



# **Arboricultural Impact Assessment**

## **Ford Castle, Berwick-Upon-Tweed**

**Report Reference Number: 211201-1.1-AIA- FCBuT-MW**

On behalf of

**SLR Consulting Limited for PGL**

**01 December 2021**

# Arboricultural Impact Assessment

## Ford Castle, Berwick-Upon-Tweed



### Document Control Sheet

**Project Name:** Ford Castle, Berwick-Upon-Tweed

**Report Ref:** 211201-1.1-AIA- FCBuT-MW

**Report Title:** Arboricultural Impact Assessment

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Surveyed by:	Rob Davidson	Arboricultural Surveyor	06/11/2021

Revision	Date	Description	Prepared by
1.0	16/11/2021	Draft	MW
1.1	01/12/2021	Minor updates to layout	MW

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### Executive Summary

- This report provides an assessment of the impact on trees and a proposal for the installation of outdoor equipment in an open field to the north-east of Ford Castle. The report makes recommendations for mitigating any negative impacts and is suitable for submission in support of a planning application.
- The design has been developed with careful consideration to minimise the impact on the most important trees across the site.
- Nine trees and 3 tree groups were surveyed to inform this report. The data for each is presented within the Tree Schedule at Appendix A.
- Two trees (T5 and T11) will need to be moved to facilitate the proposal and these trees are considered suitable for transplanting due to their age and size and will therefore be moved to a more suitable area of the site. T8 has been recommended for removal and replacement due to poor live growth. This tree is category U.
- All other trees and groups will be retained, protected, and integrated into the proposal. Sufficient space and adequate protection measures have been set out to ensure that retained trees are not damaged during the pre-construction and construction phase and to enable their successful development post-construction. Retained tree protection measures are discussed throughout this report and illustrated on the Tree Protection Plan at Appendix B.
- T1, G3 and G12 will be subject to construction within their root protection areas. Special measures are recommended to ensure that these trees and tree groups are not damaged. These measures are detailed in Section 3.4 of this report and are illustrated on the Tree Protection Plan at Appendix B.
- None of the retained trees require remedial tree work to facilitate the development or to reduce the likelihood of their being subject to excessive pressure after the completion of the proposal.
- The Central Registry Team of the Planning Department of Northumberland County Council confirmed that no Tree Preservation Orders or Conservation Areas are present on the site on 11<sup>th</sup> November 2021.

### 1 Introduction

#### 1.1 Brief and Context

1.1.1 Treework Environmental Practice was instructed by SLR Consulting on 12 November 2021 to provide an Arboricultural Impact Assessment, in accordance with British Standard BS5837: 2012 *Trees in Relation to Design, Demolition and Construction – Recommendations*, of the effect of development proposals on trees an open field to the north-east of Ford Castle, Berwick-Upon-Tweed.

1.1.2 Trees are a material consideration for a Local Planning Authority when determining planning applications, whether or not they are afforded the statutory protection of a Tree Preservation Order or Conservation Area. British Standard BS 5837:2012 *Trees in Relation to Design, Demolition and Construction* sets out the principles and procedures to be applied to achieve a harmonious and sustainable relationship between trees and new developments. The Standard recommends a sequence of activities that starts in the initial feasibility and design phase (RIBA Stage 2 'Concept Design') with a survey to qualify and quantify the trees on site and establish the arboricultural constraints to development (above- and below-ground) to inform the design in an iterative process, and continues with an assessment of the arboricultural impacts of the final design and measures to mitigate such impacts should they be negative. Detailed technical specifications for mitigation and protection measures are devised in the design phase that follows (RIBA Stage 3 and 4 'Spatial Coordination' and 'Technical Design'), and the sequence ends with the 'Handover' and 'Use' phases (RIBA Stages 6 and 7), with the implementation of those measures once planning permission is granted, guided by Arboricultural Method Statements (RIBA Stage 4 and 5, 'Technical Design' and 'Manufacturing and Construction) and professional guidance where appropriate.

1.1.3 This Arboricultural Impact Assessment (AIA) reports on the direct and indirect impacts of the proposals on trees in terms of both the buildability of the proposals and the long-term impact of the finished scheme, and where necessary presents mitigation for these impacts.

#### 1.2 Purpose of this Report

1.2.1 This AIA, and accompanying Tree Schedule and Tree Protection Plan, is provided to support a planning application for the proposals. It sets out the arboricultural impacts of the proposals using the following considerations as a framework:

- Trees to be removed and trees to be retained.
- Remedial tree work to retained trees to allow development and ensure retained trees will form a harmoniously integrated component of the proposed development.
- Suitable measures to protect retained trees.

