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Ref: 15th Dec 2020 - BJU/mmi

To: **Worcester Norton Sports Club.**

c/o: **Dan Stiff** *BA(Hons), M. Arch* Director
Boughton Butler Ltd
 E: dan@boughtonbutler.co.uk



Dear Sirs,

Norton Barracks, Brockhill Lane, Norton, WR5 2PP.- BS5837 Tree Constraints, Tree Impacts and Tree Protection Method Statement for replacement Community Hall & Pavilion.

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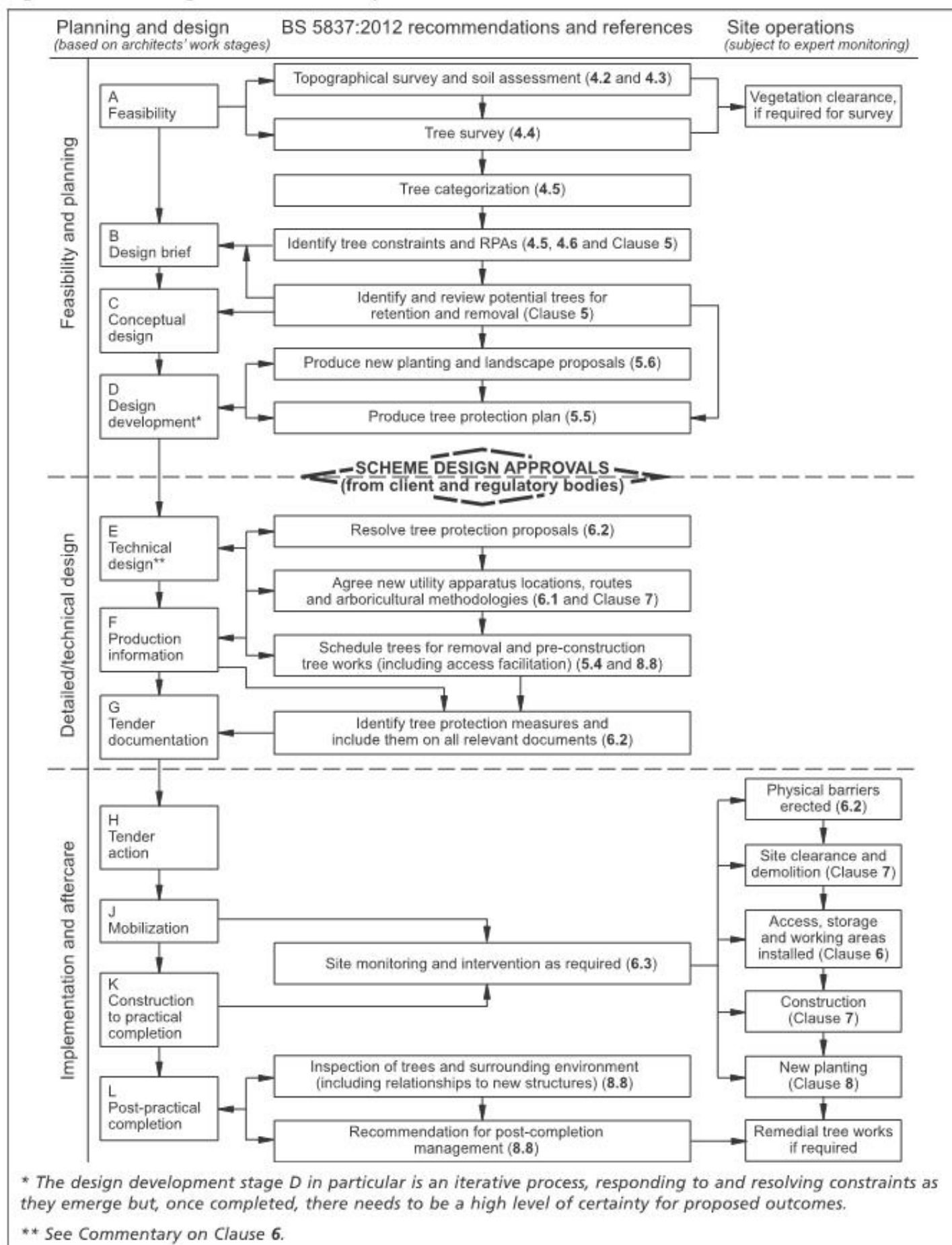
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Figure 1 The design and construction process and tree care



1. Instruction.

- 1.1 Boughton Butler Architects is assisting the management of the Sports Club to replace a dilapidated outbuilding. Therefore, Dan Stiff has asked B J Unwin Forestry Consultancy to advise on trees for planning condition purposes, subject to quote.
- 1.2 The local authority (Worcester City Council) require a tree impact assessment and tree protection method statement for any proposal. The local authority may require mitigation by new planting for any trees lost as part of any development.
- 1.3 We used a recent topo by unknown surveyor. **Boughton Butler Site Plan sections etc No.12 dated 20/10/20**, 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*.
- 1.5 BS5837 flowchart previous page. Appendices follow signature page.

2. Inspection.

- 2.1 Jim Unwin made an un-accompanied inspection on 24th June 2020, inspecting trees on the whole site, but this report concentrates on the central area around the buildings: hence numbering is not sequential.
- 2.2 The survey was from ground level, involving visual observation (Visual Tree Assessment: Mattheck and Breloer, 1994 and Lonsdale, 1999). We measured dbh, (estimated for off-site and inaccessible trees) and measured or estimated crown spread and height. We added all trees.
- 2.3 The survey and report for this project are by Jim Unwin, who has >40 years' experience working with trees (professional-CV attached).

3. The Site.

- 3.1 The site inspected is about 285m x 145m, and comprises two cricket fields, a croquet area, nets, parking, and central clubhouse buildings.
The site has access to public roads to north east and south east, so is used for informal recreation , dog walking etc, as well as more-formal games.
- 3.2 The site is low-lying with a slight fall to the north west. Geology is:-
Superficial deposits: No superficial deposits recorded
Bedrock geology: Branscombe Mudstone Formation - Mudstone. Sedimentary bedrock formed between 228.4 and 201.3 million years ago during the Triassic period.
Therefore, subsoil is fine-textured.
- 3.3 Inspection area, below.

4. Trees.

- 4.1 The dominant feature is limes edging the fields. Some may be mid-Victorian, planted when the adjacent barracks were built.
- 4.2 T2 is one such lime, with obvious basal decay, whose top broke off recently. It needs pollarding. Broken stem central in photo below.



- 4.3 The row of four old limes T19-T22, opposite clubhouse or parking, are all well-shaped and large, healthy, trees. But two exhibit decay fungi spore bodies, and a fifth tree fell two years ago, with a totally-decayed base.



