
RPS

**BARNCROFT SCHOOL
HAVANT, HAMPSHIRE
ARBORICULTURAL
REPORT**

Date: July 2013
Our Ref: JSL1786

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19 AUG 2014

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QUALITY MANAGEMENT

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Date:	26 July 2013
Project Number/Document Reference:	JSL1786_750

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1 INTRODUCTION

- 1.1 RPS were instructed in July 2013 Hampshire County Council, to prepare a tree survey of an area of disposal land on the southern tip of the Infants School site off Barncroft Way.
- 1.2 The commission followed a followed a tree survey of the wider site carried out by RPS in January 2011 in accordance with BS5837:2005 British Standard guidelines. Since the completion of the original report the standard was superseded by BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'. To update accurately the findings of the earlier report, the site was revisited in July 2013 and additional information collected.
- 1.3 This aim of the site survey and was to take note any changes to the condition of the trees and vegetation since the completion of the previous survey. This report documents this information and the relevant findings of the previous report have been appraised to identify the constraints associated with the trees prior to any potential redevelopment of the site
- 1.4 The purpose of the report is to:
 - Record the current condition of the trees found on the site and categorise them using criteria outlined in BS5837:2012 - Trees in Relation to Design, Demolition and Construction-Recommendations.
 - Provide a Tree Survey Plan that identifies any constraints to development presented by the trees to include root protection areas for the retained trees as described in BS5837 - Trees in Relation to Design, Demolition and Construction.
 - Provide guidance detailing arboricultural constraints to development and factors to be considered during the detailed design of the proposed development.
- 1.5 The survey and assessment was carried out by Chris Chambers BSc Arboriculture (Hons), Technical Member of the Arboricultural Association and Chartered Member of the Landscape Institute of RPS Group PLC.

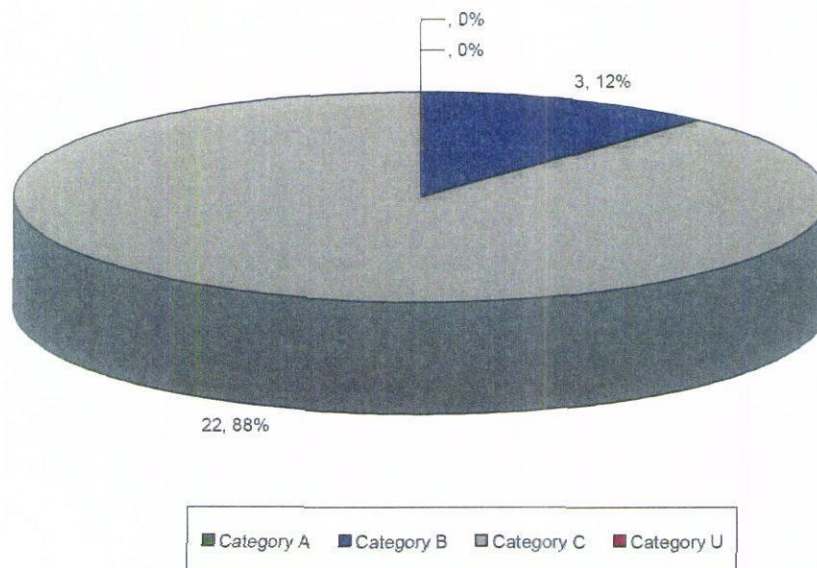
2 SITE INFORMATION

- 2.1 The site is centred on Ordnance Survey Grid Reference SU 705 073 located in the town of Havant to the north west of Portsmouth, situated in the county of Hampshire and comprises the buildings of Barncroft School, playing fields and includes a number of small lightly wooded areas.
- 2.2 The site is immediately abounded by residential properties on three of the four site boundaries, the northern boundary has a access path between Park Lane and Barncroft Way. The southern boundary joins an area of long grass and large mature Oak trees, known as Hook's Row.
- 2.3 The report is concentrates on a small area of land, within the Junior School, off Park Lane to the south. The site is accessible by foot from Park Lane and a foot path runs along Hook's Row, larger site by foot vehicle from Barncroft Way.
- 2.4 A telephone check was made with Havant Borough Council, Planning Department, (31.07.2013) confirmed there are *no* Tree Preservation Orders pertaining to the site and it is *not* located within a Conservation Area.

3 TREE QUALITY ASSESSMENT

- 3.1 All trees inspected were categorised using BS5837:2012 and the attached plan (Figure 1) shows tree positions, numbers and retention categories. The tree positions are based on a topographical survey supplied by the client.
- 3.2 The initial stage of a tree survey in accordance to BS5837:2012 looks at the trees on the site in terms of life expectancy and condition.
- 3.3 Trees are then categorised according to their retention value; category A trees have a high retention value, category B trees have a moderate retention value, category C trees are those of a low retention value which can be retained in the short term and category U trees are those believed to warrant removal as they are likely to fail or die within 10 years. Please refer to Appendix 4 for more detailed definitions of the categories.
- 3.4 Category A trees are those that have been assessed as being of a high quality and value; significant amendments to the proposed scheme should be considered in preference to their removal.
- 3.5 Category B trees are those that have been assessed as being of a moderate quality and value; amendments to the proposed scheme should be considered in preference to their removal.
- 3.6 Category C trees are those that have been assessed as being of a low quality and value; the loss of these specimens should not be considered as a constraint to development.
- 3.7 Category U trees are those that have been assessed as having no retention value; these trees should not be a material consideration in the planning process.
- 3.8 Category A, B or C trees are those that should be a material consideration in the planning process whilst category U trees are those which would be lost in the short term for reasons connected to their physiological or structural condition and hence they should not be a consideration in the planning process.
- 3.9 The charts below give a visual representation of the overall distribution of retention value of the trees surveyed.

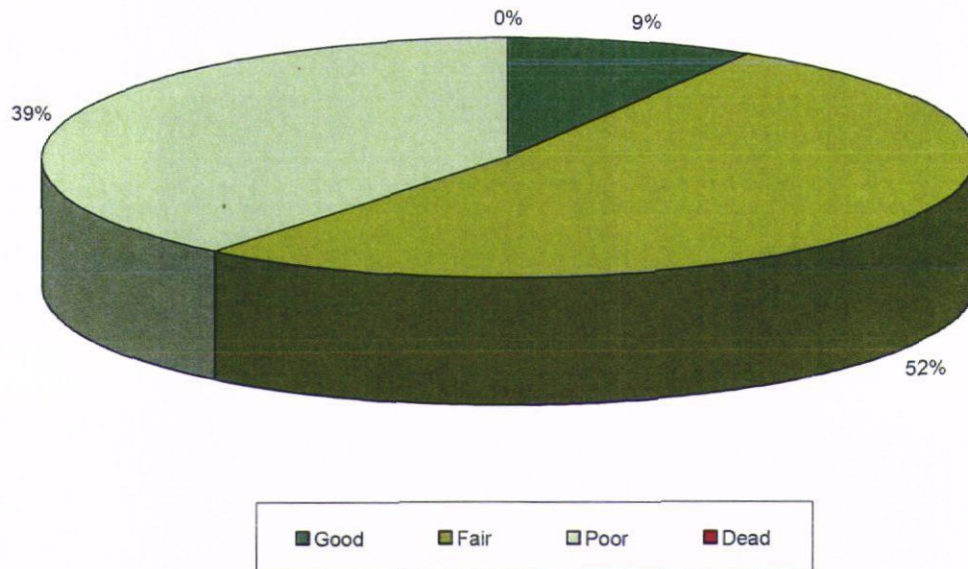
BS5837 Categories



Physiological and Structural Condition

- 3.10 The two Oak trees surveyed were assessed as being of a good physiological condition with crown density and shoot extension growth levels *within the expected ranges* for their age and species.
- 3.11 Trees assessed as being in a good physiological condition are more likely to tolerate changes within their growing environment that occur as a result of development; as such their successful retention will be easier to achieve.
- 3.12 A further twelve trees were considered to be of a fair physiological condition. Typically these specimens are exhibiting *lower shoot extension growth and reduced crown density* than would typically be expected.
- 3.13 These specimens typically have a lower life expectancy than those within the good condition class and they will not tolerate significant changes as a result of development as well as those in the good condition class.
- 3.14 Nine trees were *considered to be in a poor physiological* and structural condition. These specimens have a limited life expectancy and will not tolerate significant changes in their growing environment.
- 3.15 Whilst the range of structural defects that were noted across the tree stock on the site, such as minor deadwood in tree crowns, were not significant and are unlikely to result in the premature failure of trees' stems or primary branches. It is clear that one of the trees in particular require further investigation.

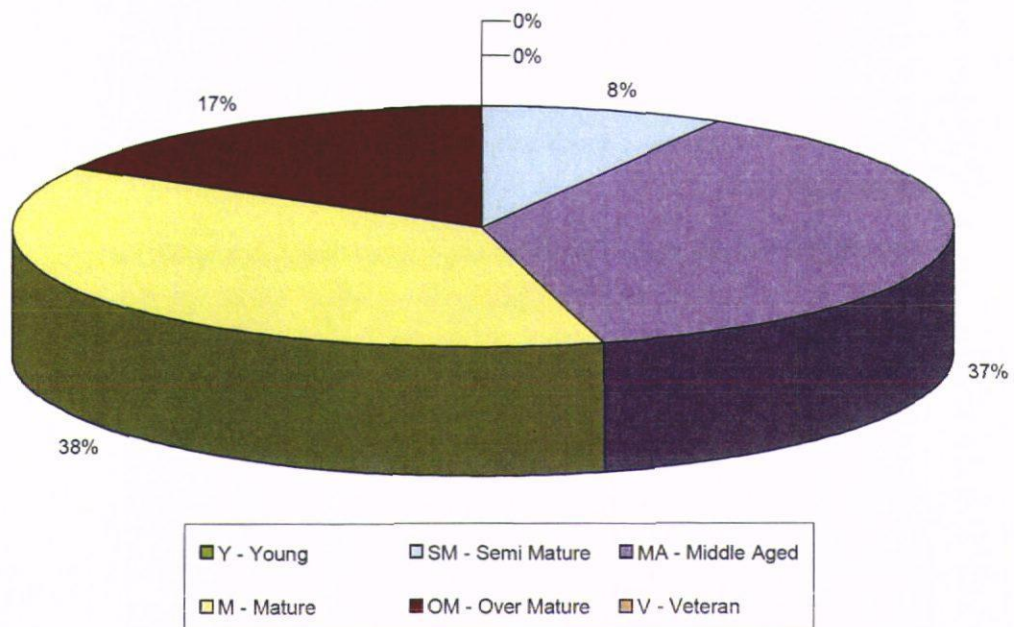
Physiological and Strucural Condition

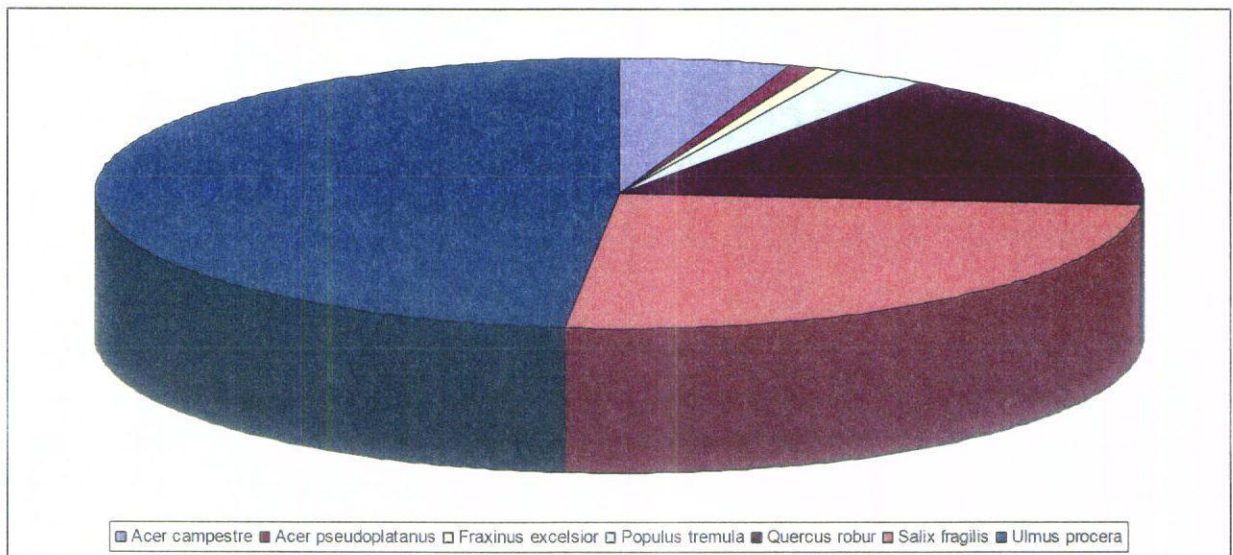


Species and Age Distribution

3.16 A schedule of the tree species recorded within the survey is included in this report as Appendix 3.

Age Class





Visual Amenity

- 3.17 Individually the trees are of limited amenity value. Many have established poorly in cramped conditions and little active management has been carried out. However, collectively, the tree mass contribute to the local amenity and immediate wider landscape setting. Tree 1 an English Oak located offsite is of good potential.

4 DESIGN APPROACH TO ARBORICULTURAL ISSUES

Tree Retention / Removal

- 4.1 The prioritisation for tree retention should be based upon the guidance contained within BS5837:2012. Category A trees should be seen as the highest priority for retention and category C the lowest.
- 4.2 When considering the extent of tree retention on site with respect to category C trees priority should be given to the trees that have been included within this category due to their having stem diameters of less than 150mm at 1.5m above ground level, as these specimens are relatively young trees with future potential.

Design Considerations

- 4.3 To ensure that the trees selected for retention can be successfully integrated within the proposed development the following factors should be considered.

Future Tree Growth

- 4.4 Most of the trees surveyed are mature and have little potential for future growth. The trees with further growth potential have been categorised as C category trees of limited life expectancy. Tree growth and crown size has been controlled in the past by major crown reductions.

