

Job Outlook

Prospective architects may face competition for entry-level positions, especially if the number of architectural degrees awarded remains at current levels or increases. Employment of architects is projected to grow about as fast as the average for all occupations through 2010 and additional job openings will stem from the need to replace architects who retire or leave the labor force for other reasons. However, many individuals are attracted to this occupation, and the number of applicants often exceeds the number of available jobs, especially in the most prestigious firms. Prospective architects who gain career-related experience in an architectural firm while in school and who know CADD technology (especially that which conforms to the new national standards) will have a distinct advantage in obtaining an intern-architect position after graduation.

Employment of architects is strongly tied to the level of local construction, particularly nonresidential structures such as office buildings, shopping centers, schools, and healthcare facilities. After a boom in nonresidential construction during the 1980s, building slowed significantly during the first half of the 1990s. This trend is expected to continue because of slower labor force growth and increases in telecommuting and flexiplace work. However, as the stock of buildings ages, demand for remodeling and repair work should grow considerably. The needed renovation and rehabilitation of old buildings, particularly in urban areas where space for new buildings is becoming limited, is expected to provide many job opportunities for architects. In addition, demographic trends and changes in healthcare delivery are influencing the demand for certain institutional structures, and should also provide more jobs for architects in the future. For example, increases in the school-age population have resulted in new school construction. Additions to existing schools (especially colleges and universities), as well as overall modernization, will continue to add to demand for architects through 2010. Growth is expected in the number of adult care centers, assisted-living facilities, and community health clinics, all of which are preferable, less costly alternatives to hospitals and nursing homes.

Because construction—particularly office and retail—is sensitive to cyclical changes in the economy, architects will face particularly strong competition for jobs or clients during recessions, and layoffs may occur. Those involved in the design of institutional buildings such as schools, hospitals, nursing homes, and correctional facilities will be less affected by fluctuations in the economy.

Even in times of overall good job opportunities, however, there may be areas of the country with poor opportunities. Architects who are licensed to practice in one State must meet the licensing requirements of other States before practicing elsewhere. Obtaining licensure in other States, after initially receiving licensure in one State, is known as “reciprocity”, and is much easier if an architect has received certification from the National Council of Architectural Registration Boards.

Earnings

Median annual earnings of architects were \$52,510 in 2000. The middle 50 percent earned between \$41,060 and \$67,720. The lowest 10 percent earned less than \$32,540 and the highest 10 percent earned more than \$85,670.

Earnings of partners in established architectural firms may fluctuate because of changing business conditions. Some architects may have difficulty establishing their own practices and may go through a period when their expenses are greater than their income, requiring substantial financial resources.

Related Occupations

Architects design buildings and related structures. Construction managers, like architects, are also engaged in the planning and coordinating of activities concerned with the construction and maintenance of buildings and facilities. Others who engage in similar work are landscape architects, civil engineers, urban and regional planners, and designers, including interior designers, commercial and industrial designers, and graphic designers.

Sources of Additional Information

Information about education and careers in architecture can be obtained from:

- ▶ Practice Management Professional Interest Area, The American Institute of Architects, 1735 New York Ave. NW., Washington, DC 20006. Internet: <http://www.aiaonline.com>
- ▶ Intern Development Program, National Council of Architectural Registration Boards, Suite 1100K, 1801 K Street NW., Washington, D.C. 20006-1310. Internet: <http://www.ncarb.org>
- ▶ Consortium for Design and Construction Careers, P.O. Box 1515, Oak Park, IL 60304-1515. Internet: <http://www.archcareers.net>

Landscape Architects

(O*NET 17-1012.00)

Significant Points

- Almost 26 percent are self-employed—nearly 4 times the proportion for all professionals.
- A bachelor’s degree in landscape architecture is the minimum requirement for entry-level jobs; many employers prefer to hire landscape architects who have completed at least one internship.
- Because many landscape architects work for small firms or are self-employed, benefits tend to be less generous than those provided to workers in large organizations.

