



MODULE 3

AGE-FRIENDLY BUILT ENVIRONMENT
- ARCHITECTURE

UNIT

3

RESIDENTIAL BUILDINGS
AND THEIR SURROUNDINGS

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DESIRE

DESIGN FOR ALL METHODS TO CREATE AGE-FRIENDLY HOUSING

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DESIRE will provide professionals in the building industry and home furnishings sector with the tools and skills to apply Design4All methods as an integral part of the design process, with the aim to create or adapt age friendly housing as a solution for the wellbeing, comfort and autonomy of the older adults or dependents at home.

The DESIRE training platform consists of six modules and 21 units.



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UNIT 3 – RESIDENTIAL BUILDINGS AND THEIR SURROUNDINGS

This unit is focused on the concepts, methods and principles of designing age-friendly residential buildings and their surroundings – family houses and apartment buildings, gardens, parks and pedestrian zones with multigenerational playgrounds and urban furniture. The aim is to provide accessible,

adaptable, and flexible solutions to residential buildings, as well as adjustments of the environment according to the individual needs. On-site surveys and case studies of residential spaces help to better understand and consider changes during life.

3.1 PRINCIPLES OF DESIGNING AGE-FRIENDLY RESIDENTIAL BUILDINGS

IN A NUTSHELL

One of the main priorities of an aging society must be the provision of affordable and accessible housing. The focus of “ageing in place” is to help older adults ensure that they can live where they choose and get the help they need as long as they can, so that they do not have to be placed in an institutional setting. The concept of “lifelong housing”

considers not only the aging processes, but also temporary or permanent changes in the lives of the population. For example, the Lifetime House concept provides a set of standards that would ensure that general housing is accessible to people with disabilities and is flexible to adapt to the changing needs of older people.

Living in one's own home symbolises independence and autonomy. For older adults, living in their own home is often a top priority, especially because they want to grow old close to family, friends, and neighbours. Based on the findings, older adults are not only connected to a particular home, but are also emotionally attached to their social networks, neighbourhood, and community. “We were also struck by the pragmatism of people's conceptions of ageing in place, including aspects like attachment to place. In each area, participants gave us a consistent and strong message of what a “warm” place their community is” (Janine L. Wiles and col., 2012, p. 364). When society promotes **active ageing**, the whole community benefits. In addition to the health and psychological benefits of older

adults, community members can also benefit from their wisdom and commitment. Older adults tend to volunteer more than any other age group, and supporting them, as well as staying active in their community, will help people of all ages.

DO YOU WANT TO KNOW MORE ABOUT...

To learn more about community and social networks read the Module 1 Unit 2, the chapter 2.2.7 Home, and the chapter 2.2.8. Social networks.

To find out more about an active ageing read the Module 2 Unit 3 Active ageing and physical activity promotion in older adults.

3.1.1 Ageing in Place

The negative demographic trend of an ageing population has raised social and economic concerns and is one of the important issues of social sustainability. **Ageing in place policies** support the interest of older adults to stay in their homes as long as possible for several reasons, such as:

- **Human rights** – guarantee the right of older people to adequate housing so that they can lead an independent life in a community environment, people cannot be forced to live in a certain environment (such as an institutional setting).
- **Political reasons** – the trend of an ageing population places new demands on governments, communities, and families, it is necessary to adopt policies that support age-friendly communities and independent living.
- **Economic reasons** – staying in an institutional setting is an expensive solution, people should stay in their homes as long as possible and receive home or outpatient social care

Ageing in place¹ is a term used to describe a person living in the residence of their choice, for as long as they are able, as they age. This includes being able to have any services (or other support) they might need over time as their needs change.

The focus of ageing in place is to help older adults ensure that they can live where they choose and get the help they need as long as they can, so that they do not have to be placed in an institutional setting. The goal of an elderly person wanting to age in place should be to maintain and/or improve their quality of life.

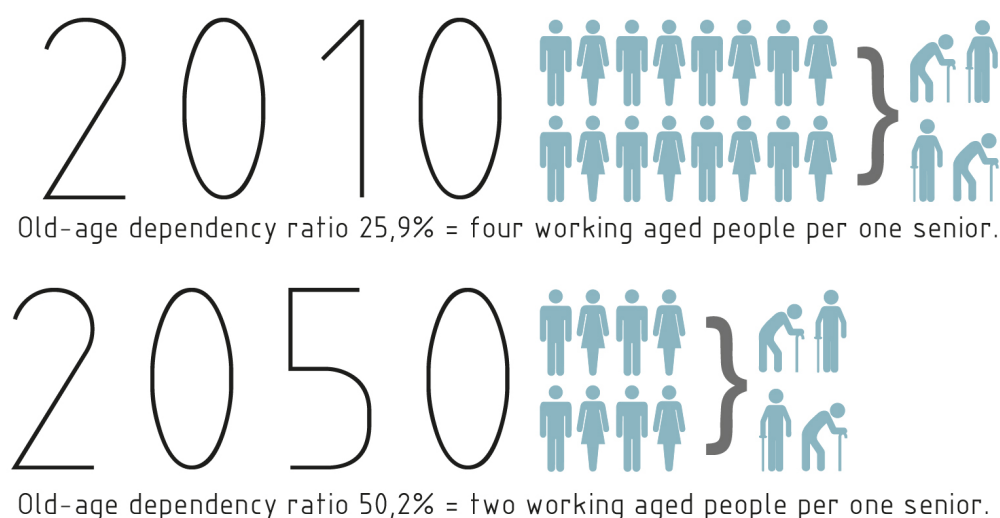


Figure 3.3.1 Ageing society (Suláková according to DAA project, 2014)

¹ Source: <https://ageinplace.com/aging-in-place-basics/what-is-aging-in-place/>

3.1.2 Independent living

The term “Independent living” can be simply expressed as the possibility of choice and control over one's life. Independent living does not mean that older adults or people with disabilities want to do everything by themselves and do not need anybody or that they want to live in isolation. Independent living should take place in a community that is familiar to them, where they are close to their family and their friends. However, the movement for independent living is more often related to fulfilling the rights of people with disabilities. A well-known fighter for an independent life is A. Ratzka (STIL, 1996), who states: Independent living means that they demand the same choices and control in their everyday lives that nondisabled brothers and sisters, neighbours, and friends take for granted. They want to grow up in their families, use the same bus as our neighbours, work in jobs that are in line with their education and abilities, and start families of their own. Like everyone else, they need to

oversee their lives. To this end, they need to support and learn from each other, organise themselves and work for political changes that lead to legal protection of their human and civil rights.

There was no comparable movement amongst older people in Europe. They are still faced with the stark choice of managing their own lives independent of the State, its service structure and its professional carers or having their lives managed for them (Oliver, M., 2001). Social welfare should design an appropriate range of community-based services that will allow older adults to live out their lives in the ways that they choose. They are currently fighting for the rights of the elderly, e.g., AGE Platform Europe: “... we need a sustained long-term vision of care for older people that supports a more positive image of ageing and affirms quality care as a social right” (AGE Platform Europe, 2022).

3.1.3 Accessible and affordable housing

One of the main priorities of an aging society must be the provision of **affordable and accessible housing**. To make the right of older people to adequate housing a reality, it is important to support changes in the legal and political environment as well. The European Union supports the right of older people to housing, as set out in the **EU Charter of Fundamental Rights** in Article 25 or the European Pillar of Social Rights, where key principles are defined, e.g., the right of “everyone” regardless of age to: access to social housing or quality housing assistance (principle 19); and access to good quality basic services (principle 20).

The UN Convention on the Rights of Persons with Disabilities provides, for example, in Article 19 for **the right to independent living and the right to adequate housing**, with people dependent on social care being able to “choose their place of residence and where and with whom they live on an equal basis with others and are not required to live in a particular living arrangement “. According to this article, the European Union supports the transition from institutional to community-based care by providing financial support. **Community living** and outpatient services take precedence over year-round living in institutions that cannot provide people with the same quality of living and living as community living.

As stated by AGE Platform Europe (2022), the **right to adequate housing** in old age has been particularly challenged during the COVID-19 pandemic: “The last two years have further highlighted the need for housing that allows

everyone to age with dignity and for supportive measures to combat social isolation. Likewise, the dire situation in nursing homes has (re)opened support for a change of approach towards the so-called ‘ageing in place’ policies”.

3.1.4 Age-friendly environments

The ageing of the population² is putting pressure not only on policy makers, financial budgets, but also on architects and designers to seek new innovative approaches to **designing age-friendly environments**, mainly residential buildings. For example, the World Health Organisation's **Global Age-Friendly Cities and Communities** project was set up to help cities prepare for rapid population

ageing and urbanisation. The program focuses on environmental, social and economic factors that affect the health and well-being of older people. The output of the project is a publication (WHO, 2007) in which experts identified eight interconnected areas that can help identify and address barriers to the well-being and participation of older people³. These areas overlap and interact with each other.

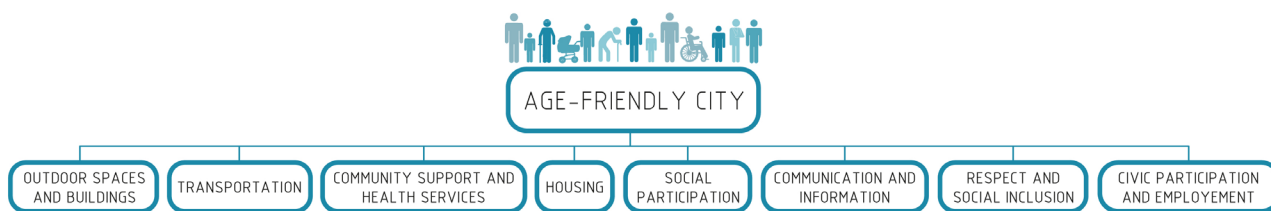


Figure 3.3.2 Age friendly city topic areas (Suláková according to WHO, 2007, p. 9)

“Housing affects the needs for community support services, while social, civic, and economic participation are partly dependent on the accessibility and safety of outdoor spaces and public buildings. Transportation and communication and information particularly interact with the other areas: without transportation or adequate means of obtaining information to allow people to meet and connect, other urban facilities and services that could support active ageing are simply inaccessible.” (WHO, 2007, p.10).

