



TRAINING & DEVELOPMENT ASSOCIATES

Creating the Accessible Home

A One-Day Seminar

New York State
October 2007

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ABOUT THE MANUAL

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CREATING THE ACCESSIBLE HOME
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Introduction
Themes, Norms, Vocabulary

GLOSSARY

Accessible when used with respect to the public and common use areas of a building containing covered multifamily dwelling units, accessible means that the public or common use areas of the building can be approached, entered and used by individuals with physical disabilities. The phrase “readily accessible to and useable by” is synonymous with accessible. A public or common use area that complies with the appropriate requirements of ANSI A117.1-1986, a comparable standard, or those Guidelines is “accessible” within the meaning of this paragraph.

Accessible route. A continuous and unobstructed path connecting accessible elements and spaces in a building or within a site that can be negotiated by a person with a severe disability using a wheelchair, and that is also safe and usable by people with other disabilities. Interior accessible routes may include corridors, floors, ramps, elevators and lifts. Exterior accessible routes may include parking access aisles, curb ramps, walks, ramps and lifts. A route that complies with the appropriate requirements of ANSI A117.1-1986, a comparable standard, or Requirement 1 of the Guidelines is an “accessible route”. In the circumstances described in Requirements 1 and 2, “accessible route” may include access via a vehicle route.

Adaptable. A space which can be easily altered to accommodate the needs of individuals with disabilities (such as a sink with cabinets below, where cabinets can be removed to provide knee space).

Adaptable dwelling units when used with respect to covered multifamily dwellings, means dwelling units that include the features of adaptable design specified in 24 CFR 100.25(c) (2)-(3).

ANSI A117.1 – 1986. The 1986 edition of the American National Standard for buildings and facilities providing accessibility and usability for physically disabled people.

Assistive device. An aid, tool or instrument used by a person with disabilities to assist in activities of daily living. Examples of assistive devices include tongs, knob-turners, and oven-rack pusher/pullers.

Bathroom means a bathroom which includes a water closet (toilet), lavatory (sink) and a bathtub or shower. It does not include single-fixture facilities or those with only a water closet and lavatory. It does include a compartmented bathroom. A compartmented bathroom is one in which the fixtures are distributed among interconnected rooms. A compartmented bathroom is considered a single unit and is subject to the Act's requirements for bathrooms.

Bathroom Specification A. A design guideline from Requirement 7 for a minimum accessible bath. If Specification A is selected on the basis for designing a bathroom, all bathrooms in the dwelling unit must comply with the A Specifications.

Bathroom Specification B. A design guideline from Requirement 7 for a more accessible bath. If Specification B is selected, only one bathroom in the dwelling unit must meet those requirements.

Building. A structure, facility or portion thereof that contains or serves one or more dwelling units.

Building entrance on an accessible route. An accessible entrance to a building that is connected by an accessible route to public transportation stops, to parking or passenger loading zones or to public streets or sidewalks, if available. A building entrance that complies with ANSI A117.1-1986 (see Requirement 1 of those Guidelines) or a comparable standard complies with the requirements of this paragraph.

Clear. Unobstructed. The dimension between two opposite surfaces (such as between two walls or railings).

Common use areas. Rooms, spaces or elements inside or outside of a building that are made available for the use of residents of a building or the guests thereof. These areas include hallways, lounges, lobbies, laundry rooms, refuse rooms, mail rooms, recreational areas, and passageways among and between buildings.

Cognitive disabilities and other hidden conditions. People with cognitive and learning disabilities may have difficulty using facilities, particularly where the signage system is unclear or complicated. In addition to people with permanent

disabilities, there are others who may have a temporary condition which affects their usual abilities. Broken bones, illness, trauma or surgery – all may affect a person’s use of the built environment for a short time. Frequently, people have diseases of the heart or lungs, neurological diseases with resulting lack of coordination, arthritis or rheumatism that may reduce physical stamina or cause pain. Reduction in overall ability is also experienced by many people as they age. People of extreme size or weight often need special accommodation as well.

Covered multifamily dwellings means buildings consisting of four or more dwelling units if such buildings have one or more elevators and ground floor dwelling units in other buildings consisting of four or more dwelling units. Dwelling units within a single structure separated by firewalls do not constitute separate buildings.

Dwelling unit. A single unit of residence for a household of one or more persons. Examples of dwelling units covered by these Guidelines include: condominiums, an apartment unit within an apartment building, and other types of dwellings in which sleeping accommodations are provided but toileting or cooking facilities are shared by occupants of more than one room or portion of the dwelling. Examples of the latter include dormitory rooms and sleeping accommodations in shelters intended for occupancy as a residence for homeless persons.

Entrance. Any exterior access point to a building or portion of a building used by residents for the purpose of entering. For purposes of these Guidelines, an “entrance” does not include a door to a loading dock or a door used primarily as a service entrance, even if nondisabled residents occasionally use that door to enter.

Environmental controls include thermostats and other heating, air-conditioning and ventilation control mechanisms such as ceiling fans and electrically operated skylights. These must be positioned in accessible locations, as must light switches and electrical outlets for each room.

Equivalent Facilitation. Alternative design or technology which provides substantially equivalent or greater access to a facility than required in the technical or scoping sections of the ADA Accessibility Guidelines.

Finished grade. The ground surface of the site after all construction, leveling, grading and development has been completed.

First occupancy. A building that has never before been used for any purpose.

Ground floor. A floor of a building with a building entrance on an accessible route. A building may have one or more ground floors. Where the first floor containing dwelling units is above grade, all units on that floor must be served by a building entrance on an accessible route. This floor will be considered a ground floor.

Hearing Disabilities. People with partial hearing often use a combination of speech reading and hearing aids which amplify the available sounds. Echo, reverberation and extraneous background noise can distort hearing aid transmission. People who are deaf and who rely on lip reading for information must be able to see clearly the face of the individual who is speaking. Those who use sign language to communicate also may be adversely affected by poor lighting. People who are hard of hearing or deaf may have difficulty understanding oral communication and receiving notification by equipment that is exclusively auditory such as telephones, fire alarms, public address systems, etc.

Individual building test. The Individual Building Test must be used to analyze a site with a single building with one common entrance and also may be used for all other sites. The Individual Building Test, unlike the Site Analysis Test, does not have to be certified by a professional licensed engineer, landscape architect or surveyor, but it should be calculated on a topographic map with two foot (or less) contour intervals.

Loft. An intermediate level between the floor and ceiling of any story located within a room or rooms of a dwelling.

Maximum extent feasible. Maximum extent feasible applies to the occasional case where the nature of an existing facility makes it virtually impossible to comply fully with applicable accessibility standards through a planned alteration. In these circumstances, the alteration shall provide the maximum physical accessibility feasible. Any altered features of the facility that can be

made accessible shall be made accessible. If providing accessibility in conformance with this section to individuals with certain disabilities (e.g., those who use wheelchairs) would not be feasible, the facility shall be made accessible to persons with other types of disabilities (e.g., those who use crutches, those who have impaired vision or hearing or those who have other impairments).

Mobility disabilities. This category includes people who use wheelchairs and those who use other mobility aids. People with severe mobility disabilities use either a power-driven or manually operated wheelchair, or the more recent development, the three-wheeled cart or scooter to maneuver through the environment.

Multistory dwelling unit. A dwelling unit with finished living space located on one floor and the floor or floors immediately above or below it.

Powder room. A room containing a toilet and a sink.

Primary function. A major activity for which the facility is intended. Areas that contain a primary function include, but are not limited to, the customer services lobby of a bank, the dining areas of a cafeteria, the meeting rooms in a conference center, as well as offices and other work areas in which the activities of the public accommodation or other private entity using the facility are carried out. Mechanical rooms, boiler rooms, supply rooms, employee lounges or locker rooms, janitorial closets, entrances, corridors and rest rooms are not areas containing a primary function.

Protruding objects. The corridor space is a circulation space, and like all other paths where people may walk (accessible route or not), it must be free of hazardous protruding objects that project from walls and posts and are dangerous to someone who is inobservant or a person with a visual impairment.

Public accommodation. A facility operated by a private entity whose operations affect commerce and falls within at least one of the following 12 categories: 1. Places of lodging; 2. Establishments serving food or drink; 3. Places of exhibition or entertainments; 4. Places of public gathering; 5. Sales or rental establishments; 6. Service places; 7. Stations used for public transportation; 8. Places for public display or collection; 9. Places of recreation; 10. Places of education; 11. Social service establishment; 12. Places of exercise

and recreation. Essentially, businesses which invite the public in to sell them goods or services.

Public use areas. Interior or exterior rooms or spaces of a building that are made available to the general public. Public use may be provided at a building that is privately or publicly owned.

Reasonable accommodation. Modifications or adjustment to the work environment, or to the manner or circumstances under which the position held or desired is customarily performed, that enable a qualified individual with a disability to perform the essential functions of that position.

Single-story dwelling unit. A dwelling unit with all finished living space located on one floor.

Site. A parcel of land bounded by a property line or a designated portion of a public right of way.

Sites with unusual characteristics. Certain sites are subject to laws or codes which specify that the lowest floor of a building or the lowest structural member of the lowest floor must be raised to a specified level. Examples of such sites are those located in a federally designated flood plain or coastal high-hazard area, where buildings must be raised to a level at or above the base flood elevation. When these laws or code result in either Step 1 or Step 2 below, than an accessible route to that building entrance is considered impractical:

Step 1: a difference in grade elevation exceeding 30 inches.

Step 2: a slope exceeding 10% between a building entrance and all vehicular and pedestrian arrival points within 50 feet of the entrance (or to the closet one if none are within 50 feet).

Site Analysis Test. This test may be used to analyze the site for a multifamily housing development containing multiple buildings without elevators or a single nonelevator building with multiple entrances. The methodology for this test is significantly different from the Individual Building Test. It requires an analysis of the site to determine the number of required units which must be on an accessible route and which must meet the design requirements of the Guidelines. After this calculation is completed, the site is laid out and the minimum number of covered units must be provided. A third step which

analyzes the placement of required units, accessible routes and accessible entrances is then performed. This step is used to identify any additional units that can, and therefore must, be made to comply. Where the site contains multiple buildings, all the covered units should not be clustered in one building, but as much as the site allows, should be dispersed throughout all the buildings.

Slope. The relative steepness of the land between two points which is calculated as follows: The distance and elevation between two points (e.g., an entrance and a passenger loading zone) are determined from a topographical map. The difference in elevation is divided by the distance and that fraction is multiplied by 100 to obtain a percentage slope figure. For example, if the principal entrance is ten feet from a passenger loading zone, and the principal entrance is raised one foot higher than the passenger loading zone, then the slope is $1/10 \times 100 = 10\%$.

Story. That portion of a dwelling unit between the upper surface of any floor and the upper surface of the floor next above or the roof of the unit. Within the context of dwelling units, the terms, “story” and “floor” are synonymous.

Technically infeasible. An alteration that has little likelihood of being accomplished because existing structural conditions would require removing or altering a load-bearing member which is an essential part of the structural frame, or because other existing physical or site constraints prohibit modification.

The 20% Rule. For proposed new construction sites where either the Individual Building Test or the Site Analysis Test may be used, the Guidelines set a minimum percentage of ground floor units which serves as a starting point even before the tests are applied. The minimum is 20%. Thus, for those sites where either test may be used, there never will be a situation where less than 20% of the units are required to comply with the Guidelines; in most cases, the tests will result in a much larger percentage of units required to be accessible. Keep in mind that this 20% minimum cannot be used as a maximum. The results of the test, depending on which test is used, will determine the maximum number of units required to be accessible.

Undisturbed site. The site before any construction, leveling, grading or development associated with the current project takes place.

Van parking. The Guidelines do not require special van parking, but they do require headroom over passenger loading zones for vans. ANSI accessible parking spaces, when located in parking garages, may or may not have sufficient headroom to accommodate vans. Also, the 60-inch access aisle specified in ANSI is not wide enough for vans with side-mounted lifts. For these reasons, it is recommended, where accessible parking is located in garages not having headroom equal to that required by ANSI at loading zones, additional supplemental designated van parking spaces be placed outdoors and furnished with an 8-foot (96 inches) wide access aisle and an accessible route to the garage or other entrances of the building.

Vehicular or pedestrian arrival points. Public or resident parking areas, public transportation stops, passenger loading zones and public streets or sidewalks.

Vehicular route. A route intended for vehicular traffic, such as a street, driveway or parking lot.

Visual disabilities. This category includes people with partial vision or total vision loss. Some people with a vision disability can distinguish light and dark, sharply contrasting colors or large print, but cannot read small print, negotiate dimly lit spaces or tolerate high glare. Many people who are blind depend upon their sense of touch and hearing to perceive their environment and communicate with others. Many use a cane or have a service animal to facilitate moving about.

Overview of Accessibility

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Definitions: Accessible, Adaptable, and Universal Design

The Center for Universal Design

Center for Accessible Housing
School of Design
North Carolina State University

Accessible, adaptable, and universal are terms now used to refer to housing or features in housing intended for use by people with disabilities and others. Each has different meanings and purposes. The differences are subtle but meaningful. They are frequently used interchangeably and often misused. For clarification, the following explanations are those understood and used by the Center for Accessible Housing.

Accessible Design: Accessible generally means that the dwelling meets prescribed requirements for accessible housing. Mandatory requirements for accessible housing vary widely and are found in state, local, and model building codes, in agency regulations such as in the Department of Housing and Urban Development's program 202 and 811, section 504, and the Fair Housing Amendments Act requirements. They are also found in standards such as the American National Standards Institute's A117.1 (ANSI A117.1-1986) and the Uniform Federal Accessibility Standards (UFAS).

Accessible features in dwellings include items such as wide doors, sufficient clear floor space for wheelchairs, lower countertop segments, lever and loop type handles on hardware, seats at bathing fixtures, grab bars in bathrooms, knee spaces under sinks and counters, audible and visual signals, switches and controls in easily reached locations, entrances free of steps and stairs, and an accessible route throughout the house. Most "accessible" features are permanently fixed in place and noticeable.

Adaptable Design: Some accessible features such as knee spaces under sinks and counters and grab bars in bathrooms are obvious and change the way an accessible dwelling looks and how it is used. Some people for whom these features are not essential, dislike the appearance or reduced base cabinet space that results. The small numbers of accessible dwelling units required to be accessible by law are intended to be usable by and rented to anyone and not held open exclusively for people with disabilities. Experience with accessible multifamily rental housing has shown the following:

- 1.** Many non-disabled people preferred not to live in the accessible units because of the appearance of clinical looking grab bars in bathrooms and unnecessary knee spaces in kitchens that sacrificed valued base cabinet storage space.
- 2.** Some people with disabilities did not use some accessible features because of the level of severity of their disability or preference. For example, people who cannot self-transfer onto toilets or in and out of bathtubs may not need grab bars. Wheelchair users may not cook or wash dishes because they have severely limited use of their arms and hands or because they do not wish to do so and, therefore, have no need for kitchen knee spaces.

Some owners of multifamily rental housing have reportedly lost revenue by lowering rent to entice non-disabled people to live in accessible units. To overcome these and other problems, adaptable features have been developed and accepted as standards for accessibility. Adaptable features are either adjustable or capable of being easily and immediately added or removed to “adapt” the unit to individual needs or preferences.

An adaptable dwelling unit has all the accessible features that a fixed accessible unit has but allows some items to be omitted or concealed until needed so the dwelling units can look the same as others and be better matched to individual needs when occupied.

In an adaptable dwelling, wide doors, no steps, knee spaces, control and switch locations, grab bar reinforcing and other access features must be built in. Grab bars however, can be omitted and installed when needed. Because the necessary blocking is already provided, the bars can simply be screwed in place without opening the existing walls to install reinforcing. Knee spaces can be concealed by installing a removable base cabinet that can simply be unscrewed from adjacent cabinets and slipped out when needed or by installing self-storing cabinet doors that fold and slide back. Counter tops and closet rods can be placed on adjustable supports rather than fixed at lower heights as required for some wheelchair users. Standards for adaptable design have been incorporated into both ANSI and UFAS. These standards specify adaptability criteria which will provide a level of full accessibility when adjustments are made.

Adaptable features are a marketing advantage for owners and occupants as they allow fully accessible dwellings to be closely suited to their users and marketable to anyone.

Adaptable design means readily adjusted. It does not allow building inaccessible units on the promise that they will be renovated or remodeled for accessibility upon request. For this reason, it is best to remember adaptable features as those that can be adjusted in a short time by unskilled labor without involving structural or finish material changes.

Additional information about adaptable design in housing is available in the HUD publication *Adaptable Housing: A Technical Manual for Implementing Adaptable Dwelling Unit Specifications*, available for \$3.00 from: HUD USER, PO Box 6091, Rockville, Maryland 20850, 1.800.245.2691, Publication #: HUD-1124 - PDR.

Universal Design: Items that are usable by most people regardless of their level of ability or disability can be considered universally usable. Many accessible and adaptable features are universally usable. For example, round door knobs are not usable by people with limited use of their hands, but lever handles which are readily available in all price ranges, styles and colors are usable by almost everyone, including people who have no hands. Some items are made more universally usable by their placement. Light switches located at a lower height and electrical receptacles raised to 15" to 18" above the floor place them within reach of most people without requiring bending or stretching. Bathtub controls located off center toward the outside of the tub provide the same benefit. Some features are made more universally usable by making them adjustable. Closet rods, shelves and countertops are a few adjustable universally usable items. Some universally usable items must be selected. For example, to be easy, comfortable and usable by most people, a water cooler may need to be a dual height model with both standard and lower spouts and controls. To create a universally usable group toilet room, two types of accessible toilet stalls may need to be installed. A universally usable landscape design may include alternative paths free of steps and stairs. The widespread use in product design of universally usable features such as touch sensitive controls is bringing the universal approach into the market for consumer items.

Universal design addresses the scope of accessibility and suggests making all elements and spaces accessible to and usable by all people to the greatest extent possible. This is accomplished through thoughtful planning and design at all stages of any design project. It need not increase costs or result in special, clinical or different looking facilities. Universal design requires an understanding and consideration of the broad range of human abilities throughout the lifespan. Creative application of that knowledge results in products, buildings and facilities that are usable by most people regardless of their level of ability or disability.

By incorporating the characteristics necessary for people with physical limitations into the design of common products and building spaces, we can make them easier and safer for everyone to use and more widely marketable and profitable. This universal design approach goes beyond the minimum requirements and limitations of accessibility law.

For more information, contact:

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Appendix L

COMMUNICATIONS GUIDELINES

Now That We've Met, What Do I Say?

Outdated or Offensive	Reason	Currently Accepted
"The" anything, e.g., <i>the</i> handicapped, <i>the</i> disabled, <i>the</i> blind.	Views people in terms of their disability; groups people into one undifferentiated category; condescending.	People with disabilities. Deaf people. Blind people.
Deaf and dumb, dumb, deaf-mute.	Implies mental incapacitation.	Deaf. Hearing-impaired. Speech-impaired.
Confined to a wheelchair; wheelchair-bound.	Wheelchairs don't confine; they make people mobile.	Wheelchair-user. Uses a wheelchair.
Cripple, crippled.	From Old English: <i>to creep</i> implies inferiority Dehumanizing.	Physical disability.
Handicapped.	Disabilities don't handicap; attitudes and architecture handicap.	Physical disability.
Deformed, freak, vegetable.	Connotes repulsiveness, oddness. Dehumanizing.	Multiple disabilities, severe disabilities.
Crazy, insane, psycho, maniac.	Stigmatizing.	Behavior disorder. Emotional disability.

Outdated or Offensive	Reason	Currently Accepted
Retarded, retardate, slow, simple, moron, idiot, mongoloid(ism).	Stigmatizing.	People with mental retardation. Developmentally delayed. Has Down's Syndrome.

General Guidelines

1. See the person who has a disability as a person, not as a disability.
2. Do not "talk down" to disabled people. Avoid responding to a person's disabilities out of "gratefulness" for not having a disability yourself.
3. Speak directly to the person who has a disability, not to a companion or an interpreter.
4. Treat adults as adults. Do not use first names unless that familiarity is extended to everyone present.
5. Be considerate. It might take extra time for the person with a disability to say or do things.
6. Relax. Don't worry about using common expressions like "see you later," or "I've got to be running along" when talking to persons with physical or visual disabilities.

Communicating with Persons Who Use Wheelchairs or Crutches

1. Don't lean or hang on a person's wheelchair. It is part of that person's body space.
2. Sit, squat, or kneel if conversation continues for more than a few minutes. Don't be a "pain in the neck."
3. Ask a wheelchair occupant if he or she wants to be pushed *before* you do so.
4. Allow a person who uses a wheelchair or crutches to keep them within reach. Many wheelchair users can transfer to chairs, car seats, etc. Some wheelchair users can walk with crutches part of the time.
5. Consider distance, weather conditions, and surfaces such as stairs, curbs, or inclines when giving directions.

Recommended Books, Films, and Videos

The following materials are available through many local public libraries.

"Who Are the DeBolts?" (16mm film)

Academy Award-winning documentary about the DeBolt family and their nineteen children, all but five of whom have multiple disabilities.

Move Over, Wheelchairs Coming Through! by Ronald Roy (Nonfiction)

Takes a brief look into the lives of seven young people who use wheelchairs. Includes photographs, index, and bibliography of related reading. For ages 8-13. Published in 1985 by Clarion. No longer in print.

Communicating with Persons Who Have Vision Loss

1. Introduce yourself and any others who may be with you. Use a normal tone of voice.
2. Use the person's name when starting conversation so they know you are speaking to them. Let the person know when you are ending a conversation or moving away.

3. Ask the person if he or she wants help. When giving assistance, allow the person to take your arm, which helps you to guide. Warn the person of any steps or changes in level. Use specifics, such as *left* and *right*.
4. Offer seating by placing the person's hand on the back or arm of the seat.
5. Don't pet a guide dog. Remember to walk on the side of the person away from the dog.

Recommended Books, Films and Videos

The following materials are available through local public libraries.

"Finding My Way" (Videocassette)

Produced for WGBH-TV, Boston. Focuses on a boy who is blind, but learning to become independent in his neighborhood and school. For juvenile and young adult viewers.

The Miracle Worker by William Gibson (Play)

A play in three acts based on the life of the young Helen Keller and her teacher, Anne Sullivan.

Annerton Pit by Peter Dickinson (Fiction)

The author has created a ghost story and psychological thriller through the senses of Jake, a boy who is blind. For young adult readers.

Communicating with Persons Who Have Hearing Loss

1. Get the person's attention. Wave your hand, tap the person's shoulder, or bang on the table, if necessary.
2. Speak clearly and slowly. Don't shout or exaggerate lip movements. Keep sentences short.
3. Be flexible in your language. If the person has difficulty understanding you, rephrase your statement using simpler words. Don't keep repeating. If difficulty persists, write it down.
4. Provide a clear view of your face and keep the light source on it. Keep hands, food, etc. away from your mouth when talking.
5. Be a lively speaker. Use facial expressions that match your tone of voice, and use gestures and body movements to aid communication.

Recommended Books, Films, and Videos

The following materials are available through local public libraries.

"Across the Silence Barrier" (16mm film)

Explores the world of deaf people. Part of the NOVA series.

Deaf Like Me by Thomas Spradley and James Spradley (Nonfiction)

True story about a family's struggle to raise their deaf daughter.

The Hunchback of Notre Dame by Victor Hugo (Fiction)

Classic story of a man whose multiple disabilities, not the least of which is his deafness, make him a target for inhumane treatment.

A Button in Her Ear by Ada Litchfield

(Fiction) Illustrated, unsentimental story about a girl who needs a hearing aid. For ages 6-8.

Communicating with Persons Who Have Speech Difficulties

1. Give your complete attention to the person who has difficulty speaking.

2. Be patient. Don't correct and don't speak for the person. Allow extra time. Give help when needed.
3. Maintain an encouraging manner.
4. Ask questions that require short answers or a nod or shake of the head, when necessary.
5. If you have difficulty understanding, don't pretend. Repeat as much as you understand. The person's reaction will clue you in.

Recommended Books, Films, and Videos

The following materials are available through local public libraries and or video rental stores.

"My Left Foot" (Videocassette)

Autobiographical story about Christy Brown, Irish painter and writer, who was born with cerebral palsy. Brown emerges as a wholly realized person. Won Academy Awards in 1990 for Best Actor and Best Supporting Actress.

The Painted Bird by Jerzy Kosinski (Fiction)

Confronted with extreme irrationality and brutality, a six-year-old boy in German-occupied Poland during World War II elects to become mute.

The Night of the Bozos by Jan Slepian (Fiction)

Story about a young man who stutters and his thirteen-year-old nephew who is reclusive. Together they leave their self-imposed isolation for the possibilities of relationships in the real world. For young adult readers.

Communicating With Persons Who Have Mental Retardation

1. Speak slowly and distinctly. *Show* might be more effective than *tell*.
2. Tell the person what to do, *not* what not to do.
3. Help the person feel comfortable. Maintain nonthreatening voice and facial expressions.
4. Treat the adult person who has mental retardation as an adult.
5. Base exceptions to rules on reason, not pity.

Recommended Books, Films, and Videos

The following materials are available through local public libraries.

"Clockworks" (16mm film)

Short story about a boy with Down's syndrome. All the actors are amateurs; the boy who plays the lead actually has Down's syndrome.

The Alfred Summer by Jan Slepian (Fiction)

The setting is Brooklyn in the 1930s. The major characters, who have various physical and emotional disabilities, learn and grow within realistic expectations. For young adult readers.

Note: Guidelines in Appendix L are based on recommendations from the Easter Seals Society.

Handicapped Accessibility

- ◆ The HOME regulations also require adherence to the three following regulations governing the accessibility of Federally-assisted buildings, facilities and programs.
 - **Americans with Disabilities Act (42 U.S.C. 12131; 47 U.S.C. 155, 201, 218, and 225)**: Provides comprehensive civil rights to individuals with disabilities in the areas of employment, public accommodations, state and local government services and telecommunications. The Act, also referred to as the ADA, also states that discrimination includes the failure to design and construct facilities (built for first occupancy after January 26, 1993) that are accessible to and usable by persons with disabilities. The ADA also requires the removal of architectural and communication barriers that are structural in nature in existing facilities. Removal must be readily achievable, easily accomplishable and able to be carried out without much difficulty or expense.
 - **Fair Housing Act**: Multi-family dwellings must also meet the design and construction requirements at 24 CFR 100.205, which implement the Fair Housing Act (42 U.S.C. 3601-19).
 - **Section 504**: Section 504 of the Rehabilitation Act of 1973 prohibits discrimination in Federally assisted programs on the basis of handicap. Section 504 imposes requirements to ensure that "qualified individuals with handicaps" have access to programs and activities that receive Federal funds. Under Section 504, recipients and subrecipients are defined more broadly than under the HOME program. Section 504 recipients and subrecipients include any entity that receives Federal funding (for example, a subrecipient or CHDO). The specific requirements under Section 504 are summarized in Exhibit 10-1.

CHAPTER 10: OTHER FEDERAL REQUIREMENTS

Exhibit 10-1 Section 504 Requirements
Removal of Physical Barriers
<ul style="list-style-type: none"> • For new construction of multi-family projects, 5 percent of the units in the project (but not less than one unit) must be accessible to individuals with mobility impairments, and an additional 2 percent of the units (but not less than one unit) must be accessible to individuals with sensory impairments. • The Section 504 definition of substantial rehabilitation multi-family projects includes construction in a project with 15 or more units for which the rehabilitation costs will be 75 percent or more of the replacement cost. In such developments, 5 percent of the units in the project (but not less than one unit) must be accessible to individuals with mobility impairments, and an additional 2 percent (but not less than one unit) must be accessible to individuals with sensory impairments. • When rehabilitation less extensive than substantial rehabilitation is undertaken, alterations must, to the maximum extent feasible, make the unit accessible to and usable by individuals with handicaps, until 5 percent of the units are accessible to people with mobility impairments. Alterations to common spaces must, to the maximum extent feasible, make the project accessible. • Accessible units must be, to the maximum extent feasible, distributed throughout projects and sites and must be available in a sufficient range of sizes and amenities so as to not limit choice. • Owners and managers of projects with accessible units must adopt suitable means to assure that information regarding the availability of accessible units reaches eligible individuals with handicaps. They also must take reasonable non-discriminatory steps to maximize use of such units by eligible individuals. • When an accessible unit becomes vacant, before offering the unit to a non-handicapped individual, the owner/manager should offer the unit: first, to a current occupant of the project requiring the accessibility feature; and second, to an eligible qualified applicant on the waiting list requiring the accessibility features. • The usual standards for ensuring compliance with Section 504 are the Uniform Federal Accessibility Standards (UFAS), although deviations are permitted in specific circumstances.
Provide Program Accessibility
<ul style="list-style-type: none"> • Individuals with handicaps must be able to find out about, apply for and participate in Federally-assisted programs or activities. • Special communication systems may be needed for outreach and ongoing communication (e.g., Telecommunications Devices for the Deaf (TDD), materials on tape or in Braille, accessible locations for activities and meetings). • Policies and procedures must be non-discriminatory (e.g., housing providers may not ask people with handicaps questions not asked of all applicants, screen individuals with handicaps differently or assess an individual's ability to live independently).
Make Employment Accessible
<ul style="list-style-type: none"> • Employers must not discriminate. • Employers must remove physical and administrative barriers to employment. • Employers must make reasonable accommodations for individuals with known handicaps (e.g., job restructuring, providing readers or sign interpreters, making facilities accessible).
Administrative Requirements
<ul style="list-style-type: none"> • If recipients or subrecipients have 15 or more employees, they must: <ul style="list-style-type: none"> ◆ designate a Section 504 Coordinator, and ◆ notify program participants and employees of non-discrimination policies. • All recipients and subrecipients must conduct self-evaluations of compliance with Section 504.

U.S. Department of Housing and Urban Development

COMMUNITY PLANNING AND DEVELOPMENT

Special Attention of:
All Secretary's Representatives
All State/Area Coordinators
All CPD Office Directors
All HOME Coordinators
All HOME Participating Jurisdictions
All CDBG Grantees
All FHEO Field Directors

Notice CPD-00-9

Issued: December 26, 2000

Expires: December 26, 2001

SUBJECT: Accessibility Notice: Section 504 of the Rehabilitation Act of 1973 and The Fair Housing Act and their applicability to housing programs funded by the HOME Investment Partnerships Program and the Community Development Block Grant Program

I. PURPOSE

The purpose of this Notice is to remind recipients of Federal funds in the HOME Investment Partnerships Program (HOME) or the Community Development Block Grant (CDBG) Program of their obligation to comply with Section 504 of the Rehabilitation Act of 1973, the Fair Housing Act, and HUD's implementing Regulations (24 CFR Parts 8 and 100, respectively), which prohibit discrimination based on disability and establish requirements for program accessibility and physical accessibility in connection with housing programs. This Notice describes key compliance elements for housing assisted under the HOME and CDBG programs. However, recipients should review the specific provisions of the Fair Housing Act, Section 504, and their respective regulations in order to assure that their programs are administered in full compliance. Note with respect to Section 504, this Notice does not address the applicability of Section 504's physical accessibility requirements to homeownership programs financed with HOME/CDBG assistance.

The Notice also recommends that recipients conduct updated self evaluations as a useful tool for enhancing efforts to comply with accessibility requirements in HOME/CDBG programs, as well as to document those efforts.

Applicability

This Notice applies to new construction and rehabilitation of housing under the HOME and CDBG programs. Each primary recipient of Federal funds from the HOME or CDBG program is responsible for providing this notice to each organization or other entity participating in the construction or rehabilitation of projects receiving such funding and for establishing policies and practices that it will use to monitor compliance of all covered programs, activities, or work performed by subrecipients, contractors, subcontractors, management agents, etc.

Distribution: W-3-1

II. SECTION 504 OF THE REHABILITATION ACT OF 1973

Background

The HOME and CDBG programs, through State and local governments, provide assistance that may be used for the construction or rehabilitation of affordable housing. HOME and CDBG funds may be used to construct or rehabilitate rental housing, to rehabilitate owner occupied housing, and to finance homeownership programs.

Section 504 of the Rehabilitation Act of 1973 prohibits discrimination against persons with disabilities in the operation of programs receiving Federal financial assistance. HUD regulations implementing Section 504 contain accessibility requirements for new construction and rehabilitation of housing as well as requirements for ensuring that the programs themselves are operated in a manner that is accessible to and usable by persons with disabilities. (See 24 CFR Part 8)

For the purposes of this Notice, the references to multifamily housing projects covered by Section 504 only apply to multifamily rental housing projects.

The Section 504 regulations define "recipient" as any State or its political subdivision, any instrumentality of a state or its political subdivision, any public or private agency, institution, organization, or other entity, or any person to which Federal financial assistance is extended for any program or activity directly or through another recipient, including any successor, assignee, or transferee of a recipient, but excluding the ultimate beneficiary of the assistance. (24 CFR §8.3) A family that will receive CDBG or HOME funds for the rehabilitation of an owner-occupied unit is not subject to the requirements of Part 8 since it is the ultimate beneficiary of the funds, and not a recipient of Federal financial assistance.

New construction

HUD regulations implementing Section 504 at 24 CFR §8.22(a) require that new construction of multifamily projects be designed and constructed to be readily accessible to and usable by persons with disabilities. Multifamily housing projects are defined at 24 CFR §8.3 as "projects containing five or more dwelling units". Both the individual units and the common areas in the building must be accessible.

For **new construction** of multifamily rental projects, a minimum of 5 percent of the dwelling units in the project (but not less than one unit) must be accessible to individuals with mobility impairments. An additional 2 percent of the dwelling units (but at a minimum, not less than one unit) must be accessible to individuals with sensory impairments (i.e. hearing or vision impairments), unless HUD prescribes a higher number pursuant to 24 CFR §8.22(c).

Rehabilitation

Substantial alterations - Section 504 requires that if alterations are undertaken to a housing project that has 15 or more units, and the rehabilitation costs will be 75 percent or more of the replacement cost of the completed facility, then such developments are considered to have undergone "substantial alterations" (24 CFR §8.23 (a)). For substantial alterations of multifamily rental housing, the accessibility

requirements contained in 24 CFR §8.22 must be followed -- a minimum of 5 percent of the dwelling units in the project (but not less than one unit) must be accessible to individuals with mobility impairments, and an additional 2 percent, at a minimum (but not less than one unit), must be accessible to individuals with sensory impairments.

Other alterations -- When **other alterations** that do not meet the regulatory definition of substantial alterations are undertaken in multifamily rental housing projects of any size, these alterations must, to the maximum extent feasible, make the dwelling units accessible to and usable by individuals with disabilities, until a minimum of 5 percent of the dwelling units (but not less than one unit) are accessible to people with mobility impairments, unless HUD prescribes a higher number pursuant to 24 CFR 8.23(b)(2). If alterations of single elements or spaces of a dwelling unit, when considered together, amount to an alteration of a dwelling unit, then the entire dwelling unit shall be made accessible. For this category of rehabilitation the additional 2 percent of the dwelling units requirement for individuals with sensory impairments does not apply. Alterations to common spaces must, to the maximum extent feasible, make those areas accessible. A recipient is not required to make a dwelling unit, common area, facility or element accessible, if doing so would impose undue financial and administrative burdens on the operation of the multifamily housing project. (24 CFR §8.23(b)) Therefore, recipients are required to provide access in covered alterations up to the point of being infeasible or an undue financial and administrative burden.

Accessibility Standards

Dwelling units designed and constructed in accordance with the Uniform Federal Accessibility Standards (UFAS) will be deemed to comply with the Section 504 regulation. For copies of UFAS, contact the HUD Distribution Center at 1-800-767-7468; hearing or speech-impaired persons may access this number via TTY by calling the Federal Information Relay Service at 1-800-877-8339. Accessible units must be, to the maximum extent feasible, distributed throughout the projects and sites, and must be available in a sufficient range of sizes and amenities so as not to limit choice.

III. FAIR HOUSING ACT

Background

The Fair Housing Act, applies to almost all housing sold or rented in the United States. The Fair Housing Act prohibits discrimination in housing practices on the basis of race, color, religion, sex, and national origin. The Fair Housing Act was amended in 1988 to provide protections from discrimination in any aspect of the sale or rental of housing for families with children and persons with disabilities. The Fair Housing Act also establishes requirements for the design and construction of new rental or for sale multifamily housing to ensure a minimum level of accessibility for persons with disabilities. (See 24 CFR 100.200 et. seq.)

Section 804(f)(3)(C) of the Fair Housing Act requires that covered multifamily dwelling units designed and constructed for first occupancy after March 13, 1991, be designed and constructed in a manner that:

- (i) the public and common use portions of such dwellings are readily accessible to and usable by disabled persons;

(ii) all the doors designed to allow passage into and within the premises within such dwellings are sufficiently wide to allow passage by disabled persons in wheelchairs; and

(iii) all premises within such dwellings contain the following features of adaptive design:

- (I) an accessible route into and through the dwelling;
- (II) light switches, electrical outlets, thermostats, and other environmental controls in accessible locations;
- (III) reinforcements in bathroom walls to allow later installation of grab bars; and
- (IV) usable kitchens and bathrooms such that an individual in a wheelchair can maneuver about the space.

Covered multifamily dwelling units are:

- dwelling units in buildings consisting of 4 or more units served by one or more elevators, or
- ground floor dwelling units in other buildings with 4 or more units.

Information about housing designs that provide accessible features in compliance with the Fair Housing Act can be found in the HUD's Fair Housing Accessibility Guidelines which were published in the Federal Register on March 6, 1991 (56 F.R. 9472) and in HUD's Fair Housing Act Design Manual. These can be obtained from the HUD Distribution Center at 1-800-767-7468. Deaf, hard of hearing or speech-impaired individuals also may access this number via TTY by calling the Federal Information Relay Service at 1-800-877-8339.

The design and construction requirements in the Fair Housing Act apply only to a building designed and constructed for first occupancy after March 13, 1991. The Fair Housing Act regulations define a building for first occupancy as a building that has never been used for any purpose. Thus, the design and construction requirements in the Fair Housing Act will not apply to rehabilitation projects or activities.

