

## Other Building Features

### Design considerations

There are many building features that need to be considered when renovating a low-rise, multi-family social housing project for persons with disabilities. Again, we must consider the needs of people with different disabilities, including individuals with mobility limitations, individuals who are blind or with low vision, those who are deaf or hard of hearing, or others with cognitive limitations. This fact sheet highlights the following features.

- Doors
- Windows
- Bedrooms
- Interior finishing
- Equipment and controls
- Laundry
- Garbage
- Fire protection
- Public washrooms

If you are planning significant renovations, think carefully about how the rooms will work. Is that wall between the kitchen and dining area really necessary? Perhaps the area could be made more spacious with a wide archway. A continuous accessible path of travel at least 915 mm (36 in.)

wide should be provided into and throughout all living spaces. Ideally, this path should provide access to all furniture, storage units, switches and controls. If a room is very small, you may have to confine the path to its most important locations.

People who use a wheelchair or scooter need a clear floor space of at least 760×1,220 mm (30×48 in.) in front of furniture and switches. This space should be integrated into the seating area. If possible, provide an open space within each living area to allow a user of a wheelchair or scooter to turn around. A circular turning space of 1,525 mm (60 in.) in diameter will accommodate most manual wheelchairs. Sometimes, though, it is easier to find space for a three-point turn. People who use walkers also need turning space but not as much as users of wheelchairs or scooters. If there is a user of a wheelchair, scooter or walker who lives in or regularly visits your dwelling, it's always a good idea to measure the amount of turning space that person requires and design accordingly.

Open space under tables and work surfaces can often be used as part of the turning space for users of wheelchairs or scooters—but make sure that the space is high enough to accommodate users' toes and knees.

### Interior doors

Suite entry doors may be wide enough to accommodate the passage of a wheelchair. However, deadbolts and locks are normally too high. Someone in a wheelchair cannot use a door viewer. The width of bedroom doors is typically equal to the width of a wheelchair with little allowance for passage. Most door handles require a twisting action of the wrist to open and do not have handles suitable for persons with limited hand mobility on both sides.

Suites with balconies often have a radiant heater under the balcony door. This raised threshold makes access to the balcony virtually impossible for persons in wheelchairs. Balconies are

often too narrow to allow individuals in wheelchairs to manoeuvre. People with mobility limitations have no access to storage rooms that may lie off the balcony.

Provide suite entry doors with clearance of 915 mm (36 in.) when the door is fully open. Install a 255mm (10-in.) kickplate on both sides of the entry door to protect the door from wheelchair footrests. Place deadbolts no higher than 1,070 mm (42 in.) from the floor. Provide lever-type handles on all doors.

Install security viewers between 1,070 and 1,220 mm (42 and 48 in.) from the floor. It is not necessary to remove the existing

viewer—two are better than one. A wide angle peephole viewer is a very positive solution for residents who use wheelchairs (see figure 1).

Provide adequate space at the entrance door for someone in a wheelchair to unlock and fully open the door. The maximum force to push or pull open the door should not exceed 22 newtons (5 pounds). On the inswing side, provide clearance of 610 mm (24 in.) and, on the outswing side, 305 mm (12 in.).

Adequate clear space on the latch side of the corridor door is not usually a problem unless the suite entry door is recessed or located at the end of a corridor. If the entrance hall is confined by interior walls, it may be more difficult to provide the 610-mm (24-in.) clearance required on the inside of the suite.

Provide lever-type door handles: these are much easier to use and essential for people with hand or wrist mobility limitations. Provide clearance of 915 mm (36 in.) at bedroom doors.

Pocket doors provide the greatest amount of clearance for a given door size. Select hardware that is suitable for persons with limited hand mobility.

Install a second handle or pull on the outswing side of the door, 205 mm (8 in.) from the hinge and 865 mm (34 in.) from the floor.

If there is not enough room to install a 915-mm (36-in.) wide hinged door, the use of offset hinges on an 865-mm (34-in.) or 810-mm (32-in.) door will maximize the available clear passage width. The offset hinge takes the width of the door out of the clear passage width (see figure 2). Please note that there must be adequate space between the door frame and wall to accommodate the door handle when considering offset hinges.

Provide adequate space for someone in a wheelchair to open the door with maximum force that does not exceed 22 newtons (5 pounds). On the inswing side, provide clearance of 610 mm (24 in.) and, on the outswing side, 305 mm (12 in.). Hinged doors are by far the most common type. They are inexpensive and easy to use but should have some clear floor space next to the door handle so that the door can be opened without having to step back (or wheel back) at the same time. A clear space of at least 610 mm (24 in.) is recommended at the latch side of the door on the pull side and 305 mm (12 in.) on the push side (see figure 3). Painting door frames a colour that contrasts with the wall colour will help those with visual and cognitive limitations locate doorways.



Figure 1: Wide angle peephole

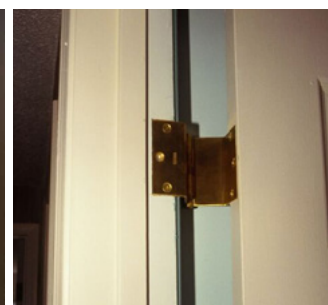


Figure 2: Offset hinge

Photo by Ron Wickman Architect

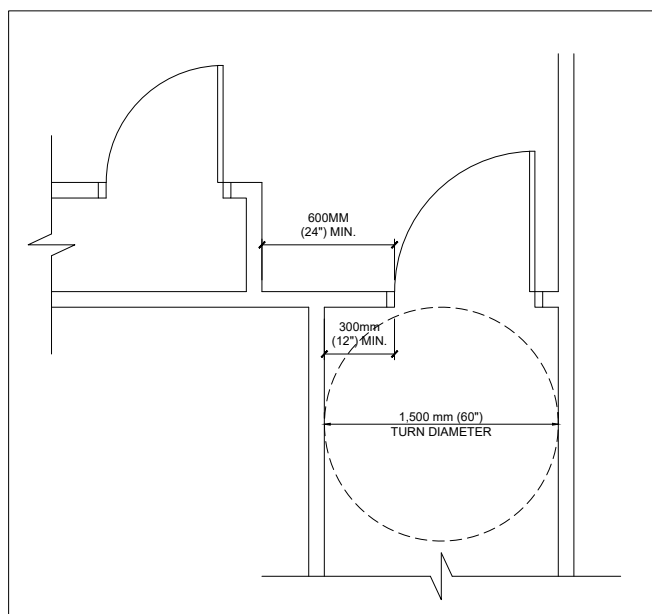


Figure 3: Clear floor space at doors

Diagram by Ron Wickman Architect

Installing a wider door with adequate latch side clearance can be quite a challenge because of space limitations. It may be necessary to move partitions or change the swing of the door to achieve adequate clearance. This type of activity could involve moving electrical outlets and remodelling closets.

