Revised Tree Survey
Arboricultural Impact Assessment
Arboricultural Method Statement

Relating to:

55 Wilkin Street Mews,
London NW5 3NN

Produced for:
Michaelis Boyd Associates

Prepared by:
Challice Consulting Ltd.
Mr. David Challice
Dip. Arb. (RFS), F.Arbor.A, MICFor

Date:
1st August 2016

Our Ref:
CC/1626 AR3061

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APPENDICES

Appendix 1	Tree Survey Schedule with Recommended Tree Works
Appendix 2	Tree Protection Plan in Colour at A1 and Scale 1:50 with Tree Protective Fencing and Ground Protection Specifications
Appendix 3	Example of Site Inspection Record
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INTRODUCTION

1.0 Frequently Used Key Terms and Abbreviations

Tree Preservation Order	TPO
Arboricultural Method Statement	AMS
British Standard 5837:2012 – Recommendations for Trees in Relation to Design, Demolition and Construction	BS 5837
British Standard 3998:2010 - Recommendations for Tree Work	BS 3998
Root Protection Area/Root Protection Areas	RPA/RPAs
Local Planning Authority	LPA

2.0 The Proposal

2.1 It is proposed to construct a rear extension to the existing building.

3.0 Instructions and Purpose

3.1 This report has been commissioned by Michaelis Boyd Associates to;

- Survey the trees in accordance with British Standard (BS 5837) 5837:2012 - Trees in Relation to Design, Demolition and Construction- Recommendations.
- Make suggestions to decrease the arboricultural impact of the proposed scheme on the retained trees.
- Detail the arboricultural impact of the proposed project.
- Prepare a tree work schedule to British Standard (BS 3998) 3998:2010 - Recommendations for Tree Work.
- Develop a tree protection strategy for the duration of the development including any demolition works.

3.2 Provision of the above information is designed to address the requirements of the LPA in terms of the arboricultural information necessary to register and determine the planning application.

4.0 Scope

4.1 In surveying the trees to the requirements of BS 5837, trees on and immediately adjacent to the site with a stem diameter over 75mm have been included. Large shrubs and hedges have been included where these are considered to be of significant amenity value. These are particularly important where they provide boundary screening. For clarity and ease of data interpretation, large shrubs have been classified as trees.

4.2 A full hazard assessment of the trees (including the assessment of decay or defects and their impact), has not been undertaken as this is considered beyond the scope of this report. Any obvious hazards and defects have been identified in the Tree Survey Schedule and appropriate works recommended for immediate action.

5.0 Documents Supplied/Used

Document	Obtained From	Format/Ref.
Existing and proposed layout plans	Michaelis Boyd Associates	Dwg.

6.0 Site Details

6.1 The site is comprised of an industrial unit located under a railway arch.

6.2 The site is largely flat with no significant inclines in any direction that would affect the recommendations in this report.

6.3 The site is within the administrative jurisdiction of the London Borough of Camden.

6.4 I have not been instructed to ascertain the protection status of any of the trees on or near the site.

TREE SURVEY

7.0 Survey Method

7.1 The site and trees were inspected on 12th July 2016.

7.2 The trees were inspected from ground level and no climbing inspections were undertaken.

7.3 Stem diameters were measured using a diameter tape at 1.5m from ground level. The locations of the surveyed trees has originated from the

drawings supplied by the client unless otherwise stated in the Tree Survey Schedule.

8.0 Tree Details

8.1 The total number of records is as follows:
Individual Trees (T): 3
Tree Groups (G): 1

8.2 The tree details and proposed works are presented in the Tree Survey Schedule with Recommended Tree Works at **Appendix 1** and tree positions are shown on the Tree Protection Plan at **Appendix 2**.

8.3 The quality and value of the tree stock has been broken down by BS 5837 quality grade. The grading system can be summarised as follows:

A Grade – trees of high quality and value with a life expectancy of more than 40 years
B Grade – trees of moderate quality and value, with a life expectancy of more than 20 years
C Grade – trees of low quality and value, with a life expectancy of more than 10 years
U Grade – trees for removal, with a life expectancy of less than 10 years