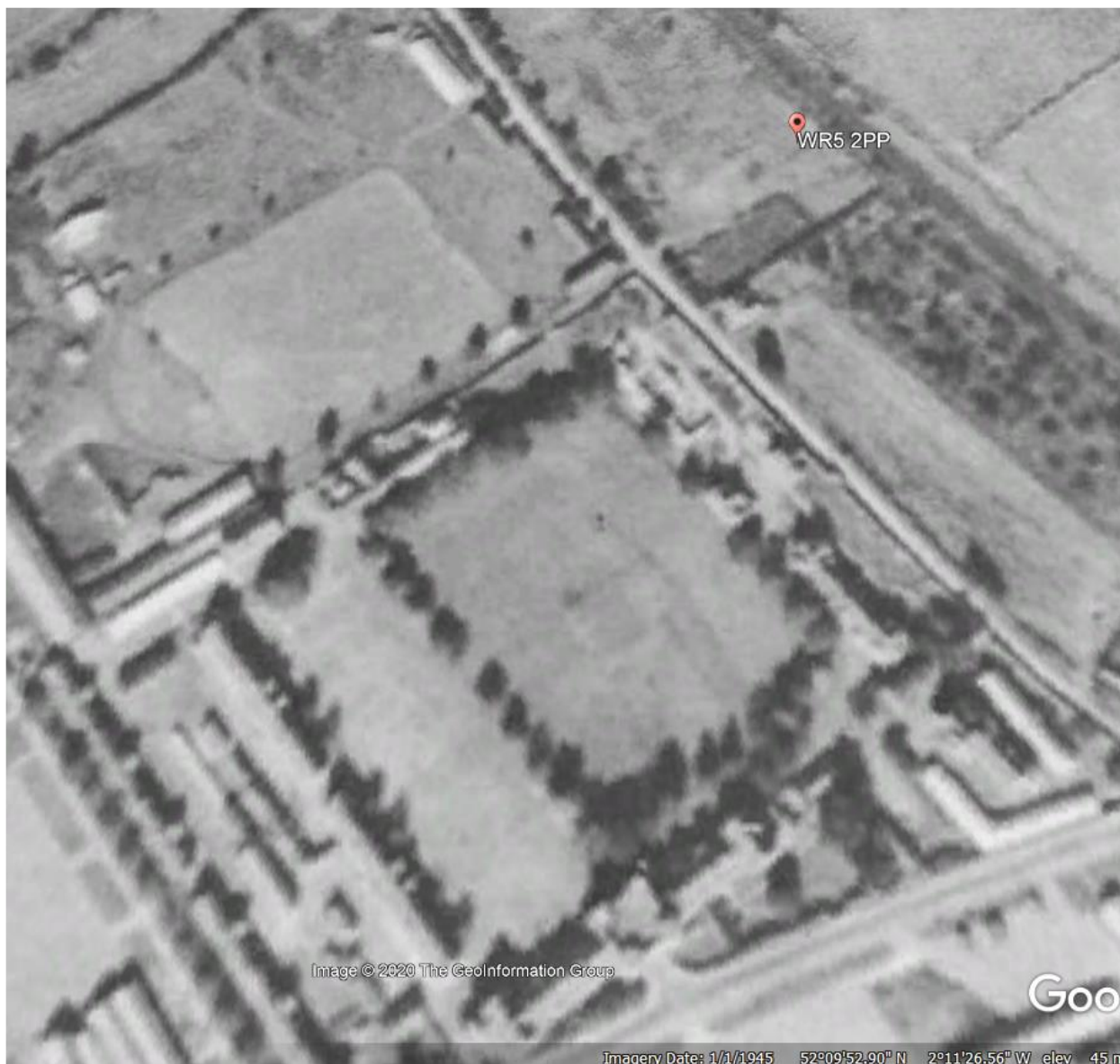
- 4.4 Two separate areas of *Ganoderma applanatum* spore bodies on base of lime T20, below.



- 4.5 Below: two spore bodies of either *Rigidoporus ulmarius* or *Ganoderma resinaceum* decay fungi at 2.5m on lime T22.



- 4.6 1945 aerial shows many more limes, but the four current limes opposite the clubhouse were big trees even 75 years ago.



- 4.7 These four old limes, which have the highest level of access nearby, need attention. They could be given ultrasound tests to measure basal soundness or decay, after which some or all could be pruned. Or they could be crown reduced.
- 4.8 Our advice would be to crown reduce all four, to retain them as similar-sized trees and to maintain their collective landscape value. We understand there are plans to re-build the clubhouse etc, which will impact these trees. (For this reason we have included BS5837 pre-development tree information in our tree table below).
- 4.9 We strongly recommend that ALL limes on site have epicormic growth removed annually, tight back to the wood of the trunk. Once done by chainsaw, it can be repeated annually with a hedge trimmer.

4.10 Detailed Tree Descriptions

4.10.1 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 Safe Useful Life

Prediction of safe life in its location, estimated as:-
<5 years, <10 years, 10-20 years, 20-40 years, >40 years.

Retention categories, based on BS 5837 Section 4.5, are:-

Retain:

A =	High quality or value >40yrs safe life:	Light Green*
B =	Moderate quality or value >20yrs safe life:	Mid Blue*
C =	Low quality or value >10yrs safe life or young trees <150mm stem diameter:	Grey*

Remove:

U =	<10yrs safe life or should be removed for sound arboricultural reasons:	Dark Red*
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(*Colour marking on relevant Tree plan, but not on our initial general 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 volume of soil 1m deep required to sustain the tree, usually expressed as a disc 1m deep, centred on the tree's trunk.

THE RPA CAN BE A VARIED SHAPE ENCLOSING THE CORRECT ROOTABLE AREA: but SHOWN AS A CIRCLE FOR CONVENIENCE.

Calculated as:-

Single-stem tree, radial distance = $12 \times \text{stem diameter at 1.5m ht.}$

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).*

4.10.2 **Norton Sports Club - BS5837 Inspection - BJUFC – 24th June 2020**

This table includes the whole club site, but only those trees around the central buildings are shown on plans.

No. T=tree S= shrub H= hedge G= group	Species	Dbh (stem diam @ 1.5m ht) mm.	Total height. Ht to base of crown. Est Ht in 10 yrs. m.			Crown radii m.				Age class	Health	Structural Condition	SULE	Comment (All are in average to good health and condition, unless stated otherwise.)	Retention category A (best) to C. U = (remove) Sub-category 1, 2 or 3	BS 5837 Root Protection Area Radius. m.	Recommended WORK excluding development.
						NW	NE	SE	SW								
T1	Blue cedar	900	16	5	16	6	5	7	6	M	F	F	20+	Overhangs house.	B1	10.8	
T2	Common lime	1000	15	5	6	7	0	0	7	Lm	F	P	20+	Severe basal decay. Stem broke at 4m height June 2020.	C2	12.0	Pollard at main fork.
T3	Common lime	750	22	8	22	5	7	4	6	Lm	F	F	20+	Some large deadwood.	B1/B2	9.0	Prune out deadwood >50mm diameter = reducing some limbs.
T4	Common lime	850	21	8	21	6	5	4	5	Lm	F	F	20+		B1/A2	10.2	
T5	Deodar cedar	730	20	6	20	7	8	7	7	M	F	F	>40		A1/A2	8.8	
T6	Large-leaved lime	940	20	3	20	7	7	7	7	Lm	F	F	>40	Large deadwood over path.	A2	11.3	Remove deadwood >50mm diameter.

