

Ref: LAS_810
Date: 18.12.24.

Site: Willow Bend, The Warren

Arboricultural Statement

1 INTRODUCTION

- 1.1 LandArb Solutions Ltd were instructed to carry out a tree survey at Willow Bend, The Warren; herein referred to as the site, to accompany a planning application for a new hobby room.

2 TREE SURVEY

- 2.1 LandArb Solutions visited the site on 10.07.24 to carry out the tree survey.
- 2.2 A copy of the tree survey schedule and tree survey and constraints plan is shown in Appendix 1 and survey method in Appendix 7. A selection of site photographs is shown in Appendix 2.
- 2.3 The following provides a short description of tree cover at the site and should be read in conjunction with the tree survey schedule and tree constraints plan.
- 2.4 At the property frontage are three mature ash trees. All have varying levels of dieback and deadwood in the crown. Tarmac surfacing surrounds their stems. To the south is a timber shed set on hard surfacing/concrete.
- 2.5 In the neighbouring property to the east are some cypress (G19) which have been suppressed vertically.
- 2.6 The land within the site drops down from the timber shed and there is a timber raised walkway on the western boundary.

- 2.7 There are no trees in the site itself, with all trees set on the site boundaries or fully within the neighbouring property. Boundary trees have been pruned and manged in the past, with many of the sycamore having been pollarded. Species comprise ash, sycamore, plane, cypress and purple plum.
- 2.8 To the very south of the site is a boathouse.

3 STATUTORY PROTECTIONS

Conservation Area / Tree Preservation Orders

- 3.1 A review of Reading Borough Council's Online "TPO register" (accessed 30.09.24) does not appear to record any trees within the site as subject to a Tree Preservation Order (TPO) at the property. However, as a precaution, it is advised that prior to any tree works, confirmation is sought from the LPA as to the status of any TPOs within or adjacent to the site.
- 3.2 A review of Reading Councils online Local Plan maps do not show the property as being in a Conservation Area.
- 3.3 Notwithstanding specific exemptions and in general terms, a TPO prevents the cutting down, uprooting, topping, lopping, wilful damage or wilful destruction of trees without the prior consent of the local planning authority. Penalties for contravention of a TPO tend to reflect the extent of damage caused but can, in the event of a tree being destroyed, result in a fine of up to £20,000 if convicted in a Magistrates' Court, or an unlimited fine if the matter is determined by the Crown Court.

Statutory Wildlife Protection

- 3.4 Although preliminary visual checks from ground level of wildlife habitats are made at the time of surveying, detailed ecological assessments of wildlife habitats are not made by the arboriculturist and fall outside the remit of the survey.
- 3.5 Trees which contain holes, splits, cracks and cavities could potentially provide a habitat for bats in addition to birds and small mammals. It is recommended that in line with any accompanying specialist advice, any tree works should only be carried out following a detailed climbing inspection to the tree to ensure that protected species or their nests/roosts are not disturbed. If any are found, the project manager, site owner or consulting arboriculturist should be informed and appropriate action taken as recommended by a Statutory Nature Conservation organisation such as Natural England.
- 3.6 It is advised that tree works are carried out with the understanding that birds will generally nest in trees, hedges and shrubs between March and August. Ideally, operations should be avoided during this period. Any necessary work should only be carried out following a preliminary check of the vegetation. For information, the Wildlife and Countryside Act 1981 (as amended), The Countryside and Rights of Way Act 2000 (as amended) and the Conservation of Habitat and Species Regulations 2010, form the basis of the statutory legislation for flora and fauna in Britain.

4 DEVELOPMENT PROPOSALS

- 4.1 Development proposals are for the demolition of the existing shed and replacement with a new hobby room as well as removal of the raised covered walkway.
- 4.2 A copy of the proposed site plan is shown in Appendix 3.

5 ARBORICULTURAL IMPACT ASSESSMENT

- 5.1 The proposed site plan has been overlaid with the tree survey to prepare a Tree Retention/Loss and Protection Plan (Appendix 4). This has been used to inform this assessment in terms of the proposed site plan and relationship with trees.

Tree Retention/Loss

- 5.2 No trees require removal to enable demolition of the raised walkway and shed.
- 5.3 Proposals are acceptable from a tree retention/loss perspective as no trees will require removal.

Impacts to retained trees

Tree works

- 5.4 No major tree work is required to enable development.
- 5.5 The overhanging canopies of G19 will need to be lifted/reduced back (where required) to ensure at least 1.5m clearance of the hobby room roof. This can be done in accordance with common law rights.
- 5.6 Existing trees can continue to be managed in accordance with good arboricultural practice as required and as would be reasonably be expected of any tree owner.
- 5.7 It was noted during the tree survey that T1-T3 have significant deadwood and dieback. It is recommended that outside of the application process, a climbing inspection is

carried out to determine extent of decay in the upper crown/stems to inform future tree works (i.e. deadwood or crown reduce or removal).

Removal of the shed and replacement with a garden room

- 5.8 The location of the proposed new hobby room is within the footprint of the existing timber structure and hard surfacing to be removed. In this context, it will not introduce built form where it has not already existed.
- 5.9 As the default RPA of T3 and G9 extend under the shed, it will be important to avoid strip foundation, in favour of a lower impact design.
- 5.10 BS5837:2012 advises that “traditional strip footings can result in extensive root loss and therefore should be avoided”. It advocates that the use of specially engineered structures within RPAs may be justified if they enable retention of good quality trees. and that root damage can be minimized by using:
 - piles, with site investigation used to determine their optimal location whilst avoiding damage to roots important for the stability of the tree, by means of hand tools or compressed air soil displacement, to a minimum depth of 600 mm;
 - beams, laid at or above ground level, and cantilevered as necessary to avoid tree roots identified by site investigation.
- 5.11 Excavating a strip foundation within a default RPA has the potential to cause significant root severance to any roots encroaching the site / growing under the shed. However, if the foundation for the new hobby room was designed to avoid or minimise excavation in the RPA, it would be possible to construct the hobby without having significant detrimental impacts on T3/G9 or their RPAs.
- 5.12 The hobby room will extend further south than the existing shed structure and will be elevated over the gradient change and set on concrete piers. In this context there would be no change in ground levels.

Removal of the covered walkway

- 5.13 The timber covered walkway is to be removed from adjacent to the boundary wall. This will result in the removal of the timber structure from default RPAs and return to soft landscaping.

Existing driveway

- 5.14 The existing driveway is to be retained. The driveway parking area will occupy areas that already comprise hard surfacing / parking. Therefore no new hard surfacing is proposed in any RPA.

Levels

- 5.15 All existing levels in RPAs are to be retained.

6 TREE PROTECTION AND METHOD STATEMENT

- 6.1 Tree protection measures are shown on the TPP in Appendix 4. Protection measures will rely on temporary fencing, ground protection and considerate working methods.

Protection fencing

- 6.2 As a precaution temporary tree protection fencing is to be installed in primary positions as shown on the TPP to prevent accidental direct contact or encroachment into RPAs/soft landscaping.
- 6.3 Fencing is to run to the edge of the existing parking area to protect the stems of T1, T2 and T3 from direct contact.
- 6.4 Fencing is to be installed in the rear garden area to limit encroachment into RPAs of neighbouring trees.
- 6.5 Fencing is to be installed prior to works and remain in place for the duration.

6.6 Fencing is to be removed when construction works are completed.

Ground Protection

6.7 Trees to the rear of the site are set in neighbouring land. Removal of the timber walkway would be within default RPAs. As such, as a precaution, ground protection is recommended to avoid ground compaction during this work.

6.8 In this area, temporary ground protection such as scaffold board or ground guards set on a 100mm layer of compressible bark chippings is to be installed.