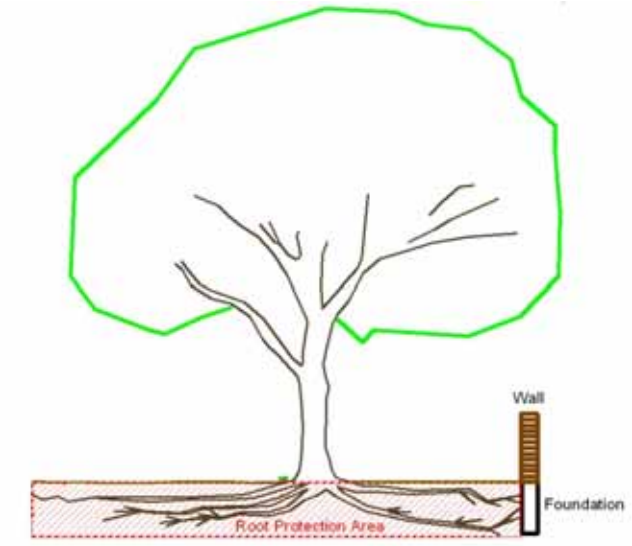
Quality and Value of Existing Tree Stock

Total No. Trees (9)	A Grade	B Grade	C Grade	U Grade
No. of Trees	0	0	9	0

8.4 The RPAs of the trees are included in the Tree Survey Schedule with reference to Table 1 of BS 5837. The RPA is the area, measured in m^2, which is calculated in accordance with the BS 5837 using the stem diameter of the trees. This should provide retained trees with sufficient rooting environment to survive the proposed development. Section 4.6.3 of BS 5837 provides for the shape of the RPA to be modified from the

starting point of a circle to account for site features where rooting may be restricted, as long as the total area remains the same.

Diagrammatic Representation of a Restricted Root Protection Area



Modified RPAs

Tree No.	Impediments to Normal Rooting
T1 and T2	Existing hard surfacing

ARBORICULTURAL IMPACT ASSESSMENT

9.0 Introduction to Arboricultural Impact Assessment

9.1 This section comprises an assessment of the impact the proposed works detailed in Section 2 above have on trees. It considers the arboricultural impact and how this may be mitigated.

10.0 Tree Removal and Retention

10.1 The proposed scheme provides for the retention and protection of all the trees with the exception of Willow T4 which is located within the boundary of the site.

11.0 Tree Pruning Works

11.1 Minor tree pruning is recommended to ensure reasonable clearance from the proposed construction. The pruning described in the Tree Survey Schedule with Recommended Tree Works at **Appendix 1** will not adversely affect the trees or their contribution to local amenity.

12.0 Incursions into Root Protection Areas

12.1 The table below summarises the significant incursions into the RPAs of retained trees. The 'Action' column details how the incursion has been mitigated and why it is considered acceptable. Incursions may be fully invasive (where specialist methods are not used and some root loss is considered acceptable) or low invasive (where specialist methods are used to minimise damage to or loss of roots). Full details of how the works will be carried out without causing damage to the trees are given in the AMS.

Summary of Incursions into RPAs

Tree No.	Type of Incursion	Incursion %	Action
T1	Low invasive to construct pile and beam foundations	15%	Two 250mm diameter piles will be installed within the RPA of this tree. Excavations within the RPA of this tree will be limited to a depth of 300mm and will be carried out by hand under direct arboricultural supervision. All roots over 25mm in diameter will be retained to install void formers which will prevent soil heave and limit root disturbance to an acceptable level (see **Appendix 4 Method 2**).

12.2 No new underground services are to be installed within the RPAs of retained trees.

13.0 Proximity Issues and Shading

13.1 The approximate shade segments for key retained trees have been plotted using the ArborCAD software system, which identifies the area of the site which may be affected by shade during the course of the day. The shade segment does not represent the area which will be in shade all day long; however, it represents an area which **may** be affected **at some point** during the course of a day by shade depending on the time of day and season.

13.2 The juxtaposition between retained trees and the proposed development is in accordance with Section 5.3 of the BS 5837 and should not lead to future pressure to heavily prune or remove retained trees for the following reasons:

1. Tree pruning has been recommended to provide adequate separation between the proposed development and the retained trees.
2. Any future tree pruning works are unlikely to be over and above those generally accepted as good arboricultural practice in an urban environment.

14.0 Summary of Arboricultural Impact

14.1 In summary, the arboricultural impact of the proposed scheme is relatively minor as only one tree is to be removed.

14.2 The retained off site trees can be afforded an appropriate degree of protection in accordance with the BS 5837 as detailed in the AMS.

ARBORICULTURAL METHOD STATEMENT

15.0 Introduction to Arboricultural Method Statement

15.1 To safeguard the retained trees (both above and below ground parts) during the development works and preserve the soil structure of areas

which could be allocated for new planting, it will be necessary to implement tree protection measures as outlined below.

