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Site: **Part of Winterfold Farm, Chaddesley Corbett, DY10 4PL.**

Subject: ***BS5837 Tree Constraints, Impact Assessment
& Tree Protection Method Statement for widened gateway.***

Surveyor: Jim Unwin.
Report: Jim Unwin. (professional-CV in Appendix VI).
Dates: Inspection 14th Nov 2023. Report: Stage 1: 27th Nov 2023.
Stage 2: 27th Nov 2023 **rev 22nd Jan 2024 with optimised access location.**

Summary:

- The A448 Bromsgrove Road is narrow and very busy.
- Winterfold Farm and adjacent Winterfold House School have a row of large Corsican and Scots pines on their road frontage.
- The proposed alternative access for Winterfold Farm requires no tree or hedge removal. But I advise crown reducing sycamore T11.
- The western end of holly hedge H13 needs hard pruning for a visibility splay.
- Impact on retained trees can be avoided provided construction access, and working methods, described in section 6 of this report are followed.

Tree and Woodland Consultancy
Woodland Valuation and Timber Sales
Landscape Management

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Visual Tree
Assessment

Contents:

	Summary	Page 1
Sections 1-4 are Stage 1 Tree constraints report.	1. Instruction.	Page 3
	2. Inspection.	Page 3
	3. The Site.	Page 3
	4. The Trees.	Page 4-12
	4.1 Trees on site:	
4.2 Off-site trees:-		
4.3 Amenity:		
4.4 Photos:		
4.5 Tree Descriptions & Tree Constraints Table.		
Sections 5 & 6 are Stage 2 Tree impact assessment and tree protection method statement.	5. Proposed Development & Tree Impacts.	Page 13-14
	5.1 The proposal.	
	5.2 Tree Constraints and Impacts (considered below).	
	5.3 Physical contact of above-ground parts of trees.	
	5.4 Below-ground root spread.	
	5.5 Light Interception & Shading.	
	5.6 Over-bearing and Falling material.	
	5.7 Subsidence/heave & root growth.	
	5.8 Amenity impact.	
	6. Arboricultural Method Statement in sequential order for proposed development.	Page 15-21
	6.1 Supervision	
6.2 Tree Management		
6.3 Tree Protection		
6.4 Construction Access.		
6.5 Demolition / Excavation within RPAs:-		
6.6 Foundations within RPAs:-		
6.7 Drainage.		
6.8 Service Trenches within RPAs.		
6.9 Minimal-dig construction for new access Drives, parking & paths.		
6.10 Tree work following construction.		
6.11 New Planting.		
Appendices 1 to VIII:-	Page 22-end	
I BS5837 Tree Quality Categorisation.		
II Location plan & Google Earth aerial.		
III Vertical Tree Protection Fencing, from BS5837.		
IV Horizontal Ground Protection x 2 examples.		
V Materials for porous, minimal-dig, roading, 3 examples.		
VI Example of Air-spade.		
VII B J UNWIN FORESTRY CONSULTANCY CV.		
VIII Constraints plan:-		
IX Tree Crowns, Root Protection Areas, Theoretical Shading. Tree Retention and Tree Protection Plan.		

Notes:

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1. Instruction.

- 1.1 The owners of Winterfold Farm, assisted by Fisher German and RAPPOR propose a new access to replace a dangerous one.
- 1.2 Wyre Forest District Council may require a tree impact assessment and tree protection method statement for the proposal. The local authority may require mitigation by new planting for any trees lost as part of any development. Therefore, The farm has asked B J Unwin Forestry Consultancy Ltd to advise on trees for planning application purposes.
- 1.3 I have used a **topo survey by Castle Surveys 23095-23-01 of 17/02/2023** for constraints plans. I have added or removed a few trees to update it. The Proposal: **Rappor 23170-RAP-3200 P03 of 8/1/2024** extract in section 5, shows the proposal, and guides our tree impact and tree protection Sections 5 & 6 of this report.
- 1.4 Therefore methodology of the report below follows *BS5837:2012 Trees in Relation to Design, Demolition & Construction*.

2. Inspection.

- 2.1 Jim Unwin visited the property on 14th November 2023, met Mrs Davies, and made an unaccompanied inspection in good light conditions.
- 2.2 The survey was from ground level, involving visual observation (Visual Tree Assessment: Mattheck and Breloer, 1994 and Lonsdale, 1999). I located all trees by laser measure from perimeter features marked on the plan. I measured stem diameter (wherever access was difficult, rounding up to nearest 5cm), measured or estimated height, and measured or lasered crown spread.

3. The Site.

- 3.1 The main survey site is a strip along the A448 roadsides about 250m long, comprising verges, fencing, grass paddock or playing field, one field gateway and the existing drive into Winterfold Farm.
- 3.2 Terrain is slightly elevated on a slight knoll, at around 92m aod. The site is a little exposed to prevailing winds.
- 3.3 Geology from BGS:-
Superficial deposits: None recorded.
Bedrock geology: Helsby Sandstone Formation - Sandstone. Sedimentary bedrock formed between 247.1 and 241.5 million years ago during the Triassic period.
Therefore, subsoil and geology is likely to be coarse-textured, without volume-change potential. This needs confirmation by ground investigation.
- 3.4 The site is set in agricultural land, but with a prep school to the south & west.

4. The Trees.

- 4.1 Trees on or adjacent to site:
 - The biggest trees are ten Corsican pines and two Scots pines flanking the existing entrance.
 - They are large and mostly good trees.
 - Scots pine T14 has a twisted top with a risk of falling into the road.

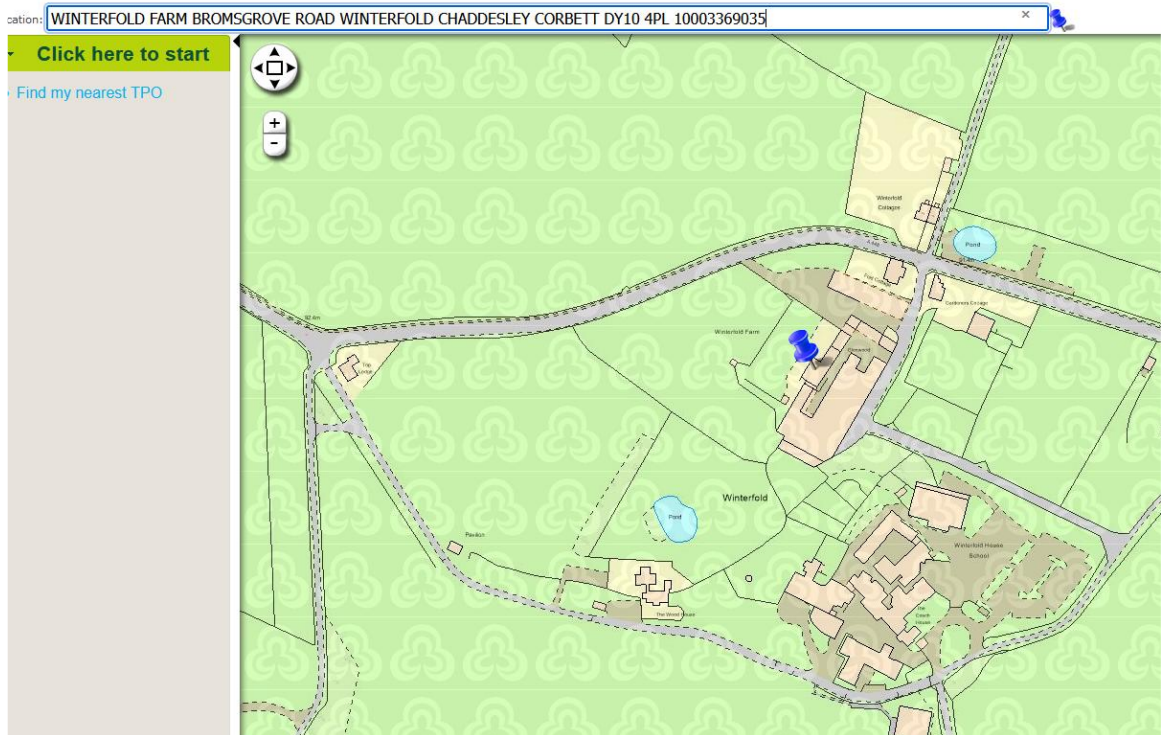
- The base of Corsican pine T18 on the entrance has been damaged by vehicles over many decades, but none in the past twenty or so years.
- A short section of good holly hedge H13 links the existing drive entrance and gateway.
- A good multi-stem holly T10 and old sycamore T11 stand in the western corner of the paddock.
- Pine T12 has been recently felled.
- Sycamore T11 has historic basal damage and *Ganoderma* basal decay (see photo).