T7	Kashmir birch	150	8	1.5	11	2.5	2.5	2.5	2.5	Y	F	F	>40	Off-site.	C1	1.8	
T8	Lime	100	7	1.5	10	2.5	2.5	2.5	2.5	Y	F	F	>40	Off-site.	C1	1.2	
T9	Ash	100	8	1.5	11	2.5	2.5	2.5	2.5	Y	F	F	>40	Off-site.	C1	1.2	
T10	Common lime	750	21	6	21	7	7	7	7	M	F	F	>40		A1/A2	9.0	
T11	Common lime	800	19	5	19	6	6	6	7	M	F	F	>40		A1/A2	9.6	
T12	Common lime	840	25	3	25	6	6	6	6	M	F	F	>40		A1/A2	10.1	
T13	Horse chestnut	700	15	5	16	5.5	5.5	5.5	5.5	M	F	F	>40		A2	8.4	
T14	Horse chestnut	600	12	4	13	4	4.5	4.5	4.5	Em	F	F	>40	Festooned with netting.	A2	7.2	
T15	Small-leaved lime	610	16	5	18	4	5	5	4	Em	F	F	>40		A1/A2	7.3	
T16	Horse chestnut	580	13	5	14	5	4	4	4.5	Em	F	F	>40	Crown reduced 2018/19.	B2	7.0	

T17	Horse chestnut	870	13	5	15	6	6	5	5	M	F	F	>40	Crown reduced 2018/19.	A2	10.4	
T18	Horse chestnut	900	15	5	17	4.5	5	5	5	M	F	F	>40	Crown reduced 2018/19.	A2	10.8	
T19	Common lime	820	18	3	18	7	6	7	6	M	F	F	>40		A2	9.8	To match other nearby limes: Heavy crown reduction down to 15m and 1/3 off radii.
T20	Common lime	1180	23	2	12	8	8	8	8	Lm	F	P	40+	Three <i>Ganoderma</i> bracket on south and west sides. Advanced basal decay.	A2	14.2	Heavy crown reduction down to 15m and 1/3 off radii.
T21	Common lime	980	23	2	12	8	8	7	7	Lm	F	F	>40		A2/A2	11.8	Heavy crown reduction down to 15m and 1/3 off radii.
T22	Common lime	1120	24	2	12	8.5	9	8	8	Lm	F	P	>40	Hollowing base. Decay fungus at 2.5m.	A2	13.4	Heavy crown reduction down to 15m and 1/3 off radii.
G23	Lime x 90 stems	50-150	12	4	14	5	4	3	4 ext.	Sm	F	P/F	<10- >40	Suckers, mostly lime, with occasional hawthorn. Dense.	C2	1.8	Thin to nine best well-spaced stems.
T24	Flowering cherry	350	8	2	8	5	5	4	3.5	M	F	F	10-20	Ivy-smothered.	C1	4.2	Remove ring of ivy from ground level up to head height.
T25	Horse chestnut	400	11	2.5	0	4	4	4	4	Em	P/D	P	0	>95% dead.	U		Fell.
H26, H28	Cherry laurel	150 basal	4	0	2	1.2	1.2	1.2	1.2	M	F	F	20+	Overgrown hedge.	C2	1.5	Cut to chest height. Cut out all sapling ash, elder etc.

S27	Elder	5 stems avg. 140	5.5	2.5	5.5	2.5	2.5	2.5	2.5	2.5	M	F	F	10	Elder tree?	C1	3.8	
T29	Leyland cypress	230, 360	12	1	15	3.5	3.5	3.5	3.5	3.5	Sm / Em	F	F	20+	3m from boundary fence.	B2	5.1	
H30, H31	Cherry laurel	100	1.5	0	1.5	0.6	0.6	0.6	0.6	0.6	Em	F	F	20+	Trim annually to 'A'-shaped profile.	C2	1.2	
T32	Ash	320, 340	14	3	16	6	1	6	7	7	Sm	F	P/F	<10	Self-sown by old brick boundary wall.	C2/U	5.6	Recommend remove.
G33	Ash and Leyland cypress	100-500	8-15	2-5	9-16	3-5	3-5	3-5	3-5	3-5	Sm - Em	P-F	P-F	<10- >20	Scrubby roadside bank. Mostly ash. Some ash dieback.	C2	6.0	Advise owner to prune stems leaning, or about to lean, on wall.
T34	Ash	360	13	3	14	2	3	4	4	4	Sm	F	P	10	Just off-site. Leaning over road.	C2	4.3	
T35	Ash	220, 280	12	4	13	3	4	4	4	4	Sm	F	P	<5	Self-sown on drive. No space.	C2/U	4.3	Recommend fell.
SG36	Elders and buddleias	150 basal	5	1.5	5	2	2	2	2	2 ext.	M	P/F	P	<5	Self-sown scrub by wall. Ugly.	C2	1.5	Suggest fell and plant tough evergreen shrubs.
T37	Common lime	850	20	5	20	8	7	6	7	7	M	F	F	40+		A1/A2	10.2	
T38	Common lime	750	14	2	15	6	8	7	7	7	M	F	F	40+		A1/A2	9.0	

T39	Horse chestnut	620	11	3	11	6	4	4	4	M	P	F	10-20	Dieback. Short life.	C1	7.4	
T40	Common lime	700	15	2.5	16	6	6	6	6	M	F	F	>40		A1/A2	8.4	
SG41	Hazel	Basal 200	5	0	6	2.5	2.5	2.5	2.5	M	F	F	10	Self-sown, unsuitable location.	C2 / U		Recommend remove.
G42	Mixed	200	4-6	0	4-6	2	2	1.5	2 ext.	M	F	F	10-20	Spotted laurel, lilac, and blue dwarf Lawson cypress. Overgrown shrubbery.	C2	2.4	Prune hard.
T43	Common lime	900	24	4	24	8	8	8	8	Lm	F	F	>40	Ivy.	A1/A2	10.8	
G44	Elder, hawthorn, ash, and cherry	100-300	3-5	0-2	3-6	1-3	1-3	1-3	1-3 ext.	Sap - M	P/ F	P	<10	Self-sown on or below retaining wall.	C2 / U	3.6	To prevent further damage to wall, or to repair wall. Remove all.
G45	Hybrid poplars x several	450	20	4	20	7	7	7	7 ext.	Em	F	F	10-20	Off-site but some stems lean northeast into site.	C2	5.4	
G46	Wild plums, hawthorns, blackthorn, and ash	50-150	2-6	0	2-8	3	3	3	3 ext.	Sm - Em	F	F	40+	Scrub on bank.	C3 Habitat	1.8	
T47	Ash	70, 80	6.5	1.5	9	2	1	2	2	Y	F	F	10-20	Self-sown tight to fence and off-site birch. No space.	C2/U	1.3	Suggest remove.