Illustrations

It must be noted that, in many cases, new construction of rental projects funded in the HOME/CDBG Programs must meet both the Fair Housing Act and the Section 504 new construction requirements. Where two or more accessibility standards apply, the housing provider is required to follow and apply both standards, so that maximum accessibility is obtained. The following examples illustrate how these requirements will (or will not) apply.

- A rental building with an elevator constructed with HOME/CDBG funding would be required to have 5% of its dwelling units meet the Section 504 accessibility requirements at 24 CFR 8.22 and the remaining 95% of the dwelling units would be required to comply with the Fair Housing Act design and construction requirements at 24 CFR 100.205. Note: An additional 2% of the dwelling units are required to be accessible for people with vision and hearing impairments.
- A newly constructed 100 unit two-story garden apartment development with no elevator constructed with HOME/CDBG assistance with half (50) of its dwelling units on the ground floor and half (50) on the second floor would be required to have 5 of its ground floor

dwelling units built to comply with the Section 504 accessibility requirements at 24 CFR 8.22, and the remaining 45 ground floor dwelling units built to comply with the Fair Housing Act design and construction requirements at 24 CFR 100.205. Note: An additional 2% of the dwelling units are required to be accessible for people with vision and hearing impairments in accordance with Section 504.

- A development consisting entirely of multistory rental townhouses constructed with Federal financial assistance is not a covered multifamily dwelling for purposes of the design and construction requirements of the Fair Housing Act at 24 CFR 100.205 since none of the dwelling units qualify as ground floor units, but would still have to meet the Section 504 5% + 2% accessibility requirements at 24 CFR 8.22. (A townhouse development of 5 or more single story dwelling units would still have to comply with both Section 504 and the Fair Housing Act design and construction requirements at 24 CFR 100.200 et. seq.)

IV. Increasing Program Accessibility

HUD's Section 504 regulations require that a recipient of Federal financial assistance ensure that its program, when viewed in its entirety, is accessible to persons with disabilities. (24 CFR 8.20) In order to meet this obligation, participants in the HOME/CDBG program must:

- To the maximum extent feasible, distribute accessible units throughout the projects and sites, and make them available in a sufficient range of sizes and amenities so as not to limit choice.
- Adopt suitable means to assure that information regarding the availability of accessible units reaches eligible individuals with disabilities. They must also take reasonable nondiscriminatory steps to maximize use of such units by eligible individuals.
- When an accessible unit becomes vacant, before offering the unit to an individual without a disability, offer the unit: first, to a current occupant of the project requiring the accessibility feature; and second, to an eligible qualified applicant on the waiting list requiring the accessibility features.
- When an applicant or tenant requires an accessible feature or policy modification to accommodate a disability, a federally assisted provider must provide such feature or policy modification unless doing so would result in a fundamental alternation in the nature of its program or an undue financial and administrative burden. See 24 CFR 8.4, 8.24, and 8.33 for further requirements and guidance.
- Providers are required to ensure that information about their programs is disseminated in a manner that is accessible to persons with disabilities. For example, special communication systems can greatly increase the effectiveness of outreach and ongoing communication (e.g., Telecommunications Devices for the Deaf (TTY), materials on tape or in Braille).
- Providers must ensure that activities and meetings are conducted in accessible locations.

Participants in the HOME/CDBG program may:

- Ask applicants for information that can demonstrate that they can meet the obligations of tenancy including financial information, references, prior tenancy history, etc. However, housing providers may not inquire into the nature and severity of an applicant or tenant's disability, nor may they ask persons with disabilities questions not asked of all applicants, apply different types of screening criteria, or assess an applicant's ability to live independently.
- Ask if the applicant qualifies for a housing program or unit designed for persons with a disability, when the housing program or unit is designed for such persons.
- Consider including a lease provision that requires a nondisabled family occupying an accessible unit to move if a family with a disability needing that size unit applies and there is an appropriately sized nonaccessible unit available for the relocating family.

V. Self-Evaluation

The Section 504 regulations required recipients of Federal financial assistance to conduct a self-evaluation of their policies and practices to determine if they were consistent with the law's requirements. This self evaluation was to have been completed no later than July 11, 1989. The regulatory deadlines are long past. However, self-evaluation continues to be an excellent management tool for ensuring that a recipient's current policies and procedures comply with the requirements of Section 504.

Involving persons with disabilities in the self-evaluation process is very beneficial. This will assure the most meaningful result for both the recipient and for persons with disabilities who participate in the recipients programs and activities. It is important to involve persons and/or organizations representing persons with disabilities, and agencies or other experts who work regularly with accessibility standards.

Important steps in conducting a self-evaluation and implementing its results include the following:

- Evaluate current policies and practices and analyze them to determine if they adversely affect the full participation of individuals with disabilities in its programs, activities and services. Be mindful of the fact that a policy or practice may appear neutral on its face, but may have a discriminatory effect on individuals with disabilities.
- Modify any policies and practices that are not or may not be in compliance with Section 504 regulations.
- Take appropriate corrective steps to remedy those policies and practices which either are discriminatory or have a discriminatory effect. Develop policies and procedures by which persons with disabilities may request a modification of a physical barrier or a rule or practice that has the effect of limiting or excluding a person with a disability from the benefits of the program.
- Document the self-evaluation process and activities. The Department recommends that all recipients keep the self-evaluation file for at least three years, including records of the

- individuals and organizations consulted, areas examined and problems identified, and document modifications and remedial steps.

The Department also recommends that recipients periodically update the self-evaluation, particularly, for example, if there have been changes in recipient owned housing stock, such as demolition of housing units and construction and/or alteration of housing, or changes in the programs and services of the agency.

VI. Visitability

Visitability Concept

Although not a requirement, it is recommended that all design, construction and alterations incorporate, whenever practical, the concept of visitability in addition to the requirements under Section 504 and the Fair Housing Act.

Visitability is a design concept, which for very little or no additional cost, enables persons with disabilities to visit relatives, friends, and neighbors in their homes within a community.

Design Considerations

Visitability design incorporates the following in all construction or alterations, in addition to the applicable requirements of Section 504 and the Fair Housing Act, whenever practical and possible for as many units as possible within a development:

- Provide a 32" clear opening in all bathroom and interior doorways
- Provide at least one accessible means of egress/ingress for each unit.

Benefits

Visitability also expands the availability of housing options for individuals who may not require full accessibility. It will assist project owners in making reasonable accommodations and reduce, in some cases, the need for structural modifications or transfers when individuals become disabled in place. Visitability will also improve the marketability of units.

HUD Technical Assistance Concerning these Requirements

Further information concerning compliance with any of these requirements may be obtained through the HUD web page (<http://www.hud.gov/fhe/504/sect504.html>). Additional assistance and information may be obtained by contacting the local Department of Housing and Urban Development Offices of Community Planning and Development (CPD) and Fair Housing and Equal Opportunity (FHEO) listed below:

CPD

FHEO

Boston, MA	617 565-5345	617 565-5310
Hartford, CT	806 240-4800 x3059	860 240-4800
New York, NY	212 264-0771 x3422	212 264-1290
Buffalo, NY	716 551-5755 x5800	716 551-5755
Newark, NJ	973 622-7900 x3300	973 622-7900
Philadelphia, PA	215 656-0624 x3201	215 656-0661
Pittsburgh, PA	412 644-2999	412 355-3167
Baltimore, MD	410 962-2520 x3071	410 962-2520
Richmond, VA	804 278-4503 x3229	804 278-4504
Washington, DC	202 275-0994 x3163	202 275-0848
Atlanta, GA	404 331-5001 x2449	404 331-1798
Birmingham, AL	205 290-7630 x1027	205 290-7630
South Florida	305 5364431 x2223	305 536-4479
Jacksonville, FL	904 232-1777 x2136	904 232-1777
San Juan, PR	787 766-5400 x2005	787 766-5400
Louisville, KY	502 582-6163 x214	502 582-6163 x230
Jackson, MS	601 965-4700 x3140	601 965-4700 x2435
Knoxville, TN	865 545-4391 x121	865 545-4379
Greensboro, NC	336 547-4005	336 547-4050
Columbia, SC	803 765-5564	803 765-5936
Chicago, IL	312 353-1696 x2702	312 353-7776
Minneapolis, MN	612 370-3019 x2107	612 370-3185
Detroit, MI	313 226-7908 x8055	313 226-6280
Milwaukee, WI	414 297-3214 x8100	414 297-3214
Columbus, OH	614 469-5737 x8240	614 469-5737 x8170
Indianapolis, IN	317 226-6303 x6790	317 226-7654
Little Rock, AK	501 324-6375	501 324-6296
Oklahoma City, OK	405 553-7569	405 553-7426
Kansas City, KS	913 551-5485	913 551-5834
Omaha, NE	402 492-3181	402 492-3109
St. Louis, MO	314 539-6524	314 539-6327
New Orleans, LA	504 589-7212 x3047	504 589-7219
Fort Worth, TX	817 978-5934 x5951	817 978-5870
San Antonio, TX	210 475-6820 x2293	210 475-6885
Albuquerque, NM	505 346-7271 x7361	505 346-7327
Denver, CO	303 672-5414 x1326	303 672-5437
San Francisco, CA	415 436-6597	415 436-6569
Los Angeles, CA	213 894-8000 x3300	213 894-8000 x3400
Honolulu, HI	808 522-8180 x264	808 522-8180
Phoenix, AZ	602 379-4754	602 379-6699 x5261
Seattle, WA	206 220-5150 x3606	206 220-5170
Portland, OR	503 326-7018	503 326-3349
Manchester, NH	603 666-7640 x7633	
Anchorage, AK	907 271-3669	
Houston, TX		713 313-2274



Home Safety Checklist

Created in partnership with the Administration on Aging

Rebuilding Together
1536 16th Street NW
Washington, DC 20036
800-4-REHAB-9
www.rebuildingtogether.org

Use this list to identify fall hazards and accessibility issues of the homeowner and family members. Home modification strategies on the reverse side of this page can help prioritize your work. Underline or use a highlighter to note problems and add comments.

1. EXTERIOR ENTRANCES AND EXITS

- Note condition of walk and drive surface; existence of curb cuts
- Note handrail condition, right and left sides
- Note light level for driveway, walk, porch
- Check door threshold height
- Note ability to use knob, lock, key, mailbox, peephole, and package shelf
- Do door and window locks work?

2. INTERIOR DOORS, STAIRS, HALLS

- Note height of door threshold, knob and hinge types; clear width door opening; determine direction that door swings
- Note presence of floor level changes
- Note hall width, adequate for walker/wheelchair
- Determine stair flight run: straight or curved
- Note stair rails: condition, right and left side
- Examine light level, clutter hazards
- Note floor surface texture and contrast

3. BATHROOM

- Are basin and tub faucets, shower control and drain plugs manageable?
- Are hot water pipes covered?
- Is mirror height appropriate, sit and stand?
- Note ability reach shelf above, below basin
- Note ability to step in and out of the bath and shower
- Can resident use bath bench in tub or shower?
- Note toilet height; ability to reach paper; flush; come from sit to stand posture
- Is space available for caregiver to assist?

4. KITCHEN

- Note overall light level, task lighting
- Note sink and counter heights
- Note wall and floor storage shelf heights
- Are undersink hot water pipes covered?
- Is there under counter knee space?
- Is there a nearby surface to rest hot foods on when removed from oven?
- Note stove control location (rear or front)

5. LIVING, DINING, BEDROOM

- Chair, sofa, bed heights allow sitting or standing?
- Do rugs have non-slip pad or rug tape?
- Chair available with arm rests?
- Able to turn on light, radio, TV, place a phone call from bed, chair, and sofa?

6. LAUNDRY

- Able to hand-wash and hang clothes to dry?
- Able to access automatic washer/dryer?

7. TELEPHONE AND DOOR

- Phone jack location near bed, sofa, chair?
- Able to get phone, dial, hear caller?
- Able to identify visitors, hear doorbell?
- Able to reach and empty mailbox?
- Wears neck/wrist device to obtain emergency help?

8. STORAGE SPACE

- Able to reach closet rods and hooks, open bureau drawers?
- Is there a light inside the closet?

9. WINDOWS

- Opening mechanism at 42 inches from floor?
- Lock accessible, easy to operate?
- Sill height above floor level?

10. ELECTRIC OUTLETS AND CONTROLS

- Sufficient outlets?
- Outlet height, wall locations
- Low vision/sound warnings available?
- Extension cord hazard?

11. HEAT, LIGHT, VENTILATION, SECURITY, CARBON MONOXIDE, WATER TEMP CONTROL

- Are there smoke/CO detectors and a fire extinguisher?
- Thermometer displays easily readable?
- Accessible environmental controls?
- Pressure balance valve available?
- Note rooms where poor light level exists
- Able to open windows; slide patio doors?
- Able to open drapes or curtains?

COMMENTS:

HELP PREVENT FALLS: Use this list to prioritize work tasks. Leave a copy of this list with the family so they can make further improvements.

1. EXTERIOR ENTRANCES AND EXITS

- Increase lighting at entry area
- Install stair rails on both sides
- Install door lever handles; double-bolt lock
- Install beveled, no step, no trip threshold
- Remove screen or storm door if needed
- Create surface to place packages when opening door
- Install peephole on exterior door
- Repair holes, uneven joints on walkway
- Provide non-slip finish to walkway surface
- Add ramp

2. INTERIOR DOORS, HALLS, STAIRS

- Create clear pathways between rooms
- Apply color contrast or texture change at top and bottom stair edges
- Install door lever handle
- Install swing-clear hinges to widen doorway. Minimum width: 32 inches
- Install beveled thresholds (max 1/2 inch)
- Replace or add non-slip surface on steps
- Repair or install stair handrails on both sides

3. BATHROOM

- Install swing-clear hinges to widen doorway. Minimum width: 32 inches
- Install secure wall reinforcement and place grab bars at toilet, bath and shower
- Install adjustable-height shower head
- Install non-slip strips in bath/shower
- Secure floor bathmat with non-slip, double-sided rug tape
- Elevate toilet height by adding portable seat or raising toilet base on a pedestal
- Adapt flush handle or install flush sensor
- Adapt or relocate toilet paper dispenser
- Round counter corners to provide safety
- Insulate hot water pipes if exposed
- Create sitting knee clearance at basin by removing vanity door and shelves underneath
- Install mirror for sitting or standing view
- Install good-quality non-glare lighting
- Install shower with no threshold if bathing abilities are severely limited

4. KITCHEN

- Increase task lighting at sink, stove, etc.
- Install D-type cupboard door handles
- Install adjustable shelving to increase access to upper cabinets
- Increase access to under counter storage space by installing pull-out units
- Insulate hot water pipes if exposed
- Install hot-proof surface near oven
- Install switches and outlets at front of counter

- Install pressure-balanced, temperature-regulated, lever faucets
- Create sitting knee clearance under work sites by removing doors or shelves
- Improve color contrast of cabinet and counters surface edges for those with low vision
- Add tactile and color-contrasted controls for those with low vision

5. LIVING, DINING, BEDROOM

- Widen or clear pathways within each room by rearranging furniture
- Secure throw and area rug edges with double-sided tape
- Improve access to and from chairs and beds by inserting risers under furniture legs
- Use side bed rail or chairs with armrests
- Install telephone jack near chair or bed
- Enlarge lamp switch or install touch-control lamp at bedside
- Install adjustable closet rods, shelving and light source for better storage access
- Install vertical pole adjacent to chair and sofa
- Raise furniture to appropriate height using leg extender products
- Install uniform level floor surfaces using wood, tile or low-pile rugs

6. LAUNDRY

- Build a counter for sorting and folding clothes
- Adjust clothesline to convenient height
- Relocate laundry appliances

7. TELEPHONE AND DOOR

- Install phone jacks near bed, sofa, and chair
- Install peephole at convenient height
- Install flashing light or sound amplifier to indicate ringing doorbell for those with visual or hearing problems
- Install mailbox at accessible height

8. STORAGE SPACE

- Install lights inside closet
- Install adjustable closet rods and shelves
- Install bi-fold or pocket doors

9. WINDOWS

- Install handles and locks that are easy to grip, placed at appropriate heights

10. ELECTRICAL OUTLETS AND CONTROLS

- Install light fixtures or outlet for lamps
- Install switches at top and bottom of stairs

11. HEAT, AIR, LIGHT, SECURITY, WATER TEMP, CARBON MONOXIDE CONTROLS

- Install smoke/CO detectors, fire extinguishers
- Increase residents' access to environmental control systems

Universal Design

THE PRINCIPLES OF UNIVERSAL DESIGN

Version 2.0 (4/1/97)

UNIVERSAL DESIGN: The design of products and environments to be usable by all people, to the greatest extent possible, without adaptation or specialized design.

The authors, a working group of architects, product designers, engineers and environmental design researchers, collaborated to establish the following Principles of Universal Design to guide a wide range of design disciplines including environments, products and communications. These seven principles may be applied to evaluate existing designs, guide the design process, and educate both designers and consumers about the characteristics of more usable products and environments.

1 **EQUITABLE USE**

The design is useful and marketable to people with diverse abilities.

2 **FLEXIBILITY IN USE**

The design accommodates a wide range of individual preferences and abilities.

3 **SIMPLE AND INTUITIVE USE**

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

4 **PERCEPTIBLE INFORMATION**

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

5 **TOLERANCE FOR ERROR**

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

6 **LOW PHYSICAL EFFORT**

The design can be used efficiently and comfortably and with a minimum of fatigue.

7 **SIZE AND SPACE FOR APPROACH AND USE**

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

1

EQUITABLE USE

The design is useful and marketable to people with diverse abilities.



- GUIDELINES**
- 1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.
 - 1b. Avoid segregating or stigmatizing any users.
 - 1c. Make provisions for privacy, security, and safety equally available to all users.
 - 1d. Make the design appealing to all users.

- EXAMPLES**
- Power doors with sensors at entrances that are convenient for all users
 - Integrated, dispersed, and adaptable seating in assembly areas such as sports arenas and theaters

5

TOLERANCE FOR ERROR

The design minimizes hazards and the adverse consequences of accidental or unintended actions.



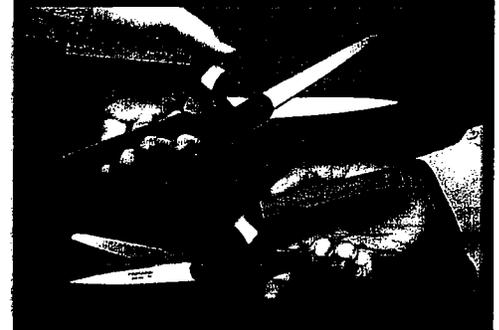
- GUIDELINES**
- 5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
 - 5b. Provide warnings of hazards and errors.
 - 5c. Provide fail safe features.
 - 5d. Discourage unconscious action in tasks that require vigilance.

- EXAMPLES**
- A double-cut car key easily inserted into a recessed keyhole in either of two ways
 - An "undo" feature in computer software that allows the user to correct mistakes without penalty

2

FLEXIBILITY IN USE

The design accommodates a wide range of individual preferences and abilities.



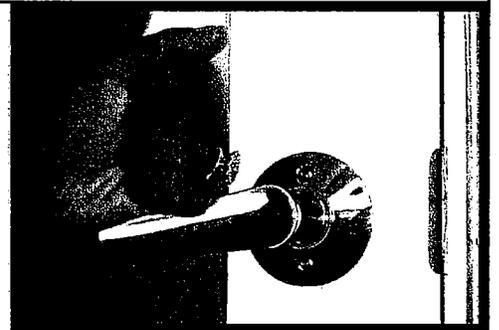
- GUIDELINES**
- 2a. Provide choice in methods of use.
 - 2b. Accommodate right- or left-handed access and use.
 - 2c. Facilitate the user's accuracy and precision.
 - 2d. Provide adaptability to the user's pace.

- EXAMPLES**
- Scissors designed for right- or left-handed users
 - An automated teller machine (ATM) that has visual, tactile, and audible feedback, a tapered card opening, and a palm rest

6

LOW PHYSICAL EFFORT

The design can be used efficiently and comfortably and with a minimum of fatigue.

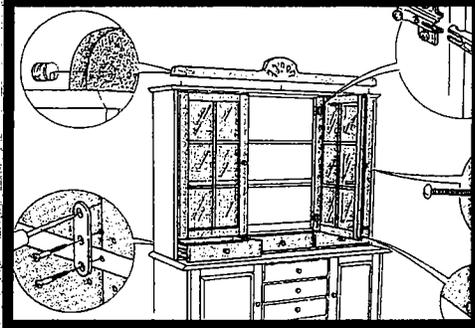


- GUIDELINES**
- 6a. Allow user to maintain a neutral body position.
 - 6b. Use reasonable operating forces.
 - 6c. Minimize repetitive actions.
 - 6d. Minimize sustained physical effort.

- EXAMPLES**
- Lever or loop handles on doors and faucets
 - Touch lamps operated without a switch

3 SIMPLE AND INTUITIVE USE

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

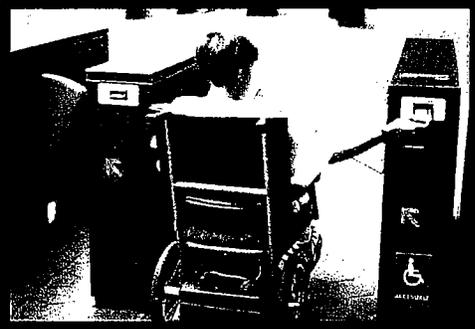


- GUIDELINES**
- 3a. Eliminate unnecessary complexity.
 - 3b. Be consistent with user expectations and intuition.
 - 3c. Accommodate a wide range of literacy and language skills.
 - 3d. Arrange information consistent with its importance.
 - 3e. Provide effective prompting and feedback during and after task completion.

- EXAMPLES**
- A moving sidewalk or escalator in a public space
 - An instruction manual with drawings and no text

7 SIZE AND SPACE FOR APPROACH AND USE

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

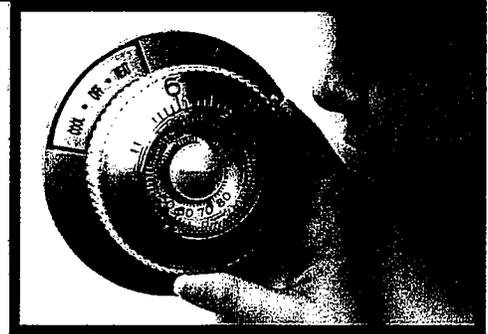


- GUIDELINES**
- 7a. Provide a clear line of sight to important elements for any seated or standing user.
 - 7b. Make reach to all components comfortable for any seated or standing user.
 - 7c. Accommodate variations in hand and grip size.
 - 7d. Provide adequate space for the use of assistive devices or personal assistance.

- EXAMPLES**
- Controls on the front and clear floor space around appliances, mailboxes, dumpsters, and other elements
 - Wide gates at subway stations that accommodate all users

4 PERCEPTIBLE INFORMATION

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.



- GUIDELINES**
- 4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
 - 4b. Maximize "legibility" of essential information.
 - 4c. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
 - 4d. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

- EXAMPLES**
- Tactile, visual, and audible cues and instructions on a thermostat
 - Redundant cueing (e.g., voice communications and signage) in airports, train stations, and subway cars

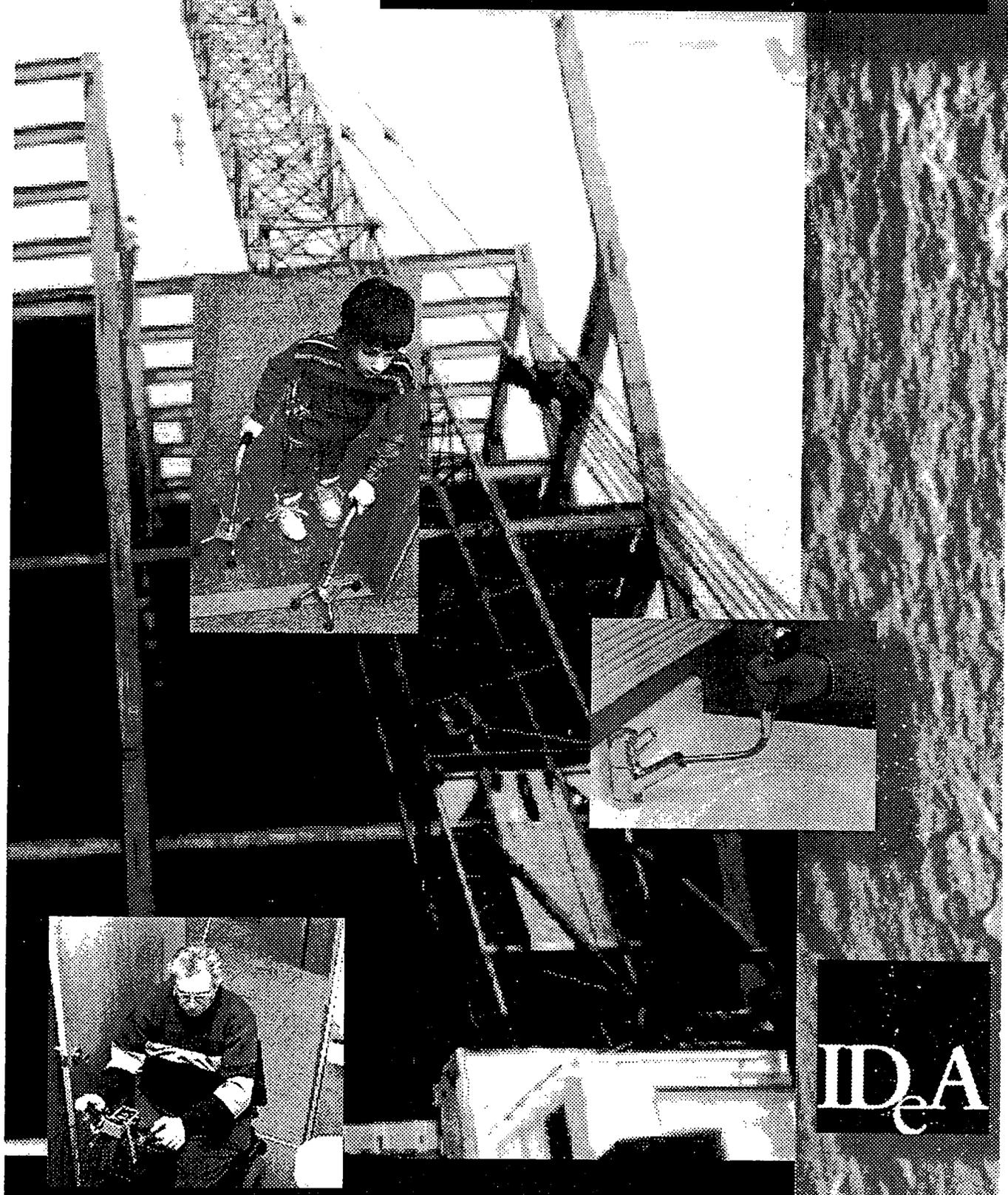
THE PRINCIPLES WERE COMPILED BY ADVOCATES OF UNIVERSAL DESIGN, IN ALPHABETICAL ORDER:

Bettye Rose Connell, Mike Jones,
Ron Mace, Jim Mueller,
Abir Mullick, Elaine Ostroff,
Jon Sanford,
Ed Steinfeld, Molly Story,
and Gregg Vanderheiden.

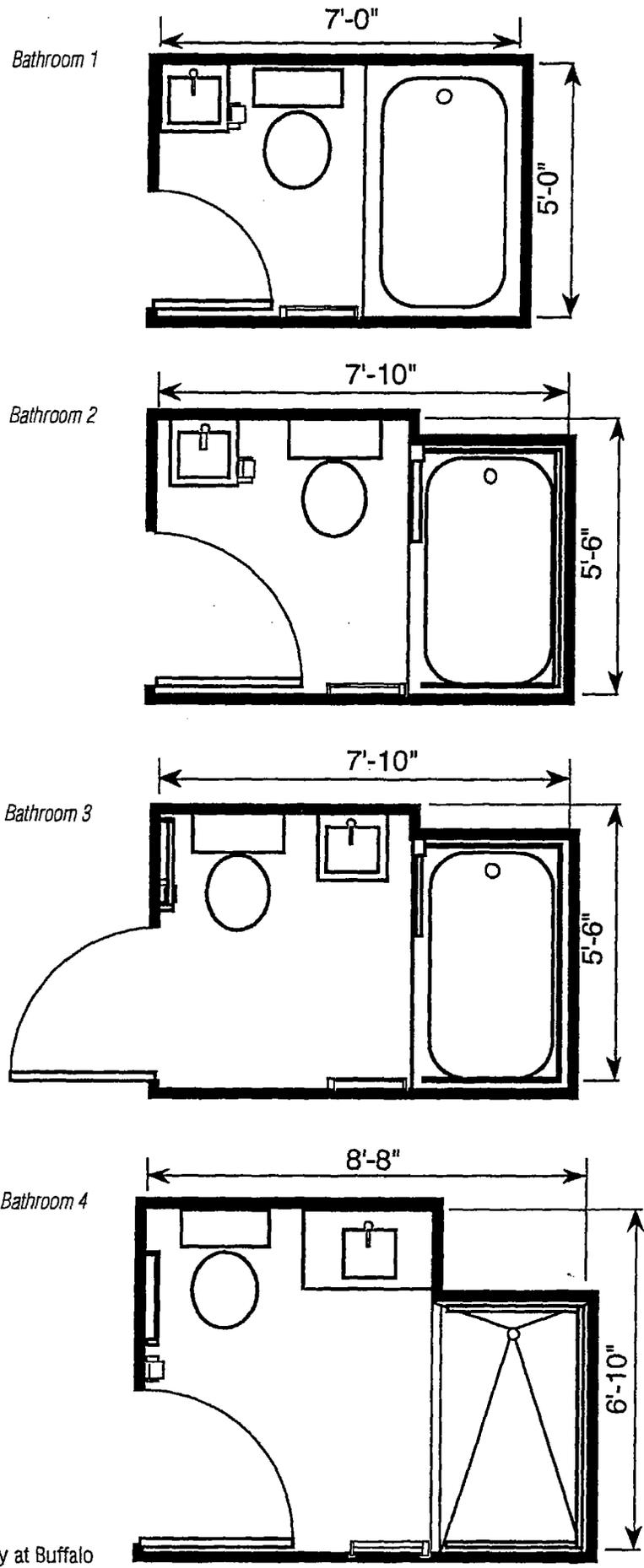
NOTE:

The Principles of Universal Design are not intended to constitute all criteria for good design, only universally usable design. Certainly, other factors are important, such as aesthetics, cost, safety, gender and cultural appropriateness, and these aspects must also be taken into consideration when designing.

FAIR HOUSING MEANS UNIVERSAL DESIGN



IDeA



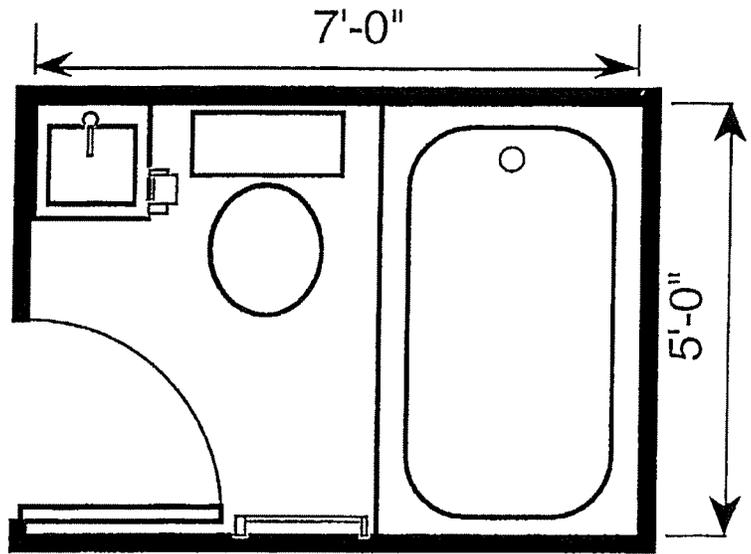
The first bathroom was a typical bathroom plan similar to what a homebuilder would use to keep the floor area of the bathroom as small as possible. Its features include:

- dimensions approximately 5 feet by 7 feet,
- fixtures all located against one wall,
- a door that was 28 inches wide, opened inward and had a standard threshold,
- a sink that was enclosed underneath with a lavatory cabinet,
- no grab bars,
- minimum clearances between fixtures.

There were many accessibility problems.

- The narrow door was difficult to pass through.
- The room was too small to close the door for privacy with a wheelchair inside.
- The room constrained caregivers assisting others in transfers.
- Lack of grab bars made the toilet and tub difficult or impossible to access.
- The faucet and medicine cabinet were difficult or impossible to reach.
- The mirror is often too high or too low.
- The close fixtures created a tight fit for all.





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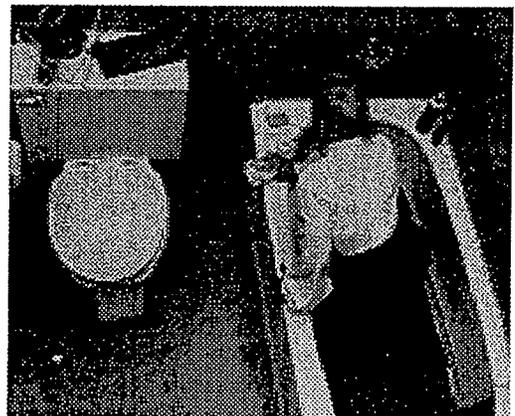


Cabinets under the sink limit usability.



Narrow doors are difficult to use.

Bathtubs without grab bars are hazardous for elderly people and those with back problems.



BATHROOM #2

Bathroom 2 meets the minimum requirements of the Fair Housing Guidelines. Changes include:

- 9 inches longer and 6 inches wider than Bathroom 1 (8 square feet larger).
- The door opened outward and was 6 inches wider than in Bathroom 1.
- Grab bars were added on the walls in the tub area and next to the toilet.
- The vanity cabinet was removed to provide for knee clearance.



Improvements include:

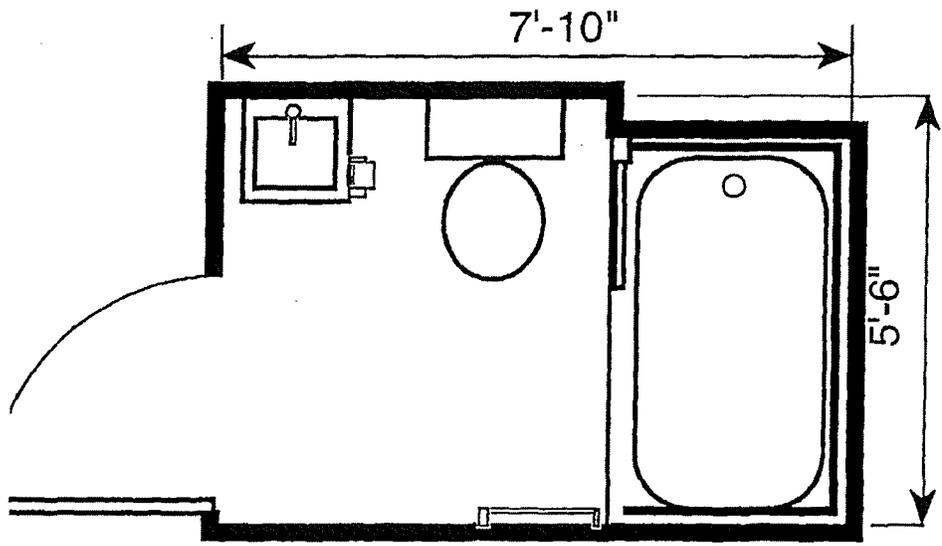
- The wider door was easier pass through.
- With the vanity removed, knee space under the sink allowed easier access to the faucet and medicine cabinet.
- Grab bars provided access to the tub and toilet.

Although Bathroom 2 was an improvement over Bathroom 1, there were still problems.

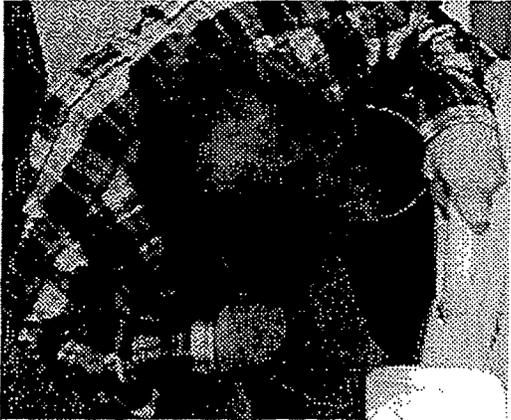
- Despite the larger size, the bathroom was still too small to turn a wheelchair around when the vanity was in place.
- The size also is too small to maneuver a chair alongside the tub, forcing people to do a 180 degree pivot transfer.

Benefits Of The Removed Vanity:

With the vanity cabinet removed, the area under the sink can be used as maneuvering space for wheelchairs. Not only can people who use wheelchairs get closer to the sink and medicine cabinet, but it is also easier to close a door that swings in and to turn around inside the bathroom. This could be vital for someone who can only transfer to a toilet from one direction. When the cabinet is removed, it is important to cover the plumbing either with a panel or insulation in order to prevent burns and other injuries.



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Grab bars at the tub and toilet increased accessibility.



The added space in this bathroom helped caregivers.



Knee space under the sink was a great improvement.

BATHROOM #3

14

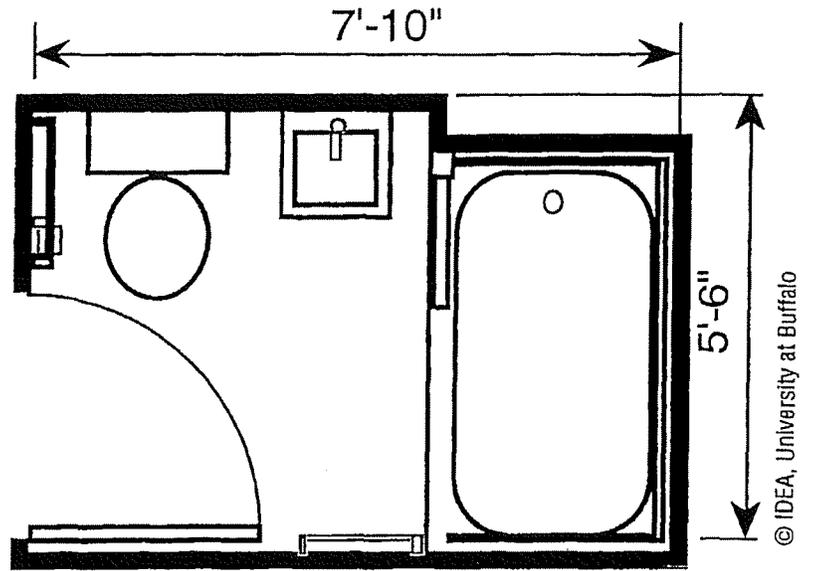
There are many ways to meet the Fair Housing Guidelines. Bathroom 3 demonstrated a different approach to Bathroom 2.

