TYBALDS ESTATE, CAMDEN

ARBORICULTURAL IMPACT ASSESSMENT

A Report to: Tibbalds Planning and Urban Design Ltd

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Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
Tel: 01676 525880 Fax: 01676 521400
E-mail: admin@middlemarch-environmental.com Web: www.middlemarch-environmental.com

REPORT VERIFICATION

This study has been undertaken in accordance with British Standard 5837:2012 “Trees in relation to design, demolition and construction - Recommendations”.

Report Version	Date	Completed by:	Checked by:	Approved by:
Final	08/06/15	Edmund Lusk HND PTI (Principal Arboricultural Consultant)	Dr Philip Fermor CEnv, MCIEEM (Managing Director)	Dr Katy Read CEnv, MCIEEM, MCIWEM, C.WEM DipSM (Executive Director)

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VALIDITY OF DATA

The findings of this study are based upon the data provided by the client (listed within Table 1.1, Section 1.4). If the development proposals change then this report will require updating to assess the impact of the amended development.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

In May 2015 Middlemarch Environmental Ltd was commissioned by Tibbalds Planning and Urban Design Ltd to compile an Arboricultural Impact Assessment in respect of the proposed development of land at Tybalds Estate, Camden, London. Middlemarch Environmental Ltd completed an Arboricultural Survey of the site in June 2012 (Report Number RT-MME-111475B-02).

Additionally Middlemarch Environmental Ltd prepared a previous Arboricultural Impact Assessment in respect of the proposed development in January 2013 (Report Number RT-MME-113218). This report has been prepared to update the earlier assessment following amendments to the proposed locations of the Mews Houses in the northern section of the site.

This report details the impact that the proposed development will have upon the site's existing tree stock and sets out recommendations for the subsequent mitigation or avoidance of impact. The study has been completed in accordance with guidance contained within British Standard BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'.

1.2 SITE DESCRIPTION

The area under consideration, hereafter referred to as the site, comprises the land and buildings which together form the Tybalds Estate; a post-war housing estate located in the Bloomsbury area of central London. The site, which extends to approximately 1.88ha in size, is located in central London at Ordnance Survey Grid Reference TQ 305 818.

The Tybalds Estate was historically constructed in three phases between 1949 and 1962 and whilst there are a number of listed buildings within the local area none of the buildings on site are listed as being of special architectural or historic interest.

The site is located partially within the Bloomsbury Conservation Area, a designated heritage asset, and some of the buildings on the site including Devonshire Court, Boswell House and part of Springwater are included within the Conservation Area boundary. In addition the open spaces surrounding these buildings, the Alf Barratt Playground, and a planted area to the north of Babington Court are also within the Conservation Area.

The site is within the administrative district of the London Borough of Camden, within the Holborn and Covent Garden Ward, and it is bounded by properties on Great Ormond Street to the north, Orde Hall Street to the east, buildings off Theobalds Road to the south and Boswell Street and Old Gloucester Street to the west.

The site is currently dominated by hardstanding with a number of buildings and areas of amenity grassland, shrub beds and scattered trees also present. The mature trees present across the site are predominantly specimens of London Plane (*Platanus x hispanica*) and Swedish Whitebeam (*Sorbus intermedia*). A number of other young to mature trees are also present across the site including species of Box Elder (*Acer negundo*), Narrow Leafed Ash (*Fraxinus angustifolia*) and various Limes (*Tilia* sp.).

The location of the trees within the site can be found on Middlemarch Environmental Ltd Drawing Number C119750-01 in Section 5.

1.3 DEVELOPMENT PROPOSALS

The proposed development of the site includes the construction of new housing blocks, extension and improvement of existing blocks and associated hard and soft landscaping works.

With respect to new build development it is understood that new mews houses will be constructed to the northern boundary of the site, that a new two/three storey block will be constructed to the north of the existing Blemundsbury block, and that a new five-storey block will be constructed adjacent to Devonshire.

The existing Blemundsbury, Springwater, Richbell and Falcon blocks will have side and rooftop extensions whilst the Devonshire block will have only a rooftop extension and Windmill will have only a side extension.

Public realm hard and soft landscaping works will include the construction of a new courtyard between the Springwater and Richbell blocks, with a smaller courtyard proposed between the new-build townhouses and Falcon block, and the construction of a new amphitheatre between Babington Court and Chancellor's Court.

The proposed development has been designed so that safe and healthy existing trees are retained wherever possible and that extensive new tree planting can be accommodated where the removal of trees to achieve the proposed development is unavoidable.

1.4 DOCUMENTATION PROVIDED

This assessment is based upon the information provided by the client in addition to information collected by Middlemarch Environmental Ltd during a survey of the site undertaken in June 2012 (RT-MME-111475B-02). The documents and drawings considered are detailed within Table 1.1.

Author	Document	Drawing Number	Date
Camlins Landscape Architects	Tybalds Estate Detailed Arrangement	LL434-100-002 & L434-100-003	November 2012
Duggan Morris Architects	Eastern Mews Houses Roof Plan	Z1 034	April 2015
Duggan Morris Architects	Eastern Mews Houses First Floor Plan	Z1 032	May 2015
Duggan Morris Architects	Eastern Mews Houses Ground Floor Plan	Z1 031	May 2015
MKSurveys	Topographical and Utility Survey	17033	April 2012
Tibbalds Planning and Urban Design	Pre-Application Submission Document 1	NA	December 2012

Table 1.1: Documentation Provided

2. STATUTORY PROTECTION

2.1 TREE PRESERVATION ORDER AND CONSERVATION AREA DESIGNATIONS

Consultation with Camden Council, in May 2012, confirmed that there are no Tree Preservation Orders affecting the site. However it is noted that part of the site, containing several trees, is located within the Bloomsbury Conservation Area.

The existence of the Conservation Area confers a degree of statutory legal protection upon the trees growing within it. In particular it should be noted that prior to undertaking any works to trees within a Conservation Area it is necessary to submit a Section 211 notice to the Local Planning Authority giving six weeks' notice of the proposed works. In practice the submission of a planning application containing fully specified details of proposed tree works will usually meet this requirement.

The trees within the site that are protected by virtue of being within the Conservation Area are numbers 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 and 50.

2.2 PROTECTED SPECIES

Bats

Mature trees often contain cavities, hollows, peeling bark or woodpecker holes which provide potential roosting locations for bats. Bats and the places they use for shelter or protection (i.e. roosts) receive European protection under The Conservation of Habitats and Species Regulations 2010 (Habitats Regulations 2010, as amended). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. Consequently causing damage to a bat roost constitutes an offence.

Generally should the presence of a bat roost be suspected whilst completing works on any trees on site then an appropriately licensed bat worker should be consulted for advice.

It is noted that the Extended Phase 1 Habitat Survey undertaken by Middlemarch Environmental Ltd in May 2012, Report Number RT-MME-111475B-01, concluded that none of the trees on site contained features suitable for use by roosting bats.

