



**FLEXHOUSING  
DESIGN  
CONSIDERATIONS**

PE 0231

**HOMES THAT ADAPT  
TO LIFE'S CHANGES**



# **FLEXHOUSING DESIGN CONSIDERATIONS**

PE 0231

Canada Mortgage and Housing Corporation  
Société canadienne d'hypothèques et de logement

Canadian Housing Information Centre  
Centre canadien de documentation sur  
l'habitation

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*Éléments de conception bâti-flex*  
PF 0231

**Canada**

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# FlexHousing Design Considerations

The key to FlexHousing is that it is easily adapted to meet specific needs rather than relying on custom designs. FlexHousing dwellings provide the initial occupants and subsequent occupants with accessibility, safety, security, ease-of-operation, convenience, comfort, and access to in-home services, as their needs and preferences change over time.

To ensure that a dwelling will be flexible enough to meet a broad range of individual needs over time, certain features should be incorporated at the time of construction. These would include features that would be difficult to retrofit, such as barrier-free access, space for maneuverability, and wide doorways. Provisions should also be made during construction to simplify the later introduction of additional features that may be required.

This booklet outlines the key FlexHousing features and refers you to other CMHC FlexHousing publications.

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## 1. Entry to Dwelling

There must be adequate maneuvering space in the entrance lobby or vestibule of a dwelling to allow for clear access to closets and ease of opening and closing exterior and interior doors. Thresholds to exterior doors should be beveled and should not exceed 19 mm in height. (See section 14, Parking and Access to Houses, and section 10, Doors.)

### Design Considerations

- ♦ Easy-to-operate door locks
- ♦ Two peepholes at different heights on exterior doors
- ♦ Easy-to-read numbers
- ♦ Good lighting both inside and outside the entrance

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## 2. Circulation within Dwelling

Corridors should be wide enough to allow a person using a wheelchair to manoeuvre easily and have full access to rooms and closets. There should be no changes in floor level. In multi-level houses, provision should be made for the future installation of either an inclined stair lift or a vertical lift. (See section 17 of the *Design Options for Barrier-Free and Adaptable Housing*.)

### Design Considerations

- ♦ Easy-to-grasp continuous stair handrails
- ♦ Three-way switches in circulation areas to avoid moving in unlit areas
- ♦ Reinforced stairway walls to allow future installation of a stair lift, or vertically aligned closets and appropriate framing to allow future installation of a vertical lift

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### 3. Kitchen

Because of the wide range of activities carried out in the kitchen, it's important to consider accessibility, safety, convenience, efficiency and ease of use for all family members, including those with disabilities. (See section 18 of the *Design Options for Barrier-Free and Adaptable Housing*.)

#### Design Considerations

- ◆ Non-slip flooring
- ◆ Task lighting at sink, stove and work surfaces
- ◆ Pull-out work boards
- ◆ Some electrical switches and outlets at front of counters
- ◆ Water temperature regulators
- ◆ Easy-to-use faucets (e.g. lever type.)
- ◆ Adjustable-height counters / sink
- ◆ Open space under sink and cook-top to accommodate a wheelchair: initial provisions and/or provisions for adaptation
- ◆ Reachable shelves in upper cabinets (e.g. through adjustable height cabinets or pull-down shelving)
- ◆ Provision for installation of wall oven
- ◆ Colour contrasts for people with poor vision
- ◆ Tactile and colour contrasted controls

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### 4. Bathrooms / Washrooms

At least one bathroom should be accessible and usable by a person in a wheelchair. This requires sufficient maneuvering space to provide easy access to the toilet, sink, bathtub or shower. If an accessible bathroom is not located on the main living level in a dwelling, an accessible washroom should be provided on this level. (See section 19 of the *Design Options for Barrier-Free and Adaptable Housing*, and pages 28-33 in *Housing for Persons with Disabilities*.)