- Special construction or engineering measures required to enable trees to be harmoniously integrated into the proposed development.

### 1.3 The Development

1.3.1 The proposed development is for the installation of outdoor equipment in an open field to the north-east of Ford Castle, Berwick-Upon-Tweed in Northumberland.

1.3.2 The following documents have been reviewed by Treework Environmental Practice to inform this report:

Document Title	Document/Drawing number	Originator
Topographical Survey	N/A	-
Proposed Layout	2035-AF-003 - Proposed Site Plan	NBDA Architects
Tree Constraints Plan	211109-1.0-FCBUT-TCP-NC	Treework Environmental Practice

## 2 Existing Tree Population and Constraints

2.1.1 A survey covering trees on site and trees on adjacent land close enough to be affected by the development was undertaken on 06 November 2021. The full survey results are presented in the Tree Schedule at Appendix A.

2.1.2 The survey was undertaken based on trees plotted using an outline base map as reference in Treework Environmental Practice's specialist tree management software – MyTrees. The basemap contained a topographical survey of the trees. Trees and hedges were plotted on the basemap using the topographical survey as reference.

2.1.3 The proposed development site currently houses an open field with seven young, semi-mature trees to the east (T5-T11), 3 mature tree groups around the periphery to the north, west and south east (G3, G4, G12) and 2 mature trees (*Acer pseudoplatanus* T1 and T2), situated to the south west.

2.1.4 BS 5837:2012 recommends classifying trees into four quality and value categories to determine their relative retentive worth. A summary of the relative retentive worth of the trees on site as recorded during the tree survey and expressed by their categories is given in Table 1. Appendix A explains the BS 5837:2012 tree categorisation process.

**Table 1: Trees/Groups in each Retention Category**

BS Category	No. of Trees (T)	No. of Groups (G)	Total
A	0	1	1
B	2	2	4
C	6	0	6
U	1	0	0
<b>Total</b>	<b>9</b>	<b>2</b>	<b>11</b>

- 2.1.5 Trees present constraints to development both above and below ground. The above ground constraints comprise the physical extent of tree crowns. The below ground constraints comprise the roots, and are expressed in terms of the root protection area (RPA), which is the minimum rooting area that a tree needs to sustain itself in reasonable health. These constraints, as established by the tree-survey, inform this assessment of the impact of the development proposals.
- 2.1.6 The full results of the tree survey on which this report is based are given in the Tree Schedule at Appendix A, and the above- and below-ground constraints are illustrated on the Tree Protection Plan at Appendix B. Each tree (T) and tree group (G) has been allocated an individual number to which it is referred in this report and all associated documents. The survey method and limitations are set out in Appendix E.
- 2.21.7 The Central Registry Team of the Planning Department of Northumberland County Council confirmed that no Tree Preservation Orders or Conservation Areas are present on the site on 11th November 2021.

## 3 Arboricultural Impact of the Proposals

### 3.1 Tree Removal and Retention

- 3.1.1 Every effort has been made to retain trees wherever possible. Only 2 'C' category trees (T5 and T11) need to be removed to facilitate the proposal and both of these trees are considered to be suitable for transplanting to another part of the site, due to their age and size. T8 is also recommended to be removed and replaced due to poor live growth, which is likely to result in decline. This tree would be recommended for replacement in any context.

3.1.2 All trees other than those in Table 2 will be retained and protected during development (see section 3.3).

### **3.2 Facilitative Tree Works**

3.2.1 No works to retained trees is anticipated to enable the proposed development.

### **3.3 Tree Protection**

#### **3.3.1 *Root Protection Areas and Construction Exclusion Zones***

Retained trees will be protected during development by establishing a Construction Exclusion Zone (CEZ) around their Root Protection Areas (RPAs). RPAs are a layout design tool, indicating the minimum area around a tree deemed to contain sufficient roots and soil to maintain the tree's viability. RPAs should be treated as a precautionary area within which activities such as ground compaction, excavation, the storing of materials, ground level changes and other construction activity are likely to cause damage to trees and should therefore be excluded. This CEZ can be achieved by the erection of barriers at the locations shown on the Tree Protection Plan at Appendix B. Tree protection barriers must be installed before any demolition or construction works start, and, unless approved by the Local Planning Authority or by an arboriculturist approved by them, should remain in place until all construction activity has been completed.