Nature of the Work

Everyone enjoys attractively designed residential areas, public parks and playgrounds, college campuses, shopping centers, golf courses, parkways, and industrial parks. Landscape architects design these areas so that they are not only functional, but also beautiful, and compatible with the natural environment. They plan the location of buildings, roads, and walkways, and the arrangement of flowers, shrubs, and trees.

Increasingly, landscape architects are becoming involved with projects in environmental remediation, such as preservation and restoration of wetlands. Historic preservation is another important objective to which landscape architects may apply their knowledge of the environment, as well as their design and artistic talents.

Many types of organizations—from real estate development firms starting new projects to municipalities constructing airports or parks—hire landscape architects, who often are involved with the development of a site from its conception. Working with architects, surveyors, and engineers, landscape architects help determine the best arrangement of roads and buildings. They also collaborate with environmental scientists, foresters, and other professionals to find the best way to conserve or restore natural resources. Once these decisions are made, landscape architects create detailed plans indicating new topography, vegetation, walkways, and other landscaping details, such as fountains and decorative features.

In planning a site, landscape architects first consider the nature and purpose of the project and the funds available. They analyze the natural elements of the site, such as the climate, soil, slope of the land, drainage, and vegetation; observe where sunlight falls on the site at different times of the day and examine the site from various angles; and assess the effect of existing buildings, roads, walkways, and utilities on the project.

After studying and analyzing the site, landscape architects prepare a preliminary design. To account for the needs of the client as well as the conditions at the site, they frequently make changes before a final design is approved. They also take into account any local, State, or Federal regulations, such as those protecting wetlands or historic resources. Computer-aided design (CAD) has become an essential tool for most landscape architects in preparing designs. Many landscape architects also use video simulation to help clients envision the proposed ideas and plans. For larger scale site planning, landscape architects also use geographic information systems technology, a computer mapping system.

Throughout all phases of the planning and design, landscape architects consult with other professionals involved in the project. Once the design is complete, they prepare a proposal for the client. They produce detailed plans of the site, including written reports, sketches, models, photographs, land-use studies, and cost estimates, and submit them for approval by the client and by regulatory agencies. When the plans are approved, landscape architects prepare working drawings showing all existing and proposed features. They also outline in detail the methods of construction and draw up a list of necessary materials.

Although many landscape architects supervise the installation of their design, some are involved in the construction of the site. However, the developer or landscape contractor usually does this.

Some landscape architects work on a variety of projects. Others specialize in a particular area, such as residential development, historic landscape restoration, waterfront improvement projects, parks and playgrounds, or shopping centers. Still others work in regional planning and resource management; feasibility, environmental impact, and cost studies; or site construction.

Most landscape architects do at least some residential work, but relatively few limit their practice to individual homeowners. Residential landscape design projects usually are too small to provide suitable income compared with larger commercial or multiunit residential projects. Some nurseries offer residential landscape design services, but these services often are performed by lesser qualified landscape designers, or others with training and experience in related areas.

Landscape architects who work for government agencies do site and landscape design for government buildings, parks, and other public lands, as well as park and recreation planning in national parks and forests. In addition, they prepare environmental impact statements and studies on environmental issues such as public land-use planning. Some restore degraded land, such as mines or landfills. Others architects use their skills in traffic-calming, the "art" of slowing traffic down through use of traffic design, enhancement of the physical environment, and greater attention to aesthetics.

Working Conditions

Landscape architects spend most of their time in offices creating plans and designs, preparing models and cost estimates, doing research, or attending meetings with clients and other professionals involved in a design or planning project. The remainder of their time is spent at the site. During the design and planning stage, landscape architects visit and analyze the site to verify that the design can be incorporated into the landscape. After the plans and specifications are completed, they may spend additional time at the



After the plans and specifications for a project are complete, landscape architects may spend time at the site observing or supervising construction.

site observing or supervising the construction. Those who work in large firms may spend considerably more time out of the office because of travel to sites outside the local area.

Salaried employees in both government and landscape architectural firms usually work regular hours; however, they may work overtime to meet a project deadline. Hours of self-employed landscape architects vary.