Root Protection Areas

- 4.5 Root Protection Areas for each tree and group of trees surveyed have been determined in accordance with BS5837:2012 Section 4.6, and a schedule of Root Protection Areas is attached to this report as Table 3. Initial Root Protection Areas for the trees have been plotted onto the Tree Survey Plan as circles, with the tree located centrally, extending to encompass the area of ground, and thus the rootable soil volume, required for protection.
- 4.6 All development, including new hard landscaping, where possible shall be situated outside of the retained trees designated Root Protection Areas. As the design and layout of the proposed development is progressed and finalised it is recommended that final Root Protection Areas for the trees are considered and a Tree Protection Plan is produced in conjunction with a detailed Arboricultural Implications Assessment and Method Statement to detail the specific measures for protection of retained trees.
- 4.7 All protective fencing and other measures should be on site and in place (refer to Appendix 4 for fencing details) before site preparation or construction work commences.

Existing Canopy Spreads

- 4.8 Where the Root Protection Areas for retained trees do not extend to the edge of existing canopy spreads it is possible that those parts of the trees extending beyond the RPA fencing may sustain damage during construction.
- 4.9 Where this occurs there are two primary options available to manage and minimise the potential for damage to tree canopies to occur during development and these may be used singularly or in combination.
- 4.10 The first option is to create a Construction Exclusion Zone (CEZ), by the erection of protective fencing, around the full extent of the trees. The second is to undertake pre-development pruning works to the trees to reduce the potential for branch damage to occur.

Shading

- 4.11 It should be appreciated during the design of the development that trees can cause shading and obstruction of daylight and sunlight. It should be recognised that the extent of shading likely will vary with tree species, canopy shape and size, foliage density, time of year and sun elevation and that such shading will often be seasonal and diffuse.

Building Foundations

- 4.12 Any structures built on the site should comply with the foundation depths for buildings near or adjacent to trees and allow for the potential size of the trees at maturity. The soil types throughout the site will need investigating and appropriate measures taken.
- 4.13 If trees are removed across the site the potential for soil heave should be assessed and foundations designed accordingly. (NHBC Chapter 4.2, 2007)

Service Runs

- 4.14 All service runs, utilities and similar infrastructure should take note of trees and allow for working methods that will minimise damage to trees by referring to documents such as NJUG Volume 4 - Guidelines for the planning, installation and maintenance of utility services in proximity to trees. (National Joint Utilities Group 2007)

Site Compounds and Materials Stores

- 4.15 Provision for materials storage, site offices, deliveries and other related activities should be made available in areas away from retained trees.

Levels Changes

- 4.16 Any level changes adjacent to trees should be assessed for their impact. Particular care should be taken with respect to mature trees, as these cannot respond to changes as rapidly as younger trees.

New Hard Surfaces and Buildings within Root Protection Areas

- 4.17 The construction of new hard surfaces and buildings around trees has the potential to cause soil compaction, to cause root damage and to reduce nutrient and moisture availability to tree roots to the detriment of tree health and vitality.
- 4.18 To minimise harm occurring as a result of such works where installation of new hard surfacing is proposed within the Root Protection Areas of retained trees it must be installed in accordance with no-dig principles. A methodology for new hard surface construction in proximity to trees is attached to this report as Appendix 6.
- 4.19 Should new buildings be proposed within the RPA of an existing tree it will be necessary to take steps to minimise the potential impact to the tree to allow construction. In this respect the guidance contained within BS5837:2012 at paragraph 7.1.3 and throughout Section 7 should be considered.

Prevention of physical damage to roots

- 4.20 To prevent physical damage occurring to roots as a result of severance buildings could be built using a pile and **above** ground beam foundation; thus preventing significant root severance as would occur should trench fill foundations be used.
- 4.21 Pile locations will have to be selected to minimise the potential for root damage to occur during their installation and exploratory investigation into root location using hand dug trial pits will be required to assist this.
- 4.22 Alternatively a pile and raft foundation structure could be considered. This again will negate the need for extensive ground works likely to result in root severance. A commercially available solution called Housedeck, which is based upon this principle, is marketed by Abbey Pynford.
- 4.23 To prevent physical damage of roots occurring as a result of soil compaction it will be necessary to protect the ground within the Root Protection Area during the installation of any foundation and throughout the course of development following this.
- 4.24 Methods for ground protection are identified within BS5837:2012 and where vehicle movements are required it will be necessary for ground protection measures to be designed by an engineer. Typically it would be appropriate to follow the guidance set out in the enclosed Hard Surface Installation Methodology (Appendix 6) excluding the final surfacing of the construction.
- 4.25 To minimise the extent of ground protection necessary it will be necessary to plan the operations involving the foundation installation to minimise vehicle movements.

Provision for water and oxygen to reach roots

- 4.26 The use of a Housedeck or pile and **above** ground beam foundation will allow a void to be left beneath any building constructed thus providing for gaseous circulation and exchange.

4.27 The presence of a void also potentially means that rain water from guttering could be ducted beneath the building; thus allowing water to reach roots.

4.28 To control the extent and location of rain water discharge beneath the property a system of ducting similar in nature to that commonly used in street tree planting could be used.

Allowance for future root growth

4.29 By constructing any building within a trees RPA in such a way as to prevent root severance and soil compaction and by allowing for continued gaseous and moisture exchange provision will be made for future root growth.

Preserve the soil structure at a suitable bulk density for root growth and function

4.30 This can be achieved by ensuring ground protection measures are implemented on site and that vehicle movements within the trees Root Protection Area are minimised.

5 ARBORICULTURAL IMPLICATIONS ASSESSMENT

Introduction

- 5.1 Trees have finite energy reserves, developed each year throughout the growing season, which are utilised for biological processes such as growth and defence against pests or diseases throughout the following year.
- 5.2 Any development in proximity to trees has the potential to cause harm to those trees unless control measures are identified and acted upon; as such it is essential to consider the relationship between the proposed development and the retained trees to identify what precautions are necessary, proportionate and appropriate.
- 5.3 Development has the potential to impact upon the above ground and below ground parts of trees.
- 5.4 Whilst some damage that can occur, such as physical damage to the trees stems and branches from machinery movements, is clearly visible the impact from other aspects of work common on development sites which can have a significant effect upon the continued health of trees are not always immediately evident.
- 5.5 Damage that is not immediately evident but which can cause long term harm to retained trees includes things such as damage to the soil structure by compaction causing root damage and levels changes altering the water table and affecting moisture availability.
- 5.6 To minimise the potential for harm to occur to retained trees all works should be carried out with regard to the Tree Protection Measures detailed within this report.
- 5.7 In general it can be seen that, by adopting appropriate methods of working, precautionary and protective measures, significant harm to retained trees can be avoided.
- 5.8 In particular the establishment of a Construction Exclusion Zone (CEZ) by erection of Tree Protection Fencing will minimise the potential for harm to occur to retained trees.

Tree Retention and Removal

- 5.9 It is unclear at the moment if the proposed development of the site will require any of the trees to be removed.

Arboricultural Implications

- 5.10 To ensure that the trees selected for retention can be successfully integrated within the proposed development the following factors have been considered.

Existing Canopy Spreads

- 5.11 Where the Root Protection Areas for retained trees do not extend to the edge of existing canopy spreads it is possible that those parts of the trees extending beyond the RPA fencing may sustain damage during construction.

Future Tree Growth

- 5.12 Some of the trees surveyed are not yet mature and they have the potential for future growth. Where these are to be retained consideration to their ultimate crown spread should be given as future branch growth may result in interference with proposed development, damage to branches and the need for a tree pruning regime.

Root Protection Areas

- 5.13 Initial Root Protection Areas for the trees have been plotted onto the Tree Survey Plan (Figure 1) as circles, with the tree located centrally, extending to encompass the area of ground, and thus the rootable soil volume, required for protection.
- 5.14 Using this information a protective fence would seem to be inappropriate within the site. Site Managers will need to be briefed on the likely areas that are within the RPA's of the retained trees and the impact of the works.

Service Runs

- 5.15 All service runs, utilities and similar infrastructure should take note of trees and allow for working methods that will minimise damage to trees by referring to documents such as NJUG Volume 4 - Guidelines for the planning, installation and maintenance of utility services in proximity to trees. (National Joint Utilities Group 2007)

Site Compounds and Materials Stores

- 5.16 Provision for materials storage, site offices, deliveries and other related activities should be made available in areas away from retained trees.

6 PREDEVELOPMENT WORKS

Tree Protection

- 6.1 If there is a requirement for protective fencing it is to be erected in accordance with the guidance contained within BS5837:20012 Trees in Relation to Design, Demolition and Construction - Recommendations.
- 6.2 Once the protective fencing is in place it must remain in situ throughout the course of the development works as required.
- 6.3 Copies of the Tree Retention/ Removals & Protection Plan should be placed in the site office for reference by all site staff.
- 6.4 The protective fencing barrier is to be constructed in accordance with the specification detailed at Appendix 4.
- 6.5 Signs detailing the purpose of the protective fencing shall be attached to the fencing at 10m intervals. Such signs should be weatherproof and shall be substantially in the form of the specimen provided at Appendix 7. Signs must be replaced as necessary should they be removed or become illegible.
- 6.6 Following erection of the protective fencing and prior to commencement of the development it is recommended that an inspection of the site, by either the Council's Tree Officer or the Arboricultural Consultant, is arranged to confirm fencing has been installed in accordance with the Tree Protection Plan and any relevant conditions that may be attached to a grant of planning consent for the development.

7 TREE PROTECTION MEASURES

Construction Exclusion Zone

- 7.1 The Construction Exclusion Zone (CEZ) as defined by the protective fence line shall be regarded as sacrosanct, and the protective fencing shall not be moved or taken down at any time.
- 7.2 Within the Construction Exclusion Zone there must be **No** mechanical digging or scraping, **No** alteration to existing ground levels including soil stripping, **No** earthworks, **No** handling or discharge of any chemical substance, concrete washings or of any fuels.
- 7.3 Furthermore vehicular or pedestrian access and the storage of any materials is **prohibited** within the Construction Exclusion Zone.
- 7.4 Additionally no materials that may contaminate the soil such as concrete mixings, diesel oil and vehicle washings shall be discharged within 10m of the stem of any tree and no fires shall be lit within 10m of the maximum extent of a trees crown.

Site Compounds and Materials Stores

- 7.5 Activities related to the establishment of a temporary site compound have the potential to impact upon retained trees by various means. In particular the storage and mixing of chemicals and materials such as concrete can have a damaging effect on tree health if precautions are not taken.
- 7.6 To prevent harm occurring to trees provision for materials storage, site offices, deliveries and other related activities should be made available in areas away from retained trees.
- 7.7 Due to the nature of the existing site there are numerous areas where a site compound could be established without it impacting upon the trees.

Monitoring

- 7.8 Following erection of the protective fencing and prior to commencement of the development an inspection of the site, by either the Council's Tree Officer or the Arboricultural Consultant, should be arranged to confirm fencing has been installed in accordance with the Tree Protection Plan and any relevant conditions that may be attached to a grant of planning consent for the development.
- 7.9 Further monitoring visits shall be carried out following implementation of the works on site, ideally on at least a monthly basis.

Reporting

- 7.10 Should any arboricultural issues become apparent during the works the site manager should immediately contact the Arboricultural Consultant or the Council's Tree Officer for advice upon how to proceed.

8 CONCLUSIONS

- 8.1 A pre development tree survey and assessment has been carried out an area of disposal land on the southern tip of the Infants School site off Barncroft Way.
- 8.2 The trees surveyed are of variable amenity value and in the main the trees appear in fair general health.
- 8.3 Individually the trees are of limited amenity value. Many have established poorly in cramped conditions and little active management has been carried out. However, collectively, the tree mass contribute to the local amenity and immediate wider landscape setting.
- 8.4 Once the final design and development layouts have been prepared an Arboricultural Method Statement should be produced to full consider the likely impacts of the development works on the retained trees. This will allow these trees to be full protected and ensure their successful retention.
- 8.5 The trees do not form part of a Tree Preservation Order and are not within a Conservation Area.
- 8.6 Guidelines contained within BS5837:2012 Trees in Relation to Design, Demolition and Construction should be followed when dealing with trees. Working methods and specifications should be followed to limit potential damage to trees throughout the construction period.
- 8.7 The specific measures for the protection of the retained trees throughout development specified within this report shall be followed throughout the course of the development.

TABLES

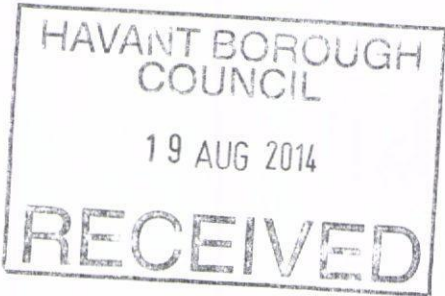


TABLE 1

Tree Survey Data

Tree Survey Schedule

Site Barncroft School

Project schedule ref: JSL1786_750

Drawing reference: JSL1786_710

Survey date: 19/07/2013

Surveyor: C Chambers

Status: For Information

Revision:

Notes:



Ref. no.	Species	Height (m)	Crown spread (m)				Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
			N	E	S	W									
1	Fraxinus excelsior Common Ash	22.0	4.0	4.0	5.0	6.0	0.28 0.23	2.00	5.00	W	M	Fair	Twin trunked, ivy.	+ 15	C2
2	Populus tremula Aspen	22.0	7.0	6.0	6.0	5.0	0.39 0.38	2.00	3.50	N	M	Poor/Fair	Large twin trunked. Weak timbered species, monitor for stability	+ 20	C2
3	Populus tremula Aspen	22.0	6.0	4.0	6.0	7.0	0.53	1.00	4.00	W	M	Poor/Fair	Western bias and suppressed.	+ 20	C2
4	Populus tremula Aspen	18.0	4.0	2.0	4.0	5.0	0.36	1.00	4.00	W	M	Poor/Fair	Suppressed.	+ 20	C2
5	Populus tremula Aspen	18.0	4.0	4.0	6.0	4.0	0.29	1.00	4.00	S	M	Poor/Fair	Southerly bias.	+ 20	C2
6	Salix fragilis Crack willow	18.0	4.0	4.0	8.0	4.0	22, 18, 17, 23, 10 14, 19	7.00	-	S	M/OM	Poor/Fair	Multi-trunked tree, likely long lapsed coppice.	+ 15	C2
7	Salix fragilis Crack willow	18.0	6.0	6.0	6.0	6.0	14, 22, 09, 12	4.00	-	S	M/OM	Poor/Fair	Multi-trunked tree, likely long lapsed coppice.	+ 15	C2
8	Salix fragilis Crack willow	18.0	5.0	5.0	4.0	4.0	0.24 0.23 0.19	3.00	-	N	M/OM	Poor/Fair	Multi-trunked tree, likely long lapsed coppice.	+ 15	C2
9	Acer campestre Field Maple	9.0	3.0	5.0	7.0	5.0	0.26	1.00	0.50	S	M	Fair	Strong bias and lean to the south. Well vegetated and in apparent good health.	+ 25	C2
10	Fraxinus excelsior Common Ash	18.0	5.0	4.0	3.0	4.0	0.32	1.00	4.00	NE	MA	Fair	Leans due north-west. Lower deadwood. Vigorous.	+ 20	C2
11	Fraxinus excelsior Common Ash	11.0	4.0	3.0	3.0	5.0	0.26	1.00	2.00	W	MA	Fair	On edge of area overhanging out west.	+ 15	C2

Note: This survey is based on a brief visual inspection from the ground. It is not intended as a full arboricultural inspection.