3.3.2 The type of barriers should match the level of activity around the retained trees. Where a high level of construction activity is expected, fencing must be braced to be robust to vehicular impact and to prevent it from being easily repositioned; a specification similar to drawing 3 in BS 5837:2012 will be suitable (reproduced at Appendix D). In areas away from the main construction activity and vehicle movement, it may be appropriate to install a lower specification fencing, examples of which are given at Appendix D.

3.3.3 All protection fencing should carry identifying signs that state its purpose and proscribe its removal until all demolition and construction work is complete. An example sign is given at Appendix D.



### 3.4 Special Technical Measures

3.4.1 Conflicts between retained trees and aspects of the proposed development that cannot be dealt with by exclusion zones, tree protection or tree work can be mitigated by the use of special technical measures. General recommendations for these measures are presented in the sections that follow based on the information about the proposed development that is currently available. The specific details must be carefully planned once detailed construction information is available to avoid tree damage.

#### 3.4.2 *Path/Drive Construction within the RPA*

Path restoration and reinstatement is planned as part of the proposal. Areas of these paths go through the RPA's of retained trees and tree groups, as illustrated on the Tree Protection Plan (Appendix B). These paths will be constructed on the basis of a 'no-dig' design, which will retain any existing base material where possible. Further base material may be used and installed over the existing ground level. Edging can be constructed by using treated timber on its edge, fixed to the ground with wooden stakes, or similar edging, providing that no strip excavations are dug to install the edging. This method will prevent the severance of any significant roots. The width of the footpaths and compaction of base stone will also be minimised as this can lead to asphyxiation of roots. The surface will be a porous surface such as loose gravel. Any deviation from the above method should be discussed with an Arboricultural Consultant and further advice provided.

### 3.5 Additional Precautions

#### 3.5.1 *Utilities and Services*

Information on the location of utility and service runs for the proposal was not available at time of writing. In principle, traditional trench-installed utilities should be routed outside of the RPAs of retained trees to avoid root damage. Where routing utility runs within RPAs is unavoidable, all work should comply with The National Joint Utilities Volume 4 and advice should be sought from a professional Arboricultural Consultant.

#### 3.5.2 *Soft Landscaping*

The Arboricultural Consultant should review any landscape operations that involve any work within the RPAs of retained trees and input additional site specific methodology where necessary.

# Appendix A

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## Tree Schedule

# Ford Castle, Berwick-upon-Tweed

## Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m <sup>2</sup> )	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T1	1	<i>Acer pseudoplatanus</i> Sycamore	17.0	1	103	N 7.0	E 11.0	S 10.0	W 7.0	2.0	3.0	Mature	Fair	Deadwood - Minor. Grass.	479.9	12.4	20-40	B	1 2
T2	1	<i>Acer pseudoplatanus</i> Sycamore	17.0	1	108	N 12.0	E 10.0	S 10.0	W 7.0	2.0	3.0	Mature	Fair	Deadwood - Minor. Grass.	527.7	13.0	20-40	B	1 2
G3	15 9 1	<i>Taxus baccata</i> Yew  <i>Acer pseudoplatanus</i> Sycamore  <i>Quercus robur</i> English Oak	16.0	1	40	N 5.0	E 5.0	S 5.0	W 5.0	1.0		Mature	Fair	Tree within group canopy.	72.4	4.8	40+	B	2
G4	50 25 20 10	<i>Prunus sp.</i> Cherry sp.  <i>Acer platanooides</i> Norway Maple  <i>Cupressus sp.</i> Cypress sp.  <i>Larix sp.</i> Larch sp.	13.0	1	35	N 4.0	E 4.0	S 4.0	W 4.0	1.0		Semi Mature	Fair	Tree within group canopy.	55.4	4.2	20-40	B	2
T5	1	<i>Cupressus sp.</i> Cypress sp.	3.0	1	12	N 1.0	E 1.0	S 1.0	W 1.0	1.0	1.0	Young	Fair	Grass.  <b>Note.</b> This tree will be transplanted in a better location.	6.5	1.4	40+	C	1

