



NATURALLY TREES

PROFESSIONAL TREE CARE

ARBORICULTURAL IMPACT ASSESSMENT

&

METHOD STATEMENT

Date: 21st April 2026

Site: Land East Grafton, East Grafton, Wiltshire SN8 3DB

(Full Report V3 Plot 5)

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Contents

Summary.....	4
Section 1: Introduction	4
1.1: Scope and purpose of this report	4
1.2: Instruction	4
1.3: Site information.....	5
Section 2: The Tree Survey	5
2.1: Method.....	5
2.2: The Survey Tree Results	5
Section: 3 Arboricultural Impact Assessment.....	6
3.1 Description of Proposed Development.....	6
3.1.2 Trees in relation to the new development.....	6
3.2 Developmental Impacts	7
3.3 Root Damage	8
3.4 Conclusion	8
Section: 4 Arboricultural Method Statement	10
4.1: Recommended Construction Method	10
4.2 Construction Space	11
4.2.2 Installation and/or upgrading of existing services.....	11
4.3. Protection Barriers.....	11
4.4 Ground Protection	12
4.5: Allowance for Future Growth	13
4.6 Arboricultural Supervision and Monitoring.....	13
4.7 General.....	15
4.8 Legal & Planning Constraints.....	15
Credentials of the author.....	16
Caveat.....	16
Bibliography	17
Appendix 1:	18
Visual Tree Assessment (VTA)	18
Health and Vigour Assessment	18
Structural Assessment	18
Appendix 2 Tree Survey Results.....	20
Appendix 3 Tree Survey Map	21

Appendix 4 Tree Survey Key	22
Appendix 5 Tree Protection	24
5.1 Pre-commencement Site Meeting.....	24
5.2 Protective Fencing and Ground Protection.....	24
5.3 Construction Exclusion Zone	26
5.4 Avoiding Damage to Stems and Branches.....	26
5.5 Reporting Damage to Trees and Protective Fencing	27
5.6 Excavating in RPAs	27
5.7 Removing Surfacing in RPAs.....	28
5.8 Installation of New Surfacing in RPAs.....	28
5.9 Micro Piling vs Screw Piling	29
Appendix 6 Arboriculture Watching Brief.....	32
Appendix 7 Photos	33

Summary

This report has been prepared in accordance with British Standard 5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations. It will accompany a full planning application for a prospective new residential development at Land in East Grafton, Wiltshire SN8 3DB

An Arboricultural Impact Assessment and Arboricultural Method Statement is included in this report to set out the extent of tree loss and the associated tree protection measures, arboricultural working methods and management recommendations to accompany the detailed planning application.

The proposal is to build one new residential homes within the boundary of the land.

No trees are required to be removed to the proposed development.

Provided that the recommendations detailed within this report are adhered to, impacts on retained vegetation are expected to be low, with the continued health and longevity of the retained trees maintained.

Section 1: Introduction

1.1: Scope and purpose of this report

1.1.1 The pre-development survey and assessment was undertaken in accordance with British Standard 5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations' (hereafter BS5837:2012).

1.1.2 The trees identified for survey are likely to be affected by the proposed developments and inspected from ground level only and were not climbed.

1.1.3 In accordance with the BS5837:2012 recommendations, the tree survey included all trees within the site boundary. Topographical survey data was available for the majority of the tree stock; however, some areas of denser boundary vegetation have been approximately placed within groups that form cohesive arboricultural features either aerodynamically, visually, culturally or in biodiversity terms.

1.1.4 An arboricultural impact assessment is included which details the constraints placed on the proposed development from the rooting area of the trees below ground and above ground by virtue of their size and position. A draft method statement is also given which demonstrates how the trees to be retained can be adequately protected throughout the construction operations.

1.2: Instruction

This report was commissioned by Jade Palmer of Fowler Architecture and Planning on 6th February 2025.

1.3: Site information

1.3.1 The site visit was undertaken on 14th February 2025. All dimensions have been measured unless stated otherwise.

1.3.2 Weather conditions at the time of survey were clear and dry.

1.3.3 The site is west of Grafton Place SN8 3DB

What3Words ///dormant.witless.bedsread

1.3.4 Most of the site is not located within a conservation area however the area hatched in blue is and all vegetation within these areas will require the necessary permits from Wiltshire CC .



A temporary Tree Preservation Order (TPO) application is currently in progress for trees T4, T5, and T7 (Ref: TPO/2025/00024). Until a decision is made, no work may be carried out on these trees without the appropriate authority and permits.

Section 2: The Tree Survey

2.1: Method

Assessments of the trees were made using elements of the 'Visual Tree Assessment' (VTA See Appendix 1) procedure. No invasive examination technique (such as increment boring, or internal decay detection) was carried out. As the inspection was visual only, no guarantee, either expressed or implied, of the internal condition of the wood of these trees can be given.

All tree inspections were carried out in accordance with current best practise (Visual Tree Assessment) to give a systematic, consistent and transparent evaluation method to tree inspecting.

2.2: The Survey Tree Results

Details of the trees as found at the time of the survey are in the tree survey sheets at **Appendix 2**. A map accurately depicting the location of all the vegetation surveyed is located at **Appendix 3**.

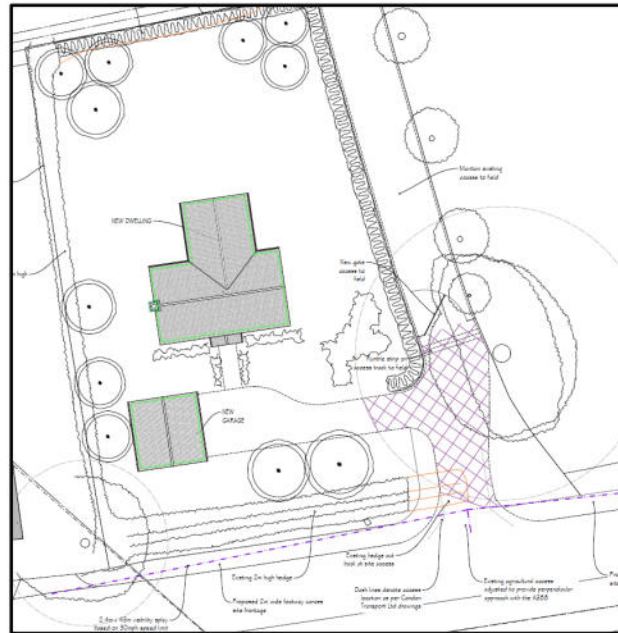
2.2.1 As agreed with the lead consultant Jade Palmer the report covers all the trees and vegetation located in or close to the proposed new build and construction site.

Section: 3 Arboricultural Impact Assessment

3.1 Description of Proposed Development

3.1.1 This report is based on the design layout provided by Jade Palmer of Fowler Architecture and Planning

The proposal is for the construction of one new residential home within the property boundary.



