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Arboricultural Assessment

(Incorporating Arboricultural Impact Assessment and
 Tree Protection measures in accordance with BS5837:2012)

Project: Summerhill Farm

On behalf of: Nigel Thorns Associates

Date: August 2016

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Wild Vision
Productions Ltd

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Executive Summary

An Arboricultural Assessment detailed within this report has been undertaken by Pearce Environment Ltd in accordance with BS5837:2012 '*Trees in Relation to Design, Demolition and Construction*' on behalf of Nigel Thorns Associates. This report has been prepared to inform a planning application for the construction of 73 residential units and associated highway access arrangements. The site is centred on approximate Ordnance Survey Grid Reference SJ 310 533.

The application area comprises of three fields of pasture, a compartment of mature board leaved trees and a series of single storey flat roofed stables. An existing track provides access from Summerhill Road.

An Arboricultural Impact Assessment has been prepared with reference to the Site Layout (**Appendix 1**) to assess the potential impacts on trees. Appropriate tree protection measures are required to provide successful tree retention detailed in **Section 5 & 6**.

The assessment identified the removal of three tree groups, one hedgerow and three individual trees to accommodate the development and highway access arrangements. With the exception of two B grade trees of moderate quality and value, all of those items proposed for removal are considered to be of limited arboricultural value.

The design process has taken into account the current tree stock with particular consideration to incorporate all 'A' and 'B' grade trees of high/moderate quality and arboricultural merit. Where unavoidable, mitigation measures have been proposed to meet a satisfactory juxtaposition between the tree stock and the proposal.

Numerous benefits will arise from the proposed development, primarily new tree and hedgerow planting. New planting incorporated into the design will actively increase the quantity, diversity and range of age classes of trees on site thereby strengthening all aspects of the tree stocks demographic.

Section 1

Introduction

- 1.1 Pearce Environment Ltd were commissioned by Nigel Thorns Associates to undertake a *BS5837:2012 Trees in Relation to Design, Demolition and Construction* compliant survey at a parcel of land parcel of land referred to as Summerhill Farm (hereafter referred to as 'the site'). The site is centred on approximate Ordnance Survey Grid Reference (OSGR) SJ 310 533.
- 1.2 This report sets out the findings of the Arboricultural Assessment undertaken on the 21st July 2016. An assessment of the potential impacts of the proposed development of the site on the current tree stock has been undertaken with recommendations and appropriate tree protection measures detailed, to ensure the successful retention of trees.
- 1.3 The findings of this report have been used to inform a planning application for the construction of 73 residential dwellings and highway access arrangements.
- 1.4 The aims of this report are to:
- Record and present the findings of the tree survey in accordance with BS5837:2012, identifying necessary tree works to maintain a safe and healthy tree population.
 - Present those arboricultural constraints pertinent to the development proposals.
 - Seek a satisfactory juxtaposition between the trees and new development by detailing tree protection measures, mitigation and compensation where necessary; and
 - Identify opportunities for the proposed development to provide enhancements to the tree stock within the site.
- 1.5 This report does not;
- Provide a detailed structural inspection of each tree surveyed. A lack of recommended work does not imply that a tree is safe, likewise it should not be implied that a tree will be made safe following completion of any recommended works;
 - Provide an assessment of the soils and the potential for those trees onsite to cause subsidence issues at present or in the future following development.

Section 2 Methodology

- 2.1 This section summarises the methodologies used during the tree survey which is based on the guidelines detailed in Section 4.4 'Tree Survey' of *BS5837:2012 Trees in Relation to Design, Demolition and Construction*,
- 2.2 The tree survey was undertaken on the 21st July 2016 by Douglas Williams, who holds an MSc in Biological Recording; the Arboricultural Association Professional Tree Inspection Certificate; the Royal Forestry Society Certificate in Arboriculture and is a Professional Member of the Arboricultural Association.
- 2.3 The tree survey includes all trees within the site and other significant vegetation with a stem diameter of >75mm at 1.5m above ground, referred to as diameter at breast height (dbh). In addition to those trees located beyond the boundaries within a distance of 12 times their stem diameter have also been recorded. The position of each item is represented in **Plan 1**, derived from the topographical data included as **Appendix 2**. Those items not recorded on the topographical survey have been annotated by hand and marked using the symbol *.
- 2.4 All numbering of surveyed items is sequential with trees given the prefix 'T' hedgerows the prefix 'H' groups of trees the prefix 'G' and Woodlands the prefix 'W'. **Schedule 1** contained at the rear of the report provides details of each item surveyed.
- 2.5 All trees have been visually inspected from ground level, with no climbing or further detailed investigative tests being undertaken. All measurements are metric and have been recorded in accordance with Section 4.4.2.5 of BS5837:2012. Where access to trees has been restricted, either as a result of vegetation, ground conditions or third party land ownership, dimensions have been estimated and highlighted using symbol # in **Schedule 1**.
- 2.6 All items have been categorised in accordance with the 'Table 1 Cascade Chart for Tree Quality Assessment' given in BS5837:2012. This framework provides a qualitative method in which trees can be categorised in terms of their health, amenity value and long-term contribution to the site summarised in **Table 2.1** below.

Table 2.1: Summary of Cascade Chart for tree quality assessment

Category and definition	Criteria
Category U	Those trees in such a condition that they that cannot be realistically retained as a living tree in the context of the current land use for longer than 10 years. If they cannot be safely retained as an ecological receptor following proposed remedial works, these trees should be removed for arboricultural reasons followed by appropriate replacement planting.
Category A (High quality and value)	Trees with an estimated life expectancy of at least 40 years. These trees may be of particular good example of their species or contribute an

Category and definition	Criteria
	important visual landscape feature or provide significant historical/conservation value.
Category B (Moderate quality and value)	Trees with an estimated life expectancy of at least 20 years. Trees which may be included within category A but are downgraded due to the presence of significant but remedial defect. May also include trees present in such numbers that they form a distinctive landscape feature i.e. woodland, or tree of a material conservation/cultural value.
Category C (low quality and value)	Trees with an estimated life expectancy of at least 10 years. Generally regarded as an unremarkable specimen of its species or of such an impaired condition that they do not qualify for higher categories providing little landscape/conservation or cultural value.