- The bathroom was the same size.
- The sink was located next to the tub to allow enough clearance for the door to open in, which is preferable if a bathroom opens off a perpendicular corridor.

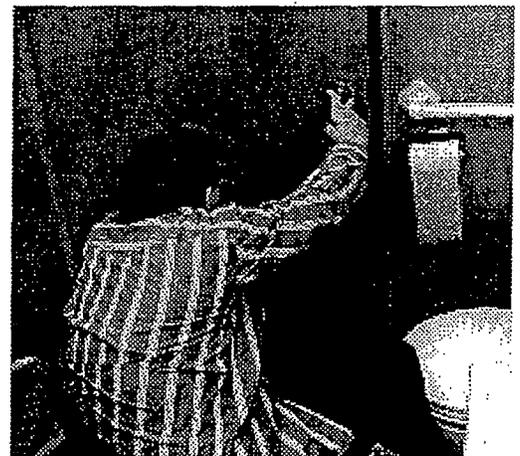
The new positions of the sink and toilet provided some additional benefits:

- It was easier to close the door and turn wheelchairs.
- There was more room in the toilet area.
- The wall next to the toilet allowed a standard grab bar, which was useful for everyone.
- As in bathroom 2, the wider door made it easier for everyone to use.

There were still problems however. For example, one participant found the grab bar next to the toilet too short. He had to use the door handle to pull up on so he could reach the bar. If the bathroom was wider, there would have been room for a longer grab bar.



Reversing the sink and toilet locations provided better maneuverability.



Sinks that are recessed in alcoves enhance the usability of a bathroom in a variety of ways. Not only do they allow greater clear floor space for general wheelchair maneuvers, but they also allow a person in a wheelchair to pull up parallel to the tub.

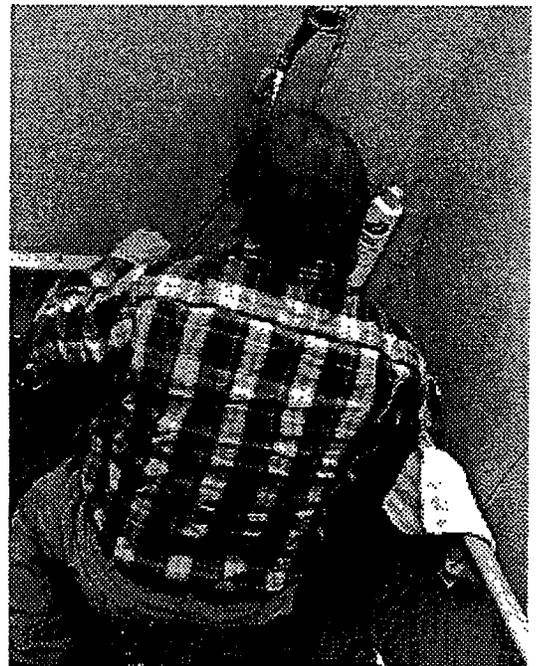
By increasing the length another 10 inches and the width 15 inches, a very accessible bathroom was provided. The improvement in usability for all of our participants was considerable.

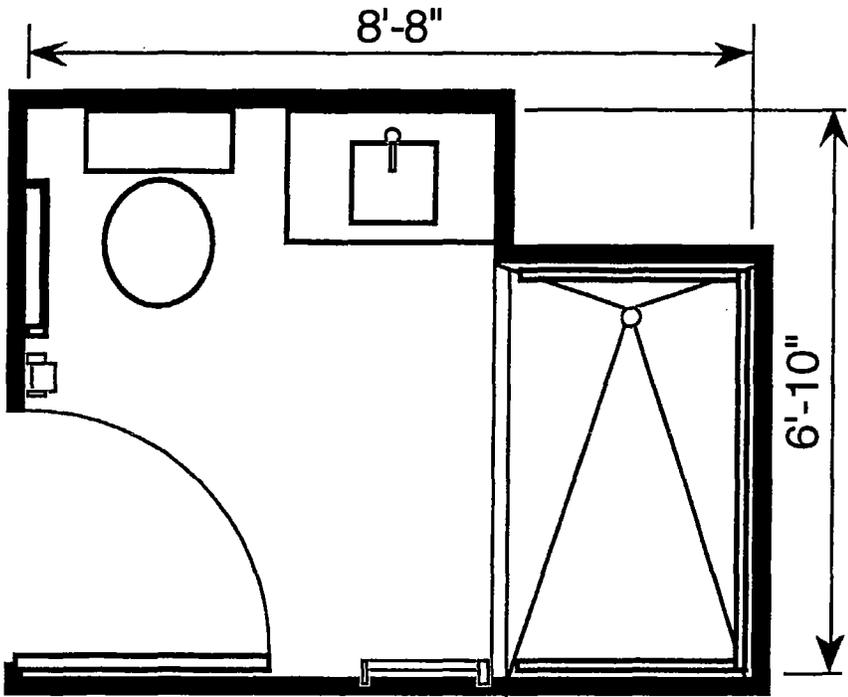
- There was plenty of space to maneuver and close the door, even for electric scooters and wheelchairs with long wheelbases.
- There was enough room for a parallel approach to the tub. This is safer for both the individual and caregivers.
- There was enough space for a longer grab bar at the toilet and more elbow room.
- The side mounted medicine cabinet was easier to reach.
- The roll in shower was much more convenient for bathing.
- Lever style handles made it easier for everybody to open the door.

Benefits Of The Recessed Sink:

Sinks that are recessed in alcoves enhance the usability of a bathroom in a variety of ways. Not only do they allow greater clear floor space for general wheelchair maneuvers, but they also allow a person in a wheelchair to pull up parallel to the tub. This enables easier side transfers because people can slide instead of standing and pivoting. It also makes it easier to reach the controls and adjust the water before getting into the tub. There is more room for caregivers and medicine cabinets can be side mounted for easier reach.

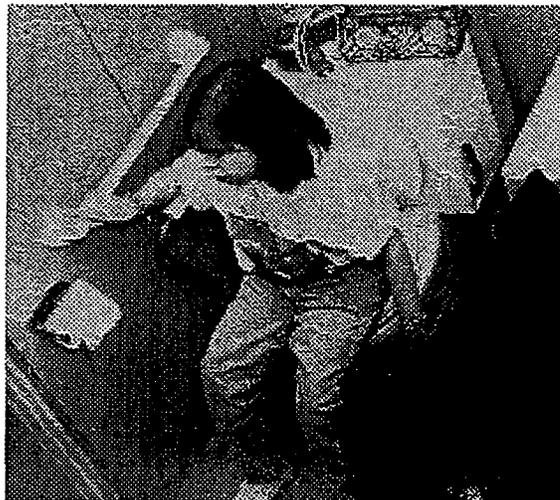
A roll in shower is the most accessible type.





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Bathroom 4 provided much greater room for transfers and maneuvering. The side access medicine cabinet and larger mirror were conveniences for all.



It is clear that the Fair Housing Guidelines result in more usable bathrooms than typical designs.

- The wider door provides a more convenient entry into the bathroom. In our focus groups, even people without disabilities preferred wider doors.
- Knee space under the sink allows easy access to the medicine cabinet and faucet.
- The usable floor area under the sink and the wider room improves maneuvering inside the bathroom, increasing independence.
- With grab bars, the toilet is easier and safer to use by people with and without disabilities.
- Grab bars also help people get in and out of the tub.

Adding slightly more space, and incorporating some innovative products can provide even greater accessibility for little cost.

- The added floor space makes the bathroom fully accessible for people with severe disabilities.
- More space is definitely a great help for caregivers as well.
- The recessed sink improves access to the tub.
- The recessed sink also allows side access to the medicine cabinet. Consumers find this convenient and desirable. They also like the additional mirror.
- A roll in shower instead of a bathtub makes bathing and transfers easier because it is not necessary to climb over a tub rim.

Extra attention to bathroom design can improve access and convenience for everyone. This is what Universal Design is all about.



The Fair Housing Accessibility Guidelines specify that a sink without knee space underneath must be centered in a clear space 30"x 48" wide to allow a parallel approach. But sinks with knee space underneath only require a 30" wide clear space. This allows the bathroom to be 18" shorter and about 8 square feet smaller. An adaptable vanity allows the use of the smaller clearance, even when the knee space is not opened from the start.

It doesn't necessarily cost more to meet the Guidelines.

- By swinging the door out, less floor space is required in an accessible bathroom. The out-swinging door improves accessibility without any cost.
- Although the Guidelines do not require knee space under the vanity, a bathroom with a closed vanity has to be 18 inches longer. This increases square footage, and overall cost. Vanities can be designed so that they can be adapted in the future to provide knee space.

Cost effectiveness is not always measured in construction dollars.

Features that add value can improve marketability.

- Lever handles on faucet controls and doors make them easy for everyone to use, particularly people with limited gripping abilities.
- The use of grab bars that lift out of the way allows the toilet to be located away from a wall. The bars do not get in the way of others using the toilet or the bathroom. For many people these bars provide a greater level of usability than bars on side walls.

Universal design makes good marketing sense.

In a highly competitive world, producers have to reach out to the broadest market. Safety and convenience are things that everyone wants, especially the older consumer. As the population ages, the market for accessibility will increase substantially. Older people have the largest disposable income of any segment of the population and housing is the largest expenditure they make. In a rapidly aging society, accessible housing will have lasting value.

Developers should anticipate changes in housing preferences now; the housing being built today will be more marketable in the future if it is built to be accessible from the start.

GOLD, SILVER and BRONZE UNIVERSAL DESIGN FEATURES IN HOUSES

The original Center's Gold, Silver and Bronze universal house feature list was created in 2001 to ease adoption for builders and developers by The Center for Universal Design. These characteristics are the elements, features, ideas or concepts that contribute to or can be components of a universal house. This list is intended as a guide and represents those features which would be most challenging to add to an existing home.

Some items on the list are finite recommendations, some are lists of options, and some are scope statements in regard to how many particular features must or should be included. The more universal features/elements that are included in a house, the higher the level that can be achieved, with GOLD the highest level. Gold and Silver levels are additive to the Bronze level: the Silver level has all the features of the Bronze level plus those listed under the Silver level. The Gold level has all the features of the Bronze and Silver levels plus those listed under the Gold level.

Remember, a key component of universal design is the market appeal of the home and the integration of universal features into the overall home scheme. Universal design becomes a virtually invisible element of a home when done well.

Bronze 
Entrance
Decks
Interior circulation
Bathroom
Kitchens
Garages and carport
Switches and Controls

Silver 
Entrance
Interior circulation
Bathroom
Kitchens
Garages and carport
Switches and Controls
Laundry
Storage
Home Automation
Light and color
Windows

Gold 
Entrance
Interior circulation
Bathroom
Kitchens
Garages and carport
Laundry
Storage
Hardware
Sliding doors
Windows

Bronze Level

Entrances

Stepless Entrances

- At least one stepless entrance is essential; if only one, not through a garage or from a patio or raised deck.
 - Level bridges to uphill point.
 - Drive and garage elevated to floor level, so vehicles do the climbing.

UNIVERSAL DESIGN FEATURES IN HOUSES

- Earth berm and bridge and sloping walk details.
- Site grading and earth work (with foundation waterproofing) and sloping walks at 1 in 20 maximum slope.
- Avoid ramps. If ramps are used, integrate into the design.

Other Entrance Features

- One-half inch maximum rise at entrance thresholds.
- Space at entry doors should be a minimum 5' x 5' level clear space inside and outside of entry door for maneuvering while opening or closing door.
- Clear door opening width (34" minimum = 36" wide doors), for all entrance doorways.

Decks

- Build deck at same level as house floor.

Interior Circulation

- At least one bedroom and accessible bathroom should be located on an accessible ground floor entry level (same level as kitchen, living room, etc.).
- Clear door opening width (32" minimum, 34" - 36" wide doors), for all doorways.
- Clear floor space (18" minimum) beside door on pull side at latch jamb provides space to move out of the way of the door swing when pulling it open.
- Circulation route (42" minimum width) to provide maneuvering room in the hallways and archways.

Vertical Circulation

- Stair handrails placed on both sides of stairs

Bathrooms

At least one bathroom on the accessible level must have one of the following accessible bathing fixtures:

- Minimum 5' x 3' (4' preferred), deep curbless shower
- Adequate maneuvering space: 60" diameter turning space in the room and 30" x 48" clear floor spaces at each fixture. Spaces may overlap.

UNIVERSAL DESIGN FEATURES IN HOUSES

- Clear space (3') in front and to one side of toilet allows for easy maneuvering to and around toilet.
- Toilet centered 18" from any side wall, cabinet or tub.
- Broad blocking in walls around toilet, tub, and shower allows for future placement and relocation of grab bars while assuring adequate load-bearing and eliminates the need to open up wall to add blocking later.

Fixture Controls

- Single-lever water controls at all plumbing fixtures and faucets.
- Mix valve with pressure balancing and hot water limiter prevents scalding people who cannot move out of the way if water temperature and/or pressure changes suddenly.

Kitchens

- Space between face of cabinets and cabinets and walls should be 48" minimum.
- Full-extension, pull-out drawers, shelves and racks in base cabinets for easy reach to all storage space.
- Adjustable height shelves in wall cabinets.
- Pantry storage with easy access pull-out and/or adjustable height shelves for easy reaching of otherwise hard-to-get items.
- Single-lever water controls at all plumbing fixtures and faucets.

Garages

- Power operated overhead doors.

Switches and Controls

- Light switches above floor, 36" - 44" maximum, and thermostats at 48" maximum height.
- Electrical outlets, 18" minimum height, allows easy reach from a sitting position as well as for those who have trouble bending over.
- Electrical panel with top no more than 54" above floor located with a minimum 30" x 48" clear floor space in front.

UNIVERSAL DESIGN FEATURES IN HOUSES

Silver Level



Stepless Entrances

- More than one stepless entrance is preferred.

Garages And Carports

- Sloping garage floor (with through-the-wall vents at bottom of slope to release fumes, if a garage) in lieu of stepped entrance with ramp from garage to house interior in attached garages.

Other Entrance Features

- Weather protection shelter while unlocking and opening doors, such as porches, stoop with roof, awnings, long roof overhangs, and/or carports.
- Use slatted decking for positive drainage (i.e., a wood trench drain).
- Light for operating at entry doors: focused light on lockset, general illumination for seeing visitors at night, and/or motion detector controls that turn on lights when someone approaches the door to eliminate the problem of dark approaches to home and adds a sense of security.

Interior Circulation

Vertical Circulation

If a two-story dwelling:

- at least one set of stacked closets, pantries, or storage spaces with knock-out floor for later use as an elevator shaft

Bathrooms

At least one bathroom on the accessible level must have one of the following accessible bathing fixtures:

- tub with integral seat, water proof floor, and a floor drain.

Additional features for all bathrooms

- Countertop lavatories preferred with bowl mounted as close to front edge as possible.
- Wall hung lavatories acceptable with appropriate pipe protection.

UNIVERSAL DESIGN FEATURES IN HOUSES

- Pedestal lavatories are not acceptable.
- Long mirrors should be placed with bottom no more than 36" above finished floor and top at least 72" high. Full-length mirrors are good choices.
- Offset controls in tub/shower with adjacent clear floor space allows for easy access from outside the tub with no inconvenience when inside.
- Integral transfer seat in tub and in 3' x 3' shower stall allows people to sit in tub/shower without needing additional equipment.
- Grab bars, if installed, should not be stainless steel or chrome. Use colors to match decor.

Fixture Controls

- Hand-held shower heads in all tubs and showers, in addition to fixed heads, if provided. Single lever diverter valves if needed.
- Adjustable height, movable hand-held shower head or 60" flexible hose allows easy use by people of all heights.

Kitchens

- Contrasting color border treatment on countertops. Color or contrast difference allows easy recognition of the edges of counters and the different heights to prevent accidental spills.
- Stretches of continuous counter tops for easy sliding of heavy items, particularly between refrigerator, sink, and stove top, for easy one-level food flow.
- Front mounted controls on appliances to facilitate easy reach.
- Cook top with knee space below allows someone to use the appliance from a seated position. May be open knee space or achieved by means of removable base cabinets or fold-back or self-storing doors. Pipe protection panels must be provided to prevent contact with hot or abrasive surfaces.
- Cook top or range with staggered burners and front or side mounted controls to eliminate dangerous reaching over hot burners.
- Glare-free task lighting to illuminate work areas without too much reflectivity.
- Side-by-side refrigerator allows easy reach of otherwise hard-to-get items, particularly if pull-out shelving is provided.
or
- Use under counter or drawer type refrigerators and install them on raised platforms for optimum access to storage space of 18" - 48" above finished floor.

UNIVERSAL DESIGN FEATURES IN HOUSES

Laundry Areas

- Front loading washers and dryers, with front controls, raised on platforms to reduce need to bend, stoop, or lean over.
- Clear space 36" wide across full width in front of washer and dryer and extending at least 18" beyond right and left sides. (Extended space can be part of knee space under counter tops, sink, etc.)

Storage

- 50% of storage to be no more than 54" high.
- Adjustable height closet rods and shelves allow for flexibility of storage options.

Garages And Carports

- Extra length and width inside for circulation around parked cars.
- No ramp in garages.
- Sloping garage floor (with through-the-wall vents at bottom of slope to release fumes) in lieu of stepped entrance with ramp from garage to house interior.

Home Automation

- Motion detector light switches in garages, utility spaces, entrances, and basements.
- Remote controls for selected lights.
- Remote controls for heating and cooling.
- Doorbell intercoms that connect to portable telephones.
- Audible and visual alarms for doorbell, baby monitor, smoke detectors, etc.

Light and Color

- Color contrast between floor surfaces and trim allows easy recognition of the junction of floor surfaces and walls. Avoid glossy surfaces.
- Color contrast difference between treads and risers on stairs.
- Ambient and focused lighting allows lots of light. Lighting that is thoughtful and variable, emphasizing lighting at stairs, entrances and task lighting
- Contrast between counter tops and front edges or cabinet faces.

UNIVERSAL DESIGN FEATURES IN HOUSES

Switches and Controls

- Easy-touch rocker or hands free switches. (See Home Automation.)
- Additional electrical outlets at bed locations and desk for equipment, four-plex boxes each side for computer and electronic equipment as well as personal use equipment.

Windows

- Windows for viewing, 36" maximum sill height. Casements, awnings, hoppers, and jalousies are good choices but not essential.

Gold Level



Stepless Entrances

- Make all home entrances stepless.

Other Entrance Features

- View of callers for all people, including children and seated users through sidelights, wide angle viewers, TV monitors, windows in doors, and/or windows nearby.
- A place to put packages while opening doors: built-in shelf, bench or table with knee space below located on the outside next to the door.
- A way for visitors to communicate with residents, such as lighted doorbell at a reachable height, intercom with portable telephone link, and/or hardwired intercom.
- Address/house number should be large, high contrast, located in a prominent place, easy for friends and emergency personnel to locate.

Interior Circulation

- Turning space in all rooms (5' diameter).
- An open plan design, minimizing hallways and doorways and maximizing sight lines.
- Floor finishes that minimize glare, are slip resistant, and offer low resistance to walking or rolling.

Vertical Circulation

- All stairs to have appropriate width and space at the bottom for later installation of a platform lift, if needed.

UNIVERSAL DESIGN FEATURES IN HOUSES

Bathrooms

Bathrooms on the second floor should follow guidelines.

At least one bathroom must have one of the following accessible bathing fixtures:

- tub with integral seat, water proof floor, and a floor drain.
- Other bathrooms in the same house may have a tub with an integral seat or a 3' x 3' transfer shower with "L" shaped folding seat and 1/2" maximum lip (curb) in lieu of fixtures described above. When more than one bathroom has the same type of bathing fixture (a tub, shower, wet area shower), at least one shower should be arranged for left-hand use and one for right.
- Knee space under lavatory (29" high) allows someone to use lavatory from a seated position. May be open knee space or achieved by means of removable vanity or fold-back or self-storing doors. Pipe protection panels must be provided to prevent contact with hot or sharp surfaces.

Kitchens

- Clear knee space under sink (29" high minimum) allows someone to use the sink from a seated position. May be open knee space or achieved by means of removable base cabinets or fold-back, bi-fold (Door Ease), or self-storing doors. Pipe protection panels must be provided to prevent contact with hot or sharp surfaces.
- Adjustable height work surfaces (28" - 42"), electrically powered, continuously adjustable counter segments, some with cook tops and/or sinks and disposal units (e.g. Adjustable Systems, Inc.)
or
- Mechanically adjustable counter segments, some with sinks and disposal units, some with cook tops, adjustable in 2" increments (28" - 42") allows in-kitchen work for people of all heights, those with back trouble, people who are seated, and/or children.
- Built-in oven with knee space beside, set for one pull-out oven rack at the same height as adjacent counter top.
- Drop in range with knee space beside, top set at 34" above finished floor.
- Dishwasher raised on a platform or drawer unit, so top rack is level with adjacent counter top, puts bottom racks within easy reach requiring less bending.

Laundry Areas

- Laundry sink and counter top surface no more than 34" above finished floor with knee space below.

Storage

UNIVERSAL DESIGN FEATURES IN HOUSES

- Motorized cabinets that raise and lower.
- Power operated clothing carousels.

Garages And Carports

- Door height and headroom clearances (8' minimum) for tall vehicles or provide alternative on site outdoor parking space.

Hardware

- Easy to use, requiring little or no strength and flexibility:

lever door handles

push plates

loop handle pulls on drawers and cabinet doors—no knobs

touch latches

magnetic latches in lieu of mechanical, keyless locks

Windows

- Crank operated windows.
- Power operators whenever possible.

Sliding Doors

- Exterior sliding doors: - drop frame and threshold into sub floor to reduce upstanding threshold track, or ramp the finished flooring to top of track on both sides.
- Interior pocket doors: When fully open door should extend 2" minimum outside door jamb and be equipped with open-loop handles for easy gripping..
- By- passing closet doors - each panel should create an opening at least 32" clear

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Exercise
Redesign This Job

BACKGROUND

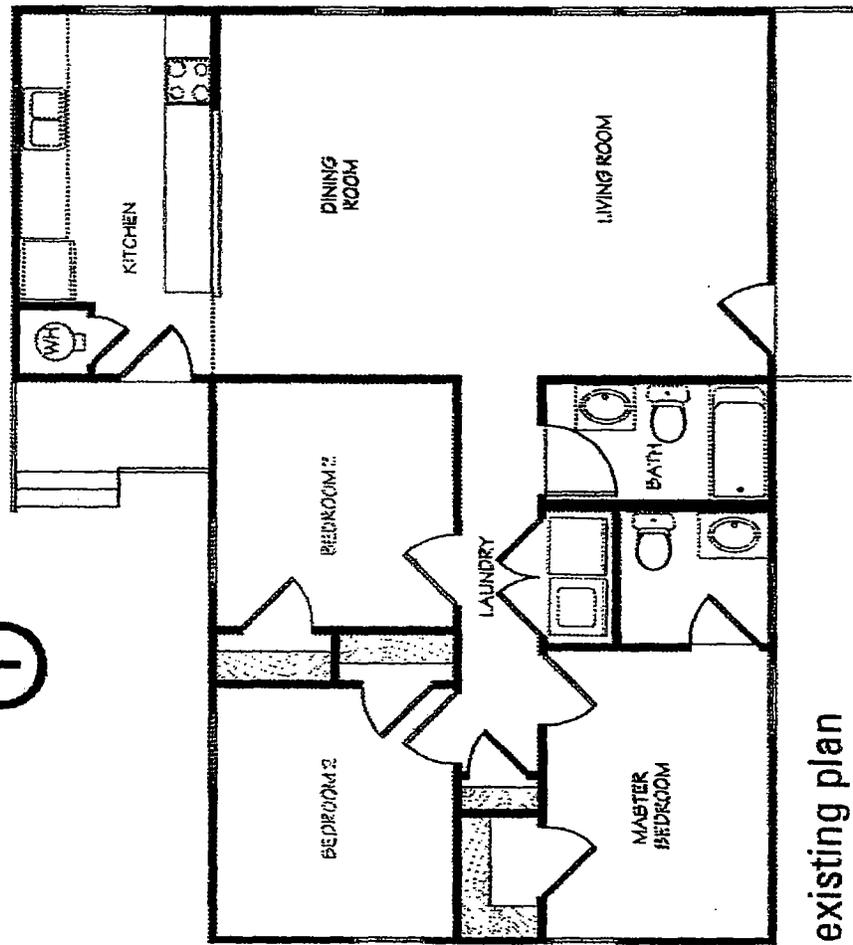
Your Community Development Corporation has been providing new scattered-site, infill dwellings for the last six years. Depending on the configuration of the site and allowable zoning, you have built two-story townhouse style, stick build ranch, modular homes for a wide range of lower income families. You've noticed that there are an increasing number of applicants who are elderly or are caregivers for household members. Until recently, your only option was to refer them to multi-family dwellings that were covered by the Fair Housing Act.

Recently your Board of Directors has decided to expand their clientele and build, 3-bedroom, 1½ bath homes that will be fully accessible to clients with mobility disabilities as well as visual disabilities. They also want to rehabilitate homes to make them more accessible. You have heard about the concept of Universal Design and wish to incorporate as many of these concepts as economically possible in a competed new or remodeled home. Your first step is to come up with a list of both required and recommended features that could be included.

You meet with a specially formed committee of the Board and come up with a list of essential and preferred features for a universal design home.

Note: The following drawing is an existing plan for a new home, but it may also be viewed as an "as built" drawing for a home that is to be remodeled.

1



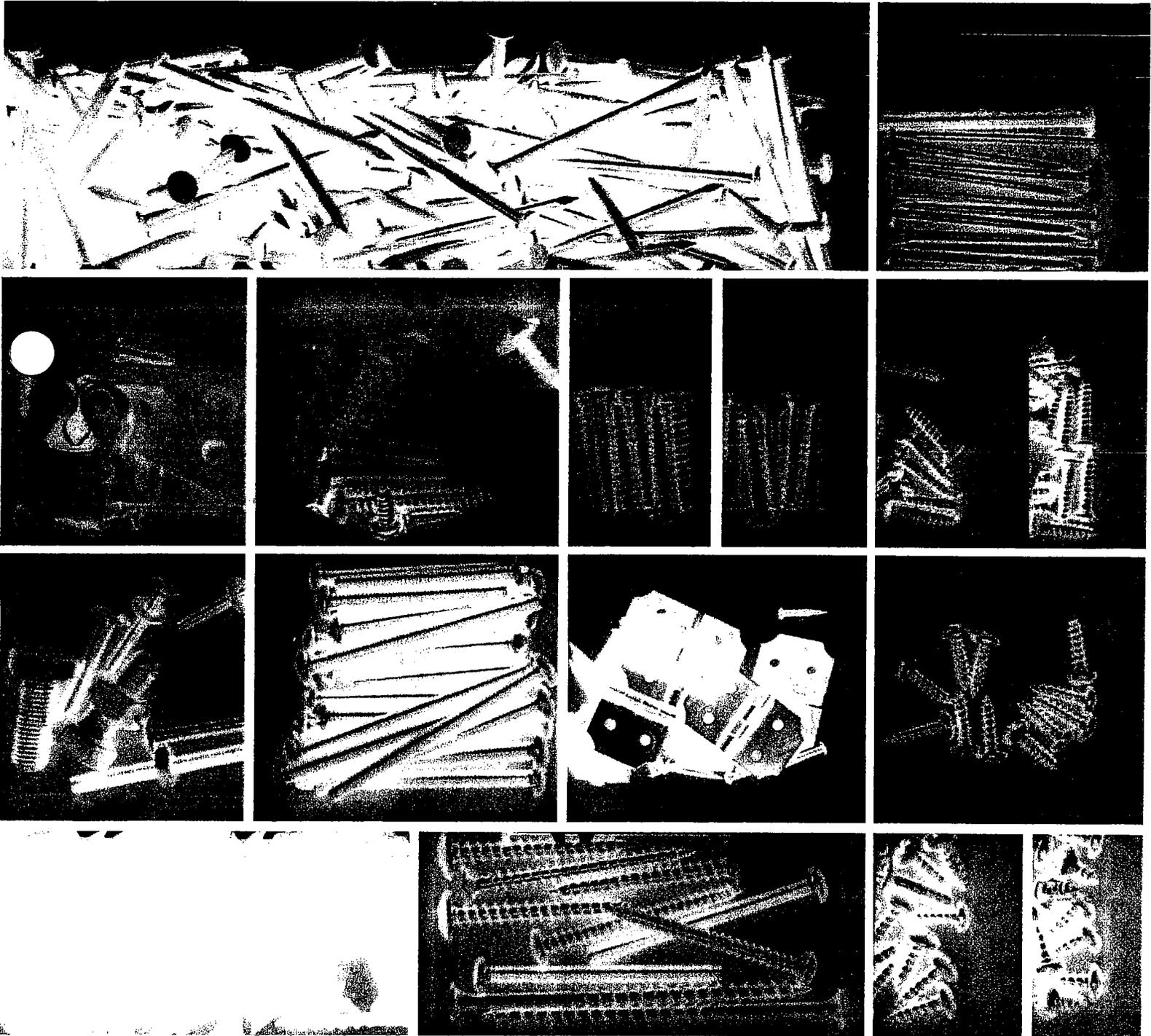
existing plan

Design Cost Options

THE UNIVERSITY OF NORTH CAROLINA AT RALEIGH

COLLEGE OF DESIGN

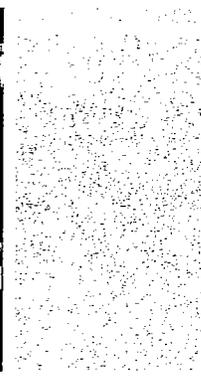
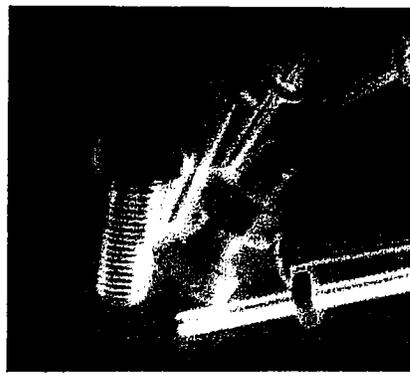
Universal Design



Dedication

The Center for Universal Design dedicates this noteworthy publication to John Dalrymple, who during his decades of work at the Division of Vocational Rehabilitation, North Carolina Department of Health and Human Services, devoted his life to promoting independent living for all North Carolinians. John understood that local recipients of state agency housing rehabilitation funds could benefit from a publication such as this. He also knew if this document could be placed in the hands of the Division of Community Assistance and the North Carolina Housing Finance Agency, as well as owners of single-family housing, significant improvements could be made in housing across the State.

John inspired the Priority Features List contained in this publication. In addition, the unique approach to a commonplace room found in all housing—the bathroom—sets this publication apart from all others. Showing multiple strategies to modify the same small residential bathroom has never been addressed in this manner. The publication offers options for those wishing to make their environment better accommodate their needs, perhaps allowing families to live more safely and comfortably in the home of their choice as long as desired.



Residential Rehabilitation, Remodeling and Universal Design

Produced by

The Center for Universal Design
College of Design, NC State University

for the

NC Department of Health and Human Services
Division of Vocational Rehabilitation
Independent Living Services

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Introduction

In recent years it has become more widely recognized that residential design must address a dynamic range of people and abilities. Housing in this century must be adaptable to accommodate the differing needs and requirements of the users. Individual characteristics such as strength or agility should not prevent a person from safely using and enjoying all features in their home. This design approach, known as UNIVERSAL DESIGN, strives to make day-to-day living and home tasks possible and safer for everyone, allowing a person to remain independent for as long as possible.

These goals are as significant for affordable housing as they are for market rate housing. They may, in fact, be even more critical for households lacking the financial and community resources to effectively deal with dramatic life changes from sickness and injury, effects of aging, or those supporting other family members affected by these issues. For many households, finding decent, affordable housing that also supports their activities is extremely difficult. A family living in a typical home often faces expensive modifications they can not afford such as adding ramps, widening doorways, or creating usable bathrooms.

Little housing today, whether single- or multifamily, adequately responds to the diverse and ever changing needs of the population. The FAIR HOUSING ACT and the NORTH CAROLINA ACCESSIBILITY CODE are altering the multifamily housing industry, but the requirements of these accessibility provisions only offer a limited degree of usability to many people. UNIVERSAL DESIGN incorporates many accessibility code requirements and stresses innovative solutions to facilitate daily living and independence, especially for people who have, are, or will be experiencing changes in their mobility and/or sight and hearing.

In the coming years, several state agencies are rehabilitating targeted older homes owned by people of low income. Significant rehabilitation may occur to address structural, energy, weatherization, and plumbing concerns. In some cases individual homes are already identified for upgrade based on the occupant's needs, i.e., older adults and people with disabilities. When significant construction is underway, what better time to address key issues of usability?

When significant construction is underway, what better time to address key issues of usability?

Entrances and bathrooms are two significant areas where mobility is essential. It is critical to ensure that people are able to get in and out of their home. Usable bathrooms, on the other hand, are essential for surviving in one's home with a temporary or a long-term disabling condition. Safety and independence

within one's home is impacted by bathroom design to such a great extent that it is the primary focus of this document.

This publication introduces key universal features to include when modifying or rehabilitating a single- or multifamily dwelling. The most critical features are provided in a 14-item list with the highest priority assigned a number one (see page 7). In the back of this document is a more comprehensive list of additional features that could be incorporated. Those homeowners with the financial resources to remodel their homes may find helpful the design guidance in the 14-item as well as the expanded list.

Housing designs that support occupants with a disability now and require no expensive modifications later are clearly superior to standard designs. When housing can be safer and more usable by current and future residents allowing them to "age in place", countless dollars in costly nursing home and Medicaid expenses can be saved. Close family and community relations can be maintained, contributing to an individual's sense of place and helping to maintain community cohesiveness, neighborhood permanence, as well as individual mental and physical health.



Key Features to Increase Function and Usability

Over the next five years the NC Housing Finance Agency (NCHFA) and the NC Division of Community Assistance (NCDOCA), will be working to rehabilitate hundreds of North Carolina homes using HOME Investment Partnership Program and Community Development Block Grant (CDBG) funds. Both agencies presently serve many families with older adults and people with disabilities. Each agency has affirmed its commitment to UNIVERSAL DESIGN where feasible.

The 14-item Priority List on page 7 offers critical key features and elements to include in rehabilitation work when only a limited number of universal features are possible. The numbers in the “Priority” column indicate the importance of the feature. Incorporating as many features as possible in the Priority List is encouraged when significant rehabilitation or modifications are being considered for inaccessible housing currently occupied by an older adult or a person with a disability. Recognizing exact dimensions cannot always be provided, it is recommended a clear usable pathway be created to allow a person using a wheelchair (or someone with any mobility limitation) to safely enter and exit the dwelling and maneuver throughout the living spaces on the ground floor, including the bathroom.

All features in the Priority List are structural and do not include such items as grab bars, easy-to-use lever faucets, and lever door hardware that can be added later at little cost. The goal of this document is to encourage the inclusion of universal features while substantial rehabilitation efforts are underway—changes that would be too costly to make later. A more comprehensive features list, provided at the end of this publication, should be reviewed to determine if additional universal elements could also be incorporated.

Developed by the Center for Universal Design in collaboration with the Division of Vocational Rehabilitation, Independent Living Services, the final Priority List was reviewed and input was provided by potential users, including several North Carolina agencies undertaking rehabilitation. Each agency has its own guidance manual or construction specifications to assist with the applicability of these priorities.

Selecting a Dwelling Conducive to Accessibility Improvements

Residents with immediate and impending needs will benefit most from a home with the addition of specific features that meet, or can be adapted to meet, their needs. However, when no specific features are required at the time of upgrade, the following design features still should be considered to provide the longest-term accessibility benefit to a home's present and future residents. Many of these homes may, over time, house other families, thus upgrades to include universal features make it easier to accommodate the needs of any new family.

Features to consider include a house with:

1. a **lot** that would allow any of the entrance options as shown on page 9 of this booklet or a dwelling with the floor level no more than 30 inches above grade. A zero-step entrance on an accessible route could be at the front, side or back of the home, or through an attached garage—wherever most feasible for the given terrain.
2. **parking** close to an entrance. It may be possible to move parking closer and install an earth berm with gently sloping walk (shallower slope than a ramp) to an entrance.
3. an entry **porch** or steps that must be replaced anyway. As the porch is replaced, it is possible to integrate a concrete pad and exterior electrical junction box for future installation of a wheelchair platform lift. Such lifts could be owned by an organization or agency and moved to a location when needed.
4. short wide **hallways** or
5. **hallways** that are possible to widen because of other planned renovations.
6. a large **bathroom** that requires some modification or a small bathroom that needs a significant upgrade, provided it can be expanded through feasibly moving or removing walls.

Priority Features List on the facing page offers guidance on selecting universal features to include in dwelling units – with a focus on units being *rehabilitated and/or remodeled*. The features should be included whenever technically feasible, even if exact dimensions cannot be provided, especially in housing for older adults or people with disabilities.

