Arboricultural Method Statement

Rev2b. Previous Revision 18th January 2016
Substation Added

at

Kings College Halls
Kidderpore Avenue
Hampstead
NW3 7ST

Dated
21st April 2016

CROWN Consultants

Tree consultants throughout England and Wales

Contents

1. Introduction

1.1. Instruction

1.1.1. We are instructed by Sean Wilkins of Mountanvil to produce a Method Statement detailing how trees shall be protected from proposed construction activity at Kings College Halls. Revision 1 of this document was issued on 18th January 2016. Today's revision includes the substation adjacent to T35.

1.2. Scope and Purpose of the Report

1.2.1. Tree protection measures specified within this report should be agreed with the local authority in order to assist with the discharge of planning conditions associated with recent **Planning Consent**, for development of the site.

1.3. References

1.3.1. This report should be read in conjunction with our report dated 1st July 2015 (reference 09166) which presents the results of our tree survey to British Standard 5837 (2012).

1.4. Drawings

1.4.1. The *Tree Removal Plan* indicates the tree constraints with the proposals overlaid. This plan shows which trees are to be pruned or removed.

1.4.2. The *Tree Protection Plan* can be found in Appendix 6. This shows the protection measures that are to be installed during the demolition and construction phase. This plan accompanies the Method Statement which is to be found in Section 2.

2. Method Statement

Section A: Introduction and Overview

2.1. Definition of Terms

2.1.1. Some terms used within the Arboricultural Method Statement have very specific meanings. These are defined below:

2.1.2. **Root Protection Area (RPA).** This is a theoretical area of ground around a tree where the roots are likely to proliferate. Ground disturbance in this area should be minimised in order to avoid significant impact on tree health. RPAs are indicated on all plans accompanying this report as a pink line.

2.1.3. **Construction Exclusion Zone (CEZ).** These zones are created to protect roots and canopies form inadvertent damage by construction activity – see Section 2.6. -*Construction Exclusion Zones*. They are usually fenced off by protective barriers throughout the entire construction phase. No works are permitted in these zones other than minor landscaping works which do not require a change in ground level. Where practicable the entire *Root Protection Area* and the area beneath the tree canopy shall be treated as a *Construction Exclusion Zone*. These zones are hatched purple on the Tree Protection Plan.

2.1.4. **Restricted Activity Zone (RAZ).** It is not always possible to create a *Construction Exclusion Zone* over the entire RPA. This is because access may be required or some works may be proposed within the RPA. In such circumstances a *Restricted Activity Zone* is created where limitations are placed on construction activity. Ground protection measures may be specified or the Restricted Activity Zone may be fenced off throughout part of the construction phase. See the legend on the Tree Protection Plan to identify these zones.

2.2. Tree Protection Barriers - Overview

2.2.1. The Tree Protection Plan indicates the location of all proposed tree protection barriers according to the following legend and overview:

Symbol on Tree Protection Plan	Barrier type See Section 5	Location
	In-Ground System or Back-Stay System	Around the Construction Exclusion Zones. As indicated on the Tree Protection Plan.
	Back-Stay System	N/A
	Barrier Mesh System	N/A
	Plywood Boxing	As indicated on the Tree Protection Plan

2.2.2. The barriers shall be installed prior to the commencement of any localised construction activity including soil stripping and delivery of materials. A detailed specification of the barriers can be found in Section 5.

2.2.3. The tree protection plan also indicates where ground protection measures shall be installed as specified in sections 2.8 onwards (Restricted Activity Zones) and Section 6–*Ground Protection Measures.*

2.3. Overview of Protection Measures

2.3.1. Below is a list of potential arboricultural impacts and a summary of the proposed protection measures:

Reference	Comments	Potential Impact	Protection measures
T38, T64	Canopy is close to proposed construction or demolition activity	Damage to branches.	Prior to commencement, pruning to be undertaken as specified in Section 4 -*Tree Works Schedule*).
shrubs marked with a red cross on the Tree Protection Plan	Vegetation prevents adequate access for plant machinery through the site	Damage to branches and roots	Vegetation to be removed. This vegetation is in addition to the trees marked for removal in our report dated 1st July 2015.
T3, T4, T5, T6, T9, T11, T20, T21, T33, T34, T35, T38, T39, T40, T64, T65	Access is required over the Root Protection Area.	Compaction and contamination adjacent to proposed works.	Suitable load spreading surface to be maintained throughout the construction phase **(Restricted Activity Zone A)**. No excavation or resurfacing shall occur other than after consultation with the appointed arborist and approval from the local authority. Construction exclusion zone to be created over remainder of Root Protection Area. See Section 2.8 for all restrictions that apply.
T21	Building foundations to be installed in RPA.	Excessive root severance.	Pile and beam/raft foundations to be installed using narrow diameter piles **(Restricted Activity Zone B)**. Trial holes to be excavated to determine rooting activity and piles located to minimise impact. Excavation for beam/raft to be minimised. See Section 2.9 for all restrictions that apply.
T52, T54	Foundations for scaffold supporting the building façade to be installed in RPA.	Excessive root severance.	Pile and beam/raft foundations to be installed using narrow diameter piles **(Restricted Activity Zone C)**. Trial holes to be excavated to determine rooting activity and piles located to minimise impact. Excavation for beam/raft to be minimised. See Section 2.10 for all restrictions that apply.
T50	Underground services to be installed in RPA.	Root severance.	Excavation to a depth of 600mm to be undertaken using an air spade and hand tools **(Restricted Activity Zone D)**. A watching brief is proposed during excavation and all large roots to be retained where possible. Tree officer and an appointed arborist invited to oversee. See Section 2.11 for all restrictions that apply.
T50	Foundations to be installed in RPA.	Excessive root severance.	Pile and beam/raft foundations to be installed. Piles not to exceed more than 200mm beyond the footprint of the building **(Restricted Activity Zone E)**. See Section 2.12 for all restrictions that apply.

2.3.2. The above measures are described in more detail throughout the remainder of this section.

2.4. Planning Status

2.4.1. Tree protection measures specified within this report should be agreed with the local authority so that they may discharge relevant planning conditions.

2.4.2. The site manager must be familiar with all aspects of this Method Statement and should liaise with the author of this report for clarification, or regarding any unforeseen issues where trees may be impacted upon.

2.4.3. A copy of this Method Statement shall be available on-site at all times. All personnel working on the site shall be made aware of any sections appertaining to their work. This includes short term contractors and persons responsible for deliveries and installation of services.

2.5. Timing of Operations

2.5.1. Activity within the site shall be phased according to the following chronology:

Order	Phase	Activity
1st.	Pre-Construction Phase	Undertake all specified tree removal and pruning (see Section 4 *-Tree Works Schedule*).
2nd.		Install the tree protection barriers (see Tree Protection Plan and Section 5 *-Tree Protection Barriers.*
3rd.		Maintain or maintain a suitable load spreading surface and exercise caution in Restricted Zones A, C and D. (see Tree Protection Plan and Section 6 *–Ground Protection Measures*)
Protection measures confirmed acceptable by the local authority		
4th.	Demolition and construction Phase	Demolish existing structures and remove existing surfaces where applicable.
5th.		Install new buildings, hard surfaces and services taking into account restricted activities as specified in Sections 2.6 onwards
6th.	Post-Construction Phase	Remove protective barriers (fencing and ground protection measures as applicable).
7th.		Undertake restricted landscaping operations within Root Protection Areas, including boundary treatments, pedestrian surfaces, decking and any proposed tree planting.

Section B: Restrictions on Activities – Specific Zones

2.6. Construction Exclusion Zones

2.6.1. Within Construction Exclusion Zones (shaded purple on the Tree Protection Plan) the following restrictions shall apply:

- Tree Protection Barriers shall be erected and maintained throughout the entire project as indicated on the Tree Protection Plan and specified in Section 5 -*Tree Protection Barriers*.
- No construction activity whatsoever shall occur.
- No vehicles or plant machinery shall be driven or parked.
- No tree works, other than those specified in this report shall be undertaken.
- No alterations of ground levels or conditions.
- No chemicals or cement washings permitted.
- No excavation whatsoever shall occur.
- No temporary structures.
- No spoil shall be stored.
- No fires shall be permitted.
- All hazardous materials (including non-essential cement products) shall be forbidden.

2.6.2. Where hard surfaces are to be removed, this shall be done using hand tools or mechanical excavators operating from outside the Construction Exclusion Zone and marshalled by the appointed arborist.

2.6.3. Any structures shall be removed manually and without mechanical excavation.

2.7. All Restricted Activity Zones

2.7.1. Within all of these zones (indicated on the Tree Protection Plan) the following restrictions apply:

- Only essential and specified works shall be permitted.
- Operations within these zones shall be supervised as specified within the Inspection Schedule in Section 3.
- All excavation and lifting of surfaces shall be undertaken using hand operated tools or a mechanical excavator operating from outside the Restricted Zone and carefully marshalled by the local authority tree officer or an appointed arborist.
- No fires shall be permitted.
- All hazardous materials (including non-essential cement products) shall be forbidden.

2.7.2. Further restrictions specific to each zone are specified below:

2.8. Restricted Activity Zone A

2.8.1. Within these zones (indicated on the Tree Protection Plan) access will be required to facilitate construction. The following restrictions shall apply:

- No permanent or temporary structures shall be erected without written approval from the local authority.
- Ground protection measures appropriate to the proposed activity shall be installed as specified in Section 6 –*Ground Protection Measures*. These shall remain in place throughout the entire demolition and construction phase. *Note 1: where existing paving is retained and only pedestrian activity is proposed, no additional ground protection measures will be required. Note 2: where a pile driver needs to operate, it should operate entirely from outside the Restricted Activity Zone. If this is not possible, the ground protection measures may need to be strengthened in order to withstand the required*

loads. A reinforced concrete slab may be required. In such circumstances the ground protection measures shall be designed by engineers and shall be subject to approval by the local authority.

- Existing ground levels shall be retained undisturbed.
- Any resurfacing or installation of new hard surfaces shall be done in accordance with the Guidelines in Section 7 *-New Surfaces.*
- No excavation shall occur in this zone without consulting the appointed arborist and obtaining approval from the local authority.
- If roots are encountered in excess of 25mm diameter, they shall be retained wherever possible and protected with damp sacking during times that they are unearthed. Any roots in excess of 10mm that need to be severed shall be pruned with secateurs.
- No machinery in excess of 2m tall shall pass through or operate in this zone unless carefully marshalled in order to avoid damage to branches.

2.9. Restricted Activity Zone B

2.9.1. Within this zone (indicated on the Tree Protection Plan) it is proposed to **install building foundations adjacent to T64.** The following restrictions shall apply:

- Concrete strip foundations shall not be installed in this area.
- Instead a pile-and-raft or pile-and-beam foundation shall be utilised.
- Excavation for the ground beam/raft shall be undertaken using hand tools or a carefully marshalled mechanical excavator operating from outside the Root Protection Area. Excavation depth to be agreed and approved by the local authority after consultation with engineers and contractors.
- Roots in excess of 25mm which are located close to the extent of the excavation are to be retained intact if possible; otherwise they shall be pruned with a sharp saw or secateurs.
- No auger or piling rig in excess of 4m shall be used beneath any tree canopy without being carefully marshalled by the appointed arborist.

2.10. Restricted Activity Zone C

2.10.1. Within this zone (indicated on the Tree Protection Plan) it is proposed to install a **scaffold structure designed to support the existing building façade** whilst the rest of the building is demolished and rebuilt. The following restrictions shall apply:

- Ground protection measures appropriate to the proposed activity shall be installed as specified in Section 6 *–Ground Protection Measures. Note: where a pile driver needs to operate, it should operate entirely from outside the Restricted Activity Zone. If this is not possible, the ground protection measures may need to be strengthened in order to withstand the required loads. A reinforced concrete slab may be required. In such circumstances the ground protection measures shall be designed by engineers and shall be subject to approval by the local authority.*
- The scaffold structure shall be founded on piled foundations.
- Trial pits shall be excavated to determine the location of the piles. Trial pits shall be 300mm x 300mm and excavated using hand tools to a depth of 600mm below that of the ground beam. Excavation shall be undertaken in the presence of the local authority tree officer or the appointed arborist. Soil shall first be loosened with a garden fork to ascertain if large roots are present before the loosened soil is removed with a spade. If roots in excess of 25mm are encountered, they shall be retained intact wherever possible and the pile shall be relocated. Roots in excess of 10mm shall be pruned using sharp secateurs. Beyond this depth, piles may be installed using an auger or piling rig. Pile diameter shall not exceed 300mm unless agreed otherwise with the local authority.
- No further excavation shall take place.

2.11. Restricted Activity Zone D

2.11.1. Within this zone (indicated on the Tree Protection Plan) it is proposed to install **underground services.** In order to ensure no significant impact on the root system of adjacent tree(s) a watching brief is proposed during all excavation in this area. The following restrictions shall apply:

- Excavation shall be overseen by an appointed arborist. The local authority tree officer shall be invited to attend.
- Hand tools and an air-spade shall be used during the excavation to a depth of 0.6m. Below this depth, a mechanical excavator may be used.
- All roots in excess of 50mm shall be retained wherever possible.
- Roots in excess of 25mm shall be retained wherever practicable.
- Any roots that need to be cut shall be pruned with secateurs.

2.12. Restricted Activity Zone E

2.12.1. Within this zone (indicated on the Tree Protection Plan) it is proposed to install **building foundations adjacent to where roots of the large London Plane, T50**, are anticipated. The following restrictions shall apply:

- Concrete strip foundations shall not be installed in this area.
- Instead a piled foundation shall be utilised.
- The piles or any part of the foundation shall not extend more than 200mm beyond the footprint of the building.
- No auger or piling rig in excess of 3m shall be used beneath tree canopy without being carefully marshalled by the appointed arborist.
- Suitable ground protection measures shall be installed if the piling rig is to operate outside of the building footprint.

Section C: Restrictions on Activities – Throughout the Site

2.13. Hard Surfacing

2.13.1. If any hard surfaces are proposed over Root Protection Areas, they shall be installed according to the guidelines specified in Section 7.

2.14. Canopy Protection

2.14.1. In order to protect tree canopies the following restrictions shall apply throughout the site:

- No machinery in excess of 2m shall pass beneath the canopy of any tree without being carefully marshalled in order to ensure that no branches are damaged.
- If materials require installation or delivery beneath tree canopies, this shall be done without the use of overhead cranes.
- If materials are to be installed or delivered close to tree canopies (but not beneath them) and a crane is required, they shall be carefully marshalled in order to ensure that branches are not accidentally damaged.

2.15. Site Hoarding

2.15.1. If site hoarding shall be installed over the Root Protection Area of any tree, the following restrictions shall apply:

- Ground levels shall be maintained as existing.
- Post holes shall not exceed 300mm x 300mm.
- No post hole shall be excavated within 1.5m of any tree stem.
- Post holes shall be excavated using hand tools or by a post-hole auger attached to plant machinery sited outside the Root Protection Area(s).
- Roots in excess of 25mm shall be retained wherever possible.
- Roots in excess of 10mm shall be pruned with sharp secateurs.
- Pruning shall be minimal and only undertaken where absolutely necessary to facilitate the site hoarding. It shall be undertaken by a reputable tree surgeon working to BS 3998 (2010).
- Cement products shall be mixed away from Root Protection Areas (see Section 2.24 - *Hazardous Materials*).

2.15.2. Site hoarding may be installed in place of the specified tree protection measures subject to the approval of the local authority with regard to its location and specification.

2.16. Fence Posts

2.16.1. If permanent fencing is to be installed within Root Protection Areas, the following restrictions shall apply:

- All post holes shall be excavated by hand and kept as narrow as possible (maximum diameter 300mm).
- Exploratory post holes shall be dug before committing to post / panel positions. If any roots in excess of 25mm are encountered they are to remain intact and the post hole shall be relocated slightly. The fencing system must permit such flexibility (i.e. where fixed panel widths are used, all post holes must be excavated before committing to the final location).
- Any roots in excess of 10mm which are severed shall be neatly pruned back with secateurs. This will encourage healing and reduce the likelihood of infection.

2.16.2. Walls shall be avoided over Root Protection Areas unless their foundations may be spanned over roots using a beam system.

2.16.3. Hedges may be planted within Root Protection Areas using hand tools to minimise excavation.

2.17. Demolition and Initial Ground Works

2.17.1. No demolition, removal of surfaces, or soil stripping shall commence until the protective fencing and ground protection measures are installed to the satisfaction of the local authority.

2.18. Underground Services

2.18.1. No underground services (including soak-aways) shall be located in any part of the *Construction Exclusion Zones* or *Restricted Activity Zones* unless done so as specified in Section 3.7.

2.19. Lighting, Bollards, CCTV and associated Cables

2.19.1. If any of the above are to be installed close to tree canopies or within Root Protection Areas of retained trees; installation methods shall be detailed in a specific Method Statement and approved by the local authority. Consideration should be given to the following:

- Pruning of branches to enable sufficient clearance for light and views. Branches should be removed to the *branch collar* as per British Standard 3998 (2010).
- Post holes must be excavated by hand or using an appropriate sized auger. No other form of mechanical excavation may be used.
- Cables should be routed in a direction directly away from the tree. It will not be acceptable to excavate a trench across any Root Protection Areas.

2.20. Use of Heavy Plant

2.20.1. All machinery operatives are to be made aware of any *Construction Exclusion Zones* and *Restricted Activity Zones* that apply to this site (see the Tree Protection Plan and Section 2.6 onwards).

2.20.2. All machinery operatives are to respect these zones and ensure that no damage occurs to trees due to the careless use of machinery.

2.20.3. Mechanical excavators should have tracks rather than wheels to help spread their load. They should be carefully marshalled when working close to tree canopies.

2.21. Scaffolding

2.21.1. If scaffolding is required in areas containing ground protection measures, the protective boards shall need to remain in-situ and be strengthened and stabilised to bear the weight of scaffold poles.

2.21.2. Prior to the installation of any scaffolding within 0.5m of any tree branches, the appointed arborist shall be consulted to specify any pruning works that may be required.

2.22. Siting of Cabins and Storage of Materials

2.22.1. Cabins and heavy building materials may be located or stored anywhere outside of *Construction Exclusion Zones* and *Restricted Activity Zones*.

2.22.2. Any proposal to install cabins or materials within these zones shall be agreed in writing with the local authority prior to installation.