Tree Work Priority Codes

- 2.7 Priority codes from 1 to 3 have been given for those trees requiring tree works detailed in **Table 2.2** below. The definition and level of urgency have been determined based on the perceived likelihood of failure and potential/actual targets.

Table 2.2: Tree Work Priority Codes

Priority Code	Description
Priority Code 1	An identified hazard considered to pose an imminent or serious risk to person or property in the context of the current land use. Works should be undertaken at the earliest possible opportunity.
Priority Code 2	Works considered necessary to mitigate a perceived hazard from an observed and recorded defect. These tree works should be undertaken prior to any development works commencing on site.
Priority Code 3	Considered to be general maintenance works which should commence post development but prior to residential occupancy.

Limitations

- 2.8 Trees are dynamic structures and can never be considered 100% safe, even those in good condition can become compromised during extraordinary circumstances or rapid decline following the infection of pathogen/disease. Regular inspection of the tree stock should be undertaken to identify potential defects/hazards before they become acute.

Section 3

Results and Design Constraints

Site Description

- 3.1 The site is located upon the southern fringes of the settlement of Summerhill and comprises of three fields of pasture, which meet a mature broad leaved woodland to the west. The main access track leading from Summerhill Road meets a complex of flat roofed stables in the centre of the site. Within the northern compartment of the site lies a small subsection of large broad leaved trees. The site meets existing residential development to the north, east and south.

Image 3.1 Generic view of the main body of the site looking towards the western boundary.



Image 3.2 Wooded compartment to the north to be retained in situ.



Tree Preservation Orders/Conservation Areas

- 3.2 At the time of the arboricultural assessment it was undetermined as to whether those trees surveyed are the subject of a Tree Preservation Order or fall within a Conservation Area. Written consent must be given by the Local Planning Authority prior to any works upon a tree subjected to statutory protection.

Forestry Act 1987

- 3.3 A felling licence is required whereby an excess of 5 cubic metres of timber is felled per calendar quarter. Exception to the Forestry Act 1967 include felling trees which when measured at 1.3m above ground level;
- Have a stem diameter of 8cm or below
 - Thinning of trees with a stem diameter of 10cm or below
 - Coppicing of trees with a diameter of 15cm or below
- 3.4 Exceptions are also afforded to work carried out by statutory undertakers; removal of dangerous/dead trees, prevention of abatement of a nuisance and to prevent the spread of quarantined pest or disease in accordance with a notice served by a Forestry Commission Plant Heath Officer.

- 3.5 Whereby full planning permission is authorised both statutory obligations above are no longer applicable, transcended by the Town and Countryside Planning act (1990) which permits tree removal for the purpose of development.

Protected Species

- 3.6 All species of British bat are listed as an European Protected Species (EPS) on Schedule 2 of the Conservation Regulations (Annex IV(a) to the Habitats Directive). This affords them strict protection under the Conservation of Habitats and Species (Amendment) Regulations 2010, making it an offence to:

- Deliberately capture, injure or kill a wild animal of an EPS;
- Deliberately disturb wild animals of an EPS wherever they are occurring, in particular any disturbance which is likely to impair their ability to survive, breed or reproduce, or in the case of hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong;
- Deliberately take or destroy the eggs of a wild animal of an EPS; or
- Damage or destroy a breeding site or resting place of a wild animal of an EPS.

- 3.7 Additional protection for bats is also afforded under the Wildlife and Countryside Act 1981 (as amended), making it an offence to intentionally or recklessly disturb bats whilst they are occupying a structure or place which is used for shelter or protection, or to obstruct access to this structure or place.

- 3.8 All wild birds, their nests and eggs are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended), this makes it an offence to:

- i. Intentionally kill, injure or take any wild bird;
- ii. Take, damage or destroy the nest of any wild bird while it is in use or being built;
- iii. Take, damage or destroy the egg of any wild bird; or
- iv. To have in one's possession, or control, any wild bird (dead or alive) or egg or any part of a wild bird or egg.

Assessment of the Tree Stock

- 3.9 The tree survey process recorded a total of 23 individual trees, eight tree groups and two hedgerows and a single woodland totalling 34 items.
- 3.10 The site can broadly be divided into two components (north and south) by the existing access track serviced from Summerhill Road, running east to west. The southern compartment can be further divided into two fields of pasture used to graze horses which are housed in stables located in the centre of the site. With the exception of a

small compartment of woodland to the north (which contains a number of high quality trees of significant stature) the majority of the tree stock is situated around the proximity of the site.

Tree Work Recommendations

- 3.11 Any tree works detailed in **Table 3.3** below should be undertaken in accordance with the requirements of BS3998:2010 *British Standard Recommendations for Tree Works* by fully trained, qualified and insured arboricultural contractor. Permissions/Notice of tree works will be undertaken prior to any works taking place as highlighted in paragraph 3.2 of this report.

Table 3.3: Tree Work Recommendations

Urgency	Tree number	Proposed works
Priority Grade 1 High Urgency	T28 - Sycamore	Fell to mitigate risk to adjacent property due to the presence of a significant basal cavity compromising structural integrity.
Priority Grade 2 Pre-construction	T5 Pedunculate Oak T22 – Sycamore T27 – Sweet Chestnut T33 - Beech	Monolith at 6m to retain as a ecological receptor. Remove primary limb back to stem, at 2.5m west. Remove Major deadwood. Perform a climbing inspection to assess the stability of the main union. (Further recommendations will be given following this inspection)
Priority Grade 3 Pre residential occupancy	T21 – Sycamore T30 – Sycamore T31 - Sycamore	Remove, rope swing girdling primary branch 4m west. On going pruning required to maintain clearance to electrical lines. On going pruning required to maintain clearance to electrical lines.

Image 3.3 Basal cavity of mature sycamore (T26) situated close to the northern boundary of the site.



