Pre-development tree survey and Impact Assessment (BS5837:2012), 56 Cheadle Road, Forsbrook

A report to :

Client

Warren Lewis

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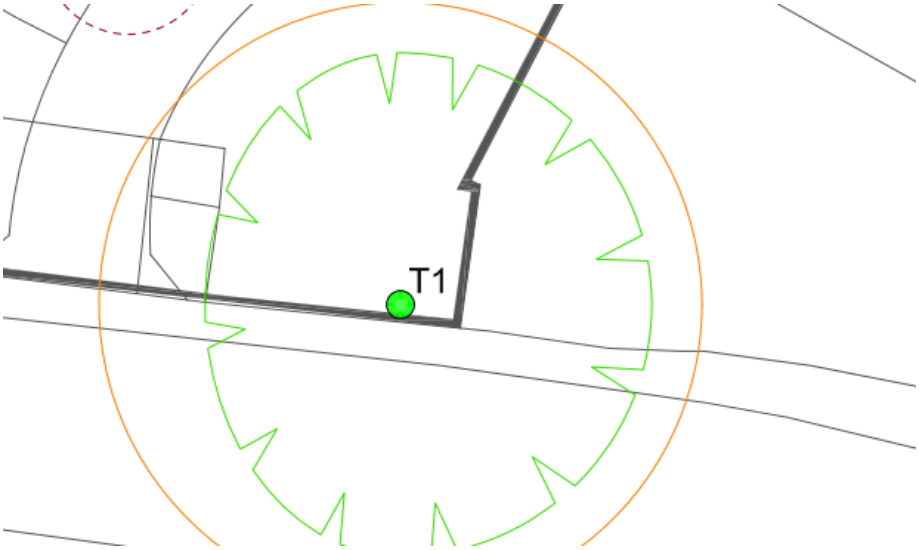
1.0. Introduction and site description

Warren Lewis commissioned Dr. Stefan Bodnar to undertake an arboricultural survey (BS5837: 2012) on trees within a development site at 56 Cheadle Road, Forsbrook in relation to the proposed conversion of a series of barn units to residential and the associated hardstanding required. The trees included within the survey and their relationship to the Development Footprint are identified on the drawing in Appendix 2. Photographs of tree involved are included in Appendix 1, together with examples of the tree concerned. BS 5837:2012 includes an assessment of all trees within the development footprint in addition to those near to the site boundary. this is particularly important as the particular tree within the site boundary is protected via a Tree Protection Order (TPO). The tree in question is a mature copper beech tree *Fagus sylcvatica purpurea,* shown in the aerial photograph below and on the plan (taken from the previous Arboricultural survey, (Tree Heritage, 2011). This plan identified the tree as in good physiological condition, and categorised it as A1.


T1

2.0. Arboricultural Survey Methodology

2.1. Condition Status

To determine the status of the trees within the site a full arboriculural survey has been undertaken, assessing species and status of all trees present within the footprint of development. The survey has been carried out in accordance with BS 5837 (2012).

The surveyor has extensive experience of arboriculture, through undertaking BS5837 surveys on many sites between 2005 and 2014. Previous to this, he has undertaken Lantra approved courses for arborists, and is competent to the level of a tree officer operating within a Local Authority, being familiar and having used the systems undertaken by tree officers for undertaking safety and condition surveys for Birmingham City Council. Dr. Bodnar possesses numerous ecological qualifications including a full member of CIEEM and a PhD (Community Forestry, 1998).

Individual trees above 75mm (diameter at 1.5m above ground level) have had their position confirmed on the survey drawing. The trees were visually assessed and a schedule prepared listing tree number, species, trunk diameter at 1.m above ground level, tree height, crown spread (radius), age, class and estimated remaining years. Any specific observation or recommendations with regard to management also.
A plan drawing indicating the location of each tree assessed is included in Appendix 2
The condition of each tree was assessed according to the following categories:

Category A
Those trees of high quality and value. Significant trees that are structurally sound and can be retained in the long term (i.e., >40 years) or trees that can be retained in the long term following remedial tree surgery. Colour code on the plan- pale green.

Category B
Those trees of moderate quality and value. Trees that may live 15-40 years. Trees that may live for more than 40 years, but whose removal may be required in that time frame to allow development of retained trees. Trees that are defective but could be retained in the medium term by remedial tree surgery.
Colour code on the plan- mid blue.

