

CHAPTER 11: External Works

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11.1 PAVING AND DRIVEWAYS

11.2 (THIS SECTION HAS BEEN REMOVED)

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FUNCTIONAL REQUIREMENTS

11.1 PAVING AND DRIVEWAYS

Workmanship

- i. All workmanship must be within the tolerances defined in Chapter 1 of this Manual.
- ii. All work is to be carried out by a technically competent person in a workmanlike manner.

Materials

- i. All materials should be stored correctly in a manner that will not cause damage or deterioration of the product.
- ii. All materials, products and building systems shall be appropriate and suitable for their intended purpose.
- iii. The structure shall, unless specifically agreed otherwise with the Warranty provider, have a life of not less than 60 years. Individual components and assemblies, not integral to the structure, may have a lesser durability, but not in any circumstances less than 15 years.

Design

- i. The design and specifications shall provide a clear indication of the design intent and demonstrate a satisfactory level of performance.
- ii. Structural elements outside the parameters of regional Approved Documents must be supported by structural calculations provided by a suitably qualified expert.
- iii. The materials, design and construction must meet the relevant regional building regulations.

Limitations of Functional Requirements

- i. The Functional Requirements for external pathways and drives in this Chapter apply only to the drive and pathway leading to the principle entrance to the dwelling.
- ii. These Functional Requirements do not and will not apply to create any policy liability for any remedial works carried out by the contractor or otherwise, nor to any materials used in those remedial works.

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11.1.1 Preparation of ground

The area to be surfaced should be prepared by stripping away all vegetation and organic material. Land drainage should be considered for ground that is saturated.

Excavation trenches (e.g. service trenches) should be backfilled with granular type material to the required level. The backfill should be compacted in layers no greater than 300mm, and the fill material should at least have the same bearing capacity as the adjacent ground.

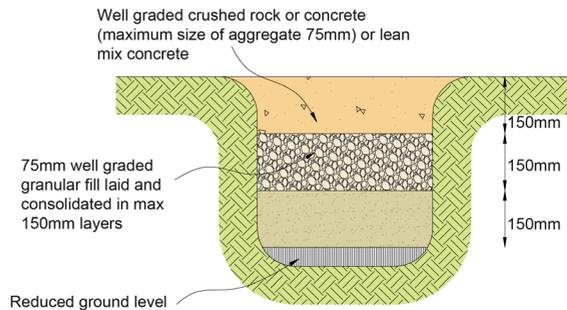


Figure 1: Backfilling of trenches

11.1.2 Laying of paths and drives

- Paths and driveways should be effectively drained to prevent ponding of water adjacent to the building.
- Paths and drives should be laid to fall away from the building.

- Rain water should either discharge into a trapped gully or drain to garden land that is well drained.
- Gullies should be trapped when discharging to a soakaway or combined drainage system (the approval of the statutory sewerage undertaker may be required).
- Where slotted surface water drainage channels are proposed to be used near the building (e.g. in front of garage door openings) and the ground levels would otherwise cause water to concentrate towards the building wall and potentially flood the building; a gradient should be created for at least 500mm away from the wall of the building to divert the water towards the slotted drain channel

Note:

1. Where access requirements are required under Building Regulations to the principal entrance of the visitable dwelling the ground surface of the defined approach route must be firm, even, smooth enough to be wheeled over, not covered by loose laid materials such as gravel and shingle and have a minimum cross-fall of 1:40.
2. Where a driveway is required by relevant Building Regulations, to provide access for fire fighting vehicles to allow a “pump” appliance to be able to get to within 45m of the entire dwelling house, the construction of the driveway must be suitable and durable to take the additional loadings (at least a minimum of 12.5 tonnes). The access width of the drive must be adequate (at least 3.7m) and if the driveway length is in excess of 20m a turning circle or hammer head should be provided.