Birds

Trees and hedgerows offer potential habitat for nesting birds which are protected under the Wildlife and Countryside Act WCA 1981 (as amended). Some species (listed in Schedule 1 of the WCA) are protected by special penalties. This legislation makes it an offence to intentionally or recklessly damage or destroy an active bird nest or part thereof.

As the trees on, and adjacent, to the site provide potential habitat for nesting birds all tree work should ideally be completed outside the nesting bird season (Generally March to September).

If this is not possible then the vegetation should be subject to a nesting bird inspection by a suitably experienced ecologist prior to commencement of works. If any active nests are identified then the vegetation, and a defined buffer zone, will need to remain in place until the young have naturally fledged.

3. ARBORICULTURAL IMPACT ASSESSMENT

3.1 INTRODUCTION

All trees within and closely surrounding the site have been surveyed and each has been identified with a unique number. The location of the trees can be found on Drawing Number C119750-01 in Section 5. A schedule of the trees surveyed can be found within Appendix 1.

3.2 DEVELOPMENT DESIGN AND LONG-TERM IMPACTS

3.2.1 Potential Impact on the Amenity Value of Trees

Impacts

Tree Removal

The proposed development will require the removal of trees across the site to permit its successful implementation. Overall the removal of twelve trees and two hedgerows is proposed.

The majority of the trees to be removed are located to the south-western corner of the site and they are situated adjacent to existing roads and boundaries. As such they do tend to have some degree of visual prominence in the local landscape.

Tree removal is required to achieve various aspects of the proposed development as discussed below:

- **Tree Condition:** One tree (number 52) is a Category U specimen which is in a poor condition. The removal of this tree would be required in the short-term irrespective of the proposed development and as such its removal should not be a material consideration in the planning process.
- **Blemundsbury Block:** The proposed construction of a new housing block to the north of Blemundsbury will require the removal of two London Plane trees to permit its construction. The trees to be removed are numbers 13, a Category A specimen, and number 14 a Category B specimen. Whilst retention of these specimens would usually be desirable it is noted that there are no suitable alternative locations within the site to accommodate a housing block of the size proposed without resulting in a greater extent of tree removal.

  The proposed extension of the existing Blemundsbury Block and the public realm improvements nearby to this will require the removal of two category C Lawson Cypress hedges, H1 and H2. These are of a low value and their loss are not be considered to be a constraint to development.
- **Springwater Side Extension:** The proposed side extension of the Springwater block will require the removal of a group of four Lime trees (numbers 44, 45, 46 and 47). Two of the trees are Category B specimens and two are Category C specimens. The loss of these trees will be mitigated for through new tree planting within the proposed court yard to the west of the building.
- **Richbell Side Extension:** The proposed side extension of the Richbell block will require the removal of a single Swedish Whitebeam (tree number 34). This tree has been assessed as being of a moderate, Category B retention value, and whilst its retention would usually be desirable it can be seen that its removal will not impact significantly upon the visual character of the local area as the tree is of relatively limited stature.
- **Bevan House / Falcon Landscape Improvements:** The proposed landscape enhancement works to the south of Bevan House will require the removal of three Cherry trees. These trees are stunted suppressed specimens of little long term value and as such they were assessed as being of category C trees, of a low retention value, in the Arboricultural Survey. The removal of these trees will have little impact upon the visual character of the immediate area and their loss will be mitigated for by replacement tree planting.

- **Public Realm Improvements:** The proposed public realm improvement works to the north of the site adjacent to Babington Court will require the removal of a Category B Apple tree, tree number 19. This tree is of limited stature and as it is located internally to the site it is not considered to have significant visual amenity value. The loss of the tree will be mitigated for by undertaking replacement tree planting around the proposed new amphitheatre to be constructed between Babington Court and Chancellor's Court.

Overall the proposed development will require the removal of one Category A tree, two Category B trees, eight Category C trees and one Category U tree.

All trees and groups to be removed are shown on the Draft Tree Protection, Drawing Number C119750-01.

Tree Works
To permit space for the installation of scaffolding around the proposed side extension of the Windmill block it may become necessary to undertake some access facilitation pruning to tree number 8.

Additionally the proposed mews house construction to the north of the site may require some access facilitation pruning works to be undertaken to the Sycamore, tree number 18, and the group of offsite Walnut and Ash trees (number OSG1) to provide working space for construction to occur.

The works required will not be so significant as to impact upon the long-term visual quality of the trees and thus no notable adverse amenity impact is likely.

The overall need for access facilitation pruning works, and the extent of such works, should be considered, and fully specified, within an Arboricultural Method Statement for the site.

Mitigation/Avoidance
As mitigation for the loss of trees across the site, and to deliver general landscape enhancements, a landscape masterplan has been prepared by Camlins Landscape Architects. An assessment of this document shows that extensive new tree and shrub planting is proposed across the site. It is considered that the proposed landscape planting will, over time, fully mitigate the visual loss associated within the proposed tree removal.

3.2.2 Proximity of Trees to Proposed Structures

Impacts
Branch Spread
The ultimate branch spread of the offsite Sycamore, number 18, and the offsite group of Walnut and Ash (number OSG1) which overhang the area proposed for new mews house construction are likely to conflict slightly with the proposed development.

However it is noted that these specimens are relatively mature trees which have already attained close to their maximum size for the location in which they are growing and such any conflict can be appropriately managed through pruning works to the tree's canopies in the future. So long as such works are completed in accordance with best practice guidance they will not cause significant harm to the health or amenity value of the trees.

Elsewhere on the site the proposed side extensions of the Windmill and Falcon blocks may conflict with the ultimate branch spreads of tree numbers 8 and 32 respectively.

Tree number 8 in particular, which is an early-mature Swedish Whitebeam, may grow to such an extent that branches will require regular pruning to prevent contact with the new side extension of Windmill. Ultimately it is likely that removal and replacement of this tree would be undertaken as part of the post development management of the site due to the ongoing maintenance requirements and extent of conflict. Nonetheless the retention of the tree in the short term whilst new tree planting across the site establishes is desirable. With respect to the ultimate potential removal of this tree it is considered that as it is of limited stature and it is growing as part of a larger group of trees its removal would not have a significant impact upon the visual character of the local area.

Tree number 32, a mature London Plane, which overhangs the proposed Falcon side extension is considered unlikely to cause significant ongoing conflict with the proposed development as it has a relatively compact crown that is currently managed in size and shape, to prevent conflict with adjacent buildings, by cyclical pruning works.

Shading
No significant shading of primary living spaces within the proposed new buildings is likely to occur due to existing trees or due to the establishment and growth of the new trees proposed within the landscape masterplan. Where any shading of buildings does occur it is likely to be transient and it should be noted that the extent of shading likely will vary with tree species, canopy shape and size, foliage density, time of year and sun elevation and that such shading will often be seasonal and diffuse. Also it is important to note that existing and new trees could be used to provide privacy and screening, reduce overlooking between neighbouring properties and/or for screening of undesirable views.

