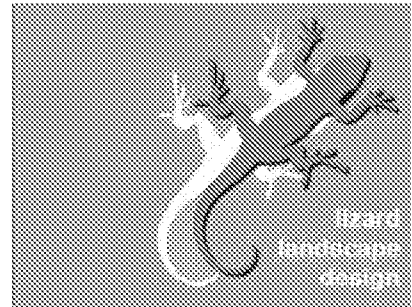




## **CRAYFERN HOMES**

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**LAND NORTH OF YAPTON ROAD  
BARNHAM, WEST SUSSEX**

**ARBORICULTURAL IMPACT ASSESSMENT  
TREE PROTECTION – METHOD STATEMENT**

Approved By: Joe Jackson  
Signed: .....  
Position: Principal  
Date: 23<sup>rd</sup> June 2015  
Rev: 01

### **June 2015 – Planning Issue**

LLD833/KM /23.06.15.Rev 00

## LAND NORTH OF YAPTON ROAD, BARNHAM, WEST SUSSEX RESIDENTIAL DEVELOPMENT - ARBORICULTURAL METHOD STATEMENT

### 1.0 INTRODUCTION

- 1.1 Lizard Landscape Design and Ecology has been commissioned by Crayfern Homes to undertake a detailed tree survey at the site of Land North of Yapton Road, Barnham, West Sussex in order to determine likely impacts upon existing trees within the site and develop a mitigation strategy for the protection of existing trees to be retained for the proposed residential development at the site.
- 1.2 The proposed residential development is located to land to the north of Yapton Road, Barnham currently lying as a field enclosure edged to the south by an area of regenerative woodland, formerly the site of a horticultural nursery development. The development proposals comprise 44 no. residential units consisting of a mix of detached, semi-detached and terraced properties with garden plots, communal space and allocated parking for residents and visitors. The proposals also include the formation of a proposed access route leading north from Yapton Road to the residential development. Sustainable drainage in the form of a balancing pond to the west of the proposed access road and dedicated infiltration areas and ecological enhancements to the woodland and site boundaries are component parts of the development proposals.
- 1.3 The existing site contains a number of existing scattered and grouped mature trees to the field site boundaries with a woodland block lying between Yapton Road in the south and the proposed residential development site. There are a number of trees within the woodland covered by statutory protection through historic Tree Preservation Orders (*Arun District Council*).
- 1.4 The existing trees within the proposed development site boundaries have been surveyed in accordance with *BS 5837; 2012 – 'Trees in Relation to Design, Demolition and Construction – Recommendations'*; and are recorded within the accompanying report; *LLD833 – Existing Tree Schedule*; and are identified within the following drawings; *LLD833 / 01 – Tree Constraints Plan*; and *LLD833 / 02 – Tree Retention and Protection Plan*. The Tree Retention and Protection Plan illustrates the impact of the proposed development upon the existing trees and sets out where vegetation is to be removed and specifically measures for tree and root protection wherever existing trees and vegetation are to be retained and protected.
- 1.5 The development proposals have been specifically developed and designed to maintain and protect the significant existing mature trees across the development site in accordance with the requirements and specification of *BS 5837; 2012 'Trees in Relation to Design, Demolition and Construction - recommendations'*.
- 1.6 Following the proposed removal of existing vegetation from the site, there are a number of existing trees within the vicinity of the development proposals that would be potentially impacted upon by the development proposals. The existing trees to be retained are to be protected in accordance with the guidance contained within *BS 5837; 2012 – 'Trees in Relation to Design, Demolition and Construction'*.
- 1.7 The status, impact, and protection of the existing trees and vegetation are subject to the protective measures as detailed in the following Arboricultural Method Statement.

### ***Drawings and Reports***

- 1.8 The Tree Retention and Protection Proposals comprise the following;
  - LLD833 / 01 – Tree Constraints Plan;*
  - LLD833 / 02 – Tree Retention and Protection Plan;*
  - LLD833 - Existing Tree Schedule – proposed schedule of works;*
  - LLD833 - Arboricultural Impact Assessment and Method Statement.*