Also think about the manoeuvring space required for the door. Adequate space should be provided inside the bathroom to allow users to close the door when they are inside. Also, for doors that swing outside the bathroom, consider installing a D-type handle, 150 mm (6 in.) long, on the door, so that it may be pulled closed once inside. Likewise, space is required to allow users to easily open the door to exit.

All doors should have a minimum clear width of 915 mm (36 in.) and should be designed to maximize manoeuvring space. It is highly recommended to use 915-mm (36-in.) doors for all rooms of a dwelling. Pocket doors can be used, particularly in smaller bathrooms, but the hardware to open pocket doors may be difficult to operate for some people with limited dexterity. It is important to research pocket door hardware, because easier-to-use hardware does exist. If possible, it would be best to test any hardware prior to installation. Door hardware should be operable with one hand that does not require fine finger control, tight grasping, pinching or twisting of the wrist.

A door handle and lock that can be operated using only one hand, without tight grasping, pinching or twisting of the wrist, is recommended. Lever door handles are a great solution for everyone, whether it is a senior with arthritis, a child with small hands or an adult with arms full of grocery bags.

Push-button locking mechanisms are much easier to use than those that incorporate keys or small turning mechanisms.

New technologies are available that can unlock and open a door with a remote control device. Slide-bolt locks can also provide a universal design solution, as long as the bolt slides easily and is not too small. However, slide-bolt locks are not usually designed to be opened from the outside in an emergency, so they may not be the best choice for a bathroom or child's bedroom.

Placing a parcel shelf next to exterior doors is inexpensive and useful, allowing users to place items they are carrying on the shelf, freeing their hands to unlock and open the door.

## Windows

Windows are used to bring light and fresh air into rooms, and they come in many shapes, sizes and styles. When choosing a window, first consider its size.

Windows should be large enough to bring sufficient light into a room but not so large that they create over-illumination and glare. Consider using adjustable blinds or curtains to control light levels. Over-illumination and glare are of particular concern for older people, as they can “wash out” the features of a room, making obstacles and tripping hazards difficult to see.

If the primary purpose of a window is to provide views to the outdoors, the sill height of the window should be carefully considered. The recommended sill height for viewing from a seated position is no higher than 760 mm (30 in.) and, from a horizontal position, no higher than 610 mm (24 in.). Note: If the window is operable, be sure to use safety locks and limit the opening space to ensure that a child cannot open it or climb through it.

Consider the usability of a window—particularly the opening and locking mechanisms. Casement, awning and hopper windows can be opened with one hand using a crank handle or lever, and the opening and locking mechanisms are usually easy to reach. Some casement windows have locks at both the top and bottom of the window. If someone in the family has limited reach, ask the supplier to provide a linkage bar to allow both locks to be operated from the bottom. Window opening mechanisms should be located at a minimum height

of 1,070 mm (42 in.) and at a minimum of 305 mm (12 in.) from a wall corner. Lever-type window opening mechanisms should be a minimum of 100 mm (4 in.) long.

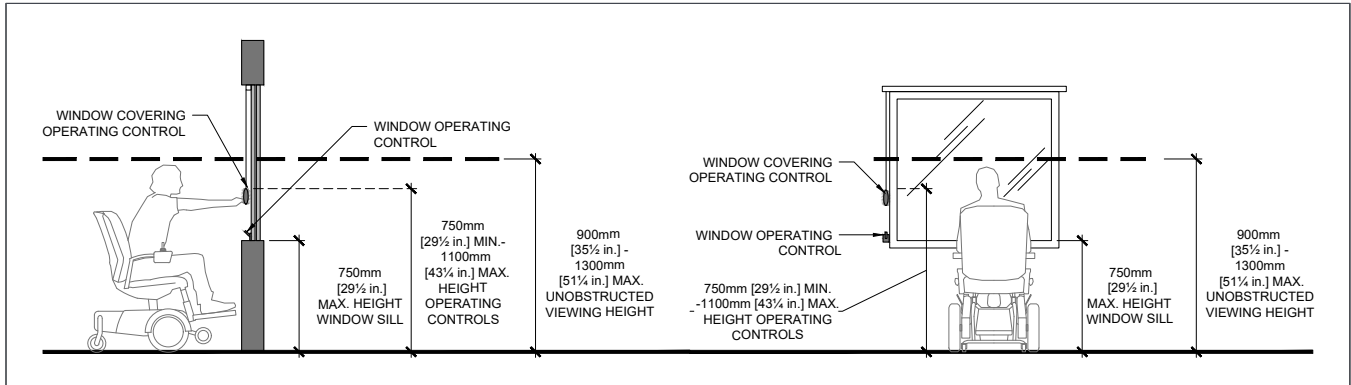
Sliding windows are also a good choice, as they are usually easy to reach and open. However, larger sliding windows (and sliding patio doors) can be heavy and may not be the best choice for someone with limited strength. Note that double-hung windows typically require fine finger control and the use of two hands to open.

Some window manufacturers make windows that can be opened with a remote control.

Window opening and locking mechanisms should be between 610 and 1,220 mm (24 and 48 in.) from the floor, with a clear floor space in front so people can use the controls without reaching over furniture. If someone in the family or a frequent visitor uses a wheelchair or scooter, consider providing at least 760×1,220 mm (30×48 in.) of clear space in front of the window controls. Window openers and locks are easier to see if they are colour-contrasted with the window frame.