15.2 The basic principle is that the area inside the tree protective fencing and where ground protection has been used is to be protected for the duration of the works.

15.3 A copy of this AMS shall be maintained on site at all times and made available to all site personnel.

15.4 All site personnel shall be made aware of the key impact of this AMS and be given an arboricultural induction by the Site Manager. An Induction Form is attached at **Appendix 5**. A copy of the Induction Form will be signed by all site personnel to confirm that they have understood the issues involved.

15.5 As of 2005, Local Planning Authorities have powers to serve **Temporary Stop Notices** if agreed tree protection measures are not carried out. Adhering to this AMS will ensure that such costly and time consuming action is avoided.

16.0 Pre-Commencement Meeting

16.1 A pre-commencement site meeting, involving representatives from the Development Company, the Arboricultural Consultant and the LPA Tree Officer will be held to ensure that all aspects of the tree protection process are understood and agreed. A record of the meeting will be communicated to all parties by the Arboricultural Consultant.

17.0 General Site Precautions

17.1 The following points will be observed at all times:

- No fires will be lit on site during the construction or demolition phases.
- No access will be permitted inside the tree protective fencing.
- No materials, equipment or debris will be stored within the tree protective fencing.

- Notice boards, telephone cables or other services will not be attached to any parts of retained trees.
- Materials which will contaminate the soil (e.g. diesel oil and vehicle washings) will not be permitted to migrate into the RPAs of retained trees.
- A dedicated mixing and cleaning area will be set up to prevent concrete, cement and cleaning residue leaching into the RPAs of the retained trees (see Tree Protection Plan for specification).

18.0 Tree Works

18.1 All works will be carried out in accordance with BS 3998:2010 'Recommendations for Tree Work' (as amended) and to current arboricultural best practice. Tree works will be carried out by a suitably qualified and experienced Arboricultural Contractor holding the necessary insurance cover. This contractor should carry out the relevant site specific risk assessments and record such information prior to commencement of tasks and work in accordance with current health and safety standards, practices and legislation. A list of such contractors is available from the Arboricultural Association at www.trees.org.uk.

18.2 The subject trees may be protected by virtue of being within a Conservation Area or covered by a by a TPO. Submission of this AMS in connection with a planning application should be construed as a formal application to carry out those works specified in the Tree Survey Schedule with Recommended Tree Works at **Appendix 1**. It is recommended that this matter be clarified in writing with the LPA prior to any works commencing.

18.3 In addition, prior to the commencement of any tree works, an ecological assessment of specific trees may be required to ascertain whether protected species (e.g. bats, badgers and certain invertebrates) may be affected.

18.4 If additional pruning of trees is required to facilitate the proposed works or access for machinery/plant, the Arboricultural Consultant will be contacted to advise on appropriate works and liaise with the LPA as necessary.

19.0 Tree Protective Fencing

19.1 Tree protective fencing is used to ensure that the RPAs of retained trees are safeguarded. These measures may also be employed to protect areas of ground for new landscaping.

19.2 The positioning and specification of the fencing is shown in **Appendix 2**. In this case, the default specification of BS 5837 consisting of **fixed Heras** fencing would be effective.

19.3 The protective fencing will remain in position for the duration of the development, including the removal of any existing structures. Clear signs will be attached to the fencing once erected – suggested wording will be **'Construction Exclusion Zone No Access'**.

20.0 Ground Protection

20.1 A provision has been made to install ground protection between the edge of the proposed development and the tree protective fencing. This provides adequate working space to permit the safe and practical completion of construction works whilst protecting the rooting environment of the retained trees (position and specification shown in **Appendix 2**). The ground protection will remain in place for the duration of the development, including the removal of any existing structures.

21.0 Site Access/Hard Surfaces

21.1 The existing access to the front of the site is suitable for site access during construction and little or no damage is anticipated to the root systems of retained trees.

22.0 Demolition

22.1 There is no requirement for demolition within the RPAs of retained trees.

23.0 Underground Services

23.1 The proposed scheme can make use of existing services and all new services and soakaways will be located in the adequate space outside the RPAs of the retained trees.

23.2 The locations, specifications and installation methods of all new services will be available for review at the pre-commencement site meeting before any works start on site.

24.0 Foundations

24.1 The foundations of the extension within the RPA of T1 will be constructed using 250mm diameter piles and a ground beam that will be designed by a suitably qualified Structural Engineer. Pile and beam foundations are a low invasive method of installing foundations within the RPAs of retained trees. This is achieved by drilling holes into the soil or driving piles into the ground.