Priority Features List

AREA	PRIORITY	UNIVERSAL HOUSING FEATURE
<i>Entrances</i>	①	1. One entrance without steps and a flat or very low threshold
	①	2. Minimum 60" by 60" level maneuvering space at stepless entrance (roof over entrance offers additional convenience)
<i>General Interior</i>	②	3. Hall widths of 42" (where possible)
	①	4. Passage doors 32" clear (typically provided with 36" door)
	②	5. Maneuvering space at doors—if inswinging door obstructs a bathroom or kitchen fixture or appliance, use offset hinges, swing door out, hinge door on opposite jamb, or widen doorway
	②	6. Increased number of electrical outlets for additional lighting and alarm indicators, especially in bedrooms
<i>Kitchens</i>	①	7. Clear floor space in kitchens; many configurations possible, 60" minimum turning circle recommended
	②	8. Adaptable cabinets to reveal kneespace at sink and under work surface near cooking appliance
<i>Bathrooms</i>	①	9. Clear floor space in room; modest increase in room size beyond 5' X 8'
	②	10. Adaptable cabinets with under sink kneespace
	②	11. Broadly applied bands of blocking (reinforcement) inside walls around toilets and bathing fixtures for future installation of grab bars
	③	12. Offset controls in tub or shower to minimize stooping, bending, and reaching
	②	13. Toilet in a 48" X 56" space with centerline of toilet 18" from sidewall
	②	14. Curbless showers, if installed, at least 36" X 60"

- ① These features are given the highest priority so a person using a wheelchair or other mobility device can safely and independently enter and exit the dwelling and get to and maneuver in the kitchen and bathroom.
- ② These features, when incorporated into the dwelling, offer residents with children, a family member with a disability or an older adult the possibility of being safe and independent for as long as possible.
- ③ Offset controls offer increased safety for all users.

Entrance Options

When modifying an existing entrance, options to create a stepless entrance include ramps, vertical platform lifts and landscaping. Each is appropriate for a particular combination of resources, heights, and site conditions. The advantages and disadvantages for each option must be carefully considered.

Ramps

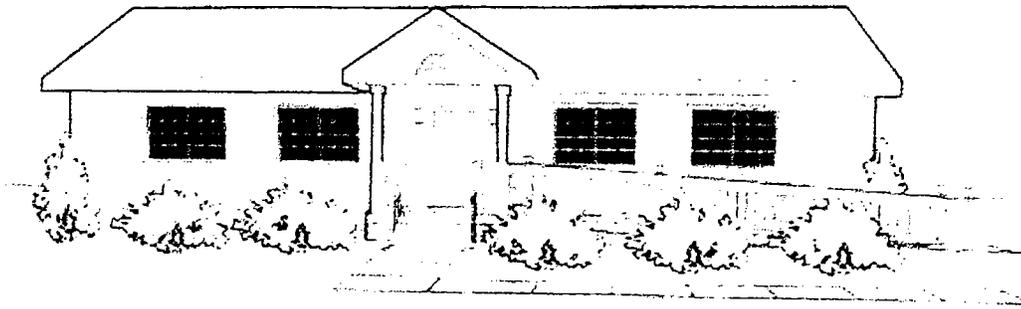
Ramps are the most familiar residential accessibility modification. They can be built relatively quickly and inexpensively. Although ramps make a big difference in the lives of those who use them, they do have some drawbacks. Ramps accommodating rises above 30 inches require extensive construction, may be very long, occupy a significant amount of space, and can be quite expensive. Ramps are not maintenance free. Leaf, snow and ice removal, painting, and periodic repairs all take time and resources. Ramps should be thoughtfully planned so they are constructed in a style compatible with the house. Some residents are concerned that ramps label the occupant as vulnerable and make them more susceptible to break-ins.

Lifts

Taking up less than 30 square feet of space, an electrically operated vertical platform wheelchair lift can avoid the space problems of long ramps. Where possible, locate lifts under cover to reduce snow and ice accumulation in the winter. On sites prone to flooding, potential water damage to mechanical components must be considered. The cost of lifts, including a concrete slab, electrical power and related remodeling expenses, ranges between \$5,000-\$15,000.

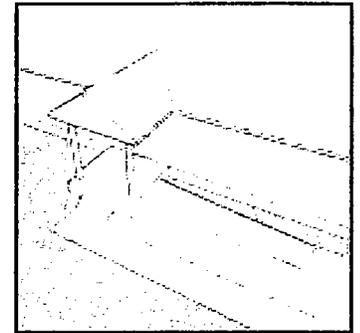
Site Grading and Landscaping

Site conditions can offer an opportunity to use landscaped earth pathways for a more natural and blended solution. This approach may include a retaining wall, an earth berm, and sometimes a bridge to an entrance. A safe path with a gentle slope of 1:20 or less can be built without handrails (unless there are abrupt drop-offs or they are needed by users), thereby avoiding the cost and intrusive appearance of handrails. Landscaped options may be more expensive than an equivalent ramp, but usually have a longer lifespan and require less maintenance. The remodeled entrance shown on page 10 makes use of the "earth berm concept."



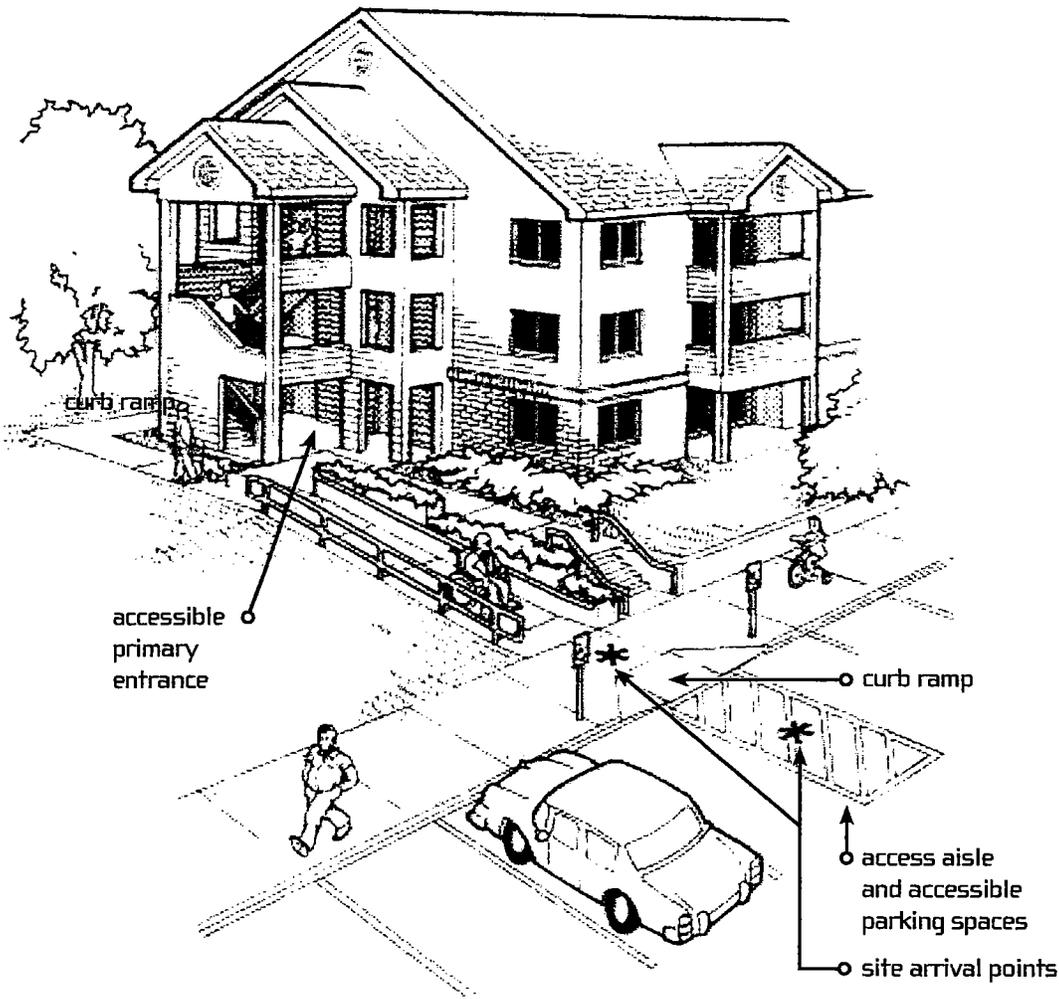
Single-family House Entrance Upgrade

plantings minimize and soften the visual impact of ramps

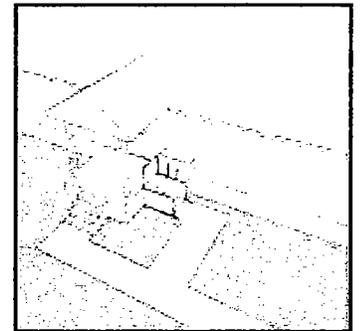


Ramps

work best for heights up to 30"

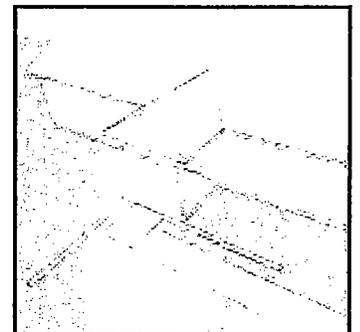


Multifamily Housing Entrance Upgrade



Lifts

space-saving option for heights over 30"



Earth Berms and Regrading depending on site conditions, can work for all heights. See page 10 for a more detailed illustration of an earth berm.

Covered entrance helps control water at low threshold and provides protection during inclement weather

Provide adequate maneuvering space around screen or storm doors

5' x 5' minimum level landing area for maneuvering

Additional lowered peep-hole for seated or short adults and children

Both entry and screen door provide a min. 32" clear opening – lever handle hardware

Provide good overall lighting plus focused lighting at locksets and house number for nighttime security and ease-of-use

High contrast house numbers, easy to read from a distance

Handrail with integral package shelf

Flush or low profile threshold, 1/2" high max.

New porch landing set at same level as interior house floor, eliminates step at entry door

Original small stoop removed

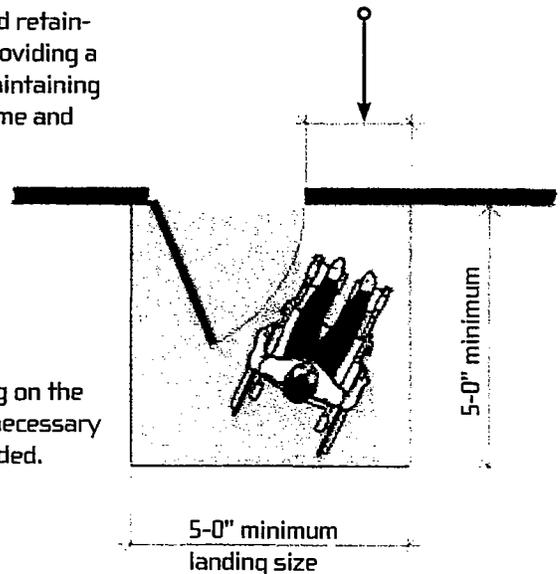
4'-0" wide walkway sloped at 1:20 or less, slopes steeper than 1:20 necessitate handrails

Using a combination of earth berm and retaining walls is an effective method for providing a stepless route to the landing while maintaining an integrated appearance with the home and surrounding site.

18" minimum to pull side of door, 24" preferred

Remodeled Stepless Entry

5' x 5' clear level area for maneuvering on the landing is recommended and may be necessary when screen or storm doors are provided.



Bathroom Modifications

Mere inches make the difference between independence and dependence. How can the greatest usability be achieved within very tight constraints? A small bathroom plan with all plumbing fixtures mounted along a common wall is the basis for nine different solutions: from renovations inside existing walls to more extensive construction using a “bump out” or “mini” addition. These modified plans can be considered in a variety of applications from single-family to multifamily housing. Both bathtubs and roll-in or curbless showers are addressed. See the publication *Curbless Showers* for additional information on the unique features of this bathing fixture, available for free download at centerforuniversaldesign.org.

Additional guidance is provided on each plan page to help select the most appropriate bathroom modification. Each page indicates which plan modification complies with specific NC accessibility requirements. Although not always necessary for bathroom modifications to comply, it gives the contractor a reference point and some awareness of how successful the modified bathroom may be for a specific user. A resident may be able to better articulate personal needs if he or she can use plans to initiate discussion.

The modified plans are shown from least usable/accessible to providing a much higher level of accessibility. (Accessibility codes only provide instructions for minimum levels of accessibility.) The NC Housing Finance Agency QAP “bonus points” bathrooms are much closer to a “universally usable bathroom.”

<p>higher usability</p>	<p>QAP Meets NCAC Type A and incorporates two additional features: a 5' X 5' clear floor space for the toilet and a curbless (roll-in) shower at least 60" long and 36" deep.</p>	<p>Meets the requirements in the NCAC for “fully accessible” Type A units. Qualified Allocation Plan (QAP) requirements established by the NC Housing Finance Agency allow builders of multifamily housing units funded under the low income tax credit plan to be awarded extra bonus points for units with a 5' X 5' clear floor space at the toilet. Curbless showers at least 36" X 60" (larger recommended) are now required in 5% of all QAP units. These units have some of the highest levels of usability.</p>
<p>moderate usability</p>	<p>NCAC Type A Type A “fully accessible” unit as specified in the NC Accessibility Code.</p>	<p>Meets State “fully accessible” design requirements. (Note: building codes provide the minimum requirements for compliance).</p>
<p>lower usability</p>	<p>NCAC Type B Type B “accessible” unit as specified in the NC Accessibility Code.</p>	<p>Meets State “accessible” or Fair Housing design requirements. These requirements are less than for Type A and offer a modest level of accessibility.</p>

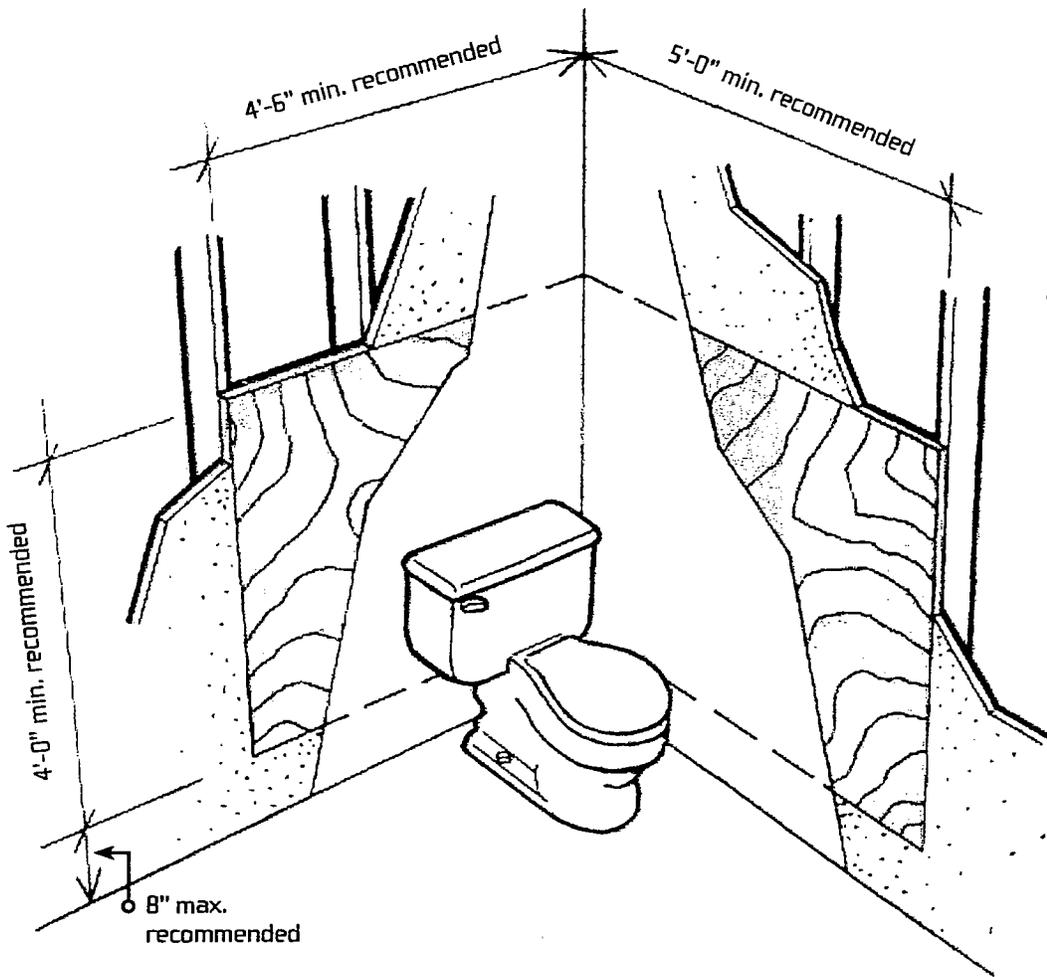
Features and Elements Shown in the Plans

- All modified plans include knee space below lavatories.
- Horizontal and fold-down grab bars are shown in conventional locations.
- Additional space has been allocated beside the toilet to allow safer transfers and assistance if needed.
- Extra maneuvering and clear floor space is provided.
- Pocket doors are shown in some plans.
- Offset controls are shown in bathtubs and showers.
- Clear floor space is shown for approach to fixtures.
- 5-foot diameter turning circle is shown when space is available to execute such a turn.
- All plans show reinforcing around toilet and bathing fixtures.

Pocket Doors. Very inexpensive doors may be problematic; however, many pocket doors are available that can successfully be used in these installations. Pocket doors are shown because in small spaces hinged doors, if inswinging, often limit maneuvering space within the room. Outswinging doors have the potential to injure someone approaching the room.

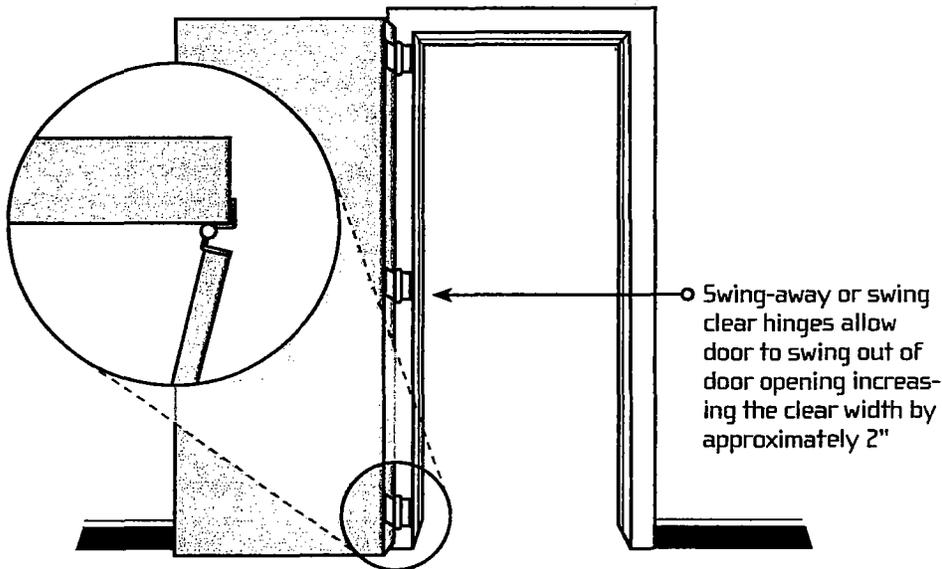
Grab Bars and Reinforcing. In certain instances the length of the bar may be shorter than specified in accessibility codes and standards; however, in rehabilitation and remodeling work this is generally not as critical unless compliance is required. Reinforcing a broad band of wall area around bathing fixtures and the toilet is preferred to installing grab bars in the limited locations specified in many accessibility design documents. A single bar location does not work for all users. Other locations are often desirable and needed and can be accommodated if enlarged reinforced areas are provided.

Offset Controls. This simple concept assists all users. When installing new faucet controls in the bathtub or shower, locate the controls close to the outside of the enclosure. Controls in this position can be easily operated from outside to set and test the water temperature before entering. This location is easier to reach and requires much less bending and stooping for a standing person and offers easier access from outside the bathing fixture for a person using a wheelchair or scooter.



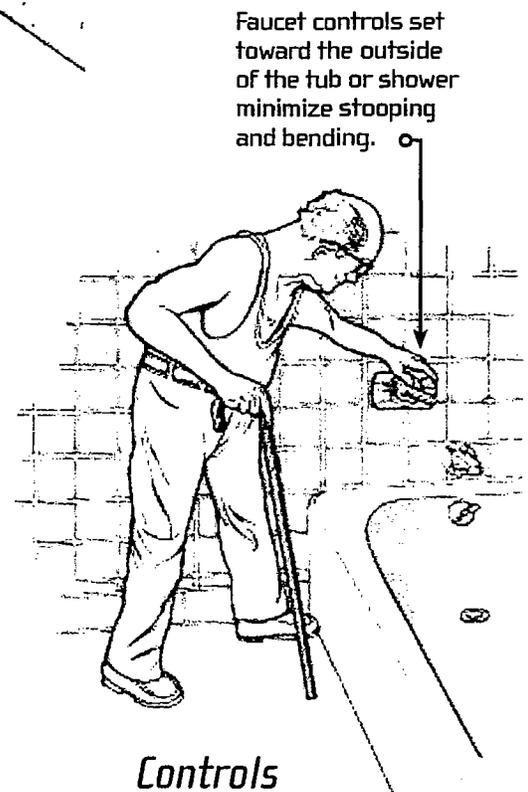
Reinforcing

Enlarged Areas of Reinforcing around Toilet



Doorway Width

Swing-clear Hinges Installed to Widen Interior Doorway



Controls

Offset Tub and Shower Control

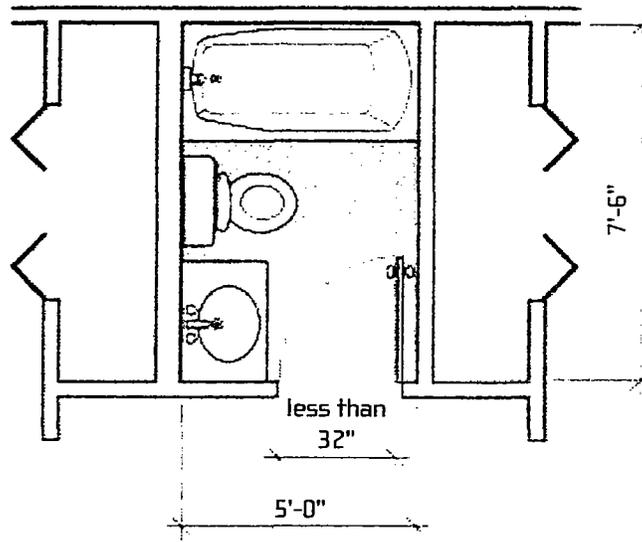
Bathroom Plans

Common Problems

- Narrow entry door
- Lack of turning space
- Lack of maneuvering space to side of toilet
- Toilet location obstructs bathing fixture
- No knee space below lavatory
- No reinforcing in walls for grab bars

Wall Key:

-  existing
-  new



Inaccessible Plan

Conventional

Changes

- Remove bathtub and replace entire floor
- New wider outswinging door
- New wall-hung countertop lavatory

Plan Meets:

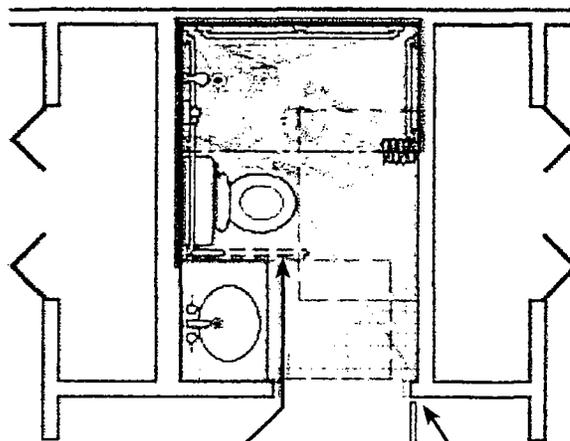
NCAC Type "B" Accessible Requirements

Plan Does Not Meet

NCAC Type "A" Fully Accessible Requirements

Advantages and Concerns

- ⊕ Additional space beside toilet
- ⊕ Wet area option utilizes existing plumbing locations
- ⊕ Significantly more space for maneuvering than in inaccessible plan. Floor area lacks full turning space for wheelchair users.
- ⊖ Toilet location requires fold-down grab bar (for many users, less secure than wall-mounted bar).

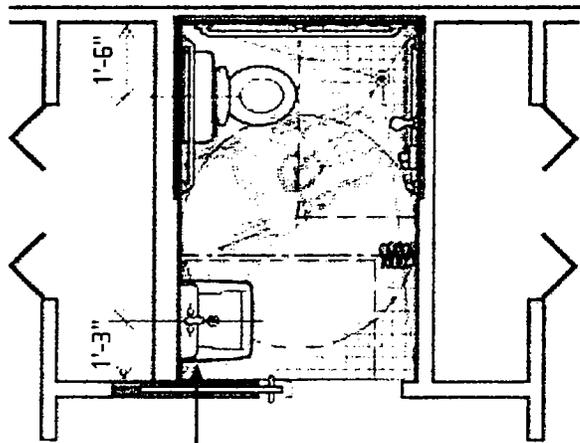


Fold-down grab bar option

2'-10" door with swing-clear hinges and custom trim work, necessary if standard depth lavatory counter used

Plan 1: "Wet Area" Design

(Changes within existing room only)



Wall-hung fixture or under-sized countertop to permit maximum door width.

Plan 2: "Wet Area" Design
(Changes within existing room only)

Changes

- Remove bathtub and replace entire floor
- Wider door (pocket)
- Relocate toilet and shower plumbing
- New wall-hung lavatory

Plan Meets:

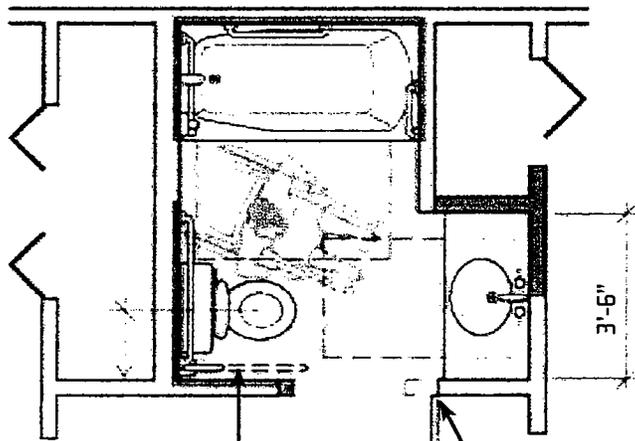
NCAC Type "B" Accessible Requirements

Plan Does Not Meet:

NCAC Type "A" Fully Accessible Requirements

Advantages and Concerns

- ⊕ Additional space beside toilet
- Ⓜ Design dependent on curbless wet area
- ⊖ Turning around possible, but obstructed by lavatory. People using scooters or oversized wheelchairs must make multiple adjustments and turns to maneuver.



Fold-down grab bar option

Locate door as close as possible to lavatory countertop

Plan 3: Tub Location Unchanged
(Modest Expansion)

Changes

- Incorporate 1/2 of right closet
- Relocate toilet and lavatory plumbing
- New wider outswinging door
- Wider wall-hung counter lavatory

Plan Meets:

NCAC Type "B" Accessible Requirements

Plan Does Not Meet:

NCAC Type "A" Fully Accessible Requirements

Advantages and Concerns

- ⊕ Some additional space beside the toilet for wheelchair users
- ⊕ Improved lavatory access
- ⊕ Existing bathtub remains
- Ⓜ Recommended installation of offset tub control
- ⊖ Floor area lacks full turning space for wheelchair users
- ⊖ Fold-down grab bar beside toilet may be necessary for some users. Short sidewall, reduced by door, limits grab bar length.

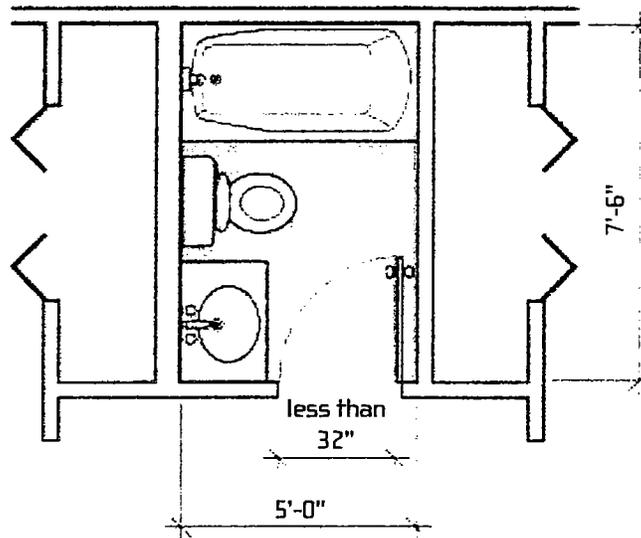
Bathroom Plans

Common Problems

- Narrow entry door
- Lack of turning space
- Lack of maneuvering space to side of toilet
- Toilet location obstructs bathing fixture
- No knee space below lavatory
- No reinforcing in walls for grab bars

Wall Key:

-  existing
-  new



Inaccessible Plan

Conventional

Changes

- Incorporate portion of adjacent right closet
- Relocate toilet plumbing
- Wider pocket door option
- New wall-hung lavatory

Plan Meets:

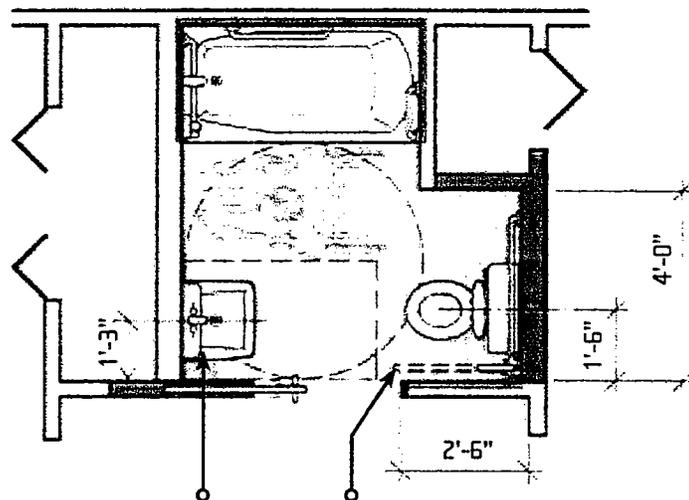
NCAC Type "B" Accessible Requirements

Plan Does Not Meet

NCAC Type "A" Fully Accessible Requirements

Advantages and Concerns

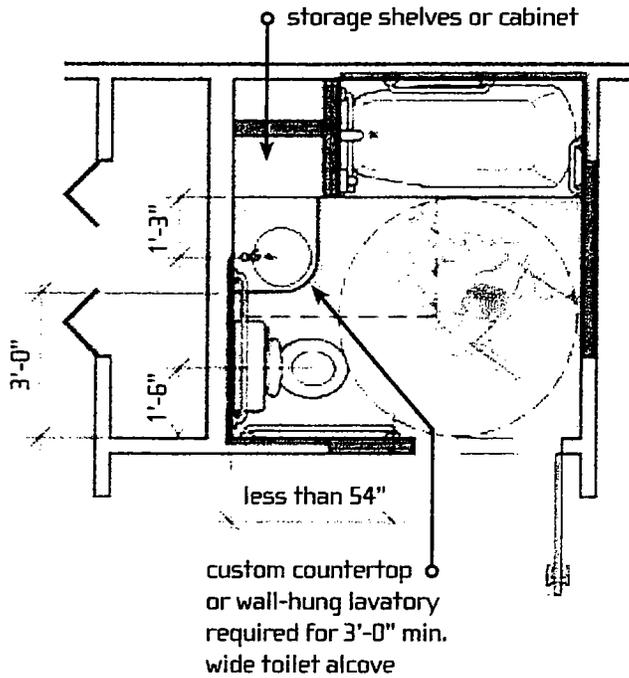
- ⊕ Improved access to bathtub
- ⊕ Existing bathtub remains
- Ⓜ Recommended installation of offset tub control
- ⊖ "Obstructed" wheelchair turning space relies on clearance below lavatory
- ⊖ While additional space is provided beside toilet, this space may need to be enlarged for some users
- ⊖ Fold-down grab bar beside toilet may be required for some users. Short sidewall, reduced by door, limits grab bar length.



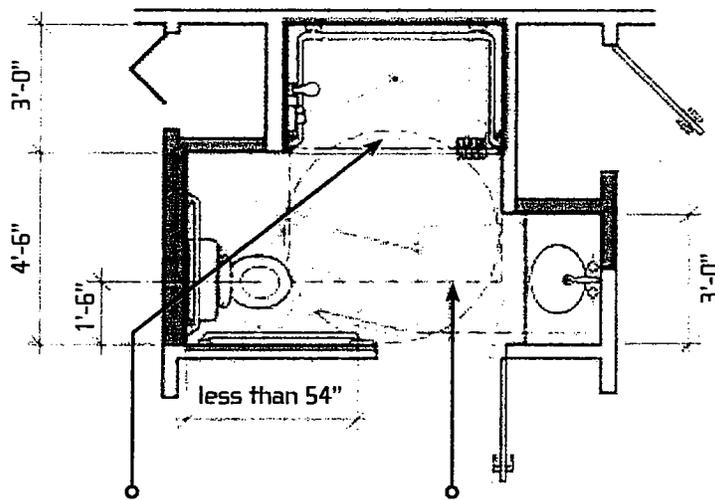
Wall-hung fixture or undersized countertop to permit door opening

Fold-down grab bar option

Plan 4: Tub Location Unchanged (Modest Expansion)



Plan 5: Increased Usability with Tub
(Modest Expansion)



Plan 6: Increased Usability with Shower
(Larger Expansion)

Changes

- Incorporate entire adjacent right closet
- Relocate all plumbing
- New wider outswinging door
- Additional storage space

Plan Meets:

NCAC Type "B" Accessible Requirements

NCAC Type "A" Fully Accessible Requirements
(primarily because side wall too short to support a complying bar)

NCQAP for 95% of units, but not the 5% required to have curbless roll-in showers

Advantages and Concerns

- ⊕ Improved access to all fixtures
- ⊕ Good access to bathtub and tub controls
- ⊕ Full unobstructed turning space
- ⊖ Restricted access to toilet
- ⊖ Some users may need more space beside the toilet
- ⊖ Length of grab bar beside toilet is restricted by door location

Changes

- Incorporate portions of both adjacent closets
- Relocate toilet and lavatory plumbing
- New "curbless" roll-in shower
- New wider outswinging door
- New wider lavatory counter

Plan Meets:

NCAC Type "B" Accessible Requirements

Plan Does Not Meet:

NCAC Type "A" Fully Accessible Requirements
(primarily because side wall too short to support a complying bar)

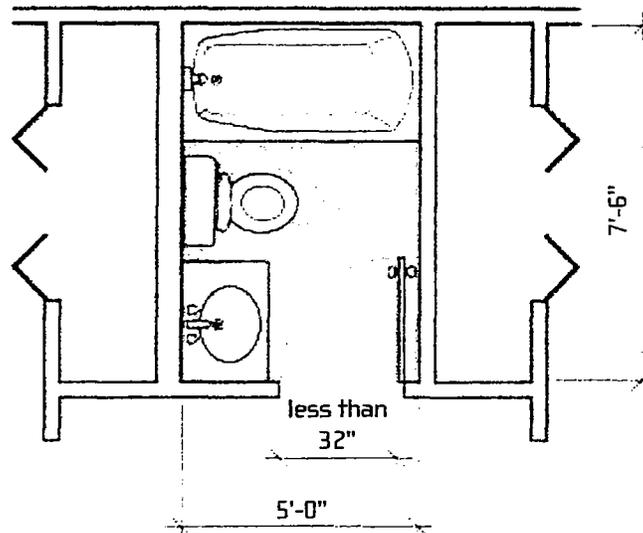
Advantages and Concerns

- ⊕ Improved access for most users
- ⊕ Good bathing and lavatory access
- ⊕ Turning space overlaps flat trench drain
- ⊕ No turns are executed across shower floor warped to the center drain
- ⊕ Shower occupies bathtub space
- ⊕ 36-inch shower depth, deeper showers better contain water
- ⊖ Some users may need more space beside the toilet
- ⊖ Grab bar length on side wall restricted by door location

Bathroom Plans

Common Problems

- Narrow entry door
- Lack of turning space
- Lack of maneuvering space to side of toilet
- Toilet location obstructs bathing fixture
- No knee space below lavatory
- No reinforcing in walls for grab bars



Wall Key:

- ◻ existing
- ◼ new

Inaccessible Plan

Conventional

Changes

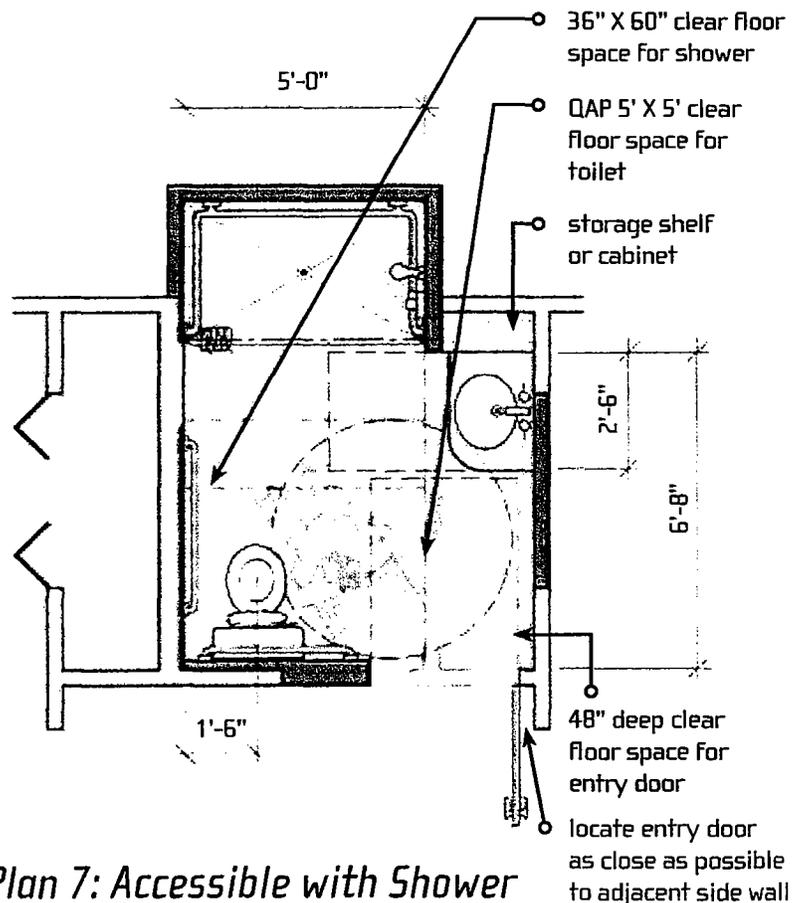
- Incorporate entire adjacent right closet
- Incorporate small "bump out" or mini-addition for shower
- Relocate plumbing and all fixtures
- New "curbless" roll-in shower
- New wider outswinging door

Plan Meets:

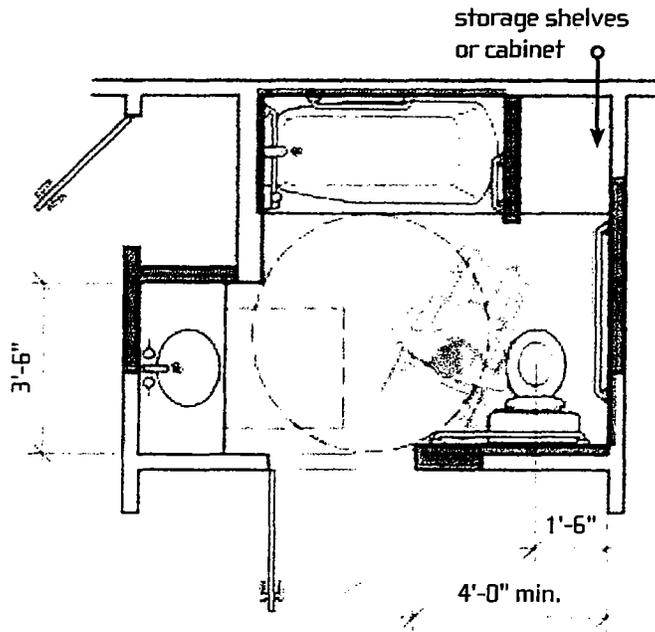
- NCAC Type "B" Accessible Requirements
- NCAC Type "A" Fully Accessible Requirements
- NCQAP for bonus points

Advantages and Concerns

- ⊕ Improved usability for most people
- ⊕ Good access to all fixtures
- ⊕ Unobstructed turning space that only minimally utilizes lavatory knee space
- ⊕ Generous space to side and front of toilet accommodates a wide range of transfer styles
- ⊖ Layout requires a mini addition



Plan 7: Accessible with Shower
(Expansion and "Mini" Addition)



Plan 8: Universal with Bathtub
(Larger Expansion)

Changes

- Incorporate adjacent right and of 1/2 left closet
- Relocate lavatory and toilet plumbing
- Wider lavatory counter
- Wider outswinging door
- Additional storage space
- Existing bathtub replumbed to include offset controls

Plan Meets:

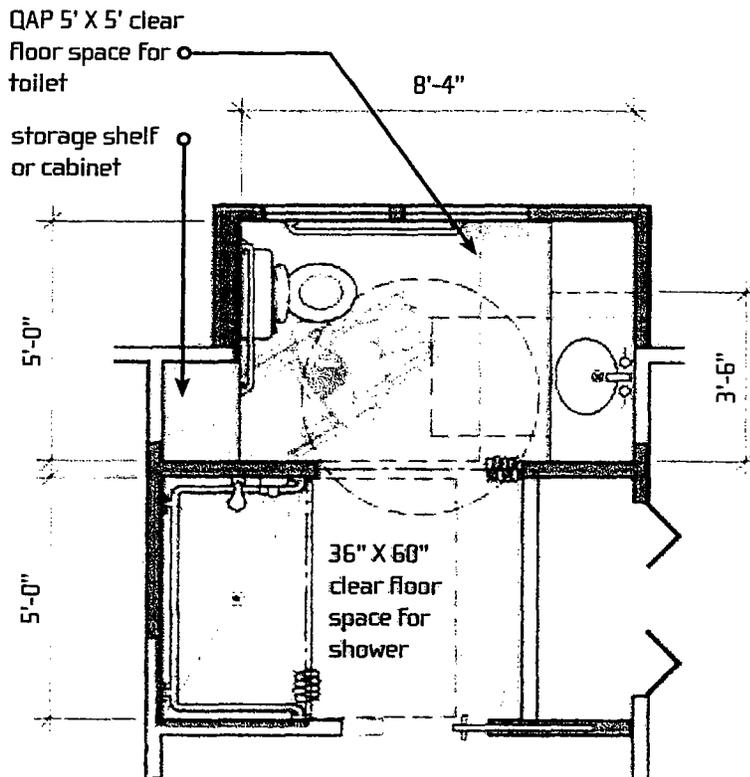
- NCAC Type "B" Accessible Requirements
- NCAC Type "A" Fully Accessible Requirements

Plan Does Not Meet:

- NCQAP for extra bonus points due to lack of curbless shower

Advantages and Concerns

- ⊕ Works well for a range of users
- ⊕ Good access to all fixtures
- ⊕ Unobstructed turning space
- ⊕ Other room improvements: wider lavatory counter and linen storage.



