D F Clark Bionomique Ltd

# Arboricultural Impact Assessment

of

## 2 – 4 Riverpark Gardens, Bromley, BR2 0BG

on behalf of

## Phoenix Community Housing


**6th March 2015**

**Our Ref:DFCP3324 AIA (Rev B)**

**Callum Campbell** FdSc (Arb):TechArborA

## Summary

An arboricultural survey has been carried out and this report prepared to support a planning application to demolish a derelict dwelling and replace with flats. All the trees that could be affected were inspected and their details are listed in Appendix 2.

This report seeks to provide information in accordance with British Standard *BS 5837:2012, Trees in relation to design, demolition and construction.*

No trees will require removal to accommodate the proposals. However, remedial pruning works in the form of crown reduction are recommended to T2 (ash) to facilitate construction.

Provided precautions to protect the identified trees are specified and implemented through the measures included in this report, the development proposal will have little impact on the retained trees or their wider contribution to amenity and character of the area.

If the recommendations made within this report are followed, the development should be achievable in arboricultural terms and should be acceptable to the local planning authority.

# Contents

# 1.0 Introduction

## 1.1 Instruction

DF Clark Bionomique Ltd was instructed by Karl Phillips on behalf of Phoenix Community Housing on the 8th October 2013 to produce an Arboricultural Impact Assessment for a proposed development at 2-4 Riverpark Gardens, London.

It has been produced in accordance with the principles of British Standard *BS 5837:2012, Trees in relation to design, demolition and construction - Recommendations* (BS 5837) and includes the following information to accompany a planning application:

- details of significant trees including an assessment of condition using BS 5837 categorisation;
- a plan showing tree survey information, retention categorisation and root protection areas;
- an assessment of the impact of the proposal on trees and any wider impact that has on local amenity and any impact trees may have on the proposed development;
- an arboricultural method statement dealing with the protection and management of the trees to be retained; and
- a schedule of tree works to facilitate construction.

## 1.2 The proposal

To demolish an existing ground floor shop with flat above, relocate a sub-station and demolish 3 garages to construct 8 new plats over 4 storeys with communal gardens and associated parking.

## 1.3 Scope and purpose of this report

This report covers trees on the site and those adjacent to the site which could be affected by any development. It is concerned with the impact the development may have on trees and the effect retained trees may have on the development. Its purpose is to allow the local planning authority (LPA) to assess the tree information as part of the planning submission.

## 1.4 Legal constraints

A request for information on the status of the trees has been submitted to London Borough of Bromley (query ref: 159730). At this stage it is not known if any of the trees on site are protected by a tree preservation order (TPO) or if the site is within a conservation area (CA).

This means that notice must be given to the council of any intention to carry out works to the trees, and consent must be received in writing for works. Full planning approval which includes the proposed tree works removes the need to gain separate consent (see Appendix 1).

## 1.5 Other information included in this report

The following information is included in Appendix 1:

- documents and information provided;
- legal constraints and liabilities;
- survey methodology;
- contacts; and
- reference documents.

# 2.0 Site Visit and Observations

## 2.1 Site visit

A site visit was undertaken on 22nd October 2014 by Callum Campbell. The weather was cloudy with good visibility.

## 2.2 Site description

The site is located in the London Borough of Bromley. The surrounding landscape is dominated by residential developments with mature trees in gardens with mature street planting.

The topography of the site is generally level. The soil is understood to be slightly acid loamy and clayey soil. The presence of clay indicates that the soil is liable to compaction which is very damaging to trees and also that there is the potential for tree root related soil movement which must be considered in relation to building foundations.

The trees are located to the south of the site in planting beds either side of an existing footpath between Ravensmead Road and Warren Avenue Playing Fields.

## 2.3 The subject trees

A total of 4 trees are the subject of this report comprising 1 'A' grade tree, and 3 'B' grade trees categorised in accordance with section 4.5 and table 1 of BS3837:2012 'Trees in relation to design, demolition and construction – Recommendations' (see Appendix 1).

The trees on site collectively provide visual amenity to the immediate surrounding area, with the two ash trees clearly visible in the treescape. There is also a diverse mix of ornamental shrubs providing ground cover which comprise *Forsythia sp, Viburnum sp, Mahonia sp, Choisya sp, Aucuba sp* and *Corylus sp* which are not part of the remit of this report. All three trees are outside the footprint of the proposed development but are likely to be impacted by the demolition and construction phases.

Details of the trees and their locations are found in the tree survey (Appendix 3) and (Appendix 4).

## 2.4 Comments on specific trees

Annotated photos providing further information on specific trees on site can be found below with further details in Table 1.

**Image 1 (left).**

From Ravensmead Road with T2 to the east of the existing derelict building.

**Image 2 (right).**

T2 as seen looking south showing its close proximity to the dwelling proposed for demolition.

**Image 3 (left).**

T3 as seen from the public access to Warren Park with T1 on the right

**Image 4 (left).**

From the interior of the footprint looking south with the subject trees T1 and T3 behind the garage block.

**Image 4 (left).**

Looking east towards Warren Avenue Playing Fields with T1 situated on the other side of the public access.

**Image 5 (right).**

T3 to the rear of the existing garage block looking from the public access to Warren Park.

**Summary of subject trees.**

*Table 1*

| Tree | Comments |
|---|---|
| T1 Ash | Large offsite tree which could be affected by the development. |
| T2 Ash | Unmaintained tree outgrowing its current environment. Likely to be directly impacted by the development. |
| T3 Hawthorn | Maintained tree very close to the southern external wall of the existing garage block. |
| T4 Spruce | Ornamental conifer in domestic garden with proposed sub-station impacting on the outer edges of the RPA. |

# 3.0 Arboricultural Impact Assessment

## 3.1 Summary of the impact on trees

Development can adversely impact on trees by causing them to be removed to facilitate the development, or in the future, by adversely affecting their potential for retention through disturbance in Root Protection Areas (RPAs)[1] or through post development pressures to prune or remove.

Tree roots can be asphyxiated and die if the rooting zone becomes compacted and soil structure damaged which can easily occur, particularly on clay soils, even with the passage of light vehicles. At the design stage, disturbance within the RPA should be avoided. If unavoidable, (which may need demonstrating), consideration must be given to any construction activity such as demolition, including removal of existing hard surfaces, changing soil levels and the provision of services where within RPAs, as well as new surfaces and structures.

Construction of hard surfaces and other construction may be acceptable within RPAs providing specialist methods of design and construction are used. This will often result in the use of minimal or no-dig methods which result in higher finished levels which must be allowed for during design due to the effect on access thresholds and structure heights etc.

The ability of trees to tolerate some disturbance depends on individual circumstances including prevailing site conditions, tree species, age and condition and this will be assessed by the project arboriculturist.

Building lines should be at least 2m outside the RPA to allow for scaffolding and other buildability issues and to allow for service runs and paths around the edges of buildings.