Example of Piling Rig Working on a Piling Mat

24.2 Once in position, the piles support ground beams, which in turn hold up the building. The beam is placed a maximum of 50mm below the existing ground level. This method of foundation construction may affect the height

of the internal floor levels of the proposed building. In this instance, the use of pile and beam foundations offers an effective way of constructing the building whilst minimising root disturbance to the retained trees. Ground protection is required for the piling rig, which must be placed on a piling mat when it is within the RPA of T1. This will consist of a load bearing granular material consisting of sand or woodchip laid over a Geotextile membrane (this prevents the granular material mixing with the soil). In addition, Ply sheeting will be laid on top of the piling mat to give added protection to the ground below.

24.3 Excavations to construct a void to prevent soil heave within the RPA of T1 will be hand dug under direct arboricultural supervision to retain all roots over 25mm in diameter to limit root disturbance to an acceptable level (see **Appendix 4 Method 2**). Void formers will be placed around the retained roots to prevent cement coming into contact with the roots.

25.0 Construction/Hard Landscaping

25.1 There is no requirement for additional construction or hard landscaping that will affect the surveyed trees.

25.2 Construction is taken to include erection of scaffolding and the installation of associated hard landscaping features such as retaining walls, patios, and cycle stores.

25.3 In this instance, retained trees will not impede the erection of scaffolding and no ancillary structures are proposed within the RPAs of the retained trees.

25.4 Subject to all of the above tree protection measures being implemented, construction works may proceed without risk of damage to retained trees.

26.0 Soft Landscaping/Boundary Fencing

26.1 Soft landscaping will be undertaken when heavy machinery has been removed from site and tree protective fencing taken down. The following points will be observed:

- Care will be taken not to compact the soil within the RPAs of retained trees or where new tree planting is to be carried out.
- No changes in ground levels will occur within the RPAs of the retained trees.
- Unwanted vegetation will be removed manually or using contact herbicides that will not damage existing tree roots.
- No irrigation or drainage pipes will be installed within the RPAs of retained trees.
- If soil has been compacted in areas where planting is proposed, measures to improve soil structure (e.g. decompaction) may be necessary to facilitate successful plant establishment.
- Where fence posts are being installed within the RPAs of retained trees, this will be undertaken under arboricultural supervision. Fence post holes shall be lined with polythene where concrete is used to prevent the harmful cement leaching into the soil and damaging the roots of the retained trees.

27.0 Sequencing and Supervision

27.1 Effective tree protection relies on following a logical sequence of events and arboricultural inspection/supervision.

27.2 Works which have the potential to affect trees will be supervised by a suitably qualified and experienced Arboricultural Consultant. Regular inspection visits will also be undertaken to ensure that tree protection measures are being adhered to. The final details of supervision and the frequency of inspection visits will be agreed with the Tree Officer at the pre-commencement meeting. The Arboricultural Consultant will make a record of visits, which will be attached to the site copy of the AMS for inspection and communicated in writing to the LPA. An example of the Site Inspection Record is found in **Appendix 3**.

Sequencing and Supervision

Stage	Action	Personnel Responsible
1.	Issue arboricultural report to site manager	Client/Developer
2.	Give Arboricultural Consultant (**AC**) at least a week's notice of pre-commencement meeting	Client/Developer
3.	Pre-commencement meeting	Site Manager, Tree Officer and AC
4.	Arboricultural induction	Site Manager
5.	Carry out tree works	AC to monitor
6.	Erect tree protective fencing and install ground protection	AC to inspect on a monthly basis to ensure tree protection is in place and report to the LPA (client instruction required)
7.	Excavate foundations by hand and install piles and void formers	AC to supervise
8.	Install underground services	AC to supervise
9.	Erect scaffolding and carry out construction (including hard landscaping)	Site Manager
10.	Remove machinery/plant	Site Manager
11.	Remove tree protective fencing/ground protection	Site Manager
12.	Carry out soft landscaping and erect boundary fencing	Site Manager to brief landscaping company on site and supervise

28.0 Amendments

28.1 Issues sometimes arise on development sites which require amendments to the previously agreed tree protection details. Any amendments to this AMS will be discussed with the Arboricultural Consultant and approved in writing by the LPA prior to being implemented. Copies of paperwork relating to any amendments shall be attached to the site copy of the AMS to provide a definitive record of what has been agreed.

