universal design
new york

The City of New York
Rudolph W. Giuliani, Mayor

Mayor's Office for People with Disabilities
Catherine Paradiso, Executive Director
Mayor's Office for People with Disabilities
The City of New York

The Mayor's Office for People with Disabilities (MOPD) was established in 1973 to assist implementation of City compliance with disability-related laws. MOPD serves as a liaison between the community and City government, as a resource to city agencies on matters related to the Americans with Disabilities Act and other legislation, and as an advocate by assisting the community when encountering problems with City services.

The Architecture unit advises The Department of Buildings on implementation of Building Code accessibility provisions (Local Law 58). This unit also assists private sector architects with design and accessibility issues.

MOPD operates Project Open House (POH), a minor home repair program for which people with disabilities can apply. Through outreach we provide disability related information to community groups, not-for-profits and city employees.

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Principle 1: Equitable Use
The building is usable by anyone. It does not disadvantage, stigmatize or privilege any group of users.

Principle 2: Flexibility in Use
The building accommodates not only a wide range of individual user preferences but also users' varying functional abilities.

Principle 3: Simple and Intuitive
How to use the building is easy to understand regardless of the user's experience, knowledge, language skills or concentration level.

Principle 4: Perceptible Information
The building communicates all necessary information effectively to all users regardless of ambient conditions or the users' varying intellectual or sensory abilities.

Principle 5: Tolerance for Error
The building minimizes hazards and adverse consequences of accidental or unintended actions by all users.

Principle 6: Low Physical Effort
Everyone can use the building efficiently, comfortably and with minimal fatigue.

Principle 7: Size and Space for Approach and Use
The building provides appropriate size and space for approach, reach, manipulation and use regardless of the users' body size, posture, or functional abilities.
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The City of New York
Rudolph W. Giuliani
Mayor

Rudy Washington, Deputy Mayor
Business and Community Development

Catherine Paradiso, Executive Director
Mayor's Office for People with Disabilities

Kenneth R. Holden, Commissioner
Department of Design and Construction

Frederic Bell, FAIA, Chief Executive Officer
New York Chapter of the American Institute of Architects
Dear Friends:

New York City has a long history of protecting the rights and enhancing the opportunities of the disabled. In fact, our Human Rights Law contains provisions for the disabled that go above and beyond the Americans with Disabilities Act. I am proud that our City is continuing its leadership role by becoming the first in the Nation to release a book to help architects, designers, urban planners, and developers make their structures equally accessible to all.

**Universal Design New York** was created by the Mayor’s Office for People with Disabilities and the Department of Design and Construction, in cooperation with the New York City Chapter of the American Institute of Architects. It describes the concept of universal design and illustrates many useful examples of this innovative design philosophy. This guide also addresses myths associated with the cost of this approach and provides a model for other municipalities to follow.

Universal design represents a further evolution toward the understanding that we must not view individuals with disabilities as separate and different, but as an inherent part of the extraordinary diversity that is, after all, what makes New York City the “Capital of the World.”

Sincerely,

Rudolph W. Giuliani
Mayor
Dear Friends:

The Mayor’s Office for People with Disabilities should be commended for developing a cogent and concise set of universal design guidelines. This book of design criteria draws upon specific examples to illustrate what works best in achieving universal design principles.

Going beyond the strictures of the Americans with Disabilities Act, the tenets of universal design address the manner in which attention to the differential needs of all people, over time, can lead to well-designed buildings that seamlessly integrate thoughtful solutions and appropriate materials.

The New York Chapter of the American Institute of Architects is dedicated to design excellence, professional development and public outreach. The City’s universal design guidelines combine these three goals in a well-written document which should be used by all architects and building owners as a reference and resource.

Yours truly,

Fredric Bell, FAIA
Executive Director
AIA New York Chapter


Preface

Universal design aspires to create products and environments that are usable by all of us. Not only can universal design help our own citizens but also the almost 40 million visitors who come here every year.

This book was developed to help the community of people who develop the City’s real estate and infrastructure learn about universal design. When implemented properly it removes many of the problems associated with trying to meet requirements of both the NYC building code and the Federal Americans with Disabilities Act. In fact, when designing from this paradigm, some regulations are met with ease. For example, a pedestrian pathway that is gradually sloped from the curb to the entrance eliminates the need for a ramp. Another example would be installing automatic doors instead of manual doors. Distributing and integrating accessible seats throughout a theater is yet another. These examples demonstrate how access and regulations come together to create a better environment for everyone when using universal design criteria.
This book contains many examples that make accessibility easier for the general population. When all aspects of designing in a space are universal, everything becomes easier for everyone. Children, people who have learning/ cognitive, vision or hearing impairments, people who use wheeled mobility devices, senior citizens, people of short stature, parents carrying children or packages – we all benefit from universal design.

**Universal Design New York** is intended for two audiences. Public agencies and environmental design and construction professionals hired by the City make up the first group. They can use it to design sidewalks, street crossings, parks, community centers, shelters, museums, and any of the many other types of buildings and facilities that the City builds. The second audience consists of developers and designers of privately constructed facilities in the City. These include hotels, office buildings, restaurants and theaters, to name just a few. Any designer can apply the principles of universal design to any project.

By issuing this book we hope to accomplish three basic goals:

- Raise awareness about the value of universal design.
- Provide practical examples of how universal design can be implemented.
- Encourage the adoption of universal design.

Information in this book demonstrates how demographic trends will increase demand for universal design. Looking to get ahead of that trend, the Mayor’s Office for People with Disabilities (MOPD) and the Department of Design and Construction (DDC) believe that now is the time to implement universal design practices. Many of the
products the City buys and virtually all of the buildings the City builds
today are going to be here for a long time. We should be planning
today for the time when the need for universal design will be obvious
to all.

We ask that the managers and designers in City agencies read this
guidebook carefully and adopt the universal design approach in
addition to meeting the requirements of life safety and accessibility
codes and other related rules and regulations. We believe that you
will find the ideas in this book to be practical and highly beneficial.
We also ask that you communicate your experience with the ideas
presented in this guidebook to the MOPD and DDC so that we can
identify new issues that need to be addressed and new ideas we can
incorporate in the future. Our hope is that all will see the value of this
effort and treat the guidebook as a living document that can help
advance the cause of good design in the City for many years to
come.

Catherine Paradiso, Executive Director
Mayor’s Office for People with Disabilities

Kenneth R. Holden, Commissioner
Department of Design and Construction
Acknowledgments

The Mayor’s Office thanks the research and professional staff of the Center for Inclusive Design and Environmental Access (IDEA), School of Architecture and Planning at the University at Buffalo, The State University of New York, for their contributions to this book. In particular, we thank Gary Scott Danford and Beth Tauke, the editors of this book, and Edward Steinfeld, IDEA Center Director.

Special thanks to:

Charles Cellura, R.A., First Assistant Commissioner, Department of Design and Construction

Jack Lamb, Esq., Deputy Director and General Counsel, Mayor’s Office for People with Disabilities

Robert Piccolo, R.A.

Shelly Goldstone-Cohen, R.A., former Administrative Architect, Mayor’s Office for People with Disabilities, for her 12 years of service and contributions to this book and to this office.

Thank you all for the unwavering commitment to this project, to the community and to universal design.

Catherine Paradiso, Executive Director
Mayor’s Office for People with Disabilities
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1 Introduction

Universal Design Defined

Universal design is an approach to the development of “products and environments that can be used effectively by all people, to the greatest extent possible, without the need for adaptation or specialized design” (North Carolina State University, 1997). It is an inclusive process aimed at enabling all of us to experience the full benefits of the products and environments around us regardless of our ages, sizes or abilities.

By designing for a diverse population, universal designers integrate usability by everyone into their work on a routine basis. This approach leads to greater inclusion for many groups often neglected in the design process (e.g., children, the elderly, people of small stature, frail people, etc.).

Universal design equalizes the ways people use products and services. For example, the stairless bus has a low floor section so that anyone can enter the bus from a pedestrian pathway using a short ramp that is extended to the pavement. This design makes entering the bus easier for everyone. This bus also has a system that verbally

Figure 1.1. The stairless bus reduces stigma associated with requiring special accommodation and ensures social integration by enabling everyone to enter and exit the bus by the same means.

The Tribecca Bridge is an example of the practical application of the principles of universal design. The incorporation of an elevator into the bridge’s design ensures its usability by all pedestrians.

announces the next stop and displays it on an electronic message board at the same time, ensuring communication of essential information to all riders.

Is universal design a utopian dream? Is it really possible? How can every graphic, product, place or system be usable by everyone? Universal design does not claim to accommodate everyone in every circumstance. Rather, it continuously moves toward this goal of universal usability. Consequently, a more appropriate term may be universal designing, a verb rather than a noun.

Universal design acknowledges that both consumers and producers have to live with cost constraints. As a result, cost can make a difference in its successful introduction into the marketplace. Consider the case of the Oxo line of kitchen utensils, one of the most successful examples of universal design in terms of market penetration. The original set of products Oxo introduced was competitive with other utensils because the cost of production was controlled by using inexpensive plastic for most parts and designing all the utensils with an identical handle and interface. Oxo utensils have thick, resilient and non-slip handles that improve grasping.

Once Oxo was successful in introducing the innovation of larger, more comfortable handles for small utensils, they started to diversify their line to address other issues. By doing so, they started a trend in the industry. Several other companies are now producing competing products with larger handles, including those that target the higher end of the market.

Myths About Universal Design

There are many demographic trends that are fueling the demand and need for universal design. There are other important issues, like
the difference between universal design and conventional ergonomic design, as well as cost implications that are not well understood. In this section, we address the many myths associated with universal design so that the value of this new design approach is clear.

**Myth #1: There are only a small number of people who can benefit from universal design; thus we should not let their needs dictate.**

There are many ways to define ability. By most criteria, over 10% of the population has some limitation in ability. Using the broadest category of functional limitations of any kind as a basis, (e.g., traveling three city blocks or hearing typical conversation), more than 50% of the U.S. population could be characterized as having diminished abilities. Thus, there is a sizable niche market for universal design according to the most conservative estimates, and a considerable general market by the most liberal. Throughout our lives, we all experience variations in our abilities. If we take this lifespan perspective, universal design eventually benefits all of us - hardly a small number.

**Myth #2: Universal design only helps people with disabilities and older people.**

Universal design extends the benefits of good functional design to many groups of people who are not necessarily classified as having a disability, but who regularly encounter functional obstacles. Consider the problems encountered by short people, tall people, large people, frail people, pregnant women, left-side dominant individuals, children, etc. In addition, consider those carrying packages, parents with children in strollers, those who are ill or fatigued and those with orientation difficulties. Visitors in an unfamiliar city or building also benefit from universal design because they might not know how to find things or how to operate its products.
Figure 1.6. Universal design fosters social participation by the widest possible group of users.

Universal design fosters social participation by the widest possible group of users. (It is worth noting here that New York City has nearly 40 million visitors every year.) Universal design, in short, benefits everyone every day by helping us all overcome obstacles routinely encountered in our daily lives.

Myth #3: The Americans with Disabilities Act (ADA) and other disability rights laws have created equality, so there is no need to do any more.

The ADA ensures that certain protected groups with disabilities can use most of the designed environment. This is hardly equivalent to universal design. Universal design is not just about physical function. Understanding signs, finding one’s way, learning how to operate products and understanding alarms and warnings are all mental, not physical, tasks. The usability of products, places and systems depends as much on the way our minds work as they do on how our bodies work. Because of this, in universal designing we have to give consideration to differences in the way people think and interpret things.

Figure 1.7. As we get older, the likelihood of developing impairments increases dramatically – making us all likely beneficiaries of good universal design. (Source: 1992 Health Interview Survey, U.S. Census.)

![Functional limitation rate by age and gender](chart.png)

The chart illustrates the functional limitation rate by age and gender. The y-axis represents the percent with activity limitation, ranging from 0 to 50%. The x-axis represents age groups, starting from 0-4 years old and ending with 85+ years old.
Myth #4: Improved medical technology is reducing the incidence of functional limitations, thus the need for universal design is short lived.

Contrary to this belief, since the 1970s the incidence of reduced ability in the U.S. has been increasing. Much of this increase has been accounted for by the aging of the population. The relationship between age and certain abilities is a major reason why universal design should be of interest to everyone. While statistics on functional limitations might not include us when we are young, there is a very good chance they will when we get older. Even though older people are living longer in better health, they are living with some lessened abilities. The rate of activity limitation is 38.8% for the population 65 years or over and it rises to 56.6% for those 85 or over. While rates for men are generally higher than women, by the last years of the lifespan women are more likely to experience activity limitations than men.

Over the next 20 years, the older population will increase by more than 50%. This in itself would be enough to fuel a greater demand
for universal design, but there is more. The geographic distribution of older people varies significantly. New York State has one of the oldest populations. The 2000 Census reported that 12.8% of the population in the state was over 65. In New York City, 11.7% of the population was over 65 and 6.1% was over 75.

Perhaps the most important trend in aging affecting the demand for universal design, however, is the aging of the Baby Boom generation, the first of whom are now in their 50s. In New York City, the 2000 Census reported that 20.2% of the entire city population was over 55 — already a huge number — yet the first group of true Baby Boomers was born in 1946, so they are just turning 55. The bulge in the population curve caused by the large numbers of Boomers will slowly work its way toward old age. And as it does so, the need for universal design will increase steadily.

