Grenfell Tower | Residential accessible design guidance

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19.04.13	00	REM	PN	-
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Contents

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1 DBA recommendations for accessible housing

1.1 Introduction

The Wheelchair Housing Design Guide (WHDG) states no requirements for the common areas of blocks of flats, with the exception of lift provision and lift size. This means that there are several features of common areas that would not suit the needs of a wheelchair user if standard practice for blocks of flats was followed. Banks of postboxes in residential foyers are an example of this.

There are also several parts of the document that conflict with one another, or with other standards. DBA's guidance about these situations is described below.

Features of a wheelchair accessible home that need more detailed guidance are in Sections 2-4.

1.2 Clarification about levels in the residential access standards.

Note that Lifetime Homes standard 3 requires that the approaches to all dwelling entrances are 'level or gently sloping', but the description of a 'gently sloping' approach given in the *Required Specification of the Lifetime Home Revised Criteria July 2010*[1] and in the *Lifetime Homes Design Guide* conflicts with the description of 'gently sloping in Sections 1 and 6 of Approved Document M.

The guidance for Lifetime Homes standards defines a gentle slope as being any gradient that is more shallow than 1:12, whereas Approved Document M defines a gentle slope as being more gentle than 1:20. This discrepancy is important because the handrails and other access provisions are not usually required for 'gentle slopes'.

The terminology of Section 1, Approved Document M is used throughout the Access Statement to avoid confusion, as follows:

- A gentle slope has a gradient of between 1:60 and 1:20. This gradient does not require handrails but does require a level landing for every 500 mm rise.
- A ramp has a gradient steeper than 1:20, but no steeper than 1:12. Level landings are required according to the standards and handrails are required on both sides of a flight.

Note that the Requirements of the *Wheelchair Housing Design Guide* prohibit ramps of steeper than 1:15 on the approach to wheelchair accessible homes.

1.3 Entrance canopies

Door canopies at communal entrances of high-density buildings are typically higher than specified in WHDG requirement 3.2.7. This is because shelter is often formed by an oversailing part of the building, or a balcony or other architectural feature. Automatically opening doors can reduce the need for a sheltered entrance. .

The entrance doors to dwellings with entrances directly to a street (rather than from a communal corridor) should be adequately sheltered. However, the need for design consistency between Lifetime Homes and wheelchair accessible dwellings means that one or the other is generally used throughout a development, rather than having two different sizes of canopy.

1.4 Clear spaces to sides of doors in communal areas

Communal doors that are held-open in normal use (and close automatically in the event of a fire) do not need the 200 mm / 300 mm clear spaces to the sides of the leading edges.

1.5 Force required to operate any door

Clause 4.2.5 of the WHDG requires that entrance doors have a maximum operating force of 20N. However, an opening force of 20N has proven difficult to achieve by general agreement and the guidance of BS 8300 is an acceptable alternative. Refer to Appendix 1 of this document). The 2013 edition of Approved Document M is now in line with BS 8300.

DBA recommends that the guidance of BS 8300, section 6.5.2, quoted below, should be followed for all doors, including those in Lifetime Homes units and internal doors of dwellings.

"For most disabled people to have independent access through single or double swing doors, the opening force, when measured at the leading edge of the door, should be not more than 30 N from 0° (the door in the closed position) to 30° open, and not more than 22.5 N from 30° to 60° of the opening cycle."

1 Available at http://www.lifetimehomes.org.uk.

1.6 Location of postboxes

The WHDG gives a minimum height from FFL of 700 mm for a letter box mounted on the back of an apartment / house door. (Ref: WHDG 2006 5.2.3).

BS 8300 gives no specific guidance about the height of post boxes. However, the reach-range for side access to shelves is 665 mm to 1060 mm, and therefore DBA recommends that at least as many post boxes as there are wheelchair accessible units in the core (of any tenure) are within the 700 mm to 1060 mm height range.

1.7 Number of lifts serving a unit

The *Wheelchair Housing Design Guide* Considerations on page 7 state:

"Ensure access to a minimum of two lifts in multi-storey developments with preferably one of at least 12 persons capacity."

Consideration 3.1.11 reads:

""Ensure that two lifts are in regular use, one of which should exceed the minimum eight-person size."

Requirement 3.2.9 states:

Where wheelchair dwellings are above the ground floor, lifts should be as detailed in BS 8300. A second lift should be accessible to and from wheelchair user dwellings for use when the first or core lift is undergoing maintenance or is out of service."

In summary, access to a second lift should always be provided for residents of wheelchair accessible / adaptable homes of any tenure. In practice, this provision is sometimes not feasible in smaller developments. The London Housing SPG standard 3.2.6 applies as a minimum.

1.8 Height of electrical sockets.

Section 15.1.4 of the Wheelchair Housing Design Guide states that:

"Controls should be within the range 700-1050 mm. It may be desirable to align sockets and switches in height, at say 900 mm".

However, 15.2.5 states:

"Set sockets generally at 700 mm high minimum."