# Ford Castle, Berwick-upon-Tweed

## Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m <sup>2</sup> )	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
T6	1	<i>Betula sp.</i> Birch	4.0	1	7	N 1.5	E 1.5	S 1.5	W 1.5	0.5	0.5	Young	Fair	Young planted tree / trees. Grass.	2.2	0.8	20-40	C	1
T7	1	<i>Acer platanoides</i> Norway Maple	4.0	1	11	N 1.5	E 1.5	S 1.5	W 1.5	1.5	1.0	Young	Fair	Young planted tree / trees. Grass.	5.5	1.3	40+	C	1
T8	1	<i>Sorbus sp.</i> Sorbus sp.	3.0	1	5	N 1.0	E 1.0	S 1.0	W 1.0	1.5	1.0	Young	Poor	Weak live growth. <b>Fell - Ground level.</b> Fell and replace poor quality tree, in a better location.			0-10	U	
T9	1	<i>Acer platanoides</i> Norway Maple	4.0	1	9	N 1.5	E 1.5	S 1.5	W 1.5	1.5	1.5	Young	Fair	Young planted tree / trees. Grass.	3.7	1.1	40+	C	1
T10	1	<i>Acer platanoides</i> Norway Maple	4.0	1	11	N 2.0	E 2.0	S 2.0	W 2.0	1.5	1.5	Young	Fair	Young planted tree / trees. Grass.	5.5	1.3	40+	C	1
T11	1	<i>Cupressus sp.</i> Cypress sp.	3.0	1	12	N 1.0	E 1.0	S 1.0	W 1.0	1.0	1.0	Young	Fair	Grass. <b>Note.</b> This tree will be transplanted in a better location.	6.5	1.4	40+	C	1

# Ford Castle, Berwick-upon-Tweed

## Tree Survey BS5837-2012



Tree/Group Reference	Tree Count	Species	Height (m)	Stem Count	Stem Diameter (cm)	Crown Radius (m)				Crown Clearance Height (m)	Lowest Branch Height (m)	Life Stage	Physiological Condition	Observations and Recommendations	RPA (m <sup>2</sup> )	RPR (m)	Remaining Contribution (Years)	Retention Category	Retention Sub-category
						N	E	S	W										
G12	4	<i>Fagus sp.</i> Beech sp.	20.0	1	80	N 8.0	E 8.0	S 8.0	W 8.0	1.5	1.5	Mature	Fair		289.5	9.6	40+	A	1 2 3
	4	<i>Quercus robur</i> English Oak																	
	1	<i>Acer pseudoplatanus</i> Sycamore																	
	1	<i>Aesculus hippocastanum</i> Horse Chestnut																	
	1	<i>Sequoiadendron giganteum</i> Wellingtonia																	

# Tree Schedule Key

<b>Tree/Group Reference</b>	Reference number for individual trees or groups of trees, prefixed by T (Tree), G (Group), W (Woodland) or H (Hedge) to indicate type of feature.
<b>No. of Trees</b>	Number of trees of a particular species recorded within a group feature, with the default value of 1 for single trees.
<b>Tree or Group Species</b>	Scientific name followed by common name (where available).
<b>Height (m)</b>	Tree height to the nearest metre, either measured with laser device/clinometer or estimated. Tree height for group records refers to the estimated average height of trees within the group (unrepresentative trees within the group may be excluded from this estimate).
<b>DBH (cm)</b>	Stem Diameter at Breast Height, measured at 1.5 m above ground level in accordance with Annex C of BS5837: 2012. Diameters of multi-stemmed trees are presented as a combined stem diameter calculated in accordance with the formula in Section 4.6.1 of BS5837: 2012. Stem diameter for group records refers to the estimated average stem diameter of trees within the group (unrepresentative trees within the group may be excluded from this estimate).
<b>No. of Stems</b>	Number of stems (indicates whether tree is single-stemmed or multi-stemmed).
<b>Spread N/S/E/W (m)</b>	Spread of the tree crown in the four cardinal directions, estimated to the nearest half metre. Crown spreads for group records refer to the estimated average spreads of trees within the group (unrepresentative trees within the group may be excluded from this estimate).
<b>Crown Clearance (m)</b>	Distance between the ground and the lowest point of the crown periphery, estimated to the nearest half metre.
<b>Age Class</b>	Young, Semi-mature, Early Mature, Mature, Late Mature, Ancient or Veteran.
<b>Physiological Condition</b>	Good, Fair, Poor, Dead.
<b>Structural Condition</b>	Good, Fair, Poor.
<b>Tree/Group Condition/ Recommendations</b>	General observations, such as basic features and morphology, structural and physiological condition, and relevant growing conditions, with <b>management recommendations to facilitate the proposed development, including trees to be removed.</b>
<b>RPA (m<sup>2</sup>)</b>	Minimum area around a tree deemed to contain sufficient roots and rooting soil volume to main the tree's viability, in which the protection of roots and soil structure is treated as a priority, calculated from the DBH according to the formula in BS5837: 2012. Group RPAs are calculated based on a single average tree in the group (unrepresentative trees within the group may be excluded from the estimate of the average).
<b>RPR (m<sup>2</sup>)</b>	Radius in metres of the RPA.
<b>Remaining Contribution</b>	Estimated number of years for which the tree will continue to make a positive contribution to the site, banded as < 10, 10-20, 20-40, 40 +.
<b>BS Category</b>	Quality and value category ( <b>A</b> , <b>B</b> , <b>C</b> or <b>U</b> ) as defined in Table 1 of BS5837:2012 (reproduced below), where <b>A</b> = high quality and value; <b>B</b> = moderate quality and value; <b>C</b> = low quality and value and <b>U</b> = tree identified for removal due to poor condition. One or more sub-categories (1-3) for Categories A-C are assigned, where 1 = arboricultural qualities, 2 = landscape qualities and 3 = conservation and cultural value.