### CRAYFERN HOMES

LAND NORTH OF YAPTON ROAD, BARNHAM, WEST SUSSEX  
ARBORICULTURAL IMPACT ASSESSMENT REPORT

LLD833/KM/23.06.15/Rev01.Planning

## 2.0 EXISTING SITE VEGETATION

- 2.1 The site comprises a mix of habitats comprising Secondary Deciduous Woodland, Dense Scrub, Tall Ruderal vegetation, Scattered Deciduous and Coniferous Trees outlined within the Extended Ecology Phase 1 Habitat Survey report (*Lizard Landscape Design; dated 03.12*).
- 2.2 The southern area is largely dominated by Secondary Woodland in which Sycamore is prolific. Ivy growth is dense and expansive throughout much of this area creating conditions amenable to Protected Species of Bats and Reptiles. The northern boundary to the Woodland is colonised by species typical of disturbed and nutrient-rich conditions that further enhances the potential as Reptile habitat. A small number of common pipistrelle (*Pipistrellus pipistrellus*) were noted to be roosting within a mature, coniferous tree (Monterey Pine *Pinus radiata*) along the northern boundary of the woodland. The southernmost area of the site is colonised by a mosaic of Dense Scrub, Tall Ruderal vegetation, and Scattered Tree habitat with some small open grassy areas providing some potential habitat for Birds and Reptiles.
- 2.3 The northern site edge is relatively devoid of mature vegetation and predominantly comprises tall ruderal scrub vegetation within which an area of Japanese Knotweed has been identified. A solitary Oak (*Quercus robur*) lies toward the eastern edge of the northern boundary.
- 2.4 The eastern boundary is better populated with a mix of mature mixed species trees amid scrub vegetation. A singular large mature Lombardy Poplar (*Populus nigra 'Italica'*) is situated to the north eastern corner of the site with 2 no. mature specimens of Red Oak (*Quercus rubra*) edging the field with further species of Poplar (*Populus sp.*) and Goat Willow (*Salix caprea*) contained within the boundary scrub vegetation. A decrepit building is located within the boundary vegetation with a small number of mixed species trees growing within or adjacent to the structure (including a Poplar in state of collapse).
- 2.5 The eastern boundary vegetation joins the northern edge of the existing woodland block situated to the south of the field site. The central northern edge of the woodland contains a number of mature mixed species trees which dominate the secondary deciduous vegetation of the woodland. A number of the trees are covered by statutory individual Tree Preservation Order (TPO) protection and are outlined below;
- *Tilia x europaea* (Lime); (TPO/BN/1/00 T2; Arun District Council);
  - *Tilia x europaea* (Lime); (TPO/BN/1/00 T3; Arun District Council);
  - *Pinus nigra* (Pine); (TPO/BN/1/00 T4; Arun District Council);
  - *Populus 'Balsam Spire'* (Poplar); (TPO/BN/1/00 T5; Arun District Council);
  - *Acer pseudoplatanus* (TPO/BN/1/00 T6; Arun District Council);
  - *Acer pseudoplatanus* (TPO/BN/1/00 T7; Arun District Council).
- 2.8 The above trees and others within the mature grouping to the central northern woodland edge contain specimens of varying condition but offer a degree of permanence and maturity to the amenity of the site.
- 2.9 Two treeline features dominate the central interior of the woodland; one of mature Holm Oak (*Quercus ilex*) runs east / west, with another of mature Hornbeam (*Carpinus betulus*) running north / south. Whilst the trees individually are of variable condition they are prominent linear features within the woodland.

- 2.10 To the southeast of the above treelines is a small group of trees of variable condition covered by statutory individual and group Tree Preservation Order (TPO) protection as outlined below;
- *Betula pubescens* (Birch); (TPO/BN/1/00 T1; Arun District Council);
  - 2 no. *Populus* sp. (Poplar sp.); (TPO/BN/1/00 G1; Arun District Council);
  - *Prunus* sp. (Cherry); (TPO/BN/1/00 G1; Arun District Council).
- 2.11 A further group of coniferous trees lie toward the southern edge of the woodland amid an area of comparatively open scrub adjacent to the northern edge of Yapton Road as it passes the southern site boundary. The trees are likely remnant of the previous horticultural nursery land use, now mature and covered by statutory group Tree Preservation Order (TPO) protection, outlined below;
- *Cupressus macrocarpa* 'Barnham Gold' (Cypress); (TPO/BN/2/00 G1.Arun District Council)
- 2.12 The coniferous tree group holds a massed and merged canopy offering some outward amenity to the southern boundary adjacent to the Yapton Road public highway.
- 2.13 The woodland itself is dominated by opportunist deciduous tree species of Sycamore (*Acer pseudoplatanus*). The coverage of Sycamore is extensive throughout affording little development of diversity in tree or understorey vegetation. The trees are largely of drawn form with suppressed high held canopy development. There is evidence throughout the woodland of continual self seeding of the Sycamore creating a monocultural succession of species. A number of Sycamore trees to the external woodland boundaries are developed and stand as more mature specimens. A small number of individual trees and tree groups are noted amongst the extensive Sycamore offering occasional diversity of species, such as; Birch, Hornbeam, Beech and Alder.
- 2.14 The natural woodland understorey is restricted in diversity and extent and further limited by the extensive development of non-native species to the west such as Cherry Laurel (*Prunus laurocerasus*); and patches of ornamental species of Bamboo and Pampas grass to the south.
- 2.15 The western site boundary is predominantly open to the adjacent residential development of Crescent Gardens with only small semi-mature stands of self sown Sycamore of interest held to the boundary. To the north western corner is a small group of trees of variable quality and condition including Sycamore, Ash (*Fraxinus excelsior*) and Horse Chestnut (*Aesculus hippocastanum*) contained within a small area of understorey. The ground surrounding the tree group has evidently been utilised for fly-tipping.
- 2.16 The woodland forms the most appreciable feature in terms of extent and through statutory protection of a number of trees contained within it. It is generally of relatively low ecological value but holds evident Bat Roosts to the northern edge and habitat suitable for Reptiles. The woodland contains several remnant structures and paths remaining from the previous landuse. The following Arboricultural Impact Assessment and Method Statement outlines and details measures to provide for the retention and protection of trees and ecological features found within the woodland and the site as a whole with regard to the proposed residential development.

### 3.0 ARBORICULTURAL IMPACT ASSESSMENT

- 3.1 The development proposals include the development of a residential housing scheme within the open land to the north of the woodland area, and south of the railway. The housing development is proposed to be accessed via a road routed from a junction upon Yapton Road to the south, extending north to the development through the scrub and secondary vegetation of the woodland adjacent to the eastern site boundary. Additional features proposed for ecological enhancement and sustainable drainage in the form of habitat creation and ephemeral water body (balancing pond). The proposals affect a number of the existing trees and site vegetation within the development site boundaries, a number of which shall require removal; trees and vegetation to be retained shall require detailed protection to enable their retention within the proposed scheme. All existing trees to be retained shall be protected in accordance with the guidance of *BS 5837; 2012 – Trees in Relation to Design, Demolition and Construction – Recommendations*.