At its 2018 meeting, the Global Network for Age-Friendly Cities and Communities assessed progress and set priorities for the next period until 2030. The recommendations state: “The next decade should see cities and communities making measurable changes in building and maintaining older people's functional ability. This has important implications for whether they can keep working, whether they are able to look after themselves or will need (and get) social care, or whether they can spend time with friends and family and maintain social relationships.” (WHO, 2018, p.20).

¹ Population ageing is a long-term development that has been apparent for several decades in Europe. This process is being driven by historically low fertility rates and increasing life expectancy. Population projections suggest that the ageing of the EU's population will quicken in the coming decades, with a rapid expansion in the number and share of older people.

² A practical approach has been taken within Eurostat: Ageing Europe (2020) – looking at the lives of older people in the EU. The following terminology is employed: • older people – those aged 65 years or more; • very older adults – those aged 85 years or more.

According to a report by the Royal Institute of British Architects (RIBA) and the Center for Towns think tank, many small towns will experience the largest population growth over the next two decades, aged 55 and over; in

this context, call for changes to "high-quality, **adaptable, and age-friendly homes** and communities" (Stern D., Warren I., Forth A., 2019, p.9).

3.1.5 Adaptable homes

The adaptable house or flat is designed so that it can be used by all people and has the possibility of **further modifications if it is necessary** for the future needs of the family, the older adults or people with disabilities. This may include simply modifying the kitchen and bathroom

to improve access and independence, raising lighting levels in response to visual impairment, or introducing support devices such as railings and other security measures. Details on adaptable housing are given in the following chapter 3.2.

3.1.6 Lifetime homes

The Lifetime Homes concept was developed in the 1990s in England by experts from the Helen Hamlyn Foundation, the Habinteg Housing Association, and the Joseph Rowntree Foundation. The concept encourages architects to think about house design a little differently. Lifetime homes should be **attractive, functional, and flexible to adapt to different stages of life or lifestyle changes**. Singles or couples of young or middle age have specific needs and desires, which may differ from families with small children. Completely different demands can be placed on the households in which older adults live. Developers and interior designers are aware of this, but they often

create solutions that target only one typical type of household, anticipating that residents will move as the living situation changes. Lifetime homes offer an alternative approach to creating housing that can adapt to different stages of life and allow people to live longer in the same housing situation. Adaptable apartments must be designed according to the principles of universal design, and some parts of the housing unit can be designed to be easily adaptable to the current needs of apartment users. This approach allows people to stay home and in the neighbourhood despite lifestyle changes.

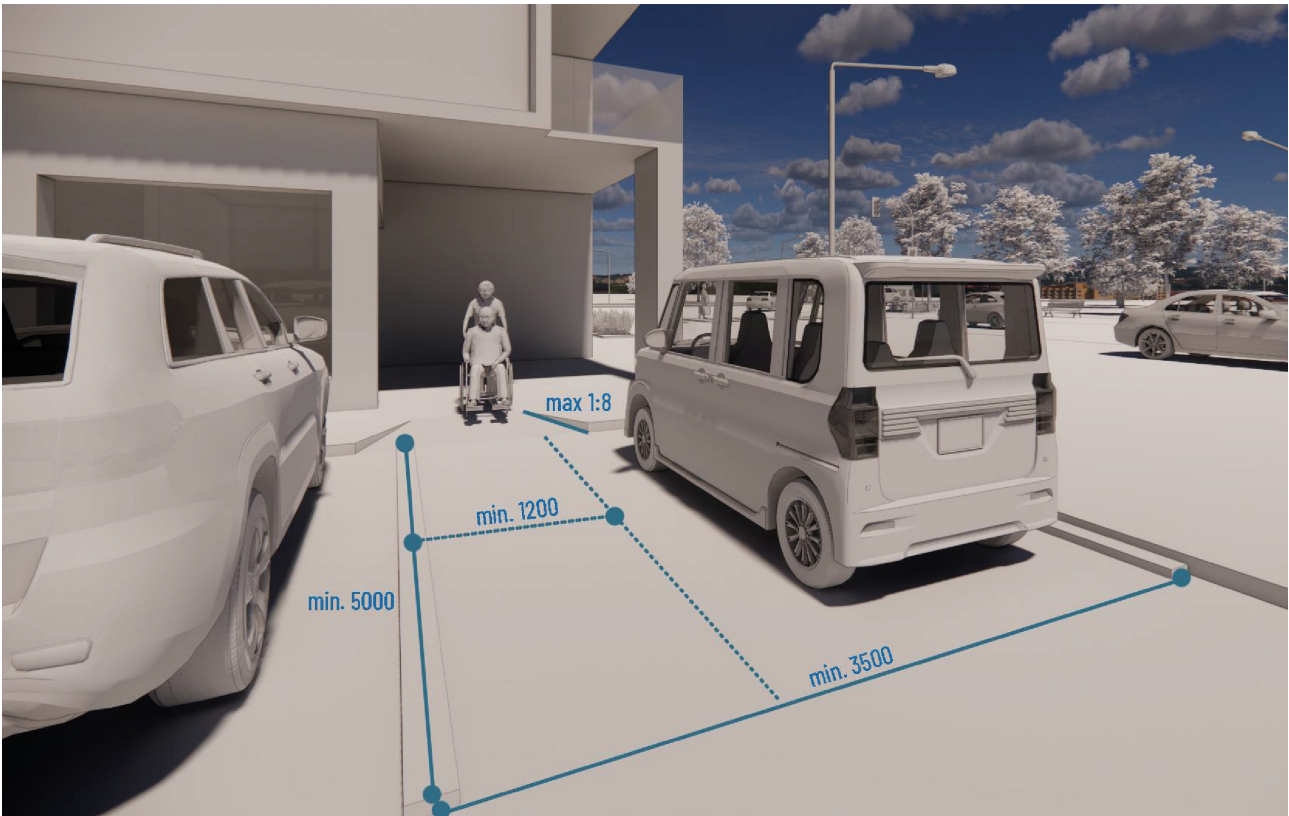


Figure 3.3.3 Accessible parking and approach to dwelling – one of the criteria of the Lifetime Homes Standards (Franko)

The aim of the Lifetime House concept was to create a set of standards that would ensure that **general housing is accessible** to people with disabilities and is flexible to adapt to the changing needs of older people. The sixteen-point criteria are published in **Lifetime Homes Standards** (2015):

1. Parking (wide or potential expansion)
2. Approach to dwelling from parking (distance, gradients and widths)
3. Approach to all entrances
4. Entrances
5. Communal stairs and lifts
6. Internal doorways and hallways
7. Circulation space
8. Entrance level living space
9. Potential for entrance level bed space
10. Entrance level WC and shower drainage
11. WC and bathroom walls
12. Stairs and potential through-floor lift in dwellings
13. Potential for fitting of hoists and bedroom/bathroom relationship
14. Bathrooms
15. Glazing and window handle
16. Location of service controls

These criteria have also been significantly affected by the **accessibility requirements for homes**, which were later set by the UK government and are now used in building regulations. Accessible houses as they fall into 3 categories ⁴:

- Level 1: **Visitable housing** – The home includes basic accessibility of architectural features on the ground floor and is “visitable” for all guests. It has a no-step entry and entertainment area, wider hallways, and accessible bathroom. It has levered door handles and faucets.
- Level 2: **Accessible and adaptable housing** – The ground floor of the home is fully accessible including all Level 1 features plus an accessible bedroom and kitchen, parking area and entrance. It also has additional features such as a raised toilet and appliances and grab bars in the bathroom.
- Level 3: **Wheelchair usable housing** which there are two standards: adaptable and accessible. Wheelchair user adaptable dwellings are to be constructed to be adjustable for occupation by person in a wheelchair, whereas accessible dwellings should be constructed for immediate occupation.

⁴ From October 2015 on, changes to national planning policy England meant that planning authorities in England could no longer apply many of the previous technical requirements, among them accessible housing. A single space standard was drawn up, the Nationally Described Space Standard (NDSS), which planning authorities could adopt as a requirement in their local plan if they chose to – it therefore was not compulsory. Secondly, three levels of accessibility were defined in Approved Document M volume 1

3.1.7 Homes4Life

The Homes4Life project was funded by EU funds in the years 2018 – 2021. The project was run by a multidisciplinary group of nine partners from five EU countries under the coordination of TECNALIA (Spain). The aim of the project was to find solutions that will allow one **to adapt an unsuitable housing stock to the needs of older adults** to allow them to age on the spot. One of the outcomes of the project was a new European certification

scheme, which is based on an inspiring and realistic long-term vision of people's needs and requirements in a holistic approach to life and helps develop better living environments that integrate construction and digital solutions where this is beneficial. As part of the project, the Homes4Life Certification Scheme was tested in 11 pilot buildings in Europe, both in the design and operational phases.

3.2 ACCESSIBLE, SAFE, FLEXIBLE, AND ADAPTABLE DESIGN OF RESIDENTIAL BUILDINGS

IN A NUTSHELL

Accessible and adaptable apartments will significantly increase user quality in the long term, as it is likely that the demands and abilities of different users will change over the lifetime of the building. The basic precondition for a residential or family house to be truly suitable for all must be designed by the method of universal design, while the layout and construction solution of adaptable

residential units must be designed to allow additional necessary modifications in a short time, at low cost, without changes to the supporting structure, installations, technology, or insulation. Housing designed in this way provides a great advantage to apartment users, as the required modifications and changes can be made with relatively little effort and low financial burden.

Old age is often associated with limited mobility and orientation, while with deteriorating health, the time spent at home gradually increases and the demands on the functionality and accessibility of the apartment space increase proportionally. The demands of younger and active people who leave their homes in the morning and return in the evening undoubtedly have different housing needs than older people who spend most of their time at home. People often do not realise this fact when acquiring real estate. With old age, physical and cognitive abilities deteriorate, and people need to adapt to their needs, which is often impossible in their own housing, or associated with great effort, long periods of time, or high building costs.