6.9 An example ground protection is in Appendix 5.

General rules for tree protection

6.10 The following activities are not permitted within a RPAs unless detailed in this statement:

- No mixing of cement.
- No soil/turf stripping, raising/lowering of ground levels, deposit or excavation of soil or rubble.
- No storage of materials, waste materials, spoil, machinery fuel, chemicals or other materials of any other description (unless on ground protection).
- No parking/use of tracked or wheeled machinery unless on ground protection/existing driveway).
- No lighting of fires or disposal of liquids.
- No signs, cables, fixtures or fittings of any other description shall be attached to any part of a retained trees.

6.11 All materials, equipment and contractor parking/compound must be located outside any retained tree RPA. There are existing hard surfacing / parking areas at the property frontage that can be used.

Considerate Working Methods

6.12 The final method of tree protection will be carrying out works considerately and being tree aware. All contractors must be made aware of tree protection requirements at the site and ensure works are carried out in accordance with this statement.

Removal of the timber shed, its base and replacement with a new hobby room

6.13 The proposed new hobby room is to be elevated over the change in ground levels, supported on piers. This will avoid the need for strip foundations or any ground beams. When excavating the footings for each concrete pier the following method should be followed:

- Ensure protection is in place.
- The timber shed is to be pulled down away from G9 using a top down pull back approach.
- The shed foundation is to be broke up and lifted out using hand tools / lightweight plant operating from existing hard surfacing.
- Care is to be taken no to excavate into the subbase below.
- Once hard surfacing has been removed no mixing of cement on exposed ground. No heavy machinery allowed within RPAs.
- The new hobby room foundation is to be installed using an alternative foundation design (i.e. avoid strip foundation in favour of either a replacement concrete slab or pile and beam solution. Any ground beam needs to be set at or above ground level and designed by a structural engineer with inputs from the project arboriculturist.

Hobby room pier installation in default RPA pf G19

6.14 The proposed new hobby room is to be elevated over the change in ground levels, supported on piers. This will avoid the need for strip foundations or any ground beams.

When excavating the footings for each concrete pier the following method should be followed:

- Mark out the location of the pier post holes and excavate the post holes using handheld tools (hand digging or use of air-spade). The priority is to remove soil without damaging or severing significant roots or damaging roots in the immediate area of excavation. Preference should be made to using an air-spade to minimise damage to roots. However, if the ground is sufficiently compacted that air-spade excavation is not possible or not possible for another reason, excavation should be carried out using hand tools. Where digging by hand as opposed to air-spade, a fork should be used to loosen soil and help locate any significant roots. Loosened soil can then be lifted out using a spade.
- During post hole excavation, roots under 25mm (where they cannot realistically be retained) are to be pruned back to the edge/face of the excavation using a sharp cutting tool such as saw or secateurs. If smaller roots under 25mm are sufficiently flexible and can be permanently displaced, then the default should be to retain.
- Roots over 25mm or large fibrous masses are to be retained. Retained roots must not be served. Where large roots are encountered, the post hole should be adjusted to avoid.
- All new post holes are to be lined with an impermeable membrane prior to concrete pouring to prevent leaching into the surrounding soil.

Existing driveway surface replacement (If required)

6.15 In the event that the existing tarmac driveway surfacing needs to be replaced by T1, T2 and T3, works will need to be carried out sensitively to avoid potential root loss beneath. Replacement surfacing is to be installed building upwards as opposed to excavating lower than existing sub-base. The following methods should be followed:

- Existing tarmac to be broken up and lifted out using hand tools or lightweight plant.
- Works should start either nearest the road and work backwards or nearest the timber shed and work away. This is to ensure works do not progress over exposed ground in the RPAs.
- Ensure the existing sub-base / ground beneath is not excavated and is retained. New surfacing is to be installed building up (i.e. no dig).
- Following hard surface removal, if any surface roots are left exposed these need to be covered with clean topsoil.
- Once hard surfacing has been removed no mixing of cement on exposed ground. No heavy machinery allowed within RPAs. Once hard surfacing has been removed, if access across an RPA is needed before new surfacing is laid, temporary ground protection must be installed (such as ground guards set on 100-150mm of compressible bark chippings, see Appendix 5 example)
- Any hollows or depressions are to be filled using clean angular stone or sharp sand to ensure level surface. Any new subbase should be permeable and installed on the prepared ground. Creation of a sub-base on the existing ground should use a permeable material such as clean angular stone or MOT type 3.

- However, if a more substantial sub-base is needed this should only be done so using a load bearing geocellular confinement system (such as cellweb).
- The surface finish should be permeable.
- Edge support where in the RPA must avoid excavation and instead use edging set about ground and pinned in place (such as timber or brick sets pinned in place using timber or steel pegs).

6.16 A Cellweb detail/manufacturers method statement is included in Appendix 6.

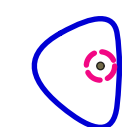
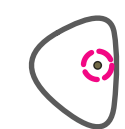
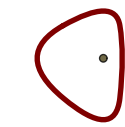
Summary

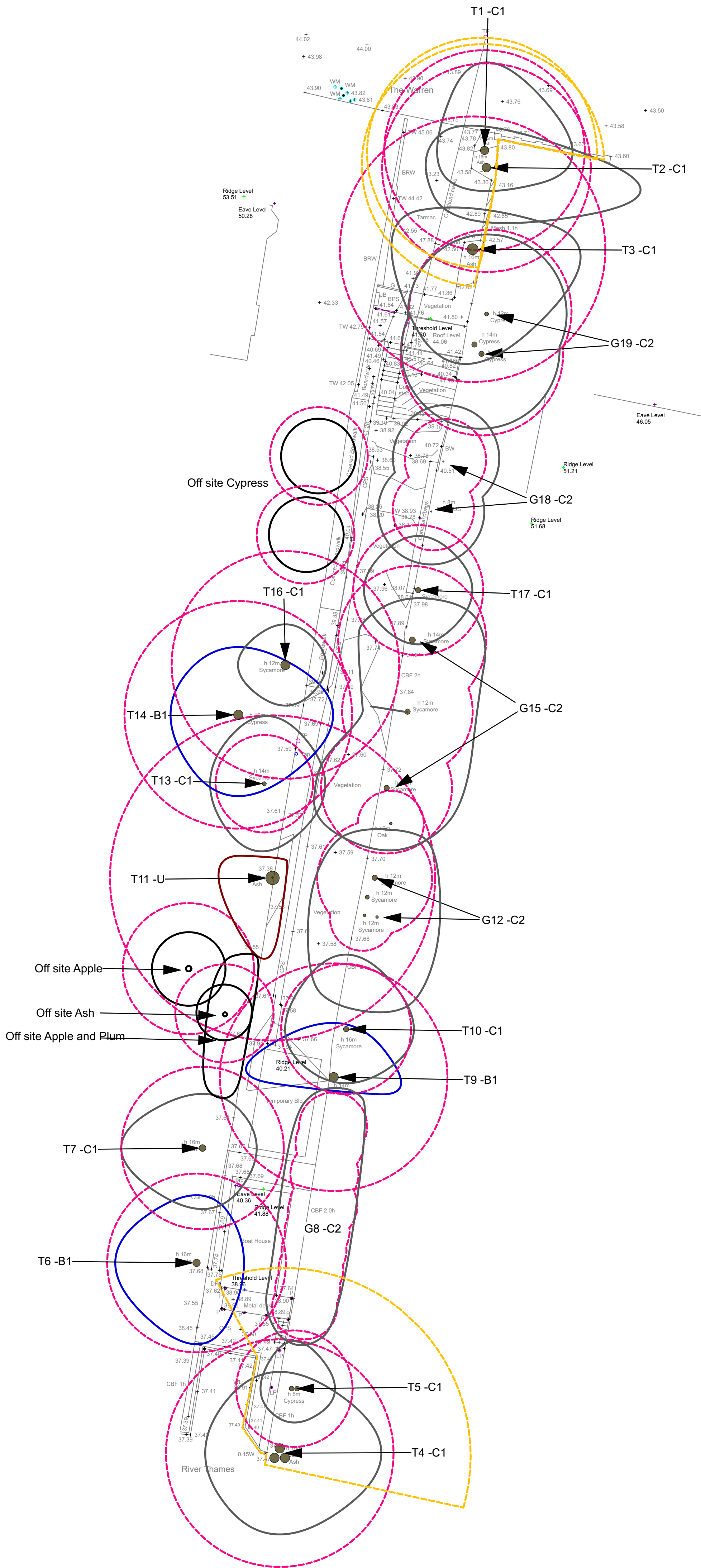
6.17 Overall with regard to proposals the following is noted:

- Proposals will not require the removal of any trees.
- No major tree works are required to enable development.
- No major engineering works are required in RPAs that would result in the deteriorate or loss of high quality trees.
- Retained trees can be adequately protected by fencing and considerate working methods.

