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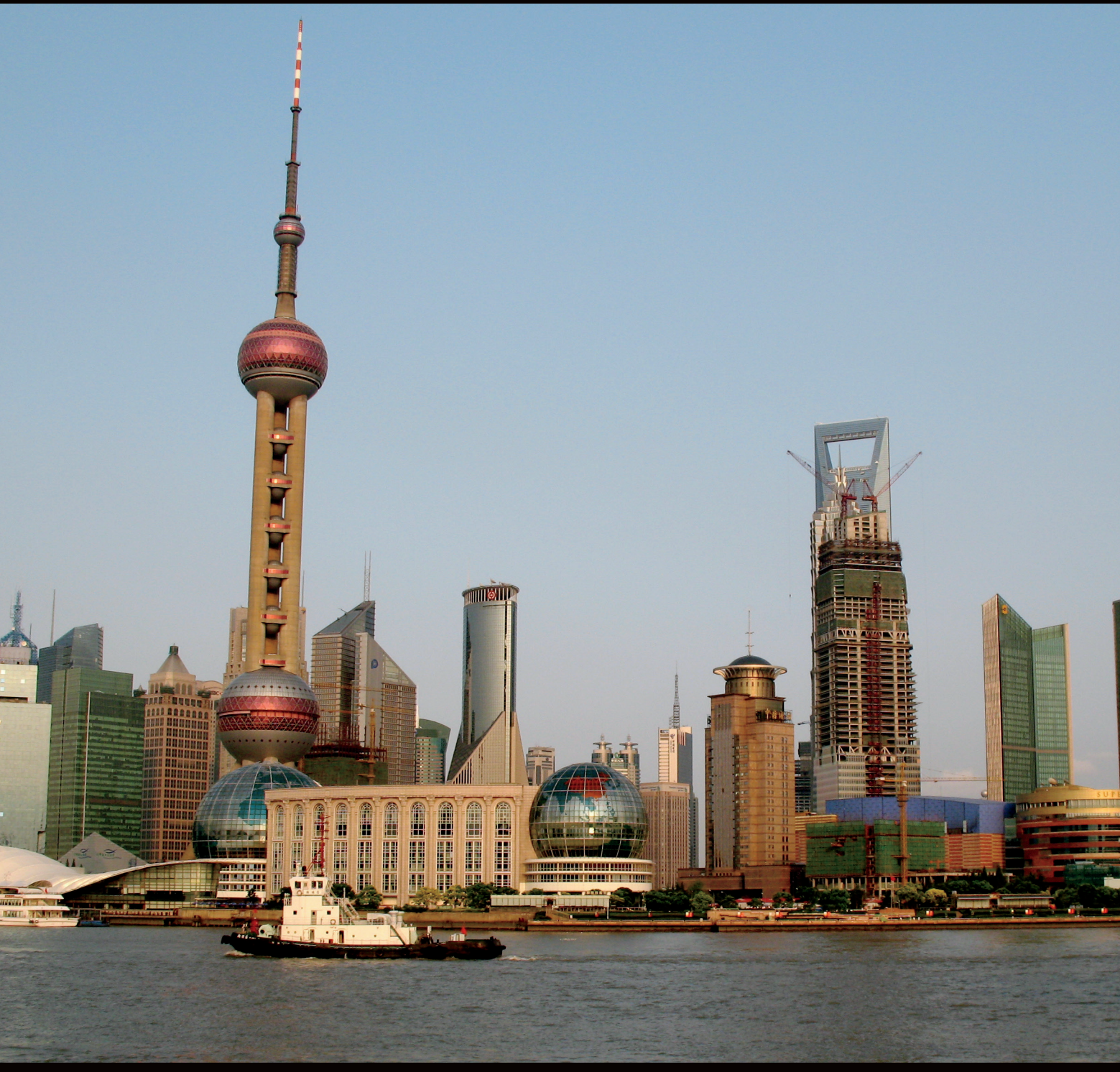
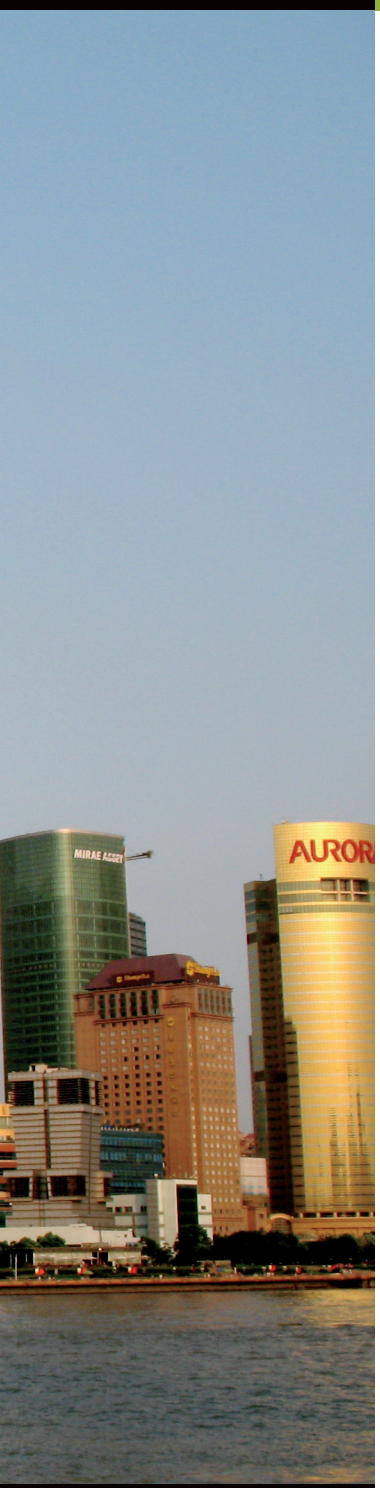