#### ***Tree Removal***

- 3.2 The following trees and vegetation shall require removal in order to accommodate the development proposals. The proposals have been developed specifically to enable the retention of the majority of the trees within the site and especially those being significant and mature specimens. A number of trees are proposed to be removed to accommodate the development proposals or due to poor condition; and are identified within drawing LLD852 / 02 – *Tree Retention and Protection Plan*.
- TG 01 – Mixed Species Tree Group; Category C; (remove to accommodate the development proposals);
  - T 02 – *Aesculus hippocastanum* (Horse Chestnut); Category U; (remove due to poor condition);
  - T03 – *Acer pseudoplatanus* (Sycamore); Category C; (remove to accommodate the development proposals);
  - T04 – *Fraxinus excelsior* (Ash); Category C; (remove to accommodate the development proposals);
  - T05 – *Fraxinus excelsior* (Ash); Category B; (remove to accommodate the development proposals);
  - T 06 – *Aesculus hippocastanum* (Horse Chestnut); Category U (remove due to poor condition);
  - T07 – *Acer pseudoplatanus* (Sycamore); Category C; (remove to accommodate the development proposals);
  - T08 – *Acer pseudoplatanus* (Sycamore); Category C; (remove to accommodate the development proposals);
  - TG45 – Mixed Species Woodland; Category C; (partially remove to accommodate the development access proposals and ecological enhancement proposals);
  - TL46 – *Carpinus betulus* (4 no. Hornbeam - treeline); Category C; (remove to accommodate the development access proposals);
  - TL47 – *Fagus sylvatica* (5 no. Beech - treeline); Category C; (remove to accommodate the development access proposals);
  - SH48 – *Fallopia japonica* (Japanese knotweed); Category U; (remove as invasive species; refer to Wildlife and Countryside Act 1981; Environmental Protection Act (Duty of Care) Regulations 1991).

**Tree Retention and Protection**

- 3.3 Following the removal of the above vegetation, those trees to be retained are to be protected in accordance with *BS 5837; 2012 – Trees in Relation to Design, Demolition and Construction – Recommendations*; the protection proposals are recorded within the accompanying report; *LLD833 – Existing Tree Schedule*; and are identified within the following drawing *LLD833 / 02 – Tree Retention and Protection Plan*. The trees proposed for retention are identified below and a detailed description of impact mitigation outlined.
- 3.4 All trees to be retained on site shall be protected with fencing erected in accordance with *BS5837; 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'*; as specified within drawing *LLD833 / 02 – Tree Retention and Protection Plan*.
- 3.5 The proposed residential development is to be set out within the open land to the north of the woodland. A small group of Sycamore (*TG09 – Acer pseudoplatanus*) trees and a single Ash (*T11 Fraxinus excelsior*) to the south western edge of the land are to be retained and protected within the development proposals, offering outward amenity value to the boundary edge. A short section of pedestrian access footpath is proposed to link the development to the land at Garden Crescent. The footpath would overlay the Root Protection Areas (*RPA*) of the above trees and shall require a '*No Dig Construction Method*' to be implemented, in accordance with *BS5837; 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'*. Excavation shall be limited to the manual removal of the existing construction material / herb layer only and no change to the existing ground level is permitted.
- 3.6 A treeline feature of Poplar 'Balsam Spire' (*TL15 – Populus sp.*) runs north / south through the central area of the woodland and extends to the northern woodland edge. The treeline is protected by Tree Preservation Order (*TPO/BN/1/00 T5; Arun District Council*). The northernmost treeline tree is heavily inclined to the northern aspect and is becoming co-joined due to its proximity to another tree within the treeline. It is noted that a relatively substantial limb has been torn from the canopy to the northern aspect.
- 3.7 The tree is to undergo tree surgery works – a proposed pollard to reduce the canopy height and spread – to reduce the potential for further limb damage / drop and the exposure to wind drag. The tree should then continue to be managed as a pollard. The *RPA* for the above tree has been calculated as a combined stem due to the potential fusing with the adjacent stem. While this is difficult to verify the assumption affords the *TPO* tree greater protection in terms of rootplate area. The crown reduction work shall effectively reduce the resource requirement to the root system. Tree surgery works shall be carried out in accordance with *BS 3998: 2010 'Tree Work: Recommendations'*.
- 3.8 The alignment of the vehicular access road to the northern edge of the woodland shall impinge upon the *RPA* of the above tree. The implementation of the road shall be undertaken with a however should be undertaken with a '*No Dig Construction Method*' to be implemented, in accordance with *BS5837; 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'*. Excavation shall be limited to the manual removal of the existing construction material / herb layer only and no change to the existing ground level shall be permitted.
- 3.9 The proposed vehicular access should be implemented with a '*No Dig*' construction method, in accordance with *BS5837; 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'*. Excavation shall be limited to the manual removal of the existing construction material / herb layer only and no change to the existing ground level shall be permitted.