Design Considerations

- 3.12 The design of the proposed development of the site should seek to retain all 'A' and 'B' grade trees and where practical 'C' grade items. Consideration should be given to the future implications associated with the retention of trees in term of their potential influence on the development.
- 3.13 Pearce Environment Ltd have provided on-going design inputs following the initial tree survey to minimise the number of items lost. Following layout revisions a final site design has been produced by Field Crest Associates (**Appendix 1**).
- 3.14 The site layout has evolved following a compromise between the minimum area required to ensure the proposal is viable whilst ensuring the maximum number of trees are retained irrespective of their grading.

Section 4

Arboricultural Impact Assessment

- 4.1 Pearce Environment Ltd have provided inputs regarding the tree constraints on site, guiding the design of the layout (**Appendix 1**) produced by Field Crest Associates to meet a satisfactory juxtaposition between trees and the proposed development. As a result the design has evolved to ensure the footprint of the development has taken into account the findings of the survey and tree loss minimised as far as possible.
- 4.2 The final site layout has been superimposed onto the tree constraints plan to inform a desk based assessment of the foreseeable impacts that the development may have on the current tree stock. The Tree Protection Plan (**Plan 2**) depicts trees to be retained with solid crown spreads, numbered and coloured stems to reflect their respective category grading. Those trees to be removed are indicated by a dashed outline without their respective root protection areas (RPAs). **Plan 2** also depicts the extent of the Construction Exclusion Zone (CEZ), protective barrier fencing and additional tree protection measures where appropriate.
- 4.3 The arboricultural impact assessment recognises that construction activities have the potential to pose significant threats to the long-term health of trees during and post development. Tree protection measures have been recommended where appropriate and mitigation proposed with the view of providing a harmonious relationship between trees and the development.
- 4.4 Ultimately the removal of any tree is based on its proximity to the development footprint and associated landscaping. Consideration has been given to the future growth of retained trees to ensure future conflicts do not arise between trees and the built form in terms of regular pruning and shading.
- 4.5 Allowances are given in para 4.6.2 of BS5837:2012 where pre existing site conditions suggest that the rooting zone does not occur asymmetrically. In such circumstances the area lost by encroachment should be compensated for elsewhere contiguously with its RPA.

Modification of RPAs

- 4.6 The shape of the RPAs of **T15** has been modified but not reduced in area on the basis that the eastern buttress meets an old boundary wall beyond which lies the hardstanding of Summerhill Road. This area is considered an inhospitable rooting environment effectively due to the presence of the road, effectively acting as a barrier to the free movement of air and moisture.
- 4.7 Section 4.6.2 of BS5837:2012 acknowledges that pre-existing site conditions may indicate that the rooting system is not asymmetric. The RPA of **T15** has been extended to the surrounding areas of pasture to give an informed illustration of the likely root distribution.

Removal of Tree to Facilitate Development

- 4.8 An assessment of the site layout highlights that the removal of three individual trees, three tree groups and a single hedgerow is required to implement the highway access arrangement and construction of residential development. Tree loss is detailed in **Table 4.1** below.
- 4.9 With the exception of **T15**, all those trees identified for removal fall within the category of poor quality and low value.

Table 4.1 Trees Proposed for Removal

Tree Number	Species	Category Grade
T1	Goat Willow	C1
G6	Ash	C1
H14	Ash & Hawthorn	C1
T15	Sycamore	B1
G16	Sycamore	C1
G18	Hawthorn, Elder, Holly	C1
G34	Goat Willow	C1

Reduction of Tree Group to Accommodate Residential Development

- 4.10 Review of the site layout identifies that the reduction of **G17** is required to accommodate the proposed landscaping associated with the rear gardens of residential development. This mixed deciduous group is the remnants of a former hedgerow and currently unmanaged. The reduction of the tree group in width is not deemed detrimental to this low grade tree group.

Construction of Driveway within RPA of retained trees

- 4.11 Review of the site layout identified the proposed highway access arrangements transverse the RPA of **T13**, an early mature, B grade off-site Sycamore.
- 4.12 Where new sections of hard surfaces are to be constructed within the RPA of **T13** an appropriate 'no dig' construction methodology as cited in Section 7.4.2 of BS5837:2012 is to be used. It is proposed that a geo textile material such as Cell Web (**Appendix 3**) filled with granular material to displace loading pressures capped with a surface treatment which allows free passage of air and moisture to the roots will be used to mitigate potential damage to the rooting environment.

Installation of Pedestrian Footpath within the RPA of Retained Trees

- 4.13 A pedestrian footpath marginal encroaches within the RPA of **G32**, in addition **Plot 7** partially encroaches into the RPA of one member of **G11**. In both cases this level of encroachment is deemed minor. Allowance for limited manual excavation is permitted for such activities in section 7.2. of BS5837:2012 limited to the use of hand held tools for such instances.

Site Compound and Storage of Materials

- 4.14 It is envisaged that materials will be brought onto site on an as need basis and stored outside of the construction exclusion zone and will remain 2m from any tree or it's RPA. There is sufficient space to act as a site compound within areas dedicated for open space

Installation of Utilities

- 4.15 All services both above and below ground should be located outside the CEZ. Guidance should be sought from NJUG 4 issue 2 included in **Appendix 4**. Where this is not possible allowances are made within Section 7.1 and 7.7 of BS5837:2012 to perform trenchless insertion methods or in the case of shallow service runs, hand dig excavations are permitted where roots can be retained and desiccation avoided.

Mitigation tree Planting

- 4.16 New tree and hedgerow planting as a consequence of development will provide specific benefits such as diversifying the age demographic of the tree stock which is currently heavily weighted to the mature – over mature end of the spectrum. Such provisions will maintained a sustainable tree stock in the long term.

Future Growth of Trees

- 4.17 Consideration has been given to the future growth of those trees retained. Care has been given to ensure trees have not been incorporated into the proposal on the basis that they can be regularly pruned in future years.

