



# APPLICATION & CONSTRUCTION

## SIMPLE RETAINING WALLS IN CLAY BRICKWORK

This leaflet deals with walls where differing ground levels and loadings are minimal. Where level differences are substantial, or other buildings will be close by, professional guidance should be obtained from a structural engineer or the local authority's building control department.

### FOUNDATIONS

What is not seen is just as important as what is. Concrete foundations should be a minimum 500mm below the lower ground level and at least 275mm in depth. The foundation width is indicated in the table below and is dependant on the finished height of wall.

A 1:2:4 mix (1 part cement: 2 parts sand: 4 parts aggregate.) (maximum aggregate size 20mm) will be strong enough in most cases.

Height of Wall mm	Foundation Width mm
300	400
500	450
800	500
1000	600

### HEIGHT AND THICKNESS

A minimum wall thickness should be 215mm of bonded construction or two separate brick skins tied together (see reinforcement). This will suffice in most cases where the ground level difference does not exceed one metre and where ground and water pressures are minimal.

### CLAY BRICKS

Appearance and durability is what is to be achieved. All clay bricks should be F2 (frost resistant quality) to ensure durability. Perforated bricks will provide more interlock and produce a stronger wall. Mortar jointing should be bucket handle or weather-struck. Recessed joints must not be used.

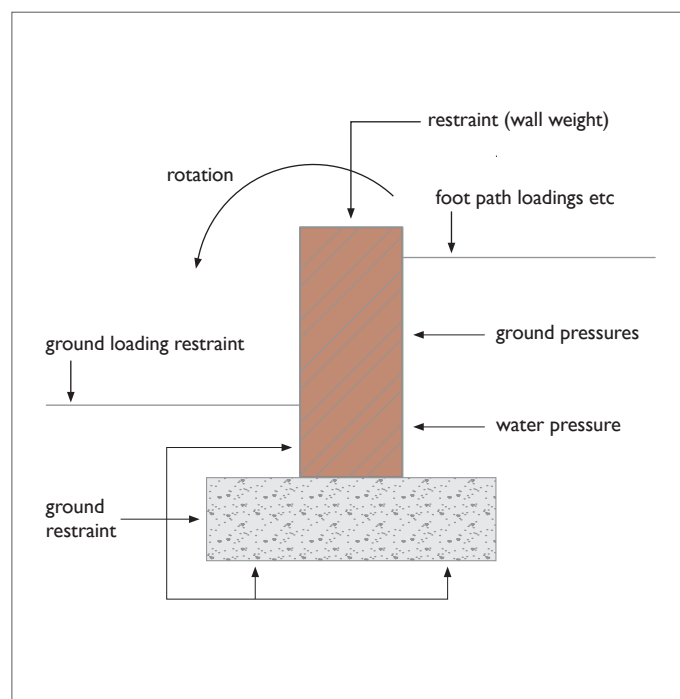
Mix 1	Mix 2
1 part Portland Cement	1 part Portland Cement
¼ part Lime	½ part Lime
3 parts Sand	4½ parts Sand

### DAMP PROOF COURSES & WATERPROOFING

DPC's are barriers to the passage of water and moisture. For greater stability use a minimum 2 courses (150mm) of Ibstock Engineering Bricks to F2 quality at the lower level. Always use a dpc beneath coping and capping courses which must be at least the width of the wall, be sandwiched within the mortar and have the ability to adhere to it (high bond).

**For continued durability the faces of retaining brickwork in contact with all retained material must be protected with a minimum 2 coats of proprietary liquid waterproofer or self adhesive membrane.**

### Forces Affecting a Retaining wall



### MORTARS

Mortar is just as exposed as the brick. Generally, and especially in the North West of England and Scotland, a mortar mix 1 below ground level DPC and for copings and cappings is strongly recommended. The exception to this recommendation would apply to 'Stock' bricks for which mix 2 should be used throughout. Fully fill all bed and perpend joints and lay frogged bricks with frog uppermost.