Table 1 Cascade chart for tree quality assessment

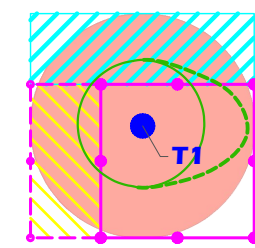
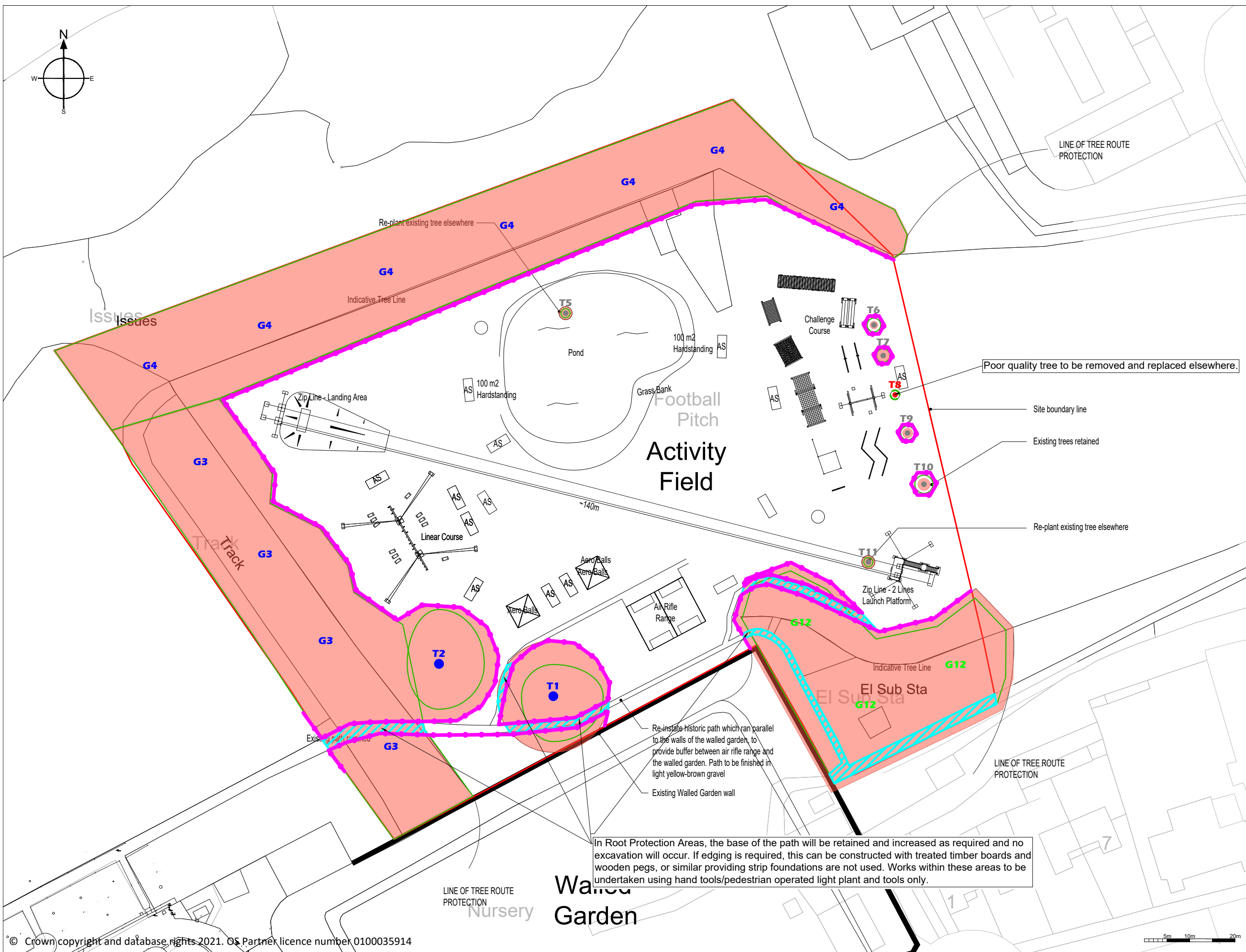
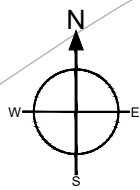
Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
<b>Trees unsuitable for retention (see Note)</b>				
<b>Category U</b> Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	<ul style="list-style-type: none"> <li>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)</li> <li>Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline</li> <li>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</li> </ul> <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>			See Table 2
	<b>1 Mainly arboricultural qualities</b>	<b>2 Mainly landscape qualities</b>	<b>3 Mainly cultural values, including conservation</b>	
<b>Trees to be considered for retention</b>				
<b>Category A</b> 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 particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
<b>Category B</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	Trees with material conservation or other cultural value	See Table 2
<b>Category C</b> 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 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	See Table 2