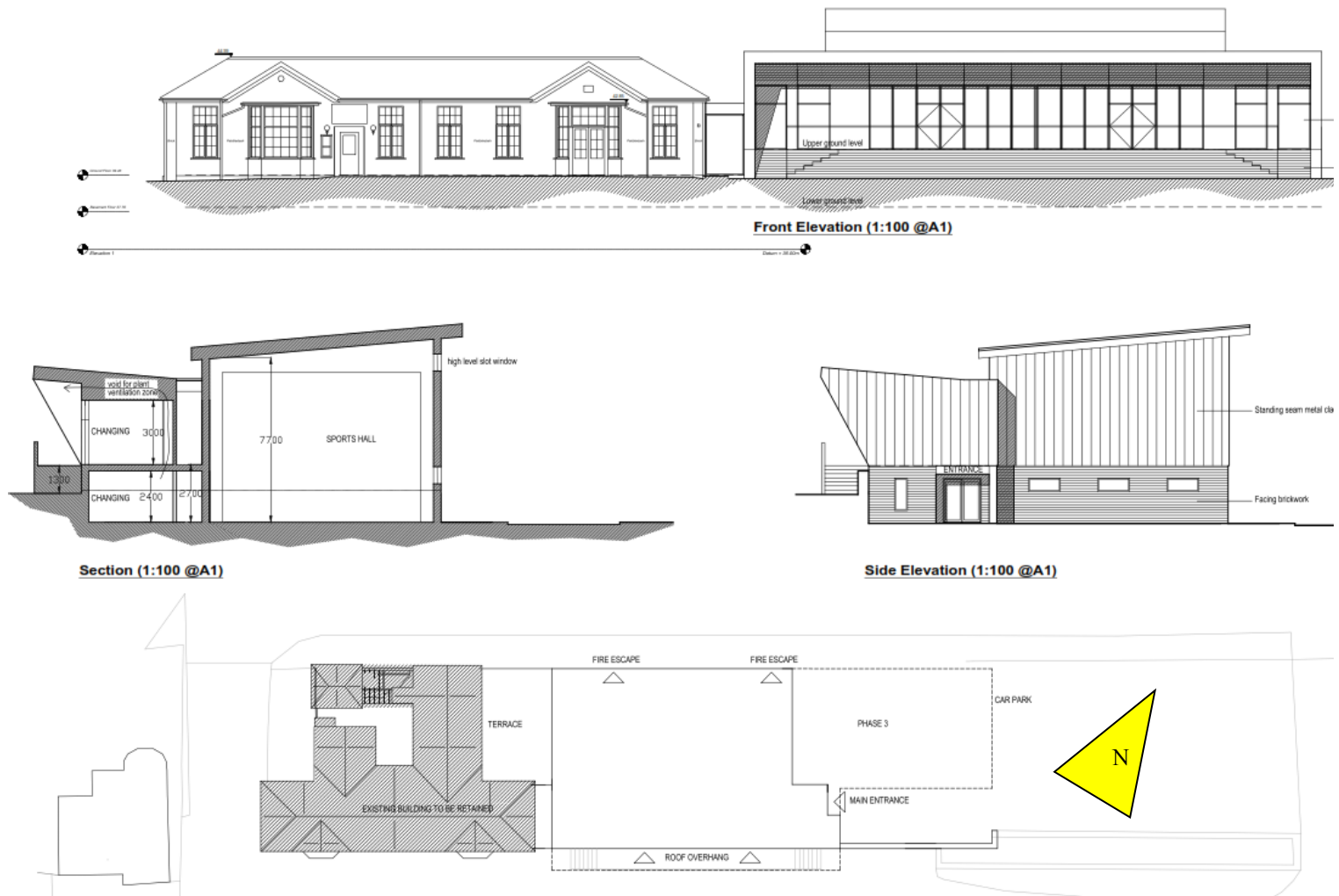
T48	Radiata pine	300	8	2	11	3	1.5	4	4	Y/ Sm	F	F	>40	Off-site. Pushing fence.	C1	3.6	
S49	Cherry laurel	300 basal	5.5	0	5.5	3	3	3	3	M	F	F	20+	Off-site but grown through fence into pitch.	C2	3.0	Prune hard !
H50	Pyracantha, yew, hawthorn etc.	150	4-5	0	4-5	1.2	1.2	1.2	1.2 ext.	M	F	F	10- 20	Off-site big hedge.	C2	1.8	Trim as required.
T51, T52	Silver birch	200	11	2.5	15	1.75	1.75	1.75	1.75	Y	F	F	>40	Off-site in garden.	C2	2.4	

End of table.

5. Proposed Development & Tree Impacts for new drive entrance.

5.1 The proposal.

- 5.1.1 The plan, **Boughton Butler Site Plan sections etc No.12 dated 20/10/20**, extract below, shows the proposal. Tree retention is indicative.
- 5.1.2 One existing building is replaced by a larger building.
- 5.1.3 The parking area to the north east is extended to the edge of the new building.



5.2 Tree Constraints and Impacts (considered below).

5.2.1 There are six potential arboricultural constraints to the development of the site:

- **physical contact of above-ground** parts of the tree,
- **below-ground** parts,
- **shading,**
- **over-bearing, and falling material,**
- **subsidence/heave, and root growth,**
- **impact on amenity value.**

5.2.2 Trees are listed in table, and coloured on the Tree Plans, to indicate their retention categories A,B,C,U: with the colours explained in the keys of the table & plan (**A = best** to **U = remove**). This allows the site designer to plan around important trees, and ignore lesser trees.

5.3 Physical contact of above-ground parts of trees.

5.3.1 General:-

Tree Plans in Appendices shows tree locations and crown spreads. Crown dimensions: spread in four directions, base of crown and tree height, are given in Table 4.5.2.

5.3.2 Specific above-ground impacts:-

- Two shrub groups SG41 & G42 are replaced by the new building.
- A few stems at the western end of carpark G23 might need pruning back or even coppicing?

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. We think of this as a disc of untouched ground 1m deep. Rooting areas are never symmetrical, but ideally there should be no ground disturbance within the RPA zone. At the discretion of an arboriculturalist, where rooting is restricted on one side, the RPA can be offset to provide the same protection area. This is shown on the RPA plan.

Typically the structural rootplate of a tree to resist windthrow is much smaller than the RPA. Therefore tree stability should not be affected by some disturbance within the RPA.

5.4.2 Specific Rootzone Impacts:-

- Big lime T20 which has basal decay, and we recommend crown reduction, has its theoretical RPA under existing and new building so no change.
- A very small part of T20's RPA is replaced by the extended carpark. This is insignificant loss: particularly if the tree is crown reduced. But we still recommend careful root pruning, see 6.6 below.

5.5 Light Interception & Shading.

5.5.1 General:-

The sun rises to 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 shading is reduced.

Theoretical shadows of arcs equal to estimated tree height in ten-years' time is recommended in BS5837. *This is the shadow pattern for a period from May to September inclusive, from 10.00hrs to 18.00hrs daily.*

5.5.2 Specific Shading Impacts:-

- T19 & T20 shade existing and proposed buildings. No change.

5.6 Over-bearing and Falling material.

5.6.1 General:-

All trees drop flower parts, leaves, twigs and fruits throughout the year. These can create a mulch layer on roads. Bird droppings and honeydew can spoil car paintwork. Big trees make adjacent dwellers nervous.

5.6.2 Specific Impacts:-

- G23 is a dense belt of self-sown stems edging the carpark. We already recommend thinning out. Regardless of re-development.
- We strongly recommend the four big limes are crown reduced as recommended to allow for increased footfall nearby.

5.7 Subsidence/heave & root growth.

5.7.1 Subsidence and heave are possible on this site, on mudstone geology.

5.7.2 Therefore, building foundations need to allow for nearby trees' presence, and their eventual removal.

5.8 Amenity impact.

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

- The proposal requires minimal tree & shrub removal.

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

6.1 Supervision

6.1.1 We would recommend the following arboricultural oversight:

- Pre-start meeting between demolition contractor / builder / groundworker, architect and LA Tree Officer, to agree tree retention and protection methods.
- Inspection of temporary tree protection fencing.
- Inspection of temporary ground protection.

6.1.2 Write-up with action points to be provided to client and Council Tree Officer within three days of each site visit.