Leaf Litter, Fruits, Pollen, Sap etc.
The majority of the retained trees are not species associated with significant fruit fall or sap exudate problems. However London Plane trees are often associated with pollen allergies and irritation due to air born trichomes arising from their leaves. Nonetheless the amenity value of the London Plane trees on the site, which are to be retained, is considered to outweigh the negative factors associated with them and as the post development situation will be no worse than the existing no specific conflict with the proposed development is considered to exist.

With respect to leaf litter it is noted that the sweeping up of leaves and cleaning of gutters, which may become blocked by falling leaves, is considered to be routine seasonal household maintenance and as such no notable conflict with the proposed development is considered to occur. Nonetheless it may prove appropriate in certain areas to use gutter guards, or otherwise enclosed gutters, to minimise the potential for leaf fall to cause blockage and an ongoing nuisance.

The new mews houses adjacent to this tree are also those most likely to be affected by aphids using the trees as their consequent honeydew exudation can cause stickiness and spotting of paving and glazing where this is present within the canopy spread of the tree.

Mitigation/Avoidance
Gutter guards or otherwise enclosed gutters should be used for the new mews houses in proximity to tree number 18 to minimise the potential for leaf fall to cause a significant conflict.

Pruning works of tree number 18 are proposed to minimise the extent of branch overhang and thus conflict from aphids/honeydew. Additionally a cleaning and maintenance regime for the courtyard area beneath the crown tree number 18 should be implemented.

Issues with honeydew and sap exudation may also be mitigated for by the use of self cleaning glazing and, in some circumstances, treatment of the trees with a pesticide to prevent aphid colonisation.

Access facilitation works will be required to tree numbers 8, 18 and those in OSG1 to permit working space and scaffolding installation, this will reduce their canopies away from the proposed buildings so that no further works are required to address issues with current branch spread. Some ongoing lateral reduction of the tree's canopies maybe required in the future.

3.3 POTENTIAL IMPACTS FROM CONSTRUCTION PROCESSES OF THE PROPOSED DEVELOPMENT

3.3.1 Potential Root and Canopy Protection

To prevent harm occurring to retained trees during development it is recommended that construction works are excluded from the Root Protection Areas (RPA) of retained trees. Additionally works should not be undertaken beneath the canopy spread of retained trees where this can be avoided.

The RPA represents the minimum area around trees that must be left undisturbed to ensure their survival. The roots typically occupy the top 600 mm of soil and the fine roots which absorb water, oxygen and nutrients are situated in the top 100 mm of soil. Any incursion into the rooting zone of a tree can cause a notable impact upon a trees health.

The RPA and canopy spread of each tree to be retained is shown on Drawing Number C119750-01, Section 5. Additionally details of the crown spread measurements are contained within Appendix 1 and a schedule of RPAs for trees on the site is located at Appendix 2.

It should be noted that due to the built up nature of the site in many cases the RPAs of trees extend to encompass areas that are currently covered by buildings and hard surfaces. In such areas the extent of root development is likely to have been reduced in comparison to areas of bare ground or grassland. Additionally in such areas roots are likely to be present at greater depths than in areas where no restriction to root growth is present. The presence of hard surfacing within a trees RPA will, if it is to be retained, provide protection of the underlying soil and any tree roots that may be present in such an area and thus it will not always be necessary to erect protective barriers to the full extent of a trees RPA to ensure root protection.

Impacts

Generally the proposed development of the site has been sited so that major works are not required within the RPAs of retained trees. However in several areas the proposed amendments to the public realm, including landscaping and changes to the finished road and footpath surface will require works to be undertaken within the RPAs of retained trees.

In particular tree numbers 3, 4, 5, 6, 7, 11, 12, 15, 16, 20, 21, 22, 23 and 50 may be affected by such works. As the areas affected by the proposed works are already largely hard surfaced and the changes are unlikely to cause disturbance of the underlying soil, where required within the RPAs of the trees, it is not considered that a significant conflict will occur.

The construction of the mews houses to the north of the site will require works within the RPAs of the offsite Sycamore, tree number 18, and the offsite Walnut and Ash trees (OSG1).

These trees are segregated from the site by a large wall which, where it is adjacent to group number OSG1, is approximately 5.79m tall. This is a retaining wall and a significant structure and it is likely that its foundation will have restricted root development from the trees spreading within the site to a notable extent. Additionally in this location it is noted that significant levels changes between the site and the land in which the trees are growing exist and as such root development beyond the wall is not likely to have occurred.

Where the wall is lower, such as adjacent to tree number 18, the extent to which root development may have been restricted is likely to be lower as the foundation required to support the wall will be less deep. As such in this area the roots of the tree may be considered to be vulnerable to construction damage if works are undertaken within the RPA.

However it is noted that the wall is still approximately 3.0m tall in this location, so is likely to have a relatively significant foundation, and that existing buildings and hard surfaces on site are likely to have contributed to a restriction in root development.

It is also noted that the new mews houses will encroach into approximately 14.7% of the overall RPA of tree number 18 and that one-third of the area affected is occupied by an existing building.

Whilst some root damage from foundation construction could potentially occur it is understood that a cantilevered foundation is proposed in this location to minimise the extent of excavation required within the RPA of the tree and, given that only a small part of the RPA will be affected, the works are not considered likely to result in significant harm occurring to the trees root system.

Additionally the proposed cantilevered foundation will ensure, as far as is possible, that conditions for root survival beneath the affected area of the RPA are maintained thus allowing the tree to progressively adapt to the changes in its growing environment that will occur due to the proposed development.

The final area where significant works will be undertaken within the RPA of a retained tree is the proposed side extension of the Falcon building. This aspect of the development will require works to be undertaken within the RPA of tree number 32, a London Plane. It is noted that the tree is located on land which is segregated from the demise of the Falcon building by a 1.7m retaining wall and the land in which it is growing is approximately 1.0m higher than the ground around the building. As such it is likely that root development from the tree has been curtailed by the retaining wall and changes in ground level and therefore the proposed development has very little potential to impact upon the trees root system.

Overall it is considered that the potential for harm to occur to the root systems of retained trees can be adequately controlled through the adoption of appropriate working practices and erection of protective barriers to exclude access from vulnerable sections of trees RPAs.

Mitigation/Avoidance

Construction Exclusion Zones

To minimise the potential for harm to occur to the root systems and canopies of retained trees during development it will be necessary to implement construction exclusion zones throughout the site. These are areas surrounding the trees' RPAs and canopies in which no construction works, or related activities, will be undertaken.

It is recommended that the exclusion zones are afforded protection at all times through the use of tree protection barriers and/or ground protection (specified in accordance with BS5837:2012).