3.1.2 Trees in relation to the new development

3.1.2.1 Trees to be removed

Tree ID	BS5837 Category Grading	Reason for Removal

3.1.2.2 Tree surgery work

Below is a table indicating the recommended remedial tree works required before construction begin.

Tree ID	BS5837 Category Grading	Recommend Remedial works

3.1.2.3 Below is a table indicates the extent of encroachment by the proposed works within the Root Protection Area (RPA) of the retained trees.

Tree ID	BS5837 Category Grading	Approximate Encroachment
T5 - Poplar T6 – Hawthorn T7 - Lime	C2 C2 B1	Enc of Driveway = 0.55m² = 0.23% Enc of Driveway = 2.42m² = 5.54% Enc of Driveway = 128.11m² = 18.12% 

3.1.3 Changes in ground surface and ground level within RPA's

3.1.3.1 There is no surface or level changes in or around the trees that are being retained.

3.2 Developmental Impacts

There are a number of potential threats to trees during development and construction. These may be listed, in general terms as:

- Compaction of ground
- Covering rooting areas with impervious surfaces
- Excavations for foundations
- Excavation for service runs
- Alterations in ground level
- Access and movement of machinery
- Need for temporary site storage
- Crown damage by passage of high-sided vehicles

3.2.1 The British Standard relies heavily on the creation of a protected zone (RPA) around each tree. This area should be protected from disturbance “in order to avoid unacceptable damage to the tree as a result of severance or asphyxiation of the root system.” The recommended minimum area (m²) for each tree to avoid potentially harmful disturbance have been calculated for all the trees on site and entered into the tree schedule.

3.2.2 BS 5837: (2012) acknowledges that the shape of the tree root system may be affected by several factors and that the shape of the RPA should reflect this. Any deviation in the RPA from the original circular plot should take account of the following factors whilst still providing adequate protection for the root system:

- a) the morphology and disposition of the roots, when influenced by past or present existing site conditions (e.g. the presence of roads, structures and underground apparatus)
- b) topography and drainage;
- c) likely tolerance of the tree to root disturbance or damage based on factors such as species, age, condition and past management.

3.3 Root Damage

3.3.1 Trees that are growing satisfactorily have achieved equilibrium with their surroundings. Any construction work that affects this equilibrium could be detrimental to health, future growth and the safety of the tree.

3.3.2 The part of the tree most susceptible to damage is the root system, which, because it is not immediately visible, is frequently ignored. Damage or death of the root system will affect the health, growth, life expectancy and safety of the rest of the tree. The effects of such damage may only become evident several years later.

3.3.3 The majority of a tree's root system is generally considered to be in the top 600mm of the soil, extending radially in any direction for distances frequently in excess of the tree's height. However, roots are adventitious and if conditions suitable for root development exist to a greater depth, the roots may extend to depths of three metres or more. Works within the root spread may damage the root system.

3.3.4 Close to the trunk are the main structural roots that develop in response to the tree's need for structural stability. Beyond these major roots, the root system rapidly subdivides into smaller diameter roots; off this main system a mass of fine roots develop.

3.3.5 Tree root systems can be damaged in a number of ways during construction works. Root severance. Severing of a root will destroy all parts of the root beyond that point. Even roots less than 10mm diameter may be serving a mass of fine roots over a large area. The larger the root severed, the greater the impact on the tree.

3.4 Conclusion

3.4.1 No trees need to be removed for the proposed development, but the new drive and footpath must be protected to avoid damaging the retained trees' RPAs.

Refer to 4.1: Recommended Construction Method.

3.4.2 Provided that the recommendations detailed within this report are adhered to, impacts on retained vegetation are expected to be negligible, with the continued health and longevity of the retained trees maintained.

3.4.3 In practical terms, unless otherwise agreed by the arboriculturist, if there is any excavations within the RPA this will be carried out using hand tools, and the preferred method will be by compressed air soil displacement. Alternatively, if the compressed air option is not available, hand digging will be acceptable. Whatever the method of digging, the priority will be to remove soil without damaging the bark and wood of significant woody roots. If individual roots or clumps are discovered, those less than 2.5cm width can be cut cleanly. Individual roots and clumps greater than 2.5cm width will be retained where possible and only cut after agreement by the supervising arboriculturist. **Refer to Appendix 5 for further details**

3.4.4 At the time of writing the proposed services will not impact the RPA of the retained trees.

3.4.5 If materials, vehicles or plant are to be stored within the construction zone the appropriate protective measure need to be installed. **See Appendix 5.**

3.4.6 If the recommended protective measures are correctly followed the impact from the expected development will be low.

3.4.7 All tree works should comply with BS 3998: 2010 'Tree Work-recommendations and BS 5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations.

Section: 4 Arboricultural Method Statement

We have included a method statement for the trees on and adjacent to the site that are to be retained. This report may require updating as the project evolves or as new detail is received.

All tree protection measures must be erected before any works commence or materials or machinery is brought onto site. Once erected, barriers and ground protection are sacrosanct, and must not be moved or altered without prior consultation with the Arboriculturist or Local Authority Tree Officer. Fencing will remain in place throughout the following processes:

- Contractor occupancy
- Plant and materials delivery
- Demolition/construction works
- Installation of utilities
- Completion of development

4.1: Recommended Construction Method

4.1.1. Traditional construction methods are considered acceptable for the construction of the main house and garage, as the building footprint and proposed landscaping do not impact the Root Protection Area (RPA) of the retained trees.

4.1.2 The proposed new driveway encroaches into the Root Protection Area (RPA) of T5, T6 and T7. Therefore, this section of the driveway will be constructed using a no-dig methodology within the RPA. A geotextile membrane and cellular confinement system will be installed, avoiding excavation and minimising root disturbance, in accordance with BS 5837:2012 *Trees in relation to design, demolition and construction*.

4.1.3 There will be a minor encroachment into the Root Protection Area (RPA) of Tree T8 from the proposed new footpath. To mitigate potential impacts, the footpath will be constructed using a no-dig methodology. This will involve the installation of a geotextile membrane and a cellular confinement system, thereby avoiding excavation and minimising disturbance to tree roots. All works will be carried out in accordance with BS 5837:2012 *Trees in relation to design, demolition and construction* – Recommendations.



4.1.4 CCS is a three-dimensional, honeycomb-like structure made of high-density polyethylene strips that are ultrasonically welded together. When expanded and filled with common materials like sand, soil, or gravel, the geocells confine the infill, creating a strong, stable, and durable composite mattress that significantly improves the load-bearing capacity of the soil beneath it. These systems are used for various engineering applications, including load support, ground stabilization, erosion control, and tree root protection, providing a "no-dig" solution that reduces soil compaction and

prevents damage to underground roots. <https://www.geosyn.co.uk/product/cellweb-tree-root-protection>

4.1.5 When installed in accordance with arboricultural best practice, this system helps maintain soil structure, permeability, and gaseous exchange, thereby reducing the risk of root damage and soil compaction.

