

# **TFL\_PSF\_9131 SITE INVESTIGATIONS: SMALL SITES INITIATIVE LAND TO THE NORTH SIDE OF ROYAL MINT STREET AND CABLE STREET, TOWER HAMLETS, E1 8LG**

**Site Ref: 2363**

**Preliminary BS5837:2012 Tree Survey Report**

OCTOBER 2017

Incorporating


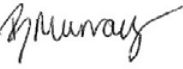

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# LAND TO THE NORTH SIDE OF ROYAL MINT STREET AND CABLE STREET, TOWER HAMLETS, E1 8LG

## Preliminary BS5837:2012 Tree Survey Report

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## VERSION CONTROL

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01	September 2017	Ellen Poppleton Beverly Smith	1 <sup>st</sup> Issue
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This report dated 02 October 2017 has been prepared for Transport for London (TfL) (the "Client") in accordance with the terms and conditions of appointment dated 02 May 2017 (the "Appointment") between the Client and **Arcadis Consulting (UK) Limited** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party

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# 1 Introduction

## 1.1 Overview

Arcadis Consulting (UK) Limited (Arcadis) has been commissioned by Transport for London (TfL) 'the Client' to undertake a number of technical surveys for Land to the North side of Royal Mint Street and Cable Street, Tower Hamlets, E1 8LG ('the Site').

TfL is aiming to divest a number of small Sites to enable prospective regeneration. The objective of the Small Sites Initiative is to provide robust and pragmatic advice that sensibly de-risks each of the sites such that unreasonable "abnormal" development costs are not included by developers.

The objective of this assessment is to present the potential constraints and future survey requirements with regards to trees and any proposed future development.

## 1.2 Site Location and Setting

The Site is located immediately north of the B126/ Royal Mint Street / Cable Street and west of Cannon Street Road, in the London Borough of Tower Hamlets. The Site is centred around the postcode of E1 8LG. The site is adjoined by industrial units and the London Docklands Railway line and to the north and east, the B126 / Cable Street to the south and the B108 / Cannon Street Road to the west. It is comprised of a mosaic of tall ruderal and ephemeral/short perennial vegetation with occasional low-lying scrub, grasses and tree saplings with a line of mature deciduous trees located along part of the southern boundary of the site. The Site is approximately 0.3 hectares in area.

An aerial screen shot illustrating the Site boundary is presented in Image 1-1. Photographs of the Site and trees can be found in Appendix D - Photographs.

Image 1-1 Site Location Plan



## 2 Methodology

### 2.1 Tree Survey Methodology

An Arboricultural Survey was undertaken by Beverley Smith, FDS Sc. Tech. Arbor. A on 17<sup>th</sup> August 2017 in accordance with BS 5837:2012.

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.4 (Department of the Environment, 1994) with the aid of binoculars.

The Site and its immediate surroundings were surveyed, this area is referred to as the study area.

### 2.2 Individual Trees and General Data Capture

For reference, individual trees are identified with the letter T and associated unique number on the Tree Schedules and Tree Constraints Plan. The stem diameter of the trees on site was recorded using a rounded-down diameter tape at 1.5m above ground level. Measurements were taken in millimetres. The height of the subject trees was estimated to the nearest metre using a digital clinometer.

The maximum crown spread of each 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 ground tape. Crown spread measurements were taken in metres.

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

Where direct access to the tree was not possible, estimations from appropriate vantage points were taken; any limitations or estimations are presented within the survey limitations section and noted in the associated Tree Schedules.

### 2.3 Categorisation

In compliance with Table 1 of BS 5837: 2012 the trees surveyed have been categorised according to their arboricultural quality and value. A glossary of survey terms can be found in Appendix A - Explanation of Terms.

### 2.4 Root Protection Area

The Root Protection Areas (RPA) of the trees were calculated in accordance with Section 4.6.1 in BS: 5837:2012. This is calculated from the measurement of the stem diameter at 1.5m above ground level or at ground level if the tree is multi-stemmed. These are recorded in Table B2 in the appendix and form the initial Construction Exclusion Zone (CEZ) to protect the trees within and adjoining the Site. The RPA is represented by pink-shaded areas. The shape and size of RPAs can be amended in accordance with Section 4.6.3 in BS: 5837:2012.