Drawing C119750-01, Section 5, provides a Draft Tree Protection Plan indicating the potential location of protective barriers and ground protection.

It can be noted that in many areas the existing hard surfaces will in effect act as ground protection by preventing damage to the underlying soil structure and thus protecting the rooting environment of the trees.

3.3.2 Site Construction Access

Impacts

The site is well served by the existing road network and construction access for the proposed development is unlikely to impact upon any retained trees as where trees do overhang potential access routes their canopies are high enough above ground level to provide clearance for all typical construction machinery that may be used on the site.

Where vehicles need to pass within close proximity to retained trees protective barriers should be installed to prevent vehicles accidentally encroaching into areas of unprotected ground within their RPAs and to minimise the potential for collision damage to trees stems occurring.

Mitigation/Avoidance

All trees surrounding the potential access routes should be adequately fenced and ground protection installed (where required) to ensure that no damage to these specimens occurs during construction.

An Arboricultural Method Statement should be prepared to detail the tree protection measures to be implemented on the site.

3.3.3 Contractors Parking

Impacts

The location of contractor parking is yet to be determined but it is understood that it will be located outside of the exclusion zones. In this respect the nature of the site is such that there are ample opportunities to accommodate contractors parking within the site in areas away from retained trees.

Mitigation/Avoidance

Installation of barriers to ensure no parking occurs within the exclusion zones.

3.3.4 Site Cabins and Toilets

Impacts

The location of the contractor's compound during the construction of the development is yet to be determined but it is understood that it will be outside the exclusion zones. If this is the case the site compound will not impact upon the retained trees.

Mitigation/Avoidance

Installation of protective barriers to ensure that trees are protected from physical damage resulting from works to establish a site compound. Where they can be located upon existing hard surfaces site cabins may be used to form part of the protective barrier.

The location of the site compound should be considered in the production of an Arboricultural Method Statement for the site.

3.3.5 Delivery and Storage of Materials

Impacts

The proposed locations for site deliveries and materials storage during the development have not been identified at this stage. However it can be seen that the site has many areas where deliveries could utilise the existing hard surfaces, thus protecting trees root systems from harm.

Mitigation/Avoidance

Ensure no storage occurs upon un-surfaced ground within the defined RPAs of the retained trees via the installation of protective barriers.

3.3.6 Demolition of Existing Structures

Impacts

The proposed development of the site will require the demolition of several small buildings including two storage buildings located to the northern boundary of the site. One of the storage buildings to be demolished is located in close proximity to the offsite Sycamore, tree number 18, and the crown of this tree overhangs the building to some extent.

As such it is considered that demolition of the building has the potential to result in branch damage occurring to the tree unless appropriate protective measures and working practices are adopted.

Elsewhere across the site it is not anticipated that any harm to retained trees, as a direct result of building demolition, will occur.

Mitigation/Avoidance

To prevent any ancillary works associated with the demolition of the buildings from harming trees it will be necessary to install protective barriers prior to commencement of demolition works.

To prevent harm occurring to tree number 18 during works to demolish the storage building wall it will be necessary to ensure that a top down pull back methodology for demolition of the building is followed and that all vehicle movements within the crown spread of the tree are supervised by a banksman. Additionally the proposed access facilitation pruning works to be undertaken to this tree to permit construction of the new mews properties should be undertaken prior to commencement of demolition works.

3.3.7 Removal of Hard Surfaces

Impacts

The removal of an existing hard surface will be required within the RPA of tree number 20, a Sycamore. The old hard surface will be replaced in part with new surfacing and with soft landscaping. Overall upon completion of the works it is expected that improved growing conditions for the tree will prevail.

Nonetheless the removal of existing hard surfaces has the potential to result in root damage, particularly where roots are found to be growing at shallow depths beneath the existing surfaces. This may be particularly likely where the existing areas of hardstanding are aged and macadam surfaced as the condensation of soil moisture upon the underside of the macadam during hot weather, in conjunction with the presence of air spaces within the MOT sub-base, provide ideal conditions for the proliferation of opportunistic roots.

The presence of significant tree root activity immediately beneath macadam surfaces is typically evident from a visual inspection as incremental growth in root girth soon causes disruption and bulging of the surface.

The hard surfaces areas around tree 20 are concrete surfaced and no disturbance of the surfacing is evident. As such, and given that the works proposed in this area are going to increase the extent of unsurfaced ground within the RPA of the tree, it is not considered that there is a high potential for harm to occur to the tree.

Mitigation/Avoidance
To prevent direct damage occurring to the stems of trees protective barriers should be installed prior to commencement of surface removal or alteration works.

The works to remove or alter hard surfaces shall be phased so that they occur towards the end of the construction as their retention throughout the main part of development will provide protection to any underlying tree roots.

All works to remove or alter hard surfaces within the RPAs of retained trees shall be completed under supervision and in accordance with a detailed specification to be set out in an Arboricultural Method Statement for the site.

3.3.8 Construction of Buildings

Impacts
Buildings
The proposed construction of the side extension to Windmill and the construction of the mews houses to the north of the site will require the erection of scaffolding and the provision of working space within the RPA of tree numbers 8 and 18.

The areas likely to be affected by this work adjacent to tree number 18 are already hard surfaced and as such it is considered that the potential for harm to this trees root system is minimal.

Where the provision of working space is required around tree number 8 the ground is grassed and as such it will be necessary to ensure the ground is protected during construction works to prevent root damage from occurring.

Mitigation/Avoidance
To minimise the risk of damage occurring to the trees crowns during the erection of scaffolding it will be necessary to undertake some access facilitation pruning works.

The potential for direct damage to the stems of the trees will be controlled by the installation of protective barriers.

Ground protection will be required within the RPA of tree number 8 if working space to the north of the Windmill building is required.

3.3.9 Construction of Roads, Footpaths and Hardstanding Areas

Impacts
There are several areas within the development where the construction of new areas of hardstanding is proposed within, or near to, the RPAs of retained trees.

The presence hard surfaces within the RPA of a tree can cause problems with gaseous exchange and water penetration and absorption. BS5837:2012 advises that no hard surface should exceed 20% of any existing un-surfaced ground within the RPA.

It can be seen that in most areas across the site the proposed works area the removal and replacement of the existing hard surfaces rather than construction of new areas of hardstanding and in these areas the potential for significant harm to occur to the retained trees can be controlled through adoption of appropriate working techniques.

Mitigation/Avoidance
Wherever it is intended to undertake construction operations within the Root Protection Areas of trees precautions must be taken to maintain the condition and health of trees root systems.