#### Design Considerations

- ◆ Non-slip flooring
- ◆ Wall reinforcement for grab bars
- ◆ Water temperature regulator
- ◆ Easy-to-use faucets (e.g. lever type)
- ◆ Standard height toilet
- ◆ Mirror usable when standing or sitting
- ◆ Bathtub or shower accessible to wheelchair user: initial provisions and/or provisions for future adaptation
- ◆ Adjustable-height shower head
- ◆ Adjustable-height vanity / washbasin
- ◆ Open space under basin: initial provisions and/or provisions for future adaptation
- ◆ Colour contrasts for people with poor vision

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## 5. Living and Dining Areas

Living and dining areas should be large enough to accommodate normal furnishings and provide adequate manoeuvring space for a person using a wheelchair. If space is limited, consideration should be given to combining living room and dining areas to improve manoeuvring space. There should be no changes in floor level. Windows should permit seated occupants to enjoy views. (See *Home Technology to Support Independent Living* for features that will enhance comfort and convenience.)

### Design Considerations

- ♦ Extra electrical outlets
- ♦ Switched outlets for light control
- ♦ Pass-through from kitchen to dining area

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## 6. Bedrooms

At least one bedroom should have enough space to accommodate a double bed and normal furnishings, and provide maneuvering space for a person using a wheelchair. This bedroom should be located for direct or convenient access to the accessible bathroom described in Section 4.

### Design Considerations

- ♦ Ceiling light fixture
- ♦ Switched outlets for light control
- ♦ Telephone jack

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## 7. Storage Space

Dwellings in apartment buildings should include some in-unit general storage space. It is preferable to have storage space outside the unit for seasonal articles. Storage spaces and closets must be easily accessible.

### Design Considerations

- ♦ Light in general storage
- ♦ Electrical outlet in general storage
- ♦ Adjustable-height shelving

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## 8. Laundry Facilities

In a house with more than one level, the laundry area should be located on the main floor. If the laundry is to be initially located in the basement, provision should be made for its future relocation to the main floor by providing easily adaptable space and the necessary electrical and plumbing connections.

In apartment buildings, it is desirable to provide laundry facilities in each dwelling unit. Laundry facilities that are accessible to a person using a wheelchair must have sufficient maneuvering space in front of the appliances.

### Design Considerations

- ♦ Appropriate task lighting
- ♦ Front loading washer
- ♦ Controls easy to reach and operate
- ♦ Provision for relocating laundry facilities to main floor

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## 9. Balcony

In most apartment dwellings the balcony is the only outdoor living area that is directly available for private use. It is therefore important that it be useable by persons using wheelchairs. This requires that the balcony floor and the floor of the adjoining room be at about the same level and that any threshold be sloped and no higher than 19 mm. (3/4 in.).

To provide for maneuverability, a balcony should have a minimum clear depth of 1.4 m (5') and be at least 2.5 m (8') long. (See section 22 of *Design Options for Barrier-Free and Adaptable Housing*.)

### Design Considerations

- ♦ Threshold and clear door width
- ♦ Balcony enclosure should not unduly restrict view from seated position
- ♦ Adequate lighting
- ♦ Electrical outlet

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## 10. Doors

All doors must provide a minimum clear opening of 810 mm, which can be achieved with a swing door 865 mm wide. Exterior sliding doors must usually be at least 1800 mm wide to provide the 810 mm opening. Thresholds should be avoided where possible, but where required, should be beveled and have a maximum height of 19 mm at exterior doors, and 13 mm at interior doors. Hardware should be easy to grasp and use (e.g. lever handles, D-shaped pull



handles). Refer to pages 16 and 17 of the *Housing for Persons with Disabilities* report for more information on manoeuvring spaces at doorways.

