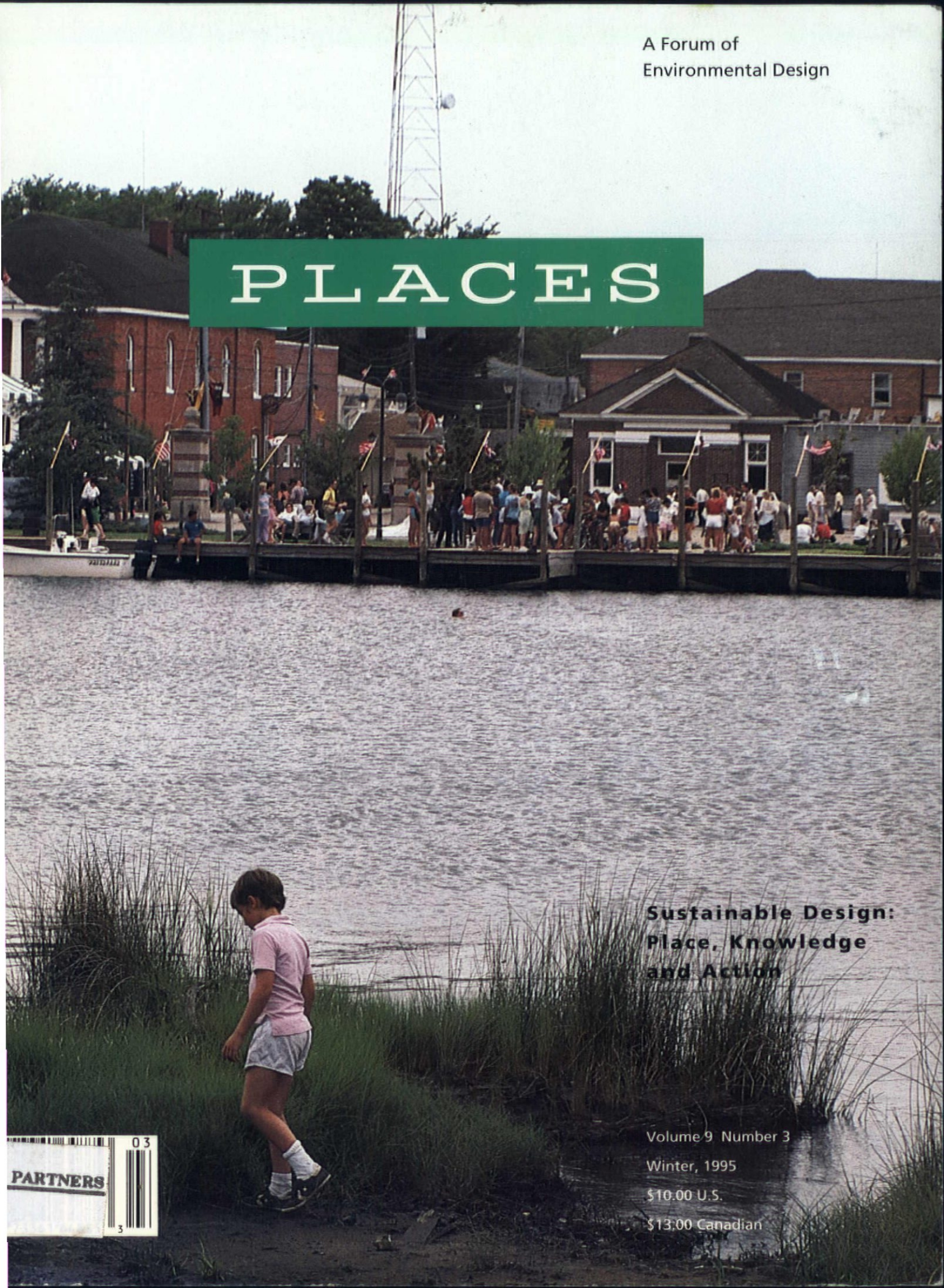

A Forum of
Environmental Design

PLACES

Sustainable Design: Place, Knowledge and Action

Volume 9 Number 3
Winter, 1995
$10.00 U.S.
$13.00 Canadian

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Publication of this issue was funded, in part, by a grant from the Design Program of the National Endowment for the Arts, a federal agency.

Places, A Forum of Environmental Design, is published by the Design History Foundation, a nonprofit, charitable organization that sponsors a range of educational, publishing and research activities. The Foundation's mission is to establish forums in which designers, public officials, scholars and citizens can discuss issues vital to environmental design, with particular emphasis on public spaces in the service of the shared ideals of society.

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A Shift in Expectations

Sustainability has become a catch word of the times. It has been the motivating call for conferences, the theme for competitions, even the title for a President's Council on Sustainable Development. Happily so, we may hope, despite the recent elections, that this interest in sustainability reflects a genuine shift in expectations for the future.

That hope is buttressed by the scope of the dialogue that has been launched, by the extent to which the long-term and indirect consequences of environmental change are discussed in public policy and process, and by the questions now being posed by concerned citizens everywhere and within our schools and professional programs.

This issue of *Places* consists of articles submitted in response to our call for papers concerning sustainability. They address the creation and care of places that can support continued use and evolution, environments that can continue to be viable for our descendents.

The projects and processes we describe here are not millenial. They will not make our comforts secure in a future characterized by global increases in population, depletion of natural resources and changes in composition of the environment itself. Nor will they, by themselves, answer the justifiably

widespread quest for an increased standard of living among those hundreds of millions of people who are less fortunate than our readers.

These articles do, however, show that there are good projects out there and real accomplishments that can implement the motivating words about sustainability and move us incrementally and with gathering speed towards constructive changes in the course of our common future.

Motivating words, after all, do create new realities; but not on their own. New realities emerge from the actions those words can provoke: intense dedication, patient reexamination, careful and imaginative exploration of how things fit together.

Much of that work lies before us. We need to trace relationships not previously noticed, forge patterns of attention that supersede convenient habits, and build with uncommon diligence. We need to engage the concerns of people who will steward their own resources and open new opporunities. We can begin now, as many have shown, to transform what we have into what those who follow us can sustain.

We need care now, informed care, for what our places shall become — for how the world will be.

— *Donlyn Lyndon*

The spartina marsh in Manteo, N.C., is both a sacred space for town residents and important for the ocean ecology. By setting aside the estuarine ecosystem and building in areas where development has less impact, Manteo is preserving for future generations the natural environment that surrounds the town and making itself more sustainable. (Jerry Blau)

Life, Liberty and the Pursuit of Sustainable Happiness

Randolph T. Hester, Jr.

Designing, building and inhabiting a sustainable American city — one that can continuously supply itself with the resources it needs — depends less on developing a better natural science understanding of city form than it does on reversing the entangled values people hold in regard to the built environment.[1] More than anything else, our concepts of status and freedom and our advanced level of anomie, each entrenched in our actions and made concrete in our built environment, have blinded us to the imperative of sustainable habitation.

Our affluence has empowered us to consume nonrenewable resources at alarming rates and to provide privately many facilities that we could easily share with our community. These facilities convey status and have become a primary basis of our personal identity and security, but at great environmental cost.

We rarely experience ecological connections in our daily lives. Foods like dairy products, fruits and vegetables are often overly processed and packaged.

Automobiles consume enormous amounts of resources to move individuals around; shared modes like vans, busses or rail lines would be more sustainable. (Todd W. Bressi)

"Not in my backyard!" is a common rallying cry, but it often speaks of our inability to take positive steps in shaping our communities and landscapes. These residents are protesting the opening of an SRO in Manhattan. (Corey Sipkin)

At the same time, we have seemingly gained freedom from environmental constraints through technology, standardization and specialization. We no longer experience ecological dependence or community connections in our daily lives as, say, a farmer does. Our disassociation from the world around us offers us enormous short-term freedom, but with adverse long-term consequences.

If these forces are not obstacles enough, they contribute to environmental and community anomie, another barrier to sustainability. From the root *anomia*, meaning lawlessness, anomie in this case refers to the state of confusion individuals and society feel about how to act toward their community and landscape. Seemingly freed from dependence on our community and the environment, we must choose new relationships with both.


MILKHOUSE CHEESE
CRY FREEDOM
CRESSIDA
WEST SIDE PHOTO
1 HOUR PROCESSING
AMERICAN
RESTAURANT
EUCLID HALL = DRUGS + CRIME!!
+WISH CHAOS!!

It is easier for us to say what we don't want — urban renewal or disruptive freeways, for example — than to articulate positive visions. Community plans all too often divide the benefits of the city as so many consumer items among the various vested interests. Few elected officials have been able to paint a civic vision supported by the citizens, probably because a sustainable city counters prevailing individual aspirations.

The environments we build concretize and, consequently, reinforce these notions of freedom and status and this disassociation from community and environment. Nonsustainable aspirations create nonsustainable environments, which reinforce nonsustainable values, which create more nonsustainable environments, and so on — accelerating the depletion of the resources upon which healthy cities depend.

These cycles can only be broken by changing both people and the environments we inhabit. What designers must do is imagine futures informed by ecological science and human needs and offer concrete demonstrations of positive, desirable alternatives to less sustainable environments. Designers must offer choice — zero lot line, small houses, solar power and woonerf streets, for example — educate people about the ramifications of those choices and help people choose sustainability.

What should guide the design of urban forms that can support themselves and that people will gladly choose? Certainly we should use the best knowledge of urban ecology,[2] but that alone will not be sufficient, for we are crippled only in part by a lack of scientific knowledge. We need design processes and products that take into account those aspects of human behavior that are so antagonistic to sustainability. We must be aware of how present ordinances and standards hinder sustainability and of how disabled our local politic is.

Our present patterns of habitation, created almost entirely without the benefit of ecological thinking, have been centuries in the making. Disentangling ourselves from these unsustainable patterns and the associated values and lifestyles also will take time, perhaps several generations. Our most realistic goal is to pursue sustainability with enough substantive and holistic insight that our pursuit can be sustained.

Pursuing sustainability will require us to reformulate our premises about the best possible life we can achieve. To effect this transformation, the form of the city must enable us to act where we are now debilitated, withstand short-term shocks to which it will be vulnerable and be alluring rather than simply limiting.

This metamorphosis must be guided by three distinctive traits: enabling form, resilient form and impelling form. Collectively these can give structure to an evolving, increasingly sustainable city that enables the incremental transfer of ecological science, reconnects a conflicted populous to both the environment and community, dismantles institutions that inadvertently hinder sustainable efforts and reinvigorates our anomic politic. Each trait, and the principles upon which it is founded, combines a social intention necessary to overcome anomie and fulfill human needs with formal implications about city design, regulations and vision.

Pike Place Market in Seattle provides a city-scale setting for both daily face-to-face encounters and special rituals that enhance community and enable collective action. The market is particularly distinguished because of its commitment to accommodating the full range of citizenry including the elderly, homeless, near-homeless, teenagers and others. (Randolph T. Hester, Jr.)

Enabling Form

We are unprepared — emotionally and intellectually, as individuals and communities — to take the complex and comprehensive actions necessary for sustainability. We need new forms of habitation that enable us to sense, understand and empathize with the multiple roles in our ecosystems, from the broad philosophical level to the practical level of building construction. We need places that enable us to act from that basis of sensing, understanding and empathizing, as private individuals and as communities.

The ice stand and general store in Haleiwa, Hawaii, is one of that community's sacred places. The architecture helps keep the building cool without expensive air-conditioning equipment. (Randolph T. Hester, Jr.)

A number of principles can help us design these places: sacredness, shared experience, caring, connectedness and to be what we are.

Sacredness: Although many of the environments built for habitation in recent years seem to be little more than machines for living, other places touch our spirits and enrich our lives. The power of sacred places can spur conservation and restoration — both key to sustainability — and inspire new designs that result in joyful and enduring environments.

Generally, sacred places can be characterized as everyday spots that are smaller and less consumptive, with somewhat higher density, more mixed uses and more pedestrian-oriented travel, than environments we produce today. Many consist of unmanicured landscapes or parts of natural systems.

In making individual and collective decisions about our habitat, there seems to be a conflict between conscious values regarding place and unconscious values of sacredness. Conscious values urge us to standardization, convenience and economic decisions. Sacredness pulls us towards actions more sympathetic to sustainability.

Helping people reacquaint themselves with sacred places and their feelings about sacred places holds considerable promise as a means of making sustainable cities. An attachment to place and first-hand, everyday experiences with natural processes (be they spartina marshes or natural air conditioning) can combat anomie effectively.

Shared Experience: To pursue sustainable design, local communities must take collective and calm action about difficult problems that typically spark emotional, knee-jerk

In Manteo, N.C., one of the most sacred areas to local people was the spartina marsh surrounding the city, essential in maintaining a healthy coastal and ocean ecology but often subject to destructive development. (Randolph T. Hester, Jr.)

reactions. For communities to work in such a way, their citizens — who are often segregated along lines of special interest (or worse), who rarely interact face to face, and who often act out of fear and mistrust of each other — must have shared experiences.

There must be places that foster special rituals where large parts of the community come together in common pursuit, celebration and observance (such as places for harvest festivals and July Fourth parades). There must be places that support multiple public activities, settings arranged to encourage safe, everyday, personal exchanges among people who might otherwise remain strangers or stereotyped, abstracted others. There must be educative environments that remind us of our shared experiences and connections. And there must be processes that invite hands-on community involvement in projects.

The small city Main Street with a city hall, post office, churches, school, library, banks, hardware, grocery and other stores and housing, all within walking distance, is one archetype of such a place. Citizens share daily activities and community is enhanced — seemingly by chance but actually by design. A trip to the post office can lead to a conversation over coffee at the diner about the upcoming bond issue to reclaim the river.

Caring: Caring about place and people is fundamental to sustainability.[3] The shift to caring exclusively for the private domain, rather than the broader interconnected landscape, has serious implications for sustainability. The totality of the system, whether river corridor or city, must be kept healthy in order to sustain even the smallest niche. For us to care about places and act as stewards of them, we must understand them better and reverse our disassociation from the larger landscape.

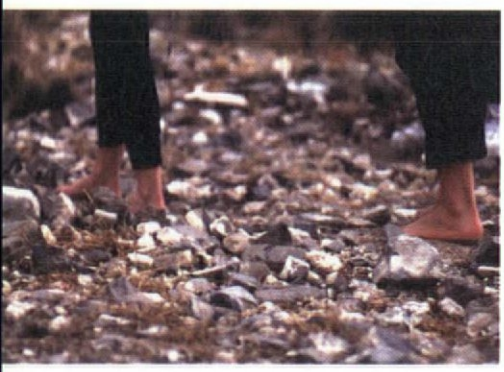
The Common Ground effort in England is an impressive effort to promote place caring. The group helps citizens map their local parishes and record aspects they care about. This place stewardship has resulted in the creation of parish boundary walks, preservation of habitat and community sharing of derelict orchards and open spaces.[4]

In New York City, Wendy Brawer and Hal Drellich's Green Apple Map (profiled in this issue) has been a useful reference, helping people know places they haven't visited and making the connections between the natural and built environments more evident. Places designed to do research and demonstrate findings also merit special attention. California's Demonstration State Forests were established, in part, as places for researching sustained yield and demonstrating the impacts of various logging methods on stream quality. Other place understanding strategies include transparent design (which urban designer Michael Southworth calls "the educative city") and tours and scored walks like ones used in planning Big Wild (profiled in this issue).

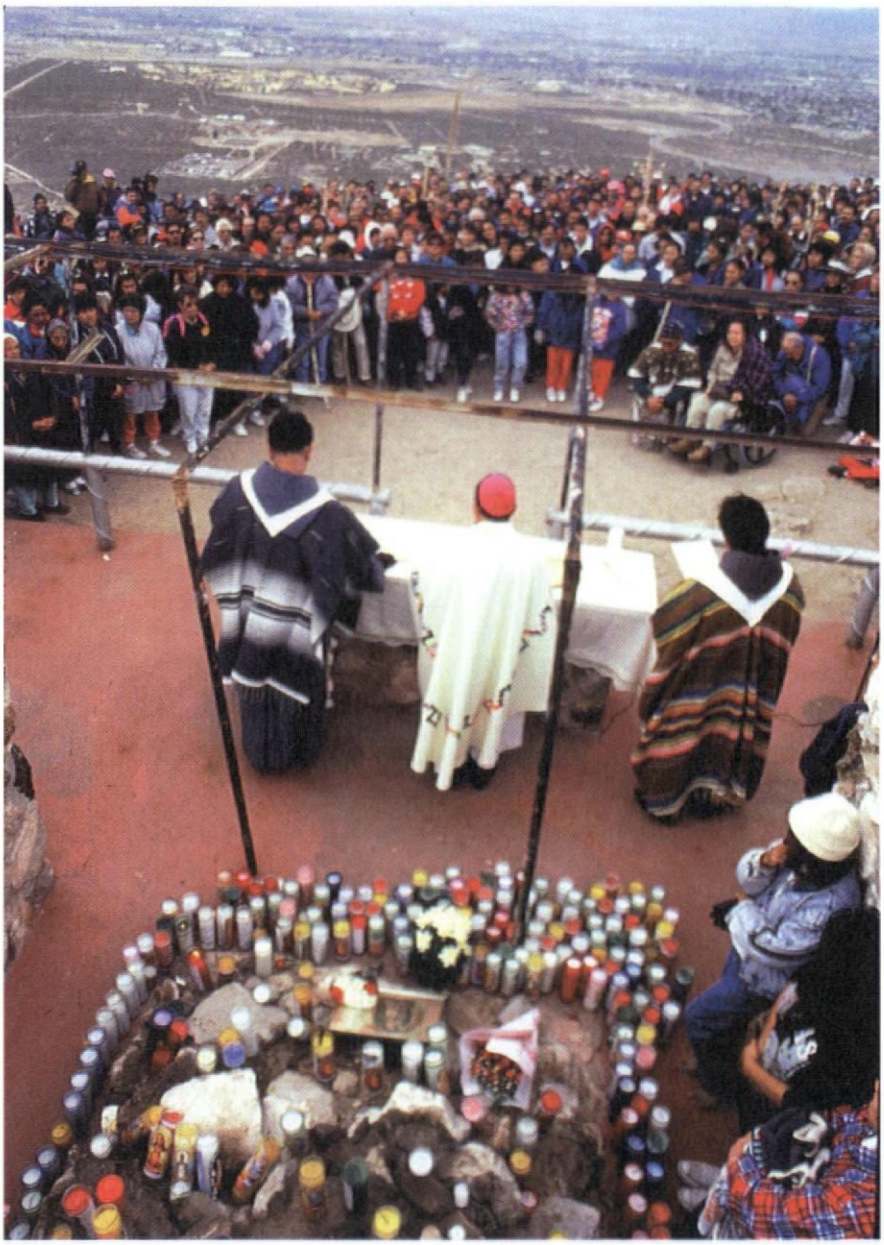
Connectedness: The interconnectedness of an ecosystem's many parts is fundamental to the survival of the whole. Both a general understanding and specific scientific understanding of the principle of interconnectedness are keys to enabling form.

A general understanding may trigger thoughtful action in everyday decisions. The Mianus River Basin study (profiled in this issue) heightens awareness of the connections among the various parts of that watershed and may enable the residents to act more sustainability at many levels, from household choices to political decisions. Scientific understanding of interconnectedness, such as the spotted owl's dependence on diminishing forest habitat or the interdependence of wealthy and poorer citizens in an urban region, may change behavior and influence policy choices, with significant cumulative effects.

Social connectedness is as important as ecosystem connectedness because, if for no other reason, there can be no peaceful sustainability without the city being more just.



Events that relate to the landscape, such as the annual pilgrimage from Las Cruces, N.M., into the mountains nearby, are especially effective. (Opposite page) Las Cruces Bishop Ricardo Ramirez celebrates Mass atop Tortugas Mountain. © Dale Fulkerson.



Nationally we are increasingly disconnected by social class, and there are few voluntary examples of how to rectify this barrier to sustainability.

Unfortunately, environmental impact statements, which are often relied upon to protect biodiversity and achieve other goals related to sustainability, focus on mitigating the negative consequences of individual projects. Project-by-project approval for large subdivisions produces sprawling low-density suburbs (with greenways that often do not connect) and sometimes severs critical regional wildlife corridors, creating island effects, local extinctions and reductions in biodiversity.

To Be What We Are: Many cities suffer from inferiority complexes and try to compensate by being something they are not. Usually this leads to a loss of collective identity and authenticity and to an increase in placelessness and wasteful public consumption.

For many years, Astoria, Ore., a port on the Columbia River, compared itself to Seaside, a cute oceanfront town nearby. Astoria felt ashamed of its history of fish processing plants, shipping and port activities. To become a tourist destination like Seaside, it approved a plan to remove much of its downtown and port and replace

Astoria, Oregon's, economic development strategy builds on the town's working waterfront. A restored pier building includes housing and commercial activities, such as a boat supply shop. (Randolph T. Hester, Jr.)

them with a highway and parking. This would have been costly and wasteful and would have resulted in the city becoming more dependent on scarce outside resources.

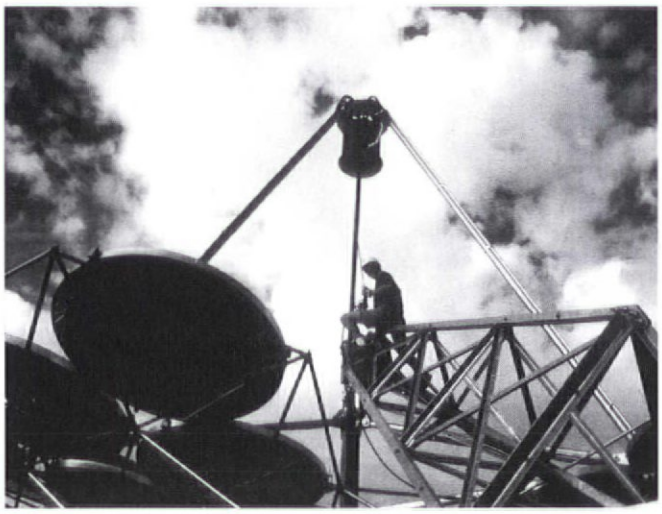
Some years later, Astoria leaders, working with the Oregon Downtown Development Association, developed an alternative reinvestment strategy that embraced its working port as both a primary industry and an attraction for visitors. The old port buildings are being reused rather than razed; walking is encouraged downtown rather than driving. Visitors view the port activity from "people places" located so as not to interfere with the working waterfront. By acknowledging the social, place and economic value in being itself, Astoria is conserving, restoring and adapting, and it is a more sustainable city.[5]

Resilient Form

To be sustainable, cities must become more resilient. They must live within bioregional limits, repair natural systems that have been stressed to the point of dysfunction and create new forms of habitation that respond joyfully to these limits rather than simply being constrained by them.

Communities need to pursue place-appropriate economic activity. Big, overspecialized, single-function economies eventually become environmentally estranged and resource-addicted and are, by their nature, susceptible to ecological catastrophes. In Gloucester, Mass., as the fishing industry used ever improving techniques and fished only selected species, those species experienced a catastrophic decline. Gloucester is now diversifying its fish industries in response to the catastrophe, but decisions are best made prior to disaster.

At the scale of land use, places with mixed land uses and pedestrian and transit access are more resilient. They are less dependent on nonrenewable energy sources and they can adapt more easily to changing use of built and open space. At the scale of building design, architects who make audits of projected energy use and the renewability of and toxicity in building materials are likely to increase resiliency. So, too, are



Resilent design uses available technology to take advantage of renewable resources. This solar array generates energy for the Center for Regenerative Studies at the California State Polytechnic University, Pomona. (Dougherty + Dougherty)

buildings that accommodate a range of shifting uses without resource consuming changes and building arrangements that provide community and privacy, light and air in compact surroundings.

The following guidelines seem important to making cities that are more resilient: particularness, selective integration, density and smallness, limited extent, adaptability, finding fish heads and everyday future.

Particularness: In every region, the landscape and built form have particular distinguishing characteristics. These characteristics offer clues about how to live within that region's limits, what systems to repair and how to build more resiliently. These precedents often are found in the natural environment and in the way people built before technology allowed wholesale control of natural systems.

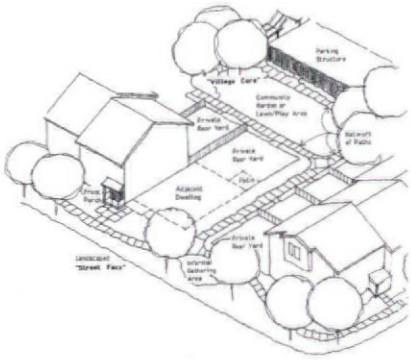
Particularness can be expressed in the architectural forms that respond to climate, such as the elements that cool buildings in Haleiwa, Hawaii. Or it can be reflected in combinations of natural and humanmade systems. Stuttgart, Germany, plagued by air pollution and temperature inversions, created a network of parks, forests and agricultural lands (based on topography, settlement patterns, microclimate and vegetation) that enhances the natural flow of air and helps clean and cool the city.[6]

These peculiar patterns of buildings, used as elements of new design, can appeal to local pride and identity, strengthening a sense of community, place and sustainability.

Selective Integration: Communities are more resilient when they are integrated. Yet the concepts of niche, territory and economies of scale suggest that segregation has value, too. The sustainable answer seems to lie in achieving a balance by selectively integrating social life, land use and government. Just in what dimensions integration should occur, and how, is not so clear.

In St. Paul, for example, Weiming Lu has had success in creating an integrated community in the Lowertown neighborhood by building housing of multiple types, from modest studios to renovated warehouses and new towers. Nearly 1,500 housing units have been built, encouraging integration of lifestyles, ages and classes by targeting both upper and lower ends of the housing market. This could be a precedent for

Village Park, a 50-unit townhouse project in Sacramento, promotes the "selective integration" of Hmong and Mien Laotians. The outward face of the housing is typical of the surrounding context; the inner areas support traditional uses of space. Designer: Pat Harrison. (Photos, plan courtesy Pat Harrison).



using public funds to reward communities that integrate rather than penalizing ones that segregate.

Government also needs new models for selectively integrating decision making processes. When I served on the Raleigh, N.C., city council, I often thought that city government was the wrong level of management for almost everything we did. The solution lies in strengthening regional and neighborhood governance, integrating them and eliminating the levels between.

Density and Smallness: Density remains one of the most important ingredients of a sustainable community for several reasons, from the enabling power of street life to matters of safety and the support of affordable public transit. As with selective integration, what densities are most appropriate and how to achieve them are not so clear.

Transit requires densities of 15 to 20 units an acre to be financially self supporting, a rarely realized benchmark. Such density can be achieved through various design strategies, including small or attached houses, small or reconfigured lots and decreasing the space allocated to cars (typically 25 percent of the land in a residential development is dedicated to street rights of way). Donald Appleyard and Allan Jacobs contend that 48 units per acre can be designed to provide for a spacious, gracious urban life, observing that San Francisco's four-story Victorians provide private or shared gardens for most of their inhabitants.[7]

In my research about residential preferences, almost every group tested, including environmentalists, has chosen the largest housing and lowest density — a challenge to which designers should respond. People may be willing to live in smaller houses at 15 to 20 units per acre if the units are designed to feel spacious, if view and private gardens are provided, and if street trees and other public amenities are increased. Public education about the ecological consequences of housing choices (similar to that which has strengthened interest in recycling) is badly needed.

Limited Extent: There are numerous reasons to limit the extent of urban development: to maintain functioning ecosystems and regional biodiversity, to preserve agricultural land, to provide identity and wildland experiences for urbanites, to encourage increased density and to maintain manageable and participatory jurisdictions. Limiting extent responds directly to all aspects of resilience but impacts most directly the maintenance and repair of stressed natural systems by setting parameters whereby urbanization can be directed to areas most beneficial to those systems.

Greenbelts along hydrological and geological systems can accomplish this, especially when associated with a land purchase program. This approach is being pursued by the Santa Monica Mountains Conservancy and other public agencies to acquire a functional ecosystem in the Los Angeles basin. Another largely successful approach is Oregon legislation that preserves prime agricultural land and creates urban growth limit lines, within which higher density is encouraged, and beyond which urbanization is curtailed.[8]

Adaptability: A primary characteristic of resilience for a species or an ecosystem is its ability to change to suit new circumstances. The adaptability of cities is a function of human choice, resource supplies and the use of space. Generally, adaptable environments are designed to serve more than one purpose, connect things not originally meant to be connected, be suitable for new uses, be flexible but not entirely open-ended and be suggestive, not dictatorial. Instead, cities are made up of highly specialized, single-purpose components, like research hospitals or freeways, that have little potential for adaptability. They need to be supported by a variety of more flexible environments. It might be wise to follow the dictum of urban designer Robert Harris regarding his work in downtown Los Angeles: "We will not abide single purpose plans."

Designers must create impelling forms, such as woonerf streets, that demonstrate postivite places that result from concrete steps towards sustainability. (© 1988, Project for Pubilc Places)

Finding Fish Heads: In every region, the most obvious resources have been, are or are about to be exploited. Using a fishing metaphor, in the past the obvious resource was the fillet; fish heads were regarded as useless by-products. No more. Today, fish heads, guts and tails can be made into value-added products like organic fertilizer and specialty foods, while reducing costs of wastewater treatment and waste disposal.

One key to making cities more resilient is identifying "fish heads" that can be put to use without environmental degradation (and often with environmental benefits). Finding fish heads requires us to pay attention to the interconnectedness of things, to consider the absurd and to make the strange familiar and the familiar strange. Fish heads can be old buildings, historical events, trash or abandoned uses; they can be scenic beauty, retired people or everyday real work. Another source of discovery is poverty, which encourages inventive improvisations to solve problems of scarcity.

The howling, oft-cursed winds in the Columbia River gorge were discovered by wind surfers to offer some of the most exciting surfing conditions in the world. As the number of wind surfers increased, local leaders began promoting the wind conditions around Hood River, Oregon. Entrepreneurs began reusing abandoned buildings for surfing-related products and services. The public sector retrofitted existing facilities to provide surfing access and has encouraged manufacturing related to surfing. This fish head has turned once declining economies into multimillion dollar industries.

Everyday Future: Resilient cities will be radically different from present ones, but the transition must accommodate everyday patterns of life. Alternatives that are shocking and upset peoples' fundamental sense of security may serve educational purposes but will likely be rejected. Transformations that are recognizable and accommodate valued ways of living while encouraging healthier dwelling patterns are more likely to succeed.

When Walter Hood undertook the restoration of Oakland's Courtland Creek (profiled in this issue), he discovered that neighbors disregarded or feared the creek. Most of the neighborhood use occurred along streets and vacant trolley rights of way adjacent to the creek. Rather than forcing a purely natural restoration plan, Hood meshed the daily use patterns particular to these residents with creek reclamation. He proposed an active linear park parallel to and with playful connections to the creek.

