SYNTEGRA CONSULTING

Belsize Square Synagogue

BS 5837: 2012 Arboricultural Report

December 2020

Ref: 20-7582

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Revision	-
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Contents

Executive Summary

Syntegra Group has been commissioned to provide Arboricultural services to support a planning application for a proposed development at the Site, referred to as: Belsize Square Synagogue, 51 Belsize Square, London.

The Site is located within the London Borough of Camden, approximately 2km north west of Camden Town. The predominant land use in the immediate area is residential.

Eight arboricultural items were recorded during the survey within the Study Area. All eight individual trees are located within the Site boundary. The trees were recorded as:

- Six individual trees of Category C (trees of low quality);
- Two individual trees of Category U (trees of poor quality).

To facilitate the design proposal, seven individual trees will need to be removed including five Category C trees and two category U trees. These trees are of a limited useful life expectancy within the Site and hold little public amenity.

Email confirmation regarding Tree Preservation Orders (TPO) and other statutory tree protection was requested from the local authority in July 2020. The Site falls within the Belsize Park Conservation Area and one tree is protected by a Tree Preservation Order.

One Category C individual tree can be retained and it is recommended protective fencing is installed in accordance with BS 5837: 2012, to safeguard the retained tree and Arboricultural features.

All tree works must be carried out by a qualified contractor in accordance with *BS3998:2010: Tree Work – Recommendations.*

1. Introduction

Overview

Syntegra Group have been commissioned to provide Arboricultural services to support a planning application for a proposed development at the Site, referred to as: Belsize Square Synagogue, 51 Belsize Square, London.

This report presents the results of an Arboricultural Survey conducted in line with *BS 5837: 2012 - Trees in relation to design, demolition and construction – Recommendations1* and is designed to identify Arboricultural constraints that could impact development of the Site.

Site Location and Setting

The Site is located within the London Borough of Camden approximately 2km north west of Camden Town. The predominant land use in the immediate area is residential.

Proposed Scheme

The proposed scheme involves the redevelop the existing outdoor space and boundary wall. The development footprint is presented in Figure 2 Arboricultural Impact Plan.

2. Methodology

Tree Survey Methodology

An arboricultural survey was undertaken by Darren Hood FdSc MArborA (Arboricultural Consultant) on 11th of December 2020 in accordance with *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations*.

Observations were conducted from ground level, utilising the "Visual Tree Assessment" (VTA) system as outlined in *The Body Language of Trees, A Handbook for Failure Analysis Research for Amenity Trees No.42,* with the aid of binoculars. For reference, individual trees are identified with the letter "T" and an associated number on the tree schedules and plans. The stem diameter of the Site trees was recorded using a rounded down diameter tape and scaled tree callipers at 1.5m above ground level. Measurements were taken in centimetres. The height of the subject tree was estimated to the nearest metre using a digital laser range finder.

Maximum crown spread of the subject tree was measured from the centre of the trunk to the tips of the live lateral branches, taken at four compass points (N-E-S-W) using a digital laser range finder, where access allowed. Crown spread measurements were taken in metres.

Tree age was estimated from visual indicators (such as tree size and appearance of bark) and should only be taken as a provisional guide. Age estimates often need to be modified based on further information such as historical records and local knowledge.

In compliance with Table 1 of *BS 5837:2012* the tree surveyed in this report has been categorised according to their Arboricultural quality and value. A glossary of survey terms can be found in Appendix A – Explanation of Terms.

Arboricultural Impact Assessment Methodology

The Arboricultural Impact Assessment (AIA) was undertaken by Darren Hood, FdSc, MArborA (Arboriculturist) in December 2020, as a desk based study based on the field data collected and design details.

Table 1 provides the data sources used.

Table 1 – Data Sources Used

Document / Plan Title and Author	Date	Information Type
Proposed Hall and Outdoor Area (Drawing no. 1807-21B) Kerens Gan Ltd	December 2020	Proposed development – DWG

Root Protection Area

The Root Protection Area (RPA) is a recommendation in *BS 5837:2012*, and is based upon a minimum area (in m^2) calculated from the measurement of the stem diameter. The resulting area is usually recorded as a generalised circle surrounding the tree on the Tree Constraints and Protection and Impact Plan. In this study, the RPA is represented by purple circles in Figure 1.