■ FIGURE 1.1
Pudong, the financial district of Shanghai, was primarily farmland and countryside prior to 1993. Today the 467-square-mile Chinese district has a population over 5 million and a density of 10,794 people per square mile (4,168 people per km^2).



CHAPTER 1

Building a Sustainable Future

CHANGE OCCURRED RAPIDLY in the twentieth century—more so than at any other time period in the history of humanity. Arguably, the most significant change has been the number of people living on earth and depending on its resources for survival. Within a hundred-year time span, the global population grew from 1.6 to 6 billion, and for the first time in history over 50 percent of the population—80 percent in the United States and Europe—is concentrated in urban areas. Cities are hastily expanding to accommodate the rapid influx. In the United States alone, 1.5 million acres (0.6 million hectares) of farmland, forest, or other rural land is being converted to urban development each year (American Farmland Trust 2009). In the coming decades, the rapid population increase is expected to continue, with projections of 7 billion in 2011, 8 billion in 2024, and 9 billion by 2045.

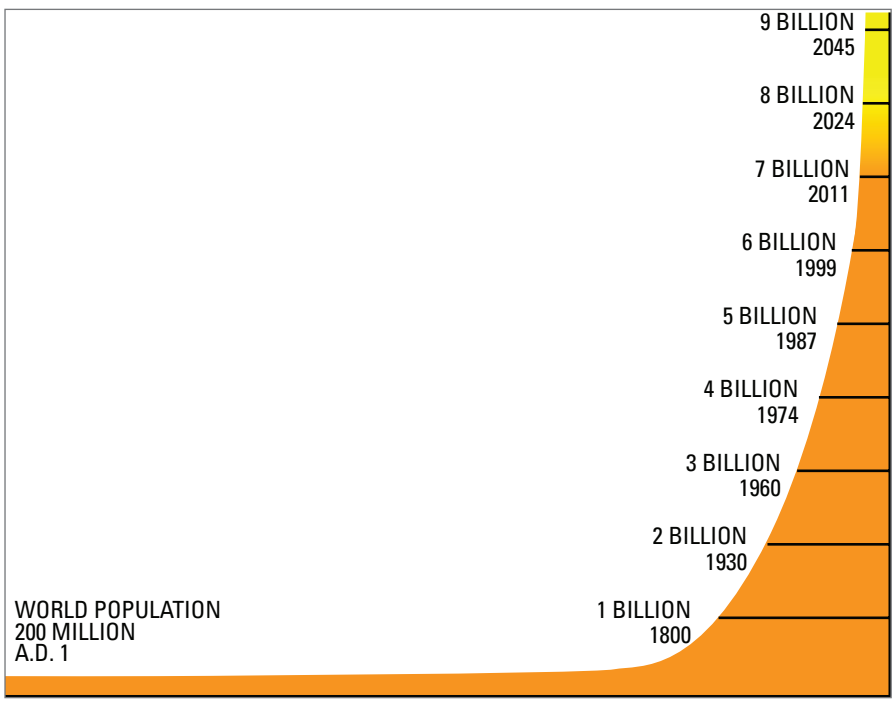


FIGURE 1.2
Global population growth.

As human populations increase, so do the demands on the earth's resources. Unprecedented pressure is being placed on the planet's soils, waters, forests, and other natural capital (Brundtland 1987). It is projected that at current rates, humanity will soon need the capacity of two earths to absorb CO_2 waste and keep up with natural resource consumption (World Wildlife Fund 2010).