**Myth #5: Universal design cannot sustain itself in the marketplace because people who need it most cannot afford it.**

The older population alone has the resources to sustain a universal design industry. Although there are significant differences across groups, overall, older households have substantially more assets than younger households. Furthermore, the next generation is expected to have higher and more disposable incomes during old age than the current generation (Sabelhaus and Manchester, 1995). The Boomer generation also spends a lot more. So the combination of higher incomes, large numbers and higher consumption patterns means that this age group will have a big impact in driving the consumer economy and, consequently, increasing the demand for universal design. In addition, we often forget that there are two marketplaces for universal design, the free market and the public sector. Despite the rosy forecasts about the increasing affluence of this group, there are many people today with low annual incomes. Low-income Sabelhaus, J and Manchester, J (1995). Baby boomers and their parents: how does their economic well-being compare in middle-age? *Journal of Human Resources, 7*, Fall.
people depend more on public services and not-for-profit organizations to meet their security, health care, housing and recreation needs. Thus, while we can expect aging Baby Boomers to have a big impact in the free market economy, the lower income population will play an important role in driving the direction of government services and those of not-for-profit organizations. The more support this group has in getting access to services, the more independent they can be in daily life and the lower the burden of service delivery (and consequent liability) will be for public and private service organizations.

**Figure 1.10.** The idea that older people are not consumers is a myth.

![Bar graph showing household incomes in late middle age and old age](Image)

**Myth #6: Universal design is simply good ergonomic design.**

This is one myth that may be partially true. The field of human factors and ergonomics has developed principles to improve the design of products, places and systems to make them safer and easier to use. Accommodating variation in abilities is an important principle in ergonomic design. However, the traditional attitude in this field has been that design cannot satisfy the needs of everyone without too great a cost and effort. Until recently, advocates of ergonomic...

**Figure 1.11.** In terms of percentage, relatively few people 55 and over are low-income. And those on the leading age of the Baby Boom generation often have substantial income and are inclined to spend it. (Source: U.S. Census, 1999.)
design typically focused on the large majority in the middle of the population curve. In contrast, universal design demonstrates that with creativity and appropriate use of new technologies, those who are not in the majority can also be included. So, human factors and ergonomics experts are now starting to adopt universal design as a good ergonomic approach. Good ergonomic design, in other words, means adopting ways to design products, places and systems that can accommodate all of us.

Myth #7: Universal design costs even more than accessible design.

Universal design goes beyond the codes to include improved functional design that can save money over the life of the building by lowering the cost of renovation. If buildings were usable by everyone from the start, then fewer renovations would be necessary in the future and those renovations that were required would be less expensive. Accessibility codes and laws are not static. New technology and knowledge about the barriers that people with functional limitations encounter in buildings and facilities generate new initiatives over time.
Unlike accessibility code compliance, universal design is flexible; there are no legal mandates. Moreover, many universal design features cost nothing, some save money and some increase income. For example, designing a main entry with level access and no change in level inside the vestibule eliminates stairs and a ramp. Selecting door handles that are easier to use does not require any additional expense. A universally designed signage system does not have to cost any more. These features provide an excellent value. Other features may have marginal additional costs but they also may have a value that exceeds their expense. For example, an automated door in a hotel can increase the comfort and satisfaction of guests and also reduce damage to door frames, staff effort, the potential for work-related injuries and congestion at the entry during bad weather. In such applications, universal design makes good economic sense.

The ADA, Building Codes and Universal Design

As noted above, compliance with accessibility regulations is not the same thing as universal design. And yet, the ADA and local regulations (e.g., the New York City Building Code) do play a role in universal designing. In fact, anti-discrimination laws like the ADA embody the intent of universal design (i.e., eliminating discrimination in obtaining goods and services and in social participation caused by the physical environment). Thus, practicing universal design does not mean that one should ignore the requirements of the ADA regulations or local building codes – far from it. Universal designing means taking a broader look. We need to recognize that the provisions of accessibility regulations are the minimum requirements for ensuring access – and then for only a protected segment of the population. Universal design also addresses the needs of that segment – plus everyone else as well.
On the other hand, understanding the principles of universal design and knowing how to implement them should reduce problems with meeting regulations. These should automatically be fulfilled through good universal design. For example, reconsider the automated door. While neither the ADA nor the City Building Code require automated doors at building entrances, such a door is more usable for everyone who comes to the building—employees, visitors, senior citizens and children alike. As part of universal design, it is important that automated doors be usable and safe for everyone. This includes employing safety features to prevent the door from closing when someone is in the operating area and to make the door detectable by all users.

If implemented properly, universal design should reduce problems meeting ADA and City Building Code requirements.

Knowing how to accomplish these objectives is part of universal designing. Although the design criteria used to achieve universal design may be different, it is important to ensure that they also meet the ADA and City Building Code. A universal design should exceed those requirements in all respects.

**Toward the Universal City**

The ultimate purpose of this book is to move further toward the creation of the universal city. What kind of place would this be? Here is a list of features that the universal city should have:

- Pathways, street crossings, and plazas would be free of hazards and barriers to the flow of movement. Where there are unavoidable natural obstacles like steep hills, convenient alternative means of access would be provided.

- All people, citizens and visitors alike, would have access to the information they need in the form they require to find their way through the city.
Introduction

• The city would be planned to provide opportunities for employment, childcare, education and recreation in close proximity to residential areas.

• Public buildings would accommodate the diverse needs of the population in a cost-effective yet dignified and pleasant manner. Goods and services in these buildings would be easy to find and access.

• Obtaining employment and being productive would not be constrained by physical barriers. This would contribute to improving economic development and the standard of living of the population.

• Tourists would want to visit the city because of its convenience, ease of use and pleasant atmosphere. And they would return for the same reasons.

• Older people would want to remain in the city after retirement because it provided a more convenient, safe and secure environment than other places they could live.

Table 1.17. New York City is host to nearly 40 million visitors each year. (Source: NYC Press Office, Release #466-00, December 18, 2000).

**2001 Outlook for Travel to New York City**

<table>
<thead>
<tr>
<th></th>
<th>2001 Volume</th>
<th>% Change</th>
<th>2000 Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Visitors</td>
<td>39.4 million</td>
<td>+3%</td>
<td>38.4 million</td>
</tr>
<tr>
<td>Visitor Spending</td>
<td>$17.1 billion</td>
<td>+3%</td>
<td>$16.7 billion</td>
</tr>
<tr>
<td>International Visitors</td>
<td>7.2 million</td>
<td>+4%</td>
<td>6.9 million</td>
</tr>
<tr>
<td>Europe</td>
<td>3.5 million</td>
<td>+5%</td>
<td>3.4 million</td>
</tr>
<tr>
<td>Asia</td>
<td>1.0 million</td>
<td>+7%</td>
<td>.95 million</td>
</tr>
<tr>
<td>South America</td>
<td>.63 million</td>
<td>+3%</td>
<td>.61 million</td>
</tr>
<tr>
<td>Domestic Visitors</td>
<td>32.2 million</td>
<td>+2%</td>
<td>31.5 million</td>
</tr>
<tr>
<td>Overnight Visitors</td>
<td>20.0 million</td>
<td>+3%</td>
<td>19.4 million</td>
</tr>
<tr>
<td>Daytrippers</td>
<td>19.4 million</td>
<td>+2%</td>
<td>19.0 million</td>
</tr>
</tbody>
</table>

Figure 1.18. This inclined moving pathway is an interesting alternative to escalators that is easier and safer for everyone to use.
Sound impossible? It is not if policy makers, planners, designers, and builders keep these features in mind in their design processes. A city that rethinks itself in light of the social and demographic trends behind the demand for universal design will be better positioned to become a desirable place for all of us to work, live and visit in the future.

The Scope of Universal Design

Universal design should address five general building issues:

- Using circulation systems
- Entering and exiting
- Wayfinding
- Obtaining products and services
- Using public amenities

The accessibility and safety of public circulation in the built environment is critical for ensuring access throughout the city. Without this, individuals are subject to unnecessary risk, expense or inconvenience.

The first step in making buildings and facilities accessible is entering and exiting. The rest of a building’s features do not matter to the person who cannot get in or out the door.

To use the city effectively, we need information about where we are (orientation) and how to get where we want to go (wayfinding). This information is provided by many means: landmarks, signs and information services.

Buildings and facilities need to be designed so that their resources are accessible and usable by all inhabitants and visitors. In some
types of buildings, this means making goods on display accessible to everyone.

The use of buildings includes the use of public amenities in conjunction with the main activities of the facility. Access to restrooms, drinking fountains, public telephones and information displays is a necessity, not a luxury.

Beyond the general issues, buildings of specific occupancy types have their own unique considerations.

In this book we have focused on six occupancy types:

- Cultural facilities
- Public assembly and entertainment facilities
- Participant sports and recreation facilities
- Temporary lodging
- Workplace facilities
- Human service facilities

New York City is rich in cultural facilities. Its many museums, galleries, zoological gardens, etc., are there to enhance the lives of all visitors.

Citizens and visitors alike routinely flock to the City’s numerous public assembly and entertainment venues. Whether it is a music hall, a Broadway theatre or a major league baseball park, all the people should be able to find enjoyment and entertainment in these often world-renowned facilities.

In general, people enjoy participating in sports and recreation events. Children’s playgrounds, recreation centers, jogging and bicycle paths, outdoor basketball courts, and playing fields are
but a few examples of participant sports and recreation facilities that all New Yorkers and their guests love to frequent.

Hotels/motels and shelters are two forms of temporary lodging that are particularly important to life in large urban centers. New York City's many fine hotels/motels are there to ensure that all its visitors and guests are welcome. Its public and private shelters provide the safety net that reflects the City's concern for the welfare of all its citizens.

Workplace facilities – whether offices or factories, retail stores or assembly lines – are the economic lifeblood of New York. Ensuring all its citizens the ability to access and use such facilities keeps the City's vital signs strong.

Human service facilities such as community centers, child-care centers, senior centers, etc., are places where all people come to participate in programs that enrich their lives. Other human service facilities (e.g., police stations) are places that all people turn to for safety and security.

The guidebook's section on “Elements of the Universal City” illustrates ways that universal design can ensure that these general building issues and specific building types are available to everyone.

Although not covered in this book, transportation systems are also a critical feature of the universal city. Public transit should effectively transport riders throughout the city seamlessly. Options would be available to accommodate the needs of all citizens throughout their lifespans.
2 Using Universal Design Guidelines

This guidebook purposely avoids recommending prescriptive design standards for the universal design of buildings. Instead, it provides general guidelines designed to broaden and enhance the usability of buildings for everyone.

This guidebook’s visual illustrations of successful applications of certain universal design guidelines are not meant to be copied or imitated. Rather, they are provided to promote a general understanding of the concept – i.e., to stimulate extension of the principles to other building applications.

Audience for this Guidebook

Universal design guidelines can be applied to the planning, design and management of all buildings – private as well as public. This guidebook, however, is targeted primarily at three groups with whom the city’s various departments routinely contract for services pertaining to public buildings: (1) professional designers, (2) building owners and developers and (3) general contractors and construction managers. It is intended to demonstrate how each of these audiences can use the guidelines to further both the city’s and their own professional interests.
Professional Designers

Universal design is a rapidly expanding area of practice in all the design professions. The growing need to design buildings that are usable by everyone regardless of their intellectual, functional or sensory abilities is a demographic fact of life. This guidebook introduces professional designers to principles of universal design that will enable them to rise to the challenges posed by that demographic.

Moreover, universal design contributes to the socially and ethically responsible design of buildings. It promotes replacement of our current discriminatory exclusive designs with new affirming inclusive designs that are usable by all of us. And it does this without burdening the professional designer with prescriptive standards that stifle design innovation. The benefits of universal design are best achieved by reinforcing design innovation rather than design imitation, or worse, design duplication.

Building Owners and Developers

Universal design provides building owners and developers with ways to maximize their buildings’ responsiveness to an increasingly diverse marketplace. Buildings that are not usable by everyone grow more marginalized with each passing day and, consequently, tend to lose their relative value. Through these Guidelines, building owners and developers should be able to discover that universal design has become a cost-effective strategy for maintaining or even enhancing the profitability of their building inventories.

Building construction, renovation and maintenance costs are more readily justified when all people benefit. A primary benefit of universal design is that it enhances the usability of buildings for everyone. Consequently, building owners and managers who embrace the principles of universal design are less likely to see their decision-making during construction, renovation and maintenance
projects become the targets of “penny wise and pound foolish” criticisms following their completion.

**General Contractors and Construction Managers**

This guidebook illustrates practical universal design solutions in many contexts. They can help contractors and construction managers keep the intent of universal design in mind as they respond to conditions encountered during construction.

More importantly, the examples and guidelines provide a broad understanding of how application of the principles of universal design at a construction site can ensure the realization of a building that is truly usable by everyone – and, typically, at a cost that is competitive with conventional design and construction methods.

**Evaluation and Improvement Over Time**

Universal design is a continuous process of innovation targeted at improving buildings’ usability for everyone regardless of their intellectual, functional and sensory abilities. And as with any design, improvement upon the status quo is always possible. But with universal design, the motivation to continually enhance the usability of a building is ever present.