The RPA presents an exclusion zone for construction activity to protect the health of the tree.

Survey Limitations

Topographical base mapping was provided without full locations of the Site trees, as such trees were plotted using a GPS enabled device. For the purposes of BS 5837:2012, only trees with a stem diameter greater than 75mm, (measured at 1.5m above ground level), have been included within

the survey; however, it should be noted that a number of individual trees and shrubs with a stem diameter of less than 75mm were present within the Site. Only trees within the likely zone of influence of the proposed redline application boundary (the Study Area) have been included within this report.

The protective fencing distances are based on a given trees stem diameter taken at 1.5 metres above ground level with each RPA (see Appendix B - Tree Schedules) being calculated from the above ground portions of the tree. It should be recognised that the RPA may not entirely encompass all of the trees rooting material.

Trees are living organisms and as such their health and condition are naturally subject to change over time. Unforeseen future circumstances such as neglect, wilful damage or severe/extreme weather conditions may affect the future health and condition of the trees included in this report.

3. Survey Results

Tree Assessment and Categorisation

Eight Arboricultural item was recorded within the Study Area. These were recorded as eight individual trees (T). All trees within this group identified on the associated schedules and plans, are under the ownership of the Belsize Square Synagogue. Full details of the survey data can be found in the Tree Schedule in Appendix B - Tree Schedule and Figure 1: Tree Constraints Plan.
Each Arboricultural item was assigned to one of four categories, as listed below:

- Category A arboricultural items: No individual trees were graded as category A (trees of high quality) as part of this survey.
- Category B arboricultural items: No individual trees were graded as category B (trees of moderate quality) as part of this survey.
- Category C arboricultural items: Six individual trees have been identified as category C (trees of low quality) as part of this survey.
- Category U arboricultural items: Two individual trees were graded as category U (trees of poor quality unsuitable for retention) as part of this survey.

Tree Species Recorded

A total of six different tree species were recorded during the survey and were represented throughout the Study Area. A summary of the species surveyed can be found within the Tree Survey Schedule located in Appendix B - Tree Schedule and within Table 2 below.

Table 2 - Tree Species Recorded

Common Name	Botanical Name	Presence within the Survey Area - High, Moderate or Low
Lawson cypress	*Chamaecyparis lawsoniana*	High
Portuguese laurel	*Prunus lusitanica*	Low
Swedish whitebeam	*Sorbus intermedia*	Low
Sweet chestnut	*Castanea sativa*	Low
Sycamore	*Acer pseudoplatanus*	Low
Tulip tree	*Liriodendron tulipifera*	Low

Age Diversity

Table 3: Age Diversity

Age Class	Number of Arboricultural Items	Approximate Percentage
Young	4	50%
Semi-mature	3	37.5%
Early-mature	1	12.5%
Mature	0	0%
Over-mature	0	0%
Totals	8	**100%**

Statutory Tree Protection

Email correspondence with Camden was undertaken in December 2020 to ascertain if the Site trees were covered by statutory tree protection. The Site falls within the Belsize Park Conservation Area. In addition T1 (Sycamore) is protected by Tree Preservation order no. 27HT57.

Soil Type

British Geological Society records show the Site Superficial Geology as “None Recorded”. Bedrock Geology being of London Clay Formation – Clay, Silt and Sand. Sedimentary bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period.

4. Arboricultural Impact Assessment

Potential Arboricultural Impacts

Development can have an adverse impact on trees and other woody vegetation within a Site. This can result in: (1) immediate vegetation removal to facilitate the footprint of a new development; (2) potential future tree loss through the early decline of trees due to soil compaction; and (3) root disturbance and damage within a tree's rooting area.

Tree Removal

Seven trees will require removal to facilitate the design proposal. Details of these trees can be found in Table 4 below and Table B1: Tree Schedule.

