WHARTON
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ARBORICULTURAL METHOD STATEMENT

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SITE LOCATION:
Kingsgate Primary School
London Borough of Camden

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PREPARED FOR:
Architects Collaborative
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QUALITY ASSURANCE

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Client number	0369	0369	

Executive Summary

Project location

The application site lies within West Hampstead, northwest London. The Site comprises of an existing primary school containing five separate buildings of different ages, styles and material qualities.

Proposed development scheme

This Arboricultural Method Statement (AMS) has been commissioned by Architects Collaborative (the Client). It is prepared in relation to the approved development for demolition of the existing single storey extensions and replacement with new single storey extensions to provide a new school hall, library space, disabled WC and entrance space at Kingsgate Primary School, London Borough of Camden (the Site).

London Borough of Camden Council (the Council) require an AMS in order to discharge planning condition No.3 of the approved planning application reference 2017/1100/P dated 27th June 2017.

Results of survey

The survey includes record of 16no. individual trees and 2no. groups of trees. These include 4no. A category, 8no. B category and 6no. C category. This survey and AMS considers all trees located on or within influencing distance of the approved development area.

The location of each tree and their associated constraints including canopy spread and root protection areas (RPAs) with and without the approved development scheme are illustrated on plan numbers DWG 001 Rev B and DWG 002 Rev A, at Appendix 4.

The Root Radar results find that off-site trees T9-T18 positioned within Kilburn Grange Park are rooting beneath an area of hard surfacing at varying densities, although generally at lower rooting densities than would be expected of open grown trees.

Conclusions

There will be no loss of trees required to implement the approved development scheme.

Construction of the new building including replacement second hall, new library, disabled WC and entrance space will involve working within the RPAs of retained trees. It has been considered that with an engineered foundation design, the building can be constructed without adversely affecting the retained trees.

To demolish the existing flat roof area to the north side of the existing hall, there will be a requirement to work adjacent to retained trees including T14-T18. However, due to the well-established hard-standing ground, the demolition activity should not cause any damage to the surrounding trees.

There will be a requirement to position site cabins within the RPAs of retained trees. No ground excavations will be necessary to install the cabins, therefore there will be no impact to the root zone of retained trees. The location of the temporary crane base is also outside of RPAs of no impact to retained tree RPAs.

Installation of the relocated MUGA and construction of the new bike and scooter store will require working within the RPAs of retained trees. The small excavations necessary for post installations and hard surface reconfigurations are unlikely to have a damaging effect on tree condition.

The channel for the proposed foul waste pipe will be excavated as close as possible to the new building foundations when working within the RPAs of T17 and T18. This will keep excavations contained to a certain area and prevent digging a separate trench for the drainage run. The proposed drainage channel will continue through the southernmost periphery of the RPAs of T14 and T15.

Recommendations

To ensure the successful retention of T15, T17 and T18, the northeast corner of the new building will be constructed using a strip footing outside of the tree RPAs, and cantilevering a 2m section of the ground floor slab to support part of the building. Minor excavations for the ground floor slab build up (including heave protection) is shown on the Ground Floor Sections & Details produced by Price&Myers (ref. 24220/50). The cantilevered slab will provide an elevated support surface with only a minimal requirement for ground excavation. The installation of new foundations within RPAs must be undertaken with hand tools only and/or under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

To ensure foreseeable damage does not occur through the installation of drainage pipes, hand-dig only methods will be adopted when working within the RPA of retained trees. Any roots identified greater than 25mm diameter will be left intact where exposed. The removal of the existing hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

All plant and vehicles engaged in demolition operate outside of RPA of trees to be retained. Clause 7.3.4 of BS5837:2012 suggests; *Where trees stand adjacent to structures to be removed, the demolition should be undertaken inwards within the footprint of the existing building (often referred to as a "top down, pull back")*. To ensure that foreseeable damage does not occur, whilst the demolition of the existing building is undertaken, the ACoW will be on-site throughout.

In relation to the relocated MUGA and new bike and scooter store, it is anticipated that only fine roots with a diameter of less than 25mm will be identified and therefore if identified will be cut back to appropriate growth points. As detailed in clause 7.2.3 of BS5837:2012 this is considered acceptable and unlikely to cause detrimental impact in this instance. To ensure foreseeable damage does not occur, hand-dig only methods will be adopted when working within the RPA of retained trees. The removal of the existing hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

All trees to be retained should be proactively managed to ensure that they enhance the development and the wider environment. This AMS provides details of the measures and steps required to retain trees during site clearance, construction and post-development through supervision, tree protection and appropriate construction techniques.

It is critical that all protective fencing is installed and erected and that the Construction Exclusion Zone (CEZ) is enforced prior to the commencement of any works on site. Following installation of tree protection, a site meeting will be undertaken with the Tree Officer to ensure satisfaction of all parties prior to any on site works commencing.

It is recommended that a suitable competent arboriculturist undertakes the Site supervision and monitoring works.

In order for tree and root protection measures to work effectively all personnel associated with the construction process must be familiar with the Tree Protection Plan at Appendix 4.

Table of Contents

1. Introduction

1.1.1 The principal author of this Arboricultural Method Statement (AMS) is Sebastian Onslow *FdSc Arb. MArborA*, Arboricultural Consultant at Wharton Tree & Ecology Consultants Ltd. Sebastian is a Professional member of the Arboricultural Association and is LANTRA certified to undertake Professional Tree Inspections.

1.2 Terms of instruction

1.2.1 This AMS has been commissioned by Architects Collaborative (the Client). It is prepared in relation to the approved development for demolition of the existing single storey extensions and replacement with new single storey extensions to provide a new school hall, library space, disabled WC and entrance space at Kingsgate Primary School, London Borough of Camden (the Site) (see aerial photograph at Appendix 1).

1.2.2 The initial instruction was to undertake a BS5837:2012 tree constraints survey and report. Further instruction was given to complete a Tree Root Radar Assessment, to evaluate the extent and volume of rooting material in the approved development area.

1.2.3 London Borough of Camden Council (the Council) require an AMS in order to discharge planning condition No.3 of the approved planning application reference 2017/1100/P dated 27th June 2017. The full details of condition No.3 can be found within Section 1.7 of this report.

1.2.4 This document may be used as a point of reference if there were to be a dispute over compliance with related planning decisions.

1.3 Scope of project

1.3.1 The scope of this project is fourfold:

i. Undertake a constraints survey and report of the trees on the Site and within influencing distance of the Site;

ii. Provide an assessment of the rooting area along the north and western boundaries through the use of Tree Root Radar;

iii. Provide an impact appraisal and arboricultural method statement specifically in relation to the physical protection of trees, to reduce the impact on retained trees, and those located adjacent to the Site; and

iv. Provide a detailed tree protection plan.

1.4 Reference documents

1.4.1 As background information, the following documentation has been referenced.

Table 1 Document and Plans Provided

Document Description	Reference No.	Prepared By	Date
OS Site Plan	MLUK-419-SK-024	-	-
Proposed Site Plan	596_P-001 B	Sarah Wigglesworth Architects	July 2017
Design, Access & Planning Statement	596_Kingsgate KS2 DAS	Sarah Wigglesworth Architects and Architects Collaborative	February 2017

Tree Impacts Plan	596_P006	Sarah Wigglesworth Architects and Architects Collaborative	February 2017
Site Adaption Works	596_L-500 C	Sarah Wigglesworth Architects	July 2017
Adaption Works Demolition	596_L-501 C	Sarah Wigglesworth Architects	July 2017
Adaption Works Proposed	596_L-502 C	Sarah Wigglesworth Architects	July 2017
Proposed Bike and Scooter Storage	596_P006 A	Sarah Wigglesworth Architects	July 2017
Below Ground Drainage Layout	24220.002-600 Version 3	Price&Myers	July 2017
Ground Floor Plan	24220/10 Version 4	Price&Myers	July 2017
Ground Floor Sections & Details	24220/50 Version 3	Price&Myers	July 2017
Tree Constraints Assessment	030615 0369 TCA V1 003	Wharton Tree & Ecology Consultants Ltd	June 2015
Root Investigation by Tree Radar	SHA 411	Sharon Hosegood Associates	June 2017
Contractor Delivery Route	S96_SK_34 C	Sarah Wigglesworth Architects	July 2017

1.5 Tree preservation orders

1.5.1 The Local Planning Authority (LPA) has been contacted to establish whether any trees contained within the survey are protected by either a Tree Preservation Order (TPO) or are within a Local Conservation Area.

1.5.2 It has been confirmed by London Borough of Camden Council on 20th July 2017, that none of the trees on the Site are protected by a TPO, nor is the Site located within a local Conservation Area. Tree Nos. T9-T18 of this survey and report are situated within Kilburn Grange Park and are also not subject to any statutory protection.

1.6 Trees and wildlife

1.6.1 The Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and the Conservation of Species and Habitat Regulations 2010 (as amended) provides statutory protection of birds, bats and other species that can inhabit trees.

1.6.2 Great care is required to avoid disturbance to those species and consideration should be given to the timing of tree works in order to avoid disturbance. Where the presence of such species is suspected, the project ecologist or Natural England should be contacted for advice.