To maintain their physical and mental health, every individual needs and *deserves* clean air, clean water, healthy productive soils, opportunities for physical activity and mental respite, and other benefits or "ecosystem services" provided by the natural environment. Historically, we have not required urban sites to function as sustainable and productive ecosystems but instead have relied on wildlands or rural areas to provide the services that sustain human life. Sadly, two-thirds of ecosystem services are now in decline worldwide (UN Foundation 2005).

Urban sites and other developed landscapes can help reverse this trend. A sustainable future for the growing population is not out of reach, but achieving it will require dramatically changing the ways in which sites are developed and maintained. To adequately provide for the next generation, the protection and restoration of ecosystem services must become standard practice for all sites—both urban and rural.

■ ECOSYSTEM SERVICES: A KEY ATTRIBUTE OF A SUSTAINABLE SITE

Ecosystems provide a multitude of resources and processes that sustain and fulfill human life. These benefits, collectively known as ecosystem services, are essential to our well-being and are a key attribute of a sustainable site. Examples of ecosystem services include:

- Regulate temperature and precipitation.
- Sequester greenhouse gases.
- Cleanse the air and water.
- Provide habitat.
- Maintain soil health and fertility.
- Retain and store fresh water.
- Control erosion.
- Provide recreation.
- Recycle nutrients.
- Produce food and other raw materials such as timber, medicine, and fuel.
- Mitigate natural hazards such as flooding, wildfire, and drought.
- Provide inspiration, intellectual stimulation, and cultural enhancement.
- Enhance opportunities for mental respite.

Many of the goods and services provided by nature are often taken for granted, in large part because they are supplied for "free" and are not part of our traditional accounting systems. To underscore their importance and inform land-use decisions, scientists have begun estimating the wealth of ecosystem services and have found the monetary value to be an average of $33 trillion per year, or nearly twice the global gross national product (Costanza et al. 1997).

Issues that plague urban environments, such as flooding, urban heat islands, and water pollution, are often caused or exacerbated by the disturbance or removal of natural systems and the benefits they provide. Sustainable sites seek to improve the quality of life of site users and the surrounding communities by creating regenerative systems that protect and restore ecosystem services.

Regenerative Systems

The building industry has been an early adopter of the sustainability movement and has documented success in reducing energy, water use, greenhouse gas emissions, and solid waste. Although reducing environmental impacts is definitely a step in the right direction, it is not enough to provide a sustainable future for the burgeoning human population. In addition to doing less damage, we must also reverse the degradation of the earth's natural resources by creating regenerative and resilient systems that sustain and increase the provision of ecosystem services. Landscape practitioners can lead the green building movement to a higher level of sustainable design by helping project teams realize this goal and integrate living systems into all aspects of the site.

Previously developed sites that have limited ecological or cultural value present the greatest opportunity for the type of regenerative change we need. The redevelopment of environmentally degraded sites, such as greyfields or brownfields, provides a mechanism not only for protecting native ecosystems and agricultural lands (via diversion of development pressure) but also for restoring natural systems and the ecosystem services they provide. Encouraging development within existing communities and developed places also conserves the natural and financial resources required to construct and maintain infrastructure. This stands in contrast to the development of greenfield sites, which has a much greater potential of reducing or destroying healthy, functioning ecosystems and the goods and services they provide. Greenfield development that diminishes ecosystem services ultimately contributes to the global decline of natural capital and the overall benefits humanity receives from nature.

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■ **FIGURE 1.3**
High Line Park, Twenty-sixth Street viewing spur. The elevated public park constructed on an abandoned railway in Manhattan repurposes existing structures and provides a ribbon of green space that restores a variety of ecosystem services in a dense urban environment.

What Is Site Sustainability?

Sustainable development is commonly defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1987). It recognizes the interdependency between the environment, human health, and the economy and considers all three when measuring success.

The three pillars of sustainability and their relationship to site development are outlined below:

- **PLANET:** Environmental or ecological sustainability stems from the realization that human life (and the life of other creatures as well) is dependent upon the natural environment and its provision of ecosystem services. It recognizes that there are limits to the bounty ecosystems can provide and to the harvest and degradation they can withstand. To ensure the longevity and viability of the earth's resources, humans must act as stewards of the environment. Sustainable sites help society build an environmental ethic by providing everyday opportunities for people to connect with nature.
- **PROFIT:** Traditionally, the success of development has primarily been evaluated by economic measures. Placing such a strong focus on financial gains alone has led to significant environmental and human health costs. For any endeavor to work long term, it must certainly be profitable; however, other factors must also be considered. Sustainable sites base decisions not only on their economic merits but also on their environmental and social costs and benefits. Including the impacts on people and the planet in the project accounting brings to light the full cost of doing business and encourages more social and environmental responsibility.
- **PEOPLE:** Social equity and human health is an aspect of sustainability that is commonly overlooked and the most difficult to address. It extends the opportunity to aspire to a better quality of life to all individuals. Social equity addresses basic provisions such as clean air and water, the right to education, and access to safe and healthy green space, and other factors that impact our quality of life. Sustainable sites play an important role in supporting human health and create opportunities for all site users to improve their physical, mental, and social well-being.

