



Arboricultural
Association

Professional Member
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Arboricultural Survey & Report

Conducted in accordance with British Standards 5837/2012

Bicton Manor

Bicton Road

Pensilva

Liskeard

PL14 5RF

SX 31409 69233

July 2023

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**Contract Details**

Grid Reference:	SX 31409 69233
Client	Mr B Mills
Architect/Planning Consultant	Pollard Architectural
Planning App'	N/A
Date of Report	05/07/2023
Report Reference	ASR_BictonManor_B.Mills_July_2023
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1 Delivery of Tree Related Information into the Planning System.

Local Authorities have a **statutory duty** to consider the protection and planting of trees when granting planning permission for proposed development. The potential effect of development on trees, whether statutorily protected (e.g. by TPO/Conservation Area) or not, is a material consideration that is taken into account in dealing with planning applications.

Consideration should be given to:

- Legal designations e.g. Tree Preservation Orders / Conservation Areas
- Planning policy – National policy (NPPF) / Regional / Local
- Guidance and Industry Best Practice
 - BS8545:2014 (*Trees: from Nursery to Independence in the Landscape – Recommendations*)
 - BS5837:2012 (*Trees in Relation to Design, Demolition and Construction - Recommendations*),
 - BS4428:1989 (*Code of Practice for General Landscape Operations*),
 - NHBC Chapter 4.2 (*'Building near Trees'*),
 - BRE CP75/75 (*Availability of sunshine*),
 - BRE 209 (*"Site Layout Planning for Daylight and Sunlight"*).

Whilst the level of detail expected by individual LPA's or even individual LPA Tree Officers can vary, the expected level of detail as recommended by BS5837 - 2012, is as follows.

Delivery of Tree Related information into the Planning System – Table B.1 (BS 5837-2012)		
Stage of process	Minimum detail	Additional information
Pre-application	Tree survey	Tree retention / removal plan (draft)
Planning Application	<ul style="list-style-type: none"> - Tree survey (in the absence of pre-application discussions) - Tree retention/removal plan (finalised) - Retained trees and RPAs shown on proposed layout 	<ul style="list-style-type: none"> - Existing and proposed finished levels - Tree protection plan - Arboricultural method statement– heads of terms - Details for all special engineering within the RPA and other relevant construction details



	<ul style="list-style-type: none"> - Strategic hard and soft landscape design, including species and location of new tree planting - Arboricultural Impact Assessment 	
Reserved Matters / Planning Conditions	<ul style="list-style-type: none"> - Alignment of utility apparatus (including drainage), where outside the RPA or where installed using a trenchless method - Dimensioned tree protection plan - Arboricultural method statement – detailed - Schedule of works to retained trees, e.g. access facilitation pruning - Detailed hard and soft landscape design 	<ul style="list-style-type: none"> - Arboricultural site monitoring schedule - Tree and landscape management plan - Post-construction remedial works - Landscape maintenance schedule

This report has been written adhering to the recommendations and guidance given within British Standard 5837:2012 Trees in Relation to Design, Demolition and Construction - Recommendations. It is therefore a BS 5837 compliant arboricultural assessment report providing sufficient information for the Local Planning Authority (“LPA”) to consider the effect of the proposed development on local character from a tree perspective.

This report is written in a manner to support an application for outline planning permission with all matters reserved, although, it may in the first instance, be used in conjunction with a pre-app. The exact details that must be followed to ensure successful tree retention on this specific site will depend upon the final layout of the proposed development. Thus, some amendments to this report may, or may not be necessary.

The survey and report seek:

- To identify and clarify the quality and value (in a non-fiscal sense) of the existing tree stock within the context of proposed development, allowing informed decisions to be made concerning which trees should be removed or retained in the event of development occurring.
- To identify the constraints and considerations, both above and below ground, associated with retained trees in the context of proposed development. Where necessary, care has been taken to avoid misplaced tree retention as attempts to retain too many or unsuitable trees on a site can result in excessive pressure on the trees during demolition or construction work, or post-completion demands for their removal.
- It is the site manager’s responsibility to ensure that the details of the various Method Statements and any agreed amendments are known and understood by all site personnel. Copies of the agreed documents must be kept on site and be readily available at all times.
- This report should form part of the site induction for all personnel.



2 Summary of Content

This report includes:

- A summary of the development proposals,
- An analysis of how trees will be affected
- *Briefly* describes how retained trees will be protected and managed during the development activity.

All trees of material consideration within, and where possible, immediately adjacent to the proposed development site, have been inspected. For practical reasons (inaccessibility) or reasons of Health and Safety, some dimensions are estimated, these are shown with an 'E' next to the measurement.

A [Tree Schedule](#) is provided which identifies trees / tree groups / hedgerows / woodlands (hereafter referred to collectively as 'Trees') that might potentially be affected by the development proposals.

A [Tree Protection Plan](#) (TPP) and [Tree Constraints Plan](#) (TCP) are either included at the end of the report in A3 format for ease of viewing or are included as separate documents which must remain associated with this report. The accuracy of these plans is dependent on the phase within the planning process that this survey was commissioned and whether a topographical survey was provided on which to plot individual trees.

Colour coding as recommended in BS5837-2012 is used throughout to emphasize the assessed value of trees.

Categorising Trees		
Category A (high quality) Category B (moderate quality)	Category C (low quality)	Category U (unsuitable for retention)
<p>This category of tree should, whenever feasible, be protected from harm and preserved within a development site.</p> <p>The presence of such trees may pose constraints to proposed development. Specialist construction methods maybe required.</p>	<p>This category of tree is best retained whenever possible but should not be permitted to pose constraints to new developments.</p> <p>These lower quality trees should, when lost because of development, be mitigated for by replacement planting on site.</p>	<p>This category of tree is that which, irrespective of development, should probably be removed and replaced through mitigation.</p> <p>Their loss should not pose any constraint to development.</p>

**Wildlife and Ecological Perspective: - Bat Roost/Bird Nest**

It is equally important to recognise that the value of a tree must also be assessed and determined by its potential for offering roosting habitat for protected species: bats/birds and other forms of biodiversity.

The presence of bats within a tree will not prohibit development, but lawful procedure must be followed to ensure appropriate Bat Emergence Surveys are completed to inform accurate Mitigation for their presence.

Constraint: - Where category 1*, 1, or 2 trees are indicated, Bat Emergence Surveys are required where ANY unmitigated works may cause disturbance/harm or death to protected species through disturbance/ damage/ modification or destruction of potential roosting habitat. Disturbance also includes introduction of artificial lighting spill onto or in the vicinity of a tree.

A Bat Emergence Survey will provide an assessment of their habitat status and information on how to proceed lawfully with their removal. Trees are categorised as below:

- 1* - Tree with multiple, highly suitable features capable of supporting larger roosts.
- 1 - Tree with definite potential, supporting fewer suitable features than Category 1* trees or capable of supporting roosts for single/low numbers of bats. 1* and 1 is classified as high roost suitability
- 2 - Tree with no obvious potential for roosting bats although due to its size and maturity the tree may support some features with limited potential to support bats. 2 is classified as being moderate-low roost suitability.
- 3 - Tree with no roosting potential.



3 Site Details

The site is a large, derelict, listed manor house known as Bicton Manor with a number of now redundant farm buildings and associated garden. The site is off Bicton Road and has access onto the road from both the north and south of the manor house. The site is to the east of the village of Pensilva and to the west of the town of Callington. There is a small area of woodland to the west of the manor house. There is another dwelling south of the site and otherwise the surrounding land is given to agriculture.

The proposal brief seeks to renovate the existing manor house and construct a new dwelling to the north following the rough footprint of the existing barn. Extensive renovation is required to save the manor house. The barns to the north of the manor house will be removed. The site will be divided in two. The division of the site and the location of the replacement dwelling and outbuildings is shown in Figure 1. The grounds and gardens are overgrown and will be restored.

The site was surveyed and 12 trees (T1-T12) and 1 tree group (G1) were catalogued.

- T6, T7, T8 and T12 are category B trees.
- The remaining trees and tree group are category C trees.
- T9, T10 and T11 will require removal for the development to proceed.
- The remaining trees can be retained.
- A veteran Oak and a Scots Pine are significant trees to the south of the development.

T9, T10 and T11 require removal for the proposals to proceed. All trees are in close proximity to the main barn that will be demolished and replaced with a new dwelling. Replacement plantings will be made to mitigate for the loss.

T1, T2 and T3 are in ground above a retaining wall along the western edge of the driveway. The trees further to the south along the driveway (T4, T5 etc) are up a steep bank away from the existing driveway. Normative RPAs are shown, however, the rooting systems off T's 1-5 will be predominately to the west of the trees. Excavation has occurred along the western edge of the driveway to create drainage ditches for the soakaway. This has exposed no significant roots. No further excavation will occur alongside the driveway.



The soakaway has been dug at the eastern edge of the site. This is to manage the surface water across the site. The soakaway ditches run along the western edge of the driveway and travels east below the existing manor house to the soakaway. Excavation has already taken place to install the soakaway system.

T12 is adjacent to the existing manor house. Its presence will not impact the renovations ability to proceed. It can be retained. Likewise, G1 and T8 are away from the proposals and will not be impacted or impact the proposals and can all be retained.

The driveway will need to be renovated. This should be done by building the surface up rather than through excavation. This should be completed before the main building works take place.

Demolition of the existing barns should take place from within the building's own footprints. Only the northern access should be used during the main construction phase.