1.7 Relevant background information

1.7.1 The following method statement addresses planning condition No.3, and the implementation of on-site works. The Council planning decision notice (reference: 2017/1100/P dated 27th June 2017) includes 13no. planning conditions of which No.3 relates to the trees on site, as detailed below:

- *Condition No.3 – All trees on the site, or parts of trees growing from adjoining sites, unless shown on the permitted drawings as being removed, shall be retained and protected from damage to the satisfaction of the Council. Details shall be submitted to and approved by the Council before any works commence on site (including demolition) to demonstrate how trees to be retained shall be protected during construction works: such details shall follow guidelines and standards set out in BS5837:2012 and should include details of appropriate working processes in the vicinity of trees, and details of an auditable system of site monitoring. The development thereafter shall be implemented in strict accordance with the approved details.*
- *Reason: To ensure that the Council may be satisfied that the development will not have an adverse effect on existing trees and in order to maintain the character and amenities of the area in accordance with the requirements of policy CS15 of the London Borough of Camden Local Development Framework Core Strategy.*

1.8 Planning policies/documents

1.8.1 It is appreciated that the trees could provide a constraint and therefore a detailed tree survey and arboricultural report was commissioned to fulfil the requirements of BS5837:2012 *Trees in Relation to Design, Demolition and Construction: Recommendations*. It considers trees directly on site or within influencing distance of the Site.

1.8.2 *National Planning Policy Framework:* When determining planning applications, LPA's should aim to conserve and enhance biodiversity. If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused. Opportunities to incorporate biodiversity in and around developments should be encouraged (Paragraph 118).

1.8.3 When determining planning applications, local planning authorities should aim to apply the following principles:

> *Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland,* ***unless the need for, and benefits of, the development in that location clearly outweigh the loss (paragraph 118).***

1.8.4 There will be no tree removals required for this approved development and therefore the principles for refusal within the NPPF would not be considered applicable.

1.8.5 This AMS makes a number of recommendations for the Site in order that those trees retained and protected through the course of development, continue to enhance the environment following its completion.

1.8.6 To achieve this a methodology for all works that may affect trees, which are to be retained on and adjacent to the Site has been provided.

2. Site Assessment

2.1 Site visit

2.1.1 The tree assessment was undertaken on 21st May 2015 by Peter Wharton *BSc(Hons) Arb. FArborA MICFor (Chartered Arboriculturist)* and the trees inspected from ground level. The owners/managers

of the Site were informed of our presence on-site and prior to undertaking the inspection of trees.

2.2 Site description

2.2.1 The approved development site lies within West Hampstead, northwest London. The Site comprises of an existing primary school containing five separate buildings of different ages, styles and material qualities. These include the Key Stage 2 (KS2) block, Nursery Block, Key Stage 1 (KS1) block, Dining Hall Block and Kitchen and the Admin Block. Outdoor play surfacing and apparatus are positioned centrally to the Site and to the northwest boundary. Kilburn Grange Park is situated immediately beyond the northern boundary. The east of site is bordered by residential dwellings along Kingsgate Road. The main vehicular access is from the south directly off Messina Avenue. Beyond the western boundary there is a children's playground and tennis courts positioned within Kilburn Grange Park. The A5 Kilburn High Road connects the Site with central London in a south-western direction.

2.2.2 The trees on the Site and within close proximity to it are varied in both maturity and quality. The trees assessed are principally located off-site within the surrounding pavements and within Kilburn Grange Park. Boundary trees provide important site screening and wider amenity value within the built-up environment.

3. Approved Development Scheme

3.1.1 The approved development includes the demolition of the existing flat roof area to the north side of the existing hall and replacing these with a second hall, new library, disabled WC and entrance space. The layout aims to reinstate the relationship to the park and has been planned to allow the potential for future community access and possible entrance from the park side.

4. Arboricultural Assessment

4.1 Method of data collection

4.1.1 The trees on the Site were originally surveyed without reference to the Site layout as detailed in Clause 4.4.1.1 of BS5837:2012. However, for the purposes of this AMS, the approved design for the Site has been considered.

4.1.2 The survey recorded trees either as individual specimens or as groups, where these trees were aerodynamically, culturally or visually important as groups. The tree numbers associated with each tree are cross-referenced within the schedule and plans at Appendix 3 and 4 respectively. The complete method of data collection for the tree survey is provided at Appendix 2.

4.2 Summary of data

4.2.1 The survey includes record of 16no. individual trees and 2no. groups of trees. These include 4no. A category, 8no. B category and 6no. C category. This survey and AMS considers all trees located on or within influencing distance of the approved development area.

4.2.2 T1 (silver maple) is a large mature specimen located off-site within the pedestrian footpath adjacent Messina Avenue. T12 (Norway maple), T14 (common yew) and T16 (common hornbeam) are mature off-site trees located within Kilburn Grange Park. All of the individual trees are considered of A category retention value. The trees provide significant amenity value within the urban context.

4.2.3 T3 (Italian alder) is positioned off-site adjacent to the main access gates. The tree provides important landscape value. T4 (common lime) is located within the nursery area of the school. The seating area at the base of the tree has restricted a detailed assessment. T6 (common lime) is positioned south of the Site and has been historically pollarded. G7 (pair of midland thorn) is positioned off-site within the footpath adjacent Kingsgate Road. T8 (common yew), T11 (common hornbeam), T17 (sycamore) and T18 (common yew) are all positioned off-site within Kilburn Grange Park. All of the trees are considered of B category retention value of important landscape and amenity value.

4.2.4 T2 (pissards plum), T5 (common lime), T9 (pedunculate oak), G10 (mixed species group), T13 (ashleaf maple) and T15 (common elder) are all of C category retention value. The trees of limited quality and value, although provide continuity of tree cover across the Site.

4.2.5 None of the trees assessed were considered to be of very low U category retention value.

4.2.6 The location of each tree and their associated constraints including canopy spread and root protection areas (RPAs) with and without the approved development scheme are illustrated on plan numbers DWG 001 Rev B and DWG 002 Rev A, at Appendix 4.

Table 2 Summary of Trees Surveyed

Retention Category	Individual Trees	Groups	Hedgerows	Totals
Category A (**Trees of high quality** with an estimated life expectancy of at least 40 years).	T1, T12, T14 & T16	0	0	**4**
Category B (**Trees of moderate quality** with an estimated life expectancy of at least 20 years).	T3, T4, T6, T8, T11, T17 & T18	G7	0	**8**
Category C (**Trees of low quality** with an estimated life expectancy of at least 10 years, or young trees with a stem diameter below 150mm).	T2, T5, T9, T13 & T15	G10	0	**6**
Category U (Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years).	0	0	0	**0**
Totals	**16**	**2**	**0**	**18**

4.2.7 It should be noted that Table 1 of BS5837:2012 only gives recommendations in relation to remaining years. A tree may be considered to have a longer remaining life, however, still be considered to be of a lower category given its maturity, condition or overall impact to the approved application site.

4.2.8 In line with BS5837:2012, the category A and B trees should be considered as providing a substantial contribution to the Site. Generally, category C and U trees are considered to be of low quality or are young specimens, which can be readily replaced, therefore, should not be considered a constraint to development.

4.2.9 However, it is considered desirable, wherever possible, that a tree should be retained as it ensures continuity of tree cover and provides a mature landscape to the approved development site.

5. Impact appraisal

5.1 Conflict between site layout and trees

5.1.1 There will be no loss of trees required to implement the approved development scheme.

6. Below Ground Constraints

6.1 Root protection area

6.1.1 The below ground constraints are generally summarised as the root protection areas (RPA). The RPA is an area equivalent to a circle with a radius 12 times the diameter of the trees measured at 1.5 metres for single stemmed trees. For trees with more than one stem, one of the two calculation methods should be used where there are either 2 - 5 stems or 5 or more stems. In all cases, the stem diameter(s) should be measured in accordance with Annex C, and the RPA should be guided from Annex D of BS5837:2012.

6.1.2 The RPA is an area in which no ground works should be undertaken without due care in relation to the retained tree(s) and this is to avoid soil compaction, changes in levels or soil contamination which could alter the trees condition and/or stability. The shape of the RPA and its exact location will depend upon arboricultural considerations and ground conditions.

6.1.3 The RPA for the trees have been calculated as prescribed by BS5837:2012 and are shown as circles or polygons on the Tree Constraints Plan at Appendix 4. These plans illustrate the relationship between the RPAs associated with the trees and the approved development.

6.1.4 In addition to the illustration of RPAs on the plans at Appendix 4, the numerical RPA values are provided within the Tree Schedule at Appendix 3. Within the schedule both RPA radius in metres from the main stem and total area for the RPA as square metres.

6.2 Existing conflicts with RPAs

6.2.1 In general terms, all of the trees have some compromising factors associated with their RPAs. This is principally through the installation of hard surfacing and retaining/boundary walls. Within Kilburn Grange Park where there has been recent installation of new play equipment, there is evident decline of trees T8 and T9. The decline is synonymous with prolonged ground compaction and construction works, evidenced here by canopy dieback and chlorotic foliage.