4.2 Off-site trees:-

- To the west are two young beech trees and a Scots pine, plus an ash, sycamore and some old hawthorns in the school playing field.
- On the northern side of the road are three good beech, but needing formative crown lifting.
- A section of trimmed field hedge stands on the northern side of the road opposite the site.

4.3 Amenity: This could describe an attractive tree, a screening function, habitat potential, or historic/veteran tree.

- The area is quite open, and the large conifers are a strong year-round landscape feature.
- Wyre Forest DC TPO map shows none nearby, extract below. The site is outside any conservation area.



4.4 Photos below:



4.4.1 View north west to big pines flanking existing entrance.



4.4.2 View east past proposed entrance to holly hedge H13 and pines T14 etc.



4.4.3 End of H13 on left.



4.4.4 Sycamore T11 right and holly T10 just out of picture right.



4.4.5 Cavity at top of pine T14.



4.4.6 View west to old wound at base of pine T18.



4.4.7 Base of sycamore T11 showing areas of eaten-off cambium, and *Ganoderma* bracket.

4.5 Detailed Tree Descriptions

4.5.1 Trees **on, or potentially influencing** the site, are individually described in the table below, and shown on the plans in Appendices.

Age class is described as:-

- Sap: Very young tree, or sapling, one-five years old.
Y: Young tree less than fifteen years old and <1/3 fully grown.
Sm: Semi-mature tree having attained 1/3 to 2/3 full stature and 1/3 to 1/2 estimated lifespan.
Em: Early mature: tree at 2/3 to virtually full size, and halfway through its safe life.
M: Mature: fully-grown tree with useful life expectancy.
Lm: Late-mature: fully grown, of declining vigour, but still healthy.
Om: Overmature tree: fully grown and starting to decline in health (but may still have years of safe life).
Vet: Veteran: usually very old; of significant historic, habitat or cultural value.

Health & Structural condition:- Self-explanatory:- **Good, Fair, Poor or Dead.**

Remaining Contribution, in years

Prediction of safe useful life in its location, estimated as:-
<10 years, >10 years, >20 years, >40 years.

Retention categories, based on BS 5837 Section 4.5, and shown in Appendix I, are:-

Retain:

- A** = High quality or value >40yrs safe life:
B = Moderate quality or value >20yrs safe life:
C = Low quality or value >10yrs safe life
or young trees <150mm stem diameter.

Light Green*

Mid Blue*

Grey*

Remove:

- U** = <10yrs safe life or should be removed for sound arboricultural reasons:

Dark Red*

(*Colour marking on relevant Tree plan).

Sub-category for retention:-

- 1 = Arboricultural Value
2 = Landscape Value
3 = Cultural and/or Habitat Conservation Value

BS 5837:2012 Root Protection Area:

The estimated area rootable soil required to sustain the tree, centred on the tree's trunk. The RPA can be a varied shape enclosing the correct rootable area: but usually shown as a circle for convenience, unless obvious constraints stop rooting.

Radius calculated as:-

Single-stem tree, radial distance = 12 x stem diameter at 1.5m ht.

Multi-stem trees 1-5 stems = Square root of (sum of individual stem diameters squared).

> 5 stems = Square root of (average dbh squared x number of stems).

(Area can be calculated by $\pi \times r^2$.)

- Denotes estimated stem diameter in mm at 1.5m height where measurement was not possible.

T = tree S = shrub H = hedge G = group HG = hedge group.

4.5.2 **Winterfold Farm - BS5837 Inspection - BJUFC – 14th November 2023**

No.	Species	Dbh (stem diam @ 1.5m ht) mm.	-Total height. -Ht of lowest branch & direction. - Est Ht in 10 yrs. m.			Crown radii m.				Age class	Health	Structural Condition	Remaining contribution Years.	Comment (All are in average to good health and condition, unless stated otherwise.)	BS5837 Retention Category.	BS 5837 Root Protection Area Radius. m.	Recommended WORK excluding development.
						N	E	S	W								
T1 - T3	Beech	550	12	1	15	5	5	4	5	Em	F	P	>40	Planted in off-site field. Never crown lifted.	B2	6.6	Advise owner to crown lift to 5m clear stem.
T4	Scots pine	500	16	8	16	2	2	4	1.5	M	F	F	>20	In school grounds.	B2	6.0	
T5	Ash	250, 300, 300, 350	12	5	12	5.5	5.5	5.5	5.5	Em	F	P/F	>10	Off-site. Self-sown in post & rail fence.	C2	7.2	
T6	Sycamore	400	10	2.5	12	4	5	4	3	Sm	F	P/F	>40	Off-site. Pushed by ash.	B2	4.8	
HG7	Hawthorn x 5, Holly x 1	300 basal	5-8	1	5-9	2	2	2	2 ext.	M	P-F	P-F	10- >40	Relic off-site hedge. Ivy-covered old hawthorns, good holly.	C2	3.0	
T8, T9	Beech	300	7-8	1.5	10-12	2.5	2.5	2.5	2.5	Y	F	F	>40	Planted in school field.	B2	3.6	

T10	Holly	10 stems x 150	9	0	9.5	3.5	3.5	3.5	3.5	M	F	F	>40	Bushy, good. Elder growing into crown.	B1 / B2	5.7	Cut out elder.
T11	Sycamore	970	16	4	16	7	8	9	9	Lm	F	P	>20	Severe animal damage around base. 2/3 basal cambium dead and <i>Ganoderma</i> fungal decay spore body.	B2	11.6	
T12														Corsican pine stump.			
H13	Holly	200 basal	2	0	2	0.8	0.8	0.8	0.8 ext.	M	F	F	>40	Trimmed. Occasional hawthorn and elder.	B2	2.0	
T14	Scots pine	550	22	5	22	4	6	4	5	Lm	F	P	>40	Tag 1443. At 4/5 height the stem twists with a long open scar. Upper part over road.	B2	6.6	Top down to twist.
T15	Scots pine	450	20	9	20	3	3	3	3	Lm	P/F	F	>40	Slender.	C2	5.4	
T16	Corsican pine	650	26	5	26	5	5	5	5	M/Lm	F	F	>40	Tag 1445.	A2 as a group.	7.8	
T17	Corsican pine	900	27	7	27	5	5	5	5	M/Lm	F	F	>40		A2 as a group.	10.8	

T18	Corsican pine	1150	27	6	27	6	6	6	6	M/Lm	F	F	>40	1/3 basal dead cambium: historic vehicle damage. Flanking drive.	A2 as a group.	13.8	
T19	Corsican pine	1050	27	9	27	6	6	6	6	M/Lm	F	F	>40	Flanking drive.	A2 as a group.	12.6	
T20	Corsican pine	750	20	9	20	4	4	4	4	M/Lm	F	F	>40		A2 as a group.	9.0	
T21	Corsican pine	900	22	7	22	6	6	6	6	M/Lm	F	F	>40		A2 as a group.	10.8	
T22	Corsican pine	750	25	7	25	6	6	6	6	M/Lm	F	F	>40	Narrow forks.	A2 as a group.	9.0	
T23	Corsican pine	700	20	8	20	4	6	3	5	M/Lm	F	F	>40	Tag 4633. Lean east.	A2 as a group.	8.4	
T24	Corsican pine	800	25	8	25	3	5	5	4	M/Lm	F	F	>40	Tag 3554.	A2 as a group.	9.6	

End of table.