Table 4: Proposed Tree Removal

Tree Number	Species	Reason for Removal	BS 5837 Category
T2	Tulip tree *(Liriodendron tulipifera)*	To facilitate design footprint	C
T3	Sweet chestnut *(Castanea sativa)*	To facilitate design footprint	C
T4	Portuguese laurel *(Prunus lusitanica)*	To facilitate design footprint	C
T5	Lawson cypress *(Chamaecyparis lawsoniana)*	To facilitate design footprint	C
T6	Swedish whitebeam *(Sorbus intermedia)*	To facilitate design footprint	C
T7	Lawson cypress *(Chamaecyparis lawsoniana)*	Structural condition/in contact with built structure	U
T8	Lawson cypress *(Chamaecyparis lawsoniana)*	Structural condition/in contact with built structure	U

Incursion within Calculated Root Protection Areas

No retained trees Root Protection Areas will be impacted by the design proposal or construction methods.

5. Arboricultural Method Statement

Sequence of Works
Prior to the start of any site work a logical sequence of works should be observed and followed. This should be broken into the following basic phases:

1. Phase 1 Pre-commencement site meeting
2. Phase 2 Facilitation pruning and tree works
3. Phase 3 Erection of temporary tree protection
4. Phase 4 Demolition and enabling ground works
5. Phase 5 Removal of temporary protective fencing

Pre-commencement site meeting
A pre-commencement meeting should take place on Site and be attended by an appointed arboriculturalist and members of the construction and design team, the purpose of this meeting is to agree on the finer points of detail on protective measures prior to any site works commencing. All parties should read and sign the arboricultural method statement (AMS) by way of acknowledgement of the terms and requirements. Contact details of each party should be exchanged at this point.

Tree removal
All tree removal should be undertaken in advance of the principal contractor taking control of the Site and starting any demolition or construction operations. All tree works should be undertaken to *BS3998:2010: Tree Work – Recommendations*[1] and current best arboricultural practice. It is recommended that a reputable contractor be used. Professional bodies such as the Arboricultural Association run professional accreditation schemes, which offer some level of quality assurance. However, it should be noted that membership of these bodies does not guarantee quality of work.

Installation of temporary tree protection
Prior to the commencement of non-arboricultural works, protective barriers and ground protection, where necessary, will be installed around trees to be retained; as identified during the pre-commencement site meeting, to create Construction Exclusion Zones (CEZ). All temporary tree protection will be installed to the agreed distances as stated in Table B3 of this document, and in accordance with specifications set out in section 6.2 of *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations*. Barriers and ground protection should be fit for purpose. Details of a protective fence specification can be found in Appendix C. Should the installation of protective fencing not be practical on Site, an alternative method of protection should be implemented following consultation with an Arboriculturist and/or the Council Tree Officer.
The CEZ is the area identified by an arboriculturist to be protected during development, including site clearance and construction work, through the use of barriers and/or ground protection fit-for-purpose to ensure the successful long-term retention of a tree.
All areas excluded by protective tree fencing or as detailed on Figure 2 (Tree Protection Plan) shall be treated as a CEZ, and the following restrictions shall apply:

- No alterations of ground levels or ground conditions.
- No chemicals or cement washings.

[1] British Standards Institution (2010) BS 3998:2010, Tree Work Recommendations

- No temporary structures*
- No storage of soil, rubble or other materials.
- No vehicles or machinery to be used or parked without appropriate ground protection measures as per BS5837 recommendations. This will require the use of a proprietary system of reinforced steel road plates on a compressible layer, or side butting scaffold boards/ 18mm plywood sheets on a compressible layer. The type of ground protection used shall be appropriate for the likely loading applied.
- No fixtures (lighting, signs etc.) to be attached to trees.

*Site huts, provided they are of the 'jack leg' type, can be sited to act as ground protection for the duration of the construction.

Once erected the construction exclusion zone (CEZ) is considered to be sacrosanct. Barriers will not be altered or moved during the demolition phase without prior consent from the appointed arboriculturalist. The site manager should inspect the condition of the protective fencing on a daily basis and rectify any defects or damage immediately. Appropriate signs will be attached at a minimum of 5m intervals on the protective fencing stating 'Tree Protection Area – No Access'. Protective barriers will remain on site until the main demolition works are completed and should be checked once erected by the project arboriculturist or other competent person.

