1990–2000 population increase of 83.3 percent), Phoenix (+45.3 percent), Tucson (+26.5 percent), and Riverside–San Bernardino (+25.7 percent).

Furthermore, the rate of land consumption has far outpaced the rate of population growth for most metropolitan areas: metro Los Angeles expanded by 300 percent in urbanized land area between 1970 and 1990, while its population grew by only 45 percent; the Seattle region grew by 38 percent in population, but 87 percent in urbanized area (see table 2 in the introduction). Even metropolitan Pittsburgh expanded 43 percent in urbanized land area between 1982 and 1997 despite a regional population decline of 8 percent during the same period (Sustainable Pittsburgh 2003, 3). Metropolitan Portland, Oregon, however, experienced only a 4 percent increase in developed area despite a 31 percent increase in population between 1990 and 2000, owing largely to its urban growth boundary, which limits sprawl onto surrounding farmland and forestland (Michael Houck, personal communication, May 19, 2005).

Sprawl has been further exacerbated by the trend toward ever-larger single-family homes and lots on the suburban fringe. Average floor area per capita in new single-family homes has tripled since the 1950s, and average lot sizes have grown correspondingly (Brewster 1997, 7).

As urban sprawl has enveloped ever more of the nation’s population and accessible land area, perception of its harmful impacts—on society, the economy, and the environment—has broadened as well. The early critiques by William H. Whyte, Charles Little, Ann Louise Strong, and others in the 1960s focused primarily on issues of aesthetics and efficient land use related to urban encroachment on productive farmland and the loss of access to “countryside.” To those still valid concerns have been added a variety of further concerns including air and water pollution, waste of energy and time, traffic congestion and highway accidents, lack of affordable housing, “brownfields,” water scarcity, increased flooding, and loss of biodiversity (Gillham 2002, 75–77).

Beyond such direct consequences are secondary sets of implications, such as (1) the fiscal burdens of providing infrastructure and public services to fringe development (Diamond and Noonan 1996, 34–40); (2) emotional stress on individuals and families due to separation of home, workplace, and other destinations; (3) loss of sense of community (Putnam 2000); and (4) social and environmental justice issues, such as unequal access to housing, jobs, schools, and health services and exposure to environmental hazards. Moreover, sprawl itself with all its social inequity is a product of deliberate public policies concerning taxation, transportation, and local zoning (Bullard, Johnson, and Torres 2000; Platt 2004a, 2004b).

Historically, it has been an American tradition to leave place-based problems behind and seek “greener pastures” through relocation: to the frontier, to the suburbs, to the Sunbelt, and to the coasts, mountains, and deserts. In the process,
however, the metropolis has often been an unwelcome hitchhiker. Metropolitan conditions have spread to such traditional vacation and retirement meccas as Cape Cod, the Maryland Eastern Shore, the Outer Banks of North Carolina, the Sierra and Rocky Mountain foothills, and the golf course utopias of the Southwest. As the urban fringe recedes indefinitely in travel time and distance, once treasured destinations increasingly resemble what people are trying to escape: traffic congestion, billboards, shopping malls, and general roadside schlock—“The Exploding Metropolis” writ large. Meanwhile, the less fortunate, the unemployed, the infirm, and the elderly are sentenced to live and die in the metropolitan environment, come what may. As Lewis Mumford wryly observed, “The ultimate effect of the suburban escape in our time is, ironically, a low-grade uniform environment from which escape is impossible” (Mumford 1961, 486).

This book and the conference from which it arose take a more upbeat look at the evolving form and substance of twenty-first-century metropolitan America. The term humane metropolis was chosen deliberately as a counterpoint to Whyte’s “exploding metropolis” of the 1950s. The metropolis has indeed “exploded,” most of us live in it, and so what are we going to do to make it more habitable? The humane metropolis was defined in the introduction as an urban region that is more green, safer and healthier, more people friendly, and more socially equitable. In the spirit of Holly Whyte, Jane Jacobs, and other “people who like cities,” including the editor and authors of this book, we have explored diverse pathways to more humane urban places.

The primary “pathways” to more humane metropolitan regions are reflected in major sections of this book: Part I, “The Man Who Loved Cities”; Part II, From City Parks to Urban Biosphere Reserves; Part III, Restoring Urban Nature: Projects and Process; Part IV, A More Humane Metropolis for Whom?; and Part V, Designing a More Humane Metropolis. Certain essays directly relate to Whyte’s own interests, such as the design of city and regional open space systems (Harnik, Houck), public attachment to city parks (Ryan), the smile index (Wiley-Schwartz), and the use of zoning incentives to create public spaces (Kayden). Other chapters, however, discuss twenty-first-century dimensions of the humane metropolis that we assume Whyte would embrace today, including social and environmental equity (Blakely, Anthony, Parrilla, Popper and Popper), regreening of brownfields (De Sousa) and ecological rehabilitation of closed landfills (Clemants and Handel), green building design (Pelletier, Cathcart), urban watershed management (Sievert), and the idea of “ecological citizenship” (Light 2002).

Several premises underlie and connect the various topics discussed in this book:

1. Most Americans now live and work in metropolitan regions.
2. Contact with, and awareness of, “nature” is a fundamental human need.
3. Access to unspoiled “nature” beyond metro areas is increasingly limited by distance, cost, traffic congestion, and tourist/resort development.
4. “Urban ecology” is not an oxymoron; nature abounds in urban places, if you know where and how to find it.
5. Therefore, opportunities to experience nature within urban places must be protected and enhanced.
6. Furthermore, protecting and restoring “ecological services” is often preferable to using technological substitutes.
7. Environmental education for all ages is critical to build support for such programs and to nurture a sense of “ecological citizenship.”