4.1.6 The installation should be carried out under arboricultural supervision, with appropriate ground protection measures in place, to ensure compliance with relevant guidance and to safeguard the retained trees throughout the construction process.

Please refer to

- Section 5.8: *Installation of New Surfacing in RPAs* for further guidance.
- Arboricultural Association (2020). *The Use of Cellular Confinement Systems Near Trees: A Guide to Good Practice*.

4.2 Construction Space

4.2.1 Space for construction work, mixing and material storage will be designated on site away from the construction exclusion zone as defined by the protective barriers and ground protection. Where mixing of materials is undertaken close to the RPAs, this should be on an impervious surface with no run-off to prevent chemical contamination of the RPA.

4.2.2 Installation and/or upgrading of existing services

Where possible, existing services into the site should be utilised keeping all new services outside RPA's. Where existing services within RPAs require upgrading or new services installed, care must be exercised to minimise any disturbance. As far as possible, trenchless installation should be the preferred option but if that is not possible, excavation must be by hand. **See Appendix 5:5.6**

Excavating in RPAs

4.2.2.1 At the time of writing the proposed services will not impact the RPA of the retained trees.

4.2.2.2 No dig techniques in line with NJUG 4 Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees', to be used for installation of services if installed or modified within the RPAs of any retained tree. Any work within the RPAs is to be supervised by a project Arboriculturist.

<http://streetworks.org.uk/wp-content/uploads/V4-Trees-Issue-2-16-11-2007.pdf>

4.2.2.3 Ducting services that have to be threaded through existing roots is good practice because it reduces the need to excavate in the future. Use hessian protection over roots while they are temporarily exposed to prevent sun scorch and drying.

4.3. Protection Barriers

Once any pre-construction tree management works and tree removal has been undertaken, protective fencing will be erected in line with BS 5837 (2012) to safeguard retained trees during the construction phase of the development.

4.3.1 If during construction there is a need for large plant/crane to be utilised, a meeting needs to be held between the site Arboriculturist and interested parties to discuss access and protection of the protected trees. See: **Appendix 5.4 Avoiding Damage to Stems and Branches**

4.3.2 Recommended Protective fencing will need to be in accordance with the TPP.

4.3.3 The fencing consists of a scaffold framework, well braced to resist impacts, with vertical tubes spaced at a maximum of 3m to add further stability. Onto this, weldmesh panels will be securely fixed with wire or scaffold clamps. Sensitive working methods will be required beyond the fence line, particularly when within RPA margins. Minor pruning works and/or the temporary tying back of branches may be required to facilitate implementation of temporary tree protective fencing. The protective fencing will remain in position for the duration of the site-wide construction activities.

Refer to **Appendix 5** section for further details

All-weather notices will be attached to the barriers with words such as 'Construction Exclusion Zone – No Access' Refer to **Appendix 5** section for further details.

4.4 Ground Protection

4.4.1 Excavators, dumpers and other site traffic must not be allowed to track on the Root Protection Areas (RPA) until roots are protected by the No-Dig surfacing.

4.4.2 If ground protection is required inside the RPA's the appropriate ground protection for each tree protection area is detailed below an approved by the Local Planning Authority, before work commences:-

- For pedestrian and light vehicle access, such as vans and small dumpers/excavators, where Trakmats (supplied by the Marwood Group, www.marwoodgroup.co.uk), Ground-Guards, as supplied by Greentek (www.greentek.org.uk) or similar approved, must be used. These must be interlinked and laid on top of a compressible layer of sand or woodchips of at least 150mm, laid onto a permeable geotextile as close to in line with the canopy drip line
- For heavy vehicles, such as lorries and piling rigs, and for major access points, either Tufftrak, trackpanel, as supplied by Eve Trakway (www.evetrakway.co.uk), Trackpanel (see www.groundtrax.com) or similar approved, must be used. These must be inter-linked and laid on top of a compressible layer of sand or woodchips of a least 150mm, laid onto a permeable geotextile as close to in line with the canopy drip line.

In all cases ground protection products must be laid as per manufacturers' best practice guidelines.

4.4.3 The leachate from poured wet concrete is toxic to plants and trees and must be prevented from contaminating RPAs by using an impermeable membrane to stop any leakage into the soil. For Protection as supplied by ABG: Geosynthetics. <http://www.abg-geosynthetics.com/products/rootline.html> or similar approved must be used.

4.4.4 Any soil within Root Protection Areas that is damaged must be ameliorated by manual forking once the soil has dried, incorporating a mixture of organic compost and zeolite (5-10%) into the surface soil horizon, taking care not to damage roots.

4.4.5 All excavations within the RPA (Root Protection Area) must be carried out using hand tools (spades forks and trowels) and taking care not to damage bark and wood of the roots. It is acceptable to use a pneumatic hammer carefully to break up any existing hard surface for removal. Specialist tools (air spade) may be suitable in certain situations to remove soil from around the roots. All soil removal must be undertaken with care to minimise the disturbance of roots beyond the immediate area of the excavation.

4.5: Allowance for Future Growth

4.5.1: Buildings and drainage need to be protected from above and below ground future growth. Subsidence, heave and direct damage needs to be taken into account especially in clay soils.

Direct damage:

This includes damage caused by falling branches or whole trees, the physical displacement of built structures/hard surfacing by tree roots, branches and main stems. Direct damage also includes the blocking of drains by tree roots.

Indirect damage:

This is usually associated with the abstraction of moisture by tree roots from cohesive plastic clay soil below the foundations. This process may result in shrinkage of the soil and structural instability in buildings due to foundation movement. The presence of shrinkable clays is required for this type of damage to occur.

4.5.2 Detailed guidance is given in NHBC Standards. Building Near Trees. This can be found at the following address. <https://nhbc-standards.co.uk/4-foundations/4-2-building-near-trees/>

4.6 Arboricultural Supervision and Monitoring

4.6.1 Pre-commencement site visit: A site meeting should be held by the interested parties prior to any works. All details of the tree protection measures should be discussed to ensure adherence by all parties during the works. Any modifications to the tree protection measures must be recorded and agreed in writing.

4.6.2 Arboricultural Supervision: Site visits by the project arboriculturist may be required by the local planning authority, particularly if works are proposed within the RPAs of retained trees. Once the site is active, the project arboriculturist will ensure compliance with arboricultural conditions and advise on tree problems or any modifications that may arise.

The developer must ensure that all conditions of the arboricultural method statement and any amendments are known and fully understood by all site personnel. All personnel engaged in works near trees must have access to written copies of the method statement and understand the content before working near trees.