- 3.10 The residential development is proposed to be accessed from Yapton Road; the access would be located to the west of the eastern site boundary. There are a number of trees contained within an area of scrub habitat. Whilst the proposals necessitate the removal of low value scrub a number of trees proposed to be retained within the development would potentially be impacted and shall require protection. The development access road would pass the western edge of the trees.
- 3.11 The proposed vehicular access shall require the removal of areas of scrub and existing woodland vegetation. Tree removal shall be undertaken in accordance with *BS 3998: 2010 'Tree Work: Recommendations'*. The access road has been developed to avoid impacts upon significant trees or those protected by individual or group Tree Preservation Orders. Construction in proximity to these trees, as identified within drawing *LLD833 / 02 – Tree Retention and Protection Plan*, should proceed with due care and attention to avoid damage to the adjacent protected vegetation.
- 3.12 Within the woodland and to the eastern boundary are a number of derelict decrepit structures, footings, low walls, concrete paths and piles of slabbed concrete. These elements are to be removed as part of the development proposals. To implement the removal of these elements the demolition and removal of debris would be required to be undertaken by hand wherever possible. Where vehicular access is required to facilitate the demolition and removal of demolition material, appropriate ground protection measures should be put in place to prevent compaction of soil structure within which viable tree roots may exist. Facilitation pruning and further tree removal where agreed shall be carried out in accordance with *BS 3998: 2010 'Tree Work: Recommendations'*.
- 3.13 Dedicated infiltration zones are proposed within the scheme as part of the sustainable drainage strategy. An infiltration zone is proposed within the central woodland area to the south of the mature trees bounding the existing field. The infiltration zone would have an area capacity of approximately 1200.0m<sup>2</sup>, with dimensions of 62.0m x 25.0m. The removal of low value secondary Sycamore woodland shall be required to accommodate the proposed infiltration zone; additional vehicular construction access shall be required to facilitate the implementation of the infiltration zone.
- 3.14 Designated temporary vehicular access shall be installed prior to the construction of the infiltration zone. The designated access shall be implemented with *Ground Protection Measures* in accordance with *BS 5837:2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'*. The Ground Protection measures shall be capable of supporting all anticipated construction traffic without deformation of the underlying existing ground structure and shall be implemented prior to the main construction works. Tree Protection Fencing shall be installed to the proposed temporary access and shall enclose the construction zone. No construction traffic shall be permitted upon open exposed ground within existing RPAs of trees to be retained; all vehicular movement shall be confined to areas of installed Ground Protection only.
- 3.15 All Tree Protection and Tree Protective Fencing is to be in accordance with *BS 5837:2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'*. Any facilitation pruning to allow for the demolition shall be undertaken only upon seeking advice of qualified arborist; and carried out in accordance with *BS 3998: 2010 'Tree Work: Recommendations'*. Protective screen hoarding is to be installed in vicinity of any demolition zone for duration of works in order to protect nearby trees. All plant and vehicles engaged with demolition and construction are to operate outside RPAs of existing trees to be retained and demolition to be undertaken from within the existing building footprint ('top down, pull back'). The protective fencing is to remain in place for the duration and completion of the construction period following demolition.

- 3.16 The above impacts have been assessed and mitigation methods outlined. The mitigation is further detailed in the Arboricultural Method Statement below. The site contains a developed number of substantial and significant mature trees of high retention value. The site is largely covered by statutory protection. Replacement tree planting should be considered within the scheme where existing trees required for removal to accommodate the development proposals.

#### 4.0 Stages of Work / Programme

- 4.1 The residential development proposals shall involve the following site operations that could impact upon the existing tree cover;
- *Removal of existing vegetation not for retention;*
  - *Contractor movements; site access and operations; storage and compound;*
  - *Construction of campus building; car park construction; and ground work operations;*
  - *Implementation of services and utilities.*
- 4.2 The supervision of work stages and periodic attendance of an Arboricultural Consultant should be undertaken as part of any approved development scheme by the Local Planning Authority.
- 4.3 Site attendance should be arranged with all parties and undertaken with the agreement of the LPA within any given permission for the scheme.
- 4.4 If deemed necessary, the suggested key stages of work outlined for site attendance are as follows;
- *Pre-commencement meeting;*
  - *Installation of Tree Protection measures;*
  - *Method Statement briefing for site staff;*
  - *Construction operation stages;*
  - *Removal of Tree Protection measures.*

## 5.0 Arboricultural Method Statement

### ***Contractor Movements; Site Access and Operations; Storage and Compound Areas***

- 5.1 The contractor site compound shall be located outside of the defined tree root protection areas as indicated on drawing; *LLD833 / 02 – Tree Retention and Protection Plan*.
- 5.2 The contractor site compound shall be located so as to not incur damage or injury to the tree root systems or canopy of any existing trees or vegetation within or adjacent to the site, in accordance with *BS 5837; 2012 – Trees in Relation to Design, Demolition and Construction - recommendations*. All operations associated with the usage of the compound area shall be undertaken with due care and attention so as to negate damage of the surrounding environment.
- 5.3 Construction access to the site area shall be made at all times via the proposed access road from Yapton Road. Pre-construction vehicular movement to facilitate the removal of existing vegetation and undertake tree surgery works shall be limited to the minimum requirement in order to fulfil the vegetation removal works and no vehicular access shall be permitted over unmade ground within the tree root protection area of existing trees to be retained and protected without prior ground protection measures put in place. Once the tree removal and tree surgery works have been completed the tree protective fencing works shall be put in place. Vehicular movements during the construction period shall be limited to the areas of existing hard standing or newly protected ground only.
- 5.4 Demolition of the existing buildings shall be undertaken once the tree protective fencing measures have been put in place in order to protect existing tree canopies and tree root protection areas from vehicle movements and material storage.
- 5.5 All site operations and construction procedures for the duration of the construction period shall seek to protect the existing site vegetation and tree root protection areas in accordance with *BS 5837; 2012 – Trees in Relation to Design, Demolition and Construction – recommendations*.
- 5.6 ***Removal of Existing Vegetation***  
All existing trees designated for removal are to be removed in accordance with the Tree Protection and Retention Drawing *LLD833 / 02 - Tree Retention and Protection Plan*. All tree work and removal shall be carried out in accordance with *BS 5837; 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'* and *BS3998: 2010 – 'Tree Work: Recommendations'*. Trees designated for removal and felling shall be clearly marked on site with white paint. Prior to the removal and felling of trees, the required work and tree positions shall be agreed on site with the Landscape Architect / Arboricultural Consultant. Trees shall be felled, and tree surgery works undertaken prior to the erection of the Tree Protective Fencing. Care should be taken during the tree removal process to avoid any damage to any trees which are designated to be retained and protected.
- 5.7 Stumps shall be removed and cut away so that the top of the tree stump shall be at least 450 mm below the final topsoil level in order that the site can be reinstated in accordance with the existing site levels. Stumps are to be treated with an approved herbicide to be agreed with the Landscape Architect / Arboricultural Consultant. Where the depth is greater than 450 mm the areas shall be backfilled with topsoil to the required level.