In particular:

- Works shall be conducted in such a manner as to prevent physical damage to roots during demolition or construction, such as soil compaction or root severance.
- Provision for water and oxygen to reach the roots must be made and the soil structure must not be disturbed.
- Provision must be made for future root growth and precautions taken to ensure that such root growth does not cause unacceptable levels of damage to the finished construction.
- The soil must not be compacted and soil bulk density must be maintained at suitable levels for tree root growth and function. In this respect a soil bulk density of over 1.8g/cm^3 is likely to impede root growth and function.

To achieve the above requirements for tree root growth and function the proposed new hard surfaces shall be designed so that:

- No excavation of bare ground is required for their installation; to ensure that physical root damage does not occur.
- The surface can be installed without compaction of the existing soils; thus ensuring damage to the soil structure does not occur.
- The surface is permeable; thus ensuring that oxygen and water can reach the root system and that CO_2 can diffuse vertically out of the soil as high concentrations can cause root suffocation.

There are various methods of creating such a surface however one that is commonly in use and is therefore recommended here is the use of a three dimensional cellular confinement system, such as CellWeb produced by Geosynthetics, to provide for load suspension above the existing soil grade and reducing vertical loads on the underlying soils.

It should be noted however that even should such an approach be adopted some impact upon the trees is likely and whilst they are of species that will typically adapt to changes in their growing environment some short term loss of vigour could be expected.

In summary mitigation measures shall be to utilise a ‘no dig’ construction technique to construct all areas of hard surface within the RPAs of the retained trees.

An appropriate method statement and protection plan should be developed to ensure all retained trees are suitably protected during the development. In accordance with BS5837:2012 all areas of construction activity within the RPA should be supervised by a suitably experienced arboriculturist.

3.3.10 Boundary and Ancillary Structures

Impacts
The exact details of any proposed boundary structures are not known at this time.

Mitigation/Avoidance
The location of any concrete foundations and posts needs to be carefully considered to ensure no damage to the adjacent trees occurs. In particular new fence posts should not be constructed within 1.0m of the stem of any retained tree. This will reduce the amount of excavation for post foundations required within the RPAs of the retained trees. Any excavation for fence posts in RPAs will need to occur by hand and under arboricultural supervision to ensure no root damage occurs.

Special construction techniques may be required where fence posts are likely to sever significant roots (in order to ‘bridge’ these areas and avoid severance of any significant roots close to trunks).

3.3.11 Site Gradients

Impacts
An examination of the proposed levels shows that no significant level changes within the RPAs of the retained trees are proposed. In particular no reductions in ground level within the RPAs of retained trees would appear to be required.

Mitigation/Avoidance
It is advised that where possible no level changes occur within the RPAs of the trees.

If any changes in levels within the defined RPA of the retained trees are required then a suitably experienced arborist should be consulted.

3.3.12 Service Requirements

Impacts
As the site was previously developed there are existing service connections throughout it and it as such it is considered that various opportunities to create new service connections without harming trees exist.

Mitigation/Avoidance
It is advised that the installation of any new services and drainage occur outside the RPAs of the retained trees. It is also advised that CCTV and lighting columns should not be situated in locations which will place future pressure on trees for crown pruning due to visibility/ shadowing.

4. ARBORICULTURAL METHOD STATEMENT

An Arboricultural Method Statement will be required for the site as various aspects of the proposed development will require works to be undertaken within the RPAs of retained trees.

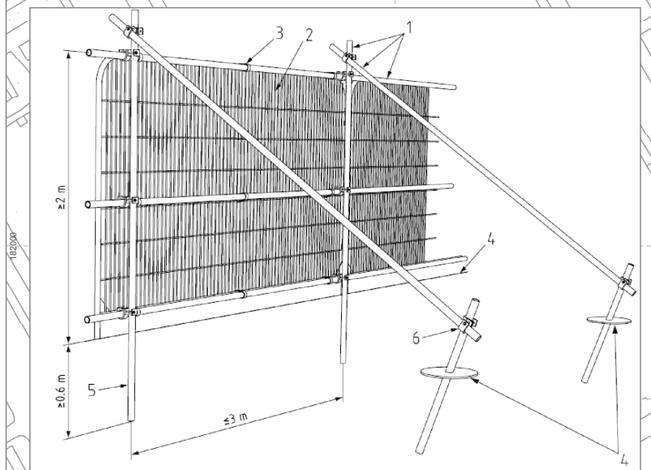
The purpose of a method statement is to ensure that all site operations can occur with minimal risk of adverse impact upon trees that are to be retained. The document will identify all areas where specific working methods will be required to ensure protection to trees. The document will also specify the location and extent of tree protection barriers and ground protection.

In relation to this development the method statement should address the following:

- Suitable site access, material storage and site compound locations.
- Protective barrier and ground protection locations and specifications.
- Method for removal and alteration of existing hard surfaces within RPAs.
- Method for construction of new hard surfaces within RPAs.
- Proposed tree works.
- Pre-commencement site meeting.

5. DRAWINGS

Drawing C119750-01 - Draft Tree Protection Plan



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

530400 530500 530600 182000 181900

OSG1 H1 H2

0 50 100 m

C119750-01

Legend

- Category A tree
- Category B tree
- Category C tree
- Category U tree
- Category C group - to be retained
- Category C group - to be removed
- Current canopy - tree to be removed
- Current canopy - tree to be retained
- Root Protection Area
- Protective fencing to BS5837(2012) standard
- Tree protection box
- Site boundary
- Proposed site layout - June 2015

The original of this drawing was produced in colour - a monochrome copy should not be relied upon

N

Project: Tybalds Estate, Camden

Drawing: Draft Tree Protection Plan

Client: Tibbalds Planning and Urban Design Ltd

Drawing Number	Revision
C119750-01	00
Scale @ A3	Date
1:1,000	June 2015
Approved By	Drawn By
EL	RP

MIDDLEMARCH ENVIRONMENTAL
Triumph House, Birmingham Road, Allesley, Coventry CV5 9AZ
T:01676 525880 F:01676 521400
E:admin@middlemarch-environmental.com

REFERENCES AND BIBLIOGRAPHY

Arboricultural Advisory Information Services. (2007). 'Practice Note 12. Through Trees to Development'.

British Standards Institution. (2012). *British Standard 5837:2012, Trees in relation to design, demolition and construction – recommendations.* British Standards Institution, London.

Johnson & More **(**2004). *Tree Guide, Collins*. London

NJUG Volume 4 (2007) Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees.