4.6.3 Time Management Schedule

Site operations schedule after consent but before work starts	
Action	Arboricultural Input
Pre-commencement site meeting with supervising arboriculturist, site manager and LPA (Local Planning authority) representative if appropriate.	• Meeting onsite • Agree details of supervision requirements (frequency of visits) • Review of tree protection if installed • Agree any changes to CEZ (Construction exclusion zones) fencing and ground protection

Site operation before demolition/construction begins	
Action	Arboricultural Input
Tree surgery works carried out	• Completion of recommended tree pruning/removal
Installation of tree protection agreed by the LPA	• Photographs showing relevant aspects of installed tree protective measures. • Liaise with the contractor installing the protection until satisfactory completed.

Site operation schedule during demolition/construction	
Action	Arboricultural Input
Excavating/digging in the RPA	• To supervise all construction operations that take place within Root Protection Areas
Changes to the proposed build that have or may impact the tree population	• As necessary, to advise on any proposed changes, issues that arise during the works. • Report to the local planning authority, the developer or contractor. The details of each site visit must be recorded, with copies circulated to the contractor, client, landscape architect and the local authority Tree Officer if required.

Site Operation Schedule After Demolition/Construction	
Action	Arboricultural Input
Removal of barriers and ground protection	• Meeting with contractor for briefing before works starts with further supervision if necessary. • This will only be authorised once there is no risk to the RPA.
Tree population health	• To undertake a tree condition survey 2 years after completion of the project to assess tree health and condition and to make any appropriate recommendations.

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4.6.4: See Appendix 6 for The Arboricultural Watching Brief.

4.7 General

Limitations of report: This report is prepared based on the latest design layout and is intended to highlight to developers the constraints imposed on the site by the existing tree population and potential conflicts whilst providing guidance on the techniques required to ensure the long-term health of retained trees. The content may require revision if the design layout is altered and/or as the scheme evolves.

Arboricultural Standards: Any tree works should be done in accordance with the British Standard Recommendations for Tree work, BS 3998 as modified by later research. Works should be undertaken by properly qualified and experienced tree contracting company as recommended by a local authority or one approved by the Arboricultural Association.

4.8 Legal & Planning Constraints

Tree Protection Orders and Conservation Area

The Town and Country Planning (Tree Preservation) (England) Regulations 2012 allows for trees either as groups, or individuals, or as woodlands, to be protected by Tree Preservation Orders (TPO). These have the effect of preventing the cutting down, topping, lopping, uprooting, wilful damage or wilful destruction of trees except in certain circumstances, other than with the consent of the local planning authority.

A Conservation Area is an area designated by the Local Planning Authority as one of “special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance”. Special controls exist with regard to demolition and alteration of buildings; Listed Building Consent must also be obtained for any demolition, even if the building is not itself listed. Similarly, trees are given some protection with the requirement for the local authority to be given six weeks written notice before carrying out any work on trees; this gives the authority time to decide if a TPO is necessary.

Wildlife

Protected Wildlife – Before any tree work is carried out on site the trees should be inspected and written records taken of the activity of any protected species on site. This is to prevent the damage to any wildlife. Under the Wildlife and Countryside Act 1981 it is an offence to destroy or disturb nesting birds, if nesting birds are discovered or suspected no works can proceed and the Local Planning Authority (LPA) and Local Wildlife Trust must be notified for advice as to how to proceed. Further to this wildlife such as Bats are protected under European legislation (Countryside and Rights of Way Act 2000 and The Habitat Regulation 2009) it is an offence to recklessly, or intentionally, kill, injure or capture bats, to disturb them, or destroy, obstruct or damage any bat roosts found. If any bat activity is found then the bat conservation trust should be contacted as soon as possible (<http://www.bats.org.uk/> or 0845 1300 228).

Credentials of the author

The tree condition survey and report was conducted by Trevor Osborne BSc (Hons) Dip Arb L4 (ABC) PTI. He has 18 years' experience in the arboricultural industry.

Caveat

Any and all information supplied to Naturally Trees Ltd by/on behalf of the client is assumed to be accurate unless otherwise informed. This advice is limited to the observations made on the date of inspection as detailed herein and any deletion, editing or alteration will result in the advice being null and void in its entirety. This advice in its entirety may be deemed null and void if remedial works are undertaken on any area of the site, on or after the date of the survey. No liability is assumed by the author or by Naturally Trees Ltd for any misuse, misinterpretation or misrepresentation of this advice. This advice is not valid in adverse or unpredictable weather conditions or for any failure due to 'force majeure' or unpredictable events. No responsibility is assumed either by the author of this advice or by Naturally Trees Ltd for any legal matters that may arise as a consequence. Neither the author nor Naturally Trees Ltd will be required to attend court or give testimony as part of this agreement. The responsibility for any works undertaken on the basis of the recommendations of this advice does not form part of this agreement.

Signed



Date: 21st April 2026

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Appendix 1:

Visual Tree Assessment (VTA)

The VTA system is based on the theory of tree biology and physiology, as well as tree architecture and structure. This method is used by arborists to identify visible signs on trees that indicate good health, or potential problems. Symptoms of decay, growth patterns and defects are identified and assessed as to their potential to cause whole-tree, part-tree and/or branch failure. For the purpose of this report, elements of the VTA system will be used, along with industry standard literature, and other relevant studies that provide an insight into potential hazards in trees. This assessment is a snapshot of what could be reasonably seen or determined from a basic visual inspection.

Whilst every effort is made to ensure an accurate assessment of the trees condition is made during survey no responsibility can be taken for resultant damage or injury occurred by a failing tree. The survey only gives a snap shot of what is visible, not obscured or accessible on the day of survey. Please note that the findings of this report are only valid for 12 months from the date of the tree inspection. This report does not constitute to a full tree safety policy for the study area nor does it take into account any underground geological activity that may affected the structural condition of the trees.

Health and Vigour Assessment

The health and vigour of a tree is assessed by looking at the tree canopy and how it is performing. Certain indicators provide information on which to base the assessment. Abnormally small leaves, chlorosis (yellowing), sparse crown, wilting, and die-back can be signs of ill-health or decline but may also be related to a temporary imbalance due to drought or pest infestations. Epicormic growth can be a sign of stress and low energy reserves but can also be related to increased light levels through the removal or pruning of adjacent trees. Extension growth can be a good indicator of vigour but this can vary greatly between species and under differing climatic conditions. For these reasons, each individual symptom or observation needs to be assessed with objectivity and consideration of all available information.