29.0 List of Contacts

Contact	Name	Company/LPA	Contact Number(s)	Report Issued to?
Client	Mr. Gabriel George	Michaelis Boyd Associates	020 7221 1237	Yes
Arboricultural Supervisor	Mr. David Challice	Challice Consulting Ltd.	01306 743374 07831 855764	N/a

Appendix 1

Challice Consulting Ltd.
Tel: 01306 743374

Tree Survey Schedule with Recommended Tree Works

Site: 55 Wilkin Street Mews, London NW5 3NN

Surveyor: Mr. David Challice

Date Surveyed: 12th July 2016

Our Ref: CC/1626 AR3061

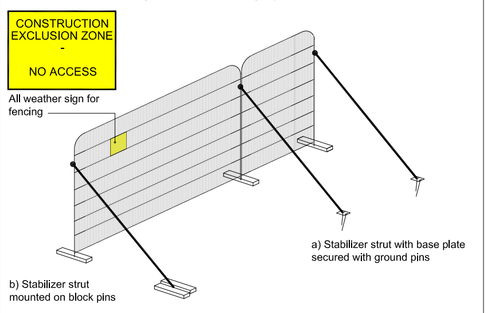
Tree No.	English Name	Height	Crown Spread	Ground Clearance	Age Class	Stem Diameter	Protection Multiplier	Protection Radius	Growth Vitality	Structural Condition	Landscape Contribution	B.S. Cat	Sub Cat	Useful Life	Observations
T1	Common Ash **1** Number	16	5 3 5 7	GC 5 FB 3 S	Early Mature	320 1	12	3.8	Moderate	Fair	Medium	C	2	20+	Self sown tree Tree located off site
Recommended Works/ Reason for Works:	Cut back to boundary only										Recommended to permit development				
T2	Lawson Cypress **1** Number	8	3 2 1 2	GC 1 FB 1 N	Semi-Mature	100 1 est	12	1.2	Normal	Good	Low	C	1,2	40+	Tree located off site
Recommended Works/ Reason for Works:	Cut back to boundary only										Recommended to permit development				
G3	Lawson Cypress **6** Number	16	3 3 3 3	GC 2 FB 2 N	Early Mature	275 1 ave	12	3.3	Moderate	Fair	Medium	C	1,2	20+	Trees located off site
Recommended Works/ Reason for Works:	No work proposed														
T4	Willow **1** Number	8	2 1 4 2	GC 1 FB 0 N	Early Mature	275 1 est	12	3.3	Moderate	Fair	Low	C	2	10+	Growing in unsuitable location adjacent to fence Pyracantha shrub growing at base
Recommended Works/ Reason for Works:	Fell Willow and Pyracantha shrub										Recommended to permit development				

Notes:

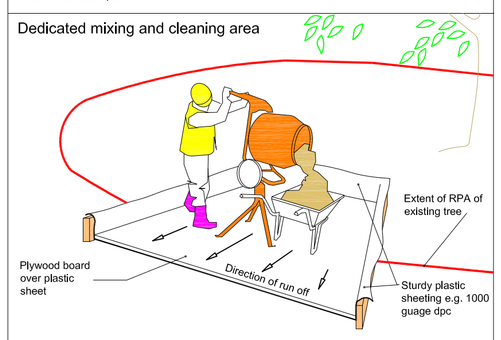
1. Height describes the approximate height of the tree measured in meters from ground level.
2. The Crown Spread refers to the crown radius in meters from the stem centre and is shown above on each of the four compass points (i.e. N, S, E, W).
3. Ground Clearance (**GC**) is the height in meters of crown clearance above adjacent ground level, the height of the first significant branch (**FB**) and the direction in which it is growing.
4. Stem Diameter is the diameter of the stem measured in millimeters at 1.5m from ground level. The stem diameter may be estimated (**est**) where access is restricted or an average (**ave**) taken for groups or multi-stemmed trees with more than five stems. The number of stems is also indicated.
5. Protection Multiplier is the number used to calculate the tree's protection radius and area and is shown as 12.
6. Protection Radius is a radial distance measured from the trunk centre.
7. Growth Vitality - Normal growth, Moderate (below normal), Poor (sparse/weak) or Dead (dead or dying tree).
8. Structural Condition - Good (no or only minor defects), Fair (remedial defects), Poor (major defects present).
9. Landscape Contribution - High (prominent landscape feature), Medium (visible in landscape), Low (secluded/among other trees).
10. B.S. Cat refers to British Standard 5837:2012 Table 1 and refers to tree/group quality and value; '**A**' - High, '**B**' - Moderate, '**C**' - Low, '**U**' - Remove.
11. Sub Cat refers to the retention criteria values where 1 is Arboricultural, 2 is Landscape and 3 is Cultural including Conservational, Historic and Commemorative.
12. Useful Life is the tree's estimated remaining contribution in years.