■ **TABLE 1.1**
Example Characteristics of Conventional and Sustainable Sites

	CONVENTIONAL SITE	SUSTAINABLE SITE
TEAM CULTURE OR PHILOSOPHY	Perceives nature and development as being in opposition. May incorporate sustainable practices into the design if it does not increase time or immediate costs.	Values nature and the ecosystem services it provides. Accepts the responsibility of sustainability and providing a meaningful quality of life to future generations. Strives to reverse the degradation of the earth's natural resources by creating regenerative and resilient systems.
MEASURES OF SUCCESS	Primarily evaluated by the economic success of the project.	Success is measured by not only the economic outcomes but also the environmental and human health impacts of the project.
DESIGN PROCESS	Site design is compartmentalized, and the landscape and buildings are viewed as separate entities. Landscape design often begins after the building design or construction is complete. Consultants work independently on their area of the project and communicate information as needed.	Building and landscape practitioners, engineers, construction and maintenance professionals, and other consultants are collectively involved in the design process and work together to optimize the performance of the site toward common goals.

	CONVENTIONAL SITE	SUSTAINABLE SITE
AESTHETICS	Somewhat homogenous, replicating standard templates similar to sites from other regions or parts of the world.	Design solutions grow from the place and are representative of the local soils, vegetation, materials, and culture.
ENERGY	Relies heavily on nonrenewable resources that harm the environment and human health.	Minimizes energy consumption and the use of fossil fuels. Whenever feasible, energy is derived from the sun and wind, biomass, or other renewable resources.
	The building and landscape do not work together to reduce energy consumption.	The landscape creates favorable microclimates that reduce the energy consumption of buildings and increase the comfort of site users.
SOILS	Construction and maintenance practices commonly damage soils.	The disturbance of healthy soils is minimized. Degraded soils are restored prior to replanting.
	Require regular applications of fertilizers to promote healthy plant growth.	Soil biota and organic matter from on-site vegetation promote healthy plant growth.
VEGETATION	Preserves large trees.	Maximizes the integration of all existing native and ecologically appropriate vegetation into the site design.
	Plant selection is primarily based on site conditions and aesthetic considerations.	Plant selection considers a broad range of factors, including growing conditions, beauty, resiliency, ecological function, native range and habitat, invasiveness, and maintenance requirements.
WATER	Quickly convey stormwater runoff and other wastewater resources off-site.	Captures rain and wastewater for reuse on-site or in adjacent properties.
	Strongly relies upon potable water for irrigation	Landscape primarily relies upon precipitation or wastewater resources such as air-conditioner condensate, greywater, or reclaimed water.
MATERIALS	Removes and disposes of much of the existing building and landscape materials.	Maximizes the reuse of existing structures, landscape, and building materials.
	The reuse of site structures or materials at the end of the project life is not considered in the design process.	Sites are designed to minimize the disposal of materials. Site structures and features can be adapted and reused in place or easily deconstructed and reclaimed or recycled.
MAINTENANCE	The individuals responsible for maintenance are not aware of the goals of the project or how maintenance practices impact the site's ecological and cultural function.	The individuals responsible for maintenance understand and support the goals of the project. Education and training is provided to ensure that maintenance optimizes the site's ecological and cultural performance of the site.
	Maintenance occurs on a regular schedule and is not informed by the needs of the site. Land-care practices focus on keeping the site somewhat static and limiting change.	Site management guides the site's natural evolution and adaption to continually improve its ecological function and visitors' experiences. Postoccupancy evaluations and monitoring guide land-care practices.
EDUCATION AND DEVELOPMENT OF AN ENVIRONMENTAL ETHIC	Relies heavily on built systems and hides the infrastructure that supports it.	Reveals ecological processes and connects people to nature and the systems that ultimately sustain us

The Importance of Education and Stewardship

Design alone cannot ensure a sustainable site; what is created on paper must be translated into a tangible project constructed and cared for in a way that perpetuates its success. Landscape practitioners often guide the design and construction process but are commonly separated from the long-term management of the site. Many project teams that have worked so diligently to minimize resource consumption, cleanse water, restore ecological processes, and address other aspects of sustainability discover after some time that their sustainable site does not function as intended or live up to its accolades. This is often due to a lack of performance monitoring and misguided or omitted operations and maintenance procedures. These important practices are frequently overlooked or cut from the project for one or all of following reasons:

- Budget restraints
- A belief that landscapes are natural systems and as such can care for themselves
- A lack of individuals who take ownership of the site and see themselves as stewards of the land
- A general ignorance or apathy toward the concept of sustainability and how the site must function in order to support it

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However, regardless of the reason, the fact stands true, constructed landscapes and many natural systems do require monitoring and strategic management and *stewardship* in order to continue to function properly and optimize their provision of ecosystem services. Accepting this, we must ask ourselves, how do we get people to embrace sustainability and care about the ecological health of our landscapes? How do we instill a sense of stewardship for our built and natural ecosystems? The answer is twofold: (1) illustrate both the short and long term economic and human health benefits, and (2) provide educational and meaningful experiences that connect people to nature. In addition to project teams working with the client, maintenance staff or volunteers to help them understand why monitoring and stewardship is central to long-term success; project teams can also create landscapes that help humanity build an environmental ethic.

Aldo Leopold, in his writings on the subject, recognized the need for a land ethic—a moral principle or value—that "simply enlarges the boundaries of our community to include soils, waters, plants, and animals, or collectively: the land." Leopold notes, "An ethic to supplement and guide the economic relation of land presupposes the existence of some mental image of land as a biotic mechanism. We can be ethical only in relation to something we can see, feel, understand, love, or otherwise have faith in" (Leopold 1949).

■ **FIGURE 1.4**
Infiltration planters filled with trees, grasses, and perennial wildflowers manage stormwater and connect the surrounding community to the natural environment at the Taylor 28 streetscape.

In other words, nature must become relevant to our everyday lives. Proving opportunities for society to see and experience nature in this way should be the charge of landscape practitioners and one of the primary purposes of a sustainable site. In this respect, a successfully designed site functions as a living teaching tool.

There are many different ways to learn, and the best teachers make a topic relevant to their students. In a landscape setting this can be accomplished through both active education or outreach and experiential learning. In addition to commonly used conventional teaching methods such as interpretation, guided tours, or volunteer activities, landscapes can also teach by being a source of inspiration, evoking emotion and providing a physical connection to the environment. Constructed landscapes can reveal the ecological processes, rhythms, and cycles of nature and provide restorative settings that allow us to reflect upon our place in the world and to notice the environment around us (Meyer 2008). Hands-on interaction and exploration of diverse and healthy ecosystems can build a broader understanding of the natural world and provide the motivational basis for more formal learning (Wells and Lekies 2006). Positive and spontaneous interaction with nature in our homes, schools, and places of work can build a familiarity and love for the natural environment that translates into a sense of stewardship. Landscapes that improve our understanding of nature and make it relevant to our lives can ultimately have a sphere of influence that extends well beyond the boundaries of the site. Though the number of people who visit the site may be relatively small in comparison to the global population, their environmental ethic can be very influential and a catalyst for change, impacting the government officials they elect, their vote on key issues, the purchase of products, and decisions on where to live and how to commute (Meyer 2008).

■ CASE STUDY

UNDERWOOD FAMILY SONORAN LANDSCAPE LABORATORY

PROJECT TYPE: Public institution

LOCATION: Tucson, Arizona

SIZE: 1 acre (0.4 hectares)

HIGHLIGHTED SUSTAINABLE PRACTICES:

- Redevelopment of a greyfield site
- Use of harvested wastewater
- Increased vegetative biomass
- Habitat for endangered species
- Landscape irrigation requirements balanced with the available wastewater supply
- A more comfortable outdoor microclimate that encourages interaction with nature
- On-site monitoring and documentation of sustainable practices to evaluate performance over time

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■ **FIGURE 1.5** Site plan.

THE SITE: Asphalt campus parking lot located adjacent to the School of Architecture and Landscape Architecture at the University of Arizona. The Tucson climate is hot during the summer and cool in winter. Average annual precipita-

continues

UNDERWOOD FAMILY SONORAN LANDSCAPE LABORATORY *(CONTINUED)*

Design Overview

In 2006, the University of Arizona built a new expansion facility that brings students from architecture, planning, and landscape architecture under one roof to provide an integrated learning environment. The asphalt parking lot adjacent to the school was transformed into the Underwood Family Sonoran Landscape Laboratory, which functions as both an outdoor classroom and entry plaza. The research-oriented garden serves as a demonstration facility that focuses on water-conscious design solutions and functions as a cleansing biosponge for stormwater runoff and building wastewater (see Figure 1.5).

Five distinct ecological communities of the Sonoran Desert are represented in the desert laboratory. The 5,000-gallon (18,900 L) pond provides habitat for endangered fish and is listed by the U.S. Fish and Wildlife Service as a "safe harbor" urban site (see Figure 1.6). The diverse garden is vegetated with native drought-resistant plants appropriate for each biome. A vertical scrim extends along the south side of the building and is vegetated with vines that have climbed 50 feet (15.24 m) high, which help to reduce the building's energy consumption.