- 5.8 The removal of shrub or scrub material within the tree root protection area of any tree to be retained shall employ a manual removal method; the use of hand tools shall be used in order to maintain the ground surface of the tree root protection area, and reduce any damage to existing tree roots within the protected tree root zone. Adjacent trees shall not be utilised as anchors or levers to facilitate the removal of adjacent vegetation.

***Tree Surgery***

- 5.9 Tree surgery measures and works have been identified with the attached *Existing Tree Schedule and Schedule of Tree Works*. Any significant defects found in the trees during the course of the scheduled work shall be reported to the Landscape Architect / Arboricultural Consultant. All scheduled and arising tree work shall be undertaken by an approved and qualified Tree Surgeon in accordance with *BS3998: 2010 - Tree Work: Recommendations*. Care should be taken to avoid damage to neighbouring trees to be retained. Branches in confined spaces shall be removed and taken down in sections. All arisings shall be transported and disposed of away from site to the contractor's tip.

***Tree and Vegetation Management***

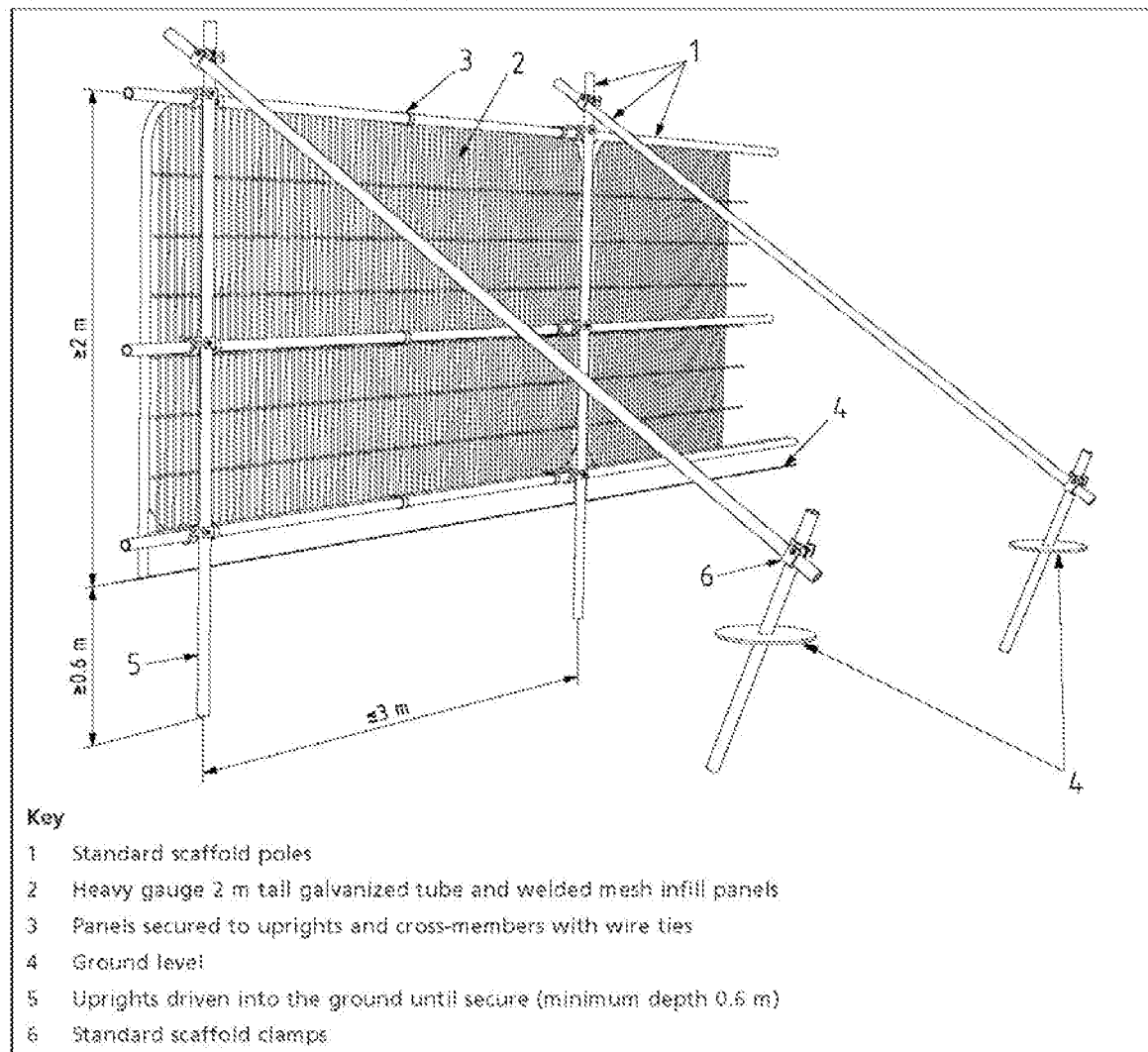
- 5.10 For tree and vegetation retention and removal proposals refer to the attached *Existing Tree Schedule*. For tree and vegetation management proposals refer to the tree surgery works and management prescriptions contained within the *Existing Tree Schedule and Schedule of Tree Works*.