Category C
Those trees of low quality and value. Trees that can only be retained in the short term (.e, 5-15 years) and that have little landscape impact due to poor form or condition. Trees having a stem diameter of <150mm at 1.5m above ground level that could be replaced.
Colour code on the plan- grey.

Category R
Trees that are dead, dying or diseased that will become dangerous in the near future (within years). Colour code on the plan- red.

Categories A, B and C have further sub-categories with regard to the reasons for tree retention:

1: Mainly arboricultural values
2: Mainly landscape values
3: Mainly cultural values, including conservation.

2.2 Root Protection Area (RPA)

In order to avoid damage to the roots or rooting environment of retained trees, the RPA has been calculated for each of the category A, B and C trees. This is a minimum area of m^2, which should be left undisturbed around each retained tree.

These figures are calculated utilising the formula blow taken from BS 5837 (2012):

Single stem tree

$$\text{RPA } m^2 = \{ \frac{\text{Stem diameter (mm) @ 1.5 x 12}}{1000} \}^2 \times 3.142$$

Trees with more than one stem below 1.5m above ground level

$$\text{RPA } m^2 = \{ \frac{\text{Basal diameter (mm) @ 10}}{100} \}^2 \times 3.142$$

2.2 Root Protection Area

During construction works the root protection areas – 'Construction Exclusion Zones' are to be protected by barriers and ground protection in accordance with Section 9.0 of BS 5837:2012 and as specified and indicated on an approved Tree Protection Plan.

Where construction operations (demolition / hard surfacing) are proposed/ permitted within the Root Protection Area precautions should be taken to maintain the condition and health of the root system in accordance with BS5837:2012.

Construction of hard surfacing within the root protection area should be designed to avoid root loss during excavation. The structure of the hard surface should be designed to avoid localised compaction, including the use of three dimensional cellular confinement system as an integral component of the sub-base.

The hard surfacing in these areas should be a permeable and gas-porous nature such as washed gravel or paving slabs and block pavers (with infiltration spaces). Edge supports such as kerbs and edgings on foundations and haunchings are not to be used within the RPA. Consideration should be given to the use of pegged timber edging or propriety or steelpaver or edge restraints.

3.0 Results: A map detailing the location of trees and their Category determined is located in Appendix 2, all other trees are noted as being below 150mm DBH and outside the requirements of BS5837. Trees below 150mm DBH but above 75 mm DBH are included in the topographical survey of the site.

Tree no. and distance to road	Species	DBH	Radius (m)	RPA (sq.m)	Crown N	Crown S	Crown E	Crown W	Height	Age Class	Estimated remaining contribution (years)	Physiological and Structural Condition	Category	Preliminary Management Recommendation
T1	Copper beech	900	10.8	366	9	9	9	7	14	Mature	>40	Good structure and physiological condition. Root spread is restricted on all sides by walls and hardstanding at varying distance, although the tree appears to have adapted well to this and shows no signs of instability or physiological stress	A1	Crown raise over the road and neighboring driveways. the tree may benefit from a crown thin (up to 50%)

Latin names for species identified:

Common name	**scientific name**
Copper beech	*Fagus sylvatica* 'Purpurea'