Appendix 1:
Tree Survey and Constraints Plan and Schedule

KEY - BS 5837 : 2012 Categories

- Tree Category A - High Quality
- A Category - Hedgerow, Group, Woodland
- Tree Category B - Moderate Quality
- B Category - Hedgerow, Group, Woodland
- Tree Category C - Low Quality
- C Category - Hedgerow, Group, Woodland
- Tree Category U - Unsuitable for Retention
- Default Root Protection Area to BS:5837:2012
- Adjusted Root Protection Area to BS:5837:2012
- Shrub Mass / Offsite Tree



Note: The original of this drawing was produced in colour - a monochrome copy should not be relied upon.

Revision	Description	Date
-	First issue	17/7/24

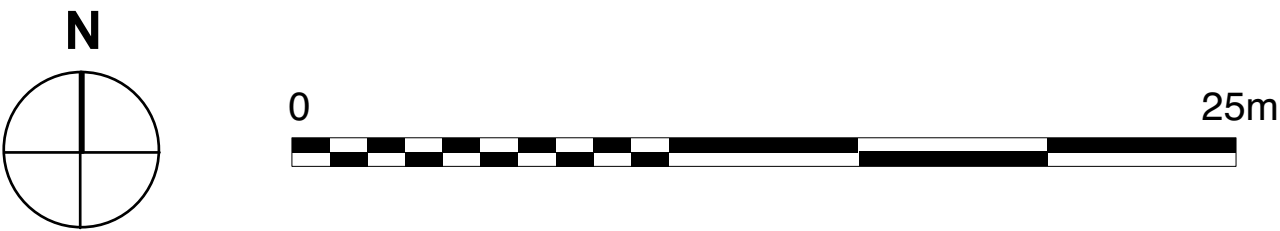
LANDARB SOLUTIONS

Project:
Willow Bend, The Warren

Description:
Tree Survey and Constraints Plan

Status:
For Planning

Scale: 1:200 @A1	Drawn I DP	Checked MP	Date: 17/07/2024
Job Number: LAS 810	Drawing Number: 01	Revision: -	



Ref no.	Species	Ht. (m)	Stem				Category Grading	Crown Spread (m)								Life stage	ULE	Physiological Condition	Structural Condition	General Observations and Notes
			Stem Count	Stem dia. (mm)	RPA radius	RPA area		N	E	S	W	Ht. 1st Br. (m)	Est.	1st Br. Direction	Ht. Can. (m)					
T1	Ash	17.0	1	620	7.4	174	C1	6.5	6.5	3.0	3.5	N/A	-	N/A	8.0	M	<10	Fair	Poor	Multiple nails in stem, leans to north, dieback in crown with large dead / dying branch south west side. Thinning crown. Tree is in decline and a high risk location, limited long term retention value.
T2	Ash	17.0	1	640	7.7	185	C1	3.0	11.5	4.0	4.5	N/A	-	N/A	3.5	M	<10	Fair	Poor	Large area of deadwood/dieback in upper crown, dense lower crown. Large wound on stem west side at base which is not soft, does sound hollowing, reaction growth around wound edge. Cavity in pruning wound/ branch loss point south side, pruned/ reduced in past, western limb over extended across neighbours property. Tree is in decline and a high risk location, limited long term retention value.
T3	Ash	17.0	1	820	9.8	304	C1	3.0	8.0	8.5	6.0	N/A	-	N/A	6.0	M	<10	Poor	Poor	Past limb loss to south, Very thin crown and deadwood throughout, large amount of fallen deadwood on ground. Appears may be a split on underside of southern lower limb, pruned / reduced in the past. Tree is in decline and a high risk location, limited long term retention value.
T4	Ash	12.0	3	704	8.4	224	C1	6.0	7.5	6.0	5.5	N/A	-	N/A	2.0	M	<10	Poor	Fair	Off site, three stems, river edge, very thin canopy, major deadwood, adventitious growth on limbs and stems, in decline
T5	Cypress	6.0	2	361	4.3	59	C1	3.5	3.0	2.5	2.5	N/A	-	N/A	1.5	EM	10+	Fair	Fair	Off site, small tree, lower crown pruned back to boundary in past
T6	Sycamore	14.0	1	550	6.6	137	B1	5.0	3.5	6.0	6.0	N/A	-	N/A	3.5	M	10+	Fair	Fair	Abscised branches south side, high canopy, dieback at extremities, thinning crown,
T7	Ash	15.0	1	500	6.0	113	C1	4.0	4.0	4.5	6.0	N/A	-	N/A	6.0	EM	10+	Fair	Fair	Off site, dense ivy on stem, thing crown, areas of deadwood dieback within crown,
G8	Elder, ash, sycamore, privet, rose	12.0	5+	200	2.4	18	C2	As on plan				N/A	-	N/A	0.0	SM	10+	Fair	Fair	Off site shrubs and young to semi mature ash and sycamore, swamped in climbers,
T9	London plane	14.0	1	700	8.4	222	B1	4.0	5.0	4.0	6.5	N/A	-	N/A	6.0	M	20+	Good	Fair	Set off site but west stem into boundary fence, cavity west side at 2m. Stem swamped in ivy, appears to have been pruned in the past, dense crown, dense ivy obscures view of stem.
T10	Sycamore	12.0	1	400	4.8	72	C1	5.5	5.0	4.0	4.5	N/A	-	N/A	4.5	EM	10+	Fair	Fair	Off site, dense ivy on stem obscures view, appears may have been topped/ pollarded in last.
T11	Ash	10.0	1	1000	12.0	452	U	1.5	1.0	6.0	4.0	N/A	-	N/A	0.0	OM	<10	Fair	Poor	Topped reduced to 4m, regrowth from side of stem forms crown. Stem is heavily decayed, hollow and so is base. Tree structure is poor, concrete poured in cavity south side, stem on boundary line, fungus on stem, irreversibly decline stem rotten and falling apart.
G12	Ash, sycamore, red oak	12.0	-	200	2.4	18	C2	As on plan				N/A	-	N/A	0.0	EM	10+	Fair	Fair	Off site, drawn up, several multi-stemmed, dense ivy.
T13	Sycamore	10.0	1	300	3.6	41	C1	5.0	4.5	5.0	4.0	N/A	-	N/A	3.0	EM	10+	Fair	Fair	Supressed to north, lower crown shaded out with thin and deadwood, stem leans to west,
T14	Cypress	12.0	1	700	8.4	222	B1	5.0	7.0	6.0	5.0	N/A	-	N/A	4.0	M	10+	Fair	Fair	Thin canopy, areas of needle browning throughout, off site.
G15	Sycamore	10.0	1	400	4.8	72	C2	0.0	0.0	0.0	0.0	N/A	-	N/A	4.0	EM	10+	Fair	Poor	Three pollarded sycamores off site, reasonably dense crowns from regrowth, cavities./ decaying branch stubs and pruning points,
T16	Sycamore	10.0	1	700	8.4	222	C1	3.0	3.0	3.0	3.5	N/A	-	N/A	0.0	M	10+	Fair	Poor	Off site, dense ivy obscures view of stem but appears that it's an older stem that's been topped and smaller 200mm new stem has grown up from old one, low quality.
T17	Plane	10.0	1	400	4.8	72	C1	4.0	4.0	4.0	4.0	N/A	-	N/A	5.5	M	10+	Fair	Poor	Off site, pollarded, exposed heartwood with hollow stem, regrowth forming crown from pollarded stem. Poor form.
G18	Purple plum. Elder	8.0	5+	250	3.0	28	C2	As on plan				N/A	-	N/A	3.0	EM	10+	Fair	Fair	Off site, multiple stems, shrubs.
G19	Cypress	11.0	3	500	6.0	113	C2	As on plan				N/A	-	N/A	0.0	M	10+	Fair	Fair	Off site, unable to access, ivy on stems obscures view, estimated, supressed vertically

Appendix 2: Site Photos



Photoview 1: View looking south east at T4 and T5.