Bedroom windows are typically positioned with sill heights that prevent people from looking in, but these heights significantly reduce the value of a window for a person in a wheelchair. In addition, they often have opening systems that are difficult to operate.





**Figure 4: Window design features**

Diagram by: Alberta Parks

Lower the windows or install longer windows with sills approximately 810 mm (32 in.) from the floor. This height will allow a person in a wheelchair to see outside and to operate the windows easily (see figure 4).

Lowering a window or installing a longer window may require repairs to the interior as well as the exterior. If wider windows are installed, the strength of the existing lintels may need to be reinforced.

Locate window hardware not more than 1,220 mm (48 in.) from the floor, so that it is easily reached by a user in a

wheelchair. Install lever-type hardware; avoid using crank or slider styles. Remote-controlled openers for windows are also available.

Slider windows are often economical but are also very difficult for a user in a wheelchair to operate. People with arm, wrist or hand limitations also find slider windows difficult. Windows that open with scissor-type lever handles offer better value. The addition of a small operable window under the existing window will leave the original window intact.

## Bedrooms

Provide rooms with a clear area of at least 1,525×1,525 mm (60×60 in.) and a space of 915 mm (36 in.) for movement between furniture. This will allow people in wheelchairs access to closets and provide them with the ability to manoeuvre around furniture.

Bedroom size that is appropriate depends on the number of people using the bedroom, the mobility of the occupants and the number and type of beds. Accessible bedrooms must be located near a barrier-free bathroom; direct access from bedroom to bathroom will be very useful for people with greater mobility limitations.

In many suites, the hallways are narrow and the doors to the bedrooms have been designed at minimum code widths. In these situations, there is insufficient room to manoeuvre a wheelchair. Where there is a closet close to the bedroom door, remove part of the closet and install a wider entrance 915 mm (36 in.) or wider. This will allow someone in a wheelchair to turn when

partially in the doorway. Alterations to bedroom closets and walls is usually easier than widening the hallway.

Another option is to install a new bedroom door from an adjoining room, such as the living room so that the wheelchair user can enter the bedroom directly without using the hallway.

In many suites, the patio doors are raised approximately 205 mm (8 in.) above the floor to allow for the installation of radiant heaters below them. This ledge makes it impossible for someone in a wheelchair to pass onto the patio. A solution is to remove the unit and install it in the floor under the door. This would allow the patio door to be lowered to floor level, reducing the barrier. The resulting small threshold could be managed easily with a very short ramp.

Shelving that is installed more than 1,395 mm (55 in.) above the floor is inaccessible to people in wheelchairs and prevents them from using the upper third of their closet. Adjusting

spring-loaded hardware is available (similar to that used for installing adjustable sinks and counter units) that allows shelving units to be moved up and down as required. A shelf can thus be raised up and out of the way, providing usable floor space, yet still remain within easy reach. A flexible strap or cord is used to pull the shelving unit down, and a pusher rod is used to raise it. These units must be light enough for easy use.

Most suites have a closet beside the entry door. This limits the space next to the door handle, making it difficult for users of wheelchairs or walkers to open the door as they must pull it open while backing up. A solution is to remove the closet door and the door jamb on the return wall, thus enlarging the space by 610 mm (24 in.). The closet does not have to be entirely abandoned, as it can be redesigned with open shelving to provide some storage and clothes-hanging space.

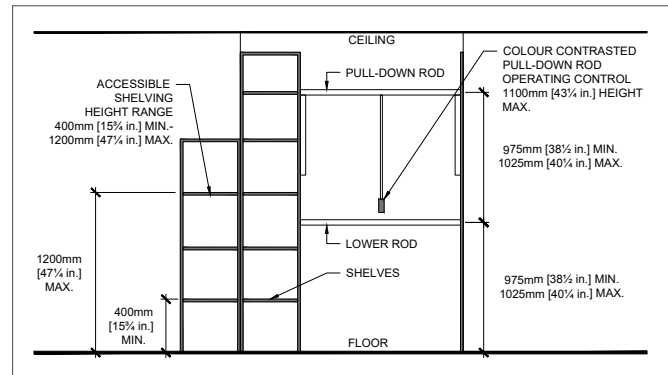
If the closet is located behind the entrance door, when it is open, the swing of the door may have to be reversed so that the closet can be used.

Most closets are of little value to users in wheelchairs. Closet doors are often too narrow to allow a wheelchair user to enter the closet, and the closet rods and shelves are typically too high and not adjustable.

Provide closet doors that are easy to operate with at least 915 mm (36 in.) of open, unobstructed access space. Bifold or accordion doors work well. Provide a clear space of at least 760×1,220 mm (30×48 in.) in front of the closet.

If closet space is limited, it may be necessary to remove existing closet doors completely or replace them with a drape or bifold door.

There are three options: install the rods a maximum of 1,395 mm (55 in.) from the floor; design a closet with two or more rods, one set lower than the other; or install adjustable bracket to allow the rods to be moved up and down (see figure 5).



**Figure 5: Closet design features**

*Diagram by: Alberta Parks*

Closet organizers are useful and offer an almost infinite range of design options. Consider custom-designing the closets.

Locate a minimum of three shelves between 405 mm (16 in.) and 1,220 mm (48 in.) from the floor. Adjustable shelving is convenient, and pullout shelving makes for easier access to the backs of the shelves. Wheelchair users require accessible and usable storage space and storage rooms or the tops of closets are not available to them. Provide storage space that is appropriate for the occupant.

In an accessible dwelling, a ceiling light fixture that uses two bulbs must be supplied and installed, switched outlets for light control should be placed near a bed, and a telephone jack should be installed close to an electrical outlet and near a bed. Alarms should be visual to accommodate persons with hearing limitations. An emergency call alarm must be located near a bed and connected to a monitoring system.