## **Appendix B**

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### **Tree Protection Plan**





- |  |   |
|--|---|
| Tree or Group Reference Number   | Tree Protection Fencing                     |
| Tree Stem Position A Category Tree   | Initial Tree Protection Fencing             |
| Tree Stem Position B Category Tree   | Special Engineering /Supervised Excavations |
| Tree Stem Position C Category Tree   | Pruning/Tree Removal                        |
| Tree Stem Position U Category Tree   | Site Boundary                               |
| Tree Crown   | Root Protection Area                        |
| No dig construction in this area Retain existing base material where available |   |

Date: December 2021

Scale: 1:800 @ A3

Project Name: Ford Castle, Berwick-upon-Tweed

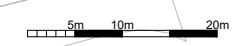
Drawing Title: Tree Protection Plan

Drawing Number: 211201-1.2-FCBUT-TPP-NC



Treework Environmental Practice  
 Monarch House  
 1-7 Smyth Road  
 Bedminster  
 Bristol  
 BS3 2BX

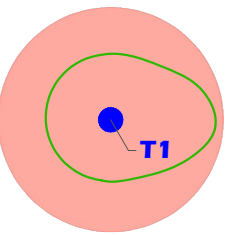
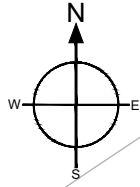
Tel: 0117 244 0012  
 Web: www.treeworks.co.uk  
 Email: info@treeworks.co.uk











## **Appendix C**

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### **Tree Constraints Plan**



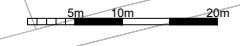
-  Tree or Group Reference Number
-  Tree Stem Position A Category Tree
-  Tree Crown
-  Tree Stem Position B Category Tree
-  Root Protection Area
-  Tree Stem Position C Category Tree
-  Tree Survey Boundary
-  Tree Stem Position U Category Tree

Date:	November 2021
Scale:	1:800 @ A3
Project Name:	Ford Castle, Berwick-upon-Tweed
Drawing Title:	Tree Constraints Plan
Drawing Number:	211109-1.0-FCBUT-TCP-NC



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 Email: [info@treeworks.co.uk](mailto:info@treeworks.co.uk)



## **Appendix D**

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### **Tree Protection Specifications**

## Technical Measures to Prevent Tree Damage

### Tree Pruning

Tree pruning will be carried out where the design and/or planned site operations encroach into the crowns of trees and where these encroachments can be accommodated through facilitation pruning without significantly reducing the landscape value and/or viability of the tree.