***Protection and Retention of Existing Vegetation***

- 5.11 The contractor shall exercise extreme care when performing operations beneath the canopy of existing mature trees and vegetation and within the specified tree root protection areas designated for protection and avoid at all times damage to the roots, trunk and branches of existing trees proposed to be retained.
- 5.12 All excavations, cultivation, and grading beneath the canopy of existing mature trees and within the specified tree root protection areas of the existing trees and vegetation shall be carried out using hand tools, taking care not to damage or disturb any existing tree roots.
- 5.13 All trees to be retained on site shall be protected with fencing erected around the area of mature vegetation in accordance with *BS5837: 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'*. The fencing shall be installed, protected, and maintained during the main works by the contractor who shall be responsible for protecting any area beneath the canopy of the existing trees and within the specified tree root protection areas.
- 5.14 The installed protective fencing shall be positioned to the outside edge of the existing tree Root Protection Areas or as specified in accordance with the Tree Protection and Retention Drawing *LLD833 / 02 - Tree Retention and Protection Plan*. All tree protection is to be in accordance with *BS 5837: 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'*. The fencing should be strained, and fixed to fences, walls, knee rails where possible to provide a complete protected area. The tree protective fencing is to be;
- (f1) min. 2.0 metres height 'Heras' Welded Wire Mesh Fencing;
  - (f2) min. 2.0 metres height Plywood Timber Hoarding Panel Fencing (where additional requirement for demolition operations).
- 5.15 Day-glo ribbons shall be maintained during the main works by the contractor attached to the top of the fencing to ensure that the fencing is clearly visible during the works. The tree protection fencing shall display all-weather notices stating '*Construction Exclusion Zone – NO ACCESS*'.

- 5.16 All such fencing shall be maintained for the full contract period. All necessary excavations, earthworks, and cultivation beneath the canopy spread of any existing tree; shrub or hedge shall be undertaken by hand. No commencement of construction operations may occur prior to the inspection of the installed tree and ground protection by the Landscape Architect / Arboricultural Consultant. Repositioning of the protective fencing during the course of the contract as the contract works progress shall need prior agreement with the Landscape Architect / Arboricultural Consultant.
- 5.17 Within the protected area the following activities must not take place;
- *No vehicles are to be used in the fenced off areas;*
  - *No materials are to be stockpiled or stored;*
  - *No chemicals are to be stored;*
  - *No excavation or increase in the soil level shall occur;*
  - *No fires shall be lit on site.*
- 5.18 At the end of the contract period the contractor shall remove the tree protective fencing from the site. All retained vegetation shall be healthy and thriving at the handover date.
- 5.19 ***Heras – Anti-climb Smart Weld Panel Fencing***  
Supplier: *Safe Site Facilities*; or equal and approved  
Address: *Old Selden Farm, Selden Lane, Patching, West Sussex, BN13 3UL*  
Web: *www.safesitefacilities.co.uk*  
Specifications; Galvanised anti-climb mesh; 2.0m height x 3.5m width; 13.8kg weight.

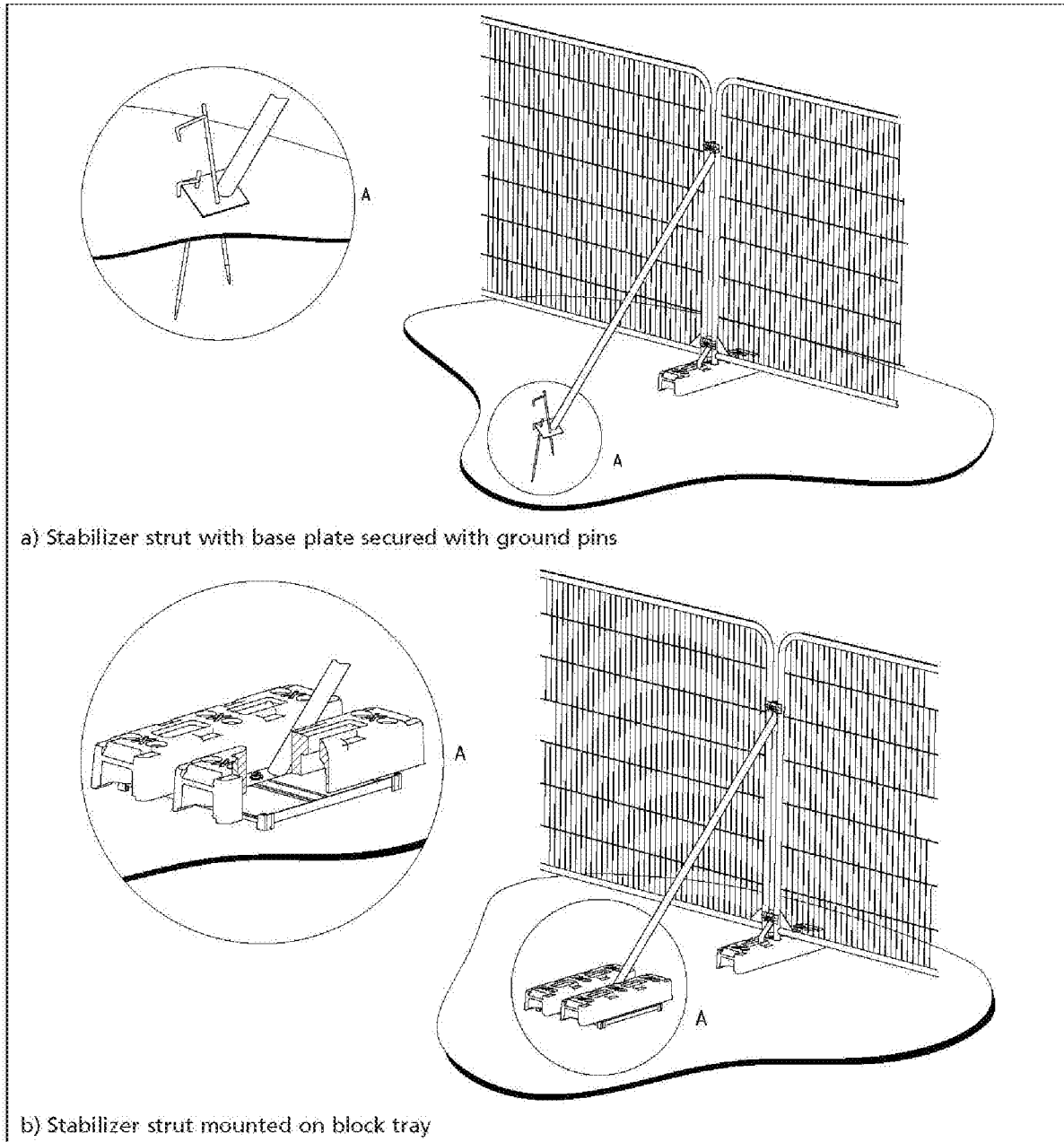
Figure 2 Default specification for protective barrier