## Interior finishing

Many rooms in walk-up buildings were designed to the minimum standards allowed by the building code at the time of construction. Rooms sized to minimum code requirements may not be usable for their intended purpose by people with disabilities. People who use wheelchairs or walkers require more space to manoeuvre and wider door openings than may be available in some suites. Floor coverings in many suites are not suitable for people in wheelchairs. Elevation changes between rooms or between floor finishes also cause problems.

Consider converting a two-bedroom to a one-bedroom suite where the interior wall is not load bearing. Careful removal will allow the wall to be re-established for future tenants.

Provide slip-resistant, non-glossy resilient floors that people in wheelchairs or people who use walkers or canes can move across easily. Avoid changes in floor surface within the suite. Install one type of flooring throughout, or provide transition strips to accommodate any elevations or changes in floor material.

Floor finishes in dwellings should be level, non-slip and durable. A colour-contrasting border on the wall and floor helps those persons with visual limitations understand the boundaries of the room. Floor and wall finishes must be non-glare and non-pattern to better accommodate persons with visual limitations or dementia.

Durability, ease of cleaning, comfort and a safe, non-slip surface are some of the main considerations when selecting flooring. Slip resistance for floors should be assessed when dry and also when wet.

A wide selection of different flooring surfaces exists. Marble or waxed floors should be avoided, as they are very slippery, especially when wet. If someone in your house is prone to dropping things or falling, be sure to choose a resilient flooring material, such as cushioned vinyl or cork. Vinyl flooring is available in sheets or tiles and is low-maintenance. However, it must be installed on a plywood surface, and, as a result, there will be some emissions from the glue, vinyl and plywood. Low-emission glues are now available. Cork provides an interesting alternative, as it is resilient, comfortable and easy to wheel on. A ceramic tile floor is waterproof, easy to clean and also easy to wheel on. A ceramic tile or hardwood floor is a harder surface, which is positive for persons who use wheelchairs.

Where carpeting is used, provide high-density, commercial-quality carpeting and fasten it securely to the subfloor. Do not use underpadding.

Whatever type of flooring material is selected, ensure the flooring is installed so that it is level with adjacent flooring to avoid having a lip or rise where the different flooring materials meet. A heated floor could be considered for added comfort.

Colour and texture contrast in a dwelling aids all users, especially those with visual limitations. Counter edges, door handles, grab bars, light switches, electrical outlets and other controls should contrast in colour to surrounding surfaces. Colour-contrast bands should also be used around accessories such as toilet paper dispensers and towel racks. Towel racks should be mounted as securely as grab bars to support people should they lose their balance.

Acoustics can help or hinder the ability to hear people talking, the television or the doorbell. If a room will be used by a family member or visitor who has a vision and/or hearing loss, a quiet environment is desirable. Rooms with a lot of hard surfaces and non-upholstered furniture can be very noisy as a result of background noises and reflected sounds. Adding “soft” elements to the room, such as carpets, draperies, upholstered furniture and acoustic ceiling tiles will improve the space’s acoustic quality.

Other design considerations that can create a quieter environment include:

- designing ceiling shapes so that echoes do not occur;
- minimizing background noise from mechanical equipment by choosing quiet equipment;
- using sound-dampening installation practices;
- soundproofing walls and ceilings;
- installing soundproof doors and windows;
- placing noisy exterior equipment, such as air conditioners, far from windows and doors.

A room used by a family member or visitor who has low vision or is blind and uses reflected sound to assist with orientation needs to be “acoustically alive.” “Hard” elements such as ceramic flooring or metal panelling enhance reflected sounds.





## Equipment and controls

In a typical walk-up building, equipment controls (such as thermostats) in suites are positioned for use by a person in a standing position; thus, someone in a wheelchair cannot reach them. While light switches are usually within reach, most electrical outlets are found behind furniture. In-suite parking space is required for an electric wheelchair that is being recharged.

Auditory fire and smoke alarms do not warn occupants with hearing impairments; in addition, many seniors with otherwise perfect hearing are unable to distinguish some frequencies. Smoke detectors and fire alarms can save lives, but only if they can be heard. People with hearing limitations may not be able to hear even very loud sounds or may not be able to distinguish the source of the sound. Standard intercoms and door bells are also of little value to those with hearing limitations.

Install a notification system for smoke and fire alarms that use a flashing light to signal an arriving visitor. Locate the intercom and security door release button between 405 and 1,220 mm (16 and 48 in.) from the floor in an area fully accessible to a wheelchair user. Mark the intercom with tactile numbers and letters. Provide a 760-mm (30-in.) wide clear space in front of all controls.

Alternatively, provide portable intercoms that can plug into outlets in a suite (wireless units are also available).

Encourage tenants with mobility, visual or hearing limitations to obtain emergency call buttons from a medical emergency service. Install emergency call buttons in bathrooms.

Making the intercom and visitor announcement system available to users in wheelchairs and those with hearing limitations may require the relocation of the intercom system or the installation of a portable system. This is easy to do, and cost is the only consideration.

Switches and controls should all be located within easy reach and be easy to operate.

An electrical outlet should be strategically located within the reach of someone either standing or seated, near the sink or vanity area or the apron in front of the vanity counter. Other controls and switches, including the switch for the ventilation fan should be located at a maximum height of 1,220 mm (48 in.) from the floor. Locating a light switch outside of a bathroom can benefit people who are deaf or hard of hearing; the light switch can be used when a knock on the door is not enough (see figure 6).