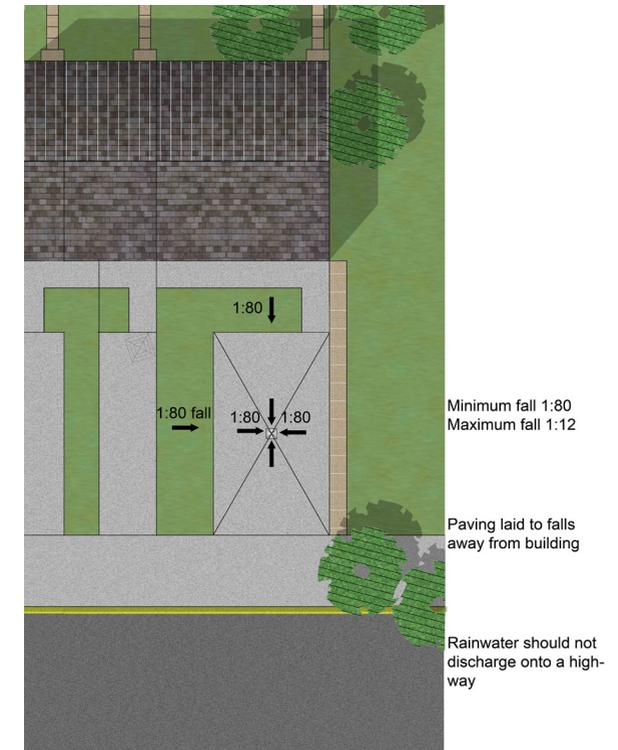


Figure 2: Drive and pathway drainage

All paving and drives, with the exception of the principle level access into the dwelling, should be laid at least 150mm below the Damp Proof Course (DPC) of the dwelling.

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11.1.3 Sub-base

A suitable sub-base that is capable of supporting the finished surface material should be provided.

Suitable sub-base material is considered as:

- Weak mix concrete ST1 (site mixed acceptable).
- Well graded crushed stone or recycled concrete (minimum aggregate size 75mm).

The minimum thicknesses of sub-bases are indicated in Table 1.

Use of surface	Min sub-base thickness	Comments
Pathway	75mm	
Driveway (light duty)	100mm	Light domestic traffic
Drive (medium duty)	150mm	Suitable for carrying small lorries e.g. refuse, vehicles or fuel delivery

Table 1: Minimum thickness of sub-base

Crushed stone or recycled aggregate sub-bases should be well compacted to adequately support the pathway or drive (see Table 2). Where the ground below the sub-base is weak or soft (typically <10% CBR), the sub-base should be designed by a Structural Engineer.

Compactor type	Compactor size	Minimum number of passes	
		100mm sub-base	150mm sub-base
Vibrating plate	1400-1800 kg/m ²	8	Unsuitable
	1800-2000 kg/m ²	5	8
	>2000 kg/m ²	3	6
Vibrating roller	700-1300 kg/m width	16	Unsuitable
	1300-1800 kg/m width	6	16
	1800-2300 kg/m width	4	6
Engine driven vibro-tamper	<65kg	5	8
	65-75kg	3	6
	>75kg	2	4

Table 2: Suitable compaction of sub-bases

11.1.4 Edgings

Edgings are to be provided to paths and driveways to prevent movement or displacement. Edgings are not necessary if the driveway is in-situ concrete or for any pathway made of precast concrete paving slabs laid on a mortar bed.

Edgings should be laid to ensure that there are no excessive gaps, and laid with smooth alignment along the top of the edging. Concrete edgings should be bedded on a 200mm wide x 100mm deep ST1 mix concrete base. The concrete should be haunched up the side of the edging to give adequate support.