- Indicates estimated / offsite tree

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			N	E	S	W									
12	Acer pseudoplatanus Sycamore	11.0	3.0	3.0	3.0	6.0	0.32	1.00	2.00	W	M	Fair	Bias to the west. Ivy on bole.	+ 15	C2
13	Fraxinus excelsior Common Ash	12.0	4.0	4.0	4.0	4.0	0.27 0.16	2.00	2.00	-	M	Fair	Twin-trunked.	+ 15	C2
14	Acer campestre Field Maple	9.0	2.0	2.0	2.0	4.0	0.13 0.12	2.00	1.00	-	MA	Fair	Located just outside of the fencing. Twin-trunked at 1.5m. Bole is lopsided.	+ 20	C2
15	Fraxinus excelsior Common Ash	17.0	4.0	4.0	3.0	5.0	0.37 0.32	2.00	3.00	-	MA	Fair/Poor	Twin-trunked. Union is tight, possibly included.	+ 20	C2
16	Quercus robur English Oak	9.0	5.0	5.0	5.0	5.0	0.22	1.00	4.00		M	Good	Vigorous, well vegetated.	+ 25	B2
G1	Quercus robur, Viburnum opulus, Salix fragilis, Cornus sanguinea, Populus alba English Oak, Guelder Rose, Crack Willow, Common Dogwood, White Poplar	9.0	-	-	-	-	-	-	-	-	OM	Fair	Congested group fronted by large Willow.	+ 20	C2
G2	Ulmus procera English Elm	>7	-	-	-	-	-	-	-	-	OM/Y	Fair/Poor	Regenerating Elm in a constant state of cycling with dead standing and regenerating, vigorous suckering.	-15	C2
G3	Salix sp., Crataegus monogyna, Ulmus sp. Willow, Common Hawthorn, Elm	11.0	-	-	-	-	-	-	-	-	MA	Fair/Poor	Close Willow poles and Hawthorn giving way to Elm.	+ 20	C2
G4	Acer campestre, Cornus sanguinea, Quercus robur, Fraxinus excelsior, Tilia sp., Field Maple, Common Dogwood, English Oak, Common Ash, Lime	>11	-	-	-	-	-	-	-	-	MA	Fair	Dogwood and regenerating Ash understory with Field Maple. Larger Ash to the west on the boundary.	+ 20	C2
G5	Acer campestre Field Maple	>8	-	-	-	-	-	-	-	-	MA	Fair	Mid-mature group, suppressed.	+ 20	C2

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- Indicates estimated / offsite tree

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			N	E	S	W									
G6	Acer campestre, Quercus robur, Cornus sanguinea, Viburnum opulus Field Maple, English Oak, Common Dogwood, Guelder Rose	11.0	-	-	-	-	-	-	-	-	MA	Fair	With Oak and fair sized Field Maple.	+ 20	C2
G7	Quercus robur English Oak	8.0	-	-	-	-	-	-	-	-	MA	Good	Well vegetated.	+ 25	B2

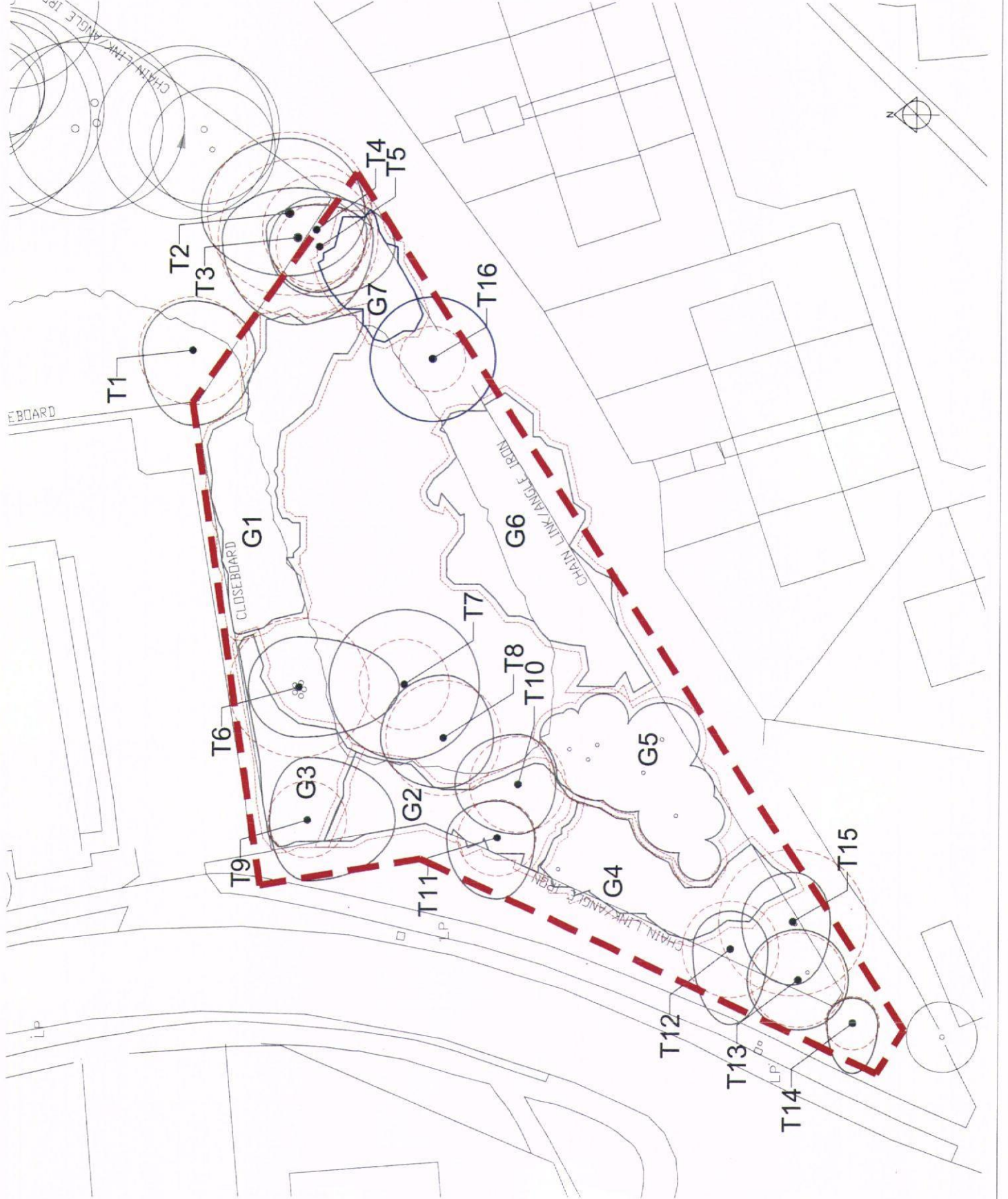
Note: This survey is based on a brief visual inspection from the ground. It is not intended as a full arboricultural inspection.
- Indicates estimated / offsite tree

Key to Inspection Report Form

Species	Genus and variety
Height	Measured Clinometer Reading or Estimated Height in Metres
Girth (dbh @ 1.5m)	Diameter measured in cms, or estimated, Where multi stemmed conventions within BS5837:2012 have been applied.
Spread (m)	Canopy height estimated in metres above ground level, Height of first branch and direction has been noted.
Canopy height (m)	Crown Spread, radius estimated in metres
Physiological Condition	Good, Fair, Poor, Dead
Age Class	Y – Young SM – Maturing (Young to Middle Aged) EM – Early Mature (Middle to mature aged) M – Mature OM – Over mature, V – Veteran
Useful Life Expectancy (years)	10, 10-20, 20-40, 40+
BS Categorization	See Cascade Appendices 2

FIGURE

Figure 1: Tree Survey Plan



Key

- Survey boundary
- Tree with numbered reference
- Vegetation group with numbered reference
- Category A - High quality
- Category B - Moderate quality
- Category C - Low quality
- Category U - Unsuitable for retention
- Tree outside of survey area
- Tree within survey area

NOTES:

- Refer to RPS Tree Survey Report Schedule for further details
- Survey boundary is a visual representation of the ground and does not represent a legal boundary
- Tree locations are indicated by numbered reference points
- Vegetation groups are indicated by numbered reference points
- Tree quality is indicated by the color of the tree symbol
- Tree outside of survey area is indicated by a dashed line
- Tree within survey area is indicated by a solid line



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Project: Bancroft School
Land off Havant

Title: Tree Survey

Drawn By: JB
Checked By: DC
Scale: 1:200
Date Created: 25/07/2013

Revision Number: 710

APPENDIX 1

Methodology

General

On site data was recorded onto site copies of forms.

The site data was transposed in the office into an MS Access database. Individual tree numbers and locations were plotted by eye on to a drawing at the time of the survey. Tree positions were then related to a Topographical survey of the site provided, where not shown on the topographical survey tree positions have been plotted by eye only and require confirmation. Colour coded versions of the drawings form part of this report. (Figure 1).

The data recorded includes:

- Height - data gathered using a Suunto optical clinometer PM - 5/1520. Where access to the tree was not possible the Heights were estimated.
- Diameter - measurements taken at 1.5 metres above ground level (complying with requirements for BS5837). Where multiple stems occurred conventions contained within BS5837:2012 were followed. Girth data was gathered using a metric diameter tape, callipers or estimated when no access.
- Tree crown spread – estimated measurement of the four cardinal points to provide information to be used with the arboricultural constraints plan
- Tree Crown Clearance – crown height above ground level
- Tree condition - judged visually using the guidelines produced in the report. The condition is indicated with the appropriate colour on the map found in the report. (see Figure 1)
- Age class - estimated from an examination of the tree in question.

Age Classification

The following classification is employed:

Y - Young:	Saplings and young trees under 10 years of age
SM – Semi Mature	Tree great than 10 years old below one third of there life expectancy
EM – Early Mature:	Trees older than one third of the life expectancy of their species, normally making substantial extension growth.
M - Mature:	Trees between one third and two thirds of the life expectancy of their species. More or less full height and large girth, increasing only slowly.
OM- Overmature:	Trees beyond two thirds of the life expectancy of their species. No significant extension growth. Crown starting to break up and decrease in size.
V – Veteran:	tree that shows features of biological, cultural or aesthetic value that are characteristic of an individual surviving beyond the typical age range for the species.

Estimated Remaining Contribution in Years

The estimated remaining contribution in years is an estimate based on currently known factors of the possible remaining life of the tree as an asset. Clearly, it is impossible to predict changes in condition which may occur in the future and this reflects what is considered reasonable under existing circumstances, The following classification is employed:

Death or removal is likely within less than 10 years

Death or removal is likely within 10-20 years.

Death or removal is likely within 20-40 years.

Death or removal is likely beyond 40 years

The estimated remaining contribution in years will be dependent on the interaction of the typical longevity of the species, its current age and condition with prevailing environmental factors. The estimated remaining contribution in years also dependent on future tree management that can extend useful life in some instances.

Tree Condition.

The tree survey assessed the individual condition of all trees identified on the site. The assessment of condition is based on a visual and professional view.

The categories considered for Physiological Condition are good, fair, poor and dead.

Structural Condition is also commented on and this will include such items of presence of decay and physical defects.

Trees are living organisms and their condition can change rapidly in response to environmental variables. Condition remarks refer to the date of survey and cannot be assumed to remain unchanged. While there is no such thing as a safe tree, regular inspection of trees is recommended to reduce the foreseeable risks associated with trees. There is currently no published guidance from the UK insurance industry on the frequency of tree inspections. In the German courts a bi-annual routine inspection is normally expected for older street trees, giving an indication of the rapidity of change in condition that can occur.

Management Recommendations

Recommendations are given where it is felt by the arborist that further investigations are required due to suspected defects and work recommendations for pre construction tree work.

Tree Categorisation Using BS 5837 Methodology

The trees surveyed were categorised using the method explained in BS5837 Trees in Relation to Design, Demolition and Construction 2012. This method categorizes individual trees, groups and woodlands in a systematic way. Each tree, group or woodland is identified on an attached plan.

Groups are identified as those trees forming a single arboricultural feature with trees that provide companion shelter, are avenues or screens or cultural.

Initially the surveyor will determine if the tree should be regarded as an U category tree. U category trees are those that are low value trees that have little future due to physiological and structural condition.

Other trees are graded A, B or C. The initial category should reflex the trees value in making an important contribution to the amenity of the site over a period of time. The higher the category the longer the perceived time period.

A sub category is included 1, 2 or 3. This sub category reflects the type of value the surveyor feels the tree presents in regards its value to 1 – arboricultural, 2 – landscape, 3 – cultural or conservation.

The cascade chart used is included as Appendix 2 of this report.

APPENDIX 2

BS5837 Table 1 – Cascade Chart for Tree Quality Assessment

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)	Identification on plan
Trees unsuitable for retention (see Note)		
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	☐☐ Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) ☐☐ Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline ☐☐ Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.	Dark Red
Trees to be considered for retention		
1 Mainly arboricultural qualities		
2 Mainly landscape qualities		
3 Mainly cultural values, including conservation		
Trees to be considered for retention		
Category A Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)
Category B Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality
Category C Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees with material conservation or other cultural value
	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value
		Grey

APPENDIX 3

Root Protection Area Barrier Details

Protective Barrier Specifications

Since trees are living organisms which interact with their immediate environment any changes made to their surroundings may have a bearing on that trees future. Developing a site will undoubtedly place any trees within close proximity under some level of stress, which could predispose them to infection. The aim of this method statement is to limit the amount of stress induced by introducing protection measures.