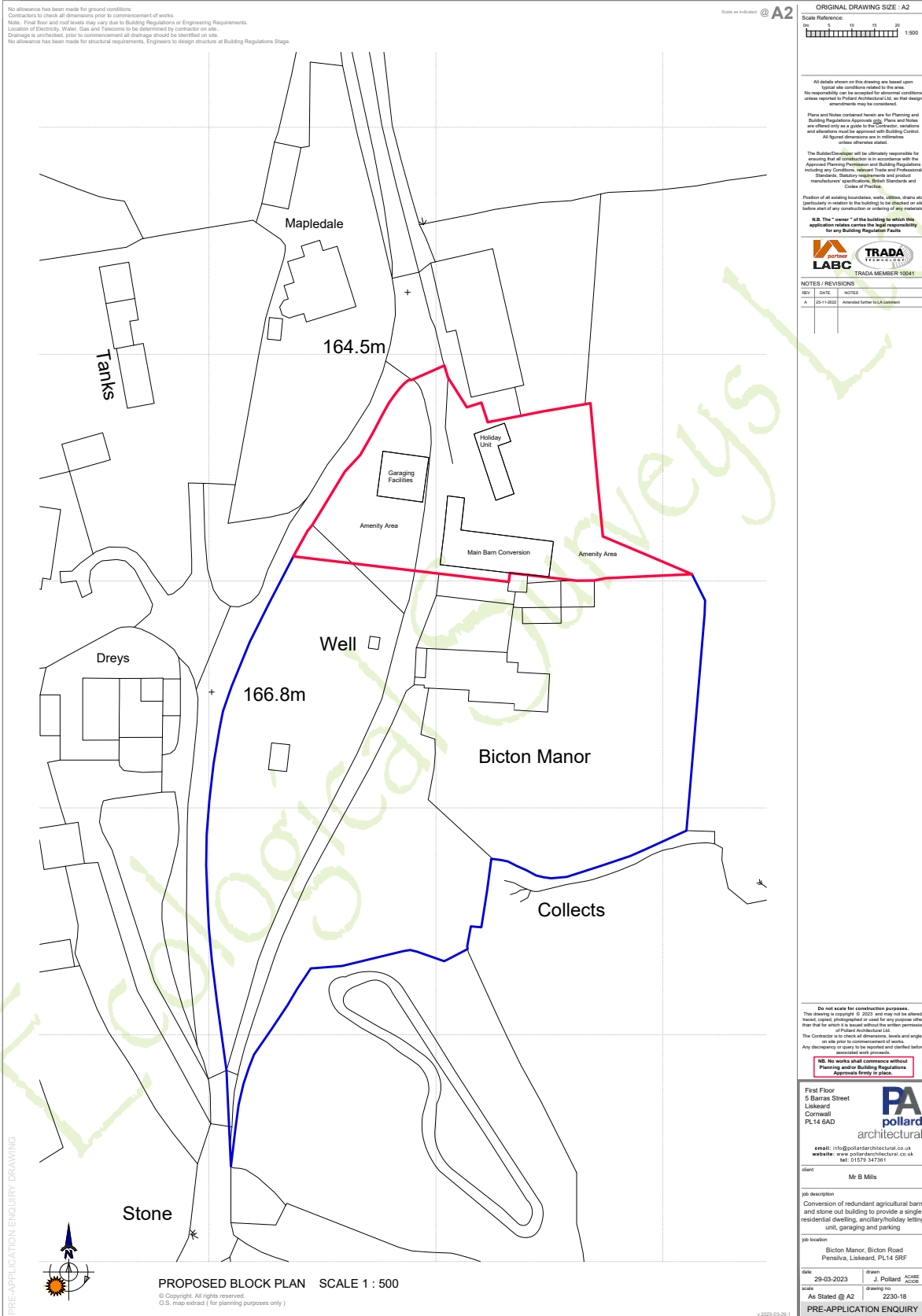
A tree protection fence is considered adequate protection for the retained trees. The trees to the west of the driveway do not need to be behind a fence as they are either behind a retaining wall or elevated on a bank. Vehicular movements on the driveway will not impact the trees. Now that the soakaway has been constructed as much of the garden as possible should be enclosed behind a tree protection fence to avoid further compaction. The tree protection fence line is shown on the TPP.

It is not considered that the development will have a negative impact on the long-term health of any trees retained on site where mitigation is appropriately adhered to.

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4 Development Proposal

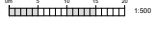
Figure 1 Illustrated Proposal



No allowance has been made for ground conditions.
Contractors to check all dimensions prior to commencement of works.
Note: Final floor and roof levels may vary due to Building Regulations or Engineering Requirements.
Location of Electricity, Water, Gas and Telecoms to be determined by contractor on site.
Drainage to be checked prior to commencement as drainage should be identified on site.
No allowance has been made for structural requirements. Engineers to design structure at Building Regulations Stage.

Scale as indicated @ A2

ORIGINAL DRAWING SIZE: A2



All details shown on this drawing are based upon typical site conditions related to the area. No responsibility can be accepted for abnormal conditions unless reported to Foster Architectural Ltd. as first design amendments may be considered.

Plans and Notes contained herein are for Planning and Building Regulations Approval only. Plans and Notes are offered only as a guide to the Contractor, variations and alterations must be approved with Building Control.

All figure dimensions are in millimetres unless otherwise stated.

The Builder/Developer will be ultimately responsible for ensuring that all construction is in accordance with the Approved Planning Permission and Building Regulations including any Conditions, relevant Trade and Professional Standards, Statutory requirements and product manufacturer's specifications, Best Practice Standards and Code of Practice.

Position of all existing boundaries, walls, utilities, drains etc. (pertinent to relation to the building) to be checked on site before and at any construction or opening of any materials.

N.B. The "owner" of the building to which this application relates carries the legal responsibility for any Building Regulation Faults.



REV	DATE	NOTES
A	25-11-2022	Amended further NLA comment

REV	DATE	NOTES

Do not scale for construction purposes.
This drawing is copyright © 2023 and may not be altered, copied, copied, reproduced or used for any purpose other than that for which it is issued without the written permission of Foster Architectural Ltd.
The Contractor is to check all dimensions, levels and angles on site prior to commencement of works.
Any discrepancy or query to be reported and clarified before associated work proceeds.

NB. No works shall commence without Planning and/or Building Regulations Approvals firmly in place.

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client: Mr B Mills

job description:
Conversion of redundant agricultural barn and stone out building to provide a single residential dwelling, ancillary/holiday letting unit, garaging and parking

job location:
Bicton Manor, Bicton Road
Pensilva, Liskeard, PL14 5RF

date: 29-03-2023 | drawn: J. Pollard ACME
scale: As Stated @ A2 | drawing no: 2230-19

PRE-APPLICATION ENQUIRY



5 Tree Data Schedule of Results.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T1	Sycamore	11	400	N	4	N		EM	10	Physical G F P Structure G F P	R = 4.8m	V = 72m ²	C
				E	4	E	4.5						
				S	4	S							
				W	5	W							

Preliminary Management, Recommendations & Comments: - Typical self-sown Sycamore. On a bank at least 2m above the site beyond a retaining wall. May require crown lifting on Eastern aspect.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T2	Sycamore	11	420	N	4	N		EM	10	Physical G F P Structure G F P	R = 5m	V = 79m ²	C
				E	4	E	4.5						
				S	4	S							
				W	5	W							

Preliminary Management, Recommendations & Comments: - Typical self-sown Sycamore. On a bank at least 2m above the site beyond a retaining wall. May require crown lifting on Eastern aspect.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T3	Sycamore	11	410	N	4	N		EM	10	Physical G F P Structure G F P	R = 4.9m	V = 75m ²	C
				E	4	E	4.5						
				S	4	S							
				W	5	W							

Preliminary Management, Recommendations & Comments: - Typical self-sown Sycamore. On a bank at least 2m above the site beyond a retaining wall. May require crown lifting on Eastern aspect.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
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T4	Sycamore	11	m/s 420 300 150 x3	N	4	N		EM	10	Physical G F P Structure G F P	R = 5.8m	V = 105m ²	C
				E	5	E	3						
				S	4	S							
				W	4	W							

Preliminary Management, Recommendations & Comments: - Typical self-sown Sycamore. On a bank at least 2m above the site. Will require crown lifting on Eastern aspect.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T5	Sycamore	13	m/s 350 x5	N	5	N		EM	10	Physical G F P Structure G F P	R = 7.8m	V = 192m ²	C
				E	5	E	3						
				S	6	S							
				W	6	W							

Preliminary Management, Recommendations & Comments: - Typical self-sown Sycamore. On a bank at least 2m above the site. Will require crown lifting on Eastern aspect.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T6	Copper Beech	14	430	N	6	N	4	M	20	Physical G F P Structure G F P	R = 5.1m	V = 82m ²	B
				E	6	E	4						
				S	6	S	4						
				W	6	W	4						

Preliminary Management, Recommendations & Comments: - Nice example. Beyond impacted zone but should be fenced. Existing drive with RPA. Any surface improvement must be on top of existing with no excavation.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T7	Copper Beech	14	420	N	6	N	4	M	20	Physical G F P Structure G F P	R = 5m	V = 79m ²	B
				E	6	E	4						
				S	6	S	4						
				W	6	W	4						

Preliminary Management, Recommendations & Comments: - Nice example. Beyond impacted zone but should be fenced. Existing drive with RPA. Any surface improvement must be on top of existing with no excavation.



Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T8	Lime	15.5	700 est	N	8	N	1.5	M	20	Physical G F P Structure G F P	R = 8.4m	V = 222m ²	B
				E	8	E	1.5						
				S	8	S	1.5						
				W	8	W	1.5						

Preliminary Management, Recommendations & Comments: - Significant epicormic growth, diameter is estimated. Significant tree and not common in Cornwall.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T9	Oak	9	410	N	4	N	2.5	EM	10	Physical G F P Structure G F P	R = 4.9m	V = 75m ²	C
				E	5	E	2.5						
				S	5.5	S	2.5						
				W	5	W	2.5						

Preliminary Management, Recommendations & Comments: - T9 requires removal as it is damaging existing structures. No PRFs. Structures 6 and 7 are considered heritage structures which must be protected and removal of this tree is essential to achieve this.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T10	Sycamore	8	m/s 290 x3	N	6	N	2.5	EM	10	Physical G F P Structure G F P	R = 5m	V = 79m ²	C
				E	5	E	2.5						
				S	3	S	2.5						
				W	5	W	2.5						

Preliminary Management, Recommendations & Comments: - T10 requires removal as it is damaging existing structures. No PRFs. Structures 6 and 7 are considered heritage structures which must be protected and removal of this tree is essential to achieve this.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
T11	Sycamore	8	200	N	3	N	2.5	EM	10	Physical G F P Structure G F P	R = 2.4m	V = 18m ²	C
				E	3	E	2.5						
				S	3	S	2.5						
				W	3	W	2.5						



Preliminary Management, Recommendations & Comments: - T11 requires removal as it is damaging existing structures. No PRFs. Structures 6 and 7 are considered heritage structures which must be protected and removal of this tree is essential to achieve this.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
				N	E	N	E						
T12	Cypress	6	m/s	N	2.5	N	<1	Y	20	Physical G F P Structure G F P	R =	V =	B
				E	2.5	E	<1						
				S	2.5	S	<1						
				W	2.5	W	<1						

Preliminary Management, Recommendations & Comments: - Multi-stem nicely balanced tree. There is some significant growth potential in this tree. It is perhaps too close to a listed heritage building to be retained when fully grown. Should be retained at the present time.

Tree No.	Species	Ht (m)	Stem Dia(mm)	Crown Spread (m)		Crown Height Direction		Age Class	SULE	Condition	Root Protection Area Radius	Root Protection Area Volume	BS Cat
				N	E	N	E						
G1	2x Cypress	12	m/s	N	3.5	N	<1	Y	10	Physical G F P Structure G F P	R =	V =	C
				E	3.5	E	<1						
				S	3.5	S	<1						
				W	3.5	W	<1						

Preliminary Management, Recommendations & Comments: - Not particularly nice specimens but are in a location that means they can safely be retained.





6 Site Images



Trench on western edge of driveway



T9, T10 and T11 to be removed



T3, T2 and T1 behind retaining wall



T8



7 Arboricultural Impact Assessment (AIA)

The purpose of the AIA is to consider the direct and indirect effects of the proposed design

Constraints: - Designations: Tree Preservation Orders / Conservation Areas

With reference to Cornwall Council's interactive mapping system;

- There are no TPO's onsite or in the immediate surrounding area.
- The site is not within a conservation area.
- The trees onsite are not subject to planning controls.

Tree Preservation Order (TPO) allows for trees to be protected either as individuals, groups, areas or woodlands. Tree Preservation Orders have the effect of preventing the cutting down, topping, lopping, uprooting, wilful damage or wilful destruction of trees other than with the consent of the Local Planning Authority. Certain exclusions do apply to Tree Preservation Orders such as the removal of dead, dying or dangerous trees, but these should be used with caution and always following the advice of the LPA Tree Officer.

Conservation Area: - Any works to trees within a Conservation Area (with some minor exceptions) will require six-week prior notice to be given to the local planning authority. Certain exclusions do apply to Conservation Areas such as the removal of dead, dying or dangerous trees, but these should be used with caution and always following the advice of the LPA Tree officer.

National Planning Policy Framework (NPPF): This sets out national planning policy. Paragraph 175 states that:

Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy.

<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Felling Licences: Parts of the site associated with the domestic property will not be subject to the provisions of the Forestry Act. Felling licenses are generally required for felling living trees unless they are fruit trees, or trees growing in a garden, orchard, churchyard or designated open space.

Tree felling licence: when you need to apply - GOV.UK (www.gov.uk)

Trees to be Retained within the proposal

All with exception of T9, T10 and T11.

Trees Proposed Removed to facilitate Development

T9, T10 and T11 trees are either growing in footprint of barn or adjacent to barn.

Further Tree Works

No further tree works required at the present time.

**Category A & B trees**

Potentially adversely affected by encroachment within the RPA without special measures.

The protection measures laid out in section 3 are considered sufficient to protect the catalogued category B trees.

Further Ecological Constraints

- All trees offer bird nesting potential.
- No further ecological constraints with regard to the catalogued trees have been identified.

Solutions

- No further solutions are considered necessary at the present time.

Method Statement

- A sequence for events and timings is shown in Section 8P

8 Development Proposal Assessment.**a. Wildlife and Ecological Perspective: - Bat Roost/Bird Nest**

Constraint: Where category 1*, 1, or 2 trees are indicated, removal of these trees may necessitate Bat Emergence Surveys. A Bat Emergence Survey will provide an assessment of their habitat status and information on how to proceed lawfully with their removal.

1* - Tree with multiple, highly suitable features capable of supporting larger roosts.

1 - Tree with definite potential, supporting fewer suitable features than Category 1* trees or capable of supporting roosts for single/low numbers of bats. 1* and 1 is classified as high roost suitability

2 - Tree with no obvious potential for roosting bats although due to its size and maturity the tree may support some features with limited potential to support bats. 2 is classified as being moderate-low roost suitability.

3 - Tree with no roosting potential.




Roosting Assessment

Category 1*, 1 or 2 trees onsite?	YES Veteran Oak away from development area.
Bat Emergence Surveys Required	With regard to the onsite trees emergence surveys are not considered necessary at the present time. Bat Emergence Surveys are required where <u>unmitigated works</u> may cause disturbance/harm or death to protected species through disturbance/ damage/ modification or destruction of potential roosting habitat.



Nesting Assessment

No active nesting was observed in the catalogued trees at the time of survey. However, all trees have nesting potential.

-  All British birds and their nests are protected whilst in use; therefore, if a nest is found during construction work, all activity must cease within proximity and ecological advice (Tel: 01503 240846 or 07736 458609) sought immediately.
-  Hedgerow/trees may not be removed/flailed/destroyed during nesting/breeding season for birds or dormice (beginning March-October end) unless a qualified ecologist accompanies prior to cutting and declares the ground and trees clear, and no other constraints apply.
-  It is possible that bird nest site/s could be newly established in association with this site during future, bird nesting season/s.

b. How the Development Proposal Affects Local Character -

From a Tree Perspective: -

The proposed removals of T9, T10 and T11 will have no impact on the local character from a tree perspective. All trees are within the grounds of Bicton manor and not viewable in the wider landscape from a place where the public have unrestricted access. New plantings will add to the local character from a tree perspective.

Also refer to Mitigation Section 9.

c. Shadow Influence on Dwellings/Buildings/Amenity Space.

The shadow arc (if shown) is not a representation of the absence of skylight/daylight and does not take into account the natural light permeating the trees crown – this varies depending on the species etc. Additionally, seasonal considerations (angle of the sun and possible leaf fall) will affect the degree and nature of shading.

The internal layout, use of buildings and the arrangement of windows is also important. Heavy or prolonged shadowing of main living areas may be inadvisable whilst the shadowing of side elevations and ancillary rooms may be insignificant.

d. Infrastructure Requirements – Services etc.

It is often difficult to clearly establish the detail of services until the final plans are known and construction is in progress. Where possible, existing services should be used and all new services ought to be outside RPAs of retained trees. However, where existing services within RPAs require upgrading or new services need to be installed in RPAs, trenchless insertion methods ought to be used with entry and retrieval pits being sited outside the RPAs. Providing roots can be retained and protected, excavation using hand-held tools might be acceptable for shallow service runs.

e. Potential Incompatibilities between Layout and Retained Trees.

Occasionally, plans are advanced which are potentially incompatible with trees that should be retained. In the first instance, consideration, should be given to amending designs and layout to avoid conflict. However, in extreme circumstances it might be possible to formulate engineering options which permit the development to proceed, whilst still protecting potentially impacted trees. This can be a costly alternative so is rarely the first option.

**f. RPA and Canopy Protection during Construction**

Root Protection Areas assume a circular area of rooting - calculated in accordance with BS5837-2012. RPAs represent minimum soil rooting area required to sustain the tree (capped at 707m²). The RPA is circular by default with a maximum radius of 15m from the tree - any deviation from this must be supported with professional arboricultural assessment.

RPAs may have been modified to reflect actual site conditions and may not be shown as circular on accompanying plans. Incursion into the RPA during any part of the investigation, demolition, design & construction phases of the project will require specialist arboricultural input. RPA's must be protected during the development process. Consequently, as recommended in BS 5837 - 2012 (Table B1), a Heads of Terms - Arboricultural Method Statement (AMS) is included within the Appendices of this report. The location/s of the CEZ are shown on the TPP.

Whilst the RPA might equate to a radius of 'X' metres it is possible that the Construction Exclusion Zone (CEZ) might exceed this area if the canopy of the tree/s exceed this area.

Early assessment of impact will facilitate the process and avoid abortive design works.

g. Future Pressure for Tree Removal.