Within Section 5.3.1 in BS: 5837:2012 it is stated the default position is that proposed development should not be within the RPA of retained trees. However, where there is an overriding need for construction and associated activity with the RPA of trees arboricultural mitigation should take place to protect the trees.

### 2.5 Survey Limitations

Topographical base mapping was provided. 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 study area.

Only trees within the study area as defined above were assessed. The RPAs are based on a given tree stem diameter taken at 1.5m 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 tree's 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.

## **2.6 Statutory Tree Protection**

According to the Tower Hamlets Council Website <http://towerhamlets.maps.arcgis.com> , the Site is not located within a Conservation Area (CA). The Site is located 15m away from St George in the East Conservation Area (designated in 1969) but given that none of the trees surveyed fall within this designation it is not considered a constraint to development.

None of the trees surveyed are protected by Tree Preservation Orders (TPO) and there are no Planning Application Conditions protecting the trees.

## 3 Tree Survey Results

### 3.1 Tree Assessment and Categorisation

A total of 31 arboricultural items were recorded within the study area. All of these items are on Site. Full details of the survey data are presented within the Tree Schedules in Appendix B and Figure 1 Tree Constraints Plan.

Each arboricultural item was assigned to one of four categories, as listed below:

- Category A individual trees, groups of trees: No arboricultural items were graded as Category A (trees of high quality) as part of this survey;
- Category B individual trees, groups of trees: 18 individual trees were graded as Category B (trees of moderate quality) as part of this survey;
- Category C individual trees, groups of trees: 13 individual trees have been identified as Category C (trees of low quality) as part of this survey due to poor form or inappropriate past management;
- Category U individual trees, groups of trees: No trees have been identified as Category U (trees of poor quality unsuitable for retention) as part of this survey due to poor structural and physiological condition.

### 3.2 Tree Species Diversity

Three different tree species and cultivars were recorded during the survey and are represented throughout the study area. A summary of the species surveyed can be found within the Tree Schedule in Appendix B and also provided in Table 1 .

Table 1 Tree Species Recorded

Tree Species	Number of Individual Stems	Approximate Percentage
Norway maple ( <i>Acer platanoides</i> )	24	77.4%
Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	6	19.4%
Ash ( <i>Fraxinus excelsior</i> )	1	3.2%
<b>Totals</b>	<b>31</b>	<b>100%</b>

### 3.3 Age Diversity

Analysis of the data identified that the majority of the trees within the study area were within the semi-mature age classification set by BS 5837: 2012 with an estimated useful life expectancy of over 10 years, as illustrated in Table 2.

*Table 2 Age Diversity*

Age Class	Number of Individual Stems	Approximate Percentage
Young	0	0%
Early-mature	8	8%
Semi-mature	13	41.9%
Mature	10	32.3%
Over-mature	0	0%
<b>Totals</b>	<b>31</b>	<b>100%</b>

### 3.4 Root Protection Area

The RPAs are presented in Figure 1 Tree Constraints Plan.



## 4 Conclusions

A total of 31 arboricultural items were recorded during the survey. All of these trees were recorded as on Site individual trees. Of these, 18 individual trees have been identified as Category B (trees of moderate quality) and should be considered for retention where possible and 13 individual trees have been identified as Category C (trees of low quality). These trees should not place a constraint on the development layout but should be considered for replacement should they be removed.

There is currently no proposed design layout and therefore it is not possible to say whether the trees would need to be removed and if there is space for any new trees to be re-provisioned on the site. This can be determined once designs are developed.

The dominant tree species within the Site is Norway maple (*Acer platanoides*). Purple sycamore (*Acer pseudoplatanus* 'Purpureum') was the second most commonly found species on site.

While the Site is not within a CA nor are any of the trees covered by a TPO, the location of the on-Site trees shields the flats adjacent to Cable Street's view of the rail tracks and are likely to contribute to noise and light level reduction. This should be considered during development proposals.

While unlikely to prevent development, tree protection for trees to be retained and tree re-provisioning for any trees lost due to development are a material consideration for planning determination. If trees cannot be replaced on-Site due to development, off-Site options for tree re-provisioning to ensure no net loss should be considered. Individual Local Planning Authorities may ask for re-provisioning in excess of 1 to 1 for trees of Category B grade.

## 5 Further Work

Should any future proposed development require tree removals or RPA incursions within RPA's of the retained trees an Arboricultural Impact Assessment (AIA) will be required by the Local Planning Authority (LPA), London Borough of Tower Hamlets, in support of a planning application.