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*(Care should be taken to avoid damage to unseen tree roots and underground services; a secondary fencing support system may be implemented to accommodate these as outlined in Figure No. 3 below).*

Figure 3 Examples of above-ground stabilizing systems



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**Ground Protection; Tree Protection Zone - Operation Zones during Construction**

5.20 Where construction operations require activity within the exposed unmade ground of any existing tree root protection area, a temporary protection zone shall be implemented allowing for construction operations only, but no vehicular access close to existing trees during the construction period. The temporary ground protection for construction operations only, including pedestrian operated plant to a gross weight of 2.0 tonnes (no general vehicular access is to be permitted), shall comprise a single thickness of ground protection plates secured and supported upon a scaffold framework driven into the ground or by a retained non-compressible layer (*woodchip / Type 1*) of 150mm depth placed above a geo-textile separation membrane in order to protect existing tree roots.

5.21 For temporary vehicular construction movements exceeding 2.0 tonnes within woodland areas and exposed unmade ground above Root Protection Areas of trees to be retained, a ground stabilising mesh (*'TDP SN20 GeoGrid' or equal and approved*), shall be rolled out over the existing ground level and evenly covered with a No Fines - Open Graded Aggregate (*in accordance with Highways Agency Specification; Clause 805 (Type 3) or equal and approved.*) incorporated within a 3 dimensional GeoCell (*Terram Geocell or equal and approved*) and shall ensure a minimum supportive depth of 150mm.

**Ground Protection; Tree Protection Zone – 'No-Dig' Construction**

5.22 In accordance with BS 5837; 2012; *'Trees in Relation to Design, Demolition and Construction - Recommendations'* ground levels should not be raised or lowered within the existing tree root protection areas. A *'no-dig' Construction* method shall be employed in order to avoid damage to existing tree roots and localised compaction of subsoil within the tree root protection area.

5.23 Where new surfacing is proposed within the tree root protection areas of the existing trees it shall be installed using a *'no-dig' permeable geo-grid construction*. Existing paving material shall be left undisturbed and retained during the construction period for as long as possible in order to protect the tree root protection area of the existing trees to be retained; existing surface hard landscape materials and sub-base layers only shall be removed carefully by hand within the existing tree root protection areas and shall not exceed the depth of the existing construction. Existing subsoil / topsoil layers shall be retained and protected in place in order to protect tree roots.

5.24 A ground stabilising geo-mesh shall be installed above the existing ground levels of the proposed car park area; prior to installation, all hollows within the existing construction are to be filled and no high points of existing undisturbed / unmade ground shall be skimmed. A ground stabilising mesh (*'TDP SN20 GeoGrid' or equal and approved*), shall be rolled out over the existing ground level and evenly covered with a No Fines - Open Graded Aggregate (*in accordance with Highways Agency Specification; Clause 805 (Type 3) or equal and approved.*)

5.25 The granular fill shall be incorporated within a 3 dimensional GeoCell (*Terram Geocell or equal and approved*) and shall ensure a minimum supportive construction depth of 250mm as specified. A geo-textile filter membrane is to be laid over the granular fill construction (*Geotextile filter membrane to be TDP 115 Non-woven Geotextile Fabric or equal and approved.*) A permeable paving system and construction method shall be installed over the prepared sub-base layers.

**Ground Protection; Tree Protection Zone – Manual Excavation**

- 5.26 Where the development proposals necessitate excavation of building foundations; the tie-ing in and re-grading of existing and proposed levels for vehicular access; or include the implementation of underground services such services, cables, pipe work; a manual excavation method must be implemented using hand held tools to minimise the impact on existing trees and roots. The excavation shall be executed with due care and attention not to disturb exposed unmade ground and any existing tree roots present within it.
- 5.27 Roots over 25mm diameter or those occurring in clumps must not be severed without arboricultural advice. Roots below such size may be cut cleanly using specialised hand tools only and to the minimum extent to allow provision. All exposed roots should be immediately wrapped in dry Hessian to avoid drying. On completion of the excavation and at the earliest opportunity the wrapping should be removed, and the roots surrounded and protected with a loose granular fill (*clean washed sharp sand or topsoil free of contaminants or matter injurious to rooting systems*) prior to backfilling the excavation to the desired levels.
- 5.28 Existing service runs should always be used wherever possible. Where the proposed routing of services impinges upon the root protection area of any existing tree to be retained, the routing shall be undertaken in accordance with a manual excavation method; to be carefully hand dug and routed most directly to and from the exterior of the tree root protection area radius. Services are to be trenched and routed together wherever possible to create the minimum impact upon the tree roots of the existing trees to be retained. Trench excavation across the tree root protection area radius beside an existing tree shall be avoided, whereby tree roots will become severed. Where services are to cross the edge of an existing tree root protection area, they should be routed through existing tree roots, via a hand dug ducting sleeve, avoiding damage to existing tree roots within the root protection zone.