#### **Design Considerations**

- ♦ Clear door width
  - ♦ Manoeuvring space
  - ♦ Thresholds
- ♦ Dwelling unit doors:
  - ♦ House entrance
  - ♦ Apartment entrance
  - ♦ Doors in living area
  - ♦ Balconies/Patios
- ♦ Common area doors in apartment buildings:
  - ♦ Main entrance
  - ♦ Secondary entrance
  - ♦ Corridors and vestibules
  - ♦ Communal facilities
  - ♦ In apartment buildings automatic door openers on entrance and vestibule doors

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## **11. Windows**

Windows should be located to allow occupants to enjoy outdoor views from a seated position. This requires that sills be not more than 750 mm above floor level. (See *Home Technology to Support Independent Living* for features that will enhance comfort and convenience.)

#### **Design Considerations**

- ♦ Type of windows which permit ease of use
- ♦ Opening mechanisms that are easy to grasp and operate
- ♦ Locking mechanisms that are easy to operate

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## **12. Electric Outlets and Controls**

Electrical outlets and mechanical system controls should be in easily accessible locations and reachable from both sitting and standing positions. Switches and controls should be easy to operate. (See *Home Technology to Support Independent Living*.)

#### **Design Considerations**

- ♦ Light switches
- ♦ Electric outlets
- ♦ Telephone jacks
- ♦ Cable outlets

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### 13. Heating and Air Conditioning

The ability to control the quality of indoor air in terms of temperature, humidity, movement and freshness is important for the comfort and health of the occupants. It can be particularly important for older people and people who are environmentally hypersensitive. (See *Healthy Housing, Practical Tips.*)

#### Design Considerations

- ♦ Type of heating system
- ♦ Type of air-conditioning system (if any)
- ♦ Type of ventilating system (e.g. in houses, is there an air-to-air heat exchanger?)
- ♦ Type of air filtering system
- ♦ Control of temperature by room or zone within houses and apartment buildings

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### 14. Parking and Access to Houses (Single-Detached, Semi-Detached, Row)

The ground floor entrance to a house should be barrier-free, or should be easily adaptable to be made barrier-free. A desirable arrangement would be to position the house to minimize any differences in level between the ground floor, parking and sidewalk, so that pathways have gentle slopes (not more than 1 in 20.). Where this is not possible, the siting of the house should allow for the future installation of an access ramp or lift.

Parking spaces, garages and carports should allow for a 1500 mm turning space at one side of the vehicle and preferably have clearance of 900 mm on the other three sides. There should be direct access between the garage and dwelling.

Parking spaces should be located close to the house entrance. (See section 14 of the *Design Options for Barrier-Free and Adaptable Housing* and pages 6-7 of *Housing for Persons with Disabilities.*)

#### Design Considerations

- ♦ Minimize differences in level
- ♦ Paving material used for surfaces of:
  - ♦ parking and driveways
  - ♦ sidewalks
  - ♦ paths
- ♦ Remote controlled overhead garage door opener or electrical outlet for door opener

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## **15. Public Areas and Communal Facilities in Low-Rise Apartment Buildings**

Public areas, communal facilities and equipment in low-rise apartment buildings should be accessible and usable by people with disabilities or should be easily adaptable to meet their needs.

Participants in focus group sessions identified design features they considered to be important. These are described in the *Focus Group to Examine Barrier-Free and Adaptable Housing Design* report. The *Design Options for Barrier-Free and Adaptable Housing* report describes alternate design solutions and products. (See appendix for comparison table.)

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## **16. Site Development and Parking for Multi-Unit Residential Projects**

The main entrance of a multi-unit residential building, and any secondary entrances that provide access from parking areas, should be accessible. The main entrance should be linked directly with a passenger loading area close to a main street.

There should be at least one barrier-free pathway, with a gentle slope (not more than 1 in 20) from the main street, and from any accessible parking area to an accessible entrance. Some accessible parking spaces should be provided for people with disabilities.