BILL TIMMERMAN

■ **FIGURE 1.6**
Wetland pond and shaded lower court. The 5,000-gallon (18,900 L) pond provides habitat for endangered fish and is listed by the U.S. Fish and Wildlife Service as a "safe harbor" urban site.

UNDERWOOD FAMILY SONORAN LANDSCAPE LABORATORY *(CONTINUED)*

Extensive collaboration between the project architect, landscape architect, engineers, and irrigation consultant resulted in an impressive water harvesting system that collects rainwater from the roof, air-conditioning condensate, and greywater from the buildings drinking fountains. The water is stored in an 11,600-gallon (43,911 L) cistern and over the course of a year, 244,000 gallons (922,320 L) are harvested. The recycled water is comprised of approximately 40 percent condensate, 33 percent rainwater runoff, 18 percent well water blowoff and 9 percent greywater. The well's operation requires daily flushing, which was sending 200 gallons (757 L) per day to the city storm drain system. The fresh water from the blowoff is now diverted into the desert riparian pond and helps to maintain water levels and the appropriate conditions for the desert fish species. After the initial establishment period, the site's water use will be balanced; potable water will likely no longer be required, and the garden will rely solely on reclaimed water sources (see Figure1.7).

BILL TIMMERMAN

■ **FIGURE 1.7**
Native plants adapted to the site conditions are planted throughout the site. Once the vegetation is established, potable water will likely no longer be required, and the garden will rely solely on reclaimed water sources.

continues

UNDERWOOD FAMILY SONORAN LANDSCAPE LABORATORY *(CONTINUED)*

PROJECT TEAM

- **LANDSCAPE ARCHITECTS**
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  Todd Briggs, ASLA, project manager
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  Jones Studio
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- **CIVIL ENGINEER**
  Evans Kuhn
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- **MECHANICAL ENGINEER**
  Kunka Engineering
  www.kunka.com
- **IRRIGATION DESIGN**
  Carl Kominsky
- **WETLAND CONSULTANT**
  Wass Gerke & Associates
  www.azwetlands.com
- **GENERAL CONTRACTOR**
  Lloyd Construction Company, Inc.
  www.lloydconstruction.com
- **LANDSCAPE CONTRACTOR**
  AAA Landscape
  www.aaalandscape.com

Creating a Love for Nature in Our Children

Children who feel connected to the natural environment and the ecological processes that sustain humanity are better equipped to face the challenge of building a sustainable society. Unfortunately, today's children are spending less and less time outdoors and as a result, their knowledge and appreciation of the natural world is dwindling (Louv 2005). The increasing disconnect with nature can be attributed, in part, to residential and schoolyard landscapes that children often find boring and uninspiring and to the layout of our neighborhoods and communities, which often limits safe access to natural settings (Moore and Marcus 2008).

Children are fascinated by nature and have an innate desire to splash in water, chase butterflies, get muddy, and explore their surroundings (see Figure 1.8). If their curiosity is not given an opportunity to flourish, an aversion to nature—or biophobia—may develop, which can result in a general discomfort, fear, or disregard for the natural environment (Kellert and Wilson 1993).

HENRY KUNOWSKI / A TELIER DREISEITL

■ **FIGURE 1.8**
Children playing with rocks and water that are part of a cleansing biotope at Tanner Springs Park

In order to cultivate a love for nature within children, they must first have fun playing outdoors and immersing themselves in healthy ecosystems and all of their components. Providing these opportunities where children spend their days—at home or school, or in a local park—enables spontaneous

interaction with nature to become part of everyday life and relieves parents of the need to program time in the natural world into children's lives (Moore and Marcus 2008). Unstructured, child-directed play in "wild" settings—as opposed to structured or programmed activities such as planting a tree or caring for a plant—has been found to be more effective at encouraging developmental impacts that support an environmental ethic in adults (Wells and Lekies 2006). Sites can serve a special and valuable purpose when they encourage children to play outdoors and explore the natural environment (see Figure 1.9).

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■ **FIGURE 1.9**
Fifty-foot-long hillside slide integrated into the Adventure Garden at the San Francisco School. The terraced garden is built from recycled concrete taken from a demolished basketball court located on-site. The schoolyard integrates concepts of sustainability, recycling, and reuse into the physical form of the landscape

Continual Improvement: Monitoring and Adaptive Management

The living systems that make up a sustainable site do not exist in a fixed state. Similar to natural ecosystems, they grow, senesce, and evolve over time. The same is true for the culture of a site and how people choose to use and experience the landscape. Acknowledging that change is an unavoidable and essential component of a site is key to the long-term success of the project.