Employment

Landscape architects held about 22,000 jobs in 2000. About 1 out of 3 salaried workers were employed in firms that provide landscape architecture services. Architectural and engineering firms employed most of the rest. The Federal Government also employs these workers, primarily in the U.S. Departments of Agriculture, Defense, and Interior. About 1 of every 4 landscape architects were self-employed.

Employment of landscape architects is concentrated in urban and suburban areas throughout the country; some landscape architects work in rural areas, particularly those employed by the Federal Government who plan and design parks and recreation areas.

Training, Other Qualifications, and Advancement

A bachelor's or master's degree in landscape architecture usually is necessary for entry into the profession. The bachelor's degree in landscape architecture takes 4 or 5 years to complete. There are two types of accredited master's degree programs. The master's degree as a first professional degree is a 3-year program designed for students with an undergraduate degree in another discipline; this is the most common type. The master's degree as the second professional degree is a 2-year program for students who have a bachelor's degree in landscape architecture and wish to teach or specialize in some aspect of landscape architecture, such as regional planning or golf course design.

In 2000, 58 colleges and universities offered 75 undergraduate and graduate programs in landscape architecture that were accredited by the Landscape Architecture Accreditation Board of the American Society of Landscape Architects.

College courses required in this field usually include technical subjects such as surveying, landscape design and construction, landscape ecology, site design, and urban and regional planning. Other courses include history of landscape architecture, plant and soil science, geology, professional practice, and general management. Many

landscape architecture programs are adding courses that address environmental issues. In addition, most students at the undergraduate level take a year of prerequisite courses such as English, mathematics, and social and physical sciences. The design studio is an important aspect of many landscape architecture curriculums. Whenever possible, students are assigned real projects, providing them with valuable hands-on experience. While working on these projects, students become more proficient in the use of computer-aided design, geographic information systems, and video simulation.

In 2000, 46 States required landscape architects to be licensed or registered. Licensing is based on the Landscape Architect Registration Examination (L.A.R.E.), sponsored by the Council of Landscape Architectural Registration Boards and administered over a 3-day period. Admission to the exam usually requires a degree from an accredited school plus 1 to 4 years of work experience, although standards vary from State to State. Currently, 16 States require the passage of a State examination in addition to the L.A.R.E. to satisfy registration requirements. State examinations, which usually are 1 hour in length and completed at the end of the L.A.R.E., focus on laws, environmental regulations, plants, soils, climate, and any other characteristics unique to the State.

Because State requirements for licensure are not uniform, landscape architects may not find it easy to transfer their registration from one State to another. However, those who meet the national standards of graduating from an accredited program, serving 3 years of internship under the supervision of a registered landscape architect, and passing the L.A.R.E. can satisfy requirements in most States. Through this means, a landscape architect can obtain certification from the Council of Landscape Architectural Registration Boards, and so gain reciprocity (the right to work) in other States.

In the Federal Government, candidates for entry positions should have a bachelor's or master's degree in landscape architecture. The Federal Government does not require its landscape architects to be licensed.

Persons planning a career in landscape architecture should appreciate nature, enjoy working with their hands, and possess strong analytical skills. Creative vision and artistic talent also are desirable qualities. Good oral communication skills are essential; landscape architects must be able to convey their ideas to other professionals and clients and to make presentations before large groups. Strong writing skills also are valuable, as is knowledge of computer applications of all kinds, including word processing, desktop publishing, and spreadsheets. Landscape architects use these tools to develop presentations, proposals, reports, and land impact studies for clients, colleagues, and superiors. The ability to draft and design using CAD software is essential. Many employers recommend that prospective landscape architects complete at least one summer internship with a landscape architecture firm in order to gain an understanding of the day-to-day operations of a small business, including how to win clients, generate fees, and work within a budget.

In States where licensure is required, new hires may be called "apprentices" or "intern landscape architects" until they become licensed. Their duties vary depending on the type and size of the employing firm. They may do project research or prepare working drawings, construction documents, or base maps of the area to be landscaped. Some are allowed to participate in the actual design of a project. However, interns must perform all work under the supervision of a licensed landscape architect. Additionally, all drawings and specifications must be signed and sealed by the licensed landscape architect, who takes legal responsibility for the work. After gaining experience and becoming licensed, landscape architects usually can carry a design through all stages of development. After several years, they may become project managers, taking on the

responsibility for meeting schedules and budgets, in addition to overseeing the project design; and later, associates or partners, with a proprietary interest in the business.