6.3 Tree Root Radar scan

6.3.1 From the results of the tree constrains assessment, the approved layout encroached into the RPAs of T15, T17 and T18 positioned immediately beyond the northeast boundary. To fully assess the impacts and look at ways this may be mitigated, it was advised that a Root Radar scan be carried out. For the full details of the report see Appendix 6 of this AMS.

6.3.2 A Root Radar survey was carried out on the 22nd June 2017 by Ian Lee *BSc (Hons), MArborA, Tech Cert (Arbor A)*, of Sharon Hosegood Associates. The root survey was conducted along the north and northwest boundaries of the Site, all of which are occupied by asphalt playground surfacing. The area surveyed included trees T9-T18.

6.3.3 The survey can be broken down into 4no. key sections are described below:

1. Running from south to north, 1m from the western boundary line and parallel to it, adjacent to T9 and G10;
2. Running west to east, 1m from the northern boundary line and parallel to it, adjacent to T9, G10, T12 and T13;
3. Running west to east, 1m from the northern boundary line and parallel to it, adjacent to T14 and T15; and

4. Running from west to east, 1m from the northern boundary line and parallel to it, adjacent to T16, T17 and T18.

6.3.4 The overall conclusions of the radar assessment are as follows:

1. Within section 1 the survey found moderate/low rooting density in an unevenly distributed pattern.
2. Within section 2 roots were found in moderate/low rooting density in an unevenly distributed pattern, concentrating around the start of the line near T9 and adjacent to the trunks of T12 and T13.
3. Within section 3 the survey identified initially very high rooting density immediately inside the boundary (1m inside the boundary), with the density rapidly dropping away to moderate density (2m inside the boundary) then very low density (3m inside the boundary).
4. Within section 4 the survey identified initially moderate rooting density inside the boundary, then rapidly dropping away to low and very low densities.

6.3.5 The Root Radar results find that off-site trees T9-T18 positioned within Kilburn Grange Park are rooting beneath an area of hard surfacing at varying densities, although generally at lower rooting densities than would be expected of open grown trees. The roots of the trees are growing beneath the hard surfacing for both structural support and to exploit moisture. Most of the roots are growing within the park side, and have been partially restricted by the physical barrier of the boundary wall footings and unfavourable conditions at the Site.

6.4 Site cabins within the RPAs

6.4.1 There will be a requirement to position site cabins within the RPAs of retained trees (see Contactor Delivery Route produced by Sarah Wigglesworth Architects ref. S96_SK_34 C). The Permanent Site Hut will be positioned outside of RPAs, therefore of no below ground impact to retained trees. The Storage Block will be positioned to the northwest corner of the Site within the associated RPAs of T9-T12. As detailed above, this proportion of the Site is currently occupied by asphalt surfacing. No ground excavations will be necessary to install the temporary cabins, therefore there will be no impact to the root zone of retained trees. The location of the temporary crane base is also outside of RPAs of no impact to retained tree RPAs.

6.5 Demolition works adjacent to the RPAs

6.5.1 In order to demolish the existing flat roof area to the north side of the existing hall, there will be a requirement to work adjacent to retained trees including T14-T18. However, due to the well-established hard-standing ground, the demolition activity should not cause any further damage to the surrounding trees.

6.5.2 All plant and vehicles engaged in demolition operate outside of RPA of trees to be retained. Clause 7.3.4 of BS5837:2012 suggests; *Where trees stand adjacent to structures to be removed, the demolition should be undertaken inwards within the footprint of the existing building (often referred to as a "top down, pull back")*. To ensure that foreseeable damage does not occur, whilst the demolition of the existing building is undertaken, the ACoW[1] will be on-site throughout.

6.6 Engineered building foundations within the RPAs

6.6.1 In order to construct the new building including replacement second hall, new library, disabled WC and entrance space, this will involve working within the RPAs of retained trees. The incursions will be within the south side of RPAs associated with off-site trees T15, T17 and T18. The new incursions are

[1] The Arboricultural Clerk of Works (ACoW) is a suitably qualified arboriculturist to act on behalf of the developer. The ACoW will be engaged to monitor and oversee the implementation of the works required within the RPAs of any retained tree.

detailed below:

- T15 (common elder) – new building foundations – 3m^2 of the total 72m^2 RPA, therefore a 4% new incursion.
- T17 (sycamore) – new building foundations – 24m^2 of the total 137m^2 RPA, therefore a 17% new incursion.
- T18 (common yew) – new building foundations – 7m^2 of the total 92m^2 RPA, therefore a 7% new incursion.

6.6.2 Due to the RPA encroachment detailed above, a traditional trench foundation would be considered inappropriate in this instance. The radar scan concludes that rooting density in this area is initially moderate and rapidly dropping away to low and very low density. It has been considered that with an engineered foundation design (see Ground Floor Plan produced by Price&Myers ref. 24220/10), the building can be constructed without adversely affecting the retained trees. The detail of which is discussed further within Section 10 of this AMS.

6.7 Bike and scooter storage within the RPAs

6.7.1 Construction of the new bike store including Sheffield stands and canopies will require working within the RPAs of retained trees including T9, G10 and T12. The incursions are detailed below:

- T9 (pedunculate oak) – new bike and scooter store – 47m^2 of the total 408m^2 RPA, therefore an 11% new incursion.
- G10 (mixed species group) – new bike and scooter store - 5m^2 of the total 56m^2 RPA, therefore an 8% new incursion.
- T12 (Norway maple) – new bike and scooter store – 3m^2 of the total 113m^2 RPA, therefore a 2% new incursion.

6.7.2 This area of the Site is currently occupied by tarmac playground surfacing and a MUGA framework. Installation of approximately 12no. Sheffield stands will require small localised excavations within the RPAs of the aforementioned trees. Alterations to the final surfacing will also be required. The Root Radar scan shows only moderate/low rooting densities in the northwest corner of the Site. It is anticipated that only fine roots with a diameter of less than 25mm will be identified and therefore if identified will be cut back to appropriate growth points. As detailed in Clause 7.2.3 of BS5837:2012 this is considered acceptable and unlikely to cause detrimental impact in this instance.

6.7.3 To ensure foreseeable damage does not occur, hand-dig only methods will be adopted when working within the RPA of retained trees. The removal of the existing soft/hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

6.8 Relocated MUGA within the RPAs

6.8.1 Following the construction of the new school building, there will be a requirement to relocate the existing MUGA to the northwest boundary of the Site. This will require working within the RPA of T9 (pedunculate oak) to be retained. The new incursion will be 50m^2 of the total 408m^2 RPA, therefore a 12% new incursion.

6.8.2 There is an existing incursion for playground hardstanding within this proportion of the Site. The relocated fence line and MUGA goalmouth structures will require a series of small localised excavations for post installations. A low-level retaining wall will be installed to the east of the MUGA although this is outside of the RPA. As detailed above, the small excavations necessary for post installations are unlikely to have a damaging effect on tree condition. The removal of the existing soft/hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW). This will ensure that foreseeable damage does not occur to the trees during this phase of works.

6.9 Site drainage

6.9.1 The details of the Site drainage are included within the Below Ground Drainage Layout produced by Price&Myers (ref.24220.002-600). The principle drainage route effecting trees is along the northern boundary within the RPAs of T14-T18. The new 150mm diameter clay foul waste pipe will be installed to a maximum depth of c.700mm and following the existing fall of the Site.

6.9.2 The channel for the proposed foul waste pipe will be excavated as close as possible to the new building foundations when working within the RPAs of T17 and T18. This will keep excavations contained to a certain area and prevent digging a separate trench for the drainage run. The Root Radar scan shows moderate/low rooting densities in this area of the Site.

6.9.3 The proposed drainage channel will continue through the southernmost periphery of the RPAs of T14 and T15. The Root Radar scan shows moderate rooting densities in this area of the Site.

6.9.4 C1 manhole chamber will be installed to a depth of c.710mm within the periphery of the RPA of T14. C2 and C3 manhole chambers will be positioned outside of the RPAs.

6.9.5 To ensure foreseeable damage does not occur through the installation of drainage pipes, hand-dig only methods will be adopted when working within the RPA of retained trees. Any roots identified greater than 25mm diameter will be left intact where exposed. The removal of the existing hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

7. Above Ground Constraints

7.1.1 The above ground constraints predominantly refer to the impact of the canopy of any retained tree on the Site either by size and form, shadowing and/or nuisance factors. As a result, a canopy protection zone is sometimes required to ensure that the canopy is not harmed during construction.

7.1.2 A schedule of tree work has been provided within Appendix 3. All tree work will be carried out prior to commencement of demolition and construction activities and prior to the erection of the tree protection measures.

7.1.3 In order to provide adequate clearance for the Site cabins, construction vehicles and plant, there will be a requirement to raise the lower overhanging canopies of off-site trees T9, G10, T12, T13, T14, T17 and T18. The proportion of the canopies overhanging the Site should be crown lifted to provide a 4m clearance from ground level. The removal of secondary branches where feasible will ensure the work is as sympathetic to the trees are possible.