Whilst it is rarely possible to be conclusive regarding future pressure for tree removal, some tree characteristics may offer an insight. Consideration should be given to whether trees are evergreen or deciduous, density of foliage, and potential nuisance factors such as susceptibility to honey dew drip, branch drop, fruit fall etc. Additionally, young trees (up to approximately ½ their potential age) generally require enough space to mature if long term retention is planned. Care must be taken with older trees as they are generally more susceptible to damage, and less tolerant of injury/harm through a) root damage; b) compaction of soil; and c) excessive and/or repeated pruning. Ideally, adequate space should be allowed for long term physical retention and future maintenance.

The trees on this site are unlikely to come under pressure for removal within the foreseeable future.

h. Direct & Indirect Damage.

All site storage areas, cement mixing and washing points for equipment and vehicles must be outside RPAs unless otherwise agreed with the local planning authority. Where there is a risk of polluted water runoff into RPAs, heavy-duty plastic sheeting and sandbags must be used to contain the runoff and prevent contamination.

All landscaping activity within RPAs has the potential to cause severe damage and any adverse impact must be minimised by following the guidance set out in the appendices. The inclusion of temporary Construction Exclusion Zones are required and are indicated within Mitigation and the Tree Protection Plan.

i. Proximity of Trees to Structures.

The default position should be that structures are located outside the RPAs of trees to be retained. However, where there is an overriding justification for construction in the RPA, technical solutions might be available that prevent damage to trees. Account should be taken of the proposed orientation and aspect of new buildings, the type of building, its use and location relative to the tree, and the species attributes of the tree. Buildings, footpaths and hard-standing areas should



be designed with due consideration to the proximity of retained trees, especially in terms of their foliage, flowering and fruiting habits. Where conflicts might arise, detailed design should address these issues.

Where tree roots have the potential to come into contact with foundations, advice can be found in NHBC Chapter 4.2 (*'Building near Trees'*),

http://nhbccampaigns.co.uk/landingpages/techzone/previous_versions/2011/Part4/section2/default.htm

Specific guidance is beyond the remit of this report and expert advice should be sought if required.

j. Construction: Access, Working Space, Storage of Materials & Topsoil.

To permit access, CEZ's may extend beyond the protective barriers. Assuming no suitable existing hard surfacing is in situ, any such areas must be covered by ground protection, based on the recommendations within BS: 5837 - 2012. The precise design and the sequencing of the installation and removal should be agreed with the Local Planning Authority before any demolition and/or construction activity starts. Further details can be found within the appendices.

k. Excavations or Changes in Ground Levels near Retained Trees

Proposed changes in ground levels must be advised in order that appropriate precautions can be undertaken. Generally, changes in levels within or adjoining RPA's are not permitted without suitable mitigation and this can often be very expensive to achieve.

l. Installation of Hard Surfacing in RPAs.

Please refer to appendices for specific details of how to achieve the above without causing damage to tree/s on site.

m. End use of Space near Retained Trees

Tree Number	Proposed use of space near retained tree/s indicated
	-

n. Removal of Existing Structures and Hard Surfacing.

If applicable, please refer to appendices for specific details of how to achieve the above without causing damage to tree/s on site.

o. Potential for New Planting to provide Mitigation for any Losses.

Where it is unavoidable, the loss of trees can be offset / mitigated for by planting new and site-specific species of trees. Specific advice on planting new trees is provided in British Standard 8545 (2014) *Trees: from Nursery to Independence in the Landscape – Recommendations*. Any new planting on site should conform to this standard.

There is a planned loss of three trees will need to be mitigated for. There is potential to make further plantings within the grounds. Replacement plantings should be of native species.

p. Heads of Terms: Construction Method Statement: -

Suggested sequence of events

1. Fell T9, T10 and T11.
2. Assemble Tree Protection/Construction Exclusion Zone fencing as indicated in Tree Protection Plan (end of report).



3. Refurbish access (if planned). Material should only be added and no excavation should take place.
4. Demolish outbuildings that are due for removal. This should take place from within the building's own footprint.
5. Carry out main construction work and all hard landscaping.
6. Dis-assemble tree protection fencing.
7. Carry out new plantings.

9 Mitigation

There are a number of actions which either by intent, or negligence which can have major negative impacts on the health of a tree and even cause death.

Therefore, the following guidance must be strictly adhered to:

- Protective fences must be positioned as shown within Tree Protection Plan/Tree Constraints Plan. These must be in position prior to and throughout the scheduled works. They can only be removed on completion of works.
- Damage to major limbs must be prevented: Ragged wounds speed infection
- Parking of vehicles / cars within the root protection area (RPA) may cause contamination from oil, or other substances and compaction of the soil may result. Parking of vehicles is therefore, prohibited within the (RPA).
- Attachment of signs, fences, cables or winches to a tree will cause direct damage and promote decay and therefore are prohibited
- Refuelling, or use of chemicals within the RPA protected area is prohibited
- Storage of materials within the RPA will cause compaction and therefore damage to the tree and is thus prohibited
- Lowering the soil level will damage the trees roots as most are very near the surface. This is therefore prohibited
- Raising ground levels even for short periods and by only a few centimetres can suffocate tree roots causing severe dieback and is therefore prohibited.
- Fires within the RPA or under the canopy of a tree will cause serious and irreversible damage to the tree. Fires within 5m of the RPA / canopy have the potential to cause damage and the larger the fire, the greater the distance over which it poses a threat to the tree. Consequently, fires within 5m of trees on this site are prohibited.

Mitigation for Replacement Hedgerow Habitat

No hedgerow loss proposed. No mitigation required.

Mitigation for Replacement Tree Planting

3 trees of species equal to or greater native biodiversity value are to be planted to replace those felled to facilitate this development.
Refer to Section 14 for native tree selections.



Mitigation for Protection of Existing Habitat (CEZ)

Temporary Construction Exclusion Zone.

- Trees/hedgerows that are being retained should be protected from damage during construction by erecting Heras (or similar) fencing around these features. Construction Exclusion Zones (CEZs) should therefore be set up: - as shown on the TPP.
- The only exception to this is at existing access points. Heras fencing is not intended to restrict the access of species to other areas of the site, therefore, mindful procedure by site workers and visitors to the site is always necessary.
- No development work should be undertaken within the CEZs and no materials, machinery, chemicals etc. should be stored within these zones. No development or any associated works should be located within these construction exclusion zones. Appropriate signs should be placed at regular intervals along the fencing to ensure everyone on site is aware of the CEZ and understands its relevance: for example, CONSTRUCTION EXCLUSION ZONE – NO ACCESS.
- Any areas proposed for planting post-development should also be fenced off where possible to prevent compaction of the soil through vehicle movements.

Mitigation for Reduction/Restriction of Artificial Lighting Spill Where Bat Roosts are Present.

An Artificial Lighting Strategy to restrict or reduce the impact of artificial lighting spill on important ecological features: hedgerows/trees.

Ideally, lighting spill from within or around the newly developed areas should be kept to the minimum level permissible with NO lighting directed towards the west of the drive.

LED and/or low-pressure sodium lamps with glass glazing should be utilised where external lighting is required instead of mercury or metal halide lamps. This type of lighting can be utilised more directionally and will reduce the range of light wavelengths emitted thus significantly reducing the levels of UV light which may attract increased levels of invertebrate bat prey items.

- Light ONLY when and where it is needed for health and safety.
- Prevent light-spill and spread: - eliminate bare bulbs, upward pointing lights, keep light near to or below the horizontal. E.g. flat cut-off lanterns. Such light should be positioned to only illuminate the required areas, limiting light spill, both horizontally and vertically. Additionally, hoods, cowls, louvers and/or shields may be utilised to further direct any lighting.
- Decrease light intensity, avoid the UV spectrum: attracting insects is NOT an aim.
- Reduce height of lighting columns. Or allow for lower main beam angles to reduce glare.
- Timer switch on any proposed outdoor lighting to facilitate dark periods.
- Increase spacing between lanterns

It is becoming increasingly common for LPA's to request an independent site lighting strategy and expect it to be submitted as early as the reserved matter stage. Consideration should be given to this prior to submission particularly on larger sites or those with important bat / dormouse habitat / corridors, rather than wait to be compelled to do so.



10 Tree Protection Plan (TPP) & Tree Constraints Plan (TCP)

The Tree Protection Plan and Tree Constraints Plan must be submitted in association with this Arboricultural Report.

Tree Protection Plan (TPP)

- Tree are numbered as per the Tree Schedule.
- The circular interpretation of root protection areas ("RPA") of category A, B and C trees with high **A (Green)** moderate **B (Blue)** and low **C (Gray)** and unsuitable for retention **U (Red)** categories.
- Trees proposed for removal are indicated by a red dotted outline
- Where necessary, canopy spreads and shadow arcs may also be indicated
- North is to the top of the plan.

Tree Constraints Plan (TCP)

The Construction Exclusion Zone ("CEZ"), which is the area of restricted access, to be protected by temporary barriers (fencing and/or ground protection) (purple shaded area) and the location of precautionary areas outside the CEZ where limited, but careful access is permitted.

11 Enhancement

Enhancement (measures that improve the biodiversity/ecological condition) of all sites post development is a planning requirement. The law, central government planning policy and local planning policy point towards the enhancement of a site's biodiversity as part of the development process.

Ecological enhancement measures must be over and above any avoidance, mitigation and compensation measures required to neutralise the impacts of the development on wildlife. An increased need for effective Enhancement has been reinforced by recent research conducted by a United Nations-backed panel called the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) stating up to million plant and animal species face extinction. Whilst we in the UK are not directly responsible for all of this loss, we can try to protect the threatened species within the UK.

Consequently, enhancement requirements within this report should be seen as the minimum expectations and we would urge all clients to carefully consider how they are able to make positive contributions to protecting and enhancing our natural environment within their planning submissions.