How should an age-friendly house be designed? The house or apartment should be designed to accommodate residents of different ages and abilities. It must be functional, secure, accessible, and can be adaptable and further customised to the needs of residents. To be able to meet all the above attributes, a house or apartment must be **designed according to the principles of universal design**. In addition to the quality of the house design, thermal comfort, indoor air quality, acoustic and visual comfort, sufficient daylight, natural ventilation,

and the use of materials for health and safety are considered when evaluating the quality of housing. If the construction of a new house or apartment is considered, it is appropriate to support the construction of **accessible adaptable housing**.

Older people have different preferences and choose their housing from several options, each of which has its pros and cons:

a) Housing in own home

Older people are interested in staying in their home environment for as long as possible, preferring contacts with their family and friends.

- Advantages: stability and security, emotional attachment to the environment, proximity to family, friends, and neighbours, familiar local surroundings such as public spaces, stores, services, etc. Houses owned are generally in better condition than rented accommodation.
- Challenges: residential buildings are often full of barriers and are not designed for home care needs, may need to invest in removing barriers, risk of significant financial burden if on fixed or limited income.

b) Living in a rented apartment

Rental apartment can be in public or private ownership, operation, or administration and is an acceptable solution for many older people. Rental housing is generally of lower quality and more precarious. Leases, although varying from country to country, do not provide tenants with the same security that homeowners provide to the landlord.

- Advantages: the possibility to choose an apartment according to your needs, the possibility to exchange an apartment, if necessary, exemption from many financial and physical obligations associated with owning a house.
- Challenges: less independence for tenants, restrictions on pet ownership, and the need to rely on landlords to make the necessary repairs and adjustments. Landlords can terminate their tenants' leases before residents want to move. Appropriate, accessible, or affordable rental units may not be available in some communities.

c) Life in community housing

Community housing, called supported housing, is used by adults and the elderly who need social care. They can be remodelled apartment complexes or remodelled houses. They can include an apartment-style living room or dormitory. The reasons why people seek this type of service can be different, for example if they need more personal care than they receive at home but do not need the constant care they would receive in an institutional setting. However, group housing does not offer the level of health care provided in retirement homes. It is very important to determine if a particular type of group housing is the right one for an individual. Information is provided by social counselling services.

- Advantages: a life filled with planned activities that they share with others in their age range, they can make new friends, if they are lonely, it is a safe environment with a wide range of social services according to individual needs.

- Challenges: Group settings can partially restrict privacy. Residents who need more care or supervision may need additional services or move to another more suitable facility.

3.2.1 Accessible Environment

Accessibility of the environment, products, and services is one of the conditions for the fulfilment of the rights of persons with disabilities, as enshrined in Article 9 Accessibility in the Convention on the Rights of Persons with Disabilities (adopted in 2006). Accessibility is the ability of people to move around an area and reach places and facilities, including older and disabled people, those with young children, and those carrying luggage or shopping. Accessibility will also improve the quality of the building in terms of operation if it is necessary to supply individual operating units.

Accessibility is essential for all public buildings, but it is not yet a matter of course for residential buildings. The construction of **accessible apartment buildings** often depends on the attitude of local politicians. Many cities have adopted zoning regulations that require the construction of accessible or adaptable housing. There are differences between countries, most of them require the implementation of only accessible common areas of apartment buildings (entrance, corridors, vertical interconnection of floors, etc.), but these requirements often do not apply to apartments. However, due to demographic changes, many cities have already adopted territorial regulations that require the construction of accessible or adaptable housing.



Figure 3.3.4 Universal design solutions for bedroom (Franko)

3.2.2 Visitable residential environment

Visitability is a global trend that corresponds to the quality of housing for different user groups. Visitability is the lowest level of accessibility. The term refers to owner-occupied or rented housing designed so that people who have difficulty walking or who use wheelchairs or walkers can live or visit it.

A house is visitable if it meets the following three basic requirements:

- Main entrance without stairs.
- Doors at least 800 mm wide (entrance doors at least 900 mm wide).
- Accessible bathroom on the main floor, which can be reached by a resident or visitor in a wheelchair.

Visitable housing is a suitable solution for all people, because it allows better use of the apartment, for example, if the resident has temporarily impaired mobility due to injury or illness, or if he needs to transfer something (parent with stroller, shopping, luggage, furniture, etc.). The biggest advantage is just the visitability, which means that the users of the apartment can be visited by anyone without significant restrictions, such as a grandmother who uses a walker or a wheelchair.

3.2.3 Adaptable housing

An adaptable house/apartment can be easily adapted and modified without costly and complex construction modifications according to the current needs of residents. The first models of adaptable housing began to take shape after the Second World War, when the ideas of structuralism, which is characterised by the search for social and functional connections in architecture and urbanism, began to come to the fore. Buildings implemented in the spirit of this stream are often characterised by adaptable and incremental modules. Architect N. John Habraken first developed the concept of adaptable housing in 1962, which consisted in the ideological separation of the building structure from the spatial solution, while in the design process the apartment space is completed in cooperation with future users. For example, H. Hertzberger's project: Diagoon housing in Delft from 1967–1970 is well known, where modifiability consisted

of variable assembly of modules using removable partitions, while each user could decide where the kitchen and living room would be located, or what the number of bedrooms should be, while the layout can be further changed according to the user's needs. Later, this concept was developed both in terms of the philosophy of "open building"⁵ (also called agile architecture) and "visitable housing", developed by Selwyn Goldsmith. Their understanding of the concept of adaptable housing is based on the knowledge that many of us will have limited abilities (physical, sensory, mental) in childhood, during illness, due to an accident, or in old age. These housing models have not gone unanswered and are now often reflected in practice. Adaptable apartments are available in many countries around the world, such as Scandinavia, the Netherlands, the United Kingdom, Austria, Australia, or the United States.

⁵ Note: The essence of the Open Building philosophy is space flexibility, while the function remains the same. However, it takes into account the change of owners or residents of the premises and their different requirements. Adaptable use of all types of buildings is preferred. In housing construction, it refers to apartments that are flexible enough to meet future specific residents requirements. This concept is often applied in the Netherlands and Japan.



Figure 3.3.5 Diagoon housing in Delft from 1967–1970 was one of the first adaptable apartment buildings (arch. Herman Hertzberger, <https://www.dezeen.com/2011/12/06/key-projects-by-herman-hertzberger/>)

The philosophy of adjustable housing is based on expected changes during the life of apartment users, respectively. family homes. These are not only possible adjustments in line with the changing needs of seniors or people with disabilities, but also the need for adaptability of the premises in terms of expected changes in family life in terms of the number of household members or the creation of adequate caregivers for elderly parents. The argument of "visitability" is also not negligible, where the opportunity to visit family or friends is also provided to those people who have various permanent or temporary mobility disorders, sensory or mental disabilities. The basic precondition for a residential or family house to be truly suitable for all must be designed by the method of universal design, while the layout and construction solution of adaptable residential units must be designed to allow additional necessary modifications in a short time, at low cost, without changes to the supporting structure, installations, technology, or insulation. Housing designed in this way provides a great advantage to apartment users, as the required modifications and changes can be made with relatively little effort and low financial burden.

Basic requirements for a universally designed residential building:

- entrance to the building at ground level (no height differences)
- wider door (entrance door at least 900 mm, other doors at least 800 mm)
- manoeuvring space (Ø 1500 mm) in the entrance areas, in the bathroom, in the kitchen, in the bedroom, in the living room
- ergonomic opening mechanisms (on doors, windows)
- controls (switches, windows, etc.) located at a lower height – within reach of the seated person
- easy control of appliances and easy handling of the device
- security system for the occupants of the house (protection against burglary or fire)
- colour contrasting interior design (doors and walls, stairs and walls, etc.).

The greatest demands are placed on a **good bathroom design** so that it can be easily adapted to the needs of the household. An integral part of the hygienic areas (bathrooms and toilets) is the floor drain, so that it is possible to shower next to the bathtub or toilet, which is used by the family in unpredictable situations, for example after an accident or post-operative situation, when it is impossible for many to enter or leave the bathtub. The drain is at the same time a preparation for the additional implementation of a roll in shower.

Similarly, an adaptable house might be designed to easily enable a reduction in size over time through the division of a large family home into two smaller housing units, offering residents the opportunity to continue living within a familiar environment.

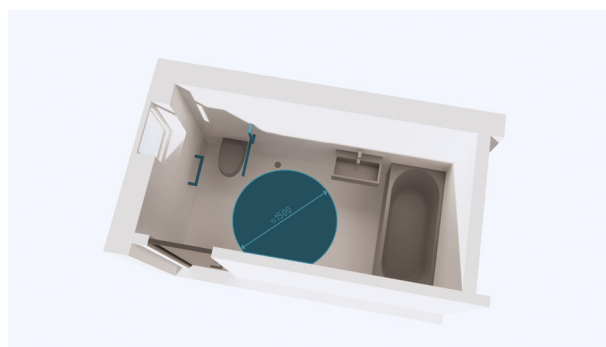
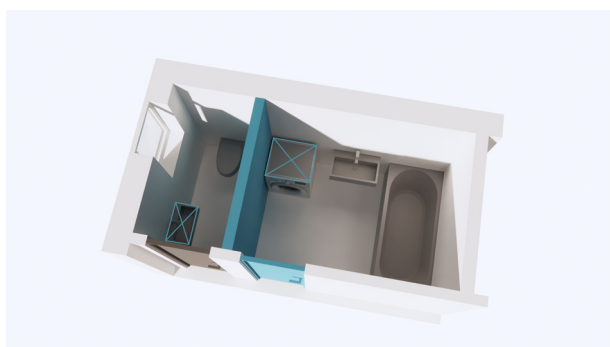
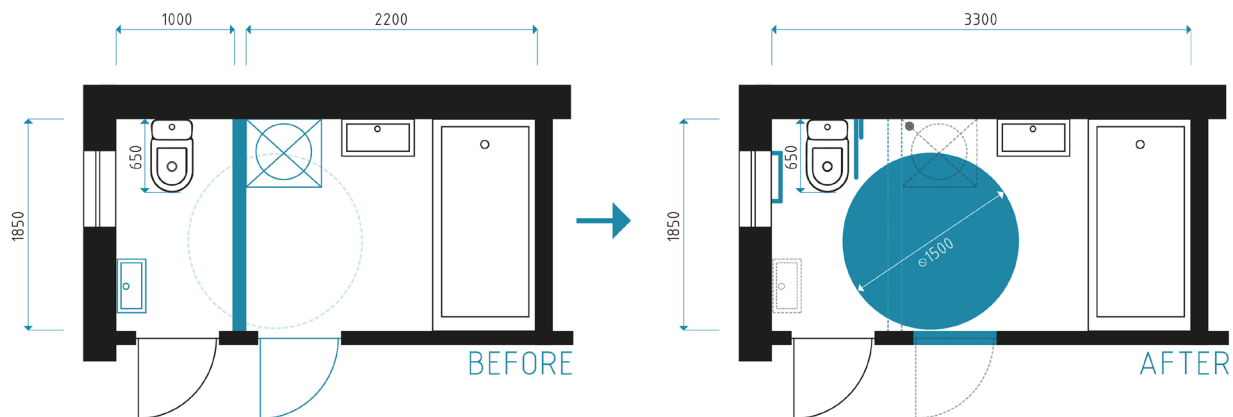