Photoview 2: View looking north towards G8.



Photoview 3: View looking east at G12.



Photoview 4: View south west towards T11 and T13.



Photoview 5: View looking north towards T11 and G12.



Photoview 6: View west at the raised timber walkway.



Photoview 7: View south at G18.



Photoview 8: View looking north east at G19.



Photoview 7: View west at H13.



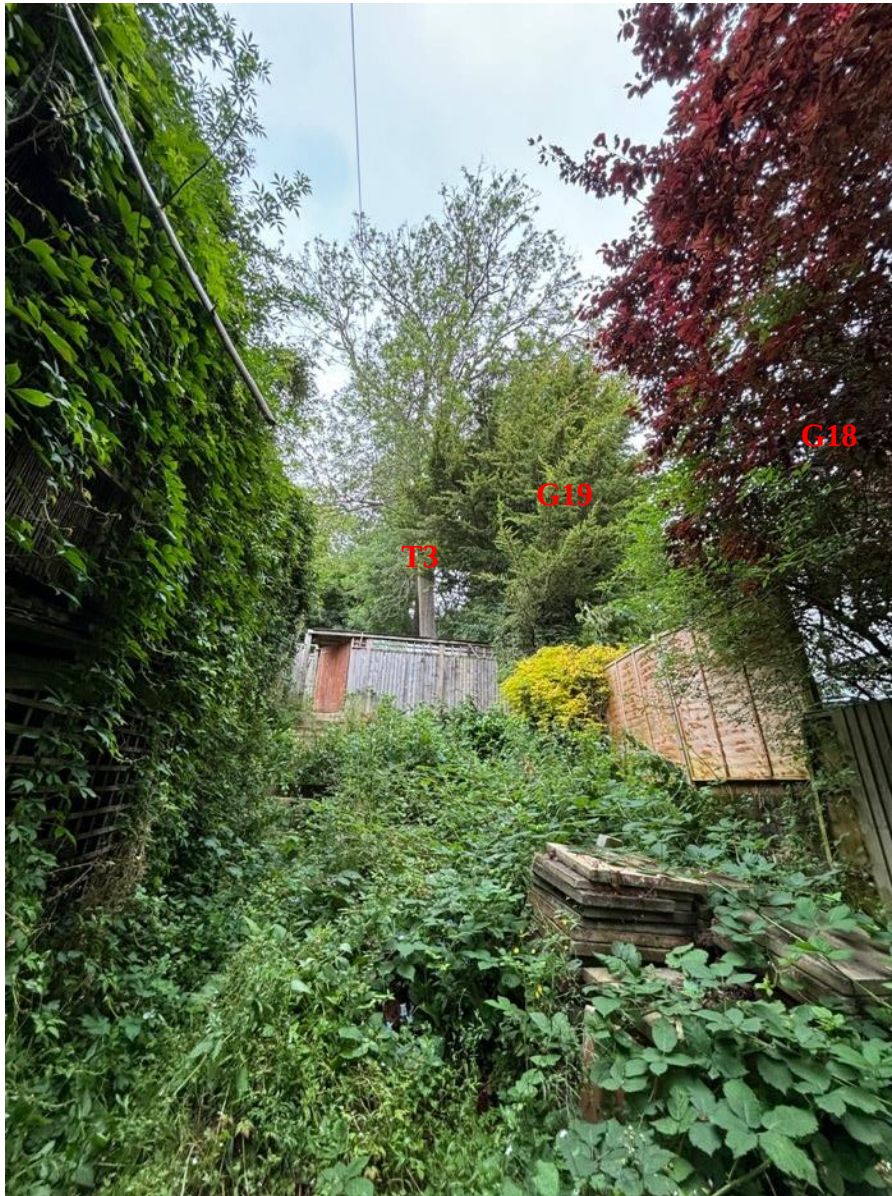
Photoview 8: View looking south-east at G19.



Photoview 7: View east towards T1-T3.

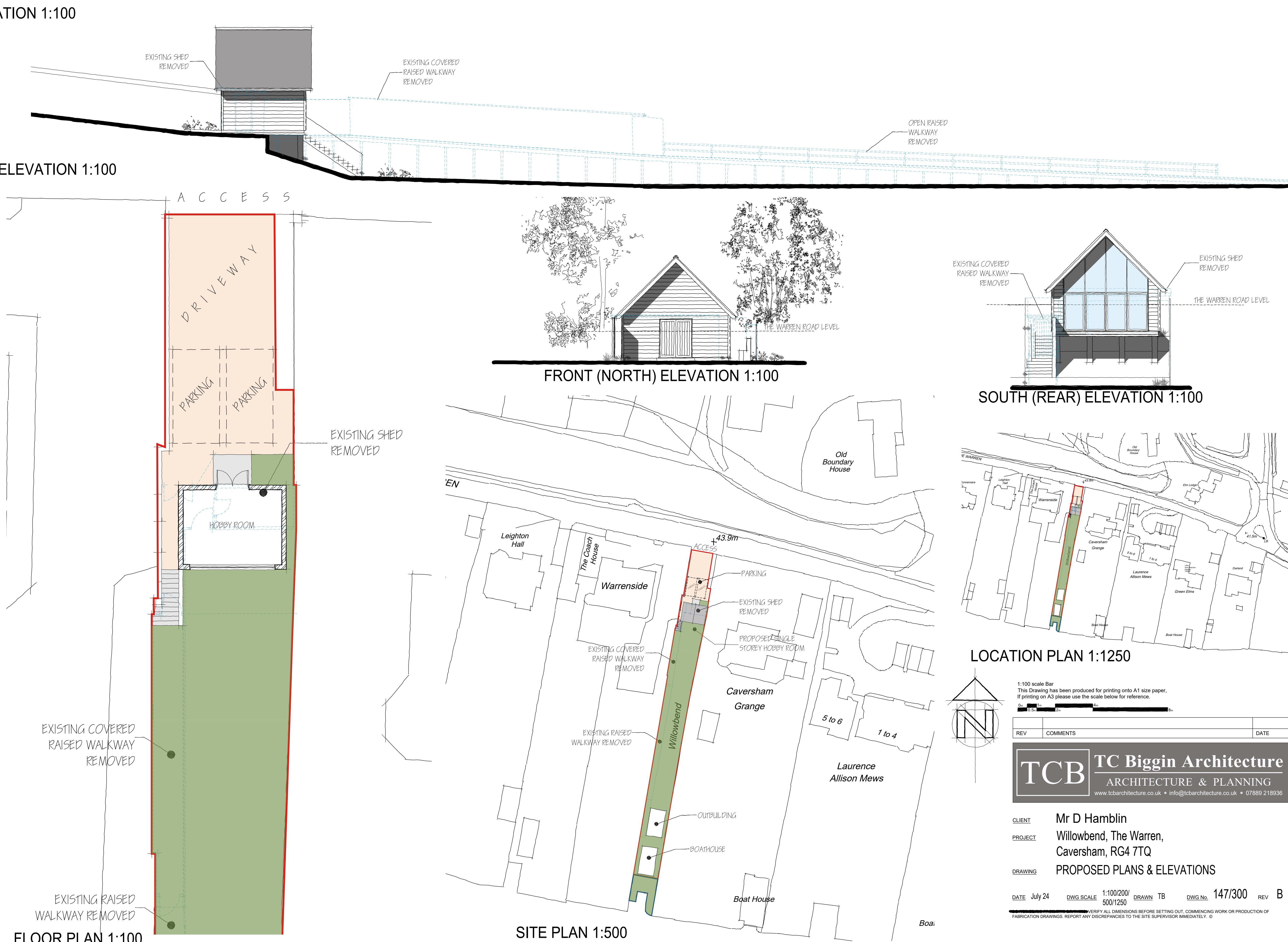
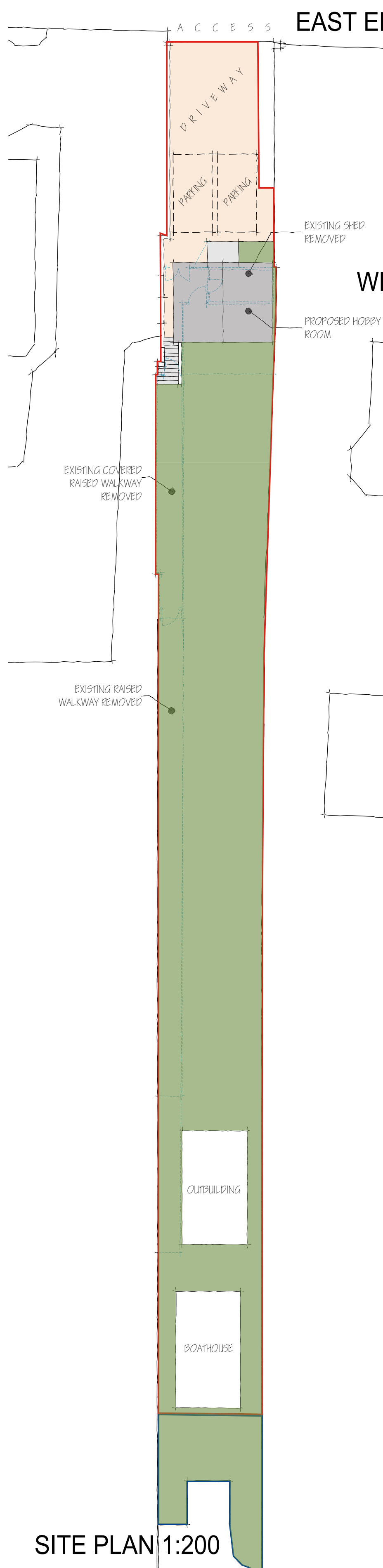