Raleigh, N.C.'s stream corridors, conceived as a greenway system, served as a basic ecological framework around which other goals of recreation and flood control could be achieved. (Randolph T. Hester, Jr.)

Impelling Form

Recent defeats and delays of federal environmental legislation suggest that it is increasingly difficult to address sustainability through national mandate. The nature of the problems has changed, and public attitudes have changed. As a result, our urge to compel must be largely replaced by a need to impel.

Impelling form should offer alternatives, be simple enough to comprehend, invite personal involvement, allow incremental incorporation of ecological science and call up our best visionary intentions, not our worst instincts. The following five principles are key to creating impelling form: choice impels, priority framework, piecemeal intricacy, continuous experiment and active responsibility.

Choice Impels: Choice has a special power to propel us forward, allowing us to respond to inner motives rather than acting against our wills. While government agencies might establish broad mandates, communities should be able to choose how to respond. Ultimately we must *want* to choose sustainability.

Priority Framework: Whereas choice impels, too many choices can debilitate. One great difficulty in achieving sustainable cities is that there are so many things to do and no clear sense of which are most important. Another difficulty is the crippling fear of solving a symptom and not a real problem or, worse, solving the wrong problems.

Even when we can determine the relative importance of various actions, it may be politically infeasible to attack the most important problems. Often, we legislate unimportant matters and fail to address difficult core problems. For example, air quality regulations in Los Angeles may force dozens of minor actions, such as paving unpaved roadways, because of the unwillingness to curb automobile use.

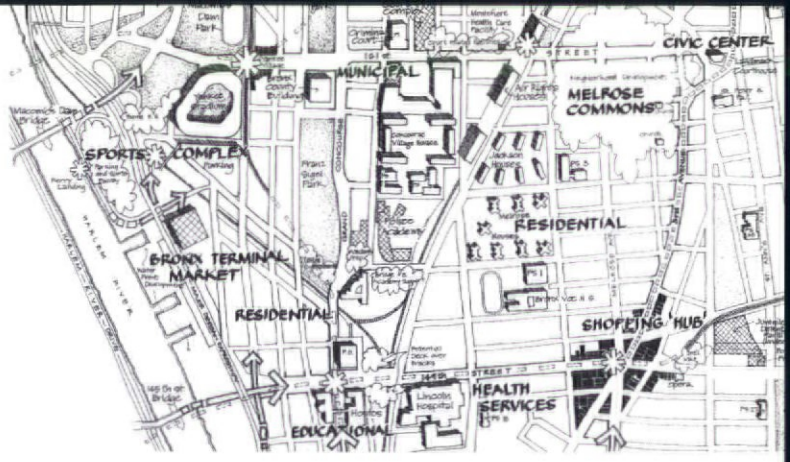
I suggest determining with the best knowledge at hand what few actions are most important and establishing a priority framework that effects only those few actions. These efforts should not be single purpose, but achieve multiple purposes around a few priority actions. In Curitiba, Jaime Lerner's relentless commitment to creating a world-class public bus system seems to have created a framework for many other sustainable actions, including land use policy and recycling.

In planning for the Pasadena civic center, each member of our design team — Donlyn Lyndon, Marvin Buchanan, Marcia McNally, Allan Jacobs, Frances Halsband and I — placed the creation of housing among our highest priorities. Housing once intermixed with civic functions, but segregated office and institutional land uses had come to dominate. Without residential advocates, the civic center was increasingly neglected, poorly maintained, uncared for and unsustainable.

The main component of the citizen committee's plan became the reintroduction of housing, the priority framework around which other complementary and supporting actions — enhancing parks, public places and pedestrian ways, creating a light rail stop, connections to Old Town and reducing the widths of underused streets — were developed. The committee plan was adopted, and a range of housing, from market-rate to single-room-occupancy, is being created in the civic center.

Piecemeal Intricacy: The shortcoming of a priority framework is that, if not carefully and sensitively managed, it can produce large, institutional results. Any successful priority framework must encourage multiple piecemeal intricacies — small actions of individual owners and citizens that provide variety, local initiative, innovations in sustainability and multiple financial and emotional investments.

Piecemeal intricacy increases opportunities for participation in decision making and expands the ownership about those decisions. Ultimately, it cultivates a stronger level



Concept for Bronx Center, a community generated plan for the civic and commercial core of the South Bronx. (D. Nels Reese/The Urban Assembly)

of caring about place and community. In the Pasadena civic center, the parcels likely to be developed were all relatively small, guaranteeing the kind of intricacy and change that is of human scale and pace.

Continuous Experiment: Much of what is known today about urban sustainability was not known even a decade ago. (For example, the nature of and extent to which vegetation could mitigate the effects of urban heat sinks was not known until recently.) And what is known is inadequate to direct urban form with certainty. Applying an inconclusive and emerging science through a public process is difficult, especially when most people lack a conceptual framework into which to place new facts and when most people have unfavorable attitudes towards life styles and city forms associated with sustainability.

Ongoing, local and participatory experiments in sustainability could overcome these obstacles. One model is the U.S. Agricultural Extension Service, through which extension agents work with farmers to apply scientific findings to crop production, erosion control, etc. A sustainability extension service would apply principles of resilience to urban ecosystem conservation, the rehabilitation and construction of neighborhoods and the expansion of urban agriculture, among other things.

Another model is the Conrad, Montana, Study Group, formed in 1945 to research local culture and history. The group has worked continuously since then to study community problems and devise local solutions. Relying on community volunteers, it has evaluated and developed solutions for agricultural, educational and service problems. Continuing evaluation would test the effectiveness of these actions.[9]

Such efforts can add to scientific knowledge and the speed with which new findings are implemented. They can embolden people to try unknown futures about which they are skeptical and strengthen a community's capacity to adjust urban form.

Active Responsibility: Achieving sustainable cities requires active citizen participation. But citizens are generally neither inclined nor prepared to create resilient communities; they often have "not-in-my-backyard" attitudes towards sustainable actions and are accustomed to success in disrupting, protecting and litigating. In other contexts this behavior would be considered terrorism.[10]

Unfortunately, these selfish actions are backed by environmental protection laws. For example, in urban infill cases that increase density, the environmental impact statement process is often used to require street widening mitigation instead of more sustainable transit use. To attain more resilient cities, such parochial, ecologically unsound citizen efforts must be reversed.

It is much easier to think globally than to act locally. In Berkeley, a two-decade effort to curb car use and protect neighborhoods through inconveniences like street diverters and speed bumps continues with a new round of actions. Fritz Jaeger, chair of the city's transportation committee, notes that in spite of this effort Berkeley residents are driving more and using mass transit a lot less.[11] Obviously, sustainability requires inspiring citizens to move from short-term, selfish interests toward a broader long-term public good: active responsibility. This may take many forms, from voluntary inconvenience and enlightened self-interest to embracing new resiliency-based lifestyles or acts of civic environmentalism.[12]

Nos Quedamos, an organization of residents of the Melrose Commons area, developed and won city approval for a plan to rebuild their neighborhood. (The Urban Assembly)

I remember a community group in Los Angeles, Friends of Runyon Canyon, which had lobbied for years to get funds to develop a community park and were finally successful, only to learn that a critical open space in another section of the city, Fryman Canyon, was about to be lost. They volunteered the transfer of their long-sought funds to the city to ensure the acquisition of Fryman Canyon. We need more acts of such active citizen responsibility.

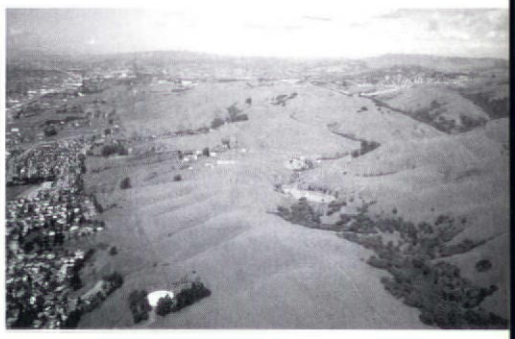
Therein lies the great hope of participatory processes. Because participatory design is, by nature, transactive, it affords a singular opportunity to teach about sustainable alternatives; to listen to legitimate citizen reservations, point out inconsistencies in values

Tilden Park, in the Berkeley-Oakland Hills, was created in the 1940s when East Bay residents voted to voluntarily tax themselves to finance its acquisition. Today, the ridgeline parks help limit the sprawl of the inner urban ring. The Bay Area Ridge Trail, which runs through this park, connects the nine counties that constitute the San Francisco Bay Area, promoting regional awareness. (© Bob Walker/IDG Films)

and actions, and find new directions; to formulate more holistic visions of habitation; and to implement experiments that enhance a sense of community and stewardship.

The search for sustainable city form has become — even if we don't know it by that name — a central, fitful but never ending aspect of our public and private lives. The shift from blind exploitation to symbiotic exploits within limits is both evolutionary and revolutionary, requiring nothing short of a reformulation of fundamental national intents and personal ideals of fulfillment.

Urgent as this is, the future cannot and need not be joyless. Enter life, liberty and the pursuit of sustainable happiness. In fact, the pursuit of sustainability may resupply joys diminished by our modernism. Enabling forms, shaped by attitudes like caring and sacredness, can prepare us to embrace resilient forms. But only those places that touch our hearts — that are both happy and sustainable — will impel us.



Greenbelt vista, Garin Park, East Bay Regional Park District. (Nancy McKay)

Notes

1. Before the theory of limits was developed and accepted, the capacity of a city or nation to supply itself was thought to depend on ever-increasing resource exploitation, war and inventiveness. Today we are aware that our habitation is part of an ecosystem with limits. We cannot deplete necessary and limited resources without replacing them. We must maintain energy and waste in balance; oxygen, food and shelter in supply; toxicity in check. Our capacity to supply the city requires selective exploitation, conservation, restoration, adaptability and resourcefulness.

2. A city can be thought of as an ecosystem or a collection of organisms living interdependently in a given place and functioning as a discrete unit. Of course, these units are not entirely separate, but interconnected with other resources and actions around the earth.

3. The social aspect of caring may spur us emotionally to address injustices like exclusion, inaccessibility and unequal distribution of environmental resources. Caring, coupled with the mindfulness of our connections, ecological and economic, may trigger actions regarding environmental racism.

4. Angela King, "Mapping Your Roots: Parish Mapping," in Doug Aberley, ed., *Boundaries of Home; Mapping for Local Empowerment* (Philadelphia: New Society Publishers, 1993).

5. Unfortunately, other actions have diminished Astoria's sustainability, particularly the inability to limit the extent of urban growth that has led to strip shopping centers that have drained economic activity from the downtown.

6. Michael Hough, *City Form and Natural Process* (New York: Van Nostrand Reinhold, 1984), 59-60.

7. Donald Appleyard and Allan Jacobs, "Toward an Urban Design Manifesto," *IURD Working Paper #384* (Berkeley: Institute for Urban and Regional Development).

8. Arthur C. Nelson, "Preserving Prime Farmland in the Face of Urbanization: Lessons for Oregon," *Journal of the American Planning Association* 58 (1992): 467-488.

9. Gary J. Conti, et. al, "Transforming a Community Through Research," *Convergence* 3 (1991): 31-39.

10. This analysis emerged in a work session with Larry Halprin.

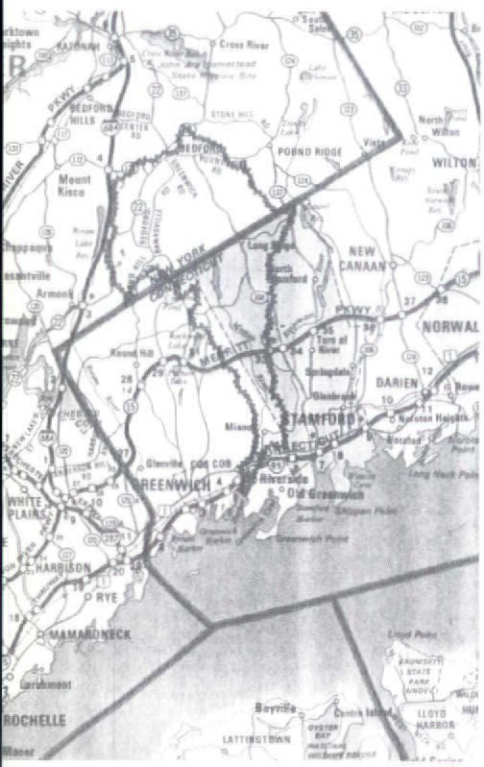
11. William Brand, "Berkeley Plans More Barriers," *Oakland Tribune* (22 September 1994): A11-12.

12. This is the term used by Dewitt John, director, Center for Competitive Sustainable Economics.

ROOTS...

The Mianus Watershed Bioregional Planning Project

Bice C. Wilson



The Mianus River watershed crosses the boundaries of dozens of jurisdictions, including towns, counties and states.

Project Credits:

Louis McCagg (president, Westchester Land Trust); Alice Bamberger (project manager); Bice C. Wilson (project conceptualization, urban planning, GIS management, exhibit design), Anders Crofoot, David Crofoot, Bill Kellner (GIS team).

Have you ever crossed a border? Did the land change?

A living place underlies the jumble of jurisdictions we use to define our locales. That living place is called a bioregion, a region defined by the boundaries of its natural living systems. The project described here explores the impact of a bioregional frame of reference on the process of designing the future of our region.

Before we can successfully envision a sustainable future, we must confront longstanding shortcomings in our planning resources and processes. Most planning occurs within an abstract, political frame of reference and considers only a fragment of the information about the bioregion. The major environmental threat to the region is not big polluters, it's non point-source pollution, what could be called "life style pollution," the result of myriad individual daily decisions about the use and disposal of chemicals and about land use and management. We lack the resources and commitment to understand the cumulative impact of these decisions.

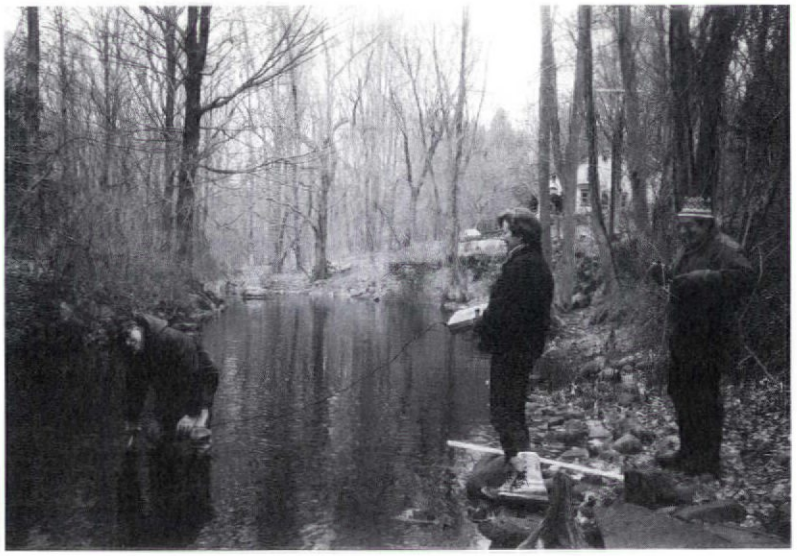
The goal of the Westchester Land Trust is to create tools and ongoing public processes to address these problems. Our group has brought together in a coalition the myriad agencies and citizens' groups responsible for the stewardship of the relatively pristine Mianus River watershed in the Long Island Sound estuary system. The Trust has begun a process that will change the context within which urban design issues are addressed and help change the way people experience their connection to the places they inhabit.

The first phase of our effort included public education, scientific testing (to establish a baseline against which to measure cumulative changes) and creating a planning and design database (using geographical information technology). The Trust is following up that study with ongoing water testing, education and political organizing efforts.

Think globally. Act locally? How do you define your neighborhood?

We often define our communities on the basis of human boundaries, such as national borders, property lines, school districts, town boundaries, area codes, zip codes, government agency service districts and zoning districts. These confusing jurisdictions and service zones are often invisible, overlapping yet seldom connected, and are often not even based on geography. We have devised this complex web of abstract, gerrymandered jurisdictions to separate ourselves from the earth.

It has become clear that our culture lacks a point of view, or frame of reference, that could lead people to consider themselves as part of the living system they inhabit. Our paradigm for



(Left) Testing water quality in the Mianus River.

(Below) Sources of household water. Wells predominate in the north; municipal water systems near the Long Island Sound.

Illustrations courtesy Bice C. Wilson, Westchester Land Trust.

relating to the land and the cultural institutions we have created to implement that paradigm are not leading us to live lightly on the land. We need to find a biologically- and geographically-based way to divide the landscape into manageable regions.

The landscape of each town is composed of watersheds, groves of trees, wildlife habitat and other biological systems. These tangible, visceral realities we can relate to, manage and sustain.

What place do you live in? Where are you from? When will you be from where you live?

Underlying your neighborhood is a living ecosystem known as a bioregion. Bioregions are defined by landform, drainage systems, distinct communities of plants and animals, and a degree of biological self sustainability. Bioregions tend to have soft, permeable edges and clear centers (often a river or other body of water).

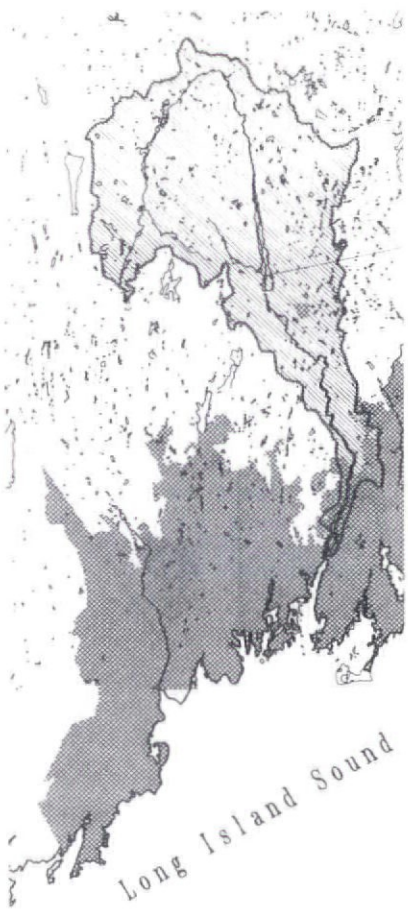
The New York metropolitan region is part of what might be called the Meeting-of-Waters Bioregion. It is defined by the confluence of the watersheds of the Hudson River, Long Island Sound and Newark Basin with the Atlantic Ocean. The Mianus River Watershed is part of the Long Island Sound subregion. One striking aspect of these nested regions is their interdependence: anything that affects the balance of the Mianus Watershed affects Long Island Sound, the Meeting-of-Waters Bioregion and the Atlantic Ocean. Whereas our manmade locales often serve to isolate us, our bioregions define our interdependence.

What drainage basin is your watershed part of? What stream or river runs near your house?

Many people have come to see watersheds as the basic building blocks of a bioregional point of view. Watersheds are defined by landforms. Their edges are the ridges and hilltops that direct water into a stream or river. The vitality of their living systems and the purity of the water that they contribute to the ocean is the result of all the day-to-day decisions of their inhabitants: Do I pour this paint thinner down the drain? Do I use toxic chemical fertilizer in my garden? Is there a place in my yard in which song birds nest?

What watershed is your neighborhood a part of?

The Mianus River Watershed is one of the nested subregions of the Long Island Sound watershed. The watershed is relatively undeveloped, and has a large wildlife population. It is under considerable development pressure. Its population has grown substantially over the past decade. The health of its ecosystem is threatened.



Fishing on the Mianus River. There are plans to build a fish ladder to help salmon re-establish a habitat in the river.

Wastewater treatment strategies. Septic systems dominate upriver; municipal wastewater treatment systems near the Long Island Sound.

There are few large parcels containing whole, coherent biological systems under one ownership left. Each sub-drainage area, each hemlock grove (at the heart of the watershed is one of the last stands of primeval hemlock forest habitat in the Meeting-of-Waters Bioregion) is composed of myriad backyards. We must devise strategies to help small landowners consider themselves as the joint stewards of these ecological niches if we hope to maintain the integrity of these living systems.

The watershed contains all or parts of two states, five towns, two counties, two federal Environmental Protection Agency districts, four school districts and dozens of clubs, parishes, neighborhoods and interest groups. Each has its own vision for its fragment of the watershed. At present, the stewardship of the watershed is delegated by its residents to various public agencies and citizens' groups. Each has its own database, documenting that piece of the spectrum of the reality of the place that falls within its mandate. These databases are executed in different media, at different scales, with different criteria and information from different periods.

The Trust has barely begun the process of assembling all the information needed to understand the workings of this watershed into a unified, computer-based mapping system. When completed, it will be possible to see the assembled puzzle pieces through the frame of reference of the watershed, in the context of the bioregion. This will be the beginning of a resource that can allow us to design and plan in harmony with the patterns of life that tie all these jurisdictions together.

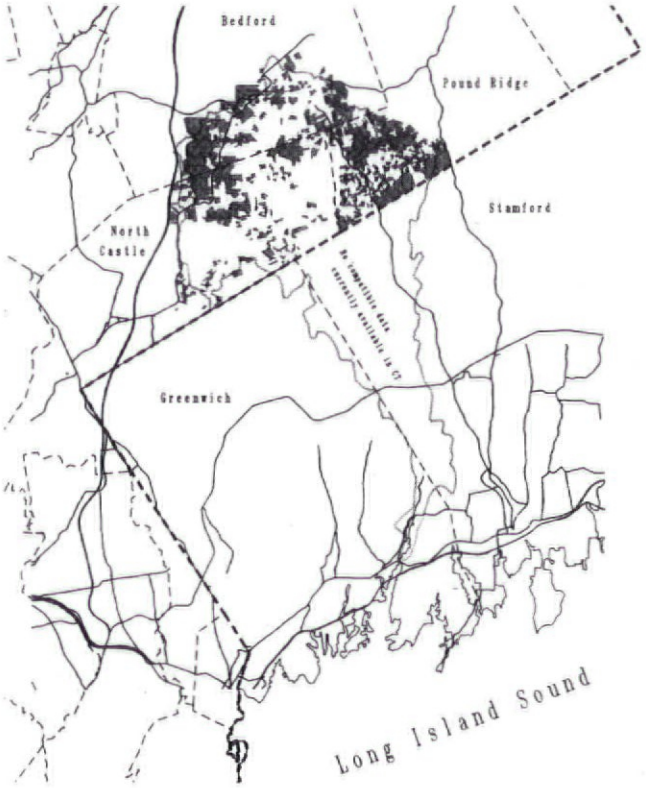
Does the stream running through your yard change when it crosses into your neighbor's property?

One of the maps we made shows the water sources for people living in this watershed and its vicinity. The watershed in this sense extends up and down the coast and includes all the towns that depend on the reservoirs. Residents in the southern part of the watershed depend on a treated public water system that taps into reservoirs that collect water from the upstream area. The extent of human development in this area has surpassed the earth's ability to provide ample, safe water.

The households in the upstream portion of the watershed still depend on unfiltered well water. They rely on the sky and the earth to provide, filter and deliver water to their wells.

Where does your sewage go?

Water moves in a cycle. Much of what we use soon goes down our drains or is absorbed back into the earth. Another map we made shows how people living in the watershed handle their wastewater. In the northern catchment areas people use a septic tank and leaching field to digest their water before it filters back into the water table. They depend on the earth and its living systems to digest and purify their waste before it reaches their neighbor's well or reservoir.



Local agencies responsible for managing land and regulating development have barely begun the process of coordinating planning efforts throughout the watershed and have limited resources to analyze our long-term cumulative impact on the bioregion.

(Left) Developable or subdividable lots in the New York section of the watershed (Connecticut data not available).

The downstream, more developed, areas have exceeded the earth's capacity to absorb waste and must rely on man-made sewer and waste treatment systems. Whichever system is used, all of the outflow of the watershed eventually makes its way into Long Island Sound, an estuary severely taxed by the cumulative impact of development.

The line between these various systems might be called the "threshold of sustainability." It shows where we have chosen to develop with greater density than the land can sustain. We now know the carrying capacity of the land and must make conscious choices when we push the land beyond that capacity.

What is your town's master plan? Do you want to live in it?

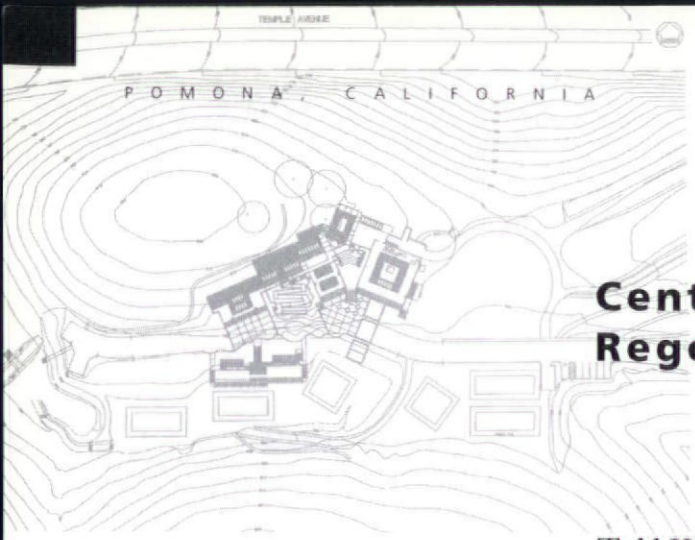
The Phantom City is the future that would happen if every master plan, zoning regulation, capital plan, child's daydream and landowner's vision came to fruition. This Phantom City is present, yet invisible. It is the product of considerable public effort and expense; it affects our taxes and land values, and it defines the future we plan to pass on to our descendants.

At present there is no practical way to see that Phantom City for any town, much less for the whole watershed. The Trust is beginning the process of visualizing that Phantom City. We are assembling the tax lot maps of five towns and cross referencing them with local master plans and zoning ordinances to identify all the lots that are currently considered appropriate for subdivision.

We don't inherit the land from our ancestors. We borrow it from our children.

Through the efforts of coalitions of government and citizens' groups (such as the one that led this study) and with the use of new information and communications technology, it is possible to comprehend the pattern of life in a region, assure ourselves that the phantom cities envisioned in our long-term plans are the ones we want to leave to our descendants and to monitor and minimize our impact on the earth.

Already the forests that were clear cut by our forebears have begun to regenerate. Wildlife is returning to the land. A fish ladder is planned to allow migratory salmon to return to the Mianus. Hundreds of citizens are becoming active in planning and environmental issues. Many of us are altering our lifestyles so we live more lightly on the land. There are many maps to create,many questions to ask, many decisions to make. We are just beginning truly to inhabit the places on earth we call home.



Center for Regenerative Studies

Todd W. Bressi

Center for Regenerative Studies, plan.

Almost twenty years ago, landscape architecture professor John T. Lyle asked his students to imagine what a community might look like if it depended only on the energy, food and water available on its site. Now they are building such a place at the edge of California Polytechnic Institute, Pomona, campus, where Lyle teaches.

The mission of this place, called the Center for Regenerative Studies, is to study and demonstrate how human settlements can be more sustainable by using "regenerative" technologies — those that turn both self-renewing resources (such as sunlight, wind and rain) and wastes into usable food, water and energy.

So far, three buildings (the core of a "village") and some gardens are complete. Ultimately the center will have dorm space for 90 students; faculty accommodations; living, meeting and teaching areas; and laboratories and offices. Eighteen students live there now and others can take classes (an undergraduate major and master's program are in the works); students are working in "lab sessions" to build ponds, terraces and planters that will produce food for the village.

Lyle won university support for building the center while he was part of a team studying how to reuse a landfill that is adjacent to Cal Poly and will one day be annexed to the campus. He convened an interdisciplinary design team that included not only architects and landscape architects but also specialists in agricultural economics, agronomy, anthropology, aquaculture, hydrology and solar engineering. The team spent two years developing a detailed program and design proposal. First it studied the way resources — energy, water, nutrients — and wastes would flow through the settlement. Then it designed physical forms (buildings, ponds, agricultural areas) to fit those patterns. "It was a little difficult because everyone speaks a different language. The design members played strong roles in guiding the thinking into channels that would fit together," Lyle said.

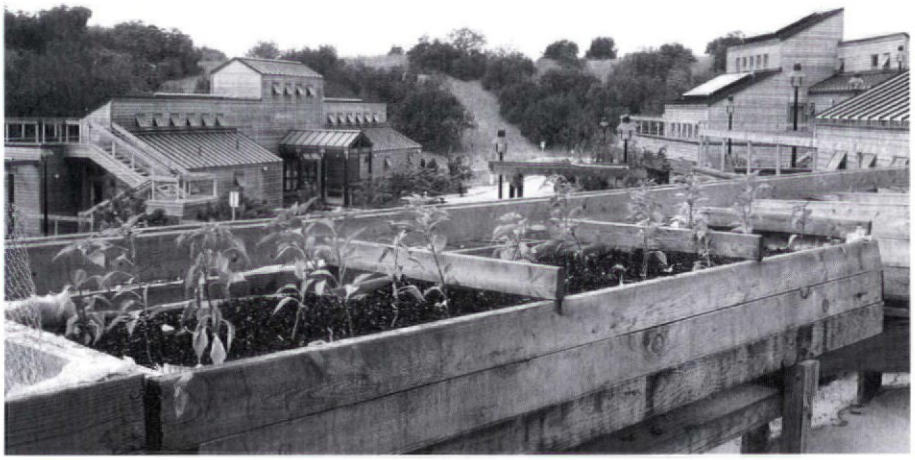
Using design to give visual form to the center's approach and values was important, Lyle said. Much of that expression follows from functional concerns rather than an aesthetic style. Buildings are located on a hillside, since hilltops (open to the sun and wind) will be used for solar energy collectors and wind-driven turbines and the valley (through which water drains) is the best place for aquaculture. Buildings are oriented east-west so their broad facades face south, towards sunlight. The buildings are surrounded by deciduous vegetation, which capture sunlight during the day (cooling the buildings) and release heat at night (warming the buildings).

Cal Poly hired Dougherty + Dougherty architects and Peridian Group landscape architects to prepare the final design, which differs from the team's vision in several ways.

For example, the original concept called for a series of buildings whose long, flat, interconnected roofs served as planting areas and were terraced to reflect the slope of the land. But the finished buildings "stick up in the air much more than we had intended," Lyle said; they are fragmented into discrete structures and their roofs have more pronounced slopes.

Those changes occurred for practical reasons, architect Betsey Dougherty explained: Buildings had been proposed on a utility easement, the flat roofs prevented designs that allow the buildings to be ventilated through convection, and the project had to be designed so it could be built in phases, rather than all at once.