6.2 Tree Management

6.2.1 Tree Work prior to ground work:-

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 a TPO, or could 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 of replacement building & parking:-

No	Species	RPA radius m.	Work for landscape / tree health.	<u>ADDITIONAL WORK FOR DEVELOPMENT</u>	
				<u>Specification.</u>	<u>Reason for additional work for development.</u>
T1	Blue cedar	10.8			
T2	Common lime	12.0	Pollard at main fork.		
T3	Common lime	9.0	Prune out deadwood >50mm diameter = reducing some limbs.		
T4	Common lime	10.2			
T5	Deodar cedar	8.8			
T6	Large-leaved lime	11.3	Remove deadwood >50mm diameter.		
T7	Kashmir birch	1.8			
T8	Lime	1.2			
T9	Ash	1.2			
T10	Common lime	9.0			
T11	Common lime	9.6			
T12	Common lime	10.1			
T13	Horse chestnut	8.4			

T14	Horse chestnut	7.2			
T15	Small-leaved lime	7.3			
T16	Horse chestnut	7.0			
T17	Horse chestnut	10.4			
T18	Horse chestnut	10.8			
T19	Common lime	9.8	To match other nearby limes: Heavy crown reduction down to 15m and 1/3 off radii.	<u>Crown reduce as recommended.</u>	<u>To allow for increased pedestrian access around the trees.</u>
T20	Common lime	14.2	Heavy crown reduction down to 15m and 1/3 off radii.	<u>Crown reduce as recommended.</u>	<u>To allow for increased pedestrian access around the trees.</u>
T21	Common lime	11.8	Heavy crown reduction down to 15m and 1/3 off radii.	<u>Crown reduce as recommended.</u>	<u>To allow for increased pedestrian access around the trees.</u>
T22	Common lime	13.4	Heavy crown reduction down to 15m and 1/3 off radii.	<u>Crown reduce as recommended.</u>	<u>To allow for increased pedestrian access around the trees.</u>
G23	Lime x 90 stems	1.8	Thin to nine best well-spaced stems.	<u>Thin as recommended.</u>	<u>To allow for increased usage of carpark.</u>
T24	Flowering cherry	4.2	Remove ring of ivy from ground level up to head height.		
T25	Horse chestnut		Fell.		
H26, H28	Cherry laurel	1.5	Cut to chest height. Cut out all sapling ash, elder etc.		
S27	Elder	3.8			

T29	Leyland cypress	5.1			
H30, H31	Cherry laurel	1.2			
T32	Ash	5.6	Recommend remove.		
G33	Ash and Leyland cypress	6.0	Advise owner to prune stems leaning, or about to lean, on wall.		
T34	Ash	4.3			
T35	Ash	4.3	Recommend fell.		
SG 36	Elders and buddleias	1.5	Suggest fell and plant tough evergreen shrubs.		
T37	Common lime	10.2			
T38	Common lime	9.0			
T39	Horse chestnut	7.4			
T40	Common lime	8.4			
SG 41	Hazel		Recommend remove.	<u>Remove.</u>	<u>Within new building.</u>
G42	Mixed	2.4	Prune hard.	<u>Remove.</u>	<u>Tight to new building.</u>
T43	Common lime	10.8			
G44	Elder, hawthorn, ash, and cherry	3.6	To prevent further damage to wall, or to repair wall. Remove all.		

G45	Hybrid poplars x several	5.4			
G46	Wild plums, hawthorns, blackthorn, and ash	1.8			
T47	Ash	1.3	Suggest remove.		
T48	Radiata pine	3.6			
S49	Cherry laurel	3.0	Prune hard !		
H50	Pyracantha, yew, hawthorn etc.	1.8	Trim as required.		
T51, T52	Silver birch	2.4			

(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 Protection Plan in Appendices.
- 6.3.2.2 Two **specifications** for suitable protective fencing are given in Appendix II. **Lightweight fencing will suffice here.**
- 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 Fencing to remain until all demolition, construction and hard landscaping work is completed, 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 arboriculturalist.
Within such zones, temporary horizontal ground protection plus temporary fencing would be essential.
TGP is needed here to protect rootzones of many trees.
- 6.3.3.2 Obvious options for temporary ground protection would be:-
 - RETAIN EXISTING HARD PAVING / ASPHALT near T19, T37-T40 & T43.
 - To protect T20-T22 where rootzones are not protected by hard surfacing: Temporary ground protection plates such as aluminium "Eve Trakway" or plastic interlocking-plate ground protection, both on 150mm depth of woodchip or bark, shown in Appendix III.
 - A layer of woven geo-textile under minimum 250mm depth of graded aggregate which is lifted after work, is another possibility.
 - Butted scaffold boards or 22mm plyboard laid on bearers on 150mm depth woodchip or bark mulch (but for pedestrian access only).

6.4 Construction Access.

6.4.1 General points:-

- We assume access will be from the existing drive and parking area.
- All retained trees and hedges need protection.
- No pedestrian, vehicle, plant or machinery to enter RPAs without temporary ground protection as detailed in para 6.3.3 above.

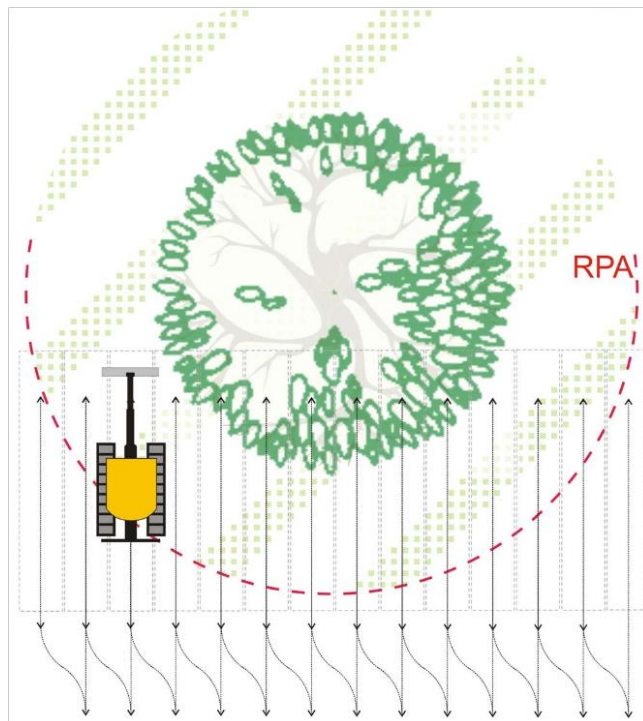
6.4.2 Site huts could be placed within RPA of trees and hedges; provided they stand elevated on stilt feet, no excavation is required for temporary services, and pedestrian and vehicle access is ground protected as detailed in 6.3.3 above.

6.5 Demolition / Excavation within RPAs:-

6.5.1 General specification FOR MINOR EXCAVATION anywhere near trees.

Sketch plan below:-

- Parallel tracking with slewing outside the RPA:-.
- 1.5-tonne rubber-tracked mini-digger with toothless grading bucket.
- Scrape off only turf or top layer to max 300mm depth.
- Slew outside RPA.
- Heap spoil outside RPA, for dumper to collect and run outside RPA.



6.6 Foundations within RPAs:-

6.6.1 Retaining wall along new parking area: See blue line of TRP plan:-

- Dig southwards towards trees.
- Stop 0.3m from final face.
- Dig last 0.3m horizontal to 1m depth by hand, severing any roots with loppers.
- Cover exposed face immediately with damp hessian.
- Dig deeper with machine, as no significant roots at depth.
- Install retaining structure and backfill on tree side within two weeks of opening ground.

6.7 Drainage.

- 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. Re-use existing.
- 6.7.2 Foul Drainage: Keep out of RPAs. Use existing.

- 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 percolation into tree root zones, but no trenching.

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. **We are not aware of any new services near trees.**
- 6.8.2 Trenches **within RPAs must be avoided.**
- 6.8.3 Otherwise use this onerous, work method:-
- Hand digging* or trench-less systems must be used.
*Use an air-spade to reveal roots (Appendix V).
 - Retain roots >15mm diameter within service trenches. Thread service pipe underneath.
 - No roots >25mm diameter must be exposed or severed without express written permission of local authority tree officer or retained arboriculturalist.
 - 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 >20mm 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. See 6.6 above for carpark retaining wall.
- 6.9.2 No special measures needed. Appendix IV gives materials for minimal-dig, porous, build-up, but not needed with current proposal.