Photoview 8: View looking at the stems of T1-T3.



Photoview 9: View looking north at the existing timber shed.

Appendix 3: Proposed Site Plan



LOCATION PLAN 1:1250

1:100 scale Bar
This Drawing has been produced for printing onto A1 size paper.
If printing on A3 please use the scale below for reference.

0 0.5m 1m 2m 3m 4m 5m 6m 7m 8m 9m 10m

REV	COMMENTS	DATE

TCB TC Biggin Architecture
ARCHITECTURE & PLANNING
www.tcbarchitecture.co.uk • info@tcbarchitecture.co.uk • 07889 218936

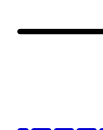
CLIENT Mr D Hamblin
PROJECT Willowbend, The Warren, Caversham, RG4 7TQ
DRAWING PROPOSED PLANS & ELEVATIONS

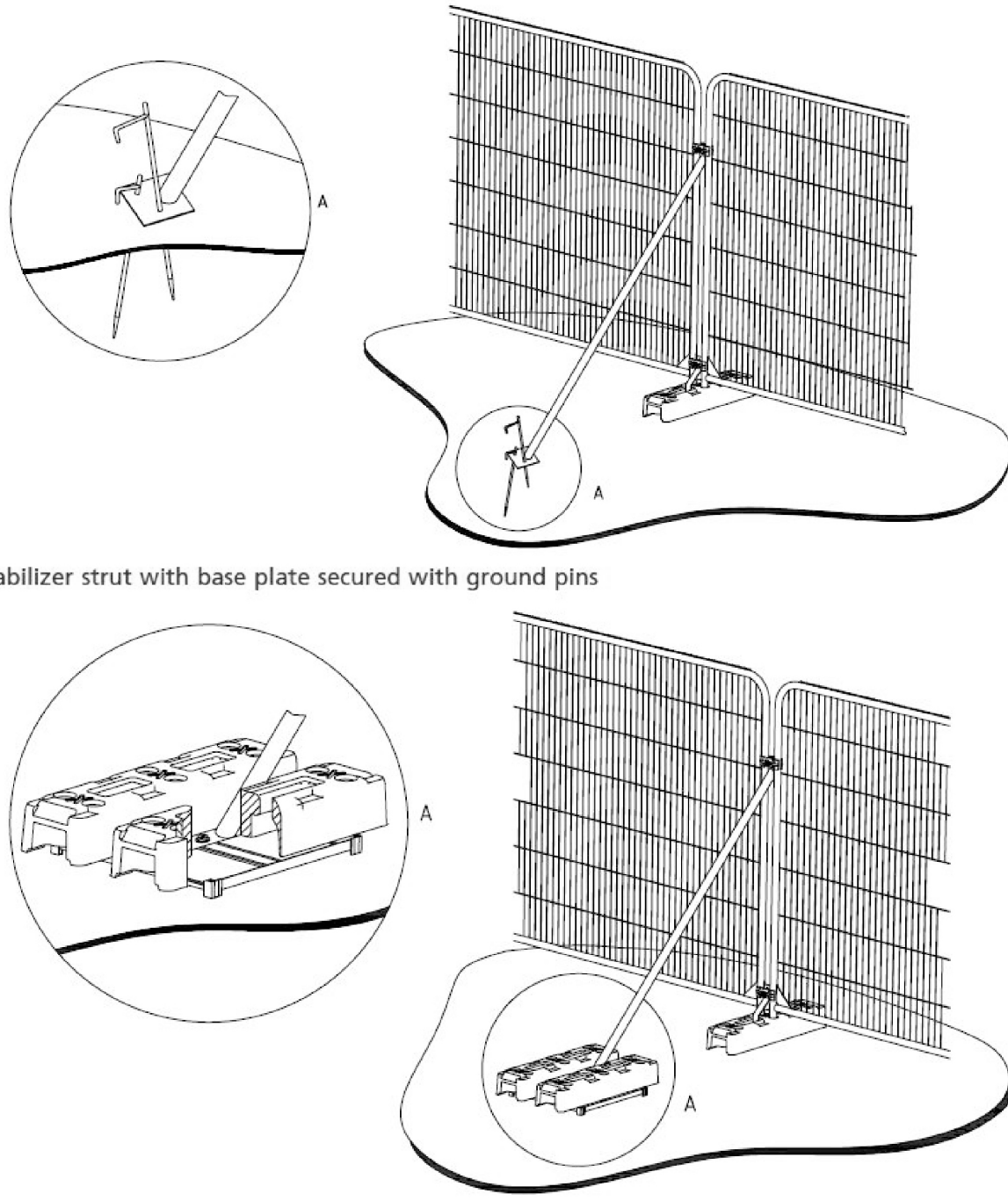
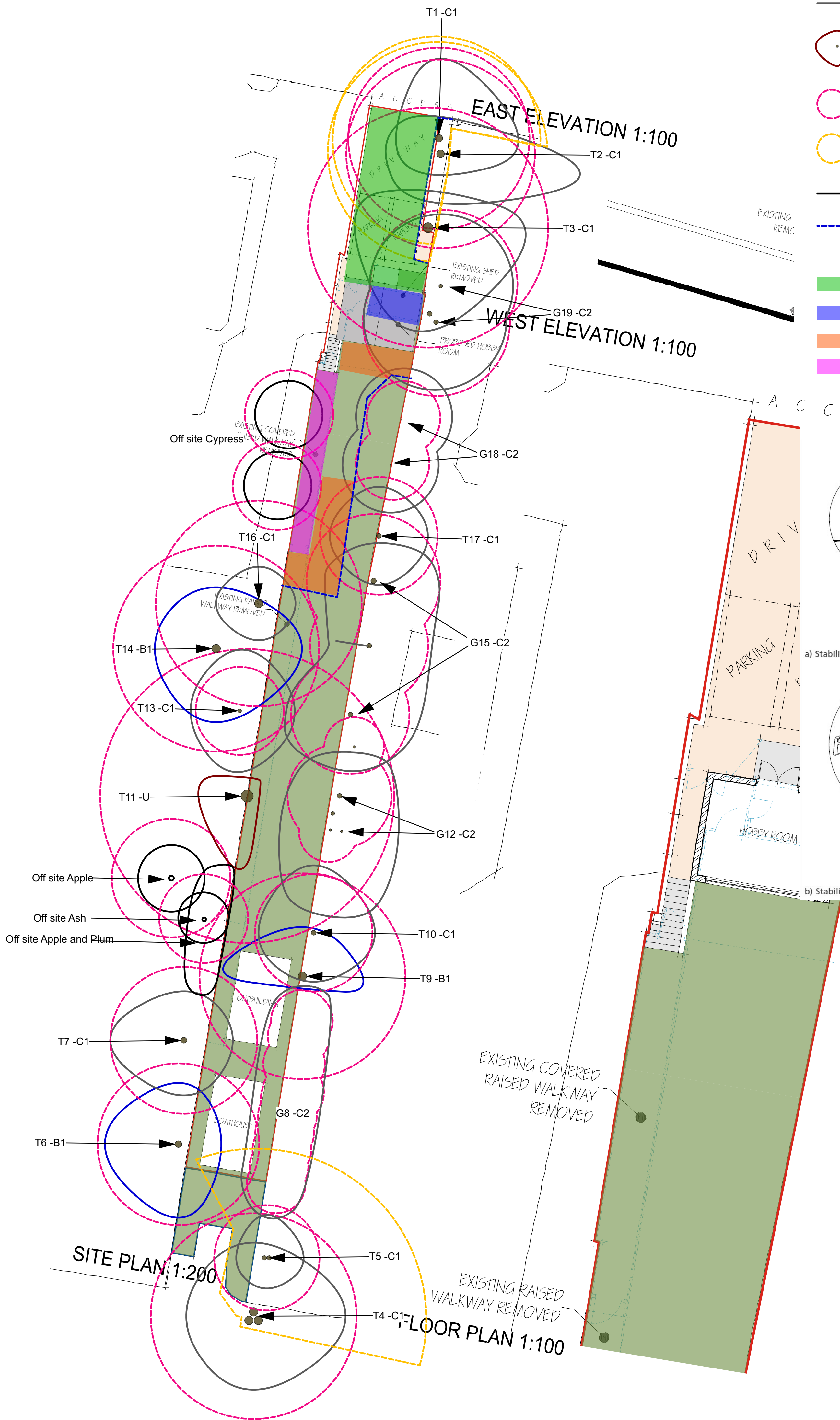
DATE July 24 **DWG SCALE** 1:100/200/500/1250 **DRAWN** TB **DWG No.** 147/300 **REV** B