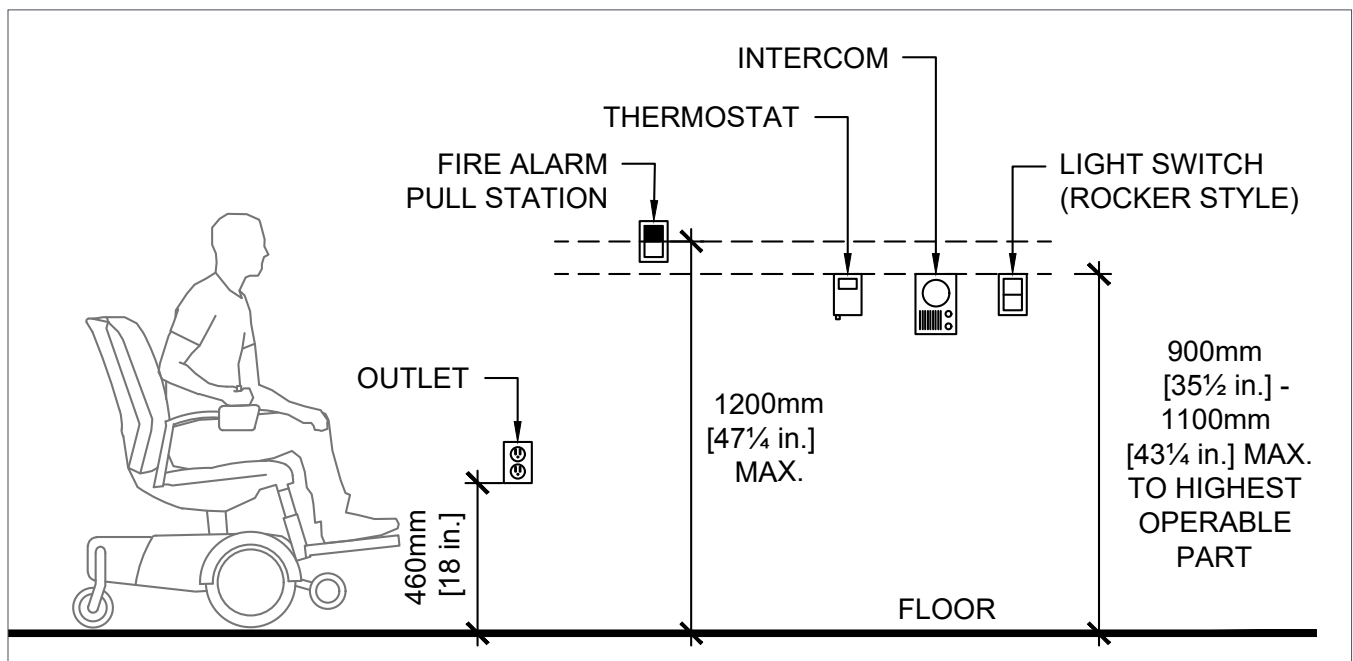


Figure 6: Control heights

Diagram by: Alberta Parks

Maintain lighting levels at a minimum of 100 lux to ensure that people with visual limitations are able to identify obstacles, elevation changes and the location of individual surfaces. The universal approach to lighting design is to address the needs of people as they age. It should be noted that people over the age of 60 typically require two to three times as much light for reading compared to people 20 years old. Three basic needs to consider for aging eyes are increased intensity, uniformed balanced lighting and controlled glare.

Increased intensity is often straightforward; however, the other goals of uniformed balanced lighting and minimizing glare still need to be considered. Fixtures and light sources should be positioned such that “islands” of brightness with dark shadows are not created. Look for a mix of ambient, task and accent lighting that works in harmony with the users of the space. It is also possible to install a light that gradually adjusts the rate of illumination. When someone wakes in the middle of the night, a motion detector activates the light, which slowly brightens so the person is not overwhelmed. Dimmer switches are also an option. Adjustable directed or task lighting also allows users to have extra illumination in key areas of the dwelling, such as at sinks and in work areas.

Uniform balanced lighting is important, because aging eyes do not adjust to changing light conditions as quickly. This is an important consideration as someone moves from one space to another. Try to balance lighting throughout the room and compensate for extra-bright areas, while eliminating dark corners. A night light in the bathroom or in hallways is also an excellent feature for increased safety.

Where possible, take advantage of opportunities to maximize natural lighting, but be careful to avoid glare. Glare-free surface treatments and a soft matte paint finish are preferred by most people, especially persons with visual limitations or dementia. These finishes reduce glare and complement illumination levels, creating a more relaxed atmosphere.

Light fixture choices include recessed lights under-cabinet fixtures, bulb strips, cove lights, wall sconces, pendants, spotlights and ceiling fixtures. Where possible, light fixtures should come complete with two long-lasting bulbs; in that way, the fixture still produces light if one bulb burns out, which benefits those persons who cannot easily change a bulb.

Special thought should be given to the ways that people who are deaf or hard of hearing will be alerted to timer buzzers and smoke alarms. Appliances that provide information in two different formats (visual and audio signals for example) are widely available. This also helps people who are blind or with vision loss.

Efforts should be made to limit sources of noise, especially when the dwelling is used by people who are hard of hearing. Soft, absorbent surfaces such as cork flooring can reduce noise in the dwelling.

Install push-pad or rocker-style light switches between 915 and 1,015 mm (36 and 40 in.) from the floor.

Install electrical outlets between 405 and 510 mm (16 and 20 in.) from the floor. This position is easier for everyone to reach, including people in wheelchairs. Provide 760 mm (30 in.) of clear floor space in front of all light switches.

Altering the height of electrical outlets and switches is difficult as wires will have to be extended or cut off and walls will have to be repaired. This type of renovation may be low on the priority list, unless walls are being remodelled.

The batteries for electric wheelchairs need to be recharged regularly, and most charging units require a 110-volt power source. To eliminate the risk of circuit failure (breaker trip), install a dedicated circuit. Choose a convenient and safe location where the wheelchair can be parked while its battery is being charged.

Finding space to park a wheelchair may be as difficult as installing a dedicated outlet, and a wheelchair must not block hallways or doorways while the battery is being charged.

Place thermostats for heating and air conditioning between 915 and 1,070 mm (36 and 42 in.) from the floor, where someone in a wheelchair can reach them. Provide a clear space of not less than 760 mm (30 in.) in front of the controls.

Install lever-type controls that are operable with one hand. These should not require twisting of the wrist, grasping or pinching. Consider providing remote controls.

Where possible, provide appliance controls that are colour-contrasted and illuminated to 100 lux and have large print.

If the controls on the wall have to be lowered, wall repair and electrical alterations will be necessary.