7.1.4 Should the recommended work schedule require modifying, for whatever reason, this will be agreed with the appointed Arboricultural Consultant (when applicable), and also approved in writing by London Borough of Camden Council. Under no circumstances will the appointed contractor deviate from the Tree Work Schedule contained in Appendix 3, unless approved in writing by London Borough of Camden Council.

7.2 Impact on amenity

7.2.1 There will be no impact on amenity to implement the approved development, as all the trees on the Site will be retained.

7.3 Leaves, fruit and Honeydew

7.3.1 Given the proximity of so many trees on and adjacent to the Site, leaf fall will be a problem across the whole of the Site in autumn. Where leaf fall will be a problem to the gutters, this can be managed through regular clearance and incorporating grates into the gutters so avoiding regular blockages.

7.3.2 Honeydew is most likely to be a significant problem from lime and maple trees of which there are a number in the area. This is not considered to have a significant impact to the overall development

scheme.

7.4 Appraisal conclusions

7.4.1 The survey includes record of 16no. individual trees and 2no. groups of trees. These include 4no. A category, 8no. B category and 6no. C category. This survey and AMS considers all trees located on or within influencing distance of the approved development area.

7.4.2 There will be no loss of trees required to implement the approved development scheme.

7.4.3 The Root Radar results find that off-site trees T9-T18 positioned within Kilburn Grange Park are rooting beneath an area of hard surfacing at varying densities, although generally at lower rooting densities than would be expected of open grown trees.

7.4.4 Construction of the new building including replacement second hall, new library, disabled WC and entrance space, will involve working within the RPAs of retained trees. It has been considered that with an engineered foundation design, the building can be constructed without adversely affecting the retained trees.

7.4.5 To demolish the existing flat roof area to the north side of the existing hall, there will be a requirement to work adjacent to retained trees including T14-T18. However, due to the well-established hard-standing ground, the demolition activity should not cause any damage to the surrounding trees.

7.4.6 There will be a requirement to position site cabins within the RPAs of retained trees. No ground excavations will be necessary to install the cabins, therefore there will be no impact to the root zone of retained trees. The location of the temporary crane base is also outside of RPAs of no impact to retained tree RPAs.

7.4.7 Installation of the relocated MUGA and construction the new bike and scooter store will require working within the RPAs of retained trees. The small excavations necessary for post installations and hard surface reconfigurations are unlikely to have a damaging effect on tree condition.

7.4.8 The channel for the proposed foul waste pipe will be excavated as close as possible to the new building foundations when working within the RPAs of T17 and T18. This will keep excavations contained to a certain area and prevent digging a separate trench for the drainage run. The proposed drainage channel will continue through the southernmost periphery of the RPAs of T14 and T15.

7.5 Appraisal recommendations

7.5.1 To ensure the successful retention of T15, T17 and T18, the northeast corner of the new building will be constructed using a strip footing outside of the tree RPAs, and cantilevering a 2m section of the ground floor slab to support part of the building. Minor excavations for the ground floor slab build up (including heave protection) is shown on the Ground Floor Sections & Details produced by Price&Myers (ref. 24220/50). The cantilevered slab will provide an elevated support surface with only a minimal requirement for ground excavation. The installation of new foundations within RPAs must be undertaken with hand tools only and/or under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

7.5.2 To ensure foreseeable damage does not occur through the installation of drainage pipes, hand-dig only methods will be adopted when working within the RPA of retained trees. Any roots identified greater than 25mm diameter will be left intact where exposed. The removal of the existing hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

7.5.3 All plant and vehicles engaged in demolition operate outside of RPA of trees to be retained. Clause 7.3.4 of BS5837:2012 suggests; *Where trees stand adjacent to structures to be removed, the demolition should be undertaken inwards within the footprint of the existing building (often referred to as a "top down, pull back")*. To ensure that foreseeable damage does not occur, whilst the demolition

of the existing building is undertaken, the ACoW will be on-site throughout.

7.5.4 In relation to the relocated MUGA and new bike and scooter store, it is anticipated that only fine roots with a diameter of less than 25mm will be identified and therefore if identified will be cut back to appropriate growth points. As detailed in clause 7.2.3 of BS5837:2012 this is considered acceptable and unlikely to cause detrimental impact in this instance. To ensure foreseeable damage does not occur, hand-dig only methods will be adopted when working within the RPA of retained trees. The removal of the existing hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

7.5.5 All trees to be retained should be proactively managed to ensure that they enhance the development and the wider environment. Therefore, this AMS provides detail of the measures and steps required to retain trees through and post development specifically through adequate supervision, tree protection and construction techniques. In the first instance, it is recommended that the tree works are undertaken as specified in the associated Tree Schedule.

7.5.6 The methodology detailed below will ensure that no foreseeable and avoidable damage will occur to the retained trees.

8. Works Phasing

8.1.1 This AMS makes a number of recommendations for the Site. For convenience, all of the recommendations in this report have been listed in the table below with the relevant sections and appendices listed.

8.1.2 In order to ensure a successful development, it is imperative that all of these recommendations are carried out in a similar order to the tabulated form below.

Table 3 Works Phasing Programme

Phase / Timing	Recommendation	Section	Appendix No.
Immediate	Facilitation tree works	9.1	3 & 4
Immediate	Appoint Arboricultural Clerk of Works (ACoW) to oversee all arboricultural issues on site.	9.2	N/A
Immediate	Initial / Pre-continuance Meeting	9.3	N/A
During Construction	Implement reporting process for all unforeseen arboricultural incidents	9.4	N/A
During Construction	Implement use of progress sheet to build up evidence base of good practice on site	9.5	N/A
During Construction	Monitoring site visits by ACoW to ensure continued compliance	9.5	N/A
During Construction	Working within the Root Protection Areas (RPAs)	10	4 & 5
Post Construction	Post Development Inspection to identify any required remedial works	11	N/A
Post Construction	General maintenance / remedial tree works	11.1	3
Post Construction	Annual Tree Inspection	11.2	N/A

9. Pre-Development Works

9.1 Facilitation tree removal

9.1.1 As detailed within Section 7, there will be a requirement to raise the lower overhanging canopies of off-site trees T9, G10, T12, T13, T14, T17 and T18. The proportion of the canopies overhanging the Site should be crown lifted to provide a 4m clearance from ground level. The removal of secondary branches where feasible will ensure the work is as sympathetic to the trees are possible.

9.1.2 A schedule of tree work has been provided within Appendix 3. All tree work will be carried out prior to

commencement of construction activities and prior to the erection of the tree protection measures.

9.1.3 All tree works will be undertaken to British Standard 3998:2010 'Tree Work - Recommendations'.

9.2 Arboricultural Clerk of Works (ACoW)

9.2.1 It is recommended that the developers appoint a suitably qualified arboriculturist to act as an ACoW. The ACoW will be engaged to monitor and oversee the implementation of the works required in this AMS.

9.2.2 The role of the ACoW is a relatively formal one. Normally their involvement should be limited to a number of site visits where decisions can be made relatively quickly. In the case of this development the following occasions are where the ACoW will be required:

- Tree works – To meet with the appointed arboricultural contractor prior to undertaking any works.
- Initial meeting (usually the pre-commencement meeting see Section 9.3) – to ensure all required tree protection is in place, and to discuss any required amendments with the Local Planning Authority Tree Officer.
- Supervision during the erection of tree protective fencing, working within the RPA of trees to be retained and during the installation of new foundations.
- Monitoring visits – Regular informal inspections to ensure that all tree protection measures are being maintained, and to inform the Site Manager where appropriate measures are not in place.
- Completion meeting – To inspect trees to assess for any required works and to confirm that the development has been sufficiently completed, and the tree protection measures can be removed.

9.2.3 The ACoW will also be the first contact for arboricultural advice for any issues that arise that are not detailed in this report, such as extra tree works, work required within the RPA of the trees on site, any damage that has occurred to any of the retained/unmanaged trees, or any breach of the tree protection measures on site.

9.3 Pre – commencement site meeting

9.3.1 It is recommended that a pre-commencement site meeting be undertaken with the Tree Officer, the client and the ACoW prior to any onsite works commencing. This meeting will enable the Tree Officer and the ACoW to inspect the tree works undertaken, the protective fencing and to ensure all parties are satisfied that the foundations to the building will not impact on the condition of any trees.

9.3.2 Regular site visits will then be undertaken by the ACoW following the Site meeting to ensure protective measures remain in place; file notes regarding the progress of the works will be prepared and filed. Once the tree protection measures have been confirmed as acceptable, they can be "signed off" on the progress sheet by the ACoW (see Section 9.5). For the purpose of the approved development it is recommended that the Site be visited on a monthly basis through the course of development.

9.4 Reporting process

9.4.1 If during the construction any damage to either the retained trees or the RPAs is sustained this should be reported to the Site Manager immediately. At the earliest possible time, the Site Manager should inform the ACoW, who will undertake a site visit to assess the impact on the trees and make recommendations for any required works.