VERIFY ALL DIMENSIONS BEFORE SETTING OUT. COMMENCING WORK OR PRODUCTION OF FABRICATION DRAWINGS. REPORT ANY DISCREPANCIES TO THE SITE SUPERVISOR IMMEDIATELY. ©

Appendix 4: Tree Retention / Loss and Protection Plan

KEY - BS 5837 : 2012 Categories

-  Tree Category A - High Quality
-  A Category - Hedgerow, Group, Woodland
-  Tree Category B - Moderate Quality
-  B Category - Hedgerow, Group, Woodland
-  Tree Category C - Low Quality
-  C Category - Hedgerow, Group, Woodland
-  Tree Category U - Unsuitable for Retention
-  Default Root Protection Area to BS:5837:2012
-  Adjusted Root Protection Area to BS:5837:2012
-  Shrub Mass / Offsite Tree
-  Tree Protection Barrier to BS:5837:2012 Primary Position
-  Existing hard surfacing retained/replaced
-  Existing shed and base footprint
-  Ground protection
-  Timber walkway removed back to soft landscaping



Appendix 5: Ground protection example

TREE ROOT PROTECTION DURING CONSTRUCTION PROJECTS

The Department for Communities and Local Government's guide **"Tree Roots in the Built Environment"** states that **"ground protection should be installed before any materials or machinery is brought onto the site"** (Section 9.3.3.2) [Crown Copyright acknowledged]

It has been shown that **"the major contribution to soil compaction from vehicle movements comes from the first passes of vehicles over the ground"** (Section 4.2.3) Thus it is essential that ground protection is specified and installed from day one of construction projects.

Failure to protect the ground from compaction will lead to reduced water and oxygen infiltration to the tree roots and can ultimately lead to the decline of the tree.

TREE ROOT PROTECTION METHOD

GroundGuards trackway mat systems are frequently used on construction sites to protect the ground from erosion and damage by construction vehicles. Where a temporary roadway must pass near to trees, the following extra precautions must be taken in order to provide cushioning for the ground under the tree canopy:

1. Edge rails of 200 x 50mm sawn timber should be installed where the trackway will pass under the tree canopy. These should be staked on either side of the trackway using 50 x 50 x 500mm timber stakes at 1.5m spacings.
2. A layer of geotextile membrane should be laid to cover at least the area under the tree canopy and preferably under the whole of the trackway.
3. A pad of trackway mats should be laid on top of the geotextile membrane, between the timber rails.
4. A 150mm deep layer of wood chipping should be laid over the mats
5. The trackway can then be laid so that it rises over the wood chippings as it passes under the tree canopy.

50x50x500 timber stakes
200x50 timber rails
Geotextile Membrane
Base layer of trackway mats
Wood chippings
Upper layer of trackway mats



Three trackway systems suitable for tree root protection are available for hire or sale:

MultiTrack



MultiTrack
These mats quickly clip together and are suitable for medium weight construction traffic. Where they pass over tree roots, install a double layer of mats with 150mm of wood chippings between to cushion the ground.

MaxiTrack



MaxiTrack
This is a unique heavy duty matting system with overlapping flanges and bolt-together connection, for heavier traffic. Again, use a sandwiched layer of wood chippings where there are tree roots.

XtremeMats



XtremeMats
For very heavy traffic, over extended periods, these rigid 4x2m mats spread the load to protect the ground. Double layering is not necessary, but 150mm of wood chippings should be used in areas with tree roots.

GroundGuards®

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info@ground-guards.co.uk
www.ground-guards.co.uk

Appendix 6: Cellweb Method

Cellweb® TRP

Tree Root Protection

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.

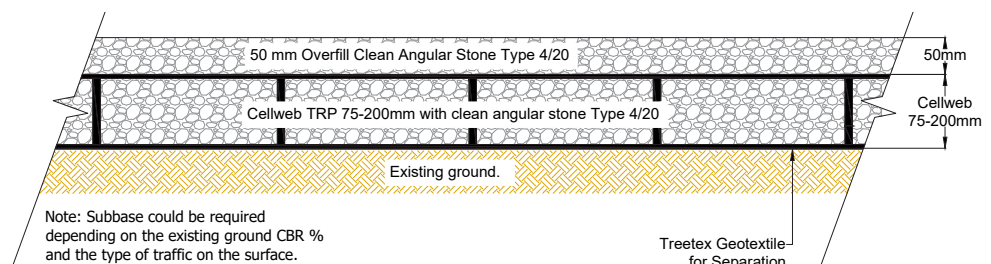
Cellweb® 3D Cellular Confinement. The Cellweb® is installed on top of the Treetex™ layer. This is fixed to the ground using ten steel J pins per panel. The panels can be cut to the required shape and adjoining panels can be connected using heavy duty staples or cell ties.