Structural Assessment

The structural assessment of trees is carried out using the basic framework of Visual Tree Assessment. Signs and symptoms of defects are assessed to gauge the likelihood of failure, because not every defect constitutes a hazard e.g. "...co-dominant stems are a structural defect. The severity of the defect is increased by included bark, large crowns and strong wind." (Matheny, N. & Clark, J. 1994.) If trees were removed purely on the basis that there were defects present without assessing the likelihood of failure or whether practical mitigation measures are available, the urban forest would cease to exist. A basic visual tree assessment is undertaken from ground level, if defects are suspected further investigation may be required and recommended. "When using the visual Tree Assessment (VTA) procedure for assessing trees, as the suspicion increases that defects are present, the examination becomes more thorough and searching." (Mattheck, C. & Broeler, H. 1994)

"Some defects, especially some forms of decay, do not give rise to external signs and therefore tend to escape detection in a purely visual survey. If there is no reason for suspecting a hidden defect to occur within a particular part of the tree, there is no reasonable basis for carrying out a detailed internal assessment. Although in theory an unsuspected defect might be detectable by the use of

specialized diagnostic devices, this would be impracticable in the absence of some external sign to indicate the place which should be probed. Also, internal examination without good reason is undesirable, as it usually causes injury to the tree and is unreasonably time consuming and costly."
(Lonsdale. 1999)

Appendix 2 Tree Survey Results

Tree/ Group No.	Species	Height (m)	Stem Diam. at 1.5m (mm)	Branch Spread (m)				Canopy Clearance (m)	Age Class	Observations	Management Recommendations	Estimated Remaining Contribution (years)	BS 5837 Category Grading	Protection Distance (m)	Root Protect. Area (m2)
				N	S	E	W								
T1	Ash	9	390	3	3	3	3	3.00	Semi Mature	Average vitality, nice balanced canopy		<10	C1	4.7	69
T2	Red Oak	9	410	3	3	3	3	3.00	Semi Mature	Good vitality, slight eastern lean		40+	B1	4.9	76
T3	Lombardy Poplar	21	810	1.5	0	0	1.5	4.00	Mature	Evidence of decay at base tracking up main stem		<10	C2	9.7	297
T4	Lombardy Poplar	21	1105	2	2	2	2	4.00	Mature	Heavily clad in Ivy average vitality		10-30	C2	13.3	552
T5	Lombardy Poplar	2	725	2	2	2	2	4.0	Mature	Good vitality, no sign of decay		20-40	C2	8.7	238
T6	Hawthorn	5	310	2.5	2.5	2.5	2.5	1.5	Semi Mature	Good vitality, average tree		20-40	C2	3.7	43
T7	Lime	17	1850	6	6	6	6	4.0	Mature	Considerable amount of epicormic growth around lower main stem, aerial deadwood present. Good vitality		20-40	B1	22.2	1548
T8	Coniferous Spp	21	700	5	5	5	5	1.5	Mature	Good vitality and balance canopy		20-40	C1	8.4	222
H9	Laurel	2	100	1	1	1	1	0.5	Semi Mature	Good vitality, offering screen good screening		40+	B2	1.2	5
H10	Mixed native hedge	2.5	100	1	1	1	1	0.5	Semi Mature	Good vitality, offering screen good screening		20-40	B2	1.2	5
H11	Field Maple	2	100	1	1	1	1	0.5	Semi Mature	Good vitality, offering screen good screening		20-40	C2	1.2	5
H12	Hawthorn	2	100	1	1	1	1	0.5	Semi Mature	Good vitality, offering screen good screening		20-40	B2	1.2	5

Appendix 4 Tree Survey Key

4.1 Tree details have been added to the plan received which is included as Appendix A. Tree locations have been taken from the topographical survey provided. Where not included on the topographical survey, they have been determined by measuring distances from features shown on the plan, using a laser measuring device.

The following information was recorded for each tree, and is shown in the Tree Schedule included as Appendix B:

Number: an identity number for each tree, prefixed with a "T", which cross references locations shown on the plan with the schedule in Appendix B. Where a number of trees, normally of the same species, are located close together and are similar in character and requirements, they have been treated as a Group under a single Number, prefixed with a "G".

Species: common name.

Tree height: approximate height in metres.

Stem diameter: diameter in millimetres, taken at 1.5m above ground. Where there are a number of stems, stem diameters are recorded in the condition column.

Branch spread: approximate spread in metres to N,S,W and E of the trunk. The approximate branch spread is drawn on the plan.

Canopy clearance: approximate height of the canopy above ground. Where a significant, low lateral branch is present, its height and direction of growth is included in the Condition column.

Age class: Young, Semi-mature, Early mature, Mature, Over-mature, Veteran.

Observations: Concise overview of health and condition of tree.

Management Recommendations: Recommended works if required.

Estimated Remaining Contribution (years): Approximated remaining safe useful life span

Protection Distance (m): Root protection area distance from the trunk of the tree.

Management Recommendations: Recommended works if required.

BS5837 Category Grading: See 4.2 table below.

4.2 Tree categorisation in relation to 5837:2012 'Trees in Relation to Design, Demolition and Construction – Recommendations'

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	- 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 <i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i>			See Table 2
	1 Mainly arboricultural qualities	2 Mainly landscape qualities	3 Mainly cultural values, including conservation	
Trees to be considered for retention				
Category A Trees of high quality with an estimated remaining 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)	See Table 2
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 the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do 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	See Table 2

BRITISH STANDARD

BS 5837:2012

Appendix 5 Tree Protection

5.1 Pre-commencement Site Meeting.

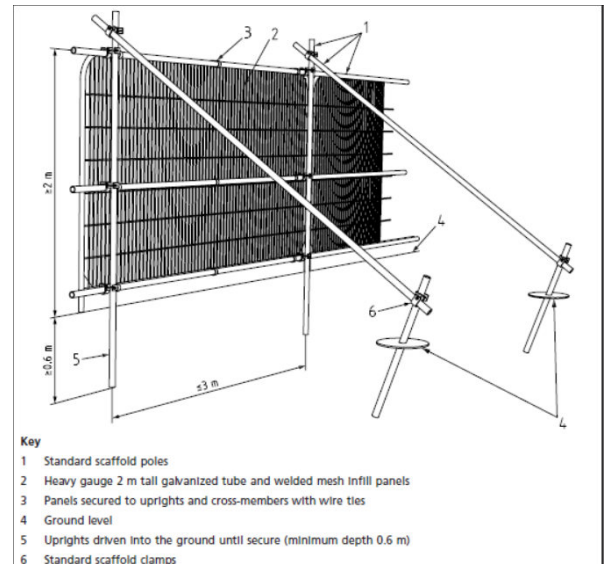
A pre-commencement site meeting is advised prior to any works commencing on site, to agree all the approved processes with the relevant concerned parties.

5.2 Protective Fencing and Ground Protection.

5.2.1 All trees to be retained on site should be protected by barriers and ground protection where applicable. Barriers should be in place before any materials or machinery is brought onto site. Once in place, barriers and ground protection should be considered sacrosanct and should not be altered or removed without prior recommendation by an arboriculturist and approval of the local planning authority. Barriers should be fit for excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). Barriers should be maintained to ensure that they remain rigid and complete.