Tree pruning operations will:

- be specified by the arboricultural consultant
- be in accordance with current best practice
- be carried out by a suitably experienced and qualified arborist

### Tree Protection Fencing

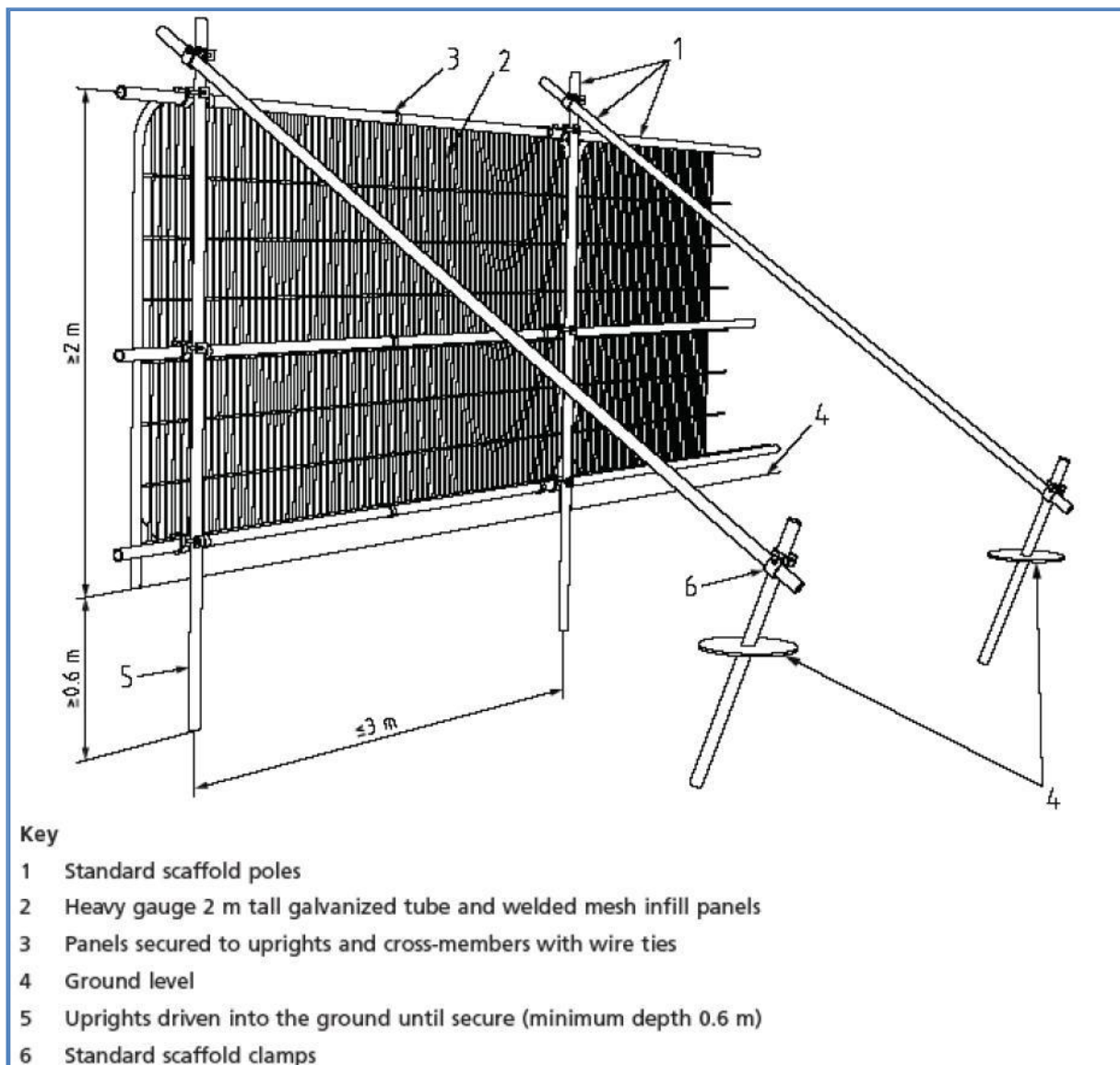
Tree protection fencing will be located at the edge of the Construction Exclusion Zone (CEZ) and will be suitably robust to provide sufficient protection for trees. The performance requirement for fencing will be determined by the type of activity that will take place in the area around the CEZ.