Small, older heating, ventilation and air conditioning (HVAC) controls may have to be updated. New styles with digital readouts and programmable buttons often are not well understood and are difficult to use without adequate instruction.

Install fire and smoke alarms that allow interconnection to a strobe light (or similar device) that flashes at a frequency of 1 hertz in conjunction with the audible alarms. Place these strategically where they can be easily seen. The lights should be significantly brighter than the ambient light.





Other devices such as vibrating pillows and vibrating wrist bands are available and can be connected to the building alarm system to alert those with hearing limitations. Consider installing audible devices inside each suite in addition to those in the hallways.

Installing interconnected visual fire and smoke alarms will mean substantial electrical work and some drywall repairs. Vibratory warning systems will require an activation module in each suite that is connected to the building alarm system.

Lighting contributes greatly to the ambiance and esthetic quality of the dwelling and provides light for paths of travel, safety and security. Appropriate lighting is particularly important for people who are deaf or hard of hearing, as it makes lip-reading easier. The use of dimmer switches is an excellent way to adjust a room's ambience, while still allowing the space to be brighter for those who need it.

For maximum safety, lighting should be bright and consistent—especially along hallways and at stairs. To enhance safety and convenience, consider providing permanent night lighting along hallways at bedrooms and bathrooms. Linear LED lighting is a good choice for this type of lighting.

If the space features glossy floor, wall or ceiling surfaces, glare can be a problem, particularly for older people. Ideally, glossy surfaces should be changed to matte surfaces. Otherwise, choose indirect lighting sources to minimize glare.

Table and floor lamps enhance lighting levels at reading areas and writing surfaces. Having plenty of electrical outlets, evenly distributed around a room, minimizes the chances of tripping over cables and extension cords. Electrical outlets should be installed no lower than 405 mm (16 in.) from the floor. An electrical outlet in the ceiling above a sitting area will allow for the future installation of a ceiling lift (see figure 7). See CMHC's fact sheet, *Accessible Housing by Design—Residential Hoists and Ceiling Lifts*.

Install light switches in places where people can find them easily when they enter the room. Wheelchair or scooter users will require clear floor space of 760×1,220 mm (30×48 in.) in front of light switches. Controls installed 865 to 965 mm (34 to 38 in.) from the floor are usable by most people (see figure 8).

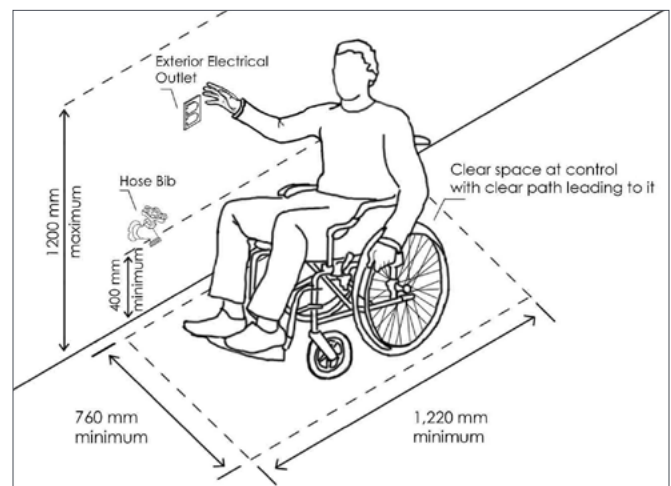
Home automation features located in an accessible residence should be used to allow people with disabilities to live more independently. Home automation features include, but are not

limited to, light-assisted doorbells, mechanically (remote control) operated opening windows, door openers, motion sensor lights, telephone jacks and outlets for computers located in various parts of a residence, extra outlets to accommodate changing technology, and security systems for theft and fire.



**Figure 7: Ceiling lift above chair in living room**

Photo by Ron Wickman



**Figure 8: Optimal reach range for controls**

Diagram by: Ron Wickman Architect

## Laundry

Typically, there is insufficient floor space in front of washers and dryers for persons in wheelchairs to approach the appliances, even from the side. Accessible shelving or work surfaces tend to be non-existent. Many older walk-up buildings have a central laundry room that is often inaccessible for users of wheelchairs or walkers. Elevation differences at thresholds are barriers for people in wheelchairs and, from a seated position, top-loading laundry equipment is unusable, especially with the controls at the back.

When it comes to laundry rooms, manoeuvring space around appliances is a key consideration, as space may be required for someone using a walker or a wheelchair. A clear manoeuvring space of at least 1,525×1,525 mm (60×60 in.) should be provided for people who use a manual wheelchair and 2,110×2,110 mm (83×83 in.) for people who use a larger power wheelchair or a scooter.

Provide a clear floor space of at least 760×1,220 mm (30×48 in.) in front of each laundry appliance to allow parallel access to the machine. Where equipment is placed side by side, the clear space for each appliance can overlap.

Install shelving at 760 mm (30 in.) from the floor and provide knee space under the shelf.

In-suite laundries often lack adequate space for access to the machines, and the top appliance in a stacked pair cannot be reached from a seated position. Doors to laundry rooms may need widening to provide access.

Front-loading washers and dryers are preferred by many people, including people who use wheelchairs. Top-loading machines may be preferred by someone who finds it difficult to bend comfortably. Whichever model is selected, front-mounted controls are preferable as they are easier for everyone to see and operate. Stacked washer and dryer units are often used when there are space limitations; however, they may not be a good design option for people who use wheelchairs, as these appliances can be difficult to operate and see into. Some combination washer-dryers are electric and ventless, perfect for remodels and where space is precious.

Pedestal base units that range from 255 to 380 mm (10 to 15 in.) are available for many models of front-loading washers and dryers, making them easier to reach into (see figure 9). The raised storage platform can be used to store large bottles of detergents. Careful consideration should be given to the location of the soap dispenser, as it may be located on the top of the machine, making it inaccessible to people who use wheelchairs. Also check the location of the lint catcher. Some dryers even feature audible alarms that inform users when the lint catcher needs to be cleaned.