New Enhancement planting has not yet been agreed with the client.

- Native tree species should be used.
- New plantings can form part of the overall landscaping.



Specific advice on planting new trees is provided in British Standard 8545 (2014) Trees: from Nursery to Independence in the Landscape – Recommendations. All planting on site should conform to this standard.

END

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12 Appendices

a. Arboricultural Supervision

Site meetings and arboricultural supervision are not always required. Each site must be assessed on its own merits. The following table details specific roles and timings which might be required.

Site meetings with the LPA Tree Officer may not be necessary on small sites		
Time Frame	Attendees	Action
Pre-commencement	Arboricultural Consultant LPA Tree Officer Site Manager	To discuss tree protection measures, Arboricultural supervision and notification of interested parties.
In progress	Arboricultural Consultant Site Manager	Supervision and notification of agreed tree protection measures.
Post completion	Arboricultural Consultant	Inspection of retained trees and notification agreed.

Tree protection cannot be reliably implemented without Arboricultural input. The nature and extent of that input varies according to the complexity of the issues and the resources available on site. An Arboricultural consultant may need to be instructed by the project management team to oversee the implementation of the protective measures and management proposals set out in an Arboricultural method statement. Should Planning Conditions pertaining to Trees be imposed, the project management should instruct an Arboricultural consultant to undertake the required supervision.

b. Report Limitations

Each tree was subjected to a quick visual check level of inspection. Where there is restricted access to the base of a tree, its attributes are assessed from the nearest point of access. Climbing inspections are not carried out during this level of inspection and, if heavy ivy is present, tree condition is assessed from what can be seen from the ground. Trees are living organisms whose health and overall condition can change rapidly.

Owing to the time that may elapse between the original survey and the start of development, all trees should be re-inspected as part of the standard risk management process before any works start on site. Our assessment of the trees was carried out on the basis that a re-



inspection would be carried out within a year of the assessment visit and our advice on tree condition must be reviewed annually from the date of that visit. The period of validity may be reduced if significant changes occur to either the trees or to the landscape within the immediate proximity of the trees. Such changes include, but are not restricted to; storm damage, flooding and alterations to soil levels surrounding or in close proximity to trees.

Any recommended tree works are based on the quick visual check level of inspection noted above and only intended to address significant hazards identified during that inspection.

c. Relevant Strategic and Policy Considerations

The Climate Change Act (2008) sets out a statutory strategic need to adapt to climate change at a national and local level, which is reiterated through the emphasis on sustainability in the National Planning Policy Framework. It is now widely accepted that trees, along with other woody plants, offer significant climate adaptation benefits to the built environment where people live and work. These benefits include, amongst others, the buffering of temperature extremes and the buffering of rainwater runoff, which can significantly reduce the adverse impacts of climate change.

Additionally, there is an increasing body of research providing reliable evidence that trees impart other significant health-related benefits to the people that live and work near them. These benefits include, amongst others, the potential to improve psychological wellbeing by reducing stress and anxiety through the relaxing nature of their presence. It seems that access to greenspace and trees makes people happier and encourages them to take more exercise, which has a direct and positive impact on physical health and wellbeing. On a subtler level, the ecological enhancement that can be achieved through appropriate tree management makes a positive contribution to environmental sustainability.

These concepts are explored and set into a built-environment context in the recent Trees and Design Action Group's publications 'Trees in the Townscape': *A Guide for Decision Makers* and *Trees in Hard Landscapes: A Guide for Delivery*. Furthermore, specific advice on planting new trees is provided in British Standard 8545 (2014) *Trees: from nursery to independence in the landscape – Recommendations*. All planting on site should conform to this standard.

It would seem reasonable to accept the general principle that more and bigger trees will deliver more benefits from their presence. Clearly, this must be applied with balance and proportionality, it nonetheless remains an important guiding principle in the planning process and it has been a prominent consideration in our analysis on this site.

Development activities may cause harm if not carried out with care. We have reviewed the situation carefully and our experience is that these trees could be successfully retained without any significant adverse impact if appropriate protective measures are properly specified and controlled through an arboricultural method statement.

**d. Heads of Terms - Arboricultural Method Statement**

Heads of terms	Overview of appropriate protective measures (to be detailed in response to a planning condition once consent has been given)
Identification of areas to be protected	The tree protection plan shows all the areas where protective measures are necessary. The construction exclusion zone (“CEZ”) boundary is shown on the plan as the heavy dashed black line, with the lighter diagonal hatching behind. If necessary, further precautionary areas outside the CEZ are shown on the plan as a yellow-coloured fill, where a high level of care is required. This work will be subject to arboricultural supervision.
Tree works	Tree works, based on our assessment of the proposal and the original site inspection, are set out in the work recommendations column of the tree schedule in Appendix 2. The location of each tree by number is shown on the tree protection plan and any to be removed are indicated with a red crown outline. All tree works must be reassessed before any site activity starts as part of the standard risk management process.
Fencing	Protective fencing must be installed at the locations shown on the tree protection plan by the heavy black dashed line. If agreed with the LPA, fencing can be set back to improve access, provided the exposed ground is protected with ground protection. This work will be subject to arboricultural supervision.
Ground protection	Ground protection must be installed wherever RPAs are exposed and not enclosed by fencing. This will be where fencing has been agreed to be set back, and in all precautionary areas. This work will be subject to arboricultural supervision.
Existing surfacing to be retained	The existing hard surfacing will be retained and utilised where possible. Any surfacing disrupted during the course of the construction activity will be reconditioned or upgraded as necessary. This work will be subject to arboricultural supervision.
Installation of new surfacing	New surfacing within RPAs is proposed as shown on the tree protection plan. These will be installed in accordance with the appropriate guidance. This work will be subject to arboricultural supervision.
New and existing services	All excavation for the installation of new services or the upgrading of existing services must be carried out in accordance with the appropriate guidance. This work will be subject to arboricultural supervision.
Removal of protection	All protective barriers must remain in place until the construction activity is finished and there is no realistic risk of damage to the protected soil surfaces. This work will be subject to arboricultural supervision.



Tree planting	Space has been allowed for a comprehensive new tree planting scheme. It would be appropriate for the precise detail to be agreed with the LPA through a planning condition.
Landscaping	All landscaping activity must be carefully controlled once the protective measures have been removed. This work will be subject to arboricultural supervision.
Other risks to trees	Any significant risk to trees from activities outside RPAs, but close enough to have a knock-on impact, must be assessed and appropriate precautions put in place to reduce that risk. Such risks include, inter alia, chemical pollution, cranes and high loads.

e. Heads of Terms - Construction Method Statement

Sequence of Events.

The management details that must be followed to ensure successful tree retention on this specific site will depend upon the final layout of the proposed development.

Heads of Terms Construction Method Statement

A construction method statement is a description of how operations that may affect trees will be carried out to minimise any adverse impact on them. The details of how the site will be managed are construction and contractual matters that can only be finalised once the post-consent detailed planning begins. For that reason, at this stage in the planning process, it is only possible to list a heads of terms summary of the issues that will require more detailed consideration once consent is issued. The issues that are likely to require further explanation on this site include:

1.	The order of work on site, including demolition, site clearance and building work.
2.	Erection and maintenance of security hoarding near trees.
3.	Who will be responsible for protecting the trees on site.
4.	Detailed proposals for inspecting and supervising the tree protection, and how problems will be reported and solved.
5.	How accidents and emergencies involving trees will be managed, including accidental damage to roots and their treatment.
6.	Details of facilitation pruning and access into site. What size vehicles will be used under canopies and will large machinery be lifted over trees.
7.	The parking arrangements for workers and visitors.
8.	A schedule of emergency contact numbers.
9.	Areas for loading and unloading of materials and storage of materials and plant.
10.	Where site facilities will be sited and when will they be installed.
11.	Crane location and zones of movement.
12.	How machinery and equipment (such as excavators, cranes and their loads, concrete pumps and piling rigs) will enter, move on, work on and leave the site.



13.	Wheel washing facilities near trees
14.	Measures to control the emission of dust and dirt during construction near trees.
15.	Recycling and storage of waste near trees.
16.	Details of earthworks, grading and mounding and removal of spoil, including any planned lowering or raising of ground levels.
17.	Details of upgrading/removing/replacing existing surfacing and areas where this will happen, including detailed and precise cross-sections where no-dig surfacing is to be installed.
18.	How and when any temporary surfacing will be laid and removed.
19.	Details of piling operations.
20.	Precise services locations, including the method of excavation when near trees.
21.	Proposed locations of site facilities/crane location/material storage/loading bays etc.
22.	Finished excavation lines for basement works.
23.	How post-construction damage through compaction to soil near existing trees and new trees will be ameliorated.

Note: It is not our role as Arboricultural Consultants to detail the timing and implementation of these measures, although we can input into the process and will need to confirm that the final proposals will not adversely affect retained trees.

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f. Explanation of codes used within the Tree Schedule.

Tree categories and values are somewhat subjective and trees with a high biodiversity value are likely to be assessed with a higher value than might otherwise be the case.