APPENDICES

APPENDIX 1: Table A1.1 – Tree Survey Schedule

APPENDIX 2: Table A2.1 – Root Protection Areas of Category A, B and C Trees

APPENDIX 1

Table A1.1: Tree Survey Schedule

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	H't 1st Branch (m)	Branch Spread (m)				Crown Clearance (m)				Age	Phys Cond	Struc Cond	Est. Remain Contrib (Years)	Cat	Comments	Preliminary Management Recommendations
						N	E	S	W	N	E	S	W							
1	Chanti-cleer pear	1	170	7.5	2.2 N	2.0	1.5	1.5	1.5	3.0	3.0	2.5	2.5	EM	G	G	>20	C1	• Minor squirrel damage.	-
2	Swedish white-beam	1	320	7.5	1.5 N	3.0	4.5	2.5	3.0	4.0	2.5	3.0	2.5	M	G	F	>10	C1	• Area of decay at 1.0m at old bark wound with adaptative growth, occluding slowly.	-
3	Swedish white-beam	1	345	6.0	1.5 E	3.0	2.5	2.5	2.5	1.2	2.0	2.5	2.5	M	F	F	>10	C1	• Crown die-back to south west side. • Large area of decay with adaptative growth at old bark wound at 1.0m on west side, occluding slowly.	-
4	Swedish white-beam	1	340	5.0	1.5 N	4.0	2.5	4.0	4.0	1.5	3.5	2.5	1.2	M	F	G	>10	C1	• Minor crown die-back throughout crown.	-
5	Swedish white-beam	1	310	5.0	2.0 S	2.0	2.5	2.5	2.5	3.5	2.5	2.5	2.5	M	G	G	>20	B1	• Bifurcates at 2.5m with a tight fork and included bark. • Crossing branches to south.	-
6	Apple	5	335	5.0	2.5 E	2.0	2.0	2.0	2.0	3.0	2.0	3.5	2.5	EM	G	F	>20	C1	• Previously pollarded at 4.0m.	-
7	Apple	1	230	4.0	1.5 SW	1.0	1.5	1.5	1.5	2.0	2.0	2.0	2.5	EM	G	G	>20	C1	• Previously pollarded at 3.0m.	-
8	Swedish white-beam	1	235	8.0	3.0 E	2.5	2.5	2.5	3.5	>5.0	3.0	3.5	2.5	EM	G	G	>20	C1	• Part of linear group.	-
9	Swedish white-beam	1	210	7.5	3.0 E	2.0	3.0	2.0	4.0	2.5	2.5	2.5	3.0	EM	G	G	>20	C1	• Minor crown die-back. • Part of linear group.	-
10	Swedish white-beam	1	155	7.5	3.0 E	1.5	2.0	1.5	2.0	4.0	3.0	5.0	2.5	Y	F	G	>10	C1	• Part of linear group. • Some crown die-back.	-
11	London plane	1	570	16.0	2.5 N	6.5	4.0	7.0	8.0	3.0	5.0	4.0	4.5	M	F	G	>20	B1	• Minor crown die-back throughout crown. • Recently crown reduced.	-
12	London plane	1	595	16.0	3.0 SE	6.5	7.0	7.0	3.0	>5.0	>5.0	>5.0	>5.0	M	F	G	>20	B1	• Minor crown die-back throughout crown. • Recently crown reduced.	-
13	London plane	1	1060	15.0	4.0 E	10.0	7.0	5.0	8.0	>5.0	3.5	>5.0	>5.0	M	F	G	>40	A1	• Recently crown reduced. • Epicormics in crown. • Minor crown die-back.	-

Table A1.1: Results of Arboricultural Survey (continues)

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	H't 1st Branch (m)	Branch Spread (m)				Crown Clearance (m)				Age	Phys Cond	Struc Cond	Est. Remain Contrib (Years)	Cat	Comments	Preliminary Management Recommendations
						N	E	S	W	N	E	S	W							
14	London plane	1	305	9.0	2.5 NE	5.0	6.0	6.0	3.5	2.5	2.5	2.5	2.0	EM	P	G	>10	B1	• Wilting foliage from drought stress.	-
15	Sugar maple	1	515	10.0	4.5 E	7.0	8.0	8.0	7.0	3.0	3.0	4.0	3.0	M	F	F	>20	B1	• Small cavity at 1.0m, nearly occluded. • Some die-back throughout crown. • Located in play area.	-
16	Sugar maple	1	570	10.0	3.2 SE	7.0	7.0	7.0	7.0	5.0	3.0	4.0	4.0	M	G	G	>40	A1	• Located in play area.	-
17	False acacia	1	420	17.0	5.0 SE	6.0	7.5	2.5	6.0	2.0	2.0	2.0	2.0	M	G	G	>20	B1	• Epicormics on trunk. • Branches touching building to south.	-
18	Sycamore	1	500	9.5	3.5 E	6.0	8.5	7.5	9.0	>5.0	4.0	4.5	4.0	M	G	G	>40	B1	• Unable to inspect stem from base up to 3.0m due to no access.	-
19	Apple	1	285	5.5	2.0 W	4.5	3.0	4.0	3.5	2.5	2.5	2.5	2.0	M	G	G	>40	B1	• Previously crown reduced. • Multiple old pruning wounds occluded. • Old pruning wound on south side at 2.0m (100 x 70 mm) occluding slowly.	-
20	Sycamore	1	440	10.0	3.5 NW	4.5	4.5	5.5	4.0	>5.0	>5.0	>5.0	>5.0	M	F	P	>10	C1	• Major bark wound on northeast side (collision damage) from base to 1.2m, with some decay, occluding slowly.	-
21	Box elder	1	500	10.0	1.7 W	4.5	3.0	2.0	5.5	3.5	3.5	3.5	3.3	M	G	G	>40	A1	• Trifurcates at 1.7m. • Trunk leans to west. • Multiple old pruning wounds occluded. • Multiple small old pruning wounds occluding well.	-
22	Norway maple 'Crimson King'	1	250	7.5	2.0 W	3.0	3.0	3.0	3.0	3.0	2.5	3.0	4.0	EM	F	G	>10	C1	• Growing in elevated planter. • Some crown die-back.	-
23	Chinese tree privet	1	200	4.5	1.7 N	4.0	3.0	2.0	3.0	2.5	3.0	3.5	2.5	M	F	G	>10	C1	• Some crown die-back to west and northwest side.	-
24	Narrow-leaved ash	1	370	11.0	2.0 NW	3.0	4.0	8.0	8.0	1.7	2.5	2.5	>5.0	M	F	P	>10	C1	• Some crown die-back. • Major collision damage on west side at 2.5m.	-
25	Cherry	1	110	3.0	2.0 N	2.5	2.5	1.0	3.0	2.0	2.0	2.2	2.0	Y	G	G	>20	C1	-	-

Table A1.1 (cont'd): Results of Arboricultural Survey (continues)