4.0 Discussion

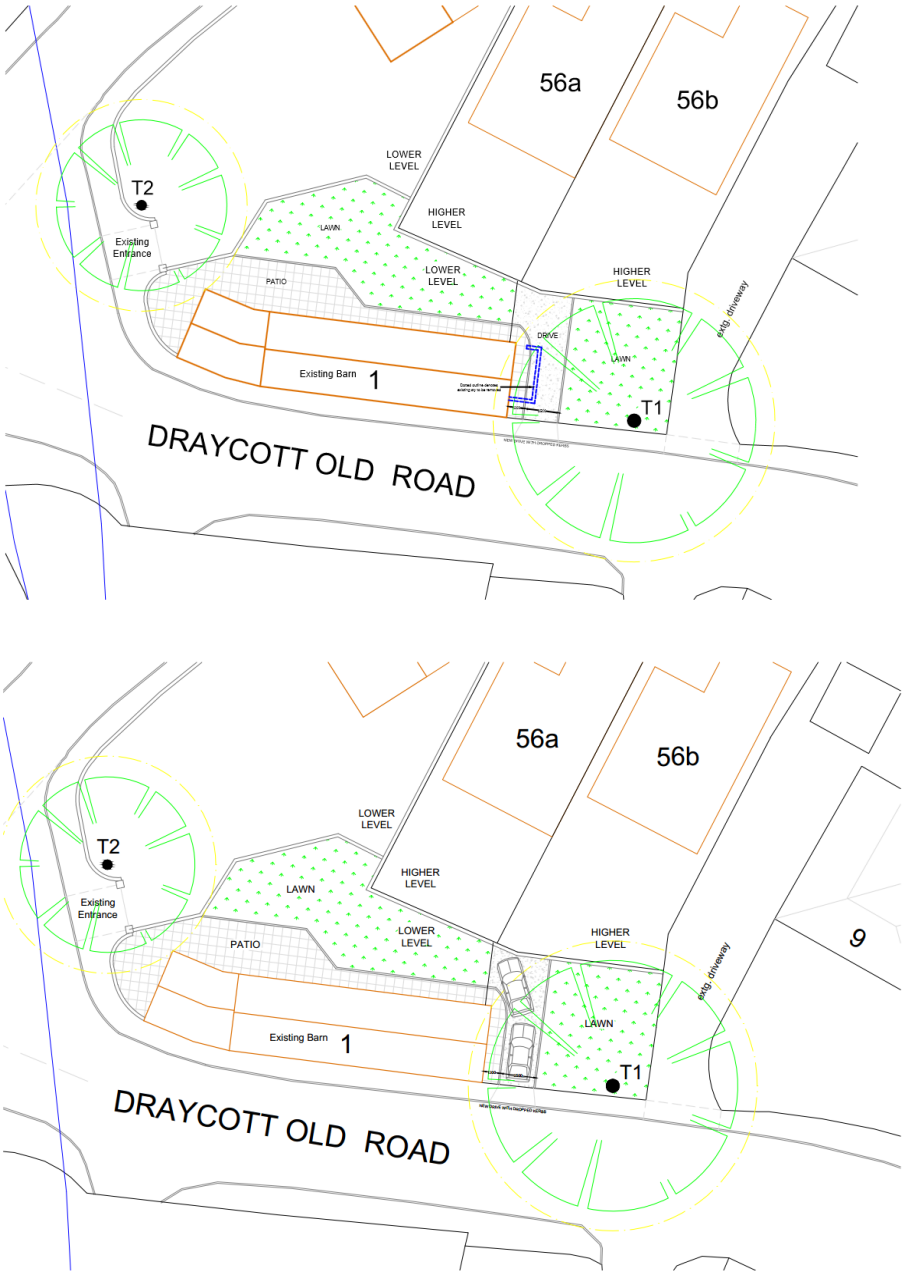
4.1 Tree Protection:

It is understood from the client, that this particular tree is covered by a Tree Preservation Order.

4.1.1 Existing trees of good quality, carefully incorporated so that they form an appropriate relationship with the new surroundings, will greatly enhance any new development proposal providing an immediate appearance of maturity. If however, existing trees are poorly sited and suffer from juxtaposition to newly developed structures, then they may cause new occupants anxiety and unacceptable nuisance to the extent that even legal protection will often not ensure their long-term retention. To avoid such problems and to ensure equilibrium between existing trees and new development, the physiological requirements of trees must be carefully considered within the planting layout. Once the right balance is found, this will ensure that they are a true asset to the site and go on to provide a wide range of material considerations for their perceived life expectancy. In particular, the development should aim to primarily retain trees in the 'A' and 'B' Categories and as many of Group 'C' as can be retained depending on the design plan. In general terms trees in Group 'C' and those designated for removal, can be mitigated for relatively easily in the replacement landscaping scheme.