Tree Survey - Key		Tree – Age Classes		Tree – Condition Physiological		Tree Survey - Codes	
Ht	Height in metres and rounded to the nearest metre	NP	New Planting	(G)ood	No significant health problems	T	Trees individually detailed
Stem Ht	Stem diameter in mm at 1.5m high.	Y	Young <1/3 rd of life expectancy	(F)air	Symptoms of ill-health that can be remediated	H	Hedgerows
Crown Ht	Estimated height of Crown Clearance	MA	Middle Aged – Between 1/3 rd and 2/3 rd of life expectancy	(P)oor	Symptoms of ill-health that cannot be remediated	W	Woodland
Crown Sprd	Estimated spread of crown in cardinal direction	M	Mature - >2/3 rd of life expectancy		Structural	TG	Tree Groups
RPA	Root Protection Area. Given in m ² and as a radii.	OM	Over Mature – species maximum life expectancy	(G)ood	No significant Structural issues	BS Cat	British Standards Categories
E	Estimated	V	Veteran – Expectancy old for its species. Usually with high biodiversity value.	(F)air	Structural issues that can be remediated	M/S	Multi – Stemmed Trees
British Standard BS5837 – Tree Categories – A = High Quality (Ordinarily retained) B = Good Quality (Ordinarily retained) C = Poorer Quality (Retained if possible) U = Unsuitable for Retention (Would normally be removed irrespective of development)				(P)oor	Structural issue that cannot be remediated	SULE	Safe Useful Life Expectancy. BS5837 is not a <i>Tree Condition Survey</i> . Therefore, this should be considered at best as a very rough guide.



g. Cascade Chart for Tree Quality Assessment

Category and definition Criteria (including subcategories where appropriate)

Trees unsuitable for retention

Category U

Those in such a condition that they cannot realistically be retained as living trees in the context or the current land use for longer than 10 years

- Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)
- Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline
- Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low-quality trees suppressing adjacent trees of better quality

Note: Category U trees can have existing or potential conservation value which it may be desirable to preserve

1. Mainly arboricultural qualities

2. Mainly landscape qualities

3. Mainly cultural values, including conservation

Category A and B trees are ordinarily retained. Category C trees should be retained where possible but NOT present a barrier to development.

Category A

Trees of high quality with an estimated life expectancy of at least 40 years

Trees that are particularly good examples of their species, especially if rare or unusual: or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)

Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features

Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)

Category B

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

Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation

Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to a wider locality

Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)

Category C

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

Unremarkable trees of a very limited merit or such an impaired condition that they so not qualify in higher categories

Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits

Trees with no material conservation or other cultural value



A typical tree – showing the Root Protection Area (RPA) in red.

This drawing illustrates the potential extent of rooting of a tree. The actual amount is dependent on species, soil conditions and location. If all the roots of a mature beech were laid end to end, it is estimated that the roots would extend to approximately 2 miles in length. This is dwarfed by the extent of the associated mycorrhiza which is estimated at over 25,000 miles!

Protecting as large an area as possible, is clearly beneficial if the objective is to retain the tree in good health. Individually engineered solutions may be available if encroachment is essential.

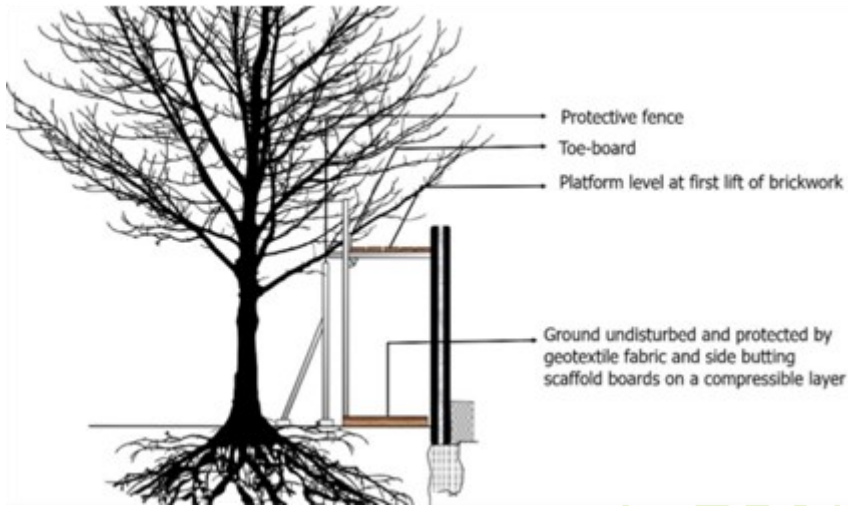


- Note that most of the roots are shallower than is normally believed. In fact, the overwhelming majority of roots are generally in the top 60cm of the soil.
- Note also that even when following the BS 5837 /2012 standard, that a significant amount of root loss might be suffered by the tree.
- Construction Exclusion Zones (CEZ) are intended to protect the soil and therefore the roots of trees.

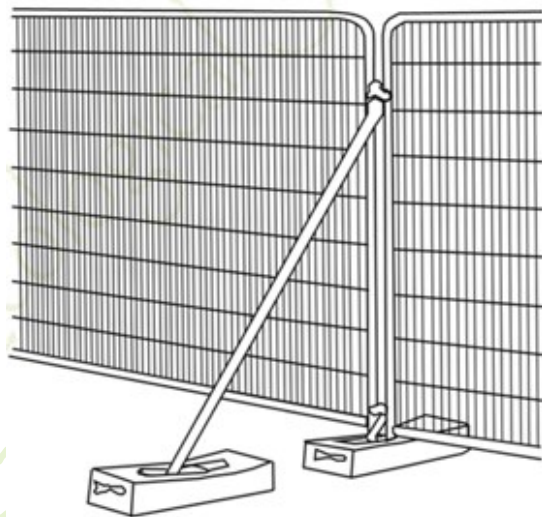
Ecology



i. Default Tree Protection Barrier Information



This arrangement can be used if it is necessary to work within a Tree Root Protection Area.



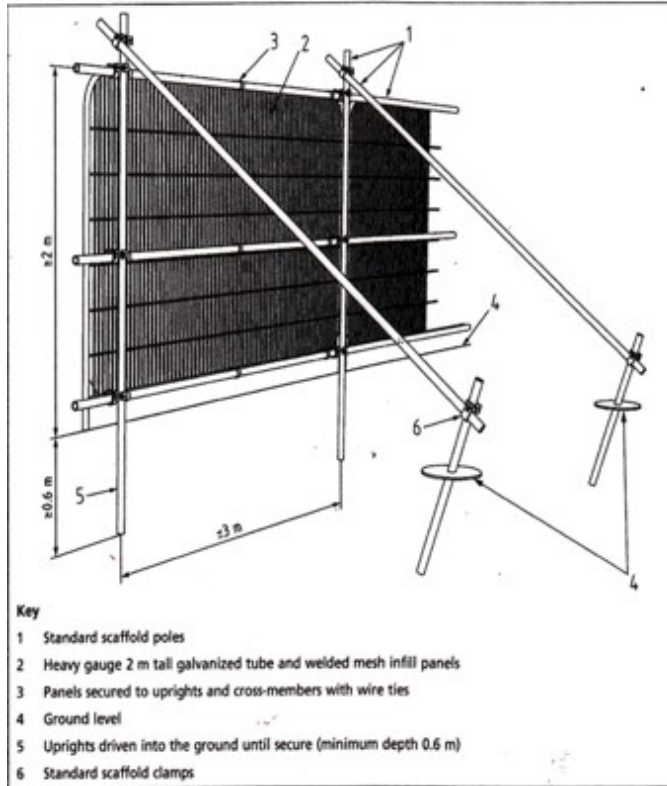
Heras (type) Fencing is typically chosen as Tree Protection Fencing. This is not actually specified under BS5837 and other forms of fencing may be suitable. Whatever form of fencing is agreed must be capable of protecting the RPAs from impact.

The use of 'feet' on hard surfaces and in lower risk areas is usually acceptable.

However, in higher risk areas it is usually expected that scaffold poles are used as bracers and on especially sensitive or large-scale schemes,



Figure 2 Default specification for protective barrier



scaffolding might be required with fencing panel fixed directly to the scaffold supporting framework.

Figure 2 is taken from BS5837 -2012.



Protective Fencing

This fencing must be maintained in accordance with the approved plans and drawing for this development.



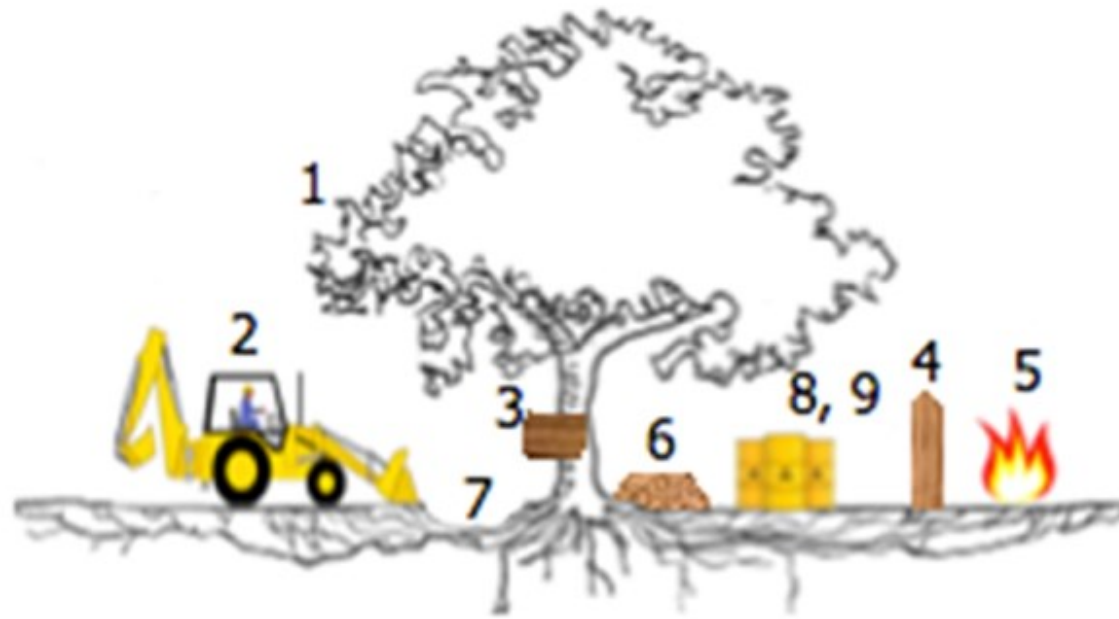
Tree Protection Area
 (Town & Country Planning Act 1990)
 Trees enclosed by this fence are protected by planning conditions and/or are the subject of a tree preservation order.
 Contravention of a tree preservation order may lead to criminal prosecution incursion into the protected area must be with the written permission of the local planning authority.