A universally designed building is as much about becoming universally usable as it is about being universally usable.

It is through post-occupancy evaluations of buildings that universal design principles are most readily tested and documented. Through such evaluations, even our best current examples of universal design in buildings will, over time, be challenged and replaced by better examples.

Whether through construction, renovation or maintenance projects, buildings designed to reflect the principles of universal design are...
part of a continuous process of innovation. This process is targeted at improving usability of buildings and cities over time.
3 Principles of Universal Design

Purposes and History

Accessible design is primarily about court-enforced compliance with regulations. The regulations are intended to eliminate certain physical barriers that limit the usability of environments for people with disabilities. Historically, accessible design has focused on compliance with state or local building codes. These typically were based on the American National Standards Institute’s requirements. With the passage of the Americans with Disabilities Act (ADA) in 1990 and the subsequent development of the ADA Accessibility Guidelines, accessible design has focused more recently on satisfying these minimum technical criteria to allow most people with disabilities to use most of the designed environment (Salmen, 1996).

Universal design is a market-driven process intended to create environments that are usable by all people. While considerations for people with disabilities are certainly necessary for universal design, they are not sufficient when planning and designing for the whole population. Accommodating the needs and wishes of

everyone - e.g., children, the elderly, women and men - is also necessary for universal design (Norwegian State Council on Disability, 1997).

Acknowledging this greater inclusiveness, in the mid-1990s the Center for Universal Design in Raleigh, NC asked ten leading advocates to identify the underlying performance requirements of universal design. The resulting Principles of Universal Design (Connell, et al, 1997; North Carolina State University, 1997), developed through funding provided by the U.S. Department of Education's National Institute on Disability and Rehabilitation Research (NIDRR), has since become the internationally referenced definition.

Explaining and Illustrating the Principles

These seven principles are not without their critics. Some consider them vague and difficult to understand. Others argue that they are more applicable to product and graphic design than building design. And yet, as evidenced by their growing international acknowledgment, these principles continue to maintain their status as the definitive statement of what constitutes universal design. This guidebook also acknowledges the seven Principles of Universal Design by explaining and illustrating their applicability to the universal design of the built environment.
On the following pages, each of the seven principles is explained and associated with a simple pictogram. When guidelines are listed in subsequent sections of this guidebook, the principles most relevant to each guideline are acknowledged through use of these pictograms. The front and back covers of this guidebook include flipout pages listing the seven principles and their associated pictograms that can be kept open for quick reference while reviewing the guidelines.

**Principle 1: Equitable Use**

The building’s design should make it equally usable by everyone. Ideally, the means by which people use the building should be the same (e.g., providing one means of entry to the building that works well for everyone). If it cannot be identical, the several means provided must be equivalent in terms of their privacy, security, safety and convenience. The building must never employ means that isolate or stigmatize any group of users or privilege one group over another.

*Figure 3.1.* People who require an accessible entrance should not be exiled to a remote delivery area such as the one shown here.
Figure 3.2. A toilet seat that is height-adjustable can be used by people of all sizes and ages.

**Principle 2: Flexibility in Use**

The building’s design should allow people to use its design features in more than one prescribed way (e.g., providing a countertop orientation map that is viewable from either a seated or standing position). It should accommodate both right- and left-handed use and be adaptable to the individual user’s pace. The building’s design should have the built-in flexibility to be usable even when it is employed in an unconventional or unanticipated manner.

Figure 3.3. The absence of detectable information makes these elevator call buttons difficult for first time users with reduced vision to recognize.

**Principle 3: Simple and Intuitive**

The building should make it easy for everyone to understand the purpose of each design feature and how to use it (e.g., providing washroom lavatory faucets that make their method of operation readily apparent and relatively easy). Moreover, its means of use should be intuitively obvious so that it operates as anticipated and, therefore, can be used spontaneously.
**Principle 4: Perceptible Information**

The building should provide all essential information in a variety of modes (e.g., written, symbolic, tactile, verbal) to ensure effective communication with all users regardless of their sensory abilities. The information provided must be presented with sufficient contrast to surrounding conditions so that it is distinguishable from its context and decipherable in all its various modes of presentation.

*Figure 3.4.* This high-contrast directional signage uses both text and pictograms to communicate to a wide group of users.

**Principle 5: Tolerance for Error**

Ideally, the building’s design should eliminate, isolate or shield any design features that could prove hazardous to or inconvenience any user. When potentially dangerous conditions are unavoidable, users should receive warnings as they approach the design feature (e.g., providing proximity warnings in a variety of sensory modes near the top of stairs.) The building’s design should also anticipate accidental or unintended actions by any user to minimize the inconvenience and/or protect the user from harm.

*Figure 3.5.* The boardwalk has raised edges to prevent users from accidently leaving the path of travel.
Principle 6: Low Physical Effort

The building’s design should employ design features that require little or no physical force to use them (e.g., replacing a traditional door knob with a lever handle that does not require the ability to grasp and turn the wrist). If a low level of force is required, any user should be able to engage the feature without assuming an awkward or hazardous body position (e.g., providing a smooth travel surface with minimal slope along the path of travel leading to the entrance).

Figure 3.6. This lavatory has up and down controls that allow each user to adjust its height.

Principle 7: Size and Space for Approach and Use

A building’s design features should provide an adequate amount of space that is appropriately arranged to enable anyone to use them (e.g., providing knee space under a washroom lavatory to enable use by someone in a seated position). In addition, the space needs to be arranged to provide a clear path of travel to and from important design features for all users.

Figure 3.7. The height of the concession stand counter permits convenient use by customers of varying heights.
4 Elements of the Universal City

For the City of New York to become a universal city, its facilities must first acknowledge the varying needs and abilities of their diverse users so that all of its venues will be available to everyone. A universal city is, by definition, a city of inclusion where everyone is welcome to participate and contribute. Whether addressing a general building issue (e.g., circulation) or a specific building type (e.g., sports facilities), universal design is a process by which inclusion is ensured for all.
4.1 General Building and Facility Issues

There are five general building issues that users of most facilities commonly encounter: (1) using circulation systems, (2) entering and exiting, (3) wayfinding, (4) obtaining products and services, and (5) using public amenities. Buildings that facilitate these activities for the widest possible population are more usable by everyone.
4.1a  Using Circulation Systems

Moving around outdoors and inside buildings is the quintessential activity of urban life. Accessibility of resources, in its broadest sense, and the mobility required for that access is what cities are all about.

Exterior Path Planning and Design

The layout of path systems should establish a pattern that is safe and accommodates the needs of people on the site and in buildings. Planning should give consideration to the needs and preferences of people who move at different paces and may have varying abilities. Travel surfaces and dimensions should support comfortable and easy movement without hazards or barriers, except in locations where challenge is part of a recreational experience. People should not encounter unexpected obstacles on a path.

Guidelines:

- Provide easy and direct access to all facilities.
- Provide accessible pathways for the full range of path types on a site. Where there are both primary and secondary pathways, for example, each should be accessible.

Figure 4.1a.1. The accessible pedestrian pathway on this bridge widens in the middle of the span to provide a place for people to pause without impeding the movement of others.
Locate seating and rest stops near but out of the flow of pedestrian traffic.

Separate pedestrian, vehicular and bicycle/skating pathways. When adjacent to one another, clearly mark the boundaries between each.

Avoid steps and curbs in pedestrian and bicycle circulation areas. Even one step can be a hazard and a barrier.

Edges of pathways should be clearly marked (e.g., textured borders).

Surfaces should be smooth, firm, continuous and non-slip (e.g., broom finished concrete provides traction underfoot).

Avoid pavement surfaces that reflect a lot of light.

Eliminate obstructions and hazards that intrude into the path of travel (e.g., drainage grates, signs, overhanging trees, manholes, light fixtures or benches).

Avoid irregular textures, ridges, rough or uneven traveling surfaces (e.g., wide pavement joints or protruding joints).

All pedestrian pathways should be wide enough for two people, whether standing or sitting, to pass each other while traveling in opposite directions. A cross slope of 2% is recommended.

Major access routes should not exceed a 5% slope. Any steeper segments should be designed as ramps.

Where steep grade, difficult surfaces or obstacles exist on challenging recreation trails, provide information for the user who is not familiar with the trail.

As an alternative to shorter direct routes with steep grades, indirect access routes that are relatively level (i.e., less than a 5% slope) should be available to users who are easily fatigued.

Figure 4.1a.2. The balls clearly demarcate the boundary between vehicles and pedestrians but could also pose a trip hazard.

Figure 4.1a.3. In this historic district, advocates convinced the city to install smooth pavement in the middle of sidewalks so that anyone could navigate through the area.

Figure 4.1a.4. This “Rambla” in Barcelona has a wide paved and planted area between roadways for use by all pedestrians.
All potentially hazardous stairs, ramps and transitions should be clearly marked with differences in color, texture or material to alert users.

**Street Crossings**

Street crossings provide continuity in the accessible path of travel.

**Guidelines:**

- Curb cuts and ramps should direct pedestrians into safe crossing areas.
- Reduce pedestrian crossing distance on major crossing routes through extensions or “bump-outs” at the corner or safe islands between center lanes. This reduces exposure time to traffic, provides a safe place to wait and helps to minimize hazards.
- Locate storm drains outside marked crossings.
- Crossings should be clearly marked with borders, color and/or texture.
- Pedestrian crossing signals should provide enough time for slower moving people to cross. These signals should be clearly detectable by motorists.
- Provide visual and auditory crossing signals at all busy crossings. Lower pitched signals are easier to hear than high-pitched.
- Provide higher illumination levels at all crossings. Lighting should highlight pedestrians. Approximately 70% of accidents at crossings occur at night due to poor lighting.
- In areas where there are particularly high levels of pedestrian and vehicular traffic, consider using pedestrian barriers to control crossing locations.

Figure 4.1a.5. A bollard and chain system was installed to separate pedestrian and vehicular traffic. This feature is a useful shoreline for travelers with reduced vision who use canes.

Figure 4.1a.6. There is an “extension” at the corner to reduce the crossing distance. The curb ramp extends completely around the corner for easy use by everyone.
Curb Ramps (Curb Cuts)

Curb ramps should provide a smooth transition in level changes within the pedestrian environment and be designed and located to reduce hazards.

Guidelines:

- Extend curb ramps across the entire crossing area where this is safe and feasible.
- Provide changes in pavement treatment including color and/or texture to help all users identify the beginning of the curb ramp.
- Where curb ramps must be kept to minimum size, they should be offset to the side of the crossing with a detectable edge.
- Avoid lips at the bottom of ramps to ensure that the curb cuts blend easily with the road surface.
- Provide either shallow sloped side flares or means to prevent pedestrians who are not crossing from traveling across the ramp.
- Add texture to ramp slopes to prevent slipping and falls in rainy or snowy weather.

Ramps and Stairs

It is important to ensure that ramps, stairs, steps and handrails are designed and constructed so that all pedestrians can use them safely.

Guidelines:

- Provide ramps and stairs at grade changes. Where ramps are short and the slope is less than 6.5%, the ramp alone is sufficient.
- Ramps should be wide enough to accommodate the expected
pedestrian flow. This may be greater than the minimum required for wheelchair use.

Design ramps for all to use rather than as special accommodations for wheelchair users.

If ramps are long, provide level resting platforms periodically.

Provide no more than ten risers on stairways between landings.

Use non-slip and non-glare surfaces and edges.

Avoid winders and single, double and curved steps. These features are hazardous to everyone.

Treads should be wide enough (11-14 inches not including nosing) to allow the foot of the person descending the stairs to fall inside the nosing edge to lessen the risk of slipping.

Provide continuous railings that are easy to grip along all stairs and ramps.

Provide handrail extensions at the top and bottom of stairs and ramps to help people identify the change in grade and make the necessary adjustments in gait.

Handrail extensions should be turned down or returned to the wall for protection.

Wall surfaces adjacent to handrails should be non-abrasive.

Provide multi-sensory indicators to identify the beginning and end of a set of stairs, a change in direction, or the location of facilities.

Ramps and stairs should be marked and lighted evenly throughout their length.

Illuminate travel surfaces with low lighting to reduce shadows.

Mark and secure the underside of freestanding stairs to prevent users from inadvertently moving underneath.

Figure 4.1a.9. This main circulation link was built as a ramp rather than stairs to ensure its usability by all people.

Figure 4.1a.10. This ramp and stairway makes effective use of space not only to exhibit art but also to provide a seating area.
Hallways and Corridors

Indoor circulation should be convenient, safe and comfortable.

Guidelines:

- Keep all stairways and ramps out of the direct path of travel. Locate them to the side or perpendicular to the travel path.
- Avoid side or overhead objects (e.g., signs, fire extinguishers, drinking fountains, etc.) that protrude into the circulation space.
- All floor surfaces should be non-slip.
- Avoid carpet and underlayment that could pose a tripping hazard or impede travel for people using wheeled mobility devices.
- Evenly illuminate all hallways and corridors. Where light levels change, provide a smooth transition from dark to light to accommodate the adaptation of the eyes.
- Hallways and corridors should be wide enough for two people, whether standing or sitting, to pass each other while traveling in opposite directions.

Mechanical Circulation Systems

Mechanical devices are used extensively in multi-story buildings. Although accessibility codes have requirements for elevator design, they do not cover escalators or moving pedestrian pathways, nor do they specify the best approaches to elevator design.