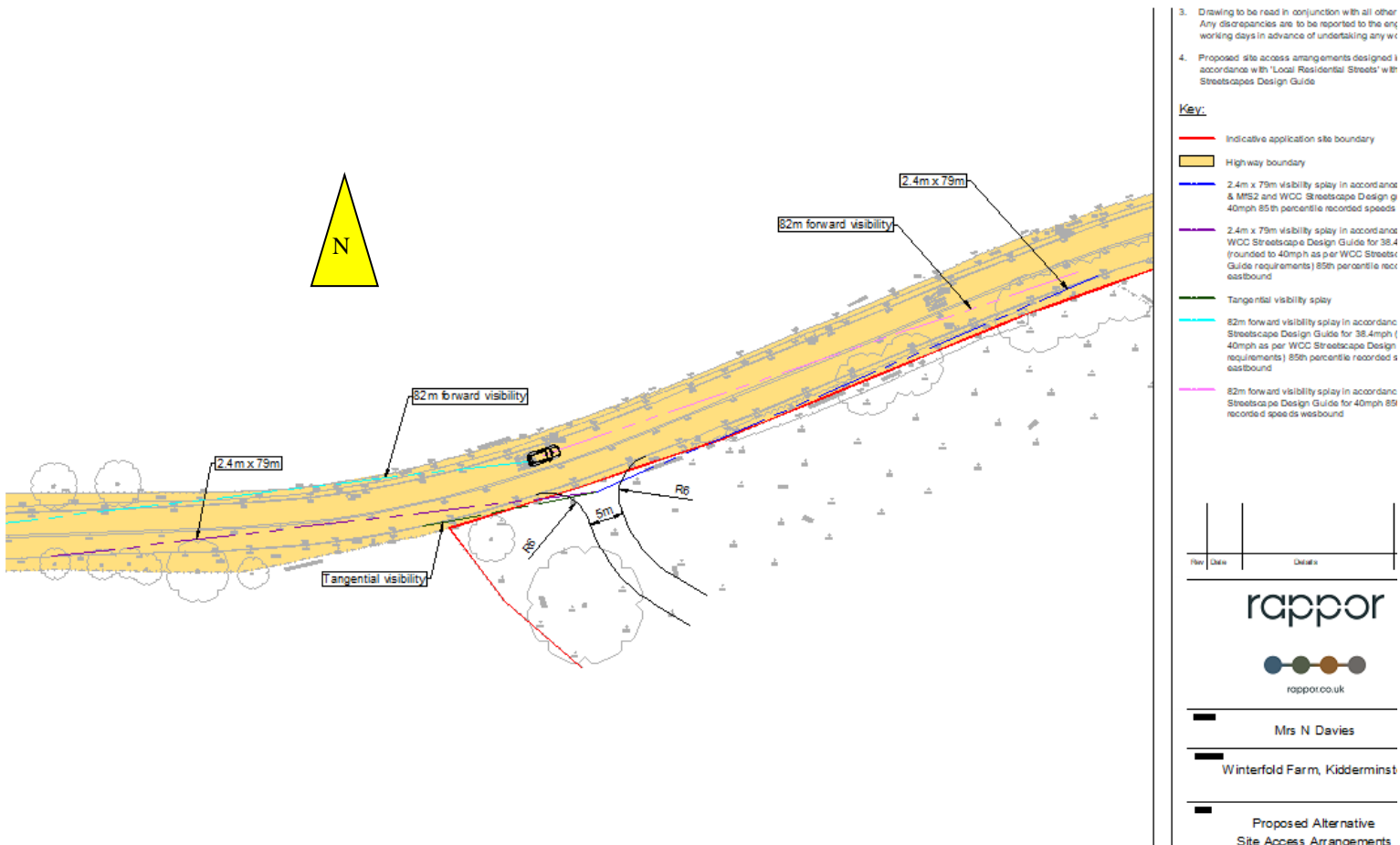
4.5.3 Trees are listed in the table above, and coloured on the Tree Constraints Plans, to indicate their retention categories A,B,C,U: with the colours explained in the keys of the table (4.5.1) & plan, and Appendix I (A = best to U = remove).

This allows the site designer to plan around important trees, and ignore lesser trees.

5. Proposed Development & Tree Impacts.

5.1 The proposal.

- 5.1.1 The proposal, Rappor 23170-RAP-3200 P03 of 8/1/2024, extract below, shows the development.
- 5.1.2 A new vehicle access is created 17m west of the existing gateway.
- 5.1.3 The new drive crosses a grass field.



5.2 Potential Tree Impacts (considered below).

5.2.1 There are six potential arboricultural impacts caused by re-development of the site:

- **physical contact above-ground,**
- **below-ground conflicts (roots),**
- **shading,**
- **over-bearing, and falling material,**
- **subsidence/heave, and damage from root growth,**
- **impact on amenity value.**

These are assessed below:

5.3 Physical contact with above-ground parts of trees.

5.3.1 General:-

Buildings, roads, paths and associated structures can replace trees or intrude into canopy zones. Tree removal and pruning is listed in table 6.2.3 below.

5.3.2 Specific above-ground impacts:-

- Visibility splay requires the western end of holly T13 to be pruned back to stems.

5.4 Below-ground root spread.

5.4.1 General:-

BS5837 defines a tree's Root Protection Area as a circular area of 12 x stem diameter: required to maintain long-term health of a full-canopied tree. We show it as an idealised circle. Rooting areas are never symmetrical. At the discretion of an arboriculturalist, where rooting is restricted on one side, the RPA can be offset to provide the same protection area.

Ground disturbance within the RPA zone should be avoided. But, the structural rootplate of a tree to resist windthrow is usually smaller than the RPA. Therefore tree stability should not be affected by some planned disturbance within the RPA.

5.4.2 Specific Rootzone Impacts:-

- The drive crosses the large RPA of sycamore T11. Given this is a shallow construction, I only require surface root pruning. See 6.9 below.

5.5 Light Interception & Shading.

5.5.1 General:-

The sun rises to about 60° at mid-day in mid-Summer when trees are in leaf (ratio of 16m vertical height to 10m horizontal distance).

The sun only rises to 12° in mid-Winter. However, in winter deciduous trees are leafless, so light interception is much reduced.

Theoretical shadows of arcs equal to estimated tree height in ten-years' time are illustrated on our Shading Plan. This is the shadow pattern for the period from May to September inclusive, from 10.00hrs to 18.00hrs daily.

5.5.2 Specific Shading Impacts:-

- No impacts for a drive.

5.6 Over-bearing and Falling material.

5.6.1 General:-

Trees drop detritus in the form of flower parts, leaves, twigs, fruits or needles throughout the year. These can be an annoyance to persons living nearby. Bird droppings and honeydew from aphids can be difficult to clean off, or can spoil car paintwork. Big trees make adjacent dwellers nervous.

5.6.2 Specific Impacts:-

- The sycamore just overhangs the drive. This combined with its historic basal damage, suggests that a minor crown reduction is needed to maintain harmony and tree safety by the drive.

5.7 Subsidence/heave & root growth.

5.7.1 Subsoil is coarse-textured without volume-change potential.

5.7.2 Therefore, the subsoil will not compact, and roots under the new drive can receive adequate aeration.

5.8 Amenity impact.

5.8.1 Amenity can be *visual landscape, functional landscape, habitat or heritage/historic.*

- Negligible impact on soft landscape.

6. Arboricultural Method Statement in sequential order for proposed development at Winterfold Farm site.

6.1 Supervision

6.1.1 I recommend the following arboricultural supervision on this site:

- None needed on this modest site.

6.1.2 But any arboricultural visits would be followed with emailed supervision log with action points, copied to client and landscape officer.

6.2 Tree Management

6.2.1 Tree Work prior to ground work:-
Detailed in table overleaf.

6.2.2 Treework informatives, included for general information:-

6.2.2.1 Disturbance to wildlife.

It is essential to check for nesting birds, bat roosts, badgers and hibernating animals such as hedgehogs under trees, before pruning or removing trees, as negligent disturbance is an offence under the EC Habitats Directive 92/43/EEC, Countryside and Rights of Way Act 2000, Protection of Badgers Act 1992. The Conservation (Natural Habitats, & C) (Amendment) Regulations 2007 make **any** damage or destruction of a breeding site or resting place of a European Protected species (mainly bats in a tree context) an offence.

In general, autumn tree work: **September, October and November** is least disruptive to bats and birds. Work on very ivy-clad trees may need a formal pre-start bat assessment by a trained bat worker.

6.2.2.2 Permission

Trees may be protected by TPO, but none known in Jan '24 , and do not lie within a Conservation Area.

Trees may be owned by third-parties.

Trees may be protected by planning conditions.

Therefore, a contractor must satisfy himself that all necessary permissions from the local planning authority or tree owners are in place before touching trees.

A Felling Licence may be needed to clear non-domestic areas.

6.2.2.3 Quality of Tree Work

All off-ground tree work should be done by insured tree surgeon with certificates in aerial chainsaw use (new designations:- NPTC 020-04, 0020-05, 0020-07, 0021-01, 0021-07; LANTRA 600/5703/8, 600/5717/8, 600/5715/5, 600/5704/X, 600/5714/2), and working to BS3998:2010, and "*Treework at Height*", the Arboricultural Association's ICoP.

(Stumps can be left to shoot again, ground out, or grubbed out, or poisoned, depending on location.)

6.2.3 Treework for development at Winterfold Farm site:

No.	Species	BS 5837 Root Protection Area Radius. m.	Recommended WORK excluding development.	<u>ADDITIONAL WORK FOR DEVELOPMENT</u>	<u>Reason.</u>
T1-T3	Beech	6.6	Advise owner to crown lift to 5m clear stem.		
T4	Scots pine	6.0			
T5	Ash	7.2			
T6	Sycamore	4.8		<u>Gentle reduction by 1.5m off radii, tapering to no reduction off height.</u>	<u>To maintain harmony adjacent to new drive.</u>
HG7	Hawthorn x 5, Holly x 1	3.0			
T8, T9	Beech	3.6			
T10	Holly	5.7	Cut out elder.		
T11	Sycamore	11.6			
T12	Gone.				
H13	Holly	2.0		<u>Prune western end back as required.</u>	<u>For visibility splay.</u>
T14	Scots pine	6.6	Top down to twist.		
T15	Scots pine	5.4			
T16	Corsican pine	7.8			
T17	Corsican pine	10.8			
T18	Corsican pine	13.8			
T19	Corsican pine	12.6			
T20	Corsican pine	9.0			
T21	Corsican pine	10.8			
T22	Corsican pine	9.0			
T23	Corsican pine	8.4			
T24	Corsican pine	9.6			

End of table.