The *Design Options for Barrier-Free and Adaptable Housing* report describes alternative design solutions in the following sections:

1. Access to multi-family buildings
12. Exterior Pathways
13. Parking area for multi-family buildings

### **Design Considerations**

- ♦ Paving material used for surfaces of:
  - ♦ parking and driveways
  - ♦ sidewalks
  - ♦ paths
  - ♦ recreational areas

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## 17. Home Automation and Technologies

Many current and emerging technologies, including home automation, can give residents greater control over their home environment and allow them to access a wide range of services. This will allow occupants to improve their safety, security, convenience and comfort; to operate their homes more efficiently; to access in-home services such as shopping, banking, information and entertainment; and to take advantage of home-based employment opportunities.

These technologies are increasingly important to everyone, including seniors and people with disabilities, who will rely on them for independent living.

The *Home Technology to Support Independent Living* report describes many different types of technology and their benefits. It also identifies potential markets and discusses ways in which the housing industry can respond to these market opportunities.

Builders could be particularly interested in the section in Chapter 6 which describes the benefits of wiring new homes, at modest cost, to enable occupants to take full advantage of the many home automation features, now and in the future.

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## 18. Healthy Housing Features

Through the "Healthy Housing" initiative, CMHC is promoting the development of housing that responds to the following five key objectives which are described in the *Healthy Housing: Practical Tips* pamphlet included in this kit. Additional details are available from CMHC in the *Healthy Housing Fact Sheets*.

- ♦ Occupant Health
- ♦ Energy Efficiency
- ♦ Resource Efficiency
- ♦ Environmental Responsibility
- ♦ Affordability

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## Appendix

- ◆ *Focus Groups to Examine Barrier-Free and Adaptable Housing Design*

This report presents the views of 238 participants in a series of 17 focus group sessions that were held across Canada. These participants included seniors, older adults and people with disabilities. They were asked to identify features that would be important to them in barrier-free and adaptable housing, and to indicate whether these features would have a "high priority" or "lower priority." The participants also identified many "custom features" that could be provided, if required, for people with special needs.

- ◆ *Design Options for Barrier-Free and Adaptable Housing*

This report describes and illustrates ways of providing barrier-free and adaptable features that were identified by participants in the focus group studies. It includes a section that presents estimates of the incremental construction costs associated with some of these features when compared to more usual design practices. Readers will appreciate that costs do vary between projects, between different regions of Canada, and over time.

- ◆ *Home Technology to Support Independent Living*

This report describes a wide range of technologies, including home automation systems, that can help to improve the safety, security, convenience and comfort for people in their homes. These technologies can be particularly helpful to seniors and people with disabilities who want to live as independently as possible in their own homes. They can, however, benefit all segments of segments of the population, and are likely to find increasing uses in improving the indoor environment and operating efficiency of homes; in supporting home-based employment; and in providing a greater choice of entertainment.

- ◆ *Healthy Housing: Practical Tips*

This pamphlet describes the objectives of CMHC's "Healthy Housing" initiative and provides practical tips on how to meet these objectives.

- ◆ *Focus Groups to Examine Barrier-Free and Adaptable Housing Design and Design Options for Barrier-Free and Adaptable Housing*

These reports describe alternate design solutions and products. The following page indicates relevant sections in both reports.

## Comparison Table

<b>Sections in the <i>Design Options for Barrier-Free and Adaptable Housing</i></b>	<b>Sections in the <i>Focus Groups to Examine Barrier-Free and Adaptable Housing Design</i></b>
2. Vestibule and Entrance Hall	17. Public Entrance, Vestibule and Lobby
3. Public Corridors	18. Public Circulation and Stairs
5. Public Stairs	19. Elevators
4. Elevator	7. Security and Alarms
6. Fire Safety Measures	20. Exits, Refuge Areas and Emergency Alarms
7. Garbage Chute	21. Garbage Disposal
8. Community Room	22. Recreation, Pool and Other
9. Semi-Public Toilet	13. Laundry
10. Laundry Room	12. Storage
11. Communal Storage	



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