Appendix 2

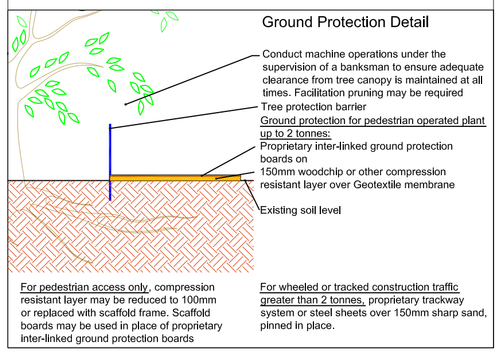
Examples of above-ground stabilizing systems for protective barriers



Dedicated mixing and cleaning area



Ground Protection Detail



For pedestrian access only, compression resistant layer may be reduced to 100mm or replaced with scaffold frame. Scaffold boards may be used in place of proprietary inter-linked ground protection boards

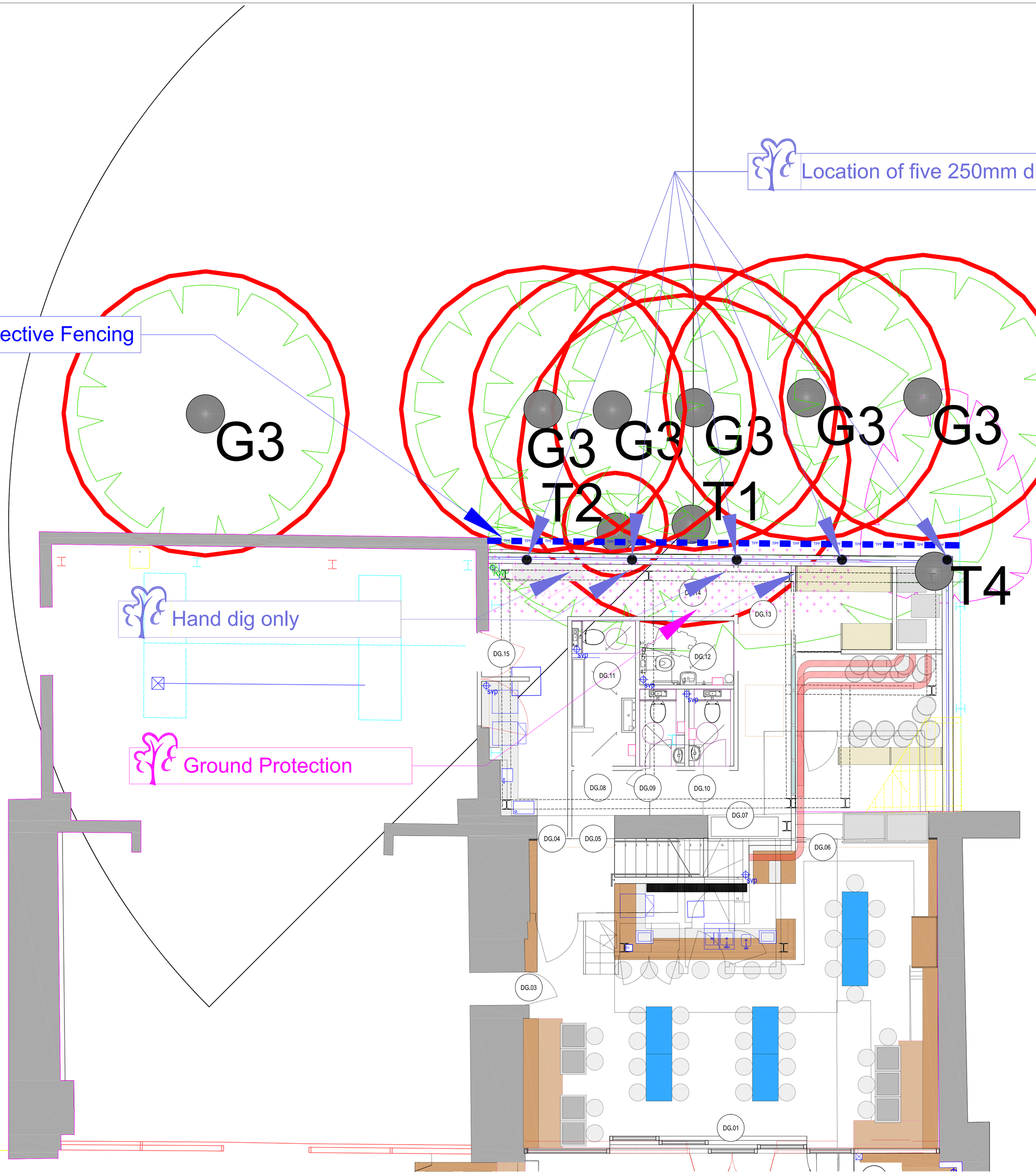
For wheeled or tracked construction traffic greater than 2 tonnes, proprietary trackway system or steel sheets over 150mm sharp sand, pinned in place.