Enabling ground works

During the enabling phase no materials should be stored, dumped or stockpiled within the root protection area (RPA) of trees and no vehicles or plant movement should occur within the RPA unless on existing hard surfaces. No additional pruning works or limb removal should take place without prior consultation with the appointed arboriculturalist, and then only buy suitably qualified contractors.

Where existing hard surfaces are to be removed or lifted within the RPA and the land use changed, the surface and sub base should be broken out by hand equipment only and removed from the RPA via wheel barrow, or other means that minimises soil compaction. As the majority of a tree's root system is located within the top 600mm of the soil, any excavations below any existing sub base levels should not be permitted without prior consultation with the appointed arboriculturalist.
All chemical and hazardous substances should be stored outside of the RPA, in a suitably bunded container or designated area as appropriate. Lime in cement based products is toxic to tree roots and consequently should be mixed in a designated area, outside of the RPA, where surface water runoff does not drain into the protective areas. No fires should be made within 20m of any of the trees that are to be retained.

Removal of temporary tree protection

The temporary tree protection should only be removed after completion of all Site works including the removal of all plant and any site skips or demolition materials.

6. Conclusions

Eight individual trees have been recorded within the Study Area. All recorded trees are located within the application boundary and are under the direct ownership of the Client.

No trees were recorded within the Study Area as Category A.

No trees were recorded within the Study Area as Category B.

Six individual trees were recorded within the Study Area as Category C.

Two individual trees were recorded within the Study Area as Category U.

Email conformation regarding Tree Preservation Orders (TPO) and other statutory tree protection was requested from the local authority in December 2020. It is confirmed that the Site falls within the Belsize Park Conservation Area and T1 (Sycamore) is protected by Tree Preservation Order no. 27HT57.

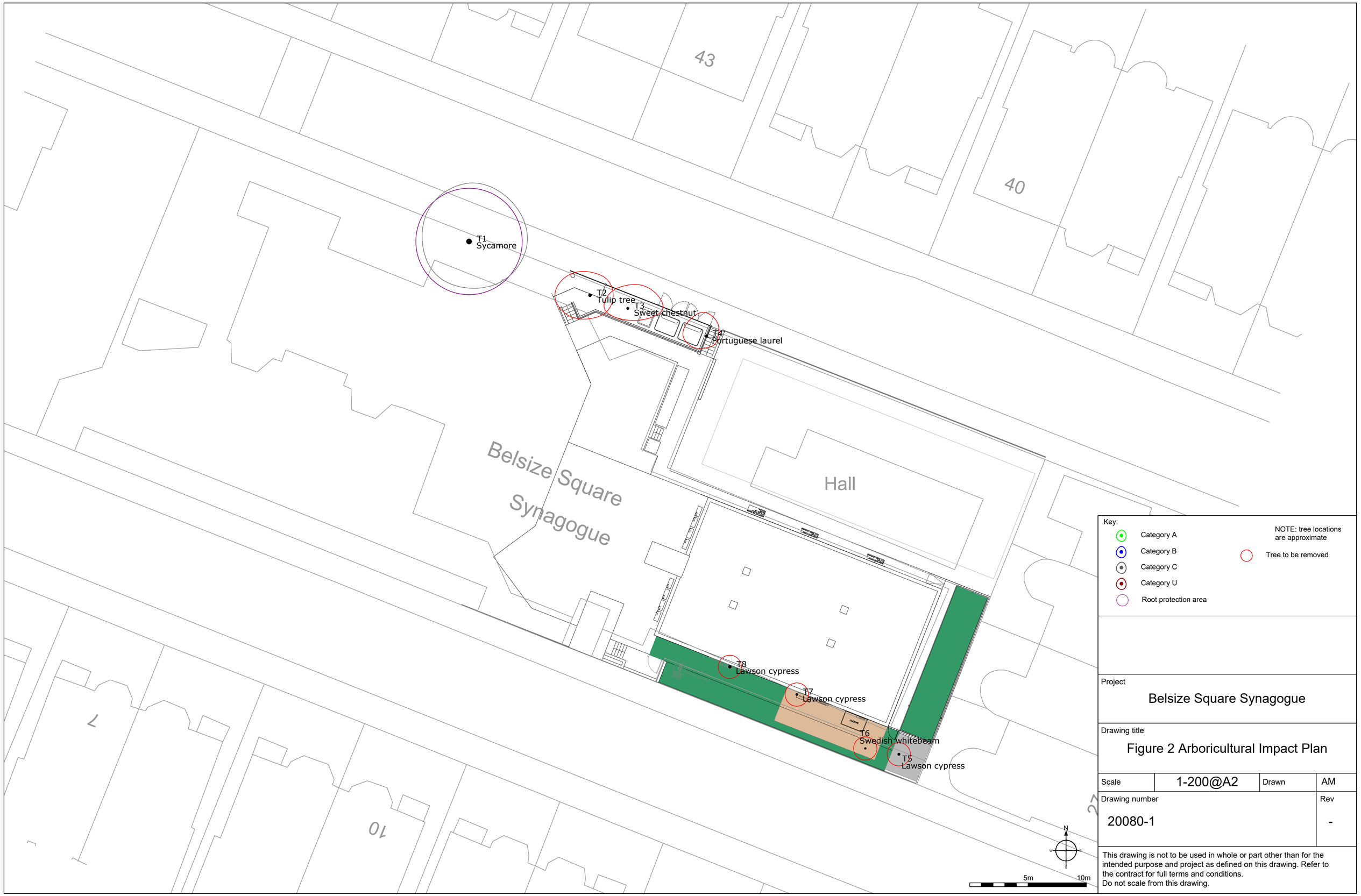
To facilitate the design proposal five Category C trees and two Category U trees will need to be removed.