Guidelines:

- In large buildings, provide escalators from the main entries to key attractions to reduce congestion. Escalators cannot be used in place of elevators.
- Provide detectable floor surface changes at approaches to
Escalators and moving pedestrian pathways or keep them out of the direct path of travel.

Moving pedestrian pathways should be wide enough and safe for use by all people whether standing or sitting.

Elevator panels should have high contrast signs and labels and be well lighted.

Elevator cabs should have enough room to allow all users, whether standing or sitting, to enter, turn around and exit.

Both verbal and visual announcements of floor levels are recommended. Verbal announcements of floor levels are more effective than a bell or buzzer sound as notification that the elevator has passed a floor.

Plan mechanical circulation systems so that the people who use them are not inconvenienced or unduly separated from the main pattern of building use.

Escape and Refuge

In the event of an emergency, all users should be provided routes of escape or safe places to wait for rescue.

Guidelines:

- Provide two means of stairless egress when the topography makes it feasible to have entries at different grade levels.

- Plan at least one approved place of refuge during emergencies on every floor in strategic locations. Vestibules leading to fire stairs or elevator lobbies that are also served by stairways can be used for this purpose if they are large enough.

- Provide labeling and instructions for use of refuge areas.

- Develop an evacuation plan for people who cannot get out of a building on their own in an emergency.

- Provide public address announcements in both verbal and visual formats.
visual formats during emergencies to inform everyone of the situation.

Provide signaling systems and signs that can help people escape from complex buildings where the way out is not easy to understand (e.g., underground facilities).

Figure 4.1a.13. In this building, a ramp and stair tower provide alternative means of circulation. The two are organized spatially to frame the main entry of the building.
4.1b  Entering and Exiting

The rest of a building’s features do not matter to the person who cannot get in or out. Therefore, it is imperative that the design of entry and exit conditions ensures their ready use by everyone.

Finding the Building

Before people can enter a building, they first must be able to find it. The use of external landmarks that distinguish the building from other nearby facilities can help people locate it.

Guidelines:

1. Use distinctive exterior design features on or near the entrance of a building to make the building easy to distinguish from other nearby buildings.
2. Such cues should involve more than one sense (e.g., employ visual, informational and tactile properties as detection devices) to provide the flexibility necessary to accommodate a range of individual preferences and abilities.
Identifying the Entrance or Exit

When faced with multiple doors or panels that imitate the appearance of doors at the entrance or exit of a building, a person should be able to tell the difference between the ones that are doorways and those that are not.

Guidelines:

- In North America, it is usually advisable to locate entrances to the right and exits to the left as the person approaches the building (and vice versa as the person leaves the building) to make them consistent with user expectations.
- Provide perceptible multi-sensory cues (e.g., visual, informational and tactile design properties) to help the person tell the difference between entrance and exit doors.

Approaching the Entrance or Exit

After identifying the entrance or exit, the next task involves the approach – i.e., successfully negotiating the path of travel to the doorway.

Guidelines:

- A primary path of travel to the entrance or exit should be provided that is readily perceptible by anyone. It should be free of level changes and obstructions that could impede access or make access hazardous.
- Multiple paths of travel to the entrance or exit may be needed where there are unavoidable grade changes and limited space, especially in adaptive reuse or historic preservation projects. Each path should be designed to be convenient and secure.

Figure 4.1b.2. This entrance is virtually impossible to distinguish from adjacent window panels.

Figure 4.1b.3. The automated sliding door at this entrance is easily detected by anyone because it provides multiple physical cues as well as a talking sign sensor mounted above the door.
Where grade changes must occur along the primary path of travel leading to an entrance or exit, provide travel surfaces with minimal slopes (below ramp slopes) to ensure efficient and comfortable use by everyone and to minimize the need for handrails.

Provide redundant multi-sensory cues that can serve as indicators to alert people that they are getting close to the entrance or exit.

Provide areas adjacent (but out of the path of travel) to the entrance and exit that can permit people with a wide range of preferences and abilities to pause, rest, wait for others or simply congregate.

Provide protection from inclement weather as well as intense light and heat changes at the entrance and exit to allow the person's senses to adjust to the contrasting indoor and outdoor conditions.

Maneuvering through the Entrance or Exit

Designing entrance and exit conditions that permit anyone to get through the doorways is a challenge that is often underestimated.

Guidelines:

Where possible, employ automated doors that accommodate people whose hands or arms are otherwise occupied (e.g., an adult holding a children or packages). The controls of automated doors should accommodate differing speeds and styles of movement through the doorway.

The entrance and exit doorways should provide open clearances sufficient to accommodate wider patterns of use (e.g., a person traveling with luggage) so that anyone can get through.

Figure 4.1b.4. This attempt to integrate side steps into a sloped approach to the building did not provide a detectable warning along the edge condition, thus creating a trip hazard for virtually everyone.

Figure 4.1b.5. This airport's revolving door is large enough to accommodate several users at once or individual users with luggage. It has a control button to enable users who travel at a slower pace to reduce its speed and slows down automatically if the door comes close to a person inside.
Handles and latches on manual entrance and exit doors should allow operation with a closed fist or open hand. This will accommodate users whose hands are either full or who have other limitations.

Latch side clearance should be provided at all swinging doors that open toward a person to provide space to move out of the way of the door’s swing.

Entrance and exit doors should not require much force to operate so that people who have limited strength can open them.

Entrance/exit doors should not close rapidly or with much force to ensure the safety of people who travel at slower speeds or employ differing styles of movement (e.g., a person pushing a shopping cart).

Entrance and exit doors that are access or departure control points in buildings should be designed to ensure through passage by anyone (e.g., a person pushing a stroller).

Broad entrance and exit areas should have recommended paths of travel that are readily identifiable and easily negotiated by everyone regardless of ability.

When entrance or exit doors are provided for use specifically for persons of differing abilities, they need to be detectable, identifiable and usable by everyone.

When faced with a sequence of entry or exit doors (e.g., a vestibule condition), the doors need to be far enough apart and easily operable to enable anyone to proceed through them (e.g., a person escorted by a pet).
Departing the Entrance or Exit Area

Successfully entering or exiting a building includes a person’s ability to move away after passing through the doorway.

Guidelines:

- Primary paths of travel leading away from the entrance and exit should be provided that are readily perceptible by anyone and free of level changes and obstructions that could impede movement.

- Multiple paths of travel leading away from the entrance or exit may be needed when there are unavoidable grade changes or limited space, especially in adaptive re-use or historic preservation projects. Each path should be convenient and secure.

- Where grade changes must occur along the primary path of travel away from an entrance or exit, provide travel surfaces with minimal slopes (below ramp slopes) to ensure efficient and comfortable use by everyone and minimize the need for handrails.

- Provide redundant multi-sensory cues that can serve as indicators to alert people to potential hazards (e.g., pedestrian or vehicular traffic, grade changes) that they may encounter.

- Provide landmarks that can provide anyone with orientation and wayfinding cues as they move away from the entrance and exit.

- Provide areas adjacent (but out of the path of travel) to the entrance and exit that can provide people with a wide range of preferences and abilities a place to congregate, wait for others or simply rest.

Figure 4.1b.8. This building has outdoor seating areas both at the curb and on either side of the processional to/from the entrance where users can wait, congregate or simply rest before entering the building or leaving the site.
Provide protection from inclement weather as well as intense light and heat changes at the entrance and exit to allow the person's senses to adjust to the contrasting indoor and outdoor conditions.
4.1c Wayfinding

Wayfinding is the organization and communication of our dynamic relationship to space and the environment. Successful design to promote wayfinding allows people to: (1) determine their location within a setting, (2) determine their destination, and (3) develop a plan that will take them from their location to their destination. The design of wayfinding systems should include: (1) identifying and marking spaces, (2) grouping spaces, and (3) linking and organizing spaces through both architectural and graphic means.

Architectural Wayfinding

There are five primary architectural wayfinding elements: (1) paths/circulation, (2) markers, (3) nodes, (4) edges, and (5) zones/districts. These, along with visual accessibility, are the design criteria for highly legible and comprehensible urban environments.

Architectural wayfinding systems use the design and organization of landscaping, urban amenities, and buildings as spatial indicators.

Figure 4.1c.1. This interior courtyard reveals the interior circulation of the building on every floor. Passageways, stairs, ramps, and elevators are identifiable from multiple vantage points allowing people to understand where they are going and how to get there.
Paths/Circulation

The circulation system is the key organizing element of a site or building. People use circulation systems to develop a mental map.

Guidelines:

1. **Develop a focal point and a system of circulation paths to help people understand where they are in the system.**
2. **Distinguish paths with width/height, material, and color differences to assist in the comprehension of the circulation system. If color is used to determine circulation, avoid using the same set of colors for other purposes such as decoration.**
3. **Use a system that has a repetition or rhythm to help people to determine intuitively where they are going and be able to anticipate destinations.**
4. **Use circulation systems that lead people from node to node.**
5. **Clearly distinguish places where the public is welcome and where access is restricted.**
6. **Communicate the circulation system to the users when they enter. In particular, vertical circulation devices such as stairs and elevators should be intuitive and perceptible.**
7. **In multi-story buildings, organize elements such as restrooms, elevators, and exits in the same location on each floor.**
8. **Remember that people often do not comprehend the overall plan of circulation paths. Whenever possible, design layouts that enable people to identify where they are going well before they arrive.**

Figure 4.1c.2. The close proximity of the stairs, elevator and entrance provides visitors with self-evident choices for vertical movement.

Figure 4.1c.3. This metal sculpture not only adds visual interest but also is an obvious marker to the entrance.
Markers

In wayfinding, a marker is an object that marks a locality. Markers such as arches, monuments, building entrances, kiosks, banners, artwork and natural features give strong identities to various parts of a site or building. They act as mental landmarks in the wayfinding process and break a complex task into manageable parts.

Guidelines:

- If possible, set up markers at focal points and at places that correspond to intersections.
- Consider locating the marker so that it is detectable from as many positions as possible. However, do not position the marker so that it physically interrupts the path of travel. In interiors, consider hanging markers from the ceiling.
- Add cues such as recesses, overhangs, and/or landscaping to mark entrances.
- When designing building exit markers, equate light cues with exit conditions.
- Locate emergency exits in places that people pass on a daily basis.
- Whenever possible, set up primary markers to incorporate tactile, sound, and visual indicators.
- Develop marker systems to make different parts of the site or building as noticeable and memorable as possible. Locate and design windows to enable detection of markers from inside.
- Consider the information desk or kiosk to be a key wayfinding marker.

Figure 4.1c.4. The awnings mark the entrance and protect patrons from rain, snow, and glaring sun.

Figure 4.1c.5. Subway maps such as this eliminate unnecessary information and present travelers with only the essential information needed to navigate the system.
Nodes

A node is a point at which subsidiary parts originate. People make decision points at nodes in paths. As a result, nodes should contain graphic and architectural information to assist with those decisions.

Guidelines:

- Think of wayfinding as a “connect-the-dots” activity and use only the information that is necessary at each node. Cluttering intersection points with too much information can confuse the user.
- Consider easy-to-understand node systems such as grids to help people establish a mental map of the wayfinding system.
- Use maps and graphic information to communicate the form of circulation only at primary rather than secondary nodes.
- Whenever possible, use visual, tactile, and auditory indicators at major decision-making points.

Edges

Wayfinding edges determine where an area begins or ends.

Guidelines:

- Design specific boundary areas, such as pathways and subway platform edges, for both visual and tactile detection.
- Introduce contrasting building floor textures and hardness to establish wayfinding edge conditions and to alert users to changes in height conditions.
- Mark the tops and bottoms of ramps and stairs to emphasize transition points.
Use tactile marking systems on handrails to inform people of changes in conditions—particularly potentially hazardous conditions (e.g., top step of stairs).

**Zones/Districts**

Wayfinding zones and districts are regions (either outside or within buildings) with a distinctive character that assists in the general identification of place.

**Guidelines:**

- Identify each zone to be unique and memorable in its context.
- If possible, reinforce the identifying characteristics of the zone with signage prior to arrival in the zone.
- Identify zones in buildings with a letter prefix such as “A” or with the cardinal points of the compass (e.g., N-101 for North wing, room 101).

**Graphic Wayfinding**

There are four main categories of graphic wayfinding elements: (1) orientation, (2) directional information, (3) destination identification, and (4) situation and object identification.

Graphic information is the most direct way for people to find their location. Typical graphic wayfinding information includes systems made up of text, pictograms, maps, photographs, models, and diagrams. Visitors are required to observe, read, learn and comprehend these systems as they make their way through a site or building.

**Guidelines:**

- Be consistent with text and graphic devices and the location of...
signage throughout the system.

Use upper and lower case letters for highest legibility except in the case of single word signage.

To increase legibility, avoid single line spacing.

For best legibility, the space between words in signage is typically the lower case “e” of the given font.

Group information on complex signs to increase comprehension.

Use flush left, ragged right to achieve ease of legibility.

Display common rather than obscure or technical names (e.g., use Ear, Nose, and Throat rather than Otorhinolaryngology).

Avoid abstract or difficult to learn pictograms.

Whenever possible, use pictograms and text together for reinforcement.