This is an example of contradiction within different parts of the Wheelchair Housing Design Guide. DBA's interpretation is that 700 mm from finished floor level is too low for many wheelchair users, and recommends 900 mm as being compliant.

1.9 Distance of electrical sockets from corners

Requirement 9.2.3 of the Wheelchair Housing Design Guide states that:

"Electrical sockets should not be located within 750 mm of internal corners."

This requirement cannot be met in certain circumstances, such as above a counter in a kitchen. DBA recommends that the distance between an internal corner and switch, socket or other control in wheelchair accessible housing is 350 mm, consistent with Approved Document M and Lifetime Homes standards.

1.10 Window controls

WHDG requirement 14.2.2 states:

"Ensure single operating handle within reach, controlling both ventilation and full opening and closing positions while maintaining security in ventilation as well as closed positions."

'Tilt and turn' windows are often specified. Windows that open in the 'tilt' operation first are not considered accessible because once open they cannot be closed by wheelchair users. Windows in wheelchair accessible units should open in the 'turn' operation first, and require a further turn of the handle to open in the 'tilt' mode.

Window controls in Lifetime Homes standard dwellings should be no higher than 1200 mm from floor level, and no higher than 1000 mm in wheelchair accessible homes.

2 Circulation space

2.1 Entrance doors - wheelchair accessible dwellings

A clear space of 200 mm is required on the push side of the door (in addition to the 300 mm clear space required on the pull side), as shown on the diagram, right.

The shorter dimension of the 1500 mm x 1800 mm clear space required immediately inside the entrance door must be against the entrance door when closed and should overlap with the 300 mm clear space described above.

The long side of the transfer / storage space required by the WHDG must be accessible, so that two wheelchairs can be parked next to each other and a person can transfer between them. (Refer to diagram, right).

Peep-holes should be provided at two levels in doors to adapted wheelchair accessible dwellings. One hole should be at standing eye-level, the other should be at 1100 mm from the floor (ref: WHDG 5.3.3). A second peep-hole need not be provided in easily adaptable dwellings.

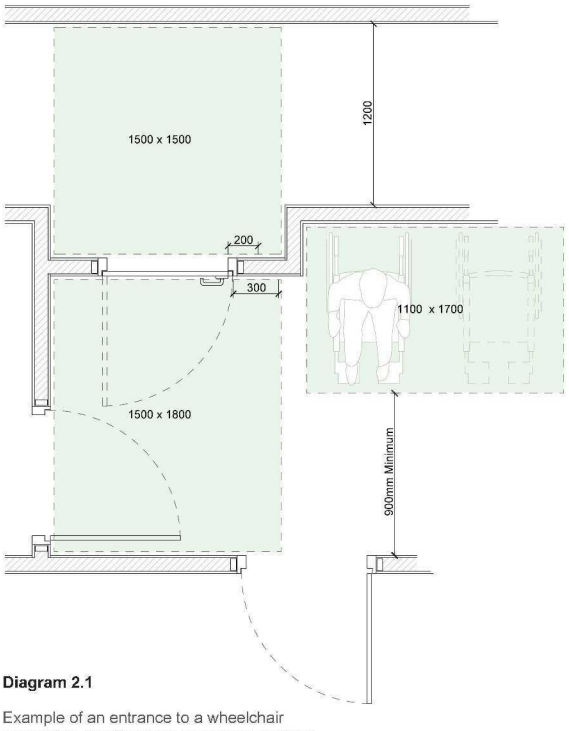


Diagram 2.1

Example of an entrance to a wheelchair accessible dwelling from a common corridor.

3 Doors

3.1 Clear opening widths

Clear opening width should be measured from the door leaf when open at 90° to the wall if the door opens further than 90°, or from any door furniture if the door does not open further than 90°.

Use the table (A3.1, right) to select the appropriate clear opening width for doors in relation to corridor widths. These dimensions apply to all doors / openings and approaches at all levels of the dwelling.

Table 3.1

		Minimum door clear opening width required	
Direction of approach	**Width of approach**	**Lifetime Homes and Islington's Flexible Homes**	**Wheelchair accessible**
Head-on	900 mm	750 mm	775 mm
Not head-on	900 mm	900 mm	Not permitted
	1050 mm	775 mm	Not permitted
	1200 mm	750 mm	775 mm

3.2 Space to the side of the leading edge

Doors on the entrance levels of all dwellings need 300 mm clear space to the side of the leading edge on their pull side.

300mm clear space is required to the side of the leading edge of the pull side of all doors, and 200 mm clear space is required on the push side of all doors in wheelchair accessible dwellings. (See right).

DBA recommends that the maximum reveal for any door without compromising the 300 mm space required by standard 6 is 200 mm, and this will be in the new BS 9266 about accessible and flexible homes. Refer to diagram 3, right.

Consider the use of bi-fold or sliding doors where outward opening bathroom doors might impact on circulation space.

Doors that can be pushed open from both directions will not require the 300 mm clear space to the side of the leading edge. Doors of this type in wheelchair accessible units will need 200 mm clear space adjacent to the leading edge on both sides.