The center will also have to surmount regulatory and funding hurdles to realize its vision of minimizing the use of energy and materials imported from off the site. "It will be a matter of time before we can determine just how well we can treat water, and we are working with regulatory agencies to determine how much we can use reclaimed waste water in lieu of potable water," Dougherty noted. A bio-mass heat-storage facility and



(Left) First phase of village. (Milroy/McAleer)

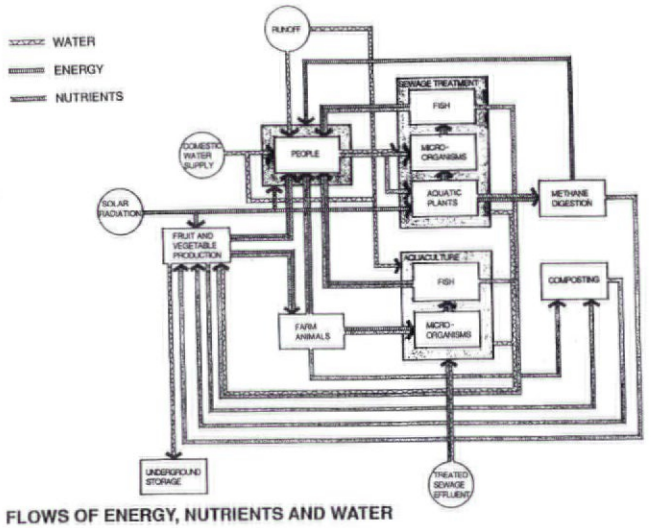
(Below) Conceptual diagram of energy, water and nutrient flows through the center.

(Bottom) Conceptual site plan showing water flows through the center.

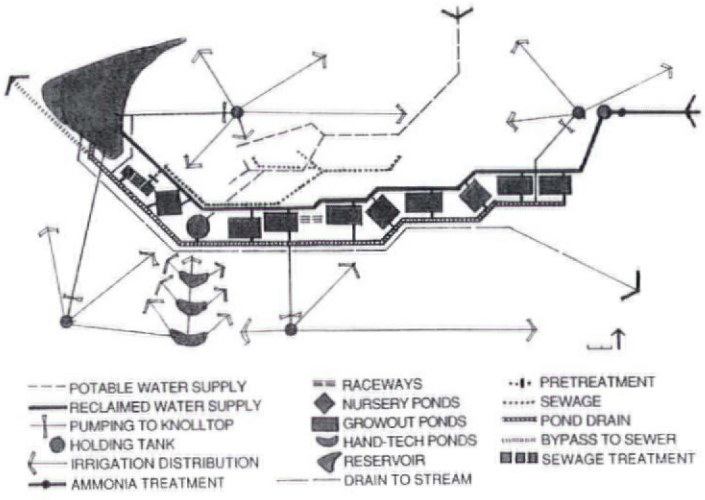
(Illustrations courtesy Dougherty + Dougherty)

methane cogeneration plant have yet to be built.

The center will certainly be a unique place, a living, breathing laboratory for demonstrating sustainable practices. The challenge, of course, is to find ways to transfer technology and influence the design and operation of other communities. The process of designing and building the center will be most instructive: Using designers to coordinate teams of environmental scientists, basing architectural and landscape design on an understanding of resource flows, negotiating through design and construction standards that might not meet goals of sustainability, and building in an incremental, flexible manner are lessons that should have as wide an application and impact as the research the center undertakes.



FLOWS OF ENERGY, NUTRIENTS AND WATER



WATER FLOW PLAN

Project Credits

Cal Poly Design Team: John T. Lyle (project director), Gregg D. Ander, Barry A. Costa-Pierce, C. Dean Freudenberger, Arthur W. Jokela, Denise L. Lawrence, Jeffrey K. Olson, Barry L. Wasserman, Victor A. Wegrzyn, James M. Weidman.

Architect: Dougherty + Dougherty

Landscape Architect: Peridian Group

The Green Apple Map

Wendy E. Brawer

It was December 1991. I was sitting in a conference room crowded with a hundred ecology-minded people planning activities to complement five weeks of intensive meetings at the United Nations, which was preparing for the Earth Summit. I wondered how the participants, who would be coming from all over the world, could be encouraged to witness personally New York City's environmental progress and challenges. I decided to make a map — a direct, universally understood, resource-efficient tool that could make the city's ecological sites, human resources and activities more accessible not only to visitors but also to residents.

The Green Apple Map, which I created with the help of Hal Drellich, a cartographically-inclined graphic designer, showcases the city's most interesting and refreshing ecological features. They range from places of ecological significance (such as wildlife habitats) to examples of sustainable urban design, technology and practices — greenmarkets, environmental centers and museums, bike paths and pedestrian accessible bridges. The map even details the city's waste infrastructure and toxic hot spots.

The map encourages people to explore and understand our city — helping expand the community of environmental stewards, people who understand the interconnections between the natural and built environments. It can help build a network of links among people of different ages and backgrounds by highlighting places that are important to our common future. It promotes and fosters replication of successful projects. Moreover, it challenges the assumption that this intensely urban setting has little redeeming ecological value.

Because of this project, I've come to appreciate maps as communication devices. Despite their modest appearance, they are powerful tools for describing places. The designer creates a view and through it, the user experiences a place anew. Maps are economical and compact — they are portable and postable — so their vision spreads rapidly. The Green Apple Map empowers quietly, leading each person to her own discoveries, helping us balance our priorities about our mobility, our destinations and, most importantly, where and how we wish to live.

One of my goals is to create a system for developing community-based Green Maps in other cities. The process of creating such a map can be democratic and inclusive, a method of fostering education, involvement and sustainability at the local level.

Note

My firm, Modern World Design, produced the first edition of the map with the support of the Municipal Art Society and its printer, Gramercy Offset. It was distributed at the United Nations and at urban ecology events in Spring 1992.

Later we produced an expanded, more colorful and friendlier second edition, which was distributed nationally. There are so many new ecotourism destinations in New York City and so much interest in the project that we are planning a third edition.

The Green Apple Map and Green Maps are trademarks of Modern World Design.


❒ ecologically designed building tours
outstanding places of natural beauty
greenmarkets and ✓ green businesses
environmental centers and ★ museums
solar sites and bicycle paths & bridges
community gardens, and lots more, even
✖ the rotten parts of the Green Apple.
BRONX
HUDSON RIVER
EAST RIVER
EASTCHESTER BAY
LITTLE NECK BAY
FLUSHING BAY
NASSAU
QUEENS
MANHATTAN
DETAILED ON REVERSE
BROOKLYN
JAMAICA BAY
ATLANTIC OCEAN
UPPER NEW YORK BAY
LOWER NEW YORK BAY
Newark Bay
Kill Van Kull
The Narrows
Gravesend Bay
Rockaway Inlet
Raritan Bay
NEW JERSEY
STATEN ISLAND
The most polluted waterways are the Arthur Kill, Newtown Creek and the Gowanus Canal. The good news is that marine pollutants are diminishing in the larger waterways, as evidenced by the return of striped bass, barnacles and marine borers in the Hudson River.

On the Energy Conservation Front

Charles C. Benton, Robert A. Marcial

(Above) Energy center facade. (PG&E Energy Center)

(Below) Designer exploring daylighting issues with a scale model during an educational seminar. (PG&E Energy Center)

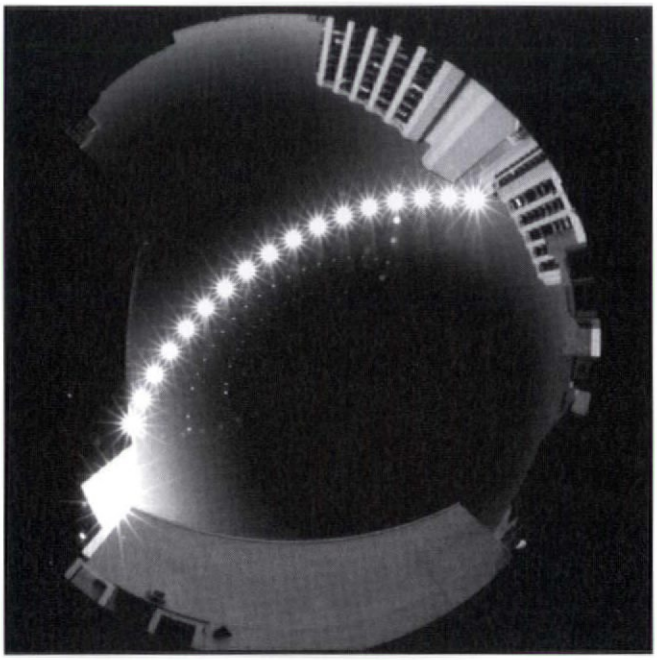
For a decade the country's domestic power utilities have been active promoters of energy conservation. From their perspective, encouraging the wise use of energy is more palatable than facing the rigors of building new generating plants.

The utilities encourage conservation through "demand-side management" programs, efforts to shape behavior on the consumer side of the meter. Pacific Gas and Electric, the nation's largest utility, offers programs ranging from energy information labels to rebates on high-performance windows. Among its most interesting and speculative efforts is the PG&E Energy Center, a workshop that assists building professionals in matters of energy efficiency. Given that buildings consume 60 percent of California's electricity, this service seems well targeted.

The center emerged from collaborative discussions involving the California utilities, regulatory agencies and environmental advocacy groups. Its program — guided by an advisory committee of design practitioners, academics, building scientists, utility managers and environmental advocates — coalesced around the roles of academy, toolbox and advisor. The planners decided the center's services would be free of charge and specified an approach that addressed architectural space making and the well being of occupants as important corollaries of energy efficiency.

Since opening in December, 1991, the center has hosted more than 30,000 visits by building professionals and their clients. In the role of the academy, the center has presented more than 200 seminars and lectures, ranging from brown-bag lunch presentations by building scientists from nearby Lawrence Berkeley Laboratory to multi-day courses on electric lighting fundamentals staged by the Illuminating Engineering Society. Classes are supported by permanent and rotating exhibits that demonstrate topics from first-order principles of lighting and thermal dynamics to the latest energy-efficient hardware. Perhaps the greatest endorsement for this continuing education program comes in the consistently high demand for the center's offerings — workshops fill within days of their announcement.

As a toolbox the center provides a "back office" previously unavailable to



(Left) Multi-exposure, 180-degree fish-eye photo showing the path of the sun every 30 minutes during the summer solstice. Photo taken from energy center rooftop. (Robert A. Marcial)

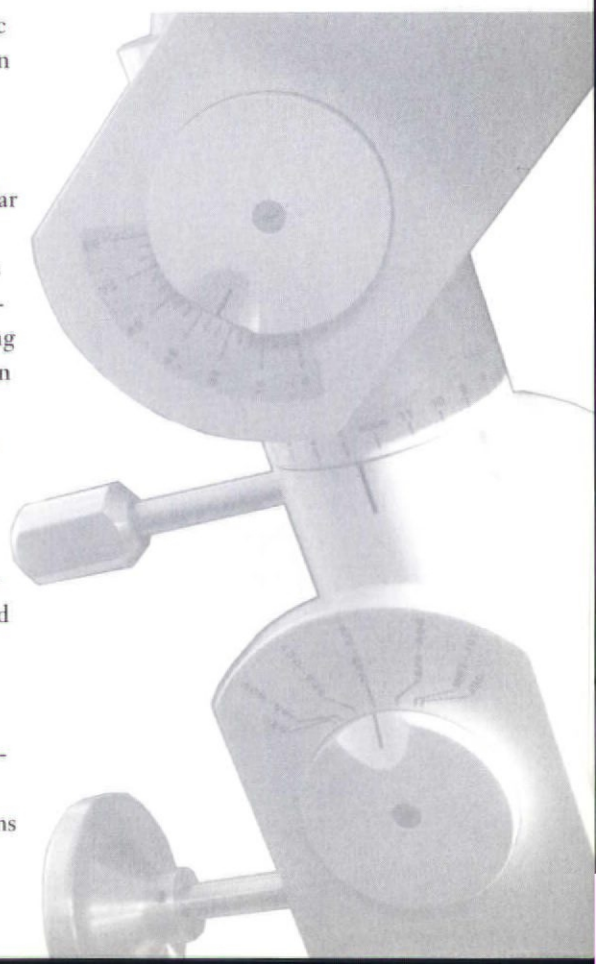
(Below) Detail of heliodon axes: latitude, time of day, month of year. (Robert A. Marcial)

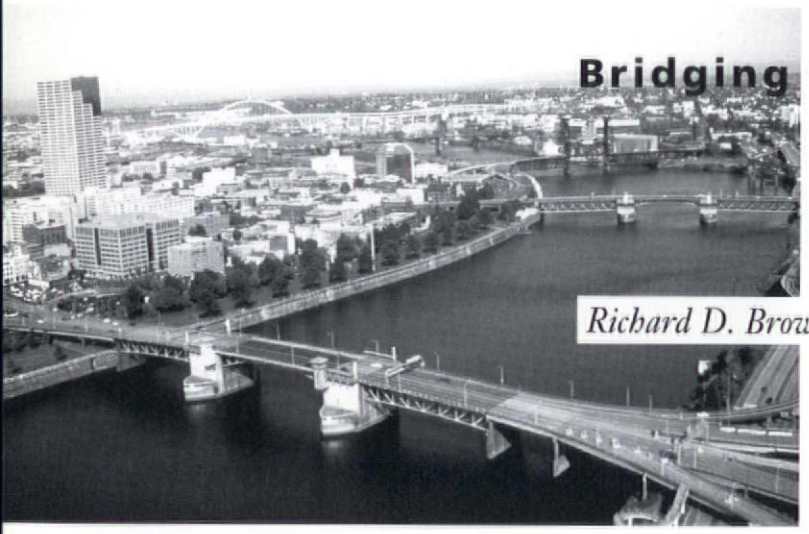
most practitioners. For example, there are two mock-up spaces with ceiling heights, interior finishes, fenestration and electric lighting that adjust to allow full-scale, experimental comparison of design alternatives. Architects use the center's custom-built heliodon, a machine that accurately simulates sunlight patterns on three-dimensional models, to examine shading performance and solar access. Professionals interested in evaluating physical building performance can borrow from the fine collection of data acquisition equipment in the center's tool lending library (light meters, amp meters, temperature/relative humidity sensors). Patrons also have access to the resource center, a collection of technical literature and computer software staffed by two research librarians.

As advisor, the center offers a technical staff for guidance on project-specific questions. In particular, the center encourages a multidisciplinary review of building plans during the schematic design stage and a follow-up review on issues related to the initial tuning of building systems.

The PG&E Energy Center offers lessons for those contemplating similar efforts. The center has been well received by building professionals, its liveliness confirming a need. Also valued is the provision of a central setting for the Bay Area's energy conservation activities and the center's role as a symbol for the cause. In retrospect, a key strength of the center is the breadth of collaboration that guided its formation.

It is perhaps unfair, and potentially unwise, to expect utilities alone to fund such efforts in a changing regulatory environment. The National Energy Policy Act suggests an alternative model, federally-funded regional energy centers managed by collaborative groups, and while this program remains unfunded, it offers much promise.





Bridging the Gap

Richard D. Browning

Portland, Oregon, is one of the few U.S. cities with affordable housing within easy cycling and walking distance of a vibrant, pedestrian-oriented downtown. But the Willamette River separates downtown from most of the neighborhoods with middle-income housing, posing a major barrier to bicyclists and pedestrians. The river's seven non-interstate bridges, a genteelly decaying collection of structural antiquities, accommodate bicycles, pedestrians and the disabled either grudgingly or not at all. Thousands of people living within sight of their high-rise offices are too intimidated by the gauntlet of bridge crossing to ride a bicycle or walk to work.

Local and state agencies, goaded by grassroots agitation from bicycle transportation advocates (who staged mass protest rides) and fortified with the promise of $1 million from the Federal Highway Administration, are now working to make non-motorized users feel more welcome on the bridges.

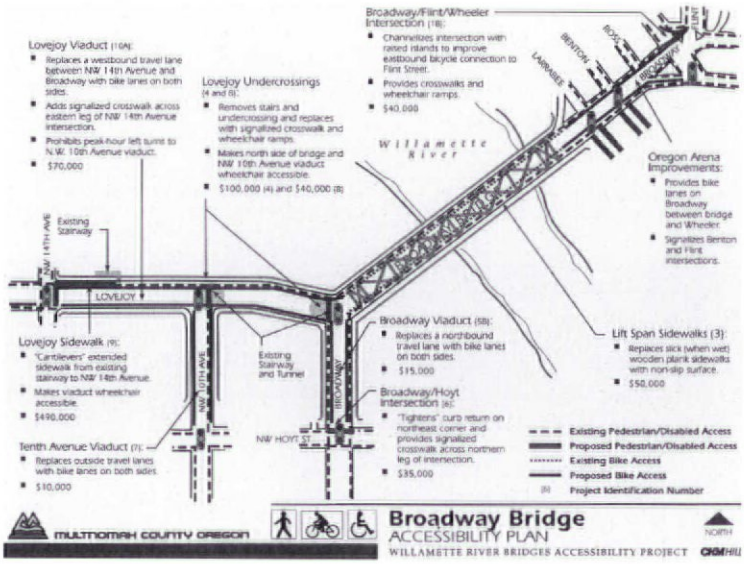
Citizens, government planners and design consultants formed a task force and spent 18 months defining problems and proposing solutions. The task force decided to pinpoint choke points in the network — places where small, inexpensive improvements could remove significant barriers and open new routes. For example, it recommended making three new curb cuts on the east Burnside bridgehead, a simple act that will make the bridge accessible to wheelchair users. In some cases, however, bridges that were designed for 1910s horse-and-buggies but now carry 1990s traffic volumes present intractable problems that can be solved only by expensive retrofits.

Portland's walkable downtown and neighborhoods are separated by the Willamette River, whose bridges favor auto traffic.

(Photos courtesy Richard D. Browning)

The Broadway Bridge typifies the opportunities and dilemmas the seven bridges present. The highest impact project involves removing one automobile lane to create space for two bike lanes on one of the approach viaducts. Traffic studies showed that by adjusting signal controls at approach intersections, the viaduct could accommodate westbound traffic in one lane, not two. The viaduct will be restriped with a single westbound lane, two lanes will continue to serve eastbound traffic and bike lanes will be added on either side (in a kind of poetic symmetry, two standard bike lanes are the same width as one narrow car lane). This project avoids an expensive retrofit; paint and signal re-timing are minor costs.

Unfortunately, pedestrian improvements did not always fare this well. The addition of a sidewalk along part



Detailed plan of bicycle and pedestrian improvements to Broadway Bridge and access streets. (CH2M Hill)

of the bridge appears to be too expensive to receive funding; because of the narrow bridge width, a cantilevered structure would have been necessary.

Another Broadway Bridge project demonstrates the importance of considering the network of streets leading to and away from a bridge. Street modifications are proposed on an especially troublesome intersection for bicycles located three blocks from the bridge.

The preliminary design phase of the Willamette River Bridges Accessibility Project was completed in 1994 and the recommendations have been approved by the Multnomah County Commission (reluctant steward of Portland's bridges). Work on a few of the simplest projects is already complete. A signal button has been modified, signage improved and some curb cuts installed. These improvements may seem trivial by themselves, but when seen in the context of a full bridge access plan, small additions are important contributions to a greater whole.

The attempt to put bikes and pedestrians on an equal footing with cars highlights the inequalities built into traffic planning practice. A plethora of minutely defined standards exists for motor vehicle traffic, but nationally accepted standards for bicycle and pedestrian facilities are anemic.

For example, "level of service" analysis, which measures how easily motorized traffic flows on a street, has never been applied to bicycle traffic in the U.S. "Level of service" standards do exist for pedestrian traffic, but they are seldom used and measure only the density of pedestrians in a space. Delay (caused by detours and signal timing as well as congestion) is not a factor in determining a level of service for pedestrians.

The most remarkable achievement of the project was the way in which it bridged the gap between road designers and non-motorized road users. Traffic engineers attended a series of open forums and made a sincere attempt to respond to public concerns. While design standards for motor vehicles were never broken, they were sometimes bent creatively. A few low-volume facilities — a turning lane on one bridge, an approach ramp on another — were sacrificed to accommodate non-motorized users better.

Pedestrian access to Portland's bridges can be seen as symbolic of human access to the city in general. During the last years of his life, Lewis Mumford reminisced about an unforgettable walk he once took across the Brooklyn Bridge. Halfway across, looking towards Manhattan, he experienced a once-in-a-lifetime flash of enlightenment, feeling as if he contained both the city and the sky within himself.

The world, at that moment, opened before me, challenging me, beckoning me, demanding something of me that it would take more than a lifetime to give ... I trod the narrow, resilient boards of the footway with a new confidence that came, not from my isolated self alone, but from the collective energies I had confronted and risen to. [1]

Like Mumford, designers of urban infrastructure must draw strength from the varied and collective energies of the city and plan transportation systems that allow human beings to go confidently wherever they please, under their own power and at their own pace.

Note

1. Lewis Mumford, *Sketches from Life* (New York: Doubleday, 1982).

Reconfigured span of Burnside Bridge, with added bicycle lanes.

A Sustainable Community Profile

Muscoe Martin

Chestnut Hill, Pennsylvania, a community of 10,000 people in northwest Philadelphia, is often cited as an example of successful traditional town planning. Chestnut Hill has a long history as an attractive, pedestrian-oriented suburb with a distinctly urban character; its mix of land uses are compactly distributed on a street grid anchored by a shopping avenue; and the architectural fabric and wooded landscape combine to produce a graceful, human-scaled community.

Chestnut Hill can also be seen as a sustainable community in a number of ways. The most common definition of sustainable, in this context, is "meeting the needs of the present without compromising the ability of future generations to meet their own needs."[1] Sustainable community design has typically focused on developing design strategies for more efficient utilization of energy, resources and waste in order to reduce the damage to the natural environment caused by development.

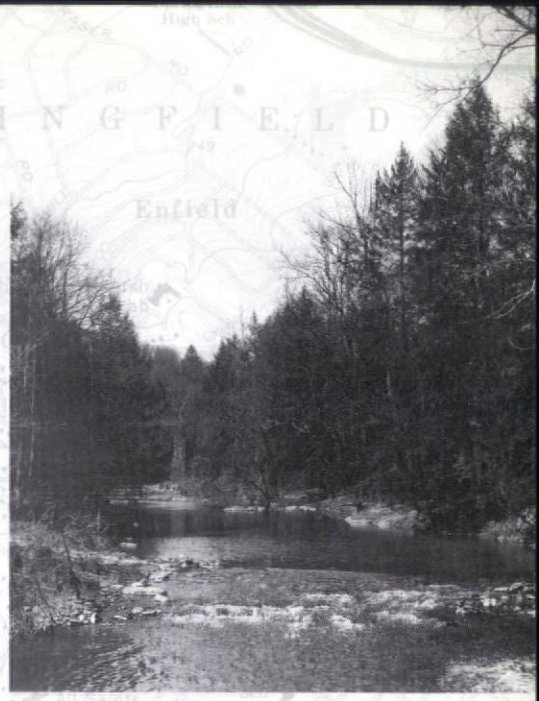
Chestnut Hill reflects many of these sustainable attributes. The community is well served by public transportation. Walkable distances to shopping and transit stops reduce the need for automobiles. A wide range of housing size and type mixed together accommodates a community of diverse households. The character of the natural environment has been preserved by land conservation and sensitive urban design.

There are also many attributes of Chestnut Hill that are not sustainable. The older housing stock is not particularly energy efficient and efforts to utilize newer sustainable technologies have been limited. In spite of the accessible transit system many residents commute by car, either by

Above: Chestnut Hill land subdivision, eighteenth century. (Chestnut Hill Historical Society)

Opposite page, clockwise from top right: Wissahickon Creek ravine, Germantown Avenue commercial district, Chestnut Hill West commuter rail station, a "Wissahickon-style" garden.

(Illustrations courtesy Muscoe Martin unless indicated otherwise)



1. Eighteenth-century development. Sources: Christian Lehman, Description of Roads in Germantown Township, 1751; Hannah Benner Roach, "The Back of Germantown," The Pennsylvania Genealogical Magazine 20:2 (1956): 126-127.

2. Development to 1852. Sources: J.C. Sidney, Map of the Township of Germantown, 1848; R. P. Smith, Map of the Vicinity of Philadelphia from Actual Surveys, Camden, Lloyd Van Derveer, 1852.

3. Development to 1885. Source: G. M. Hopkins, Atlas of the 22nd Ward, Philadelphia, 1885.

4. Development to 1969. Source: Field survey.

Drawings from Willard S. Detweiler, Jr., Chestnut Hill: An Architectural History (Philadelphia: Chestnut Hill Historical Society, 1969).

choice or need. The residential density, while higher than comparable suburbs, is arguably too low to justify the transportation infrastructure. There is a lack of affordable housing for lower-income families.

What is often neglected in thinking about sustainable community is the relationship between community and place. The community must derive some sustenance and inspiration from the place. When the physical attributes of a place attract a wide variety of people eager to inhabit that place as willing members of the community, not just as individuals, the community will be motivated to care for that place. This communal appreciation grows from a love of the land from which comes a respect for the interdependence of the natural and the man-made. Without this shared concern for its long term-survival, no place can be truly sustainable, no matter how energy efficient or resource conserving.

Chestnut Hill possesses the seeds of sustainability in its strong sense of shared ideals rooted in the physical place, and offers valuable lessons to those concerned with the way we imagine, build and inhabit our communities. By analyzing this place based on sustainable criteria, we can gain a broader understanding of the success and longevity of traditional suburbs such as Chestnut Hill, as well their potential as models for sustainable development.

The Culture of Community

For a century, Chestnut Hill's inhabitants, inspired by the natural beauty of the place, have come together as a community to conserve it. The landscape of Chestnut Hill is defined by the Wissahickon and Cresheim creek valleys to the south and west and the thickly wooded streets of the higher ground. In the mid-1800's, the Wissahickon Creek ravine and the summer breezes on the hill made the area an attractive vacation retreat for wealthy Philadelphians, who escaped the hot, crowded city for the cooler microclimate and sublime rural landscape.

In the nineteenth century much of the two creek valleys was annexed into Philadelphia's Fairmount Park. The preservation of this beautiful natural feature before most land development had occurred helped conserve one of Chestnut Hill's most distinctive landscapes and maintain its wooded character. These parklands have inspired a vigorous conservation movement; in the 1920s, this activism successfully mobilized to ban automobiles from the upper Wissahickon Valley.

Chestnut Hill's activist spirit was aroused again when some of the larger estates were sold for subdivision. Citizens created the volunteer Chestnut Hill Community Association, which is still actively concerned with new development and its affect on the nature of this place. The association wields significant influence over local issues of transit, traffic, police and city services, and, most importantly, land use. The association has developed design guidelines and processes for community review of proposed development with the goals of "preserving and enhancing the physical character of Chestnut Hill."[2] Although community review does not always lead to good architecture, proposed developments are forced to address the urban design issues that give Chestnut Hill its character.

Land Use, Housing and Transportation

A healthy ecosystem supports a diversity of life and activity. Similarly, a healthy community is home to a diverse population and provides a mix of employment, shopping and recreation opportunities. Chestnut Hill has a relatively wide range of land uses — shopping, parks, offices, restaurants, health care institutions and light industry — arranged in a pedestrian-scaled, walkable townscape amid large areas of protected open space.

Chestnut Hill's main street, Germantown Avenue, is the major route through the community and the spine of the business district. This shopping street is the image most non-residents have of Chestnut Hill — an upscale, diverse, enjoyable place to shop. Although there are a number of boutiques, galleries and antique stores along the avenue, there are also hardware stores, shoe repair shops, bank branches, small grocers and dry cleaners, which serve residents' basic needs.

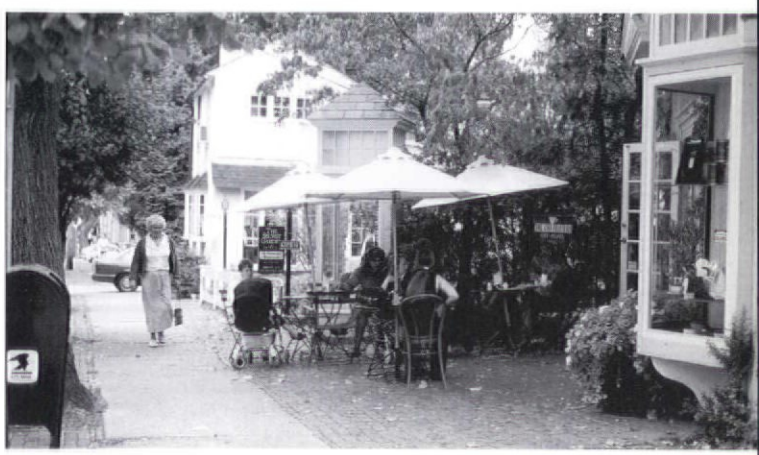
Elsewhere, the street patterns, lot sizes and dwelling types extend the pedestrian-friendly, human-scaled character of Germantown Avenue. The early streets were laid out in a grid, roughly parallel to Germantown Avenue, following original eighteenth-century land divisions. This grid was extended by city surveyors in the late nineteenth century, deforming only at the edges, where the topography becomes dominant. The grid provides multiple routes to most local destinations, connects neighborhoods within Chestnut Hill and helps distribute traffic evenly. Most streets have sidewalks and children can walk or bike to parks or friends without crossing major thoroughfares.

Residential development is concentrated near the commercial and transit spine. Densities range from 7-12 dwelling units per net acre, contributing to the relatively urban character of this part of town. Lot size varies from 2,500 square feet (a typical row house lot) to one-half acre.

A diversity of housing types is an important characteristic of a sustainable community because it can accommodate higher densities and a range of household types within a traditional town character of front yards, distinct neighborhoods and open space. The higher density and mix of households, in turn, supports a wider range of transportation, service, shopping and recreation options and help justify investments in transportation and other infrastructure.

The blocks of compact Philadelphia row houses east of Germantown Avenue were developed in the nineteenth century for shopkeepers and clerks, and for artisans and domestic servants employed in the larger houses and estates. Beyond that area is a wide zone of diverse housing where large and small single-family houses, twins, attached row houses and occasional apartment buildings coexist in a lively mix. Further

Germantown Avenue's two- and three-story buildings constitute an almost solid commercial and retail frontage and create a pleasant pedestrian environment for a mile and a half. ("Chestnut Hill Community Association Land Use Guidelines," 1982)



1

2

Chestnut Hill's varied house types provide living places for a diverse population.

1. Early nineteenth-century row houses.
2. Mansion on the edge of town.
3. Twentieth-century twin houses.
4. Twentieth-century twin houses.

from the avenue, lots and houses are larger and grander, particularly on the north and west edges of town, where the topography interrupts the grid and affords spectacular building lots.