9.4.2 Possible damage to the trees or to the RPAs could result from: collision damage to crowns of retained trees by site vehicles; excavation within root protection area; dumping of soil / materials within root

protection area; chemical / cement spillage into root protection area or fire damage to the crown / stem of the tree.

9.5 Progress sheet

9.5.1 During the various stages of the development a record of the completion of the various tree protection works will be kept by the ACoW. This will provide the Council with sufficient evidence that all practicable steps have been taken to prevent damage to the trees, thereby ensuring compliance to Planning Condition No.3.

9.5.2 A separate progress sheet will be filled in for each completed operation. The original will be kept with the copy of this document that will be retained by the Site Manager in the Site office. Once completed a copy will be sent to the ACoW and the Councils Tree Officer.

10. Working within the RPAs

10.1 Site cabins within the RPAs

10.1.1 As discussed within Section 6, there will be a requirement to position site cabins within the RPAs of retained trees (see Contactor Delivery Route produced by Sarah Wigglesworth Architects ref. S96_SK_34 C). The Permanent Site Hut will be positioned outside of RPAs, therefore of no below ground impact to retained trees. The Storage Block will be positioned to the northwest corner of the Site within the associated RPAs of T9-T12. As detailed above, this proportion of the Site is currently occupied by asphalt surfacing. No ground excavations will be necessary to install the temporary cabins, therefore there will be no impact to the root zone of retained trees. The location of the temporary crane base is also outside of RPAs of no impact to retained tree RPAs.

10.2 Demolition works adjacent to the RPAs

10.2.1 In order to demolish the existing flat roof area to the north side of the existing hall, there will be a requirement to work adjacent to retained trees including T14-T18. However, due to the well-established hard-standing ground, the demolition activity should not cause any further damage to the surrounding trees.

10.2.2 All plant and vehicles engaged in demolition operate outside of RPA of trees to be retained. Clause 7.3.4 of BS5837:2012 suggests; *Where trees stand adjacent to structures to be removed, the demolition should be undertaken inwards within the footprint of the existing building (often referred to as a "top down, pull back")*. To ensure that foreseeable damage does not occur, whilst the demolition of the existing building is undertaken, the ACoW will be on-site throughout.

10.3 Engineered building foundations within the RPAs

10.3.1 In order to construct the new building including replacement second hall, new library, disabled WC and entrance space, this will involve working within the RPAs of retained trees. The incursions will be within the south side of RPAs associated with off-site trees T15, T17 and T18. The new incursions are detailed below:

- T15 (common elder) – new building foundations – 3m^2 of the total 72m^2 RPA, therefore a 4% new incursion.
- T17 (sycamore) – new building foundations – 24m^2 of the total 137m^2 RPA, therefore a 17% new incursion.
- T18 (common yew) – new building foundations – 7m^2 of the total 92m^2 RPA, therefore a 7% new incursion.

10.3.2 Due to the RPA encroachment detailed above, a traditional trench foundation would be considered inappropriate in this instance. The radar scan concludes that rooting density in this area is initially moderate and rapidly dropping away to low and very low density. It has been considered that with an

engineered foundation design (see Ground Floor Plan produced by Price&Myers ref.24220/10), the building can be constructed without adversely affecting the retained trees.

10.3.3 To ensure the successful retention of T15, T17 and T18, the northeast corner of the new building will be constructed using a strip footing outside of the tree RPAs, and cantilevering a 2m section of the ground floor slab to support part of the building. Minor excavations for the ground floor slab build up (including heave protection) is shown on the Ground Floor Sections & Details produced by Price&Myers (ref.24220/50). The cantilevered slab will provide an elevated support surface with only a minimal requirement for ground excavation. The levels will not be disturbed in this area and will allow for future root extension and good infiltration of ground water run-off to the underlying root system. This is supported within NOTE 1 of Clause 7.4.2 of BS5837:2012 in that:

10.3.4 Appropriate sub-base options for new hard surfacing include three-dimensional cellular confinement systems. Alternatively piles, pads or elevated beams can be used to support surfaces to bridge over the RPA or, following exploratory investigations to determine location, to provide support within the RPA while allowing the retention of roots greater the 25mm in diameter.

10.3.5 The installation of new foundations within RPAs must be undertaken with hand tools only and/or under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW). This will ensure that foreseeable damage does not occur to the tree during this phase of works. If any roots with a diameter greater than 25mm, the Tree Officer will be contacted as recommended within BS5837:2012 clause 7.4.2.7 Note 1.

10.4 Bike and scooter storage within the RPAs

10.4.1 To construct the new bike store including Sheffield stands and canopies, this will require working within the RPAs of retained trees including T9, G10 and T12. The incursions are detailed below:

- T9 (pedunculate oak) – new bike and scooter store – 47m^2 of the total 408m^2 RPA, therefore an 11% new incursion.
- G10 (mixed species group) – new bike and scooter store - 5m^2 of the total 56m^2 RPA, therefore an 8% new incursion.
- T12 (Norway maple) – new bike and scooter store – 3m^2 of the total 113m^2 RPA, therefore a 2% new incursion.

10.4.2 This area of the Site is currently occupied by tarmac playground surfacing and a MUGA framework. Installation of approximately 12no. Sheffield stands will require small localised excavations within the RPAs of the aforementioned trees. Alterations to the final surfacing will also be required. The Root Radar scan shows only moderate/low rooting densities in the northwest corner of the Site. It is anticipated that only fine roots with a diameter of less than 25mm will be identified and therefore if identified will be cut back to appropriate growth points. As detailed in Clause 7.2.3 of BS5837:2012 this is considered acceptable and unlikely to cause detrimental impact in this instance.

10.4.3 To ensure foreseeable damage does not occur, hand-dig only methods will be adopted when working within the RPA of retained trees. The removal of the existing soft/hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

10.5 Relocated MUGA within the RPAs

10.5.1 Following the construction of the new school building, there will be a requirement to relocate the existing MUGA to the northwest boundary of the Site. This will require working within the RPA of T9 (pedunculate oak) to be retained. The new incursion will be 50m^2 of the total 408m^2 RPA, therefore a 12% new incursion.

10.5.2 There is an existing incursion for playground hardstanding within this proportion of the Site. The relocated fence line and MUGA goalmouth structures will require a series of small localised

excavations for post installations. A low-level retaining wall will be installed to the east of the MUGA although this is outside of the RPA. As detailed above, the small excavations necessary for post installations are unlikely to have a damaging effect on tree condition. The removal of the existing soft/hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW). This will ensure that foreseeable damage does not occur to the trees during this phase of works.

10.6 Site drainage

10.6.1 The details of the Site drainage are included within the Below Ground Drainage Layout produced by Price&Myers (ref. 24220.002-600). The principle drainage effecting trees is along the northern boundary within the RPAs of T14-T18. The new 150mm diameter clay foul waste pipe will be installed to a maximum depth of c.700mm and following the existing fall of the Site.

10.6.2 The channel for the proposed foul waste pipe will be excavated as close as possible to the new building foundations when working within the RPAs of T17 and T18. This will keep excavations contained to a certain area and prevent digging a separate trench for the drainage run. The Root Radar scan shows moderate/low rooting densities in this area of the Site.

10.6.3 The proposed drainage channel will continue through the southernmost periphery of the RPAs of T14 and T15. The Root Radar scan shows moderate rooting densities in this area of the Site.

10.6.4 C1 manhole chamber will be installed to a depth of c.710mm within the periphery of the RPA of T14. C2 and C3 manhole chambers will be positioned outside of the RPAs.

10.6.5 To ensure foreseeable damage does not occur through the installation of drainage pipes, hand-dig only methods will be adopted when working within the RPA of retained trees. Any roots identified greater than 25mm diameter will be left intact where exposed. The removal of the existing hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

11. Post Construction Works

11.1 Post development inspection

11.1.1 Following the completion of the development an inspection of the condition of retained trees will be made. Where appropriate tree works will be undertaken following notification to the Council. These works will be to remove ivy, deadwood and undertake works on the grounds of safety and also to remediate where necessary.

11.1.2 Where the soil around any tree is found to be compacted appropriate remediation will be undertaken. This will be prescribed by the ACoW and could include soil aeration or manual digging/forking to loosen the soil increasing drainage and aeration.

11.2 Annual inspection

11.2.1 An annual inspection of trees will be undertaken post construction for the duration of two years following construction completion. It is not anticipated that the condition of trees will significantly change following the development's completion but a continued monitoring of the trees' condition will be made by the ACoW. Where appropriate remedial works will be undertaken to improve the environment for trees or to make the trees safe.

12. Conclusions

12.1.1 This AMS has been commissioned by Architects Collaborative (the Client). It is prepared in relation to the approved development for demolition of the existing single storey extensions and replacement with new single storey extensions to provide a new school hall, library space, disabled WC and entrance space at Kingsgate Primary School, London Borough of Camden (the Site).

12.1.2 The above AMS and accompanying plans provide detail that with correct implementation, no foreseeable damage will occur to retained trees as part of the approved development. The survey includes record of 16no. individual trees and 2no. groups of trees. These include 4no. A category, 8no. B category and 6no. C category.