Plan 9: Universal with Shower
(Expansion and "Mini" Addition)
see illustration on next page

Changes

- Incorporate adjacent left and 1/2 of right closet
- Incorporate small "bump out"
- Relocate all plumbing
- New "curbless" roll-in shower
- Wider pocket door option
- Wider wall-hung counter lavatory
- Additional storage space

Plan Meets:

- NCAC Type "B" Accessible Requirements
- NCAC Type "A" Fully Accessible Requirements
- NCQAP for bonus points

Advantages and Concerns

- ⊕ Works well for a range of users
- ⊕ Good access to all fixtures
- ⊕ Unobstructed turning space
- ⊕ Other improvements: wider lavatory counter, linen storage, base cabinets, windows
- ⊕ Generous space to side and front of toilet accommodates range of transfer styles
- ⊕ Compartmentalized design an advantage for families and in other shared facilities

Frame width for pocket doors should be at least 6" to achieve a clear 32" opening. An accessible handle or a stop inside the pocket should prevent the door from sliding completely into the frame.

Pocket door with loop handle hardware is an alternative to out-swinging door that may obstruct hall or room circulation

Switches and outlets in easy-to-reach accessible locations

Lever handle faucet control

Shallow lavatory with rear drain to permit knee space clearances

Removable pipe protection and appearance panel carefully configured to provide the necessary knee space for a forward approach

Whole wall areas of plywood or other solid material reinforcing

Enlarged reinforced areas provide more secure mounting for future installation of shower seats

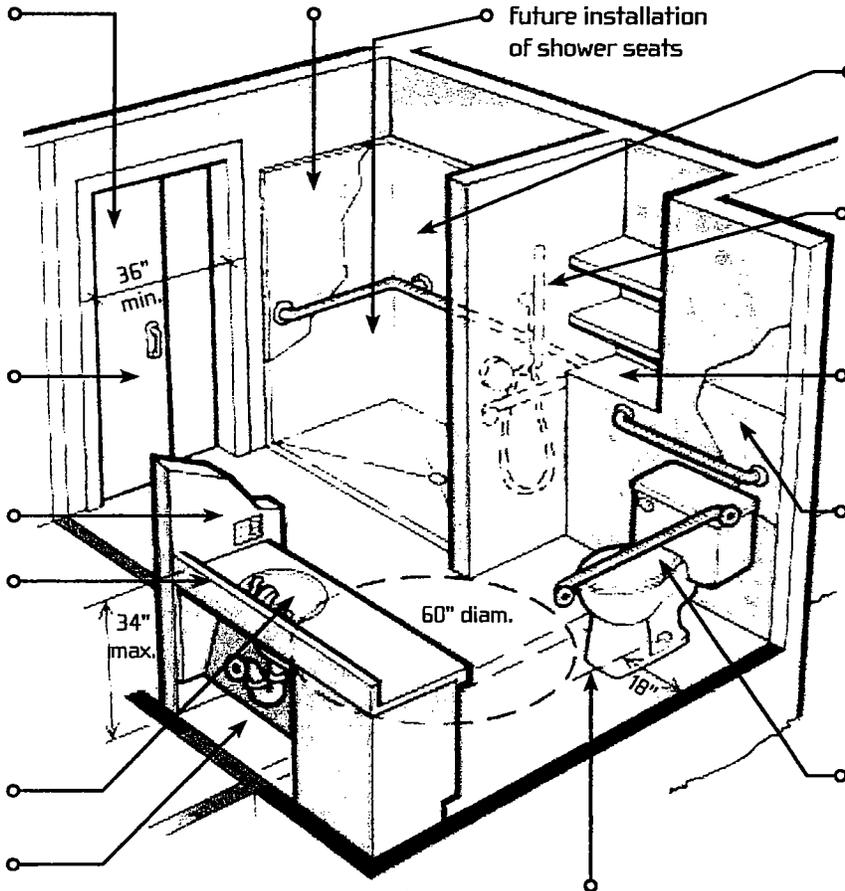
"Curbless" (roll-in) shower is a versatile fixture usable by people with differing abilities and necessary for some, 36" X 60" or larger

Hand-held shower head on adjustable height slide mount with off-set anti-scald valve and single lever handle valve

Incorporate additional "livability" features such as storage or shelving

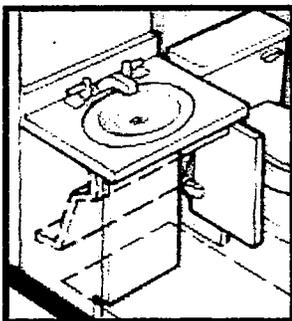
Whole wall areas of plywood or other solid material reinforcing allow grab bar placement at the best heights and configurations to suit individual needs

Toilet seat height from 15" min. to 19" max.



Toilet placed in the corner of a 60" X 60" clear floor space is ideal, creating unobstructed areas in front and to one side—this allows greater maneuvering and transfer options for people using wheelchairs and those needing assistance

Remodeled Bathroom

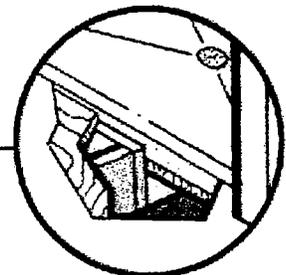


Adaptable Vanity Cabinet

To create a more conventional and marketable appearance, knee space may be concealed with retractable doors or a removable cabinet.

Recessed Floor Detail

To achieve a curbless flush shower threshold, the fixture must be recessed into the floor.



Select Universal Features

for All Housing: Single + Multifamily

Entrances

1. Accessible **parking** convenient to dwelling (covered from the elements)
2. Accessible **path of travel** to dwelling from parking or drop off area (slope of 1:20 or less eliminates the necessity for handrails, except when needed by a specific individual)
3. At least one entrance **without steps** and flush or low profile threshold
4. Minimum **5-foot X 5-foot** maneuvering space at stepless entrance
5. **36-inch** minimum exterior door with lever hardware
6. Movement sensor **light** at entrance
7. A **sidelight** or a **peephole** at 42 and 60 inches above the floor
8. Ambient and focused **lighting** at keyhole
9. High visibility **address numbers**

General Interior

1. Hall width **42 inches** minimum (interior accessible route is 36 inches)
2. Interior door width **32-inch** minimum (requires 34 or 36-inch wide door), equipped with lever hardware
3. **Flush** transitions between floor surfaces (maximum of 1/2-inch rise)
4. **5 pounds** maximum force to open doors
5. **18-inch** minimum space at latch side of door
6. **5-foot X 5-foot** maneuvering space in each room (after furniture is placed)
7. Increased number of **electrical outlets** for additional lighting and alarm indicators, especially in bedrooms
8. Electrical outlets at **18-inch** minimum height
9. Light switches **44 inches** maximum above floor
10. View windows at **36-inch** maximum sill height and large enough to use as an escape route in the event of an emergency
11. **Crank** operated (casement) or light weight sliding windows
12. Closet **rods** adjustable from 30 inches to 66 inches above the floor
13. **Loop** or other easy-to-use handle pulls on drawers and cabinets
14. **High contrast**, glare free floor surfaces and trim
15. **Low pile** carpet or smooth anti-slip flooring
16. High-speed **Internet** access data connection port and cabling



Bathrooms

1. **60-inch** diameter turning circle
2. **30-inch X 48-inch** area of approach (forward or parallel, depending on fixture type) in front of all fixtures
3. **Toilet** more usable by many if positioned in a 5-foot X 5-foot space with centerline 18 inches from sidewall
4. 32-inch minimum **lavatory** counter height with lever faucet control
5. Adaptable cabinets to reveal **kneespace** under lavatory. Exposed piping in kneespace should be padded or concealed.
6. When tub or shower are installed, select models designed to accept a portable bench or bathing seat
7. Curbless or **roll-in shower** plus standard tub
8. **Offset** single-lever controls in tub and shower to minimize stooping, bending, and reaching
9. Adjustable height **hand-held** shower head in addition to standard fixed shower head
10. **Anti-scald** devices on all plumbing fixtures
11. Enlarged **reinforced** areas around toilet and bathing fixture to provide secure mounting locations for grab bars and shower seats
12. **Mirror** to backsplash at lavatory
13. **Contrasting color** edge border at countertops
2. **30-inch X 48-inch** area of approach (forward or parallel, depending on fixture type) in front of all appliances
3. **Cooktop** or range with front- or side-mounted controls and staggered burners to eliminate dangerous reaching
4. **Front-mounted** controls on washer and dryer
5. Adaptable **cabinets** to reveal kneespace (when needed) at sink and under work surface near cooking appliance
6. Variable height **sink** adjustable between 32 and 40 inches
7. Exposed **piping** and any sharp or hot elements in any kneespace should be padded or concealed
8. **Single-lever** faucet controls
9. Full height **pantry** cabinets for high and low storage.
10. **Adjustable** height shelves in wall cabinets
11. Refrigerator / freezer with frozen food storage in the bottom or side-by-side refrigerator / freezer
12. Variable height **counter surfaces** or adjustable through a range of 28 to 40 inches
13. Base **cabinets** with pullout shelves or drawers
14. **Contrasting color** edge border at countertops
15. Microwave oven at **countertop** height with uninterrupted counter surface or pull out shelf to support the safe transfer of hot and / or heavy cookware
16. Under cabinet glare free **task lighting**

* See *Curbless Shower* booklet available as free download from the Center for Universal Design website: www.centerforuniversaldesign.org

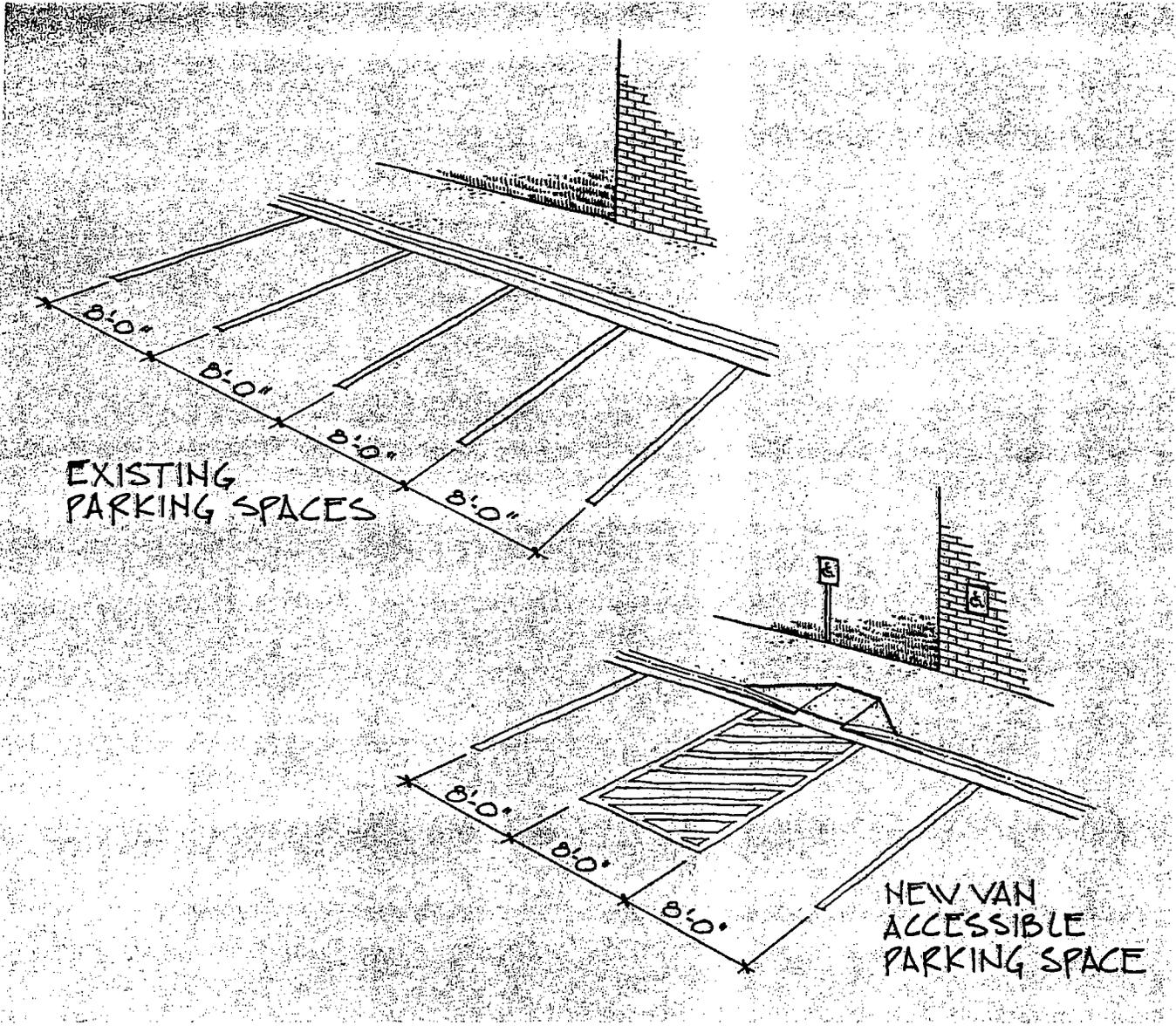
Kitchens

1. **60-inch** diameter turning space

STATE/ZIP	CITY	Residential	Commercial
556-558	Duluth	1.10	1.05
559	Rochester	1.05	1.03
560	Mankato	1.02	1.01
561	Windom	.85	.90
562	Willmar	.86	.93
563	St. Cloud	1.10	1.09
564	Brainerd	.98	1.00
565	Detroit Lakes	.99	1.00
566	Bemidji	.96	.99
567	Thief River Falls	.94	.97
MISSISSIPPI			
386	Clarksdale	.60	.66
387	Greenville	.69	.75
388	Tupelo	.63	.70
389	Greenwood	.63	.67
390-392	Jackson	.72	.75
393	Meridian	.66	.74
394	Laurel	.62	.68
395	Biloxi	.75	.78
396	McComb	.73	.76
397	Columbus	.64	.70
MISSOURI			
630-631	St. Louis	1.01	1.02
633	Bowling Green	.91	.94
634	Hannibal	.88	.91
635	Kirksville	.81	.89
636	Flat River	.94	.97
637	Cape Girardeau	.87	.94
638	Sikeston	.84	.91
639	Poplar Bluff	.85	.91
640-641	Kansas City	1.01	1.02
644-645	St. Joseph	.95	.96
646	Chillicothe	.86	.85
647	Harrisonville	.96	.98
648	Joplin	.83	.85
650-651	Jefferson City	.89	.92
652	Columbia	.89	.94
653	Sedalia	.87	.92
654-655	Rolla	.89	.88
656-658	Springfield	.85	.88
MONTANA			
590-591	Billings	.88	.89
592	Wolf Point	.85	.88
593	Miles City	.87	.87
594	Great Falls	.89	.89
595	Havre	.82	.87
596	Helena	.89	.88
597	Butte	.84	.88
598	Missoula	.84	.86
599	Kalispell	.83	.86
NEBRASKA			
680-681	Omaha	.90	.90
683-685	Lincoln	.79	.85
686	Columbus	.69	.76
687	Norfolk	.78	.83
688	Grand Island	.78	.84
689	Hastings	.76	.80
690	Mccook	.69	.75
691	North Platte	.75	.80
692	Valentine	.66	.72
693	Alliance	.65	.71
NEVADA			
889-891	Las Vegas	1.01	1.04
893	Ely	.92	.93
894-895	Reno	.97	.99
897	Carson City	.97	.98
898	Elko	.93	.92
NEW HAMPSHIRE			
030	Nashua	.91	.94
031	Manchester	.91	.94
032-033	Concord	.88	.93
034	Keene	.73	.77
035	Littleton	.81	.82
036	Charleston	.71	.75
037	Claremont	.72	.75
038	Portsmouth	.85	.90

STATE/ZIP	CITY	Residential	Commercial
NEW JERSEY			
070-071	Newark	1.13	1.11
072	Elizabeth	1.15	1.10
073	Jersey City	1.12	1.10
074-075	Paterson	1.13	1.11
076	Hackensack	1.12	1.10
077	Long Branch	1.12	1.09
078	Dover	1.12	1.09
079	Summit	1.12	1.10
080,083	Vineland	1.10	1.08
081	Camden	1.11	1.08
082,084	Atlantic City	1.14	1.08
085-086	Trenton	1.12	1.10
087	Point Pleasant	1.11	1.09
088-089	New Brunswick	1.12	1.09
NEW MEXICO			
870-872	Albuquerque	.86	.89
873	Gallup	.86	.90
874	Farmington	.86	.90
875	Santa Fe	.86	.89
877	Las Vegas	.86	.89
878	Socorro	.86	.89
879	Truth/Consequences	.84	.86
880	Las Cruces	.83	.84
881	Clovis	.85	.89
882	Roswell	.86	.89
883	Carrizozo	.86	.90
884	Tucumcari	.86	.89
NEW YORK			
100-102	New York	1.37	1.34
103	Staten Island	1.30	1.30
104	Bronx	1.32	1.29
105	Mount Vernon	1.18	1.19
106	White Plains	1.21	1.19
107	Yonkers	1.22	1.21
108	New Rochelle	1.23	1.19
109	Suffern	1.15	1.14
110	Queens	1.30	1.30
111	Long Island City	1.33	1.31
112	Brooklyn	1.34	1.31
113	Flushing	1.32	1.31
114	Jamaica	1.32	1.30
115,117,118	Hicksville	1.22	1.24
116	Far Rockaway	1.31	1.31
119	Riverhead	1.23	1.25
120-122	Albany	.96	.97
123	Schenectady	.96	.97
124	Kingston	1.04	1.09
125-126	Poughkeepsie	1.08	1.11
127	Monticello	1.05	1.08
128	Glens Falls	.88	.92
129	Plattsburgh	.93	.92
130-132	Syracuse	.96	.96
133-135	Utica	.93	.94
136	Watertown	.92	.95
137-139	Binghamton	.92	.93
140-142	Buffalo	1.06	1.02
143	Niagara Falls	1.04	1.02
144-146	Rochester	.99	.99
147	Jamestown	.91	.93
148-149	Elmira	.89	.92
NORTH CAROLINA			
270,272-274	Greensboro	.74	.75
271	Winston-Salem	.74	.75
275-276	Raleigh	.75	.76
277	Durham	.74	.75
278	Rocky Mount	.64	.68
279	Elizabeth City	.62	.69
280	Gastonia	.74	.74
281-282	Charlotte	.75	.75
283	Fayetteville	.72	.75
284	Wilmington	.72	.74
285	Kinston	.62	.67
286	Hickory	.62	.67
287-288	Asheville	.72	.74
289	Murphy	.66	.67
NORTH DAKOTA			
580-581	Fargo	.81	.85
582	Grand Forks	.76	.82
583	Devils Lake	.81	.83
584	Jamestown	.75	.80
585	Bismarck	.81	.85

Install Accessible Parking Spaces



Accessible parking spaces are often the first part of an accessible route of travel. Proper design and location can create the difference between an accessible and inaccessible facility, as well as ensuring the safety of people using them.

ADAAG References

4.1.2 (5) (a) and (b), Accessible Sites and Exterior Facilities, New Construction

4.6 Parking and Passenger Loading Zones

Where Applicable

All parking lots for visitors or employees.

Design Requirements

- Number of accessible spaces as designated by ADAAG 4.1.2 (5) (a) and (b). Accessible spaces can be dispersed among multiple lots with accessible entrances.

- Spaces on an accessible route with curb cut, if necessary.
- Spaces located closest to accessible entrance to the building, or to the lot entrance if no particular building is served.
- Spaces 8' wide, with 5' access aisle (two spaces can share one aisle).
- One designated van-accessible space for every eight accessible spaces (never less than one), an 8' space with 8' access aisle.
- 98" minimum height clearance at the van-accessible space.
- Surfaces to be stable, slip-resistant, maximum cross slope 2% (1:50).
- Signage with accessibility symbol.

Design Suggestions

ADAAG shows perpendicular spaces in its illustrations, but it is possible to use angled or parallel spaces if access aisle requirements can be met. Look at the

route of travel first: Spaces should be located so that people with disabilities are not forced into vehicular traffic. Vans equipped with wheelchair lifts usually exit to the passenger side (some exit at the rear), so if only one van space is required, the wide access aisle should be on the passenger side of the space. Locate accessibility signs to always be visible to the car's driver and not blocked by cars, poles, etc.

Key Items

Paving material (asphalt or concrete), striping paint, signs, curb cut material if necessary.

Level of Difficulty

Low to moderate. Re-striping, ground markings, or installing signage can be done by facility staff or contractors. Installing a curb cut is usually done by a mason or concrete contractor.

Estimates

Add new accessible spaces

Description	Quantity	Unit	Work Hours	Material
Saw cutting, conc., per inch of depth (20 L.F., 4" deep)	80.000	L.F.	1.360	20.00
Site demolition, remove granite curb	14.000	L.F.	0.952	0.00
Site demolition, remove concrete sidewalk	5.340	S.Y.	0.838	0.00
Site demolition, remove asphalt paving	1.670	S.Y.	0.124	0.00
Painted line removal	100.000	L.F.	2.200	35.00
Install granite curbing, 6" x 18"	14.000	L.F.	1.736	235.20
Gravel base, 4" deep	48.000	S.F.	0.480	5.76
Install 4" concrete sidewalk, broom finish	48.000	S.F.	1.920	43.20
Miscellaneous asphalt patching	1.670	S.Y.	0.890	2.45
Line painting, latex, yellow, 4" wide	20.000	L.F.	0.040	1.00
Line painting, gore lines	100.000	S.F.	1.600	79.00
Install signs	2.000	Ea.	0.914	17.50
Install sign post	1.000	Ea.	0.160	27.00
Totals			13.214	466.11

Total for two accessible spaces including general contractor's overhead and profit

\$1,611

I. Install Accessible Parking Spaces *(continued)*

Re-stripe existing parking lot

Description	Quantity	Unit	Work Hours	Material
Painted line removal	263.000	L.F.	5.786	92.05
Line painting, latex, yellow, 4" wide	20.000	L.F.	0.040	1.00
Line painting, gore lines	500.000	S.F.	8.000	395.00
Totals			13.826	488.05

Total per space including general contractor's overhead and profit

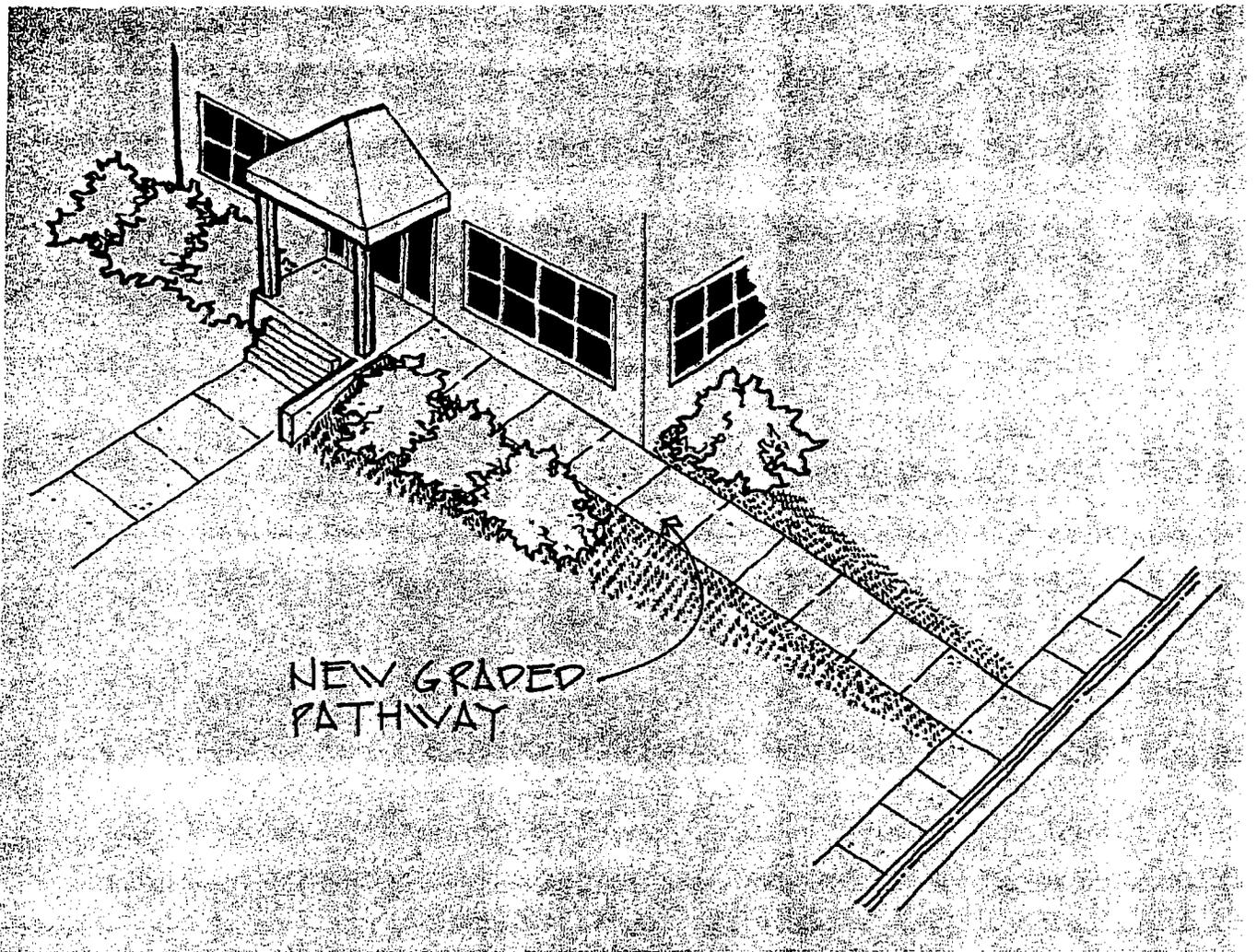
\$17

Total per one hundred spaces including general contractor's overhead and profit

\$1,697

4

Construct Graded Entrance Pathway



Where an entrance is not on the same grade as an accessible route of travel, constructing a graded pathway may be

an alternative to a ramp. Since graded pathways have a slope no greater than 1 in 20, they have the added advantage of

being usable by people with a wider range of ability. Graded pathways can be created with landscaping which can

be useful in situations where a ramp might be visually disruptive (as in some historic facilities).

ADAAG References

4.3 Accessible Route

4.4 Protruding Objects

4.5 Ground and Floor Surfaces

Where Applicable

Wherever a new exterior accessible route of travel is constructed at a slope of no more than 1:20.

Design Requirements

- 36" wide minimum.
- Surface stable, firm, and slip-resistant.
- Differences in level between 1/4" and 1/2" beveled at maximum slope of 1:2.
- No differences in level greater than 1/2".
- No gratings with holes greater than 1/2" across perpendicular to the direction of travel.
- Maximum 5% slope (1:20).
- Maximum 2% cross-slope (1:50) for drainage.
- 80" minimum height clearance.
- No objects 27" a.f.f. or higher protruding more than 4" into pathway without warnings below.

- 60" x 60" passing space every 200' if pathway is less than 60" wide.

Design Suggestions

Pathways graded at a slope less than 1:20 can avoid the use of ramps. In new construction or additions, the first floor elevation can often be set to accommodate a pathway. In renovations, a graded pathway can be advantageous where a ramp would be difficult to incorporate into the existing building style, as in historic situations, or where a ramp would be prohibitively expensive. (In cases of historic buildings, the pathway should be pulled away from the building to avoid damage to existing features). Generally, pathways are usable by people with a wider range of mobility impairments than ramps and are therefore a recommended design option for creating access. However, some people with stamina difficulties find ramps easier to use. Without an entrance that is level with the existing grade, no solution can accommodate everyone. It is important to consider the height difference between one end of the route of travel and the entrance: Excessively long pathways can create very circuitous accessible routes of travel, and in such situations, ramps might be preferable.

Use the 36" width cited in ADAAG as a minimum. 48" is recommended, and 60" is convenient for passing. By the same token, the 5% slope is a maximum. Shallower slopes are easier to use. Avoid unit pavers (e.g., bricks) if possible. If used, install unit pavers on a firm base; stone dust is recommended, and concrete preferred (the firm substrate is more expensive). Avoid placing utilities (e.g., drainage gratings) in the path of travel, even if the dimensions comply. Similarly, locate amenities, such as phones, adjacent to, rather than in, the path of travel but within reach from the accessible path. Ensure that drainage is sufficient to prevent puddling on the pathway.

Key Items

Paving materials, substrate.

Level of Difficulty

Moderate to high, depending on material. Pavers or bituminous easier to install than concrete. Usually involves landscape planning. Trades involved: paving contractors, masons, landscapers.

Estimates

Install three-foot-wide concrete pathway on graded ramp (total rise, 1 foot)

Description	Quantity	Unit	Work Hours	Material
Gravel fill	0.300	Ton	0.000	0.88
Gravel delivery charge	0.200	C.Y.	0.019	0.00
Hand spread gravel	0.300	Ton	0.164	0.00
Compaction (4 passes)	0.200	C.Y.	0.011	0.00
Gravel base, 4" thick	3.000	S.F.	0.030	0.36
Install 4" concrete sidewalk, broom finish	3.000	S.F.	0.120	2.70
Install topsoil, 4" deep	0.500	S.Y.	0.005	0.94
Install sod	0.005	M.S.F.	0.025	0.78
Totals			0.374	5.66

Total per linear foot including general contractor's overhead and profit

\$29

4. Construct Graded Entrance Pathway *(continued)*

Install three-foot-wide asphalt pathway on graded ramp (total rise, 1 foot)

Description	Quantity	Unit	Work Hours	Material
Gravel fill	0.300	Ton	0.000	0.88
Gravel delivery charge	0.200	C.Y.	0.019	0.00
Hand spread gravel	0.300	Ton	0.164	0.00
Compaction (4 passes)	0.200	C.Y.	0.011	0.00
Gravel base, 4" thick	3.000	S.F.	0.030	0.36
Install 2-1/2" thick asphalt sidewalk	0.340	S.Y.	0.025	1.22
Install topsoil, 4" deep	0.500	S.Y.	0.005	0.94
Install sod	0.005	M.S.F.	0.025	0.78
Totals			0.279	4.18

Total per linear foot including general contractor's overhead and profit

\$22

Install three-foot-wide asphalt paver pathway over tamped earth base on graded ramp (total rise, 1 foot)

Description	Quantity	Unit	Work Hours	Material
Gravel fill	0.300	Ton	0.000	0.88
Gravel delivery charge	0.200	C.Y.	0.019	0.00
Hand spread gravel	0.300	Ton	0.164	0.00
Compaction (4 passes)	0.200	C.Y.	0.011	0.00
Gravel base, 4" thick	3.000	S.F.	0.030	0.36
Install 8" x 8" x 2" asphalt block pavers	3.000	S.F.	0.369	10.50
Install topsoil, 4" deep	0.500	S.Y.	0.005	0.94
Install sod	0.005	M.S.F.	0.025	0.78
Totals			0.623	13.46

Total per linear foot including general contractor's overhead and profit

\$55

Install three-foot-wide brick paver pathway over tamped earth base on graded ramp (total rise, 1 foot)

Description	Quantity	Unit	Work Hours	Material
Gravel fill	0.300	Ton	0.000	0.88
Gravel delivery charge	0.200	C.Y.	0.019	0.00
Hand spread gravel	0.300	Ton	0.164	0.00
Compaction (4 passes)	0.200	C.Y.	0.011	0.00
Gravel base, 4" thick	3.000	S.F.	0.030	0.36
Install 4" x 8" x 2-1/4" brick pavers	3.000	S.F.	0.435	7.35
Install topsoil, 4" deep	0.500	S.Y.	0.005	0.94
Install sod	0.005	M.S.F.	0.025	0.78
Totals			0.689	10.31

Total per linear foot including general contractor's overhead and profit

\$53

**Install three-foot-wide brick paver pathway over stone dust base on graded ramp
(total rise, 1 foot)**

Description	Quantity	Unit	Work Hours	Material
Gravel fill	0.300	Ton	0.000	0.88
Gravel delivery charge	0.200	C.Y.	0.019	0.00
Hand spread gravel	0.300	Ton	0.164	0.00
Compaction (4 passes)	0.200	C.Y.	0.011	0.00
Install stone dust base	0.340	S.Y.	0.003	0.71
Install 4" x 8" x 2-1/4" brick pavers	3.000	S.F.	0.435	7.35
Install topsoil, 4" deep	0.500	S.Y.	0.005	0.94
Install sod	0.005	M.S.F.	0.025	0.78
Totals			0.662	10.66

Total per linear foot including general contractor's overhead and profit

\$52

**Install three-foot-wide brick paver pathway over concrete base on graded ramp
(total rise, 1 foot)**

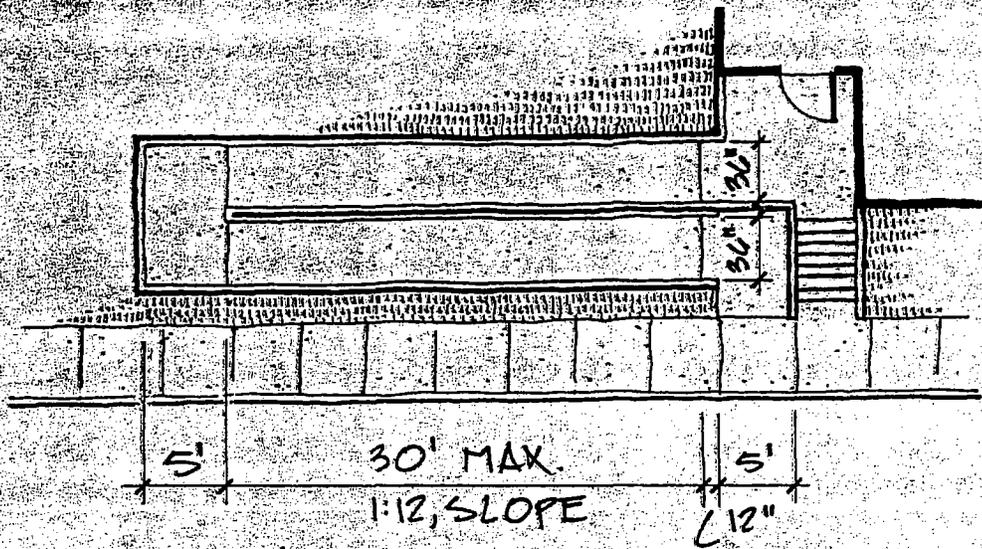
Description	Quantity	Unit	Work Hours	Material
Gravel fill	0.300	Ton	0.000	0.88
Gravel delivery charge	0.200	C.Y.	0.019	0.00
Hand spread gravel	0.300	Ton	0.164	0.00
Compaction (4 passes)	0.200	C.Y.	0.011	0.00
Install 4" concrete mud slab	3.000	S.F.	0.120	2.70
Gravel base, 4" thick	3.000	S.F.	0.030	0.36
Install 4" x 8" x 2-1/4" brick pavers	3.000	S.F.	0.435	7.35
Install topsoil, 4" deep	0.500	S.Y.	0.005	0.94
Install sod	0.005	M.S.F.	0.025	0.78
Totals			0.809	13.01

Total per linear foot including general contractor's overhead and profit

\$63

9

Construct New Ramp: Switch-Back



PLAN VIEW,
SWITCHBACK RAMP



ELEVATION,
SWITCHBACK RAMP

By adding additional ramp length, a switch-back ramp increases the potential height of a ramp. It also enables a ramp to fit in a tighter area than a straight-run or dog-leg ramp, and can be useful in situations where there are obstructions or a lack of open land.