Section 5

Tree Protection Measures

- 5.1 This section details those tree protection measures which are required to ensure the adequate protection of any trees in proximity to development. These protection measures are detailed in **Plan 2** taking into account the crown spreads and RPAs calculated using the methodology set out in Section 4.6 and Annex C and D of BS5837:2012 of all trees proposed for retention on site.

Below Ground Constraints

- 5.2 The rooting system of trees provides the resources required for growth, photosynthesis and other vital metabolic process. The vast majority of the trees roots are located in the top 50cm of the soil, compaction/disturbance of the upper surface can have a serious effect on the trees ability to function.
- 5.3 To ensure adequate protection is afforded to the root system of retained trees, the extent of the RPA will be enclosed using a protective barrier fencing as illustrated in **Appendix 5** using the measurements provided in **Schedule 2**.
- 5.4 Section 4.6.2 of BS5837:2012 acknowledges that pre-existing site conditions may indicate that the rooting system is not asymmetric. In this case the shape of the RPA may be modified but area not reduced, based on arboricultural reasoning.
- 5.5 Where temporary access routes transverse the RPA of retained trees, porous ground protection will be installed in accordance with paragraph 6.2.3.3 of BS5837 to avoid compaction of soils.
- 5.6 Roots smaller than 25mm in diameter may be pruned back making a clean cut with a sharp tool. Where roots above 25mm are encountered works will halt and advice sort from an appropriately qualified arboriculturalist. Exposed roots will be covered with hessian to prevent desiccation which should be removed prior to backfilling as soon as possible.
- 5.7 All material/liquids will be stored on wooden pallets and kept on an area of hard standing/site compounds due to the toxicity of some materials. No mixing or storage of materials will take place upslope where they may leak into a CEZ.
- 5.8 Lowering of the water table can significantly impair a trees ability to function. All hard standing areas should be drained into a soft landscape area or a known soak away.

Above Ground Parts

- 5.9 The stem and branches of the tree support the photosynthetic resource needed for the tree to provide itself with carbohydrates and to grow. Whilst more visible and easier to quantify than the root system, consideration is needed in respect to the ultimate height and canopy spread of the trees to prevent future conflict with the built form.

- 5.10 Protective barrier fencing erected to safeguard the RPA in most case will incorporate the crown spread of any given tree. In some cases the crown spread may exceed the RPA in which case the tree protective barrier should be extended and offset 1m from the extremities of the crown.

Recommendations for Future Actions

- 5.11 All services both above and below ground should be located outside the CEZ. Guidance should be sought from NJUG 4 issue 2 included in **Appendix 4**. Where this is not possible allowances are made within Section 7.1 and 7.7 of BS5837:2012 to perform trenchless insertion methods or in the case of shallow service runs, hand dig excavations are permitted where roots can be retained and desiccation avoided.
- 5.12 Following completion of development, an arboricultural survey of the tree stock should be undertaken on an bi-annual cycle to ensure long term longevity and safety is monitored and documented.

Section 6

Arboricultural Method Statement (AMS)

- 6.1 This Arboricultural Method Statement has been prepared to ensure successful retention of the tree stock during all stages of construction. This section details the protective measures to be applied, specialist construction methodologies to be adopted, the schedule of works to be undertaken and the responsibilities of the Contractors and Arboricultural Clerk of Works. This section should be read in conjunction with **Plan 2** the tree protection plan which shows the proposed protective measures, as identified in the Arboricultural Impact Assessment (**Section 4**).

Schedule of Works & Working Methodologies

- 6.2 The following method statement sets out a five staged approach to ensure impacts upon the tree stock are avoided during the construction of the development:

Appointment of Arboricultural Clerk of Works (ACW) & Pre commencement meetings

- The developer shall appoint an experienced ACW to ensure that those protection measures detailed in this report are enforced to safeguard all retained trees/hedgerows.
- The ACW will be appointed at the developers cost prior to the commencement of works and shall attend site on an 'as need basis'. It is proposed that a regular inspection regime will be agreed with the Local Planning Authority (LPA).
- A pre commencement meeting will be undertaken between the developer, appointed contractor, ACW and LPA tree officer to confirm the arrangement of the tree protection measures, timings of construction program/monitoring regime and reporting procedures.

Pre commencement Tree works & Insulation of Tree Protection Measures

- Where tree works are required they will be completed prior to the commencement of construction works in accordance with *BS3998 2010 British Standard for Tree Works*, by appropriately qualified and trained and insured arboricultural contractor.
- Prior to the commencement of tree works the ACW will meet the appointed arboricultural contractor to confirm the scope and extent of the tree works proposed.
- The installation of tree protection measures in accordance with Section 6.2 of BS5837:2012 as detailed in **Section 4** and illustrated in **Appendix 5** will be completed post tree works but prior to any construction activities.

- To assist with the setting out of protective barrier fencing the measurements of the RPAs have been included within **Schedule 2** and checked against **Plan 2**. The enclosed area referred to as the construction exclusion zone should be treated as sacrosanct and remain intact/undisturbed throughout the construction process. The ACW will undertake an inspection of all protective barriers to ensure the specifications comply with the measurements included in **Schedule 2**.
- Where temporary access is required within the RPA of retained trees ground protection will be installed in accordance with paragraph 6.2.3.3 of BS5837 and overseen by the ACW. Ground protection will be capable of supporting the relative loads without resulting in compaction of the underlying soils.