The most effective way of offering protection is by erecting protective barriers set at a distance from the tree stem using the methods given within BS 5837: 2012 Trees in Relation to Design, Demolition and Construction. Barriers should be braced and constructed to resist impacts; see figures 1 & 2 below for barrier specifications. Barriers can be of an alternative specification to that within the BS5837:2012 provided it is approved by the Local Planning Authority Tree Officer.

Barriers should be erected before any works commence on site with the exception of recommended tree work. Areas of retained and future structure planting should be similarly protected.

All personnel should be made aware of the protected areas and instructed to keep them free of materials, waste and excess soil. Soil disturbance should be prohibited and travel of any kind, including foot traffic should also be excluded within the root protection area (RPA) unless previously agreed and adequate ground protection has been installed. Where foot traffic is agreed within the RPA, single thickness scaffold boards laid over a compressible material on a geotextile, or supported by scaffold should suffice. Where vehicular access through the RPA is agreed an engineer should be consulted to design adequate ground protection methods.

Suggested Barrier Specification (as per BS5837: 2012)

Figure 1

Figure 2 Default specification for protective barrier

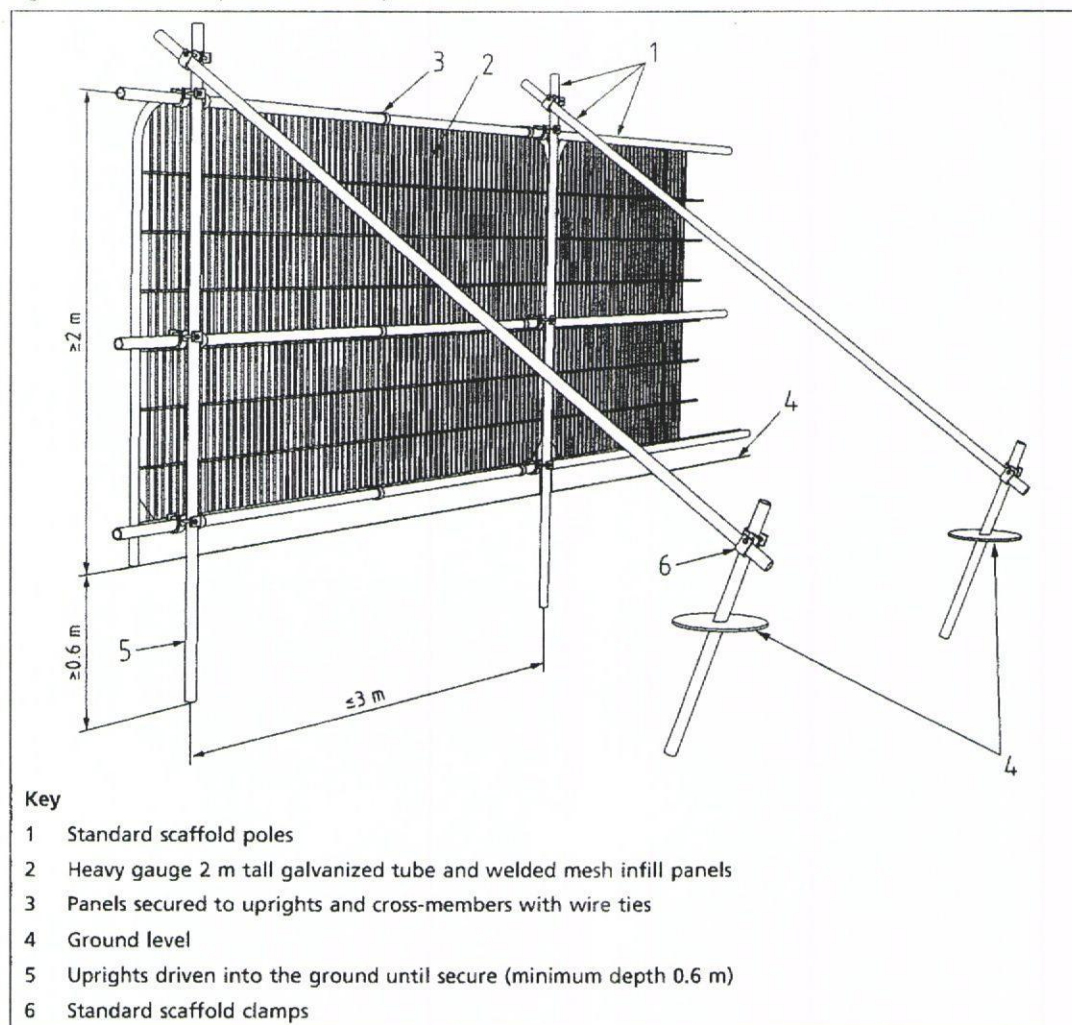
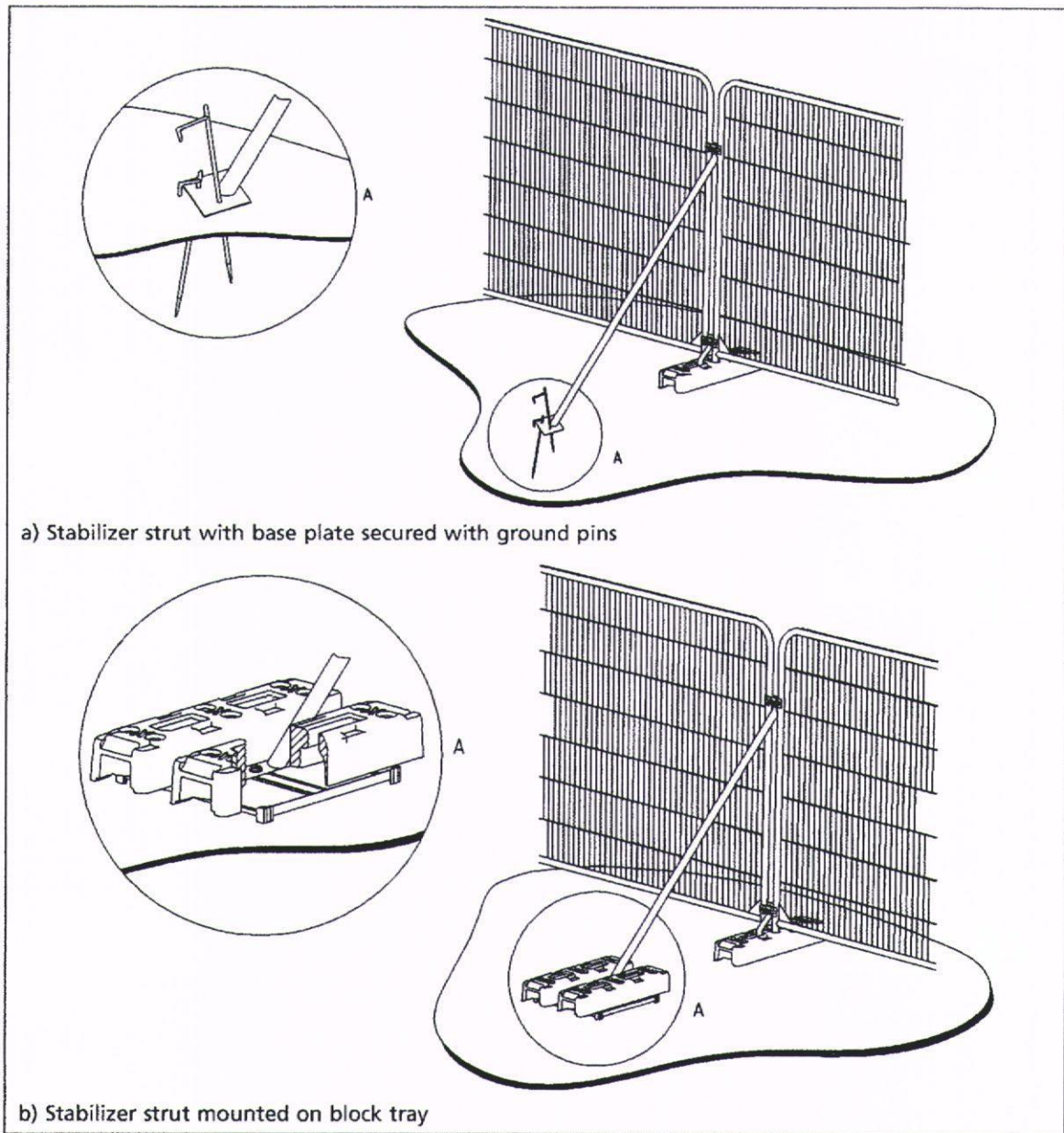


Figure 2

Figure 3 Examples of above-ground stabilizing systems



APPENDIX 4

Arboricultural Glossary

Abiotic Factors - Nonliving factors of the environment, including temperature & wind.

Age-class - A general classification of the tree into either - young, semi-mature/maturing, mature, over-mature, or senescent.

Apical Bud/Shoot – The apical bud, also known as the leading shoot, is responsible for shoot extension and is dominant.

Apical Dominance – A singular, leading shoot remains dominant.

Arboreal - In connection with, or in relation to, trees.

Arboriculturalist – Person who has, through relevant education, training and experience, gained recognised qualifications and expertise in the field of trees in relation to construction.

Arboricultural Implications Assessment (AIA) – Study, undertaken by an arboriculturalist, to identify, evaluate and possibly mitigate the extent of direct and indirect impacts on existing trees that may arise as a result of the implementation of any site layout proposal.

Arboricultural Method Statement (AMS) – Methodology for the implementation of any aspect of development that has the potential to result in the loss of or damage to a tree. Note The AMS is likely to include details of an on-site tree protection monitoring regime.

Biotic factors - Living factors. For example, animals and pathogens.

Bottle Butt – Term used to describe shape of stem base, usually associated with an internal defect – refer to 'Reaction Wood' below.

Branch union/junction - The point at which a branch joins a larger stem. Can be a point of weakness, especially in certain species.

Cambium - A lateral meristem (see below) in vascular plants located just beneath the bark responsible for secondary growth, e.g. production of annual growth rings.

Canker – A clearly defined area of dead and sunken or malformed bark, caused by bacteria or fungi. Can have a bearing on structural integrity of infected limb(s) depending on size and location.

Chlorosis/Chlorotic – Abnormal yellow or yellow-green coloration of usually green leaves. Essentially a reduction of chlorophyll levels often as a result disease or nutrient deficiency.

Co-dominant stems - A growth characteristic, where two or more stems of similar size grow from the same point. Can create an inherent weakness.

Compaction - The compressing & hardening of soil around tree root systems, due to vehicular/pedestrian use etc. Loss of pore space between soil granules limits water movement and gaseous exchange, and inhibits root growth.

Competent person – Person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached

Note 1 A competent person understands the hazards and the methods to be implemented to eliminate or reduce the risks that can arise. For example, when on site, a competent person is able to recognise at all times whether it is safe to proceed.

Note 2 A competent person is able to advise on the best means by which the recommendations of this British Standard may be implemented.

Condition – Assessment based on a visual and professional view giving consideration to many factors such as tree health, structural integrity and suitability of its position.

Construction Exclusion Zone – Area based on the RPA (in m²), identified by an arboriculturalist, to be protected by 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.

Coppice - The method of managing trees by cutting the stems at between 1.0 inch and 1.0 foot from the ground level on a regular cycle, the cut stumps of the trees or shrubs are allowed to re-grow many new stems.

Crown spread - Gives distances between extreme limits of the crown and the stem, usually along the four compass points. Helps to show crown symmetry.

Crown Reduction – The removal of branch ends to reduce the extreme limits of a trees branch spread and height.

Crown Thin – The removal of selected branches within the crown to thin the internal branch structure.

D.B.H. - 'Diameter at Breast Height', an industry standard to gauge tree stem size and development. Within arboriculture, breast height is taken to be 1.5m above ground level.

Dieback - The reduction in crown vigour and extension growth progressing to death of distal parts; often associated with decline.

Epicormic/adventitious growth - New growth from dormant buds that can often form tenuous attachments. Although some species readily form such shoots, it can be an indication of stress.

Feathered Whip – Size of tree for planting, usually ranging from 1.25m to 2.5m in height.

Form - A general assessment of the shape and position of the tree within its' environment.

Frass – Debris such as bore dust left by wood boring insects.

Hanger – Term used to describe a branch that has become detached and is being supported by other branches. Can be a hazard to persons and property below.

Hazard Beam – After the loss of a distal part, a limb concentrates growth upwards creating adverse end weights that can render the limb susceptible to failure.

Heavy Standard – Size of tree for planting, usually above 3.5m in height.

Included bark – Growth characteristic usually caused when two or more stems/branches growing in close proximity 'fuse' together entrapping the bark from when the parts were separate in the middle, creating a structural weakness.

Meristem - The undifferentiated plant tissue from which new cells are formed, such as that at the tip of a stem or root.

Meristematic Disorder – A growth disorder caused by a disruption of the meristem (see above) from any of a number of biotic factors (see above). Manifests as growths such as 'Witches Brooms' & 'Galls'.

Necrosis/Necrotic – Death of tissues usually characterised by a blackening in colour.

Occlusion/Occluded – Normally used to describe the overgrowth of a wound. Also, immovable foreign objects in contact with a tree part can become encased or 'occluded' by the tree as it grows incrementally.

Pathogen - An agent that causes disease, especially a living microorganism such as a bacterium or fungus.

Plasticity index - The table used to calibrate the shrinkability of a clay soil.

Pollard – The removal and subsequent regular re-removal of the crown of a tree above animal browsing height. Can be an effective method of controlling the size of trees in urban areas. This is ideally begun in the trees early stages and maintained throughout its life.

Reaction wood - Essentially additional wood laid down by the tree to compensate for structural defects such as cavities.

Ring barking/Girdling – the removal of bark around the entire circumference of a stem or branch, causing the death of all distal parts.

Root Protection Area (RPA) – Layout design tool indicating the area surrounding a tree that contains sufficient rooting volume to ensure the survival of the tree, shown in plan form in m².

Saprophyte – An organism which exists on dead plant material.

Scaffold branches - The main structural branches within the crown.