12.1.3 There will be no loss of trees required to implement the approved development scheme.

12.1.4 The Root Radar results find that off-site trees T9-T18 positioned within Kilburn Grange Park are rooting beneath an area of hard surfacing at varying densities, although generally at lower rooting densities than would be expected of open grown trees.

12.1.5 Construction of the new building including replacement second hall, new library, disabled WC and entrance space will involve working within the RPAs of retained trees. It has been considered that with an engineered foundation design, the building can be constructed without adversely affecting the retained trees.

12.1.6 To demolish the existing flat roof area to the north side of the existing hall, there will be a requirement to work adjacent to retained trees including T14-T18. However, due to the well-established hard-standing ground, the demolition activity should not cause any further damage to the surrounding trees.

12.1.7 There will be a requirement to position site cabins within the RPAs of retained trees. No ground excavations will be necessary to install the cabins, therefore there will be no impact to the root zone of retained trees. The location of the temporary crane base is also outside of RPAs of no impact to retained tree RPAs.

12.1.8 Installation of the relocated MUGA and construct the new bike and scooter store will require working within the RPAs of retained trees. The small excavations necessary for post installations and hard surface reconfigurations are unlikely to have a damaging effect on tree condition.

12.1.9 The channel for the proposed foul waste pipe will be excavated as close as possible to the new building foundations when working within the RPAs of T17 and T18. This will keep excavations contained to a certain area and prevent digging a separate trench for the drainage run. The proposed drainage channel will continue through the southernmost periphery of the RPAs of T14 and T15.

13. Recommendations

13.1.1 To ensure the successful retention of T15, T17 and T18, the northeast corner of the new building will be constructed using a strip footing outside of the tree RPAs, and cantilevering a 2m section of the ground floor slab to support part of the building. Minor excavations for the ground floor slab build up (including heave protection) is shown on the Ground Floor Sections & Details produced by Price&Myers (ref. 24220/50). The cantilevered slab will provide an elevated support surface with only a minimal requirement for ground excavation. The installation of new foundations within RPAs must be undertaken with hand tools only and/or under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

13.1.2 To ensure foreseeable damage does not occur through the installation of drainage pipes, hand-dig only methods will be adopted when working within the RPA of retained trees. Any roots identified greater than 25mm diameter will be left intact where exposed. The removal of the existing hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

13.1.3 All plant and vehicles engaged in demolition operate outside of RPA of trees to be retained. Clause 7.3.4 of BS5837:2012 suggests; *Where trees stand adjacent to structures to be removed, the demolition should be undertaken inwards within the footprint of the existing building (often referred to as a "top down, pull back")*. To ensure that foreseeable damage does not occur, whilst the demolition of the existing building is undertaken, the ACoW will be on-site throughout.

13.1.4 In relation to the relocated MUGA and new bike and scooter store, it is anticipated that only fine roots with a diameter of less than 25mm will be identified and therefore if identified will be cut back to appropriate growth points. As detailed in clause 7.2.3 of BS5837:2012 this is considered acceptable and unlikely to cause detrimental impact in this instance. To ensure foreseeable damage does not occur, hand-dig only methods will be adopted when working within the RPA of retained trees. The removal of the existing hard surfaces within the RPAs must be undertaken under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW).

13.1.5 The on-site trees to be retained should be proactively managed to ensure that they enhance the development and the wider environment. This AMS provides details of the measures and steps required to retain trees during site clearance, construction and post-development through supervision, tree protection and appropriate construction techniques.

13.1.6 It is critical that all protective fencing is installed and erected and that the Construction Exclusion Zone (CEZ) is enforced prior to the commencement of any works on site. Following installation of tree protection, a site meeting will be undertaken with the Tree Officer to ensure satisfaction of all parties prior to any on site works commencing.

13.1.7 It is recommended that a suitable competent arboriculturist undertakes the Site supervision and monitoring works.

13.1.8 In order for tree and root protection measures to work effectively all personnel associated with the construction process must be familiar with the Tree Protection Plan at Appendix 4.

14. References

14.1.1 British Standard 5837:2012 'Trees in Relation to Design, Demolition and Construction - Recommendation'

14.1.2 British Standard 3998:2010 ‘Tree work – Recommendations’

14.1.3 National Joint Utilities Group ‘Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees’ (NJUG 10, Volume 4, 2007)

14.1.4 The Forestry Act 1967

14.1.5 The Town and Country Planning Act 1990

14.1.6 The Town and Country Planning (Tree Preservation) Regulations 2012

15. Caveats and Limitations

15.1.1 The report is for the sole use of the Client and its reproduction or use by anyone else is forbidden unless written consent is given by the author.

15.1.2 This is an arboricultural report and as such no reliance should be given to comments relating to buildings, engineering or soil.

15.1.3 This is not an arboricultural health and safety survey, a more detailed survey of internal decay detection etc. can be supplied but would be subject to a further fee.

15.1.4 This is a report which is pursuant to the discharge of planning conditions. It provides no detail specifically in relation to the health and safety of the trees.

15.1.5 All tree inspections were undertaken from ground level and no climbing inspections were undertaken.

15.1.6 For the purposes of this survey all dimensions of trees and their associated parts are based on estimation unless otherwise stated.

15.1.7 Trees are growing dynamic structures. Whilst reasonable effort has been made to identify defects within the trees inspected, no guarantee can be given as to the absolute safety or otherwise of any individual tree. No tree is ever absolutely safe due to the unpredictable laws and forces of nature. As

a result of this, natural failure of intact trees will occur; extreme climatic conditions can cause damage to even apparently healthy trees.

15.1.8 Trees are living organisms whose health, condition and structure can change quickly and without warning. Therefore, the contents of this report are valid for a period of one year from the date of this survey.

15.1.9 On undertaking the recommended works, the arborist/tree surgeon must without delay report any defects that become apparent while climbing or working on the tree/s in question. Those defects must be reported immediately to the relevant project manager, landowner and/or the author of this report to enable the appropriate remedial action.

15.1.10 This is an arboricultural report and therefore does not rely on ecological or archaeological data. If either is commented upon within the report further professional advice should be sought.

Signed

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Sebastian Onslow *FdSc Arb. MArborA*

Appendix 1: Aerial Photograph

Kingsgate Primary School, London Borough of Camden


Redline site boundary
Kilburn Grange Park
Dynham Rd
Dynham Rd
Dynham Rd
Lord & Du Plooy
Kingsgate Workshops
Primary School
Cotleigh Rd
Cotleigh Rd
Cotleigh Rd
Cotleigh Rd
Cotleigh Rd
Kingsgate Rd
Messina Avenue Tennis Courts
Messina Ave
Messina Ave
Messina Ave
Messina Ave
Messina Ave
D K E Entertainment
Ruchi
Odu-Dua
Roger La Borde
Kingsgate Rd
Grangeway
Noodle

Appendix 2: Survey Methodology

i. The trees on the Site were originally surveyed without reference to site layout as detailed in paragraph 4.4.1.1 of BS5837:2012. However, for the purposes of this AMS the design proposal for the Site has been considered.

ii. The position of each tree was plotted with reference to the supplied ordinance survey plan. Small trees with a stem diameter less the 75mm were generally not surveyed as they would either be easily replaced or relocated.

iii. Each individual tree has been given a tree identification number, the groups and hedges clearly defined for the purpose of this report. Metal tags have not been used for this survey as identification on site does not require this. The tree numbers associated with each tree are cross referenced within the schedule and plans at Appendix 3 and 4 respectfully.

iv. The tree species have been recorded with both common and botanical names.

v. All tree heights have been assessed using a clinometer and where indicated in groups the height of the tallest tree was measured unless otherwise stated. Tree heights are given in metres.

vi. All stem diameters were measured at 1.5 metres above ground level and are given in millimetre units (unless otherwise stated where “gl” is an abbreviation for ground level where diameter was measured just above root flare, “est” is an estimate and “av” is an average).

vii. The canopy spread is recorded in either the four cardinal points or is given as an average diameter for the crown, especially in groups or where the crown is evenly weighted. Canopy spreads are measured in metres.

viii. The height of the ground clearance is given in metres and is an estimate of the height of the first branch above ground level.

ix. In absence of detailed information on the age the following classification has been used:

Yng Young trees age less than 1/3 life expectancy;

Mid Middle age trees 1/3 – 2/3 life expectancy**;**

Mat Mature trees over 2/3 life expectancy**;**

O/mat Over-mature – declining or moribund trees of low vigour; and

Vet Veteran trees – specimens exhibiting features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.

x. Age class is indicative and will vary between species.

xi. The structural condition of the trees has been assessed and is summarised as:

Good Few minor defects of little overall significance;

Fair A significant defect or several small defects; and

Poor Major defect present or many small defects.

xii. The physiological condition has been recorded to provide an indication of the tree’s general health and vitality. The trees have been described thus:

Good Generally in good health typical of the species;

Fair	Reasonable health with few defects;
Poor	Trees that exhibit significant defects which are irremediable or moribund tree; and
Dead	Tree has died

xiii. Each tree was individually assessed and comments, where appropriate, were recorded for the condition of each tree's roots, main stem and crown.

xiv. General comments have also been made where appropriate, with recommendations when relatively immediate works are given.

xv. Estimated remaining contribution has been categorised as: less than 10 years, 10-20 years, 20-40 years or over 40 years, based upon an assessment of the tree's potential safe useful life expectancy. The remaining contribution in years has not always been directly followed in relation to the retention categories of the trees as trees may have a long remaining life however be of little significance in terms of development.