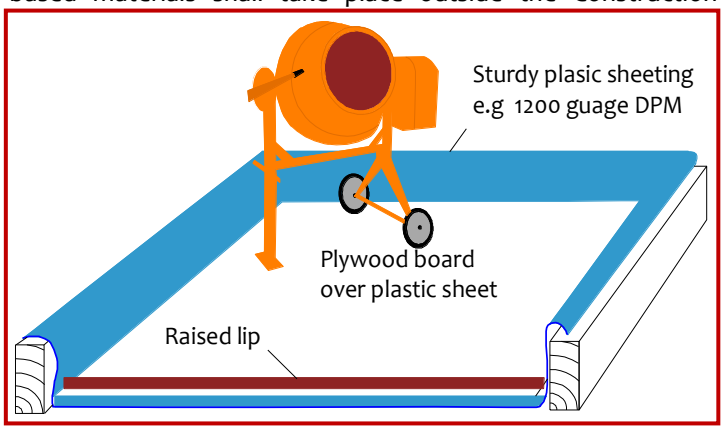
2.22.3. It may be acceptable to locate site cabins such that they act as a tree protection barrier and replace the specified protective fencing. Where this is being considered, written approval must be sought from the local authority.

2.23. Pedestrian Paving

2.23.1. If it is proposed to install new pedestrian surfaces over Root Protection Areas, excavation shall be limited to the removal of existing turf/vegetation plus an additional 50mm. Excavation shall be undertaken using hand tools only. Porous materials are preferred but not essential if the new surface covers less than 10% of the Root Protection Area. Paving with a thickness of 50mm bedded on mortar, or sand, bearing directly onto the ground, with a finished surface level with existing ground levels will be acceptable. No retaining kerbs shall be used.

2.24. Hazardous Materials

2.24.1. Any mixing of cement based materials shall take place outside the Construction Exclusion Zones and Restricted Activity Zones. Where cement is to be mixed at considerable distances from trees and water run-off cannot enter Root Protection Areas, then no further special measures are required. Otherwise, provision shall be made to ensure that the mixing area is contained so that no water run-off enters the Root Protection Area of any trees (see diagram for example). Mixers and barrows shall be cleaned within this area.



2.24.2. All other chemicals hazardous to tree health, including petrol and diesel, shall be stored in suitable containers as specified by current COSHH Regulations, and kept away from Root Protection Areas.

Section D: Post-Construction Phase

2.25. Removal of Tree Protection Barriers

2.25.1. This will be done after all major construction work is complete. Vehicular access will not be permitted within the Construction Exclusion Zones.

2.25.2. The local authority tree officer shall be made aware that the fencing is to be removed.

2.26. Ground Remediation

2.26.1. After all construction activity is completed a site meeting shall take place and the soil conditions assessed. The appointed arborist shall attend and the local authority tree officer shall be invited.

2.26.2. Where compaction is deemed to have occurred over any Root Protection Areas, suitable remediation measures shall be agreed and implemented (e.g. terraventing and mulching).

2.27. Landscaping

2.27.1. No machinery used within landscaping operations shall operate within the Root Protection Areas of retained trees.

2.27.2. Ground levels shall not be altered within Root Protection Areas without consultation and approval from the local authority.

2.27.3. It is recommended that the local authority tree officer or an appointed arborist visit the site and discuss with the site manager any strategies to improve conditions for existing or new trees in order to ensure their continued well-being.

2.28. Tree Planting

2.28.1. Trees planted in poor soils or compacted soils are unlikely to become established, so prior consideration should be given to rooting conditions. Where compaction or contamination is believed to have occurred expert horticultural or arboricultural advice should be sought.

2.28.2. Any new tree planting shall be carried out after completion of all construction activity in the vicinity.

3. Site Inspection

3.1. Inspection Schedule

3.1.1. In order to ensure that the trees are adequately protected it shall be necessary to periodically monitor the works. This will be done by the local authority tree officer or an appointed arborist (see Section 3.2 below) who will provide the tree officer with a copy of inspection details.

3.1.2. The following inspection schedule is suggested though the local authority may specify additional supervision where deemed necessary.

Inspection	Attendees	Comments
Pre- Start To occur prior to any works taking place on the site.	N/A.	Site manager to study this Method Statement & contact the appointed arborist to agree all protection measures.
Pre-Construction Meeting After tree works completed & tree protection barriers / ground protection measures installed. Prior to any other activity, inc. demolition & soil stripping.	Site manager, appointed arborist and/or local authority tree officer. *	Tree protection fencing locations & specification checked. Additional ground protection measures checked. Further protection measures / restrictions agreed.
Intermediate Reporting Throughout the entire project. At least once per month.	N/A.	Site manager to liaise with the appointed arborist regarding any issues which may affect trees. General site photos indicating tree protection measures to be provided monthly.
Excavation or resurfacing in Restricted Zones Including underground services.	Site manager, appointed arborist and/or local authority tree officer.	At least one week's notice shall be given prior to commencing excavation.
Post-Construction Meeting Post major construction activity but prior to removal of fencing & landscaping operations.	Site manager, appointed arborist and/or local authority tree officer.	Retained trees inspected. Further landscaping operations and restrictions to be agreed.
Post-Landscaping Meeting Confirm landscaping and mitigation planting is acceptable.	Site manager, appointed arborist and/or local authority tree officer.	N/A.

* Where agreed with the L.A. it may be acceptable to supply photographs of the fencing to avoid the necessity for a site visit.

3.2. The Appointed Arborist

3.2.1. The appointed arborist must have a good understanding of the project and be suitably qualified to understand the hazards associated with development near to trees.

3.2.2. The appointed arborist should work closely with the site manager and shall have the authority to insist upon work stoppage until resolution of any major issues arising which could be detrimental to the health of protected or important trees.

3.2.3. The appointed arborist must keep the local authority updated at each of the stages within the inspection schedule and will advise on any unexpected issues arising throughout the project which could impact on trees.

4. Tree Works Schedule

4.1. Tree Works Specification

4.1.1. The following table specifies the tree works which will be required (in addition prior to the commencement of construction activity:

Tree Reference	Action Required	Notes
Cotoneasters adjacent to T34 and other shrubs marked with a red cross on the Tree Protection Plan	Remove.	These trees are in addition to the trees proposed for removal within our report dated 1st July 2015. Stumps of trees within the RPAs of retained trees shall be removed with a stump grinder NOT a mechanical excavator.
T1, T2, G7, T8, T10, T12, T13, T14, T15, T16, T17, T18, G19, T23, T24, T25, T26, T27, T28, T29, T30, T31, G32, T36, T37, T41, T42, T43, T44, T45, T49, T55, T56, T60	Remove.	These trees are proposed for removal within our report dated 1st July 2015. These works are consented by virtue of the Planning Consent. Stumps of trees within the RPAs of retained trees shall be removed with a stump grinder NOT a mechanical excavator.
T64	Trim overhanging foliage back to 2m from the boundary.	Only very light pruning using secateurs (or a small manual pruning saw) will be necessary.
T38, T50	Trim back to create a clearance distance of 2m from the existing building walls and roof.	Branches to be pruned back to a secondary branch junction or the branch collar wherever possible. Pruning to be kept to a minimum to achieve the desired clearance of 2m.
T48	Trim back to create a clearance distance of 4.5m from the proposed building walls and roof.	Branches to be pruned back to a secondary branch junction or the branch collar wherever possible. Much of the desired clearance may be achieved by the removal of one large limb.

4.1.2. **Pruning Standards:** Sympathetic pruning shall be carried out to BS 3998 (2010). Lopping of branches is to be avoided. Instead as system of 'drop crotching' or 'reduction via thinning' is to be used to achieve the desired clearance without spoiling the appearance, or form, of the trees. All pruning cuts shall be made close to the branch collar or a secondary growth point. Cuts to be made with sharp, clean tools. No wound sealants to be used.

5. Tree Protection Barriers

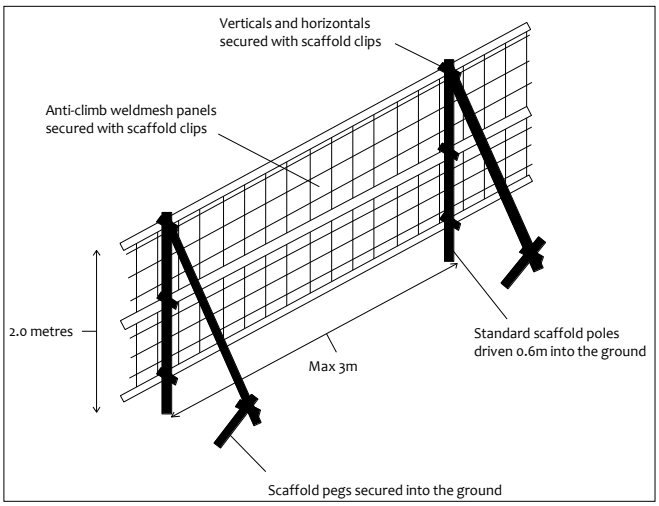
Detailed Specification

5.1.1. The purpose of tree protection barriers is to keep construction activity away from *Restricted Activity Zones* or *Construction Exclusion Zones*. They should be appropriate to the nature and proximity of activity within the site. The barriers should be erected prior to the commencement of all activity including demolition, soil stripping and delivery of materials and demolition (except where existing structures require demolition to enable the barriers to be installed). Barrier systems are specified below and should be installed according to the legend on the Tree Protection Plan.

5.2. The In-Ground System

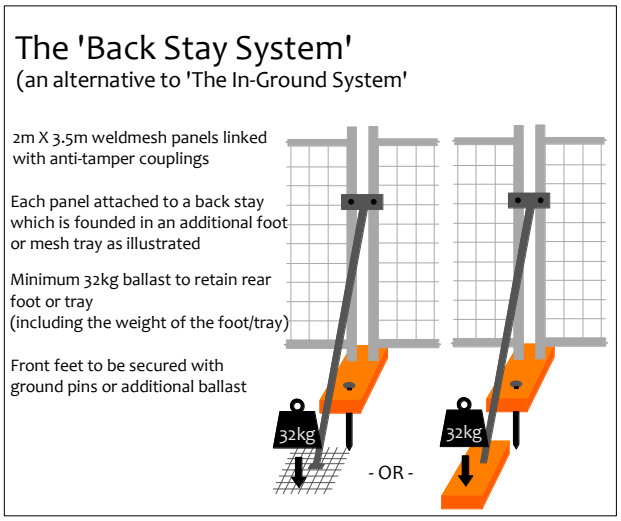
5.2.1. This system may be installed where indicated by a solid purple line on the Tree Protection Plan. It should be robust enough to withstand occasional knocks by plant machinery and, once installed, shall remain in place throughout the entire construction phase.

5.2.2. Vertical scaffold poles are driven into the ground, onto which are affixed horizontal scaffold poles and diagonal bracing struts. Weldmesh panels (or similar – e.g. Heras type fencing panels, or 18mm+ plywood boards) are secured to this scaffold framework using sturdy clips e.g. standard scaffold clips. The system is illustrated in the diagram to the right and is based on BS 5837 guidelines.



5.3. The Back-Stay System

5.3.1. This system may be installed where indicated by a solid or dashed purple line on the Tree Protection Plan. It is more practical over existing hard surfaces or where the fencing needs to be moved to enable permitted activities within a *Restricted Activity Zone*. This system should be able to withstand occasional knocks by machinery and should not be relocated except with the consent of the site manager and the approval of the local authority.



5.3.2. Within this system, weldmesh fencing panels (minimum height 2m) are affixed into rubber or concrete feet and clipped together with anti-tamper couplers. Where topography permits, two couplers should be used, spaced at least 1m apart. Alternate panels should be

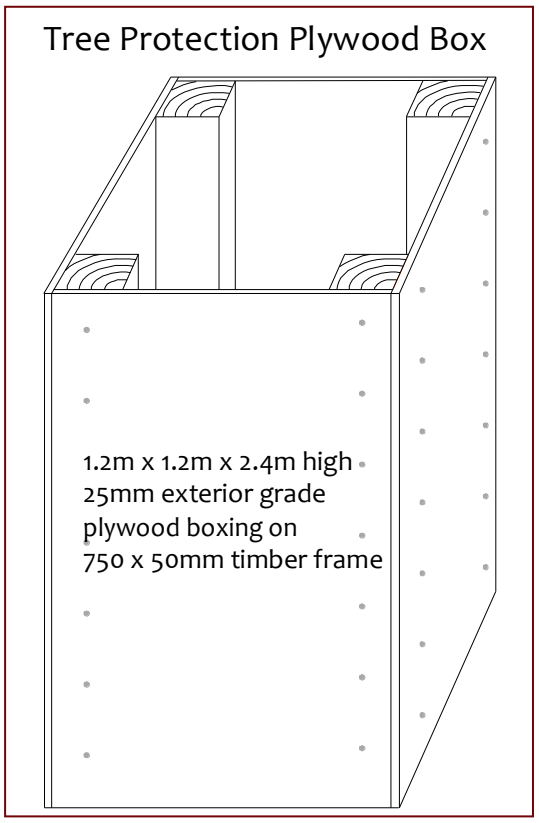
attached to a diagonal back stay connected to an additional foot or baseplate secured with ground pins or additional ballast. Where ground pins are not used, the total weight of the foot/plate plus ballast should total not less than 32kg.

5.3.3. Alternatively, timber struts may be used to affix the panels to existing walls using brackets and screws where the fence panels are sufficiently close for this to be effective.

5.3.4. Where it is not possible to install diagonal struts (such as very close to a hedge) then the front feet shall be secured using ground pins or ballast.

5.4. Stem Protection – Timber Boxing

5.4.1. Where indicated by a turquoise square on the Tree Protection Plan, it shall be necessary to install robust plywood boxing to protect a tree stem, The plywood boxing specification is indicated in the diagram opposite. It shall be affixed in place without securing it to any part of the tree. Instead, it shall be secured to the ground or to adjacent structures. It shall be made firm enough to withstand occasional knocks from construction vehicles.



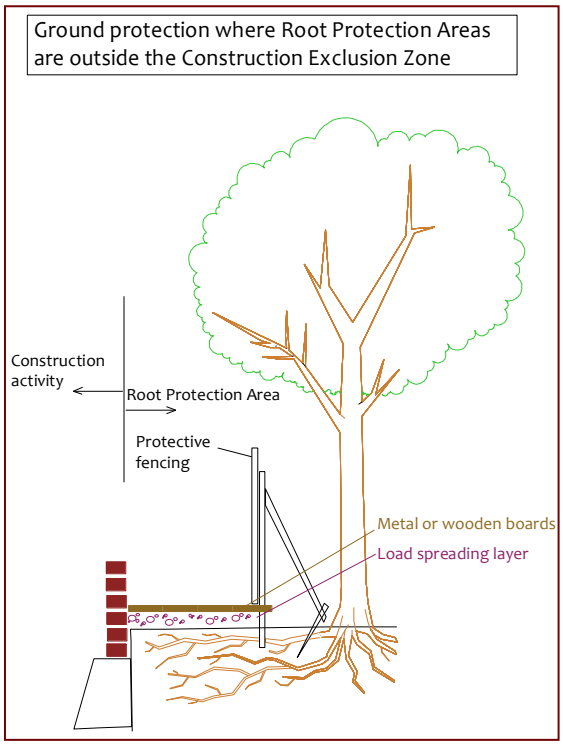
5.5. Notices

5.5.1. Suitable weather-proof notices should be displayed to identify tree protection zones. They should state the purpose of the fencing and that it should not be moved, or traversed, other than by authorised personnel.

6. Ground Protection Measures

Detailed Specification

6.1.1. Where indicated on the Tree Protection Plan (Restricted Activity Zones A, C and D), soils containing roots may be subject to compaction due to general construction activity (including pedestrian activity and use of plant machinery). In order to minimise compaction, it is proposed to ensure that a suitable load-spreading surface is in place at all times.



6.1.2. Any existing hard surfacing may be retained and reinforced (where applicable and adequate), otherwise suitable new ground protection measures shall be installed. The ground protection shall need to be able to adequately spread the load of construction traffic. Where existing hard surfacing is to be retained, it shall not be necessary to install additional ground protection measures. However, the hard surfacing must be firm enough to spread the load of any traffic passing overhead.

6.1.3. Where only pedestrian traffic will occur, the ground protection measures may be as simple as timber boards, or scaffold planks installed directly onto a geotextile fabric on the ground. The ground should first be made even by raking, or by adding a few centimetres of sand or woodchip. Alternatively the boards may be supported by a scaffold framework. The scaffold may be founded on poles driven into the ground and/or onto blocks (to raise the scaffold) with additional couplings to make the framework secure.

6.1.4. Where only light vehicles are to operate (e.g. barrows, trolleys or occasional cars), thick wooden boards or scaffold planks should also suffice, though at least 150m of compressible woodchip will need to be installed first to help spread the load. Sturdier systems are specified below:

6.1.5. Where cars will regularly park or heavier vehicles/plant machinery will occasionally operate, sturdier ground protection measures will be required such as metal road plates, or purpose built synthetic road mats over a compression resistant layer such as 150mm of woodchip or 100mm of a 3D cellular confinement system in-filled with 7–40mm angular gravel (e.g. *Cellweb*^{TM} - see Section 7).

6.1.6. A temporary concrete slab may also be considered as a suitable load spreading platform. Where a pile driver needs to operate, a concrete slab may be the preferred option.

6.1.7. Where existing structures need to be removed, this shall be done with temporary ground protection measures in place to enable this to be achieved without compacting soils.

6.1.8. The ground protection measures shall be installed and approved before commencement of demolition and construction activity and before the arrival of plant machinery or materials. They shall remain in place until all heavy construction activity is complete or until they are due to be replaced with a new hard surface.

7. New Surfaces

Detailed Specification

7.1. Removing an Existing Hard Surface

7.1.1. Where it is necessary to remove an existing hard surface over Root Protection Areas the following restrictions shall apply:

- The existing hard surfacing shall remain in place throughout the entire construction project or until it is replaced with ground protection measures as specified in Section 6. No vehicle shall pass over this zone unless a permanent hard surface or ground protection is in place.
- No excavation in excess of the existing sub-base shall occur.
- Hand operated tools shall be used to lift existing surface. Mechanical excavators may be used so long as they operate from outside Root Protection Areas and are carefully marshalled by the appointed arborist or local authority tree officer.
- Any exposed roots in excess of 25mm are to be retained. Before the new surface is installed, 25mm of soil (or river sand) and a geotextile membrane shall be laid over the root. Until such times, the root shall be adequately protected from pedestrian damage using timber and sand.
- Any soils used to raise ground levels back to the original level shall be fertile granular top soil. Proposed soil levels shall not exceed existing ground levels.