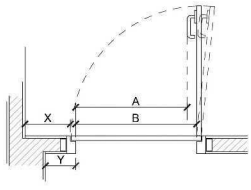


Diagram 3.1

A = Method of measuring clear opening width of an entrance door or internal door if the door does not open further than 90°.

B = Clear opening width of door that opens further than 90° so that the door furniture does not impede access.

X = 300 mm clear space required for all doors in a wheelchair accessible dwelling, and all doors at entrance level for Lifetime Homes standard dwellings.

Y = 200 mm clear space required to the side of the leading edge of the push side of all doors in wheelchair accessible dwellings.

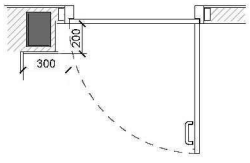


Diagram 3.2

Maximum reveal of any door without compromising the 300 mm minimum space required adjacent to the door is 200 mm. (DBA guidance).

4 Accessible kitchen guidance

4.1 Introduction

This section describes David Bonnett Associates' (DBA) guidance about the key features required for kitchens in wheelchair accessible residential units.

DBA refers to 'wheelchair accessible' dwellings and kitchens rather than 'adapted / adaptable' because at planning approval stage of the design process the difference between the two is negligible, and because all wheelchair accessible units need to be easily adapted to meet the needs of individuals.

4.2 Access criteria

The usual reference for the design of wheelchair accessible homes is the requirements sections of the *Wheelchair Housing Design Guide* (published 2006). However, the kitchen section is out-dated and would result in very large but not particularly accessible kitchens. Some of the requirements are even considered to be unsafe.

This DBA guidance has been developed over several years and is based on the *Wheelchair Housing Design Guide* (WHDG, 2006), *Approved Document M*, *BS 8300* and conversations with a specialist in accessible kitchen design, (Adam Thomas of Design Matters).

4.3 Using the guidance

The guidance is divided into features that DBA considers to be essential or recommended. In the absence of published guidance (except the WHDG) about this type of accessible kitchen DBA will support designs that feature the Essential (E) items listed below. DBA highly recommends that the other Recommended (R) features are included if possible.

4.4 General points about kitchen design

Kitchen layouts should be designed to avoid circulation routes crossing the working areas, as described in the WHDG, 10.1.2.

Kitchens are often designed with an 'island unit', containing the hob, sink or other features, separated from the rest of the storage and appliances by circulation space on all sides. This arrangement can be proposed for market wheelchair accessible kitchens, provided that it would be feasible to extend the worktop to connect any appliances and worktop with the rest of the kitchen, in DBA's view. This is because safe use of a wheelchair accessible kitchen is based on sliding objects along a surface rather than carrying hot / heavy items over the knees.

This arrangement is only acceptable in market dwellings because residents of affordable units are more likely to require the features of a fully wheelchair accessible kitchen from the outset. Furthermore, local authorities seek to minimise applications for Disabled Facilities Grant assistance with making alterations.

The following table describes the essential and recommended features of wheelchair accessible kitchens in terms of layout of units and appliances. The layout will need to allow for the installation of electrical sockets, isolator switches and other equipment with regard to other guidance about proximity to water, etc, which may result in longer kitchen runs than are implied here.

4.5 Kitchen guidance table

E Essential requirement for an accessible kitchen in wheelchair accessible / adaptable units.

R Good practice recommendation.

Item	E/R	Guidance	DBA comment	✔
1	E	A rectangular clear space of 1800 x 1500 mm should be designed into the kitchen. This should not overlap with any work surfaces, storage or appliances. A clear space of at least 1200 mm is required in front of all work surfaces, storage and appliances that are not immediately adjacent to the 1500 x 1800 mm clear space.	The clear space of 1500 x 1800 mm is a requirement of the *Wheelchair Housing Design Guide (WHDG)*. The 1200 mm clear space in front of all storage, work surfaces and appliances is a criterion of the Lifetime Homes standards.	
2	E	Sufficient work surfaces and storage space when an eye-level fridge and oven are in place.	Work surfaces and storage should be equivalent to the provision in other units of the same tenure on the development. In adaptable (market units) it is usually sufficient to indicate that the space is available for the storage required, ie, there is space available in the layout to extend a worktop / run of units without compromising the required circulations zones.	
3	E	The sink, hob and a continuous 800 mm length of work surface have space (rather than cupboards) beneath.	The space beneath the work surface, sink and hob enable a wheelchair user to get closed enough to use the facilities. Adaptable units should have the oven, hob and sink in the correct locations for a fully accessible kitchen, but they can have storage beneath.	
4	E	The height of the sink, hob and work surface should be adjustable to suit an individual's needs. The range for adjustment needs to be 750 - 910 mm, measured from finished floor level to topmost surface of the worktop.	This could be a proprietary 'rise and fall' system. In some instances a design that facilitates the height to be adjusted manually is more appropriate. However, the power supply and space for a powered rise-and-fall unit should be in place from the outset to enable future installation, including the structure to support it and space for services to be concealed.	
5	E	The oven, hob, sink, and a length of worktop of 800 mm wide (minimum) and with clear knee-space beneath, should be in the same run of units.	The safest way to transport items in the kitchen is by sliding them along the work surface.	
6	E	The oven should be at a right angle to an adjacent work surface, ie, next to the corner of a kitchen, with a pull out heat-proof shelf beneath. The work-surface that is at right-angles to the mid-height oven should have clear knee-space beneath for a minimum width of 600 mm. The surface of the pull-out shelf beneath the oven should be at 900 mm above floor level.	This is to reduce the need to lift heavy / hot dishes. An L-shape in the run of units facilitates this. Ensure that the side-hinged oven is specified to enable this manoeuvre. Currently there is no oven available that has controls anywhere other than at the top. This means that they are outside the range of 700 - 1050 mm (WHDG, 15.1.4), but this is acceptable in DBA's view.	