Figure 3.3.6 a, b, c, d Accessible bathroom is achieved by removing the wall between the bathroom and the toilet. No plumbing and pipe fittings can be installed on the removable wall. The bathroom floor must be sloping into the floor drain (Rollová, Suláková)

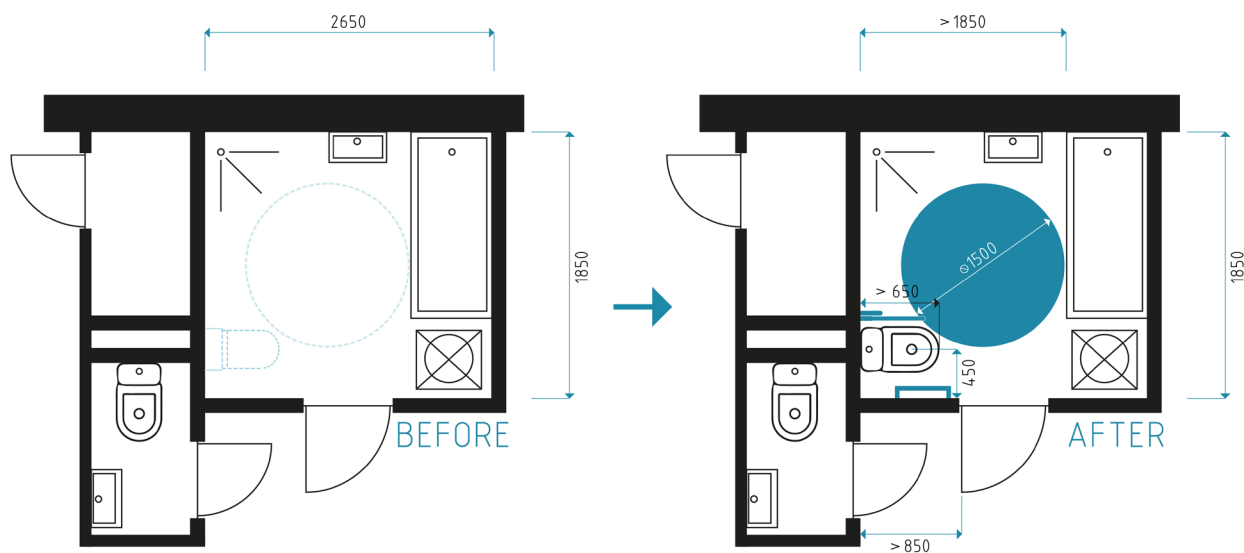


Figure 3.3.7 a, b Location of the installation core allows the additional implementation of another toilet in the bathroom to create an accessible bathroom (Rollová, Suláková)

3.2.4 Summary of requirements for adaptable housing

Fixed accessible features

- wide doors, passages
- accessible routes/corridors (wide enough, without height differences)
- manoeuvring space (dimensioned for turning the wheelchair)
- controls/opening windows within reach of a person in a wheelchair/lower height.
- visual and audible alarms
- foot storage area (washbasin, kitchen sink, hob, table...)
- roll-in shower
- load-bearing walls with the possibility of additional installation of handles (according to the specific needs of the resident)
- accessible balcony or terrace through a low-threshold balcony door

Adjustable Features

- removable wall, which is realised by dry assembly (for example, plasterboard)
- adjustable height of table, kitchen worktop, washbasin, etc.
- adjustable height of storage spaces (upper kitchen cabinets, wardrobe...)

Optional Removable or Added Features

- mobile container storage systems under the kitchen worktop, under the bathroom sink, etc.
- handles that can be added/installed as needed
- folding/additional seat in the shower.

"Smart House"

- uses systems of computer and electronic control and management of technical equipment of the house (heating, lighting, etc.)
- provides a sensor system for motion control, vital signs monitoring and a safe bed (eg falling out of bed)
- provides a security system for the occupants of the house (protection against burglary or fire)
- enables greater independence and autonomy for people with disabilities

3.3 AGE-FRIENDLY RESIDENTIAL SURROUNDINGS

IN A NUTSHELL

Residential surroundings should ensure **accessible, safe and comfortable** movement and usability of the spaces as much as possible for all persons, including people with limited mobility and orientation. Therefore, it is very important not only to create accessible routes and public spaces, but also to design a

comprehensive and logical guidance and way-finding system, especially for people with visual or cognitive impairments. Moreover, it is necessary to provide activities for all age groups of people in residential surroundings, e.g. multigenerational parks.

3.3.1 Basic principles

Age-friendly and inclusive residential surroundings should be created in accordance with the Design for All/Universal Design methods; it is necessary to focus on the following **basic principles**:

- **accessibility and equal usability** of the environment – to allow all people to access, move and use the environment in an equal way (e.g. not to create separate routes and entrances);
- **flexibility and adaptability** of the environment – to provide various activities for wide range of users of different ages, with different abilities and limitations;
- **perceptibility** of the environment and **easy orientation in space** also for people with sensory impairments or people with limited cognitive and mental abilities;
- **accessibility and availability of information** and activities in a multisensory form using a combination of at least two modes of sensory perception (for example, visual and tactile, or visual and auditory perception);
- **safety** in the environment – to ensure the identification of areas, elements and objects that could pose a risk, especially for persons with visual impairments;
- **low physical effort and comfort** in using the environment and its elements for diverse groups of people;
- **sufficient space for movement and manoeuvring** in the environment and in the use of its individual elements, including suitable range distances for users of different heights as well as people in wheelchair;
- **self-realisation and active participation** in a community life – to provide an equal opportunity for the participation of all persons in activities in public spaces.

3.3.2 Pedestrian routes and system of wayfinding

Dimensioning the width of pedestrian routes depends on the frequency of use (often set out in national legislation); however, the main routes should be at least 1,500 mm wide for passing people in a wheelchair or the pedestrians along each other smoothly. If the pavements are made of cobblestones, wood or stone, the joints between the pieces must not exceed 10 mm. Pavements made of crushed materials are harder to maintain and are often difficult to be used by parents with baby-carriages, people in a wheelchair, or with other walking aids.

Pedestrian routes and public spaces must provide a **system of wayfinding elements** for people with visual impairments. The basic elements are:

- **natural or artificial guiding lines**, which help to keep the direction of a person moving by the white cane technique;
- **warning and signal tactile lines**, which help people moving by the white cane technique to identify the area and any obstacles.

Guiding lines help to maintain the direction of walking when using the white cane technique, while it is important to use mainly **natural guiding lines**, which can take the form of:

- **the contact line** (interface) of the pavement surface with the wall of the house, fence, or other fixed element (for example, raised flower beds);
- **park curb** at the interface with the lawn (however, it must not be a curb directly at the road, as it is necessary to maintain a safety distance of at least 500 mm from the road);
- interface of two significantly **tactilely different surface** treatment structures, for example different types of paving.

There must be no obstacles in the guiding lines that could endanger the safety of people with visual impairments when moving on the pedestrian route.



Figure 3.3.8 a, b, c Natural guiding lines created by flower beds and park curbs (Stockholm and Athens, Čerešňová)

Artificial guiding lines are only proposed on pedestrian routes where no natural guiding lines are available and where the transition distance between natural guiding lines is greater than 8 metres, for example on paved squares or pedestrian zones.

Artificial guiding lines can be created in the form of:

- a strip of **tactile paving** with a surface structure of longitudinal character (e.g. grooved profile) with a total width of 400 mm;
- a **strip of elements** (metal or plastic) mounted directly on the paving or walking surface – the so-called **tactile indicators** of longitudinal shape, which should have a total width of 400 mm.

When solving **artificial guiding lines**, it is necessary to consider these requirements:

- the line should be straight, turning and changing its direction is allowed at a 90° angle (arcs are unsatisfactory);
- paving with a smooth surface with a length of 400 mm must be placed at the intersection or branch of the artificial guiding line;
- no obstacles must be placed in the 800 – 1,000 mm wide strip on either side of the axis of the artificial guiding line;
- artificial guiding lines must always follow the system of natural guiding lines and other landmarks to create a comprehensive navigation system.