Construction Within the RPA of retained trees

- In accordance with 6.2.3 of BS5837:2012 temporary RPA set back of **T13** is required to facilitate construction of proposed highway access arrangements.. Activities within this area will be restricted to a 'no dig methodology' in accordance with 7.4.2 of BS5837:2012 as shown on **Plan 2**. The ACW will ensure that the works are in line with the provisions set out below.
- A 'no dig' construction methodology will be adhered to through the construction period as cited in Section 7.4 of BS5837. CellWeb Tree Root Protection System will be installed under the supervision of the ACW. The ACW will ensure that the works are in line with the provisions set out in CellWeb Tree Root Protection Checklist (**Appendix 3**) briefly summarised below.
- Works will be undertaken between May – October, all ground vegetation will be killed using a herbicide and removed by hand.
- All major protrusions/stumps will be removed/ground out where necessary and remaining holes will be filled with sharp sand.
- Where limited excavation is required to produce a level surface, confined excavation is permitted in accordance with Section 7.2.1 of BS5837:2012 following root investigation to provide a level surface.
- A geogrid such as CellWeb will be installed by hand over the entire area of the proposed access route which transverses RPAs. The depth of the grid will be determined following consultation with an engineer to ensure adequate displacement of loading pressures are achieved.
- The geogrid will be filled with washed angular stone. This will be tipped from one end so that machinery moves on already spread sub-base and not upon the geogrid or ground close to the geogrid. This will ensure protection to the rooting environment during a period of temporary RPA setback.
- Compact the sub-base using hand held vibrating tamper; and

- Apply porous surface treatment such as porous asphalt or bonded gravel.
- Once construction activities in these areas are completed, the protective barriers will be repositioned.

Monitoring and Maintenance of Tree Protection Measure

- The Appointed ACW will undertake regular site visits to ensure tree protection measures remain fit for purpose in accordance with the monitoring regime determined during the pre-commencement meeting.
- It is the responsibility of the main contractor to contact the ACW in the event of any conflicts between the tree protection measures and construction operations.
- Where required ACW will make changes to those recommendations in this report in the best interest of the tree stock to be agreed with the LPA prior to implementation.
- Site access will be achieved via new access arrangements provided from Summerhill road.
- Contractors parking, plant and machinery will be located outside of the construction exclusion zone.
- No lighting of fires/mixing of material will take place within 2m of the construction exclusion zone. No mixing or storage of material will take place up slope where they may leak into a construction exclusion zone.
- Contingency plan: water will be readily available on site to flush spilt materials through the soil to avoid contamination to the tree roots. In the event a spillage occurs, the ACW will be contacted for advice.

Dismantle Tree Protection Measures/Post Construction Tree Inspections

- Once all construction/landscaping is completed all tree protection measures will be removed from site.
- A post construction tree survey will follow to assess the condition of the tree stock and identify any remedial works required.

Section 7

Conclusion

- 7.1 An Arboricultural Assessment was undertaken in accordance with the recommendations of the British Standard 5837:2012 *Trees in relation to Design, Demolition and Construction*. The survey process identified 23 individual trees, eight tree groups and two hedgerows and a single woodland totalling 34 items detailed in **Schedule 1**.
- 7.2 The arboricultural Impact assessment identified the removal of three trees, three tree groups and a hedgerow to allow development to proceed. With the exception of **T15** all those items proposed for removal have been classified as 'C' grade of poor quality and value. In addition the reduction of a single low grade tree group is required to implement the landscaping proposal associated with the rear gardens of residential development.
- 7.3 Hand dig methodologies have been proposed where a pedestrian foot path marginally encroaches into a woodland group of high arboricultural merit, where plot 7 encroaches into the RPA of one member of **G11**.
- 7.4 Construction within the RPA of **T13** will be restricted to 'no dig' construction methodology utilising a geo textile material such as Cell Web in accordance with *Section 7.4.2* of BS5837 to mitigate impacts to tree roots
- 7.5 New tree and hedgerow planting has been incorporated into the design to mitigate tree loss, thereby securing a sustainable tree population on site. It should be highlighted that the tree stock at present is heavily weighted toward the mature end of the age spectrum. New planting as part of the proposal gives the opportunity to secure a sustainable tree population in the long term.
- 7.6 Protective measures have been detailed in **Section 5 & 6** of this report to ensure no significant impacts upon those remaining trees are considered likely to arise.
- 7.7 The arboricultural assessment of the tree stock is valid for up to two years from the date of this report. The findings of this report, plans and appendices is the property of Pearce Environment Ltd, and has been prepared for the sole use of the client. Permission from the author must be obtained prior to reproduction of material either wholly or in part.
- 7.8 Should the development proposals be altered significantly, such that changes to the working area and/or duration of the works arise, then a re-assessment of the likely impacts arising by a suitably experienced arboriculturalist will be required.

Schedules

Schedule 1 (Tree Survey Schedule)

Client: Nigel Thorns Associates								Site: Summerhill Farm								
Date of Survey: 21 st July 2016								Consultant: Douglas Williams MSc, BSc, RFS cert Arb, AA PTI								
Tagged No								Weather Clear and dry								
Tree Reference No.	Species	Height (m)	Stem Diameter (mm)	Canopy Spread (m)				First Significant Branch (m)	Canopy Clearance (m)	Life Stage	Physiological Condition	Structural Condition	Proposed Works	Estimated Remaining Contribution (Years)	Category Grade	Priority
				N	E	S	W									
H1	Goat Willow	5	210, 240	3	3	3	3	1.5/N	1.5	Semi Mature	Fair	Bifurcates at ground level, union included, no spacing observed within crown. Intertwined branches provide stability to this defect.	N/A	10+	C1	N/A
T2	Sycamore	8.5	480	3	5	4	3	1.5/E	1.5	Mature	Good	Epicormic growth at base, Primary limbs pruned back to stem at 2m west and 2-3m east.	N/A	20+	B1	N/A
T3	Beech	16	710	6	6	6	6	4/N	2	Mature	Good	Minor bark wounding to buttresses due to horse grazing. Initials inscribed onto main stem. Large diameter pruning wound between 2-3m south and west.	N/A	20+	B1	N/A
W4	Turkey Oak, Pedunculate Oak, Sycamore & Holly	15	300-650	5	8	5	5	2/E	2	Mature	Good	Woodland abuts the western boundary of the site.	N/A	40+	A1	N/A
T5	Pedunculate Oak	13.5	900	7	5	6	6	2.5/N	2	Poor	Over Mature	Southern RPA unlikely to be asymmetric due to adjacent stone wall. Small stem wound 5cm x 15cm on main stem north at 1m. Showing late stages of decline Large diameter deadwood within crown, longevity limited.	Monolith to retain as an ecological receptor	<10	U	N/A