Item	E/R	Guidance	DBA comment	✔
7	E	If a microwave is supplied it should be at an accessible height.	Having the base of the microwave level with the top of the work surface and with worktop space in front of it is ideal. Also consider having a similar built in arrangement to the oven, described in item 4.	
8	E	Trolley units on wheels should not be specified because they are potentially dangerous in an accessible kitchen.	Try pushing something on wheels when you're on wheels yourself!	
9	E	All plumbing should be concealed and flexible.	This especially applies to water pipes beneath sinks.	
10	E	Cupboards above work surface should have half-width doors, with twin-door opening mechanisms so that both doors open with one hand at the same time.	Some wheelchair users will stand to open a cupboard and a 600 mm side-hinged door encroaches too much on the circulation space directly in front of the cupboard. 600 mm wide cupboards with a split door, ie, two doors of 300 mm width are an appropriate solution.	
11	E	An induction hob should be specified.	This is to reduce the risk of burning when the hob is at low-level.	
12	E	All storage and appliances below the work surface should have pull-out drawers rather than hinged doors concealing shelves.	Side-hinged cupboards and appliances are very difficult for wheelchair users to reach into. Side-hinged doors with drawers behind are acceptable.	
13	E	D-type handles should be fitted, not handle-less doors or knobs, which are difficult / impossible for people with limited dexterity to use.	Refer to illustrations in Section 4.	
14	E	If a dishwasher is to be installed then it should be a drawer-type, not hinged at the bottom.	A dishwasher with its door hinged horizontally at the base is difficult / impossible for wheelchair users to close. Some wheelchair users prefer to keep crockery, etc, in the dishwasher rather than cupboards, to save carrying items to another part of the kitchen to store them.	
15	E	Extractor hood controls need to be within the range of 750 - 1050 mm, as specified by the WHDG, clause 15.1.4.	The extractor is usually operated by pulling the hood out or using a switch on the hood, but extractor hoods are required to be a minimum distance above the hob surface. This is also a potential issue for Lifetime Homes standards, which requires regularly-used controls to be within 450 -1200 mm of floor level. Fully adapted wheelchair accessible units will need to be supplied with a alternative control such as a remote, hand-held device, or remote switch that is installed with socket outlets and switches. For Lifetime Homes standard and adaptable wheelchair accessible units the provision of an accessible, alternive operation for the extractor hood would be a reasonable post-occupancy change.	

Item	E/R	Guidance	DBA comment	✔
16	R	A motorised rise-and-fall unit containing the hob, sink and worktop is recommended.	In affordable, adapted kitchens it is usually sufficient for these features of the kitchen to be adjusted to suit the needs of a particular household, ie, the whole unit is moved up or down manually and fixed into place by maintenance staff. However, provision should still be made for a motorised unit to be installed in the future. (Refer to item 4).	
17	R	The work surface should have a waterfall edge on all edges	The WHDG specifies a waterfall edge on the front of work surfaces only. Refer to Section 5 for illustration of waterfall edge.	
18	R	Pull-down baskets should not be specified.	Most pull-down basket units do not work well for wheelchair users, as they need to be operated from a head-on position. Also the spring mechanisms make opening them difficult.	
19	R	Specify mid-height fridge and freezer.	A vertically arranged fridge-freezer is impractical for wheelchair users because the top portion of the fridge and bottom portion of the freezer are usually inaccessible.	
20	R	Specify a work surface depth of 700 mm.	Some wheelchair users find a work surface depth of 600 mm provides too little space underneath for their knees, especially beneath the sink where there will be plumbing and possibly mechanisms for rise-and-fall units. Also, the length of work surface that is not supported by cupboards beneath will be weak, especially around the sink. Increasing the depth will improve the strength of the work surface.	

4.6 Example of an accessible kitchen

Visualisation by Design Matters, used with permission, illustrating the principles of accessible kitchens that were developed for the Olympic Athletes Village by Design Matters and DBA.

DESIGN matters
QUALITY KITCHENS EXPERT DESIGN

4.7 Illustrations of acceptable kitchen handles for wheelchair accessible kitchens

Photographs are included to illustrate kitchen handle types only; no other parts of the kitchens on this page illustrate acceptable/unacceptable wheelchair accessible kitchens.

Acceptable kitchen cupboard handle type.