Many landscape architects are self-employed because start-up costs, after an initial investment in CAD software, are relatively low. Self-discipline, business acumen, and good marketing skills are important qualities for those who choose to open their own business. Even with these qualities, however, some may struggle while building a client base.

Those with landscape architecture training also qualify for jobs closely related to landscape architecture, and may, after gaining some experience, become construction supervisors, land or environmental planners, or landscape consultants.

Job Outlook

Employment of landscape architects is expected to increase faster than the average for all occupations through the year 2010. Overall, several factors are expected to increase demand for landscape architectural services over the long run: Anticipated growth in residential, commercial, and heavy construction; continued emphasis on preservation and restoration of wetlands; and growth in landscape ecology, the use of techniques from landscape architecture to address environmental problems.

Implementation of the Transportation Equity Act for the Twenty-First Century is expected to spur employment for landscape architects, particularly in State and local governments. This Act, known as TEA-21, provides funds for surface transportation and transit programs, such as interstate highway maintenance and environment-friendly pedestrian and bicycle trails. Also, growth in construction of residential and commercial building is expected to contribute to demand for landscape architects. However, opportunities will vary from year to year, and by geographic region, depending on local economic conditions. During a recession, when real estate sales and construction slow down, landscape architects may face layoffs and greater competition for jobs. The need to replace landscape architects who retire or leave the labor force for other reasons is expected to produce nearly as many job openings as employment growth.

As the cost of land rises, the importance of good site planning and landscape design grows. Increasingly, new development is contingent upon compliance with environmental regulations and land use zoning, spurring demand for landscape architects to help plan sites and integrate man-made structures with the natural environment in the least disruptive way.

Budget tightening in the Federal Government might restrict hiring in the U.S. Forest Service and the National Park Service, agencies that traditionally employ the most landscape architects in the Federal Government. Instead, such agencies may increasingly contract out for landscape architecture services, providing additional employment opportunities in private landscape architecture firms.

In addition to the work related to new development and construction, landscape architects are expected to be involved in historic preservation, land reclamation, and refurbishment of existing sites. Because landscape architects can work on many different types of projects, they may have an easier time than other design professionals finding employment when traditional construction slows down.

New graduates can expect to face competition for jobs in the largest and most prestigious landscape architecture firms. The number of professional degrees awarded in landscape architecture has remained steady over the years, even during times of fluctuating demand due to economic conditions. Opportunities will be best for landscape architects who develop strong technical skills—such as computer design—and communication skills, as well as knowledge

of environmental codes and regulations. Those with additional training or experience in urban planning increase their opportunities for employment in landscape architecture firms that specialize in site planning as well as landscape design. Many employers prefer to hire entry-level landscape architects who have internship experience, which significantly reduces the amount of on-the-job training required.

Earnings

In 2000, median annual earnings for landscape architects were \$43,540. The middle 50 percent earned between \$32,990 and \$59,490. The lowest 10 percent earned less than \$26,300 and the highest 10 percent earned over \$74,100. Landscape and horticultural services employed more landscape architects than any other industry, and their median annual earnings were \$37,820 in 2000.

In 2001, the average annual salary for all landscape architects in the Federal Government in nonsupervisory, supervisory, and managerial positions was \$62,824.

Because many landscape architects work for small firms or are self-employed, benefits tend to be less generous than those provided to workers in large organizations.

Related Occupations

Landscape architects use their knowledge of design, construction, land-use planning, and environmental issues to develop a landscape project. Others whose work requires similar skills are architects, except landscape and naval; surveyors, cartographers, photogrammetrists, and surveying technicians; civil engineers; and urban and regional planners. Landscape architects also know how to grow and use plants in the landscape. Some conservation scientists and foresters and biological and medical scientists study plants in general and do related work, while environmental scientists and geoscientists work in the area of environmental remediation.