The AIA should include a tree schedule, although one is provided within this report, a review of any proposed development should be undertaken to ensure that there are no additional trees within the zone of influence of the development. For example, parking requirements often extend the zone of influence.

The AIA should state the trees to be removed due to the design and access requirements and any proposed tree facilitation pruning works. This should also be accompanied by an assessment of the likely impacts due to construction activity on the trees to be retained. Indicative arboricultural mitigation measures should be provided which would include recommendations for tree re-provisioning. The AIA should be accompanied by an updated Tree Constraints Plan and a Tree Impact and Protection Plan based on the proposed design.

The AIA should also include a Tree Replacement Strategy which should take into consideration the landscape character, local treescape and biodiversity features of the immediate and adjoining areas. The species, number, size, type of stock, location and planting aids for the compensating planting should be chosen for landscape, wildlife and arboriculture values. To ensure that appropriate and sustainable planting is achieved advice should be sought from an ecologist and arboriculturist. Furthermore, liaison with the LPA Tree Officer will be necessary during the planning process to agree an approved tree compensation and or landscape scheme plan.

All new tree planting should be in accordance with British Standard 8545: Trees: From Nursery to Independence in the Landscape – Recommendations, 2014 and all tree works must be carried out by a qualified contractor in accordance with BS3998:2010: Tree Work – Recommendations.

This document encloses a Preliminary Arboricultural Method Statement (AMS) outlining tree protection measures. However following planning determination and when full construction measures are known a bespoke AMS may be required to ensure protection of the trees to be retained on and adjoining the Site.

## 6 References

British Standards Institution (2010) BS 3998:2010, Tree Work Recommendations.

British Standards Institution (2012) BS 5837: 2012 Trees in relation to design, demolition and construction – Recommendations.

British Standards Institution (2014) BS 8545: Trees: From nursery to Independence in the Landscape – Recommendations.

Mattheck, C. and Broeler, H. DETR (1994) The Body Language of Trees: A Handbook for Failure Analysis Research for Amenity Trees No.4.



**FIGURE 1. Tree Constraints Plan**

## **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 and value, 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

Client: Transport for London (TfL)  
Street, Tower Hamlets, E1 8LG  
Survey date: 17<sup>th</sup> August 2017

Project: Land to the North side of Royal Mint Street and Cable  
Surveyor: Beverly Smith FDS<sup>c</sup>. Tech.Arbor.A

Table B1 Tree Schedule

Tree reference number	Species	Height (m)	Stem diameter (mm)	Branch spread (m)				Height of crown clearance (m)	Age class	Physiological condition	Structural condition	Additional Information	Estimated remaining contribution (years)	Category grading
				N	E	S	W							
T1	Norway maple ( <i>Acer platanoides</i> )	12	300	4	4	3	1	2.5	Semi-mature	Good	Fair	Wound around stem N - S. Also a wound on west from ground level to 2.5m. Deadwood in lower crown.	10-20	C1
T2	Norway maple ( <i>Acer platanoides</i> )	14	455	6	5	2	4	2	Mature	Good	Good	None	20-40	B1
T3	Norway maple ( <i>Acer platanoides</i> )	14	400	2	5	4	3	3	Mature	Good	Good	Deadwood in crown.	20-40	B1
T4	Norway maple ( <i>Acer platanoides</i> )	14	325	2	5	4	3	4	Semi-mature	Good	Good	None	20-40	B1
T5	Norway maple ( <i>Acer platanoides</i> )	14	350	6	6	7	4	4	Early-Mature	Good	Good	None	20-40	B1
T6	Norway maple ( <i>Acer platanoides</i> )	12	315	12	3	5	4	4	Semi-mature	Good	Fair	Wound on N from ground level to 1m. Exposed sapwood sound. Wound on limbs on W and S at 6m. Minor deadwood in lower crown on W.	10-20	C1
T7	Norway maple ( <i>Acer platanoides</i> )	14	310	4	3	4	3	2	Semi-mature	Good	Good	None	20-40	B1
T8	Norway maple ( <i>Acer platanoides</i> )	13	345	6	2	2	4	2.5	Early-Mature	Good	Good	Bark wounds on W at 1.5m.	20-40	B1
T9	Norway maple ( <i>Acer platanoides</i> )	12	300	1	1	4	5	1	Semi-mature	Fair	Fair	50% dieback in crown. Deadwood. Reduce crown by 30%.	10-20	B1
T10	Norway maple ( <i>Acer platanoides</i> )	14	490	7	5	6	6	2	Mature	Good	Fair	Wound at base on east to 1.2m. Hollow sound at base following percussive test. Recommend reduce crown by 30%.	10-20	C1
T11	Norway maple ( <i>Acer platanoides</i> )	18	285	3	2	1	1	2	Semi-mature	Good	Fair	Bark wound on W from ground level to 3m.	10-20	C1