No recess for fingers - unacceptable.

No recess for fingers - unacceptable.

Knobs - unacceptable.

Handle-less (opened using recess in top of door/ drawer) - unacceptable.

4.8 Illustration of waterfall edge on kitchen counter

This photograph is included to illustrate the waterfall edge of the kitchen counter only; no other parts of the kitchens on this page illustrate acceptable/ unacceptable wheelchair accessible kitchens.

(Photograph: Design Matters).

Waterfall edge to kitchen counter.

5 Bathrooms and WCs

5.1 Entrance level WC in all dwellings

The requirement for a WC to be provided to the recommendations of Approved Document Part M is to enable a disabled visitor to the dwelling to use the WC.

This is the minimum provision in all dwellings with the exception of any dwelling that is on two or more storeys, and has no more than two habitable rooms in addition to the main living room and any kitchen/diner (typically a one or two bedroom house). In this case an entrance level WC as shown in Approved Document M will suffice.

At least one entrance level WC meeting LTH 10 is required in all other dwellings and this should be accessed from circulation space.

The entrance level (LTH10) WC may be within the main bathroom of a single-level dwelling, provided that this room is accessed from the circulation space.

1100mm clear space is required in front of LTH 10 WCs.

The side-transfer spaces can be achieved by recessing the basin so that it protrudes no more than 200mm, as shown by the example on this page.

Provision for a future level access shower is required in or adjacent to an entrance level WC, unless such a provision is already installed elsewhere in the entrance level (e.g. an accessible bathroom).

Entrance level WCs in two storey dwellings are sometimes combined with the utility room.

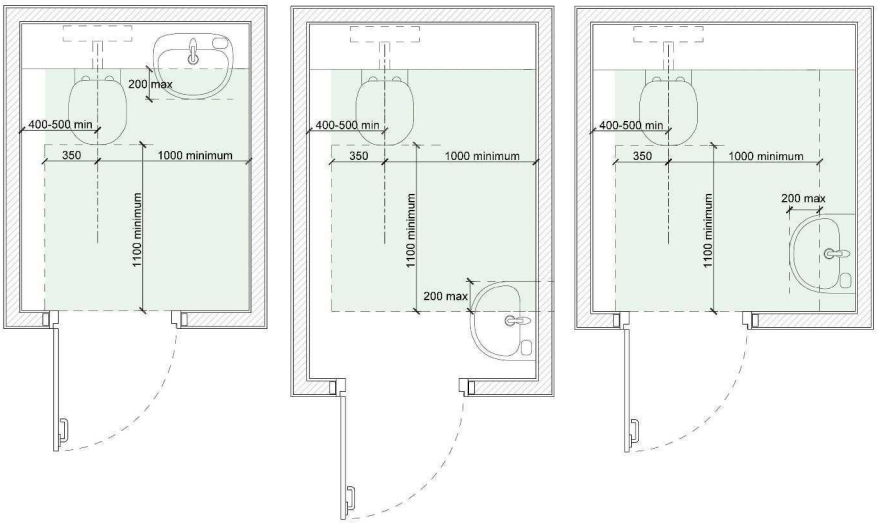


Diagram 5.1

Three options for the provision of an entrance level WC that meets LTH 10. Other arrangements are possible. Note that provision for a level access shower is also required within or adjacent to the room.

5.2 Lifetime Homes standard bathroom layout

The bathroom layout should incorporate the minimum clear zone described on the previous page

A washbasin that is accessible for a wheelchair user requires 1100mm x 700mm space in front and should project sufficiently to allow a wheelchair user to reach the taps, but not more than 200mm from the front of the duct so as not to intrude into the side transfer space.

If there is no main bathroom (accessed from the circulation space), then standard 14 applies to the en suite of the master bedroom.

The space to transfer sideways from a wheelchair to the WC should be 500mm deep (from the front of the pan to the rear wall) and 1000mm from the centre line.

Photograph showing how a basin that is mounted level with the rear of the WC cistern (concealed or not) does not impinge on the space needed to transfer to adjacent WC.

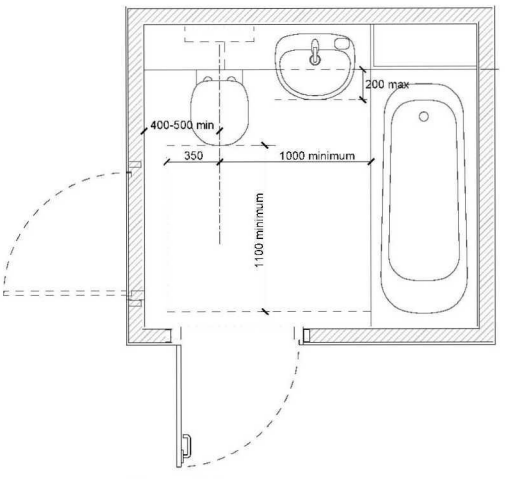


Diagram 5.2

Example of a Lifetime Homes bathroom layout.