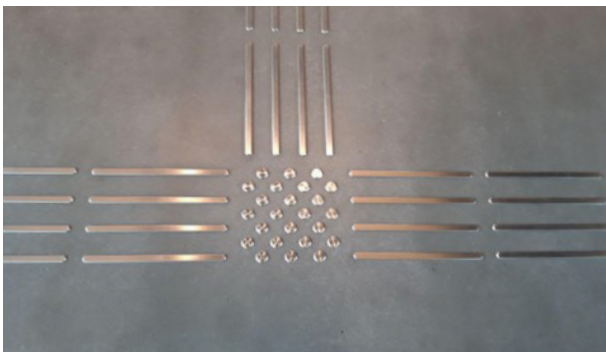


Figure 3.3.9 a, b Artificial guiding lines – metal tactile indicators (Dessau, Germany and Poprad, Slovakia, Čerešňová)



Figure 3.3.10 a, b Artificial guiding lines – tactile tiles with drainage (Stockholm and Copenhagen)

From the point of view of **user safety**, it is necessary to pay attention to regular maintenance of the pedestrian zone in order to avoid injury or slipping of pedestrians. For example, growing greenery must not interfere with the routes, and the appropriate head clearance (minimum 2,200 mm) under the trees must be maintained on the routes. The root system must not interfere with pavement

surfaces and create obstacles for movement. As for safety of pedestrian routes and public spaces, emphasis is placed on the correct use of surface materials, as well as on lighting and perception of users with visual impairment, but also on the design of fixed elements such as benches, waste bins, way-finding signage and maps, and so on.

3.3.3 Overcoming height differences

When creating pedestrian routes and public spaces in residential areas, it is necessary to consider the configuration of the terrain. When there is a slope terrain, the pavements should preferably be situated in the direction of the terrain contour lines so that they do not have a steep inclination. The routes with a slope greater than 1:20 should be designed as ramps, which are interrupted by horizontal landing and equipped with handles on both sides.

When solving the exterior ramp, it is necessary to comply with these requirements:

- the arms of the ramp must have a straight shape with a length of at most 9,000 mm, then a horizontal landing at least 2,000 mm long must be inserted (in the case of perpendicular connection of the arms, the landing can be 1,500 × 1,500 mm);
- the ramp arms must have a sufficient clear width of at least 1,300 mm (optimally 1,500 mm), as well as sufficient manoeuvring space at the beginning and end of the ramp arm (1,500 × 1,500 mm);
- the handles must be placed on both sides of the ramp arm – at a height of 900 mm and a second handle at a height of 750 mm is also recommended;
- the ramp arms should have a raised edge up to a height of 100 mm and a guide bar at a height of 300 mm (this is not necessary for full railings);

- beginning and end of the ramp must be clearly recognizable in colour and surface finish from the surroundings, for example by tactile paving;
- ramps must have a non-slip surface and a solution (e.g. tempering or roofing) in order to be usable even in winter.

The longitudinal slope of the ramp is designed depending on the height difference to be overcome (according to the standard EN 17210):

- not more than 1:12 (8.3 %) with a height difference of up to 210 mm;
- maximum 1:15 (6.7 %) with a height difference of up to 300 mm (2 steps);
- maximum 1:17 (5.9 %) with a height difference of up to 500 mm (3 steps);
- optimal 1:20 (5.0 %), especially with a height difference above 500 mm (4 or more steps);
- maximum 1:8 (12.5 %) in rare cases, for example when overcoming the curb height (approx. 75 mm);
- the slope of the ramp must be the same on all arms of the ramp.

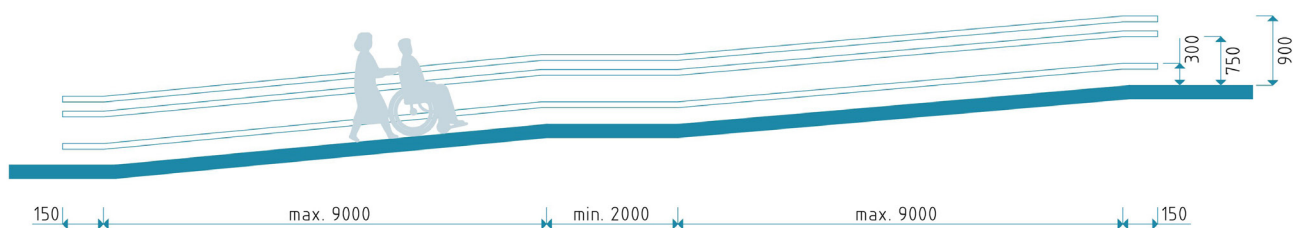


Figure 3.3.11 Dimensions of the ramp with handles (Čerešňová, Suláková)



Figure 3.3.12 a, b Ramps situated next to the stairs (Vienna and Stockholm, Čerešňová)

For height differences of more than 2,000 mm, it is recommended to use an **exterior lift**, which must meet these requirements:

- free manoeuvring area at least 1,500 × 1,500 mm before entering the lift;
- lift cabin dimensions at least 1,100 × 1,400 mm (optimally 1,400 × 1,600 mm);
- automatic door opening at least 900 mm wide (according to EN 17210);
- location of control panels in the height range 800 – 1,200 mm, with tactile description next to the buttons (description in Braille on the left and tactile symbols/numbers on the right);
- providing an acoustic signal upon arrival of the lift cabin;
- handles in the lift cabin at a height of 750 mm and 900 mm;
- folding seat in the lift cabin.

Ramps and lifts can create interesting spatial divisions of the outdoor environment, thus enriching its aesthetics and comfort. Ramps and lifts are usually combined with stairs.

Stairs that are part of walking routes must have:

- straight shape of the stair arm and suitable shape of the stair step (continuous shape without gaps and protruding edge of the step);
- placement of handles on both sides of the stair arm at a height of 900 mm (a second handle at a height of 750 mm suitable for children is also recommended);
- differentiation of colour and surface treatment of the first and last staircase step from the surroundings.

From the point of view of the safety of persons (especially with visual impairment), an area less than 2,200 mm below a staircase or ramp must be clearly marked (or enclosed) so that it can be identified by white cane technique, such as furniture elements (e.g. flower beds) or other elements, which would prevent entry into such an area.

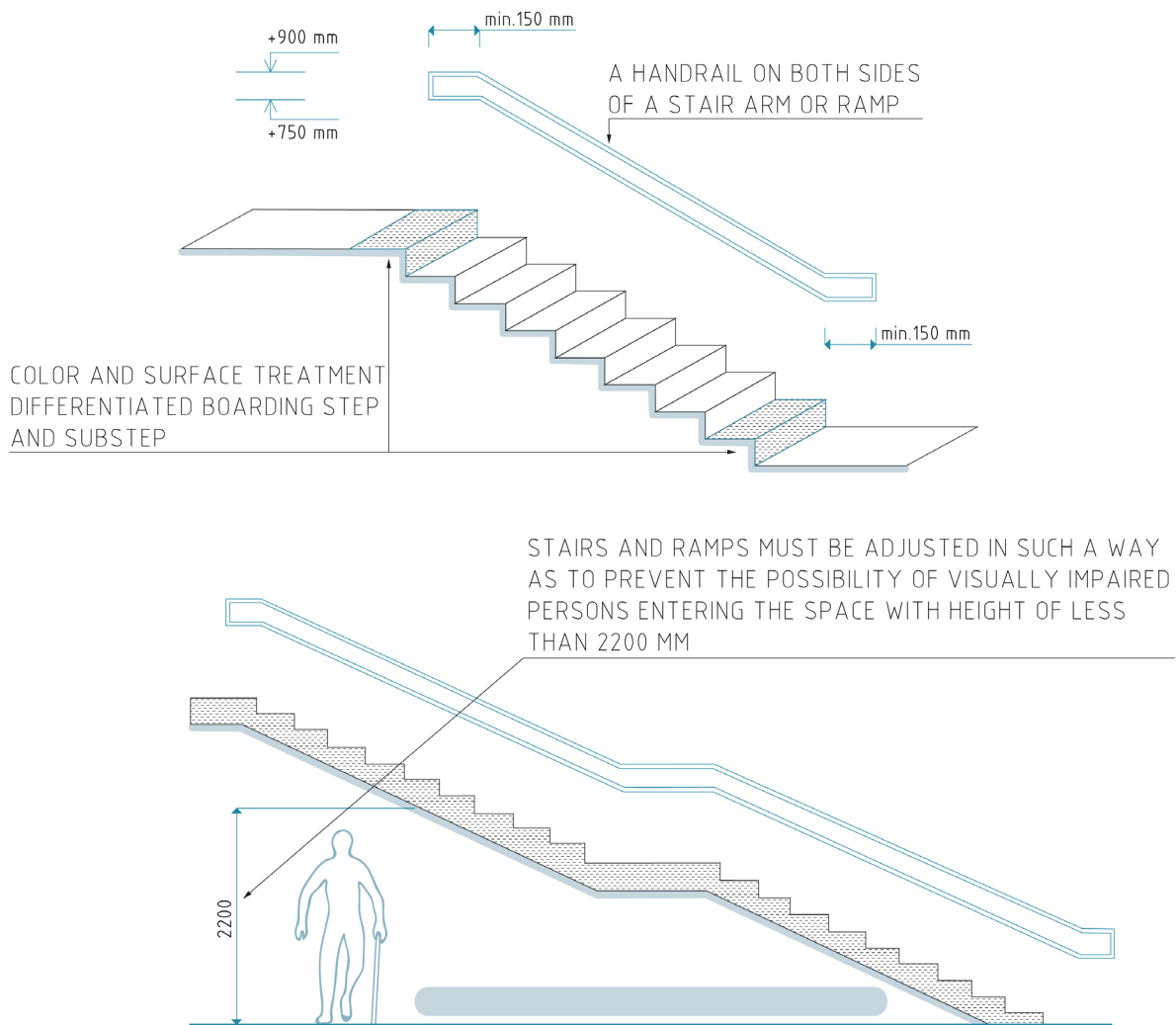


Figure 3.3.13 Stairs and safety (Čerešňová, Suláková)

Underpasses and overpasses that serve to overcome great height differences (even at level crossings for pedestrians or on platforms) must be accessible. When solving the overcoming of height differences, it is suitable to combine several accessible methods, e.g. **combination of a ramp with a lift** or a vertical lifting platform. The ramp reaches a very long length when overcoming significant height differences, which is more difficult for many people in a wheelchair to overcome. However, it is not appropriate to design only one lift, as it may be a barrier at given times due to failure (or vandalism).