Protection measures, usually a combination of barriers and ground protection must be in place before any works, including site clearance, begin, and stay in place for as long as a risk of damage remains. The protection of trees must take account of the buildability of the proposal, including services, and ensure that all activities such as storage of materials, parking and the use of plant and vehicles can be accommodated outside of

[1] *Root Protection Area (RPA) - A layout design tool indicating the minimum area surrounding the tree that contains sufficient rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. Assessed according to the recommendations set out in clause 4.6 of BS 5837. It is calculated by multiplying the radius squared by 3.142. Clause 4.6.2 of BS 5837 states that the RPA may be changed in shape, taking into account local site factors, species tolerance, condition and root morphology.*

RPAs. Particular care and planning is necessary in the operation of excavators, lifting machinery and cranes to ensure all vehicle movements and lifting operations will not impact on retained trees.

Trees are long-lived organisms which take a long time to mature and if considered at an early stage can complement and increase the value of a development.

On this site, one tree will be removed as part of the proposal. Excavation will be required within the theoretical RPA of some trees for construction purposes.

### 3.2 Tree survey plan (TSP)

The plan found at appendix 4 is based on provided information and all scaled measurements and site boundaries must be checked against the original documents. This plan should only be used for dealing with the tree issues. It shows the existing trees numbered and categorised in accordance with BS 5837. Below ground constraints are represented by the RPA. The above ground constraints are represented by the trees crown spread and height where appropriate. The survey plan is an aid to design and should not be used post consent on site; the tree protection plan is to be used for this purpose.

### 3.3 Tree protection plan (TPP)

The plan found at appendix 5 is based on provided information and all scaled measurements and site boundaries must be checked against the original documents. This plan should only be used for dealing with the tree issues. Trees to be retained have black centres and green outlines whilst trees to be removed have red centres and a red, dashed, outline. Tree protection is shown as barriers and/or ground protection defining the Construction Exclusion Zone (CEZ)[2] and any areas requiring non-standard methods of demolition or construction are shown.

### 3.4 Trees to be removed

No trees are to be removed to accommodate the proposals.

[2] *Construction Exclusion Zone. An area based on the RPA in $m^2$ identified by an arboriculturist, to be protected during development, including demolition and construction work, by the use of barriers and/or ground protection fit for purpose to ensure the successful long-term retention of a tree.*

3.5 **Trees to be pruned**

T2 is likely to need crown reducing to reduce the overall canopy size to facilitate the development as well as clear the head of the existing street light. All tree surgery works to facilitate the development and for obvious safety and arboricultural reasons can be found at Appendix 6.

3.6 **Root protection area incursions**

The existing surface to the western boundary is currently covered by concrete slabs up to the main stem of T2 - Ash, and therefore is within the RPA of this tree. Unless new sub-bases are proposed to be much deeper than the existing, it will not be necessary to utilise non-standard methods. If new services are to enter the site from the road, they should be designed to enter away from the RPA of T2, to the north of the tree. Details of work methodology close to trees can be found in Section 4 of this report.

3.7 **Protection of retained trees**

Details of tree protection barriers and ground protection can be found in the arboricultural method statement section of this report.

T2 (Ash) will be fully protected using barriers as there is open access within the RPA. This area is currently covered in concrete and it is recommended that this is retained in situ throughout the construction phase to protect the roots and soil structure, and only being removed as part of the design. If this is not possible, ground protection must be installed as soon as the existing surface is removed and before any other works are undertaken.

T1 – (Ash) is an off-site tree located behind low railings on the southern edge of the existing planting beds. Theoretically the RPA extends as far as the proposed development, although it is unlikely that any significant roots would be present within the footprint. This tree would need protection during the demolition and construction phases of the development.

T3 – (Hawthorn) is an off-site tree located approximately 1.5m away from an existing boundary wall. The trees theoretical RPA extends well past the boundary wall, although it is likely that any roots would be contained within the planting bed and not extend below the level of the foundations. This tree would need protection during the demolition and construction phases of the development.

T4 – (Norway spruce) is and off-site tree located within a private garden. Ground protection should be used during the installation of the proposed electricity sub-station.

### 3.8 Impact on local amenity

There are no proposals to remove any trees, therefore there will be no impact on the local amenity and the tree cover in the immediate vicinity will remain intact.

### 3.9 Post-development pressures

Shade cast by trees can be viewed negatively when it affects main habitable rooms. In addition to shade, there may be future pressure to prune or remove trees if development occurs too close to the tree due to concerns over leaves, fruit, twigs etc and the perception of risk from falling branches and trees and the sheer size and mass of nearby trees.

# 4.0 Preliminary Arboricultural Method Statement

## 4.1 Introduction

This section is a preliminary arboricultural method statement specifying the methodology to be used for the protection of trees and works close to trees that have the potential to result in the loss of or damage to a tree. It includes details of site management and supervision required for successful tree retention.

Following planning consent, a detailed arboricultural method statement may be required and should be developed with other members of the design team.

## 4.2 Site clearance and set-up

### 4.2.1 Site clearance

Damage can easily be caused to trees to be retained during initial site clearance, therefore tree protection barriers must be in place before site clearance. If necessary, localised vegetation clearance in order to install the barriers can be undertaken using hand tools only (including chainsaws, brushcutters etc) but without the use of tracked or wheeled plant and machinery.

### 4.2.2 Temporary buildings

Temporary site cabins, marketing trailers and other site buildings can be used within RPAs if agreed with the LPA. They will need to be installed on appropriate ground protection with no excavation taking place. All temporary services must be installed above ground level.

### 4.2.3 Site and fuel storage, cement mixing and washing points

All site storage areas, cement mixing and washing points for equipment and vehicles and fuel storage must be outside RPAs. No discharge of potential contaminants should occur within 10m of a retained tree stem or where there is a risk of run-off into RPAs.

### 4.2.4 Tree protection barriers

Appendix 7 includes guidance for protective barriers based on BS 5837. The approximate location of the barriers and the CEZs is shown on the TPP. The precise location of the barriers and other protective measures should be confirmed at the pre-commencement meeting before any demolition or construction activities, including site clearance, start.

## 4.3 Ground protection

In areas where it is not possible to erect protective barriers, ground protection must be used to protect the CEZ of trees. Where it has been agreed during the design stage that vehicular or pedestrian access for the construction operation may take place within the CEZ, the possible effects of construction activity should be addressed by a combination of barriers and ground protection. The position of the barrier may be within the CEZ at the edge of the agreed working zone but the soil structure beyond the barrier to the edge of the CEZ should be protected with ground protection. The precise location should be confirmed at the pre-commencement meeting before any demolition or construction activities, including site clearance, start. This is to protect soil structure and tree roots.

## 4.4 Precautions when working in CEZs

Only work agreed with the local planning authority can be carried out within CEZs. Any works must be carried out in accordance with the details as set out in Appendix 8 which are summarised below.