**Figure 9: Front-loading washer and dryer mounted on pedestal with pullout drawers**

*Photo by: Ron Wickman*

Choose washers and dryers that offer multiple modes of information on the status of the laundry cycle, including visual, tactile and audible alerts. Such features will maximize accessibility for people with a variety of different capabilities.

The location of the washer and dryer in the dwelling should be designed to be easily accessible and free of hazards. Well-planned storage will increase the efficiency as well as the safety of the laundry area. Manoeuvring space in front of the appliances should be at least 1,525×1,525 mm (60×60 in.), in addition to the area where dirty clothes are stored. Storage of soap and other supplies should be located nearby, at a maximum height of 1,220 mm (48 in.).

A laundry sink and an area for folding clothes should be located within close proximity to the washer and dryer. If clothes are to be ironed within the laundry area, an easily accessible electrical outlet should be incorporated and a fold-down ironing board should be considered. Also, do not forget to plan a space to store the iron.



The exterior and interior of the appliance should have sufficient lighting to enable people to see and safely operate the appliance. The instruction text and controls should contrast in colour with the background area. In addition, some manufacturers allow the customer to program the size of letters and characters to maximize readability, a feature appreciated by many customers. The control area should also be free of glare and non-reflective. The surface materials offered by manufacturers vary from glass to enamel to

stainless steel, some of which make controls more difficult to see and operate. Legibility of operating controls and instructions is an especially important issue for people with reduced vision.

Controls should be easy and intuitive to operate for everyone, regardless of language, cognitive ability, ability to grasp or fine motor skills. Also, since the controls will be used by different people, they should be clearly visible and within reach of people who are either seated or standing.

## Garbage

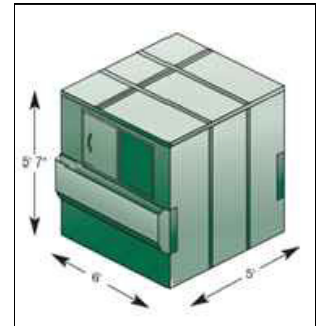
Even the most able-bodied person has difficulty carrying out the garbage. In most walk-up buildings, the garbage facility consists of large metal bins in the parking lot. Such bins are typically too high and are often surrounded by fences and doors. Users of wheelchairs or walkers cannot easily manage this type of garbage disposal system.

Provide a garbage room that is reserved for tenants with mobility, visual and hearing limitations. Ensure special access to the area for tenants who need it.

Where an exterior garbage drop-off is required, bin heights should not exceed 915 mm (36 in.), and the cover lids must be easy to open (see figure 10). Light the pathways to the garbage area, and keep the area clean of snow and ice.

Decide whether the inside garbage area will be open to all tenants or only people with mobility and visual limitations. A second special garbage drop-off will take up space and involve additional work and expense to transport garbage to the exterior garbage bins.

People with visual limitations need to be able to distinguish the door to the service room from those that lead to the laundry room or to other suites. Identify service room doors with a danger sign.



**Figure 10: Front-loading garbage bin**

*Diagram by: Ron Wickman Architect*

## Fire protection

On each barrier-free floor, construct an area of refuge with a floor space of 2 m<sup>2</sup> (21.5 sq. ft.) for each non-ambulatory occupant and attendant. Provide a minimum of two spaces. Locate the area of refuge near an exit. Construct a fire separation between the area of refuge and the main floor area. Ensure that doors do not encroach on the space required for wheelchairs. Provide early warning systems for tenants with mobility limitations and ensure that they know about the refuge area.

The area of refuge must provide safety from fire and smoke until help arrives for building evacuation. Landings are often not large enough to accommodate two wheelchairs and still

allow egress for others. Enlarging the landing may be difficult and costly or impractical. Development of an adjacent area on each floor as a refuge may result in a loss of suite space.

Most walk-up buildings have a fire resistance rating of 30 minutes or less for stairwells and corridors. If elevators or chair lifts are installed, the fire protection may be inadequate. Fire doors are often propped open by tenants and do not close in the event of a fire.

Equip fire doors with auto-release hardware that will close them in the event of a fire. The doors remain open when there is no fire, which permits tenants to pass through fire doors

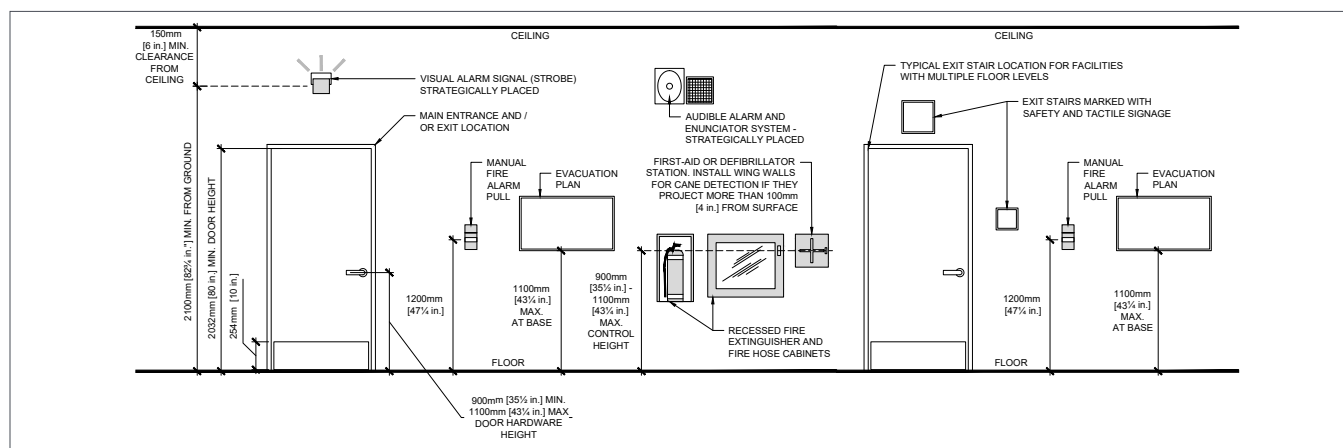


Figure 11: Fire and life safety features

Diagram by: Alberta Parks

without having to touch them. Ensure that all automatic devices are connected to the fire alarm system and smoke detectors; this will cause all fire doors to close immediately.