Appendix 3: Schedules

BS5837:2012 Cascade Chart

Complete Tree Schedule

Table 1 - Cascade Chart for Tree Quality Assessment

Category and Definition	Criteria (including subcategories where appropriate)			Identification on Plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning); • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline; and/or • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality. *NOTE: Category U trees can have existing or potential conservation value which it might be desirable to preserve; see **4.5.7**.*			Dark Red (127-000-000)
Trees to be considered for retention				
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that Are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue).	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features.	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture).	Light Green (000-255-000)
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation.	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality.	Trees with material conservation or other cultural value.	Mid Blue (000-000-255)
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural value.	Grey (091-091-091)

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BS5837:2012 Tree Schedule

Client Name: Architects Collaborative
Site: Kingsgate Primary School, London Borough of Camden
Tags: N/A
Ref: 210515 0369 TS V2

Consultant: P. Wharton
Survey Date: 21/05/2015

Tree No.	Tag No.	Species (Common Name)	Species (Botanical Name)	Height (m)	Stem Dia (mm)	Crown Spread (m)				Height of Crown Clearance (m)	Age Class	Phys Con	Struc Con	Additional notes	Preliminary works recommendations	Estimated remaining contribution	Ret Cat	RPA (m^2)	RPA Radius (m)
						N	E	S	W										
T1	No tag	Silver Maple	*Acer saccharinum*	14.5	745	7	7	7	6	3.5	Mat	Good	Fair	Mature street tree located off-site withun pavement on southern boundary. Structural canopy forms from 3.5m. Canopy has previously been reduced is size. Important amenity tree within landscape.	No works required at time of assessment.	>40 yrs	A1	254	9.00
T2	No tag	Pissards Plum	*Prunus atropurpurea*	5.5	215	4	3	2	3	2	Mid	Fair	Fair	Off-site specimen abutting highway. Upper canopy appears sparse. Slight leaning tendency north. Limited long term retention value.	No works required at time of assessment.	10 to 20 yrs	C1	23	2.70
T3	No tag	Italian Alder	*Alnus cordata*	16.5	515	4	4	4	4	5	Mat	Good	Fair	Mature specimen located off-site adjacently to main access gates. Good overall canopy form. Tree is surrounded by pavement. Important landscape specimen.	No works required at time of assessment.	20 to 40 yrs	B1	125	6.30
T4	No tag	Common Lime	*Tilia europaea*	17	620	5	6	4	5	2	Mat	Good	Fair	Located within nursery area of school. Base of tree could not be assessed due to timber box seating surrounding it to 0.5m high. Structural canopy forms at 3m with tight union. Historically pollarded at 4m with canopy having now developed fully. Lower canopy encroaching onto adjacent footpath. Important specimen downgraded as a precaution due to base not being assessed.	No works required at time of assessment.	20 to 40 yrs	B1	177	7.50
T5	No tag	Common Lime	*Tilia europaea*	9	315	1	4	3	2	3	Mid	Good	Fair	Significantly smaller tree than those north and south of it. As with T4 restricted assessment of base. Dense epicormic growth associated with trunk. Suppressed canopy to the north.	Remove epicormic growth.	20 to 40 yrs	C1	48	3.90
T6	No tag	Common Lime	*Tilia europaea*	17	590	6	5	5	5	3.5	Mat	Good	Fair	Restricted assessment as per T4. Historically pollarded at 4.5m and has now developed a full canopy. Single large dead branch at 4.5m on southern side of canopy. Dense canopy form. Important landscape feature.	Remove large diameter deadwood. Remove epicormic growth.	20 to 40 yrs	B1	163	7.20
G7	No tag	Midland Thorn	*Crataegus laevigata 'Paul's Scarlet'*	4	100	2	2	2	1	2	Mid	Good	Good	Pair of establishing hawthorn street trees with good future potential.	No works required at time of assessment.	20 to 40 yrs	B1	5	1.20

Tree No.	Tag No.	Species (Common Name)	Species (Botanical Name)	Height (m)	Stem Dia (mm)	Crown Spread (m)				Height of Crown Clearance (m)	Age Class	Phys Con	Struc Con	Additional notes	Preliminary works recommendations	Estimated remaining contribution	Ret Cat	RPA (m^2)	RPA Radius (m)
						N	E	S	W										
T8	No tag	Common Yew	*Taxus baccata*	9.5	430	4	5	5	5	3	Mat	Good	Fair	Specimen located off-site within park. Canopy appears sparse likely as a direct consequence of ground compaction and installation of play equipment. Boundary wall to east 2.5m from treecis likely to be acting as a root barrier.	No works required at time of assessment.	20 to 40 yrs	B1	82	5.10
T9	No tag	Pedunculate Oak	*Quercus robur*	16.5	950	9	10	11	11	3 S	Mat	Good	Fair	Large spreading specimen located within park and play ground area. Compaction at base. Brown exudate associated with trunk at 1m on south side synonymous with AOD. Peeling and necrotic bark associated with canopy. Structural canopy develops from 3m. Canopy has been over thinned resulting in no secondary canopy formation. Deadwood and dieback associated with canopy likely as a result of compaction and AOD. Limited physiological life remaining.	Raise low canopy encroaching over the site to provide a 4m clearance from ground level.	10 to 20 yrs	C1	408	11.40
G10	No tag	A Group	*A Group*	7	240	3	2	3	2	2	Mid	Good	Fair	Small understory group of three trees comprising of two yews and a plum. Trees are located off-site. Boundary wall between trees and school acts as a root barrier.	Raise low canopy encroaching over the site to provide a 4m clearance from ground level.	20 to 40 yrs	C1	28	3.00
T11	No tag	Common Hornbeam	*Carpinus betulus*	13	430	5	4	5	3	3.5	Mat	Good	Fair	Specimen located off-site within park. Cavity associated with trunk. Previously suppressed canopy to west.	No works required at time of assessment.	20 to 40 yrs	B1	82	5.10
T12	No tag	Norway Maple	*Acer platanoides*	16	500	5	6	5	5	3 E	Mat	Good	Good	Good example of species located within park. Boundary wall located 1m south is likely to act as partial root barrier. Structural canopy forms at 3m.	Raise low canopy encroaching over the site to provide a 4m clearance from ground level.	>40 yrs	A1	113	6.00
T13	No tag	Ashleaf Maple	*Acer negundo*	15	430	8	7	8	7	3	Mat	Good	Fair	Specimen located 0.5m from boundary wall. Canopy appears sparse with significant dieback associated. Deadwood overhangs school playground. Tree appears to be in physiological decline.	Raise low canopy encroaching over the site to provide a 4m clearance from ground level.	10 to 20 yrs	C1	82	5.10
T14	No tag	Common Yew	*Taxus baccata*	8	470	4	4	4	4	2	Mat	Good	Good	Access to to tree not gained therefore measurements are estimated. Tree is approximately 3m from school boundary. Good canopy form.	Raise low canopy encroaching over the site to provide a 4m clearance from ground level.	>40 yrs	A1	102	5.70
T15	No tag	Common or Black Elder	*Sambucas nigra*	5	390	3	3	3	3	0.5	Mat	Good	Fair	Access to tree not gained therefore measurements are estimated. Stem diameter taken at taper below multi-stemmed union.	No works required at time of assessment.	10 to 20 yrs	C1	72	4.80
T16	No tag	Common Hornbeam	*Carpinus betulus*	14	465	7	4	6	6	2.5	Mat	Good	Good	Good mature specimen located within playground north of school. Tree is 4m north of boundary wall.	No works required at time of assessment.	>40 yrs	A1	102	5.70

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Tree No.	Tag No.	Species (Common Name)	Species (Botanical Name)	Height (m)	Stem Dia (mm)	Crown Spread (m)				Height of Crown Clearance (m)	Age Class	Phys Con	Struc Con	Additional notes	Preliminary works recommendations	Estimated remaining contribution	Ret Cat	RPA (m^2)	RPA Radius (m)
						N	E	S	W										
T17	No tag	Sycamore	*Acer pseudoplatanus*	16.5	550	6	6	8	4	2 SW	Mat	Good	Good	Specimen located within nature area of park 1.5m north of school. Tree shares mutual canopy with neighbouring trees.	Raise low canopy encroaching over the site to provide a 4m clearance from ground level.	20 to 40 yrs	B1	137	6.60
T18	No tag	Common Yew	*Taxus baccata*	8.5	450	4	6	4	2	0	Mat	Good	Fair	Accwss to base of tree not gained due to location in nature part of park which is fenced off. Tree has biased canopy to east and is suppressed by sycamore. Tree is approximately 1.5m north of school boundary wall.	Raise low canopy encroaching over the site to provide a 4m clearance from ground level.	20 to 40 yrs	B1	92	5.40

Appendix 4: Plans

Tree Constraints Plan (001 Rev B)

Arboricultural Impact Plan (002 Rev A)

Tree Protection Plan (003 Rev B)

N

W E

S

T16 T18 T17 T15 T14 T11 T13 T12 G10 G10 G10 T9 T8 T6 T5 T4 T1 T2 T3 G7

Legend:

- A Category Trees/High Retention Value
- B Category Trees/Moderate Retention Value
- C Category Trees/Low Retention Value
- U Category Trees/Remove

Tree Trunk

Root Protection Area

Canopy Spread (m)/Tree Retention Category

The locations of trees are estimated and based on surrounding built features illustrated on the Ordinance Survey plan. No topographical plan has been provided and this will be required for accurate tree locations. Tree locations are currently estimated.