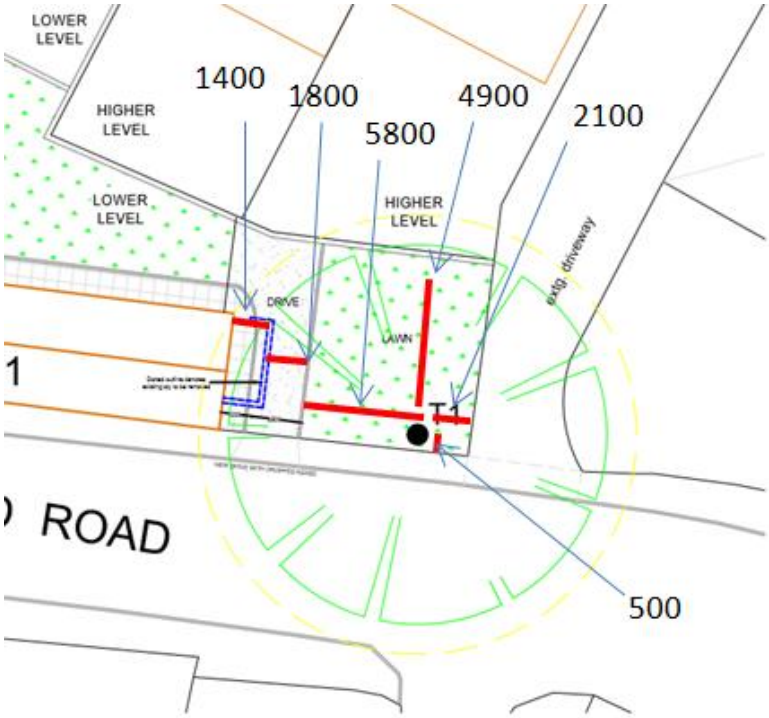
4.1.2 Trees may be negatively affected by the construction period by both direct and indirect actions, which are often borne out of ignorance as to their physiological requirements. Careful site planning and management along with the implementation of robust physical protection measures is necessary to ensure the retention of important trees.

It is proposed that this tree will be retained within the development and protected. The following plan shows the design of the entrance drive and car parking space beside the barns proposed for redevelopment:



Clearly the intended driveway show some slight incursion into the root protection zone, although this is slight. The blue line above illustrates the location of a previous wall and the concrete floor of a previous pigsty. This extends 1.4m away from the existing barn. The area required to complete the drive will be another 1.8m towards the tree trunk. The distance that will remain from the tree trunk will be a minimum of 5.8m (see detail below). This should avoid the main anchoring roots. However, in order to work within the RPZ an appropriate method will be required. Although the incursion into the root zone is slight, consideration of this is particularly important as the root zone is already constrained by the wall and

footpath/road of the Draycott Old Road, to the south, and the access drive to the neighboring property to the East.
Recent clearance of debris and redundant brick walls on and around the former pigsty area has left the original ground level sloping from the tree base to the concrete flooring of the pigsty with the fine surface root structure intact.



Working method of construction of gravel drive where it extends into RPZ:

N.B. All works to be undertaken under direct arboricultural supervision.

Is proposed within the RPZ, no-dig construction techniques should be employed using Cellweb (Geosyn) or similar approved, in conjunction with permeable surface finishes, (e.g. free draining gravel or permeable block paving. This allow spread of load and prevents compaction, and allows water and nutrients to pass through to the roots beneath.

Cellweb Tree Root Protection System provides a flexible and permeable solution for protecting tree roots while creating a robust and stable platform when creating vehicular access paths.

Cellweb Cellular Confinement System with its unique cellular structure and perforated cell walls reduces the vertical load pressure on sub soils above tree roots and prevents compaction. With clean granular materials as infill, air and moisture can reach the roots to encourage healthy prolonged growth.

With no-dig solutions being the preferred option Cellweb is ideal as only the surface

vegetation need be removed. An image of the structure, illustrating it's appearance is shown below:

4.1.3 It is essential to safeguard a pre-determined volume of soil around the base of the retained trees to ensure that then ongoing biological functioning of the root system along with the interaction with the soil is not impaired. This requires, that prior to the commencement of development activity on site (including the demolition works) that a robust protective barrier is erected.

4.1.4 The specifications for this barrier should be as per the British Standard 5837 of 2012 (Trees in Relation to Construction – recommendations). In brief, this consists of 2.3m high panels attached to an adequately braced scaffold structure to deter un-authorized dismantling and robust enough to rebut physical impacts from site plant and machinery. In practice Heras, weld-mesh type panels perform well when attached to the above mentioned scaffold structure.

4.1.5 Bird breeding season: All tree works should ideally take place outside of the bird breeding season. Bird breeding season is between mid March and mid July, although certain species can breed outside these months and if breeding birds are found then work should cease and the advice of an ecologist sought. If clearance is undertaken within the bird breeding season then all site features should preferably be checked immediately prior to clearance by a suitably qualified ecologist.