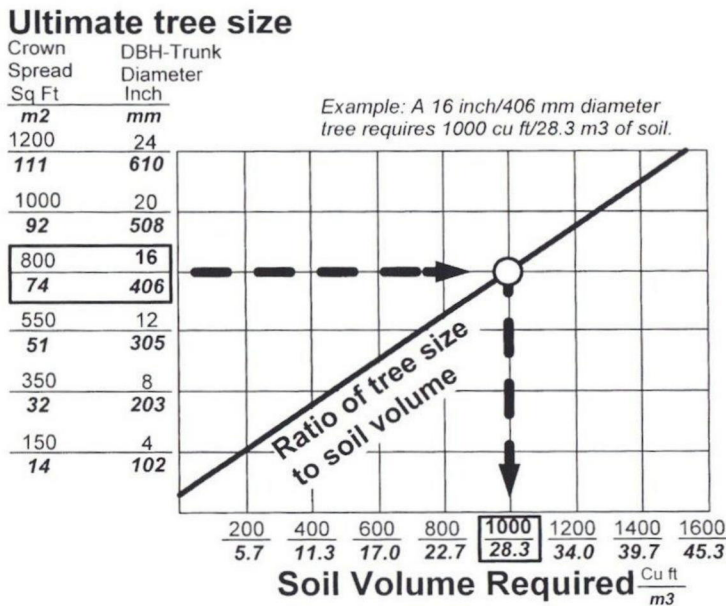
6.10 Tree work following construction.

- 6.10.1 Trees should be re-inspected. 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 TPO or planning conditions, or stand within a Conservation Area.

6.11 New Planting.

- 6.11.1 The developed site is small, and the wider site already contains ample trees, shrubs and perimeter hedges. No more planting needed as part of this proposal; BUT: we strongly recommend regular annual planting to eventually replace the ageing tree population on site.
- 6.11.2 Any planting and maintenance to comply with: BS 8545 “Trees: from nursery to independence in the landscape – Recommendations”. BSI 2014.
- 6.11.3 Any planting must be provides with adequate long-term soil-moisture availability: graph below from James Urban shows rootable area related to tree size (Up by Roots, ISA, 2008), to remind designers:

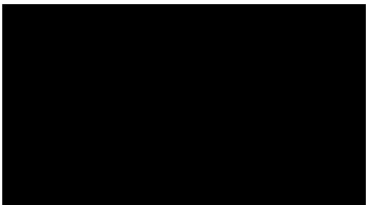
Table 2.4.1. Tree size to soil volume relationships (Urban 1992).



7.0 Conclusions

- 7.1 The proposed re-development at Worcester Norton Sports Club requires only shrub removal.
- 7.2 Lime trees T19-T22 are recommended for crown reduction for safety, and not for the development. They can be protected by careful construction detailed in Section 6 of this report.
- 7.3 Tree and, hedge planting is not required for this development, but is desirable to eventually replace the ageing tree population on the wider site.

Please contact us for further information.



Yours sincerely,

For 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, 2013.
"Tree Roots in the Built Environment". J Roberts, N Jackson & M Smith. R.A.T.8, TSO (The Stationary Office), London, 2006.
"Treework at Height" Industry Code of Practice. Arboricultural Association. 2020.
Guidance Note 12: Cellular Confinement Systems. Arboricultural Association. Sept 2020.

Appendix I

Location





Google Earth aerial.
Taken June 2018.



Appendix II

Vertical Tree Protection Fencing, from BS5837.

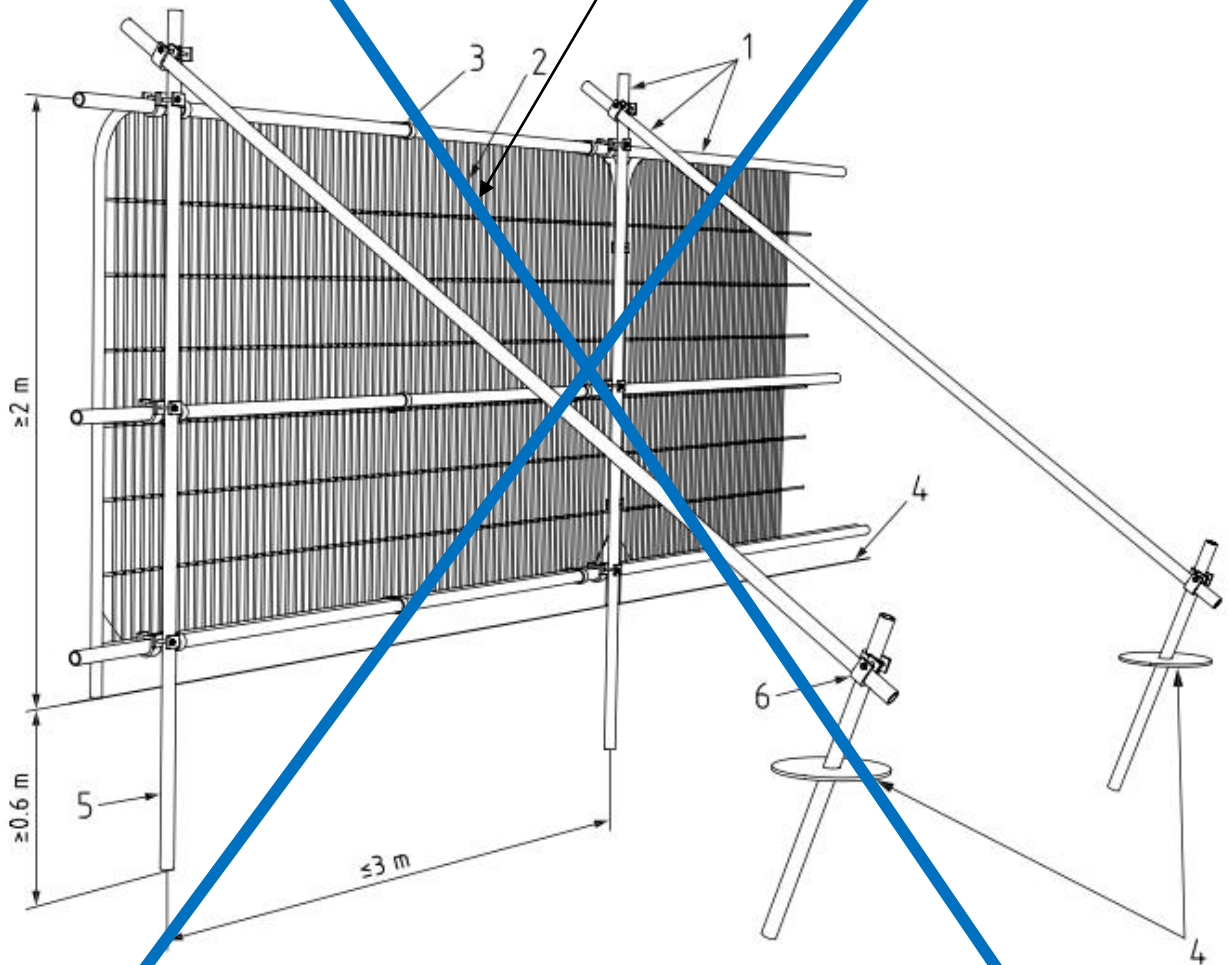
Vertical protective fence: location on plan:

Default in situ > 3 months:-

Heras panels on driven poles, + braces on driven poles.