### 4.4.1 Removal of existing surfacing

The majority of the site is covered in hard surfacing and is within the RPA of T2, care must be used to minimise the impact on these trees when the surfaces are removed which will include machinery positioned outside RPAs and the use of hand tools in sensitive areas.

### 4.4.2 Installation of new surfacing

Full details of the new surfacing proposed within the RPA of tree T2 is not known at the time of writing however because the area is a concrete slab leading to the existing garages, it will only be necessary to use non-standard methods of construction if the sub-base for the new surfacing is deeper that existing. Although the existing concrete surface is impervious, ideally the new substrates and finished surfaces should be of a porous design to allow water and air passage in and out.

### 4.4.3 Installation of new services

The exact location of services is often difficult to establish until construction is in progress. During the design stage every effort must be made to keep all new services outside RPAs. When existing services within RPAs require upgrading or new services have to be installed in RPAs, conventional excavation techniques are unacceptable and great care must be taken to minimise any disturbance. Trenchless installation should be the preferred option but if that is not feasible, any excavation must be

carried out by hand or using a compressed air lance. Methodology must comply with *NJUG Volume 4: Guidelines for the Planning, installation and Maintenance of Utility Apparatus in Proximity to Trees.*

#### 4.4.4 Site hoarding and signs

If site hoarding runs through the RPAs of retained trees it must be erected to avoid damage to retained trees. It shall be positioned or shaped to avoid contact with the trunk, branches or crown of the tree and make allowance for movement during windy conditions. The holes for the posts must be positioned to avoid significant roots and be dug by hand. Holes shall be lined with an impermeable membrane to avoid the caustic effect wet cement can have on tree roots.

#### 4.4.5 New soft landscaping

All retained trees may be affected by landscape activities which have the potential to cause severe damage. In addition, the removal of protective barriers and ground protection to carry out landscape operations may allow other contractors in previously protected areas.

Details of all the above methods of work close to trees can be found in Appendix 8.

### 4.5 Other site works with the ability to affect trees

#### 4.5.1 Tree surgery works

Recommendations for tree works can be found in the tree surgery schedule in Appendix 6. All works shall be in accordance with British Standard *BS 3998:2010 Tree work: Recommendations,* or in accordance with current best practice. The use of a competent tree surgery contractor is necessary to comply with this. The main contractor and tree surgery contractor must ensure that any necessary consents have been received from the local authority and that no protected species are harmed whilst carrying out site clearance or tree surgery works.

Within CEZs, stumps, shrubs and other vegetation must be removed by hand or using specialised stump grinding machinery to minimise root damage to retained trees. Where poisoning of stumps is specified, this must be carried out by trained and qualified operatives. Only chemicals approved for this purpose and used in accordance with the manufacturer's instructions will be used.

### 4.5.2 **Use of piling rigs and cranes and other high plant and vehicles**

Piling rigs and cranes are often used close to trees. Where protective barriers do not entirely protect the canopies of trees from potential damage from high vehicles and plant, care must be taken to ensure no damage is caused. Work must be carefully planned and a banks-man used to guide the operator. Arboricultural supervision may be required.

# 5.0 Site Management and Supervision

## 5.1 Pre-commencement site meeting

Before any site works including site clearance begin, a site meeting between the site manager and project arboriculturist should be held and to which the LPA tree officer will be invited. The purpose of the meeting will be to discuss tree protection measures detailed in this document and to agree the sequence of events where they can impact on trees. At this meeting a programme of tree protection will be agreed by all parties to form the basis of any monitoring and/or supervision arrangements between the project arboriculturist and the developer.

## 5.2 Site management

It is the responsibility of the main contractor to ensure that the details of this report are known, understood and followed by all site personnel. As part of the site induction, all site personnel who could have an impact on trees should be briefed on specific tree protection requirements. Copies of the report and plans should be available on site at all times.

## 5.3 Site monitoring and supervision

Once work begins on site, the project arboriculturist should visit site at an interval agreed at the pre-commencement site meeting. The interval should be sufficiently flexible to allow the supervision of key works as they occur. These are likely to include the following although this is not an exhaustive list:

- tree pruning and felling and site clearance close to trees;
- installation of tree protection barriers;
- installation of ground protection; and
- any agreed works in root protection areas.

The project arboriculturist's role is to monitor compliance with arboricultural conditions and advising on any tree problems that arise or modifications that become necessary. Following every site visit, a report will be sent to the local authority tree officer and the client/developer. Tree site supervision reports are useful not only as an audit trail for the client and local planning authority, showing compliance to tree protection conditions, but also to provide evidence of retention and protection of 'ecological features of value' which is required under Code for Sustainable Homes section Eco 3.

Should any issues or compromises occur during the development which have an impact on any retained tree it is the responsibility of the site manager to inform the project arboriculturist who will notify the LPA tree officer of the issue and any proposed remedial works.

Overleaf is a schedule to be completed at the pre-commencement site meeting listing key stages requiring monitoring and supervision. It may be necessary to add to the schedule according to site specific issues or planning conditions.

## **Site Monitoring & Supervision Schedule** - to be completed at the pre-commencement meeting

*Table 2*

| Constraints item | Supervision/ monitoring required? | Number or frequency of visits expected | Timing of site visits |
|---|---|---|---|
| **Tree works** | Yes/No | | Prior to construction |
| **Establishment of Construction Exclusion Zones with barriers and/or ground protection** | Yes/No | | Prior to site clearance and throughout development |
| **Site access for construction and avoidance of compaction damage to soil within CEZs** | Yes/No | | During site clearance and construction phase |
| **Changes in soil levels within CEZs** | Yes/No | | During site clearance and construction phase |
| **Excavation for foundations within CEZs** | Yes/No | | During construction phase |
| **Excavation for services within CEZs** | Yes/No | | During construction phase |
| **Construction of hard surfaces within CEZs** | Yes/No | | During construction phase |
| **Protection and prevention of damage to retained tree canopies** | Yes/No | | During construction phase |
| **Generic construction site constraints:**<br>• **site set-up location**<br>• **location of contaminant storage and washout areas**<br>• **siting of bonfires**<br>• **location of spoil and materials** | Yes/No | | During construction phase |
| **Replacement tree planting conforms with planning conditions and NHBC guidance** | Yes/No | | Post construction |
| **Additional at initial site meeting...** | | | |
| **Additional at initial site meeting...** | | | |

## 6.0 Conclusions

6.1 T3 is very close to an existing wall, and a proposed terrace within the new development, and will require protection during the demolition and construction phases. The trees root protection area (RPA) will need to be considered in the final design.

6.2 The existing parking area to the front of the flats is within the root protection area of a T2 (ash). This area is currently surfaced with concrete, and if this is to be renewed the impact on the rooting zone could be minimised by using a porous material for any new surfacing.

6.3 Construction activities should be limited within the root protection area of T1 (ash), and a combination of protective barrier fencing and ground protection methods should be used to protect this tree during the demolition and construction phases of the development.