Postoccupancy evaluations and the monitoring of sustainable design practices are necessary for continued improvement and informed site stewardship. Adaptive management uses the information gathered to continually adjust maintenance practices and improve the overall function of the site.

Planning for information gathering and adaptive management begins in the design phase. Project teams can incorporate tracking mechanisms into the site design for water and energy use, waste disposal, and other performance targets. And the design of the site can ease the gathering of information and encourage monitoring.

To understand which components of a site to monitor, the goals and performance targets of the project must first be agreed upon. How the information will be used to improve the site performance should be clear to all those involved. Projects are more likely to be successful when the individuals collecting and using the data are included in the design process.

Project teams may need to educate clients about the public perception and monetary benefits of monitoring and adaptive management, which include:

Avoid trial and error maintenance practices

Reduce replacement costs

Prevent extreme overhauls of failing systems

In addition to the on-site benefits, postoccupancy evaluations and monitoring also provide invaluable opportunities for continued learning that will improve the body of knowledge and success of the sustainable design industry.

■ **TABLE 1.2**
Guiding principles are commonly held values or fundamental beliefs that steer an organization, team, or individual's decision making. They are the foundation of the design process and help articulate expectations and evaluate success.

GUIDING PRINCIPLES OF A SUSTAINABLE SITE
DO NO HARM. Avoid making changes to the site that will degrade the surrounding environment. Promote projects on sites where previous disturbance or development presents an opportunity to regenerate ecosystem services through sustainable design.
HEED THE PRECAUTIONARY PRINCIPLE. Be cautious in making decisions that could create risk to human and environmental health. Some actions can cause irreversible damage. Examine a full range of alternatives—including no action—and be open to contributions from all affected parties.
DESIGN WITH NATURE AND CULTURE. Create and implement designs that are responsive to economic, environmental, and cultural conditions.
USE A DECISION-MAKING HIERARCHY OF PRESERVATION, CONSERVATION, AND REGENERATION. Maximize and mimic the benefits of ecosystem services by preserving existing environmental features, conserving resources in a sustainable manner, and regenerating lost or damaged ecosystem services.
PROVIDE REGENERATIVE SYSTEMS AS INTERGENERATIONAL EQUITY. Provide future generations with a sustainable environment supported by regenerative systems and endowed with regenerative resources.
SUPPORT A LIVING PROCESS. Continuously reevaluate assumptions and values and adapt to demographic and environmental change.
USE A SYSTEMS-THINKING APPROACH. Understand and value the relationships in an ecosystem and use an approach that reflects and sustains ecosystem services; reestablish the integral and essential relationship between natural processes and human activity.
USE A COLLABORATIVE AND ETHICAL APPROACH. Encourage direct and open communication among colleagues, clients, manufacturers, and users to link long-term sustainability with ethical responsibility.
CONTINUALLY IMPROVE SITE PRACTICES. Conduct postoccupancy evaluations and ecological monitoring to inform the maintenance of the site and provide opportunities for continued learning that improves the field of sustainable design.
FOSTER ENVIRONMENTAL STEWARDSHIP. In all aspects of land development and management, foster an ethic of environmental stewardship—an understanding that responsible management of healthy ecosystems improves the quality of life for present and future generations.
CONNECT PEOPLE TO NATURE. Create environments where all people can receive and enjoy the benefits of nature in their everyday lives.

SOURCE: THE SUSTAINABLE SITES INITIATIVE GUIDELINES AND PERFORMANCE BENCHMARKS, 2009

■ CASE STUDY

PACIFIC CANNERY LOFTS

PROJECT TYPE: Mixed Use, Multifamily Development

LOCATION: Oakland, California

SIZE: 2.7 acres (1.1 hectares)

COMPLETION DATE: 2008

CLIENT: Holliday Development

HIGHLIGHTED SUSTAINABLE PRACTICES:

- Redevelopment of a brownfield site
- Within walking distance to mass public transportation
- Reuse of existing on-site materials
- Reduce impervious cover
- Increase vegetative biomass
- Gardens include edible plants
- Mitigate the urban heat island effect
- Utilize reclaimed water in a drip irrigation system

THE SITE: Industrial brownfield site located in West Oakland. The historic neighborhood was characterized by abandoned warehouses, a crumbling train station, and a maze of raised freeways, frontage roads, and rail lines.

■ **FIGURE 1.10** Pacific Cannery Lofts master plan

Design Overview

Pacific Cannery Lofts is an adaptive reuse project that has transformed a historic vegetable cannery into 163 contemporary loft and town house units (see Figure 1.11). The site is part of a vision to redevelop nearly 30 acres of brownfield into a new Central Station neighborhood that brings together a number of developers to build parks with improved streets, commercial spaces, an urban farm, and over 1,000 new housing units around the renovated train station.