### DRAINAGE

Ground water can exert considerable pressure.

Water accumulating behind retaining walls and exerting pressure, must be released. A gravel trench and small 38 or 50mm plastic pipes through the wall will normally suffice.

*Note:* Leaving open perpend joints to release collected water can lead to localised wall saturation, with resultant staining and perhaps an effect on durability.



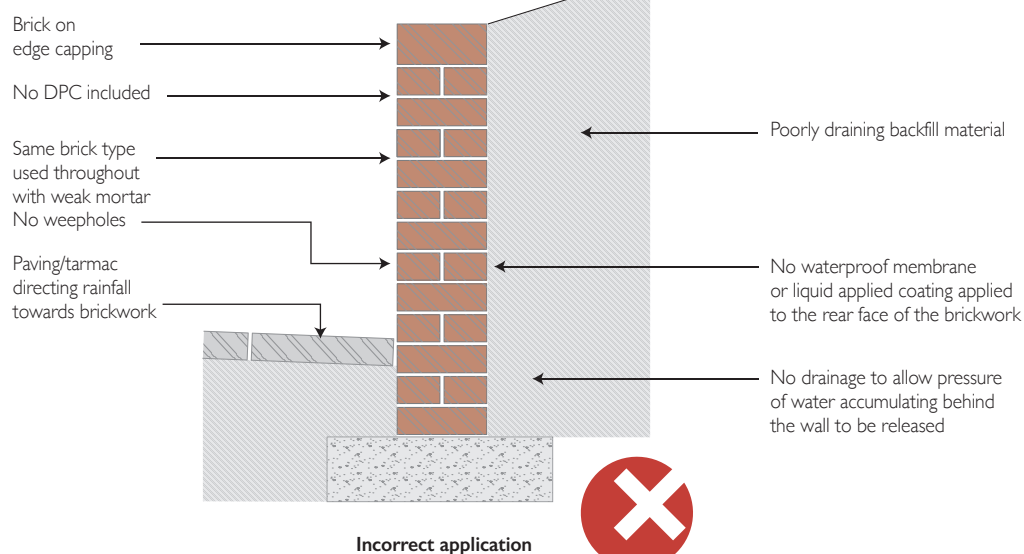
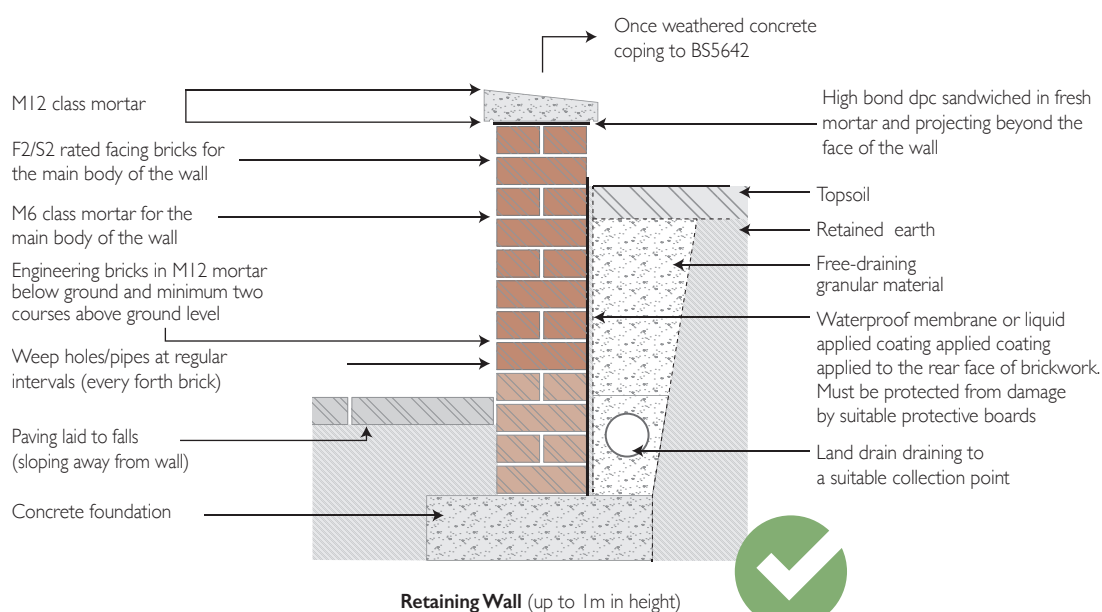
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### MOVEMENT JOINTS