5.3 WCs in wheelchair accessible homes

The use of the term 'transfer' applies here to the movement of a wheelchair user from the chair to a WC, bath or shower.

Some wheelchair users find this easiest (and safest) when moving from left to right, others from right to left. For this and other similar reasons, bathrooms are ideally fitted out to suit an individual.

The width of clear space in front of the basin should be 600mm (between the bath and WC in the example on the left). This is derived from guidance in the WHDG 2006 about kitchens. The basin should be set at 750mm from FFL, based on guidance in BS8300 and the Wheelchair Housing Design Guide. The transfer spaces in front of the WC should not be blocked by the basin.

A second accessible WC with a basin should be provided in dwellings designed for four or more people. The transfer space for this second WC needs to be on the opposite side of the WC to the space in the main bathroom.

If the second WC has a level access shower installed, then the main bathroom will not need provision for a future level access shower.

1100mm minimum clear space should be provided between an inward-opening door swing and the front edge of the WC, or between the front edge of the WC and wall / door / bath.

The WC pan should project 750mm from the wall (or cistern concealment) behind it to allow for lateral transfer from a wheelchair.

WCs should be positioned with their centre-line 500mm from an adjacent wall, as illustrated in 5.3.2, opposite.

The minimum dimension of clear wall required on which to locate an accessible WC is 1500mm, which includes the 500mm described in 8, above, and a clear space of 1000mm minimum on the other side of the WC for lateral / side transfer.

Wall-hung sanitary-ware allows space for wheelchair footrests to swing underneath. This maximises the space for a turning circle.

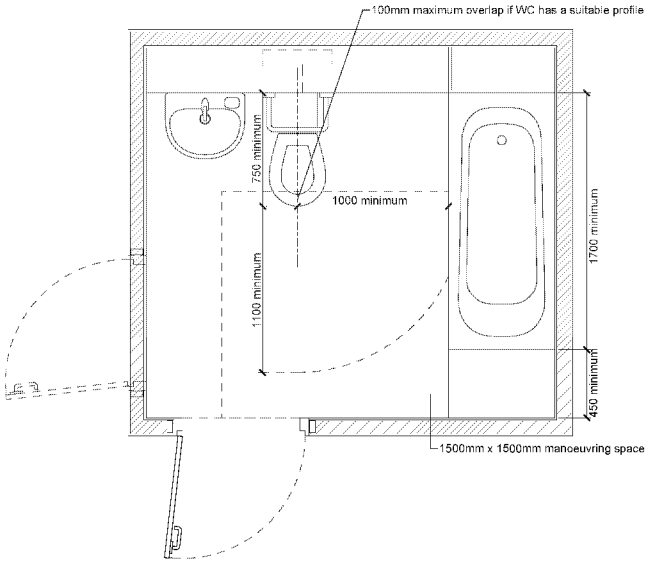
On plan the turning circle or ellipse can 'overlap' the fittings by 100mm where these are wall-hung or have a suitable profile.

Demonstration of space available beneath wall-hung WC to facilitate turning in a wheelchair. Location: Nido by AHMM

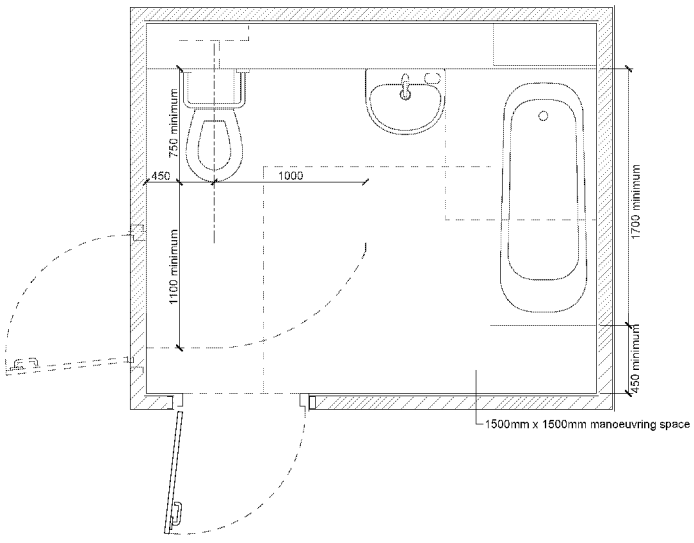
Knee space beneath a wall-hung basin unobstructed by pedestal of basin. Location: Nido by AHMM

Diagram 5.3

Examples of fully accessible bathroom layouts (DBA)



5.3.1 Example of smaller layout with peninsula WC. Use of this type of layout must be agreed with local authority.



5.3.2 Example of preferred layout with WC adjacent to wall.

5.4 Bathroom layouts for wheelchair accessible homes

Affordable wheelchair accessible dwellings would normally have a level access shower installed from the outset.

Either provide a 1000 x 1000mm (1200 x 1200mm preferred) shower activity area, or a 1700mm x 700mm bath. Provision for a future level access shower (including plumbing) is essential from the outset. It should also be possible for a bath to replace the shower, should it be preferred.