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



Cellweb® TRP Installation Guide



Step 1: Prepare Surface



Step 2: Lay out Treetex™



Step 3: Lay out Cellweb® TRP

- Cellweb® TRP is a NO DIG tree root protection measure and it is recommended that no excavation be performed without prior approval and guidance from the Local Authority Arboricultural Officer.
- Soil compaction from vehicles, machinery and materials is to be strictly prohibited during construction within Root Protection Areas (RPAs).
- Approval must be obtained from the Local Authority that the design and the method of construction is acceptable.
- Further information is available from the following two documents;
 - British Standard BS5837: 'Trees in Relation to Design, Demolition and Construction' (2012).
 - Arboricultural Advisory and Information Service: Practice note 12 – 'Through the Trees to Development' (APN12).

Installation Method

1. Prepare the Surface

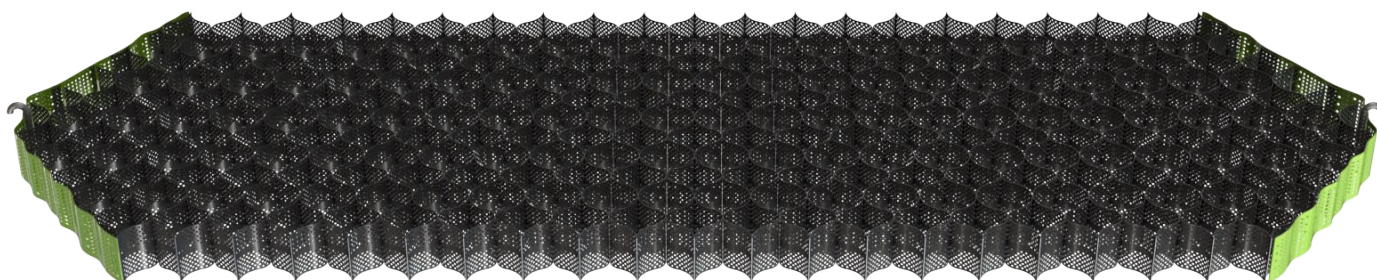
- Remove the surface vegetation using appropriate hand held tools or herbicide (see Note 1).
- Remove any surface rocks, debris and organic material.
- Create a level surface by filling any hollows with clean angular stone or sharp sand.
- Do not level off high spots or compact the soil through rolling.

2. Lay out the Treetex™ Non-Woven Geotextile

- Lay out the Treetex™ over the prepared area, overlaying the edges of the required area by 300mm.
- Overlap any joins by 300mm minimum or more, depending on soil structure (see Note 2).

3. Lay out the Cellweb® TRP Cellular Confinement System

- Lay out the collapsed Cellweb® TRP on-top of the Treetex™.
- Place one of the supplied J pins into the centre cell at the end of the panel and secure into the ground.



Cellweb® TRP - Installation Guide

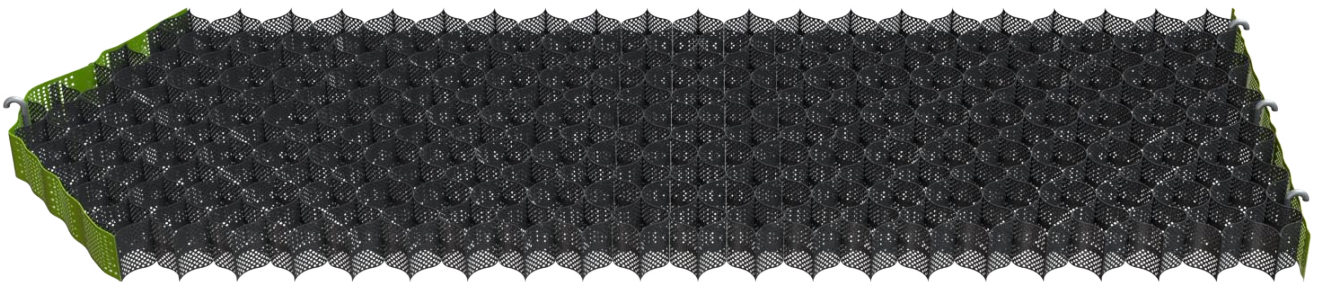


Step 3: Pinning Cellweb® TRP

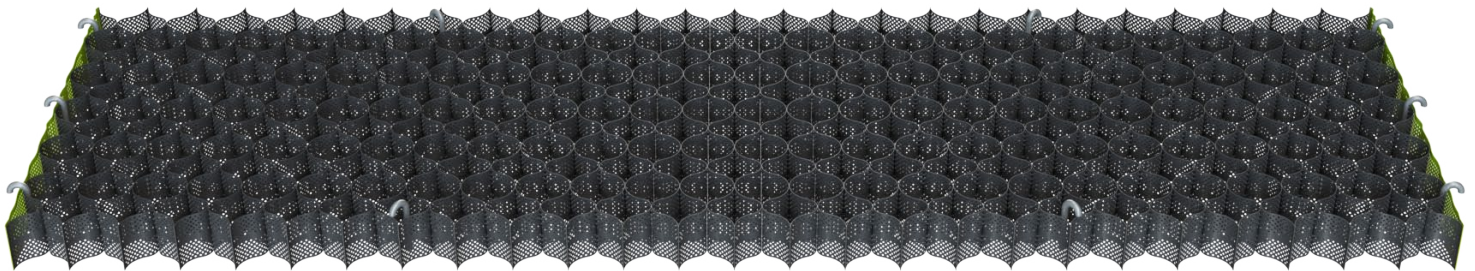


Step 3: Stapling Cellweb® TRP

- Pull out the Cellweb® TRP to its full 8.1m length and secure its length with another J pin.



- Now measure its width to 2.56m and secure in each of the corners with the J pins.
- Use 10 pins per panel to create a panel measuring 8.1m x 2.56m.



- This will produce a cell size of 259mm x 224mm which is the required cell diameter. Each cell must be fully extended and under tension.
- Staple adjacent panels together at each cell (see Note 3).
- If a curved path or shape is required, this should be cut when the Cellweb® TRP panel is pinned out to 8.1 x 2.56m, ensuring complete cells remain. Do not try to curve or bend the Cellweb® TRP panels into place.
- All cells must be fully opened to the required diameter.

Cellweb® TRP - Installation Guide



Step 4: Clean Angular Stone



Step 5: Edge Restraints



Step 6: Surface Options

4. Infill the Clean Angular Stone

- The infill material must be a clean angular stone, Type 4/20mm or Type 20/40mm (see Note 4).
- Do not use M.O.T type 1 or crushed stone with fines for tree root protection.
- Infill the Cellweb® TRP cells with the clean angular stone, working towards the tree and using the infilled panels as a platform.
- Minimum 25mm overfill of clean angular stone when used in conjunction with a hard surface.
- No compaction is required of the infill. Do not use a whacker plate or other means of compaction.
- Encourage settlement of the stone with the use of a light roller or with 2-3 passes of the construction plant used for installation.
- If the clean angular stone is being used as the final surface; regular maintenance will be required to ensure a minimum overfill of 50mm.

5. Edge restraints

- Excavations for kerbs and edgings should be avoided within the RPAs.
- Where edging is required for footpath and light structures, a peg and treated timber board edging is acceptable
- Other options include wooden sleepers, kerb edging constructed on-top of the Cellweb® TRP system, plastic and metal edging etc.

6. Surface options

- All surfaces in Root Protection Areas must be porous. Surfaces can include block paving, asphalt, loose gravel, grass and gravel retention systems (e.g Golpla), resin bound gravel, concrete etc.