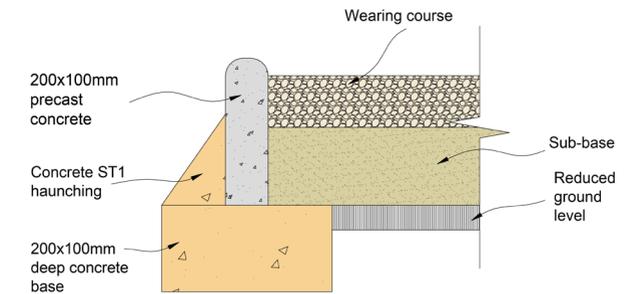


Figure 3: Typical edging detail

11.1.5 Surfacing of paths and drives

Differences in the surface should not exceed +/- 10mm from a 2m straight edge with equal offsets. Some fracturing or weathering may also appear if the material is natural stone because of the natural make-up of the material. This tolerance applies to principle pathways and driveways to the dwelling that are required to meet the standards of Part M (Access to dwellings).

Suitable surfaces for paths and driveways

Suitable surfaces are considered as:

- Block paving
- Precast concrete paving slabs
- Timber decking
- Cast in-situ concrete
- Rolled asphalt
- Macadam

Note:

Where access requirements are required under Building Regulations to the principal entrance of the visitable dwelling, the ground surface of

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the defined approach route must be firm, even, smooth enough to be wheeled over and not covered by loose laid materials such as gravel and shingle

Minimum Thickness of surfaces

The minimum thicknesses of surfaces are indicated in Table 3.

Surface type	Material specifications	Minimum thickness ⁽¹⁾		British Standard
		Path	Drive	
Macadam single course	40mm coated macadam	75	75	BS 4987
Rolled asphalt	Coarse asphalt 10mm nominal size	60	60	BS 594
Macadam two course	Nominal 20mm coated macadam,	60	60	BS 4987
	nominal 6mm wearing course	20	20	BS 4987
Block paving	Clay or calcium silicate	50	50	BS 6677
Block paving	Pre-cast concrete	60	60	BS 6717
Concrete	Designated mix	75	100mm ⁽²⁾	
Pre-cast concrete paving	Dense concrete	50	N/A	BS 7263:1

Notes: ⁽¹⁾ Drive minimum thickness assumes standard loadings for a typical family car, additional thicknesses are required where increased loads are applied e.g. LGV vehicles.
⁽²⁾ Drives increased to 150mm on poor ground or clay.

Table 3: Minimum thickness of surfaces for drives and paths

11.1.5.1 Paving slabs

Paving slabs should be placed on a 25mm bed of sharp sand or a semi-dry mortar mix (sand/cement mix ratio 3:1). Joints between slabs should be no greater than 4mm for straight edge paving slabs, and should be filled with kiln-dried sand. A neat consistent joint should be provided to rustic slabs. Slabs should be cut with a diamond blade cutter or similar to give a neat finish.

11.1.5.2 Block paving

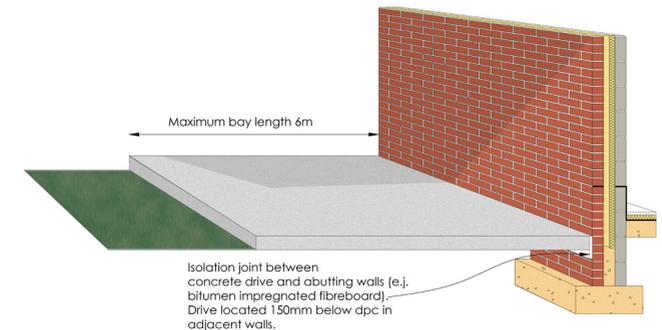
Block paving should be laid on a minimum of 50mm sharp sand, and gaps between blocks should not exceed 5mm. All joints should be filled with kiln-dried sand or similar. Blocks should be cut using a block splitter and the finished path or driveway should be compacted with a plate vibrator. Care should be taken to ensure that the surface of the paving is not damaged or scuffed.

11.1.5.3 Porous block paving joints

Where paving is designed to allow ground water to drain through the joints, the gaps between blocks and the material within the joints should meet the initial design specification. The joint material should be sufficient to prevent blocking and prevent moss growth.