KEEP OUT!

Signs clearly stating that the area must not be entered without express permission from an Arborist / LPA Tree Officer and that its purpose is to protect the enclosed trees, must be erected upon the fencing every 5 metres. Signs can be purchased from specialist retailers.



j. **Avoiding harm to Trees.**



1	Damage to major limbs must be avoided: Ragged wounds speed infection.
2	Parking of heavy vehicles must not be permitted near the Root Protection Area (RPA). Compaction and oil contamination may result and must be avoided.
3	Do not attach anything to a tree - Attachment of signs, fences, cables and winches etc to a tree causes direct damage and encourages infection and decay.
4	The use of properly positioned and erected Protective Fencing must prevent damage to, and death of trees.



5	Fires must not be lit in a position where flames / heat can damage a tree - A distance of 5 metres beyond the tree canopy must be consider the absolute minimum and consideration of wind direction, size of the fire, materials being burned etc must be taken into account when deciding on a safe distance. If in doubt, do not light a fire.
6	Do not raise ground levels - Trees need to breathe through their roots, which is why most trees are shallow rooted (typically less than 75cm deep) so raising ground levels, even for short periods and by only a few centimetres can suffocate roots causing die back and death of the tree.
7	Lowering ground levels will similarly damage the root system and cause die back and death.
8	Do not store any materials within the RPA as this can cause compaction and seepage of chemicals can poison a tree.
9	Do not refuel machinery near trees and do not store or mix cement / mortar within or close to the RPA as such chemicals will kill trees.

k. BS5837 Terms and Definitions

For the purposes of British Standard 5837:2012, the following terms and definitions apply:

Access Facilitating Pruning	One-off tree pruning operation, the nature and effects of which are without significant adverse impact on tree physiology or amenity value, which is directly necessary to provide access for operations on site.
Arboricultural Method Statement	Methodology for the implementation of any aspect of development that is within the root protection area or has the potential to result in loss of or damage to a tree to be retained.
Arboriculturist	Person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction.
Arboricultural Supervisor	Arboriculturist who works with the construction project team to ensure that the Arboricultural Method Statement is followed and can advise on off-specification issues that may arise.



Competent Person	Person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached. <i>Note: a competent person is expected to be able to advise on the best means by which the recommendations of this British Standard may be implemented.</i>
Construction	Site-based operations with the potential to affect existing trees.
Construction Exclusion Zone	Area based on the root protection area from which access is prohibited for the duration of a project.
Root Protection Area (RPA)	Layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority.
Service	Any above- or below-ground structure or apparatus required for utility provision. <i>Note: Examples include drainage, gas supplies, ground source heat pumps, CCTV and satellite communications.</i>
Special Engineering	Design of a structure with the physiological requirements of trees as the priority.
Stem	Principal above-ground structural component(s) of a tree that supports its branches.
Structure	Manufactured object, such as a building, carriageway, path, wall, service run, and built or excavated earthwork.
Tree Protection Plan	Scale drawing, informed by descriptive text where necessary, based upon the finalized proposals, showing trees for retention and illustrating the tree and landscape protection measures.
Veteran Tree	Tree that, by recognized criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. <i>Note: these characteristics might typically include a large girth, signs of crown retrenchment and</i>



Tree Preservation Order (TPO)	A Tree Preservation Order allows for trees to be protected either as individuals, groups, areas or woodlands. Tree Preservation Orders have the effect of preventing the cutting down, topping, lopping, uprooting, willful damage or willful destruction of trees other than with the consent of the Local Planning Authority. Certain exclusions do apply to Tree Preservation Orders such as the removal of dead, dying or dangerous trees, but these should be used with caution and always following the advice of the LPA Tree Officer.
ConservationArea	Any works to trees within a Conservation Area (with some minor exceptions) will require six-week prior notice to be given to the local planning authority. Certain exclusions do apply to Conservation Areas such as the removal of dead, dying or dangerous trees, but these should be used with caution and always following the advice of the LPA Tree officer.

This section may or may not be required. If it is, specific recommendations / Method Statements will be included. If it is not immediately required for Planning purposes, it may prove of value at some future juncture

I. Guidance for Working in Root Protection Areas (RPAs)

Introduction

The following sets out the guidance for working in RPAs that should be followed to ensure successful tree retention. It is based on the guidelines and recommendations set out in British Standard 5837:2012 Trees in relation to design, demolition and construction - Recommendations (hereinafter BS:5837) and the National Joint Utilities Group: Guidelines for the planning, installation and maintenance of utility services in proximity to trees. Volume 4, issue 2. London: NJUG, 2007 (hereinafter NJUG 4).

General Guidance for Working in RPA's

What is the purpose of this guidance?

The purpose of this guidance is to set out the general principles that must be followed when working in RPAs as follows;

- pre-site commencement: to demonstrate that tree protection issues have been properly considered and sets out how they must be implemented, and,
- post site commencement: to inform all site personnel of their obligations towards protected trees and how to meet them.



What are RPAs?

RPAs are the areas of root protection where;

- a) roots must not be severed, cut or broken i.e. no excavation, no soil stripping
- b) ground levels must not be changed i.e. no soil stripping, no soil level raising
- c) soil must not be compacted - no movement of vehicles

All RPAs close to the construction area are illustrated on the tree protection plan within this report. Any and all works within RPAs must be carried out with great care if trees are to be successfully retained.

When must this Guidance be Followed?

This guidance must be followed by all personnel entering into or working within an RPA.

The main scenarios where this guidance must be followed are;

- a) demolition,
- b) construction of new hard surfacing,
- c) construction of new structures,
- d) subterranean construction,
- e) underground and above-ground utility apparatus, and
- f) landscaping activities.

Broad definitions of surfacing, services, structures and landscaping are set out in the following sections.

In recognition of the fact that trees are sensitive to disturbance, the British Standards Institution has published recommendations on how to protect them during their development. BS 5837:2005 recommends that there should be a root protection area in which development should not be permitted.

In 2007 the Arboricultural Advisory and Information Service published Arboricultural Practice Note 12: Driveways Close to Trees (APN12) which suggested that driveways could be installed within the root protection area subject to roots and the soil not being damaged. APN12 advises that an above-ground, no-dig construction should be used. This advice was incorporated into the recent British Standard (5837 -



2012) which recommended that the most effective means of achieving this was through the use of three-dimensional cellular confinement system, such as a Terram Geocell.

m. Method Statement For “No-Dig” Construction

In Line with Arboricultural Practice Note 1 - “Driveways Close to Trees”

Prior to commencing any construction on site, erect protective fencing around trees to form an exclusion zone (see above plan). This will ensure that roots will not be severed during the construction work and the soil in the area of the exclusion zone will not be compacted, enabling oxygen to continue to diffuse into the soil beneath. Construction should be undertaken in dry weather between May and October when the ground is driest and least prone to compaction.

1. Kill ground vegetation using a translocated herbicide (glyphosate), ensuring that the selected herbicide doesn't damage the root of the tree(s) below the surface of the path.
2. Remove the dead or organic material from the site and ensure that large stones and shrub stumps are removed from the proposed route.
3. Any stumps should be ground rather than excavated to minimize soil disturbance.
4. The resulting hollows and any other holes in the path should be filled with sharp sand.
5. Lay geotextile matting across the full width of the access. This will prevent the intrusion of roots into the sub-base whilst still allowing nutrients and gaseous exchange.
6. Lay Terram 100 Geocell (cellular confinement system). Other Systems are available.
7. The drive is to be supported against 150 x 20mm tanalised softwood boarding and 200mm long tanalised soft wood pegs driven into the ground at 1500mm centres.