ADAAG Reference

4.8 Ramps

Where Applicable

Public entrances and routes of travel where steps or different levels exist which are being made accessible and a ramp is installed with one leg parallel to the other (or where more than two legs of a ramp are parallel to each other).

Design Requirements

- 36" minimum clear width between handrails or curbs.
- Maximum slope 1:12, or one inch of rise for every 12 inches of run. (Any slope between 1:20 and 1:12 is a ramp).
- Base flush with adjacent paving.
- A level landing at least every 30" of rise.
- Slip-resistant surface.
- 60" level area at base, all landings, and top, as wide as the ramp; 60" x 60" minimum landing wherever ramp changes direction.
- Handrails on both sides, 1-1/4" to 1-1/2" diameter, continuous, round or oval, 12" level extensions top and bottom, 34"-38" above ramp surface, 1-1/2" from the wall, ends returned to a post or wall.

- Curbs or rails at any drop-offs on both sides of ramp.
- No pooling of water on ramp surface.

Design Suggestions

Switch-back ramps: Switch-back ramps can be installed in areas where a straight-run or dog-leg ramp won't fit. As with dog-leg ramps, switch-back ramps require at least one turn, so if possible the ramp can be widened to the width of the landing to make it easier to use. If a switch-back ramp has multiple turns, care should be taken to ensure that the ramp entrance is on an accessible route (preferably the main route of travel) and is clearly visible.

General Ramp Design: When making an entrance accessible, it should be determined if ramps are necessary. In new construction or additions, floor heights can be established so that neither steps nor a ramp are necessary at entrances. Graded pathways at a slope of 1:20 or less might be possible. If a ramp is necessary, choose the location carefully. Always look to first making the main or public entrance accessible. If that is not possible, another entrance may be modified and proper signage installed to direct people to the accessible entrance. The 1:12 slope cited in ADAAG is a *maximum*, so even if a graded pathway is not possible, a ramp with a shallower slope might be. A ramped entrance or route should also have stairs adjacent to it. This integrates the ramp into the common route of travel, and stairs are easier for some people to use.

It helps acceptance and use of the ramp if the ramp is integrated into the existing building aesthetic, rather than constructed of completely different materials and details. Plantings or other landscaping can help integrate the ramp into the surrounding environment. All materials must be slip-resistant, a critical issue for wood ramps, which can be slippery when wet. Even though it may be expensive, consider the possibility of covering the ramp for weather protection. This helps keep the ramp free of water, snow, ice, etc., and makes maintenance easier. Detail railings for continuity (Under-rail brackets work best; be sure that there is 1-1/2" clearance between the rail and the wall or other surface). Above all, remember that ramps get used by people with baby strollers, shopping carts, hand trucks, etc., and are a helpful addition to an existing facility.

Key Items

- Ramp material: painted wood, treated lumber, concrete.
- Rails: pipe rails, metal rails, wood banisters or rails, uprights, attachments.
- Possibly requires slip-resistant surfaces applied materials: sand paint, sandpaper strips.

Level of Difficulty

Moderate to high. A wood ramp requires skilled carpentry. Concrete requires foundation work. Can require design drawings and building permit.

9. Construct New Ramp: Switch-Back (continued)

Install new pressure-treated wood switch-back ramp

Description	Quantity	Unit	Labor-Hours	Material
Hand excavating for post footings	3.000	C.Y.	6.000	0.00
Concrete forms, 12" diameter tubes (13 forms, 4' deep)	52.000	L.F.	11.093	109.20
Hand backfilling around post footings	1.000	C.Y.	0.727	0.00
Place concrete for footings, direct chute	2.000	C.Y.	1.745	0.00
Concrete, material only	2.000	C.Y.	0.000	145.00
Install two-piece galvanized steel post foot	13.000	Ea.	0.800	70.20
4" x 4" post framing, w/pressure-treated lumber	0.140	M.B.F.	0.000	135.10
2" x 8" joist framing, w/pressure-treated lumber	0.490	M.B.F.	0.000	350.35
1" x 8" board decking	312.000	SF Fir.	5.706	249.60
Handrail stock	144.000	L.F.	14.400	175.68
Drilling bolt holes	432.000	Inch	7.681	0.00
Bolts, nuts & washers	108.000	Ea.	6.171	32.40
Handrail bracket	36.000	Ea.	6.000	162.36
2" x 6" railing enclosure	564.000	L.F.	0.000	431.46
Anchor layout and drilling, per inch of depth (1/2" diameter, 2" deep)	16.000	Ea.	2.560	1.12
1/2" anchors (for attachment of wood framing to building)	8.000	Ea.	0.800	20.96
Totals			63.683	1,883.43

Total per linear foot including general contractor's overhead and profit

\$128

Total per each 60-foot ramp including general contractor's overhead and profit

\$7,703

Install new concrete switch-back ramp

Description	Quantity	Unit	Labor-Hours	Material
Excavation	60.000	C.Y.	8.889	0.00
Concrete forms, footings	248.000	SFCA	16.363	178.56
Concrete forms, walls	1752.000	SFCA	66.751	893.52
Reinforcing (@ 50 lbs./C.Y.)	0.800	Ton	8.533	432.00
Place concrete, direct chute	32.000	C.Y.	17.067	0.00
Concrete, material only	32.000	C.Y.	0.000	2,320.00
Backfilling	38.000	C.Y.	5.630	0.00
Gravel under slab	6.000	C.Y.	0.280	31.80
Slab for ramp, 4" thick	6.000	C.Y.	5.739	510.00
Aluminum pipe rail (2 rail)	150.000	L.F.	30.000	2,497.50
Totals			159.252	6,863.38

Total per linear foot including general contractor's overhead and profit

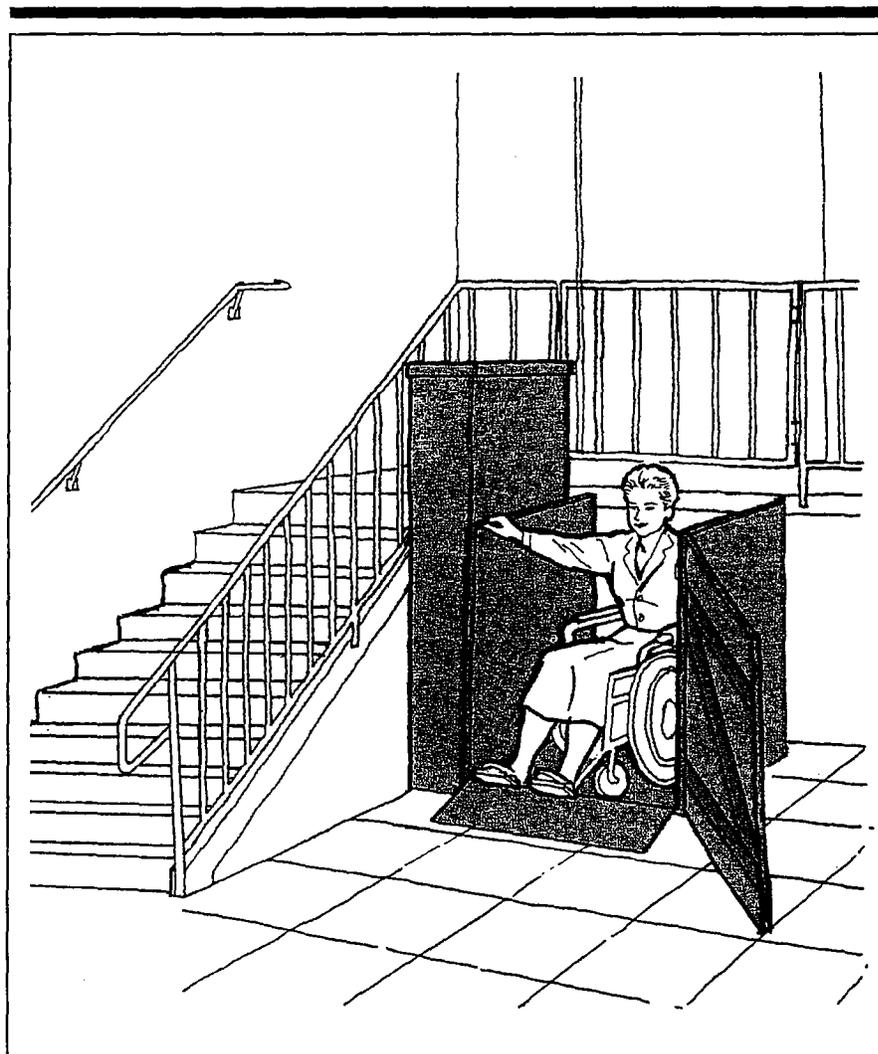
\$415

Total per each 60-foot ramp including general contractor's overhead and profit

\$24,909

14

Install Vertical Platform Lift



Vertical platform lifts are useful for creating access where a ramp would not fit or would be too long, an elevator would be too expensive, or a stair lift would block an egress stair. Platform lifts can be installed inside or outside and can be open or enclosed. The maximum height of a vertical lift is usually less than 8', although 12' heights are available.

ADAAG References

206.7, Platform Lifts
207.2, Platform Lifts, Means of Egress
302, Floor or Ground Surfaces
303, Changes in Level
305, Clear Floor or Ground Space
309, Operable Parts
404.2, Doors, Doorways, and Gates
404.3, Automatic Doors and Gates
410, Platform Lifts
ASME A18.1-2003
IBC 1007 (2003 Edition)

Where Applicable

Allowed in existing buildings to create accessible vertical circulation between levels where installation of an elevator or ramp is not possible. Allowed in certain specific locations in new construction, such as performance areas, speakers' platforms, areas in courtrooms, and incidental spaces that are not public and are used by five or fewer people. They can also be used in assembly areas to achieve wheelchair space dispersion or line of sight requirements and where exterior site restraints make use of a ramp or elevator not feasible. They are allowed in certain situations in transient guest rooms, amusement rides, play areas, team seating areas, and boating facilities and fishing piers.

Design Requirements

- Accessible route to and off lift, top and bottom.
- Maneuvering space at swinging gate or door meeting ADAAG 404.2.4, Maneuvering Clearances.
- Stable, firm, slip-resistant surface at approaches, top and bottom.
- 80" head clearance along path of travel.
- Cannot be attendant-operated; must allow unassisted entry and exit. Gates must be power operated if serving more than two landings.
- Controls within reach range (48" high, maximum) and operable with a closed fist.
- To fit in a lift, you will probably need to rough-in an area about 54" by 54" for a straight-through design for a nominal 36" by 48" platform, and 60" by 72" for the smallest 90° turn configuration.
- In compliance with ASME A18.1 and *International Building Code* (IBC) Section 1007.
- Standby power required when lift is part of a means of egress.

Design Suggestions

While lifts can be used as a means of achieving vertical access, they require servicing, periodic testing, staff training, and protection against

vandalism. They often end up locked (usually against regulations) and take time to use. Accordingly, they should be avoided as a means of making a heavily-used route accessible.

Consider the possibility of using a ramp, or even an elevator, as an alternative, even though these will be more expensive. Frequently, lifts are limited to wheelchair users by local safety codes (but not by ADAAG).

Because of the wide gate to the lift, check to see if a person can get around the gate to open it. Maneuverability is often the largest impediment to using a lift.

Needless to say, the difficulty of fitting a lift into the existing aesthetic increases as the height increases.

Unless it cannot be avoided, use a straight-line configuration where the on/off direction of travel is a straight line (making a turn is very difficult). The best design allows users to enter from one end and exit from the opposite end.

Lifts must be usable independently (i.e., unassisted). Where the lift must be kept locked, explore other options, because a locked lift complies with the regulations only if an attendant is readily available *at all times*. Consider installing a call button within reach, even when the lift is not locked, in

case assistance is needed. ASME A18.1, referenced in ADAAG, sets strict technical requirements for the length of travel and methods of operation for lifts. Most lifts are standard items and meet these requirements, and are so labeled. Accordingly, the actual specifications must be reviewed only for quality based on a facility's particular need, not for regulatory compliance. Local codes, however, may have additional requirements, and should be consulted prior to any installation. A manufacturer's representative can assist you in making a choice.

Key Items

Accessible route to lift and maneuvering room at entrance/exit. Lift equipment. Concrete pad for exterior applications. Enclosure, if desired, prefab or custom (important in older building applications). Call button recommended, even if not necessary.

Level of Difficulty

Moderate to high. Installation is usually done by lift manufacturer's representatives. Requires preparatory electrical wiring. Possible concrete work for pad and carpentry if custom enclosure.

Estimates

Install exterior unenclosed lift with concrete pad

Description	Quantity	Unit	Labor-Hours	Material
Excavation	0.600	C.Y.	0.089	0.00
Concrete formwork	32.000	SFCA	4.388	16.64
15" thick concrete pad	16.000	S.F.	0.460	58.24
Unenclosed lift	1.000	Ea.	16.000	5,375.00
Totals			20.937	5,449.88

Total per each including general contractor's overhead and profit

\$11,071

14. Install Vertical Platform Lift *(continued)*

Install exterior enclosed lift with concrete pad

Description	Quantity	Unit	Labor-Hours	Material
Excavation	0.600	C.Y.	0.089	0.00
Concrete formwork	32.000	SFCA	4.388	16.64
15" thick concrete pad	16.000	S.F.	0.460	58.24
Enclosed lift	1.000	Ea.	32.000	12,700.00
Totals			36.937	12,774.88

Total per each including general contractor's overhead and profit **\$24,932**

Install interior unenclosed lift

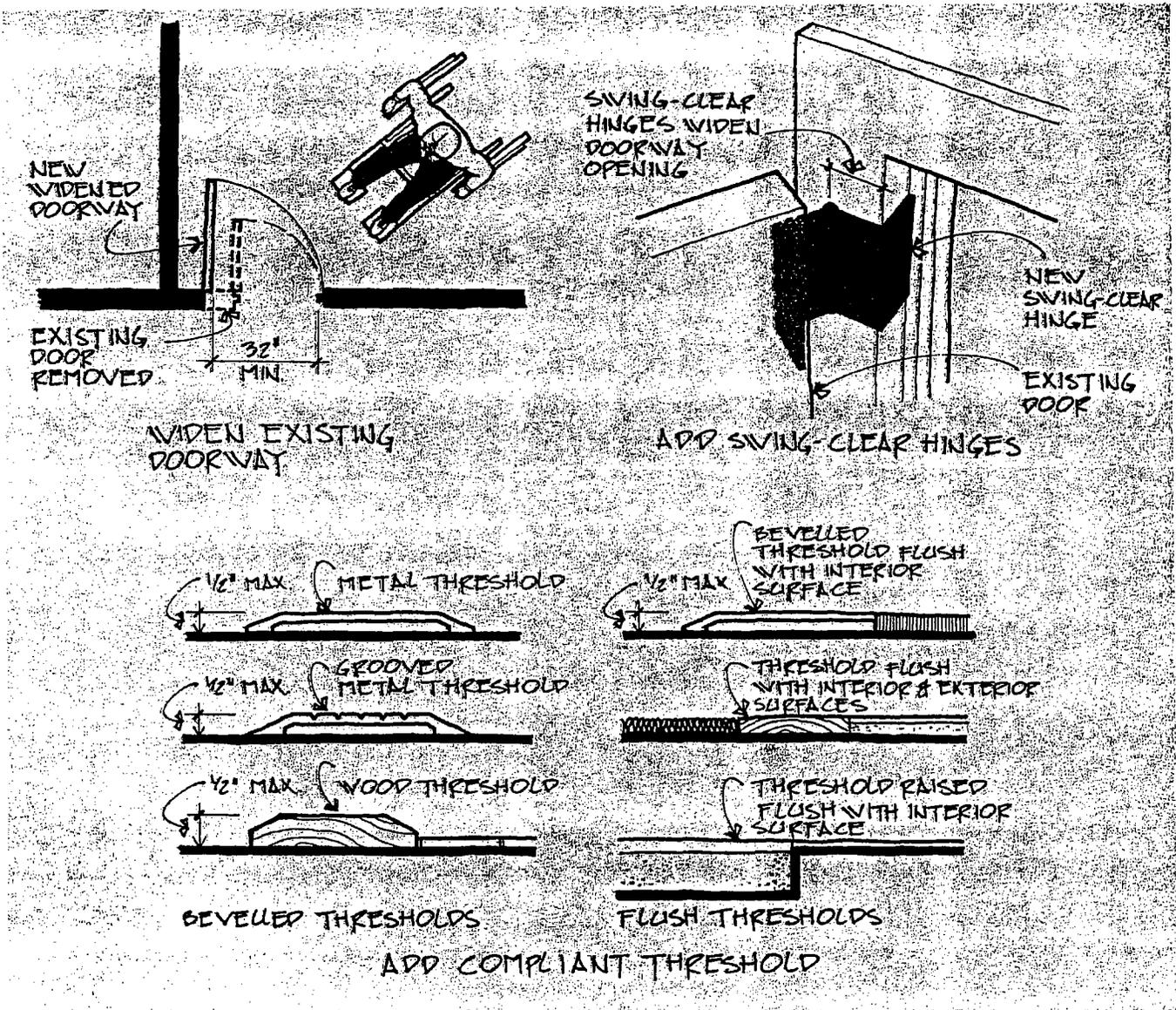
Description	Quantity	Unit	Labor-Hours	Material
Interior unenclosed lift	1.000	Ea.	16.000	5,375.00
Totals			16.000	5,375.00

Total per each including general contractor's overhead and profit **\$10,592**

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Modify Existing Door



Some modifications are relatively simple on any door. Examples include replacing or modifying existing hardware, beveling an existing threshold, or removing an existing threshold. Reversing a door swing can solve maneuvering clearance problems, but can be difficult with metal doors because hinges and hardware have to be changed and the frame sometimes has to be reversed in the opening. Swing-clear hinges free the space normally occupied by the door (when the door is open), although they can also be difficult to install on metal doors.

ADAAG Reference

4.13 Doors

Where Applicable

Non-compliant doors along an accessible route.

Design Requirements

- 32" clear opening width.
- Accessible hardware (acceptable if operable with a closed fist).
- Threshold 1/2" high maximum, beveled.
- Interior pull weight 5 lbs. maximum (no ADAAG reference for exterior doors).
- 18" clearance adjacent to the latch on the pull side of the door, 12" on the push side, with level clearances on both sides of the door as required (consult ADAAG for exact dimensions).
- 3 second minimum closing time to a point 3" from the latch.

Design Suggestions

If there is a closer on the door, the closing speed can usually be adjusted which improves accessibility. If there are hinges, oiling them is another simple way to make a door easier to open. It is almost always possible (but sometimes expensive) to install an automatic opener to compensate for insufficient latchside clearance or heavy door opening weights.

Key Items

Door hardware, hinges, thresholds, automatic opener.

Level of Difficulty

Low to moderate. Some finish work required for threshold removal. Automatic openers require preliminary electrical work, and can be expensive.

Estimates

Reverse door swing, wood door

Description	Quantity	Unit	Work Hours	Material
Remove door	1.000	Ea.	0.400	0.00
Remove door frame & trim	1.000	Ea.	0.571	0.00
Interior door frame	18.000	L.F.	0.774	57.60
Door trim set, 1 head, 2 sides, 2-1/2" pine	2.000	Opng.	2.712	22.00
Remove door hinge	3.000	Ea.	0.501	0.00
Install door hinge	3.000	Ea.	0.501	0.00
Re-install door	1.000	Ea.	1.143	0.00
Remove lockset	1.000	Ea.	0.040	0.00
Re-install lockset	1.000	Ea.	0.667	0.00
Paint door frame & trim	18.000	L.F.	0.450	0.72
Totals			7.759	80.32

Total per each including general contractor's overhead and profit

\$571

25. Modify Existing Door (continued)

Replace existing hinges with swing-clear hinges

Description	Quantity	Unit	Work Hours	Material
Remove interior door	1.000	Ea.	0.400	0.00
Remove door hinge	3.000	Ea.	0.501	0.00
Swing-clear hinges	1.500	Pr.	0.000	136.50
Install door hinge	3.000	Ea.	0.501	0.00
Re-install door	1.000	Ea.	1.143	0.00
Totals			2.545	136.50

Total per set of hinges including general contractor's overhead and profit

\$368

Replace existing lockset with lever-handled lockset

Description	Quantity	Unit	Work Hours	Material
Remove lockset	1.000	Ea.	0.040	0.00
Lever-handled lockset	1.000	Ea.	0.000	79.78
Totals			0.040	79.78

Total per each including general contractor's overhead and profit

\$204

Install push plates on wood door

Description	Quantity	Unit	Work Hours	Material
Aluminum push plates, both sides of door	1.000	Ea.	0.571	11.90
Totals			0.571	11.90

Total per each including general contractor's overhead and profit

\$51

Install push plates and panic bar

Description	Quantity	Unit	Work Hours	Material
Aluminum push plates, both sides of door	1.000	Ea.	0.571	11.90
Panic bar and verticle rod, for exit only	1.000	Ea.	1.600	410.00
Totals			2.171	421.90

Total per each including general contractor's overhead and profit

\$834

Remove threshold, fill floor flush with existing flooring (vinyl tile)

Description	Quantity	Unit	Work Hours	Material
Remove threshold	1.000	Ea.	0.200	0.00
Vinyl tile	3.000	S.F.	0.048	8.25
Minimum labor to patch subfloor and lay new tile	1.000	Job	2.000	0.00
Totals			2.248	8.25

Total per each including general contractor's overhead and profit

\$136

Bevel 2 existing wood thresholds

Description	Quantity	Unit	Work Hours	Material
Minimum labor to bevel 2 wood thresholds	1.000	job	2.000	0.00
Totals			2.000	0.00

Total per each including general contractor's overhead and profit **\$57**
Total per 2 thresholds including general contractor's overhead and profit **\$114**

Remove 2 existing thresholds

Description	Quantity	Unit	Work Hours	Material
Min. labor to remove 2 existing thresholds (no patching incl.)	1.000	job	2.000	0.00
Totals			2.000	0.00

Total per each including general contractor's overhead and profit **\$57**
Total per 2 thresholds including general contractor's overhead and profit **\$114**

Adjust door-closing speed (5 doors)

Description	Quantity	Unit	Work Hours	Material
Minimum labor to adjust 5 door closers	1.000	job	2.000	0.00
Totals			2.000	0.00

Total per each including general contractor's overhead and profit **\$23**
Total per 5 closers including general contractor's overhead and profit **\$114**

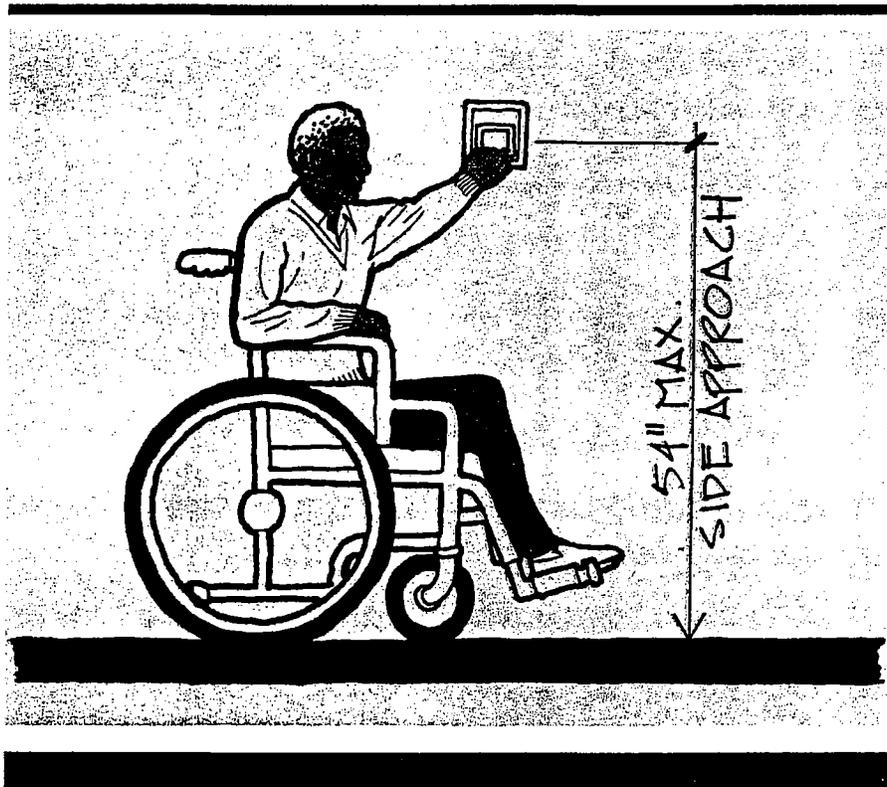
Install automatic door opener

Description	Quantity	Unit	Work Hours	Material
Cutout demolition of partition	1.000	Ea.	0.333	0.00
Conductor fished to nearby junction box	0.100	C.L.F.	0.333	2.90
Junction box	1.000	Ea.	0.400	1.54
Automatic opener, button operation	1.000	Ea.	2.000	1025.00
Totals			3.066	1029.44

Total per each including general contractor's overhead and profit **\$1,921**

40

Install or Modify Controls



Controls in public places are often vital for public safety. Examples include fire alarm pull boxes and emergency assistance boxes. Placing public controls in accessible locations or making the control devices accessible not only makes them usable by people with mobility or grasping impairments, it also makes them easier to reach and use for everyone in the facility.

ADAAG References

4.2 Reach Ranges
4.27 Controls and Operating Mechanisms

Where Applicable

All controls and alarms operated by building occupants.

Design Requirements

- Within reach range: 54" a.f.f. for side reach, 48" a.f.f. for front reach.
- All controls operable without tight grasping, pinching, or twisting of the wrist.
- 30" x 48" clear floor space in front of control.
- Operating force no greater than 5 pounds/foot.

Design Suggestions

- Install controls at 48" a.f.f. maximum even if side reach is possible. Fire alarms can be covered with plastic shields to help prevent false alarms, but shields must comply with 4.17 and be operable without tight grasping, pinching, or twisting of the wrist.
- Locate all controls at least 18" from an inside corner.

Key Items

Controls, wiring, finishes to match existing.

Level of Difficulty

Moderate. Involves electrical and finish work.

Estimate

Lower 5 fire alarm boxes (surface-mounted conduit)

Description	Quantity	Unit	Work Hours	Material
No. 700 wiremold raceway	10.000	L.F.	0.800	6.30
#18 fire alarm conductor	0.100	C.L.F.	0.100	6.40
Labor minimum	1.000	Job	2.000	0.00
Totals			2.900	12.70

Total per each including general contractor's overhead and profit

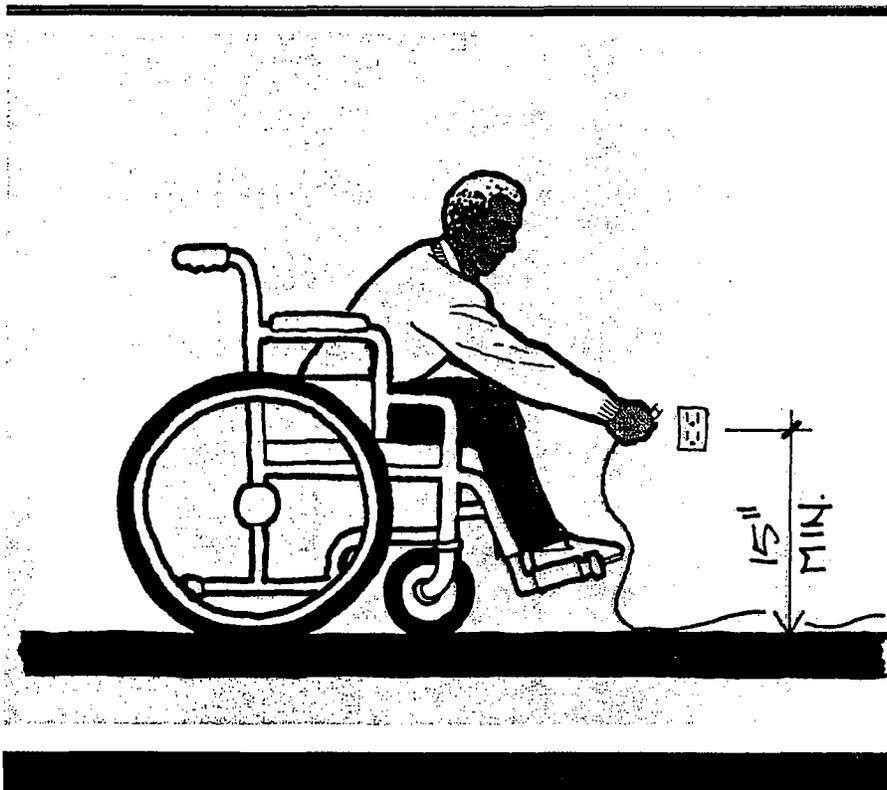
\$39

Total per 5 alarm boxes including general contractor's overhead and profit

\$196

41

Install or Modify Outlets



While placing outlets in accessible locations is essential for people who use wheelchairs, it makes them easier to use for everyone. Outlets located close to the floor require stooping even for people who do not use wheelchairs. Installing or relocating outlets to accessible heights is a relatively simple modification that may only require minor electrical and finish work to complete.

ADAAG References

4.2 Reach Ranges
4.27 Controls and Operating Mechanisms

Where Applicable

All outlets operated by building occupants.

Design Requirements

- Within reach range: 54" a.f.f. for side reach, 48" a.f.f. for front reach, 15" minimum a.f.f. for electrical or convenience outlets and telephone and data jacks.
- 30" x 48" clear floor space in front of control.

Design Suggestions

- Locate all controls at least 18" from an inside corner.

Key Items

Outlets, wiring, finishes to match existing.

Level of Difficulty

Low to moderate. Involves electrical and finish work.

Estimates

Raise 5 outlets, gypsum/metal stud wall

Description	Quantity	Unit	Work Hours	Material
Remove plate and receptacle/switch/fixture	5.000	Ea.	0.155	0.00
Cutout demolition of partition	5.000	Ea.	1.665	0.00
Conductor	0.100	C.L.F.	0.296	1.55
Install junction box	5.000	Ea.	2.000	23.25
Re-install outlet	5.000	Ea.	1.480	0.00
Install plate	5.000	Ea.	0.500	11.50
Misc. materials for gypsum board painting and repair	1.000	Job	0.000	75.00
Repair gypsum board	1.000	Job	2.000	0.00
Paint gypsum board—minimum	1.000	Job	2.000	0.00
Totals			10.096	111.300

Total per each including general contractor's overhead and profit

\$176

Total per 5 outlets including general contractor's overhead and profit

\$878

Install 5 outlets, gypsum/metal stud wall

Description	Quantity	Unit	Work Hours	Material
Cutout demolition of partition	5.000	Ea.	1.665	0.00
Conductor	0.100	C.L.F.	0.296	1.55
Install junction box	5.000	Ea.	2.000	23.25
Install outlet	5.000	Ea.	1.480	26.25
Install plate	5.000	Ea.	0.500	11.50
Misc. materials for gypsum board painting and repair	1.000	Job	0.000	75.00
Repair gypsum board	1.000	Job	2.000	0.00
Paint gypsum board—minimum	1.000	Job	2.000	0.00
Totals			9.941	137.550

Total per each including general contractor's overhead and profit

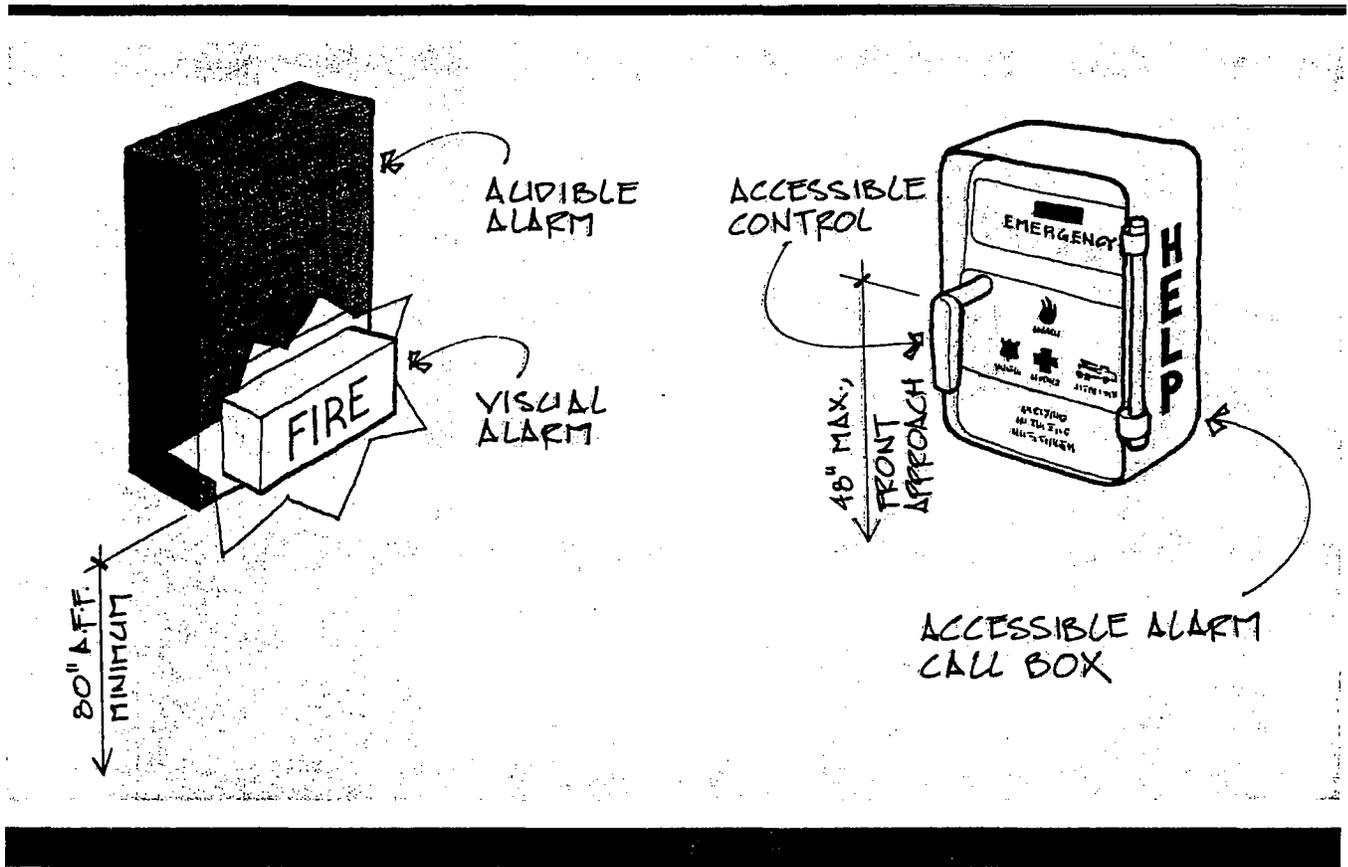
\$182

Total per 5 outlets including general contractor's overhead and profit

\$909

43

Install Audible and Visual Fire Alarms



Maximum fire safety is based on assuming the worst case scenario and taking steps to prevent it. Accessible fire safety includes providing a means of warning people with visual and hearing impairments of an emergency wherever they may be in an accessible facility. This means that both visual and audible alarms are necessary. Installing them has the added benefit of increasing the level of fire safety for all of a facility's users.

ADAAG Reference

4.28 Alarms

Where Applicable

All common use areas where fire alarms are provided.