In signage, use colors that are easily recognizable by name such as blue, orange, gray. Reserve the colors red, yellow, and green for public safety uses.

Use color combinations that have at least a 70% brightness differential.

Design lighting, windows and surfaces to prevent glare on signage.

Place signs within the cone of vision to increase detection and legibility.

Repeat information displayed for longer distance detection in a format for close detection.

Avoid blocking signage with building elements such as lights and air vents.

Figure 4.1c.10. The brightly colored pole contains an information phone to supplement the maps. It also marks the location of this information display to make it easier to find.

Figure 4.1c.11. Building maps should be accessible to people of all statures. This tactile map is tilted to help both standing and seated users access the information.
Orientation

Orientation devices such as maps, site plans, floor plans, building and floor directories are used to help people to develop a mental map of a large complex. This is typically the first level of graphic information given for decision-making in an unfamiliar setting. These devices should help people to determine where they are, where their destination is, and what the best route is to their destination.

Guidelines:

- Site and building plans should be oriented in the direction corresponding with the setting and orientation of the viewer.
- Provide a "you are here" symbol to help in orientation.
- Include key landmarks in the site or building plan.
- Provide text labels on maps that correspond to directional and destination signage.
- Use familiar or easy-to-learn pictograms to reinforce text and to bypass language-based information.
- Tilt maps and plans displayed for pedestrian use so that people of all statures and those who are seated can access them.
- Place information desks near building maps and directories so that attendants can use them to explain directions to visitors.
- Place exterior map signage in locations that are legible from a parked vehicle. Require a pullover area out of the way of moving traffic to access the map.
- Provide a talking sign system in complex buildings where providing assistance is neither desirable nor feasible.
- For building directories, provide visitors with level and room numbers for all destinations, listed alphabetically.

Figure 4.1c.12. Talking signs are positioned at wayfinding decision-making points throughout this building. They communicate locations to users through hand-held receivers.
Avoid all upper case text in directories to increase legibility.

On each level, provide a map of that level with room numbers and tenants identified. Orient the map with the floor plan and include key markers for the level.

Display hours of service in a prominent area near or on the building entrance as well as in the vestibule area.

### Directional Information

This type of signage guides people along a route to a destination, and is given after they have had the chance to orient themselves to the general setting. Most often this includes signs with arrows and elevator button panels.

**Guidelines:**

- Keep the font size consistent. Use font weight to determine the importance of information.
- Light letters on a dark background appear larger than dark letters on a light background and therefore are recommended for directional signage.
- Maintain consistency of arrow styles and use throughout the system. Consider the plain language option of “straight ahead” instead of an arrow pointing up or down to avoid confusion with “upstairs” and “downstairs.”
- Avoid more than five messages and five lines of text in a single directional sign.
- Use familiar or easy-to-learn pictograms to reinforce text and to bypass language-based information.
- Emphasize information offered in directional signage with architectural indicators such as wall graphics or landscaping that lead to the destination.

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**Figure 4.1c.13.** Like subway maps, tactile maps abstract information to convey the major elements of the building, complex, or site.
Supplement directional information with maps at key decision points to reduce the amount of directional signage.

Place signs in transitional areas to reassure people that they are on the correct route.

Place call buttons at levels that can be reached by all people, seated or standing, and employ multi-sensory systems to indicate “up” and “down.”

Position elevator panels so that all people can easily reach them.

Include tactile and high contrast floor numbers.

Display easy to understand identifiers next to control buttons on elevator panels. For example, place a star symbol next to the number “1.”

Clearly identify floor levels and their uses (e.g., entrances to the complex, offices, concourse, parking) in elevator lobbies and at the tops of ramps, stairs, and escalators.

Design all routes to destinations so they are usable by all people.

In intersections, place signage to ensure that those coming from all directions can detect the information.

Use interactive multi-sensory systems at key decision-making points to provide more information and flexibility than is possible in a static signage system.

If there is more than one entrance to a building, provide directions to the information desk at all secondary entrances.
Destination Identification

This graphic information is provided at the point of destination. Typically it includes building signage, floor numbers, and room identifiers.

Guidelines:

- Use outdoor signage to identify all buildings by name. Locate signs for legibility from both roadways and pathways.
- The numbering system used in buildings should be intuitive and simple. For example, in multi-story buildings, all room numbers should correspond to their floor number (e.g., B1 or -1 for the basement, 101, 102 for the first floor, 201, 202 for the second, etc.). Even numbered rooms should be on one side of double loaded corridors and odd numbered rooms should be on the other side. Avoid splitting even and odd numbers for different wings.
- Make floor numbers detectable at each entrance.
- Place room number signs beside doors so that they can be easily detected when the door is open.
- Public amenities (e.g., restrooms) and restaurants should be identified with pictograms, text, and Braille.

Situation and Object Identification

This graphic information informs visitors about situations such as local hazards, changes of status (e.g., train schedules) and identifies objects such as fire extinguishers.

Guidelines:

- Use a public address sound system with accompanying visual
information on dynamic signs to inform people of specific information and emergency conditions.

- Use dynamic signage (e.g., an LED display) in situations when information continually changes.

- In emergency situations, use repetition of cues (e.g., connect audible alarms to visual signs).

- Use pictograms, text, and color-coding to label all emergency equipment.

- Use standard signage shapes for specific purposes (e.g., circles for regulation, squares and rectangles for identification, and triangles for warning).

- Use standard signage colors for specific purposes (e.g., yellow for warning signs, red for emergency signs or devices, and green for life protection equipment or facilities signs).

- All information desks and kiosks should be identified with signage.

Figure 4.1c.17. Large text, pictograms, lights, alarm identifiers and color coding are effective ways to help everyone find emergency devices and directions.
Obtaining Products and Services

One of the main reasons for using buildings is to obtain access to products and services. Any building with that function should be designed to facilitate such access for the entire population. Such buildings include commercial facilities, service centers, bill payment locations, libraries and offices handling applications and forms.

Entries and Circulation Spaces

These spaces will be the first contact people have with the interior of the facility. Providing a sense of openness improves knowledge of the facility's spatial layout and social organization.

Guidelines:

- In retail establishments, provide a transition space at the entrance to help customers get oriented to the facility.
- Provide interior glazing or open access into all departments except those where privacy is desirable. Provide window treatments where privacy needs are variable.

Figure 4.1d.1. This interior glazing provides only visual access to the products and services in this museum bookstore.
Wherever controlled access is necessary, make the initial entry space an inviting area. A reception desk should be located immediately in or adjacent to this area, strategically located to prevent visitors from passing by without being cleared for entry.

**Product Distribution**

Displays expose visitors to the range of products available. Space and illumination are critical concerns for access and product selection. Accommodations for resting should be made wherever it is likely that someone may be in the area for more than a few minutes.

**Guidelines:**

- Examples of the best and most interesting products should be displayed in a reachable location providing hands-on access.
- Focus more intense and dramatic lighting on special product displays.
- Keep all products within the comfortable reach range of 24-48 inches.
- The width of all aisles should be planned to provide effective access to all products.
- All aisles should enable two people, either standing or using wheeled mobility devices (e.g., strollers, wheelchairs), to pass each other while traveling in opposite directions.
- Provide a supporting surface for trays and packages (e.g., tray slide) in service and cashier lines.
**Staff Assistance**

Where assistance is necessary to provide access to all products, (e.g., books on a top shelf) this can be a universal service provided and available to everyone. This will eliminate the stigma associated with asking for help. It will also improve the public’s image of the organization because providing assistance where needed is a good business practice.

**Guidelines:**

- **Assistance should be advertised for all who cannot manage on their own.** This may include signs indicating the type of services available.

- **Assistance services should not be identified with the International Symbol of Access.** Such labeling immediately creates the impression that one must use a wheelchair to receive such services.

- **Service desks should be low enough for seated use.** If standing is more desirable, they should have low sections for seated use and for children. There should also be knee clearance for both sides when the counter must be used from a frontal position.

**Waiting Areas**

It is inevitable that people sometimes will have to wait where services are provided to the public. In some building types, like health service facilities, the waiting area can be conceived as part of the service area.

**Figure 4.1d.4.** At this supermarket checkout, the service counters are lowered for two reasons. They are more usable by customers of all statures, whether standing or sitting, and also enable this checkout clerk to work from a seated position.
Guidelines:

1. Provide enough space for the expected number of people waiting during the peak periods of the day. An overflow area also can be provided that is used for other purposes (e.g., lobby alcove) during most other times.
2. All waiting areas should have seating when it is expected that the wait will be longer than 15 minutes.
3. A system for taking turns should be provided in locations where the receptionist or clerk can easily lose track of who is next. This system should contain both auditory and visual components.
4. Waiting areas should be well lighted and have sound control to reduce background noise.
5. Where it is expected that people may wait for periods of up to an hour, access to restrooms, public telephones and drinking fountains should be provided in close proximity.
6. If smoking is allowed, there should be a separate smoking lounge that is well ventilated. An alternative is access to a weather protected outdoor area.
7. If small children are present, a play area is advisable.

Service Desks and Offices

The most critical point of contact between visitors to a building and staff is at service desks where a variety of activities take place that set the tone of the organization and establish its image to the public. It is particularly important to establish an equitable relationship between the visitor and the person providing service.

Guidelines:

1. Enough space for maintaining appropriate interpersonal distances should be provided.
The seating arrangement should facilitate conversation where appropriate. Corner to corner seating or round tables may promote more conversation than face-to-face seating.

Each person involved in a transaction or conversation should be at face-to-face level.

The service provider should be at the same floor level as the recipient.

Service counters should be low enough for use in a seated position or have a lower auxiliary or optional counter area. The lowered areas should have knee clearances and be wide enough for use by anyone.

Background noise in the service desk area should be controlled enough to ensure that quiet talking is understandable by all parties to the conversation.

At service desks where confidential information is communicated, provide sound absorbing surfaces, privacy partitions and other measures to control access to confidential discussions. Ideally, there should be a private office that can be used if the conversation may result in emotional distress.

Information Transaction Machines

An increasing amount of information services is being provided through computer-based equipment like ATMs, ticket machines and internet terminals. These machines are called information transaction machines (ITMs). All ITMs should be simple to use and easy to perceive.

Guidelines:

Provide step-by-step menus that present manageable chunks of information in a logical order.
Group controls for similar functions and spatially organize the controls to reflect the sequence of steps. Graphics that guide the user through the steps also can be provided.

Include back-up and cancel modes to provide the option of correcting entry mistakes.

All transactions should provide feedback on the result. Critical actions should have confirmation steps before proceeding.

Reinforce correct choices with labels, symbols, color feedback messages and signals, etc.

Provide input/output modes that everyone can use (e.g., touch screen plus headset jack for verbal feedback).

Allow different methods of payment (e.g., credit cards, cash, debit card, etc.). Design the input slots for ease of insertion without the need for fine motor control.

Locate all operating controls within the comfort zone of 24 - 48 inches above grade.

Provide adequate lighting for all controls and directions.

Provide knee space when the device must be used from a frontal position.

Provide a display screen that can be adjusted to reduce glare, to optimize contrast and to accommodate the position of the user.

Vending and Ticket Machines

Vending machines, ticket machines, change machines, vend-a-card systems and related equipment should be usable by everyone. Since these machines are often owned and maintained by outside vendors, it is important that agreements with the vendors incorporate universal design provisions. These should include the types and design of machines and the location and arrangement of machines in the spaces provided.
Guidelines:

- Clearly identify accurate prices, types of payment methods and the process for canceling an order and getting refunds.
- Provide alternative means of payment including credit or vend-a-cards, change and bills.
- Bill readers should allow different orientations of bills and be tolerant of common flaws on bills.
- Automatic change features should be provided as part of the machine; if not provided, change machines or vend-a-card purchase machines should be located in the immediate area.
- Provide identification and instructions for operational controls in alternate formats (e.g., text, recorded or synthesized speech, and Braille).
- All controls should be operable using a closed fist or open hand.
- Provide enough space for both side and front reach approaches for any user whether standing or sitting.
- Locate all controls, money input devices and product dispensing areas within a comfort zone of reach for all people whether standing or seated.
- Product removal should be possible using one hand.

Figure 4.1d.9. This touch screen ticketing machine has instructions in four languages and a very simple and obvious method of operation. Several different methods of payment are possible and audible instructions and tactile labels are provided.
Public amenities are resources, conveniences, facilities or benefits continuously offered to the general public for their use and/or enjoyment, with or without charge (e.g., restrooms, information displays, public telephones, rain shelters, drinking fountains, etc.).

As such, public amenities are expected to function around the clock, in adverse conditions such as inclement weather, high noise environments and in varying degrees of light and heat. Consequently, there are several key attributes that should be integrated into all public amenities to ensure universal usability.

**General Requirements**

Key attributes for usability include location, interactivity and safety.

**Guidelines:**

1. Public amenities must be located on a clear path of travel where accessibility is continuously maintained.

2. Locations of all amenities should be clearly marked at heights accessible to people of all statures from either a standing or sitting position.
detectable by all users. They should be equally discernible to users with varying abilities.

Switches, controls, instructions, and dispensers must be understandable to the broadest audience possible, accessible from numerous heights, and usable by many alternative means.

Avoid placing public amenities in situations where users are isolated. Isolation, though not a physical threat itself, places the vulnerable user at greater risk to crime.