Sources of Additional Information

Additional information, including a list of colleges and universities offering accredited programs in landscape architecture, is available from:

► American Society of Landscape Architects, Career Information, 636 Eye St. NW., Washington, DC 20001. Internet: <http://www.asla.org>

General information on registration or licensing requirements is available from:

► Council of Landscape Architectural Registration Boards, 12700 Fair Lakes Circle, Suite 110, Fairfax, VA 22033. Internet: <http://www.clarb.org>

Surveyors, Cartographers, Photogrammetrists, and Surveying Technicians

(O*NET 17-1021.00, 17-1022.00, 17-3031.01, 17-3031.02)

Significant Points

- Four out of 5 are employed in engineering services and in government.
- Computer skills enhance employment opportunities.

Nature of the Work

Measuring and mapping the earth's surface are the responsibilities of several different types of workers. Traditional *land surveyors* establish official land, air space, and water boundaries. They write descriptions of land for deeds, leases, and other legal documents;

define air space for airports; and measure construction and mineral sites. Other surveyors provide data relevant to the shape, contour, location, elevation, or dimension of land or land features. *Cartographers* compile geographic, political, and cultural information and prepare maps of large areas. *Photogrammetrists* measure and analyze aerial photographs to prepare detailed maps and drawings. *Surveying technicians* assist land surveyors by operating survey instruments and collecting information in the field, and by performing computations and computer-aided drafting in offices. *Mapping technicians* calculate mapmaking information from field notes. They also draw topographical maps and verify their accuracy.

Land surveyors manage survey parties who measure distances, directions, and angles between points and elevations of points, lines, and contours on, above, and below the earth's surface. They plan the fieldwork, select known survey reference points, and determine the precise location of important features in the survey area. Surveyors research legal records, look for evidence of previous boundaries, and analyze the data to determine the location of boundary lines. They also record the results of the survey, verify the accuracy of data, and prepare plots, maps, and reports. Surveyors who establish boundaries must be licensed by the State in which they work, and are known as Professional Land Surveyors. Professional Land Surveyors are sometimes called to provide expert testimony in court cases concerning surveying matters.

A survey party gathers the information needed by the land surveyor. A typical survey party consists of a party chief and one or more surveying technicians and helpers. The party chief, who may be either a land surveyor or a senior surveying technician, leads day-to-day work activities. Surveying technicians assist the party chief by adjusting and operating surveying instruments, such as the theodolite (used to measure horizontal and vertical angles) and electronic distance-measuring equipment. Surveying technicians or assistants position and hold the vertical rods, or targets, that the theodolite operator sights on to measure angles, distances, or elevations. They also may hold measuring tapes, if electronic distance-measuring equipment is not used. Surveying technicians compile notes, make sketches, and enter the data obtained from surveying instruments into computers. Survey parties may include laborers or helpers who perform less-skilled duties, such as clearing brush from sight lines, driving stakes, or carrying equipment.

New technology is changing the nature of the work of surveyors and surveying technicians. For larger projects, surveyors are increasingly using the Global Positioning System (GPS), a satellite system that precisely locates points on the earth by using radio signals transmitted via satellites. To use this system, a surveyor places a satellite signal receiver—a small instrument mounted on a tripod—on a desired point. The receiver simultaneously collects information from several satellites to establish a precise position. The receiver also can be placed in a vehicle for tracing out road systems. Because receivers now come in different sizes and shapes and the cost of the receivers has fallen, much more surveying work is being done using GPS. Surveyors then must interpret and check the results produced by the new technology.

Cartographers measure, map, and chart the earth's surface, which involves everything from geographical research and data compilation to actual map production. They collect, analyze, and interpret both spatial data—such as latitude, longitude, elevation, and distance—and nonspatial data—such as population density, land use patterns, annual precipitation levels, and demographic characteristics. Cartographers prepare maps in either digital or graphic form, using information provided by geodetic surveys, aerial photographs, and satellite data. *Photogrammetrists* prepare detailed maps and drawings from aerial photographs, usually of areas that are inaccessible, difficult, or less cost-efficient to survey by other methods.