11.1.5.4 In-situ concrete

In-situ concrete should be laid in areas of 20m² maximum to allow for movement. Where abutting an adjacent structure, the concrete should be isolated using a flexible jointing material. Where the sub-base is well drained, it is recommended that the concrete is cast onto a Damp Proof Membrane.



11.1.5.5 Macadam and asphalt

Ensure that sub-bases are dried and primed and that the surface is appropriately rolled with a vibratory roller to the required finish.

11.1.5.6 Timber decking

Only timber naturally resistant to decay, or which can be treated by an industrial process to give long-term protection from decay, shall be used.

Hardwoods: Only use species rated as durable or moderately durable.

Softwoods: Only use species/components with natural durability or which have been treated in accordance with BS EN 335 to a 'Use Class' standard appropriate to their use, i.e. 'Use Class 4' treatment for posts and other structural components in direct ground or freshwater contact, or 'Use Class 3' treatment for all components out of direct ground contact subject to frequent wetting.

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Note:

- Whitewood should not be used for posts embedded in the ground or for other elements (joists) in the ground or other non-permeable surface, e.g. concrete slab.
- All crosscuts, notches or large boreholes shall be treated on site with a suitable preservative. For full guidance on wood preservation specification, contact the Wood Protection Association.

Timber grade (strength class): C16 minimum

The grade (strength class) of timber used for structural components such as posts, beams and joists shall be sufficient to cope with the loads placed upon it during its service life. Softwood with a strength class rating of C16 is considered the minimum standard for decks above 600mm in height, and is a requirement of Building Regulations for such raised-level structures. The higher strength classes, typically C18 and C24, should be specified where smaller component sections, longer spans or commercial deck performance design considerations are required.

For decks below 600mm in height, the use of C16 timber is also recommended.

Posts can be made from laminated sections, solid timber or round poles, and should have a load-bearing capability/size/spacing appropriate to the scale and end use of the structure. For extended life, the surface mounting of posts on precast piers or metal shoes is recommended.

Note:

- Do not exceed the recommended load and span for each strength class; for detailed recommendations, refer to span tables in TDA/ TRADA Timber Decking: The Professionals' Manual
- Use 'noggins'/blocking to strengthen frames where appropriate to prevent flexing
- Timber moisture content at installation: 20% maximum

To minimise the effects of shrinkage, e.g. cupping, cracking, warping, etc., install timber as close as possible to the equilibrium moisture content of the site. For outdoor wood, moisture content varies from 19% in winter to 13% in summer in the UK. For best results, always install wood with moisture content lower than 20%. The stability of all wood used outdoors can be improved by the use of water-repellent treatments.

Board spacing

When laying timber decking boards:

- Allow for a 5mm minimum to 8mm maximum gap between board lengths.
- Where the board abuts a post, allow a 5mm gap.
- Where board ends meet, allow a 3mm gap.

Metal fixings

All metal fixings shall be made from corrosion-resistant materials, such as stainless steel, hot dipped, galvanised or other specialist coating. Before use, verify with the manufacturer that the fixings you have chosen are suitable for use with treated timber. Aluminium fasteners should not be used with treated wood. Prevent galvanic corrosion by using the same type of metal for both fixings and connectors.

Screws should be at least two-and-a-half times the thickness of the board being fixed. Ideally, choose screws that are self-countersinking. Pre-drilling pilot holes will help prevent splitting, and always drill pilot holes 2mm oversize when fixing hardwoods. At all joist crossing points, secure boards with two fixings positioned at the outer quarter points of the deck board, i.e. 25% in from either edge. On grooved boards, fixings should always be at the bottom of grooves. Take care using high-pressure nail guns as they can damage timber.

Fall

To aid drainage, build a gentle fall of 1:100 into the deck, away from any adjacent property. Grooved deck boards are designed to assist the drainage of surface water, so lay them in the direction of the fall.