6.4 Provided tree protection and methods of work close to trees outlined in this report are followed, the impact of the development on trees will be negligible.

## 7.0 Recommendations

7.1 Tree protection barriers and ground protection must be in place before any works begin (see TPP - Tree Protection Plan).

7.2 The arboricultural method statement should be observed by all site personnel and supervised at key stages by the project arboriculturist. Supervision/monitoring reports to be issued after each inspection as a record of compliance and audit trail for the local authority.

7.3 The routes of proposed services should be planned so they avoid the RPAs of any trees to be retained. Any services installed within RPAs should be in strict accordance with NJUG 4:2007.

7.4 The design of any new surfacing within the RPAs of any trees should be of a porous construction to ensure the impact on these trees is minimal.

7.5 A copy of this report and associated plans should be kept on site and be part of the site induction where applicable.

7.7 A detailed arboricultural method statement is produced one the design has been finalised and prior to any construction activity commencing on site.

Callum Campbell FdSc (Arb):TechArborA

Senior Arboricultural Consultant — DF Clark Bionomique Ltd

*I have over 15 years' experience in arboriculture, including 6 years as a forestry/arboricultural manager, 3 years as a County Council Highways Tree Officer and 3 years in Arboricultural consultancy. I also possess the LANTRA Professional Tree Inspection certificate which is the premier tree inspection accreditation scheme in the UK.*

# Appendix 1

# Survey and Background Information

1. **Methodology**

The trees were surveyed from ground level without detailed investigations. All trees with a trunk diameter of 75mm or above[3] were surveyed. All dimensions were estimated unless otherwise indicated. Obvious hedges and shrub masses were identified where appropriate. Information collected is in accordance with recommendations in subsection 4.4.2.5 of BS 5837 and includes species, height, diameter, branch spread, crown clearance, age class, physiological condition, structural condition and remaining contribution. Each tree was then allocated one of four categories (U, A, B or C) to reflect its suitability as a material constraint on development.

2. **Documents and information received**

- Existing and proposed layout SK003 by Bell Phillips Architects.

3. **Contacts**

| **Name** | Company/organisation | Tel.No. |
|---|---|---|
| **Karl Phillips** | Pheonix Community Housing | 0203 3121 0207 |
| **Callum Campbell** | DF Clark Bionomique | 07930 760028 |

4. **Reference documents**

- *British Standards Institution (2012) BS 5837: Trees in relation to design, demolition and construction – Recommendations;*
- *British Standards Institute (2010) BS 3998: Tree work – Recommendations;*
- *DETR Tree Preservation Orders – A Guide to the Law and Good Practice;*
- *National Joint Utilities Group (2007) Volume 4, Issue 2: Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees;*
- *DTLR (2001) Principles of Tree Hazard Assessment and Management - David Lonsdale.*

[3] *BS 5837recommends that in most circumstances all trees over 75mm stem diameter should be included in a pre-planning land and tree survey*

## 5. Legal constraints and liabilities

**Tree preservations orders/Conservation Areas:** It is not know at this time if any of the trees on site are the subject of constraints in the form of Tree Preservation Orders (TPO) or are within a Conservation Area (CA). It is therefore the responsibility of any persons undertaking tree work operations to the trees which are the subject of this report and in accordance with our recommendations, to undertake their own statutory tree protection checks with the local planning authority, to include TPO, conservation area (CA) and planning conditions prior to works commencing.

**Occupiers Liability 1957 and 1984:** The Occupiers Liability Act places a duty of care to ensure that no reasonably foreseeable harm takes place due to tree defects. Therefore this report includes recommendations within the tree tables for work required for safety reasons. 'Common sense risk management of trees (National Tree Safety Group 2012)' states that *'the owner of the land on which a tree stands, together with any party who has control over the tree's management, owes a duty of care at common law to all people who might be injured by the tree. The duty of care is to take reasonable care to avoid acts or omissions that cause a reasonably foreseeable risk of injury to persons or property.'*

**Common Law:** This enables pruning back of the crown and roots of trees on adjacent land where they overhang neighbouring property, providing the work is reasonable and does not cause harm. This right does not override TPO and CA legislation.

**Ecological constraints:** The Wildlife and Countryside Act 1981, as amended, The Conservation of Habitats and Species Regulations 2010 and the Countryside and Rights of Way Act 2000, provide statutory protection to species of flora and fauna including birds, bats and other species that are associated with trees. These could impose significant constraints on the use and timing of access to the site. It is the responsibility of the main contractor and tree surgery contractor to ensure that no protected species are harmed whilst carrying out site clearance or tree surgery works. Unless competent to do so, the advice of an ecologist must be sought.

# Appendix 2

# Key to tree survey sheets

**Key to terms**

**T** = Tree **G** = Group **H** = Hedge **S** = Shrub mass

**Age Class:**
**NP** = Newly planted.
**Y** = Young - an establishing tree that could be easily transplanted.
**SM** = Semi-mature - an established tree still to reach its ultimate height and spread and with considerable growth potential.
**EM** = Early mature - a tree reaching its ultimate height and whose growth is slowing however it will still increase considerably in stem diameter and crown spread.
**M** = Mature - a tree with limited potential for further significant increase in size although likely to have a considerable safe useful life expectancy.
**OM** = Over mature - a senescent or moribund tree with a limited useful life expectancy.
**V** = Veteran - a tree older than typical for the species and of great ecological, cultural or aesthetic value.

**Dia:** Diameter of stem in millimetres at 1.5m above ground level for single-stemmed trees or in accordance with Annex C of BS 5837 for multi-stemmed trees or trees with low forks or irregular stems.

**Stems:** Numbers of stems or M/S = multi-stemmed.

**Ht:** Height in metres.

**Ult ht:** Ultimate height likely to be achieved for this tree in this location.

**Cr ht 1:** Height of first significant branch above ground level and direction of growth.
**Cr ht 2:** Height of canopy above ground level.

**NSEW:** Crown spread at the four cardinal points. Ø = average crown radius.

**BS cat:** Category in accordance with Table 1 and section 4.5 of BS 5837.
**U** - Unsuitable for retention. Existing condition is such that they cannot be realistically retained as living trees in the context of the current land use for longer than 10 years. Note, category U trees can have existing or potential conservation value which it might be desirable to preserve.
**A -** High quality and value (non-fiscal) with at least 40 years remaining life expectancy.
**B** - Moderate quality and value with at least 20 years remaining life expectancy.

**C -** Low quality and value with at least 10 years remaining life expectancy, or young trees with a stem diameter below 150 mm.

A, B and C category trees are additionally graded into: 1) Mainly arboricultural values; 2) Mainly landscape values; 3) Mainly cultural values including conservation.