Tree Protective Fencing

Location of five 250mm diameter piles

Hand dig only

Ground Protection



THIS PLAN TO BE USED FOR SETTING OUT OF TREE PROTECTION MEASURES ONLY; DO NOT SCALE FROM THIS PLAN UNLESS IT IS PRINTED AT A1. DO NOT USE UNLESS PRINTED IN COLOUR

Indicative

KEY:

- Shade pattern for key retained Ash tree
- BS rooting area is shown uniform but may be modified to account for site features
- BS rooting area has been modified to account for site features
- A Grade
- B Grade
- C Grade
- U Grade (remove)
- Tree to be removed
- Position of fixed Heras style fencing
- Position of ground protection
- Challice Consulting Ltd. annotation

Notes:
Tree protection barrier and ground protection to be erected and installed before machinery or materials are brought onto site, before any demolition or development of land and before soil stripping.

Tree protection measures should be implemented following any necessary pre-development tree work.

Where due to site constraints, construction activity cannot be fully or permanently excluded from all or part of a trees Root Protection Area, appropriate ground protection should be installed.

Barriers and ground protection must not be removed or altered except with prior recommendation by project arboriculturist and where necessary, approval from the Local Planning Authority.

Setting out to be confirmed by project arboriculturist prior to commencement of other operations.

The ground protection detail is to be used where the tree protection barrier needs to be set back so that it will expose unmade ground to construction activity. New, temporary ground protection should be installed as part of the physical tree protection measures prior to starting work on site.

Suitable existing hard surfacing not proposed for re-use as part of the finished design shall be retained as ground protection within root protection areas, where and as long as, it is possible.

Plan to be printed in colour and to scale

DRAWING TITLE
Tree Protection Plan

PROJECT
55 Wilkin Street Mews, London NW5 3NN

SCALE	DATE	DRAWN BY
1:50 @ A1	01.08.2016	D.C.

DRAWING NUMBER	REV
TPP-CC/1626 AR3061	1

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Appendix 3

Challice Consulting Ltd.
T: 01306 743374

Arboricultural Site Supervision

Site: Sample
Inspected By: D. Challice
Client: The Builder
Site Agent: No staff present
Date of Inspection:
Time of Inspection:

Tree Protective Fencing

Tree protection in correct location

Comments/Action
No action at this time

Tree protection T23

Agreed Construction Exclusion Zone

No debris within construction exclusion zone

Comments/Action
No action at this time

Amendments to Documentation Required

No amendments required

Comments/Action

Tree protection T14

Remedial Works

Install protection as per Arboricultural Method Statement

General Comments

No ground protection in place for T11,12,14,17 & 22
Sweet Gum T1 not removed

Appendix 4

Hand Digging Methodology and Installation of Services within Root Protection Areas

Introduction

- Trees need roots to stay upright and to obtain water and nutrients from the soil
- Any excavation within the Root Protection Area of a tree may affect its stability and health
- Roots over 25mm in diameter are likely to be of particular structural significance
- Roots less than 25mm in diameter are likely to be important to the tree for survival and structural significance. Cutting many small roots may have an impact on tree health and stability
- Most tree roots are within 0.6 -1m from the soil surface
- Desiccation and exposure to rapid temperature change is likely to cause root death
- Hand digging carried out correctly is less likely to damage tree roots than digging with machinery
- All digging within the Root Protection Areas of trees should be supervised by an Arboriculturalist
- Whether digging is acceptable and how it should be carried out depends on tree species and characteristics (age, vigour, past management etc.)
- Site conditions are also important when deciding whether digging is acceptable (soil type, ground levels, existing structures etc.)
- Carry out a suitable risk assessment prior to starting work. In particular, take care when working in the vicinity of underground services

Why/What For?