7.2. Replacing an Existing Hard Surface

7.2.1. Where it is necessary to replace an existing hard surface over Root Protection Areas the following restrictions shall apply:

- The existing hard surfacing shall remain in place throughout the entire construction project or until it is due to be replaced with a new surface. If the hard surfacing is removed for any reason it shall immediately be replaced by ground protection measures as specified in Section 6 until a permanent hard surface is installed. No vehicle shall pass over this zone unless a permanent hard surface or ground protection is in place.
- No excavation in excess of the existing sub-base shall occur. The existing sub-base may be retained undisturbed and incorporated into the new structure.
- Hand operated tools shall be used to lift existing surface. Mechanical excavators may be used so long as they operate from outside Root Protection Areas and are carefully marshalled by the appointed arborist or local authority tree officer.
- Any exposed roots in excess of 25mm are to be retained. Before the new surface is installed, 25mm of soil (or river sand) and a geotextile membrane shall be laid over the root. Until such times, the root shall be adequately protected from pedestrian damage using timber and sand.
- Any new sub-base shall not contain fine particles. Coarse sand or larger particles shall be acceptable. 7-14mm gravel is ideal.
- A 3 dimensional cellular confinement system may be incorporated into the sub-base and is encouraged. However, this is not considered compulsory since the resurfacing operation shall not cause a deterioration of rooting conditions beneath the existing driveway.
- No salt or lime based products are to be incorporated within the sub-base.

7.2.2. Where the existing surface is porous, it shall be replaced with a new surface which is equally as porous. Where the existing surface is impermeable (e.g. concrete or asphalt), replacement with a porous surface is encouraged but not compulsory.

7.3. No-Dig / Minimum-Dig Driveway Installation

7.3.1. This section details the No-Dig and Minimum-Dig Method which are acceptable when installing new surfaces over Root Protection Areas. Minimum dig techniques are generally acceptable within the outer half of a Root Protection Area; any closer and the No-Dig technique should be adopted.

7.3.2. **Ground Preparation - NO DIG**

- Surface vegetation may be killed using a translocated herbicide such as GlyphosphateTM. Turf maybe lifted to a depth of 50mm using a hand operated turf lifting machine; mechanical excavators may not be used.
- Loose topsoil which contains a high degree of organic matter and is not suitable for bearing the hard surface may be removed using hand tools. If any roots in excess of 25mm, or an abundance of roots in excess of 10mm, are encountered, the excavation shall cease and the local authority shall be informed so that an appropriate response may be agreed. In such circumstances, exposed roots shall be covered with damp sacking or soil.
- Occasional roots in excess of 10mm which are severed shall be neatly pruned with secateurs to minimise the likelihood of infection. If no roots are encountered and the operation is being overseen by the local authority (or an approved appointed arborist), it may be possible to continue to excavate in strata of 50mm until the arborist overseeing the operation deems that excavation should cease.
- Any hollows should be filled with 2mm – 6mm chippings and a levelling layer of at least 25mm of sharp sand should be installed.

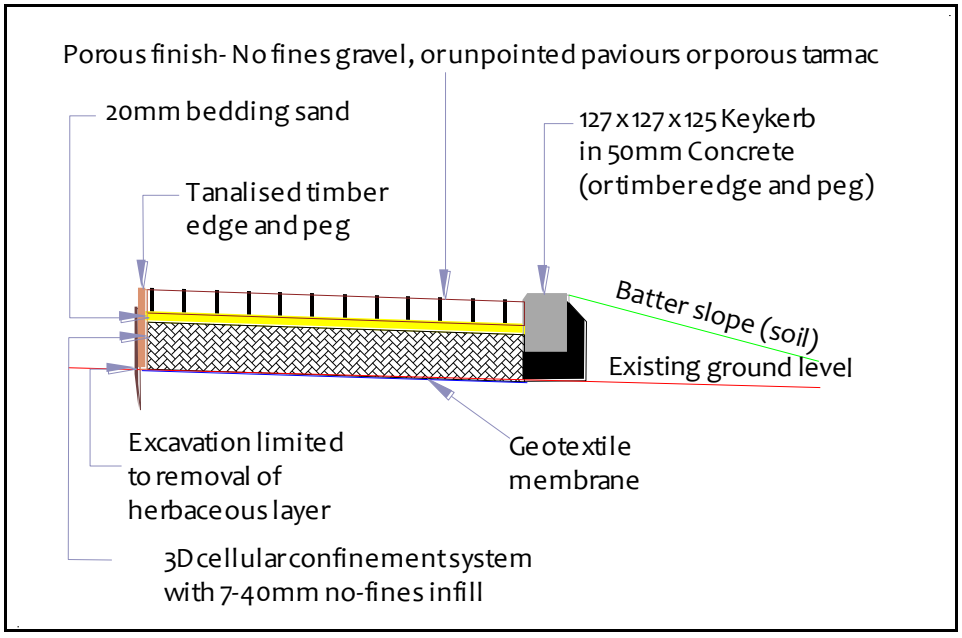


Figure 2: No-Dig Method

7.3.3. **Ground Preparation - MINIMUM DIG**

- Surface vegetation may be killed using a translocated herbicide such as GlyphosphateTM. Turf may be lifted to a depth of 50mm using a hand operated turf lifting machine; excavators may not be used.
- All further excavation shall take place using hand tools or a carefully marshalled mechanical excavator operating from outside the Root Protection Areas and

overseen by the local authority tree officer or an approved appointed arborist. Soil shall be removed in strata of 50mm to a maximum depth of 150mm in total.

- If any roots in excess of 25mm are encountered, they are to be retained undamaged and the level of the new surface adjusted to accommodate this wherever possible. Before the new surface is installed, 25mm of soil (or river sand) and a geotextile membrane shall be laid over the root. Until such times, the root shall be adequately protected from pedestrian damage using timber and sand.
- Roots in excess of 10mm which are severed shall be neatly pruned back with secateurs to minimise the likelihood of infection. If no roots are encountered it may be possible to continue to excavate in strata of 50mm until the arborist overseeing the operation deems that excavation should cease.
- Any hollows should be filled with 2mm – 6mm chippings and a levelling layer of at least 25mm of sharp sand should be installed.

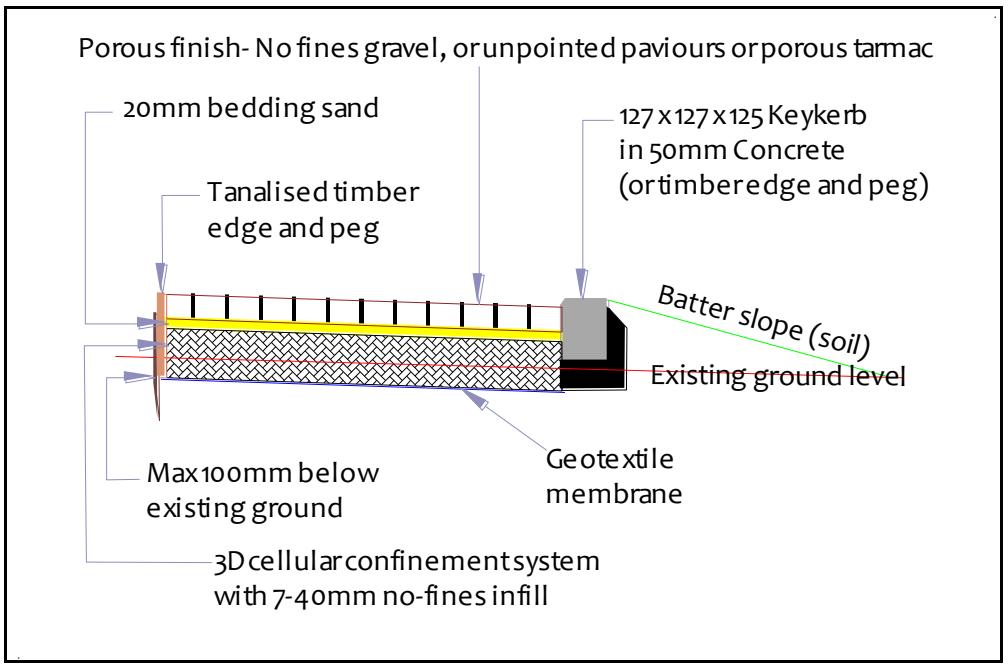


Figure 3: Minimum-Dig Method

7.3.4. **Drive Edgings.** Edging solutions (such as kerbstones) requiring further excavation will not be acceptable within Root Protection Areas. Instead, an above ground system shall be installed such as a tanalised timber edge (treated for a 40 year design life) retained by narrow pegs driven into the ground. Alternative above ground systems must be approved by the local authority.

7.3.5. Where required, batter slopes may be installed to tie in with existing ground levels (max 1:3 gradient, maximum 100mm increase in ground level). However, no increase in ground level shall be permitted immediately adjacent to any tree stem or associated buttress roots.

7.3.6. **The sub-base.** Once the edgings are in place, a geotextile membrane shall be laid down to prevent root penetration into the road surface. A thin layer (up to 35mm) of angular gravel or crushed aggregate gravel may then be laid over the membrane and levelled off.

7.3.7. A 3 dimensional cellular system should then be installed. This may either be a confinement system (flexible or rigid) which incorporates an aggregate, or a raft system that requires no aggregate. These three systems are all considered suitable for use over tree roots and are specified below:

7.3.8. **1) Rigid Cellular System** - A 3 dimensional cellular confinement system shall then be installed with a minimum thickness of 40mm. This may be filled with 7-14mm angular gravel. Example systems are illustrated below:

7.3.9. The entire cellular system shall be laid first and may be pinned in place using ground pins. This shall be followed by the infill, working from one end such that heavy machinery does not pass over any Root Protection Areas until the in-fill is installed.

7.3.10. **2) Flexible Cellular System** – see illustration. This will be filled with a no fines angular in-fill (e.g. 7 – 14mm or 20 – 40mm gravel).

7.3.11. I understand that a 100mm deep system is generally adequate to cope with light traffic, though this should be verified with the manufacturer and engineers. A limestone based in-fill will not be acceptable. Enough infill should be used to allow for settlement and compaction and no more. If required, the infill may be periodically topped up.

7.3.12. The entire cellular system shall be laid first and may be pinned in place using ground pins. This shall be followed by the infill, working from one end such that heavy machinery does not pass over any Root Protection Areas until the in-fill is installed. The entire system may then be lightly compacted to a degree appropriate for the expected load.

7.3.13. Up to 50mm of 2 - 6mm clean hard grit (no fines) angular granular fill may be overlaid as a laying course.

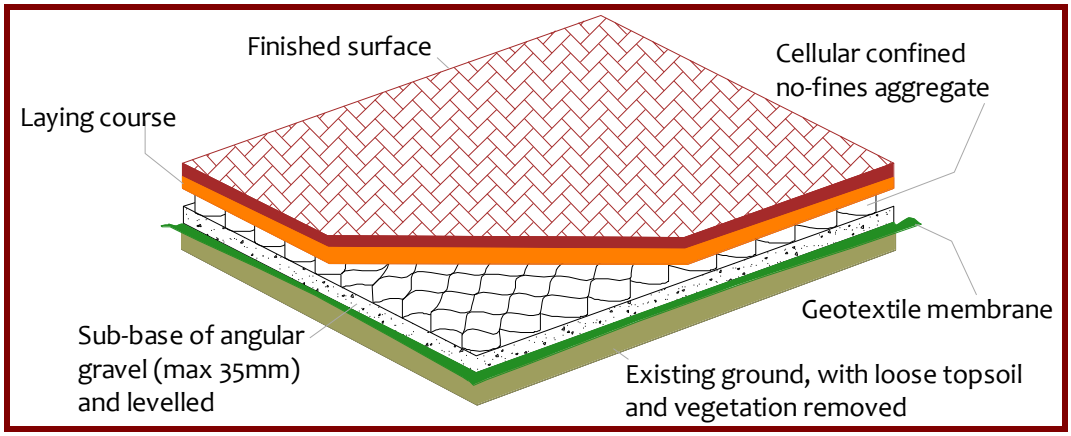
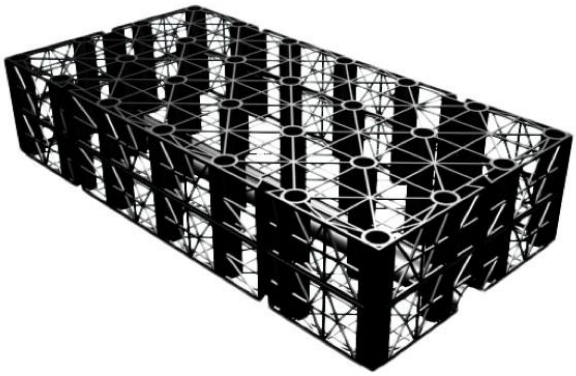


Diagram illustrating the cellular confinement system

7.3.14. **3) Raft System (e.g. Arboraft™)** – In this system, 85mm or 150mm deep polypropylene box structures are connected together to form a raft which sits above the ground and beneath the finished surface.



For situations other than very light usage, the 150mm system is recommended. This should be laid over a suitably thick geotextile. Another geotextile (or similar) is laid over the raft and any finished surface may then be installed according to engineers specifications. The finished surface may be porous or may be impermeable. If impermeable, ventilation and rainwater run off should be directed into the void. The overall thickness is likely to vary from 300mm to 450mm depending on the specification of the finished surface.

The advantage of this type of system (regarding roots) is that it is very light-weight (requiring no aggregate) and has an excellent load spreading capacity (reducing soil compaction) whilst also providing maximum aeration and rainwater to the soils beneath. It can also be a very cost effective solution since no aggregate needs to be purchased and installed.

7.3.15. **The Finished Surface**. The following surfaces are acceptable over rooting areas:

- **No-Fines gravel.** This option offers the maximum permeability. However, loose gravel should be avoided close to the site entrance as it has a tendency to spill out into the adjacent public footway. Resin bonded gravel may be acceptable if it is shown to be sufficiently porous to enable rainwater to easily pass through to the sub-base below.

- **Block paving.** This is a good alternative as it allows a fair degree of permeability. Blocks with extra wide nibs shall be utilised to enable maximum infiltration of water between the blocks. Blocks shall be jointed with 1mm – 4mm clean hard crushed stone (no fines) brushed over the spaces and settled with the aid of a vibrating plate compactor.
- **Porous asphalt to BS EN 13108-7 (previously Pervious Macadam BS 4987 – 1 & 2). This** offers a degree of permeability and is preferred over concrete or asphalt containing-fines (e.g. *Stone Mastic Asphalt* (BS EN 13108-5) or *Hot Rolled Asphalt* (BS EN 13108-4)). This surface may require a porous binder course. Actual specification will vary according to ground conditions and expected load, and should be agreed with a Highways Engineer or Geotechnical engineer.
- **Concrete.** Concrete is impermeable so is only suitable for very small areas e.g. narrow paths where oxygen and rainwater runoff will be able to penetrate beneath the surface from the sides. It is possible to engineer a fully concrete solution whereby a concrete slab is supported by narrow piles with a ventilated void beneath. This is effectively a bridge over the Root Protection Area and needs to be specified by an appropriately qualified engineer. This system can provide an excellent solution but is rarely adopted due to the prohibitive cost.

7.4. Pedestrian Surfaces

7.4.1. Where it is proposed to install new pedestrian surfaces over Root Protection Areas, excavation shall be limited to the removal of existing turf/vegetation plus an additional 50mm. Excavation shall be undertaken using hand tools only. Porous materials are preferred but not essential if the new surface covers less than 10% of the Root Protection Area. Paving with a thickness of 50mm bedded on mortar, or sand, bearing directly onto the ground, with a finished surface level with existing ground levels will be acceptable. No retaining kerbs shall be used.

8. Signature

This report represents specifies the proposed protection measures at

Kings College Halls
Kidderpore Avenue
Hampstead
NW3 7ST

Signed

.....

Ivan Button N.C.H. (Arb), FDSc (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.

on behalf of

Crown Consultants Ltd

Dated

21st April 2016

CROWN Consultants
Tree consultants throughout England and Wales

Appendix 1: BS 5837: 2012 – Guidance Notes

This Standard prescribes the principles to be applied to achieve a satisfactory juxtaposition of trees and structures. It sets out to assist those concerned with trees in relation to design, demolition and construction to form balanced judgements.

It acknowledges the positive contribution trees may offer to a site, as well as the negative aspects of retaining inappropriate trees. It addresses the negative impacts that construction activity may have upon trees and offers mitigation strategies to minimise these impacts.

The Standard suggests a three stage approach to ensure best practice is followed when developing close to trees:

A1.1 Stage 1: Survey of Existing Trees

This identifies the existing trees on and adjacent to the site. Data is recorded for each tree and is presented in a Tree Data Schedule. Each tree is allocated a ***Retention Category*** according to its size, amenity value, condition and safe useful life expectancy. The categories are allocated independently of development proposals. Our interpretation of the Retention Categories is explained below:

A1.1.1 Retention Categories

A Category: Trees of high quality and amenity value. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

B Category: Trees of moderate quality and amenity value. Usually these are maturing trees or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

C Category: Trees of low quality or small specimens with a relatively low amenity value. These trees are not considered to be a material planning constraint and their removal will generally be seen as acceptable in order to facilitate development.

U Category: Trees of such low quality that their removal is recommended regardless of development proposals.

A1.1.2 Occasionally trees are borderline and do not fall neatly into one of the categories A, B or C. In such cases we apply a superscript (**+/-**) such that:

C^{+} Indicates borderline C/B, though Category C is deemed to be most appropriate.

B^{-} Indicates borderline C/B, though Category B is deemed to be most appropriate.

A1.1.3 The British Standard suggests that each of the A, B and C categories may be further subdivided (A1, A2, A3, B1, B2, B3 etc) such that subcategory 1 denotes mainly arboricultural values, subcategory 2 denotes mainly landscape values and subcategory 3 denotes mainly cultural values (including conservation). Multiple subcategories may be used.

Our experience suggests that these subdivisions lack clarity and can be confusing. Within this report subcategories are **not** denoted. Where appropriate, the use of phrases such as '*Part of a formal group*', or '*Has a high ecological value*', or '*Offers good screening to the site*' are incorporated into the observation section of the Tree Data Schedule. We believe this conveys all relevant landscape and cultural information without any confusion.

A1.1.4 **Tree Constraints Plan (TCP).** This indicates the position, crown spread, Retention Category and Root Protection Area of each tree. It is used to inform where development may proceed without causing damage to trees.

A1.1.5 **Root Protection Area (RPA).** This is the area around each tree likely to contain the majority of roots. It should ideally remain undisturbed to avoid a detrimental impact on tree health. For single stemmed trees It is calculated according to the formula "radius of RPA" = "12 x stem diameter". For multiple-stemmed trees a more complex formula is used which may occasionally produce an RPA which seems inappropriately large relative to the trees canopy. This shape can then be modified to take into account site factors which influence rooting activity, e.g. foundations, soil type or impermeable surfaces. Where development works are proposed within the RPA they should be undertaken in a sympathetic manner to minimise root disturbance.

A1.1.5 **Shade Constraints.** The previous Standard (BS 5837 2005) suggested that shade constraints should be indicated on the TCP. This are denoted as a circle-segment drawn northwest to due east with a radius equal to the height of the tree. These do not represent the actual shade pattern which varies through the seasons. Rather, they indicate the area most shaded by the tree throughout the course of the year. Ideally habitable room windows should be located outside of these shade constraints. Where we consider it appropriate, we will include shade constraints information on our Impact Assessment Plan or Proposed Layout Plan.