(Treework following development see 6.10 below.)

6.3 Tree Protection

6.3.1 Requirement

The most important tree-protection measure is effective protective fencing, erected as close as possible to the Root Protection Area (RPA) boundary before any other work starts on site including demolition in the vicinity of trees. It must be maintained until all work is completed, except final soft landscaping. Here tree protection is proposed for retained trees, and for areas of possible new planting where this is feasible: called **landscape protection zones**.

6.3.2 Vertical Tree Protection

6.3.2.1 Tree Protection fencing **locations** are shown on Tree Retention & Protection Plan (TRP) in Appendices.

6.3.2.2 Two **specifications** for suitable protective fencing are suggested in BS5837.

Light-weight BS5837 fencing is suitable for the rest of the site. **Specification given in Appendix III.**

See TRP plan for fence requirement for each area.

6.3.2.3 Within the fenced off **CEZ** Construction Exclusion Zone: there must be:-

- no construction access,
- no storage of materials, including soil,
- no ground disturbance.

6.3.2.4 Tree protection measures will be erected **prior to commencement of demolition & development and any machinery brought onto site.**

Fences will be maintained throughout the demolition & construction until the works are complete and the site is cleared from any machinery and equipment.

And removed only for final soft landscaping.

6.3.3 Temporary Ground Protection (TGP) within RPAs:-

6.3.3.1 IF work is required to be closer than the all-round protection zone, then the fenced off zone can be made smaller on that side, or entered temporarily, subject to permission from retained arboriculturist.

Within such zones, temporary horizontal ground protection plus temporary fencing would be essential.

6.3.3.2 **TGP is not needed on current proposal**

Obvious options for temporary ground protection would be:-

-Butted scaffold boards or 22mm plyboard laid on bearers on 50mm depth woodchip or bark mulch (pedestrian access only).

-Temporary ground protection plates such as aluminium "Eve Trakway" or plastic interlocking-plate ground protection; both on 150mm depth of woodchip or bark mulch, as shown in Appendix IV.

- A layer of woven geo-textile under minimum 250mm depth of graded aggregate which is lifted after work.

6.4 Construction Access.

6.4.1 General points:-

- Use existing gateway or access from the field.
- No pedestrian, vehicle, plant or machinery to enter RPAs without temporary ground protection, as detailed in para 6.3.3 above.

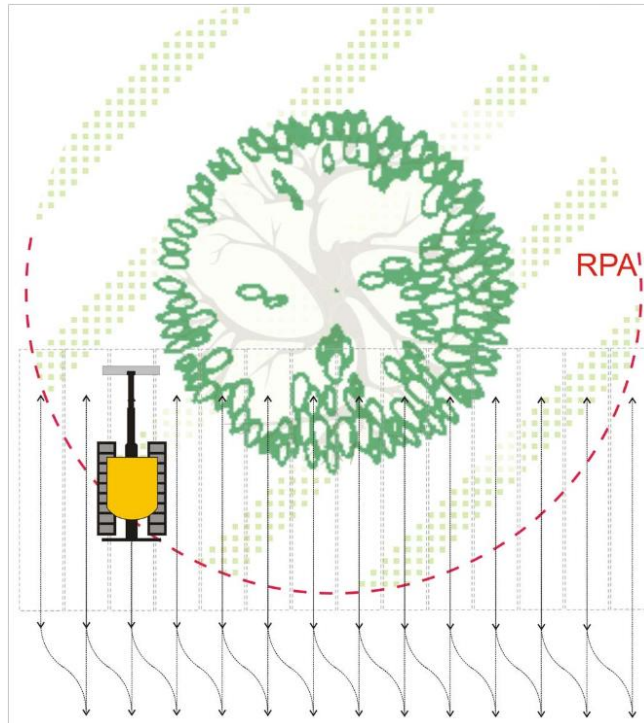
6.4.2 Site huts could be placed within RPA of trees and hedges; provided they stand elevated on stilt feet, no excavation is required for temporary services, and pedestrian and vehicle access is ground protected as detailed in 6.3.3 above.

6.5 Demolition / Excavation within RPAs:-

6.5.1 General specification FOR EXCAVATION anywhere near trees. But see 6.9 below for detail on this site.

Parallel tracking with slewing outside the RPA:-

- Max 1-tonne rubber-tracked mini-digger with toothed bucket.
- Banksman to sever all roots immediately they are exposed, using loppers or sharp saw, to prevent tearing.
- Excavation ideally max 100mm depth.
- Slew outside RPA. See sketch below:
- Heap material outside RPA, for dumper to collect and run outside RPA.



6.6 Foundations within RPAs:-

6.6.1 No foundations needed here. See 6.9 for drive.

6.7 Drainage.

General tree protection principles must be followed.

6.7.1 Storm-water drainage: Any soak-away system must be designed to avoid significant increase and no decrease of ground water in trees' rooting zones. Divert into soakaways outside RPAs, dissipate into landscaped areas (field).

6.7.2 Foul Drainage: not needed here.

6.7.3 Sustainable Urban Drainage System: Any SUDS scheme, to reduce the load on local mains drainage, must not significantly add to, or reduce, the soil water in trees' root zones. Allow gradual percolation into landscaped areas (field).

6.8 Service Trenches within RPAs.

6.8.1 Service trenches (electric lights, utilities, telecoms, drains etc) must be **designed** to run as far from trees as possible.

6.8.2 Trenches **within RPAs should be avoided.**

6.8.3 Any trenching within an RPA ideally uses a **trenchless boring** system.

6.8.4 Here, use onerous **hand digging** method:-

- If soil is coarse-textured and friable use an air-spade to reveal roots (Appendix VI).
- No roots >25mm diameter or bundles of smaller roots must be exposed or severed without express written permission of local authority tree officer or retained arboriculturist.
- Retain roots >25mm diameter or bundles of smaller roots within service trenches. Thread service / pipe underneath.
- Any pruning of smaller roots must use a sharp saw or loppers, and not ripped by mini-digger bucket.
- Any excavation within the RPA of a tree must be covered immediately after digging with damp hessian, topped by tarpaulin & plyboard, to prevent root desiccation.
- Hole must be backfilled within five days of opening.
- Wrap exposed roots >25mm or bundles of smaller roots with hessian, and surround by 50mm depth sand, as part of backfill medium.
- Tamp backfill material by hand thumper or whacker plate only.

6.9 Minimal-dig construction for new access drives, parking & paths

6.9.1 If roads, footpaths, cycle-ways, yards or parking are required near trees, they can be constructed in two ways:-

Conventional construction:- If outside a tree's RPA.

Minimal-dig construction:- If within a tree's RPA.

6.9.2 30m of drive lie within potential RPA of sycamore T11. Work as follows along blue line on TRP plan: 

- Use mini-digger to carefully excavate a narrow trench just inside SW edge of drive.
- MAXIMUM DEPTH 250mm.
- Banksman to neatly prune off exposed roots with secateur or loppers.
- Cover tree side of trench with damp hessian and sheet material (eg white Terram) to prevent desiccation.
- Excavate rest of drive past T11, max depth 250mm.**
- Given the minimum depth of excavation, lay 300g/m² geotextile, then 2-D geogrid such as Tensar SS20 to strengthen formation.
- Build up drive with type-1 and surface as required.
- If drive is above general ground level, carefully add topsoil to remove any step.

- ****** If crossover from road is tarmacked, a short section may need excavation to 300m depth.

6.9.3 Appendix V gives examples of materials for minimal-dig, porous, build-up, but not needed on current proposal.

6.10 Tree work following construction.

6.10.1 Trees should be re-inspected at completion of construction and hard landscaping. This inspection would reveal the need for remedial tree work for the following reasons:-

- to rectify damage occurring during construction (regrettable but possible),
- to allow additional clearance.
- or complete tree removal if trees were considered too close for safe retention.

6.10.2 All additional work subject to further local authority agreement if trees are protected by planning conditions, TPO, or location within a Conservation Area.

6.11 New Planting.

6.11.1 The site already contains trees. **New planting is not needed.**

6.11.2 A useful web-based guide: *Tree Species Selection for Green Infrastructure – A guide for specifiers by Dr Andrew Hiron & Dr Henrik Sjomon Issue 1.3 of 2019*, advises on tree selection and size.