Tree reference number	Species	Height (m)	Stem diameter (mm)	Branch spread (m)				Height of crown clearance (m)	Age class	Physiological condition	Structural condition	Additional Information	Estimated remaining contribution (years)	Category grading
				N	E	S	W							
T12	Norway maple ( <i>Acer platanoides</i> )	15	485	7	5	7	5	0	Mature	Good	Good	None	20-40	B1
T13	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	12	280	4	2	1	3	2	Semi-mature	Good	Fair	Wound at base on N to 0.5m. Deadwood in south of crown. Recommend remove deadwood.	10-20	C1
T14	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	16	420, 385	4	4	7	4	2.5	Mature	Good	Fair	Twin-stemmed at 1.5m. Fire damage to stem. Each stem has cavity from union point to 0.5m with decay.	10-20	C1
T15	Norway maple ( <i>Acer platanoides</i> )	14	325	6	4	1	3	2	Semi-mature	Good	Good	Crown suppressed on south.	20-40	B1
T16	Norway maple ( <i>Acer platanoides</i> )	13	285	7	2	3	2	4	Semi-mature	Good	Fair	Number of bark wounds on stem, no cavities.	10-20	C1
T17	Norway maple ( <i>Acer platanoides</i> )	14	290	3	3	4	1	1	Semi-mature	Good	Fair	Snapped hanging branch on N. Number of bark wounds on stem. Bulge in stem at base on N.	10-20	C1
T18	Norway maple ( <i>Acer platanoides</i> )	14	390	6	4	3	5	3	Early-Mature	Good	Good	None	20-40	B1
T19	Norway maple ( <i>Acer platanoides</i> )	16	360	6	3	2	4	2	Early-Mature	Good	Good	Twin-stemmed at 2m. Rocks piled around base of stem to 30cm height. Recommend remove rocks.	20-40	B1
T20	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	16	375	5	6	7	3	2.5	Early-Mature	Good	Good	None	20-40	B1
T21	Norway maple ( <i>Acer platanoides</i> )	16	470	5	5	7	7	3	Mature	Good	Good	Deadwood in crown over highway. 30% dieback. Recommend to Remove deadwood.	20-40	B1
T22	Norway maple ( <i>Acer platanoides</i> )	15	260	3	3	4	3	4	Semi-mature	Good	Good	Minor deadwood.	20-40	B1
T23	Norway maple ( <i>Acer platanoides</i> )	16	525	5	5	4	4	1.5	Mature	Good	Good	None	20-40	B1
T24	Norway maple ( <i>Acer platanoides</i> )	11	265	1	4	4	3	2	Semi-mature	Good	Good	30% dieback in crown on north.	10-20	C1
T25	Norway maple ( <i>Acer platanoides</i> )	14	320	3	3	5	3	2.5	Early-Mature	Good	Fair	Dieback on north. Minor bark wounds on stem.	10-20	C1



Tree reference number	Species	Height (m)	Stem diameter (mm)	Branch spread (m)				Height of crown clearance (m)	Age class	Physiological condition	Structural condition	Additional Information	Estimated remaining contribution (years)	Category grading
				N	E	S	W							
T26	Norway maple ( <i>Acer platanoides</i> )	16	370	6	4	4	4	2	Early-Mature	Good	Good	Exposed on north with decay. Not an issue at present.	20-40	B1
T27	Ash ( <i>Fraxinus excelsior</i> )	17	480	4	4	8	6	3	Mature	Good	Good	Crown suppressed on north. Deadwood in crown. Recommend to remove deadwood.	20-40	B1
T28	Norway maple ( <i>Acer platanoides</i> )	14	370	5	3	2	4	1.5	Early-Mature	Good	Fair	40% dieback in crown. Deadwood. Recommend to remove deadwood.	10-20	C1
T29	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	14	400	3	3	5	3	2	Mature	Good	Fair	Dieback in crown on east. Elder growing at base.	10-20	C1
T30	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	14	330	3	3	5	3	2	Semi-mature	Fair	Fair	Dieback in crown on south.	10-20	C1
T31	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	14	425	4	3	5	6	1.5	Mature	Good	Good	Minor deadwood.	20-40	B1