The last three of these premises are critical to adapting to the twenty-first-century metropolis (Platt 2004b). Even as urban design professionals continue to manipulate the physical form and appearance of the built environment, new approaches, including some described in this book, focus on the unbuilt elements of the urban environment. Such adjustments are concerned less with the way urban places “look” and more with the way they “work,” ecologically and socially.

The recognition that cities and nature are symbiotic rather than oxymoronic was long retarded by the professional disdain of natural scientists for cities. For instance, an influential Conservation Foundation book of the mid-1960s, Future Environments of North America (Darling and Milton 1965), virtually ignored urban places even though they were the “future environments” of most North Americans. As recently as 1988, a prominent National Academy of Sciences book titled Biodiversity (Wilson 1988) devoted a mere seven of 520 pages to “urban biodiversity.” The view of nature as “out there” beyond the urban fringe or in exotic and distant places accessible only to scientists and the affluent ecotourist has often been reinforced by well-meaning natural history museums, zoos, aquaria, and television nature documentaries.

The seed of a different perspective on cities and nature was planted by landscape architect Ian McHarg in his seminal 1968 book Design with Nature. McHarg urged urban designers to evaluate and incorporate natural factors such as topography, drainage, natural hazards, and microclimate into their plans, rather than overcoming such constraints through technology—often at great cost and with uneven success. McHarg’s advice was directed primarily to the planning of new and often upscale suburban development. The proposition, however, would be significantly expanded by Anne Whiston Spirn in her book The Granite Garden: “The city, suburbs, and the countryside must be viewed as a single, evolving system within nature, as must every individual park and building within that larger whole. . . . Nature in the city must be cultivated, like a garden, rather than ignored or subdued” (1985, 5). In 1987, The Greening of the Cities examined British experience with “cultivating nature in cities,” proposing that ecology offers “a way out of manmade aesthet-
ics and proprietorial landscapes” (Nicholson-Lord 1987, 115). In a more emotional
voice, evolutionary biologist Lynn Margulis and her son, Dorion Sagan, put it this
way: “The arrogant habitat-holocaust of today may cease; in its wake may evolve
technologically nurtured habitats that re-bind, re-integrate, and re-merge us with
nature” (Margulis and Sagan 1999, 1).

Various terms today encompass efforts to regreen cities: green urbanism (Beatley
2000), green infrastructure, natural cities (Lord, Strauss, and Toffler 2003), vari-
ations of urban sustainability, and my own preference, ecological cities (Platt, Rowntree, and Muick 1994). Whatever the term, such approaches are typically localized,
practical, and diverse. According to planner Timothy Beatley, green urbanism in
European cities includes such elements as green roofs, community gardens, car-
free neighborhoods, pavement removal, passive solar heating, and cohousing.
Many of these are beginning to appear in U.S. cities at various scales and encom-
passing a broad spectrum of goals and means, as depicted in figure 1.

Some strategies that have been identified by the Ecological Cities Project (www.
.ecologicalcities.org), based at the University of Massachusetts Amherst, include
the following:

- Rehabilitation and adaptation of older parks and urban green spaces
- Protection and restoration of urban wetlands and other sensitive habitat
- Preservation of old-growth trees and forest tracts
- Development of greenways and rail trails
- Urban gardening and farm markets
- Green design of buildings, including green roofs and green schools
- Brownfield remediation and reuse
- Urban watershed management
- Riverine and coastal floodplain management
- Endangered species habitat conservation plans
- Urban environmental education sites and programs
- Environmental justice programs.

Such efforts are typically initiated by nongovernmental organizations (NGO’s)
such as museums and botanic gardens, schools and colleges, watershed alliances,
and regional chapters of national organizations like The Nature Conservancy,
Trust for Public Land, Sierra Club, and National Audubon Society. NGOs provide
vision, persistence, and sometimes volunteers to work in the field. Public-sector
agencies play supporting roles: funding, staff resources, technical know-how, and
(when applicable) regulatory muscle. Funds also may be contributed by businesses,
foundations, and individuals, especially for projects in localities of particular in-
terest to the donor (as with the Heinz and Mellon foundations in the Pittsburgh
area and the Rockefeller Brothers Fund in New York). Researchers in universities,
public agencies, and NGOs help define the scientific and social goals and means.
Urban regreening efforts are often scattered, uneven, and underfunded, but like ecological organisms, they thrive on diversity: of goals, of means, of participants, of disciplines, and (one hopes) of viewpoints. Some are closely related to larger national movements such as social and environmental justice, affordable housing, physical fitness, public health, natural disaster mitigation, animal rights, and environmentalism. Some depend on spontaneous and often voluntary local leadership. They are pragmatic and creative in stitching together existing program resources, available funding, and donations of money, time, and office space. Most involve
public-private partnerships, some of which are local alliances to save a particular site, to restore a stream, wetland, or watershed, or to pursue a particular mission such as environmental education or urban gardening. Others have evolved into influential regional networks such as Chicago Wilderness. Many also foster social interaction among diverse populations sharing a common resource like a watershed, thus promoting ecological citizenship. (See Light’s essay in this volume.)

The half-century between the exploding metropolis and the humane metropolis thus spanned a period of vast change in the size, distribution, and habitability of urban places and regions. Although the negative implications of rampant urban growth have been widely deplored, efforts to curb the outward expansion of metropolitan areas have been largely futile. In the decades ahead, the emphasis must shift from limiting “urban sprawl” to making the resulting metropolitan fabric as green, habitable, and humane as humanly possible.

References