3.3.4 Urban furniture and greenery

Urban furniture is an integral part of the outdoor environment. The furniture elements are not only used for relaxation, but they could also be a meeting place for inhabitants. When creating these elements, it is always necessary to consider the diversity of people and their different demands, so it is recommended to offer various furniture elements, which allow the possibility of choice according to individual needs and abilities. For example, **combinations of seating elements** (with backrest, with armrests, etc.) or tables are suitable.

Benches should have different seat heights; some benches with a 450 mm seat height should have armrests to facilitate sitting down and standing up. Near the benches, there should be a clear **space area for person in a wheelchair or a baby-carriage** which should be situated outside the clear circulation width of the walkway, so it is recommended to **create**

nooks. These nooks should be no longer than 8 metres in length, which is the maximum length to maintain the direction of movement of a person with white cane in the case of an interruption of a natural guiding line (e.g. a park curb on a sidewalk).

People with hearing impairment need to have visual contact with discussing persons, so it is advisable if the bench arrangement is opposite to each other or at a 90° angle orientation, eventually in arches or circles.

Seating should be located, so that people can rest or put things down without tiring, for example, the European standard requires the placement of accessible seats at intervals of no more than 50 m, while in the Slovak legislation a rest area must be located at intervals no longer than 200 m.

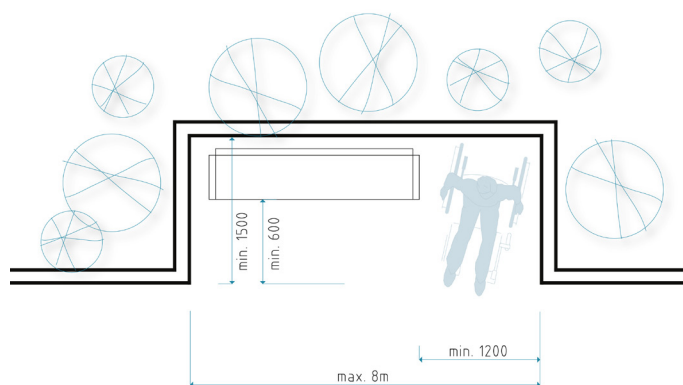


Figure 3.3.14 a, b Benches situated in nook with clear space for person in a wheelchair or a baby-carriage (Čerešňová, Suláková)

The **refreshment tables** in a standing position must be supplemented with a table at a standard height which can be used in the seated position, including persons in a wheelchair.

Waste bins must be located within reach of people in wheelchairs or people of smaller stature; the height of the opening should be approximately 800 mm from the ground. The waste bin must be identifiable by the white cane technique at the level of the walking area.



Within the recreation areas on pedestrian routes and in parks, it is appropriate to solve some **flowerbeds** at a height of 350 mm to 650 mm above the level of the sidewalk, which allows a person in a wheelchair to have direct contact with the planting. There may be a **seating area** on the border of the flowerbeds. For people with visual impairment, it is advisable to place **tactile labels** with the name of plants in flower beds.



Figure 3.3.15 a, b Flower beds with seating area and tactile labels (Brno, Czechia, Čerešňová)

If summer **terraces or podiums** are in elevated position or elevated terrain, access must also be provided by a suitable ramp.

For persons with visual impairment, it is important that the **elements of urban furniture are well perceptible**, that is, contrastingly colour-differentiated from the surrounding environment and identifiable by the white cane technique. All public areas and furniture elements must be designed to consider the diversity of users and their various demands.

People perceive the surrounding environment through **multiple sensory perceptions**: eyesight, touch, smell and sound. Based on a combination of these sensory modes, the environment can be modified by different colours, textures, sounds or scents that can contribute to the wayfinding. Greenery and water elements can improve regeneration of the human body or reduce stress. Trees and shrubs planted along busy roads reduce noise and filter smog. It is also important to choose and select appropriate trees and plant species. Plants having the risk of injury should not be placed immediately adjacent to the pavements and areas for rest and recreation.

3.3.5 Multigenerational parks

The attractive parks for all generations provide activities for different age groups of people. The park must meet not only the requirements of **accessibility, but also functionality and safety** according to the standards for the equipment and surface of playgrounds.

It is necessary to place as much play equipment as possible, accessible to children in wheelchairs from the ground level, such as interactive panels, play counters and tables, drawing stands and whiteboards. **Interactive panels, stands and drawing boards** must be placed within reach of children in a wheelchair at a height range of 500 – 950 mm from floor level.

Some parts of the **sandpit** should be designed in the form of **sand play tables** to create space for insertion of children in wheelchairs. The height of the upper edge of the table can be a maximum of 785 mm from the floor level. Access with a wheelchair can also be solved from the side – the so-called parallel access, but this solution is not optimal.

Universally designed play equipment allows all children to play together, regardless of their physical capabilities, examples of which are carousels and swings designed for inclusion of children in wheelchairs. Swing chairs with a fixed backrest, seat belts and a fixed (non-chain) attachment are also recommended.



Figure 3.3.17 Play equipment with interactive panels by HAGS Sweden (Stockholm, Čerešňová)



Figure 3.3.16 Accessible sand play table (Oslo, Čerešňová)



Figure 3.3.18 a, b Accessible elevated play equipment with ramp in Sundsvall, Sweden and accessible carousel in Ljubljana, Slovenia (Čerešňová)

Elevated play equipment can be accessed for children in wheelchairs by:

- **the ramps** with a width of minimum 900 mm and a slope of max. 1:12, with handles on both sides,
- the **transfer system**, which includes a transfer platform and transfer steps used to independently move the child in a sitting position without a wheelchair (with the help of a parent or peers).



The active parks for all generations should consist of these main areas:

- **playground** (equipment mainly for children),
- **workout area** (equipment for fitness, sport activities, etc.)
- **multifunctional playground** (various sport activities),
- **relaxation area** (quiet zone with seating).

The **playground surface** should be very flexible and durable (e.g. rubber EPDM floor). The floor has a primarily safety character, it has a damping function in the event of a fall. At the same time, it forms another functional space for playing and exercising.

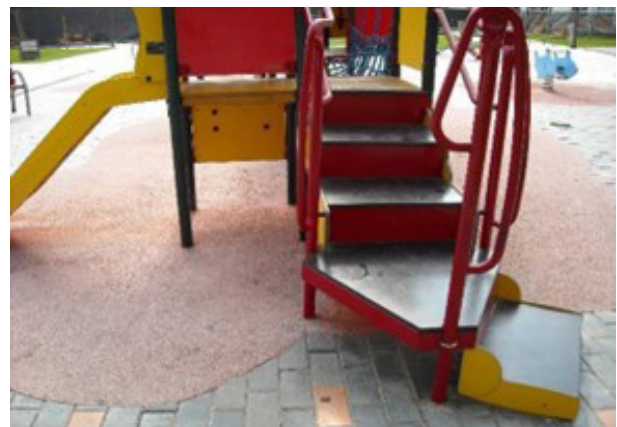


Figure 3.3.19 a, b Accessible elevated play equipment with transfer system – transfer steps and platform by HAGS, Sweden (Čerešňová)

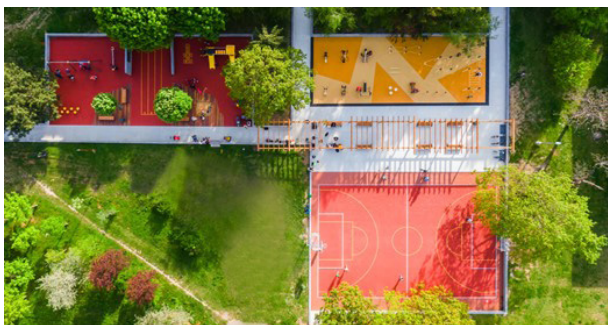


Figure 3.3.20 Active park for all generations in Pezinok, Slovakia (source: Octago)



Figure 3.3.21 Workout area in Active park for all generations in Pezinok, Slovakia (source: Pezinok)

3.3.6 Parking spaces

Near the entrance to the building/complex, it is necessary to reserve an accessible parking space for people with severe disabilities, which has dimensions of 3,500 × 5,000 mm (with transverse parking layout) and ensure a

smooth transition from the parking lot to the sidewalk without steps or with a small ramp. For longitudinal parking, the parking space has minimum dimensions of 3,500 × 6,000 mm (width × length).

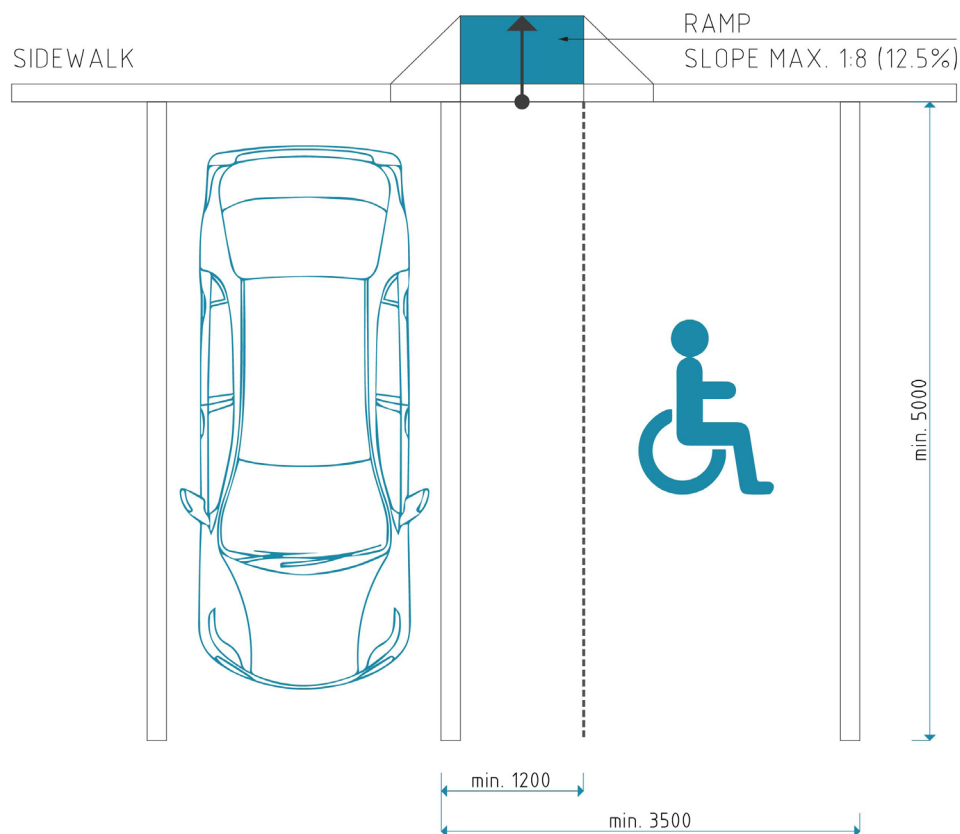


Figure 3.3.22 Parking space dimensions in transverse parking layout (Čerešňová, Suláková)