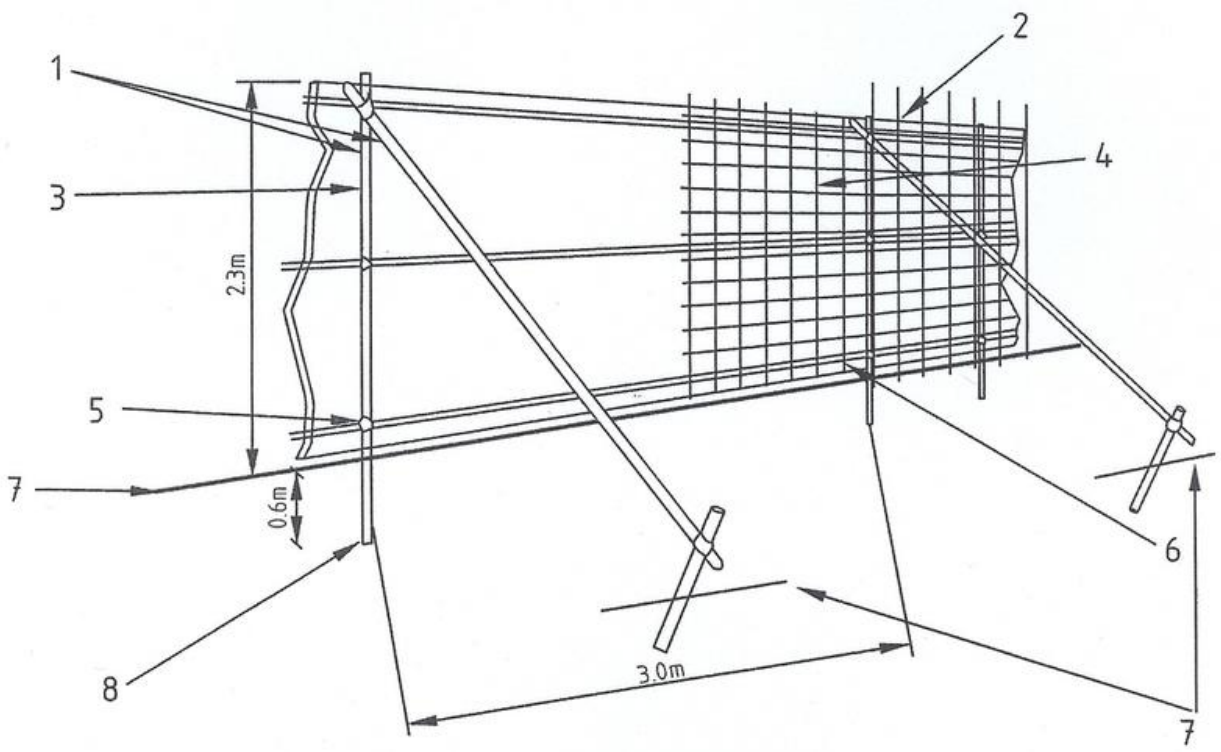
4.1.6 Bats: There are no trees of high or moderate bat roost potential identified

4.2 Tree Protection & Ground Protection

4.2.1 All trees that are being retained on site are to be protected by barriers and/or ground protection before any materials or machinery are brought onto the site, and before any demolition, development or stripping of soil commences. Where all activity can be excluded from the RPA, vertical barriers are to be erected to create a construction exclusion zone. The default barrier specification is to be in accordance with Figure 2. of BS 5837:2012 'Trees in Relation to Design, Demolition and Construction - Recommendations' as illustrated below.

4.2.2 The protected area is to be regarded as sacrosanct, and, once installed, barriers and ground protection is not to be removed or altered without prior recommendation by the project arboriculturist and, where necessary, approval from the local planning authority.

4.2.3 All weather tree protection posters (an example is detailed below) are to be securely fixed to the tree protection fencing in plain view.



1 Standard scaffold poles
2 Uprights to be driven into the ground
3 Panels secured to uprights with wire ties and, where necessary, standard scaffold clamps
4 Weldmesh wired to the uprights and horizontals
5 Standard clamps
6 Wire twisted and secured on inside face of fencing to avoid easy dismantling
7 Ground level
8 Approx. 0.6m driven into the ground

Figure 2. – Protective fencing for RPA

4.2.4 The tree protection fencing to the retained trees is to be erected as detailed above.

Care is to be exercised when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid contact with structural roots. If the presence of underground services precludes the use of driven poles, an alternative specification that provides an equal level of protection is to be prepared in conjunction with the project arboriculturist as illustrated within Figure 2 above.

4.2.5 Where the set-back of the tree protection barrier exposes unmade ground to construction damage, temporary ground protection is to be installed as part of the implementation of physical tree protection measures prior to work starting on site.