Any planting and maintenance must comply with: **BS 8545 “Trees: from nursery to independence in the landscape – Recommendations”**. BSI 2014.

6.11.3 Any planting must be provided with adequate long-term soil-moisture.

To remind architects and engineers, we reproduce below, Stockholm Tree Pits’ (www.stockholmtreepits.co.uk) table of root volumes for a given final size of tree:

Table 1: Minimum requirements for tree pit specifications.

	Mature Size of Tree**				
	Very Small (<5m)	Small (5-10m)	Medium (10-15m)	Large (15-25m)	Massive (>25m)
Recommended minimum volume of uncompacted loam soil	6m³ (5m³ if shared)	12m³ (9.5m³ if shared)	20m³ (16m³ if shared)	28m³ (24m³ if shared)	36m³ (30m³ if shared)
Recommended minimum volume of stone-based structural soil	8m³ (6m³ if shared)	15m³ (12m³ if shared)	26m³ (20m³ if shared)	36m³ (28m³ if shared)	45m³ (35m³ if shared)
Recommended number of air/water inlets†	1 (0.5 if shared)	1 (0.5 if shared)	1	2 (1.5 if shared)	2

†Fastigate trees will require less rooting space than trees with wide canopy shapes. As a rule of thumb, one should assume that a tree with a narrow and columnar crown form would require half as much soil volume as a tree of the same height that has a wide crown.

‡Ideally the surface of the tree pit should be open, rough in texture, and protected from compaction. If there is hard surfacing above the tree pit designers must provide pathways for water ingress and gaseous exchange. This could be provided by a permeable surface over the whole of the tree pit or by using a non-permeable surface with specially designed inlets. Suitable inlets would be substantially larger than an irrigation tube and service the whole of the tree pit.

Author:



B J Unwin Forestry Consultancy.

References:

- "The Body Language of Trees"*. Claus Mattheck and Helge Breloer. HMSO 1994.
- "Principles of Tree Hazard Assessment and Management"*. David Lonsdale. HMSO 1999.
- BS 3998: 2010 *"British Standard Recommendations for Treework"*.
- BS 5837: 2012 *"Trees in Relation to Design, Demolition & Construction"*.
- BS 8545 *"Trees: from nursery to independence in the landscape – Recommendations"*. BSI 2014.
- NJUG Volume 4 2007 *"Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees"*. NJUG, 30 Millbank, London, SW1P 4RD.
- "Trees and Development"*. Nelda Matheny and James R Clark. ISA. 1998.
- BS 8206:1992 *"Lighting for buildings"*.
- BRE guide 209 (2002) *"Site Layout planning for daylight and sunlight"*.
- NHBC Chapter 4.2, *Building Near Trees*. National House Building Council, 2021.
- "Tree Roots in the Built Environment"*. J Roberts, N Jackson & M Smith. R.A.T.8, TSO (The Stationary Office), London, 2006.
- "Tree Species Selection for Green Infrastructure – A guide for specifiers"* Dr Andrew Hiron & Dr Henrik Sjomann Issue 1.3 2019.
- "Treework at Height"* Industry Code of Practice. Arboricultural Association. 2020.
- "The use of Cellular Confinement Systems near Trees"*. Practice Guidance Note 12. Arb Association. Sept 2020.

Appendix I

BS 5837 section 4.5 Tree Categorisation Method.

Table 1 overleaf:

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)	Identification on plan
Trees unsuitable for retention (see Note)		
<p>Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years</p>	<ul style="list-style-type: none"> Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality 	See Table 2
<p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>		
<p>1 Mainly arboricultural qualities 2 Mainly landscape qualities 3 Mainly cultural values, including conservation</p>		
Trees to be considered for retention		
<p>Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years</p>	<p>Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)</p> <p>Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features</p>	See Table 2
<p>Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years</p>	<p>Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation</p> <p>Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality</p>	See Table 2
<p>Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm</p>	<p>Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories</p> <p>Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits</p>	See Table 2

Appendix II

Site location, shows local roads and public rights of way (none nearby).



Google Earth aerial. Taken June 2023.



Appendix III

Vertical Tree Protection Fencing, from BS5837.

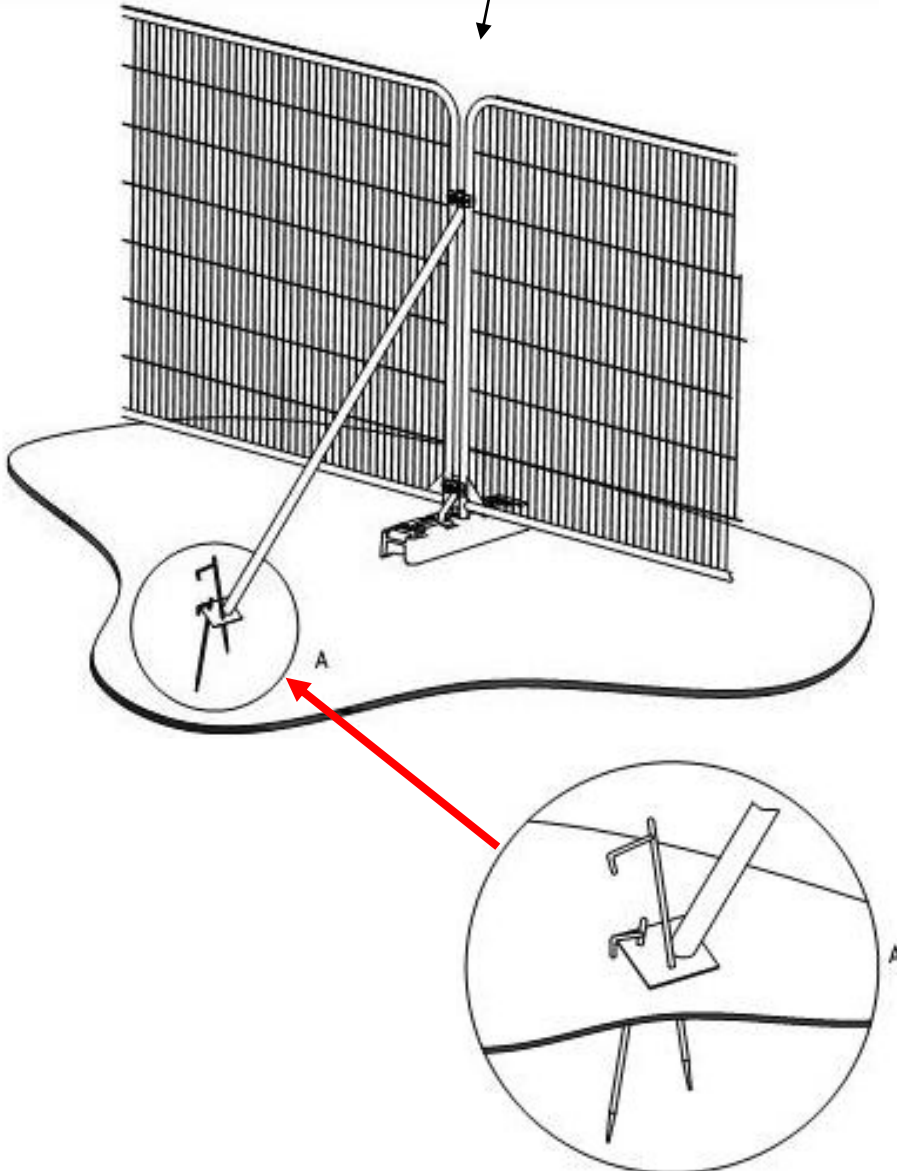
Vertical protective fence: location on plan:

Lightweight: in situ for < 3 months or constrained site-



Heras panels joined by two clamps, on feet, with pegged strut on each panel.

Apply signs at maxm 20m spacing:





**TREE PROTECTION -
Construction Exclusion
Zone.
NO ACCESS**



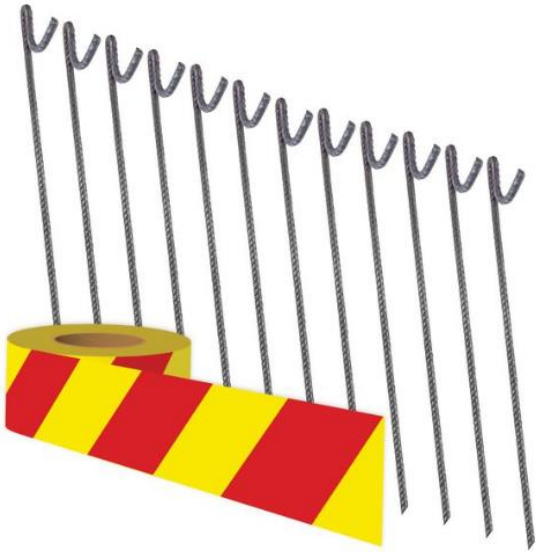
Example of Barrier stakes & heavy-duty tape, use three strands, for tree protection on a modest site.