Design Requirements

- Alarms to be audible and visual.
- Visible from all locations within the space.
- No more than 50' from any point, 100' apart along corridors or in large rooms.
- Clear strobe lamp, 75 candela minimum, 3-Hz flash rate.

- 80" above the highest floor level, or 6" below the ceiling, whichever is lower.

in high-use spaces, such as rest rooms, where people might be alone.

Level of Difficulty

High. Requires hard-wiring alarms to existing system, and may substantially increase power requirements. May require new wiring system.

Design Suggestions

- Install visual alarms in rooms (such as toilet rooms) where audible alarms are provided. Even if not required as part of a renovation, consider installing audible and visual alarms

Key Items

Audible or visual components added to existing alarm, new audible and visual alarm, electrical conduit to main wiring system.

Estimates

Install new visual alarm

Description	Quantity	Unit	Work Hours	Material
Fire alarm light	1.000	Ea.	1.509	96.00
#18 fire alarm conductor	0.100	C.L.F.	0.100	6.40
Totals			1.609	102.40

Total per each including general contractor's overhead and profit

\$271

Add visual alarm to existing audible alarm

Description	Quantity	Unit	Work Hours	Material
Fire alarm light	1.000	Ea.	1.509	96.00
#18 fire alarm conductor	0.100	C.L.F.	0.100	6.40
Totals			1.609	102.40

Total per each including general contractor's overhead and profit

\$271

Install new audible/visual alarm

Description	Quantity	Unit	Work Hours	Material
Fire alarm light and horn	1.000	Ea.	1.509	96.00
#18 fire alarm conductor	0.200	C.L.F.	0.200	12.80
Totals			1.709	108.80

Total per each including general contractor's overhead and profit

\$288

46

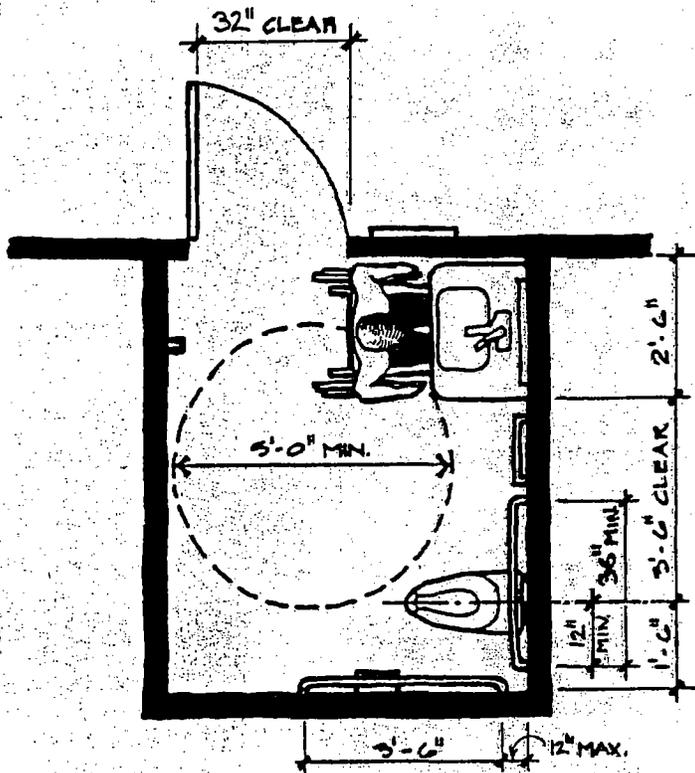
Construct Single-User Toilet Rooms

Where Applicable

All public and common-use, single-user, toilet rooms.

Design Requirements

- Located on an accessible route.
- Door compliant with all width, hardware, pull weight, and maneuvering space requirements.
- Raised character, Braille, and international symbol of accessibility signage if not all rest rooms are accessible, adjacent to door, latch side, 60" a.f.f.
- 60" diameter clear turning space inside (can extend 19" under wall-mounted sink).
- 30" x 48" clear space in front of sink, extends 19" maximum under sink.
- Slip-resistant flooring.
- Sink with paddle faucets or other accessible faucets, 34" maximum to top, 29" clear knee space below apron, 27" clear below bowl measured 8" from front.
- Exposed pipes wrapped with insulation or protected from contact.
- Mirror 40" a.f.f. maximum to bottom.
- Toilet: seat 17" to 19" a.f.f., centerline 18" from wall, flush valve on open side.
- Grab bars 33" to 36" a.f.f., 1-1/2" diameter, 1-1/2" from wall, 42" long minimum at side wall, 36" long minimum at back wall.
- Toilet paper dispenser below with grab bar within 36" of rear wall, 19" a.f.f. minimum.
- All dispensers within reach range (48" front reach, 54" side reach) and accessible in operation.



As an access modification, single-use accessible rest rooms are most often considered in cases where existing, multiple-stall toilet rooms are inaccessible, and creating access to both is technically infeasible. If the

toilet room is to be unisex, verify that local plumbing codes allow unisex accessible toilet rooms.

ADAAG Reference

4.22 Toilet Rooms

Design Suggestions

It is possible to use standard sinks that are not designated "HP" units to meet the apron height and knee space requirements; they will be less costly, more attractive and easier to install and use. The same is true of tilted "HP" mirrors; if a mirror above the sink cannot be lowered to the correct height, add another mirror in a different

location. Having tilted mirrors does not meet accessibility requirements if they are too high. Be sure that grab bars are anchored to either framing or blocking, so that they meet the minimum weight resistance requirements.

Key Items

Plumbing fixtures/hook-ups: minimum toilet, sink/paddle faucets, door with privacy lock, framing, grab bars, finishes, mirror, dispensers, ventilation.

Level of Difficulty

High. Requires plumbing, framing, electrical, and finish (usually tile) work.

Estimate

Install single-use toilet room

Description	Quantity	Unit	Work Hours	Material
Remove metal stud/gypsum board partition	21.000	S.F.	0.966	0.00
Remove gypsum board from stud face at room interior	55.000	S.F.	0.440	0.00
Remove vinyl flooring	60.000	S.F.	0.960	0.00
Ceiling demolition (suspended A.C.T.)	60.000	S.F.	0.660	0.00
Metal stud partition (3-5/8" wide, 16" O.C.)	230.000	S.F.	4.370	66.70
1/2" gypsum board, taped and finished	230.000	S.F.	3.910	46.00
2" x 4" blocking	0.025	M.B.F.	1.429	13.63
Water-resistant 1/2" gypsum board	300.000	S.F.	2.400	69.00
Ceramic tile cove base	30.000	L.F.	5.280	78.30
Ceramic tile floor, thin-set 4" x 4" tiles	60.000	S.F.	7.980	213.00
Ceramic tile walls, thin-set 4-1/4" x 4-1/4"	300.000	S.F.	25.200	570.00
Mineral fiber suspended ceiling	60.000	S.F.	1.380	74.40
Vinyl tile flooring	23.000	S.F.	0.368	32.20
Vinyl base, 6" high	23.000	L.F.	0.575	18.17
Painting	230.000	S.F.	4.140	39.10
Interior door frame	1.000	Ea.	1.000	65.50
Hollow metal flush door, 3'-0" x 6'-8"	1.000	Ea.	0.941	147.00
Hinges	1.500	Pr.	0.000	69.00
Lever-handled lockset	1.000	Ea.	0.000	79.78
Signage	1.000	Ea.	0.457	8.75
Layout & drilling of anchor holes	4.000	Ea.	0.212	0.16
Plastic shields and screws	4.000	Ea.	0.000	0.12
Grab bars	3.000	Ea.	1.200	105.00
Combined soap/towel dispenser/mirror/shelf	1.000	Ea.	0.800	255.00
Double-roll toilet tissue dispenser	1.000	Ea.	0.333	21.00
13-gallon waste receptacle	1.000	Ea.	0.800	144.00
Accessible lavatory	1.000	Ea.	2.286	210.00
Rough in supply, waste and vent	1.000	Ea.	9.639	128.00
Water closet	1.000	Ea.	3.200	276.00
Rough in supply, waste and vent	1.000	Ea.	5.634	113.00
Totals			86.560	2842.81

Total per square foot including general contractor's overhead and profit

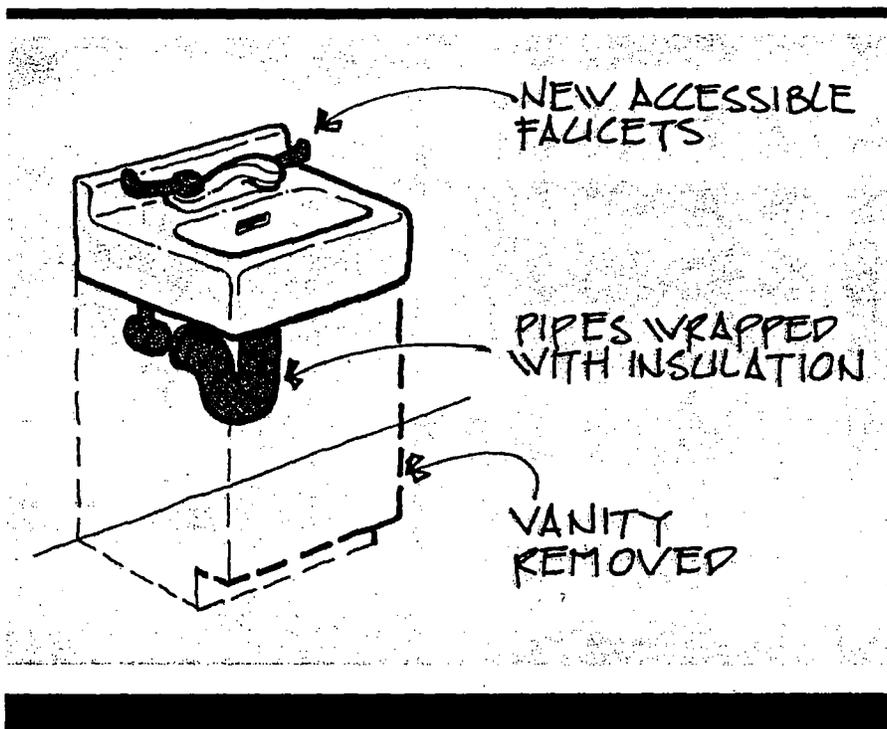
\$402

Total per each including general contractor's overhead and profit

\$9,237

52

Modify Existing Sink



A sink on an accessible route can almost always be modified to increase accessibility. Removing a vanity or apron, replacing the existing faucet with a single-lever or paddle handles, or even lowering the bowl can all help make a sink compliant and more accessible for all users. (Ask anyone who's ever tried to use a ball faucet with soapy hands.)

ADAAG Reference

4.19 Lavatories and Mirrors (Note: ADAAG makes a distinction between lavatories, which are basins for hand washing, and sinks, which are other types of basins. ADAAG 4.19 refers to lavatories only.)

Where Applicable

At least one sink in all public toilet rooms.

Design Requirements

- 34" maximum to rim, 29" minimum clear knee space below rim, 27" clear below bowl.
- Bowl 6-1/2" deep maximum.
- Pipes wrapped with insulation.
- No sharp or abrasive surfaces under sink.
- Faucets operable with closed fist (electronic sensor faucets acceptable); self-closing faucets to remain open for at least 10 seconds.
- Mirror 40" a.f.f. maximum.
- Dispensers (such as soap dispensers) operable with a closed fist, and within reach range (48" a.f.f. for front approach, 54" for side approach).

Design Suggestions

If a sink is required to be accessible, there are many modifications that can make it more compliant and easier to use, such as lowering the sink, replacing inaccessible faucets with paddle faucets, or modifying the apron below to create sufficient knee space. At least one mirror has to be installed with its bottom edge no more than 40" a.f.f., but that mirror is not required to be above the accessible sink.

Key Items

Sink, piping, faucets, insulation, mirror, and under-sink or wall bracing.

Level of Difficulty

Varies. Involves insulation, plumbing, finish, and possible structural work.

Estimates

Lower existing sink

Description	Quantity	Unit	Work Hours	Material
Labor minimum for lowering sink	1.000	Ea.	2.000	0.00
Rough in supply, waste and vent	1.000	Ea.	9.639	128.00
Misc. materials for gypsum board and ceramic tile repair	1.000	job	0.000	100.00
Labor minimum to repair gypsum board and ceramic tile	1.000	job	4.923	0.00
Totals			16.562	228.00

Total per each including general contractor's overhead and profit

\$1,286

Replace knob faucets with paddle faucets

Description	Quantity	Unit	Work Hours	Material
Labor minimum to remove faucets	1.000	job	2.000	0.00
Paddle faucets with spout	1.000	Ea.	0.800	126.00
Totals			2.800	126.00

Total per set including general contractor's overhead and profit

\$392

Wrap pipe with insulation

Description	Quantity	Unit	Work Hours	Material
1" wall flexible closed cell foam insulation	4.000	L.F.	0.380	9.40
Totals			0.380	9.40

Total per each including general contractor's overhead and profit

\$39

Remove base cabinets, add additional bracing

Description	Quantity	Unit	Work Hours	Material
Labor minimum to remove base cabinets	1.000	job	2.000	0.00
Blocking	0.013	M.B.F.	0.631	7.30
Bracing cover (plywood)	32.000	S.F.	1.152	46.40
Add. labor for fitting plywood bracing cover	1.000	job	4.000	0.00
Totals			7.783	53.70

Total per each including general contractor's overhead and profit

\$420

52. Modify Existing Sink *(continued)*

Remove apron below plastic laminate counter

Description	Quantity	Unit	Work Hours	Material
Labor minimum to remove apron	1.000	Job	2.000	0.00
Totals			2.000	0.00

Total per each including general contractor's overhead and profit

\$91

Remove apron below synthetic stone counter

Description	Quantity	Unit	Work Hours	Material
Labor minimum to remove apron	1.000	Job	2.000	0.00
Totals			2.000	0.00

Total per each including general contractor's overhead and profit

\$91

Remove apron below granite counter

Description	Quantity	Unit	Work Hours	Material
Labor minimum to remove apron	1.000	Job	2.000	0.00
Totals			2.000	0.00

Total per each including general contractor's overhead and profit

\$91

53

Install or Modify Grab Bars

Grab bars are essential in enabling many people to use toilets, tubs, and showers. They are also one of the simplest access modifications to install. The types of available grab bars have increased, so colored, non-institutional grab bars are available to fit into an existing decor, and different configurations are available to assist people who might need bars in addition to those required in the ADA Standards.

ADAAG References

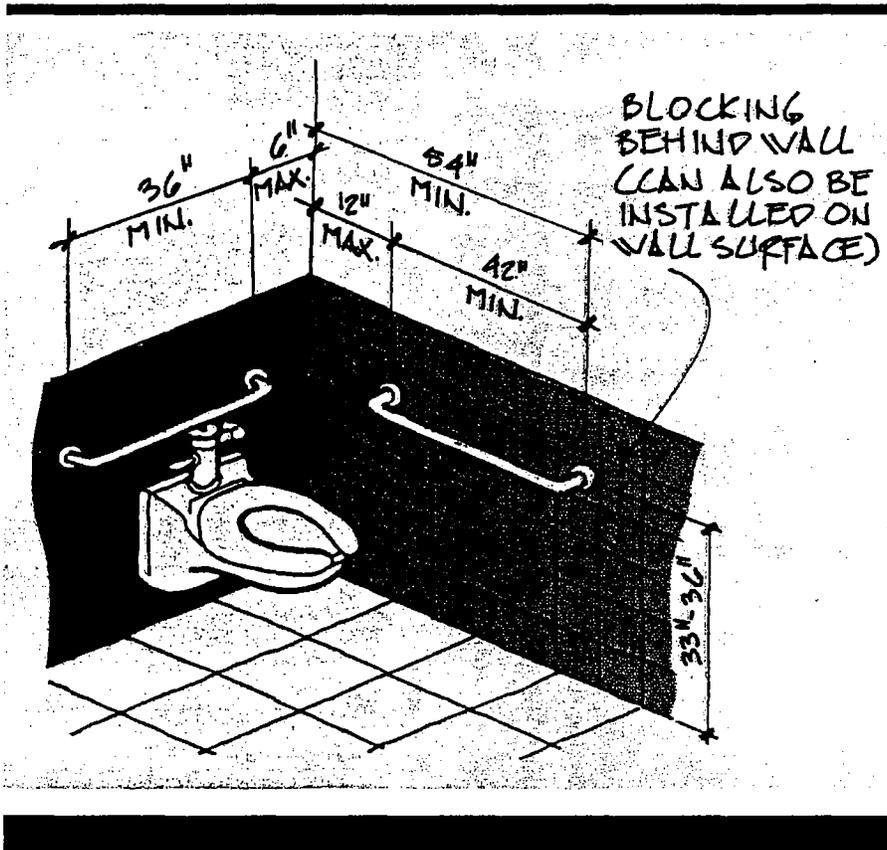
- 4.26 Handrails, Grab Bars, and Tub and Shower Seats
- 4.16 Water Closets
- 4.17 Toilet Stalls
- 4.20 Bathtubs
- 4.21 Shower Stalls

Where Applicable

All accessible toilets, tubs, and showers.

Design Requirements

- 1-1/4" to 1-1/2" diameter, 1-1/2" from wall.
- Capable of resisting 250 lbs. of force (as specified in 4.26.3).
- For toilet stalls, 33" to 36" a.f.f., 36" long on rear wall, 12" from corner, 42" long on side wall, 12" from corner. In 36" wide stalls, two 42" long grab bars on either side. (See illustrations in ADAAG Sections 4.17, 4.20, and 4.21 for exact configurations.)
- In roll-in showers:
 - a. in 36" x 36" stalls, grab bars on side wall and wall opposite seat.
 - b. in 30" x 60" stall, on both side wall and rear wall.
- In tubs:
 - a. For 60" tub with in-tub seat: two grab bars on rear wall, 24" long, top bar 33" to 36" a.f.f., bottom 9" above rim of tub. One 24" grab bar on side wall; one 12" grab bar on side wall opposite controls.
 - b. For 60" tub with in-tub seat: two grab bars on rear wall, 48" long for tub with end seat, top bar 33" to 36" a.f.f., bottom 9" above rim of



tub. One 24" long grab bar on side wall with controls.

wood 1 x 6 on the face of the wall to the studs, and attach the grab bar to that. In tight spaces, a fold-down grab bar allows flexibility in use, but only in addition to the required fixed grab bars. Grab bars are vital for safety, however, and it should be determined that any grab bar or installation method meets the strength requirements in ADAAG 4.26.3, cited above.

Key Items

Grab bars, fasteners, either blocking in wall or anchors, and possibly, finish materials.

Level of Difficulty

Moderate. May require finish work.

Design Suggestions

A grab bar doesn't have to be battleship gray. Textured grab bars provide a better gripping surface than smooth bars. If studs or blocking are insufficient or difficult to locate, it might be possible to attach a painted

Estimates

Install grab bar, gypsum/metal stud wall

Description	Quantity	Unit	Work Hours	Material
Cutout demolition of partition	1.000	Ea.	0.333	0.00
2" x 4" blocking	0.005	M.B.F.	0.306	2.92
Miscellaneous materials for gypsum board repair	1.000	Job	0.000	25.00
Labor minimum to repair and paint gypsum board	1.000	Job	2.000	0.00
Grab bars	1.000	Ea.	0.400	35.00
Totals			3.039	62.92

Total per each including general contractor's overhead and profit

\$267

Install grab bar, gypsum/metal stud wall with ceramic tile

Description	Quantity	Unit	Work Hours	Material
Cutout demolition of partition	1.000	Ea.	0.333	0.00
2" x 4" blocking	0.005	M.B.F.	0.306	2.92
Misc. materials for gypsum board and ceramic tile repair	1.000	Job	0.000	100.00
Labor minimum to repair gypsum board and ceramic tile	1.000	Job	4.923	0.00
Grab bars	1.000	Ea.	0.400	35.00
Totals			5.962	137.92

Total per each including general contractor's overhead and profit

\$531

56

Install Roll-In Shower

A shower that allows a person using a wheelchair to roll in is one of the most versatile access modifications, since it permits use both by people who use wheelchairs and those who don't. For people who shower while in their wheelchair, it is vital. Prefab fiberglass roll-in showers are now standard and make installation relatively simple.

ADAAG Reference

4.21 Shower Stalls

Where Applicable

Accessible public bathing facilities.

Design Requirements

- On accessible route.
- No lip at entry.
- 30" x 60" clear with grab bars with 36" x 60" clear floor space in front, 33" to 36" a.f.f., 1-1/4" to 1-1/2" in diameter, 1-1/2" from wall, on side and rear walls.
- Shower head adjustable and hand held with flexible hose at least 60" long on rear wall, 27" maximum from corner.
- Accessible controls, 48" a.f.f. maximum.

Design Suggestions

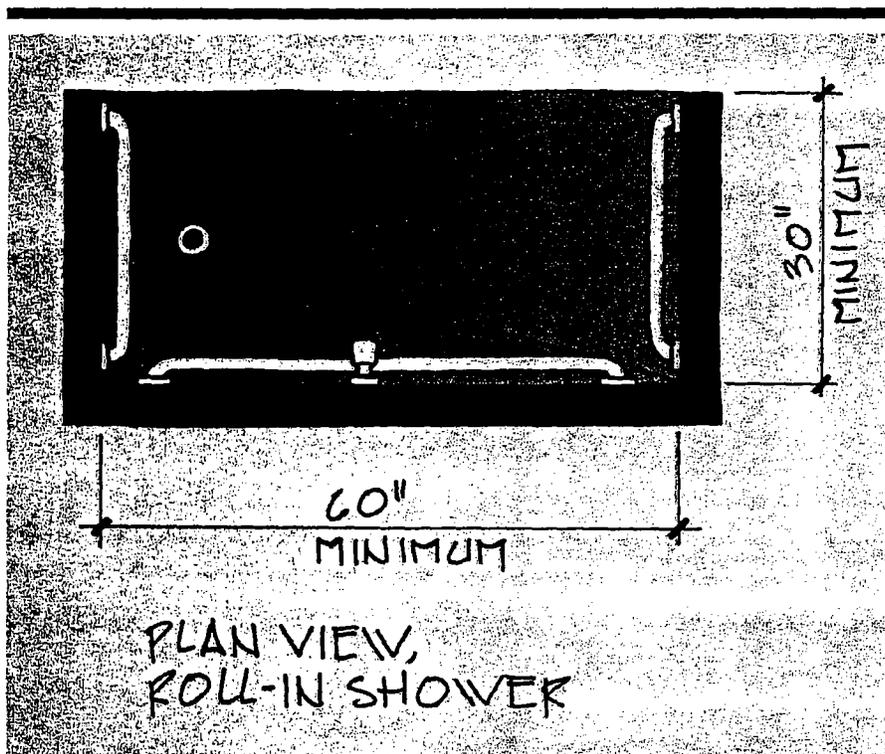
Recessing the floor pan below floor level allows for smooth roll-in. This can be very difficult as a retrofit, but is easier to do in new construction, since it requires strengthening the existing floor structure. Shower curtains should reach to the floor to prevent spillage.

Key Items

Either prefab shower stall or custom-framed stall and floor pan, water supply and drainage, ventilation, wall/ceiling finish materials.

Level of Difficulty

High. Requires plumbing, framing, finish work.



Estimates

Install prefabricated roll-in shower (plumbing available)

Description	Quantity	Unit	Work Hours	Material
Remove metal stud/gypsum board part. for shower opening	35.000	S.F.	1.610	0.00
Remove vinyl flooring	20.000	S.F.	0.320	0.00
Metal stud partition	77.000	S.F.	1.463	22.33
1/2" gypsum board, taped and finished	110.000	S.F.	1.870	22.00
Insulation	110.000	S.F.	0.660	18.70
Vinyl tile flooring	11.000	S.F.	0.176	15.40
Vinyl base, 6" high	12.000	L.F.	0.300	9.48
Painting	110.000	S.F.	1.980	18.70
Bar-mounted hand-held shower head	1.000	Ea.	0.400	137.00
Fiberglass shower, corner seat, and grab bars	1.000	Ea.	8.000	570.00
Rough in supply, waste and vent	1.000	Ea.	7.805	76.50
Totals			24.584	890.11

Total per each including general contractor's overhead and profit

\$2,853

Install custom roll-in shower

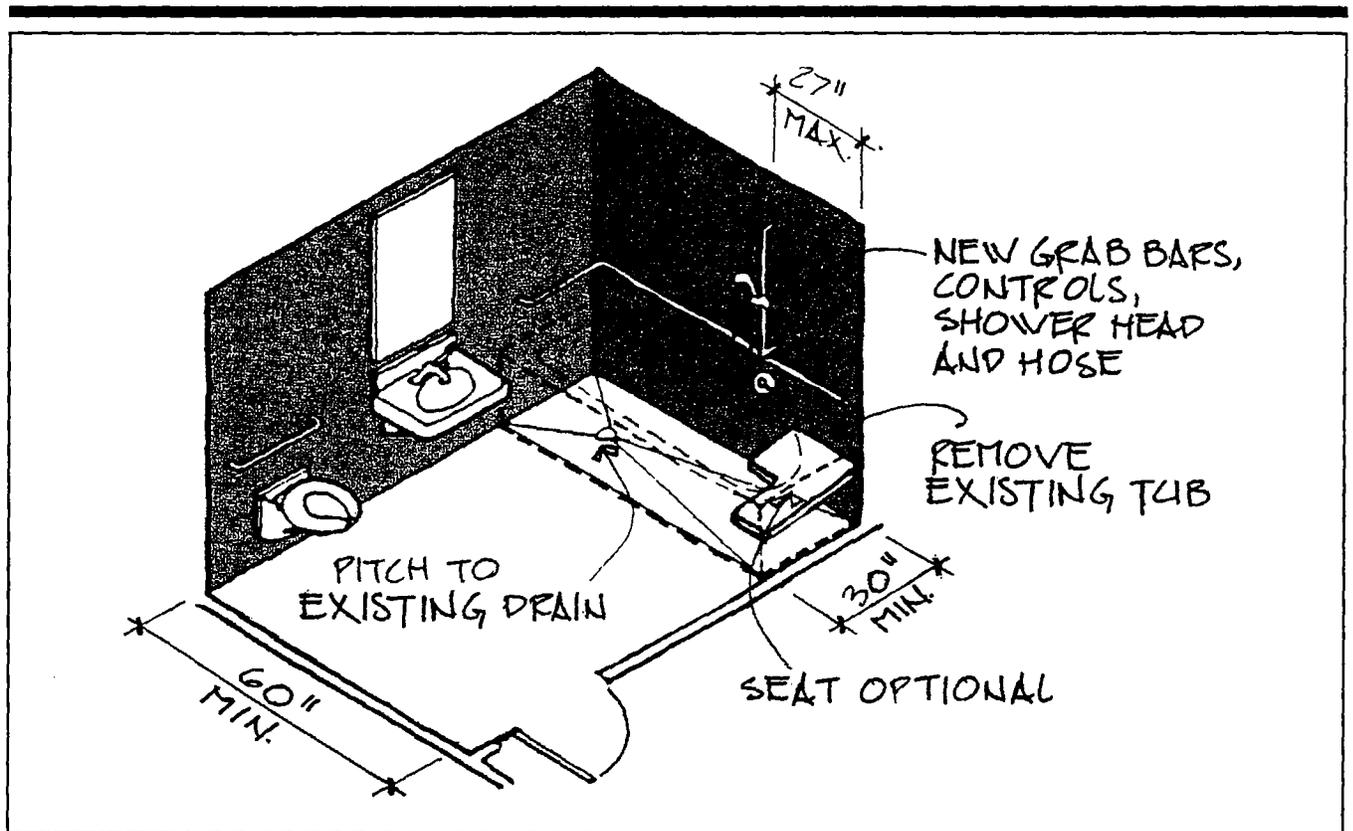
Description	Quantity	Unit	Work Hours	Material
Remove metal stud/gypsum board part. for shower opening	35.000	S.F.	1.610	0.00
Remove vinyl flooring	20.000	S.F.	0.320	0.00
Wood stud partition	11.000	L.F.	1.760	41.58
Insulation	110.000	S.F.	0.660	18.70
Water-resistant 5/8" gypsum board	110.000	S.F.	0.880	30.80
5/8" gypsum board, taped and finished	110.000	S.F.	1.870	26.40
Vinyl tile flooring	11.000	S.F.	0.176	15.40
Vinyl base, 6" high	12.000	L.F.	0.300	9.48
Painting	110.000	S.F.	1.980	18.70
Copper shower pan	18.000	S.F.	1.440	45.00
Gypsum board ceiling	15.000	S.F.	0.315	3.60
Ceramic tile floor (pitched to drain)	15.000	S.F.	1.995	53.25
Ceramic tile walls, thin-set 4-1/4" x 4-1/4"	110.000	S.F.	9.240	209.00
Ceramic bath accessories	2.000	Ea.	0.390	18.10
Tub grab bar	1.000	Ea.	0.571	77.00
Grab bar vertical arms	2.000	Ea.	1.334	137.00
Bar-mounted hand-held shower head	1.000	Ea.	0.400	137.00
Rough in supply, waste and vent	1.000	Ea.	7.805	76.50
Totals			33.046	917.51

Total per each including general contractor's overhead and profit

\$3,260

57

Replace Tub with Roll-in Shower



The floor space of a standard 30" × 60" tub is the same as what is required for a roll-in shower. In an existing structure with plumbing and drain locations in place, it is often possible to create an accessible roll-in shower by replacing an existing tub. In an accessible bathroom, this modification can create a shower

usable by a wide range of people, including those who use wheelchairs.

ADAAG References

- 303, Changes in Level
- 309, Operable Parts
- 608, Shower Compartments
- 609, Grab Bars
- 610, Seats

Where Applicable

Where there already is at least one tub, and accessible bathing facilities are required.

Design Requirements

- On accessible route.
- Curbs, 1/2" maximum and beveled.
- Roll-in 30" × 60" shower with 36" × 60" clear space in front.

- Seat (optional) 15" to 16" deep, mounted 17" to 19" above floor of stall and 1-1/2" maximum from adjacent wall. Seat must withstand a 250 lb. force applied anywhere.
- Grab bars 33" to 36" a.f.f., 1-1/4" to 2" in diameter, 1-1/2" from wall, on both sides and rear walls (omit behind seat if seat is installed).
- Grab bars to withstand 250 lbs. applied anywhere in any direction and be tight in their fittings.
- Shower (fixed or hand-held) with flexible hose at least 59" long.
- Water thermal shock protected with maximum temperature of 120°.

- Controls operable with a closed fist, 3" above the grab bar to 48" a.f.f. maximum. When there is a seat, controls mounted on wall adjacent to, and within 27" from the seat wall.

construction, but can be difficult in existing buildings, since it requires strengthening the existing floor structure. The shower curtain should reach all the way to the floor to prevent spillage.

Design Suggestions

Although the 30" x 60" dimensions preclude the shower being a transfer-type shower, consider installing a fold-down seat anyway to allow for people who transfer to a seat and those who shower in a wheelchair. Recessing the floor pan below floor level allows for smooth roll-in. This is relatively easy to do in new

Key Items

Either prefab shower stall or custom-framed stall and floor pan, water supply and drainage, and wall/ceiling finish materials.

Level of Difficulty

High. Requires plumbing, finish, and possibly framing work.

Estimates

Replace tub with accessible fiberglass shower

Description	Quantity	Unit	Labor-Hours	Material
Remove bathtub	1.000	Ea.	2.000	0.00
Labor to disconnect plumbing and remove faucets/handles, etc.	1.000	Job	4.000	0.00
Remove partition finishes	66.000	S.F.	0.587	0.00
Fiberglass shower, corner seat, grab bars and nonskid floor	1.000	Ea.	8.000	640.00
Bar-mounted hand-held shower head	1.000	Ea.	0.364	63.50
Rough in supply, waste and vent	1.000	Ea.	13.445	141.00
Totals			28.396	844.50

Total per each including general contractor's overhead and profit

\$3,652

Replace tub with custom roll-in shower

Description	Quantity	Unit	Labor-Hours	Material
Remove bathtub	1.000	Ea.	2.000	0.00
Labor to disconnect plumbing and remove faucets/handles, etc.	1.000	Job	4.000	0.00
Remove partition finishes	66.000	S.F.	0.587	0.00
Water-resistant 5/8" gypsum board	110.000	S.F.	0.880	29.70
Copper shower pan	18.000	S.F.	1.440	55.98
Ceramic tile floor (pitched to drain)	15.000	S.F.	1.311	134.25
Ceramic tile walls, thin-set 4-1/4" x 4-1/4"	110.000	S.F.	9.263	229.90
Ceramic bath accessories	2.000	Ea.	0.390	19.00
Tub grab bar	1.000	Ea.	0.571	78.50
Grab bar verticle arms	2.000	Ea.	1.333	173.00
Bar-mounted hand-held shower head	1.000	Ea.	0.364	63.50
Rough in supply, waste and vent	1.000	Ea.	13.445	141.00
Totals			35.584	924.83

Total per each including general contractor's overhead and profit

\$4,116

59

Modify Existing Tub

Many people who use wheelchairs do transfer to a seat in a tub, but a bathtub does not necessarily have to be part of a fully accessible bathroom to be modified for increased accessibility. Accessible grab bars, controls, and an in-tub seat can be added relatively simply to assist people with mobility, balance, and grasping impairments.

ADAAG Reference

4.20 Bathtubs

Where Applicable

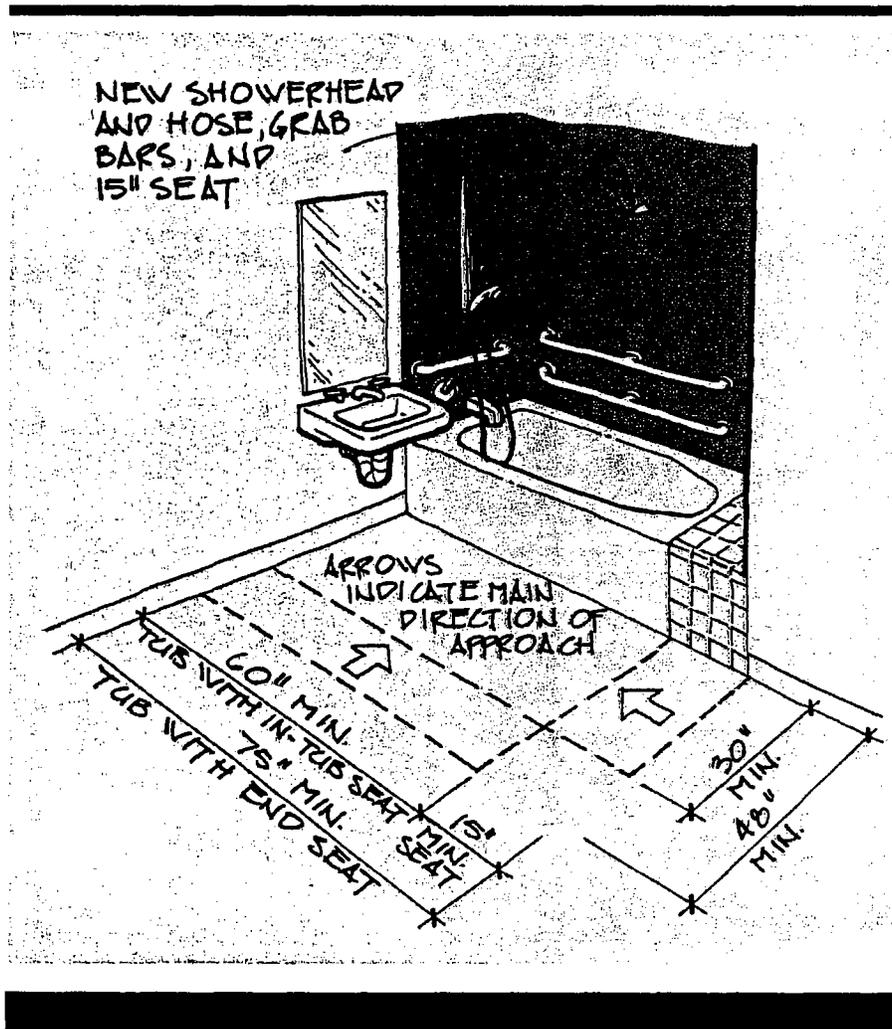
Accessible bathing facilities are required to have at least one accessible tub or shower.

Design Requirements

- On accessible route.
- Clear floor space as least as wide as the tub and 30" to 48" deep, depending on the approach.
- Either an in-tub seat or end seat; end seat 15" wide minimum, full depth of tub.
- Grab bars:
 - a. For 60" tub with in-tub seat: two grab bars on rear wall, 24" minimum long, top bar 33" to 36" a.f.f., bottom 9" above rim of tub. One 24" long minimum grab bar on wall at foot; one 12" minimum grab bar on wall at head, opposite controls.
 - b. For 60" tub with end seat: two grab bars on rear wall, 48" minimum long, top bar 33" to 36" a.f.f., bottom 9" above rim of tub. One 24" minimum long grab bar on foot wall with controls.
- Controls on foot wall, below grab bar.
- Shower head on a 60" minimum hose, usable as a fixed or hand-held shower.
- No tub enclosure obstructing controls or transfer to a seat, or mounted on a rim.

Design Suggestions

In-tub seats prevent a shower curtain from closing fully; for an in-tub seat, two curtains would minimize spillage. Some sliding door tracks permit transfer to a seat.



Key Items

Shower head on a hose, tub seat, grab bars.

Level of Difficulty

Low to moderate. Replacing showerhead and faucets might require a

plumber; grab bar installation may require finish (tile) work. Extending tub enclosure to include end seat requires additional framing.