Reflective surfaces (e.g., mirrors) should be installed so that those using them may observe anyone approaching.

Provide emergency communications equipment wherever potential security threats exist.

Public amenities that require payment before use should accept multiple means of payment (e.g., cash, credit or debit card).

Restrooms

Restrooms are an amenity particularly in demand by all segments of the community. Lack of access can result in severe discomfort or embarrassment. Consequently, they should be available to everyone.

Guidelines:

Use floor surfaces that are designed to drain and dry quickly.

Provide automatic flush plumbing or a large flush activation switch placed so that it can be activated with the gross movement of a hand, shoulder, or elbow.

Provide changing tables for care of infants in at least one restroom at a height usable by people of all statures whether standing or seated.
W here clothing hooks are provided (e.g., stalls), they should be placed at or below 48 inches.

W herever possible, eliminate doors in favor of a maze-type entry system.

Provide a single use or family style restroom in addition to gender-specific facilities.

Provide a floor-to-ceiling mirror to enable use by anyone.

Position handrails and grab bars so that they are not obstructed by soap or towel dispensers.

Provide a choice of heights for toilets to allow all users to keep their feet in contact with the floor and to facilitate transfers onto toilets.

Stalls should provide either a shelf or ledge to keep personal items off the floor and should be large enough to accommodate the user with packages or luggage.

Hand dryers and/or towel dispensers should be placed at heights that accommodate people of all statures whether standing or seated. Mount at least one in a lower position.

Consider providing a lavatory inside a large toilet stall.

Areas of Public Information Display

Public information displays should present information so that it can be accessed and understood by everyone.

Guidelines:

Information displays should be organized intuitively, making them simple to use and understand. Where a key or legend is necessary, it should be prominently displayed.
Information should be provided in a large a format as is practical.

Information should be provided in as many alternative formats as possible (e.g., raised letters, large print, Braille, voice, etc.) and be clearly marked.

Where activation switches are necessary, they should be easily identifiable and positioned so that they are operable by anyone.

Maps, directories, and information displays should be arranged spatially to accommodate all users.

Place repetitive displays of maps, directories, or information in a consistent manner so users can predict their locations.

Public Telephones

Using a telephone is a necessity rather than a luxury. Not everyone has a cell phone, so public telephones must be usable by everyone. They should be selected to ensure that their design features accommodate the widest possible range of users.

Guidelines:

Use high contrast colors and materials to differentiate buttons, faceplate and key numbering.

The layout for keypad numbers/buttons should follow the standard pattern.

Where possible, a flat horizontal surface should be offered near the telephone for gathering change, writing notes, placing handbags, etc.

For wall mounted or pedestal based telephones, provide sufficient space for approach and use by all users.
Provide a control for those who prefer a louder volume and to ensure listening capability over background/ambient noise.

Handsets should be compatible with portable text telephone (TDD/TTY) devices or the telephone should offer automatic passive access to an integrated TDD/TTY.

**Public Rain Shelters**

When bus stops are used as a refuge from rain or other inclement weather or as public resting areas, they become public amenities not solely related to transportation. In the universal city, such areas must also enable use by anyone.

**Guidelines:**

- Locate shelters on a flat paved surface rather than on dirt, gravel or grass.
- Shelters should be constructed of transparent materials for security reasons.
- Provide sufficient space for those using strollers, carts, and wheeled mobility devices.
- Provide benches for long waits. Benches should not impede movement by those who choose not to use them.
- The floor surface should facilitate removal of snow, ice, rain and debris.

**Drinking Fountains**

Public drinking fountains need to be usable by everyone. Therefore they should be selected to ensure that their design features accommodate the widest possible range of user requirements.
Guidelines:

1. Drinking fountains should be located along an accessible path of travel offering space to use the fountain from either a standing or seated position without being in the path of traffic.
2. All fountains should ensure approach and use by anyone. The activation switch should be conveniently located and its means of operation should be obvious, intuitive and usable by anyone.
3. The fountain should be positioned at a height that enables all users to reach the drinking stream.
4. The drain should facilitate rapid emptying of the basin.

Figure 4.1e.9. Drinking fountains should be usable from either a standing or sitting position. Their controls should be easily reached and operated by everyone. Dual height fountains are an effective solution.
4.2 Specific Occupancy Type Issues

Buildings of specific occupancy types present their own unique issues. This guidebook looks at several of those issues for six occupancy types: (1) cultural facilities, (2) public assembly and entertainment facilities, (3) participant sports and recreation facilities, (4) temporary lodging, (5) workplace facilities and (6) human service facilities. Ensuring the usability of these facilities by everyone helps create the universal city.
4.2a Cultural Facilities

Cultural facilities, by their very nature, attract diverse groups of users. Particularly in New York City, citizens and visitors of all ages, sizes, abilities and cultures use museums, galleries, zoological gardens, etc. Therefore it is particularly important to acknowledge this diversity and ensure usability by everyone.

Site Design

Cultural facilities should be easily accessible from public transit, parking and public pathways. This creates a good introductory experience for the first time visitor. Since many of these facilities are attended by tours, there is a need to provide sufficient space for small or large groups. In some of these facilities, like zoological gardens, outdoor activities may be the main attraction. Providing year round comfort and access to outdoor sites is a key design goal.

Guidelines:

- Locate the main building entrance in closest proximity to the major points of public access. This may be a transit stop, a pedestrian pathway or a parking lot. Study each site to determine the priorities based on expected visitor volume.

Figure 4.2a.1. The corner entrance to the Guggenheim Museum provides its visitors with convenient access to local transportation including a subway stop only one block away.
Design outdoor attractions so that people of all statures, whether standing or seated, can have an unobstructed appreciation of the attraction. Provide more than one choice.

Use pathways on the site to enable pedestrians to anticipate the attractions inside. Windows, small display cases and signboards with current attractions will provide an orientation to the building’s activities prior to entry and entice passing pedestrians to visit.

On large sites, strategically locate restrooms to be within about a two-minute travel distance from all locations.

Provide space and locations for groups of different numbers to unload from vehicles, assemble and gather prior to entry.

Orient and design outdoor activity spaces to protect people from prevailing winds, hot sun and precipitation.

Entrees

The entry to a cultural facility is the point of main introduction. Most cultural facilities have important transitional areas through which access is controlled and where ticketing, coat check and other activities take place.

Guidelines:

It may be desirable to have two main entry points (e.g., one for people arriving by vehicle and one for those arriving on foot or by public transit).

Provide space and seating for individuals who are waiting for others. Such spaces should be in a location easily detectable from main entries but out of the way of busy traffic.
In large facilities, provide a separate waiting space for groups to assemble and queue up. This space should have some seating for people who need to rest.

Provide amenities like restrooms, drinking fountains and public telephones on the public side of the security perimeter and near waiting spaces.

If facilities are provided for night use by the public when the rest of the building is closed, the entry and exit to that part of the building should be accessible to everyone.

**Spatial Organization**

In cultural facilities, it is very important to design the building to support wayfinding by new visitors. Not only is it critical to make the resources in the building easy to find but also it is just as important to make the locations of amenities like restrooms intuitively obvious.

**Guidelines:**

- The main visitor entry should be detectable from public access ways. This is particularly important if the institution has more than one building or is situated on a campus.
- Group amenities like restrooms, drinking fountains, and telephones together. The groupings will serve as important landmarks in the building.
- Provide an information desk immediately inside the entry or in a strategic location in an entry hall.
- Ensure that crowd control devices are detectable by everyone.

**Figure 4.2a.4.** This museum’s seating area provides space for everyone to rest or wait for others.

**Figure 4.2a.5.** Crowd control devices need to be detectable by everyone. These ropes hang so low that they could pose a trip hazard and are also difficult for some users with reduced vision to detect by cane.
Signage Systems

Signage systems help support wayfinding but they should not be depended upon to compensate for a confusing layout. Cultural institutions have a multi-cultural clientele and often many visitors cannot read English.

Guidelines:

- Develop a pictogram system to associate with different parts of the building. This system can be based on the type of resources a building contains. For example, in zoological gardens, the system could display silhouettes of animals. But in a library, it might use images related to the type of literature in an area.

- Signs should be in at least two languages common to the region. English, Spanish, Chinese, Japanese, French or Russian may be appropriate in some areas. Internationally known facilities should have major signs in at least English, Spanish, French and Japanese. For other languages, alternate language maps and directories should be provided.

- Use a graphic identity scheme to distinguish one area from another. This could include color family differences and/or display graphics like photographs or banners.

Exhibits and Collections

The resources provided in a cultural facility (e.g., collections, exhibits, lectures) are the primary attraction. Thus, these resources should be made available to the broadest population.

Guidelines:

- Provide alternate media for wayfinding information, exhibits, presentations and background material using Braille, audio,
text and captions. Audio presentation controls should be well marked and easy for anyone to activate.

Alternate language descriptive material should be provided for all major exhibits and presentations.

The information desk should have materials available in the alternate media and languages. This may include audio-guided tours, tactile maps, Braille information and text scripts of audio presentations.

Design exhibits to enable all people to experience them. Where exhibits are interactive, access should be provided at different heights and with knee clearance if approached from the front.

Provide hands-on access to some objects in each exhibit area where it is appropriate. Controls and devices in such exhibits should be easy to grasp and not require fine motor control unless absolutely necessary for educational reasons.

The paths through exhibits should be spaced to accommodate wider patterns of use (e.g., adults pushing children in strollers). Avoid dead ends with confined spaces where wheeled mobility devices cannot be turned around.

Eliminate deep shadows in exhibits that block access to content. The placement of lighting and design of exhibit enclosures are both critical.

Provide plenty of resting places within exhibit areas.

Figure 4.2a.8. This ramp has walls that provide a convenient resting place. Because the floor surface slopes, people of different statures can find a comfortable spot.
Public Assembly and Entertainment Facilities

Public assembly and entertainment facilities are places where people congregate in large numbers to attend events. Examples of these types of facilities include professional sports stadiums and arenas, exhibition and convention centers, assembly halls and auditoriums, movie theaters and live performance venues.

Site Design

Public assembly and entertainment facilities service large crowds of people and, therefore, must be easy to access from parking lots, drop-off areas, public transit, and pedestrian pathways without disrupting the surrounding flow of pedestrian and vehicular traffic.

Guidelines:

- The main entrance to the building should be located near the major points of public access.
- Provide drop-off and pick-up areas for large groups to load and unload from vehicles without impeding the flow of traffic. These areas should protect visitors from inclement weather.
Parking should be located within close proximity to the building and reachable by a clear path of travel.

**Entrances and Exits**

At public assembly and entertainment facilities, people typically enter and exit around the same time. The main point of entry is unique in that it usually involves a ticketing or controlled access area through which everyone must pass. This provides a level of security and allows the facility to monitor the number of people in attendance.

**Guidelines:**

- The main entrance should lead to a lobby that provides waiting areas close to yet out of the flow of traffic. These waiting areas should provide accessible seating areas for those who may want to rest.
- Entrances should employ alternatives to conventional turnstiles or other devices that are not usable by everyone.
- Entrances that do have turnstiles should provide an adjacent gate or door for people who otherwise would not be able to enter.
- Entrances that are not accessible should have signs to direct users to the entrance that is usable by everyone.
- Everyone should be able to pass through any security checkpoint in the same manner.
- Provide enough doorways to enable timely mass exiting by all users, whether standing or sitting, at peak demand times (e.g., after performances).
- If coatrooms are available, they should be located near the main entry and have adequate space to accommodate large
numbers of people, including both standing and sitting, before and after performances.

- All people should be able to detect, access and use emergency exits in a safe and timely manner from all locations in the building.
- For people who cannot access or safely use the emergency exits, secure and appropriately sized areas must be provided where they can wait for rescue.

Spatial Organization

In places of public assembly and entertainment, final destinations will not be the same for all people. Once people arrive at the facility they must find their section and seat. The larger the facility, the more difficult and challenging this can be.

Guidelines:

- The main entrance should be easily distinguishable from other entrances so that those approaching the facility can reach their intended destination.
- Amenities such as restrooms, drinking fountains, and telephones should be grouped together along a clear path of travel that is usable by everyone.
- A directional system should be provided that can direct all users from the lobby to their seats.
- If ushers are present, they should be trained to provide information, directions and assistance in a variety of forms.
- Different areas (e.g., levels of seating) should be coded (e.g., color, symbols, etc.) to ensure timely wayfinding.
- Both audible and visual alarms should be provided for crowd control during emergency conditions to enable effective communication with and ensure the safety of everyone.
Services and Concessions

Two products are usually offered in public assembly and entertainment facilities: (1) the performance itself and (2) items sold at concessions. If those in attendance do not have access to both, the overall experience of the event is diminished.

Guidelines:

1. The ticket booth or will call window should have a section of the counter that is lower and has adequate knee clearance to enable anyone to purchase tickets or view seating charts.

2. Concessions, including souvenir stands and food service areas, should have counters at comfortable heights for use by both standing and sitting patrons.

3. Condiments and self-serve items should be provided within reach of all people whether standing or sitting.

4. Areas around concessions should be spaced to accommodate wider patterns of use (e.g., people using wheeled mobility devices, adults pushing children in strollers, etc.). They should also be large enough to prevent traffic congestion.