A1.2 Stage 2: Arboricultural Impact Assessment

After the initial survey and the production of the Tree Constraints Plan, arborists and designers are encouraged to work together to establish a design proposal with minimal impact on the high quality trees. An assessment should be made of all possible impacts including the impact that the trees may have upon the proposal. The arborist may recommend mitigation strategies to minimise these impacts and help achieve a more harmonious juxtaposition between buildings and trees.

A1.3 Stage 3: Arboricultural Method Statement

This type of report specifies the measures necessary to protect trees against damage from construction activity. The Method Statement should be written in a manner that it may be conditioned and enforced by the local authority upon granting of planning permission. The site manager should be familiar with all aspects of the Method Statement and should ensure that all persons working on the site are aware of those aspects which appertain to their work. This includes service installation engineers and operators of plant machinery.

Appendix 2: Explanation of Tree Data & Glossary

This section explains the terms used in the **Tree Data Schedule** (see Section 3 and Appendix 6).

A4.1 General Observations

A4.1.1	**Numbering System:**	Each item of vegetation has its own unique number prefixed by a letter such that T1=Tree 1, G2=Group 2, H3=Hedge 3 and W4=Woodland 4, S5=Shrub 5.
A4.1.2	**Age Categories:**	
	Young	Usually less than 10 years old.
	Semi-Mature	Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy).
	Early-Mature	Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy).
	Mature	Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy).
	Veteran	A level of maturity whereby significant management may be required in order to keep the tree in a safe condition.
	Over Mature	As for veteran except management is not considered worthwhile.
A4.1.3	**Species:**	Common names and Latin names are given.
A4.1.4	**Height:**	Measured from ground level to the top of the crown.
A4.1.5	**Stem Diameter:**	Taken at 1.5m above ground level where possible. On multi-stemmed trees this measurement may be taken at ground level, though usually an indication of the number of stems and average diameter is given, e.g. 3 x 30cm.
A4.1.6	**Crown Height:**	Measured from ground level to the height at which the main crown begins. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.
A4.1.7	**Tree Diagram:**	This scaled drawing is computer generated based on measurements taken for stem diameter, crown height and spread, and overall height. It is designed to help the reader rapidly assess the data. It is not an accurate representation of the form of the tree.
A4.1.8	**Crown Spread:**	Measured N, E, S & W, taken from the centre of the stem and usually rounded up to the nearest metre.
A4.1.9	**Observations:**	If a tree's position is considered to be relevant it will be commented upon (e.g. overhanging a children's play area). Tree form and pruning history are also recorded along with an account of any significant defects. Defects and descriptive terms are dealt with in more detail at the end of this section.
A4.1.10	**Recommendations:**	Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.
A4.1.11	**Priority Scale:**	Depending upon the threat posed by the tree, and the likelihood of failure, recommendations should be carried out according to the following priority scale:
	Urgent	To be carried out as soon as possible.
	Very High	To be carried out within 1 month.
	High	To be carried out within 3 months.
	Moderate	To be carried out within 1 year.
	Low	To be carried out within 3 years.
A4.1.12	**Inspection Frequency:**	An interval of 6 months, 1 year, 1.5 years or 3 years is allocated before the next inspection is due. Wherever practical, consideration should be given to seasonal changes so that deciduous trees are not always surveyed in winter when they have no leaves, or in summer when leaves may obscure branches within the upper crown.
A4.1.13	**Vigour:**	An indication of growth rate and the tree's ability to cope with stresses:
	High	Having above average vigour.
	Moderate	Having average vigour.
	Low	Having below average vigour.
	Very Low	Tree is struggling to survive and may be dying.
A4.1.14	**Physiological Condition:**	
	Good	Healthy and with no symptoms of significant disease.
	Fair	Disease present or vigour is impaired.
	Poor	Significant disease present or vigour is extremely low.
	Very Poor	Tree is dying.
A4.1.15	**Structural Condition:**	
	Good	Having no significant structural defects.
	Fair	Some defects observed though no high priority works are required.
	Poor	Significant defects found. Tree requires monitoring or remedial works.
	Very Poor	Major defects which will usually require significant remedial works or tree removal.
A4.1.16	**Amenity Value:**	
	Very High	Exceptional specimen, observable by a large number of people.
	High	Attractive specimen, observable by a significant number of people.
	Moderate	One of the above factors is not applicable.
	Low	Unattractive specimen or largely hidden from view.
A4.1.17	**Life Expectancy:**	The estimated number of years before the tree may require removal. Classified as (<10), (10 – 20), (20 – 40), or (40+).
A4.1.18	**Retention Category:**	These are explained in detail in Appendix 1.

A4.2 Evaluation of Defects

A4.2.1 Cavities, wounds, deadwood etc are all evaluated as follows:

Major	Such that structural integrity is, or will become, compromised and the tree is, or will inevitably become, hazardous.
Significant	A defect that may over time become a major defect, though not necessarily so. This will depend on the vigour of the tree and its ability to deal with decay etc.
Minor	A defect that is not likely to compromise the tree's structural integrity.

General Glossary

Adaptive growth	In tree biomechanics, the process whereby wood formation is influenced both in quantity and quality by the action of gravitational forces and mechanical stresses on the cambial zone.
Aerobic	Conditions in which oxygen is freely available, or to biomechanical processes that depend on the presence of oxygen.
Anaerobic	A condition marked by the absence of oxygen; Generally such areas are unsuitable for normal life and growth of plant tissues. These sites tend to be populated by bacteria capable of surviving low oxygen conditions often associated with Slime Flux.
Arboriculture	The culture and management of trees as groups and individuals primarily for amenity and other non-forestry purposes.
Arborist	A person possessing the technical competence through experience and related training to provide management of trees or other woody plants in a landscape setting. Generally involved with the development or management of trees for visual amenity or land management rather than the growth of trees for product or profit.
Barrier zone	A layer within an annual increment of wood which contains abnormal xylem cells, laid down by the cambium in response to wounding or other trauma.
Body language	In trees, the outward display of growth responses and or deformation in response to mechanical stress.
Bole	Or Trunk, the main stem of a tree below its first major branch.
Bracket	A type of fruiting body produced by various fungal species, plate like to hoof like in shape and often a one sided attachment to the wood or bark.
Branch bark ridge	A ridged area located at the union of a branch to a trunk or stem.
Branch Collar	Trunk tissue that forms around the base of a branch between the main stem and the branch, or between a main branch and a lateral branch. As a branch decreases in vigour or begins to die, the collar usually becomes more pronounced and completely encircles the branch.
Brown Rot	Form of decay where cellulose is degraded, while lignin is only modified.
Buttress Root	Roots that emerge from the base of the tree stem, normally large and well developed that rapidly reduce in diameter to create the Root Plate this offers structural support for the tree. Buttress roots divide rapidly forming the connection between the stem and the transport roots.
Cabling Bracing	Installing cables within the crown of a tree to prevent collapse.
Callus	Undifferentiated cells often formed at the edges of recent injuries. This tissue quickly becomes differentiated, forming cells of the type characteristic of that position on the tree (e.g. forming wood, bark, roots, etc.) see wound response tissue.
Cambium	A thin layer of actively growing and dividing cells, located between the xylem (sapwood) and bark of a plant; the part responsible for radial growth of a tree stem or branch.
Canopy	The topmost layer of twigs and foliage in a woodland, tree or group of trees.
Canker	A localised area of dead bark and cambium on a stem or branch, caused by fungal or bacterial organisms, characterised by woundwood development on the periphery. This may be annual or perennial.
Cavity	An open and exposed area of wood, where the bark is missing and internal wood has been decayed and dissolved.
Chlorotic	Also Chlorosis. A condition of the plant marked by yellowing of normally green foliage, often indicating nutrient deficiency or plant dysfunction.
Clinometer	Devices that measures vertical angles, and provides direct height measurements of objects by triangulation.
Co-dominant stems/trunk	Are forked branches or trunks of nearly the same size in diameter and lacking a normal branch union.
Compacted soils	Soils in which the air-space (oxygen space) has been reduced or eliminated, reducing water infiltration and percolation, reducing root presence and inhibiting new root development.
Compartmentalisation	The physiological process that creates the chemical and mechanical boundaries that act to limit the spread of disease and decay organisms.
Compression Failure	Localized buckling of fibres and other longitudinal elements produced by compression of wood along the grain; compression failures sometimes develop in standing trees.
Compression Strength	The ability of a material or structure to resist failure when subjected to compressive loading; measurable in trees using special drilling devices
Compression Wood	Abnormal wood formed on the lower side of branches and curved stems, with physical properties different from normal wood.
Conservation Area	In Great Britain, designated areas of architectural or historical interest, in which there are special procedures for planning applications. Additionally tree works cannot generally be undertaken without prior notification (Currently 6 weeks) to the relevant local planning authority. See also Tree Preservation Orders.
Core Sample	A sample of wood extracted from a trunk or branch, using an increment borer tool. The resulting core can be analysed for characteristics of growth, wood strength, structure, decay, and for species identification.
Crotch	The union of two or more branches; the auxiliary zone between branches.
Crown	The upper canopy of a tree, including upper trunk, scaffold branches, secondary branches, stems and leaves.
Crown lifting / raising	Crown Lift The removal of the lowest branches, usually to a given height. It allows more residual light and greater clearance underneath for vehicles etc.
Crown reduction	The reduction of a tree's height or spread while preserving its natural shape.
Crown thinning	The removal of some of the density of a tree's crown, usually 5-25% allowing more light through its canopy and reducing wind resistance.
Deadwood (noun)	Deadwood is often present within the crown or on the stems of trees. It may be an indication of ill health, however, it may also indicate natural growth processes. If a target is present beneath the tree, deadwood may fall and cause injury or damage and should be removed, otherwise deadwood can remain intact for conservation purposes (insects, fungi, birds etc.).
Deadwood (verb)	The removal of dead branches from a tree's canopy, usually of a specified size (in diameter).
Decay	Progressive deterioration of organic tissues, usually caused by fungal or bacterial organisms, resulting in loss of cell structure, strength, and function. In wood, the loss of structural strength.
Decay Detection	The assessment of decay within a tree has been traditionally difficult, but recent advances have made it possible to achieve accurate representations of the internal section of a tree in both 2D and 3D, removing doubt over the condition of the tree and allowing accurate management decisions.
Defect	In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment.
Defoliation	The losing of plants foliage.
Dieback	Progressive death of buds, twigs and branch tissues, on individual limbs resulting in Deadwood, or throughout the canopy,

	extreme cases can result in Stag Heading.
Dripline	A projected line on the ground that corresponds to the spread of branches in the canopy; the farthest spread of branches.
Epicormic shoots	Fast growing, weakly attached shoots/branches that often grow as a response to stress factors upon a tree or branch removal.
Failure	In connection with tree hazards, a partial or total fracture within the wood tissue or loss of cohesion between roots and soil. (In total failure affected parts will snap or tear away completely, Partial failure there is a crack or deformation, which results in an altered distribution of mechanical stress.
Feeder Roots	Fine fibrous Water and nutrient absorbing roots located in the outer root system.
Flush-Cut	In trees and shrubs, a pruning cut close to the parent stem, which removes the branch bark ridge.
Foliage	The live leaves or needles of the tree; the plant part primarily responsible for photosynthesis.
Formative pruning	The trimming of a tree to remove weaknesses and irregularities which may lead to problems. The formative pruning operation is aimed at reducing the potential for future weaknesses or problems within the tree's crown.
Gall	An abnormal, disorganized growth of plant tissues, caused by parasitic or infectious organisms such as insects, fungi, bacteria, or viruses.
Girdling	In woody plants, any form of damage that destroys the bark and / or the Cambium all the way around the stem, branch or root, normally resulting in death of the damaged section.
Girdling Root	In woody plants, a root that grows across the buttress, or across other roots, eventually causing constriction of the radial growth.
Growth Increment	The incremental growth added as new annual ring develops each season over existing wood. This is seen as (growth) rings in cross-sections of wood.
Hazard beam	An upwardly curved branch in which strong internal stresses may occur without the compensatory formation of extra wood (longitudinal splitting may occur in some cases).
Heartwood	Inner non functioning tissues that provide structural support to trunk.
Heave	In relation to shrinkable clay soils, expansion due to rewetting of a volume of soil previously subjected to the removal or water by plant / trees following felling or root severance. Also in relation to root growth, the lifting of pavements and other structures by radial expansion. Also in relation to tree stability, the lifting of one side of a wind rocked root plate.
Herbicide	A chemical compound that causes the death of a plant.
Included Bark	Bark that becomes embedded in a crotch between branch and trunk or between co-dominant stems, usually found in narrow or tight crotches, and causes a weak structure.
Increment Borer	A tool that cuts and extracts a narrow cylinder of wood from a tree for analysis of the wood tissue and growth increments.
Leader	The primary terminal shoot or trunk of a tree.
Limb	A large lateral branch growing from the main trunk or from another larger branch.
Lion Tailing	Often the result of poor pruning practices; the main leader or branches are largely devoid of side branches, growth is restricted to the end of branches and is likely to suffer damage through end loading.
Lopping	In trees, a general term that related to the removal of branches from a tree.
Monitoring	Due to the relative life span of trees in relation to our own, long-term monitoring provides a valuable insight to the health of trees, identifying decline and or stabilisation and or improvement.
Mulch	A material laid over the root system of a tree to help conserve moisture within the soil. Additionally it may help control the development of weeds close to the tree.
Mycelium	A mass of growing filaments (hyphae) formed by fungi.
Mycorrhizae	The symbiotic relationship between roots and certain beneficial fungi. Mycorrhizae are the combined root / fungal growth.
Occluding tissue	The general tern of wood, cambium and bark that develop around the site of a wound on a woody plant
Pathogen	A microorganism that causes diseases within another organism.
Phloem	The principle conductive tissue that the products of Photosynthesis are transported around the plant
Photosynthesis	The process were light energy is used to create energy (Carbohydrate) for use within the plant.
Pollard	A term for a pollarded tree.
Pollard head	The swollen section of branch / stem that forms behind the pollarding cut.
Pollarding	The complete or partial removal of the crown of a young tree so as to encourage the development of numerous branches either for amenity or historically as fodder, repeated management is required cyclically to maintain the feature
Prune or Pruning	Selective removal of woody plant parts of any size, using saws, Loppers, Secateurs, or other pruning tools.
Reaction Wood	Wood with distinctive anatomical characteristics, formed in parts of leaning or crooked stems and in branches to provide additional strength / support. In hardwoods, tension wood usually forms. In conifers, compression wood is usually found.
Reaction Zone	A zone normally darker than surrounding wood that denoted the boundary often a defensive one between functional sapwood and dysfunctional or decaying wood.
Re-grading	The raising or lowering of a soil profile from its original grade.
Remedial pruning	The removal of old stubs, deadwood, epicormic growth, rubbing or crossing branches and other unwanted items from the tree's crown.
Resistograph	Invasive decay detection technique whereby the resistance offered by the timber to a spinning probe is measured and plotted.
Rib	In tree body language, a long narrow, axial protuberance which often over lays a crack.
Ring Barking	Artificial Girdling of the stem, to result in the death of a tree. May be used in habitat creation were the retention of dead standing trees is required.
Rod Bracing / Bolting	Traditionally, this has relied upon the Installation of steel rods or bolts through the stems or limbs, to reduce twisting or splitting of the wood. The installation of such features does require legal interpretation.
Root Barriers	Both Buildings and services can benefit from the installation of root barriers to protect a soil volume from the ingress of roots.
Root Collar	The basal area of the tree; transition zone from trunk to root. Also sometimes called trunk flare.
Root Plate	The primary support area for the tree; an area of the root system close to the base that structurally anchors the tree to the soil.
Root Rot	Either a general term for decay within the wood of the lower stem / buttress roots, or a disease in which the fine roots are killed.
Root System	The portion of the tree containing the root organs, including buttress roots, transport roots, and fine absorbing roots; all underground parts of the tree.
Root Zone	The area and volume of soil around the tree in which roots are expected. May extend to three or more times the branch spread of the tree, or several times the height of the tree.
Sail Area	That area or the tree subjected to wind load.

Sapwood	**Xylem wood tissue, usually light in colour, representing the outer growth rings of the wood. Usually living, reactive wood tissue, in a healthy tree. See heartwood**
Scaffold limbs / scaffold Branches	**The branches that from the main network framework of the crown of a tree.**
Senescent	**A decline in growth and vigour due to age or stress factors.**
Shrub	**A woody plat that branches at or close to the ground level and so does not have a single stem.**
Slime Flux	**Relating to a toxic condition from the spreading of bacteria or their products from a source of infection; characterized by malodorous gases, or salt deposits upon the bark. If these products enter the sap stream, localised vessel necrosis can result, usually associated with anaerobic conditions.**
Soft Rot	**A kind of wood decay, were a fungi degrades cellulose within the cell wall, without causing overall degradation.**
Soil Compaction	**The compression of soil, causing a reduction of pore space and an increase in the density of the soil. Air is squeezed out and nutrients become locked. Tree roots cannot grow in compacted soil.**
Sonic Decay Detection	**Non invasive method whereby sound waves are passed through the tree and the speed is measured. Slow speeds indicate decay and a tomography picture representing the inner stem is produced.**
Stag Heading	**In a tree, a state of dieback were dead branches protrude beyond the current living crown.**
Stress	**In plant physiology, conditions were one or more physiological functions Are not working within normal parameters.**
Stump Grinding	**The removal of a tree stump using a specialist grinding machine.**
Subsidence	**In relation to vegetation, the removal of water by plant growth resulting in localised shrinkage in the soil volume.**
Sucker	**Same as sprout.**
Suppressed	**Trees which are dominated by surrounding vegetation and whose crown development is restricted from above.**
Systemic	**Affecting the whole plant or organism. A systemic compound is carried throughout the entire plant to all parts through the vascular system.**
Target	**Any person or object within reach of a falling tree or part of a tree that may be injured or damaged.**
Target Pruning	**The pruning of a branch were the wound affects only branch material, often result in a target shaped wound.**
Tension Wood	**Reaction wood typically formed on the upper side of limbs or curved stems; characterized by lack of cell wall lignifications (higher ratios of cellulose to lignin).**
Tight Union / Tight Crotch	**Also, narrow crotch. A crotch with a narrow angle between branches, often having included bark.**
Tomography	**The comparison of sound or stress waves through the tree allows the creation of a 2D or 3D representation of the internal structure of a stem or branch section and highlights areas of damage. Virtually non-injurious.**
Topography	**The configuration of surface features, including the vertical and horizontal relationships of the ground and other features.**
Topping	**Cutting large limbs back severely, without regard to form or habit of the tree. Cuts are usually made between lateral branch nodes. This practice is extremely injurious to trees, and promotes decay and structural weakness within the crown.**
Tree	**A woody plant that typically has a single stem, at maturity has a height of a least 4 metres and a stem diameter at breast height of at least 75mm.**
Tree Preservation Order	**In Great Britain, an order made by the local planning authority, were consent must be gained before undertaking all but exempt works to a tree.**
Trunk Flare	**The basal area of the trunk that flares or widens, and merges with the main roots. See root collar**
Veteran Tree	**Veteran trees are often found in large parks or estates and commonly affected by extensive decay or have been subject to extensive works. These trees are retained for historical importance and often pose greater risk than normal, which is generally justified. They need careful management and often propping or bracing to support them, some require fencing to limit access.**
Vigour	**Active, healthy growth of plants: ability to respond to stress factors.**
Visual Tree Assessment (VTA)	**An assessment of the mechanical condition of trees based upon their 'body language'. Trees are dynamic and respond to faults / decay / environmental factors in various ways, these responses can be indicative of structural integrity.**
Wetwood	**An infection caused by bacteria living inside the plant tissues. The bacteria ferment the plant fluids, resulting in death of nearby cells, and often causing exudations of fluid from the bark, often referred to as a Slime Flux.**
White Rot	**A kind if wood decay were a fungi attacks the lignin within the wood matrix**
Wind loading	**Forces placed upon tree canopy, branches, trunk and roots of a tree under windy conditions.**
Wind Throw	**The failure of a tree due to wind loading.**
Witches Broom	**A deformed or unusual growth of twigs from adventitious buds, caused by insects, disease, or dieback of twigs and buds.**
Wood	**Secondary Xylem; the main structural support and water conducting tissue of trees and shrubs.**
Wound Response Tissue	**Also Occluding Tissue, Wound Wood or Callus. Differentiated wood tissue that grows around the margins of a wound or injury.**
Wound Wood	**Wood with atypical features, formed in the vicinity of a wound and a term to describe the occluding tissues around a wound**
Xylem	**Plant tissues with special function of translocation of water and dissolved nutrients.**

Appendix 3: Survey Methodology

A2.1 Ground level visual surveys are carried out using the *Visual Tree Assessment* technique described by Mattheck and Broeler (1994) and endorsed by the Arboricultural Association (LANTRA Professional Tree Inspection course, 2007).