Services – Any above ground and piped and/or ducted underground infrastructure including water main, electricity supply, gas supply, fibre optic utilities, telecommunications cabling, storm and foul water drainage, including temporary storage for run-off, pumping stations, interceptors and other allied buried structures.

Shrinkable clay – Clay soil which alters in volume depending on moisture content. Property sited on shrinkable clay can suffer subsidence damage due to soil desiccation; this can be due to the water uptake of nearby vegetation, including trees.

Special engineering – design of a structure with the physiological requirements of trees as the priority.

Standard – Size of tree for planting, usually ranging from 2m to 3.5m in height.

Structure – Man-made object, such as a building, carriageway, path, wall, services, and built and excavated earthworks.

Transplant – (1) size of tree for planting, usually ranges from 0.2m to 0.9m in height (2) the relocation of a tree or shrub including a given portion of the root system.

Tree Constraints Plan (TCP) – Plan prepared by an arboriculturalist for the purposes of layout design showing the RPA and representing the effect that the mature height and spread of retained trees will have on layouts through shade, dominance, etc.

Tree protection plan – scale drawing prepared by an arboriculturalist showing the finalised layout proposals, tree retention and tree and landscape protection measures detailed within the arboricultural method statement (AMS), which can be shown graphically.

U.L.E – 'Useful Life Expectancy' is an estimate based on currently known factors of the possible remaining life of the tree as an asset.

Veteran tree – Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned.

Vigour - A general classification, as to the present and future potential growth and development of a tree. A comment regarding the health status of the tree specific to its species.

Water Demand - A generic classification of the water demand of specific species as outlined by the NHBC (National House Building Council).

Whip – Size of tree for planting, usually ranging from 1m to 1.75m in height.

APPENDIX 5

Hard Surface Installation Methodology

The following methodology sets out the requirements and stages in construction of new hard surfaces in relation to existing trees.

This methodology is not meant to be considered as a specification and whilst examples of products that meet the arboricultural requirements for the installation of hard surfacing adjacent to trees are given the final construction detail must be designed by a suitably qualified and experienced engineer, whilst ensuring the arboricultural requirements are met, to ensure that the finished surface is fit for purpose.

In this respect it should be noted that Geosynthetics Limited, who supply cellular confinement systems, offer a design service to develop site specific solutions.

Arboricultural Requirements

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

In particular:

- Works shall be conducted in such a manner as to prevent physical damage to roots during demolition or construction, such as soil compaction or root severance.
- Provision for water and oxygen to reach the roots must be made and the soil structure must not be disturbed.
- Provision must be made for future root growth and precautions taken to ensure that such root growth does not cause unacceptable levels of damage to the finished construction.
- The soil must not be compacted and soil bulk density must be maintained at suitable levels for tree root growth and function. In this respect a soil bulk density of over 1.8g/cm³ will impede root growth and function.

To achieve the above requirements for tree root growth and function the surface shall be designed so that:

- No excavation is required for their installation; to ensure that physical root damage does not occur.
- The surface can be installed without compaction of the existing soils; thus ensuring damage to the soil structure does not occur.
- The surface is permeable; thus ensuring that oxygen and water can reach the root system and that CO₂ can diffuse vertically out of the soil as high concentrations can cause root suffocation.

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

Prior to installation of any new surfacing the following factors shall be considered:

- The exact location of the area to receive the special surfacing shall be determined.
- The area should be investigated to identify any existing services.
- The area shall be fenced off with tree protection fencing until installation of the special surfacing is to take place. Such installation should generally be phased to occur following substantial completion of the development.
- The final surface shall be decided upon, the surface must be permeable and several options for final surfacing are considered in the following section.

Methodology for Surface Installation

Prior to the installation of the new surface, existing ground cover and surface vegetation should be killed using an appropriate herbicide.

Specialist advice should be sought in order to determine the most appropriate herbicide to use due to the potential for leaching through soils and the potential impacts that this will have on retained vegetation.

As an alternative or addition to herbicide treatment the existing surface vegetation may be carefully removed by using hand tools.

All dead organic matter is to be removed by hand following herbicide treatment to prevent anaerobic conditions, as a result of the decomposition of dead vegetation, occurring.

All major protrusions such as rocks shall be removed by hand and all tree or shrub stumps from removed vegetation shall be ground out to minimise ground disturbance.

The soil surface **must not** be skimmed or stripped to achieve a level surface and where necessary major hollows shall be filled using a granular fill, such as no-fines gravel, washed aggregate or cobbles, to achieve a level surface.

In some cases it may be appropriate to consider the removal of the top layers of soil by non mechanical means to achieve desired levels, establish rooting patterns and potentially provide for some embedding of the new surface into the existing ground level. Such works shall be completed using pneumatic soil excavation techniques and the works must be supervised by an Arboricultural consultant. The need for such works to occur shall be considered during the detailed design of the surface.

Following surface preparation the soil shall be covered by a permeable geotextile to prevent the cellular confinement fill from migrating into the existing soils.

The geotextile layer shall be laid with overlaps of 300mm beyond the edge of the proposed construction and shall be temporarily retained with pins, stakes or weights.

The cellular confinement system shall then be installed and fixed in position in accordance with the manufacturer's recommendations.

The cellular confinement system shall then be filled with the specified aggregate in accordance with the manufacturer's recommendations. All works involved in the filling of the system with aggregate must be completed by hand and be supervised by the site supervisor.

The infill aggregate shall then be rolled or whacked to ensure cohesion of the granular fill with the cellular confinement system.

The desired finished surface shall then be installed. This shall be permeable and gas porous. Options for the type of finished surface are:

- Washed gravel – This retains porosity unless excessively consolidated and will be particularly useful where the final surface is not level. However it may not be suitable in areas with high pedestrian and vehicular passage. If gravel is used, this shall be distributed in a 75mm layer over the exposed infill aggregate.
- Paving slabs / brick paviours – These shall be laid dry jointed on a bed of sharp sand to allow air and moisture to permeate. Specialist slabs and paviours with inbuilt infiltration holes may be used.
- Tarmacadam – This shall not be used where it will cover over 20% of a trees Root Protection Area.

Following completion of the hard surface protective fencing shall be erected around the trees until the completion of development.

APPENDIX 6

Construction Exclusion Zone Sign



**PROTECTIVE FENCING. THIS
FENCING MUST BE
MAINTAINED IN ACCORDANCE
WITH THE APPROVED PLANS
AND DRAWINGS FOR THIS
DEVELOPMENT.**



TREE PROTECTION AREA

KEEP OUT !

(TOWN & COUNTRY PLANNING ACT 1990)

**TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY
PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A
TREE PRESERVATION ORDER.**

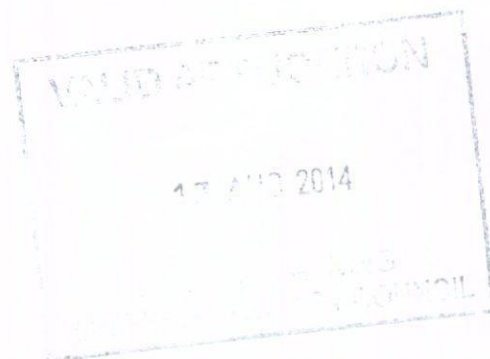
**CONTRAVENTION OF A TREE PRESERVATION ORDER MAY
LEAD TO CRIMINAL PROSECUTION**

**ANY INCURSION INTO THE PROTECTED AREA MUST BE
WITH THE WRITTEN PERMISSION OF THE LOCAL
PLANNING AUTHORITY**

RPS

**BARNCROFT SCHOOL
HAVANT, HAMPSHIRE**

**ARBORICULTURAL
METHOD STATEMENT**



17th September 2013



Our Ref: JSL1786_775_Rev A

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Date:	17th September 2013
Project Number/Document Reference:	JSL1786_775_Rev A
Status:	For Planning

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Appendix 1: Tree Protection Plan

Appendix 2: Tree Works

Appendix 3: Tree survey schedule

Appendix 4: Example Tree Protection Barriers

Appendix 5: Example arboricultural site register

Appendix 6: Construction Exclusion Zone (CEZ) Signage

EXECUTIVE SUMMARY

- RPS was commissioned by Hampshire County Council to prepare an Arboricultural Method Statement in relation to proposed development of land on the southern tip of the Infants School off Barncroft Way, Havant in Hampshire.
- This document has been produced in accordance with the requirements set out in BS5837: 2012 'Trees in relation to design, demolition and construction – Recommendations'.
- The proposed development of the site consists of the construction of a Children's Home and related facilities. This includes a new entrance to the west, off Park Lane, staff parking, privacy fencing and a back garden with patio for outside seating and eating. A separate footpath to the house will be installed and front garden planting to separate vehicles from pedestrians
- The proposals will result in the loss of a number of trees consisting of lapsed Willow coppice, Ash and Birch of low amenity value. A number of tree groups will require complete or partial removal.
- Where the partial removal of a wooded group is required it should be cleared back to create a safe woodland edge. It may be favourable to reduce edge trees to coppice stools to help produce a rapidly establishing firm edge.
- A Tree Protection Plan JSL1786_711 has been prepared by RPS utilising the surveyed information compiled within the tree survey.
- Construction activities have the potential to disturb the root system and damage tree canopies and the during construction phase the trees must be monitored and carefully managed in accordance with the checklist in section 5 of this document.
- Any tree works must to be in accordance with BS 5837:2012 'Trees in relation to design, demolition and construction', BS 3998:2010 'Recommendations for Tree Work' (copies can be obtained from BSI Tel: 020 8996 7400 www.bsi.global.com) and The Arboricultural Association Guidance Note 8: Standard Conditions of Contract and Specification (2009) (copies can be obtained from the AA Tel: 01242 522152, www.trees.org.uk).

1 INTRODUCTION

- 1.1 RPS was commissioned by Hampshire County Council to prepare an Arboricultural Method Statement and accompanying Tree Removal and Protection Plan in support of a planning application for the construction of a Children's Home on the southern tip of land at Barncroft School in Havant, Hampshire.
- 1.2 The commission followed a tree survey of the wider site carried out by RPS in January 2011 in accordance with British Standard guidelines. To update accurately the findings of the earlier report to the most current standard *BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'*, the site was revisited in July 2013 and additional information collected.
- 1.3 The purpose of this report is to:
- Assess the appropriateness of the proposed tree removal that is required to achieve the proposed development and make recommendations for mitigation where appropriate.
 - Assess to what extent the proposed development will impact upon the health and vitality of the retained trees on site and make recommendations for mitigation where appropriate.
 - Specify measures for the protection of trees throughout development of the site and identify any necessary predevelopment tree works.
 - Provide additional arboricultural information and advice in relation to the protection of trees throughout the development of the site.
 - Provide a Tree Protection Plan to detail the proposed protective measures to be taken in respect of the trees during development of the site.
- 1.4 The Tree Removal and Protection Plan JSL1786_711 identifies the following:
- Trees to be retained;
 - Trees requiring removal;
 - Alignment and design of protective fence;
 - Root Protection Area (RPA) of trees;
 - Methods of construction / implementation within RPA of retained existing trees
- 1.5 The Arboricultural Method Statement will be made available to all relevant site operatives prior to and throughout the demolition and construction process, so they understand the scope and importance of the tree protection measures.
- 1.6 This report was carried out by Chris Chambers BSc Arboriculture (Hons), Professional Member of the Arboricultural Association and Chartered Member of the Landscape Institute (CMLI) on behalf of RPS Group PLC.

2 ARBORICULTURAL IMPACT ASSESSMENT

Introduction

- 2.1 Trees have finite energy reserves, developed each year throughout the growing season, which are utilised for biological processes such as growth and defence against pests or diseases throughout the following year.
- 2.2 Any development in proximity to trees has the potential to cause harm to those trees unless control measures are identified and acted upon; as such it is essential to consider the relationship between the proposed development and the retained trees to identify what precautions are necessary, proportionate and appropriate.
- 2.3 Development has the potential to impact upon the above ground and below ground parts of trees. Whilst some damage that can occur, such as physical damage to the trees stems and branches from machinery movements, is clearly visible the impact from other aspects of work common on development sites which can have a significant effect upon the continued health of trees are not always immediately evident.
- 2.4 Damage that is not immediately evident but which can cause long term harm to retained trees includes things such as damage to the soil structure by compaction causing root damage and levels changes altering the water table and affecting moisture availability.
- 2.5 To minimise the potential for harm to occur to retained trees all works must be carried out with regard to the Tree Protection measures detailed within this report.
- 2.6 In general it can be seen that, by adopting appropriate methods of working, precautionary and protective measures, significant harm to retained trees can be avoided.
- 2.7 In particular the establishment of a Construction Exclusion Zone (CEZ) by erection of Tree Protection Fencing will minimise the potential for harm to occur to retained trees.
- 2.8 The retention and protection of the significant vegetation will assist in assimilating the proposed development into the wider landscape and offer longer term tree cover. Furthermore, redevelopment of the site may offer an excellent opportunity to actively manage the retained vegetation and accordingly we recommend restorative tree works be undertaken. This will further improve the amenity value and landscape setting of the site and increase the useful life of the trees.

Brief Description of Proposed Development

- 2.9 The proposed development of the site consists of the construction of a Children's Home and related facilities. This includes a new entrance to the west, off Park Lane, staff parking, privacy fencing and a back garden with patio for outside seating and eating. A separate footpath to the house will be installed and front garden planting to separate vehicles from pedestrians.

Tree Retention and Removal

- 2.10 The proposals will result in the loss of trees (T6, T7, T8 T10 and T11) consisting of lapsed Willow coppice, Ash and Birch of low amenity value. A number of tree groups will require complete or partial removal. G2 and G3 consists of Elm, Hawthorn and Willow, of low amenity value, will require removal. Groups G1, G4, G5 and G6 will be partially removed.
- 2.11 Where the partial removal of a wooded group is required it should be cleared back to create a safe woodland edge. It may be favourable to reduce edge trees to coppice stools to help produce a rapidly establishing firm edge.
- 2.12 All existing trees and, where possible, selective groups around the peripheries of the site will be retained and protected as they provide a valuable resource for the site in terms of screening, shade / shelter and offer a mature landscape setting to the site.

Development Works

Predevelopment Tree Pruning Works

- 2.13 The specified tree works (Appendix 2) will be undertaken prior to commencement of the proposed development.