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	H't 1st Branch (m)	Branch Spread (m)				Crown Clearance (m)				Age	Phys Cond	Struc Cond	Est. Remain Contrib (Years)	Cat	Comments	Preliminary Management Recommendations
						N	E	S	W	N	E	S	W							
26	Narrow-leaved ash	1	290	11.0	3.5 SE	1.5	3.0	7.0	7.0	>5.0	>5.0	>5.0	>5.0	EM	G	G	>40	B1	• Bifurcates at 2.5m. • Branch tear-out wound at 4.5m, occluding well.	-
27	Narrow-leaved ash	1	310	11.0	4.0 W	4.5	3.5	5.0	4.0	4.0	>5.0	2.5	3.5	M	G	G	>20	B1	• Bark wound on west side at 1.5m (150 x 50mm), occluding well. • Multiple old pruning wounds occluding well.	-
28	Narrow-leaved ash	1	345	12.0	5.0 SE	2.5	7.0	8.0	0.0	>5.0	3.5	2.5	>5.0	M	G	G	>20	B1	• Trunk leans to east. • Crown weighted to east. • Bifurcates at 4.0m. • Multiple old pruning wounds occluding well. • Minor deadwood.	-
29	London plane	1	935	17.0	2.5 SE	6.5	11.5	7.5	5.0	>5.0	>5.0	>5.0	>5.0	M	F	G	>40	A1,2	• Part of linear group. • Recently crown reduced. • Minor crown die-back to west. • Ivy on trunk - unable to fully inspect the point of crown break. • Crown weighted to east.	-
30	London plane	1	720	18.0	3.0 SE	3.0	11.0	10.0	5.0	>5.0	3.0	>5.0	>5.0	M	G	G	>40	A1,2	• Part of linear group. • Recently crown reduced. • Minor deadwood. • Crown weighted to east.	-
31	London plane	1	765	18.0	2.0 S	10.0	11.0	3.0	6.0	4.0	4.0	>5.0	>5.0	M	G	G	>40	A1,2	• Part of linear group. • Recently crown reduced. • Multi stemmed at 2.0m. • Multiple, small old pruning wounds, occluding well. • Minor crown die-back to west.	-
32	London plane	1	800	20.0	5.0 N	10.0	12.0	11.0	5.0	>5.0	5.0	>5.0	>5.0	M	G	G	>40	A1,2	• Part of linear group. • Recently crown reduced. • Minor crown die-back to west.	-
33	London plane	1	415	13.0	4.0 W	6.0	3.5	6.0	7.0	2.0	2.5	2.0	3.0	M	G	G	>40	B1	• Wilting foliage from drought stress. • Branch tear-out wound at 6.0m on north east side.	-

Table A1.1 (cont'd): Results of Arboricultural Survey (continues)

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	H't 1st Branch (m)	Branch Spread (m)				Crown Clearance (m)				Age	Phys Cond	Struc Cond	Est. Remain Contrib (Years)	Cat	Comments	Preliminary Management Recommendations
						N	E	S	W	N	E	S	W							
34	Swedish white-beam	1	320	7.0	4.0 N	5.0	4.0	3.5	4.0	4.0	4.0	3.5	4.0	M	G	F	>20	B1	• Bifurcates at 2.2m. • Large old pruning wound (100 x 150mm) on west side with cambial die-back, but occluding well.	-
35	Common lime	1	350	15.0	4.0 W	6.0	6.0	4.0	5.0	3.0	4.0	4.0	3.5	M	G	G	>20	B1	• Bifurcates at 4.5m. • Part of linear group. • Minor cavity at old pruning wound at 4.5m. • Unable to fully inspect due to access restrictions	-
36	Small-leaved lime	1	230	14.0	3.5 SE	2.0	7.0	4.0	4.0	3.5	4.0	2.5	2.5	EM	F	G	>20	C1	• Part of linear group. • Minor crown die-back to east. • Unable to fully inspect due to access restrictions.	-
37	Small-leaved lime	1	250	14.0	6.0 SW	3.0	4.0	6.0	5.0	>5.0	3.0	3.0	2.5	EM	G	G	>20	C1	• Part of linear group. • Bifurcates at 8.0m. • Unable to fully inspect due to access restrictions.	
38	Common lime	1	120	9.0	6.0 SW	3.0	1.0	4.0	5.0	3.0	1.0	3.0	3.0	EM	G	G	>10	C1	• Part of linear group. • Suppressed and stunted by neighbours. • Unable to fully inspect due to access restrictions.	• Advise removal.
39	Common lime	1	320	15.0	6.0 NE	5.0	5.0	4.0	4.0	3.0	3.0	3.5	>5.0	EM	G	G	>20	B1	• Part of linear group. • Unable to fully inspect due to no access.	-
40	Common lime	1	380	13.0	3.5 N	4.0	3.5	3.0	3.0	>5.0	4.0	4.0	4.0	M	G	G	>20	B1	• Part of linear group. • Bifurcates at 3.5m. • Unable to fully inspect due to access restrictions.	-
41	Cherry	1	130	5.5	4.0 S	1.0	3.0	3.0	3.5	4.0	4.0	4.0	4.0	Y	F	F	>10	C1	• Sparse crown. • Bifurcates at 2.5m. • Unable to fully inspect due to access restrictions.	-
42	Cherry	1	150	7.0	4.0 SW	3.0	2.0	3.0	3.0	3.0	3.0	2.5	3.5	Y	F	F	>10	C1	• Bifurcates at 3.0m. • Sparse crown. • Unable to fully inspect due to access	-

Table A1.1 (cont'd): Results of Arboricultural Survey (continues)

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	H't 1st Branch (m)	Branch Spread (m)				Crown Clearance (m)				Age	Phys Cond	Struc Cond	Est. Remain Contrib (Years)	Cat	Comments	Preliminary Management Recommendations
						N	E	S	W	N	E	S	W							
																			restrictions.	
43	Cherry	1	170	5.0	2.0 N	2.5	2.5	3.5	2.5	2.5	2.5	3.0	2.5	EM	F	F	>10	C1	• Graft incompatibility at crown break. • Unable to fully inspect due to access restrictions.	-
44	Crimean lime	1	330	14.0	6.5 S	5.0	4.0	4.0	4.0	4.0	4.0	2.0	4.0	EM	G	G	>20	B1	• Part of linear group. • Old pruning wounds fully occluded. • Roots lifting paving stones.	-
45	Swedish white-beam	1	240	5.5	2.5 N	4.0	3.0	3.5	2.0	3.0	2.5	2.5	2.5	EM	G	G	>20	C1	• Part of linear group. • Multiple old pruning wounds - occluding well.	-
46	Swedish white-beam	1	250	5.0	2.2 W	4.0	2.5	4.0	4.0	3.0	2.5	3.0	2.5	EM	G	G	>20	C1	• Part of linear group. • Old pruning wounds occluding well.	-
47	Crimean lime	1	330	15.0	4.0 SE	4.0	5.0	5.0	4.0	3.5	4.0	2.0	2.5	EM	G	G	>20	B1	• Part of linear group. • Bifurcates at 3.0m.	-
48	Rowan	1	80	5.0	2.0 N	1.5	1.0	1.0	1.0	2.5	2.5	2.5	2.5	Y	G	G	>20	C1	-	-
49	Rowan	1	100	5.5	2.5 N	2.0	1.5	1.5	1.5	3.0	2.5	2.5	2.0	Y	G	G	>20	C1	-	-
50	London plane	1	450	17.0	2.0 S	5.0	6.0	5.0	5.5	3.0	4.0	3.5	4.5	M	G	G	>40	B1	• Previously pollarded. • Bifurcates at 2.0m. • Growing in elevated (by 1.0m) brick planter.	-
51	Goat willow	1	180	5.5	2.0 W	2.0	4.5	2.0	3.0	1.0	1.5	1.0	0.5	EM	F	F	>10	C1	• Apical crown die-back. • Bifurcates at 2.0m. • Trunk leans to north. • Unable to fully inspect due to no access.	-
52	Southern evergreen magnolia	1	120	5.5	2.5 W	2.0	1.0	1.5	2.5	2.0	>5.0	2.0	1.5	Y	P	F	<10	U	• Major crown die-back. • Exhibiting multiple nutrient deficiencies. • Unable to fully inspect due to no access.	• Recommend removal.
53	Silver birch	1	180	8.0	4.0 NE	4.0	3.0	2.0	3.0	3.0	3.0	1.5	2.5	EM	G	F	>20	C1	• Two truncated limbs to south at 4.5m. • Unable to fully inspect due to no access.	-