- Service installation/maintenance
- Demolition
- Foundations
- Hard surface installations
- Decay detection

Relevant Documents

- British Standard 5837:2012 - Section 7.2 - Trees in Relation to Design, Demolition and Construction – Recommendations
- National Joint Utilities Group Volume 4 2007: Guidelines For The Planning, Installation And Maintenance Of Utility Apparatus In Proximity To Trees (Issue 2) – Operatives Handbook

Principles

The key principles are as follows:

- Avoid compaction of the soil when carrying out the works
- Sever as few roots as possible
- Do not leave damaged or poorly cut roots as these are likely to lead to decay in the future
- Do not let exposed roots dry out
- Do not use materials containing harmful chemicals or salt as these will harm the trees (including builders' sand)

How/What to Use?

Method 1 - Hand Digging Retaining all Roots Above 25mm in Diameter to British Standard 5837:2012 Section 7.2:

- Hand tools –pick, fork, spade, wheel barrow and trowel
- Brush - it is useful to brush away loose soil from exposed roots prior to cutting them
- Secateurs/sharp pull-saw - roots that need to be cut must be cut cleanly using suitable hand tools
- Damp Hessian sacking – this should immediately cover the sides of the trench down to a depth of 1m below ground level and is effective in preventing roots drying out following excavation
- Suitable back-fill - covering the exposed or cut roots with a 100mm layer of topsoil or a mixture of 50% composted organic matter and 50% un-compacted sharp sand is suitable
- Supervision - ***a suitably qualified and experienced Arboriculturalist should be present when the works are carried out***

Method 2 - Hand Digging Removing all Roots to a Depth of 1m Below Ground Level to British Standard 5837:2012 Section 7.2:

- Hand tools –pick, fork, spade, wheel barrow and trowel
- Brush - it is useful to brush away loose soil from exposed roots prior to cutting them
- Secateurs/sharp pull-saw - roots that need to be cut must be cut cleanly using suitable hand tools
- Damp Hessian sacking – this should immediately cover the sides of the trench down to a depth of 1m below ground level and is effective in preventing roots drying out following excavation
- Suitable back-fill - covering the exposed or cut roots with a 100mm layer of topsoil or a mixture of 50% composted organic matter and 50% un-compacted sharp sand is suitable
- Excavations below 1m from ground level can be carried out using an excavator or similar due to health and safety requirements
- Supervision - ***a suitably qualified and experienced Arboriculturalist should be present when the works are carried out***

Method 3 - Compressed Air Soil Displacement Combined with Hand Digging Retaining all Roots Above 5mm in Diameter to British Standard 5837:2012 Section 7.2:

- Air spade - this uses a high pressure jet of air, delivered from a compressor to a hand held lance
- Hand tools – pick, fork, wheel barrow and trowel
- Brush - it is useful to brush away loose soil from exposed roots prior to cutting them
- Secateurs/sharp pull-saw - roots that need to be cut must be cut cleanly using suitable hand tools
- Damp Hessian sacking – this should immediately cover the sides of the trench down to a depth of 1m below ground level and is effective in preventing roots drying out following excavation
- Suitable back-fill - covering the exposed or cut roots with a 100mm layer of topsoil or a mixture of 50% composted organic matter and 50% un-compacted sharp sand is suitable
- Supervision - ***a suitably qualified and experienced Arboriculturalist should be present when the works are carried out***

Method 4 - Trenchless Technique Retaining all Roots to British Standard 5837:2012 Section 7.7:

- Micro-tunnelling, thrust boring or surfaced launched directional drilling is designed to avoid open trenches and can provide single service runs for up to 150m between starting pits
- Starting pits should be located outside the Root Protection Areas of the retained trees or can be hand dug using **Method 1**
- Bore holes should be a minimum of 500mm below ground level
- Only water should be used to lubricate the mole or drill to prevent root death due to soil contamination
- Supervision of hand digging using **Method 1** - ***a suitably qualified and experienced Arboriculturalist should be present when the works are carried out***

Appendix 5

Induction Form for all Site Personnel:

Site Name:……..

- I have had explained to me by the Site Manager the key implications of the Arboricultural Method Statement relating to the development at the above site.

- I am aware that the tree protective fencing must remain in its original position and must not be moved without the approval of the appointed Arboricultural Consultant.

- I understand that certain operations must be supervised by the appointed Arboricultural Consultant and that these operations must not start until the consultant is present and has given approval.

- I confirm that I will bring any concerns about potential damage to trees to the attention of the Site Manager.

- I am aware that I must not cause damage to any of the retained trees on or adjacent to the site. Damage may be caused by direct means (i.e. physical damage caused to roots or the trunk/branches of the tree) or by indirect means (e.g. by fire or toxic materials entering the rooting environment of the tree).

Print Name:…….

Sign Name:…….

Date:…….