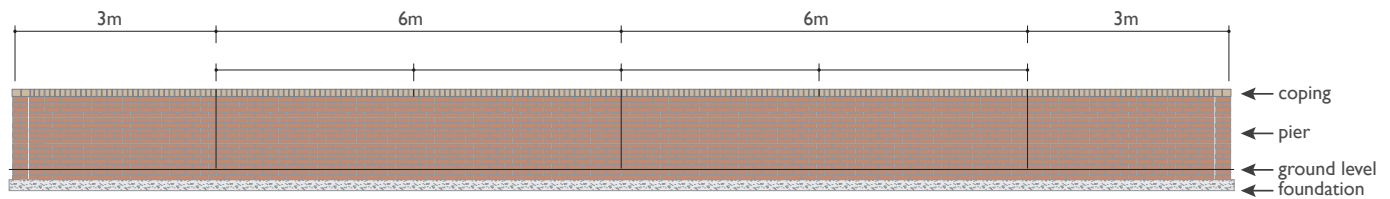
All building materials move when subjected to temperature and moisture changes. Brickwork is no exception. Movement joints (often referred to as expansion joints) must be provided at a maximum of 6m spacing with a maximum 3m from a corner or change of direction.

They must commence at concrete foundation level and continue through the coping/capping courses. **Additional movement joints will be required at 3m centres through the copings/cappings.** A 10mm joint width will normally be sufficient.



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To increase stability at the movement joint position, piers can be built at either side.

### FILLERS AND SEALANTS

Filler materials should be easily compressible by pressure between finger and thumb and should recoil back to its original thickness when released.

Cellular polyethylene and cellular polyurethane are ideal. Impregnated fibre boards must not be used with clay brickwork as they do not compress easily and will restrict expansion. The sealant should be a polysulfide or low modulus silicone.

### COPINGS AND CAPPINGS

This is where water will ingress the brickwork if not properly constructed. Clay brick copings and cappings must always be F2 (frost resistant). Of particular importance for walls constructed in areas rated as severe or very severe exposure to wind driven rain such as Scotland, Wales and the North and South West of England the wall should be protected by overhanging copings with a drip groove to help shed water.

**A flexible (roll type) high bond bitumen polymer DPC must always be provided and sandwiched in the mortar directly beneath the coping course.**

For clay copings the Ibstock patented 'Caplock' system will provide additional security, particularly in areas where vandalism is prevalent.

Forticrete Stone or Supreme Concrete copings are also ideal available in profiles to assist in shedding water:

Brick on edge cappings are not recommended, particularly in areas of severe exposure to wind driven rain.

### REINFORCEMENT – BED JOINT TYPE

Untied walls of two separate skins are unlikely to perform satisfactorily. Where the wall is constructed of two separate brick skins in stretcher bond, they will require tying together.

Stainless steel bed-joint reinforcement every third course will achieve this and greatly enhance the strength.