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Horizontal Ground Protection x 2 examples

Example of aluminium temporary ground protection.

EVE TRAKWAY



Roadways - Medium Duty Trakpanel

The Medium Duty Trakpanel, or 'Box' panel, is ideal for where both pedestrian and vehicle access is required. This versatile panel can be laid with either a smooth or corrugated surface uppermost. The smoother surface finish provides excellent support underfoot, whilst the construction of the panel maintains a high load bearing capacity. Due to the way these panels fit together, a smooth joint is created therefore reducing trip hazards.

The Benefits:-

Pedestrian friendly upper surface

Suitable for heavy vehicles Ideal for where both pedestrians and vehicles require safe passage.

Technical Specifications	
Dimensions	2.5 x 3m (when installed 2.44m x 3m due to overlap)
Weight	274.7 kg
Carrying Capacity	A more pedestrian friendly roadway, this system is capable of taking any road going loads.

The following Roadways are available.

Please select an item to view more information:

Other Roadways products:-

Heavy Duty Trakpanel-

LD20-

Roadway Ramps-

Multi-Directional Trakpanel

Example of plastic temporary ground protection.

Ground-Guards Tree Root Protection

Tree root protection for construction projects

Planning Departments may often need to stipulate that site access roads will not involve any excavation because of the proximity of tree roots on the site. Furthermore, that they will also provide additional ground cushioning when passing over the immediate areas where there are tree roots beneath. This is very important to prevent compaction of the ground, and long-term damage to the soil structure, the tree roots, and ultimately, to the health of the trees themselves.

An effective means of protecting tree roots is to use a double layer of Ground-Guards. Panels with 150mm of wood chips sandwiched in-between which creates a suitably cushioned roadway for this purpose.

The Ground-Guards system is so durable and versatile that whatever your need, the team will be delighted to work with you to provide an effective solution. Please just call our team on 0113 267 6000 for friendly advice on any difficult site conditions that you need assistance with.



Appendix V

Two Examples of 3-dimensional cellular confinement build up for minimal-dig roading or parking.

Cellweb® TRP is a 3D cellular confinement tree root protection system. The system provides a ‘no dig’ solution for the construction of new hard surfaces within root protection areas (RPAs). Cellweb® TRP has been designed and independently tested to comply with recommendations made in Arboricultural Practice Note 12 and BS 5837 2012 – Trees in relation to design, demolition and construction.



Cellweb® TRP Key Functions

Cellweb® is a ‘no dig’ solution which is constructed directly on the existing ground surface. This eliminates the requirement for excavation, preventing root severance.

Cellweb® is a completely porous system allowing continued water permeation and gas exchange between the rooting environment and atmosphere.

Cellweb® spreads point loads, minimising increases in soil compaction within the rooting environment. This maintains an open graded soil structure allowing continued root growth, water, gas and nutrient migration.

The Cellweb® TRP system comprises the following three components

Treetex™ Geotextile. Following minimal ground preparation the Treetex™ is laid onto the existing ground and top soil. This acts as a separation layer, separating the system above from the soil and rooting environment below. Treetex™ performs as a hydrocarbon pollution control measure in accordance with BS5837, holding 1.7lt of oil per square meter.

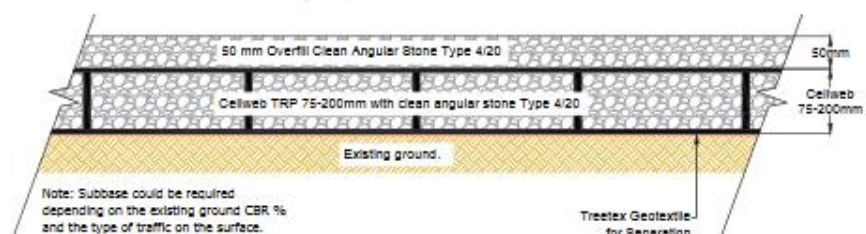
Cellweb® 3D Cellular Confinement. The Cellweb® is installed on top of the Treetex™ layer. This is fixed to the ground using ten steel J pins per panel. The panels can be cut to the required shape and adjoining panels can be connected using heavy duty staples or cell ties.

4-20mm Clean Angular Stone. The expanded Cellweb® is infilled with a 4-20mm clean angular stone. The confined angular stone locks together to produce a rigid stone mattress, while maintaining air pockets for continued water permeation and gas exchange. The low fines content of the stone prevents the Treetex™ layer from becoming blocked over time.

Which depth of Cellweb® TRP?

The Cellweb® System is provided in four different depths; 200mm, 150mm, 100mm and 75mm. The depth required is determined by the proposed traffic loadings and the site ground conditions. Geosynthetics in house engineering department can provide a free site specific technical recommendation. For free technical and engineering support please contact Geosynthetics Ltd 01455 617139 or the full installation guide can be found on our website www.geosyn.co.uk.

Indicative Cellweb with overfill

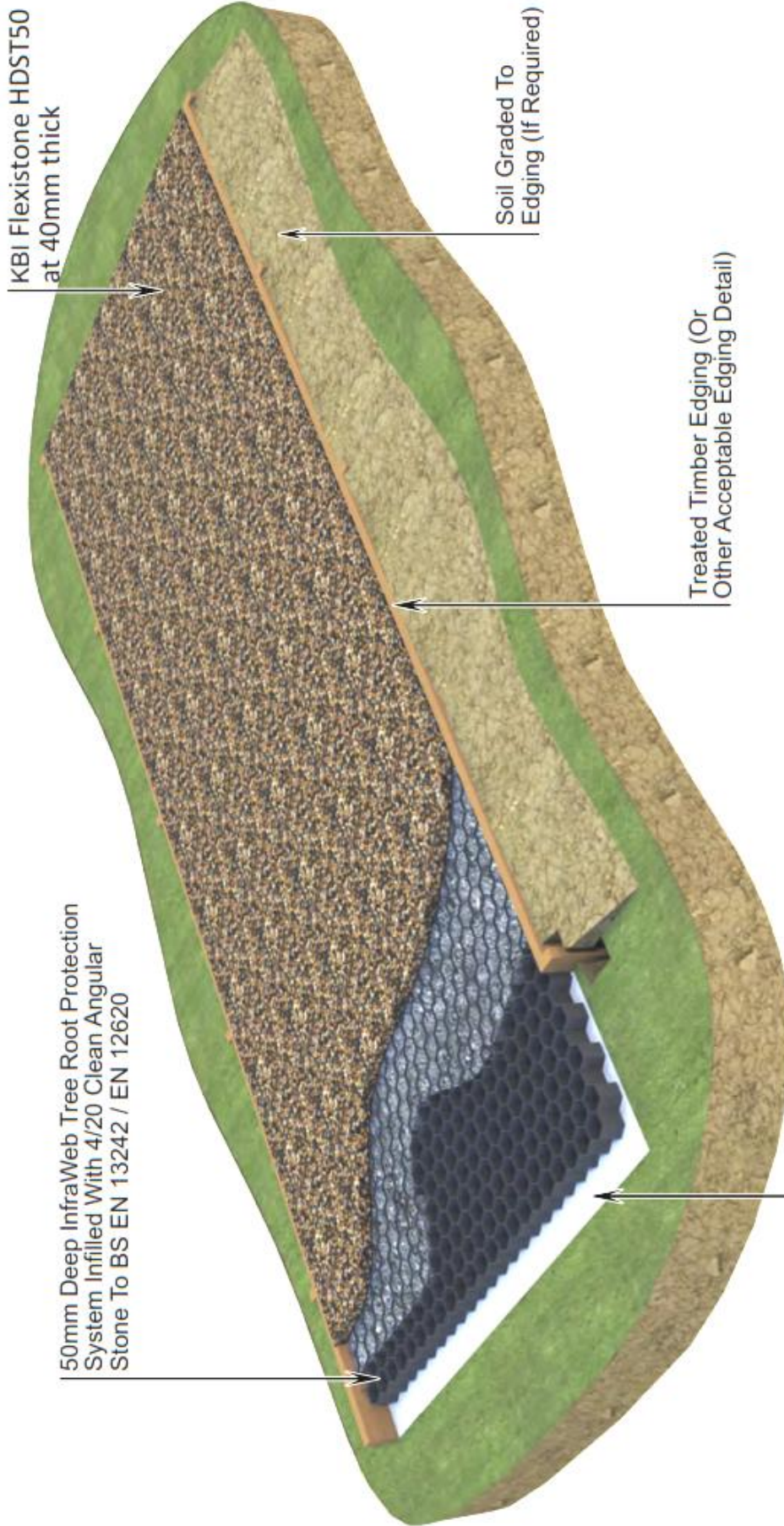


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 Fax: 01455 617140 | Email: Sales@geosyn.co.uk