Standard of Work

- 2.14 All tree works will be carried out in accordance with BS3998:2010 Tree Work - Recommendations and latest arboricultural best practice. All tree work shall be carried out by suitably qualified, competent and insured arboricultural contractors.
- 2.15 All green and woody waste generated by the tree works shall be removed from site and disposed of in an environmentally sustainable manner.
- 2.16 Prior to the commencement of any tree works an appropriate risk assessment will be produced by the contractor (and made available) to describe the measures required to fulfil the statutory safety obligations. It will aim to identify and prioritise the necessary control measures and precautions

Timing of Works

- 2.17 All tree works will be completed at a time appropriate to the required works and construction operations.
- 2.18 All works will be timed to have regard to the phenological cycles of protected species that are associated with trees; notably birds and bats.
- 2.19 Nesting birds are protected by law and any removal / tree works will not be carried out during the bird nesting season (generally accepted as March-August inclusive). Should any vegetation be identified for removal during this period, then an ecological inspection would be required to check that no nesting birds are present. Should checks reveal nesting birds the vegetation must remain until September or until an ecologist has certified that the fledglings have left the nest. A visual inspection for bats will also be carried on mature / ivy clad trees prior to commencing any operations.

Tree Protection Fencing

- 2.20 Prior to the commencement of any site works the protective fencing is to be erected in accordance with the locations set out on the Tree Removal and Protection Plan JSL1786_711
- 2.21 Once the protective fencing is in place it must remain *in situ* throughout the course of the development until the completion of all site works.
- 2.22 Copies of the Tree Removal and Protection Plan shall be placed in the site office for reference by all site staff. The protective fencing barrier is to be constructed in accordance with the specification detailed in Appendix 4.
- 2.23 Signs detailing the purpose of the protective fencing shall be attached to the fencing at 10m intervals. Such signs must be weatherproof and shall be substantially in the form of the specimen illustrated in Appendix 6. Signs must be replaced as necessary should they be removed or become illegible.
- 2.24 Following erection of the protective fencing and prior to commencement of the development it is recommended that an inspection of the site, by either a suitably experienced site representative, the Council's Tree Officer or Arboricultural Consultant is arranged to confirm fencing has been installed in accordance with the Tree Removal and Protection Plan and any relevant conditions that may be attached to a grant of planning consent for the development.

3 TREE PROTECTION

Tree Protection

- 3.1 The RPA roughly equates to the spread of a tree canopy. This area or an area equivalent to a radius 12 times the stem diameter of the tree at 1.5m above ground level, whichever is the greater (capped at 15m), will be designated as the RPA. Where any part of a trees crown extends passed the calculated RPA, the protective measures will be extended to protect the trees branched framework. Where possible it will be fenced-off with suitable barrier and protected in accordance with BS5837: 2012 (refer to Appendix 4).
- 3.2 The tree protection measures shall be inspected and monitored during the course of the construction works, to ensure its compliance with the Tree Removal and Protection Plan JSL1786_711. The Client shall ensure that at regular intervals the protective measures are inspected to ensure that they are not damaged or been removed.
- 3.3 The Client or their nominated agent shall note areas which are not in accordance with the Tree Removal and Protection Plan and these areas shall be recorded and reinstated immediately. Where any areas of protective fencing cannot be reinstated for reasons unknown, consultation with an arboriculturalist will be sought immediately.

Construction Exclusion Zone

- 3.4 The Construction Exclusion Zone (CEZ) as defined by the protective fence line shall be regarded as sacrosanct, and the protective fencing shall not be moved or taken down at any time. Within the Construction Exclusion Zone there must be No mechanical digging or scraping, No alteration to existing ground levels including soil stripping, No earthworks, No handling or discharge of any chemical substance, concrete washings or of any fuels.
- 3.5 Furthermore vehicular or pedestrian access and the storage of any materials is prohibited within the Construction Exclusion Zone.
- 3.6 Additionally no materials that may contaminate the soil such as concrete mixings, diesel oil and vehicle washings shall be discharged within 10m of the stem of any tree and no fires shall be lit within 10m of the maximum extent of a trees crown.

Site Compounds and Materials Stores

- 3.7 To prevent harm occurring to trees the provision for materials storage, site offices, deliveries and other related activities will be situated on an existing area of hardstanding outside the temporary tree protection area.

Monitoring

- 3.8 Following erection of the protective fencing and prior to commencement of the development an inspection of the site, by a suitably experienced site representative, the Council's Tree Officer or the Arboricultural Consultant, will be arranged to confirm fencing has been installed in accordance with the Tree Removal and Protection Plan.

-
- 3.9 Monitoring of tree protection measures will be carried out on site on a regular basis by the contract administrator to ensure tree protection is upheld at all times or reviewed if necessary in consultation with a suitably experienced site representative, the Council' Tree Officer or the Arboricultural Consultant.

4 ARBORICULTURAL CHECKLIST

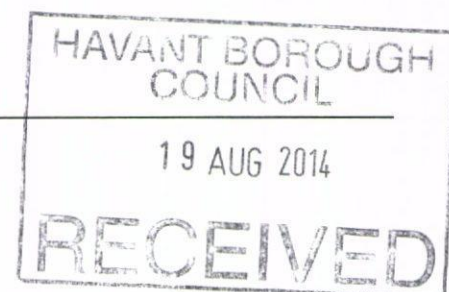
Ref	Work Activity	Schedule of Works	Refer	Recommendations
General site works and tree related operations				
01	Pre-start site meeting	Pre-start site meeting with LPA tree officer, site manager, client representative to agree scope of any works, where required.		
02	Protect trees to be retained	Barriers will be fit for the purpose of excluding construction activity, and will remain rigid and complete. Barriers are to be located in accordance with RPS Tree Removal and Protection Plan.	BS 5837:2012 Trees in relation to design, demolition and construction: Figure 2 & 3 RPS Tree Removal and Protection Plan JSL1786_711	Ongoing monitoring by appointed person
03	Protective fencing to be inspected by LPA	CA to give LPA at least 2 working days notice of the erection of the temporary protective fencing.		Appointed person to contact LPA prior to completion of fencing.
04	Maintain the temporary protective fencing	CA to ensure the temporary protective fencing is maintained throughout the entire construction period and record any breach of the tree protection.	BS 5837:2012 Trees in relation to design, demolition and construction Fig:2 & 3 RPS Tree Removal and Protection Plan JSL1786_711	Appointed person responsible for arboricultural protection measures shall monitor fencing monthly , recording details
05	Removal of identified vegetation	CA to identify vegetation at pre-commencement meeting agree to establish the extent of any necessary tree works. Carry out inspection for presence of bats / nesting birds as appropriate; Vegetation identified for removal shall be removed with care in accordance with current H&S requirements and good practice to avoid damage to adjacent trees or property;	Arboricultural Association Standard Conditions Of Contract And Specifications For Tree Works (2008) Edition BS 3998:2010 Tree Work RPS Tree Removal and Protection Plan JSL1786_711	All tree work should be carried out by a suitably tree qualified tree surgeon, preferably an Arboricultural Association approved contractor

Ref	Work Activity	Schedule of Works	Refer	Recommendations
06	Stump removal	Stumps within the RPA should not be dug or pulled out but mechanically ground or chipped out to a minimum depth of 300mm. Where the presence of stumps in soft landscaping does not restrict any proposed new planting, consideration should be given to their retention for ecological benefits.	Arboricultural Association Standard Conditions Of Contract And Specifications For Tree Works (2008) Edition BS 3998:2010 Tree Work RPS Tree Removal and Protection Plan JSL1786_711	All tree work should be carried out by a suitably tree qualified tree surgeon, preferably an Arboricultural Association approved contractor
07	Removal of arisings	Removal of all arisings off site unless instructed otherwise by the CA. Fires are NOT permitted on the site	Arboricultural Association Standard Conditions Of Contract And Specifications For Tree Works (2008) Edition BS 3998:2010 Tree Work	Ongoing monitoring by appointed person

APPENDIX 1

RPS Tree Removal and Protection Plan

JSL1786_711





A	Protective fence added		Project	JO	QC
Rev	Description		Date	Initial	Checked

RPS

Chesham House, Millingale Road, Chesham, Bucks

monie, 9051353

Hampshire County Council

Project Barncroft School
Land off, Havant

Tree Protection and Removal Plan

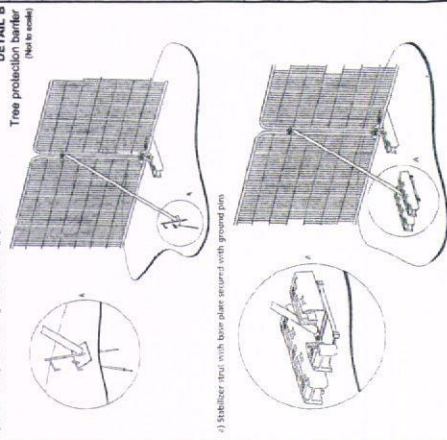
24412 Drawn by JB or Information	Checked by CC Date checked
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Invited Number

749

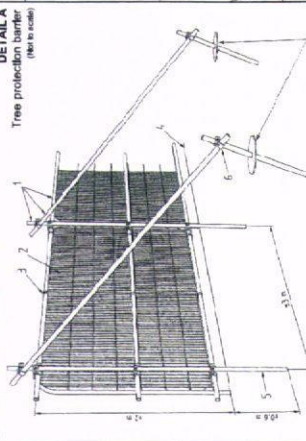
tsigroup.com

Figure 3 Examples of above-ground stabilizing systems



b) Stabilizer steel mounted on block (Fig. 1)

Figure 2 Default specification for protective barrier



Key	
1	Standard scaffold poles
2	Heavy gauge 2 in tall galvanized tube end welded mesh until panels
3	Parents secured to uprights and cross-members with wire ties
4	Ground exit
5	Uprights driven into the ground until secure (minimum depths 6.6 m)

5 Uprights driven into the ground until secure (minimum depth 6.6 m)

APPENDIX 2

Tree Works

Tree #	Species	BS Category	Description of Works
6	Salix	Poor (C2)	Fell and grub out
7	Salix	Poor (C2)	Fell and grub out
8	Salix	Poor (C2)	Fell and grub out
10	Fraxinus excelsior	Poor (C2)	Fell and grub out
11	Fraxinus excelsior	Poor (C2)	Fell and grub out
11	Betula pendula	Poor (C2)	Fell and grub out
G1	Mixed species	Poor (C2)	Partial clearance and grind out
G2	Mixed species	Poor (C2)	Clearance and grind out
G3	Mixed species	Poor (C2)	Clearance and grind out
G4	Mixed species	Poor (C2)	Partial clearance and grind out
G5	Mixed species	Poor (C2)	Partial clearance and grind out
G6	Mixed species	Poor (C2)	Partial clearance and grind out

APPENDIX 3

Tree Survey Schedule

JSL1786_750

Tree Survey Schedule

Site: Bamcroft School
Project schedule ref: JSL1786_750
Drawing reference: JSL1786_710
Survey date: 19/07/2013

Surveyor: C Chambers
Status: For Information
Revision:
Notes:



Ref. no.	Species	Height (m)	Crown spread (m)				Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
			N	E	S	W									
1	Fraxinus excelsior Common Ash	22.0	4.0	4.0	5.0	6.0	0.28 0.23	2.00	5.00	W	M	Fair	Twin trunked, Ivy.	+ 15	C2
2	Populus tremula Aspen	22.0	7.0	6.0	6.0	5.0	0.39 0.38	2.00	3.50	N	M	Poor/Fair	Large twin trunked. Weak limbered species. monitor for stability.	+ 20	C2
3	Populus tremula Aspen	22.0	6.0	4.0	6.0	7.0	0.53	1.00	4.00	W	M	Poor/Fair	Western bias and suppressed.	+ 20	C2
4	Populus tremula Aspen	18.0	4.0	2.0	4.0	5.0	0.36	1.00	4.00	W	M	Poor/Fair	Suppressed.	+ 20	C2
5	Populus tremula Aspen	18.0	4.0	4.0	6.0	4.0	0.29	1.00	4.00	S	M	Poor/Fair	Southerly bias.	+ 20	C2
6	Salix fragilis Crack willow	18.0	4.0	4.0	8.0	4.0	22, 18, 17, 23, 10 14, 19	7.00	-	S	M/OM	Poor/Fair	Multi-trunked tree, likely long lapsed coppice.	+ 15	C2
7	Salix fragilis Crack willow	18.0	6.0	6.0	6.0	6.0	14, 22, 09, 12	4.00	-	S	M/OM	Poor/Fair	Multi-trunked tree, likely long lapsed coppice.	+ 15	C2
8	Salix fragilis Crack willow	18.0	5.0	5.0	4.0	4.0	0.24 0.23 0.19	3.00	-	N	M/OM	Poor/Fair	Multi-trunked tree, likely long lapsed coppice.	+ 15	C2
9	Acer campestre Field Maple	9.0	3.0	5.0	7.0	5.0	0.26	1.00	0.50	S	M	Fair	Strong bias and lean to the south. Well vegetated and in apparent good health.	+ 25	C2
10	Fraxinus excelsior Common Ash	18.0	5.0	4.0	3.0	4.0	0.32	1.00	4.00	NE	MA	Fair	Leans due north-west. Lower deadwood. Vigorous.	+ 20	C2
11	Fraxinus excelsior Common Ash	11.0	4.0	3.0	3.0	5.0	0.26	1.00	2.00	W	MA	Fair	On edge of area overhanging out west	+ 15	C2

Note: This survey is based on a brief visual inspection from the ground.
It is not intended as a full arboricultural inspection.
- Indicates estimated / offsite tree

Tree Survey Schedule

Site Barncroft School
Project schedule ref: JSL1786_750
Drawing reference: JSL1786_710
Survey date: 19/07/2013

Surveyor: C Chambers
Status: For Information
Revision:
Notes:

RPS

Ref. no.	Species	Height (m)	Crown spread (m)				Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
			N	E	S	W									
12	Acer pseudoplatanus Sycamore	11.0	3.0	3.0	3.0	6.0	0.32	1.00	2.00	W	M	Fair	Bias to the west. Ivy on bole.	+ 15	C2
13	Fraxinus excelsior Common Ash	12.0	4.0	4.0	4.0	4.0	0.27 0.16	2.00	2.00	-	M	Fair	Twin-trunked.	+ 15	C2
14	Acer campestre Field Maple	9.0	2.0	2.0	2.0	4.0	0.13 0.12	2.00	1.00	-	MA	Fair	Located just outside of the fencing. Twin-trunked at 1.5m. Bole is lopsided.	+ 20	C2
15	Fraxinus excelsior Common Ash	17.0	4.0	4.0	3.0	5.0	0.37 0.32	2.00	3.00	-	MA	Fair/Poor	Twin-trunked. Union is tight, possibly included.	+ 20	C2
16	Quercus robur English Oak	9.0	5.0	5.0	5.0	5.0	0.22	1.00	4.00	-	M	Good	Vigorous, well vegetated.	+ 25	B2
G1	Quercus robur, Viburnum opulus, Salix fragilis, Cornus sanguinea, Populus alba	9.0	-	-	-	-	-	-	-	-	OM	Fair	Congested group fronted by large Willow.	+ 20	C2
	English Oak, Guelder Rose, Crack Willow, Common Dogwood, White Poplar														
G2	Ulmus procera English Elm	>7	-	-	-	-	-	-	-	-	OM/Y	Fair/Poor	Regenerating Elm in a constant state of cycling with dead standing and regenerating, vigorous suckering.	-15	C2
G3	Salix sp., Crataegus monogyna, Ulmus sp. Willow, Common Hawthorn, Elm	11.0	-	-	-	-	-	-	-	-	MA	Fair/Poor	Close Willow poles and Hawthorn giving way to Elm.	+ 20	C2
G4	Acer campestre, Cornus sanguinea, Quercus robur, Fraxinus excelsior, Tilia sp., Field Maple, Common Dogwood, English Oak, Common Ash, Lime	>11	-	-	-	-	-	-	-	-	MA	Fair	Dogwood and regenerating Ash understory with Field Maple. Larger Ash to the west on the boundary.	+ 20	C2
G5	Acer campestre Field Maple	>8	-	-	-	-	-	-	-	-	MA	Fair	Mid-mature group, suppressed.	+ 20	C2

Note: This survey is based on a brief visual inspection from the ground.