It is usually acceptable for market (easily adaptable) units to have a bath from the outset that can be easily removed and replaced with a level access shower if needed.

If the main bathroom has both a level access shower and a bath installed from the outset the future provision is not required.

Provision should be made for direct access from the main bedroom to the bathroom. This could be either a knock-through panel for future use or a connecting door. This door / knock-out panel does not need to be full-height.

Layouts should be designed to ensure independent approach and transfer to use all fittings. Bathrooms and shower rooms require a 1500 x 1500mm square manoeuvring space, clear of all fittings.

A transfer space should be provided at the end of bath 450mm deep, and 700mm wide.

Ensure the taps are located so that they are easily accessed and operated.

Wet rooms are ideal for providing wheelchair accessible bathrooms, as they have no raised shower tray obstruction.

Underfloor heating in wetroom-style bathrooms is recommended to dry the floor more quickly.

6 Mobility scooter parking

6.1 Mobility scooter parking

The need for a charging / parking facility for mobility scooters in residential developments arises from the fact that many people, especially older people, are unable to walk long distances and rely on a mobility scooter.

Currently there are no standards or regulations about mobility scooter parking, but a place to safely store and change such a vehicle could enable a person to remain in their own home for longer.

Due to the size of mobility scooters and the types of batteries they use it is not usually practical to store and charge them inside dwellings.

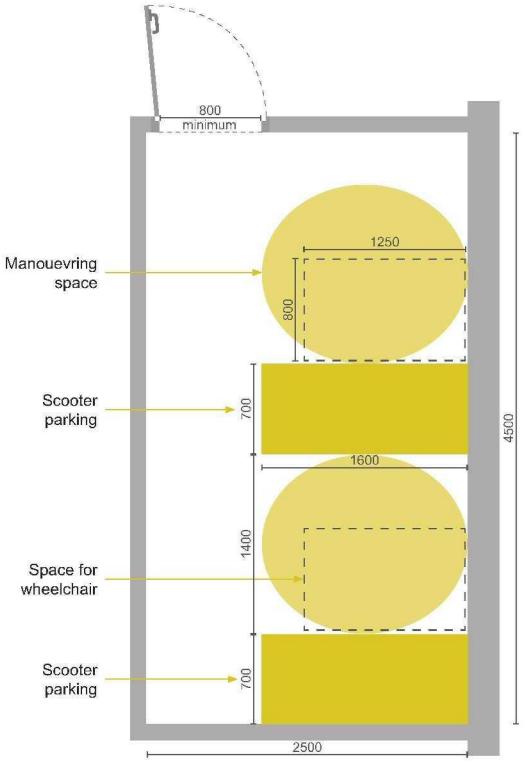
DBA recommends that a secure room in the car park of high-density developments, with minimum dimensions and manoeuvring spaces as shown on the example, right, should provide sufficient for storage and charging of two mobility scooters. The overall dimensions of the room may vary.

BS 8300 recommends a maximum space of 1600mm x 700mm for an occupied electric mobility scooter, and 640mm x 1500mm for an unoccupied scooter.

BS 8300 also recommends a space of 800mm x 1250mm for a manual wheelchair. Space to park a manual wheelchair next to a parked scooter should be provided in the storage and charging facility.

The supply of electricity for charging mobility scooters in common areas must be considered. There may be a possibility for integrating this with a power supply for electric cars and other vehicles.

The routes to any car club, bicycle storage area and mobility scooter storage must be accessible. Provision for future parking spaces for tricycles and recumbent bicycles used by disabled people should be considered.



Spaces required for parking, charging and manoeuvring two mobility scooters. Dashed lines show spaces for parking a wheelchair adjacent to a scooter.

Appendix 1 | Door closers

A1.1 Opening forces in Approved Document M and BS 8300.

The following guidance is from the Frequently Asked Questions section of the Planning Portal pages about Part M of the Building Regulations and reflects the guidance given to the Athletes Village design teams throughout the design of the plots.

URL: http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partm/faqs

"Q. Does the 'opening force' of doors in Part M 2004 equate to 'closing force' in BS 8300:2001?

A. The guidance that follows is based on consideration of Amendment 1:2005 to BS 8300:2001 (see BS 8300:2001)

The guidance relates to doors to accessible entrances, manually operated non-powered entrance doors and internal doors (see AD M 2.13, 2.17, 2.26, 3.7 and 3.10), and means that with careful selection of components, door closers may be specified that will meet the requirements of both Part B and Part M.

For disabled people to have independent access through single or double swing doors, the opening force, when measured at the leading edge of the door, should be not more than 30 N from 0° (the door in the closed position) to 30° open, and not more than 22.5 N from 30° to 60° of the opening cycle.

Where, in order to meet the above opening force limits, the door-closing device is insufficient to keep an entrance door closed against external conditions, consideration should be given to installing one of the following door closing systems:

1. a power operated (automatic) door - sliding, balanced or swing;
2. a low energy swing door;
3. a power operated revolving door assembly; [but note the caveats about use of revolving door assemblies in BS 8300 paragraph 6.3.5]
4. an entrance lobby or air lock system of inner and outer doors; or
5. for the purposes of Building Regulations in England and Wales, a low power rated door closer on a door fitted with a suitable latch.