Pearce Environment Ltd – Arboricultural Assessment –Summerhill– August 2016

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Tagged	No								Weather	Clear and dry							
Tree Reference No.	Species	Height (m)	Stem Diameter (mm)	Canopy Spread (m)				First Significant Branch (m)	Canopy Clearance (m)	Life Stage	Physiological Condition	Structural Condition	Proposed Works	Estimated Remaining Contribution (Years)	Category Grade	Priority	
				N	E	S	W										
G6	Ash	9	320	5	2	2	2	2/W	2	Poor	Semi Mature	Major bark wound north between 0.5m and 2m from grazing horses.	N/A	10+	C1	N/A	
T7	Pedunculate Oak	18	1430	9	11	6	8	4.5/W	2	Fair	Over Mature	Large diameter pruning wounds on main stem east, west and south between 3M, and 4m. Large tear out wound at 6m north west and 9m south east.	N/A	20+	B1	N/A	
T8	Sycamore	12	250	2	2	2	3	1.5/E	1.5	Fair	Semi Mature	Offsite tree position hand annotated. Boundary wall likely to have impeded root development north into the site. Tall etiolated form.	N/A	10+	C1	N/A	
T9	Ash	10	120, 150, 180, 200	3	3	3	3	2/N	0.5	Fair	Semi Mature	Multi-stemmed self set specimen located behind boundary wall. RPA unlikely to extend into the site.	N/A	10+	C1	N/A	
T10	Beech	18	640	6	5	5	7	4/w	4	Good	Mature	Off site tree, position hand annotated, dimension estimated. Prolific ivy on main stem extending into canopy.	N/A	20+	B1	N/A	
G11	Birch, Goat Willow, Poplar	8 to 11	280	N/A	N/A	N/A	N/A	2/S	2	Fair	Semi Mature	Off site trees, dimension estimated. No visible defects.	N/A	20+	B1	N/A	
T12	Eucalyptus	14	500	5	4	6	6	2/E	4	Fair	Early Mature	Off site tree, position hand annotated, historically topped at 9m, tall etiolated new growth.	N/A	20+	B1	N/A	
T13	Sycamore	11	410	4	4	4	3.5	4/S	3	Fair	Early Mature	Off site tree, position hand annotated, crown raised to 3m west to provide clearance to telephone wire.	N/A	20+	B1	N/A	
H14	Ash & Hawthorn	4.5	80	1	1	1	1	0.25	0.25	Young	Fair	Defunct tall etiolated hedgerow.	N/A	10+	C1	N/A	

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Tagged	No								Weather	Clear and dry						
Tree Reference No.	Species	Height (m)	Stem Diameter (mm)	Canopy Spread (m)				First Significant Branch (m)	Canopy Clearance (m)	Life Stage	Physiological Condition	Structural Condition	Proposed Works	Estimated Remaining Contribution (Years)	Category Grade	Priority
				N	E	S	W									
T15	Sycamore	12	760	5	5	5	6	3/N	2	Early Mature	Good	Barbed wire stapled into stem. Set on retained wall, RPA bias to west and south.	N/A	20+	B1	N/A
G16	Sycamore	5	100	2	2	2	2	0.5/n	0.5	Young	Fair	Self set.	N/A	10+	C1	N/A
G17	Elder & Hawthorn	6	100	N/A	N/A	N/A	N/A	0.25	0.25	Young	Fair	Self set around stables.	N/A	10+	C1	N/A
G18	Elder, Hawthorn & Holly	7	100	N/A	N/A	N/A	N/A	0.25	0.25	Early Mature	Fair	Self set remnants of a hedgerow.	N/A	10+	C1	N/A
T19	Pedunclate Oak	12.5	770	7	7	9	7	3.5/N	2.5	Mature	Good	Large diameter limb previously removed at 3m north to aid clearance into paddock. Minor deadwood throughout crown typical of age and species.	N/A	40+	A1	N/A
T20	Sycamore	13	620	4	5	6	5	2	2	Mature	Good	No visible defects.	N/A	20+	B1	N/A
T21	Sycamore	13	550	3	2	5	5	2.5/E	1	Mature	Good	Minor bark wounding to buttresses from grazing stock.	Remove, rope swing girdling primary branch 4m west.	20+	B1	3
T22	Sycamore	14	530	6	3	3	6	2.5/W	1	Mature	Fair	Minor Bark wound at buttress. Bark necrosis around union of primary branch 2.5m west. Union predisposed to failure due to compromised wood, minor deadwood throughout canopy.	Remove primary limb back to stem, at 2.5m west.	10+	C1	2
T23	Beech	16	820	5	5	6	5	4.5/W	1.5	Over Mature	Good	Minor bark abrasions on buttress, cavity 15cm x 5cm on main stem south partially occluded extending 5cm into heartwood. Initials inscribed into stem at 1.5m North.	N/A	40+	A1	N/A

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Tagged	No								Weather	Clear and dry							
Tree Reference No.	Species	Height (m)	Stem Diameter (mm)	Canopy Spread (m)				First Significant Branch (m)	Canopy Clearance (m)	Life Stage	Physiological Condition	Structural Condition	Proposed Works	Estimated Remaining Contribution (Years)	Category Grade	Priority	
				N	E	S	W										
T24	Sweet Chesnut	14	930	7	4	7	7	3/S	1.5	Over Mature	Good	Abrasion of buttress, minor deadwood throughout crown typical of age and species.	N/A	40+	A1	N/A	
T25	Pedunculate Oak	14	680	6	3	6	5	2/N	2	mature	Poor	Minor damage to upper surface of exposed roosts from grazing stock. Minor deadwood in crown typical of age and species.	N/A	10+	C1	N/A	
T26	Pedunculate Oak	16	670	5	3	5	3	2/N	2	Mature	Fair	Minor damage to upper surface of exposed roosts from grazing stock. Dense epicormics growth on primary limbs.	N/A	20+	B1	N/A	
T27	Sweet Chesnut	17	1220	7	6	7	7	2/E	1	Over Mature	Good	Minor deadwood at 4m south on primary limb. Moderate dead wood (>100mm) throughout crown typical of age and species. Large historic pruning wood at 8m south on main stem.	Remove Major deadwood.	40+	A1	2	
T28	Sycamore	13	410	6	0	6	6	2/N	2	Mature	Poor	Basal cavity extends into vertical decay coulomb beyond 500mm.	Fell to mitigate risk to adjacent property.	<10	U	1	
G29	Sycamore	15	600	N/A	N/A	N/A	N/A	3/W	2	Mature	Good	No visible defects, all trees set on a raised earth mound.	N/A	20+	B1	N/A	
T30	Sycamore	21	750	5	0	5	5	7/E	7	Mature	Fair	Bifurcates at 6m, eastern crown historically pruned to aid clearance to electrical lines. Large tear out on northern stem between 5.5m and 7m	Ongoing pruning required to maintain clearance to electrical lines.	10+	C1	3	