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11.1.6 Further specification references

- TDA/TRADA Timber Decking: The Professionals' Manual – second edition November 2006
- TDA Technical Bulletin TB 02: Statutory requirements
- TDA Technical Bulletin TB 04: Parapet design and construction
- TDA Technical Bulletin TB 08: Metal fixings
- TDA Code of Practice TDA/RD 08/01: Raised timber decks on new homes – desired service life 60 years
- Wood Protection Association: Timber Preservation Manual

British Standards

The standards set out below all have a relevance to the creation of high-performance timber decks.

BS EN 335-1

Use classes of wood and wood-based products against biological attack – Part 1: Classification of Use classes

BS EN 335-2

Use classes of wood and wood-based products against biological attack – Part 2: Guide to the application of use classes to solid wood

BS EN 335-3

Durability of wood and wood-based products – Definition of hazard classes of biological attack – Part 3: Application to wood-based panels

BS EN 350-1

Durability of wood and wood-based products – Natural durability of solid wood – Part 1: Guide to the principles of testing and classification of the natural durability of wood

BS EN 350-2

Durability of wood and wood-based products – Natural durability of solid wood – Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe

BS EN 351-1

Durability of wood and wood-based products – Preservative-treated solid wood – Part 1: Classification of preservative penetration and retention

BS EN 351-2

Durability of wood and wood-based products – Preservative-treated solid wood – Part 2: Guidance on sampling for the analysis of preservative-treated wood

BS EN 460

Durability of wood and wood-based products – Natural durability of solid wood: Guide to the durability requirements for wood to be used in hazard classes

BS EN 599-1

Durability of wood and wood-based products – Performance of wood preservatives as determined by biological tests – Part 1: Specification according to hazard class

BS 8417

Preservation of timber – Recommendations. Guidance for specifiers on the treatment of timber drawing on relevant sections of BS EN Standards

BS 5756:1985

Specification for visual strength grading of hardwood

BS 6105:1981

Specification for corrosion resistant stainless steel fasteners.

BS 6399-1:1996

Loading for buildings. Code of Practice for dead and imposed loads

BS 7359:1991

Nomenclature of commercial timbers, including sources of supply.

BS 5268-2:2002

Structural use of timber. Code of Practice for permissible stress design, materials and workmanship.

BS 6180:1999

Barriers in and about buildings – Code of Practice.

BS 6399-1:1996

Loading for buildings. Code of Practice for dead and imposed loads.

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The following diagrams are considered as an acceptable provision to meet Warranty standards:

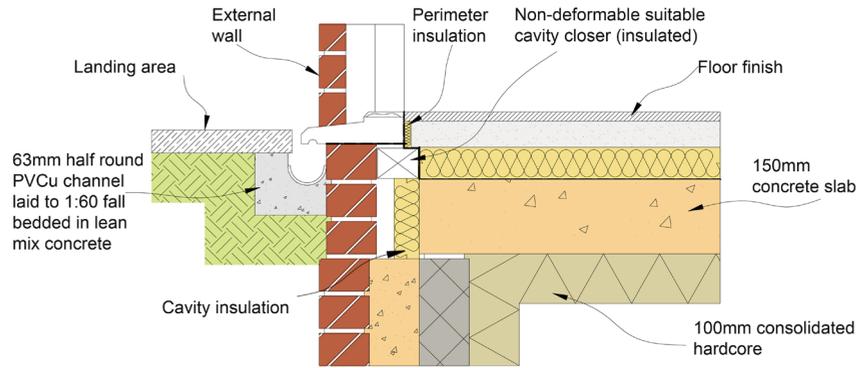


Figure 5: Level thresholds and access to dwellings

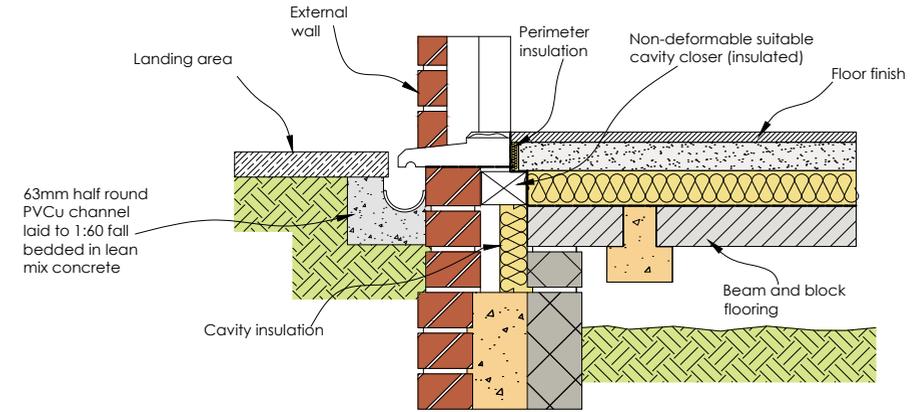


Figure 7: Level threshold: with canopy protection (block and beam floor)

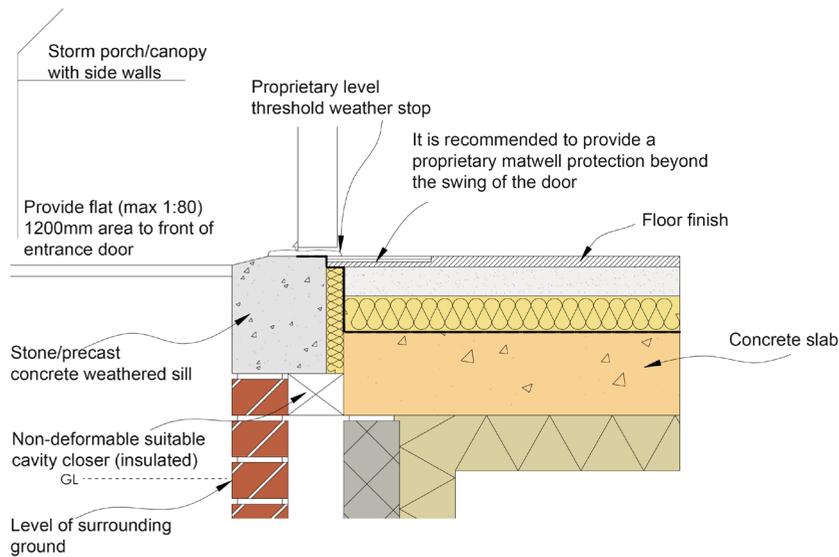


Figure 6: Typical level threshold cast in-situ concrete slab

FUNCTIONAL REQUIREMENTS

11.2 SITES SUSCEPTIBLE TO FLOODING

This section has been removed from the Technical Manual

FUNCTIONAL REQUIREMENTS

11.3 OUTBUILDINGS

Workmanship

- i. All workmanship must be within the tolerances defined in Chapter 1 of this Manual.
- ii. All work is to be carried out by a technically competent person in a workmanlike manner.

Materials

- i. All materials should be stored correctly in a manner that will not cause damage or deterioration of the product.
- ii. All materials, products and building systems shall be appropriate and suitable for their intended purpose.
- iii. The structure shall, unless specifically agreed otherwise with the Warranty provider, have a life of not less than 60 years. Individual components and assemblies, not integral to the structure, may have a lesser durability, but not in any circumstances less than 15 years.

Design

- i. The design and specifications shall provide a clear indication of the design intent and demonstrate a satisfactory level of performance.
- ii. Outbuildings should be constructed to resist lateral and vertical loads adequately.
- iii. Foundations should be designed and constructed to suit local ground conditions and adequately support the weight of the structure and imposed loads.
- iv. The materials and construction must meet the relevant regional building regulations.

Limitations of Functional Requirements

- i. The Functional Requirements are limited by the recommendations applied to the specific areas covered in this chapter.
- ii. These Functional Requirements do not and will not apply to create any policy liability for any remedial works carried out by the contractor or otherwise, nor to any materials used in those remedial works.