Where hinged or pivoted fire resisting doors need to be accessible by disabled people, the door closing devices fitted should have 'controlled' action, conforming to the requirements of BS EN 1154:1997, Annex A, be of a variable power type and conform to the recommendations above.

Annex A to BS EN 1154 states that controlled door closing devices with a power size less than 3 are not considered suitable for use on fire/smoke door assemblies. This means that, in general, only high efficiency door closers mounted on doors with a width greater than 900 mm are likely to meet fire door requirements as well as the opening force limits described above. Controlled door closing devices of a lower power size and with relatively low efficiencies, with a lower power size and/or of a width less than 900mm may only be suitable for non-fire resisting doors.

Where the force required to open a fire resisting door on a circulation route exceeds the limits described above, an electrically powered hold open device, either stand-alone or integral in the body of the closer, which conforms to the requirements of BS EN 1155, should be installed.

The use of "swing free" controlled door closing devices should be limited to applications where doors are located for access to rooms or similar locations and not part of a circulation route.

The use of "delayed action" controlled door closing devices should similarly be avoided in circulation areas.

For non-fire resisting doors which have a requirement to self close for reasons of privacy, acoustics or energy control, controlled door closing devices should be selected, fitted and adjusted so that the opening forces are well below the limits set out above, consistent with the doors functioning as intended. It is emphasized that, for non-fire doors, door closing devices of a power size less than 3 will normally be acceptable.

The opening force should be checked using a plunger-type force measuring instrument. Where measurements cannot be taken at the leading edge, they may be taken at a point on the face of the door up to 60 mm from the leading edge, a position approximately in-line vertically with the spindle of a lever handle or the centre line of a pull handle or push plate, in which case the opening force limits can be increased by approximately 2 N.

The accuracy of force measuring instruments available on the market varies and there are inherent difficulties in measuring forces on site. It is recognized, therefore, that any measurements will be subject to a degree of imprecision which could give rise to variations of between 2 and 3 N.

The ability of a controlled door closing device to close effectively while keeping within the opening force limits depends on its efficiency and the resistances from edge seals, hinge friction, latch resistance and differential air pressure. The effect of using a low efficiency controlled door closing device is to reduce the closing force to a point where, coupled with the other resistances to closing, the door may not latch, or stay closed if unlatched. The use of high efficiency closers can reduce the force required to open the door and increase the proportion of the disabled population who can pass through independently.

In some locations in a building, a controlled door closing device incorporating a backcheck is sometimes used to prevent damage to adjacent walls or furniture and to the closer mechanism if a door is flung open with some force. However, when the door is opened slowly, the resistance effect is minimal. With some controlled door closing devices, the backcheck starts to become effective when the door is open at 70°. Care should be taken to ensure that controlled door closing devices, with or without the backcheck, allow the door to open to provide the required effective clear width.

The maximum closing force exerted by a controlled self-closing device should be within 0° and 15° of final closure. Controlled door closing devices that do not have this characteristic should be avoided.

Without regular maintenance of all door fittings, the resistances to opening and closing can increase to an extent that the ability of disabled people to pass through the door may be affected. The opening force at the door opening angles described above should therefore be checked at regular intervals."

Appendix 2 | References

A2.1 Legislation

Equality Act 2010, HMSO, 2010.

A2.2 Building Regulations

The Building Regulations 2000, Fire Safety, Volume 2 - Buildings other than Dwellings, Approved Document B, HMSO, 2006.

The Building Regulations 2010, Fire safety, Volume 1 - Dwellinghouses, Approved Document B (2006 edition incorporating 2010 and 2013 amendments), HMSO, 2013.

The Building Regulations 2010, Protection from falling, collision and impact, Approved Document K, HMSO, 2013.

The Building Regulations 2010, Access to and use of buildings, Approved Document M (2004 edition incorporating 2010 and 2013 amendments), HMSO, 2013.

URL: http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partm/faqs

A2.3 British Standards

British Standard 8300:2009 (Amended 2010) Design of Buildings and their approaches to meet the needs of disabled people - Code of practice, British Standards Institution, 2010.

British Standard 9999:2008 Code of practice for fire safety in the design, management and use of buildings, British Standards Institution, 2008.

BS 9266:2013 Design of accessible and adaptable general needs housing. Code of practice, British Standards Institution, 2013.

A2.4 Residential references

Wheelchair Housing Design Guide, Stephen Thorpe and Habinteg Housing Association, 2006.

The London Plan Spatial Development Strategy for Greater London, Mayor of London, 2011.

Housing Supplementary Planning Guidance, London Plan 2011 Implementation Framework, Mayor of London, November 2012.

Code for Sustainable Homes Technical Guide, DCLG, 2010.

A2.5 Hotels

PAS 88:2008 Guidance on Accessibility of Large Hotel Premises and Hotel Chains, British Standards Institute, 2008.

London Tourism Action Plan 2009 – 2013, London Development Agency, 2009.