A2.2 Structural condition is assessed by inspecting the stem and scaffold branches from all angles looking for weak branch junctions or symptoms of decay. Particular attention is paid to the stem-base. Cavities are explored using a metal probe in order to assess the extent of any decay. If this is not possible further inspection is recommended in the form of a climbed inspection or using specialist decay detection equipment.

A2.3 The physiological condition is assessed by inspecting the stem, branches and foliage for symptoms of disease. The overall vigour of the tree is also taken into account.

A2.4 Where significant defects are observed, recommendations are made according to a scale of priority in order to reduce the likelihood of structural failure. The position of the tree and its potential targets are taken into account.

A2.5 Measurements are obtained using a diameter tape, clinometer, distometer and loggers tape. Where this is not practical measurements are estimated.

A2.6 Some trees are surveyed as groups, though this is usually avoided close to areas likely to be developed.

A2.7 Finally, a *Retention Category* is allocated as described in Appendix 1.1.1.

Appendix 4: Author's Qualifications

Qualifications & Experience of Ivan Button N.C.H. (Arb), FDSc (Arb), BSc (Hons), P.G.C.E., M. Arbor. A.

Construction

Between 1983 and 1995 Ivan worked primarily within the construction industry and received training in a broad range of practical building skills and general construction principles. During this time he obtained a BSc (Hons) at Leeds University followed by a P.G.C.E at The University of Wales.

Arboriculture

He obtained a NCH (Arboriculture) at the University of Lincoln and became a member of the Arboricultural Association. He then worked for an Arboricultural Consultancy for one year before establishing a tree surgery and landscaping business in 1998. In 2005 Ivan commenced full time employment with a leading Arboricultural Association approved consultancy and soon adopted a senior role responsible for five consultants.

He obtained a FDSc in arboriculture at the University of Lancashire, which he passed with distinction and is now a Director and Principal Consultant of Crown Consultants Ltd. He is accredited as a LANTRA *Professional Tree Inspector*. A qualification produced in association with the Arboricultural Association and generally recognised as appropriate for all levels of tree inspection.

He is a member of the Consulting Arborist Society and is listed within their areas of professional expertise for QTRA and as an expert witness.

Ivan is a professional member of the Arboricultural Association and the International Society of Arboriculture.

He is a licensed Quantified Tree Risk Assessment user.

Ivan has undertaken professional expert witness training and has been registered as a Sweet and Maxwell Checked Expert Witness since 2008.

Throughout 2009 acted as the principal Tree Officer for Barnsley Metropolitan Borough Council.

Ivan has produced several hundred Arboricultural Reports for the purposes of Development, Safety, Management, Mortgage, Subsidence, Mitigation and Litigation.

Appendix 5: Further Information

Building Near Trees – General

National Joint Utilities Group publication # 10 (1995), *Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees. Downloadable at www.njug.demon.co.uk/pdf/NJUG%20Publication10.pdf*

NHBC Standards Chapter 4.2., *Trees and Buildings.*

Horticulture LINK project 212. (*University of Cambridge,* 2004), *Controlling Water Use of Trees to Alleviate Subsidence Risk.*

Tree Planting and aftercare

See www.trees.org.uk/leaflets.php# for downloadable leaflets on selecting a garden tree, planting, aftercare and veteran tree management.

British Standards

BS 5837: 2012. Trees in Relation to Design, Demolition and Construction – Recommendations.
Bs 3998: 2010. Recommendations for Tree Work.
BS 3936: 1992. Nursery Stock. Part 1: Specification for Trees and Shrubs.
BS 3936: 1992. Nursery Stock. Part 10: Specification for Groundcover Plants.
BS 4043: 1989. Transplanting Root-balled Trees.
BS 8004: 1986. Foundations.
BS 8103: 1995. Structural design of Low-Rise Buildings.
BS 8206: 1992. Lighting for Buildings.
BS 8545:2014. Trees: From nursery to independence in the landscape – Recommendations
BS 3882: 2007. Topsoil.
BS 4428: 1989. General Landscaping Operations (excluding hard surfaces).

Permission to do Works to Protected Trees / Tree Law

Forestry Commission (Edinburgh, 2003), *Tree Felling – Getting Permission*. Country Services Division - Forestry Commission. Downloadable at www.forestry.gov.uk/website/pdf.nsf/pdf/wgsfell.pdf/$FILE/wgsfell.pdf

Transport and the Regions (Department of the Environment, 2000), *Tree Preservation Orders, A Guide to the Law and Good Practice*. Downloadable at www.communities.gov.uk/publications/planningandbuilding/tposguide

C. Mynors, *The Law of Trees, Forests and Hedgerows* (Sweet and Maxwell, London, 2002)

Communities and Local Government website with numerous downloadable documents, from: http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/

Lighting Levels

P.J. Littlefair, *B.R.E. 209: Site layout planning for daylight and sunlight A guide to good practice.* B.R.E. Bookshop, London.

British Standards Institution. Code of practice for day lighting. *British Standard* BS 8206: Part 2 (1992).

Chartered Institution of Building Services Engineers. *Applications manual: Window Design* (London, 1987).

NBA Tectonics. A study of passive solar housing estate layout. *ETSU Report* S-1126. Harwell, Energy Technology Support Unit (1988).

I.P. Duncan; D. Hawkes, Passive solar design in non-domestic buildings. *ETSU Report* S-1110. Harwell, Energy Technology.

P. J. Littlefair, Measuring Daylight, *BRE Information Paper 23/93 f3.50.* (Advises on measuring daylight under the real sky or an artificial sky, allowing for the changing nature of sky light).

High Hedges

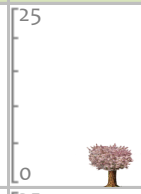
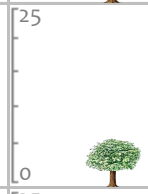
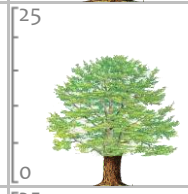
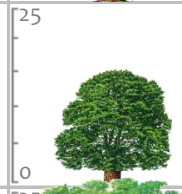
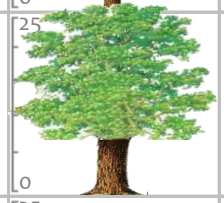
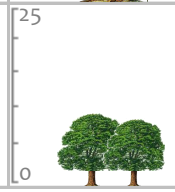
Communities and Local Government website with numerous downloadable documents, from: http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/

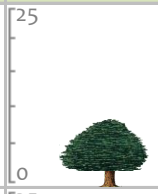
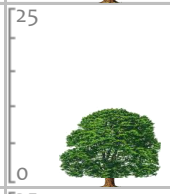
Tree Specific Websites

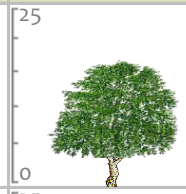
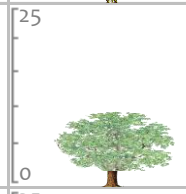
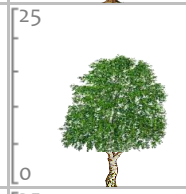
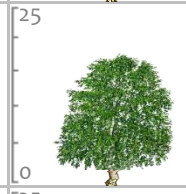
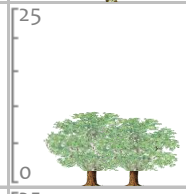
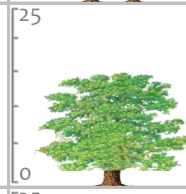
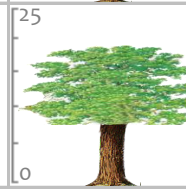
www.crowntrees.co.uk	Crown Consultants site containing useful information
www.trees.org.uk	Arboricultural Association
www.rfs.co.uk	Royal Forestry Society of England, Wales and N. Ireland
www.treehelp.Info	The Tree Advice Trust
www.woodland-trust.org.uk	The Woodland Trust
www.treecouncil.org.uk	The Tree Council

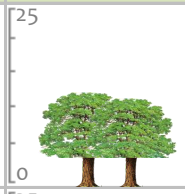
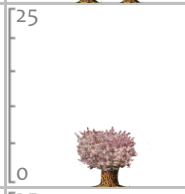
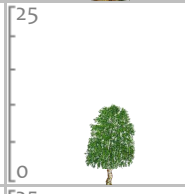
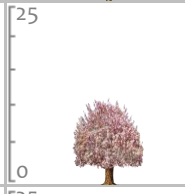
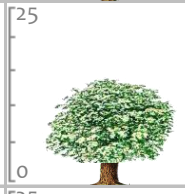
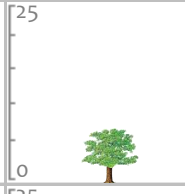
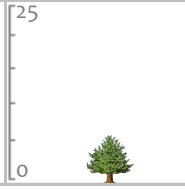
Appendix 6: Tree Data Schedule and Site Plan(s)

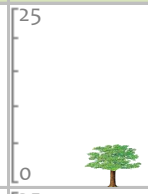
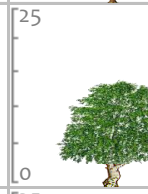
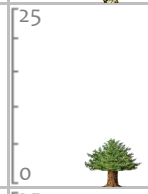
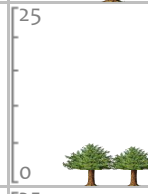
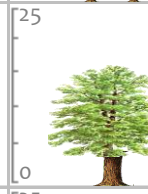
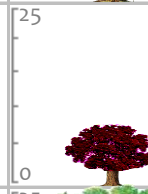
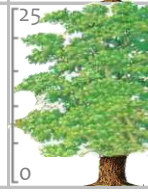
The Tree Data Schedule and any drawings accompanying this report follow this page. They are also provided as separate documents for ease of printing and screen viewing.

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W / N / E / S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
								Priority	Inspect Freq (yrs)		
T1	Semi-Mature **Cherry** Prunus sp.	5	2	22	W 3, N 3, E 3, S 3		Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning **Defects: No defects observed.**	No action required.	n/a / 3	High / Good / Good	Low / 20-40 / C
T2	Semi-Mature **Hawthorn** Crataegus monogyna.	5	2	13	W 1.5, N 1, E 1.5, S 3		Form: Multi-stemmed at 2m with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Low / 40+ / C
T3	Mature **Turkey Oak** Quercus cerris.	20	4	101	W 5, N 10, E 9, S 10		Form: Single stemmed and vertical with a well-formed crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	High / Good / Good	High / 40+ / A
T4	Mature **Beech** Fagus sylvatica.	18	4	61	W 6, N 6, E 5, S 5		Form: Single stemmed and vertical with a well-formed crown, co-dominant stem at 1.5m. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Kinked at base.	No action required.	n/a / 3	Moderate / Good / Good	Moderate / 40+ / B +
T5	Mature **Lime** Tilia sp.	16	2	60	W 5, N 4, E 5, S 5		Form: Single stemmed with a slight lean and a well-formed crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Moderate / 40+ / B +
T6	Mature **Ash** Fraxinus excelsior.	27	8	112	W 8, N 10, E 13, S 9		Form: Multi-stemmed at 8m with a well-formed crown. History: Occasional pruning wounds due to crown reduction. **Defects: Sparse canopy, minor deadwood throughout.**	Monitor.	Moderate / 1.5	Low / Poor / Fair	High / 20-40 / B
G7	Young **Lime** Tilia sp.	av 9	av 2	av 16	W 3, N av 3, E 1, S 3 each		Form: 2 suppressed specimens. History: Several branches reduced to allow access underneath the canopy **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Low / 40+ / C

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W N E S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals) Priority	Inspect Freq (yrs)	Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
T8	Semi-Mature **Lawson Cypress** Chamaecyparis lawsoniana.	8	2	31	W 4, N 4, E 4, S 4		Form: Single stemmed and vertical with a narrow, upright habit. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Low / 40+ / C +
T9	Semi-Mature **Lime** Tilia sp.	10	1	28	W 3.5, N 3.5, E 4, S 3.5		Form: Single stemmed and vertical with a balanced crown. History: Several branches reduced to allow access underneath the canopy **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Moderate / 40+ / B
T10	Young **Laburnum** Laburnum anagyroides.	5	1.5	11	W 0.5, N 2, E 4, S 2		Form: Twin-stemmed at ground level with an unbalanced crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 2 stems at 8 and 7cm diameter.	No action required.	n/a / 3	Moderate / Good / Good	Low / 40+ / C
T11	Semi-Mature **Lime** Tilia sp.	9	5	19	W 3, N 3, E 3, S 3		Form: Multi-stemmed at ground level with a narrow, upright habit. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 4 stems at 10, 11, 8 and 9cm diameter.	No action required.	n/a / 3	High / Good / Good	Low / 20-40 / C
T12	Semi-Mature **Fig** Ficus sp.	6	0	30	W 4, N 4, E 4, S 4		Form: Multi-stemmed at ground level with a balanced crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Low / 20-40 / C
T13	Semi-Mature **Fig** Ficus sp.	5	0	9	W 3, N 2, E 0, S 2		Form: Single stemmed with a slight lean and an unbalanced crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Low / 20-40 / C
T14	Mature **Silver Birch** Betula pendula.	21	2	56	W 6, N 6, E 7, S 8		Form: Single stemmed and vertical with a weeping habit. History: No evidence of significant pruning **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Moderate / 20-40 / B

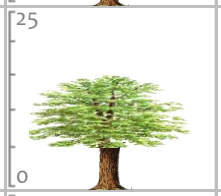
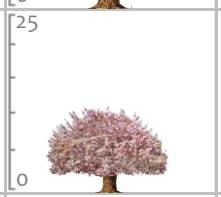
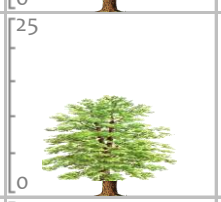
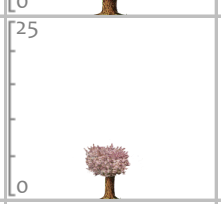
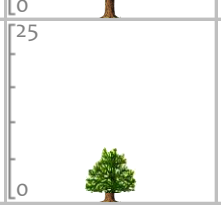
Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W N E S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals) Priority	Inspect Freq (yrs)	Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
T15	Early-Mature **Silver Birch** Betula pendula.	17	4	42	W 4, N 5, E 8, S 5		Form: Single stemmed and vertical with a slightly unbalanced crown. History: Several branches reduced to create clearance towards the adjacent building. **Defects: No defects observed.**	No action required. n/a	3	Moderate Good Good	Moderate 20-40 **B**
T16	Semi-Mature **Rowan** Sorbus aucuparia.	9	2.5	30	W 5.5, N 3.5, E 6, S 4.5		Form: Multi-stemmed at ground level with a balanced crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 4 stems at 10, 11, 13 and 22cm diameter.	No action required. n/a	3	Low Fair Poor	Low 10-20 **C**
T17	Early-Mature **Silver Birch** Betula pendula.	18	5	40	W 4, N 4, E 6, S 4		Form: Single stemmed and vertical with a weeping habit. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. n/a	3	Moderate Good Good	Moderate 20-40 **B**
T18	Early-Mature **Silver Birch** Betula pendula.	18	2	44	W 5, N 4, E 6, S 5		Form: Single stemmed and vertical with a weeping habit. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. n/a	3	Moderate Good Good	Moderate 20-40 **B**
G19	Semi-Mature **Rowan** Sorbus aucuparia.	av 9	av 2.5	av 28	W 4, N av 4, E 4, S 4 each		Form: 3 multi-stemmed specimens. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. n/a	3	Moderate Good Good	Low 20-40 **C**
T20	Early-Mature **Turkey Oak** Quercus cerris.	15	2	57	W 5.5, N 8, E 6, S 6.5		Form: Twin-stemmed at ground level with a balanced crown. History: Occasional pruning wounds due to crown lifting (now healed). **Defects: Major included bark at base.** Other: Acceptable condition at present.	No action required. n/a	3	Moderate Good Good	Moderate 40+ **B**
T21	Mature **Ash** Fraxinus excelsior.	19	9	90	W 8, N 8, E 8, S 8		Position: Situated on third party land. Form: Single stemmed and vertical with a sparse crown. History: Occasional pruning wounds due to crown lifting, reduced. **Defects: No significant defects observed.** Other: Access prevented detailed inspection.	No action required. n/a	3	Moderate Fair Fair	Moderate 40+ **B**