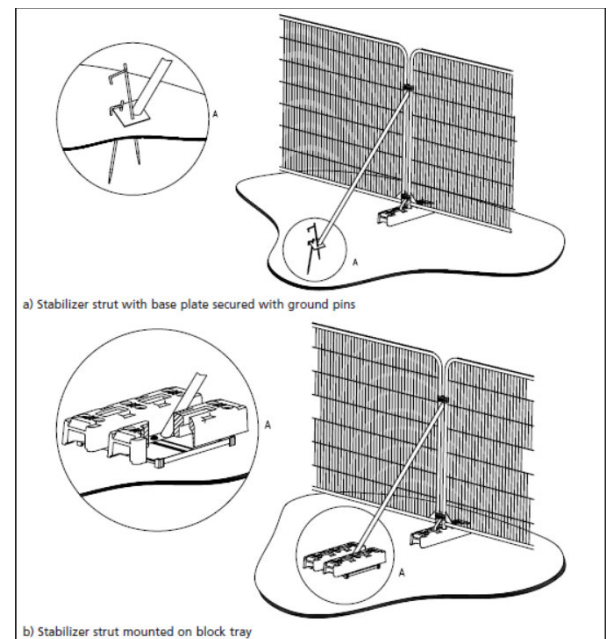
5.2.2 The protective fencing is to be erected prior to any site works or demolition works.

5.2.3 The barrier is to comprise of a vertical and horizontal framework, well braced to resist impacts, with vertical tubes spaced at a maximum interval of 3m. Weldmesh panels, such as Heras, should be securely fixed with wire or scaffold clamps to this framework. Weldmesh panels on rubber or concrete feet are not resistant to impact and should not be used. Care should be exercised when locating the vertical poles to avoid underground services and, in the case of the bracing poles, also to avoid contact with structural roots. If the presence of underground services precludes the use of driven poles, an alternative specification should be prepared in conjunction with the project arboriculturist that provides an equal level of protection. Such alternatives could include the attachment of the panels to a freestanding scaffold support framework.



5.2.4 Where retained trees are in close proximity to the existing buildings, a higher specification hoarding will be required to prevent damage from falling rubble. In place of the weldmesh, panels solid hoarding should be used, for example, scaffold boards.

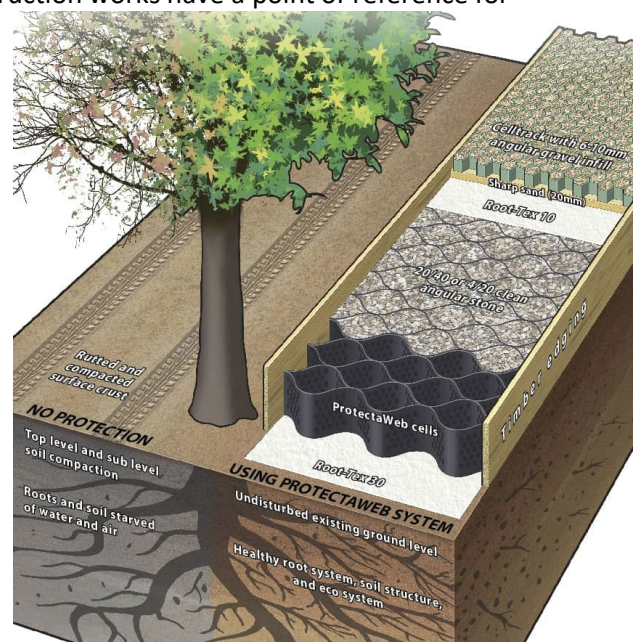
5.2.5 Where the site circumstances and associated risk of damaging incursion into the RPA do not necessitate the default level of protection, an alternative specification should be prepared by the project arboriculturist and, where relevant, agreed with the local planning authority. For example, 2 m tall welded mesh panels on rubber or concrete feet might provide an adequate level of protection from cars, vans, pedestrians and manually operated plant. In such cases the fence panels should be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The distance between the fence couplers should be at least 1 m and should be uniform throughout the fence. The panels should be supported on the inner side by stabilizer struts, which should normally be attached to a base plate secured with ground pins. Where the fencing is to be erected on retained hard surfacing or it is otherwise unfeasible to use ground pins, e.g. due to the presence of underground services, the stabilizer struts should be mounted on a block tray.



5.2.6 It is advised that a plan be pinned up on site in highly visible areas such as in the site huts so that all ground staff involved in the demolition and construction works have a point of reference for tree protection issues. All demolition and construction workers should be briefed on the importance of tree protection prior to works commencing. Special attention must be paid to ensure that protective fencing remains rigid and complete during the course of all works.

Where it is agreed that vehicular or pedestrian access for construction purposes is necessary within the RPA, ground protection measure will be required to prevent damage to the soil structure within the RPA.

5.2.7 For pedestrian access within the RPA, the installation of ground protection in the form of a single thickness of scaffold boards over a compressible layer laid onto a geotextile, or supported by scaffold, is likely to be acceptable.



5.2.8 For wheeled or tracked vehicle, access within the RPA the ground protection should be designed by an engineer to accommodate the likely loading and may involve the use of proprietary systems or reinforced concrete slabs. The structure must use a no dig design to prevent root severance and must prevent localised soil compaction by distributing the load across the track width. Such a system may include the use of three dimensional cellular confinement systems (CCS) as a component of the sub-base, to act as a load suspension layer.

5.2.9 New permanent hard surfacing should not cover in excess of 20% of the RPA or be wider than 3m within it; it should be constructed to be permeable to moisture and gas.

5.3 Construction Exclusion Zone

Once the construction exclusion zone (CEZ) has been protected by barriers and/or ground protection, demolition/construction can take place.

5.3.1 Inside the Construction Exclusion Zone (CEZ) of the protective fencing, the following prohibitions shall apply:

- No mechanical digging or scraping
- No hand digging
- No storage of plant, equipment or materials
- No vehicular or plant access
- No fire lighting
- No washing down of vehicles or machinery
- No handling, discharge or spillage of any chemical substance, including cement washings
- No action likely to cause localised waterlogging
- No change in ground levels
- No construction of a hard surface
- No earthworks

5.3.2 In order to inform site personnel of the purpose of the fencing, information notices shall be fixed to the fencing at 5m intervals. These notices shall be of all-weather construction and replaced as and when necessary.

5.3.3 In addition to the above, further precautions are necessary adjacent to trees outside the CEZ:

- Materials that will contaminate the soil, e.g. concrete mixing, diesel soil and vehicle washings, should not be discharged within 10 metres of the tree stem. This should take into consideration the topography of the site and slopes to avoid materials such as concrete washings running towards trees.
- Fires should not be lit in a position where their flames can extend to within 5m of foliage, branches or trunk. This will depend on the size of the fire and the wind direction.
- Notice boards, telephone cables or other services should not be attached to any part of the tree.

5.4 Avoiding Damage to Stems and Branches

5.4.1 Site operations should be planned to ensure that wide or tall loads or plant with booms, jibs and counterweights, could operate without coming into contact with retained trees. Mechanical damage from large plant can be significant and make their safe retention impossible. Any transit or traverse of plant in close proximity to trees should be conducted under the supervision of a banksman to ensure adequate clearance from trees is maintained at all times.