5. Lowered counters at cash registers will be usable by everyone.

6. An information booth should be provided in a centralized location for those who need assistance. Maps and wayfinding material should be made available in alternative media.

7. If audible communications are integral to the performance or event, assistive listening systems (ALS) or captioned text should be made available. ALS receivers should be located throughout the facility and spectators should be notified of their availability in a variety of media. Captioned text helps everyone during periods with intense crowd noise.
If large scoreboards are used, means of communicating essential information in alternative forms should be provided (e.g., audio receivers).

All printed program materials for performances should be available in alternative forms.

Accessible seating areas should be dispersed throughout the performance area to ensure that all people have comparable choices of admission prices/locations and that companion seating is available.

People who are sitting should be ensured an experience of the event comparable to the experience of those who stand.

Routes of travel to performance spaces, arena or stadium floors, dressing or locker rooms, and other areas used by performers should be usable by all.

Public Amenities

Public assembly and entertainment facilities typically serve a large number of people during short periods of time. During intermissions, people leave their seats and use telephones, restrooms and concessions. It is important to plan adequately for these peak demand times.

Guidelines:

Public restrooms should be dispersed throughout the facility. Since most people will use the facilities during intermissions, restrooms should be sized and designed to accommodate large numbers of users with varying abilities at the same time. In communal restrooms, doors should be eliminated by using a maze entry to enable easy entering and exiting by everyone. Single user restrooms (e.g., those placed in boxes and suites)
should still provide enough clearance for more than one person to enter (e.g., a companion or child needing assistance).

Public telephones should be dispersed so they can be reached from all locations within the building and provided in numbers appropriate to the seating capacity of the facility.

Public telephones should provide an acoustic barrier in areas where excessive crowd noise is predictable.
Participant sports and recreation facilities provide users with a range of participation levels. Users can engage in an activity (e.g., children playing) or merely be observers (e.g., parents watching them play). Frequently, areas for varying levels of participation are clearly defined (e.g., playing field and bleachers), though there are instances where the boundaries are not distinct (e.g., a public park). Examples of participant sports and recreation facilities include bicycle paths, fishing and boating piers, playing fields, tennis and basketball courts, amusement parks, skating rinks, recreation centers, and golf courses.

**Site Design**

Participant sports and recreation facilities can be either interior or exterior spaces or a combination of both. Such facilities often have large areas and may include several buildings that can be far apart.

*Figure 4.2c.1. This playground has a controlled point of entry usable by everyone and is enclosed by a fence to prevent children from leaving unattended.*
Guidelines:

1. It may be advantageous to have more than one main entrance to provide a more direct route for people arriving by differing means.

2. If there is only one primary entrance, locate it as close as possible to the major points of public access. This could be a subway station, bus stop, a pedestrian pathway or a parking lot. The entrance should also be detectable from public access routes, especially when there is more than one facility in the complex.

3. Provide a zone to unload and load vehicles without intruding on nearby pedestrian and vehicular traffic. This area should also offer protection from inclement weather.

4. In a large outdoor setting, alternative locations for parking should be provided in proximity to the various destinations.

5. Having paved pedestrian pathways around the perimeter of the property opens up the outdoor space, connects the areas and often gives pedestrians better access to the venues.

6. Fences with a gate should surround play areas if they are located near vehicular traffic. Ground surfaces should be firm, stable, slip resistant and provide adequate shock absorbency to reduce the risk of injury.

Entrances

Some participant sports and recreational facilities have a security perimeter through which access is controlled. For those that do not, there may not be a single defined entry point.
Guidelines:

For buildings, the main entrance should be usable by everyone and lead to a lobby that provides waiting areas close to but outside the path of travel. These waiting areas should provide accessible seating areas for those who may want to rest.

Entrances that function as control points should be usable by everyone in the same or at least an equivalent manner.

Spatial Organization

In participant sports and recreational facilities, it is important to make the buildings or attractions easy to find.

Guidelines:

Indoor amenities such as restrooms, drinking fountains, and telephones can be grouped together to function as landmarks inside the building.

On large sites, strategically locate restrooms to be within about a two-minute travel distance from all locations for all participants.

Locate locker rooms and showers where they can be easily identified and reached by all users of the facility.

A clear path of travel usable by anyone should connect all public and common use areas such as locker rooms, playing fields, dugouts, swimming pools and warm-up areas.

If a training room is provided, it should be usable by everyone. All participants should be able to easily reach it so that it can function as a first aid station for emergencies during events.

Figure 4.2c.4. This marina provides a ramped pedestrian pathway for access to a fishing pier and boat launch by all users.

Figure 4.2c.5. Information booths are dispersed throughout this park to ensure that essential information, directions and assistance are available to all users.
Signage Systems

If sports and recreation facilities are spread out in a campus-like setting, finding and reaching destinations can be challenging.

Guidelines:

- Develop a system of multi-sensory maps and directories to identify different buildings or locations so they are legible to everyone whether standing or seated.
- Provide outdoor identification systems to distinguish one area from another. In the event that there is more than one venue of the same type (e.g., more than one baseball field), they should each be marked so they are identifiable by everyone.
- If scoreboards are used, an alternative means of providing essential information should be used (e.g., a public address system).

Public Amenities

Sports and recreation facilities often support multiple simultaneous activities. Public amenities should be reachable and usable by all the activities’ participants.

Guidelines:

- Public restrooms should be near spectator, waiting and queuing areas and along a clear path of travel that is easily usable by everyone.
- Trash receptacles that can be used with one hand should be provided throughout the facility.
- Seating should be provided for spectators and pedestrians who want to rest. Areas usable without stairs should be dispersed throughout the facility so that there is a choice of
locations. People who are sitting in those areas should have comparable access to the activity even when others are standing.

Adequate illumination should be provided for activities that occur after dark. Lighting should also be located along pedestrian pathways for security. Lighting on pathways should reflect downward onto the path and should not create hot spots or glare.

A number of public restrooms, including portable units, appropriate to the size of the facility and usable by everyone should be available.

Public telephones usable by everyone should be placed where crowd noise would least disturb someone placing a phone call.

Drinking fountains should be located close to venues for participant events and should be usable by all participants whether they are standing or sitting.

Figure 4.2c.8. This outdoor drinking fountain is usable by people whether they are standing or sitting.
Temporary lodging includes hotels, shelters of all types and halfway houses. There are many similarities in applying universal design to all these building types. But because these facilities provide a broad spectrum of services and serve diverse populations, there are obviously some important differences between them.

Building Identification

Temporary lodging facilities should be easily identifiable by people who need to find them, especially those who are at risk. This may include both potential guests and visitors (e.g., social service workers, health care workers). In particular, building signage should be easy to comprehend by all.

Guidelines:

- Incorporate two types of signage: overhead signs for detection at a distance and wall signs for closer detection.
- Signs should have high contrast and effective lighting. If possible, illuminate signs for nighttime use.
- Provide signs with the street address in a conspicuous location.

Figure 4.2d.1. Hotels should provide signage at two different scales - one that is legible from several blocks away and another that is detectable at the pedestrian pathway level.
Building Entrances

Temporary lodging should be easy to access from public transit, parking and pedestrian pathways. Since guests at hotels and some shelters are likely to be carrying baggage, a drop-off zone and temporary parking in close proximity are needed.

Guidelines:

- Locate the main entrance in close proximity to the major points of public access (e.g., transit stop, pedestrian pathway or parking lot).
- Doorbells and intercoms should be within reach of and usable by people with a wide range of statures and abilities.
- Install an intercom, vision panels or audio-video system to facilitate two-way communication and assist those who need access when the entry is locked.
- Provide a drop-off area or temporary parking that is usable by all guests and close to the main entrance.
- Ensure that the area close to the main entrance is well lighted and provides a clear path of travel to the entrance for all guests (e.g., no steep grade changes or steps).

Staff Offices

Welcoming offices for staff should be provided in all temporary lodging.

Guidelines:

- Staff offices should be strategically located for easy access.
- In shelters where residents will stay for a while (e.g., hospice facilities and shelters for abused women and children), access
Temporary Lodging

to staff should be possible without the barrier of a service counter.

Provide an information center near the staff office to keep all guests informed of activities in the building. A staff person should be in charge of the information center and be available to assist people who cannot read.

Sleeping Rooms

Sleeping rooms in all temporary lodging should be inviting and facilitate social interaction.

Guidelines:

- In hotels, provide accessible rooms in a choice of sizes, locations, views and cost categories.

- All controls for heating and air conditioning, lighting, entertainment systems and communications systems should be located within reach of seated people, be easy to operate and well lighted.

- Provide secure storage for personal goods and valuable belongings that can be accessed by any user. In shelters, include additional storage since some guests may be carrying everything they own.

- Provide locks that can be used easily without great force or tight grasping. Locks should be well illuminated.

- Provide enough clear floor area for convenient access along the full length of the bed and to access all other furniture, storage units, lighting, environmental controls and windows.

- Provide enough space around doorways for all people to enter, turn around and exit the room without being impeded by the door swing.

Figure 4.2d.4. This bedroom provides accessible storage which is essential for all types of temporary lodging.

Figure 4.2d.5. Showers in temporary lodging should adapt to the needs of the user with adjustable fixture heights and seating.
All operable windows should be easy to open and have all hardware within reach of people who are standing or sitting.

**Bathrooms**

Privacy and independence are critical in bathrooms although some people will need assistance, especially in shelters for people with medical conditions.

**Guidelines:**

- Bathroom design should promote independent use but also accommodate those who require assistance.
- Provide safety features such as grab bars, slip resistant surfaces, non-glare lighting, effective ventilation, and an emergency alarm system – particularly for residents who may require assistance.
- Provide some bathrooms with tubs and some with showers, or provide a tub room if only showers are available in bedroom suites.
- Include adequate storage for personal grooming and hygiene items within reach of people who may be standing or sitting. In shelters, provide additional storage since some guests may be there for an extended stay.
- Consider use of the bathroom by children and infants and provide space for storing children’s bath products and toys.

**Kitchens**

Cooking facilities should be available where residents will stay for relatively long periods of time. Kitchens play an important role in social interaction since people tend to congregate where food is shared.
Guidelines:

- In shelters and residential hotels, provide a kitchenette so residents and guests can prepare their own meals or snacks. The kitchenette should be equipped with utensils and dishware.
- Provide enough space for small groups to congregate in kitchens.
- Provide safety devices such as a fire extinguisher and an emergency alarm and locate them in places that are easy to find and reach.
- All kitchens should have counter space that can be used in both a standing and seated posture. Consider further levels of adjustability to accommodate differences in stature.
- When no kitchens are available, provide information for food delivery service in a variety of forms (e.g., written, audiotape, Braille) to ensure communication of essential information to all guests.

Social and Activity Spaces

In temporary lodging, particularly extended stay facilities, social and activity spaces are important to the guests' sense of well being.

Guidelines:

- In shelters, provide private space for an individual or small group to meet with counselors or support staff when needed.
- Living rooms, dining rooms and activity rooms in shelters should provide sufficient space for all people to access and use all amenities, including furniture, entertainment systems and storage.
Provide adequate general illumination plus supplementary task lighting to increase light levels for all activities requiring fine handwork, reading and conversation.

All televisions should include captioning features and multiple language options.

If telephones are not provided in rooms, provide a communal phone with adequate privacy and a place to sit while using it.

Recreation Facilities

Many forms of temporary lodging provide facilities for their guests’ active participation in recreational and fitness activities.

Guidelines:

1. All levels in lobbies, recreation and entertainment facilities should be accessible without stairs.

2. Fitness facilities should provide a clear path of travel for all users to at least one of every type of equipment.

3. The selection of equipment in fitness facilities should accommodate a range of abilities.

4. Pools and hot tubs should be usable without having to climb steps or ladders to get in and out.
4.2e  Workplace Facilities

Designing a workplace that provides opportunities for the broadest potential workforce makes good business sense. This allows employers to select the most qualified people from the largest possible applicant pool. It may also improve work efficiency, employee productivity, workplace safety and the quality of work.

The workforce will likely represent a wide range of demographics and abilities. Most workers spend much of their time at the workplace. Therefore, many design considerations for workplace facilities may be different than other types of built environments that are used by fewer people over shorter time periods.

General Environment

Job performance is best when the environment neither under-stimulates nor over-stimulates the employee. Lighting, the thermal environment and noise are the key environmental variables to consider. The most desirable levels of each will not only vary across work environments and people, but also will vary for different job
requirements. It is therefore important for the designer to have a good understanding of the work requirements to design effective environments.

**Lighting**

Appropriate lighting is critical to effective task performance.

**Guidelines:**

- The amount of light necessary for good work performance will depend on the requirements of the task and the abilities of the employee. When possible, use a combination of natural and artificial light sources that can be adjusted through the use of blinds, overhead lights and direct light sources. This will allow employees to adjust the lighting to fit the requirements of their tasks and individual abilities.

- Use adjustable blinds so that employees can control the amount of natural light that enters their workspaces. Motorized blinds may offer the easiest adjustment.

- Place direct lighting at workstations to enable employees to adjust the level of lighting for their specific task requirements and individual abilities.

- Excessive glare may cause discomfort and reduce work performance. Because those with reduced visual ability may require greater illumination levels, it is very important to avoid glossy work surfaces.