**Cond:** Physiological condition. G = good; F = fair; P = poor; D = dead.

**Life exp:** Estimated remaining contribution in years.

**RPR:** Root protection radius in metres based on stem diameter.

**RPA:** Root protection area. A layout design tool indicating the minimum area surrounding the tree that contains sufficient rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority. Assessed according to the recommendations set out in clause 4.6 of BS 5837. It is calculated by multiplying the radius squared by 3.142. Clause 4.6.2 of BS 5837 states that the RPA may be changed in shape, taking into account local site factors, species tolerance, condition and root morphology.
**CEZ:** Construction exclusion zone. An area based on the RPA in $m^2$ identified by an arboriculturist, to be protected during development, including site clearance, demolition and construction work, by the use of barriers and/or ground protection fit for purpose to ensure the successful long-term retention of a tree.

# Appendix 3

# Tree survey sheets

## Appendix 4

## Tree survey plan DFCP 2514 TSP

*See attached plan*

# Appendix 5

# Tree protection plan DFCP 2514 TPP

*See attached plan*

# Appendix 6

# Tree surgery schedule

## Tree surgery recommendations

All tree works to be undertaken in accordance with *BS 3998:2010 Recommendations for tree works*, or industry best practice.

*Table 3*

| Tree no. | Species | Proposed works | Reason |
|---|---|---|---|
| T1 | Common ash | Crown reduce by 2m and crown lift to ensure 2.5m clearance. | To accommodate the proposals |
| T2 | Common ash | None | N/A |
| T3 | Hawthorn | None | N/A |
| T4 | Spruce | None | N/A |

# Appendix 7

# Tree protection barriers & ground protection

**Design of welded mesh, Heras type tree protection barrier**

Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place. The default specification should be in accordance with 6.2.2.2 of BS 5837, as set out below.

**Specifications:** Barrier shall be a minimum 2 m high. It shall consist of a vertical and horizontal scaffold framework, well braced to resist impacts, as illustrated below. The vertical tubes should be spaced at a minimum interval of 3 m and driven securely into the ground. Onto this framework, welded mesh panels should be securely fixed. See Figure 2 overleaf.

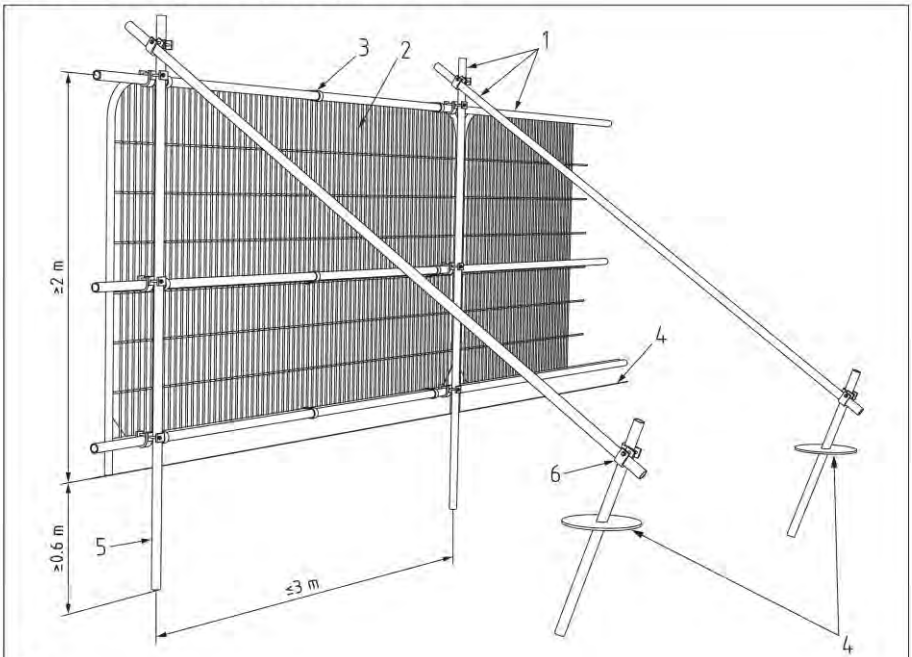
Where site circumstances and associated risk of damaging incursions into the RPA do not necessitate the default level of protection, an alternative specification may be used if agreed with the local authority. An example would be 'Heras' type welded mesh panels on rubber or concrete feet. The panels should be joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The panels should be supported on the inner side by stabiliser struts. See Figure 3 overleaf. All-weather notices should be attached to the barrier with words such as 'TREE PROTECTION ZONE - NO ACCESS.

**Location:** Barriers shall be positioned on the perimeter of the Root Protection Area to define the Construction Exclusion Zone or as specified in the Tree Protection Plan.

**Shown on the Tree Protection Plan by a dashed black line**

Figure 1 Example **of welded mesh barriers in use**

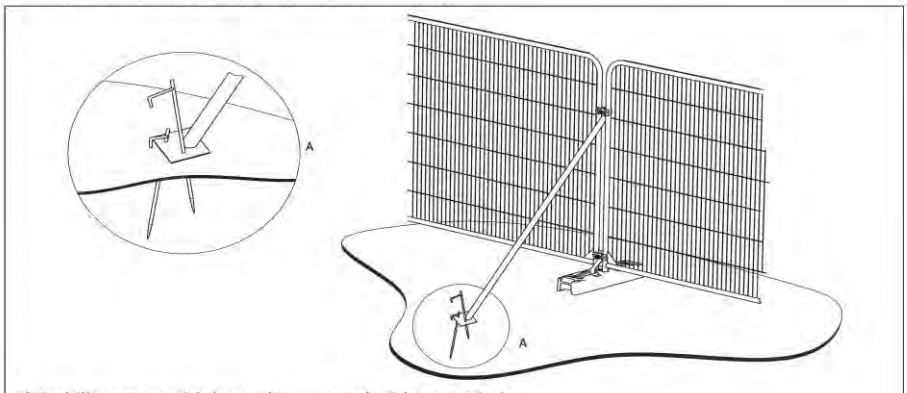
Figure 2 **Default specification for protective barrier**



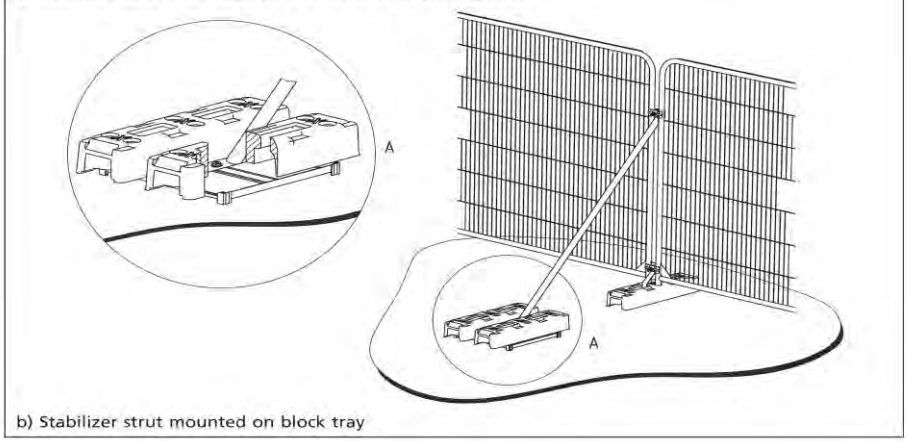

**Key**

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

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

Figures above are reproduced with the permission of the British Standards Institute.