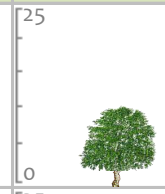
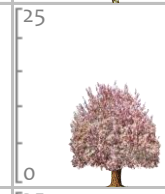
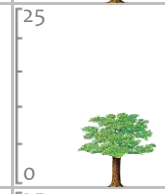
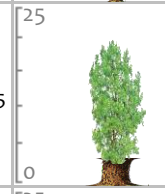
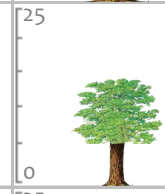
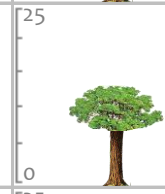
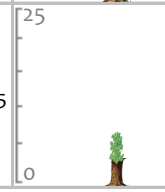
Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N / W / E / S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
								Priority	Inspect Freq (yrs)		
G22	Semi-Mature **Sycamore** Acer pseudoplatanus.	av 12	av 4	av 35	N: av W: 4 E: 4 S: 4 each		Position: Situated on third party land. Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate Fair Fair	Low 40+ C
T23	Mature **Cherry** Prunus sp.	8	2	60 @ Base	N: 6 W: 4 E: 3 S: 4		Form: Multi-stemmed at 1m with a slightly unbalanced crown. History: Multiple pruning wounds due to crown reduction. **Defects: No defects observed.** Other: Ivy prevented detailed inspection.	No action required.	n/a / 3	Moderate Good Good	Low 10-20 C
T24	Semi-Mature **Silver Birch** Betula pendula.	10	2	15	N: 2 W: 0 E: 4 S: 1		Form: Single stemmed and leaning with a weeping habit. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate Good Good	Low 20-40 C
T25	Semi-Mature **Cherry** Prunus sp.	11	1.5	22	N: 2 W: 1 E: 4 S: 3.5		Form: Twin-stemmed at 2.5m with a narrow, upright habit. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	High Good Good	Low 20-40 C
T26	Mature **Goat Willow** Salix caprea.	14	3	61	N: 6 W: 6 E: 5 S: 5		Form: Multi-stemmed at 2.5m with a balanced crown. History: No evidence of significant pruning. **Defects: No significant defects.** Other: Ivy prevented detailed inspection.	Remove ivy and inspect stem for defects.	Moderate / 1.5	High Fair Fair	Low 20-40 C
T27	Young **Ash** Fraxinus excelsior.	5.5	2	12	N: 2 W: 2 E: 2 S: 2		Form: Twin-stemmed at 1.5m with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	High Good Good	Low 40+ C
T28	Semi-Mature **Holly** Ilex aquifolium.	5	1	14	N: 1 W: 2 E: 2.5 S: 1		Form: Single stemmed with a slight lean and a slightly unbalanced crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	High Good Good	Low 20-40 C

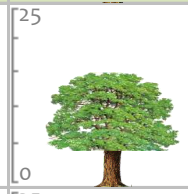
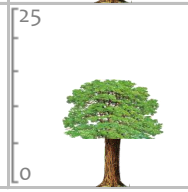
Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W N E S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals) Priority	Inspect Freq (yrs)	Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
T29	Young **Oak** Quercus robur.	4	1.5	9	W 1.5, N 1.5, E 1.5, S 1.5		Form: Single stemmed and vertical with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. n/a	3	High Good Good	Low 40+ C
T30	Early-Mature **Silver Birch** Betula pendula.	14	3	63	W 4, N 5, E 5, S 5		Form: Twin-stemmed at ground level with a narrow, upright habit. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Actually 3 close growing specimens.	No action required. n/a	3	Moderate Good Good	Low 20-40 B
T31	Semi-Mature **Holly** Ilex aquifolium.	5	2	31	W 2, N 2, E 2, S 2		Form: Twin-stemmed at 0.5m with a balanced crown. History: Regularly trimmed. **Defects: No defects observed.** Other: 2 stems at 17 and 26cm diameter.	No action required. n/a	3	Moderate Fair Good	Low 20-40 C +
G32	Semi-Mature **Holly** Ilex aquifolium.	av 4	av 2	av 15	W 1.5, N av 1.5, E 1.5, S 1.5 each		Form: 3 multi-stemmed specimens. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. n/a	3	Moderate Fair Fair	Low 40+ C
T33	Early-Mature **Maidenhair Tree** Ginkgo biloba.	16	4	63	W 6, N 6, E 4, S 5		Form: Multi-stemmed at 2m with a narrow, upright habit. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. n/a	3	Moderate Good Good	Moderate 20-40 B
T34	Early-Mature **Pissards Plum** Prunus cerasifera 'pissardii'.	7	2	39	W 2.5, N 1, E 5, S 7		Form: Twin-stemmed at 1.5m with an unbalanced crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. n/a	3	Moderate Good Fair	Low 20-40 C
T35	Mature **Turkey Oak** Quercus cerris.	26	4	99	W 10, N 10, E 13, S 11		Form: Multi-stemmed at 3m with a well-formed crown. History: Occasional pruning wounds due to crown lifting (now healed). **Defects: No defects observed.** Other: Excellent specimen.	No action required. n/a	3	High Good Good	High 40+ A +

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N / W / E / S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals) Priority	Inspect Freq (yrs)	Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
T36	Semi-Mature **Magnolia** Magnolia sp.	6	3	21	N 4 / W 1 / E 2 / S 1		Form: Twin-stemmed at ground level with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 2 stems at 16 and 14cm diameter.	No action required.	n/a	Moderate Good Good	Low 20-40 C
T37	Semi-Mature **Magnolia** Magnolia sp.	5	2	28	N 4.5 / W 1.5 / E 3.5 / S 5		Form: Twin-stemmed at 1m with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Tear wound at 1.5m (acceptable condition at present).	No action required.	n/a	Moderate Good Good	Low 20-40 C
T38	Mature **Lime** Tilia sp.	19	3	90	N 4 / W 8 / E 6.5 / S 7		Form: Multi-stemmed at 2m with a well-formed crown. History: Several branches reduced to create clearance towards the adjacent building. **Defects: No defects observed.**	No action required.	n/a	Moderate Good Good	High 40+ A
T39	Semi-Mature **Spindle** Euonymous europea.	4	2.5	23	N 3.5 / W 3 / E 2 / S 3.5		Form: Twin-stemmed at 1m with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 2 stems at 15 and 17cm diameter.	No action required.	n/a	Low Fair Good	Low 20-40 C
T40	Early-Mature **Ash** Fraxinus excelsior.	15	2	42	N 2 / W 2 / E 8 / S 7		Form: Single stemmed and leaning with an unbalanced crown. History: Multiple pruning wounds due to crown reduction. Occasional pruning wounds due to crown lifting (healing slowly). **Defects: No defects observed.**	No action required.	n/a	Moderate Good Good	Moderate 40+ B
T41	Semi-Mature **Holly** Ilex aquifolium.	6	2	19	N 2 / W 1 / E 2 / S 2		Form: Single stemmed and vertical with a narrow, upright habit. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a	Moderate Good Good	Low 20-40 C
T42	Semi-Mature **Elder** Sambucus nigra.	8	3	22	N 2.5 / W 1 / E 3 / S 2		Form: Multi-stemmed at 2m with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a	Moderate Good Good	Low 10-20 C

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W N E S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals) Priority	Inspect Freq (yrs)	Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
T43	Semi-Mature **Holly** Ilex aquifolium.	7	2.5	26	W 3, N 2, E 2, S 2		Form: Twin-stemmed at ground level with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 2 stems at 14 and 22cm dimaeter.	No action required. n/a	3	High / Good / Good	Low / 20-40 / C
T44	Semi-Mature **Holly** Ilex aquifolium.	5	2	21	W 2, N 2, E 2, S 2		Form: Twin-stemmed at 0.5m with a balanced crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 2 stems at 10 and 18cm diameter.	No action required. n/a	3	High / Good / Good	Low / 20-40 / C
T45	Semi-Mature **Holly** Ilex aquifolium.	4.5	2	17	W 1.5, N 1.5, E 1.5, S 1.5		Form: Twin-stemmed at ground level with a balanced crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 2 stems at 12cm diameter.	No action required. n/a	3	Moderate / Good / Good	Low / 20-40 / C
T46	Mature **London Plane** Platanus x hispanica.	18	3	80	W 7, N 7, E 7, S 7		Position: Situated on third party land. Form: Multi-stemmed at 5m with a well-formed crown. History: Multiple pruning wounds due to crown reduction. **Defects: No defects observed.** Other: Limited inspection, dimensions estimated.	No action required. n/a	3	Moderate / Good / Good	High / 40+ / A
T47	Semi-Mature **Leyland Cypress** X Cupressocyparis leylandii.	14	3	55	W 4, N 4, E 4, S 4		Position: Situated on third party land. Form: Single stemmed and vertical with a narrow, upright habit. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Limited inspection, dimensions estimated.	No action required. n/a	3	High / Good / Good	Moderate / 40+ / B
T48	Mature **Sycamore** Acer pseudoplatanus.	16	5	65	W 6, N 6, E 6, S 6		Position: Situated on third party land. Form: Multi-stemmed at 5m with a well-formed crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Limited inspection, dimensions estimated.	No action required. n/a	3	Moderate / Good / Good	High / 40+ / A
T49	Semi-Mature **Hawthorn** Crataegus monogyna.	6	2.5	17	W 1, N 2, E 3, S 2		Form: Single stemmed and leaning with an unbalanced crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. n/a	3	Moderate / Good / Good	Low / 20-40 / C

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) W N E S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals) Priority	Inspect Freq (yrs)	Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
T50	Mature **Hornbeam** Carpinus betulus.	24	2.5	125	W 14, N 11, E 10, S 11		Form: Triple-stemmed at ground level with a well-formed crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 3 stems at 82, 66 and 68cm diameter.	No action required.	n/a / 3	Moderate / Good / Good	High / 40+ / **A**
T51	Early-Mature **Walnut** Juglans regia.	11	4.5	56	W 5, N 5, E 6.5, S 6		Form: Single stemmed and vertical with a well-formed crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: minor branch broken at 4m to the north west.	No action required.	n/a / 3	Moderate / Good / Good	High / 40+ / **A**
T52	Mature **Indian Bean Tree** Catalpa bignonioides.	15	6	68	W 7, N 8, E 8, S 4		Form: Single stemmed with a slight lean and a well-formed crown. History: Occasional pruning wounds due to crown lifting (healing slowly). **Defects: No significant defects.** Other: minor branch broken at 4m to the north west.	No action required.	n/a / 3	Moderate / Good / Good	High / 40+ / **A**
T53	Mature **Cherry** Prunus sp.	11	2	46	W 6, N 6, E 4, S 5		Form: Multi-stemmed at 3m with a well-formed crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Moderate / 20-40 / **B**
T54	Early-Mature **Dove Tree** Davidia involucrata.	13	2	48	W 5, N 3, E 9, S 5		Form: Multi-stemmed at 1m with a well-formed crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: 3 stems at 20, 34 and 27cm diameter.	No action required.	n/a / 3	Moderate / Good / Fair	High / 40+ / **A**
T55	Semi-Mature **Cherry** Prunus sp.	7	3	27	W 3, N 2, E 5, S 2		Form: Single stemmed and vertical with a compact crown. History: Reduced. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Low / 40+ / **C**
T56	Semi-Mature **Monkey Puzzle** Araucaria araucana.	6	1	27	W 2, N 2, E 2, S 2		Form: Single stemmed and vertical with a balanced crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required.	n/a / 3	Moderate / Good / Good	Moderate / 40+ / **B**

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N / W / E / S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)	Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
T57	Semi-Mature **Silver Birch** Betula pendula.	10	2	21	N 2, W 3, E 3, S 4		Form: Single stemmed with a slight lean and a weeping habit. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. Priority: n/a; Inspect Freq (yrs): 3	High Good Good	Low 20-40 C
T58	Semi-Mature **Cherry** Prunus sp.	14	2.5	30	N 4, W 4, E 3, S 4		Position: Situated on third party land. Form: Single stemmed and vertical with a well-formed crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Limited inspection, dimensions estimated.	No action required. Priority: n/a; Inspect Freq (yrs): 3	High Good Good	Moderate 20-40 B
T59	Young **Ash** Fraxinus excelsior.	9	4	21	N 2, W 4, E 2, S 4		Position: Adjacent boundary. Form: Single stemmed and leaning with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.**	No action required. Priority: n/a; Inspect Freq (yrs): 3	High Good Fair	Low 40+ C
T60	Early-Mature **Lombardy Poplar** Populus 'italica'.	20	3	104	N 2, W 2.5, E 2.5, S 2		Position: Adjacent boundary. Form: Single stemmed and vertical with a narrow, upright habit. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Ivy prevented detailed inspection.	Remove ivy and inspect stem for defects. Priority: Moderate; Inspect Freq (yrs): 1	Moderate Good Fair	Moderate 20-40 B
T61	Semi-Mature **Ash** Fraxinus excelsior.	14	6	45	N 4, W 1, E 4, S 5		Position: Situated on third party land. Form: Single stemmed and leaning with a compact crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Ivy prevented detailed inspection, dimensions estimated.	No action required. Priority: n/a; Inspect Freq (yrs): 3	Moderate Good Fair	Low 20-40 C
T62	Semi-Mature **Sycamore** Acer pseudoplatanus.	13	8	40	N 2, W 4, E 4, S 5		Position: Situated on third party land. Form: Single stemmed and vertical with a slightly unbalanced crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Limited inspection, dimensions estimated.	No action required. Priority: n/a; Inspect Freq (yrs): 3	Moderate Good Good	Low 40+ C
T63	Semi-Mature **Ash** Fraxinus excelsior.	6	3	35	N 0.5, W 0.5, E 0.5, S 0.5		Position: Situated on third party land. Form: 4m tall stump. History: Some regrowth (minor).	No action required. Priority: n/a; Inspect Freq (yrs): 3	Moderate Fair Fair	Low 10-20 C

Reference (G = Group, H = Hedge)	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N / W / E / S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour / Physiological Condition / Structural Condition	Amenity Value / Life Expectancy (yrs) / Retention Category
								Priority	Inspect Freq (yrs)		
T64	Mature **Sycamore** Acer pseudoplatanus.	15	5	57	N 6, W 5, E 5, S 6		Position: Situated on third party land. Overhanging the boundary. Form: Twin-stemmed at ground level with a balanced crown. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Ivy prevented detailed inspection. Limited inspection, dimensions estimated.	No action required.	n/a / 3	Moderate / Good / Good	Low / 40+ / C
T65	Early-Mature **Sycamore** Acer pseudoplatanus.	14	7	51	N 4, W 4, E 4, S 4		Position: Situated on third party land. Form: Multi-stemmed at ground level with a narrow, upright habit. History: No evidence of significant pruning. **Defects: No defects observed.** Other: Ivy prevented detailed inspection. Limited inspection, dimensions estimated.	No action required.	n/a / 3	Moderate / Fair / Fair	Low / 40+ / C

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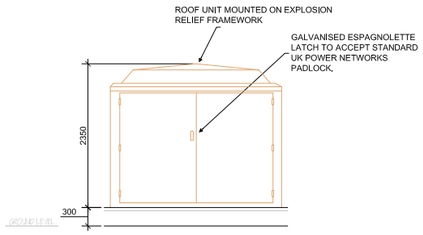
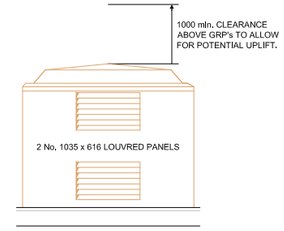
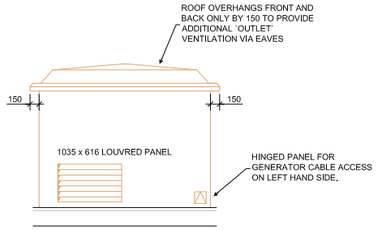


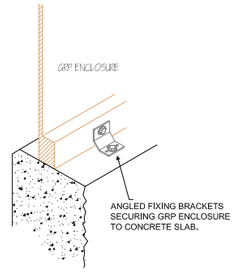
GRP Front Elevation



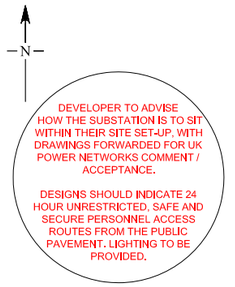
GRP Rear Elevation



GRP Side Elevation

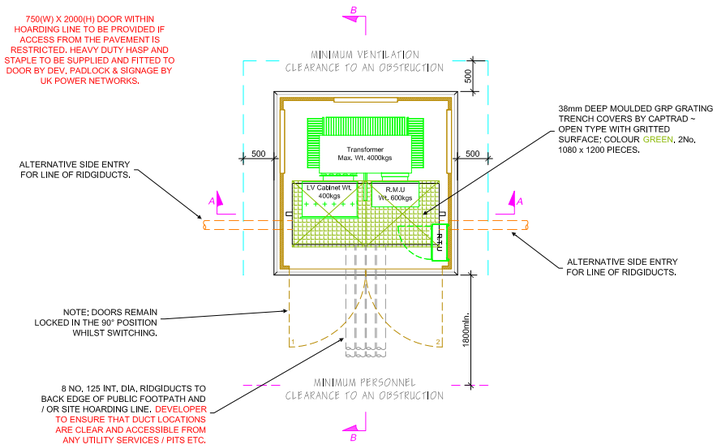


Fixing of Shell to Foundations

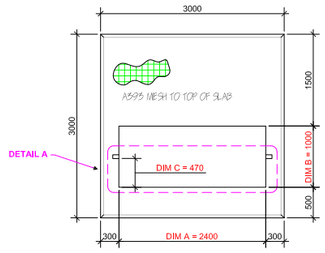


Substation Location Plan

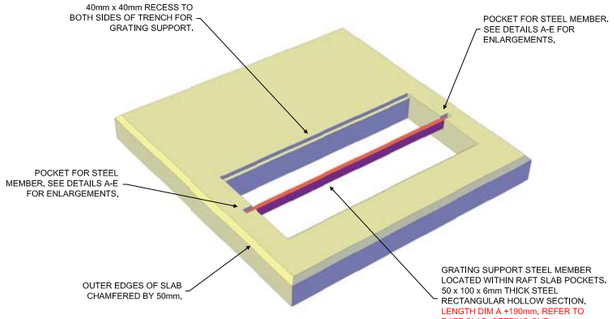
IF THE SITE SPECIFIC CIRCUMSTANCES DICTATE THAT TRAFFIC PROTECTION TO THE SUBSTATION BE CONSIDERED, THEN THE DEVELOPER IS TO PRODUCE A DESIGN SATISFYING LOCAL HIGHWAYS SPECIFICATIONS AND FORWARD PROPOSALS FOR UK POWER NETWORKS COMMENT / ACCEPTANCE PRIOR TO CONSTRUCTION.