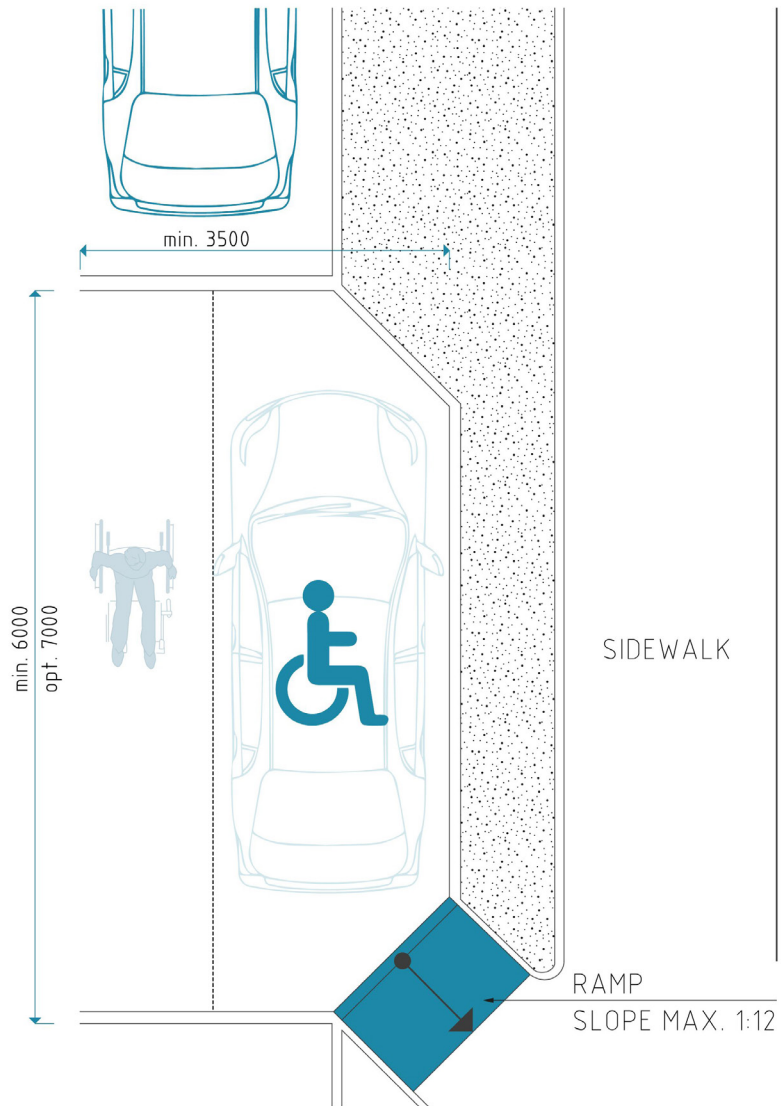


Figure 3.3.23 Parking space dimensions in longitudinal parking layout (Čerešňová, Suláková)

3.4 ON-SITE SURVEYS OF EXISTING LIVING SPACES

IN A NUTSHELL

Carrying out an on-site survey of the built environment is now common practice in a professional construction industry. In relation to the needs of older adults or people with disabilities, an **evaluation system** (Evaluation Sheet) has been created in many countries to assess the accessibility of buildings and public spaces. The problem is that many existing evaluation systems mostly provide an essential overview of whether the required spaces or products exist or not but do not provide information on the correctness of required solutions. In order spaces or

products to be usable for people with different limitations, every detail must be well resolved. For example, it is not enough to state that there is an accessible toilet, it is also necessary to examine whether it is properly designed. For example, if there is no manoeuvring space near the toilet, or if there is no equipment within reach of a person in a wheelchair, this is an incorrect solution. The aim is that all spaces and products are usable independently for all people (as much as possible) in a built environment designed by method of Universal Design.

3.4.1 Evaluation sheet – identification of barriers

A well-prepared **evaluation sheet** (worksheet) is an important element in the development of an evaluation system and creates the quality background for the evaluation report and for the formation of recommendations. Therefore, it is necessary to implement many legislative provisions into the evaluation sheet which, even persons without professional education (architecture/civil engineering) could understand. The process can be difficult, as it is necessary to reflect the demands on wayfinding systems, measures to improve communication and to think about the safety of users, as well as the solution for accessibility of the environment. Therefore, CEDA⁶ divided

the structure of the worksheet into several tables, each for different groups of spaces. Due to several legislative provisions, each table is divided into rows and columns. In the rows basic requirements for accessible environment are formed, and in the columns, there is space for Clues, Answers and Remarks (see Figure 3.3.24).

The correctness of proposed evaluation system was verified in practice when assessing the accessibility of many buildings in Slovakia. A user guide has been prepared to assist in carrying out an accessibility assessment on site.

⁶ CEDA – Centre of Design for All at the Faculty of Architecture and Design, Slovak University of Technology in Bratislava.

	REQUIREMENTS	ANSWERS	CLUES	REMARKS
C.6	Vertical Circulation	<input checked="" type="checkbox"/> YES		
	– Elevator available	<input type="checkbox"/> NO		Identical elevators are available in each wing of the building.
	to overcome the	<input type="checkbox"/> Y/N		
	floors	<input type="checkbox"/> 0		
C.7	The dimensions	<input type="checkbox"/> YES		Real size of cabin: 1,308 mm × 1,045 mm.
	and spaces of the	<input type="checkbox"/> NO	– elevator cabin size is min. 1,100 × 1,400 mm	
	elevator follow	<input checked="" type="checkbox"/> Y/N	+ manoeuvring space Ø 1,500 mm	
	building regulations	<input type="checkbox"/> 0	+ door opening width min. 800 mm	
C.8	Elevator equipment	<input type="checkbox"/> YES	– automatic door opening	Elevator equipment does not meet the requirements.
	follows building	<input checked="" type="checkbox"/> NO	– elevator calling button at the high of 900 – 1,200 mm	
	regulations	<input type="checkbox"/> Y/N	– elevator control panel button max. 1,400 mm	Exchange of elevator cabin and replacement of elevator calling button needed!
		<input type="checkbox"/> 0	– embossed sign next the buttons – auditory information	

Figure 3.3.24 Selected Part of Table „Vertical and Horizontal Circulation“ (CEDA)

Explanatory Notes – Answers

Yes: meets the requirements

No: doesn't meet the requirements

Y/N: partially meets the requirements

0: space or element doesn't exist

Explanatory Notes – Clues

+ meets the requirements

– doesn't meet the requirements

3.4.2 Accessibility assessment procedure

The assessment process is conducted in four phases:

- a training of the members of the Assessment Committee,
- a survey on the building and filling in the Access Audit Checklist,
- a final report and recommendations to remove barriers of the facility,
- a proposal of an Action Plan.

Assessment group members (recommendation):

- building manager,
- people with disabilities (different type of impairments),
- expert on accessible built environment.

The training of the members of the assessment group can be realised by an expert on accessible built environment. To carry out the training and the following assessment procedure, the expert should have a good understanding of disability issues and knowledge about the

demands of people with disabilities in the built environment. The expert also needs to have experience with building construction and with identifying practical and appropriate design solutions. The training is complemented by practical exercises in the premises of a selected building; the expert gives advice on how to carry out the evaluation and how to fill in the evaluation sheet. The role of the expert is to highlight the problems that should be noted, as well as to highlight appropriate and inappropriate solutions.

An assessment process is realized by carrying out an on-site survey that includes a thorough assessment of the use of the building; existing findings and barriers are recorded simultaneously on the evaluation sheet. Consultations with users with disabilities and employees are a useful method for assessing how well their needs are met and what their requirements for new projects or developments might be.

3.4.3 Evaluation report

The **evaluation report**, together with detailed recommendations for modifications or improvements, must highlight accessibility deficiencies, including suggestions on how they can be resolved in the best way. When preparing the report, it is necessary to consider several factors that affect movement, comfort, and safety of all users.

- evaluation in terms of independence and the movement and use
- evaluation in terms of wayfinding and access to information;
- assessment of safety, health hazards, and evacuation.

The **independence of movement** and use of all facilities for older adults and people with disabilities is very important. Many of them depend on the help of an assistant in a barrier-built environment. In assessing the building premises, it is therefore important to examine whether people with disabilities could use all parts of the building, products and services independently, to the greatest possible extent. It is necessary to check the access and usability of the horizontal and vertical circulations. It is also important to check if there is manoeuvring space available in all building premises and if a person in a wheelchair can reach for objects, switches, controls, etc.