Estimates

Extend tub enclosure

Description	Quantity	Unit	Work Hours	Material
Remove wood stud/gypsum board partition	36.000	S.F.	1.656	0.00
Remove partition finishes	12.000	S.F.	0.108	0.00
Wood stud partition	3.000	L.F.	0.480	11.34
Water-resistant 5/8" gypsum board	36.000	S.F.	0.288	10.08
Seat framing	0.030	M.B.F.	1.412	16.35
Seat sheathing	18.000	S.F.	0.198	6.66
Ceramic tile covering for seat	9.000	S.F.	1.197	31.95
Ceramic tile walls, thin-set 4-1/4" x 4-1/4"	45.000	S.F.	3.780	85.50
Totals			9.119	161.88

Total per each including general contractor's overhead and profit

\$713

Add in-tub seat

Description	Quantity	Unit	Work Hours	Material
Portable in-tub or in-shower seating	1.000	Ea.	0.000	110.00
Totals			0.000	110.00

Total per each including general contractor's overhead and profit

\$188

Add grab bars

Description	Quantity	Unit	Work Hours	Material
Cutout/demolition of partition	1.000	Ea.	0.333	0.00
2" x 4" blocking	0.005	M.B.F.	0.306	2.92
Misc. materials for gypsum board and ceramic tile repair	1.000	Job	0.000	100.00
Labor minimum to repair gypsum board and ceramic tile	1.000	Job	4.923	0.00
Grab bars	1.000	Ea.	0.400	35.00
Totals			5.962	137.92

Total per each including general contractor's overhead and profit

\$531

59. Modify Existing Tub *(continued)*

Replace fixed shower head with shower head on hose

Description	Quantity	Unit	Work Hours	Material
Labor minimum to remove and install shower head	1.000	Job	2.000	0.00
Bar-mounted hand-held shower head	1.000	Ea.	0.400	137.00
Totals			2.400	137.00

Total per each including general contractor's overhead and profit

\$385

Relocate controls, tiled wall

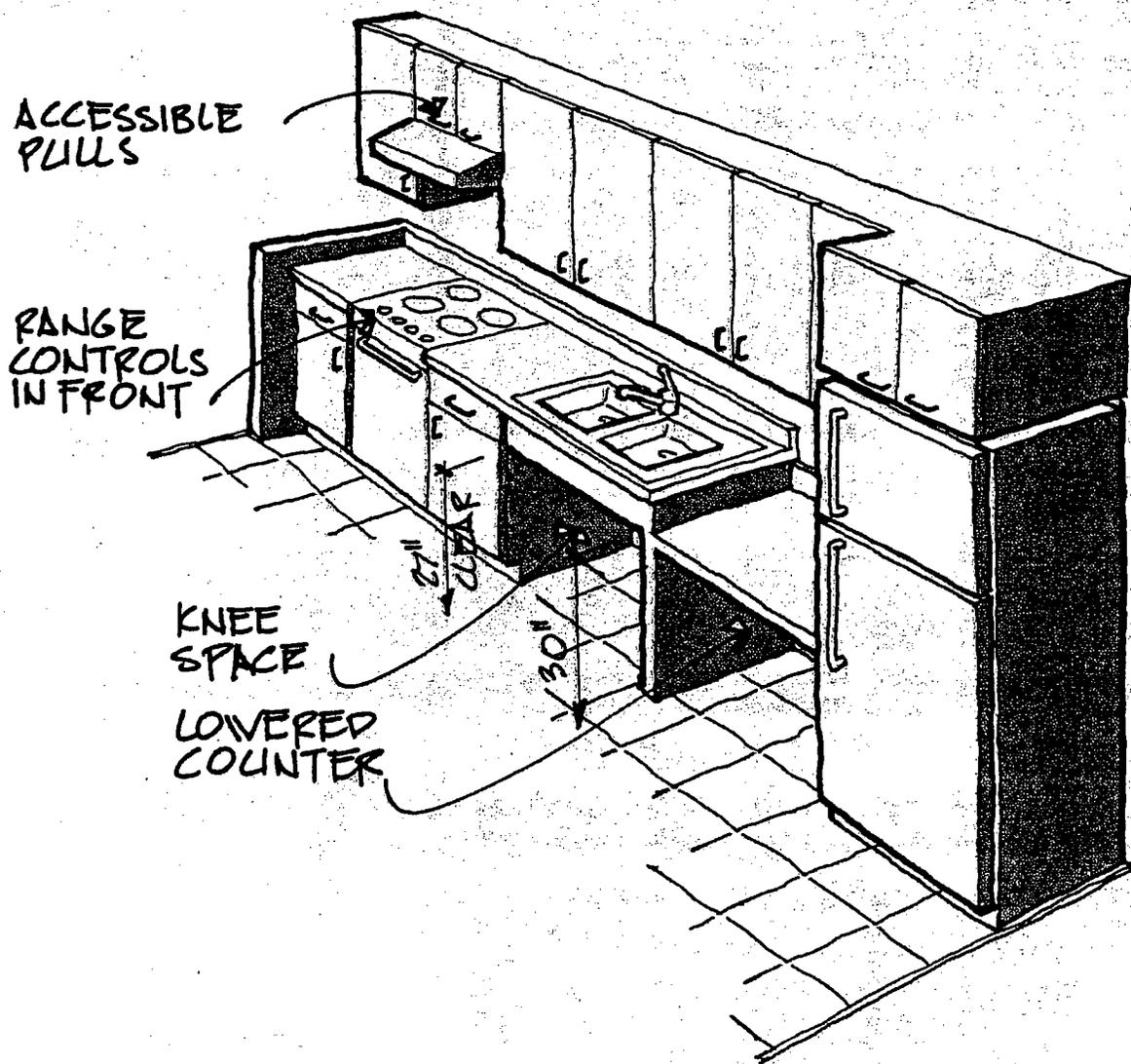
Description	Quantity	Unit	Work Hours	Material
Cutout demolition of partition	1.000	Ea.	0.333	0.00
Labor minimum to remove & replace mixing valve	1.000	Job	2.000	0.00
Misc. materials for gypsum board and ceramic tile repair	1.000	Job	0.000	100.00
Labor minimum to repair gypsum board and ceramic tile	1.000	Job	4.923	0.00
Totals			7.256	100.00

Total per each including general contractor's overhead and profit

\$554

69

Modify Kitchenette



Common kitchens in public spaces covered under ADA are not subject to the same requirements as residential accessible kitchens covered by other access regulations, but they still need some degree of access. As with any other space, a kitchen located on an accessible route can have an entrance modified to create access; even kitchen spaces not located on an accessible route can be altered to include accessible sink faucets, work counters, drawer and cabinet pulls, and outlets with relatively little modification to the space.

ADAAG References

- 9.2 Requirements for Accessible Units (9.2.2 (7) Kitchens, Kitchenettes, or Wet Bars.)
- 4.2 Space Allowance and Reach Ranges
- 4.3 Accessible Route
- 4.27 Controls and Operating Mechanisms

Where Applicable

All common-use kitchens.

Design Requirements

Kitchen guidelines are covered under 4.1 Minimum Requirements as common areas under Title II and Title III. The requirements below apply to

accessible lodging facilities and dormitories, and are recommended for all accessible common-use kitchens.

- On an accessible route, with an accessible entrance.
- Clear floor space (30" x 48") for frontal or parallel approach to all features.
- Countertops and sinks 34" a.f.f. maximum.
- Minimum 50% shelf space and refrigerator/freezer space within reach range.
- Accessible controls and handles (acceptable if operable with a closed fist).
- Slip-resistant surface on accessible route.

Design Suggestions

L-shaped or U-shaped kitchens work best, since they allow objects to slide without having to be picked up. A possible renovation is to join two separate counter sections to create a single counter. If the cabinet floor under the sink is not installed and the finish floor continues for the full depth, opening the doors can provide knee space. Base cabinets shouldn't structurally support the sink so they can be removed for knee space if necessary. A hose at the sink is recommended even at sinks with a faucet located near the front. Loop-type

handles on drawers and cabinets allow for ease of use (cabinets with routed holds are difficult to use for people with low fine motor control, and also do not comply with ADAAG). Pull-out drawers and lazy Susans prevent the need for reaching to the back of storage spaces.

Some appliances are easier to use by a wide range of people. Side-by-side refrigerator/freezers allow a range of storage space on both sides. Stove and range controls should be located in front, and staggered burners prevent having to reach over a hot surface from a seated position. It is important to make the kitchen usable for people with low vision: lighting levels should be high at work stations, and placed so as not to cast shadows on the work space. Light-colored finishes and matte surfaces help people with low vision.

Key Items

Varies: drawer hardware, sink hardware, cabinets, slide drawers, and new appliances, possibly relocated to create maneuvering space.

Level of Difficulty

Varies. Low for cabinet and storage modifications; moderate for sink and stove alterations; high for kitchen reconfiguration or total rehabs.

69. Modify Kitchenette *(continued)*

Estimate

Modify kitchens

Description	Quantity	Unit	Work Hours	Material
Remove cabinet hardware (labor minimum)	1.000	Job	2.000	0.00
Remove drawer hardware (labor minimum)	1.000	Job	2.000	0.00
Remove & replace faucet with lever handle faucet (labor only)	1.000	Job	4.000	0.00
Kitchen faucet, gooseneck spout, paddle handles	1.000	Ea.	0.800	126.00
Add for spray hose	1.000	Ea.	0.333	10.00
Install D pull drawer/cabinet handles	13.000	Ea.	0.650	11.70
Install new drawer guides	2.000	Pr.	0.334	11.00
Under-cabinet task lighting	4.000	Ea.	2.000	204.00
Conductor	0.300	C.L.F.	1.043	8.70
Outlet boxes	4.000	Ea.	1.392	6.00
Switch	1.000	Ea.	0.200	3.65
Miscellaneous materials for gypsum board repair	1.000	Job	0.000	25.00
Labor minimum to repair and paint gypsum board	1.000	Job	2.000	0.00
Totals			16.752	406.05

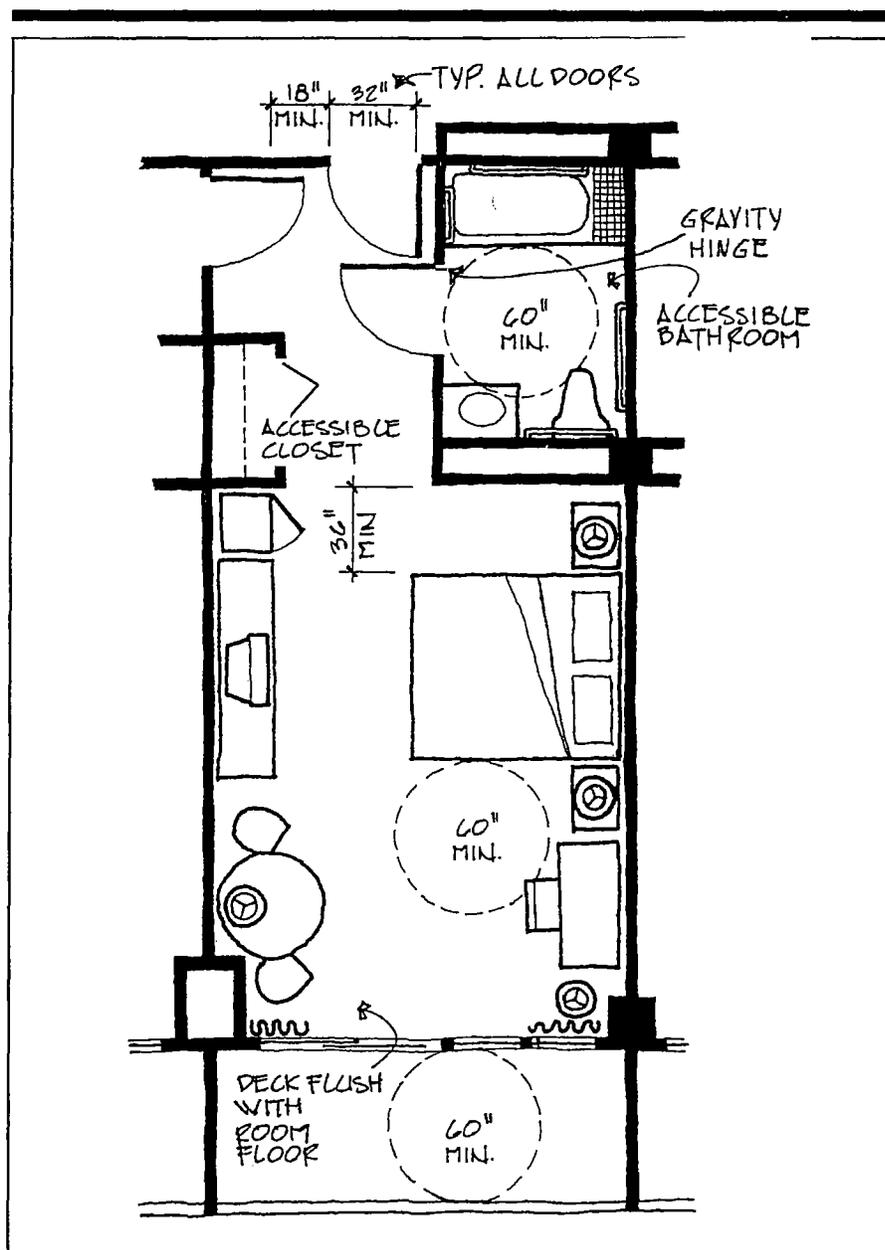
Total per each including general contractor's overhead and profit

\$1,663

70

Create Accessible Transient Lodging Guest Rooms

When inaccessible sleeping rooms are located on an accessible route, it is almost always possible to make at least some modifications to increase accessibility. Widened doorways, lever handles, visual and audible alarms, drawer pulls, closet poles, grab bars, and other modifications are changes that can make guest rooms in the hospitality industry even more accessible.



ADAAG References

- 206.5.3, Doors in Transient Facilities
- 215.4, Fire Alarms in Transient Lodging
- 224, Transient Lodging Guest Rooms
- 305, Clear Floor and Ground Space
- 306, Knee & Toe Clearance
- 308, Reach Ranges
- 404.2.3, Doorway Clear Width
- Chapter 6, Plumbing Elements and Facilities
- 608.4, Shower Seats in Transient Guest Rooms
- 702.3, Guest Room Visual Alarms
- 804, Sinks, Kitchens, & Kitchenettes
- 806, Transient Lodging Guest Rooms

Where Applicable

All transient lodging buildings for rent or hire, including time-shares and dormitories. Exception for five rooms or less if the building is the owner's residence. Existing lodging facilities, as public accommodations, must remove barriers where it is readily achievable to do so, but are not required to make existing rooms in compliance unless they are altering them.

Calculate the minimum number of accessible rooms at 5% up to 100 rooms, and a sliding scale after that. Within a guest facility, having more than 25 beds, the requirement is that 5% of the beds be accessible.

Approximately 10% of the guest rooms must accommodate persons

with hearing impairments according to 806.3. (Consult table 224.4 for the exact number.) The rooms providing mobility and communication features should be dispensed among different types of units.

Design Requirements

- Audible (110 dB, maximum) and visual alarms meeting NFPA 72.

Design Requirements, Guest Rooms, Mobility Features

- Accessible route (36" clear minimum, with no protruding objects) connecting all accessible spaces and elements (including phones) within the guest room, and a 60" minimum turning area.
- If balconies or other outdoor spaces are provided for the accessible guest room, they must be accessible.
- Accessible bed(s) must be on an accessible route (36" clear minimum, with no protruding objects) and must have a 30" by 60" clear floor area on both sides.
- At least one of each type of cabinet, dresser, or storage area on an accessible route and within reach range, hardware and controls 36" to 48" a.f.f. and operable with a closed fist.
- An accessible full bathroom (toilet, sink, tub, or roll-in shower); roll-in shower must have folding transfer seat. If only half baths are provided, an accessible half bath.
- If vanity tops are provided in any guest room, then the accessible room must have a comparable vanity top adjacent to a 30" by 60" clear area.
- If provided in other guest rooms, must include an accessible kitchen,

kitchenette, and wet bar, with sufficient clear floor space for a front or side approach at all cabinets, sinks, and appliances, with counters and sinks mounted at 36" high maximum. 50% of shelf space in cabinets and refrigerator/freezers within reach range. Sufficient floor space to allow all doors to be accessible and usable, and controls and pulls operable with a closed fist.

- 32" minimum, clear openings/doorways to and within all units, whether designated accessible or not, except for shower and closet doors in the rooms without mobility features.
- If carpeting is installed, it should be un-backed, with 1/2" pile maximum.

Design Requirements for Guest Rooms for Hearing-Impaired Users

- Visual smoke/fire alarms visible in all parts of the room either directly or by reflection mounted within 16' (measured horizontally) from the head of the bed.
- Visual telephone call alert devices and visitor alert devices, not connected to visual alarms.
- Volume controls on permanently installed telephones.
- An accessible electrical outlet within 48" of a telephone connection to allow use of a TTY.

Design Suggestions

If a high threshold or change in level is necessary for any patios, terraces, and balconies for water and/or wind protection, some sort of equivalent facilitation, such as ramping, may be required. In as much as this would be

an alteration to an existing condition, steeper slopes are allowed: 1:8 for 3" or less vertical rise, and 1:10 for 6" or less.

Extra storage space for a wheelchair is useful. (Otherwise, a wheelchair user is forced to leave the wheelchair in the route of travel.) Corner guards and door kick plates help protect walls from damage. Crank or lever hardware on a window is easier to operate than locks, which require pinching, and blinds on a continuous pull chain (or on a machine-operated push button) are easier to use than blinds on a standard string. Clear floor space is necessary to reach window drape or blind controls.

Accessible rooms sometimes have one single-person bed instead of a double to create additional maneuvering space. However, double beds are a standard feature in lodging rooms for many reasons, and are strongly recommended for all accessible rooms. Lamps should be within reach range of the bed (swing-arm lamps are useful), with easily operated controls (touch-switches are ideal). Furniture should not block environmental controls (thermostats, air conditioning vents, etc.).

Key Items

Standard room partition materials, finishes, and features installed to compliant dimensions; accessible door and cabinet hardware; either visual alarms, phone alerts, and door alerts or outlets for the same; accessible bathroom features.

Level of Difficulty

Varies. Carpentry, wiring, finish work and possibly plumbing involved.

70. Create Accessible Transient Lodging Guest Rooms (continued)

Estimates

Modify bedroom area of hotel room

Description	Quantity	Unit	Labor-Hours	Material
Remove interior door	1.000	Ea.	0.400	0.00
Remove door frame	2.000	Ea.	1.000	0.00
Remove metal stud/gypsum board partition	28.000	S.F.	1.292	0.00
Re-frame door opening	96.000	S.F.	4.388	64.32
Interior door frame	2.000	Ea.	2.000	150.00
Hollow metal flush door, 3'-0" x 6'-8"	2.000	Ea.	1.882	332.00
Hinges	3.000	Pr.	0.000	133.50
Lever-handled lockset	1.000	Ea.	0.800	121.00
Threshold	1.000	Ea.	0.400	30.00
Paint door	2.000	Ea.	3.200	20.60
Painting	136.000	S.F.	3.454	29.92
Remove closet hardware (labor minimum)	1.000	Job	2.000	0.00
Install D-pull closet handles	4.000	Ea.	0.200	13.92
Adjustable closet rod and shelf, 12" wide, 3' long	1.000	Ea.	0.400	8.50
Cutout demolition of partition	1.000	Ea.	0.333	0.00
Conductor	0.100	C.L.F.	0.296	1.23
Install junction box	1.000	Ea.	0.400	7.75
20-amp rocker switch	1.000	Ea.	0.296	11.70
Install plate	1.000	Ea.	0.100	1.80
Cutout demolition of partition	1.000	Ea.	0.333	0.00
Conductor	0.100	C.L.F.	0.296	1.23
Install junction box	1.000	Ea.	0.400	7.75
Install outlet	1.000	Ea.	0.296	7.05
Install plate	1.000	Ea.	0.100	1.80
Repair gypsum board	1.000	Job	4.000	0.00
Paint gypsum board - minimum	1.000	Job	2.000	0.00
Fire alarm horn	1.000	Ea.	1.194	36.50
#18 fire alarm conductor	0.100	C.L.F.	0.100	6.00
Fire alarm light	1.000	Ea.	1.509	95.00
#18 fire alarm conductor	0.100	C.L.F.	0.100	6.00
Telephone company labor minimum	1.000	Job	2.286	0.00
Totals			35.455	1,087.57

Total per each including general contractor's overhead and profit

\$4,377

Modify bathroom in hotel room

Description	Quantity	Unit	Labor-Hours	Material
Remove interior door	1.000	Ea.	0.400	0.00
Remove door frame	2.000	Ea.	1.000	0.00
Remove metal stud/gypsum board partition	28.000	S.F.	1.292	0.00
Re-frame door opening	96.000	S.F.	4.388	64.32
Interior door frame	2.000	Ea.	2.000	150.00
Hollow metal flush door, 3'-0" x 6'-8"	2.000	Ea.	1.882	332.00
Hinges	3.000	Pr.	0.000	133.50
Lever-handled lockset	1.000	Ea.	0.800	121.00
Paint door	2.000	Ea.	3.200	20.60
Painting	136.000	S.F.	3.454	29.92
Remove bathtub	1.000	Ea.	2.000	0.00
Remove partition finishes	66.000	S.F.	0.587	0.00
Water-resistant 5/8" gypsum board	110.000	S.F.	0.880	29.70
Copper shower pan	18.000	S.F.	1.440	55.98
Ceramic tile floor (pitched to drain)	15.000	S.F.	1.311	134.25
Ceramic tile walls, thin-set 4-1/4" x 4-1/4"	110.000	S.F.	9.263	229.90
Ceramic bath accessories	2.000	Ea.	0.390	19.00
Tub grab bar	2.000	Ea.	1.143	157.00
Grab bar vertical arms	4.000	Ea.	2.667	346.00
Bar-mounted hand-held shower head	1.000	Ea.	0.364	63.50
Rough in supply, waste and vent for shower	1.000	Ea.	13.445	141.00
Rough in supply, waste and vent for sink	1.000	Ea.	9.639	220.00
Walkhung porcelain enamel lavatory (22" x 19")	1.000	Ea.	2.000	405.00
Faucet, handles and drain	1.000	Ea.	0.800	107.00
Mirror with stainless steel shelf	1.000	Ea.	0.400	90.50
Labor minimum for toilet relocation	1.000	Job	4.000	0.00
Rough in supply, waste and vent	1.000	Ea.	5.634	139.00
Labor minimum to repair gypsum board and ceramic tile	1.000	Job	0.080	0.13
Totals			74.459	2,989.30

Total per each including general contractor's overhead and profit

\$10,418

70

Modify Closet

Most closets can be modified with some basic carpentry work, in many cases without altering the doorway. Simple modifications like lowering a shelf and pole or installing them on adjustable brackets are nevertheless vital in making common storage spaces accessible.

ADAAG Reference

4.25 Storage

Where Applicable

At least on closets or storage area (if provided) in accessible spaces.

Design Requirements

- 32" minimum door clear opening width.
- Shelves, poles, and hooks within reach range: 48" for front reach, 54" for side reach.
- Accessible door hardware.
- Clear floor space in front, 30" x 48" minimum.

Design Suggestions

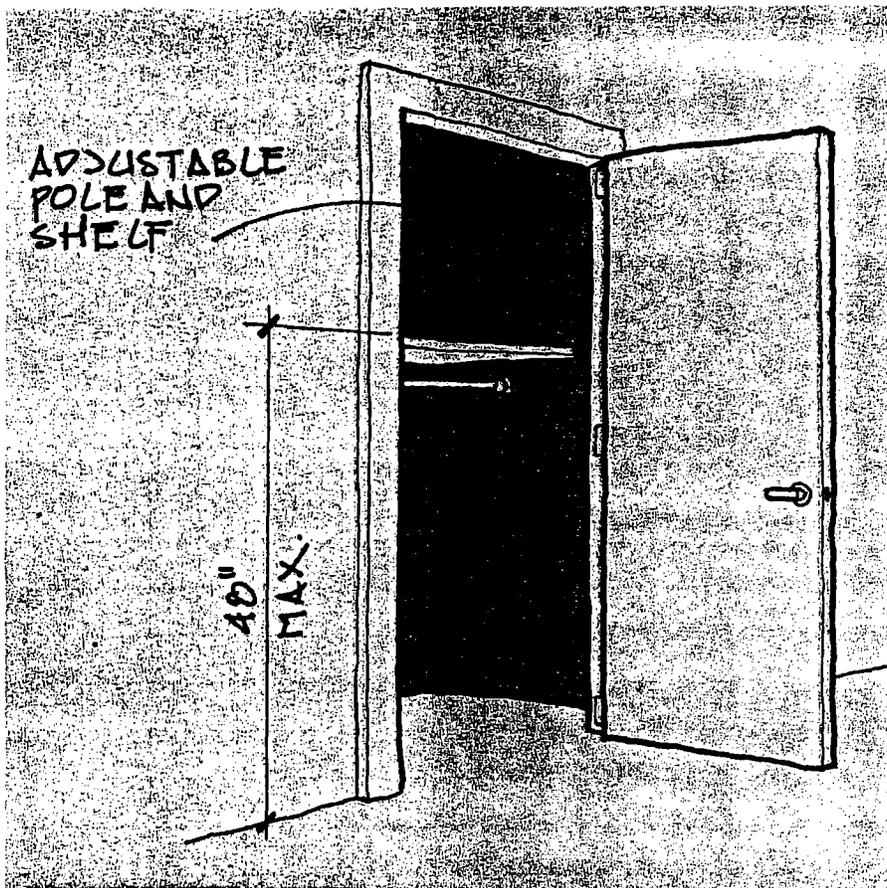
Adjustable shelves and poles, set at 12" heights, allow for flexibility in use. If the closet is deep, consider adding hooks to side walls or inside of doors for easy reach.

Key Items

Shelves, brackets, poles, coat hooks, closet door hardware.

Level of Difficulty

Low.



Estimates

Install accessible wood shelf and pole

Description	Quantity	Unit	Work Hours	Material
Shelf supports	7.000	L.F.	0.231	2.80
Closet pole	3.000	L.F.	0.120	2.55
Shelving	6.000	L.F.	0.684	12.30
Additional labor required for work within closet area	1.000	Job	2.000	0.00
Totals			3.035	17.65

Total per each including general contractor's overhead and profit

\$207

Install adjustable wood shelf and pole

Description	Quantity	Unit	Work Hours	Material
Adjustable closet rod and shelf, 12" wide, 3' long	1.000	Ea.	0.400	8.05
Additional labor required for work within closet area	1.000	Job	2.000	0.00
Totals			2.400	8.05

Total per each including general contractor's overhead and profit

\$155

Lower 2 coat hooks

Description	Quantity	Unit	Work Hours	Material
Labor minimum to lower 2 coat hooks	1.000	Job	2.000	0.00
Totals			2.000	0.00

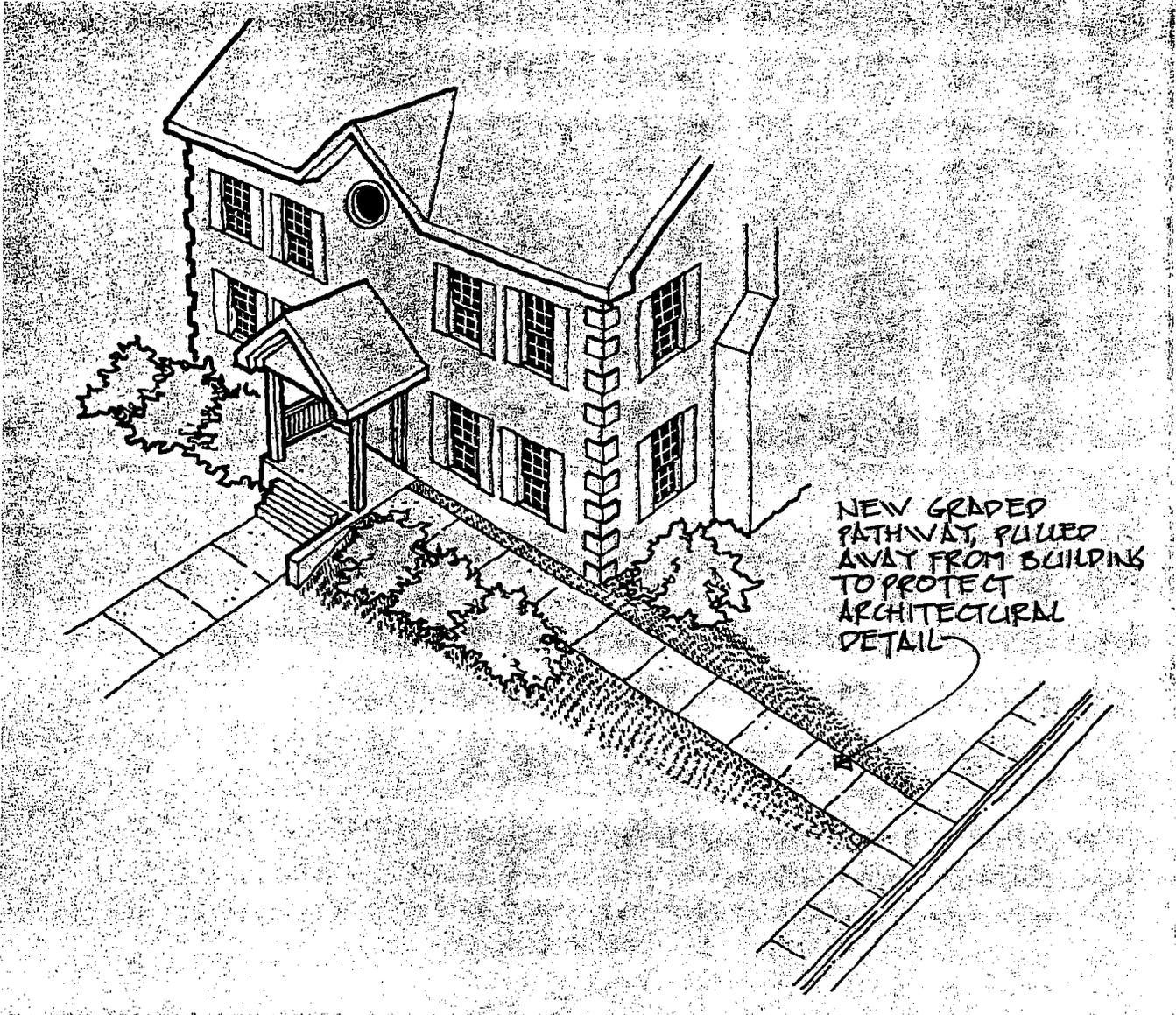
Total per each including general contractor's overhead and profit

\$59

Total per 2 coat hooks including general contractor's overhead and profit

\$117

Historic Entry Modification



Existing Conditions:

Two-story library with basement, town-owned, 1840s Federalist design, brick and limestone construction, on local and state historic registers.

Level of Accessibility:

Building set back 50' from sidewalk. Two entrances, front and back; front entrance up a set of four steps, 6" risers, to extended entrance porch; rear entrance on grade, but opens onto stairwell.

Reason for Modification:

Title II compliance. A non-structural program access not possible since the town has no other library and no means of providing alternative forms of program accessibility.

Design Options:

1. Stair lift on front stairs. Rejected by historic commission.
2. Stair lift on rear stair. Accepted by historic commission, rejected by fire marshal; designated fire egress stair cannot be blocked with lift.
3. Exterior elevator. Rejected by historic commission, and by town board since cost would require floating a bond issue (estimated cost, two-stop elevator with brick shaft, \$90,000).
4. Ramp at front entrance. Acceptable, if design conforms to existing style. Requires concrete ramp with limestone facing, and metal rails attached to painted fluted posts. Estimated cost: \$19,000.
5. Graded pathway, rough-finish stone pavers, up to entrance at slope of 1:20, cover portion of existing steps.

Acceptable, with approval from historic commission. Estimated cost: \$14,000, with landscaping.

Plans reviewed by:

Library manager, town architect, local historic commission, and town disability rights committee.

Preferred Solution:

Graded pathway, changed to broom-finish concrete. It is the only affordable solution that satisfies the historic commission. Concern is raised about necessary snow removal and drainage, since the pathway is flush with the entrance level. This issue is addressed by the landscape contractor.

For More Information

WEBSITES

- Rebuilding Together <http://www.rebuildingtogether.org>
- Assist, Inc. <http://www.assistutah.org>
- Toolbase (NAHB/HUD) <http://www.toolbase.org>
- Ability Magazine <http://www.abilitymagazine.com>
- Universal Design Living Library <http://www.udll.com>
- Prince William County, VA <http://www.pwcgov.org/default.aspx>

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800.647.6777 (V/TTY Info. Request Line)
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www.design.ncsu.edu/cud

FAIR HOUSING & UNIVERSAL DESIGN RESOURCES

1. THE CENTER FOR UNIVERSAL DESIGN www.design.ncsu.edu/cud
2. ADAPTIVE ENVIRONMENTS www.adaptenv.org
3. CENTER FOR INCLUSIVE DESIGN www.ap.buffalo.edu/~idea
4. HOME MOD. ACTION PROJECT www.homemods.org
5. FAIR HOUSING ACCESSIBILITY GUIDELINES www.hud.gov/fhefhag.html
6. FAIR LENDING: A RESOURCE GUIDE www.fairlending.com
7. NAHB RESEARCH CENTER www.nahbrc.org
8. NAT.ASSOC. OF REMODELING INDUST. www.nari.org
9. US ACCESS BOARD www.access-board.gov
10. US DEPARTMENT OF JUSTICE www.usdoj.gov

Recommended Universal Design References

Accessible Home Design: Architectural Solutions for the Wheelchair User

Thomas D. Davies, AIA, Kim Beasley, AIA
1999, \$22.95
PVA Distribution Center
P. O. Box 753
Waldorf, MD 20604-0753
888-860-7244 (toll free)
www.pva.org

Aging in Place: Aging and the Impact of Interior Design

American Society of Interior Designers, 2002
608 Massachusetts Ave. NE
Washington, DC 20002
Free at www.asid.org/research.asp

Building for a Lifetime: The Design and Construction of Fully Accessible Homes

Margaret Wylde, Adrian Baron-Robbins
1994, \$44.95
Taunton Press
63 S. Main Street
P. O. Box 5560
Newtown, CT 06470
800-888-8286
www.taunton.com

A Consumer's Guide to Home Adaptation

Adaptive Environments, 1995, \$12.00
374 Congress St., Suite 301
Boston, MA 02210
617-695-1225
www.adaptenv.org

Creating the Not-So-Big House

Susan Susanka, 2000, soft cover \$24.95
Taunton Press
63 S. Main Street
P. O. Box 5560
Newtown, CT 06470
800-888-8286
www.taunton.com

Directory of Accessible Building Products

2006, \$5.00
NAHB Research Center
400 Prince George's Boulevard
Upper Marlboro, MD 20774
301-249-4000; 800-638-8556
Free at www.nahb.org

Elderdesign: Designing and Furnishing a Home for Your Later Years

Rosemary Bakker, 1997, \$14.95
www.elderdesign.homestead.com/elderdesign.html
(or www.amazon.com)

The Healthy House

John Bower, 2001, \$23.95
The Healthy House Institute
430 N. Sewell Rd.
Bloomington, IN 47408
Phone/fax 812-332-5073
www.hhinst.com/books/videos.html

Available from CUD

A House for All Children: Planning a Supportive Home Environment for Children with Disabilities

New Jersey Institute of Technology, 2000
Campbell Hall, Room 335
University Heights
Newark, NJ 07102-1982
973-596-3097
www.ahouseforallchildren.njit.edu

Housing Choices and Well-Being of Older Adults: Proper Fit

Leon Pastalan and Benjamin Schwarz (eds.),
2001, ISBN 0789013215, \$24.95
The Haworth Press, Inc.
10 Alice Street
Binghamton, NY 13904
800-429-6784
www.haworthpress.com

Universal Kitchen and Bathroom Planning

Mary Jo Peterson, 1998, \$79.95
McGraw Hill Order Services
P. O. Box 545
Blacklick, OH 43004
800-722-4726
books.mcgraw-hill.com

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www.centerforuniversaldesign.org

Publications:

Affordable and Universal Homes: A Plan Book

NCSU School of Design, 2000, \$10.00

North Carolina Accessible Multifamily Housing

1999
NC Residents free
Out-of-State \$5.00

Products and Plans for Universal Homes

Home Planners, LLC, 2000, \$20.00

Tech Packs

{subject-specific illustrated booklets}:

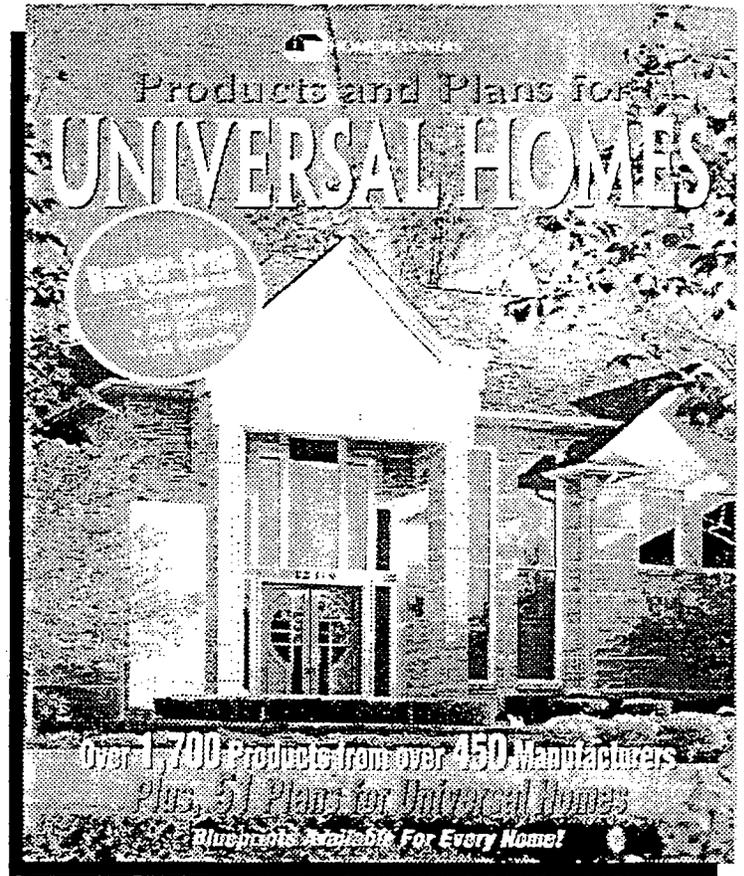
Bathrooms	\$10
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