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Table B2 Root Protection Area

Tree reference number	Species	Stem diameter (mm)	Radius of nominal circle (m)	RPA (m <sup>2</sup> )
T1	Norway maple ( <i>Acer platanoides</i> )	300	3.6	40.72
T2	Norway maple ( <i>Acer platanoides</i> )	455	5.5	93.66
T3	Norway maple ( <i>Acer platanoides</i> )	400	4.8	72.38
T4	Norway maple ( <i>Acer platanoides</i> )	325	3.9	47.78
T5	Norway maple ( <i>Acer platanoides</i> )	350	4.2	55.42
T6	Norway maple ( <i>Acer platanoides</i> )	315	3.8	44.89
T7	Norway maple ( <i>Acer platanoides</i> )	310	3.7	43.47
T8	Norway maple ( <i>Acer platanoides</i> )	345	4.1	53.85
T9	Norway maple ( <i>Acer platanoides</i> )	300	3.6	40.72
T10	Norway maple ( <i>Acer platanoides</i> )	490	5.9	108.62
T11	Norway maple ( <i>Acer platanoides</i> )	285	3.4	36.75
T12	Norway maple ( <i>Acer platanoides</i> )	485	5.8	106.41
T13	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	280	3.4	35.47
T14	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	420, 385	6.8	146.86

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Tree reference number	Species	Stem diameter (mm)	Radius of nominal circle (m)	RPA (m <sup>2</sup> )
T15	Norway maple ( <i>Acer platanoides</i> )	325	3.9	47.78
T16	Norway maple ( <i>Acer platanoides</i> )	285	3.4	36.75
T17	Norway maple ( <i>Acer platanoides</i> )	290	3.5	38.05
T18	Norway maple ( <i>Acer platanoides</i> )	390	4.7	68.81
T19	Norway maple ( <i>Acer platanoides</i> )	360	4.3	58.63
T20	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	375	2.2	14.66
T21	Norway maple ( <i>Acer platanoides</i> )	470	4.5	63.62
T22	Norway maple ( <i>Acer platanoides</i> )	260	3.1	30.58
T23	Norway maple ( <i>Acer platanoides</i> )	525	6.3	124.69
T24	Norway maple ( <i>Acer platanoides</i> )	265	3.2	31.77
T25	Norway maple ( <i>Acer platanoides</i> )	320	3.8	46.32
T26	Norway maple ( <i>Acer platanoides</i> )	370	4.4	61.93
T27	Ash ( <i>Fraxinus excelsior</i> )	480	5.8	104.23
T28	Norway maple ( <i>Acer platanoides</i> )	370	4.4	61.93
T29	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	400	4.8	72.38

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Tree reference number	Species	Stem diameter (mm)	Radius of nominal circle (m)	RPA (m <sup>2</sup> )
T30	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	330	4.0	49.27
T31	Purple sycamore ( <i>Acer pseudoplatanus</i> 'Purpureum')	425	5.1	81.71

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. Preliminary Arboricultural Method Statement

### Overview

This Preliminary Arboricultural Method Statement provides generic best practice measures to be adopted in order to protect retained trees during the development process. It has been prepared in order to inform the planning and the construction/ development process.

### Protective Fencing

The purpose of this fencing is to provide protection to the RPA of retained trees/groups and to protect trees and hedgerows prior to their translocation. 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 three specifications for fencing would be employed during construction.