It is not intended as a full arboricultural inspection.

- Indicates estimated / offsite tree

Tree Survey Schedule

Site Barncroft School
 Project schedule ref: JSL1786_750
 Drawing reference: JSL1786_710
 Survey date: 19/07/2013

Surveyor: C Chambers
 Status: For Information
 Revision:
 Notes:



Ref. no.	Species	Height (m)	Crown spread (m)				Stem dia. (m)	Stem no. at 1.5m	Height of crown clearance (m)	Dir/ height	Age class	Structural Physiological condition	General observations Management recommendations	Estimated remaining contribution (years)	Tree Quality Category (BS5837)
			N	E	S	W									
G6	Acer campestre, Quercus robur, Cornus sanguinea, Viburnum opulus Field Maple, English Oak, Common Dogwood, Guelder Rose	11.0	-	-	-	-	-	-	-	-	MA	Fair	With Oak and fair sized Field Maple.	+ 20	C2
G7	Quercus robur English Oak	8.0	-	-	-	-	-	-	-	-	MA	Good	Well vegetated.	+ 25	B2

Note: This survey is based on a brief visual inspection from the ground.
 It is not intended as a full arboricultural inspection.
 # - Indicates estimated / offsite tree

APPENDIX 4

Example Tree Protection Barrier (BS5837:2012 Fig 2 & 3)

Figure 2 Default specification for protective barrier

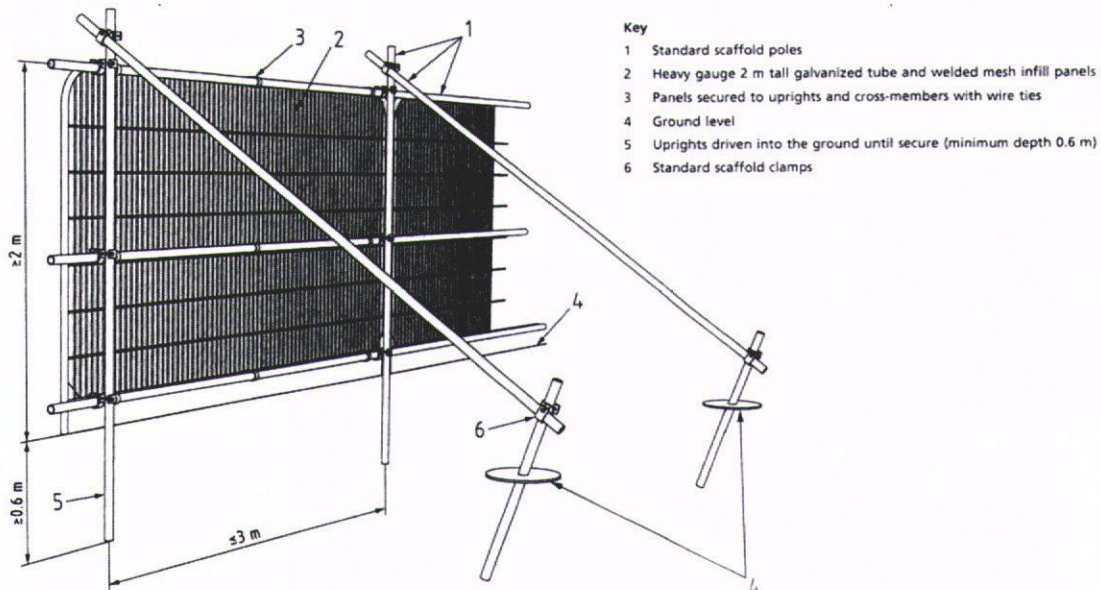
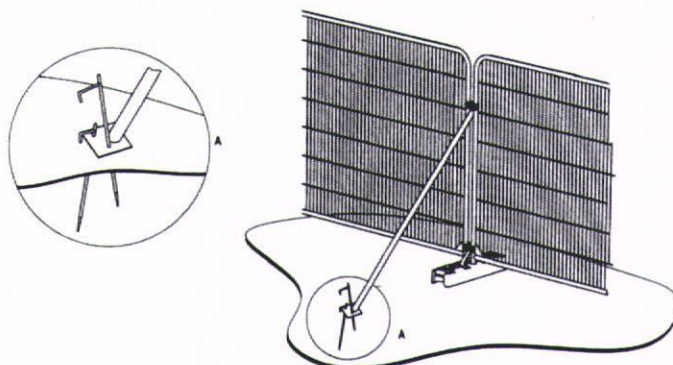
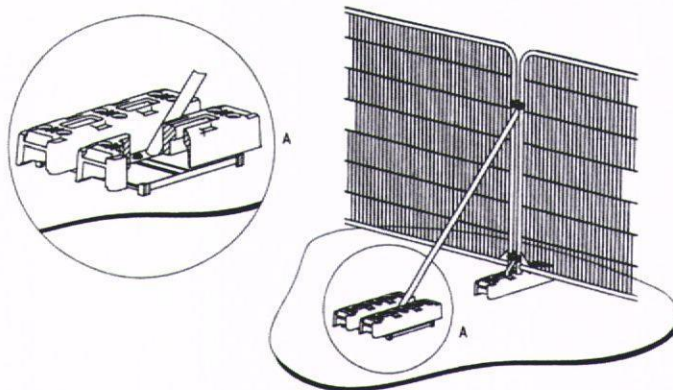


Figure 3 Examples of above-ground stabilizing systems



a) Stabilizer strut with base plate secured with ground pins

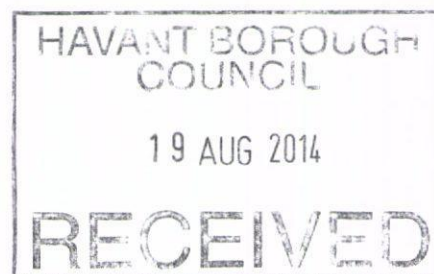


b) Stabilizer strut mounted on block tray

APPENDIX 5

Arboricultural site register

(Example template only)



ARBORICULTURAL SITE REPORT

PROJECT:

XXX, XX Street, XXX Town

SITE CONTACT:

Mr XXX

REPORT NO:

001

INSPECTION COMPLETED BY:

Mr XXX

DATE AND TIME:

XXX

SHEET:

X OF X

ITEM	LOCATION	NOTES / RECOMMENDATIONS	ACTION
1	E.g. Adjacent to T999, north of building	E.g. Damaged fence, materials spilled into RPA, further inspection requirements, damage to tree	E.g. Reinstate fencing, make good levels with topsoil
2			
3			

CIRCULATION:

Mr XXX

Mr XXX

APPENDIX 6

Construction Exclusion Zone (CEZ) Signage



**PROTECTIVE FENCING. THIS
FENCING MUST BE
MAINTAINED IN ACCORDANCE
WITH THE APPROVED PLANS
AND DRAWINGS FOR THIS
DEVELOPMENT.**



**TREE PROTECTION AREA
KEEP OUT !**

(TOWN & COUNTRY PLANNING ACT 1990)

TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY
PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A
TREE PRESERVATION ORDER.

CONTRAVENTION OF A TREE PRESERVATION ORDER MAY
LEAD TO CRIMINAL PROSECUTION

ANY INCURSION INTO THE PROTECTED AREA MUST BE
WITH THE WRITTEN PERMISSION OF THE LOCAL
PLANNING AUTHORITY

Barncroft Children's Home (RIBA Stage B) Flood Risk Assessment & Drainage Strategy

Site Address: Park Lane, Havant, PO9 3HQ

Flood Risk Assessment

The Environment Agency flood maps indicate that the site is located in Flood Zone 1, where the annual probability of river flooding is low. The relevant extract from the maps for this site are attached.

The area of the site is approximately 0.14 Hectares. A FRA will not be required as part of the planning submission.

Foul Water

The Southern Water sewer records indicate the presence of a 225mm diameter foul water sewer running along the western boundary of the site which fronts Park Lane.

The existing site is undeveloped, any buildings constructed on site would need to have a new connection to the adopted foul sewer, connection approval will be required from Southern Water.

An assessment of proposed foul flows from the developed site would need to be undertaken and agreed with Southern Water.

Any buildings on site would need to be constructed outside of the sewer easement.

Surface Water

The Southern Water sewer records indicate the presence of a 225mm diameter surface water sewer crossing the south west corner of the site and a 750mm diameter surface water sewer running along the south east boundary.

The existing site is undeveloped, any buildings constructed on site would need to have a new connection to the adopted surface water sewer, connection approval will be required from Southern Water.

A flow rate from the developed site would need to be agreed with Southern Water.

Any buildings on site would need to be outside of the sewer easement.

The new surface water drainage system should be designed as recommended by the Building Regulations and the SuDS manual. The system should be capable of draining the site, without flooding, during the 1 in 100 year storm flows plus 30% allowance for climate change within the site boundary and without putting the proposed residential dwellings and respite centre or third party land at risk from flooding. For more extreme storms flood routing is to be identified and the risk of flooding to buildings minimised as far as reasonably practical.

There are no watercourses within or on the boundary of the site.

Map of PO9 3HN at scale 1:10,000

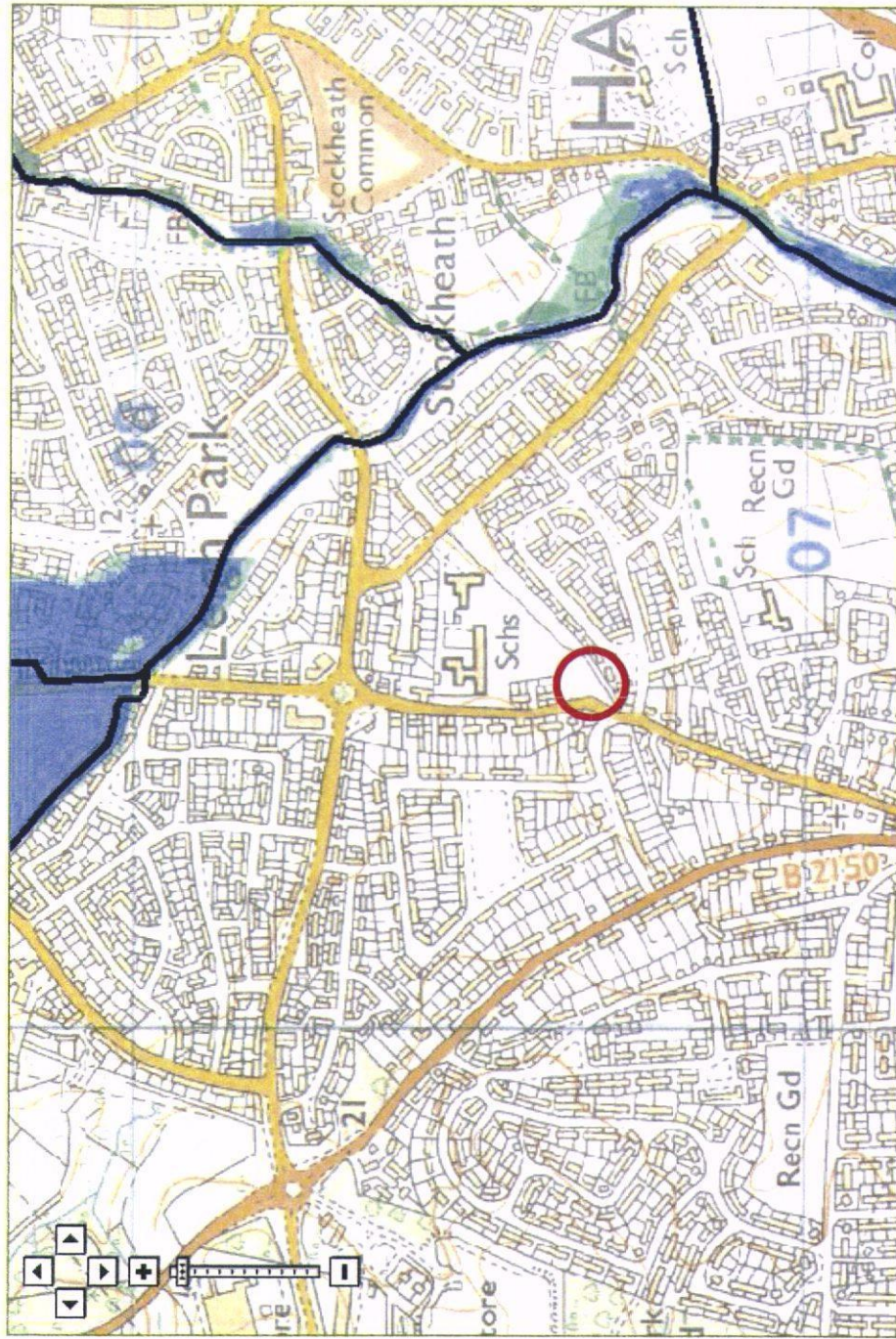
Data search  Text only version 

Map legend

Click on the map to see what is the Risk of Flooding at a particular location.