Chestnut Hill has the highest median house price in Philadelphia, which is a measure of both its success as a desirable community and its failing as a sustainable one. That affluent families can be attracted to a diverse, town setting instead of a more exclusively zoned, limited access suburban subdivision is encouraging. However, the lack of more housing opportunities for lower-income families limits claims of diversity. Similarly, although nearly twelve percent of Chestnut Hill residents are African American, most live in and around one development in the northeast corner. Few blacks own businesses or are involved in the community association.

Although these divisions are being blurred by changing demographics, they remain as legacies of Chestnut Hill's history as a wealthy two-class suburb. The rapid increase of two-income families has enabled a new group of middle-class homeowners to purchase the small and mid-sized houses in the west side of town. Young singles and couples are attracted by Chestnut Hill's proximity to downtown and its relatively urban character. One of the few apartment buildings taller than three stories has become very popular with retirees, due to its easy walk to both a train station and Germantown Avenue.

One of the main tenets of sustainable communities is convenient access to mass transit. Chestnut Hill is extremely (some argue extravagantly) well served by commuter rail to center city Philadelphia, with two lines and six stations, a streetcar line and busses. However, the recent growth of employment outside of downtown has begun to erode the effectiveness of this infrastructure.

The commuter lines were built by private ventures eager to develop real estate and generate commerce in Chestnut Hill.

Streetcars and busses along Germantown Avenue connect Chestnut Hill to Center City Philadelphia.

3

4

Their proximity was justifiable in the pre-automobile era when the only way to the station was by foot or horse. At the top of the hill, where the streetcars turn around, the two terminal stations of the east and west commuter lines lie within one-half mile of each other. One can transfer from here to other bus lines connecting cross-town and suburban routes to these 100-year-old transit lines.

Some 80 percent of Chestnut Hill residences and virtually all employers are within a quarter mile of a transit stop. This exceptional access to public transportation benefits many groups of people, from commuters and shoppers to kids and older people, who gain a freedom of mobility not available in automobile-oriented suburbs. Several stations on the two commuter lines have park-and-ride lots, providing transit access to many residents living beyond walking distance as well as non-residents from farther suburbs.

Although transit use by Chestnut Hill residents appears reasonably strong (on average 1,300-1,400 people ride the commuter trains from Chestnut Hill each day[3]), it could be higher. One reason may be that the drive to downtown Philadelphia takes about 30 minutes and can be made on relatively uncongested parkways and other surface routes. Another reason is that one quarter of Chestnut Hill residents commute to work outside of downtown Philadelphia. This trend, increasingly common in areas where the growth in jobs is mainly in the far suburbs, calls into question the current value of the public transit infrastructure of railroad suburbs.

Nature, Resources and Architecture

Sustainable design attempts to make evident the connections between the natural and constructed worlds. One way to accomplish this is by using building material and architectural character that relate to the climate and landscape of a place. There are several such aspects of Chestnut Hill's buildings that create a common identifiable fabric.

Chief among these is the widespread use of locally quarried limestone schist for foundations, exterior building walls and landscape elements. Chestnut Hill stone, ubiquitous in the steep Wissahickon Creek ravines and the bane of many local gardeners, demonstrates an immediate connection between land and building and provides a literal grounding of the man-made to the natural place. Later development has not always followed these patterns as the local stone became less available and fashions of architecture and landscape design changed.

Chestnut Hill gardeners have always preferred landscaping with indigenous species, either from familiarity, affection or availability. In the early part of this century, Chestnut Hill provided a thriving business to a large nursery specializing in native plants. More recently, the use of native trees for street planting became institutionalized in community guidelines.

A Wissahickon style of garden has developed, designed to represent the native elements (trees, water and stone) and structure of the Wissahickon ravine. "Gardens are conceived more as usable spaces than display for houses."[4] (This is a particularly valuable feature for smaller dwellings in denser neighborhoods as outdoor space can often be used in this temperate climate.) Natural patterns of planting are followed: native understory species such as dogwood and laurel find their appropriate position beneath indigenous canopy trees — an idealized forest in the yard.

Most of the development of Chestnut Hill's infrastructure and buildings occurred when little attention was given to conservation of energy and natural resources. The buildings, although generally solidly built, are poorly insulated. Overt use of renewable energy, such as solar or wind power, is rare.

Cresheim Valley Road is part of a network of streets that provide convenient access to Center City, draining ridership from commuter rail lines (one of which runs on the viaduct that crosses the road).

Several characteristics of Chestnut Hill's residential construction, however, provide a measure of heating and cooling efficiency. The shared party walls of the smaller attached and semi-attached houses lower energy use by reducing the surface area of walls exposed to the weather. The stone foundations and walls used in many older structures act as thermal mass, modulating the diurnal temperature swings, especially in the summer. Combined with the countless large deciduous shade trees and beneficial breezes, this permits many houses to remain comfortable for much of Philadelphia's hot, humid summers without air conditioning.

The street grid of Chestnut Hill is oriented is almost exactly 45 degrees from the cardinal points. This orientation is considered ideal for passive solar energy utilization; it provides an egalitarian solar access for nearly all lots and permits each side of a structure to see the sun at some time of the year.[5] This configuration provides great flexibility in planning residences to accommodate both the sun and street exposure. Although buildings designed specifically as "solar" are few, many older houses feature sun rooms and solaria.

Curbside recycling is very successful in Chestnut Hill. Composting and leaf mulching are widespread and curbside pickup of yard wastes for community composting is offered. These resource conservation activities help balance the energy inefficiency of the housing stock and, because they are community efforts, also encourage among residents and a sense of interdependence.

The Lessons of Chestnut Hill

This analysis raises questions about both the sustainability of the traditional town model and the ability of sustainable communities to maintain an amenable scale and character. Chestnut Hill, while not a completely sustainable community, does offer encouraging lessons to planners of sustainable communities:

• The natural environment is a critical framework for a sustainable community. A place not tied to the climate, topography, soil or water will always be working against natural systems and teaching the wrong lessons.

Few urban or suburban communities have natural features with the beauty of the Wissahickon Creek, but something must be there in the land to infuse the community with a spirit of place and a respect for the natural environment. One questions the location of sustainable communities based solely on transportation or similar infrastructure.

• Sensitive urban design can reinforce and enhance the qualities of the natural environment. A community that acknowledges the natural edges of a place, takes advantage of the favorable physical characteristics and balances urban infrastructure requirements with natural features can create visible connections between nature and the built environment, helping to foster an understanding of the relationships between natural systems and human settlements.

• Urban design patterns that encourage mixed uses and housing diversity will be able to accommodate changes in economic characteristics or demographics. Places that can absorb change will have a better ability to endure through time.

• Places that provide a variety of opportunities for face-to-face encounters (in Chestnut Hill, the train stations, Germantown Avenue, the farmer's market) enable residents to interact and the community to recognize itself.

For Chestnut Hill to evolve into a healthy, sustainable community, it must address a number of social and technological challenges, both at the community and regional level:

• Chestnut Hill is a middle class to upper class community. How can it accommodate less affluent residents?

• Residential densities, although higher than in comparable suburbs, are lower than recommended by sustainable community guidelines. Can the density of a traditionally planned town support and justify the infrastructure investment required for it to be sustainable and, at the same time, provide housing for all incomes? Conversely, how could the densities that would support an effective transit system be accommodated without adversely affecting Chestnut Hill's unique environment?

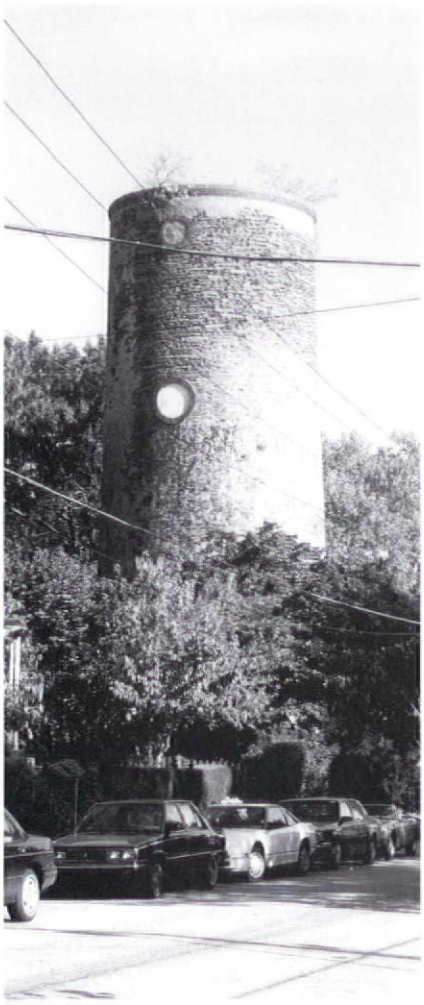
• How can an established community with a mature architectural fabric like Chestnut Hill incorporate newer, more sustainable technologies such as solar and wind energy, waste

recycling and composting, urban agriculture? Should these technologies be imposed on existing structures, or should other ways be found to balance the conservation of resources? Community design review, which now focuses on maintaining the scale, texture and style of Chestnut Hill, may be a tool for helping designers connect the man-made to natural landscape and incorporate sustainable technologies.

• Transit-oriented developments can lead to reduced automobile use and more mobility for multi-generation communities, and they can be successful commercial destinations. But suburbs whose transit systems are tied to downtown destinations are having difficulty accommodating work-related trips because of shifting employment patterns.

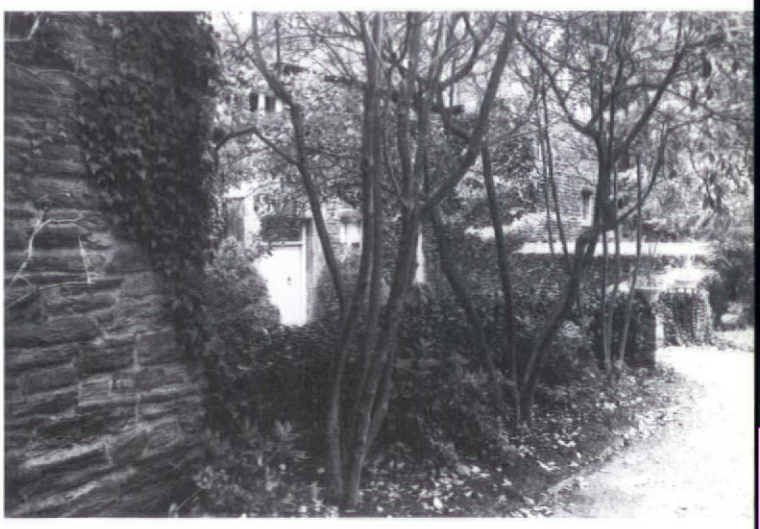
This points to a number of challenges: Transit systems must be adaptable as conditions change over time; conversely, land development must build on existing infrastructure investment; transit networks must be extended in new directions to provide transportation to workplaces now accessible only by car.

The word *sustainable* has roots in the Latin *subtenir*, meaning "to hold up" or "to support from below." A community must be supported from below — by its inhabitants, present and future. Certain places, through their peculiar combination of physical, cultural and, perhaps, spiritual characteristics, inspire people to respect and care for their community. These are the places where sustainability has the best chance of taking hold.



Until the late nineteenth century, Chestnut Hill drew water from a nearby spring and stored it in this tower, still part of the town's landscape.

A "Wissahickon-style" garden.



Notes

1. World Commission on Environment and Development (headed by G. H. Brundtland), *Our Common Future* (Oxford, U.K.: Oxford University Press, 1987). Although this is the most cited definition, I prefer Wendell Berry's more evocative interpretation of sustainability: "our wish that human freedom and pleasure may last." Wendell Berry, *Sex, Economy, Freedom and Community* (New York, San Francisco: Pantheon Books, 1993).

2. "Chestnut Hill Land Use Guidelines" (Chestnut Hill Community Association Land Use Planning Committee, 1982), 1.

3. Data provided by Southeastern Pennsylvania Transit Authority. This figure is for all riders boarding at stations within Chestnut Hill and does not distinguish between residents and non-residents.

4. "Chestnut Hill Land Use Guidelines," 18.

5. I am indebted to Terry Jacobs for this observation.

Sources

David R. Contosta, *Suburb In the City: Chestnut Hill, Philadelphia*, 1850-1990, (Columbus: Ohio State University Press, 1992).

Willard S. Detweiler, Jr., *Chestnut Hill: An Architectural History* (Philadelphia: Chestnut Hill Historical Society, 1969).

Making Big Wild

Marcia McNally

This is a story about Los Angeles. Predictably, it is about development pressures, an insatiable appetite for more roads, the struggle to preserve open space, mountain lions ... Wait a minute, mountain lions? In Los Angeles?!

Yes. This is a tale about creating a vision for 20,000 acres of urban wilderness, a place that came to be known as Big Wild. This is the story of how science reinforced the vision and solidified a politically acceptable argument for protecting an ecosystem in the face of extreme pressure to build roads right through it. This is a statement about reconnecting a city with its native landscape in order to achieve environmental stewardship.

Big Wild, 15 minutes from downtown Los Angeles as the red-tailed hawk flies, is an intact ecosystem within a network of mountainous open spaces between the San Fernando Valley and communities on the Pacific coast.

(Above) Location map. (Agnes Rozsnyoi)

(Below) Land protection plan for eastern section of Santa Monica Mountains National Recreation Area. (Marcia McNally).

Los Angeles always has been a place where big dreams gave shape to city form. As Mike Davis put it so well in his book *City of Quartz*, "Compared to other great cities, Los Angeles may be planned or designed in a very fragmentary sense ... but it is infinitely envisioned."[1]

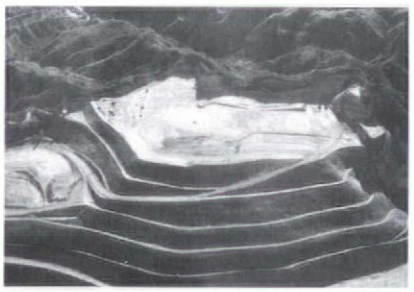
The people who fought and planned for the Santa Monica Mountains National Recreation Area envisioned a continuous mountain park spanning from Dodger Stadium to Point Mugu. The recreation area was established in 1978 as a network of connected urban open spaces cooperatively managed by park agencies for similar purposes.[2]

Big Wild, one link in this chain, started with a big-picture thinker and doer, Joe Edmiston, executive director of the Santa Monica Mountains Conservancy (created in 1979 to acquire land in the national recreation area). Edmiston and the conservancy, racing against encroaching development, have successfully aggregated more than 21,000 acres of wilderness into public ownership.

Looking east from Big Wild to downtown Los Angeles. (Randolph T. Hester, Jr.)

(Inset) Trail leading from Big Wild into San Fernando Valley. (Marcia McNally)

Development near Big Wild.
(Randolph T. Hester, Jr.)



Terracing in preparation for new construction near Big Wild.
(Randolph T. Hester, Jr.)

The lands are beginning to form an edge to urban growth, a natural container for this seemingly limitless city.

In October, 1989, about a week after the Loma Prieta earthquake, I was sitting in my office and got a call from Joe. He was having trouble with a project in the central Santa Monicas and wanted us to come down and look. "You just have to see it to understand," he said, so we went to LA.

The first part of the meeting was conducted in a helicopter flying over thousands of acres of mountain tops being cut off and graded for suburban estates. We talked about Mulholland Gateway Park, 1,081 acres of land in the mountains acquired through developer donations. But the majority of the tour consisted of driving along Dirt Mulholland, a seven-plus mile stretch of Mulholland Drive that has never been paved. I remember spotting a bobcat up on a knoll, backlit by late afternoon sun. In my most vivid memory we are standing at the top of Rustic Canyon, gazing out at the chaparral and talking about the big picture — only 15 minutes from downtown Los Angeles, as the red-tailed hawk flies.

The Problem

The conservancy's immediate focus was on Mulholland Gateway Park. The developer of an adjacent parcel, Harlan Lee, was under pressure to satisfy the remaining condition of development before he could put his lots up for sale. The city had required Lee to extend Reseda Boulevard to Dirt Mulholland and make it as wide as a secondary highway. Time was of the essence.

Why such concern over this seemingly small detail? First, the extension would blast through Mulholland Gateway Park and Topanga State Park before it hit Dirt Mulholland. A 60-foot peak on the ridge would be flattened; all of the land available for a park gateway would be consumed by Reseda. Second, to satisfy city fire department standards, Dirt Mulholland would have to be cut down 10 feet at the point where it joined Reseda, undermining the stability of the southern rim of Caballero Canyon. Third, it was feared that the road requirement was a plot to give Los Angeles County Sanitation vehicular access to Rustic and Sullivan Canyons, which would become landfills. Fourth, it was assumed that once the Reseda connection was made, it was only a matter of time before Dirt Mulholland would be paved and other parts of the mountains would be opened for development. Fifth, a city-owned right-of-way on the other side of Dirt Mulholland intersected with the proposed extension, raising the possibility of another cross-mountain freeway (it already had a name, Reseda-to-the-Sea).

The community was actively lobbying the conservancy to intervene. Friends of Caballero Canyon was pulling out all the stops to shut down the road and protect the canyon. Assisted by other local environmentalists, the group had staged a protest earlier in the year to halt construction; some of the demonstrators had even chained themselves to the bulldozers.

On the other side, the Encino Hillside Traffic Safety Organization was fighting to uphold the road condition. Several canyons to the east, this neighborhood had been discovered as a short cut by commuters seeking alternatives to standstill traffic at the junction of Highway 101 and Interstate 405. The homeowners were convinced that extending Reseda and paving Dirt Mulholland answered their problem. Further, several regional agencies were demanding this dirt remnant be paved, including the Southern California Association of Governments, which felt it was a factor in achieving regional mobility goals, and the South Coast Air Quality Management District, which sought to reduce the emission of particulate matter into the air.

In August 1989 the two sides clashed at a community meeting that erupted into a brawl, as the *Los Angeles Times* reported:

Some members of a crowd of about 300 that had gathered outside the auditorium of Lanai Road Elementary School ... began shouting

(Left) "Dirt Mulholland"; unpaved section of Mulholland Drive. (Randolph T. Hester, Jr.)

(Below) William Mulhol-land and other officials with construction plans for Mulholland Drive. (Los Angeles Times)

(Bottom) A 1989 public meeting about connecting Reseda Boulevard with Dirt Mulholland led to fist fights. (Joe Vitti/ Los Angeles Times).

and shoving each other ... About 10 Los Angeles police officers and a police helicopter were dispatched to the scene, but there were no arrests ... The meeting marked the latest battle in the dispute between Tarzana and Encino homeowners over the question of whether Reseda Boulevard should be extended to connect with Mulholland Drive.[3]

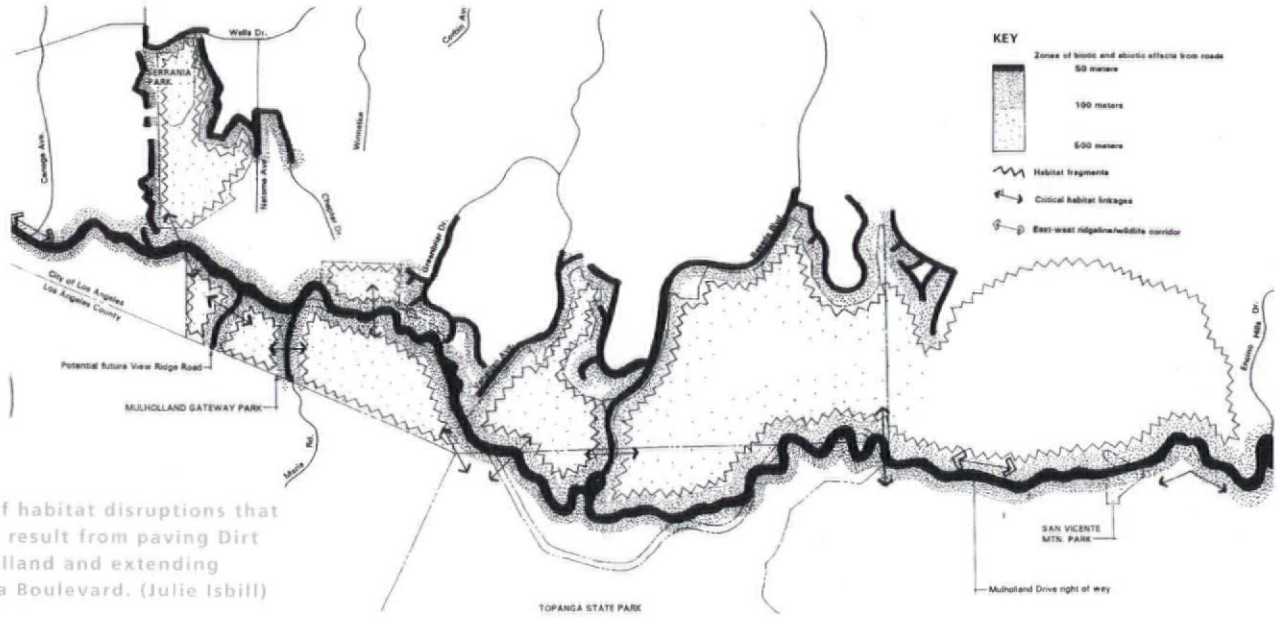
When we started on the project a year later, the hostility was as strong as ever. It became clear that our role was to negotiate the Reseda extension issue as part of preparing a master plan for the park.

Creating a Gestalt

Our early analysis convinced us that we had to include Dirt Mulholland in our thinking, even though it lay mostly outside the Mulholland Gateway Park planning area. When William Mulholland conceived this scenic ridge-top road in 1913, he imagined it to be continuous. Years of debate had yielded proposals ranging from a trail to a six-lane highway, but Dirt Mulholland remained unpaved.[4]

During this early phase we met Suzanne Goode, a state parks ecologist, and Paul Edelman, a conservancy consultant investigating wildlife corridors in the mountains. Suzanne detailed the interconnectedness of the various plant communities; Paul showed us local habitat fragmentation and told us about recent mountain lion sightings. We learned that some of the most valuable habitat, particularly the riparian and walnut plant communities in Corbin Canyon and the grasslands on Serrania Ridge, was on the verge of development.

After three months we held an in-house charette. This is when Big Wild was first imagined, almost by accident. Big Wild came about because it was impossible for us to develop a convincing gestalt for Mulholland Gateway Park, which kept



Map of habitat disruptions that would result from paving Dirt Mulholland and extending Reseda Boulevard. (Julie Isbill)

appearing in our minds as it was, four land dedications with abutting property lines, no unifying integrity, just acreage scalped off in the development process, snippets of natural landscape that didn't add up to any ecological unit. Mulholland Gateway Park didn't offer the user any kind of wilderness experience — you were always right smack up against development.

Our minds started to wander. We looked at an aerial photo and saw the large amount of undeveloped land surrounding our site. We were reminded of other canyons we knew from previous projects, hidden spots in the city that would envelop and captivate us with natural wonder. Uninhibited by jurisdictional lines, we looked at maps and saw an ecosystem — a unit of land that could sustain the range of organisms found in this part of the Santa Monicas. With care, it could survive and interact with the human ecosystem of Los Angeles.

We quickly calculated that while half of the 20,000 acres in this ecosystem was in public ownership, the remaining land was vulnerable. And we knew our client would want to acquire it. Convincing Edmiston to change our scope of work to address the entire 20,000 acres was easy — Big Wild would give him defensible borders to protect, something he could envision.

Not all of our planning team was convinced that Big Wild was the proper unit of analysis, however. Some of the team wanted scientific answers before expanding the local fight into a debate about biodiversity, before creating a forum for negotiation with the warring communities while arguing for the protection of Big Wild. This required answering two questions: Would extending Reseda Boulevard and paving Dirt Mulholland provide adequate additional road capacity to solve the Encino Hillside traffic problem? What would be the impact of paving Dirt Mulholland on wildlife? We hired a transportation planner (Bob Conradt) and biologists from the University of California Davis Wildlife Resources Group (Ray Sauvajot, Marybeth Buechner and Christine Schonewald-Cox) to pursue the answers.

The wildlife biologists established that Big Wild provided an essential buffer from highly developed areas and protection from road-associated impacts. From ground surveys they identified pieces of habitat that would be fragmented by proposed roads or development. They also determined that as long as Dirt Mulholland remained unpaved it would serve as a crucial wildlife corridor, providing a connection to open spaces east of Interstate 405, west to Malibu and north to the national forest. Having calculated that Big Wild's mountain lions needed to be able to roam 640,000 acres of relatively-remote land in order to sustain a healthy gene pool, we knew this corridor was critical.

The biologists confirmed that paving Dirt Mulholland would expose wildlife to road-generated impacts (road kills, intrusive biotic changes, access for other animals, pollution, barriers and habitat removal). If the roads were paved, abiotic effects (e.g. pollution, such as lead poisoning) and biotic effects (changes in species composition and/or numbers) would impact much of the area. The roads would fragment habitat, leading to the isolation and decline of species (especially those that did not do well in edge habitat, were sensitive to human contact, existed at low densities, were unlikely to cross roads, sought out roads for heat or food, or required considerable space).

The traffic study confirmed that the Encino Hillside neighborhood's problem was critical; two thirds of the homes fronted on streets functioning as routes for cut-through traffic. It also found that Hayvenhurst was classified by the Encino-Tarzana District Plan as a secondary highway and was expected to provide highway-level traffic capacity, even though it went through a residential neighborhood. The projected outlook was bleak. Conradt predicted that the use of the neighborhood as a short cut would not be solved by paving Mulholland Drive. The proposed Reseda-Mulholland bypass was too far west and provided too little capacity to solve the problem.

We had the answers, and they were clear. Extending Reseda Boulevard and paving Dirt Mulholland would have a negative

impact on the ecosystem of Big Wild and would not solve the Encino-Hillside traffic problems. We could argue confidently and effectively that the road should not be built and that Mulholland Gateway Park should be considered as a larger, ecosystem-scaled open space — Big Wild.

Creating a Constituency

Having compelling scientific evidence to argue against extending Reseda was not enough. We knew there had to be a political will to reverse the development condition. We had to engage the public in thinking about, in knowing, in loving Big Wild.

Several steps were necessary. First, we had to get people to the land (while many had very strong opinions about Reseda Boulevard, very few had ever been to the park). Second, we needed to expand the debate beyond the warring factions to include citizens of Los Angeles who had no vested interest, who could envision a broader public good and support Big Wild for its recreational potential and natural resource values.

A site tour was the logical solution. We knew from experience that citizens could more readily understand complex technical issues on site than in a public meeting. The event included seven stops, each illustrating a key issue: preserving wildlife habitat and corridors, protecting archaeological and historical resources, transportation planning, neighborhood traffic problems and park facility planning. We developed a script for tour leaders that both informed and educated participants and built their excitement. We prepared a score for participants to fill out at each stop, posing questions that ranged from "What is your most memorable wildlife experience in LA?" to "Did you ever short cut in this neighborhood?"

The first stop was Corbin Canyon, which, we explained, supported a more diverse plant community than neighboring canyons and was a wildlife corridor. We pointed out that while the canyon appeared to be part of Mulholland Gateway Park, it was privately owned and slated for development. Another stop was a sandstone cave that had been created by years of water dripping and carving out the soft rock. Participants gathered close together to talk about the sacred rituals of the Chumash and Gabrielino Indians, the mountains' former inhabitants.

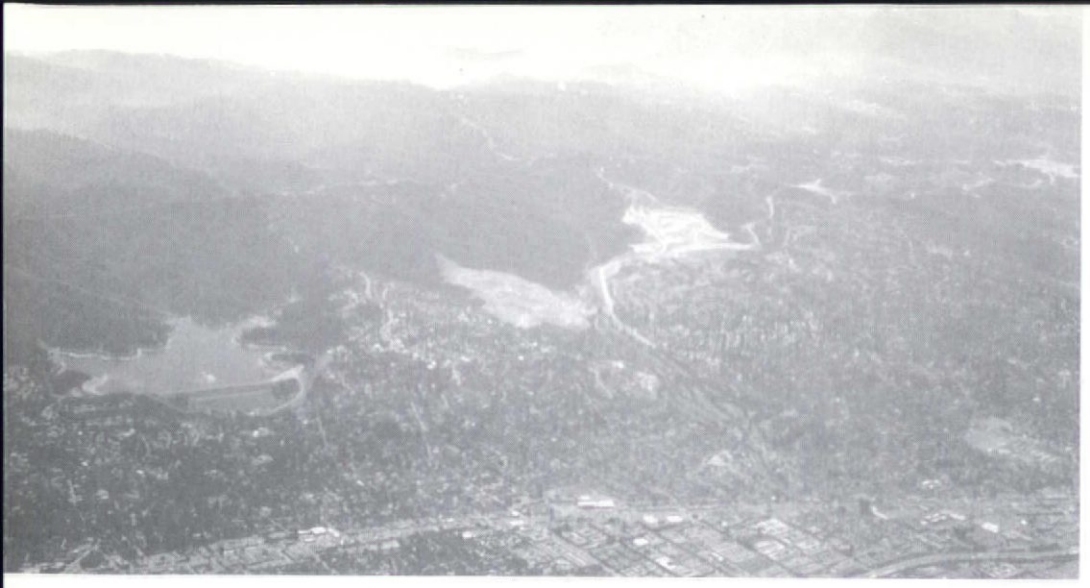
The impact was overwhelming. People were excited! All day we heard comments like "I've lived here all my life and I never knew this existed" and "It's like I'm a million miles from LA — this is fantastic."

We forged on with the planning process. We held a community meeting to present the wildlife and traffic findings. We held a design charrette to debate and develop plan alternatives. Conradt met with the Encino Hillside neighbors to work on a traffic mitigation plan. The city began looking at proposals for rerouting traffic away from the neighborhood using internal diverters and one-way streets. We presented a draft plan for Mulholland Gateway Park, including a section on the acquisitions necessary to protect Big Wild, to the conservancy board. The *Times* ran a lead article announcing "'Big Wild' Access Plan Unveiled." The idea was taking hold.

The constitutency building process included a design charrette (pictured here), public meetings to discuss research about traffic and wildlife, and tours of Big Wild. (Randolph T. Hester, Jr.)

Then a funny thing happened. We were asked to meet with Councilman Marvin Braude (Big Wild is located in his district) to present the plan. Braude arrived while we were hanging a 20-foot drawing of Big Wild. He looked surprised and asked if we knew that he was involved more than 25 years ago in the fight to create the national recreation area, that his first campaign ran on an environmental platform.

We had drawn his vision. Yet in the meeting he brought us up short. He was very concerned that we were overemphasizing the importance of preserving the area for biodiversity. "You have to serve the broad public interest," he admonished. But he was so taken with Big Wild that he was willing to reverse the condition of development on Harlan Lee requiring the extension of Reseda Boulevard.