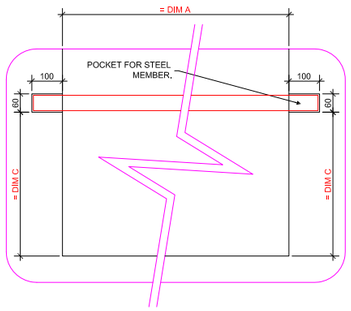
Substation Plan



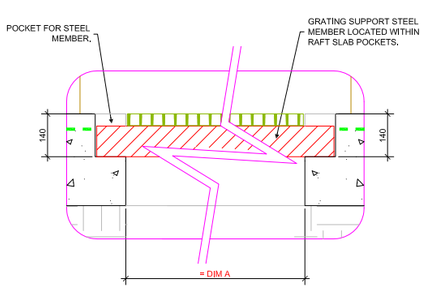
Raft Slab Plan ~ Setting Out Dimensions



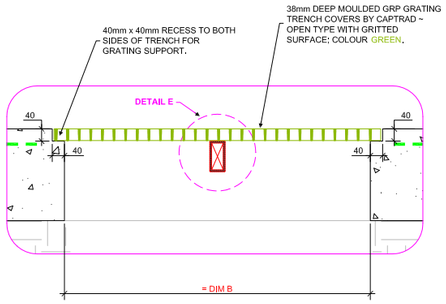
Raft Slab 3D View



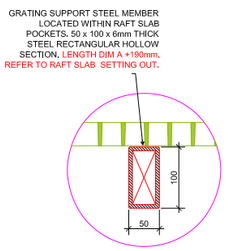
Detail A



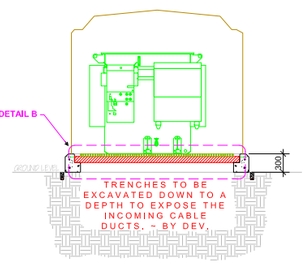
Detail B



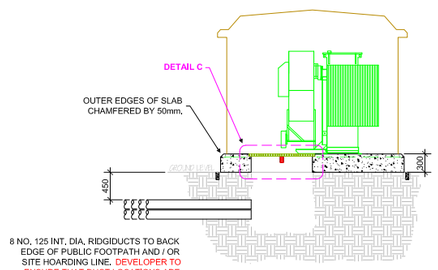
Detail C



Detail E



Section A~A



Section B~B

Plot Stamp –

Drawing Number: PACKAGE RAFT
Rev: 3

Specification Notes

ALL BUILDERSWORK TO BE PROVIDED BY CLIENTS DEVELOPER / BUILDER UNLESS EXPRESSLY STATED OTHERWISE.

GENERAL NOTES:
- THIS DRAWING IS NOT TO BE SCALED AND NO VARIATION TO THE STATED DIMENSIONS OR MATERIALS SPECIFIED WILL BE PERMITTED WITHOUT PRIOR WRITTEN CONSENT FROM UK POWER NETWORKS.
- ALL DIMENSIONS ARE IN MILLIMETRES.
- THE RUNNING OF HEATING, GAS, TELECOMS, WATER AND OTHER SERVICES THROUGH OR UNDER THE SUBSTATION AREA WILL BE NOT PERMITTED.
- THE DEVELOPER WILL BE RESPONSIBLE FOR OBTAINING ALL PLANNING CONSENTS AND APPROVALS BEFORE CONSTRUCTION WORK COMMENCES.

SUBSTATION LOCATION.
- IT IS IMPORTANT THAT THE POSITION AND ORIENTATION OF THE SUBSTATION IS DISCUSSED AND AGREED WITH THE UK POWER NETWORKS BUILDING OFFICER PRIOR TO THE COMMENCEMENT OF ANY BUILDING WORKS ON SITE.
- SUBSTATIONS SHOULD BE LOCATED ADJACENT TO A PUBLIC HIGHWAY OR REACHED BY A PRIVATE DEDICATED ACCESS WAY WITH FULL CONTROL AND ASSOCIATED LEGAL RIGHTS.
- 24 HOUR UNIMPEDED UK POWER NETWORKS PERSONNEL ACCESS IS REQUIRED AT ALL TIMES, 365 DAYS OF THE YEAR. ANY DOORS OR GATES ON THE ACCESS ROUTE ARE TO BE LOCKED IN STANDARD UK POWER NETWORKS LOCKING SUITE.
- ACCESS VIA 24HR SECURITY IS UNACCEPTABLE.
- THE SUBSTATION RAFT SLAB SHALL NOT BE POSITIONED OVER DRAINAGE COVERS OR UTILITY INSPECTION / ACCESS PITS. IF NO OTHER POSITION CAN BE FOUND THEN THESE MUST BE FIRST DIVERTED CLEAR OF THE PROPOSED STRUCTURE.
- IN THE EVENT OF BUILDERSWORK, (I.E. SCAFFOLDING) AFFECTING THE AGREED PLANT ACCESS ARRANGEMENTS, (NORMAL ACCESS VIA LORRY MOUNTED HIAB); THEN THE DEVELOPER IS TO LIAISE WITH THE UK POWER NETWORKS FIELD ENGINEER TO AGREE AN ALTERNATIVE METHOD OF ACCESS TO UK POWER NETWORKS SPECIFICATIONS AT THE DEVELOPER'S COST.

FOUNDATIONS, CONCRETE & REINFORCEMENT.
- THE STANDARD DESIGN SHOWN IS BASED ON A NET INCREASE OF GROUND PRESSURE AT FORMATION LEVEL NOT EXCEEDING 25kN/m². THIS IS CONSIDERED ADEQUATE FOR NORMAL GROUND CONDITIONS, SHOULD SPECIAL SITE CONDITIONS EXIST SUCH AS MADE UP GROUND OR VARIABLE BEARING PRESSURES THEN THE CLIENT'S STRUCTURAL ENGINEER IS TO DESIGN SUITABLE ALTERNATIVE FOUNDATIONS ~ ALL ALTERNATIVE PROPOSALS TO BE SUBMITTED TO UK POWER NETWORKS FOR COMMENT / ACCEPTANCE PRIOR TO BUILDING WORKS COMMENCING ON SITE.
- LOCAL SOFT SPOTS MUST BE EXCAVATED AND BROUGHT UP TO FOUNDATION FORMATION LEVEL WITH A DESIGNATED GEN1 MIX TO BS 8500-2 WITH A CEMENT COMBINATION TO ENSURE SULPHATE RESISTANCE OR SULPHATE RESISTING PORTLAND CEMENT TO BS 4027.
- CONCRETE TO BE DESIGNATED RC30/37 MIX WITH 20mm AGGREGATE, TO BS 8500-2 WITH A CEMENT COMBINATION TO ENSURE SULPHATE RESISTANCE OR SULPHATE RESISTING PORTLAND CEMENT TO BS 4027.
- ALL REINFORCEMENT TO HAVE A MINIMUM COVER OF 50mm AND A NOMINAL COVER OF 75mm.
- ALL EXTERNAL EDGES ABOVE GROUND LEVEL TO HAVE 50mm x 50mm CHAMFERS.
- TOP OF ALL CONCRETE WORKS TO BE FINISHED SMOOTH & LEVEL WITHIN ±2mm WITH A STEEL TROWEL ~ IT SHOULD BE NOTED THAT A HIGH STANDARD OF WORKMANSHIP IS REQUIRED.

GRP ENCLOSURE.
- UNLESS OTHERWISE STATED, THE STANDARD UK POWER NETWORKS GRP ENCLOSURE WILL BE PROVIDED AND INSTALLED BY UK POWER NETWORKS AS PART OF THE WORKS.
- THE TOTAL WEIGHT OF STANDARD UK POWER NETWORKS GRP ENCLOSURE IS 585Kgs.
- ROOF IS SUPPLIED AS A SINGLE MOULDING INCORPORATING ENCAPSULATED TIMBER. MAX LOAD ON ROOF 2.5kN/m².
- ROOF IS MOUNTED ON EXPLOSION RELIEF FRAMEWORK WITH MOUNTINGS. ENCAPSULATED AND BONDED INTO THE CORNERS OF THE ENCLOSURE. THE ROOF IS CAPABLE OF RISING 1m AND RETURNING TO THE NORMAL POSITION.
- DOORS HUNG ON 1½ PAIRS OF STAINLESS STEEL BUTT HINGES.
- DOORS FITTED WITH DOOR STAYS TO HOLD EACH DOOR OPEN AT 90°.
- ESPAGNOLETTE LOCKING SYSTEM ~ SECURED BY UK POWER NETWORKS STANDARD PADLOCK ~ PROVIDED BY UK POWER NETWORKS.
- THE THRESHOLD SECTION BELOW THE DOORS IS REMOVABLE TO FACILITATE PLANT MOVEMENT.

VENTILATION.
- VIA HIGH AND LOW LEVEL LOUVRED PANELS IN SIDES AND REAR OF GRP ENCLOSURE. LOUVRES MUST NOT BE OBSTRUCTED AT ANY TIME. A MINIMUM CLEAR AREA OF 500mm HARDSTANDING IS REQUIRED AROUND THE GRP ENCLOSURE.

COLOUR.
- STANDARD EXTERIOR COLOURS ARE MID BROWN 08-B-25 OR DARK GREEN 14-C-39 TO BS 4800.

GRATINGS & GRATING SUPPORT.
- 38mm DEEP MOULDED GRP GRATINGS BY CAPTRAD - OPEN TYPE WITH GRITTED SURFACE. COLOUR GREEN. GRATINGS MUST BE FLUSH WITH TOP OF FOUNDATION AND SECURELY SUPPORTED USING STEEL SUPPORT MEMBER AS SHOWN IN DETAIL A - F .
- GRATINGS MUST BE SEATED LEVEL WITH NO NOTICEABLE ROCKING.

ASSEMBLY.
- THE GRP ENCLOSURE IS USUALLY DELIVERED FULLY ASSEMBLED. AN OPTION FOR A FLAT PACK UNIT IS AVAILABLE ~ SPECIAL ORDER.

DUCTS.
- THE EXACT NUMBER OF DUCTS AND DUCT ENTRY POSITIONS ARE TO BE VERIFIED BY UK POWER NETWORKS TO SUIT THE PROJECT.
- PERMITTED DUCTS:- 125mm INTERNAL DIAMETER TWIN WALLED HIGH DENSITY POLYETHYLENE DUCTING TO ESI 12-24 (BS EN 50086-2-4) LAID FLAT & LEVEL. eg. RIDGIDUCT.

CABLE ACCESS.
- GROUNDWORK FOR CABLE ENTRY TO BE FULLY EXCAVATED BY DEVELOPER.

EARTHING.
- A DEDICATED EARTHING SYSTEM IS REQUIRED TO BE SUPPLIED, INSTALLED AND TESTED BY DEVELOPER'S SPECIALIST CONTRACTOR, SEE SHEET 2 FOR FULL DETAILS.

NOTES FOR UK POWER NETWORKS.
- BACKFILL WITH BUILDERS SAND AROUND CABLES TO FINISH 500mm FROM TOP OF GRATING. NOTE THAT GRATINGS ARE DESIGNED FOR PERSONNEL LOADING ONLY.
- SITE SURVEY TO DETERMINE WHETHER A CRANE IS NEEDED.

Rev	Description	Revised By	Date
3	Earthing sheet added.	D.Gabbitass	05/12/14
2	Re-drawn and Re-numbered.	D.Gabbitass	06/06/14
1	Generator flap, Hiab access note.	D.Gabbitass	02/07/12

Issued For Information Only

UK Power Networks

Substation Design Team
Metropolitan Hse, 3 Darkes Lane, Potters Bar, EN6 1AG.

Title: GRP Enclosure for Temporary Substation Package Arrangement. Sheet 1 of 2

Date Drawn	Scale @ A1	
25/05/12	Not to scale, use dimensions	
Drawn By	Building Officer	Project Designer
David Gabbitass	N/A	N/A

Drawing Number: PACKAGE RAFT
Rev: 3

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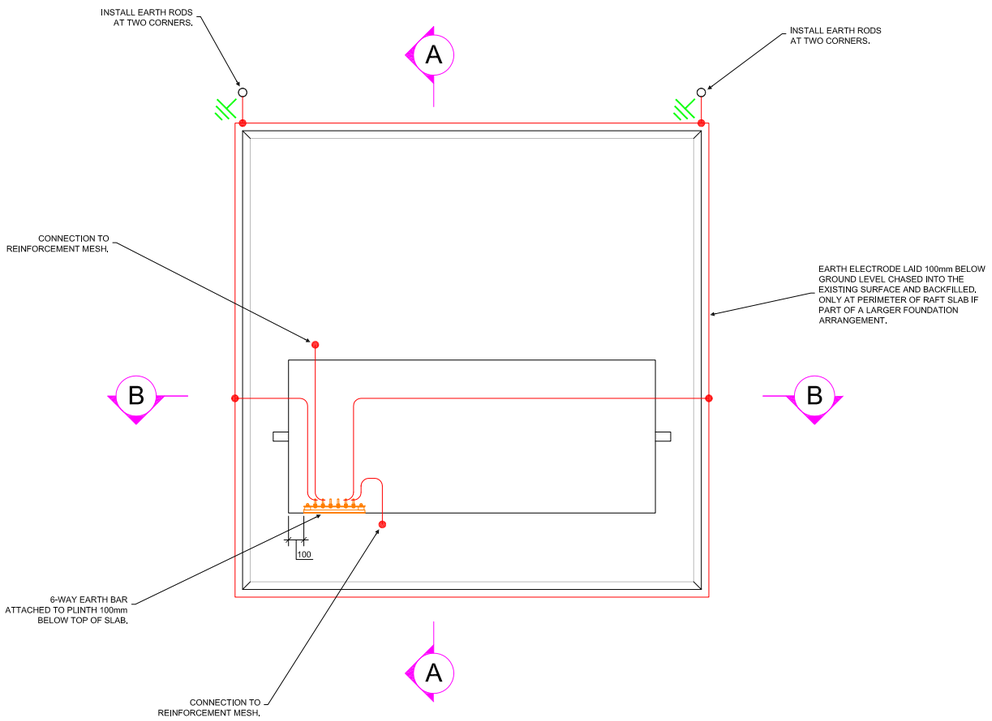
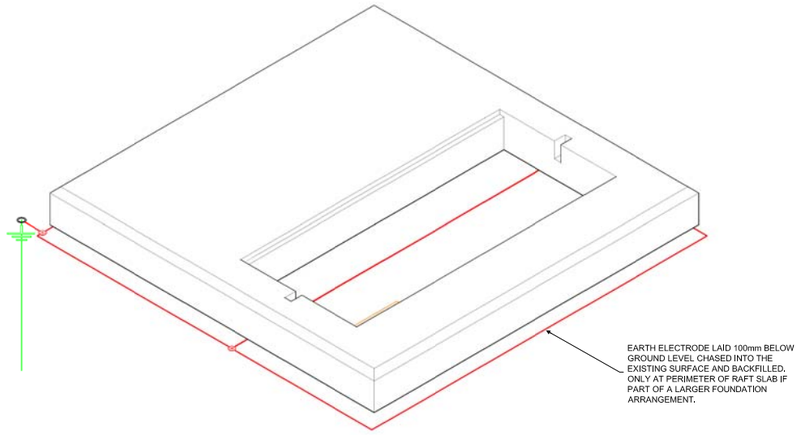
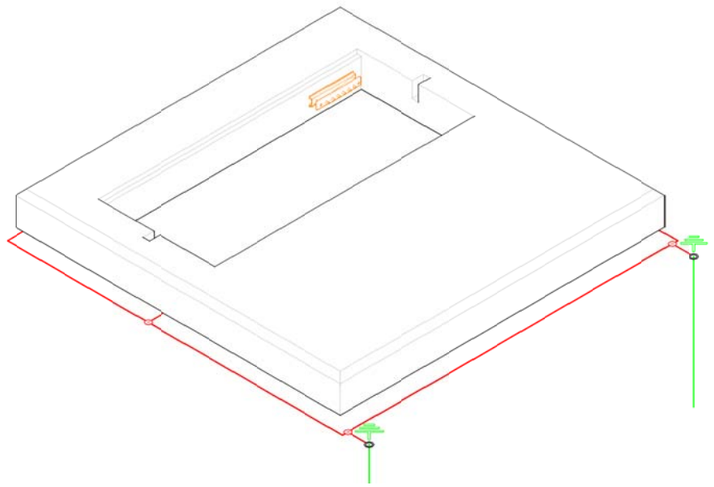


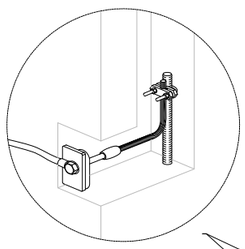
Raft Slab Plan



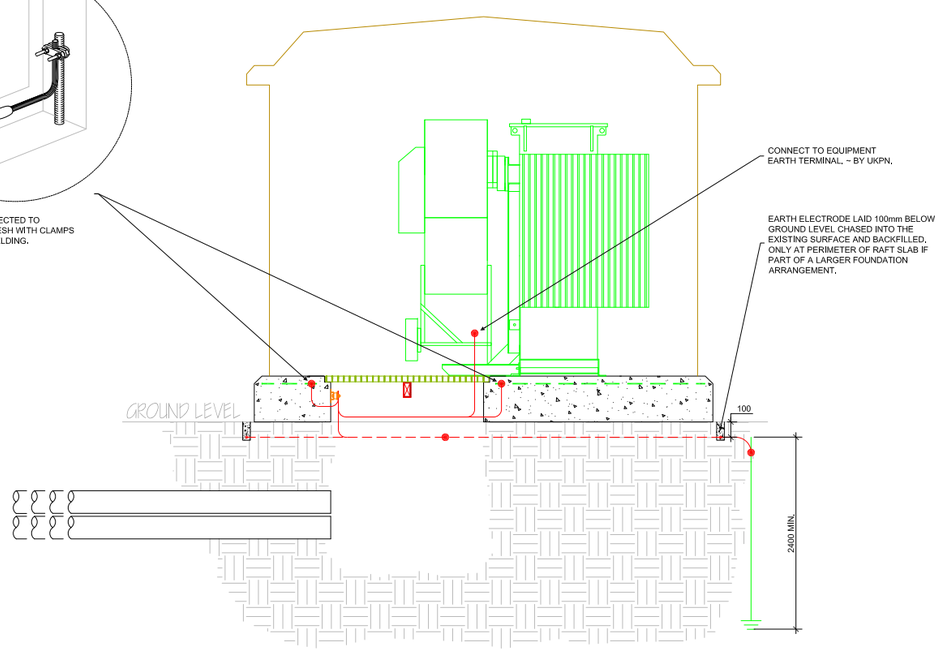
3D View Showing Earth Electrodes and Rods



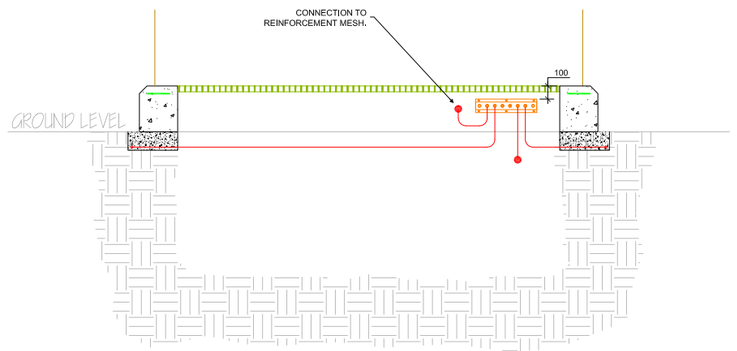
3D View Showing Earth Electrodes, Rods and Earth Bar



EARTH POINT CONNECTED TO REINFORCEMENT MESH WITH CLAMPS OR EXOTHERMIC WELDING.