  **Flood Maps** 

-  Flooding from rivers or sea without defences
-  Extent of extreme flood
-  Flood defences (Not all may be shown*)
-  Areas benefiting from flood defences (Not all may be shown*)
-  Main rivers



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Barncroft Children's Centre

Drainage Strategy



Storm

The run-off from both the hard-standing areas and the roof will be collected in pipes and discharged into the existing public storm water sewer located in the pathway to the south of the development. The total contributing area to the storm drainage system amounts to approximately 320m².

Based upon the above contributing area, the peak discharge flow rate from this site during the critical 30 year storm is 10.8 litres per second.

The previous development at Barncroft School agreed discharge rates with Southern Water. The 30 year discharge rate agreed for this part of the development was 5.97 litres per second. Thus, excess flows will be attenuated using an underground storage tank controlled by a Hydrobrake vortex flow control device.

To achieve the agreed 30 year discharge rate, a storage volume of 1.6m³ will be required. A further 1.9m³ of above ground storage will be required to attenuate the 100 year storm event (plus 30% allowance for climate change) and ensure that no surface water discharges onto neighbouring third party land.

Foul

The Children's Centre consists of 6 bedrooms and other shared facilities. All bedrooms have en-suite showers WCs. In accordance with BS EN 12056 Part 2, the calculated flows from the centre will be as below...

Appliance	Number	Individual Discharge Units	Discharge Units
WC	7	1.2	8.4
Wash hand basin	7	0.3	2.1
Shower	6	0.4	2.4
Bath	1	1.3	1.3
Washing machine	1	0.6	0.6
Sink	1	1.3	1.3
Dishwasher	1	0.2	0.2
Total Discharge Units			16.3

Therefore the total peak foul flow from the centre will be 2.8 litres per second.

It is intended to discharge this flow into the public foul water manhole located in the footpath of Park Lane. However, the level of the site (some 1.0m below those of Park Lane) means there are two options available to achieve this...

Option 1 requires the foul drains to be connected into a new foul water pumping station; this will then pump at a rate of 5.5 litres per second into a discharge/ demarcation chamber at the site boundary and will then flow by gravity into the public foul sewer. The pumping station would be designed to have a 24 hour emergency storage capacity (1,200 litres) in case of pump or electrical failures.

Option 2 requires that the site levels are raised such that the minimum finished floor level of the Children's centre is set at 13.89m (approximately 1.1m above existing ground levels). This will then mean that the foul flows can be discharged by gravity (at the lower rate of 2.8 litres per second) into the existing foul sewers in Park Lane and eliminates the on-going cost and maintenance implications associated with a pumping station.

A section 106 (Water Industries Act) application is to be submitted to Southern Water for both the foul and storm water connections.

Barncroft Desk Study – April 2013

Study Site Address:

Barncroft, Park Lane,
Havant – PO9 3HQ

At the request of the CCBS department a basic desk study has been undertaken utilising geotechnical, GIS and EA data to provide an outline of potential issues affecting proposals to develop the above site. This desk study is not comprehensive enough to satisfy planning requirements for a phase 1 contamination assessment should one be required.

1. Geology.

The available digital BGS data indicates that the bedrock geology at the study site is the Thames Group, London Clay Formation comprising undifferentiated clay, silt and sand. Superficial geology of Head Deposits are indicated at the study site comprising undifferentiated clay, silt, sand and gravel. There is no artificial geology indicated at the study site. Radon protection measures are not required at the study site.

2. Aerial.

The study site is a very heavily vegetated and undeveloped plot of land at the southern tip of the Barncroft Primary School playing fields. The species, height and maturity of this vegetation is unknown. A medical centre is located immediately north of the study site.

3. Historical Maps.

Epoch 1: 1843 to 1893

The study site forms the southern corner of a large, undeveloped agricultural field. Park Lane (although unnamed on the Epoch 1 map) is located immediately outside the western boundary of the study site. The alignment of the lane is as it is today. Where the modern day Jessie Road branches off Park Lane, there is an entrance to a property called Newbarn.

Epoch 2: 1891 to 1912

There is no apparent change at the study site. There is a well indicated at Newbarn approximately 80m west of the study site.

Epoch 3: 1904 to 1939

The southern corner of the field within which the study site is located has been subdivided into smaller plots. Two small buildings (residential properties?) have been constructed immediately outside the northern boundary of the study site - the boundary of this residential plot comes within the bounds of the study site. Barncroft Farm has been built approximately 50m north of the study site.

Epoch 4: 1919 to 1943

There is no apparent change at the study site. There has been some expansion of Barncroft Farm. Park Lane is now named.

4. Environmental Information.

Hermitage Stream is located approximately 550m east of the study site. There are EA Flood Warning and Flood Alert Areas as well as EA Flood Zones 2 & 3 associated with the course of the Hermitage Stream, though these are located 500m away from the study site. The study site is located within EA Flood Zone 1 (anywhere in England & Wales not designated as EA Flood Zone 2 and/or 3).

The study site is not located within a Groundwater Source Protection Zone.

The study site is not located within a Groundwater Vulnerability Zone.

A former landfill site is located approximately 900m south of the study site. The site is listed as Bedhampton Waterworks Landfill, property of Portsmouth Water Ltd.

5. Other Information.

Digital contour line data suggest that the study site is located on flat ground between 10-20mAOD.

A SCOTIA medium pressure gas network main runs along the south-eastern boundary of the study site. A low pressure gas network main is located just outside and runs parallel to, the western boundary of the study site. A Southern Water sewer line crosses the south-western corner of the study site. Numerous service lines run along the length of Park Lane.

6. Previous Investigations.

No previous site investigations have been conducted at the study site. There are however, five SI reports available from past developments in the vicinity:

1) **Site Investigation at Barncroft Middle School, Havant - September 1993.**

The site investigation revealed the soils at the site to consist of slightly gravelly clay. No groundwater was encountered during the site investigation which went to 3.6mbgl. The ground conditions were considered suitable for the use of shallow strip and pad foundations. It was recommended that foundations be taken down to a minimum depth of 0.9mbgl to avoid the zone affected by seasonal swelling and shrinkage. An allowable bearing capacity of 125kN/m² was recommended for design purposes. Settlements were anticipated to be in the order of 10mm and to take place within approximately one year of construction. No special precautions were deemed necessary for the design of concrete in contact with the ground.

2) **Site Investigation at 106 Park Lane, Havant - October 1999.**

The site investigation revealed the soils at the site to consist of variable Head Deposit which were underlain by London Clay. The Head Deposits were observed to a depth of 1.2m below ground level. The Head Deposits were found to be of medium to high volume change potential. The transition from the Head Deposits to the London Clay was clearly visible from the colour change in the soils. Groundwater was not encountered during the investigation which went to 3mbgl.

3) Ground Investigation at Barncroft Infant School, Havant - May 2001.

The site investigation revealed the soils at the site to consist of Made Ground overlying Head Deposits overlying London Clay. Slight water seepage was encountered in one trial pit. It was advised that foundations should be situated in the London Clay underlying the Made Ground and Head Deposits at the site. An allowable bearing capacity of 150kN/m² was considered appropriate for traditional strip footings placed in the London Clay. The clays present at the site were found to be of high shrinkability and so it was recommended that floor slabs be suspended. It was recommended that buried concrete be designed in accordance with Class 1 of BRE Digest 363.

4) Barncroft Junior School - Site Investigation Report - February 2010.

The site investigation revealed the soils at the site to consist of Fill / Made Ground overlying Head Deposits overlying variably weathered London Clay Formation soils. Ground water was encountered in only one exploratory position. Spread foundations passing through the Made Ground into the natural soils were considered suitable at the study site. Precautions against volumetric changes in the soil under the influence of trees were recommended such as the use of proprietary void formers and compressible material for the sides of trench fill, pier caps and ground beams, and where necessary the undersides; within the zones of influence of existing or proposed trees. It was estimated that allowable bearing pressures in the order of 110kN/m² could be obtained for pad or strip footings bearing on to the fine grained soils of the Head Deposits or London Clay Formation, at minimum depths of 1mbgl, limiting settlements to no greater than 25mm.

It was recommended that floor slabs be suspended. The Aggressive Chemical Environment for Concrete (ACEC) was considered to be AC-4s for the tested soils. A CBR of 2% was recommended for road and pavement design. It was anticipated that excavations would remain relatively stable, however, it was advised that care should be taken to ensure that potential collapse, even of shallow foundations would not compromise the integrity of existing foundations or services. It was not anticipated that significant dewatering would be required for foundation excavations. Chemical testing did not reveal any specific constituents of concern.

5) Barncroft Infant School - Site Investigation Report - February 2010.

The site investigation revealed the soils at the site to consist of Made Ground overlying Head Deposits overlying London Clay Formation Soils. Ground water was encountered at depths of between 0.8-1.5mbgl. Spread foundations passing through the Made Ground into the natural soils were considered suitable at the study site. Precautions against volumetric changes in the soil under the influence of trees were recommended such as the use of proprietary void formers and compressible material for the sides of trench fill, pier caps and ground beams, and where necessary the undersides; within the zones of influence of existing or proposed trees. It was estimated that allowable bearing pressures in the order of 80- 110kN/m² could be obtained for pad or strip footings bearing on to the fine grained soils of the Head Deposits or London Clay Formation, at depths of 1.0 to 2.0mbgl respectively, limiting settlements to no greater than 25mm. It was recommended that floor slabs be suspended. The Aggressive Chemical Environment for Concrete (ACEC) was considered to be AC-4s for the tested soils. A CBR of 2% was recommended for road and pavement design. It was anticipated that excavations would remain relatively stable, however, it was advised that care should be taken to ensure that potential collapse, even of shallow foundations would not compromise the integrity of existing foundations or services. It was not anticipated that significant dewatering would be required for foundation excavations. Chemical testing did not reveal any specific constituents of concern.

7. Conclusions.

For any proposed works, the founding stratum is expected to be London Clay. Due the presence of the Head and underlying London Clay (both of which are susceptible to volumetric changes under the influence of vegetation) and the abundance of trees and shrubs present at the site, deep trench fill foundations will likely be required and these will need to be designed in accordance with current BRE and NHBC guidance. Trees and vegetation will clearly need to be felled and cleared to permit the proposed development and the removal of this vegetation would be expected to result in swelling of the ground as moisture levels in the soil increase with time.

Firm London Clay Soil would have an allowable bearing capacity in the range of 75 to 150 kPa. The formation level should be inspected by a suitable qualified geotechnical engineer immediately upon excavation to ensure that the shear strength of the material meets the design requirements and that there are no soft spots. Any soft spots identified would need to be dug out and replaced with a suitably compacted fill, lean mix concrete or the formation level taken lower until in-situ shear strengths met design requirements. Following inspection, the formation level should be blinded immediately to ensure that the formation is not softened and degraded by the effects of weather. Excavations in the London Clay should remain stable in the short term. Groundwater seepage into excavations are possible. Any groundwater influx into excavations that is greater than minor seepage would be expected to be controllable by sumps and motorised pumps.

If greater capacities are required (for example for multiple storey buildings) then piles could be used at the site. It is recommended that piles be sleeved in their upper extents to eliminate any potential negative skin friction caused by volumetric changes in the soil under the influence of trees.

Due to the presence of the shrinkable Head & London Clay and the abundant trees, it is considered that floor slabs would need to be suspended.

Buried concrete will need to be designed to DS1 AC1 as a minimum.

Soakaways would not be expected to be feasible at the study site.

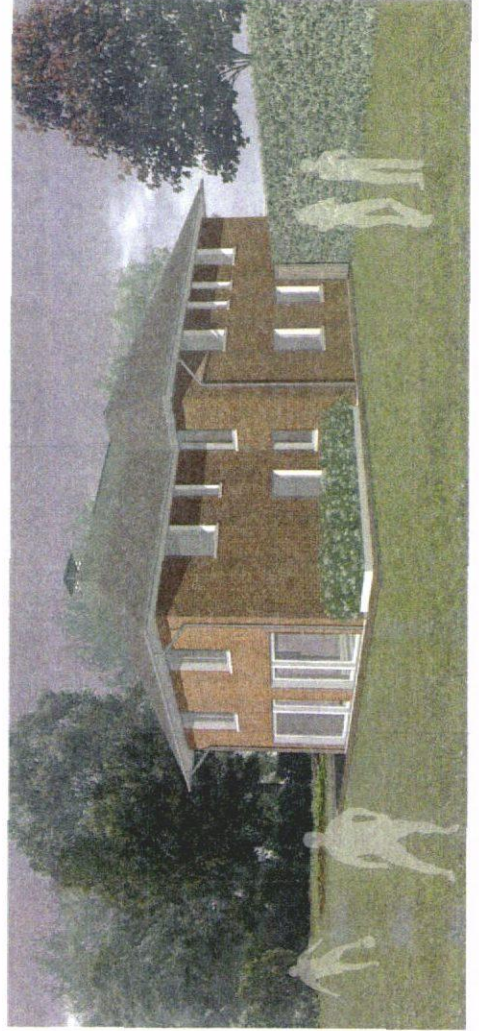
A package of SI would be recommended for the study site in order to;

- 1) Assess ground and groundwater conditions and investigate possible dessication to inform foundation design
- 2) To inform a contamination assessment of the site should this be required for planning purposes.
- 3) To classify any Made Ground for Waste Acceptance Criteria (i.e. landfill).

A full arboricultural survey may exist for the study site, but in the absence of one, a full survey is recommended to ascertain the species, height and maturity of the trees and shrubs present at the site.

A full buried services Ground Penetrating Radar survey of the site is recommended before any SI or construction works take place (if one is not already available).

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Generic 3D Images for Children's Home Programme