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NOTES ON SITE MANAGEMENT

The approach generally taken by engineers in designing house footings is to aim for a performance level that avoids significant cracking or other damage, assuming that site conditions are properly maintained. It is economically unrealistic to have a footing system that will accommodate extremes of soil movement that could occur if the moisture levels in clay soils under and near footings are not appropriately managed.

Some cracking or movement, while undesirable, can be expected to occur in most houses, particularly those on the more reactive clay soils. The structural significance of cracking depends on a number of factors including the width and location of the cracks and the extent or number of cracks throughout the building. Typically, minor cracking is more of a cosmetic problem than of structural concern. Serious cracking may be accompanied by lean, bow or buckling in walls, ceiling splits, slope in the flooring system as well as door and window frame misalignments. In some cases, tiling, roof framing, plumbing and possibly wiring may also be affected.

The objective with site management is to minimise extremes of year to year and season to season soil moisture variation near the building. That will reduce volume changes in clays and the extent of future cracking in a building. Soil movement will still occur where there are unavoidable seasonal variations in clay soil moisture levels but will be less if the controllable factors are well managed. The most common site management problems and general remedies for them are set out below.

(1) ROOF WATER

All roof water should be taken well clear of the building - preferably to the street, in sealed PVC piping. The same applies to the overflow from rain water tanks.

If the street is higher than the grounds around the building, a “wet” storm water system can be used so long as the lowest point of the gutters is at least 1.2m above the street level. Such a system must be water-tight to work effectively and should include screw on inspection points to clear any silting.

Storm water systems should preferably be protected by being buried under the ground surface. Where this is not possible pipes should be suitably supported and protected from UV light degradation.

(2) SITE WATER

It may be necessary to intercept sub-surface **seepage water** via a seepage trench. Trenches may need to be 600mm to 1200mm deep (depending on the depth in the soil provile where the seepage is), be graded to drain to a low point at least 6m away from and lower than the building, or to a storm water drain system. Heavy plastic sheet is placed to the base and side of the trench nearest the house and an agricultural pipe is laid along the bottom with risers at least every 6m for periodic back flushing. The trench is back filled with gravel.

Surface water may need to be diverted by appropriate landscaping. Sometimes a surface drain system is warranted. Surface water should not pond within 6m of the perimeter of the building. It is preferable to have surface water drainage in a separate storm water system from the roof water.

(3) PERIMETER PATHS

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There should be at least 1 metre wide paths (concrete or pavers) to the perimeter of buildings. On reactive clay soils, paths should slope away from the footing edge at least 50 mm over the first 1000mm. A well compacted quarry rubble base is recommended. If using pavers, bedding sand thickness after compaction should be less than 30mm. The finished surface of the path should be at least 75mm below the damp proof course unless the soil type is of low to moderate reactivity and there is some other form of approved perimeter termite protection. Use viscourse between the path & footing edge, extending 300mm under the path. Termite treatment to grounds under paths is recommended. Any gaps that develop between paving and the wall should be sealed with flexible sealant.

Grounds beyond the path should slope away from the building or be landscaped and incorporate drainage so that water will not pond within 6m of the building.

(4) VEGETATION

Gardens and lawns near the house should not be over watered nor should they be allowed to dry out in summer - they should be kept clear of the house perimeter by at least one metre, preferably more, to avoid changing the moisture levels in the soils immediately adjacent to and under the footings.

(5) LEAKS

Leaks in appliances, fittings, gutters, storm water systems, water supply and sewerage pipes and garden watering systems should be repaired as soon as possible - avoid using a damaged plumbing system. In the case of water pipes, turn off the water meter until leakage is repaired.

(6) TREES

Ensure that tree root systems do not seek out water from near and under the house footings - space trees a sufficient distance from the house when planting and provide adequate water to trees during the warmer months. Depending on tree and soil type, root systems generally seek out moisture a distance from their trunks of 1 to 1.5 times their mature height (some trees send out roots much further) if they are not provided with an adequate supply of water. Australian native trees are generally more problematic as they have a higher suction capacity.

One effective means of watering a tree is to sink 1.2m deep holes 1m to 2m from the tree, on the side away from the building. Flexible agricultural pipe can be put into the hole and gravel be placed between the pipe and the wall of the hole. Water can then be given to the tree via the agricultural pipe as needed or as part of a programmed automatic watering system. In some instances, installing a root barrier may be appropriate.

Large trees very close to a building may present a "catch 22" problem. Structural damage may result from removal as soils rehydrate to their longer term moisture balance over time. Doing nothing can lead to progressively deeper and wider drying of soils and associated structural problems. Watering of a very close tree can also be highly problematic as excess water can also cause movement. Typically, aesthetic and environmental considerations with trees compete with objectives for minimising soil movement.

Once site management factors are addressed, it may take some time for soils to reach a new, relatively stable moisture balance. It is therefore preferable to address site management factors prior to patching cracks. Soil stabilisation times vary, depending on the depth of soil wetting or drying associated with site specific moisture and moisture change issues.

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