NOTES

1. **Herbicide:** According to BS5837:2012 "The use of herbicides in the vicinity of existing trees should be appropriate for the type of vegetation to be killed, and all instructions, warnings and other relevant information from the manufacturers should be strictly observed and followed. Care should be taken to avoid any damaging effects upon existing plants and trees to be retained, species to be introduced, and existing sensitive habitats, particularly those associated with aquatic or drainage features."
2. **Geotextile:** We recommend the installation of a Treetex™ under the Cellweb® TRP, or under the sub-base, if installed. The overlapping between adjacent rolls of Geotextile should be: CBR > 3%: 300mm minimum, CBR between 1% and 3%: 500mm minimum. CBR ≤ 1%: 750mm minimum.
3. **Staples:** Number of staples per join: 200mm: 5 staples. 150mm: 4 staples. 100mm: 3 staples. 75mm: 3 staples.
4. **Granular Fill:** Open graded sub-base, clean angular stone Type 4/20 or Type 20/40. Please refer to BS7533-13:2009 and to the Design Manual for Roads and Bridges (DMRB), Volume 4 Geotechnics and Drainage, Section 1 Earthworks, HA44/91, Volume 7 – IAN 73/06 Design Guidance for road pavement foundations and Manual of Contract Documents for Highway Works (MCHW), Volume 1 Specification for Highway Works for the construction and maintenance of the fill material.



Appendix 7: Survey Method

The tree survey was carried out with reference to the methodology set out in BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'. Trees were not tagged.

Trees were surveyed individually or as groups where it was considered that they had grown together to form cohesive arboricultural features either aerodynamically (trees that provide companion shelter), visually (e.g. avenues or screens) or culturally (including for biodiversity). However, where it was considered that there was an arboricultural need to differentiate between attributes trees within groups/woodlands were also surveyed as individuals

Tree survey findings are recorded in the tree survey schedule.

APPENDIX 1 – TREE SURVEY SCHEDULE

Within the tree survey schedule, each surveyed tree (T), hedgerow (H), group (G), woodland (W) on or adjacent to the site is given a reference number which refers to its position on the tree survey plan.

APPENDIX 1 – TREE SURVEY AND CONSTRAINT'S PLAN

Also shown on the tree survey plan are quality grading and preliminary tree constraints: root protection areas.

Tree species: listed by common name.

Heights: measured in metres. They are recorded to the nearest half metre for dimensions up to 10m and to the nearest whole metre for dimensions over 10m.

Trunk diameters: measured in millimetres and are rounded to the nearest 10mm. Single stemmed tree diameters are measured at 1.5m above ground level or, where a fork or swelling makes this impractical, at the narrowest point beneath. Diameters of multi-stemmed trees are calculated as 'combined stem diameters' according to specific guidance set out within BS5837:2012 (p.10, para 4.6.1 a and b).

Crown spreads: taken at the four cardinal points to derive an accurate representation of the tree crown. They are recorded up to the nearest half metre for dimensions up to 10m and to

up the nearest whole metre for dimensions over 10m. For trees assessed as groups or woodland, an estimated mean radial crown spread in metres is taken for trees at the 80 percentile size.

Crown clearance: expressed both as existing height above ground level of first significant branch along with its direction of growth (e.g. 2.5m-N), and also in terms of the overall canopy. Measurements are recorded to the nearest half metre for dimensions up to 10m and to the nearest whole metre for dimensions over 10m.

Estimates: where any other measurement has had to be estimated, due to inaccessibility for example, this is indicated by a “#” suffix to the measurement as shown in the tree survey schedule.

Life stage:

- Y – young (stake dependent);
- SM - Semi-Mature (still capable of being transplanted without preparation, up to 30cm girth and not yet sexually mature);
- EM – Early Mature (not yet having reached 75% of expected mature size);
- M – Mature (anything else up to normal life expectancy for the species);
- OM – Over Mature (anything beyond mature and in natural decline); and
- V – Veteran (any tree displaying characteristics described by Natural England).

Management Recommendations: recorded in relation to a tree’s structural and/or physiological condition (e.g. the presence of any decay and physical defect) and /or any preliminary management recommendations that may be appropriate. This is NOT intended to comprise a specification for tree work; further advice should be sought prior to implementation. Trees

assessed as being in apparently immediately hazardous condition will be notified to the client separately as soon as practical.

Physiological condition:

- Good (Generally in healthy condition. No indications of impaired physiological function and in optimum condition for age and species);
- Fair (Condition satisfactory though below mean species performance, with indicators of reduced vitality. Some intervention may be required);
- Poor (Tree in decline/retrenching, with significantly impaired physiological function for age and species); and
- Dead (self-explanatory).

The above are informed by the following;

- Leaf size and colouration – unless otherwise state, leaf size and colouration is typical of the age and species; and
- Canopy density – unless otherwise stated, the canopy density of trees is typical of the age and species.

Structural Condition & Notes:

- Good (without any observable significant biomechanical structural weaknesses);
- Fair (with minor biomechanical structural flaws. Some remedial action may be required); and
- Poor (with significant biomechanical weaknesses requiring intervention particularly where risk management is required).

Notes on the apparent structural integrity of the tree are based upon visual tree assessment, including notes on form, taper, forking habit, storm damage, wood decaying fungi, pests and disease etc. plus other pertinent observations.

Anticipated useful life expectancy (ULE): the length of time a tree is estimated to be able to make a safe useful contribution to local amenity is expressed in years as: <10, 10+, 20+, 40+.

Category Grading: individual trees, hedgerows, groups of trees, and woodlands are assessed in terms of quality and benefit within the context of proposed development and graded into one of four categories (U, A, B, and C) which are differentiated on the tree survey plan by the colours indicated below:

Category U (Red)

Unsuitable for retention. Trees in such a poor condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.

Retention Implications to a site

Not a material consideration in the planning process but may have other benefits i.e. ecological benefits/importance.

Category A (Green)

Trees of high quality with an estimated remaining life expectancy of 40 years.

Retention Implications to a site

Tree should be retained and amendments to a proposed scheme should be identified in preference to tree removal.

Category B (Blue)

Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.

Retention Implications to a site

Where possible amendments to a proposed scheme should be considered in preference to tree removal.

Category C (Grey)

Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.

Retention Implications to a site

The retention of trees may be advantageous in the short term, but they should not be seen as a constraint to development.

A, B and C trees have also been given a sub-category of 1, 2 or 3 which reflects their arboricultural, landscape or cultural and conservation values respectively. Each subcategory has an equal weight, for example an A1 tree has the same retention priority as an A3 tree.

Trees have been assigned 'U' or category grading A-C in accordance with the cascade chart given in BS: 5837:2012.

In addition to the category, the tree survey schedule also describes each tree's root protection area (RPA) in terms of radius (metres) and overall area (sq metres).

Limitations

This report has been undertaken in compliance with BS: 5837:2012 and is not intended to be a tree safety survey. This report is prepared for planning application purposes only and does not evaluate the degree of risk posed by trees. Any notes offered regarding structural integrity of trees are to be considered incidental. Our recommendations given for immediate intervention should be put in the hand of the owner/site manager as soon as reasonably practicable.

Trees are dynamic living organisms as well as self-supporting dynamic structures, capable of achieving considerable size and structural complexity. Their physiological and structural condition can change rapidly in response to a wide range of biotic/abiotic factors. They are exposed to and can become damaged by the elements and by human activity, and have co-evolved with decay causing organisms that can degrade and sometimes destroy their structural integrity. The laws and forces of nature dictate a natural failure rate even among trees that appear healthy and structurally sound. They therefore have the potential to fail structurally, without prior manifestation of any reasonably observable symptoms. By their very nature, therefore, it is not possible to categorically state that any tree is 'safe' or hazard free.

Tree surveys and/ or tree inspections are inherently a snap shot in time of the structural and physiological conditions of the trees concerned.

It is beyond the scope of this report to comment in relation to structural damage – direct or indirect, existing or potential – that might be associated with vegetation growth, or vegetation-related soil subsidence or heave.

Unless otherwise stated, all such surveys/inspections are undertaken from ground level and no internal inspections or tests have been undertaken.

Any management recommendations set out within this report are of an advisory and preliminary nature only and relate to trees within the context of current site use.

The findings and recommendations of this report should be considered time-limited for planning purposes to a maximum of 24 months from the date of the tree survey (absent revisions of BS5837, which render pre - existing data obsolete).