Tree protection boxes must not be fixed directly to the tree stem as damage could occur either as a direct fixing or by means of transmitting forces to the tree if the box sustains a collision. The box must be self-supporting and ideally anchored to the ground. There must be a minimum of 150mm between the tree stem and any part of the box. The materials used must be robust and durable enough to be fit for the purpose of preventing damage to the trunk and last the lifetime of the development. Usually 18mm exterior ply fixed to 50mm x 50mm battens is sufficient.

Signs should be fixed to the boxes stating that they are for tree protection and not to be removed.

**Annotated on the tree protection plan where specified**

Example of trunk protection box in use

**Suggested protective fencing warning sign format**

**Ground protection**

In areas where it is not possible to erect protective fencing, ground protection must be used to protect the CEZ of trees. Where it has been agreed during the design stage, and as shown on the tree protection plan, that vehicular or pedestrian access for the construction operation may take place within the CEZ, the possible effects of construction activity should be addressed by a combination of barriers and ground protection. The position of the barrier may be within the CEZ at the edge of the agreed working zone but the soil structure beyond the barrier to the edge of the CEZ should be protected with ground protection. **This must be installed before any site activity takes place to protect soil structure and tree roots.**

Ground protection must be fit for the purpose of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil. It might comprise one of the following:

- for pedestrian movements or the erection of scaffolding within the RPA the installation of ground protection in the form of a single thickness of scaffold boards either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip laid onto a geotextile;
- for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards or panels placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane; or
- for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.

The following is a list of suppliers of temporary ground protection including polymer, metal or wooden panels. Other companies supply similar products and the following are given only as an example:

- www.ground-guards.co.uk
- www.evetrakway.co.uk
- www.trakmatseurope.com
- www.centriforce.com
- www.marwoodgroup.co.uk
- www.groundtrax.com

Cellular confinement no-dig systems can also be used.

**Examples of proprietary ground protection panels**

# Appendix 8

# Methods of work close to trees

**Guidance for working within RPAs**

This guidance sets out the general principles that must be followed when working in RPAs.

## 1.0 Removal of hard surfaces within RPAs

1.1 All structures including hard surfaces, walls and fences within construction exclusion zones (CEZ) must be removed following the methods detailed below to minimise damage to tree roots.

1.2 The use of conventional tracked and wheeled machinery causes damage to soil structure from compaction and damage to roots from excavation and must not be used within the CEZ. All areas of hard surfacing requiring removal within a CEZ will be broken up using a hand held pneumatic drill or mounted hydraulic breaker attached to a digger located outside the CEZ. The broken rubble will then be removed by hand.

1.3 The only exception to this is where the hard surface is of such a size as not to be reachable from outside the CEZ. In this situation a rubber tracked mini-digger will be used. The maximum working height of the machine must be less than the lowest branch of any overhanging trees.

1.4 The mini-digger will work from the existing hard surface pulling the debris away from the tree/s.

1.5 No excavation of existing soil beneath the hard surface will take place.

1.6 Immediately after removal of the hard surface, topsoil or sharp sand must be used to cover the soil surface and any roots to prevent drying out.

1.7 Upon completion, the protective fencing must be moved out to the edge of the CEZ or ground protection used if access is required.

## 2.0 Services

2.1 The location and direction of new services should be designed to allow for services to be routed away from the RPAs of retained trees.

2.2 If any services need to run through a CEZ the main contractor must contact the project arboriculturist before any works are undertaken. Agreement will then be sought from the LPA tree officer on methodology. Works will only begin with the agreement of the LPA. Methodology used must comply with *NJUG Volume 4: Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees*, which can be summarised as:

- hand excavate only;
- work carefully around roots only cutting as a last resort;
- do not cut roots over 25mm in diameter without referring to the project arboriculturist; and

- for roots less than 25mm in diameter use a sharp tool to make a clean cut leaving as small a wound as possible.

## 3.0 New hard surfaces within RPAs

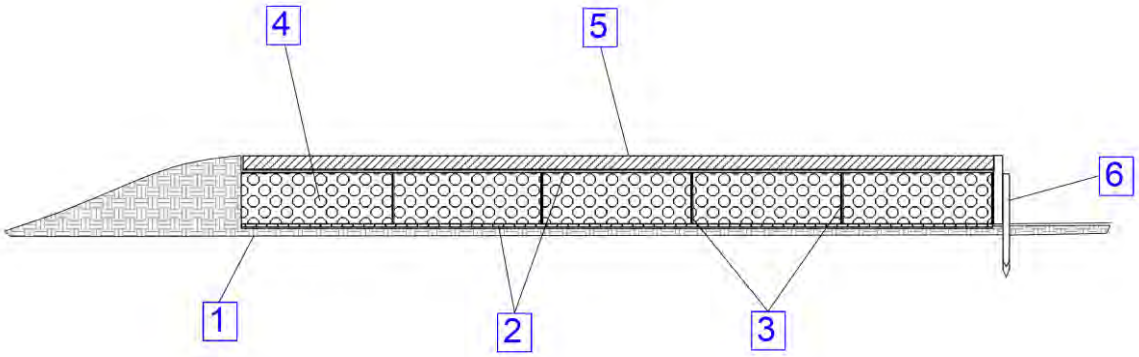
3.1 Where it has been agreed with the LPA that hard surfaces are acceptable within RPAs of retained trees, these will require designing to be of above ground, no-dig construction to minimise impact on tree roots and soil structure. In addition, finished surfaces of the car parking and paved areas will need to be of porous design to allow water and air passage in and out.

3.2 An illustrative example of a cellular confinement no-dig system can be found below. The actual system will need to be designed by a structural engineer to accommodate the loadings anticipated.

3.3 The principles to follow are:

- no excavation other than the removal of existing hard surfaces if required, or the removal of surface vegetation and no more than 50mm of leaf litter, vegetation debris etc;
- a method to spread and support the load of the hard surface and anticipated usage without causing compaction of the soil structure beneath;
- the use of a porous sub-base and finishing layer to allow water and air diffusion in and out of the soil;
- porosity must be designed to be long-term and not to block with fine particles in the short-term; therefore irregular, no-fines aggregate must be used; and
- the pH of the aggregate must be considered as many conventional road stones have very high pH values which can damage susceptible trees and therefore aggregates with a near neutral pH should be preferred.