Table A1.1 (cont'd): Results of Arboricultural Survey (continues)

Tree No.	Species	No. Stems	Diam (mm)	H't (m)	H't 1st Branch (m)	Branch Spread (m)				Crown Clearance (m)				Age	Phys Cond	Struc Cond	Est. Remain Contrib (Years)	Cat	Comments	Preliminary Management Recommendations
						N	E	S	W	N	E	S	W							
54	Osmanthos	1	160	5.0	2.0 S	3.0	2.0	1.0	2.0	1.0	1.0	1.0	1.0	M	F	F	10+	C2 Interim	• Limited access and survey data. • Growing in elevated pit 1.5m above ground level. • Trunk and crown shape distorted due to buildings. • Trunk leans South. • Bark wound to East at 1.0m above ground level occluding.	-
OSG1	Walnut, Ash	1	300	~13.0	3.0	~4.0	~4.0	~6.0	~4.0	~4.0	~4.0	~4.0	~4.0	M	F	F	10+	C1	• Located in elevated garden beyond retaining wall. • No access for inspection.	-
H1	Lawson cypress	1	120	3.0	0.2 S	2.0	1.0	1.0	1.0	2.0	0.5	0.5	0.5	Y	G	G	>20	C1	• Linear hedgerow group.	-
H2	Lawson cypress	1	145	4.5	0.5 N	1.0	1.0	1.0	1.0	0.5	0.5	0.5	1.0	Y	G	G	>20	C1	-	-

Key

Age Class
Y: Young = tree within first third of average life expectancy
EM: Early mature = tree within second third of average life expectancy
M: Mature = tree within final third of average life expectancy
OM: Over mature = tree beyond average life expectancy

Physiological Condition
G: Good = no health problems
F: Fair = symptoms of ill health that may be remedied
P: Poor = poor health

Structural Condition
G: Good = no structural defects
F: Fair = remedial structural defects
P: Poor = significant structural defects

000: Estimated measurement due to access restrictions
~: Average Dimension

Major deadwood: branches in excess of 50 mm diameter
Minor deadwood: branches/twigs less than 50 mm diameter

Table A1.1 (cont'd): Results of Arboricultural Survey

APPENDIX 2

Table A2.1: Root Protection Areas of Category A, B and C Trees

Tree No.	Species	Category	Diam (mm)	Approximate Root Protection Radius (m)	Root Protection Area (m^2)
1	Chanticleer pear	C1	170	2.10	14
2	Swedish whitebeam	C1	320	3.90	48
3	Swedish whitebeam	C1	345	4.20	55
4	Swedish whitebeam	C1	340	4.20	55
5	Swedish whitebeam	B1	310	3.60	41
6	Apple	C1	335	3.90	48
7	Apple	C1	230	2.70	23
8	Swedish whitebeam	C1	235	2.70	23
9	Swedish whitebeam	C1	210	2.40	18
10	Swedish whitebeam	C1	155	1.80	10
11	London plane	B1	570	6.90	150
12	London plane	B1	595	7.20	163
13	London plane	A1	1060	12.60	499
14	London plane	B1	305	3.60	41
15	Sugar maple	B1	515	6.30	124
16	Sugar maple	A1	570	6.90	150
17	False acacia	B1	420	5.10	81
18	Sycamore	B1	500	6.00	113
19	Apple	B1	285	3.30	34
20	Sycamore	C1	440	5.40	92
21	Box elder	A1	500	6.00	113
22	Norway maple ‘Crimson King’	C1	250	3.00	28
23	Privet	C1	200	2.40	18
24	Narrow-leaved ash	C1	370	4.50	64
25	Cherry	C1	110	1.20	5
26	Narrow-leaved ash	B1	290	3.60	41
27	Narrow-leaved ash	B1	310	3.60	41
28	Narrow-leaved ash	B1	345	4.20	55
29	London plane	A1,2	935	11.10	387
30	London plane	A1,2	720	8.70	238
31	London plane	A1,2	765	9.30	272
32	London plane	A1,2	800	9.60	290
33	London plane	B1	415	5.10	81
34	Swedish whitebeam	B1	320	3.90	48
35	Common lime	B1	350	4.20	55
36	Small leaved lime	C1	230	2.70	23
37	Small leaved lime	C1	250	3.00	28
38	Common lime	C1	120	1.50	7
39	Common lime	B1	320	3.90	48

Table A2.1: RPA and Approximate Root Protection Radius of Category A, B and C Trees Surveyed (continues)

Tree No.	Species	Category	Diam (mm)	Approximate Root Protection Radius (m)	Root Protection Area (m^2)
40	Common lime	B1	380	4.50	64
41	Cherry	C1	130	1.50	7
42	Cherry	C1	150	1.80	10
43	Cherry	C1	170	2.10	14
44	Crimean lime	B1	330	3.90	48
45	Swedish white-beam	C1	240	3.00	28
46	Swedish white-beam	C1	250	3.00	28
47	Crimean lime	B1	330	3.90	48
48	Rowan	C1	80	0.90	3
49	Rowan	C1	100	1.20	5
50	London plane	B1	450	5.40	92
51	Goat willow	C1	180	2.10	14
53	Silver birch	C1	180	2.10	14
54	Osmanthos	C2	160	1.80*	10*
OSG1	Walnut, Ash	C1	300	3.60*	41*
H1	Lawson cypress	C1	120	1.50*	7*
H2	Lawson cypress	C1	145	1.80*	10*

Key:
000:estimated figures due to access restrictions
*: around each individual within the group/ from centre of hedgerow

Table A2.1 (cont'd): RPA and Approximate Root Protection Radius of Category A, B and C Trees Surveyed