Geosynthetics
 Engineered Solutions

InfraWeb TRP 50 Section - Tree Root Protection c/w Flexistone HDST50 at 40mm thick for pedestrian and cycleway use only



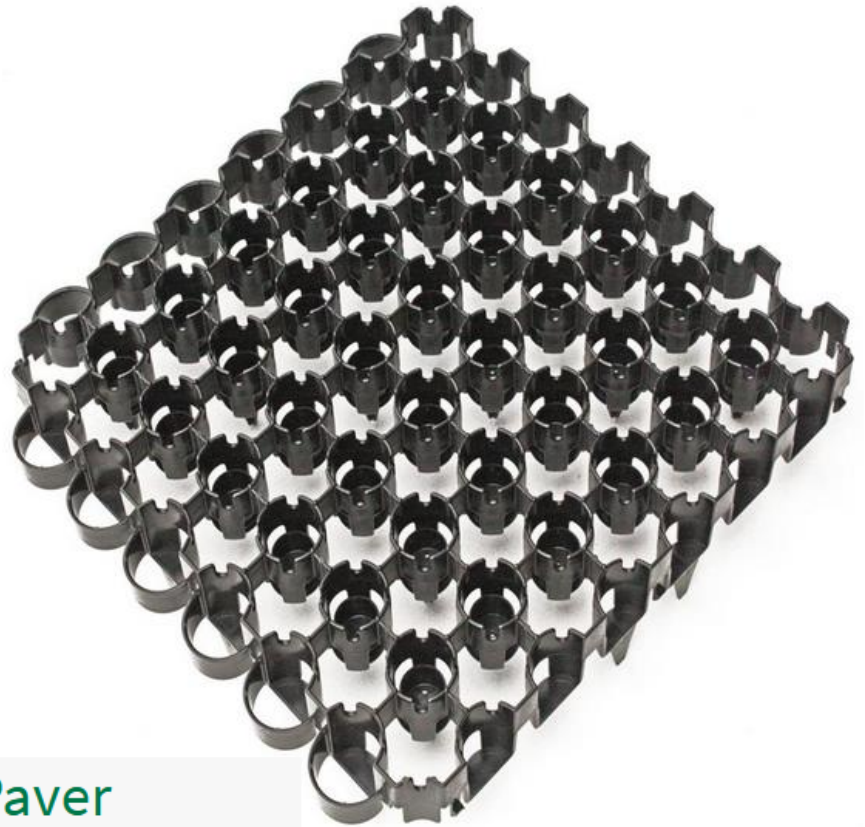
Date: 29/12/2016
Drawn By: NLG Design
Revision: A
Drawing Number: TRP50HDST50

InfraWeb TRP 50 Section - Tree Root Protection c/w Flexistone HDST50 at 40mm thick for pedestrian and cycleway use only

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 Barnsley
 South Yorkshire
 S71 3GN
 +44 (0) 1422 242880
<http://www.kbiuk.co.uk>



**Trays for strengthening gravelled or grassed areas over tree roots.
Or for surfacing porous, minimal-dig, build-up.
GOPLPA 40mm thick or 85mm thick Bodpave, below.**



Bodpave 85 Plastic Paver

PRODUCT CODE: 150WW4080-PRO

Bodpave® 85 porous pavers can be installed with either a grass or gravel filled surface. Bodpave® 85 pavers/grids are strong interlocking 100% recycled cellular porous plastic paving grid systems for grass reinforcement, ground stabilisation and gravel retention for regular trafficked surfaces (pedestrian and vehicles) BodPave® 85 permeable pavers are manufactured in the UK from UV Stabilised 100% recycled HDPE and are very strong, chemically inert and non-toxic. Bodpave® 85 porous paving provides a durable, safe and environmentally friendly surface for trafficked areas with a very low carbon footprint. BodPave® 85 is a cost effective solution to worn and rutted grassed areas, displaced gravel and for source control of surface water run-off. Bodpave® 85 offers a load bearing capacity of up to 400t/m², will cope with static axle loads up to 60kN.



Appendix VI

Example of Air-spade.

Courtesy of Ruskins Trees & Landscapes



Appendix VII

- B J UNWIN FORESTRY CONSULTANCY Ltd. -

Head office: **Parsonage Farm, Longdon, Tewkesbury, Gloucestershire. GL20 6BD.**

Tel / Fax: 01684 833538. Home Tel: 01684 833795. Mob: 07860376527. E-mail: Jim@bjunwin.co.uk

Satellite Offices: - Haley Ridge, Highcliffe, **Nr. Wadebridge, Cornwall**, PL27 6TN.

-105 Charfield Court, 2 Shirland Road, **London**, W9 2JR.

Associate office: - 1 Market Place Mews, **Henley-on-Thames, Oxfordshire**, RG9 2AH.

Principal: **Jim Unwin BScFor, MICFor, FArborA, CEnv.**

**Chartered Forester - ICF Registered Consultant - Fellow of the Arboricultural Association -
Chartered Environmentalist.**

From:	Jim Unwin	To:	Prospective Client
Date:	Aug 2023	No. of pages:	2
Subject:	Professional CV		

Below are set out **B J Unwin Forestry Consultancy's** competences and experience.

Insurance:-

£5m Public Liability & £2m Professional Indemnity (renewed June).

Personnel:-

B J Unwin (born 1956) started his forestry career as a tree surgeon and landscape contractor in 1975. He studied forestry at Aberdeen University from 1977 to 1981, worked for Unilever as a Forestry Manager in the Solomon Islands from 1981 to 1983. Since then he has been based in Gloucestershire assisting clients to manage their woodland, trees and vegetation throughout Southern Britain, and occasionally in northern England, Scotland and Northern Ireland.

In the mid-1980s to mid-1990s for a period of about ten years he taught chainsaw, tree felling and tree surgery courses at Worcestershire Agricultural College on a part-time basis. He was assessed and passed as a LANTRA **Assessor** in these skills, and held NPTC certificates of competence in chainsaw use on the ground and up trees.

He now works as a tree consultant / adviser to a range of clients listed below.

For tree decay testing we have a **PICUS II ULTRASOUND** tomograph with electronic callipers and a **RESISTOGRAPH-R400** micro-drill.

A secretary/ plan technician assists; plus calling in extra help as required (eg ecologist or arboricultural assistant). On bigger projects he regularly works as a part of a multi-disciplinary team.

Current BJUFC qualifications are:-

BSc Forestry Hons 1st Class, Aberdeen 1981.

Chartered Forester No. 0330064, 1986.

Fellow of the Arboricultural Association, 1995.

Licensed Subsidence Risk Assessor, 1997-2001 (scheme closed in 2001).

Completed Training in September 2002 to Prepare Native Woodland Plans for CCW and FC in Wales.

Arboricultural Association Registered Consultant No. 42, from 2004 to May 2021.

LANTRA certificate for Arboriculture and Bats, BJU in 2005.

Examined and approved to submit Welsh WGS as Management Planner and PAWS Assessor, 2006.

Joined Utilities Vendor DataBase, Supplier No: 88101 in Feb 2006 (left 2010).

Training and Certification in basic CAD operation 2006.

Chartered Environmentalist April 2008.

Woodfuel Production and Supply : LANTRA Certificate of Training Dec 2008.

Training in CAVAT amenity tree asset valuation October 2010.

Company Safety Policy:- We were successfully assessed by Safety Management Advisory Services (SMAS) for many years as meeting CDM Regs 2015 Core Criteria Stage 1, as a **Worksafe Consultant No. 75950.** expired 09/2020. Not renewed.

CITB *Health, Safety & Environment Test for Managers & Professionals* passed 22/01/2015.

First-aid at work June 2013.

DBS Basic Certificate P0003GX9B7C dated 28th Nov 2022 Certificate 001100238741.

ROSPA Routine Playground Inspection Certificate valid from 20/10/2022 to 20/10/2025.