# Example of a Cellular Confinement System




Notes

1. Existing ground
2. Geotextile membrane
3. Cellular confinement system
4. 20/40mm clean angular stone
5. Porous surface layer
6. Timber retaining edge

## 4.0 Fencing, hoarding, signs etc within RPAs

4.1 Where posts are to be installed within RPAs the holes must be dug carefully by hand. If roots with a diameter of 25mm or greater are found, the position of the post must be moved. Roots smaller than 25mm diameter can be cut with sharp tools leaving as small a wound as possible. The sides of the hole should be lined with an impermeable membrane such as plastic sheeting to prevent the caustic and toxic effects of wet cement in the concrete from damaging tree roots.

## 5.0 Landscaping works within RPAs

5.1 Landscape operations within tree protection zones have the potential to damage trees if not carried out with care; in addition the removal of protective fencing to carry out landscape operations may allow other contractors in previously protected areas.

5.2 If protective fencing is taken down to facilitate landscaping operations, the area of the CEZ must be delineated by pins and marker tape, spray paint, or some other method to clearly show the extent of the CEZ.

5.3 The preparation of soil for planting and turfing must be carried out by hand where within CEZs. Cultivation should be kept to a minimum and new topsoil added must not exceed 100mm in depth within 1m of the stem of any tree.

5.4 Topsoil and other materials must be transported by wheelbarrow on running boards when working within CEZs.

# Appendix 9

# Specific report caveats

**Specific report caveats**

- The survey was based on a drawing provided by the client.
- No internal diagnostic equipment was used other than a sounding mallet and probe.
- The survey is concerned solely with arboricultural issues.
- Any work with trees will discharge the due diligence requirements of all relevant wildlife and countryside legislation.
- Trees are dynamic living organisms whose health and condition can change rapidly. Any changes to the tree or conditions close to the tree may change the stability and condition of the tree and a further examination would be required and may affect the validity of this report.
- This report is valid for 12 months.

**Copyright and non-disclosure**

# Arboricultural Impact Assessment

of

# 2 – 4 Riverpark Gardens, Bromley, BR2 0BG

on behalf of

## Phoenix Community Housing

**6th March 2015**

**Callum Campbell** FdSc (Arb); TechArborA.

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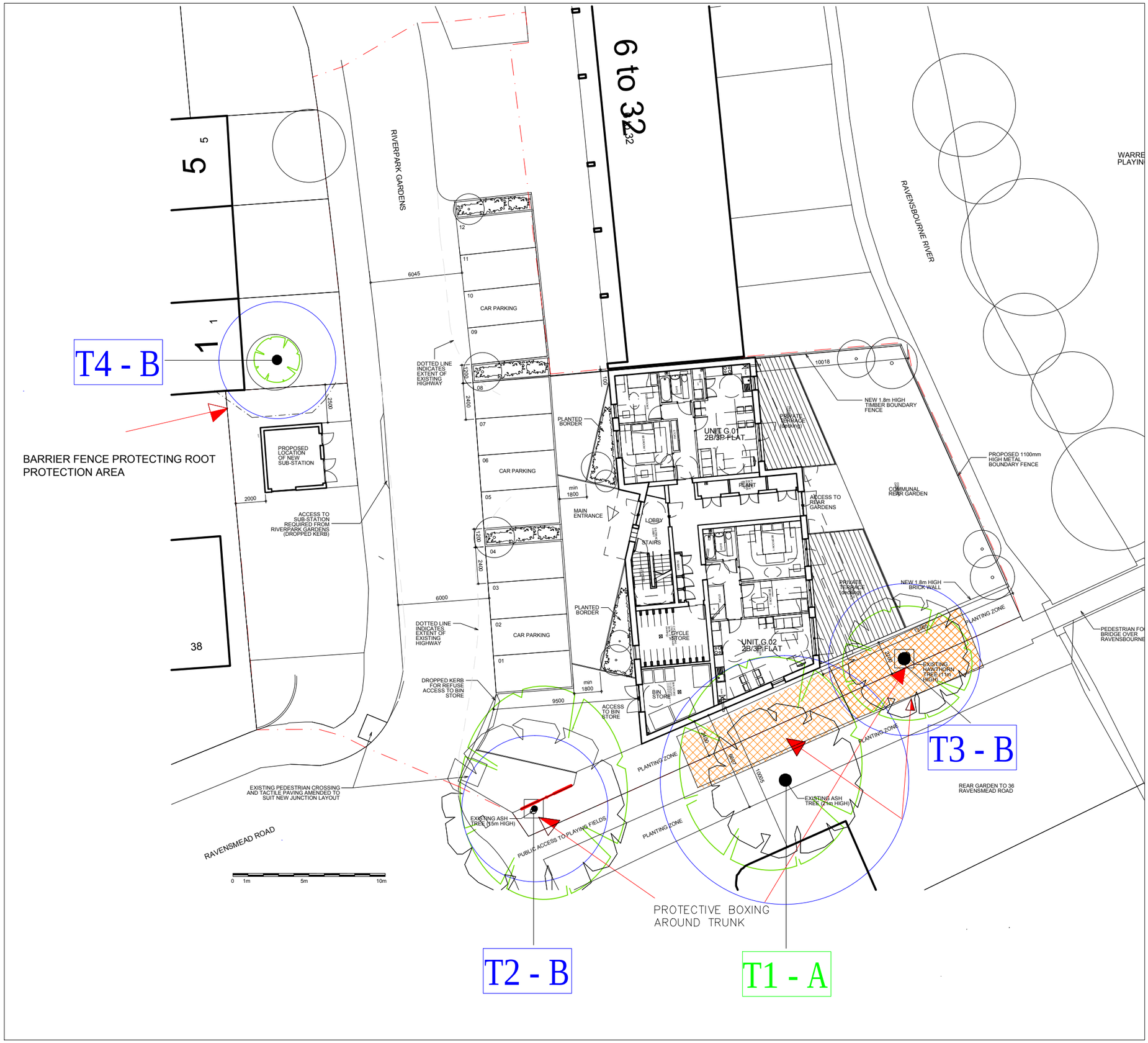
**Tree Survey Schedule/Phoenix Community Housing/Riverpark Gardens/10/10/2014**

| Tree ref no. | Common name | Botanical name | Height (m) | Stem diameter (mm) @ 1.5m | Stems | Branch spread (m) | Crown clear (m) | Age class | (P) Physiological condition (S) structural condition | Preliminary management | Est life exp | BS cat | Radii single stem | RPA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | Common ash | *Fraxinus excelsior* | 20 | 680 | 1 | N<br>E 8.0<br>S 6.0<br>W 7.0 | 6.0 | M | (P) Good (S) Good: No signs of ill health or significant structural defects. Co-dominant stems at approximately 5m. Previously crown reduced and crown lift to clear canopy from No 9. Ravensmead Road. Minor bark damage at base on north side. | N/A | 20+ | B2 | 8.16 | 209 |
| T2 | Common ash | *Fraxinus excelsior* | 15 | 400 | 1 | N 8.0<br>E 6.0<br>S 6.0<br>W 5.0 | 1.0 | SM | (P) Good (S) Good: No signs of ill health or significant structural defects. Low crown approximately 1m away from existing structure. Head of lamp column needs clearing. | Crown reduce to clear building and lamp column | 40+ | A1 | 4.8 | 72 |
| T3 | Hawthorn | *Crataegus monogyna* | 10 | 415 | 1 | N 3.5<br>E 4.5<br>S 4.0<br>W 4.0 | 5.0 | M | (P) Good (S) Good: No signs of ill health or significant structural defects. Multiple stems at approximately 2.5m. Western part of canopy overhangs proposed development site. | N/A | 10+ | B2 | 4.98 | 77 |
| T4 | Spruce | *Picea sp* | 9 | 320 | 1 | N 1.5<br>E 1.5<br>S 1.5<br>W 1.5 | 1.0 | EM | (P) Good (S) Fair: Unable to undertake full Visual Tree Assessment (VTA) as tree is in a private garden. | N/A | 10+ | B2 | 3.84 | 46 |