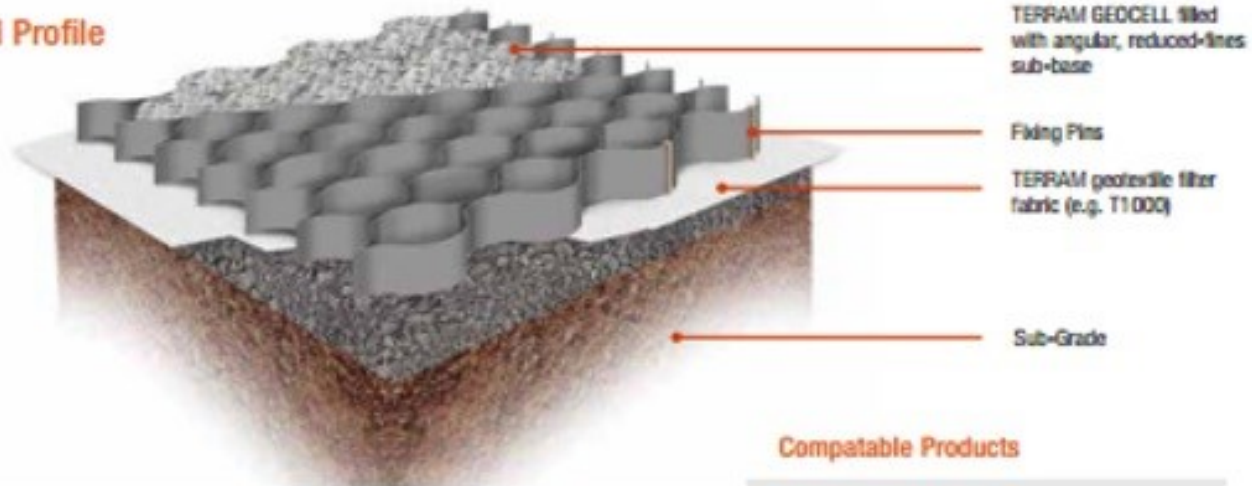
8. Using hand shovels, carefully push 20mm – 40mm gravel chippings (no fines) into the Geo 100 Geocell matting to form an aggregate sub-base.
9. The chippings should be placed at one end of the matting and pushed/spread across the matt to prevent compacting the soil, working on either side of the track.
10. Compact the subbase to ensure binding with the geogrid and to minimise future rutting.
11. Lay second layer of terram geotextile matting across the full width of the path. This will prevent the intrusion of fines into the gravel chippings.
12. Add layer of 'no fines, sharp sand and compact if using pavers as surface treatment.
13. If required, place proposed (permeable) surface treatment on top of the compacted sub-base to form the finished surface to the path and bank up the edging with topsoil, which is to be grass seeded in spring/autumn. This will form a gentle slope from the edging back onto the existing ground level.

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Protect tree roots from vehicle traffic, whilst maintaining water and nutrient absorption using TERRAM GEOCELL.

Typical Profile



Before application



During construction



On completion

**Arboricultural Supervision:**

It is essential that all works relating to the installation of the no-dig solution are supervised by a qualified Arboriculturist from the beginning of the project through to completion as it is known that the common failing in no-dig solutions is lack of professional supervision. This process will be strictly adhered to throughout the course of this project.

Providing the methods described above are adhered to during the entire construction process, a permanent surface can be constructed without causing demonstrable harm to the trees by minimising the effect on the trees root system. All work within RPAs must be carried out with care if trees are to be successfully retained. An Arboriculturist must be consulted if there is any risk of misunderstanding or misinterpretation.

Ongoing work must be inspected regularly and on completion, the work must be signed off by the Arboricultural consultant.

n. Demolition within RPA's

The existing building is outside of any trees RPA so this is not necessary on this site.

o. Construction of New Hard Surfacing within RPA's

Refer to Method Statement For ["No-Dig" Construction](#). A similar approach can often be adopted for patios or other areas. There are restrictions on the amount and type of surfacing that can be constructed with RPA's. Specific advice should always be sought prior to any works commencing, although such works are not currently proposed on this site.

p. Construction of New Structures within RPA's

Not currently proposed on this site.

q. Underground and above-ground utility apparatus within RPAs**Basic Principles:**

Mechanical trenching for the installation of underground apparatus and drainage severs any roots present and can change the local soil hydrology in a way that adversely affects the health of the tree. For this reason, particular care should be taken in the routeing and methods of installation of all underground apparatus.

Wherever possible, apparatus should be routed outside RPAs. Where this is not possible, it is preferable to keep apparatus together in common ducts. Inspection chambers should be sited outside the RPA.

Where underground apparatus is to pass within the RPA, detailed plans showing the proposed routeing should be drawn up in conjunction with the project Arboriculturist. In such cases, trenchless insertion methods should be used with entry and retrieval pits being sited outside the RPA. Provided that roots can be retained and protected excavation using hand-held tools might be acceptable for shallow service runs.



r. Landscaping within RPA's

Basic Principles:

The general treatment of areas around newly planted and existing trees should allow for adequate infiltration of water and free gas exchange, reduction of water evaporation and the retention of an open soil structure to encourage root growth.

Soil Compaction and Remediation Measures:

Soil that has been compacted will not provide suitable conditions for the survival and growth of vegetation, whether existing or new, and is a common cause of post-construction tree loss on development sites.

Compacted soil will adversely affect drainage, gas exchange, nutrient uptake and organic content, and will seriously impede or restrict root growth. The risk of soil compaction is greatest in soils with significant clay content and in wet conditions.

Soil compaction should be avoided around existing vegetation, including trees, and in areas where new planting or seeding is proposed.

Where soil compaction has occurred in the vicinity of existing trees, arboricultural advice should be taken before carrying out any remedial or other works within RPAs to mitigate risk of further damage to roots.

Remedial works may include sub-soil aeration using compressed air, and the addition of other materials, preferably of a bulky, organic nature (but excluding peat), to improve structure. Heavy mechanical cultivation such as ploughing or rotivation should not occur within the RPA.

Any cultivation operations should be undertaken carefully by hand in order to minimize damage to the tree, particularly the roots. Decompaction measures include forking, spiking, soil augering and tilled radial trenching. Care should be taken during such operations to minimise the risk of further damage to tree roots.

Use of Herbicides:

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 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.

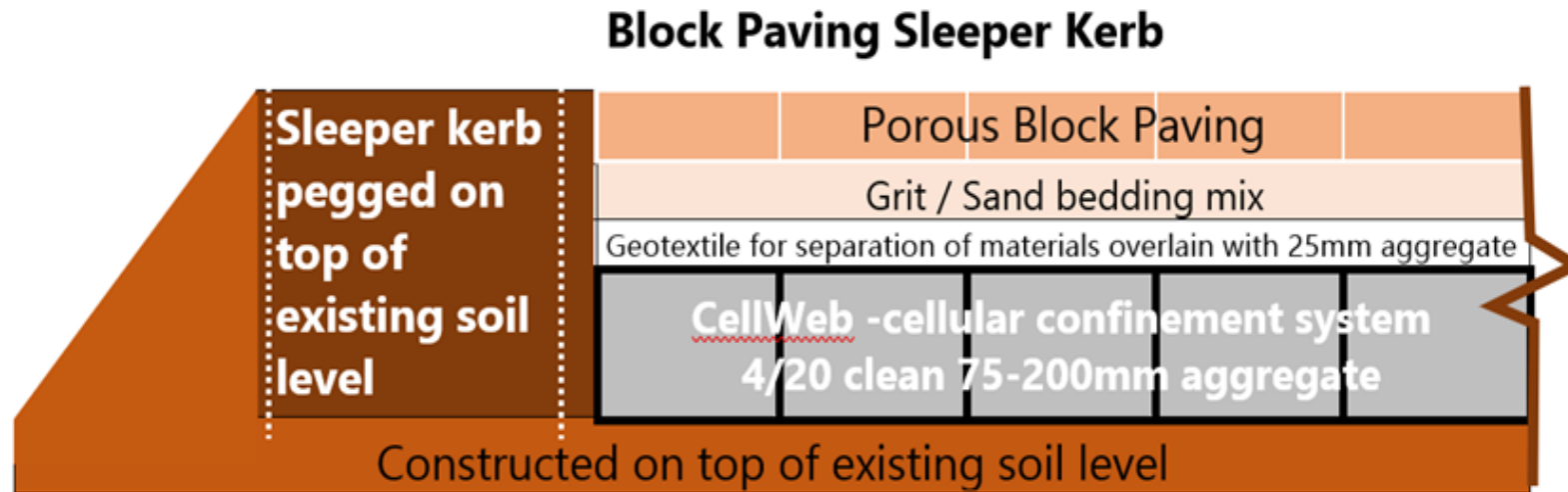


s. Tree work within RPAs:

Care should be taken to ensure during tree removal or remedial work that damage to the retained trees and/or disturbance to the RPA is avoided. Precautions should include dismantling techniques to reduce the risk of accidental damage, and ground protection measures where excessive pedestrian movements or use of plant and machinery might lead to compaction.

If temporary access is required for plant or vehicles within the RPA, this should be provided by means of temporary ground protection.

13 Block Paving Sleeper Kerb



Note – Sub-base could be required depending on the existing ground CBR% and the type of traffic on the surface. Provision of a sub-base will mean raising the height of the drive / path, not digging it out. The CBR test is fully described in BS1377: Part 9: 1990: Soils for civil engineering purposes.



14 References

- British Standard 5837:2012 Terms and Definitions
- British Standard 5837:2012 Process Flow Chart
- British Standard 5837:2012 Tree Categories
- Reference Documents and Contacts

British Standard 3998:2010 Tree Works – Recommendations

British Standard 5837:2012 Trees in relation to design, demolition and construction Recommendations.

Available from:

British Standards Institution

389 Chiswick High Road London W4 4AL

Telephone: 020 8996 7000 Web:

www.bsi-global.com

National Joint Utilities Group Publication Volume 4 “Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees”

Available from:

National Joint Utilities Group

30 Millbank

London SW1P 4RD Telephone: 020 7963 5720

Web: www.njug.co.uk

Tree Preservation Orders – A Guide to the Law and Good Practice

Available from:

Department for Communities and Local Government Communities and Local Government Publications

PO Box 236

Wetherby LS23 7NB

Telephone: 0870 1226 236

Download:

<http://www.communities.gov.uk/publications/planningandbuilding/tposguide>

Arboricultural Practice Note 12: Through the Trees to Development

Available from:

Arboricultural Advisory and Information Service (AAIS)

Alice Holt Lodge, Wrecclesham, Farnham, Surrey, GU10 4LH

Telephone: 01420 22022

Web: www.treehelp.info

Nature crisis: Humans 'threaten 1m species with extinction' (2019) Matt McGrath

Site accessed: 06/05/2019 <https://www.bbc.co.uk/news/science-environment-48169783>



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