The site design features three internal garden courtyards that are linked by a 350-foot-long (107 m) double-height corridor known as the Gallery, which serves as the internal "main street" of the project. A sense of retreat and privacy for residents was created through a thoughtful organization of space, rich detail in the lushly planted courtyards, and a linear grove court featuring fruit trees and edible plants. Central walkways focus circulation to the middle of the spaces, leaving room adjacent to the buildings for individual entry garden zones and privacy plantings designed to screen private unit patio areas (see Figure 1.11). Incorporating edible plants and highlighting natural wind and stormwater events in the gardens tempers the heavily built atmosphere of the site.

continues

PACIFIC CANNERY LOFTS *(CONTINUED)*

The main entry courtyard is designed as a rain garden. Flagstone paths lead to individual unit entries furnished with a dual-purpose bench and aqueduct. Water cascades from the pebble-filled aqueduct into linear "rivers" adjacent to the main walkway that hold and cleanse the water before it infiltrates into the local aquifer. Recycled tumbled glass installed at the surface of the channels is underlit with LED strands marking the path and giving the courtyard a warm glow at night (see Figure 1.12). Reclaimed gears and valve heads embedded in the walkway provide rhythm and indicate locations of drain inlets set immediately below the recycled tumbled glass. The drain inlets relieve the courtyard when extreme downpours deluge the infiltration system, thereby protecting the building from flooding.

Abandoned cannery relics are reused throughout the Pacific Cannery Lofts project as industrial sculpture. Ten-foot diameter cast-iron wheels, originally part of the cannery's ice-making equipment, mark the west entry, along with engines, mounts, and other related machine parts. The cannery's original scale marks the east entry, and slate-plated switching stations are set in the building's new gallery arcade.

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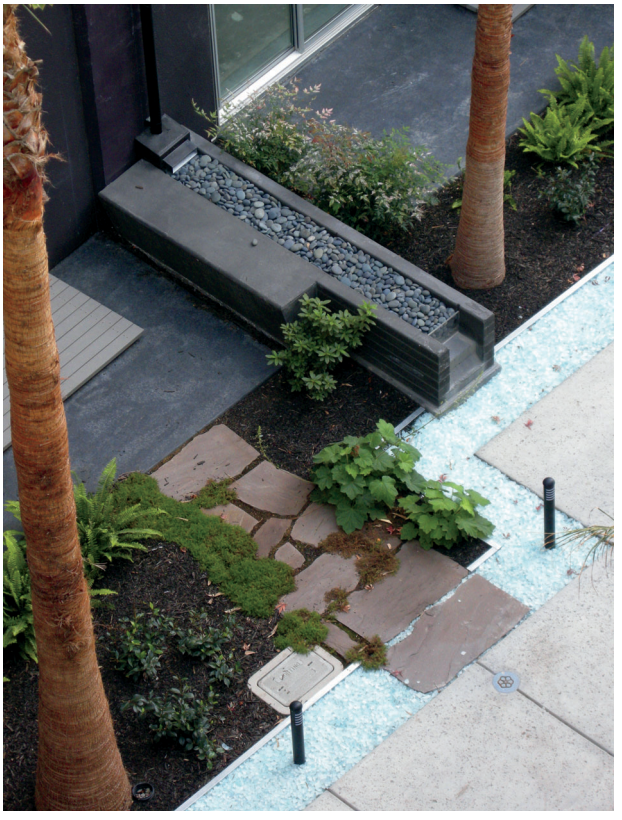
■ **FIGURE 1.11**
Central walkways in the dining room courtyard focus circulation to the middle of the space, leaving room adjacent to the buildings for individual entry garden zones and privacy plantings designed to screen private unit patio areas.



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■ **FIGURE 1.12**
Flagstone paths lead to individual unit entries furnished with a dual-purpose bench and aqueduct. Water cascades from the pebble-filled aqueduct into linear "rivers" adjacent to the main walkway that hold and cleanse the water before it infiltrates into the local aquifer. Recycled tumbled glass installed at the surface of the channels is underlit with LED strands marking the path and giving the courtyard a warm glow at night.

PACIFIC CANNERY LOFTS *(CONTINUED)*

PROJECT TEAM

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Leah Hickey, project assistant

ARCHITECTS

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GENERAL CONTRACTOR

Cannon Constructors

www.cannongroup.com

LANDSCAPE CONTRACTOR

Miller Company Landscape Contractors

William Rogers, project manager

www.millercomp.com

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FIGURE 1.13
Brightly hued custom concrete banquettes and low tables flank the central walkway in the living room courtyard. The tandem U-shaped seating design invites conversation and provides respite. Large leaf and flower plantings create a tropical effect, while the low-water-use understory provides texture and fragrance.

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