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West Berks Building Control Consultancy						

Building Near Trees

Trees, shrubs and hedgerows can provide interest and enjoyment at every season of the year as well as enhance the appearance and quality of most properties. However, possible problems can arise in clay soils where buildings are in close proximity (up to 25m) to existing and newly planted trees, shrubs and hedges.

Damage to Buildings

Damage can be direct, indirect or a combination of both. Indirect damage is commonly termed as shrinkage and heave.

Direct damage includes physical damage to foundations and services by expansion of the trunk and root growth, damage from branches or fallen trees in high winds. Infestations from certain shrubs such as knotweeds can root into and damage the concrete/brickwork of properties.

Shrinkage can result from the removal of moisture from shrinkable clay soils by the evaporation and transpiration of moisture through the leaves. Damage can occur when the ground is at its driest and the roots continue to withdraw moisture. This can result in the ground shrinking and cracking which in turn can cause movement and settlement of the foundations.

Heave can be caused by the removal of trees or severe pruning of mature trees which can allow clay soils to recover their moisture content which results in the ground swelling and causing uplift or heave. Heave is also seasonal and the extent of heave can vary throughout the year. Heave can cause serious damage to properties.

Foundation Design

Foundations in clay soils near trees shrubs and hedgerows require special consideration. They should be designed so that the structure will not be adversely affected by shrinkage and heave. Key considerations in foundation design include:

1. Soil Classification – Clay soils can be tested to confirm their volume change potential as being low, medium or high. Where tests are not carried out the high volume change potential value is usually assumed for foundation depth and design purposes.
2. Identify the species of any trees, shrubs and hedgerows within 25m of the property. Include any which have been removed in the last 3 years.
3. Information from items 1 and 2 above can be used to determine the required foundation depths using various design guides. The mature heights and species of trees if not known can be determined from tree books or design guides. The mature height is usually used when designing foundations. An engineered foundation design will be required where foundation depths would exceed 2.5m. This will often consist of a piled foundation and ground beam design.

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4. Heave systems such as Clay Master and void forming products may have to be incorporated into the foundation floor slab design to reduce the impact of clay heave.
5. A suspended floor construction will also be required, as the ground cannot be relied upon to provide the necessary support or withstand the swelling or heave of the clay soil.
6. The designer or architect should seek advice at an early stage if existing trees, shrubs or hedgerows are in close proximity to the proposed works. Furthermore consideration should also be given to any proposed planting design as this may influence the adequacy of the proposed foundation depths.

The Table below illustrates the safe distance common trees should be away from any building.

Water Demand of Tree	Tree Species	Max (Mature) Height in metres (m)	Safe distance away from Trees for a 1.2m deep foundation (m)
High	Eucalyptus	18	21
	Hawthorn	10	12
	Oak (English)	20	23
	Poplar	28	32
	Willow (crack)	24	27
	Willow (weeping)	16	18.5
	Cypress Leylandi	20	11.5
Moderate	Cedar	20	6
	Monkey Puzzle	18	5
	Pine	20	6
	Spruce	18	5
	Acacia	18	12
	Alder	18	12
	Apple	10	7
	Ash	23	23
	Bay Laurel	10	7
	Cherry	17	11
	Horse Chestnut	20	13
	Lime	22	14
	Maple	18	12
	Pear	12	8
	Plane	26	17
	Sycamore	22	14
	Walnut	18	12
	Whitebeam	12	8
Yew	12	8	
Low	Birch	14	5
	Holly	12	5.5
	Horn Beam	17	7
	Laburnum	12	5.5
	Magnolia	9	4