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11.3.1 Limitations

This section does not apply to outbuildings where:

- The building is heated or protected against frost damage
- The building is used as a habitable space, including home offices
- It is essential that the walls will resist wind-driven rain

11.3.2 Introduction

In order to achieve a satisfactory standard of performance, garages, conservatories, small outbuildings and extensions should be designed and constructed so that:

- They are able to sustain and transmit all normal loads to the ground without affecting their own stability or that of the housing unit (or any adjacent buildings) by excessive deflection or deformation that would adversely affect the appearance, value and serviceability of the building or the housing unit.
- They provide an acceptable and durable external surface and are not adversely affected by harmful or toxic materials in the atmosphere or from the ground.
- They are resistant to moisture and do not allow the passage of moisture to parts of the building that would be adversely affected by it.
- They encourage the rapid discharge of moisture due to rain or snow from their surfaces to suitable gutters and down pipes, or to some other form of collection and discharge that prevents moisture from re-entering the building, where it might have adverse effects.

- In the event of fire, they resist fire spread to the housing unit and to adjacent buildings.
- They are provided with sufficient locks or other devices to resist unauthorised entry.
- Where additional services installations are provided (such as central heating boilers or electrical or plumbing installations), these comply with Chapter 9 of this Manual.
- The risk of injury from accidental breakage of the glazing (where fitted) is reduced to a minimum

A satisfactory performance for the design and construction of garages, conservatories, small outbuildings and extensions may be achieved by meeting the relevant parts of the Approved Documents.

11.3.3 Foundations

Foundations should be constructed so that loads are adequately transferred; further guidance can be found in Chapter 5 of this Manual.

11.3.4 Floors

Floors should have a minimum concrete thickness of 100mm and bear onto a suitable sub-base. The concrete should be float finished and to at least a GEN3 grade. Further guidance can be found in Chapter 6 of this Manual.

11.3.5 Walls

Single leaf 100mm walls are considered acceptable, providing that the following provisions are met:

- The height of wall does not exceed 2400mm from ground level.
- Intermediate piers are provided, in accordance with Figure 9.
- The wall is adequately restrained at ceiling and verge level.
- The walls are capable of adequately transferring the roof loadings to the foundation.
- Walls are pointed both internally and externally.
- Walls should be provided with a suitable DPC located at least 150mm above ground level
- Proprietary lintels should be provided over window/door openings.

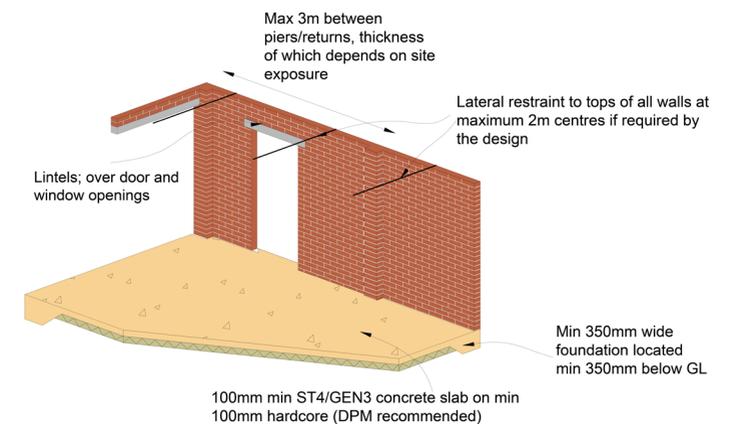


Figure 8: Small Detached Buildings

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11.3.6 Roofs

Roofs should be weather tight and provided with a minimum fall of 1:40. Tiled roofs should be installed in accordance with the manufacturer's instructions, including pitch, fixing and lap.

Roof structures should be durable enough to support roof loadings adequately. Timber trusses should be adequately braced and traditional cut roofs should have timber elements that meet relevant Building Regulations and supporting documents.

Further guidance can be found in Chapter 7 of this Manual.

11.3.7 Walls between outbuildings

Where walls separate outbuildings under two different ownerships or tenancies, the separating wall should be taken up to the underside of the roof and fire stopped.