One Category C tree (T1) which is protected by TPO no. 27HT57 will not have any impacts to its RPA, however, it would be recommended that prior to any on-site construction activities protective fencing should be installed around the RPA of the retained tree, where practical, as indicated in Appendix B Table 2, to protect them from any demolition and construction activities. Details of protective fencing have been provided in Appendix C (Protective fencing) to safeguard the retained trees and arboricultural features within the survey area.

All tree works must be carried out by a qualified contractor in accordance with *BS3998:2010: Tree Work – Recommendations3.*

Figure 1 – Tree Constraints Plan

Figure 2 – Arboricultural Impact Plan



Key:

- Category A
- Category B
- Category C
- Category U
- Root protection area

NOTE: tree locations are approximate

- Tree to be removed

Project

Belsize Square Synagogue

Drawing title

Figure 2 Arboricultural Impact Plan

Scale	1-200@A2	Drawn	AM
Drawing number	20080-1	Rev	-

APPENDIX A. Explanation of Terms

Age Class

Young – Trees in the first fifth of full life expectancy

Semi-mature – Trees in the second fifth of full life expectancy

Early-mature – Trees in the third fifth of full life expectancy

Mature – Trees in the fourth fifth of full life expectancy

Over Mature – Trees having reached full life expectancy and trees in natural decline

Veteran – Trees of interest biologically, culturally and aesthetically because of their age

Stem Diameter

The diameter of the stem measured in millimetres (mm) at a height of 1.5m above ground level

Crown Spread

Average measured in metres using a ground tape where possible

Physiological Condition

Good – Healthy tree with no signs of ill health and signs of good extension growth for species

Fair – Trees with signs of disease, minor defects and decreased life expectancy due to physical damage

Poor – Trees with significant disease, significantly reduced life expectancy and/or under major physiological stress

Dead – Dead tree or trees with over 70% crown dieback

Structural Condition

Good – Trees with no significant defects

Fair – Trees with remedial defects which require minor tree surgery works

Poor – Trees with remedial defects which require significant tree surgery works or felling

Dead – Trees which require felling

BS 5837 Retention Category

Each tree, group of trees or hedge is assigned to a retention category where:

Table A1 – Categorisation of Trees

Category	Description
A	Trees of high quality and value, retention is highly desirable
B	Trees of moderate quality and value where retention is desirable
C	Trees of low quality and value, or young trees with a stem diameter <150mm. Category C trees may be retained, replaced or in the case of younger trees, relocated
U	Trees of poor quality unsuitable for retention or trees which should be Removed

In addition, each tree, group of trees or hedge is assigned to a retention sub-category where categorisation is for:

Table A2 Reasons for Categorisation

Sub-category	Reason for Categorisation
1	Mainly arboricultural qualities
2	Mainly landscape qualities
3	Mainly cultural values, including conservation

Appendix B – Tree Schedules

Table B1 – Tree Schedule

Tree Reference Number	Species	Height (m)	Stem Diameter (mm)	Crown Spread (m)	Height of Crown Clearance (m)	Age Class	Physiological Condition	Structural Condition	Estimated Remaining Contribution (years)	Category Grading
T1	Sycamore *(Acer pseudoplatanus)*	14	380#	N5 E5 S4 W4	4	EM	Fair	Good – Located at top of retaining wall. Protected by Tree Preservation order no. 27HT57.	20+	C (1)
T2	Tulip tree *(Liriodendron tulipifera)*	9	190	N2 E2 S2 W3	3	Y	Good	Fair – Pruning history on southern side of crown.	10+	C (1)
T3	Sweet chestnut *(Castanea sativa)*	7	150	N2 E3 S1 W2	2	Y	Fair	Fair – Pruning history on southern side of crown.	10+	C (1)
T4	Portuguese laurel *(Prunus lusitanica)*	6	3 stems @ 90	N2 E1 S1 W2	0	SM	Fair	Fair – Multi stemmed.	10+	C (1)
T5	Lawson cypress *(Chamaecyparis lawsoniana)*	5	140	N1 E1 S1 W1	0	Y	Fair	Fair	10+	C (1)
T6	Swedish whitebeam *(Sorbus intermedia)*	5	90	N1 E1 S1 W1	2	Y	Fair	Fair – Still on tree stakes.	10+	C (1)
T7	Lawson cypress *(Chamaecyparis lawsoniana)*	7	120	N1 E1 S1 W1	1	SM	Good	Poor – Growing at foot of building in direct contact with built structure.	<10	U
T8	Lawson cypress *(Chamaecyparis lawsoniana)*	7	180	N1 E1 S1 W1	1	SM	Fair	Poor – Growing at foot of building in direct contact with built structure.	<10	U

- Dimensions estimated and based on averages due to limited access

Table B2 – Root Protection Area

Tree Reference Number	Species	Stem Diameter (mm)	Radius of Nominal Circle (m)	RPA (m2)
T1#	Sycamore *(Acer pseudoplatanus)*	380#	4.6	65.3
T2	Tulip tree *(Liriodendron tulipifera)*	190	2.3	16.3
T3	Sweet chestnut *(Castanea sativa)*	150	1.8	10.2
T4	Portuguese laurel *(Prunus lusitanica)*	3 stems @ 90	1.9	11.0
T5	Lawson cypress *(Chamaecyparis lawsoniana)*	140	1.7	8.9
T6	Swedish whitebeam *(Sorbus intermedia)*	90	1.1	3.7
T7	Lawson cypress *(Chamaecyparis lawsoniana)*	120	1.4	6.5
T8	Lawson cypress *(Chamaecyparis lawsoniana)*	180	2.2	14.7

 # - Dimensions estimated due to limited access

Table B3 – Key to Categories

Tree Reference Number	Category
T/GXX	Category A
T/GXX	Category B
T/GXX	Category C
T/GXX	Category U

APPENDIX C. Protective Fencing

The purpose of this fencing is to provide protection to the RPA of retained trees/groups. The type of fencing used shall be appropriate to the level of adjacent construction activity and shall be agreed with the Local Authority tree officer. Weather-proof notices shall be attached to any protective fencing located adjacent to retained trees displaying the words “Construction Exclusion Zone” and listing restrictions which apply. All personnel must be made aware of these restrictions.

It is anticipated that one specification for fencing would be employed during construction.