**Tree Survey Schedule/Phoenix Community Housing/Riverpark Gardens/10/10/2014**




Please refer to full arboricultural report for details

T1 - A Category A - high quality and value

T1 - B Category B - moderate quality and value

T1 - C Category C - low quality and value

T1 - U Category U - unsuitable for retention

RPA - root protection area as defined by Table 2 BS 5837:2012

Trees to be retained

Tree protective fencing

Ground protection measures

Protective boxing around trunk

Please note this is not based on a topographical drawing, and therefore tree locations need to be checked on site

Notes

1. Contractors must check all dimensions on site
2. Any discrepancies must be reported to the Arboricultural Consultant before proceeding
3. It is the responsibility of the contractor to ensure necessary consents for tree works are in place
4. This drawing is copyright © DF Clark Ltd

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

| Revision | Description | Drawn | Authorised |
|---|---|---|---|
| B | New layout received 06.03.15 | MB | CC |
| A | New layout received 20.11.14 | ND-H | CC |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Client: Pheonix Community Housing

Site address: Riverpark Gardens

Drawing title: Tree Protection Plan

Orientation: N

Date: 10.11.14

Scale: 1:250@A3

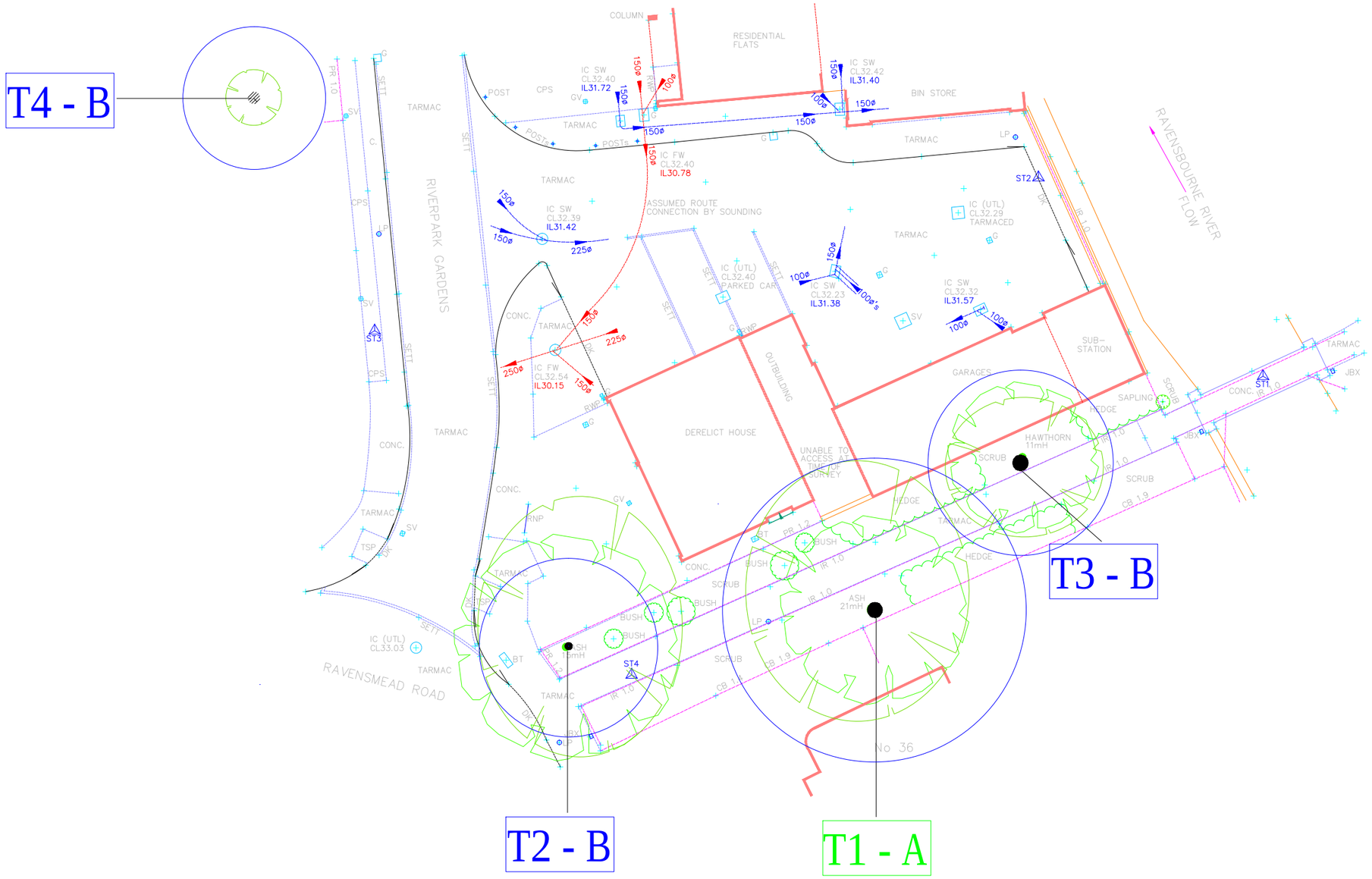
Drawing number: DFCP 3324 TPP

Revision: B

Drawn: ND-H

Authorised: CC

Drawing status: FOR ISSUE




Please refer to full arboricultural report for details

- T1 - A — Category A - high quality and value
- T1 - B — Category B - moderate quality and value
- T1 - C — Category C - low quality and value
- T1 - U — Category U - unsuitable for retention
- RPA - root protection area as defined by Table 2 BS 5837:2012
- Crown spread

Notes

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| Revision | Description | Drawn | Authorised |
|---|---|---|---|
| A | Amendment to the RPA of T1 & T2 | MB | CC |


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Client: Phoenix Community Housing Trust

Site address: 2-4 Riverpark Gardens, Bromley

Drawing title: Tree Survey Plan

Orientation: N

Date: 19.11.14
Scale: 1:250@A3
Drawing number: DFCP 3324 TSP
Revision: A
Drawn: ND-H
Authorised: CC
Drawing status: FOR ISSUE