#### Low-use areas

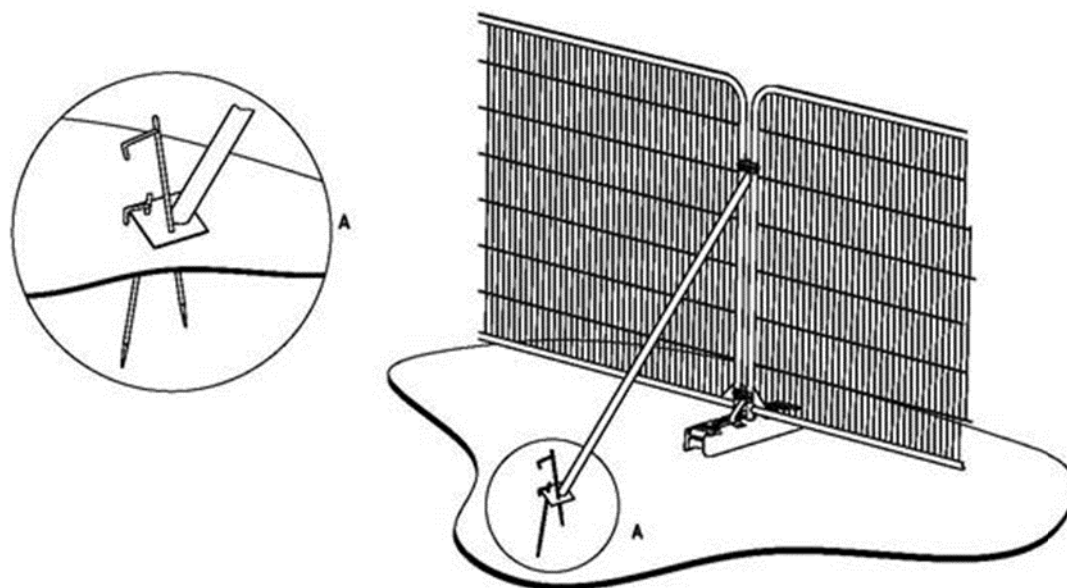
The system illustrated in Figure C1 is adequate to define areas of protected vegetation and exclude traffic, and comprises Cleft Chestnut Pale Fence in accordance with *BS 1722 Part 4: Specification for cleft chestnut pale fences (British Standards Institution, 1991)* supported by 150mm wooden stakes. Assembled with galvanized 14-gauge (2 mm) wire, four strands per row, peeled and pointed one end. Approximate spacing of pales 75 mm.



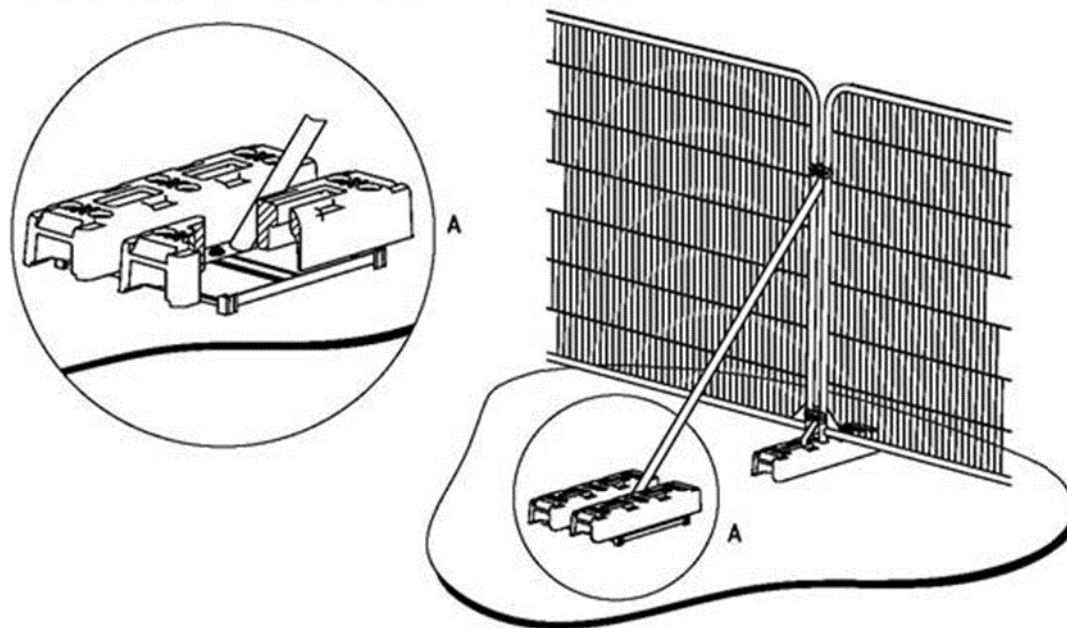
Figure C1 Tree Protection fencing example for low use areas

#### Medium-use areas

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 5837:2012 Trees in relation to design, demolition and construction – Recommendations (British Standards Institution, 2012)* guidelines. This kind of system is robust enough to withstand occasional knocks by plant machinery.