Big Wild, with the Encino Reservoir (lower left) and San Fernando Valley (foreground). (Randolph T. Hester, Jr.)

Things started to happen fast. State Assemblyman Terry Friedman (Big Wild was located in his district as well) introduced a bill (AB 1152) to preempt locally-imposed roadway conditions and release Lee from compliance. It passed and was signed by the governor on October 13, 1991, despite heavy lobbying by the Encino Hillside neighbors. To many, Big Wild was created that day.

Evaluation and Future Prospects

How were notions of the proper form of Los Angeles advanced? Certainly for "a city without boundaries, which ate the desert ... and dreamt of becoming infinite,"[5] AB 1152 set a precedent by giving priority to public parkland and biodiversity over traffic mobility, highways and development. Creating a scientific basis to determine the amount of land needed to sustain Big Wild provided the political justification necessary for state intervention and local acquiesence. Examining competing arguments for the best use of the land established that no matter how much people wanted a new highway to solve traffic problems, it wouldn't. The calculation of wildlife acreage needs provided a planning principle that could be used as systematically as parking requirements for an office building.

Giving Big Wild a memorable name and suggesting tangible, defensible borders were acts of place creation that allowed people to envision what Big Wild could be. The range of places and programs proposed — parks, educational and training programs, overnight facilities — will provide opportunities to develop new constituencies for environmental protection and stewardship and to forge a political connection among communities surrounding Big Wild, from the San Fernando Valley to the Santa Monica Bay. Big Wild can be an essential common ground for Los Angeles' diverse population.

Has Big Wild been saved? Stopping Reseda was only a first step. The conservancy is negotiating or has already acquired three parcels (more than 1,100 acres), including the critical walnut and riparian habitat in Corbin Canyon, a wildlife corridor to Malibu Creek State Park and a site that will provide a gateway park at the west end of Big Wild.

An additional acquisition in the works will provide an exciting home for the Earth Adventure Camp, a proposed regional environmental education facility for at-risk youth. We took a group of high school students from East and South Central Los Angeles on a tour of the site this spring. They were thrilled with Big Wild, the prospect of meeting a mountain lion on the trail, the ecological principles, the views, just being in it. The conservancy is considering extending the educational concept to include a family retreat for central-city residents.

These days, face-to-face interaction with nature and park land in Los Angeles is scary. The earthquake and the fires, the riots, gangs ... the sum total shakes one's faith in the vision. Which leads to the more important point. No amount of good science will ensure a sustainable landscape. Individual and community commitment are irreplaceable ingredients.

While Big Wild is powerfully understood in its name and concept, at some level it is an abstraction that remains motivating to only a few of its conceptual parents. For Big Wild to survive, the constituency has to grow. Education will be key.

In 1989, the conservancy created the Mountains Education Program to provide interpretation of the mountains' natural and cultural resources as well as "to form a community united by environmental stewardship." One of the goals is for every Los Angeles school child to go to the Santa Monica Mountains at least once before they graduate from high school. In 1993, 15,000 children and adults participated.

Providing opportunities for daily use of Big Wild by more than just adjacent neighbors is also critical. What kind of uses? For some, it is trail use. But for many more, it is being in a space at the edge of the urban wilderness — a piece of grass to sit on, a place to have a picnic, a vista to view and put one's neighborhood in a regional context. The gateway parks will help; they will draw people to the mountains and invite them in. But the challenge remains to share the vision.

Notes

1. Mike Davis, *City of Quartz* (New York: Vintage, 1990), 23.

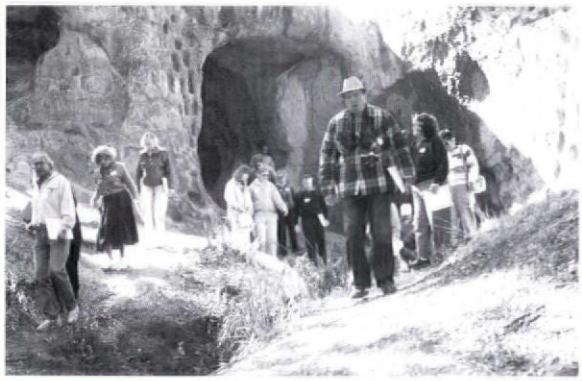
2. The agencies primarily include the National Park Service, the Santa Monica Mountains Conservancy, the California Department of Parks and Recreation and the Los Angeles Department of Recreation and Parks. The boundary includes approximately 150,000 acres, about 60,000 of which are currently in public ownership.

3. Greg Braxton, "Fistfights Erupt at Meeting on Street Extension," *Los Angeles Times*, 18 August 1989.

4. Mulholland Parkway Citizens' Advisory Committee, *Report of the Citizens' Advisory Committee on the Mulholland Scenic Parkway* (Los Angeles: 1972).

5. Davis, 12.

The plan for Big Wild was done by Randy Hester, Julie Isbill and Marcia McNally with the assistance of Laura Lawson, Nancy Nelson, Stephanie Schipper, the staff of the Santa Monica Mountains Conservancy and the community participants. The author wishes to thank Liz Cheadle, Tedra Fox, Myron Levin and Joe Vitti for their help in updating information.



Building a constituency for Big Wild depends on getting more people to experience the space. In these photos, visitors take part in a "scored walk." (Randolph T. Hester, Jr.)

Strengthening a Neighborhood Through Stream Restoration

Walter Hood

Sustainable design advocates argue that the greening of inner-city landscapes (through projects like community gardening, reclaiming streams and planting and maintaining trees) can strengthen urban ecosystems and connect them better to human communities. But in many communities, ecological concerns take a back seat to issues of employment, crime, safety and respect for cultural diversity. In these places, designers and environmental advocates must develop strategies that address social, physical and economic conditions as part of the ethic of sustainability.

The Courtlandt Creek project in Oakland uses stream restoration as a tool for strengthening a neighborhood. The project involves rehabilitating a five-block-long stretch of the creek and an abandoned streetcar right-of-way and melding them into a park. The park will provide a better physical link between the community and the creek, help residents (who are participating in planning and implementing the project) value their environment and validate cultural and ethnic identity (by promoting places that have multiple uses and interpretations).

The landscape features both riparian and street spaces that can be used by residents of all ages. The design embraces the idiosyncratic patterns and practices of the diverse community while using state-of-the-art restoration techniques to repair the creek and revegetate its damaged slopes.

Each intervention is multi-layered, teaching an awareness of place and environment through contact and use. For example, at corner "chillin'" or hanging out spots, historical markers will document the old trolley stops while new corner structures will make places for informal group socializing and feature details for water collection and drainage.

The slope restoration uses plant materials to stabilize stream beds. Techniques include brush layering (staking and layering plant material to build up damaged slopes) and wattling (bundling locally cut willow branches and placing them along stream contours to correct erosion). These methods provide temporary stability until the creek stabilizes its course.

The slopes are also designed with users in mind, in familiar patterns and allowing opportunities for access and play. Neighborhood residents will constantly be reminded of the presence — and fragility — of the creek.

The success of the project rests on the community's willingness to claim ownership of the new park. A neighborhood organization has evolved into an administrative entity, tracking the project's progress, making sure the community stays involved in decision making and expanding the community's role in civic affairs. It sponsors neighborhood clean ups, tree planting and restoration workshops and block parties.

The Courtlandt Creek park project is both restoring a neglected creek bed and streetcar right of way and energizing the surrounding community, which is involved with designing and managing the park. (Walter Hood)

The park project has also kindled linkages among residents that are giving the neighborhood new strength. Neighbors who worked with each other in the park development process are organizing a community watch program. Police and city officials are a more common sight in the community.

Scientific research can help identify restoration strategies that will enable waterways like Courtlandt Creek to sustain themselves. But for the neighborhood and city, long-term sustainability depends on people being able to resolve conflicts, see beyond stereotypes, acknowledge a range of values and accept one another. The process of designing, building and managing the Courtlandt Creek park has created a framework for this kind of dialogue.

A Garden Grows a Community

Laura Lawson

(Above) Densely planted crop beds alternate with raised wood-sided beds that provide seating for physically impaired people.

(Left) Youth gardeners Kenneth Stuart and Dayon Carradine selling produce at local farmers' market.

(Photos courtesy Laura Lawson)

The BYA Community Garden Patch started as a modest idea, a small piece of land where children could grow food for their families and older youth could raise produce for sale. But this half-acre, abandoned railroad right-of-way has become much more — a place that provides physical resources and community services that help a diverse, working-class neighborhood sustain itself.

Berkeley Youth Alternatives (BYA), whose programs serve at-risk youth and their families in West Berkeley, started the Garden Patch in 1993. Teens, their parents, their neighbors, BYA board members and city officials planned the Garden Patch — which includes a children's garden, demonstration garden, outdoor classroom, compost area and entrepreneurial youth garden — in bilingual design workshops.

The site design reflects the interaction of several goals: establishing a productive garden, providing social spaces and educational opportunities, and creating a community open space. A "front yard" of flower and herb beds faces the street, placing these visually attractive and highly marketable crops on public view. A bosque of trees not only offers fruit and shade but also creates an outdoor room. A fountain invites children to touch and celebrate water while serving as an irrigation source.

The various settings and activities bring together people who may not normally interact. Residents who tend the gardens reflect the neighborhood's diverse social and ethnic groups, each bringing different gardening experiences and traditions. For example, one Chinese-American gardener is encouraging the youth entrepreneurial gardeners to grow medicinal herbs.

An organic farmer (Alison Lingane, employed through Americorps, the national service corps) is helping teenagers develop a garden whose produce they can sell at farmers' markets; more teens will be hired to develop value-added products for specialty markets. BYA also employs 10 teens in park landscape maintenance and trains them at the garden. They have become community liaisons and teachers, working with volunteers, gardeners and, especially, younger children.

At the Garden Patch, people of all ages can not only learn organic gardening and composting techniques but also improve their diets and supplement their household budgets by growing their own food. In the future, classes will demonstrate gardening techniques to improve health, nutrition and household food resources. Already, a good amount of informal learning and self-realization occur at the garden, leading to healthier and happier living conditions for many of the gardeners.

From the beginning, the Garden Patch has been sustainable and self-regulating in a social sense. Community members attend monthly work days and program different spaces. Employed youth are responsible for the garden's health and assist children and community members in gardening and composting. Everyone involved wears several hats — designer, activist, diplomat, laborer, participant. The garden is a thriving, living entity; it moves forward by recognizing needs of the community and continually adapting.

Bomb Crater Fish Ponds

Thomas J. Campanella

Fish pond at Dong Set, south of Hanoi, made deeper and more productive by American bombing. (Thomas J. Campanella)

One of the great ironies of the Vietnam War is that the bomb craters left in the wake of American B-52s now provide sustenance to the Vietnamese people. These relics have become part of the agrarian landscape, transformed from a symbol of death into one of life.

The U.S. waged one of history's most devastating campaigns of ecological destruction in Vietnam. Landscapes were bombed, burned and soaked with defoliants in an effort to deprive the Vietnamese of food, to flush the rural population into cities and to eliminate the village and woodland sanctuary of Vietcong forces. An agrarian culture, Vietnam did not offer concentrated industrial targets; instead, saturation bombing of "soft" rural areas was pursued, to little strategic avail. Thousand-pound bombs, designed to take out munitions factories, were used to blow apart buffaloes and rice paddies.

These scars are still very much a part of the Vietnamese landscape. In Quang Binh and Vinh Linh provinces (just north and south of the former demilitarized zone) the landscape resembles the face of the moon, with craters 30 to 50 feet in diameter and several yards deep.

Villagers have transformed the bomb craters into ponds for growing fish, a staple of the Vietnamese diet. In the south, bomb craters are favored sites for houses, with a replenishable source of protein at the doorstep.

Several kilometers south of Hanoi are the rice fields and fish farms of Thanh Tri. Aquaculture here is highly productive, providing the city its principal source of fish. Such productivity is partly attributed to the 1972 "Christmas bombing" of Hanoi, when bombers pounded the Hanoi region for several days. At Dong Set a large load of bombs fell into shallow lakes used for rice and fish culture. According to local farmers, the explosions significantly deepened the lake beds. Because carrying capacity increased, fish harvests more than doubled after the war. Today Dong Set produces some 500 tons of *ca me trang*, *ca troi an do* and other fish annually.

The contrasts are striking at Dong Set. Several net-filled punts bask in the sun, water trickles over a small spillway; it is a peaceful scene. Yet beneath the waters are reminders of war; some distance out from this shore a downed B-52 lies at rest. The waters are high today, but one fisherman offers to take me out there. With a stick, he tells me, I may touch the submerged tail of the bomber, home now to schools of fish.

Bláa Lónid

Above: The Blue Lagoon, with the adjacent power plant and nearby bathing facilities and motel.

Below: The hot lake allows people to sunbathe all year, in spite of the cold Icelandic climate.

(Photos courtesy Zophónias Björgvinsson)

In 1974 the Sudurnes Regional Heating Company built a geothermal power station, which provides pollution-free electricity and heating to several towns, in one of Iceland's largest lava fields. The project unexpectedly facilitated the creation of a popular bathing and hang-out spot, which local residents call Bláa Lónid (the Blue Lagoon), because of the strikingly creamy blue color of the water.

The plant taps into an aquifer deep underground and draws up hot steam and water, which is used for driving electric generating turbines and heating buildings. The water that is discharged from the plant mixes with sea water just beneath the porous lava field, creating a hot-water lake. The healing power of the water's chemical mixture, the surreal natural setting and the vivid industrial architecture have combined to make this place popular among locals and tourists alike.

The lake now has comfortable bathing facilities and a motel for longer stays, all created by entrepreneurs who were quick to realize the lagoon's potentials. SRHC has encouraged this development, which, it believes, educates people about the often hidden processes of generating electricity and heat and about the pollution-free technology the plant uses.

As Earth's resources dwindle, industries must find ways to consume less and to forge creative new relationships with their surroundings. One strategy may be to imagine industrial landscapes as places for tourism, as at Bláa Lónid. Such an approach will certainly help convince owners, managers and investors of the benefits of pollution-free environments.

SRHC has succeeded not only in supplying its customers with power and heat but also in creating a base for economic activity for years to come — while consuming a minimum of resources, generating a minimum of waste and creating a remarkable juxtaposition of architecture and landscape. Bláa Lónid clearly demonstrates that clean and healthy technology can exist next to human habitation and have a positive influence on its surroundings. And it demonstrates the possibilities that serendipity can unleash.

Sustainable Communities: What's Going on Here ?

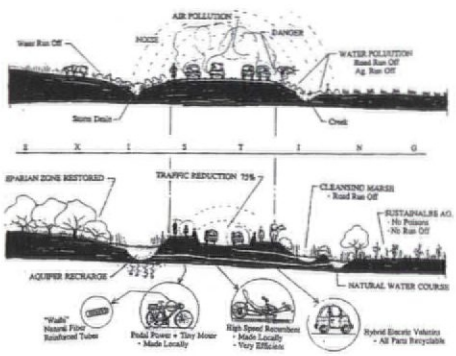
Mike Pease

The word is everywhere: "sustainable architecture," "sustainable agriculture," "sustainable environments," "the politics of sustainability." It's a buzz word for our moment, subsuming older favorites, like "appropriate technology," "ecological" and "energy conscious," into an even more inclusive concept that includes references to reduced vehicle trips, mixed-use zoning, transit oriented development, infill housing and much more.

But as we develop a language to deal with our increasing awareness of the earth as a whole system — the newly popular word "sustainable" makes sense. It accurately reflects where we are in this process of self discovery: we're beginning to see the long-term, global picture, and we're afraid. To talk of sustainability as we do is to face the possibility, even the likelihood, that our usual way of doing business isn't working, or, more to the point, that it won't work for the future: It's not sustainable.

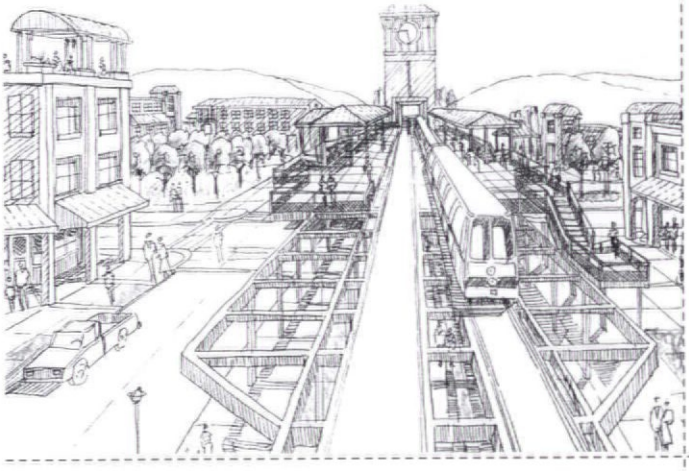
We're beginning to see that most of the technologies central to industrialized, urbanized cultures like ours — technologies that determine our housing, transportation, commerce, agriculture, access to water and energy, waste management — and many of our social, economic, and cultural institutions are simply not viable in the face of global resource, environ mental, population and political conditions. Some systems, like waste management, have been under fire for some time, and important changes are already visible. Others, like our way of producing housing, are not even issues yet for most people.

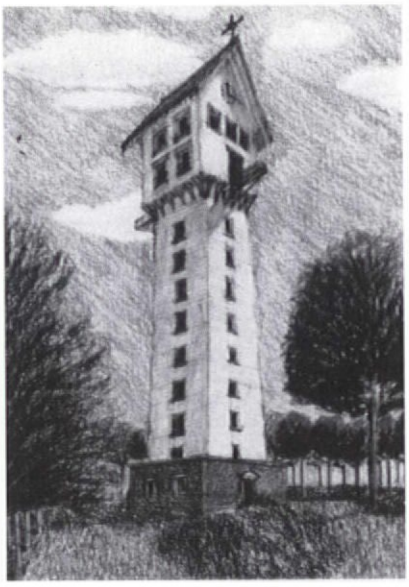
Underlying all issues related to sustainability are three fundamental economic realities. First, the resources upon which we on earth are all dependent — clean air and water, sunlight, agricultural land, plants,

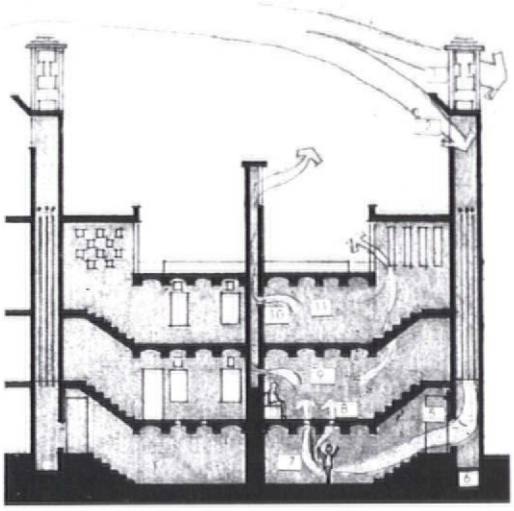


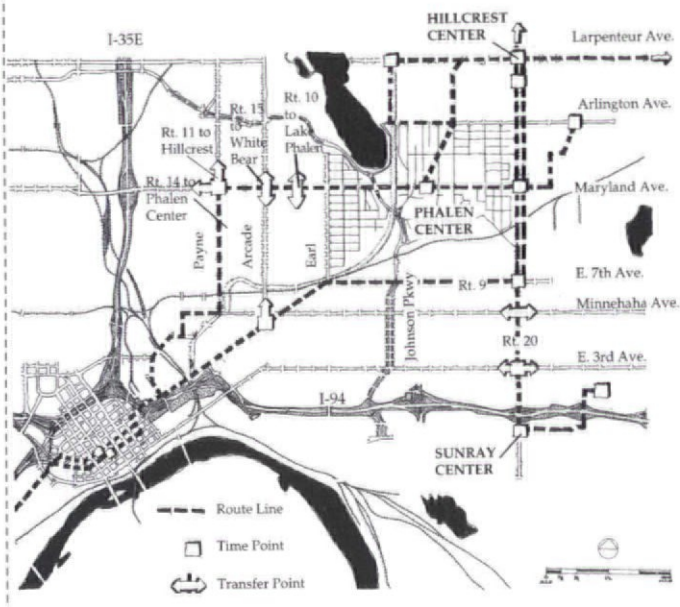
(Above) Analysis from proposal for Los Osos, A Sustaina-ble Community in a Sustainable Watershed (Morro Bay, Calif.)

(Opposite page) Clockwise from top left: St. Vincent's Station (San Rafael, Calif.), Haymount (Caroline County, Va.), Phalen Village (St. Paul), Regenerating a Profile of Place (Pullman, Wash.), Weeks Neighborhood (East Palo Alto, Calif.), A Sustainable Neighborhood in Urfa, Turkey.





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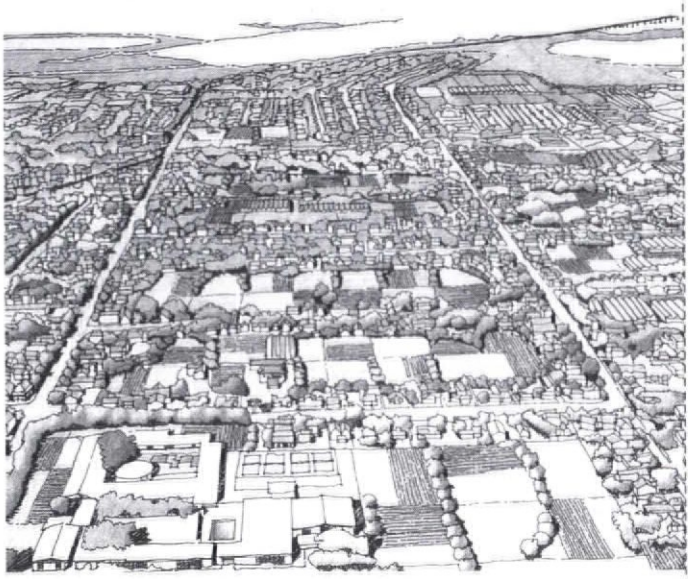

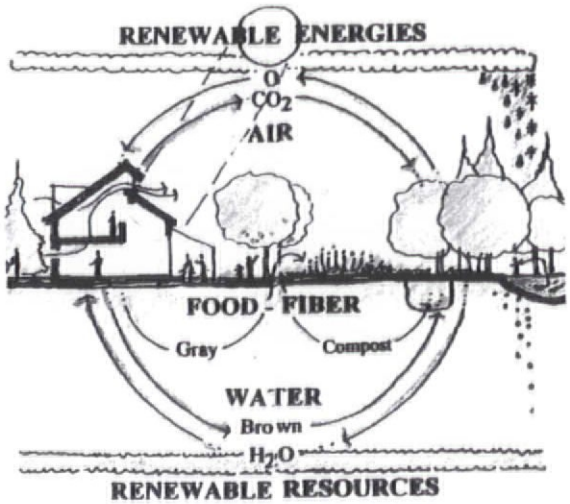
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animals, minerals — are in limited supply. In some cases we are already near the limits; in all areas, apparent limits are within sight. Second, throughout the world, economies are expanding, on the whole providing an increasingly higher standard of living for people, thus requiring an ever broader sharing of resources. Third, in the next 50 years, global population will double; there will be twice as many people with whom to share. Any of these three factors by itself is enough to justify an interest in sustainability; taken together, they eventually will generate a force powerful enough to wreak monumental change.

The seven projects described here (six in the U.S., one in Turkey) serve well to represent the range of work being done in the name of "sustainable community design," at least in the U.S. The Turkish project is both a reminder that this issue is being faced in other parts of the world, and a challenge to our assumptions about what is appropriate and what is possible.

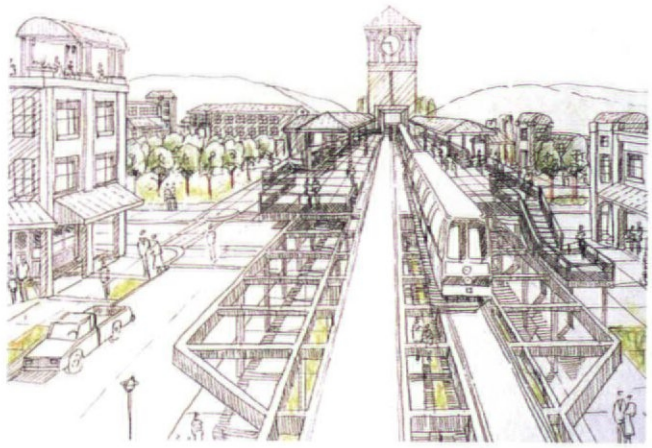
All of these projects, with their many and significant differences, recognize the need for new approaches to community design that support resource conserving ways of life. All are potential models for us as we seek new, sustainable ways to configure our world. Whether, and to what degree, these projects are truly sustainable is the essential question.

St. Vincent's Station

In this elegant scheme for what is essentially a new town, most of the features that are characteristic of sustainable community planning and design are clearly articulated: enhanced provision for walking, biking and public transit; compact configuration, with most uses located within easy walking distance from a retail center and transit connection; medium residential densities; a mixture of land uses, including residential, commercial, employment, cultural and recreational uses; and preservation of and access to significant natural areas. These five characteristics can be taken as the fundamental principles upon which all sustainable communities are built. More about each:

Enhanced provision for walking and public transit. It is well understood that our dependence on cars for moving in about cities is the primary threat to sustainable development. That is due to not only the immense resource demands of the car itself (both in its manufacture and its operation) but also the effects of the car on our settlement patterns. The car's enormous spatial demands (it is essentially a large shell that each of us carries with us on our daily rounds, demanding much space to move through when we are in it and much space for storage when we leave it) requires uses to be dispersed. Car dependent settlements work most efficiently where densities are relatively low.

One result is that we travel long distances between our daily activities, usually alone, and necessarily by car. Another is



This proposal was second place winner in an open competition, sponsored by the city of San Rafael in 1993, to generate ideas and local support for housing development on a 1,200 acre site (the first place winner had lower densities and was judged more marketable). The site is mostly agricultural and undeveloped, with some historically important buildings.

The proposal focuses on preserving and enhancing existing natural areas and maintaining some agricultural production while developing a compact new settlement that "protects and celebrates" significant existing buildings, landscapes and other existing artifacts. Areas of resource preservation include a salt marsh, a fresh water marsh, hay fields, a dairy pasture and oak woodland.

The development, for about 7,000 residents, is intended to be "self-sufficient ... with enough population and services so that residents are not forced to leave it for work, shopping or recreation." Connection with a proposed interurban light rail corridor is considered essential; local shuttle service links neighborhoods to each other and to the transit station. To encourage walking and biking, streets are narrow and parking is limited. Affordable housing, for rent and for sale, is included. Dwellings are primarily walkup apartments and row houses.

Project team:

Bruce Brubaker, David Early, Lisa Flaster, Nicholas Haskell, Julie Isbill, Susi Marzuola, Terezia Nemeth, Kevin Powell, Peter Waller.

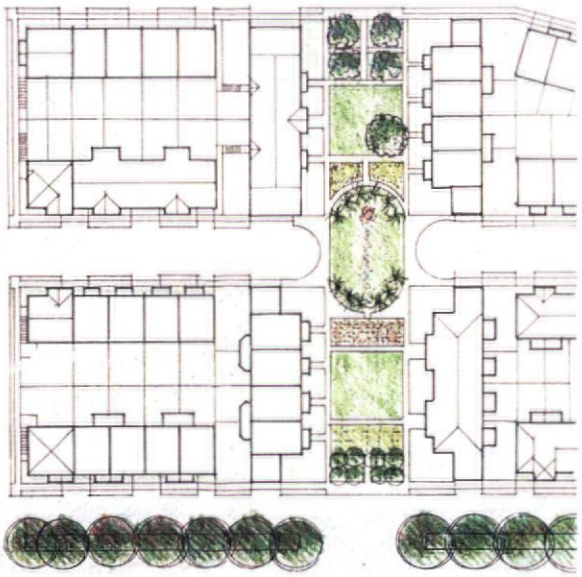
St. Vincent's Station

(Above) Panorama of site, looking north.

(Right) Row houses facing pedestrian way.

(Below and left) Town square.

(Bottom) Site plan superimposed on aerial photo. A freeway is to the left; San Francisco bay and its wetlands are to the right. The reactivated rail line bisects the proposed community, from top to bottom.



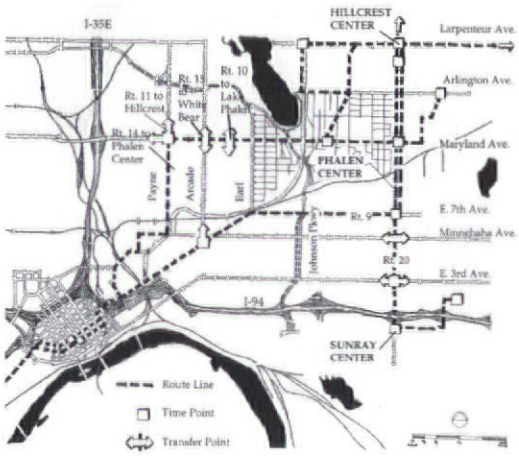
that this low density pattern requires a massive per capita outlay of resources for infrastructure (roads and utilities). As our cities spread out, the space we use is usually the farmland (itself a scarce resource) that was originally the community's source of food. Yet another result is that we are too distant from each other, physically and psychologically, to be able to share; to live "the good life," we must each own all the material supports for that life (gourmet kitchen, personal library, laundry, entertainment center, swimming pool) and we must have the space to house it all. Another, more subtle, result: because once we are in our comfortable cars it seems almost as easy to drive five miles as five blocks (especially if there's money to be saved), car-based settlement patterns create very large market areas, which support large, globally supplied retailers who can buy in huge quantities and sell cheap. The resultant global distribution system uses vast quantities of resources.

Where sustainability has become an issue, pedestrian and public transit systems are developed as alternatives to travel by car because these modes are in themselves radically more efficient in per capita use of resources, and because these modes support compactness, higher densities and mixed uses, all of which also can lead toward radical reductions in resource use.

The development of supportive, enjoyable places for walking (and the public life that accompanies walking) is one of the crucial challenges for making sustainable communities. U.S. designers are not well prepared for this job. We must look to other cultures, especially older urban cultures, for references that will help us rediscover what this quintessentially human activity is about and to imagine the immensely rich environments that can be made in support of walking and public life.