5.4.2 If the use of a tower crane is necessary, its location will be predetermined and agreed in writing by the Local Planning Authority, and its operation and movements supported by a detailed Method Statement.

5.5 Reporting Damage to Trees and Protective Fencing

5.5.1 In the event of any damage to trees scheduled for retention, the damage should be reported to the site agent immediately. The site agent shall report up the chain of responsibility to the project arboriculturist or in the absence of such an appointment to an appropriately qualified arboriculturist, to enable remedial measures to be carried out immediately and if possible.

5.5.2 Should protective fencing be damaged to impair its function, all work shall cease near the damage until the fence has been returned to standard.

5.6 Excavating in RPAs

5.6.1 All excavations must be carried out using hand tools (spades, forks and trowels) and taking care not to damage bark and wood of the roots. It is acceptable to use a pneumatic hammer carefully to break up any existing hard surface for removal. Specialist tools (air spade) may be suitable in certain situations to remove soil from around the roots. All soil removal must be undertaken with care to minimise the disturbance of roots beyond the immediate area of the excavation.

5.6.2 Where a mass of flexible roots is encountered, it may be possible either to displace the roots to another location temporarily or permanently to avoid areas of excavation.

5.6.3 Exposed roots to be removed should be cut cleanly with a sharp saw or secateurs approximately 20cm back from the face of the final excavation.

5.6.4 Roots that are exposed temporarily should be protected from drying out, direct sunlight and extremes of temperature by suitable covering.

5.6.5 Roots greater than 2.5cm diameter should be retained where possible; roots up to 10cm diameter should only be cut in exceptional circumstances and roots greater than 10cm should only be cut after consultation with the appropriate supervising officer.

5.6.6 Working within RPAs requires a high level of care to ensure the long-term potential of the trees. Qualified supervision is vital to minimise the risk of misinterpretation. Site personnel must be properly briefed before work commences and ongoing work should be regularly inspected by an arboriculturist to confirm compliance by the contractor.



5.7 Removing Surfacing in RPAs

5.7.1 Roots are frequently found beneath or adjacent to existing surfacing or built structures and care is needed. Damage to the roots may be by direct physical damage or compaction of the soil from the weight of plant and machinery or repeated pedestrian movement. This is generally not a problem whilst surfacing is in place as the load is spread and additional protection is not required. However, once the existing surface is removed and the soil below exposed significant damage can occur to the soil structure and directly to the roots in a very short time.

The following rules must be followed:

- No vehicular activity or repeated pedestrian access into the RPAs unless on existing hard surfacing or custom designed ground protection, this must be designed for anticipated loads.
- Regular vehicle and pedestrian access routes must be protected from compaction by temporary ground protection.
- RPAs exposed by the works must be protected as set out in BS 5837:2012 until there is no risk of damage from construction activity.

5.7.2 Appropriate tools for manually removing debris may include a pneumatic breaker/drill, crow bar, sledgehammer, pick, mattock, shovel, spade, trowel, fork and wheelbarrow. Secateurs and a bow saw must be available to deal with any exposed roots that have to be cut.

5.7.3 Machines with a long reach may be used if they can work from outside RPAs or from areas protected by ground protection designed for the loading within the RPA.

5.7.4 Debris to be removed from RPAs manually must be moved across existing hard surfacing or temporary ground protection to prevent compaction damage. If possible, leaving below ground structures in place should be considered if their removal may cause excess root disturbance.

5.8 Installation of New Surfacing in RPAs

5.8.1 New surfacing is potentially damaging to trees as it may require changes to existing levels, result in localised soil structure damage and disrupt the exchange of water and gases in and out of the soil.

5.8.2 Mature or older trees are more sensitive to this type of damage than younger trees. Potential adverse impacts on the trees can be minimised by limiting the extent of these changes.

5.8.3 The most suitable surface will be porous to allow the relatively free movement of gas and water and load spreading to limit compaction damage. The actual specification is an engineering issue that has to be considered in the context of the loadbearing capacity of the soil; this element requires specialised input from the appropriate professional.



5.8.4 The actual location and depth of roots is unpredictable and will only become clear once excavation starts and following the guidance in section 5.7 above. Ideally, all new surfacing in the RPAs will be no dig, but this is rarely possible on undulating surfaces.

5.8.5 New surfacing generally requires an evenly graded sub-base which can be made up to any high points with granular, permeable fills such as crushed stone or sharp sand; this sub-base must not be

compacted as in a normal installation. Some limited excavation is usually necessary to achieve this and need not be damaging to the tree if carried out with care and avoiding cutting large roots.

5.8.6 Tree roots generally do not occupy the top 5cm of soil so the removal of a turf layer need not cause root damage. It may be possible to dig to a greater depth with care and dependant on local conditions.

5.8.7 On undulating surfaces, finished levels must be carefully planned and flexible enough to allow on-site adjustment if excavations reveal large roots. Roots of 2.5cm diameter and less can normally be cut without a significant impact on the tree and the minimal 5cm depth can be used. If roots larger than 2.5cm diameter are encountered and it is considered inappropriate to cut them by a suitably qualified professional, the surrounding levels must be adjusted to take into account the high points by infilling with a suitable material.

5.8.8 Generally, the construction of hard surface access within the root protection area is to be that of a 'no-dig' design to avoid root loss due to excavation. In addition, the structure of the hard surface should be designed to avoid localised compaction, evenly distributing the carried weight over the track width and wheelbase of any vehicles that will use the access. The design will be based on a cellular confinement system as an integral component of the sub-base, to act as a load suspension layer.

5.8.9 The finished surface will be either a granular material, permeable and gas-porous finished surface (wearing course) to allow moisture infiltration and gaseous diffusion. It is essential to maintain adequate supplies of water and oxygen for trees through the soil. Porosity is important particularly where the new hard surface covers an area of previously unmade ground, under which tree roots may have developed preferentially.

5.8.10 No-fines granular materials should be used wherever fill or a sub-base is required to help to ensure adequate gaseous diffusion. Excess water in the root protection area should be avoided, particularly on clay soils where water logging can occur. In these cases, the hard surface should slope away from the tree to avoid ponding. Provided surface water is not liable to be contaminated by salt or toxic run-off from oil or petrol, a permeable surface should be employed.

5.8.11 Washed gravel. Washed gravel retains its porosity unless excessively consolidated, and is particularly useful where changes of level occur, or an irregular shape is needed around the stem of a tree. Gravel is easily renewed or topped up. Although weeds may become established, they can be controlled by chemical or mechanical means. However, gravel is rarely suitable for use where there is vehicle or pedestrian traffic for example, in residential areas. Materials with high fines content, such as binding gravels or hogging, should not be used due to their almost impermeable texture when consolidated.