Current clients and typical work include:-

English Heritage	Tree safety inspection contract 2007-2013 for East Midlands, East Anglia, London and SE England. Tree safety inspection contract for West of England & Midlands 2008 - 2021.
Planning Inspectorate (PINS) & Dept for Communities and Local Government. 2000-2017.	Arboricultural Inspecting Officer in South-West England, South East England, West Midlands and East Midlands; advising the First Secretary of State on TPO appeals since 2000. Contract with DCLG expired April 2008 when transferred to PINS. Contract continued with PINS, as Non-Salaried Arboricultural Inspector, determining TPO appeals and High Hedge appeals. All non-salaried inspectors released in 2017.
Architects / Developers / Planning Appeals	Complete Tree Constraints, Impact Assessment & Tree Protection advice for planning, working with other professionals to input arboriculture into more complex development schemes. Recent assignments in Liverpool to Cornwall, Kent, Norfolk & London. All using BS5837:2012. FULL CAD CAPABILITY.
Amey Mouchel Ltd	Overseeing Amey Tree Officer on motorway and trunkroad tree inspections throughout Midlands and Marches to 2012. Amey Mouchel are agents for Highways Agency.
CRH Tarmac Ltd, + Midland Quarry Products + Quarryplan (in Northern Ireland).	Since 1990 working with Estates staff, quarry managers and Landscape / ecological consultancies organising and managing contracts for tree and woodland planting both pre- and post- quarrying. Also preparing landscape restoration schemes for straightforward sites plus landscape management on sites throughout southern England, East Anglia and south and south-west Wales. (Commendations for Land Restoration and Environmental improvements from Spelthorne Borough Council 2003.) Also in England & Northern Ireland ongoing tree consultancy for Quarryplan.
Land Agents	Assisting Bruton Knowles clients' with woodland management and other tree issues since 1984. We also assist clients of Fisher German and Savills on a regular basis.
Tarmac Central now CRH Tarmac Ltd.	1988-2018 woodland management of Hopwas Hays Wood, Tamworth.
Rural estates in Herefordshire, Worcestershire and Gloucestershire, plus private woodland owners in southern England and Wales.	Since 1983 woodland management, tree management, hedgerow management. Many are Ancient woodlands and SSSI's requiring detailed ecological management plans produced in consultation with ecologists. About forty Farm Woodland Premium Schemes and about twenty Native Woodland Plans prepared to date in England and Wales. On-going EWGS grant applications. Input into Tir Gofal (and its successor) and Stewardship schemes. Better Woods for Wales (BWW) applications.
British Waterways	Ten-year Tree and Vegetation Management Plans along canals and around reservoirs in London, Hertfordshire, Berkshire, Birmingham, Staffordshire, Worcestershire, Gloucestershire, Shropshire, Llangollen Canal, etc: plus help in dispute with riparian owners. This work ceased around 2011.
Stroud District Council	Management of 49Ha woodland since 1989 on FC schemes plus grassland on DEFRA Stewardship Schemes, including HLS. Retired Nov07.
One-off clients	Since 1983 assisting tree owners, developers, lawyers etc throughout southern or midland Britain, including Wales, on a wide range of tree-related issues including planning, planning appeals, subsidence, health & safety, disputes, vegetation control, expert witness, valuation of woodlands, standing and felled timber, Christmas trees etc, and tree and landscape planting schemes. Recently High Hedge issues and BS5837 are hot topics.
Malvern Hills District Council. South Oxfordshire District Council	BJU Stand-in part-time Consultant Tree Officer Summer 2003. JF-D stand in Consultant Tree Officer summer 2009 to spring 2010.
Golf course & leisure facilities	Assistance with development of Carden Park golf course in Cheshire. Management advice for trees on other golf courses: Eg Ross Golf Club, Swindon Golf Club .
Farm management	Management of own 95Ha farmland since 1985.

Please do not hesitate to ask for further information. B J Unwin END.

Appendix VIII

Constraints plan:-

- **Tree crowns**

Retention categories, based on BS 5837 Table 1:-

A = High quality & Value (>40yrs life): Green.

B = Moderate quality & Value (>20yrs life): Blue.

****C = Low quality & Value (>10yrs life): Grey.**

U = Trees to be removed (<10yrs life): Red.

****PLEASE NOTE. FOR CLARITY, C-CATEGORY TREES MAY NOT BE COLOURED.**

and

- **Root Protection Areas**

RPA = circles.

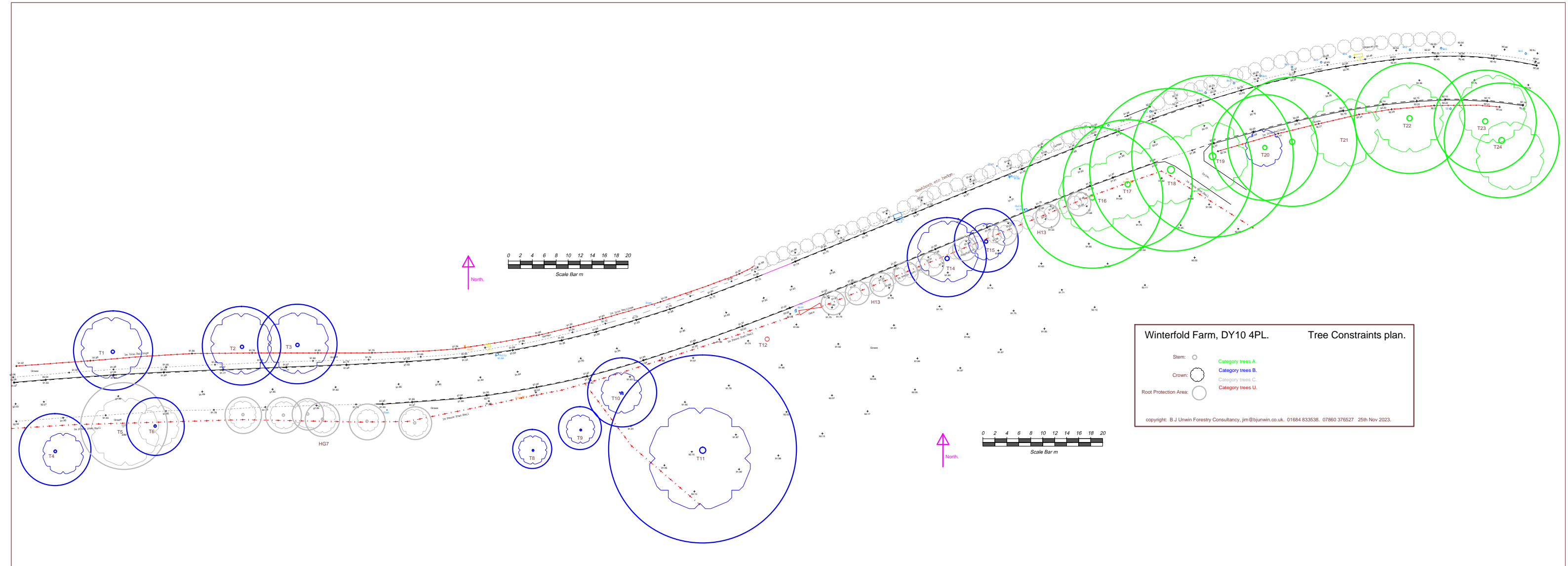
See Tree Table for dimensions.

and

- **Theoretical Shading**

= quadrant of tree height in ten years' time from north west (mid-morning) to due east (evening).

This is a shadow pattern for 1 x tree height from 10.00-18.00hrs from May to September.



Winterfold Farm, DY10 4PL. Tree Constraints plan.

Stem:	○	Category trees A.
Crown:	⊖	Category trees B.
Root Protection Area:	⊖	Category trees C.
	⊖	Category trees U.

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Appendix IX

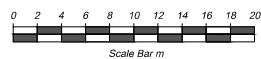
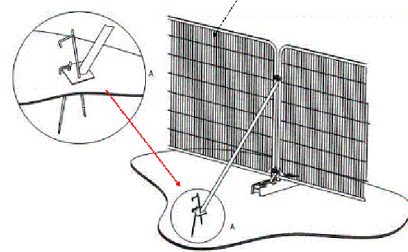
**Tree retention & Tree Protection Plan.
(TRP)**

Vertical Tree Protection Fencing, from BS5837.

Vertical protective fence: location on plan:
 Light weight, in situ for <math>< 20</math> months or combined site.
 Heres panels joined by two clamps, on foot, with pegged strut on each panel.

Apply a sign at 1m from 20m spacing:

TREE PROTECTION
Construction Exclusion
Zone.
NO ACCESS



82m forward visibility

2.4m x 79m

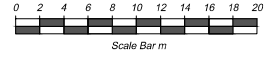
Tangential visibility

5m

2.4m x 79m visibility splay.

82m forward visibility

2.4m x 79m



Winterfold Farm, DY10 4PL. Tree Protection plan.

Stem: ○	Category trees A.	Construction Exclusion Zone: CEZ
Crown: ○	Category trees B.	Tree Protection fence:
Root Protection Area: ○	Category trees C.	Tree to remove:
	Category trees U.	Hand sever roots:

Scale: 1:625 @ A3.
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Hand sever roots; see 6.9 of BJUFC report.

END.