Compact configuration. To encourage walking as the primary means of transportation for daily activities and to encourage use of public transport, those daily activities, and a transit station, must be located within easy walking distance of their users. A common rule of thumb is that a five-minute walk, or a quarter mile (on flat terrain), is the maximum for easy walking between home and essential daily activities. Though there are many variables that can influence people's willingness to walk, the quarter-mile/five-minute rule is a good starting point for communities that are trying to tempt car users into the walking/ transit mode. In communities where walking is taken for granted, the distances can be somewhat greater. And the design issue again: if walking is perceived as a positive experience in itself, people will walk much farther without complaint than if the walk is viewed simply as a process of getting from here to there.

"Walking," of course, is a shorthand term that also includes travel by wheelchair and travel with carts, strollers, etc. Well designed places for walking will also account for the needs of

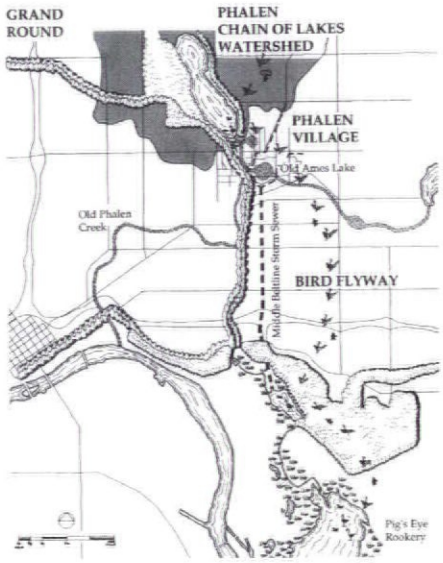


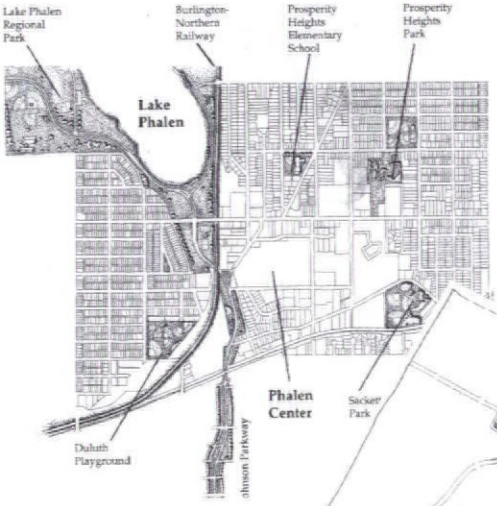
This is a proposal for redeveloping an existing piece of suburbia (a neighborhood three miles northeast of downtown St. Paul) to create a new, compact, pedestrian-oriented neighborhood and repair damaged natural systems. A shopping center, parking lot and apartment superblocks would be removed to reclaim a large wetland area, which will function as the organizing focus for the village and give it its own signature. A centrally located commercial "niche" and a limited access bus connection to downtown are at the village nexus. Residential areas are intensified and made more complex, filled in with a variety of housing types, with new streets added to subdivide the village into smaller blocks. Some of the new streets, the busway and parts of the wetland are currently being implemented, and the city of St. Paul has an option to buy the shopping center site.

Project team:

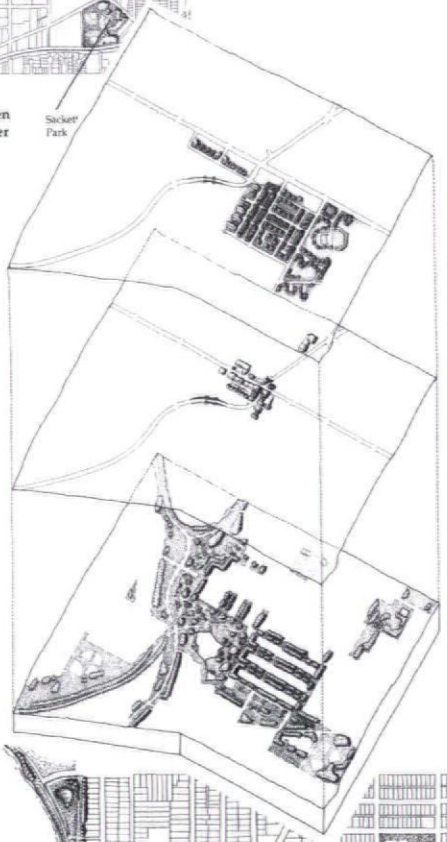
University of Minnesota, College of Architecture and Landscape Architecture Case Study Team: Harrison Fraker (manager) Joseph E. Lambert, Daniel J. Marckel, Mark Tambornino. Advisors: Catherine R. Brown, William R. Morrish, Joan I. Nassauer, Mary Vogel. Houses into Town Studio: Dan Solomon, Catherine Clarke, instructors. Phalen Case Study participants also included Phalen Small Area Task Force, and business, resident, city and regional representatives.

Phalen Village





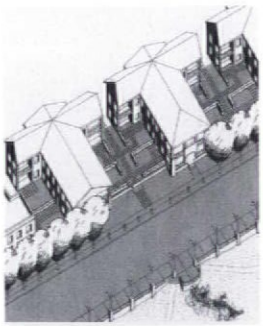
Existing contexts: (Left) Transit connections to downtown St. Paul. (Center) Wetlands and flyway. (Right) Public open space and property ownership patterns.

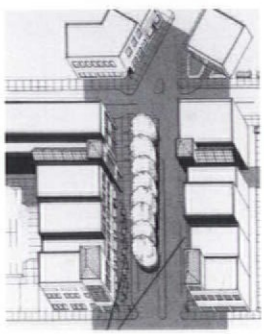


Proposed housing and neighborhood streets.

Transit node and neighborhood commercial niche.

Wetland park and public open space system.

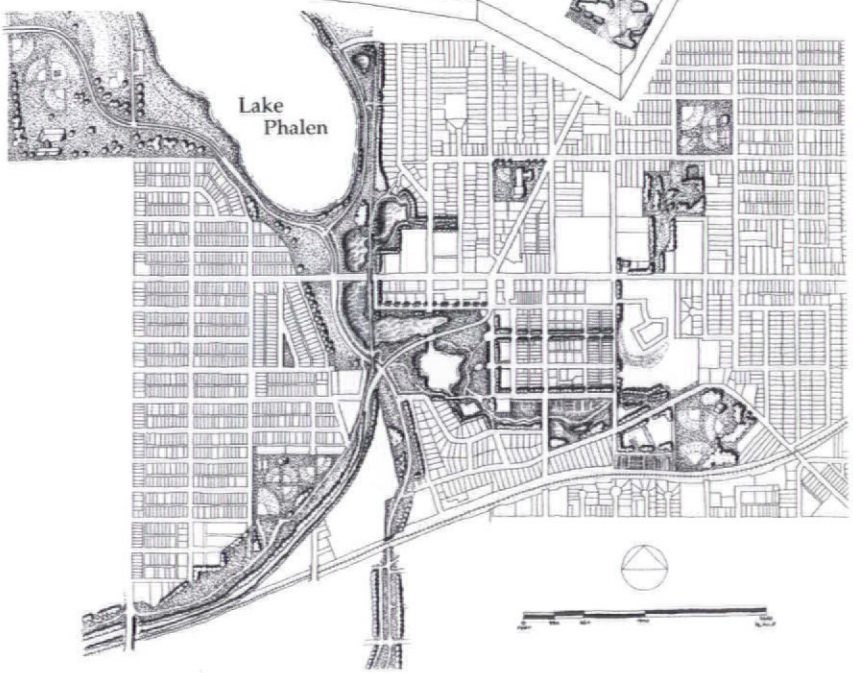




Proposals: (Top left) Detail of housing along park.

(Bottom left) Detail of "transit room" with pedestrian space, retail frontage and upper-level business and residential uses.

(Bottom right) Wetland park and open space system.



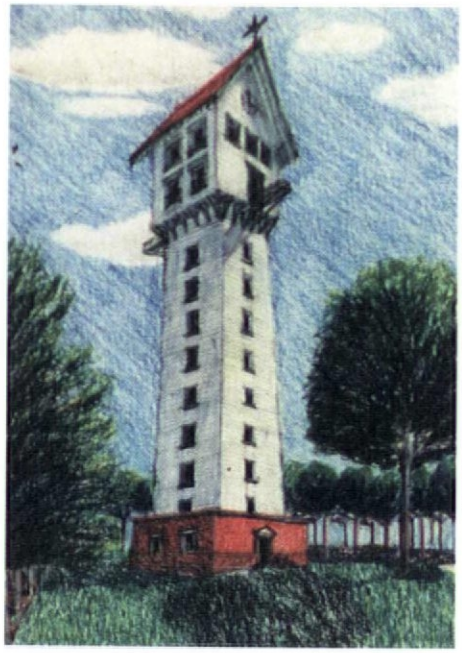
walkers who have difficulty seeing or hearing, or who in other relevant ways do not fit the average profile.

Medium residential densities. Residential densities of three to six dwellings per gross acre (dpga) are common in suburbs, and they are ideal for car use. (Gross acreage includes private and public lands, including streets, parks, etc., and a dwelling is any single household residence, from a studio apartment to a mansion.) But where the market area is based on walking, thus limited to a quarter-mile radius, those densities do not include enough people to support either basic services or a public transit system. The minimum density for transit is about 10 dpga, but 20 or 30 is much better. The higher the density, the greater the range of goods, services, social contacts, job opportunities, etc., and the more efficient the transit system will be. Above about 50 dpga, most dwellings must be in multistory buildings, which will not be tempting for most households with children (at least in the U.S.). Such densities are appropriate for some center-city areas or certain specialized areas, such as college neighborhoods.

At about 30 dpga a critical mass is reached that can support a significant range of local services. That is also the density at which travel by car becomes so difficult (due to traffic congestion and competition for parking space) that many people will opt to walk or use the transit system. While densities of 30 dpga are not unusual, in most U.S. cities they almost invariably house people without children. At this density, assuming 30 percent of land is used for non-residential activities, the average land area per dwelling is about 1,000 square feet, pretty tight by U.S. standards. Mixing dwelling types, of course, means some larger family dwellings are balanced by smaller one or two person units, but the average family dwelling site, for three to five occupants, will still be only 1,500 to 2,000 square feet.

This, again, is a huge, and essentially new, challenge for U.S. designers and developers: creating good housing, for households of all configurations, where density requirements dictate very small lot sizes. Apartments will work for some households. But for others, especially those with children, some form of row housing is probably the most viable dwelling type; row housing balances compactness with ground-level access and household autonomy, and is workable at these middle densities. Wonderful models for row housing exist throughout the world, and new construction technologies for waterproofing skylights and roof decks will allow this dwelling form to develop an even richer future.

A mixture of land uses. An ideal sustainable walking-based community provides for all its residents' needs — dwelling, shopping, work, recreation, friendships, cultural activities — within the local, walkable area. But contemporary expectations for variety in all those areas make it unlikely that a single walking-based community could support a satisfying life for most



This is a plan for a new town, in early stages of development, on a 1,700 acre site on the Rappahannock River, 50 miles south of Washington, D.C. It will include 4,000 homes, 250,000 square feet of retail space, 500,000 square feet of office/commercial space and a range of cultural and recreational facilities intended to "nurture community life."

The plan encourages walking with narrow streets, short distances to local services, a shuttle that ties neighborhoods and the town center together and a timed-transfer connection to commuter trains. Housing of many sizes and types is planned, for sale or rent at all prices. Natural resource protection and pollution prevention are essential aspects of the development plan: preservation and support for existing plant and animal life, protection of water quality, energy conservation in buildings and recycling. The site plan preserves wildlife habitat, plant groupings and wetlands. And there is an environmental manager to administer the programs that address these concerns, both within the community and in the surrounding area.

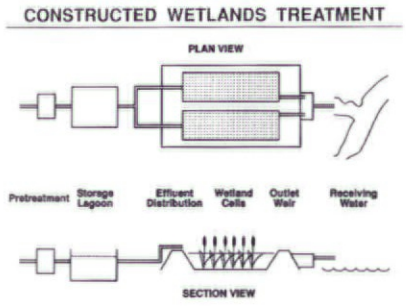
Project team:

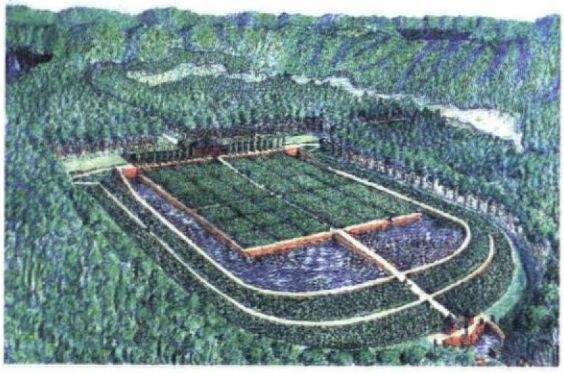
The John A. Clark Co. (developer), Duany/Plater-Zyberk (architect and town planner), McGuire Woods Battle and Boothe (attorneys), North American Resource Management (environmental management), Remy, Kemp & Associates (traffic), White Mountain Survey Co. (civil engineers), Neal I. Payton (architect), Warren Byrd (landscape architect), James A. Harrison (archaeology).

Haymount

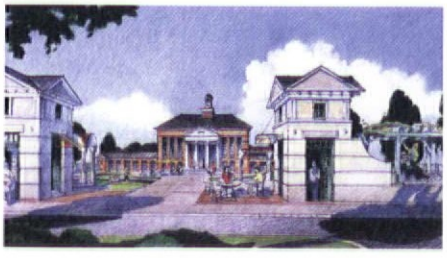
(Right and far right) The land development plan conserves important wildlife habitat, vegetation and wetlands. At far right, blue stippling and cross hatching indicates wetlands and 100-foot setbacks. (Duany/Plater-Zyberk)

(Opposite page) A water storage tower is designed as an architectural landmark, celebrating the environmental systems that support the town. (Neal Payton)



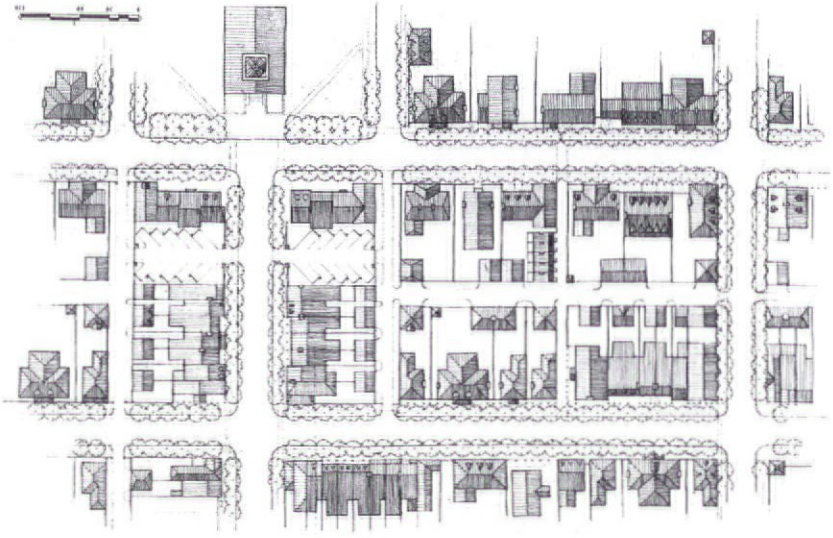


Haymount's water treatment system (far left) inspired the design of open spaces (left). (Diagram: Carrie Fischer/ John A. Clarke Co.; Drawing: Neal Payton).



(Above) Entrance to organic gardens. (Jim Wassely, Duany/Plater-Zyberk)

(Right) Typical block plan, with mixed housing types. (Duany/ Plater-Zyberk)



urbanized people. Still, the more opportunities there are to satisfy one's daily needs locally, the closer the community comes to the ideal. When many walking-based communities are effectively linked together by public transit (and pedestrian and bike paths), and when each community supports a wide range of activities, the potential for structuring varied, complex and satisfying lives without being dependent on cars is high.

Preservation of and access to significant natural areas. Part of the motivation for preserving and regenerating natural areas within or near sustainable communities is that such environments are among the places to which people want access in their everyday lives. But underlying the whole concept of sustainable communities is the understanding that we humans are part of the larger web of natural systems, and that our continued healthy survival depends also on the healthy survival of the "living earth." In general, the larger the geographic area encompassed in a sustainable development, the more complex and the more prominent are the provisions for protecting and enhancing natural systems.

Phalen Village

Phalen Village covers a smaller area than does the St. Vincent's proposal, but it uses the same set of strategies, in much the same ways, toward achieving sustainability. The primary difference between these two projects is that while the physical context for St. Vincent's is primarily land, plants, animals and water, with a secondary (though important) overlay of existing buildings, the Phalen Village context is primarily artifacts — buildings, roads, parking lots, utility systems — with a secondary (though, again, very important) set of existing "natural" systems. In both cases, the objective is the same: to bring the complex of human and non-human systems into an ecologically balanced relationship.

Haymount

Again we see the same basic set of strategies, but this time in a project that is on its way toward full implementation. Besides that fact, distinguishing in itself, two things are especially notable about this project. First, an immense effort has been made here to understand the precise characteristics of the existing site, and to devise management systems for future use of the site that will not only preserve but strengthen the site as a support system for healthy life of all kinds — including, for example, a combination of "sequence batch technology, advanced tertiary treatment, and constructed wetlands, to produce discharge water cleaner than that which is withdrawn from the river"; storm water management with "constructed

Weeks neighborhood, a 300-acre site in the heart of East Palo Alto, is a grid of very large blocks subdivided into predominantly one-acre lots. The soils are deep, water is abundant and the microclimate is very favorable for agriculture. Historically, these lots were the basis of an early twentieth-century utopian agricultural community; later, they were owned by families who successfully operated truck farms and flower growing businesses.

Contemporary East Palo Alto, including Weeks neighborhood, "embodies the urban crisis conditions facing the nation today: poverty, racial tension, crime, drugs, disrupted families, unemployment, a decaying urban infrastructure and a lack of affordable housing." This project, a joint effort by public agencies, foundations and community groups, hopes to ameliorate those crisis conditions by rejuvenating the agricultural economy that once thrived here — and is still very evident — by providing both a sense of identity and a livelihood for the existing multi-ethnic, low-income residents. The objective is to establish Weeks neighborhood as "a green village within the city," with its own local services, new housing of many kinds and a variety of local transportation options.

Project team:

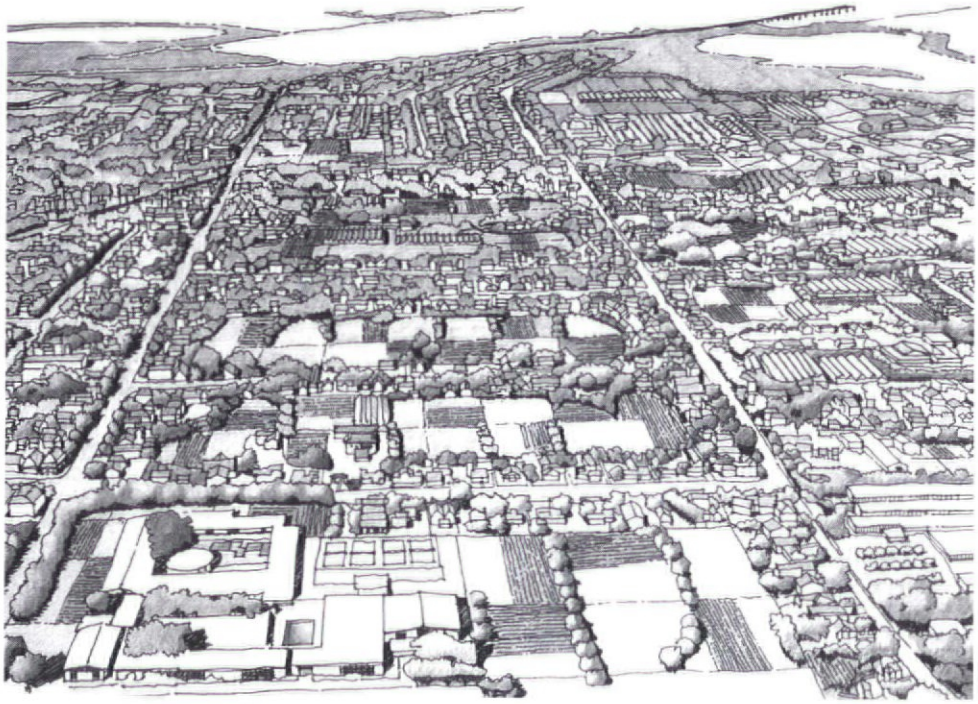
Paul Okamoto (Urban Ecology), Trevor Burrowes (East Palo Alto Historical and Agricultural Society), Martha Crusius (National Park Service, Rivers and Trails Conservation Assistance Program)

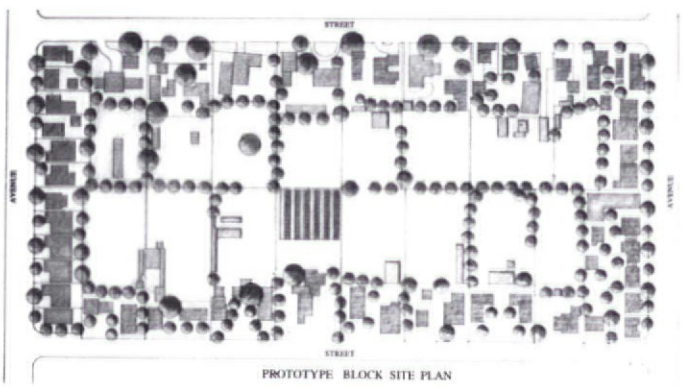
Weeks Neighborhood

(Far left) Weeks Street community garden. (Paul Okamoto)

(Left) Rural scene in East Palo Alto. (East Palo Alto Historical and Agricultural Society)

(Right) Aerial photo of East Palo Alto (Pacific Aerial Surveys)





PROTOTYPE BLOCK SITE PLAN

(Above) Proposed vision of Weeks Neighborhood. (Paul Okamoto)

(Right) Conceptual block plan, showing residential lots with small agricultural plots. (Paul Okamoto)

wetlands, porous pavement, fascines, grass and block parking areas and infiltration strategies"; a water delivery system designed to leave the riverbed, riverbanks and underlying aquifer undisturbed; management plans that consider habitat preservation and enhancement for 302 identified animal species and major plant groupings; and a landscape code regulated by an environmental manager.

The second item of note here is that the design for this project is by the architecture and planning firm of Duany/Plater-Zyberk, in Miami. This firm's Seaside project in Florida, begun in the early eighties, and similar subsequent projects, has provided much of the imagery and theoretical base for projects everywhere whose purpose is to create healthy, sustainable communities (the other firm whose impact has been similarly profound is Peter Calthorpe Associates, San Francisco).

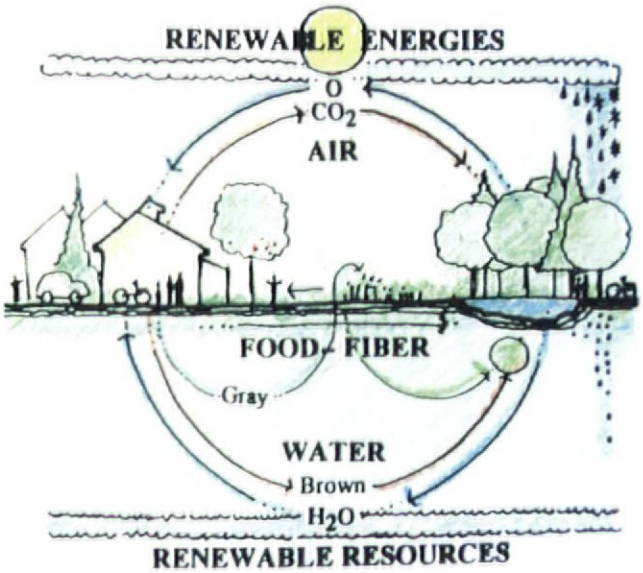
Weeks Neighborhood: An Urban Agricultural Village

The importance of this project for our understanding of sustainable community design is first in its focus on the development of food production as a primary part of the community's physical and economic structure. Every community needs food, and a lot of it. In most "advanced" communities that need is satisfied by a process that often moves the basic foods over very long distances: from origin, to broker, to processor, to wholesaler, to retailer, to consumer, at an immense total cost in resources. Localizing that process, for food and for other essential goods, is part of creating sustainable communities, not only because it minimizes the transportation component in goods processing but also because it provides local work for local residents (another way to reduce transportation costs).

The Weeks Neighborhood project is also important as a general experiment in sustainable economic development for existing communities, and it is especially important for its intention to bring together existing resources (in this case local agricultural land and the local farming tradition) and existing residents to create a viable new structure. Whether it succeeds or fails in its objectives, there is much to be learned here.

Pullman, Wash.: Regenerating a Profile of Place

This study uses Pullman, a town of 25,000 in eastern Washington, to describe a "theoretical and practical program for the sustainable regeneration of an existing city." It includes prescriptions for strategies at five levels: *region* (greenbelt, holding lakes for spring runoff, local renewable energy sources); *city* (strengthened city center, "Main Street" develop-

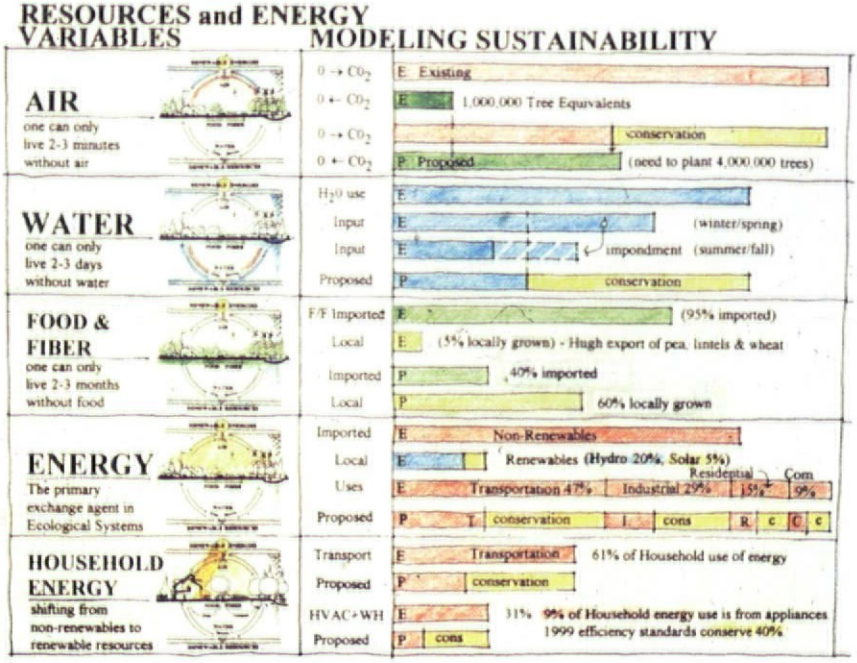


This study, an entry to the American Institute of Architects' 1993 "Call for Sustainable Community Design Solutions," uses Pullman, a town of 25,000 in eastern Washington, to describe a "theoretical and practical program for the sustainable regeneration of an existing city."

The proposal uses ecological modeling techniques to demonstrate how locally available land, water, air, food, fiber and energy can be used as a sole source for sustainability. It includes design strategies and analysis of costs and benefits at five scales: *region* (greenbelt, holding lakes for spring runoff, local renewable energy sources); *city* (strengthened city center, "Main Street" development, support for walking and public transit, energy conservation through building codes, water conservation and reuse programs, recycling programs); *district and neighborhood* (access to community facilities and transit, increased densities, "green" pedestrian streets), *cluster* (infill construction and increased building development in yards, setbacks and unneeded rights-of-way); and *dwelling* (conserve runoff, recycle solid and liquid wastes, family gardens, energy conservation).

Project team:

Bashir A. Kazimee, Tom J. Bartuska, Michael S. Owen.

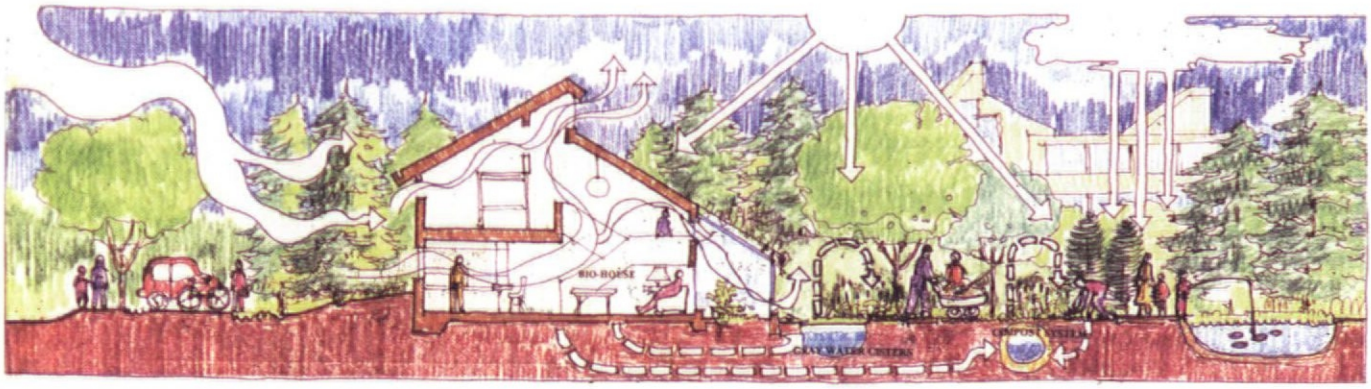


(Above right) Conceptual district and neighborhood plan.

(Left) A model of how a city's use of resources can be analyzed and balanced in a sustainable plan.

(Opposite page) Conceptual model of sustainable human-environmental relationships.

Proposal for filling in typical block with row houses and a community greenhouse.



Conceptual sketch of energy and water flows through a typical single-family house.

ment, support for walking and public transit, energy conservation through building codes, water conservation and reuse programs, recycling programs); *district and neighborhood* (support for local cultural facilities, increased densities, "green" pedestrian streets), *clustering* (infill construction and increased building development in yards, setbacks and unneeded rights-of-way); *dwellings* (conserve runoff, recycle solid and liquid wastes, family gardens, energy conservation).

This is not so much a proposal as a description of a general process, essentially a planning and design guide for sustainable redevelopment of existing urban areas. Besides the particular strategic advice given for each level of decision making, its special value is in its clear articulation of the range of scales, from regional plan to construction detail, that impinge on issues of sustainability, and its implicit clarification of the intertwining of apparently disparate actions taken within and between scales.

The greatest challenge to effective conversion to sustainability comes from the fact that cities and towns have over the past half century been restructured in myriad systematic, interconnected ways to respond to the automobile as the primary means of transportation. Now, for example, even if we want to walk more, distances between functions are too great, and the per capita cost of even the simplest sidewalks is prohibitive. Even if we want to give up cars for public transit, the low densities won't support public transit systems. Even if we want to share more facilities instead of owning everything individually, we're too distant from our neighbors to make that possible. Even if we want mixed-use neighborhoods, our car-based regional economies undermine small, local enterprises. And so on.