Apply signs at MAX 10m spacing:

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



Key

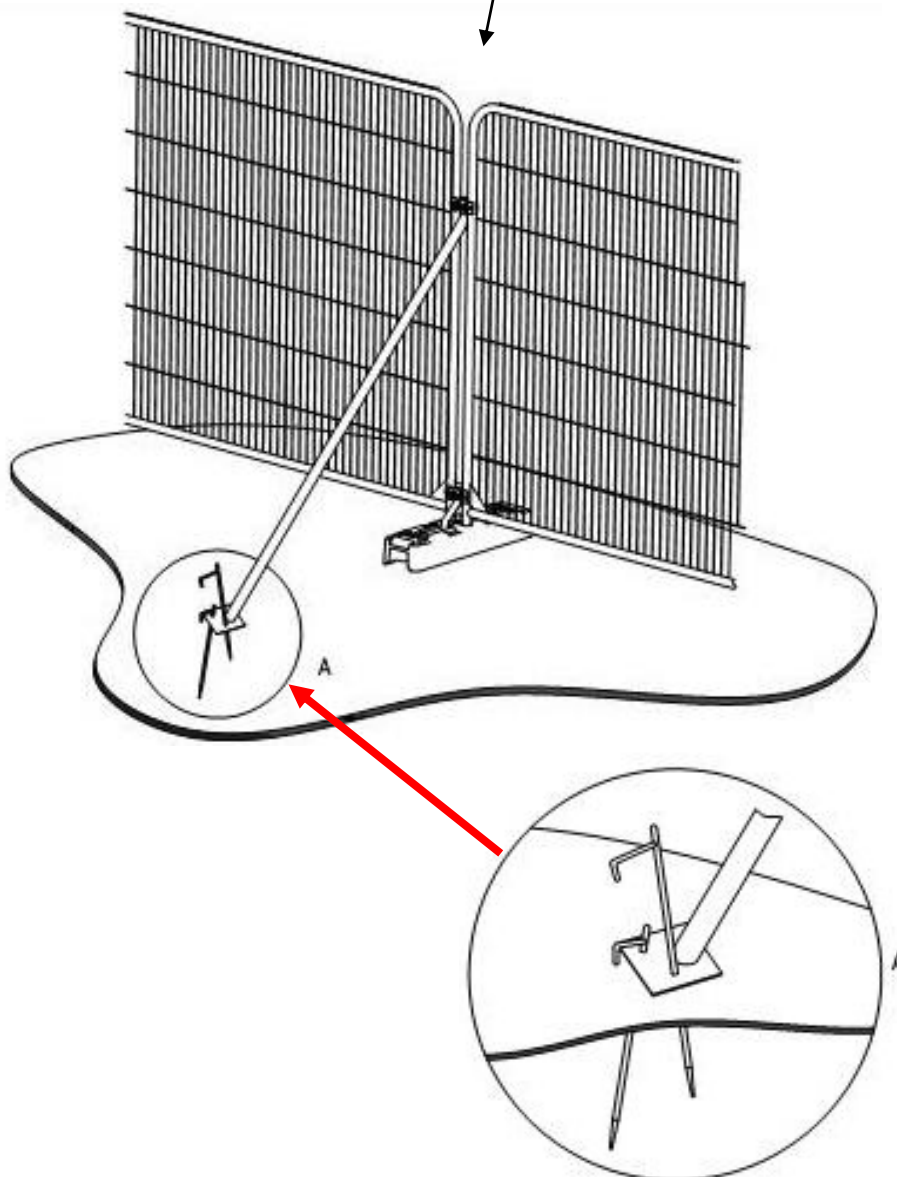
- 1 Standard scaffold poles
- 2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
- 3 Panels secured to uprights and cross-members with wire ties
- 4 Ground level
- 5 Uprights driven into the ground until secure (minimum depth 0.6 m)
- 6 Standard scaffold clamps

Lightweight: in situ for < 3 months-

Heras panels on feet, + pegged strut on each panel.

Apply signs at maxm 20m spacing:

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



Appendix III

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.

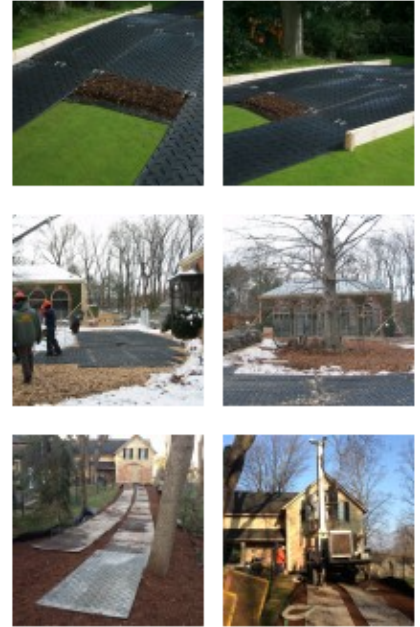
Ground-Guards Tree Root Protection

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 IV

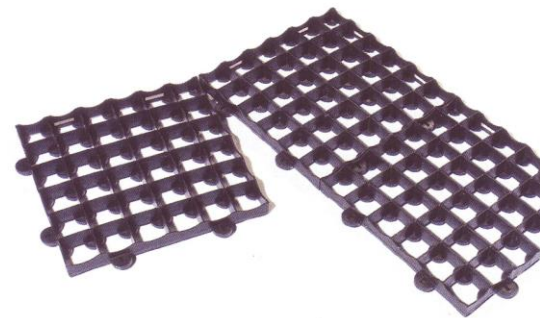
Trays for strengthening gravelled or grassed areas. (50mm or 80mm trays for strengthening gravelled or grassed areas.

DuoBlock

Grass Protection System



Using grass or gravel infill, DuoBlock 750 and 500 give architects, consulting engineers, landscape contractors and developers the ultimate in load-bearing performance combined with aesthetic appearance.



Porous paving systems have been available since the early 1990's and provide a durable yet aesthetically pleasing alternative to traditional surfacing solutions. Increased awareness of the need to manage storm water runoff in new developments and the advent of Sustainable Urban Drainage Systems (SUDS) has led to an increase in popularity.

DuoBlock is a permanent grass protection / gravel retention porous paving system. It is extremely versatile and may be used in a wide range of applications including:

Applications:

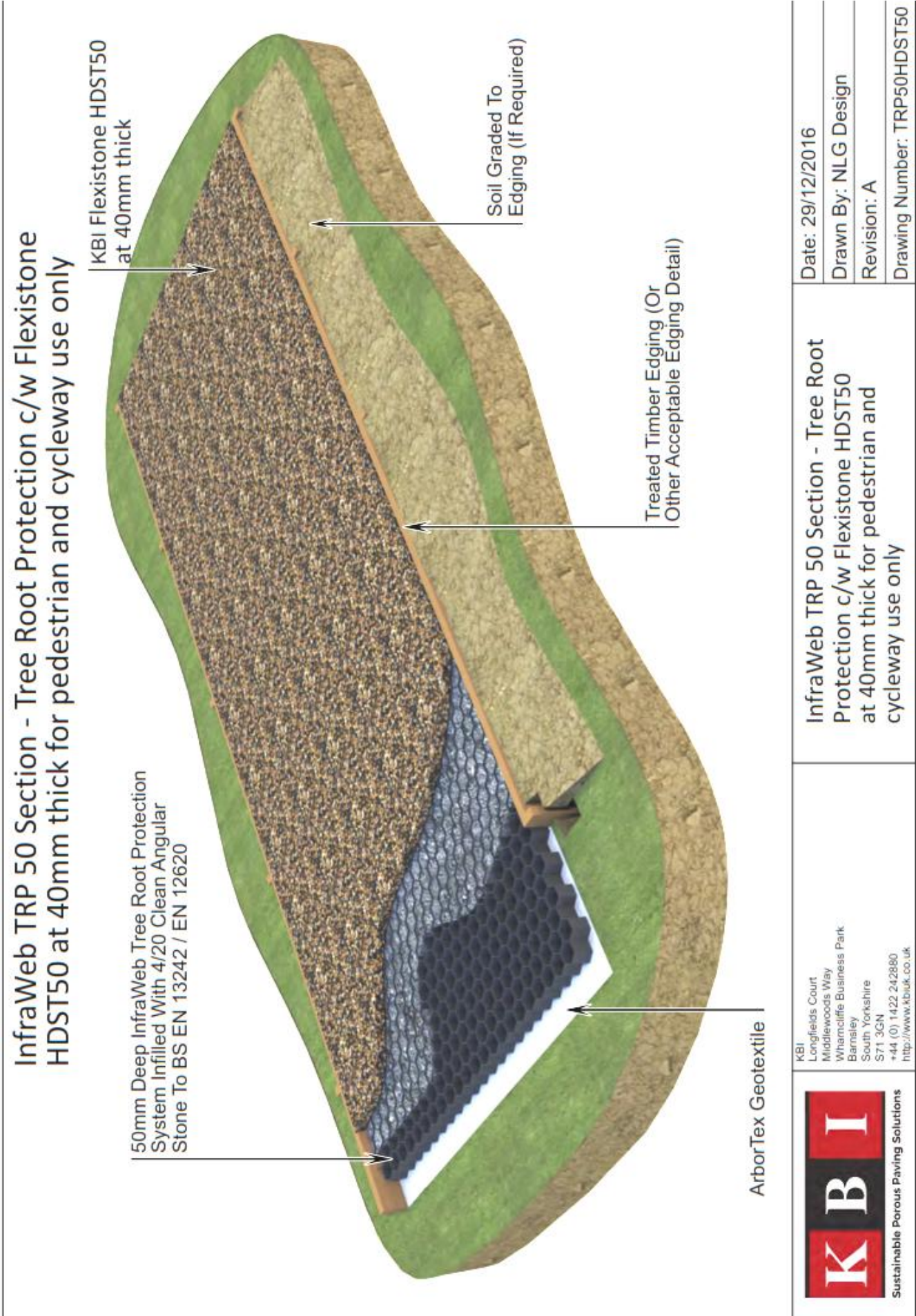
- Overspill car parking
- Emergency access and service roads
- Caravan hardstanding
- Verge hardening
- Service Roads
- Pedestrian walkways and towpaths
- Bridle ways
- Helipads
- Golf course pathways / Tee reinforcement

DuoBlock systems are uniquely designed to ensure the ultimate in load bearing performance and aesthetic appearance and have numerous benefits over traditional and first generation plastic systems such as:

Benefits:

- 90% surface area available for infill
- Reduces surface water runoff
- Increases water Filtration
- Interconnecting cell walls
- High Load Performance
- Unique surface design for greater aesthetic appeal
- Positive interlock System

**NEXT DAY
DELIVERY**
from stock



Deeper Cellweb 3-D grid for strengthening tracks.

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.

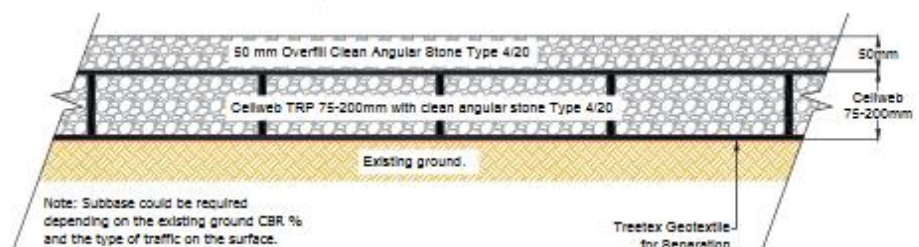
Cellweb® 3D Cellular Confinement. The Cellweb® is installed on top of the Treetex™ layer. This is fixed to the ground using ten steel J pins per panel. The panels can be cut to the required shape and adjoining panels can be connected using heavy duty staples or cell ties.

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



Web: www.geosyn.co.uk | Tel: 01455 617139
Fax: 01455 617140 | Email: Sales@geosyn.co.uk



Geosynthetics
Engineered Solutions

Appendix V

Example of Air-spade.

HANDLE VIBRATION TEST

Product type – MBW Soil Pick SP125

Manufacturer of testing apparatus – Castle

Accelerometer was affixed to the rear of the handle on the Soil Pick and all three axes were tested.

Accelerometer position:

X axis = 0.0M/S²

Y axis = 0.0M/S²

Z axis = 0.0M/S²

Hand/arm vibration = 0.0M/S²

TREE CARE

MBW's Soil Pick provides a multi-functional air tool for a variety of applications in the tree care industry including:

Radial Trenching

Radial trenching is a process which involves aerating the soils around a tree root in a pattern resembling a wagon wheel. The Soil Pick provides a safe and damage free means of utilizing a high air pressure to loosen tightly compacted soils.

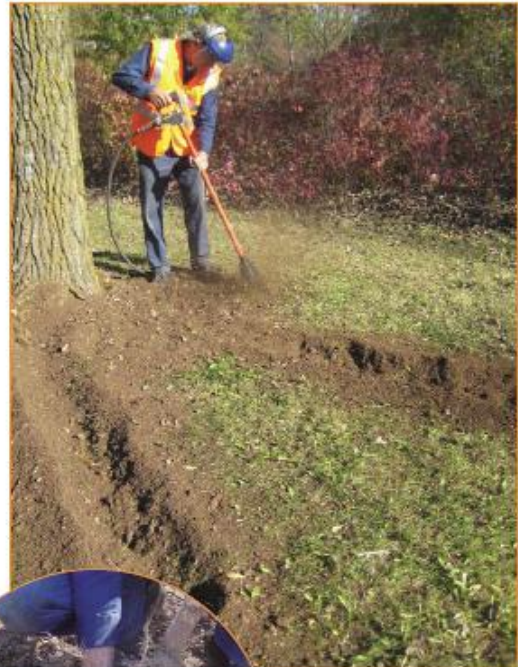
Aeration & Excavation

Root Locating for Utility Line Installation or Pruning

Investigating Root Structure and Damage

Transplanting or Bare Rooting

Reducing Soil Compaction



Appendix VI

- 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, RArborA, CEnv.**

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

From:	Jim Unwin	To:	Prospective Client
Date:	Nov 2020	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 / manager / contract manager to a range of clients listed below.

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

He works with two self-employed arboriculturalists of >20 years' combined experience:-

Jasper Fulford-Dobson Arboricultural Association Registered Consultant - Associate Member of the Institute of Chartered Foresters - Professional member of the International Society of Arboriculture - Technicians Certificate (ArborA) 2005, now regarded as NQF "level 4" - Professional Tree Inspection Certificate (LANTRA) 2013,

Owen Hutchison BSc(Hons) Agriculture & Estate Management, Level 4 Diploma Arboriculture, LANTRA Professional Tree Inspection & working with trees since 2007.

Plus a secretary/ plan technician; 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, 2004.

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 have been successfully assessed by Safety Management Advisory Services (SMAS) as meeting CDM Regs 2015 Core Criteria Stage 1, as a **Worksafe Consultant No. 75950.** expiry 09/2020.

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

First-aid at work June 2013.

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 2013-2021.
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 VII

Constraints plans :-

- **Tree Plan**

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 Plan**

RPA = circles.

See Tree Table for dimensions.

and

- **Theoretical Shading Plan**

= 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.

Plans are not included in pdf format of report.

Insert plans here in paper copy of report:-

Appendix VIII

Tree retention and Tree Protection Plan

Plans are not included in pdf format of report.

Insert plans here in paper copy of report:-

END.