Section A~A



Section B~B

Drawing Number — Rev

PACKAGE RAFT — 3

Specification Notes - For the Attention of the Developer / Builder.

GENERAL NOTES:

- THIS DRAWING IS NOT TO BE SCALED AND NO VARIATION TO THE STATED DIMENSIONS OR MATERIALS SPECIFIED WILL BE PERMITTED WITHOUT PRIOR WRITTEN CONSENT FROM UK POWER NETWORKS.
- ALL DIMENSIONS ARE IN MILLIMETRES.
- THE EARTHING SYSTEM SHALL BE PROVIDED BY THE DEVELOPER/CONTRACTOR UNLESS STATED OTHERWISE BY UK POWER NETWORKS.
- WHEREVER POSSIBLE THE EARTHING SYSTEM SHOULD BE INSTALLED IN ASSOCIATION WITH THE GROUND WORKS TO ENSURE THAT EARTH ELECTRODES ARE CORRECTLY POSITIONED PRIOR TO PLACEMENT OF CONCRETE.

REBAR/MESH REINFORCEMENT

- THE CONNECTION TO THE REINFORCEMENT WITHIN THE PLINTH SHALL USE EXOTHERMIC WELDING OR SUITABLE CLAMPS.
- ALL CONNECTIONS TO THE REINFORCEMENT SHALL USE A MINIMUM OF 70mm² STRANDED HARD DRAWN COPPER CABLE OR 25mm x 3mm COPPER TAPE.

EARTH ELECTRODE

- THE EARTH RODS SHALL BE COPPER CLAD WITH APPROPRIATE FITTINGS, DRIVEN TO A MINIMUM DEPTH OF 2.4m.
- THE EARTH ELECTRODE SHALL BE AS FOLLOWS:
- FOR EARTH FAULT LEVELS UP TO 8kA USE 70mm² BARE STRANDED HARD DRAWN COPPER CABLE OR 25mm x 3mm COPPER TAPE.
- FOR EARTH FAULT LEVELS UP TO 12kA USE 120mm² OR 2 x 70mm² BARE STRANDED HARD DRAWN COPPER CABLE OR 25mm x 4mm COPPER TAPE.
- FOR EARTH FAULT LEVELS UP TO 15kA USE 2 x 70mm² BARE STRANDED HARD DRAWN COPPER CABLE OR 25mm x 6mm COPPER TAPE.

EARTH RESISTANCE

- THE MAXIMUM RESISTANCE OF THE STANDALONE EARTHING SYSTEM SHALL BE SPECIFIED BY THE UK POWER NETWORKS DESIGNER.
- WHERE THE EARTHING SYSTEM IS INSTALLED BY A DEVELOPER OR CONTRACTOR CERTIFICATION CONFIRMING THE RESISTANCE OF THE STANDALONE EARTHING SYSTEM SHALL BE PROVIDED TO UK POWER NETWORKS PRIOR TO EQUIPMENT INSTALLATION.

BONDING

- NOT ALL EQUIPMENT BONDING IS SHOWN ON THE DRAWING. ALL EQUIPMENT SHALL BE BONDED IN ACCORDANCE WITH ECS 06-0023.

OTHER

- A 6-WAY EARTH BAR SHALL BE PROVIDED IN THE POSITION SHOWN ATTACHED TO THE PLINTH AROUND 100mm BELOW TOP OF SLAB.

FURTHER INFORMATION

- REFER TO:
- EDS 06-0014 SECONDARY SUBSTATION EARTHING DESIGN
- EDS 06-0023 SECONDARY DISTRIBUTION NETWORK EARTHING CONSTRUCTION

NOTE: THIS DRAWING ONLY SHOWS THE EARTHING ASSOCIATED WITH THE GROUND WORKS. ADDITIONAL EARTHING MAY BE REQUIRED TO ACHIEVE THE EARTH RESISTANCE VALUE AND TO ENSURE THE SUBSTATION IS SAFE, REFER TO THE RELEVANT EARTHING STANDARD FOR THE COMPLETE EARTHING AND BONDING REQUIREMENTS.

EARTHING KEY

- EARTH ROD
- EARTH ELECTRODE
- CONNECTION

Rev	Description	Revised By	Date
3	Earthing sheet added.	D Gabbitass	05/12/14
2	Re-drawn and Re-numbered.	D Gabbitass	06/06/14
1	Generator ilap, intab access note.	D Gabbitass	02/07/12

Issued For Information Only

UK Power Networks

Substation Design Team
Metropolitan Hse, 3 Darkes Lane, Potters Bar, EN6 1AG.

Title

GRP Enclosure Earthing details for;
Temporary Substation Package Arrangement.
Sheet 2 of 2

Date Drawn	Scale @ A1	
25/05/12	Not to scale, use dimensions	
Drawn By	Building Officer	Project Designer
David Gabbitass	N/A	N/A

Drawing Number — Rev

PACKAGE RAFT — 3

Plot Stamp -

Section B: Restrictions on Activities – Specific Zones

2.6. Construction Exclusion Zones

2.6.1. Within Construction Exclusion Zones (shaded purple on the Tree Protection Plan) the following restrictions shall apply:

- Tree Protection Barriers shall be erected and maintained throughout the entire project as indicated on the Tree Protection Plan and specified in Section 5 -*Tree Protection Barriers*.
- No construction activity whatsoever shall occur.
- No vehicles or plant machinery shall be driven or parked.
- No tree works, other than those specified in this report shall be undertaken.
- No alterations of ground levels or conditions.
- No chemicals or cement washings permitted.
- No excavation whatsoever shall occur.
- No temporary structures.
- No spoil shall be stored.
- No fires shall be permitted.
- All hazardous materials (including non-essential cement products) shall be forbidden.

2.6.2. Where hard surfaces are to be removed, this shall be done using hand tools or mechanical excavators operating from outside the Construction Exclusion Zone and marshalled by the appointed arborist.

2.6.3. Any structures shall be removed manually and without mechanical excavation.

2.7. All Restricted Activity Zones

2.7.1. Within all of these zones (indicated on the Tree Protection Plan) the following restrictions apply:

- Only essential and specified works shall be permitted.
- Operations within these zones shall be supervised as specified within the Inspection Schedule in Section 3.
- All excavation and lifting of surfaces shall be undertaken using hand operated tools or a mechanical excavator operating from outside the Restricted Zone and carefully marshalled by the local authority tree officer or an appointed arborist.
- No fires shall be permitted.
- All hazardous materials (including non-essential cement products) shall be forbidden.

2.7.2. Further restrictions specific to each zone are specified below:

2.8. Restricted Activity Zone A

2.8.1. Within these zones (indicated on the Tree Protection Plan) access will be required to facilitate construction. The following restrictions shall apply:

- No permanent or temporary structures shall be erected without written approval from the local authority.
- Ground protection measures appropriate to the proposed activity shall be installed as specified in Section 6 -*Ground Protection Measures*. These shall remain in place throughout the entire demolition and construction phase. *Note 1: where existing paving is retained and only pedestrian activity is proposed, no additional ground protection measures will be required. Note 2: where a pile driver needs to operate, it should operate entirely from outside the Restricted Activity Zone. If this is not possible, the ground protection measures may need to be strengthened in order to withstand the required loads. A reinforced concrete slab may be required. In such circumstances the ground protection measures shall be designed by engineers and shall be subject to approval by the local authority.*
- Existing ground levels shall be retained undisturbed.
- Any resurfacing or installation of new hard surfaces shall be done in accordance with the Guidelines in Section 7 -*New Surfaces*.
- No excavation shall occur in this zone without consulting the appointed arborist and obtaining approval from the local authority.
- If roots are encountered in excess of 25mm diameter, they shall be retained wherever possible and protected with damp sacking during times that they are unearthed. Any roots in excess of 10mm that need to be severed shall be pruned with secateurs.
- No machinery in excess of 2m tall shall pass through or operate in this zone unless carefully marshalled in order to avoid damage to branches.

2.9. Restricted Activity Zone B

2.9.1. Within this zone (indicated on the Tree Protection Plan) it is proposed to **install building foundations adjacent to T64.** The following restrictions shall apply:

- Concrete strip foundations shall not be installed in this area.
- Instead a pile-and-raft or pile-and-beam foundation shall be utilised.
- Excavation for the ground beam/raft shall be undertaken using hand tools or a carefully marshalled mechanical excavator operating from outside the Root Protection Area. Excavation depth to be agreed and approved by the local authority after consultation with engineers and contractors.
- Roots in excess of 25mm which are located close to the extent of the excavation are to be retained intact if possible; otherwise they shall be pruned with a sharp saw or secateurs.
- No auger or piling rig in excess of 4m shall be used beneath any tree canopy without being carefully marshalled by the appointed arborist.

2.10. Restricted Activity Zone C

2.10.1. Within this zone (indicated on the Tree Protection Plan) it is proposed to install a **scaffold structure designed to support the existing building façade** whilst the rest of the building is demolished and rebuilt. The following restrictions shall apply:

- Ground protection measures appropriate to the proposed activity shall be installed as specified in Section 6 -*Ground Protection Measures*. *Note: where a pile driver needs to operate, it should operate entirely from outside the Restricted Activity Zone. If this is not possible, the ground protection measures may need to be strengthened in order to withstand the required loads. A reinforced concrete slab may be required. In such circumstances the ground protection measures shall be designed by engineers and shall be subject to approval by the local authority.*
- The scaffold structure shall be founded on piled foundations.
- Trial pits shall be excavated to determine the location of the piles. Trial pits shall be 300mm x 300mm and excavated using hand tools to a depth of 600mm below that of the ground beam. Excavation shall be undertaken in the presence of the local authority tree officer or the appointed arborist. Soil shall first be loosened with a garden fork to ascertain if large roots are present before the loosened soil is removed with a spade. If roots in excess of 25mm are encountered, they shall be retained intact wherever possible and the pile shall be relocated. Roots in excess of 10mm shall be pruned using sharp secateurs. Beyond this depth, piles may be installed using an auger or piling rig. Pile diameter shall not exceed 300mm unless agreed otherwise with the local authority.
- No further excavation shall take place.

2.11. Restricted Activity Zone D

2.11.1. Within this zone (indicated on the Tree Protection Plan) it is proposed to install **underground services.** In order to ensure no significant impact on the root system of adjacent tree(s) a watching brief is proposed during all excavation in this area. The following restrictions shall apply:

- Excavation shall be overseen by an appointed arborist. The local authority tree officer shall be invited to attend.
- Hand tools and an air-spade shall be used during the excavation to a depth of 0.6m. Below this depth, a mechanical excavator may be used.
- All roots in excess of 50mm shall be retained wherever possible.
- Roots in excess of 25mm shall be retained wherever practicable.
- Any roots that need to be cut shall be pruned with secateurs.

2.12. Restricted Activity Zone E

2.12.1. Within this zone (indicated on the Tree Protection Plan) it is proposed to install **building foundations adjacent to where roots of the large London Plane, T50,** are anticipated. The following restrictions shall apply:

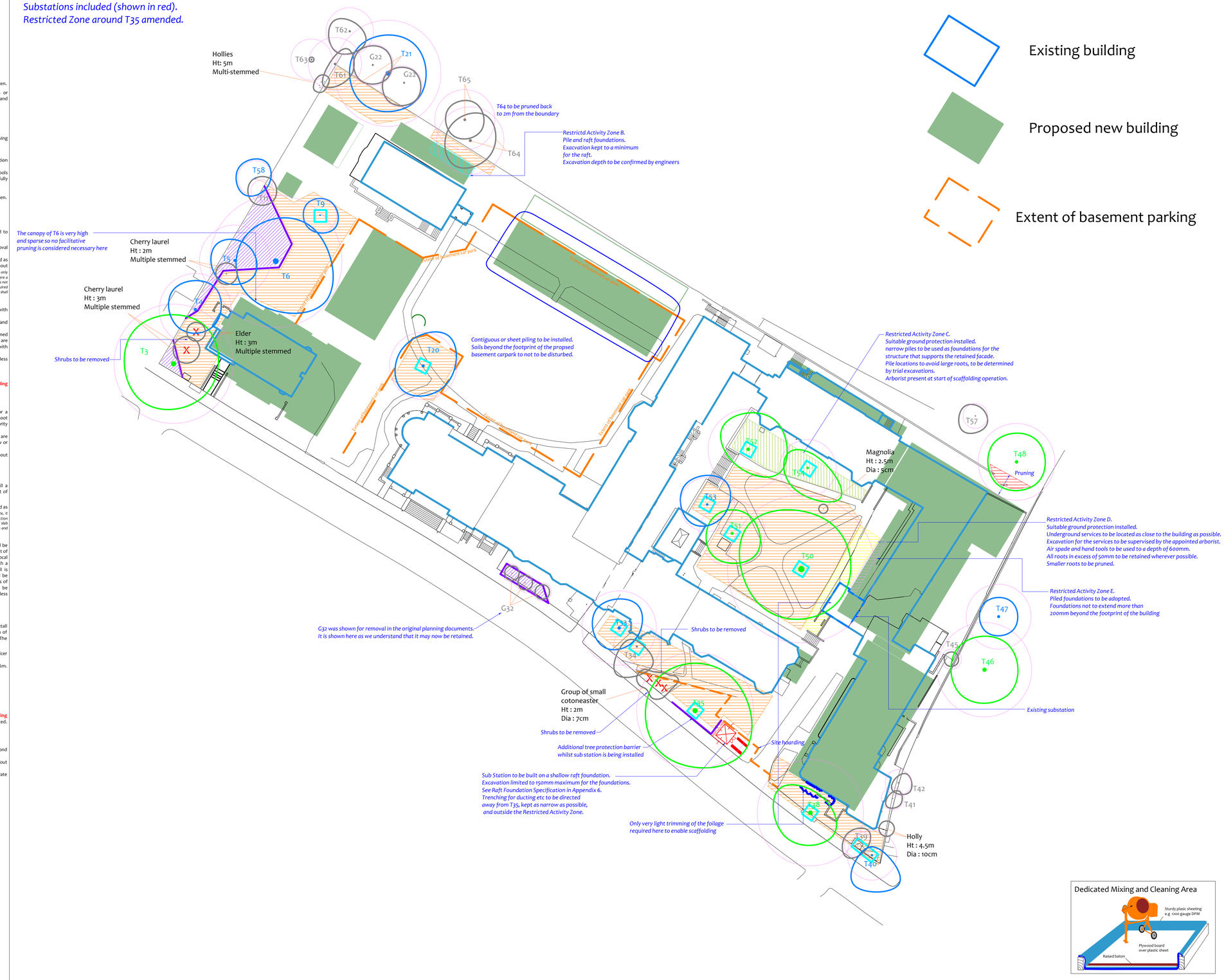
- Concrete strip foundations shall not be installed in this area.
- Instead a piled foundation shall be utilised.
- The piles or any part of the foundation shall not extend more than 200mm beyond the footprint of the building.
- No auger or piling rig in excess of 3m shall be used beneath tree canopy without being carefully marshalled by the appointed arborist.
- Suitable ground protection measures shall be installed if the piling rig is to operate outside of the building footprint.

Revision 2b. Dated 21st April 2016

Substations included (shown in red).
Restricted Zone around T35 amended.

Revision 2b. Dated 21st April 2016

Substations included (shown in red).
Restricted Zone around T35 amended.



Dedicated Mixing and Cleaning Area

Tree Protection Plan

Tree Protection Barriers:

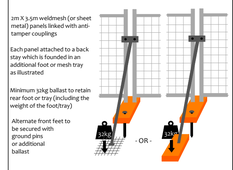
Fixed protective barrier: The 'In-Ground System' or the 'Backstay System'. To remain in place for all construction activity

Construction Exclusion Zone

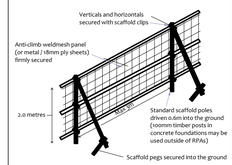
Stem protected to a height of 2.5m with thick cloth & wire

Tree Protection Boxing 1.2 x 1.2 x 2.4m high 25mm plywood

The 'Back Stay System'



The 'In-Ground' System



Construction Exclusion Zone

Within this area the following restrictions shall apply:

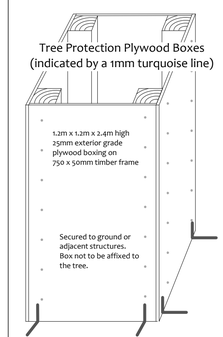
No excavation or land regrading whatsoever.
No storage of materials, rubble, soil or spoil.
No fires within the exclusion zone or within 10m of any tree canopy.
No site cabins or other temporary structures.
No discahrge of polluted water, cement or chemicals of any kind.
No use of any machinery, or passage or parking of vehicles.
No tree works without council consent.

Restricted Activity Zones

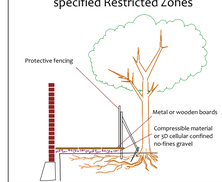
Restrictions are detailed within the accompanying Method Statement

Restricted Zone A
Restricted Zone B
Restricted Zone C
Restricted Zone D
Restricted Zone E

Tree Protection Plywood Boxes (indicated by a 1mm turquoise line)



Ground Protection where specified Restricted Zones



Revision 2a. Dated 19th April 2016

Substations included (shown in red).
Restricted Zone around T35 amended.

Drawing No:	CCL 09166/C / TPP Rev: 5
Title:	Tree Protection Plan (Existing Layout with Proposals Overlaid)
Site:	Kings College Halls NW3 7ST
Scale:	1:400 (0, 5, 10m) Paper Size: A1

CROWN
Arboricultural Consultants
01422 316660

Tree Retention Categories
Stems & canopies shown

Category A tree	Trees of high quality with an estimated life expectancy of 40+ years. Usually large trees with significant presence or smaller trees with excellent form. Retention of these trees is highly desirable.
Category B tree	Trees of moderate quality with a life expectancy of 20+ years. Usually maturing trees, or younger trees with good form. Retention of these trees is desirable though less than Category A trees
Category C tree	Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.
Category U tree	Trees unsuitable for retention due to their very poor condition.

BS 5837 Root Protection Area (radius = 12xstem diameter)

Root Protection Area needing amendment due to site conditions, e.g. presence of exising road or building.

Root Protection Area having been amended to account for for site conditions

T1 = Tree No 1 G2 = Group No 2 H3 = Hedge No 3

MN = Measured North:

Canopy spreads are sometimes measured to an approximate N defined by site features. Often more accurate, especially where rows of trees are not aligned N-S or E-W.