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Date of Survey: 21 st July 2016								Consultant Douglas Williams MSc, BSc, RFS cert Arb, AA PTI								
Tagged No								Weather Clear and dry								
Tree Reference No.	Species	Height (m)	Stem Diameter (mm)	Canopy Spread (m)				First Significant Branch (m)	Canopy Clearance (m)	Life Stage	Physiological Condition	Structural Condition	Proposed Works	Estimated Remaining Contribution (Years)	Category Grade	Priority
				N	E	S	W									
T31	Sycamore	17	510	5	2	6	5	2/5	1	Mature	Fair	East crown heavily pruned to aid clearance to electrical lines.	Ongoing pruning required to maintain clearance to electrical lines.	10+	C1	3
G32	Sycamore	18	670	N/A	N/A	N/A	N/A	2	2	Mature	Good	No visible defect, good example of species form a cohesive feature.	N/A	40+	A1	N/A
T33	Beech	24	1100	5	5	5	5	2.5/N	2	Over Mature	Good	Bark wound between ground level and 1m from grazing stock. Stem trifurcates at 5m.	Perform a climbing inspection to assess the stability of the main union.	20+	B1	2
G34	Hawthorn, Sycamore, Ash & Pedunculate Oak	06-Aug	140	N/A	N/A	N/A	N/A	1	1	Young	Fair	Tall etiolated group provided a degree of screening and filtering to and from the site.	N/A	10+	C1	N/A

Schedule 2 (Tree Constraints Schedule)

Tree ID	DBH (mm)	Radius of RPA (m)	Area of RPA (m2)	Category Grading	Crown spread			
					N	E	S	W
H1	210, 240	5.5	95.7	C1	3	3	3	3
T2	480	5.8	104.2	B1	3	5	4	3
T3	710	8.5	228.1	B1	6	6	6	6
W4	300-650	7.8	191.1	A1	5	8	5	5
T5	900	10.8	366.5	U	7	5	6	6
G6	320	3.8	46.3	C1	5	2	2	2
T7	1430	17.2	925.2	B1	9	11	6	8
T8	250	3.0	28.3	C1	2	2	2	3
T9	120, 150, 180, 200	4.0	49.4	C1	3	3	3	3
T10	640	7.7	185.3	B1	6	5	5	7
G11	280	3.4	35.5	B1	N/A	N/A	N/A	N/A
T12	500	6.0	113.1	B1	5	4	6	6
T13	410	4.9	76.1	B1	4	4	4	3.5
H14	80	1.0	2.9	C1	1	1	1	1
T15	760	9.1	261.3	B1	5	5	5	6
G16	100	1.2	4.5	C1	2	2	2	2
G17	100	1.2	4.5	C1	N/A	N/A	N/A	N/A
G18	100	1.2	4.5	C1	N/A	N/A	N/A	N/A
T19	770	9.2	268.3	A1	7	7	9	7
T20	620	7.4	173.9	B1	4	5	6	5
T21	550	6.6	136.9	B1	3	2	5	5
T22	530	6.4	127.1	C1	6	3	3	6
T23	820	9.8	304.2	A1	5	5	6	5
T24	930	11.2	391.3	A1	7	4	7	7
T25	680	8.2	209.2	C1	6	3	6	5
T26	670	8.0	203.1	B1	5	3	5	3
T27	1220	14.6	673.4	A1	7	6	7	7
T28	410	4.9	76.1	u	6	0	6	6
G29	600	7.2	162.9	B1	N/A	N/A	N/A	N/A
T30	750	9.0	254.5	C1	5	0	5	5
T31	510	6.1	117.7	C1	5	2	6	5
G32	670	8.0	203.1	A1	N/A	N/A	N/A	N/A
T33	1100	13.2	547.5	B1	5	5	5	5
G34	140	1.7	8.9	C1	N/A	N/A	N/A	N/A

Appendices
Appendix 1

Illustrative Site Layout Plan (not to scale)



Appendix 2 Topographical Survey



Appendix 3 CellWeb Tree Root Protection Checklist

CellWeb TRP (Installation Checklist)

Installation of the CellWeb™ Cellular Confinement System within the Root Protection Area of Trees



The following installation checklist can be used on projects where CellWeb™ is being installed as a permanent hard surface, a sub-base, or as temporary root protection during construction works.

The installation procedure can be utilised by the Local Authority (LA) tree officer to ensure that CellWeb™, that is being used for tree root protection, will be effectively installed. Alternatively, it may be more appropriate to request that the installation is certified by arboricultural consultants who are experienced in the installation of CellWeb™ and who can offer installation certification as part of a package endorsed by Geosynthetics.

The completion of the CellWeb™ installation in accordance with this procedure will enable planning conditions to be successfully signed off on completion of the project.

Stage 1 Initial site meeting to assess tree protection requirements in line with the Arboricultural Method Statement (AMS) produced by the developer's arboricultural consultant.