If there is any single principle that is fundamental in planning for sustainability, it is this: Within a given area, whatever the scale, random improvements will not work. They may even be counterproductive because sustainable communities are structurally different from car-oriented communities. Effective change must recognize that what is needed is the replacement of one whole system by another very different — indeed, essentially opposite — whole system.

Los Osos: A Sustainable Community in a Sustainable Watershed

Like the Pullman study, the Los Osos project is a process guide more than a specific proposal (though it does include specific proposals). It is a guide for sustainable development of essentially rural areas, with extensive advice regarding preservation and support for natural systems, as well as instruction for appropriate ways to integrate human development with those natural systems.

Los Osos is a rural/suburban area that has experienced severe drought for the past seven years. This study, essentially a strategy for sustainable regional development, focuses primarily on water issues, proposing that the region's watershed boundaries (the area within which all surface water drains to a common collector) be considered the focus of all planning decisions. It was one of seven winning entries in the American Institute of Architects' 1993 "Call for Sustainable Community Design Solutions."

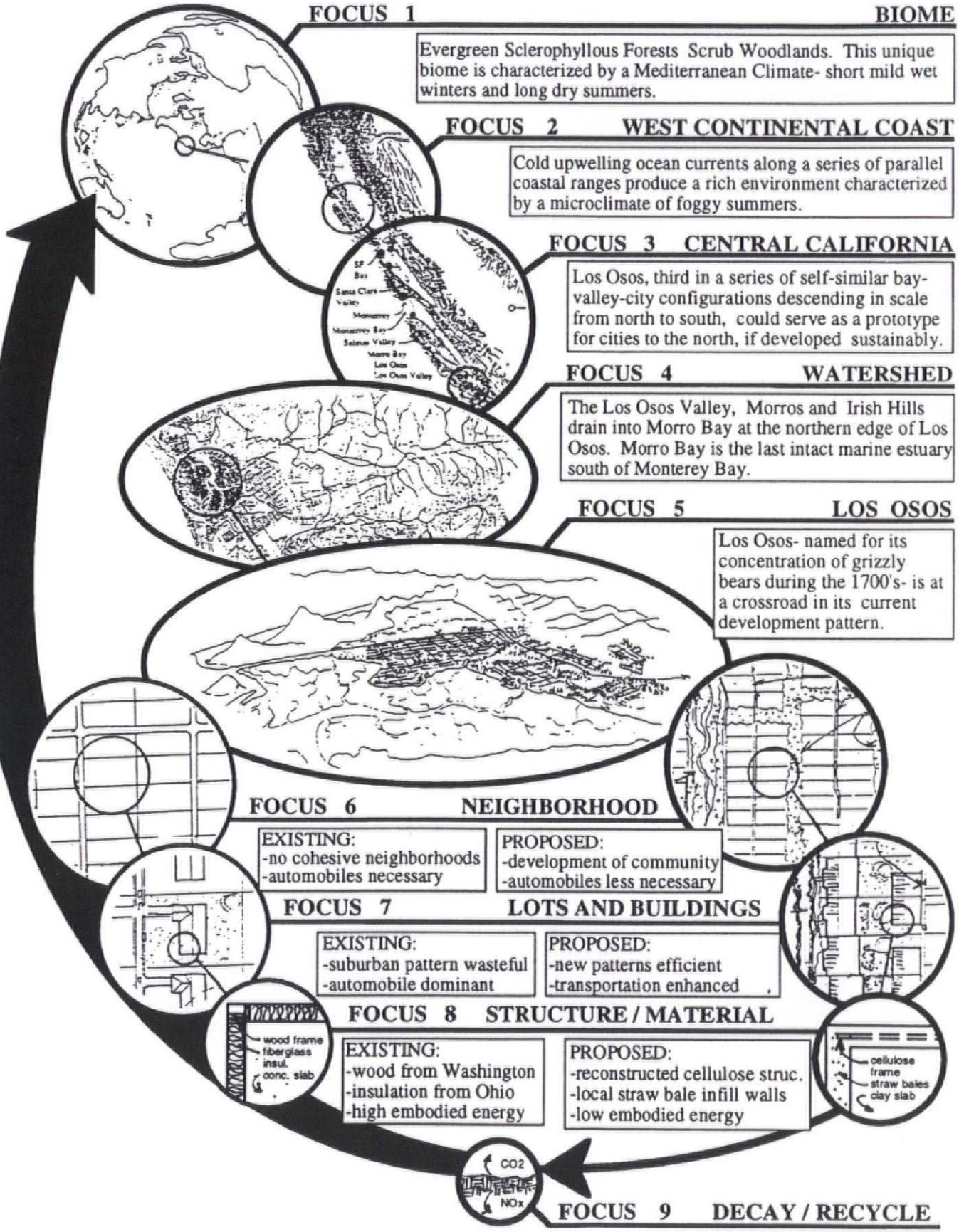
Detailed strategies are proposed for water use, water treatment and land uses that will allow the area to regenerate as a healthy habitat for plants and animals — including people. The study includes suggestions for developing locally-generated construction materials, alternative transportation systems (including new types of cars and bikes), and solid- and liquid-waste recycling systems, which recover valuable resources. It specifically proposes the development of a community center, conceived as the cultural and political heart of the watershed-defined region and seen as an important strategy for both generating and maintaining community involvement in long-run sustainable development.

Project team:

Polly Cooper, Marilyn Farmer, Jacob Feldman, Ken Haggard, Henry Hammer, Brian Kesner, Jora Clokey, Margot McDonald, Mark Mondor, Dan Panetta, Jennifer Rennick, Randy Reynoso, Bill Whipple.

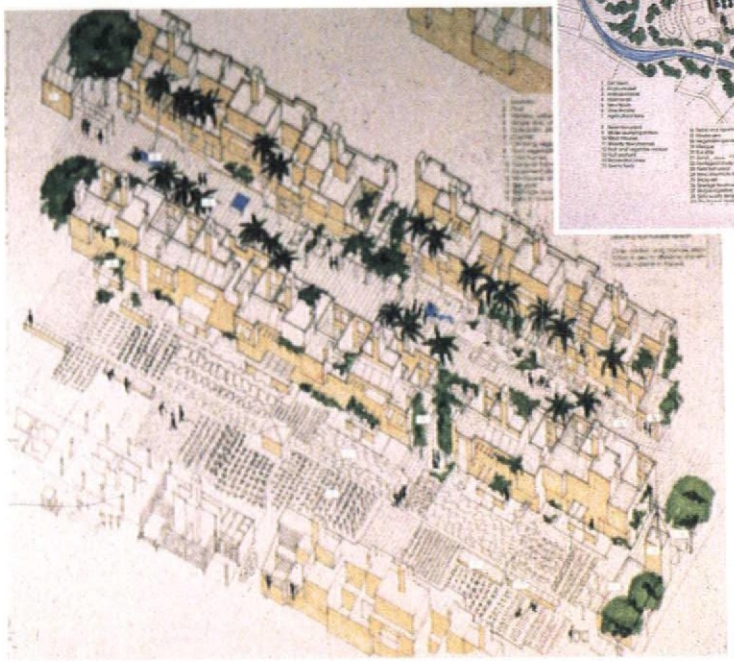
(Opposite page):

A "fractal scan" of the Los Osos project area, demonstrating the nested interrelationship among the site and design strategies at various scales.


FOCUS 1 BIOME
Evergreen Sclerophyllous Forests Scrub Woodlands. This unique biome is characterized by a Mediterranean Climate- short mild wet winters and long dry summers.
FOCUS 2 WEST CONTINENTAL COAST
Cold upwelling ocean currents along a series of parallel coastal ranges produce a rich environment characterized by a microclimate of foggy summers.
FOCUS 3 CENTRAL CALIFORNIA
Los Osos, third in a series of self-similar bay-valley-city configurations descending in scale from north to south, could serve as a prototype for cities to the north, if developed sustainably.
FOCUS 4 WATERSHED
The Los Osos Valley, Morros and Irish Hills drain into Morro Bay at the northern edge of Los Osos. Morro Bay is the last intact marine estuary south of Monterey Bay.
FOCUS 5 LOS OSOS
Los Osos- named for its concentration of grizzly bears during the 1700's- is at a crossroad in its current development pattern.
FOCUS 6 NEIGHBORHOOD
EXISTING:
-no cohesive neighborhoods
-automobiles necessary
PROPOSED:
-development of community
-automobiles less necessary
FOCUS 7 LOTS AND BUILDINGS
EXISTING:
-suburban pattern wasteful
-automobile dominant
PROPOSED:
-new patterns efficient
-transportation enhanced
FOCUS 8 STRUCTURE / MATERIAL
wood frame
fiberglass insul.
conc. slab
EXISTING:
-wood from Washington
-insulation from Ohio
-high embodied energy
PROPOSED:
-reconstructed cellulose struc.
-local straw bale infill walls
-low embodied energy
cellulose frame
straw bales
clay slab
CO2
NOx
FOCUS 9 DECAY / RECYCLE

A Sustainable Neighborhood

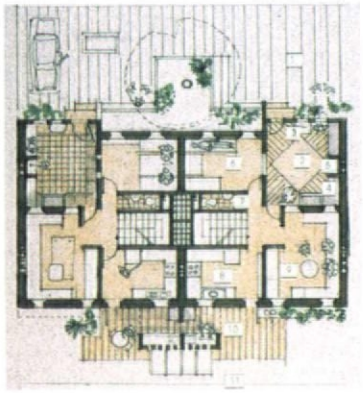
URFA, TURKEY



(Above) Site plan of proposed extension of the city.

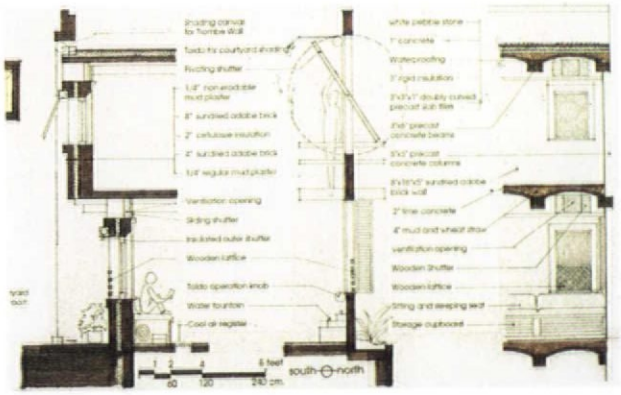
(Left) Detail of housing clusters, showing traditional architectural and urban characteristics — narrow streets, courtyards, walls, small openings and flat roofs.

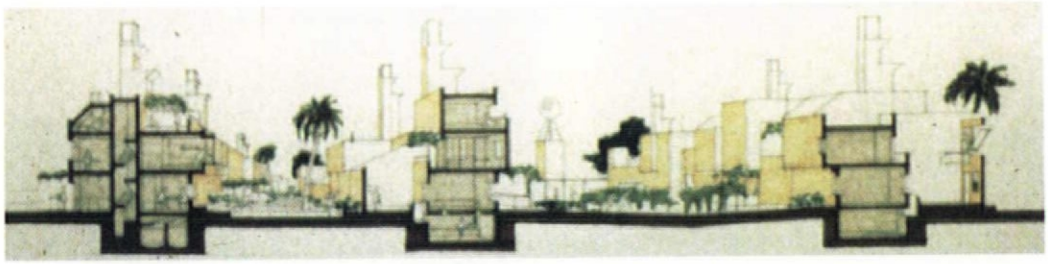
(Opposite page) Section through the cooling towers.



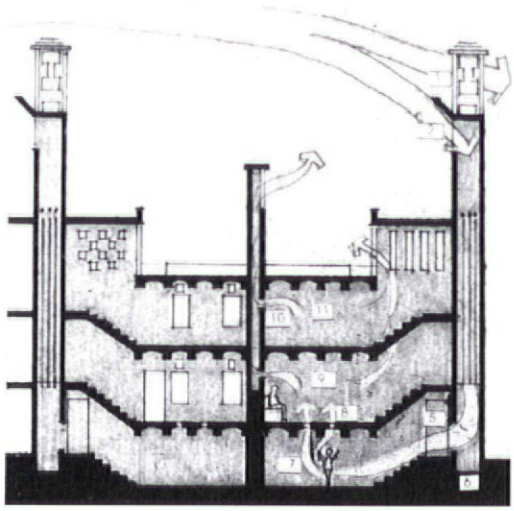
(Left) First-floor plan of typical house.

(Right) Section showing details of materials and cooling and ventilation techniques.





Section through several housing clusters.



The case study is a new neighborhood for 3,500 to 4,000 residents, mostly immigrants from villages, on a 360-acre site at the edge of Urfa, Turkey, an existing city of 750,000. The proposal, prepared for the Amer-ican Institute of Architects' 1993 "Call for Sustainable Community Design Solutions," was awarded the UNESCO prize for best student project.

The approach borrows heavily from traditional building and planning strategies in Turkey to create culturally familiar forms using simple, time-tested urban patterns and technologies. It includes mixed-use neighborhoods with services within walking distance; small, pedestrian-dominated alleys that organize neighborhood life; allowance for many routine activities (cooking, laundry, gardening, building) to be done collectively; trees and trellises to shade public spaces; organization of dwellings in response to climate conditions (including a traditional basement retreat from hot weather); cooling towers for natural ventilation; and cisterns to collect rainwater for reuse.

Some new forms and technologies are used, too — the provision of large garden areas adjacent to each block of dwellings is not a traditional arrangement, for example. There are trombe walls (interior masonry walls next to south-facing glass; they trap and absorb the sun's heat for later reuse), precast concrete building elements, solar cookers, biogas generators and solar and photovoltaic panels.

In general, the proposal relies on local materials and labor-intensive technologies for construction and maintenance, and it emphasizes water conservation, waste treatment and natural heating, cooling, and lighting. Much emphasis is placed on developing of the neighborhood as a largely self-sufficient community, culturally and economically.

Designer

Can Elmas.

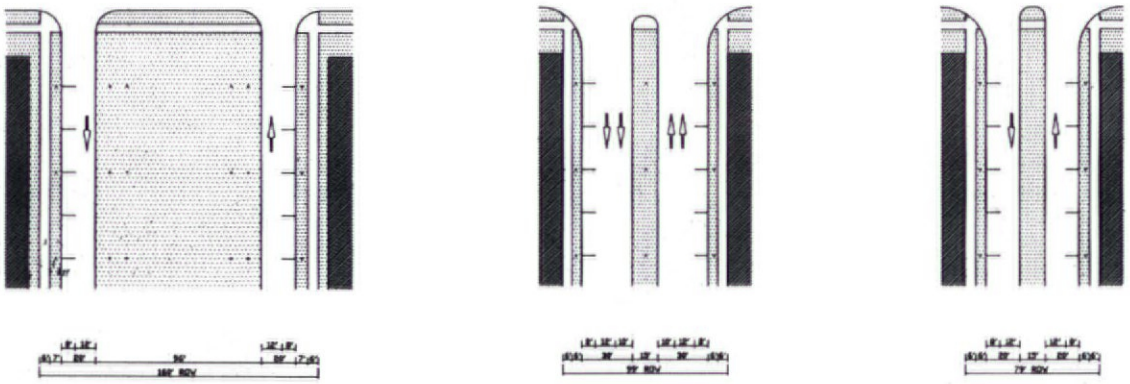
One of the many strengths of this study is that it presents a simple and coherent philosophical framework for sustainable development, broad enough to be useful in projects at any scale, in any context. It stipulates four qualities thought to be characteristic of sustainable communities: *holistic* ("composed of interdependent and interconnected subsystems at multiple scales"); *diverse* ("diversity in biological, social, cultural and economic systems, at all scales, is necessary for both healthy operation in the present, and for healthy adaptation to change"); *fractal* ("composed of [nested] and interacting systems whose fundamental qualities, processes, and physical forms appear self similar at many scales"); and *evolutionary* seeking greater efficiency over time through "iteration, feedback, and chaos."

A Sustainable Neighborhood in Urfa, Turkey

On one hand, this proposal takes the general issues outlined earlier much farther than the U.S. projects do, and it is far more thrifty in its use of resources. On the other, the context is radically different than that of the U.S. projects: Turkish cities are still, by and large, pre-automotive, dependent on walking, bicycles, animals, carts and public transportation for most travel, although car use and ownership is increasing. Mixed-use, high-density neighborhoods are the norm in Turkish cities, thus the cultural habits related to that kind of living do not have to be learned. Family farming is already part of the culture, especially for low-income squatter families, so this cultural pattern does not have to be learned. And the technologies for construction, waste and water management, and climate control proposed here are, with few exceptions, derived from traditions long in use and still visible in the culture at large (though fast eroding).

None of this diminishes the value of the Urfa proposal; it is probably as radical in its own context as the more limited U.S. projects are in theirs. Certainly it is intrinsically interesting and instructive as an example of what sustainable community design means in another culture, another physical context. But it is even more important than that, especially for us whose working context is the U.S. or similar industrialized cultures, because it tells us how much farther it is possible to reach. It asks us to ask ourselves, "Is this really far enough?"

The most serious potential flaw in all the work presented here may be just that: It may not go far enough, even for a first step. At issue is the most basic question: What do we mean by sustainability? This question is almost never definitively answered, yet without a definitive answer we are left with no real basis for measuring our successes or failures.



Defining Sustainability

My concern is the implications of the three trends that I outlined earlier: the earth's limited supply of resources, expanding global economies and massive population increases. Consider this: in 1970, the U.S. contained six percent of the world's population but used 34 percent of the world's energy resources; in 1988, the U.S. population was five percent of the earth's total and used 25 percent of the earth's energy resources. U.S. per capita use of energy resources shrank by seven percent during that time, due to increasingly stringent conservation measures, but total U.S. consumption increased by 11 percent (the difference attributable to population growth). During the same period, worldwide consumption of energy resources increased by 55 percent and per capita worldwide consumption of energy resources increased by 12 percent.

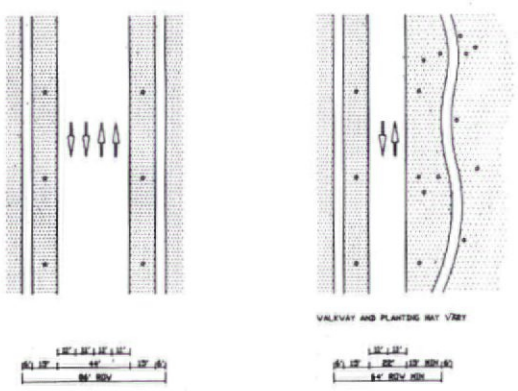
The U.S. figures by themselves seem encouraging, implying that if we try a bit harder we might reach a steady state. But looking at the worldwide figures and adding in what we know about the limited supply of energy resources, there is good reason to believe that in the coming decades the availability of energy resources in this country will be radically diminished. Essentially the same is true for metals, wood, agricultural land, fisheries, drinking and irrigation water, and clean air. Demand is up, and increasing; supply is limited and dwindling

So what do we mean by sustainable? Sustainable for whom? For how long? If we are only concerned about sustaining the present adult generation of mainstream U.S. citizens, what we are doing now will probably work, though we may have to beef up our military capabilities (we are, after all, still using five times our share of the world's energy resources, and we use other resources in similarly disproportionate amounts). If we're concerned about sustaining people in our own society who currently have low incomes, or are homeless, or without jobs, we are obviously not doing enough to spread resources to where they are needed; if we're concerned about sustaining the next generation of Americans, our own children, not to mention generations beyond theirs, and if we are concerned about equal access to resources for other citizens of the world, the changes we must make in our way of life are far more extensive than most of us are willing to contemplate. I assume that our definition of sustainability must be based on the urge toward long-term global equity, for both moral and pragmatic reasons, and my guesses about the effectiveness of our seven projects as sustainable communities are founded on that assumption.

It's Still Suburbia

Certainly the general thrust of all the projects shown here is exactly right: higher densities, mixed uses, local economies, recycling, stewardship of the land, support for walking, biking and public transport. These are all clearly appropriate and necessary. And these projects serve the immensely important purposes of raising the issue of sustainability to a higher level of awareness (perhaps the most important purpose, at this moment) and of contributing to the developing discussion about what we must do to prepare for a future of scarce resources.

But it is clear that the general model that is being proposed (best seen here in St. Vincent's and Haymount projects) will not produce sustainable communities. One of the model's fundamental tenets is that the basic organization of U.S. urban neighborhoods of the 1930s, with family houses on small lots facing onto a grid of relatively narrow streets with sidewalks, is an appropriate pattern of development that, when coupled with appropriate design and zoning restrictions (to insure lively neighborhoods, safe sidewalks and a mixed-use local economy, among other things), and when served by a public transit system, will lead to sustainability. All U.S. attempts to move toward sustainable communities — real or theoretical, on new ground or in existing places— essentially follow this model.



A range of street sections from the plan for Haymount. The designs attempt to balance the demands of the car with pedestrian movement and open space. But can a plan for a community that makes using cars convenient be considered sustainable? (Duany/Plater-Zyberk).

We're making a big investment in this model, but it has a fatal flaw. A basic assumption of this model, and of every project we see here, is that whatever else we do, everyone must be able to have doorstep access to a car, and everyone must be able to get from home to anywhere else by car.

The history of this century is clear: as long as travel by car continues to be doorstep accessible, cars will be the dominant mode of transport. And as long as cars dominate the transportation picture, densities will have to be limited to suburban levels; public transit will not be efficient; streets will not really be for people on foot; economies cannot be truly localized; neighborhoods cannot become real communities; and families will still have to own most of the space and equipment needed for a good life.

What is being reproduced here is, in fact, the same set of circumstances that led to the destruction of the pedestrian- and transit- based urban structure typical of the 1920s and earlier. In today's urban structure, which is far, far more supportive of car use than cities of the 30s, 40s, and 50s were, why would we think that people will walk out their doors, ignore their cars, ignore the goods, services, jobs, cultural opportunities and social life that is available in the larger region, and that their cars can so easily allow them to have? Of course we will use our cars if they are there and we demand low enough densities to allow comfortable driving and easy parking. We will use the nice little neighborhood center if we feel like it, but we'll do most of our real shopping at the big retail centers on the freeway. We'll use transit if our jobs happen to be easily accessible at the other end, but we'll do most everything else by car. And most of us will still get to work by car, because most jobs these days are not in places that are easily accessed by transit.

The hard truth is that truly sustainable communities — dense and compact, with a localized economy and a rich and complex public life — can only develop where cars are not a practical choice for travel within the community. Are the new neighborhoods and new towns we have examined here sustainable? The neighborhood for Urfa, Turkey, probably is. But the answer must be no for the other projects . If we are concerned about equity, if we are thinking about future generations, if we believe that resources are severely limited, we must then recognize that sustainability requires a more radical reformation of the suburban structure.

A Step in the Right Direction?

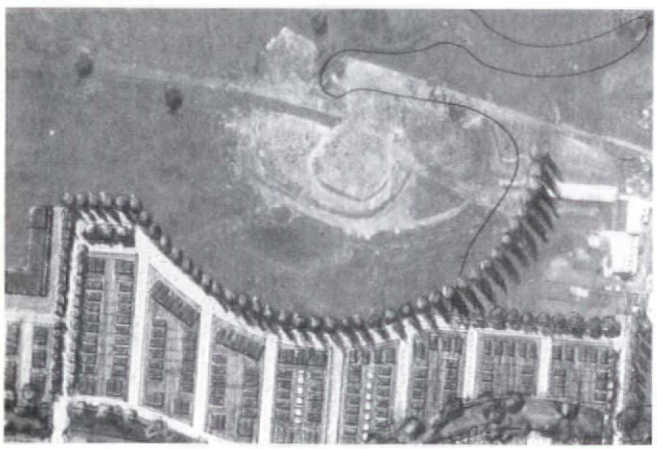
Even if these U.S. projects do not go far enough, do they move us in the right direction? In most ways, yes, they do. Certainly the emphasis on support for public transit systems is a positive, progressive step; so is the preservation and enhancement of natural systems: the reclamation of natural areas in Phalen, the rejuvenation of farmland in Weeks, the rebuilding of the watershed in Los Osos, the stabilization and strengthening of plant and animal systems in both St. Vincent's and Haymount, all would be permanent changes for the better. And, again, all these projects have immense long-run value for their roles in raising the level of awareness of sustainability issues.

But while the approach to urban land use in these projects will create some resource savings, in the long run it is a dead end. By emphasizing the importance of walking and transit, mixed uses and increased density, the model proposed here will help us take the next steps. But the places described in these projects will not be part of that next set of steps. When the time comes that we see the global resource picture for what it is, we will have to accept the fact that no urban structure that is dependent on cars, no matter how efficient the car is, will work. These communities, with all their insights, are still too dependent on cars, still too low in density. Like other car-oriented parts of the urban fabric, these places will have to be ripped apart — streets rebuilt, buildings and infrastructure replaced, land divisions revised — in order to accommodate a fundamentally different, sustainable structure.

(Above) The landscape of the St. Vincent's site.

(Below) A proposed neighborhood next to a working farm.

Illustrations courtesy Terezia Nemeth.



Left Out: Connections, Adaptability, Longevity

Some readers may use this discussion to help in formulating a set of principles for the design of sustainable communities. Thus I feel some obligation to mention three potentially important concerns that should, I think, be part of the thinking in the design of any sustainable community, but that were not explicitly mentioned by the authors of these seven projects.

One is the importance of connections within, and especially between, neighborhoods. All of the projects clearly provide for a transit system that expands any single neighborhood's range of options. But today there is also the possibility of including as part of any community's infrastructure a sophisticated, interactive information system that allows people to know what possibilities are available throughout the community — meetings, menus, sales, cultural events, schedules — and to make reservations, pay fees, etc. This is very significant: historically, one of the major drawbacks of living in a small village or neighborhood has been that the only options one really can know well are the ones that one sees every day. An effective information system shifts the balance between dependence on the local neighborhood and access to the larger community, allowing a greater measure of autonomy without destroying the essential face-to-face nature of the neighborhood.

The other two concerns are related. No designer can anticipate the kinds of support systems — rooms, buildings, shelters, plazas—that will be needed as a local economy evolves. Thus an essential aspect of planning for mixed uses is making sure that physical systems can be used in a variety of ways over time, easily adapting to changes in patterns of use — today a residence, tomorrow a shop, next day an office, then a residence again. One way to do that, of course, is to design places for the short run only, assuming that they will be torn down and replaced when the next use comes along. But the other concern is for longevity. The efficient use of resources demands that our physical constructions be largely permanent; we can't afford to continue to discard the materials and energy invested in construction every time a new use comes along.

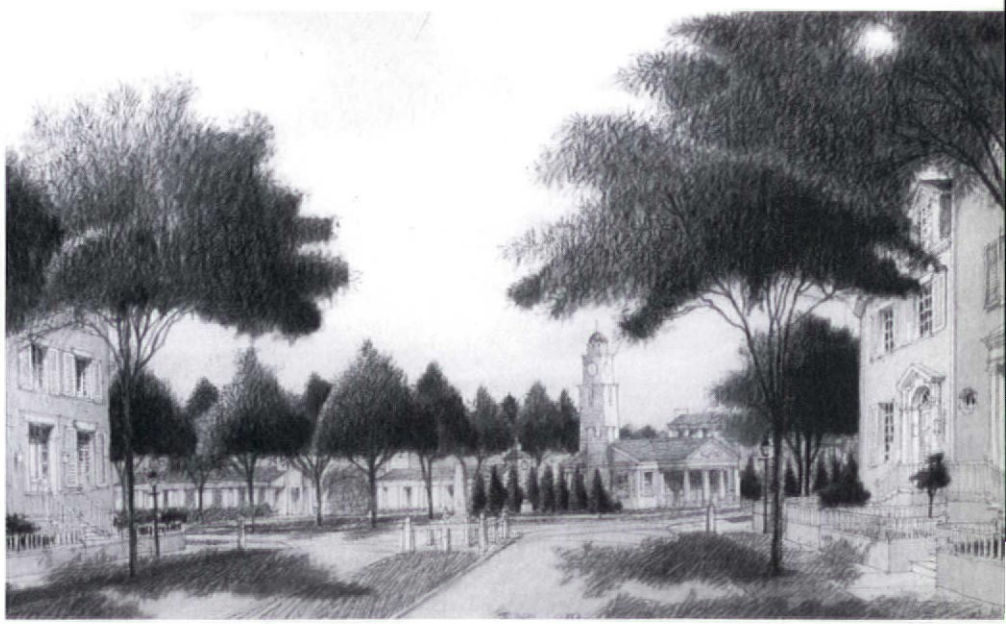
The need for both adaptability and longevity create yet another challenge for designers: how to make structures that are both fundamentally permanent and adaptable to a wide range of unanticipated use through time. It is a problem that older, traditional communities worldwide have had to solve for survival; we would do well to look to such communities for advice.

The Place of Sustainability

Happily, in a journal entitled *Places*, all three of the site-specific U.S. projects shown here, Phalen Village, St. Vincent's and Haymount, are specifically and effectively concerned with the way their communities will become places. Phalen Village does this by giving new life to an older natural area overwhelmed by human incursions, then restructuring the built areas so that the whole village street system orients to that recreated parkland. The latter two go to great pains to shape new communities that respect the specifics of existing topography, plant life, climate and, in the case of St. Vincent's, historically important existing buildings. All three celebrate the particulars of the land and the history of it's use, and they help us all to understand what it means to make places.