Client: Architects Collaborative

Title: Tree Constraints Plan

Project Site: Kingsgate Primary School, London Borough of Camden

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Map File Reference: 260515 0369 TCP V2

Dwg No: 001 Rev B

Scale: 1/500 @ A3 Date: May 2015

N
W
E
S

T16
T17
T18
T15
T14
T13
T12
T11
T9
G10
G10
G10

38.40
38.61
38.35
38.26
38.31
38.57
38.29
38.30
38.30
38.68
38.98
39.00
38.43
38.29
38.26
38.21
38.27
37.71
37.96
38.01
39.00
39.03
38.14
38.13
38.16
38.18
39.27
38.28
38.21
38.83
38.97

RPA

Legend:

- A Category Trees/High Retention Value
- B Category Trees/Moderate Retention Value
- C Category Trees/Low Retention Value
- U Category Trees/Remove
- Tree Trunk
- Root Protection Area
- Canopy Spread (m)/Tree Retention Category
- New RPA incursion for building foundations
- New RPA incursion for bike and scooter storage
- New RPA incursion for relocated MUGA

The locations of trees are estimated and based on surrounding built features illustrated on the Ordinance Survey plan. No topographical plan has been provided and this will be required for accurate tree locations. Tree locations are currently estimated.

Client: Architects Collaborative

Title: Arboricultural Impact Plan

Project Site: Kingsgate Primary School, London Borough of Camden

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Map File Reference: 170720 0369 AIP V1

Dwg No: 002 Rev A

Scale: 1/250 @ A3 Date: July 2017

Existing site fencing to be retained throughout development

Area of existing hard surfacing

Lower canopy pruning works to be undertaken prior to demolition and construction

T9 T11 T12 T13 T14 T15 T16 T17 T18 G10 G10 G10

RPA

TREE ROOT PROTECTION

ZONE: PROPOSED DRAINAGE RUN WITHIN ZONE TO BE HAND DUG ONLY

All plant and vehicles engaged in demolition will operate outside of RPAs of trees to be retained. Clause 7.3.4 of BS5837:2012 suggests; *Where trees stand adjacent to structures to be removed, the demolition should be undertaken inwards within the footprint of the existing building (often referred to as a "top down, pull back")*. To ensure that foreseeable damage does not occur, whilst the proposed demolition of the existing building is undertaken, the ACoW will be on-site throughout.

The removal of hard surfacing, foundations and existing built-up ground within the RPAs must be undertaken using hand tools and/or under the direct supervision/guidance of the Arboricultural Clerk of Works (ACoW). This will ensure that foreseeable damage does not occur to the trees during this phase of works. If any roots with a diameter greater than 25mm are uncovered, the Tree Officer will be contacted as recommended within BS5837:2012 clause 7.4.2.7 Note 1.

N W E S

Legend:

- A Category Trees/High Retention Value
- B Category Trees/Moderate Retention Value
- C Category Trees/Low Retention Value
- U Category Trees/Remove
- Tree Trunk
- Root Protection Area
- Canopy Spread (m)/Tree Retention Category
- New RPA incursion for building foundations
- New RPA incursion for bike and scooter storage
- New RPA incursion for relocated MUGA

The locations of trees are estimated and based on surrounding built features illustrated on the Ordinance Survey plan. No topographical plan has been provided and this will be required for accurate tree locations. Tree locations are currently estimated.

Client: Architects Collaborative

Title: Tree Protection Plan

Project Site: Kingsgate Primary School, London Borough of Camden

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Map File Reference: 170725 0369 TPP V2

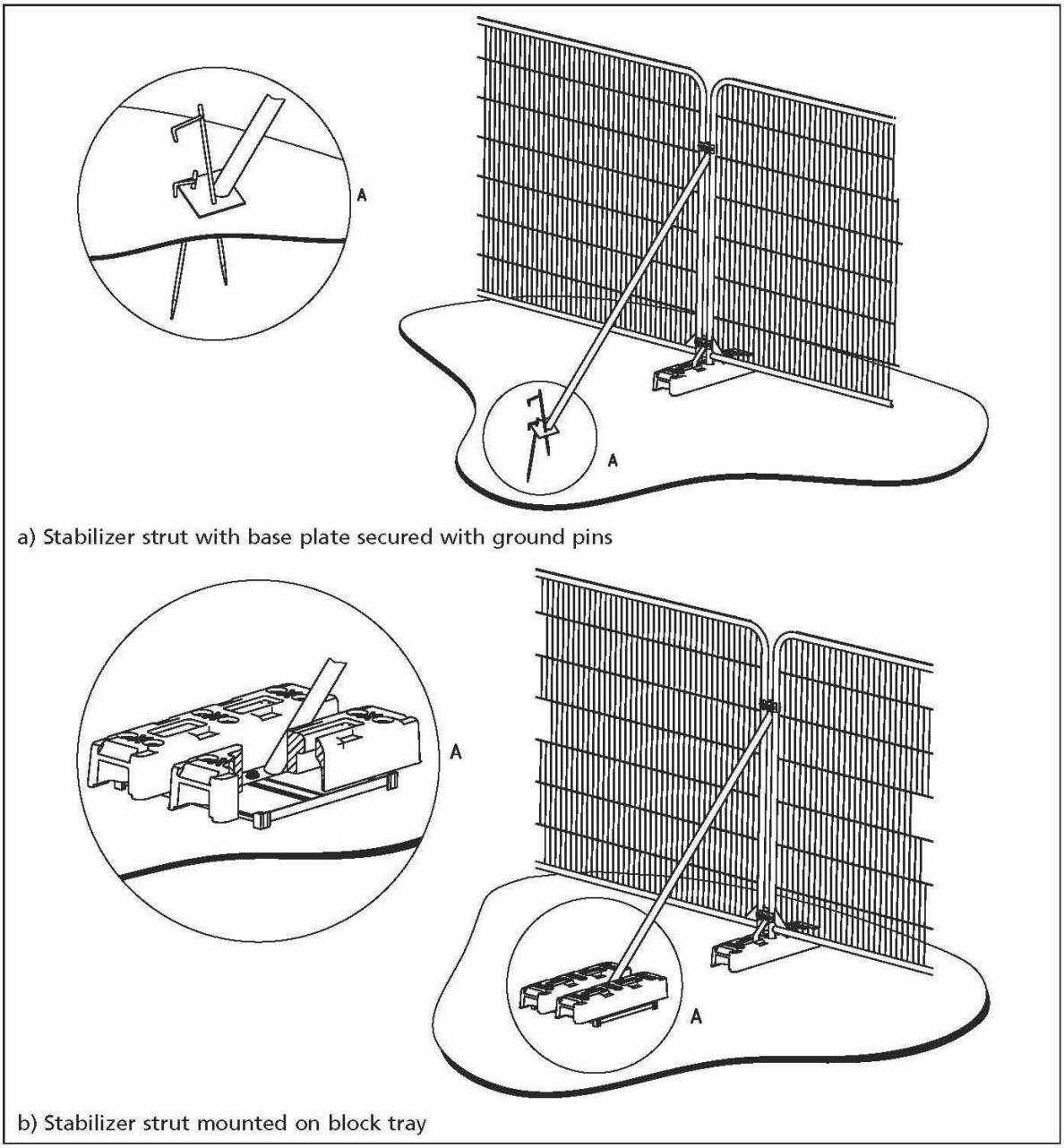
Dwg No: 003 Rev B

Scale: 1/250 @ A3 Date: July 2017

Appendix 5: Tree Protection

Fencing Specification and Signage

Figure 3 **Examples of above-ground stabilizing systems**



a) Stabilizer strut with base plate secured with ground pins

b) Stabilizer strut mounted on block tray


TREE PROTECTION AREA
KEEP OUT !
(TOWN & COUNTRY PLANNING ACT 1990)
TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A TREE PRESERVATION ORDER.
CONTRAVENTION OF A TREE PRESERVATION ORDER MAY LEAD TO CRIMINAL PROSECUTION
ANY INCURSION INTO THE PROTECTED AREA MUST BE WITH THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY


PROTECTIVE FENCING. THIS FENCING MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED PLANS AND DRAWINGS FOR THIS DEVELOPMENT.

Appendix 6: Tree Root Radar

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