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray

Figure C2 Tree Protection Fencing specification (extract from BS 5837)

## High-use areas

This system involves driving scaffold poles into the ground, onto which are affixed horizontal scaffold poles and diagonal bracing struts. Anti-climb weldmesh panels are secured to this scaffold framework using standard scaffold clips or wire. The system is illustrated in diagram Figure. C3 and is based on *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations* (British Standards Institution, 2012) guidelines. This kind of system provides the highest level of security.

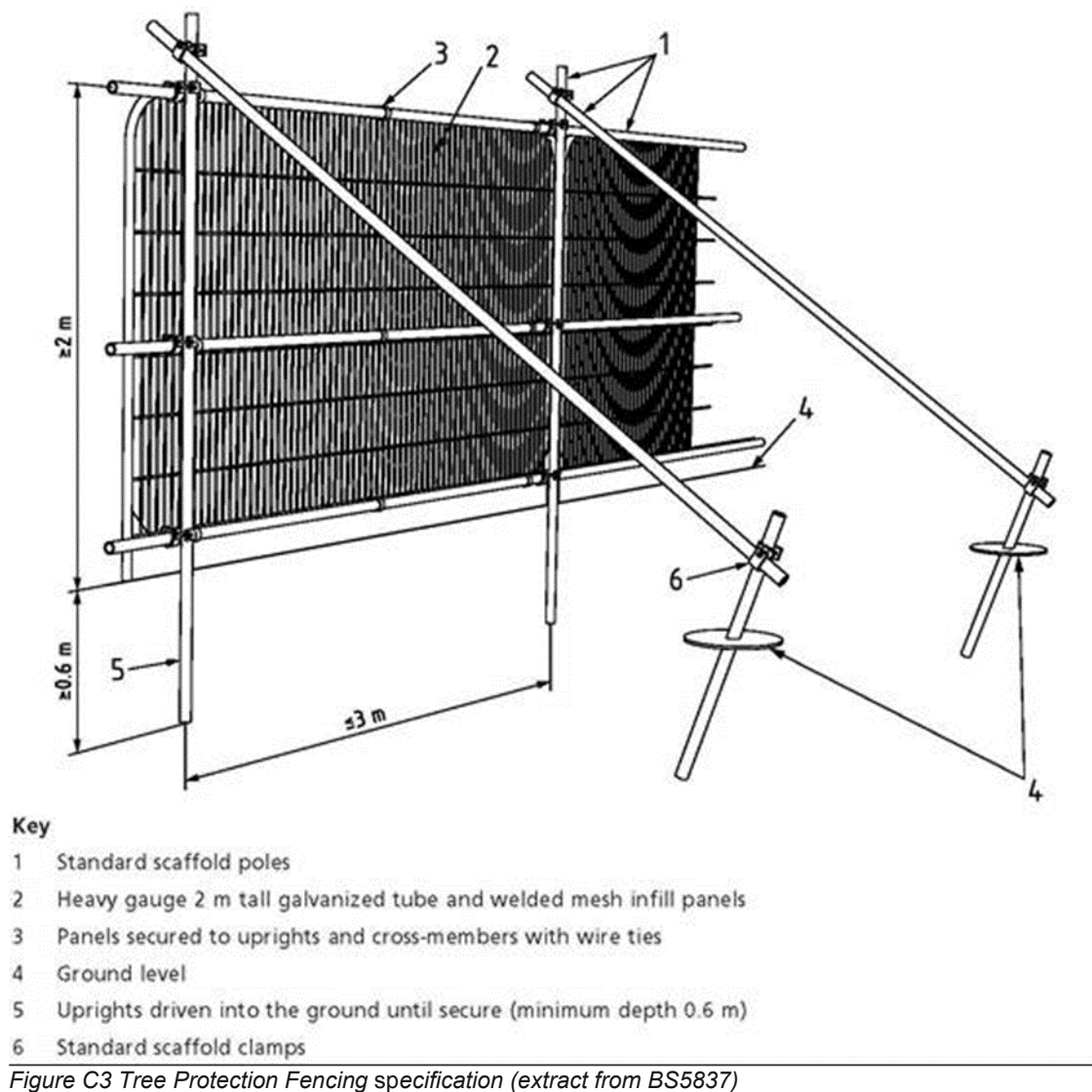


Figure C3 Tree Protection Fencing specification (extract from BS5837)



## Construction Exclusion Zone (CEZ)

The Construction Exclusion Zone (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. The area within the construction exclusion zone is to be regarded as sacrosanct and the fencing shall not be taken down or relocated at any time.