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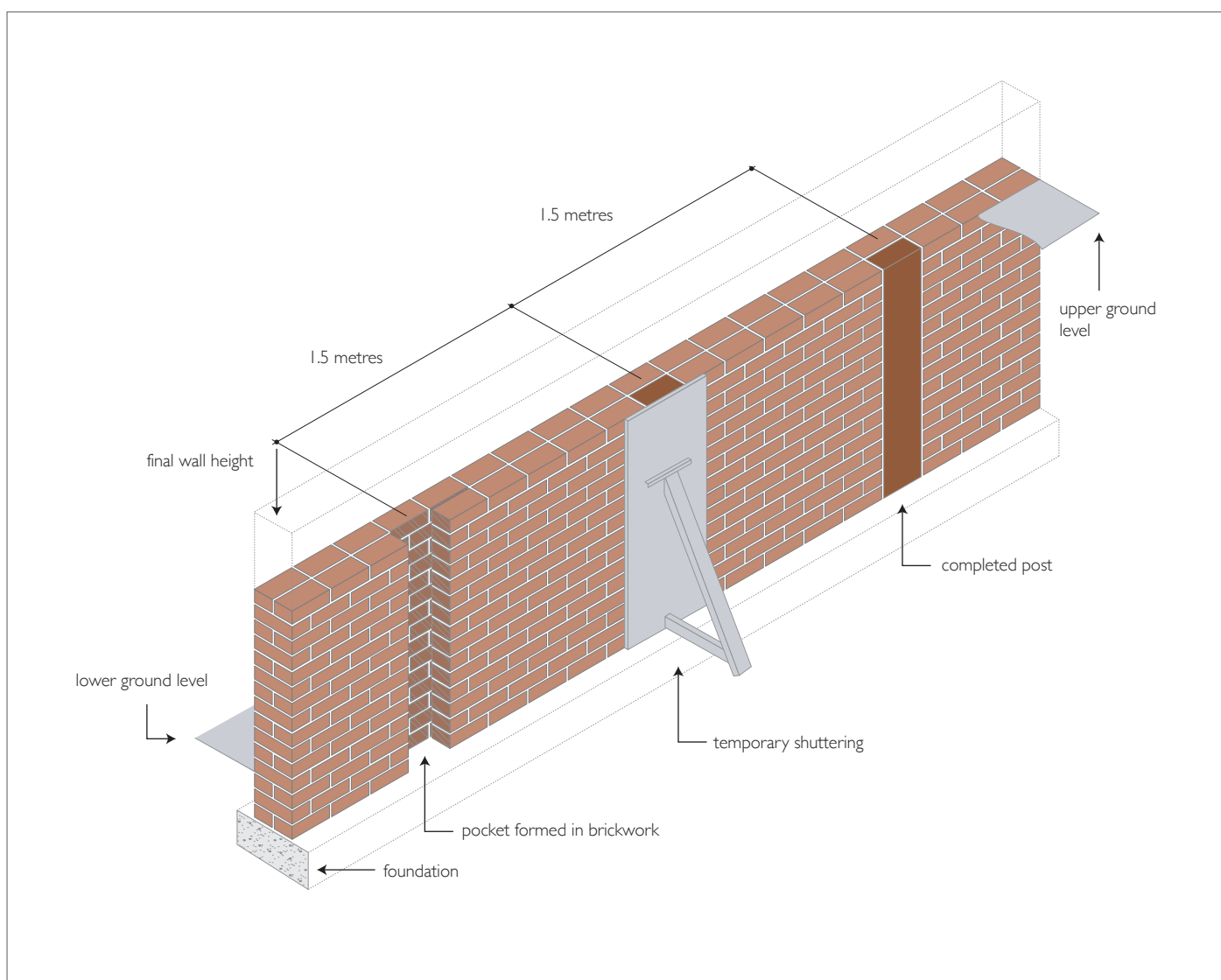
### REINFORCEMENT – POCKET WALL CONSTRUCTION

Additional strength and stability can be obtained by introducing reinforced concrete pockets into the construction.

This is achieved by casting into the foundation 10 or 12 mm diameter mild steel reinforcing bars which are accommodated within a vertical slot formed in the rear skin of the wall.

When a suitable height is reached a temporary shutter board completes the box which is filled with well compacted concrete.

**Remember to remove all mortar droppings from the bottom of the pocket before placing the shuttering and pouring the concrete.**



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