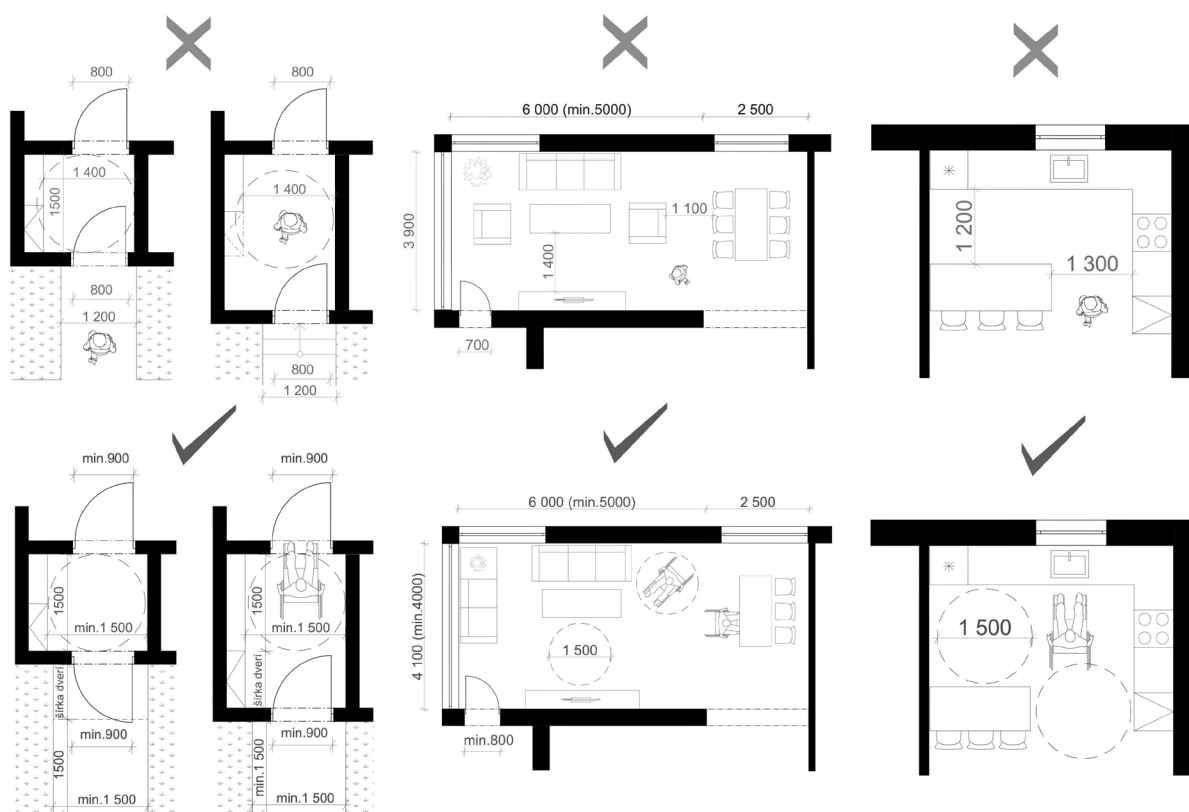


Figure 3.3.25 Accessibility evaluation of the residential environment (Suláková)

Wayfinding within the built environment depends to a large extent on its visual design, particularly on contrast, light, and colour for most people. A quality orientation and information systems are essential for users with sensory impairments. This system must be mediated by at least two different ways of sensory perception e.g., visual, and auditory, or visual and tactile. It is necessary to check whether the orientation elements such as pictograms, tactile maps, orientation labels with large, Braille, and embossed lettering, and sound information are available. Appropriate orientation aids for people with visual impairments are contrasting coloured areas to indicate important elements, such as information desk, elevator doors, or toilet doors. Different materials, texture changes or raised symbols could indicate floor levels, room numbers, or key information such as “stairs are being approached”.

In terms of **safety**, it is necessary to consider whether outdoor or indoor surfaces are not slippery, if exterior ramps can be used during winter and in bad weather. It is also dangerous to have any objects hanging on the wall that are not perceptible by the white cane.

Freestanding stairs must also have an entry barrier under them to prevent injury. It is also important to assess the building in terms of quality lighting, heating, and ventilation or if the spaces are not draughty.

When evaluating the facilities in terms of **evacuation**, it is necessary to examine whether an evacuation plan is made for people with disabilities. Buildings must have two-way communication devices (to receive and transmit messages) installed in elevators and areas of rescue assistance so that users can call for evacuation assistance. The trained personnel that can provide assistance to people with disabilities during evacuation must be available. Furthermore, it must be tested if an emergency alarm has audible and visible notification systems.

At the end of the final report, **recommendations for proposals** for adaptation work should also be included. The accessibility requirements for the built environment for all users should be proposed as the best possible solution and not as a minimum solution when evaluating facilities and public spaces.

3.4.4 Exercises/discussion

- Identification of barriers in the living environment during the changes of the life (ageing process).
- Analyses of the existing living environment according to Universal Design/DfA principles.
- Conclusions of surveys: What are the main barriers in existing buildings? Are the new apartments better prepared for the ageing of users?

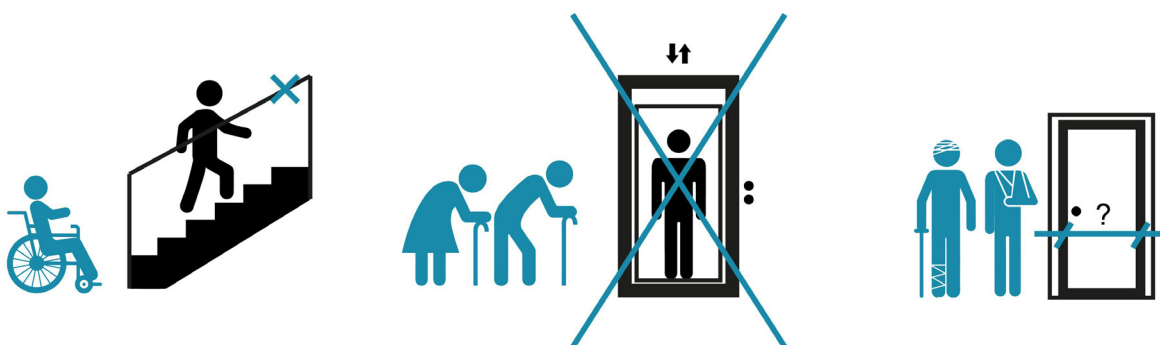


Figure 3.3.26 Main barriers in existing buildings (Suláková)

3.5 PRESENTATIONS OF CASE STUDIES AND GOOD EXAMPLES

The concept of adaptable housing was developed in Sweden in the early 1970s by the Fokus Society. It spread to many countries, mainly in northern Europe (Steinfeld and Maisel, 2012). In Nordic countries, all new apartment buildings and the surrounding environment are being implemented in accordance with the concept of adaptable housing and Universal Design/Design for All. The environment is designed to allow not only access, but also active participation in various activities in the community, such as barbecues with neighbours, physical activities in multigenerational parks and relaxation areas.

Good example from practice is the adaptable residential environment in Nordic countries, which has the following basic characteristics:

- in the vicinity of the apartment building there are enough accessible areas for various activities (e.g. barbecue, fitness, sitting, etc.);
- there is an accessible parking space in front of the apartment building (near the entrance to the building);
- the apartment building has a clearly marked entrance and the opening of the door is automated by means of a button (all control mechanisms are within reach of a person in a wheelchair);
- in the apartment building there is an elevator with sufficient dimensions also for people in electric wheelchairs;
- all doors have a clear width of at least 800 mm (entrance door at least 900 mm), without a threshold (or max. 15 mm), including balcony doors;
- manoeuvring space \varnothing 1500 mm in the common areas of the apartment building and in the apartment unit, especially in the vestibule, at the kitchen, in the bathroom and in other rooms, as well as in the balcony/terrace;
- lowered windowsills and opening windows within reach of a person in a wheelchair;
- the light switches and electrical sockets are located within reach of the person in the wheelchair;
- the bathroom has a floor drain and the shower is located at floor level, while it is situated next to the toilet bowl, and this shower space can also serve as a transfer/manoeuvring space from wheelchair to toilet;
- a free-standing bathtub (on legs) can be placed in the bathroom – but there is always a floor drain;
- the door in the bathroom opens outwards.



Figure 3.3.27 a, b Accessible parking space and entrance to the residential building in Lahti, Finland (Čerešňová)



Figure 3.3.28 a, b Horizontal and vertical circulation in the residential building in Lahti, Finland (Čerešňová)



Figure 3.3.29 a, b Hallway and adaptable bathroom in a new apartment in Espoo, Finland (Čerešňová)

SUMMARY

Good design goes beyond aesthetics. If the residential buildings and their surroundings are designed correctly according to the principles of universal design and provides the possibility of additional adaptation of the apartment according to current needs, it has the potential to improve the health of older adults and people with disabilities, the local environment, and can solve several other problems. If we are serious about building high-quality, sustainable and adaptable residential spaces, we must constantly promote good and timeless design.

- Concept of **“lifelong housing”** – considers not only the aging processes but also temporary or permanent changes in the lives of the population
- Concept of **“age-in-place”** – allows people to grow old at their place of residence
- Concept of **“independent living”** – allows people with disabilities to live independently with the support of community social care services provided in family houses/flats (de-institutionalisation)
- Concept of **“community living”** – provides multigenerational living, co-housing, social housing, etc.
- Concept of **“adaptable housing”** – allows easy to adapt existing housing to changing needs of users

REVIEW TOPICS:

- Discuss **accessibility and visitability** of residential environment for all users (principles, solutions, dimensions according to the movement of a person in a wheelchair).
- Discuss accessible **adaptations of protected (listed) historical** residential buildings.
- Discuss **safety** of residential environment – movement safety, evacuation in case of fire, etc.

For older people with reduced mobility, reduced vision, or other disabilities, the ability to perform common tasks such as carrying home shopping, cooking, using the bathroom, or accessing high-shelf items can often be limited by inappropriate house design. The needs of individuals are specific, and it is therefore appropriate to consider the various aspects and demands that may affect the approach to residential building design.

1. **“Visitability”** is the design approach for new housing such that anyone who uses a wheelchair or other mobility device should be able to visit.
2. **“Accessible house”** that meets universal design standards and is able to accommodate wheelchair users in all areas of the dwelling.
3. An **“adaptable house”** is one which can respond effectively to changing household needs without requiring costly and energy-intensive alterations. The design must comply with the principles of universal design.

- How can we create **flexibility and adaptability** of residential environment to accommodate all users (mobile and flexible components, adaptable solutions)?
- Discuss **adjustments** of residential environment according to the individual users' needs (mobile furniture, high-adjustment furniture).

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