**Ground Protection; Tree Protection Zone – Temporary Construction Access**

- 5.26 Where the development proposals necessitate the movement of construction vehicles within or over Root Protection Areas of existing trees to be retained, designated Ground Protection Measures shall be installed prior to any construction operation over exposed unmade ground in proximity to existing trees and within associated Root Protection Areas.
- 5.27 A temporary 'Ground Protection Zone' shall allow for the passage of construction vehicles to the site and shall be implemented without intrusion or change of existing ground levels within the Root Protection Areas of existing trees. The Ground Protection measures shall be capable of supporting all anticipated construction traffic without deformation of the underlying existing ground structure and be implemented prior to the main construction works.
- 5.28 The existing ground within the Root Protection areas of existing trees is to be overlain with a Heavy Duty Geotextile Membrane upon which a proprietary ground protection system of metal panels shall be laid. A layer of 150mm depth woodchip shall be placed upon the ground protection and overlaid with a second layer of metal panels to provide a suitable trackway for construction access. The temporary construction access shall be retained with timber restraints / edge supports; secured above ground.
- 5.29 No traffic shall be permitted upon open exposed ground within existing RPAs; all vehicular movement shall be confined to areas of installed Ground Protection only.

**Tree Protection Zone – Protection through Demolition**

- 5.30 For any proposed demolition of structures within the vicinity of trees to be retained, pruning should be first undertaken to facilitate access and prevent injurious contact due to plant movements. When demolishing a structure (including underground structures) within root protection areas, ground protection measures shall be implemented to protect the underlying soil to the edge of the existing structure. All plant and vehicles involved with demolition works should either operate outside the RPA, or upon the installed ground protection. All ground protection should be installed prior to commencement of operations.
- 5.31 Where trees are located adjacent to structures proposed for removal, demolition should be undertaken inwards and from within the footprint of the existing building ('top down, pull back' method). Where an existing hard surface is scheduled for removal, care should be taken not to disturb tree roots that might be present beneath it. Hand-held tools or appropriate machinery should be used (under arboricultural supervision) to remove the existing surface, working backwards over the area, so that the machine is not moving over the exposed ground.
- 5.32 Temporary Protective screen hoarding is to be installed in the vicinity of any demolition zone for the duration of the demolition works in order to protect nearby trees. The protective screen hoarding shall comprise min. 2.0 metres height Plywood Timber Hoarding Panel Fencing secured to timber posts, or attached temporarily to the specified Wire Mesh Tree Protection Fencing system.

**Tree Protection Zone - Trenchless Excavation / Insertion**

- 5.33 The development proposals incorporate a sustainable drainage strategy to alleviate off site drainage impacts. A number of infiltration zones are proposed within the site boundaries. Where service pipework is to be made through the Root Protection Area of existing trees to be retained, the pipework shall be routed utilising a *Trenchless Excavation* method. (Refer to drainage engineering detailed specification and drawing - ES1504 502-00.)
- 5.34 The trenchless insertion of pipework shall be employed through micro-tunnelling / directional drilling to accommodate the proposed pipe runs. The entry and retrieval pit locations shall be sited outside any RPA of any existing trees to be retained. The pipe run shall be made at the deepest practical depth below the root protection area in order to achieve appropriate pipe gradients for transference of stormwater runoff to the infiltration zone; wherever possible this shall be a minimum of 750mm depth below existing ground level to reduce potential intrusive impacts upon underlying root systems. Run depths of 600mm or less below existing ground levels considerably increase the potential for invasive and damaging impacts upon existing root systems and should be avoided.
- 5.35 The minimum bore diameter necessary for the insertion of conduit pipework shall be employed and shall be located and directionally set out to incur the minimum impingement of the specified root protection areas, as indicated within *LLD833/02 Tree Retention and Protection Plan*..

**Arboricultural Method Statement – Notes; General**

- 5.36 The principles and recommendations of *BS5837; 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'* shall be adhered to where possible in order to prevent damage or undue stress upon the existing trees, soils and roots potentially impacted upon by the development proposals.
- 5.37 Destruction of soil structures through soil compaction, excavation or contamination shall be avoided at all times within the tree root protection areas. Physical damage to existing trees to be retained; roots, stems, branches shall be prevented wherever possible.
- 5.38 All tree protection measures are to be carried out, on site and within the development proposals, in accordance with the relevant approved drawings accompanying this method statement.
- 5.39 Arboricultural Supervision shall be required at the following stages of work;
- *Installation of tree protection measures;*
  - *Method statement briefing for site staff;*
  - *Supervision of the manual excavation of building foundations within tree root protection areas;*
  - *Supervision of the 'no-dig' area prior to and for the implementation of the construction process;*
  - *Removal of tree protection measures.*
- 5.40 The loss through development of existing trees may occasionally be unavoidable. Wherever existing trees are removed to accommodate development, contingency should be made for relocation of removed trees if possible or the replanting of young trees with suitable species for the site location where relocation of existing trees is not viable.
- 5.41 The phasing of works might be appropriate in order to implement the proposed development. Where the construction operations impact upon existing trees to be retained the trees shall be fully protected where possible in accordance with *BS 5837; 2012; 'Trees in Relation to Design, Demolition and Construction - Recommendations'* for the duration of the construction period. The phased retraction of construction operations may allow for tree protection measures to be withdrawn / re-sited. The re-alignment or withdrawal of any Tree Protection Measure shall only be permitted with the agreement of the Project Arboricultural Consultant / Local Planning Authority.

**6.0 Contact Details**

Lizard Landscape Design and Ecology  
19 Broadwater Street East, Worthing, BN14 9AA;