4.2.6 Temporary ground protection is to be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil. Detail is shown in Figure 3 below: Scaffolding and root protection within the RPA.

a) for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;
b) for pedestrian-operated plant up to a gross weight of 2t, proprietary, inter-linked ground protection boards placed on top of a compression resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;
c) for wheeled or tracked construction traffic exceeding 2t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

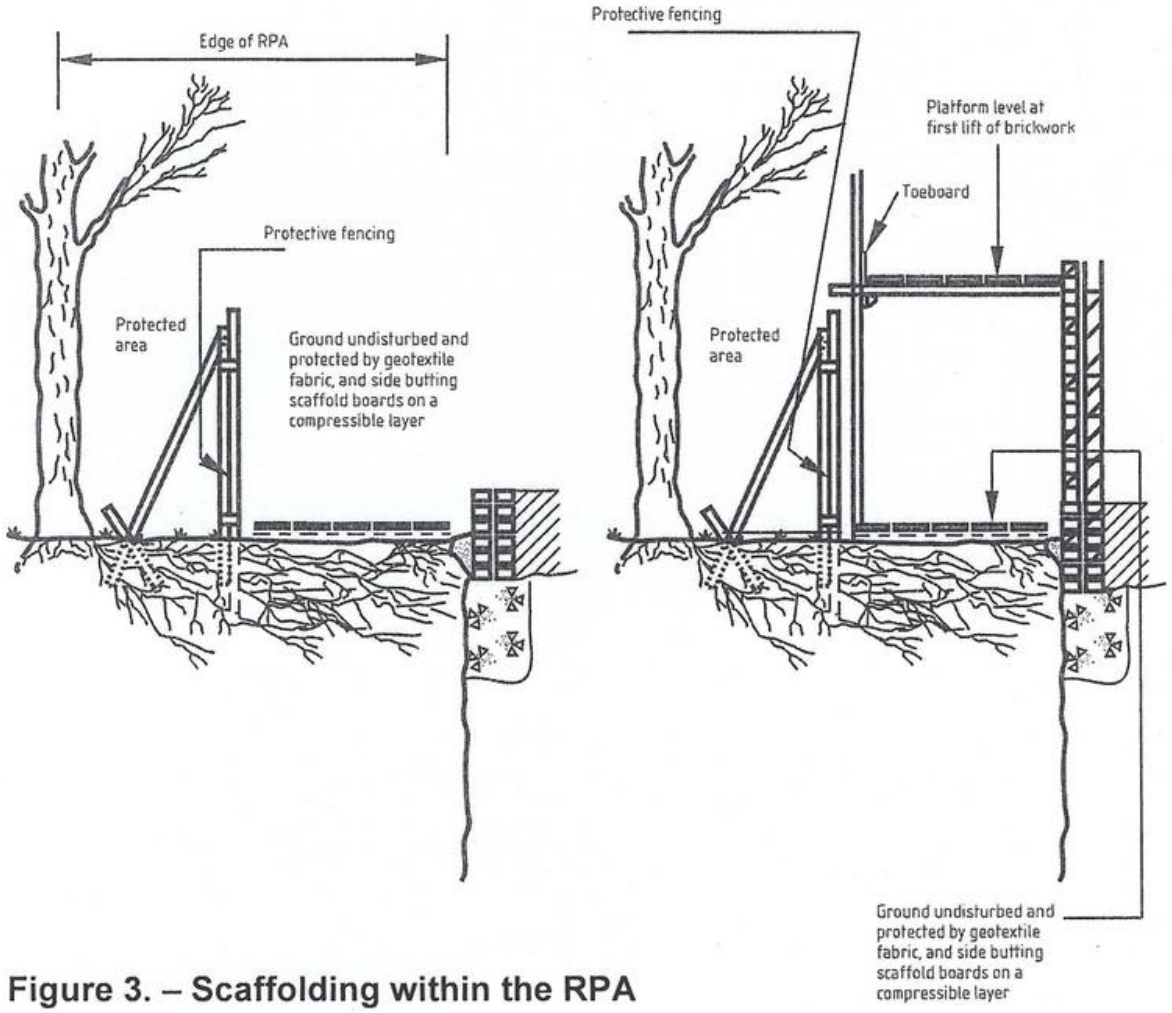


Figure 3. – Scaffolding within the RPA

REPORT ENDS

Appendix 1: Images of trees

Tree 1 from Draycott Old Road

Base of former pigsty (concrete)

Debris above original earth level cleared

Appendix 2: Tree location maps