- Check the ground conditions, including the presence of compaction or made ground.
Is any remedial work required, such as the removal of old hard surfaces and rubble or soil decompaction?
- Compare the existing ground levels with the new levels proposed in the development.
Do the new levels allow for the depth of hard surfaces installed with a CellWeb™ foundation without excavation?
Will excavation be required to achieve the proposed levels or to enable site drainage or integration with other water management solutions?
- Assess the suitability of tree protection proposals, including the fencing and ground protection that will be used throughout the demolition and construction phases of development.
Can CellWeb™ be used as ground protection throughout the development period and also form the foundation for final hard surfaces?
Is a temporary CellWeb™ installation needed to enable site access for construction traffic over an area designated as requiring tree root protection?
- Consider how utility service installations can be integrated with the installation of CellWeb™.
Can services be installed before the CellWeb™ is laid, or is it possible to use directional drilling later on in the development?
- Consider how other water management solutions for the site can be integrated with CellWeb™, including porous hard surfaces, drainage and underground storage.
Has a combined and integrated water management plan been designed that considers retained trees?
Do the water management solutions for the site consider the water requirements of retained trees?
Do the storage solutions allow for the slow release of water into areas of the site accessible by tree roots, while also dealing with potential soil pollutants from surface water run-off?
- How are the developers going to ensure that the CellWeb™ is specified and installed effectively?



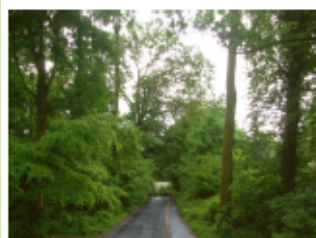
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Stage 2 Approval of the CellWeb™ site-specific installation method statement, which should include:

- Details of the sensitive removal of existing hard surfacing.
- Details of any remedial de-compaction work required.
- Root investigation procedures where site level changes require limited excavation to allow the installation of CellWeb™.
- A scaled site plan illustrating where the CellWeb™ will be installed that includes both existing and proposed levels.
- Details of how the CellWeb™ tree root protection system will be integrated with other traditional hard surface foundations on site.
- An integrated water management site plan illustrating working porous surfaces, drainage and water storage solutions, with consideration of the physical presence of roots and tree water requirements.
- Details of the CellWeb™ load limit specifications, with site-specific information.
- Engineering drawings provided by Geosynthetics showing the CellWeb™ specification.
- An engineering design indemnity policy based on a site-specific soil assessment.

Stage 3 Site visit before CellWeb™ installation to check that the ground has been prepared in accordance with the AMS. Check:

- Site level layout.
- The need for root investigations where excavation work is required to meet level requirements.
- Soil bulk density (compaction) CBR has been maintained.
- Completion of any site remedial work required before the installation of CellWeb™.

Stage 4 Site visit to check that materials supplied for installation comply with the installation method statement and AMS specifications. Check:

- The specification of the geotextile underlay.
- The specification of the cellular confinement system (depth and product used).
- The specification of the fill material (4/20, 20/20 or 20/40 washed angular stone with site-specific pH if required and appropriate structural load rating).

Stage 5 Site visit to check that the installation methodology meets the manufacturer's specification and is in accordance with the AMS. Check:

- The minimum cell size.
- The orientation of the sheet layout.
- There is sufficient fill to form a cell structure.
- The upper geotextile has been installed to maintain the CellWeb™ sandwich.

Stage 6 Site visit to check that the final surface installation meets the porosity specification in the installation method statement and the AMS.

Stage 7 Project sign off.

Following this checklist should ensure the successful specification and installation of CellWeb™ as a tree root protection system, either as a temporary ground covering during development or as a structural sub-base for permanent porous hard surfaces.

This checklist has been written to enable Local Authority Tree Officers to plan site visits and document checks in a structured way. However, the same procedure can be completed by an independent arboricultural consultant as part of a certification program offered by Geosynthetics Ltd using dedicated arboricultural consultants and approved installers.



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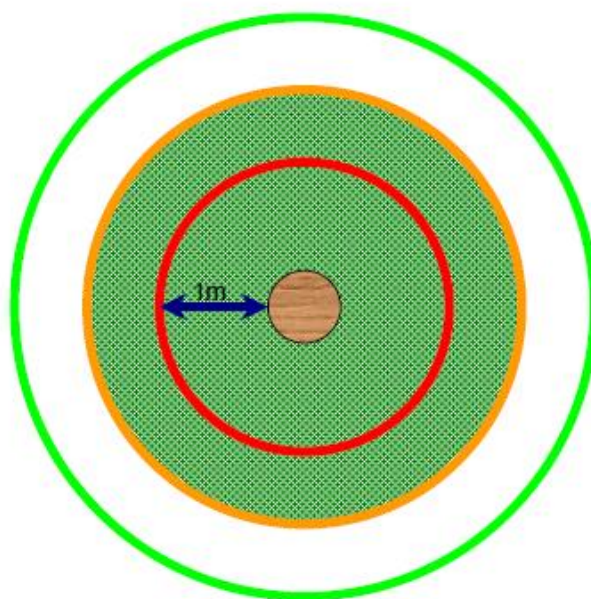
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Appendix 4

NJUG Vol. 4 Guidelines for the Planning Installation and Maintenance of Utility Apparatus in Proximity to Trees (Issue2)



NJUG Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees – Issue 2



TREE PROTECTION ZONE

Key to Diagram



Trunk of Tree



Spread of canopy or branches



PROHIBITED ZONE – 1m from trunk. Excavations of any kind must not be undertaken within this zone unless full consultation with Local Authority Tree Officer is undertaken. Materials, plant and spoil must not be stored within this zone.



PRECAUTIONARY ZONE – 4 x tree circumference. Where excavations must be undertaken within this zone the use of mechanical excavation plant should be prohibited. Precautions should be undertaken to protect any exposed roots. Materials, plant and spoil should not be stored within this zone. Consult with Local Authority Tree Officer if in any doubt.



PERMITTED ZONE – outside of precautionary zone. Excavation works may be undertaken within this zone however caution must be applied and the use of mechanical plant limited. Any exposed roots should be protected.

Appendix 5

Tree Protection Barrier on Scaffold 2.0m High

(Extract from BS 5837:2012, Figure 2 'Protective Barrier')