All areas excluded by protective tree fencing shall be treated as CEZs, and the following restrictions shall apply:

- No construction activity whatsoever must occur within these areas.
- No tree works, without the written consent from the Local Authority.
- No alterations of ground levels or conditions.
- No chemicals or cement washings.
- No excavation.
- 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 concrete slabs/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.
- No fires within 10 metres of the canopies of any tree or hedgerow.

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*\*Sales Cabins or Site huts, provided they are of the Jack Leg type, can be sited to act as ground protection for the duration of the construction.*

## General construction activity

Since the canopies of retained trees may be in close proximity to areas of crane operation, the following restrictions will apply:

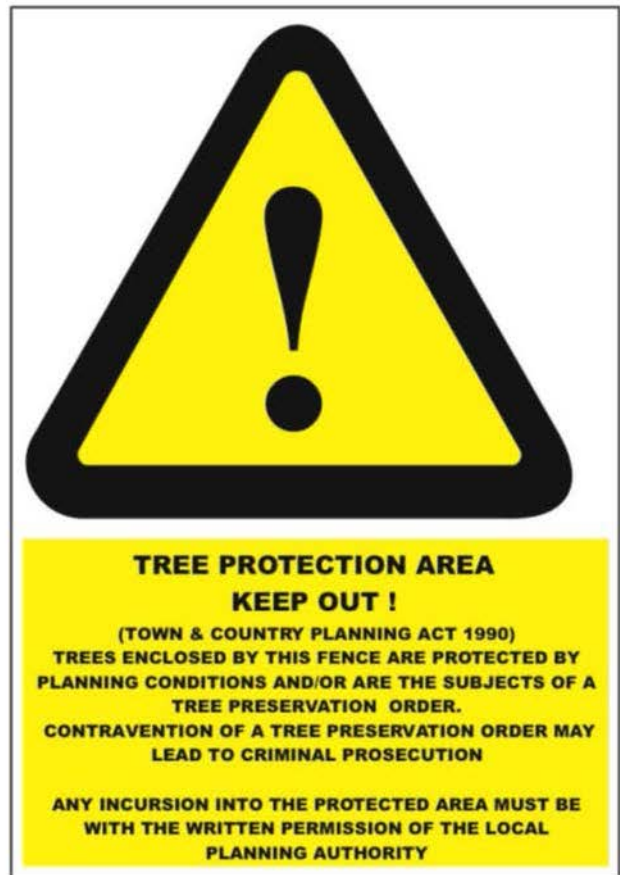
- All cranes will be sited outside the defined RPAs of retained trees / groups, and the appointed contractor will ensure all relevant personnel shall be made aware of the location of branches and the need to avoid causing damage to them.
- Prior to the implementation of lifting operations, a representative from the equipment supply company shall visit the Site and ensure all operations can be completed without causing damage to retained trees. A lifting plan will be prepared and submitted for approval prior to all lifting operations. The lifting plan will make provision for the potential for damage of retained trees.
- All lifting operations will be completed under the close direction of a qualified banksman, who will be briefed by the appointed contractor as to the need to avoid damage the stems and branches of retained trees.
- Should additional tree removal or pruning be required the Local Authority Tree Officer shall be contacted and the scope of works agreed in writing.
- All materials will be stored within designated areas and no materials shall be stored within any RPA.

## Hazardous materials



Any mixing of cement-based materials is to take place outside the RPAs of all trees. Provision shall be made to ensure that the mixing area is contained so that no water runoff enters the RPAs of any trees. All mixers and barrows shall be cleaned within this dedicated mixing area.

All other chemicals hazardous to tree health, including petrol and diesel, are to be stored in suitable containers as specified by the Control of Substances Hazardous to Health (COSHH) Regulations (2002), and kept away from the RPAs.

## Example of Protective Fencing Signs



APPENDIX D. Photographs

Tree No.	Description	Photograph
N/A - multiple	View of the trees at the south of the site viewed from the east to the west	
N/A - multiple	Tree line on site viewed from the north	

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