Stabilizer Strut mounted Fencing

This system comprises anti-climb weldmesh panels connected by clamps and supported by rubber or concrete bases and bracing struts. The system is illustrated in Figure C2 and is based on *BS 5837:20121* guidelines. This kind of system is robust enough to withstand occasional knocks by plant machinery.

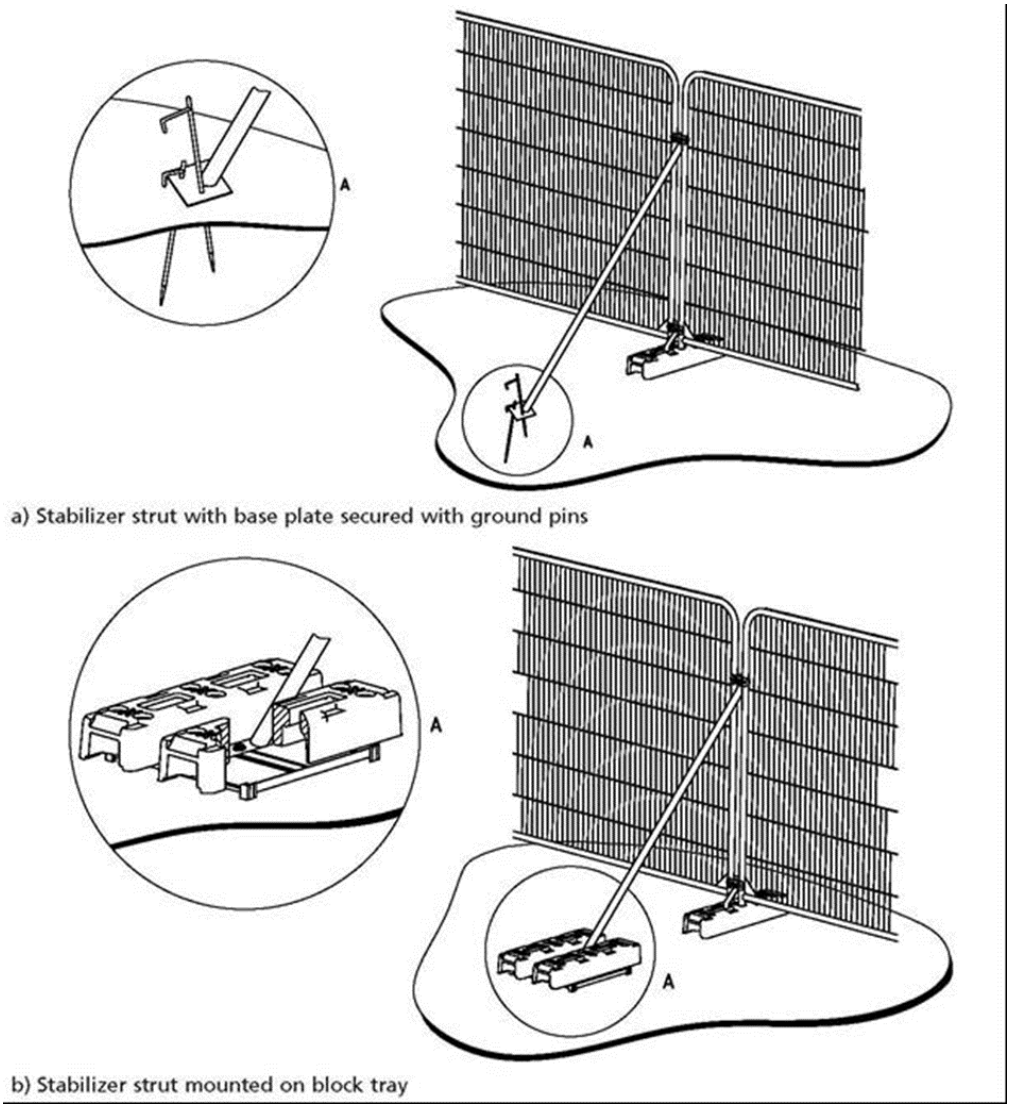


Figure C1 - Tree Protection Fencing specification (extract from BS 5837)

Example of Protective Fencing Signs