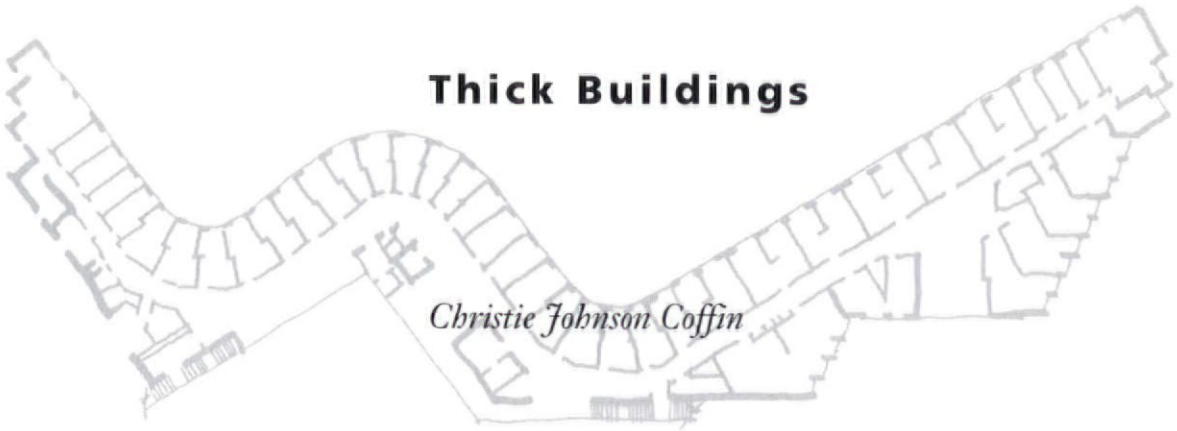
On the other hand, not one of these seven projects brings that thinking down in scale beyond the site plan. Within the sometimes truly beautiful and powerful land-based forms of the overall plan we find consistently the same geometric streets layouts — rectilinear grids, Bath-like circuses, great Haussmann diagonals, and the geometric sites and formalist buildings that respond to such gestures. All are forms forced onto a reluctant local landscape, all relics of a tradition in which the land was the enemy — or at best, merely a tool, a floor on which to build — and dominance by humans was the only possible objective. For sustainability's sake, if for no other reason, it is surely time to reconsider this set of assumptions. Some traditions, after all, may need to change.

And this too is an issue for sustainability. The quest for sustainable communities, sustainable landscapes, sustainable architecture, leads us toward a reevaluation of our relationship to the earth at every scale. This quest asks us, demands of us, that we call into question those aspects of our culture that separate us from the realities of plant and animal life, geology, topography and climate, and find a new way of designing that lets us be part of all that, that lets us celebrate our humanness — our triumphs, our insights, our hopes, our history — but that also lets us celebrate our connection with the non-human universe. Our cultural history in recent centuries has been increasingly anthropocentric. That anthropocentrism is as clear in our architectural and planning paradigms as anywhere, and that will have to change. More than anything, the call for sustainability is a call for a new understanding of the meaning of place.



The St. Vincent's and Haymount communities are shaped clearly and respond to the larger landscape. But once the line between landscape and town is drawn, the rules change — in the design of buildings, streets and open spaces, concern for existing natural systems is abandoned.

(Right) Community space in Haymount conveys little idea of the surrounding landscape character.



Thick Buildings

Christie Johnson Coffin

The idea of tracts of windowless indoor space has troubled me for years. I often ask people why they assume that windows are a luxury and not a necessity in a workplace. The most heartbreaking answer came from a professor at a major university, who told me that architects had taught him to live without windows.

As an architect, I direct large hospital and laboratory projects. A portion of my effort has been devoted to rethinking the design to accommodate the inhabitants and let light in. At a hospital design meeting I proudly presented a plan that managed to daylight a basement for the medical records department, thus providing natural light at the records clerks' work desks. A nurse administrator asked me, "Why would you want them to have windows?"

I have always been interested in daylight. As an architect I argue for narrow buildings with access to natural light, fresh air and view; yet large, contemporary buildings are often planned with the assumption that windows are a luxury. I outline here some questions raised by the construction of large, window-poor buildings, which I will call thick buildings.

Given a choice, almost all of us would select offices with operable windows for our own use. Yet since the development of mechanical heating, ventilating and cooling systems earlier in the twentieth century, we have been content to design buildings that ignore people's heliotropic tendencies.

Thick buildings, it is claimed, provide improved flexibility, economy and communication. Flexibility is gained, it is said, by creating large featureless plains of space that can be portioned out in small allotments as needed.

Limiting the quantity of building surface in contact with the weather may reduce construction costs, conserve energy and cut maintenance expenses. There are fewer windows to wash or clothe with sun control devices.

Thick buildings may also result from an overemphasis on the importance of internal proximity within modern organizations. In the last 20 or 30 years, design programs have grown from simple space lists to full functional specifications, including relationships among departments and spaces. Compactness increases the number of people within hailing distance of any person's desk. If space continues unimpeded for hundreds of feet, many differently shaped departments can be tessellated on the same floor plane.

In the U.S., we leave the question of thick or thin to building owners and their advisors to solve. U.S. codes require operable windows for habitable rooms within residences. This often excludes kitchens and bathrooms and permits daylighting through adjacent spaces for dining or sitting areas. Within hospitals and other residential institutions windows are required only in bedrooms. In recent decades, intensive care bedrooms have been included in this requirement. Labor and delivery rooms, examination and treatment rooms, and surgical recovery rooms are permitted to be windowless, despite research indicating more rapid recovery in rooms with windows.[1]

Major U.S. codes, such as the Uniform Building Code (International Conference of Building Officials), and the BOCA National Code (Building Officials and Codes Administrators International, Inc.), commonly permit either windows or artificial illumination and ventilation for all non-residential uses. Windowless schools were popular briefly in the 1960s, especially with

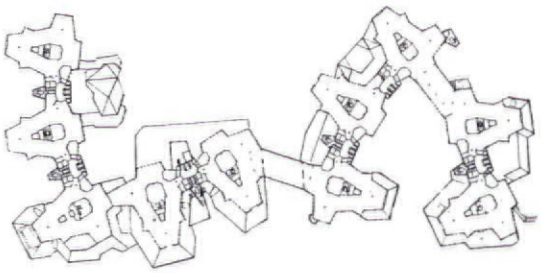
(Opposite page) Baker House. Design by Alvar Aalto. (Christie Johnson Coffin)

(Left and below) An inventively thin building in Amsterdam: Nederlandsche Middenstandsbank. Ton Alberts and Max von Huut, designers. (Photo: Rocky Mountain Institute; drawing: Christie Johnson Coffin)

authoritarian teachers. Even now there is no daylighting requirement for U.S. schools or workplaces. Daylighting is seen as an amenity, but not required for public health and safety.

Europeans have taken a stronger stance on workplace windows. In Germany, windows are expected near workstations. In Finland, where at midwinter the few daylight hours occur entirely during the work day, daylighting is a legal requirement in workplaces. The Netherlands also requires windows in workplaces. Indeed, a further Dutch requirement prevents the use of mechanical air conditioning in new structures unless required by machinery or processes. In the Netherlands, bad building design is not a justification for air conditioning.

With this in mind, should we reconsider U.S. practices and standards?



Are Thick Buildings Economical?

Building economics is a crucial determinant of building form. While thick buildings may be less expensive in the first instance, the economics of bulk is often a limited calculation that does not account for the full range of costs, short-term and long-term, monetary and human, that building forms affect.

Mechanical engineers often speak of the energy economies possible in thick buildings. One referred to a building with four sides of floor-to-ceiling glass walls. In this case, half-silvered, black-tinted glass reduced the heat gain and extra artificial illumination was added to make up for the loss of daylight. The reported energy conservation effort was heroic, the engineer justly proud. He enjoyed the challenge of producing complex systems to solve the problems posed by the thick form and the large quantities of unprotected glazing.

Yet, when asked, this same engineer speculated that, except in extreme climates like Siberia and Zanzibar, high-perimeter, daylighted buildings may require less energy to run. Daylighting can save electrical costs. Artificial lighting may account for one third of the energy used in a workplace, not to mention increased air conditioning energy needed to remove the heat generated by lights, both winter and summer. In daylighted buildings, external sun control devices and landscaping can mitigate unwanted heat gain from windows.

Simpler heating, ventilating and cooling systems may mitigate the costs added by increased building perimeter. Systems worth considering to save first costs and energy include four-pipe radiators with thermostats, operable windows and ceiling fans. Many passive heating and cooling approaches may be practical only for thin buildings, for example, trombe walls and night sky cooling. Individuals with access to operable windows and thermostats report comfort in a wider temperature range, thereby effecting further energy savings. In some cases, mechanical cooling may be eliminated altogether.

Preliminary computer modeling of energy use versus building mass by Bob Rundquist, developer of BEEM software, uses weather tapes for Minneapolis, Miami and New York. Early results indicate only a minor increment of added energy cost as building shape

San Francisco's Victorian rowhouse, a quintessential type of thin building, has demonstrated its adaptability over the years. (Christie Johnson Coffin)

varies from a massive square to a slender shape with full daylighting.[2] This modest cost differential can be offset by a number of features that have a more pronounced effect in thin buildings: solar orientation, exterior sunshading, natural ventilation, passive solar heating and cooling, wider comfort range. Indeed, rental values increase for space with windows. Costs may not play as large a part as suspected.

Sustainable architecture advocates point to examples like the 1987 Amsterdam headquarters of the Nederlandsche Middenstandsbank (NMB), designed by Ton Alberts and Max von Huut. This narrow, many winged, six- to nine-story building houses 2,400 employees in 528,000 square feet. A podium accommodates parking and meeting rooms. No desk is further than 23 feet from a window. Energy use is one fifth that of a nearby contemporary bank building. Extra construction costs estimated at $700,000 have resulted in annual energy savings estimated at $2.5 million.[3]

Are Thick Buildings Healthy?

Do thick buildings make people sick? As Hal Levin and Kevin Teichman point out, indoor air quality "has become a major concern, because people spend up to 90 per cent of their time indoors, where pollutant levels frequently exceed those outdoors."[4] Some threats to health, like Legionnaire's disease, developed with artificial ventilation. Other potential threats include secondhand smoke and the use of building products that emit everything from offensive odor to irritants, systemic toxins, carcinogens, and teratogens.

Indoor air pollution can result in a significant increase in sick leave and reduction in productivity. Costs to building owners have included monetary settlements to affected building users, as well as renovation. The most serious cases, such as the Terrasses de la Chaudiere near Ottawa, have been thick, sealed buildings with reduced air changes. In a British study on building sickness the five healthiest buildings had operable windows and a high proportion of one- or two-person office space.[5] Indoor air quality is rarely a serious question in narrow buildings with smaller spaces and operable windows.

People who work in thick buildings often report that they endure rather than enjoy the arrangement; they describe feelings of isolation and oppression. Again the economic and social benefits of the new NMB Bank building are worth citing. Absenteeism is down. Workers' blood pressures have gone down. The employees have achieved remarkable productivity since moving in. The results exceed the expected Hawthorne effect, the short-term improvement often encountered in work groups who receive even random attention and changes in their workplace. NMB is perceived to be progressive and has experienced a major growth in business. How important was building configuration in the health and economic changes at NMB?[6]

Are Thick Buildings Recyclable?

American economic practice is to view buildings as short-term investments to be depreciated and sold, a practice that results from tax policies, not from regarding buildings as embodiments of materials and energy and as objects of use. Far from designing for significant long term savings, we have come to treat buildings and their interior architecture as disposable. A strong expectation is that commercial buildings will be gutted and remodelled several times over their economic lives.

The dynamics might change if there were more incentive to motivate better use of building resources. Germany has enacted "cradle-to-grave legislation" on manufactured products like television sets and refrigerators; manufacturers are required to recycle or otherwise safely dispose of obsolete equipment. A true test of sustainability in architecture

would emerge if buildings were covered by similar legislation.

As these codes and standards change future generations may not seek out thick buildings to sustain their needs. I haven't found any study that tracks the rate of renovation and reuse as a function of building massing, but I expect that thick buildings and the energy embodied in them may not be as easily recycled as extensively daylighted buildings.

I often see windowed buildings such as the Massachusetts Institute of Technology's main building complex reused with a minimum of adaptation. Freeman and Bosworth's complex has survived 78 years of use with minimal renovations. On either side of the main corridor are rooms with operable windows and, perhaps, a view to the river. Many rooms are generously sized; offices that can house whole seminars or serve as incubator spaces for new programs. Newer MIT buildings, thick ones, have been extensively renovated.[7]

What will we make of the thick office buildings lying vacant in many urban centers? What new uses can we find for surplus, often thick, urban hospitals? This is not an idle question in California, where it is estimated that we have twice as many hospitals as we need, and more and more medical care is provided outside of hospitals.

One of my fantasies is the wholesale recycling of an urban hospital. The process would start, as it has with many successful warehouse and factory conversions, by creating enormous holes in the structure for multilevel courtyards and gardens. The complex could mix commercial, residential and civic uses or could house a new community college complete with realistic training facilities for fields such as health care, warehousing, office and computer work, and maintenance of complex building systems. It would be expensive, but could be part of a process that brings health, life and greater safety into urban precincts dominated by secured health care building complexes..

Perhaps we can learn from the survivors, such as the temporary structures found at most universities. At the University of California, Berkeley, several clapboard buildings, narrow boxes with a gabled roofs, have long refused to die. All rooms were equally simple boxes with tall double-hung, operable windows. They were economically built during World War II for temporary use. Over the years, with minimum remodeling, they housed many departments, agencies and programs; often serving as incubator space for new programs, such as women's studies or peer counseling. Lack of preciousness made reuse inexpensive. The rules were few. The inhabitants enjoyed the availability of space, a garden setting, windows that opened, and doors that locked. They served many well by their adaptability.

Victorian townhouses, purposely built for extended Victorian families with servants, have demonstrated an uncanny ability to be reused with relatively little effort. With minimal changes they have been transformed to accommodate straightened Edwardian families with boarders and day servants, clusters of flats and bed sitters, stylishly unconventional graphic designers, conservative legal offices, a bookstore/coffee house, or even a small hotel. Many of these changes occur graciously through reinterpretation with little more than a coat of paint. Decorative features, moldings and good finishes encourage maintaining the integrity of the original construction. Generously sized, well-proportioned, daylighted spaces with privacy are remarkably versatile.

Who Benefits from Large, Compact Configurations?

What effect do thick, internalized structures have on our communities and our social structure? While building form alone does not determine organizational behavior, it can mediate, enable or obstruct it.

Kantoorgebouw Centraal Beheer, a Dutch insurance company building, includes features like skylights to bring sunlight into its interior. Herman Hertzberger, designer. (Christie Johnson Coffin)

Inhabitants of thick, inward-looking buildings are isolated and often secured from the surrounding community. A large complex organization, such as a hospital, corporate offices or university department, can achieve partial self-sufficiency within a single building.

Hospital architects will feel at home with arguments for thick buildings designed to improve internal communication. Functional specifications for hospitals commonly require everything to be near everything else to reduce response time in an emergency and to cut staffing costs. Yet, in recent years, with thicker and thicker hospitals, both staffing costs and response time have tended to increase. When I fell ill in Tanzania, a small clinic with few resources provided me with initial examination, blood drawing, lab test, consultation, prescription and dispensing of appropriate pharmaceuticals all within an hour.

Maze-like hospital megastructures are stressful to patients, visitors and staff. How critical is this stress? Is it naive to think that daylighted buildings interlaced with courtyards, gardens and views into the community would better serve the needs of health?

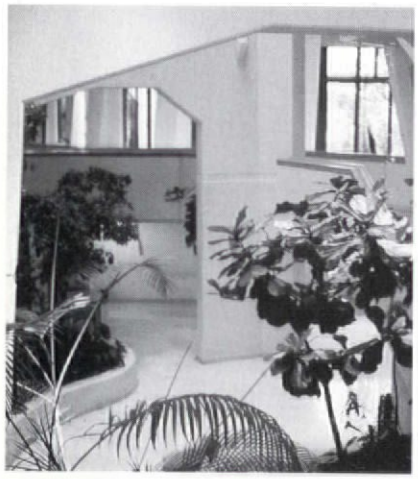
Also, narrow buildings may enhance connections that help make communities function. Working in a slender building, one has a view of other people — people not in the same company, institution or profession, people who constitute a diverse social and cultural milieu. The presence of more windows, doors and thus eyes on the street may deter crime and encourage increased, safe use of open spaces and streets. These relationships are as important as the intra-organizational connections thought to be fostered by thick buildings.

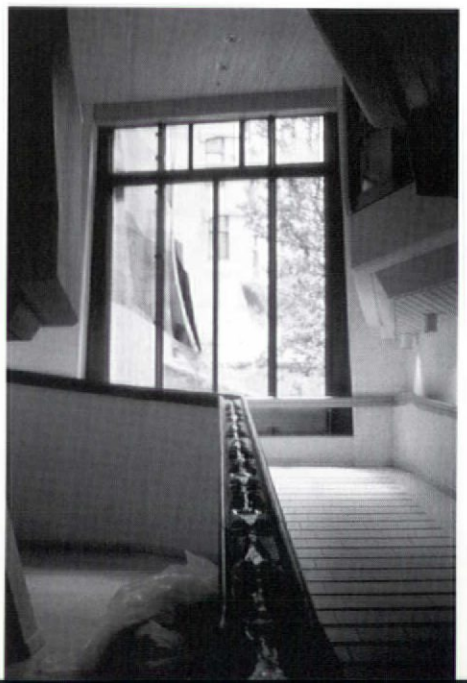
The notion that narrow, daylighted buildings reduce absenteeism and reinforce overall worker self-esteem and productivity is not far fetched, but it is difficult to establish. Objective measures of productivity are unavailable for most pursuits. There is little in the research to strongly support or dispute this idea.[8] Scarcity of windows may support gender and race bias, through the use of windows as a status symbol. Executives in their rooms with views ringing a windowless central pool of clerks is a familiar representation of the spatial caste system.[9] The social price of thick buildings must be questioned.

Thin Buildings that Work

An employer wishes to house a work group of hundreds of employees. This employer wants the building to be both reasonable in terms of normal market prices for space and sustainable in the long run. She is concerned about her employees and wishes to sustain their long term health, productivity and contribution to the company and the community, while sustaining long-term energy savings of all sorts (initial in terms of the energy embodied in the building, and ongoing in terms of heating, cooling, lighting, maintenance, and remodeling). Would her company be best served by a thick building or a daylighted building?

In thinking through an answer consider carefully the following: Most employees given the choice will choose daylighted space, and not only for the increased prestige. Natural ventilation and daylighting will continue to be virtually free and other sources of energy will likely become more expensive. (A building width four times the window header height would allow daylighting throughout.) Most indoor air quality problems have been experienced in





Offices, lobbies and stairways inside the NMB building all have access to natural light. (Rocky Mountain Institute)

thick buildings. Many employers during the current recession have been faced with large increments of window-poor space that are difficult to sub-lease as an organization shrinks.

Consider carefully before carting that narrow, old building off to landfill and replacing it with a new, thick one. It may be that for the moment all we can back up with hard data is that the windows at worst won't hurt and that thick buildings might. I am on the side of doing building users no harm.

Notes

1. Roger S. Ulrich, "View Through a Window May Influence Recovery from Surgery," *Science* 224 (27 April 1984): 420-421.

2. Christie Coffin and Bob Rundquist are working on an article that advances a simple model showing how energy use varies as massing varies.

3. William Browning, "NMB Bank Headquarters: The Impressive Performance of a Green Building," *Urban Land* (June 1992): 23-25.

4. Hal Levin and Kevin Teichman, "Indoor Air Quality — for Architects," *Progressive Architecture* (March, 1991).

5. S. Wilson and A. Hedge, *The Office Environment Survey: A Study of Building Sickness* (London: Building Use Studies Ltd., 1987).

6. Karl H. Maret, "Working with Light," *In Context* (Spring, 1993).

7. Fred Hapgood, *Up the Infinite Corridor* (New York: Addison-Wesley, 1993).

8. J. C. Vischer, "The Effects of Daylighting on Occupant Behavior in Buildings, New Directions for Research," in E. Bales and R. McCluney (eds.) *1986 International Daylighting Conference, Proceedings II* (ASHRAE, 1989).

9. Leslie Kanes Weisman, *Discrimination by Design* (Chicago: University of Illinois Press: 1992).

The Bateson Building, in Sacramento, is a thin building that surrounds an atrium. (Christie Johnson Coffin)

Seattle Community Centers Put Sustainability to the Test

Donald Canty

A set of community centers in Seattle is providing a kind of laboratory experiment in the search for sustainability. The five centers, two completed and three under way, were designed under sustainable "public building guidelines for the twenty first century" drafted especially for them.

The experiment was instigated by Seattle architect and environmental consultant Chris Stafford, who has served for 13 years on various environmental committees of the American Institute of Architects at the national level. These committees have become increasingly aggressive and influential, their efforts culminating in the 1993 World Congress of Architects, which had environmental concern as its theme and issued the declaration:

all must participate in the creation of an ecologically sustainable future ... but the integrating professions — architects and engineers, planners and designers — are particularly critical because we are responsible for the impact of what we construct.

Stafford saw the opportunity to apply such exhortations locally in the community center program. He approached the city's department of parks and recreation, which is administering the program, about inserting considerations of sustainability into the centers' programming and design. The director agreed to do so if Stafford could provide specific guidelines.

Stafford got funding from the Bonneville Power Administration and Seattle City Light, the local electric utility, and in June 1992 convened a workshop of local and national architectural environmentalists. The result was a 62-page document entitled "Designing with Vision" that was given to each of the community center architects.

Conventional planning and design, the document notes, "often creates a steel, concrete and plastic energy and resource hog." It calls for nothing less than a "new way of thinking" about building design and use that makes sustainability central. It is peppered with aphorisms and exhortations: "Reduce, reuse, recycle, rethink" and "problems are opportunities, wastes are resources."

Getting down to specifics, the document establishes performance targets in such areas as overall energy efficiency, including embodied energy considerations; conservation of water and electricity; and environmentally sensitive use of materials. Some of the targets are numerical, represented as a percentage of local or federal energy codes. In the case of energy efficiency, for example, the document calls for beating the codes by 65 percent.

Following the targets, the document presents 30 pages of "strategic advice" subsequently summarized in a checklist. A sampling of the recommendations in the checklist:

Objectives for the site: Provide low-maintenance landscaping and site improvements. Include native, edible, food-producing landscaping. Protect natural site features.

Objectives for structure: Coordinate space functions with site-solar orientation. Define the building envelope using super insulated roof and walls, high performance glazing and skylights, thermal mass and airlock entry.

To achieve the energy saving target, the checklist suggests considering solar and geothermal energy sources, cogeneration and use of more efficient HVAC systems and lighting hardware.

It calls for use of half recycled and half recyclable building materials and avoidance of old-growth hardwoods and chloro-fluorocarbon products.

The five centers were designed to a common problem adjusted to the individual sites. All will be roughly 19,000 square feet and contain a lobby, multipurpose and activity rooms, a kitchen, a large gymnasium and space for a family counseling and educational center.

In the program, the parks and recreation department recommends the guidelines to the architects but offers its own six-point list of environmental requirements, which emphasizes daylighting, passive heating and natural ventilation. Given a choice between this list or 62 pages of guidelines, it is not hard to guess which got more of

(Opposite page)
Garfield Community Center.
(Miller/Hull)

(Right)
Delridge Community Center.
(Boyle•Wagoner Architects)

the architects' attention. Asked whether the architects were given the guidelines to read or to follow, department spokesman David Takami said, "to follow where possible within the budget," which says it all.

Joy Okazaki, a department project manager on the community centers, acknowledges that "we couldn't afford to make the program a full-scale experiment." She notes that the budget for the centers was established in 1990 as the basis for the tax levy, long before the guidelines were conceived.

The impact of the guidelines has been "not as high as we would have liked," Okazaki says. In some cases, she notes, "the technology wasn't there." In others, products and materials recommended by the guidelines weren't available locally at affordable prices and others (gray water, for example) were ruled out by city codes.

All of the centers have features reflecting the guidelines, but none follow them point by point. The centers are not going to be the "living examples" of the precepts of sustainability that the drafters had hoped.

All are making use of recycled and recyclable materials, which became a requirement on public buildings in Seattle by city ordinance passed while they were in design.

Garfield Community Center, in a mostly minority neighborhood, is the first of the five to be occupied. It is a delightful little building designed by Miller/Hull of Seattle. The architects have deftly used inexpensive and durable materials. The forms are strong and simple, the colors cheerful and there is an abundance of light and volume inside.

The department offers a lengthy list of the building's environmental features, starting with three in the area of recycling: "Use of recycled materials in construction; recycling of construction debris and vegetation for use in this and other projects" and training programs in recycling for the center's staff and users.

Specifically, fly ash made from soot was added to the concrete mixture, reducing the amount of cement and aggregate needed. Recycled gypsum and paper were used in the drywall; ceramic tiles that brighten the masonry contain 50 percent recycled glass and acoustic ceiling tiles contain 70 percent recycled wood fiber.

Low-flow plumbing fixtures are used to conserve water and the department has installed a central energy management control system to monitor heating and ventilation, reducing usage whenever the center is closed. Building orientation maximizes natural ventilating and daylighting and most windows are operable.

How many of these features can be traced to the guidelines? The answer is complicated by the fact that Garfield was well into construction when they were drafted. Principal architect Robert Hull says that the guidelines would have been followed more systematically if they had been around earlier. As it is, he finds it difficult to identify specific design decisions that they influenced.

In general, however, the guidelines did encourage thinking about sustainability and made the public client more receptive to environmental features in design.

Stafford, for his part, feels that Miller/Hull was more receptive to the guidelines than the architects of the other centers and that Garfield pays more attention to sustainability than the other centers will. "One out of five isn't bad," he says of his experiment. "It would be worthwhile if we changed just one person's mind."

If it is difficult to determine how much the guidelines changed the design of the centers, they had a tangible impact upon the client. Some form of sustainability requirements are now part of all parks and recreation building projects and the energy management control system is being applied to both new construction and retrofits.

The department also included Stafford on the value engineering panel for the community centers with results that surprised him. Once he explained the concept of sustainability to the maintenance and operations people on the panel, they became his allies. "It's a very attractive idea when properly understood," Stafford says contentedly, noting that 300 copies of the guidelines have been requested by architects, public officials and others from Austin, Texas, to Auckland, New Zealand.

Zero Emissions and More in Chattanooga

Christine Saum

In October, I visited an urban design workshop that was studying the southern area of Chattanooga's central business district. Places like this, cut off from other parts of town by freeways and characterized by abandoned or marginal industrial facilities and pockets of neglected worker housing, can be found in many cities. It's the sort of neighborhood that fills one with despair because of the waste it represents — waste of character-filled buildings, infrastructure and strategically located developable land.

The goal of the three-day workshop (organized by RiverValley Partners, a private redevelopment non-profit, and architect Bill McDonough) was to develop a plan that not only spurs economic development in the south CBD but also makes the area a model of sustainability.

The workshop began with discussions among property owners, residents and political leaders of the issues that would guide the plan. Then a team of designers retreated to Chattanooga's Riverfront/Downtown Planning and Design Center to draft a preliminary plan. (The center coordinates and guides public and private development projects in the city and receives both public and private funding.) The team presented its work at the end of the workshop; a final plan (prepared by Calthorpe Associates, RiverValley and the planning and design center staff) will be presented at a meeting of the President's Council on Sustainable Development in Chattanooga in January.

The guiding principle that emerged was to transform the area into a "zero emissions zone," which means that all industrial and residential waste generated in the area would be treated there as well. (This is one of several ideas McDonough has outlined as the "Chattanooga Principles.") RiverValley also wants to persuade companies with a commitment to sustainable operations and products to build facilities there. Still other strategies would help cut auto use (and emissions) — improving pedestrian and transit connections between south CBD and the rest of Chattanooga, and encouraging a diversity of uses within the district so people can live, shop, work and play in a pedestrian-oriented neighborhood.

The workshop also generated ideas for breaking down the barriers that single-minded, single-purpose places pose to improving urban environments. A request by citizens to ameliorate the visual impact of a freeway interchange led to a proposal for an urban forest along the right-of-way; it would function as a tree bank for public landscaping projects. A desire to reduce the expanse of unattractive, non-porous surface parking that normally surrounds a stadium (one was proposed for a local university) resulted in a suggestion for "parking streets" that would accommodate overflow parking during stadium events and provide grassy medians at other times. The jewel in the environmental crown would be a bioremediation center, which would not only treat industrial waste from within the district but also be a place where citizens could learn about the process.

Can Chattanooga pull the plan off? The city does have a track record of following big ideas through. By the late 1970s, its manufacturing base of coal-fired industries was virtually obsolete. The local Lindhurst Foundation underwrote a plan called Vision 2000; it resulted in $800 million worth of investment ($200 million of it public funds) in downtown redevelopment, affordable housing and an aquarium. Both the Planning and Design Center and RiverValley Partners were instrumental in making the plan work.

For this new plan to be successful, city government would have to make capital investments, change zoning laws and be prepared to lure businesses with financial enticements. Local business and political leaders, including the heads of the Chamber of Commerce and Convention and Visitors Bureau, see Chattanooga's commitment to "green" industry as a marketing strategy; the city has already developed a fledgling industry in electric busses, which are used in Chattanooga and marketed to other communities. But while council member David Crockett thinks Chattanooga could be the American Curitiba, other local officials are reticent about the plan and are taking a wait-and-see attitude.

Cities must continually renew and reinvent themselves, and Chattanooga's efforts should inspire leaders in other communities. The strategies the workshop formulated offer a structure for guiding countless public policy decisions, and the city has been successful in using urban design to weave together the many concerns — including sound economic development, environmental sustainability, preservation of local history and culture — that go together to make a livable community.

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Wendy E. Brawer

is principal of Modern World Design, which promotes environmental stewardship with resource-efficient services and products. She has chaired the Industrial Designers Society of America's Committee on Environmental Concerns and writes, lectures and teaches about design for the environment.

Richard D. Browning

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Randolph T. Hester, Jr.

is a professor of landscape architecture at the University of California, Berkeley.

Walter Hood

is an assistant professor of landscape architecture at the University of California, Berkeley and Principal of Hood Design.

Laura Lawson

designed the West Berkeley Garden Patch and is the project manager for it and for employment programs at Berkeley Youth Alternatives. She received a masters degree in landscape architecture from the University of California, Berkeley, where she researched agriculture as an urban design element.

Robert A. Marcial

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Muscoe Martin

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is a partner in the firm Community Development by Design. Her work includes park planning, survey research and small town economic development. She teaches citizen participation at the University of California, Berkeley and is known for her work in politically-charged planning and design arenas.

Mike Pease

is an architect, artist and teacher. He has worked on projects of all kinds and scales, from furniture to housing to new towns. He lectures and consults on topics related to sustainable communities, and is collaborating on a book about traditional Dutch housing and town planning.

Christine Saum

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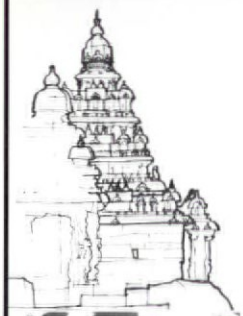

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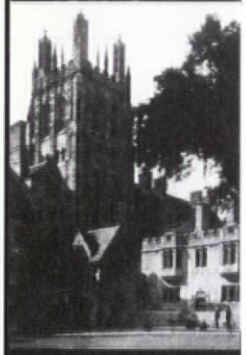

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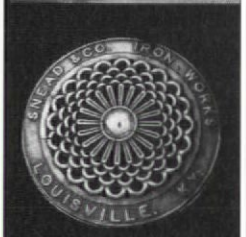

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