**Thermal Environment**

Temperature, humidity and ventilation affect more than employee comfort. They also impact work performance and employee health.
Workplace Facilities

Guidelines:

- Individuals should be able to adjust the ventilation, heat and humidity associated with their work areas. This can be accomplished by giving employees control over the temperature and ventilation at their workstations through the use of local thermostats, windows, fans and adjustable window blinds.

- Temperature and humidity extremes should be avoided, particularly cooler environments that may be uncomfortable for the elderly or others with circulatory impairments.

- Ventilation must be effective but minimally distracting. Use low speed ceiling fans, so that air velocities can be changed depending on the environment temperature and humidity, tasks performed and preferences of individual employees.

Noise

Workplace noise can negatively affect both task performance and personal safety.

Guidelines:

- Background (ambient) noise can interfere with communication among employees. To allow efficient communication, keep ambient noise levels low and avoid short, unpredictable noise.

- Uninvited noise is distracting and should be minimized, but there are large differences between individuals in the types and intensity levels of noise that are distracting. Individuals should be allowed to control the noise levels in the environment without interfering with the noise in another employee’s environment. Offices or cubicles with high sound resistant walls, rather than large open areas with desks, can be used.

Figure 4.2e.3. Window treatments like shades and blinds enable employees to control the amount of natural light and solar heat gain in their work environment.

Figure 4.2e.4. This fire alarm provides both auditory and visual signals to enable detection by most people.
Alarms or communications having auditory frequencies above 4000 Hz are difficult for many individuals to detect and should be avoided. Auditory alarms should be supplemented with visual signals (e.g., flashing lights).

Layout of Work Areas

Environments that promote efficient materials flow, minimize manual materials handling and facilitate social communication and social interaction will provide an accommodating work environment.

Materials Flow, Handling and Storage

Materials flow, handling and storage should be designed to enable job performance by people of varying statures and abilities.

Guidelines:

- The frequency and distance of materials moved from receiving to workstations should be minimized. In addition, minimize redundant handling of materials. Options can be evaluated by developing and using simple material flow diagrams.

- Provide people with containers that give them the option of carrying, pushing or pulling.

- Stored materials should be reachable by anyone regardless of size or ability whether standing or seated. Automated materials retrieval systems that allow selected materials to be brought close to the employee can be used.

Social Interaction

Opportunity for social interaction between all employees contributes to higher morale and satisfaction.
Guidelines:

- Workstations should be situated so employees can communicate information effectively with visual and/or verbal modes of communication. Visual obstacles except for intentional obstructions such as cubical or office walls should be avoided. Background noise should be minimized.

- Employees should have designated areas to recover from work demands and communicate with others. Break rooms or areas should be located near workstations and have a clear path to minimize travel time, and should be quiet, well lighted and equipped with chairs and tables to facilitate recreational social interaction between all employees.

Workstations

Workstations can be categorized into those that allow standing or sitting postures, or a combination of both (i.e., sit-stand stations). In addition, workstations that contain computers and their accessories require special design consideration. The appropriate workstation design will allow the broadest set of employees possible to perform specific sets of job tasks. While the physical characteristics of a workstation will depend largely on the tasks that are to be performed, some general guidelines can be provided.

Standing Workstations

Several types of employees (e.g., retail checkers, ticket takers, fabricators, architects, and graphic designers) use standing workstations. Standing for long periods of time can be particularly straining to the back and legs; as a result, standing workstations often contain a sitting or resting option to reduce fatigue.
Figure 4.2e.8. The sitting workstation is adaptable to a wide range of users including people who use wheeled mobility devices.

**Guidelines:**

- Use standing workstations instead of sitting workstations when larger physical work effort is required or the employee must cover a larger work area. Employees should not be required to stand in place for long periods.

- Counter or table heights should be adjustable to allow the employees to maximize their strength capabilities and minimize physical effort associated with maintaining stooped working postures.

- Working heights of standing workstations for employees performing inspection tasks should be adjustable for those who want to bring the task closer and should be designed to minimize efforts that would result in awkward neck postures.

- Provide adequate knee and toe clearance beneath workstations and counters so that employees can be as close to the workstation as possible.

- Avoid the use of elevated platforms, but consider the use of durable rubber floor matting to reduce muscle fatigue of the legs and backs for those who stand.

**Sitting Workstations**

Sitting is generally less strenuous than standing, and allows easier control over hand and body movements. It is not surprising that the sitting workstation is the most common.

**Guidelines:**

- Use sitting workstations to facilitate hand movement accuracy when smaller hand manipulation forces are required and when less area needs to be covered by the employee.
Seated workstation table heights should be approximately the elbow height of the seated individual and therefore should be adjustable. Seated workstations should allow enough clearance for users of wheeled mobility devices.

**Sit-Stand Workstations**

Sit-stand workstations offer the most flexibility to employees because standing and sitting put stress on different parts of the body. They enable employees to change their postures throughout the day to minimize muscle fatigue and can be used by people with a very wide range of abilities. Several studies have shown that they can reduce physical strain on specific muscle groups and increase productivity.

**Guidelines:**

- Workstations that accommodate both standing and seated work are extremely desirable. Use these stations when possible.

**Computerized Workstations**

Video display terminal (VDT) workstations hold a monitor, and usually a keyboard, mouse, trackball and/or other input device, and may also require room for a telephone, printer, and other office supplies. The space and furniture requirements of VDT workstations therefore have a unique set of design requirements.

**Guidelines:**

- Monitors should be positioned to reduce neck strain. Adjustable stands are desirable to accommodate people with different statures and needs.
- Drive slots should be positioned so that individuals with varying statures and abilities can insert CDs and disks.
Tilt-adjustable keyboards or keyboard support surfaces are recommended to reduce awkward postures of the wrist during keyboarding.

Footrests should be used to provide relief in the lower back and buttocks for those sitting in front of computer terminals.

Ambient and natural light conditions should be designed to eliminate any glare or interference on the screen.

Figure 4.2e.10. This workstation offers a lowered keyboard surface and tilted keyboard to reduce back, neck and wrist fatigue.
Human Service Facilities

Some human service facilities (e.g., community centers, child-care centers, senior centers, etc.) are places where people obtain critical services, find recreation opportunities and meet to socialize with their peers. Other human service facilities (e.g., police stations, court houses, etc.) combine community functions with civic missions carried out by professionals. These places are often key points of contact between city employees and the public.

Location

Human service facilities should be located in the heart of neighborhoods where they are readily identifiable and reachable by all the people they serve.

Guidelines:

- Locate the facility within an active community context and provide strong connections to related community facilities.
- Design connections to existing neighborhoods to encourage chance encounters and social integration among all users.

Figure 4.2f.1. This municipal court building provides both a ramp and steps with handrails at its entrance to enable everyone to enter.
Figure 4.2f.2. This senior center has a weather protection canopy that also makes finding the building and locating the entrance easier. It also provides seating where users can rest or gather before entering or departing.

Figure 4.2f.3. The front desk of this police station provides a low counter with knee space underneath so that visitors of all statures can interact with the desk officer from either a standing or sitting position.

Site Design

The design of the site will play a large role in determining how well the building fits into the community context and makes connections to the pedestrian and transportation systems. The sites of buildings like community centers, child-care centers and senior centers also can provide key outdoor activity areas.

Guidelines:

1. Accessible parking should be located close to the main entrance. Senior centers should provide more than the minimum required accessible parking.
2. The routes from parking and transit stops to the entrance should be safe for pedestrians and free of steps and steep grade changes.
3. Protection from the elements should be provided at the entrance to reduce exposure in bad weather. Ideally, this protection should extend to the drop-off area or pedestrian pathway. Even positioning a building to provide protection from prevailing winds is enough to make a difference.
4. Provide outdoor patios or courtyards with accessible seating areas in both sun and shade as an extension of lobby/waiting areas.
5. All terraces, courtyards and play areas should be reachable by paths of travel without steps. In child-care centers, controlled access from the street is critical.
In facilities used at night, provide good illumination at entrances, parking and approach paths.

**Entrances**

Entrances provide a transition space between the public environment and the organization’s realm and from the outside to the inside.

**Guidelines:**

- Provide enough window area to allow inspection of the interior from the surrounding public pedestrian pathways.
- An automated door should be provided at the main entrance. This could be a low-power slow operating door that can also be used without power.
- Provide direct access to restrooms from the entry area.
- Information about upcoming events and activities should be available in a variety of forms (e.g., bulletin boards, electronic message boards, or video monitors) to ensure communication of essential information to all users.
- Provide a waiting area with direct access to the passenger loading area, where one is provided. In child-care settings, parents should be able to wait outside the children’s area without being detectable to the children so as not to disturb activities.
- Main administration areas should be in close proximity to the entrance. This is particularly important in police stations for security purposes.
- Provide ample space for coats, bags, boots, etc. This space should be out of the flow of traffic and have an area that can be used by anyone, whether standing or seated, for removing outerwear. In child-care settings this is a key activity area.
The reception desk should be identifiable and usable by all staff and visitors.

Where communications take place through a security screen, provide visual and auditory access to the receptionist for people of all statures whether standing or seated.

Meeting Rooms

Most human services facilities have rooms where public meetings are held. These rooms need to be easy to find and have the space and equipment to ensure that all citizens can participate.

Guidelines:

Provide a clear path of travel that can be negotiated by everyone between meeting rooms and the main entrance. Accessible public amenities (e.g., restrooms, drinking fountains, etc.) should be located along this path. If nighttime access is provided from a different entrance, equivalent public amenities should be available in the night access area.

Provide enough circulation space around furniture to enable easy movement by all users including people with wheeled mobility devices.

Meeting rooms should have good acoustics, lighting and sight lines to promote full participation by all users.

Equip all meeting rooms with assistive listening systems (ALS) or provide a portable device in the building.
Spatial Organization

Human service facilities are often designed on a very low budget. Efficient spatial organization is the key to keeping costs down and making sure that the budget does not compromise the usability of the facility.

Guidelines:

- Group related social and recreation spaces together to increase interaction between activity areas, promote vicarious participation, and increase casual socialization.
- Separate non-compatible uses. In senior centers, it is particularly important to separate noisy activities from areas where conversation takes place.
- The spatial organization of community centers should provide all users access to stages without requiring the use of steps or stairs.
- Provide restrooms close to social recreation areas that can be used by everyone.
- Design patios, courtyards and terraces as extensions of indoor activity areas so it is easy to move activities outside in good weather. Consider public access to provide a neighborhood amenity.
- Windows should be large and low enough to enable use by everyone whether they are standing or seated.

Figure 4.2f.8. This large patio is directly accessible from the adjacent dining spaces inside, enabling everyone to move outside easily when the weather is good.
5 Conclusion

Universal design continuously approaches the ideal of universal usability. With each new iteration, buildings’ designs come closer to, but never quite reach, that theoretical ideal. The reason is simple: with each new design, with each lesson learned, and with each success achieved, the aspirations underlying that ideal become higher. It is hoped that this guidebook contributes to that process.
This guidebook was developed by the research and professional staff of the Center for Inclusive Design and Environmental Access (IDEA), School of Architecture and Planning at the University at Buffalo, The State University of New York.

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A number of the photographs in this guidebook were obtained through funding provided by the National Institute on Disability and Rehabilitation Research (NIDRR), U.S. Department of Education to:

- The Rehabilitation Engineering Research Center on Universal Design (RERC on UD) at the University at Buffalo, The State University of New York.
- The Center for International Rehabilitation Research Information and Exchange (CIRRIE) at the University at Buffalo, The State University of New York.

The cover image of the Manhattan skyline was photographed by Mayor Rudolph W. Giuliani.

The photograph of the moving pedestrian pathway in 1 Introduction and 4.1a Using Circulation Systems was provided through the courtesy of Schmidt, Hammer & Lassen k/s from the Danish book, *Accessibility and Architecture*.

The photograph of the bedroom in 4.2d Temporary Lodging was provided through the courtesy of S&I, from the Danish book, *Accessibility and Architecture*.

The following photographs in 5 Conclusion were provided through the courtesy of Richard Dattner & Partners Architects PC:

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- New York Presbyterian Lung Center by Peter Sprung
- Riverbank State Park (stair tower) by Norman McGrath
7 Resources

Articles and Chapters


Books and Monographs


**Web Sites**

**Adaptive Environments Center**
www.adaptenv.org

**Center for Inclusive Design & Environmental Access, University at Buffalo, The State University of New York**
www.ap.buffalo.edu/~idea

**The Center for Universal Design, North Carolina State University**
www.design.ncsu.edu/cud

**Design for the Aging Network**
dan.interact.nl

**Designing for the 21st Century**
www.adaptenv.org/21century/

**Trace Research and Development Center, University of Wisconsin-Madison**
www.trace.wisc.edu
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The Center for Inclusive Design and Environmental Access (IDEA) is dedicated to improving the design of environments and products by making them more usable, safer and appealing to people with a wide range of abilities throughout their life spans. Originally based on the concepts of accessible or “barrier free” design, our work has expanded to embrace the concept of universal design - i.e., the design of places and products that are usable by and desirable to a broad range of people, including those with disabilities and other often overlooked groups. The IDEA Center provides resources and technical expertise in architecture, product design, facilities management and the social and behavioral sciences to further these agendas.

We hope that this guidebook encourages its readers to promote the design of environments that are usable by everyone.

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Director

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