5.8.12 Paving slabs and block pavers. Paving slabs and block pavers are available with built in infiltration spaces between the slabs or blocks. These are ideal, though they should be laid dry-jointed on a sharp sand foundation to allow air and moisture to penetrate to the rooting area.

5.8.13 Graded Soil. Sufficient spoil shall be placed along the edge of the area to receive Geoweb, suitably graded away from the works in order that it may be pulled in later. This eliminates the need to transport soil over the finished surface. The spoil (E.g. Heicom sand) shall be graded into the finished structure at the end of the scheme.

5.9 Micro Piling vs Screw Piling

Local Planning Authorities will often allow buildings or structures to be built within an RPA if they are supported by Micro Piles or Screw Piles.

There are many different forms of Micro Piles in use in the UK, mainly manufactured from steel or concrete or a combination of the two. They are typically pre-fabricated and driven in (using a percussion rig or vibratory action), or preaugured and cast in situ. Micro piles provide an excellent foundation system in the correct situation.

Installing virtually any type of micro pile will create a hole up to 300mm diameter to the required depth which involves fully displacing or removing soil or tree roots in the intended pile location. This creates a suitable hole to allow a pile to be driven in or cast into place but at the expense of root damage.

Screw piles are a far less invasive foundation system. A screw pile consists of a slender, hollow steel shaft with a small number of steel helices (or screw threads) welded to it. As an indication, the largest screw pile offered by Ultimate Screw Piling Ltd – the 76R - has a pile shaft outer diameter of 76mm, a maximum helix diameter of 350mm, a maximum helix thickness of 20mm but can support 20 tonnes as standard.

Installing screw piles is a smooth and steady process whereby screw piles are rotated into the ground using a handheld or excavator mounted torque head. Installation occurs at a constant speed, inducing no vibration and requiring no pre-auguring.

A screw pile displaces a comparatively small amount of soil & tree roots compared to a traditional micro pile. The helices attached to the screw pile shaft are deliberately made from thin steel plate, with a blunt protruding edge to ensure that where possible, roots are moved out of the way during installation rather than severing them. The pile shaft is considerably smaller than that of a micro pile so again, displacement of soil and tree roots is minimised.

5.9.1 Screw Piles: Keeping root damage to an absolute minimum

Clearly there is no way that a pile can be installed through an existing root system without causing some damage, however it is key to the health of the tree to minimise this effect as much as possible. As previously discussed, micro piling requires the removal of all material in the position of the pile, including any tree roots encountered. Based on experience from years of pile installation, screw piling has been found to leave a good proportion of the tree roots intact following installation. It has been argued that screw pile installation acts to aerate the soil in which it penetrates, which has the added benefit of increasing oxygen supply to the root system.

Compression of soil containing tree roots by traditional foundations has been shown to have a detrimental effect on the continued health of the tree. Compaction of soil reduces the passage of oxygen to roots during wet weather, and can cause the soil to become so dense that roots are no longer able to penetrate through it. Screw piles overcome this by supporting load directly on their constituent helices. These are placed well below the tree roots to ensure the root ball does not experience any loading influence or disturbance as a result of development.

5.9.2 Additional benefits of using screw piles

When installed as a deep foundation (4m+), screw piles are resistant to water movement in the soil (heave/shrinkage) experienced as a result of water uptake from the soil by the tree and therefore are ideally situated for use in high volume potential clays. Installing screw piles as an alternative to deep footings in such soils is often considerably cheaper.

Screw Piles are installed to a predetermined torque during the installation process. A well-established relationship exists between installation torque achieved and the final load capacity of the pile, so the final capacity of the pile can be calculated quickly on site. As no further pile testing is

required once the pile is in the ground, there is no need to place the tree at further risk of damage through the use of testing equipment.

No heavy plant is needed to install a screw pile (unlike the equipment required for concrete driven piles or similar where large rigs are required). Our excavator mounted torque head (capable of installing piles with a SWL of 250kN (factored)) can be operated from a long reach excavator, which ensures that the root ball experiences no loading as a result of pile installation.

Typically screw piles are used in combination with a cast concrete ground beam system / Steel ring beam and Block and Beam System. This system is generally flexible enough to allow pile to be adjusted on site if any large tree roots are encountered and need to be avoided.

5.9.3 Screw Pile Installation Method

The typical screw pile installation method is described briefly below for reference.

1. Clear away vegetation in the area to be piled and check for underground cables, drains, pipes using appropriate equipment. Identify any major tree roots to be avoided in the intended pile locations.
2. Mount the powerhead to the excavator, remembering to connect the auxiliary hydraulics to the powerhead as per the detailed instructions supplied. Check for correct operation
3. Insert the upper end of the screw pile lead section into the anchor driver & secure with the drive pins supplied.
4. Position the anchor at the desired location and at a near vertical position screw the first helix into the ground.
5. When the first helix is buried, begin to make the angular adjustment to maintain verticality. Remember that final angular adjustments should be made before the second helix penetrates the ground.
6. When the installing tool becomes 300mm-500mm from the ground disconnect it from the section in the ground and reconnect it to the next extension.
7. Align the extension with the section in the ground and bolt them together. (Make certain that the bolt and nut are securely tightened)
8. Continue to drive the anchor and add extensions until the desired torque is reached and maintained; and the pile is installed to the correct depth and required height. It may be necessary to cut the pile to the desired length if it cannot be driven to a suitable depth in the ground.
9. Attach the terminations.

Appendix 6 Arboriculture Watching Brief

ABORICULTURAL WATCHING BRIEF:

Remove this sheet from the report, copy it and keep it on file and displayed within the site cabin.

Jobs to be initialled and dated on an on-going basis throughout the project. Site Agent to remain in close communication with the Project Arboriculturist.

No.	Job	Date	Site Agent	Arboriculturist	Architect /Engineer
1.	Sit meeting with all parties to review and ensure understanding of Arb Method Statement. Tree Protection Plan and Arb method Statement to be available for inspection by any persons involved with the development. This "Watching brief" to be signed and dated by all relevant parties.				
2.	Tree Surgery works to be undertaken in accordance with the specification of works in the arb method statement.				
3.	Tree Protection Fencing and ground protection to be erected in accordance with the Tree Protection Plan. Tree Protection Plan to be pinned up in site office.				
4.	Designate material storage area, contractor parking and areas for site cabins.				
5.	Site agent to inform all contractors and sub-contractors about the role of the protective fencing and ground protection to ensure they understand its importance.				
6.	Construction phase: All fencing to remain in place and in good condition. - Report any damage to fencing. - Excavation of investigative trench to determine foundation type. Any damage to trees to be reported to enable remedial works to be carried out.				
7.	Landscaping phase.				
8.	Removal of protective fencing and ground protection.				
9.	Assessment of the trees post construction and a specification for remedial tree works compiled and submitted to the Local Planning Authority for their written agreement if necessary.				
10.	END OF PROJECT				

Appendix 7 Photos