Most fire doors in older buildings are normally in a closed position. When auto closers and auto-release hardware are installed, tenants must be educated in safe fire door usage.

All fire protection equipment and controls should be within easy reach for persons in wheelchairs (see figure 11).

## Public washrooms

Many multi-family social housing projects are built with public washrooms. Buildings that are 20 years or older are rarely designed to accommodate users with disabilities, and, therefore, they are often very difficult to modify.

Typical problems commonly found in washrooms include the following:

- Signage does not exist to help individuals locate the washrooms.
- The entrance door is too narrow.
- The entrance vestibule is too small.
- There is inadequate manoeuvring space beside the latch on the pull side of the entry door.
- Manoeuvring space within the washroom is compromised by a toilet partition coming down to the ground, or a free-standing garbage can is in the way.
- The water closet stall is not large enough.
- The toilet is located in the centre of the stall.
- Grab bars are incorrectly located.
- The urinal is mounted too high.

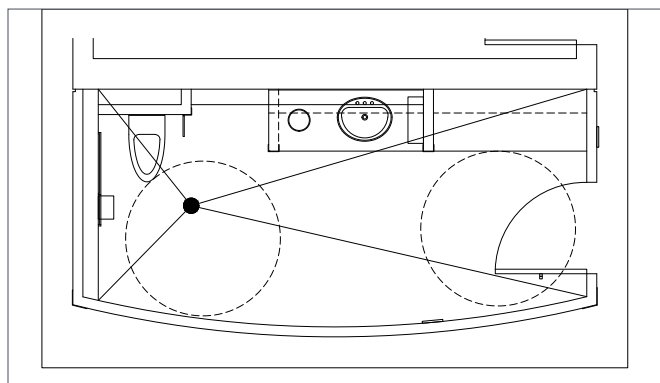
- There is inadequate knee clearance under the lavatory.
- The sink faucets are hard to operate.
- Washroom accessories, including mirrors, are mounted too high or located to obstruct the movement of persons with visual limitations.
- Washroom accessories are hard to use for persons with limited hand mobility.

In existing buildings where the washrooms are inaccessible and difficult to modify, it is often more economical to construct an entirely new self-contained washroom. This is an especially useful solution when the modification of the existing washroom would require a reduction in the number of fixtures and result in the building not meeting the building code. If an existing public washroom does not meet the building code, it will likely take three stalls to make an accessible stall. This will result in the loss of two existing stalls.

Positive wheelchair accessibility will allow a minimum clear space of 1,525 mm (60 in.) in diameter measured 305 mm (12 in.) above the floor, to permit turning a wheelchair without coming into contact with any fixtures or plumbing. Creating an

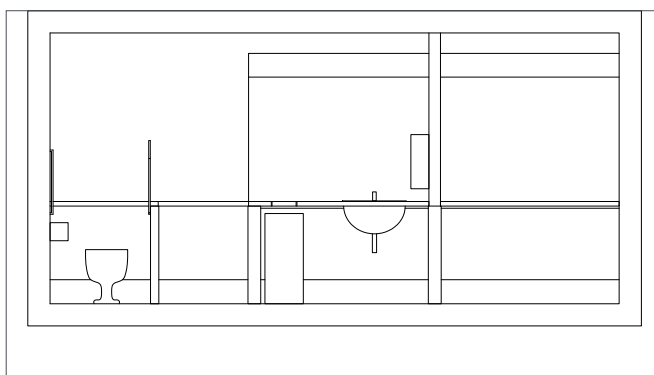


accessible toilet stall complete with a sink and accessories offers more privacy for people with complicated personal care needs; for example, some individuals who wear leg bags would like to be able to empty the bag and wash and dry their hands in private. It is important to keep the sink and the accessories outside of the 1,525×1,830 mm (60×72 in.) space.



**Figure 12: Washroom plan**  
Diagram by: Ron Wickman Architect

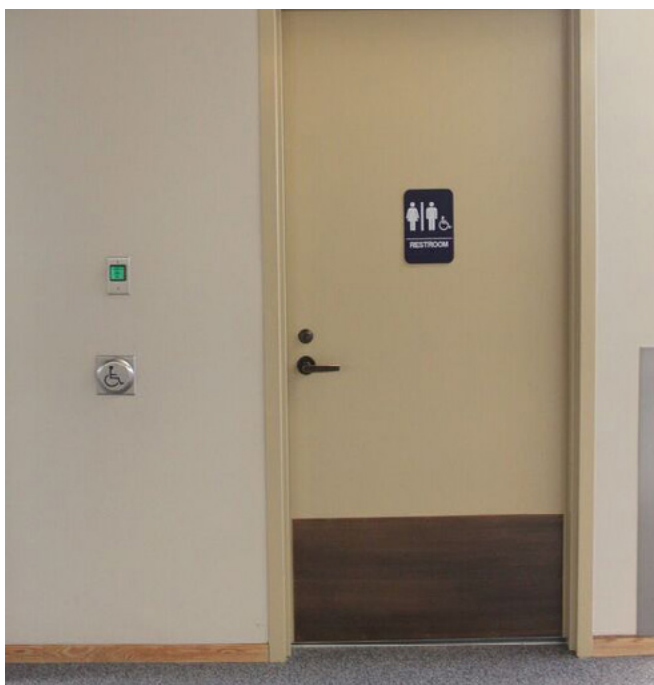
Self-contained (family or unisex) washrooms are a very good idea and should be included in new building designs and building renovations. They work well, for example, for an individual in a wheelchair with an attendant of the opposite sex or for a parent accompanying a small child of the opposite sex (see figures 12 to 15).



**Figure 13: Washroom elevation**  
Diagram by: Ron Wickman Architect



**Figure 14: Interior view of washroom**  
Photo by: Ron Wickman



**Figure 15: Exterior view of washroom**  
Photo by: Ron Wickman



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