Typically the performance requirement for the Tree Protection Fencing will be:

- Tree Protection Fencing will be installed prior to commencement of activity on the site.
- Tree Protection Fencing will only be removed once all works associated with the development have been completed.
- The Tree Protection Fencing will be installed and removed without causing damage to retained trees.
- Installation, removal and, where required, replacement of Tree Protection Fencing will be supervised and signed off by the Arboricultural Consultant.
- The Tree Protection Fencing will be stable and robust (typical construction method, in accordance with BS5837: 2012, see below).
- The area between the Tree Protection Fencing and the tree will be a Construction Exclusion Zone (CEZ)
- Fence panels will be made of mesh (e.g.: Heras fencing) or, if solid, will have 30cm windows cut into enough panels to enable conditions within the CEZ to be viewed.
- The CEZ will be clearly identified (see Construction Exclusion Zone sign example below)

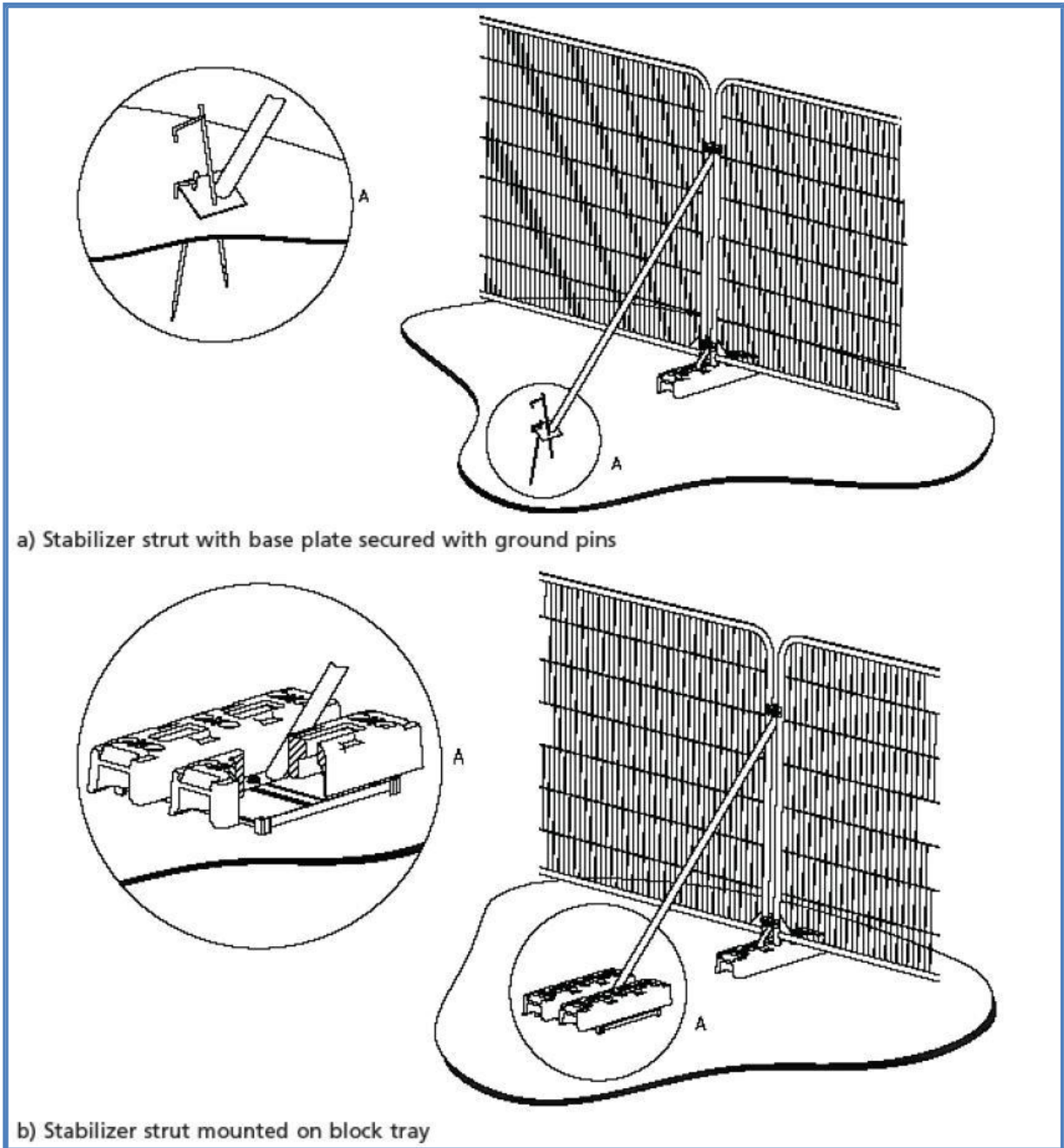


**Example Tree Protection Fencing Sign**



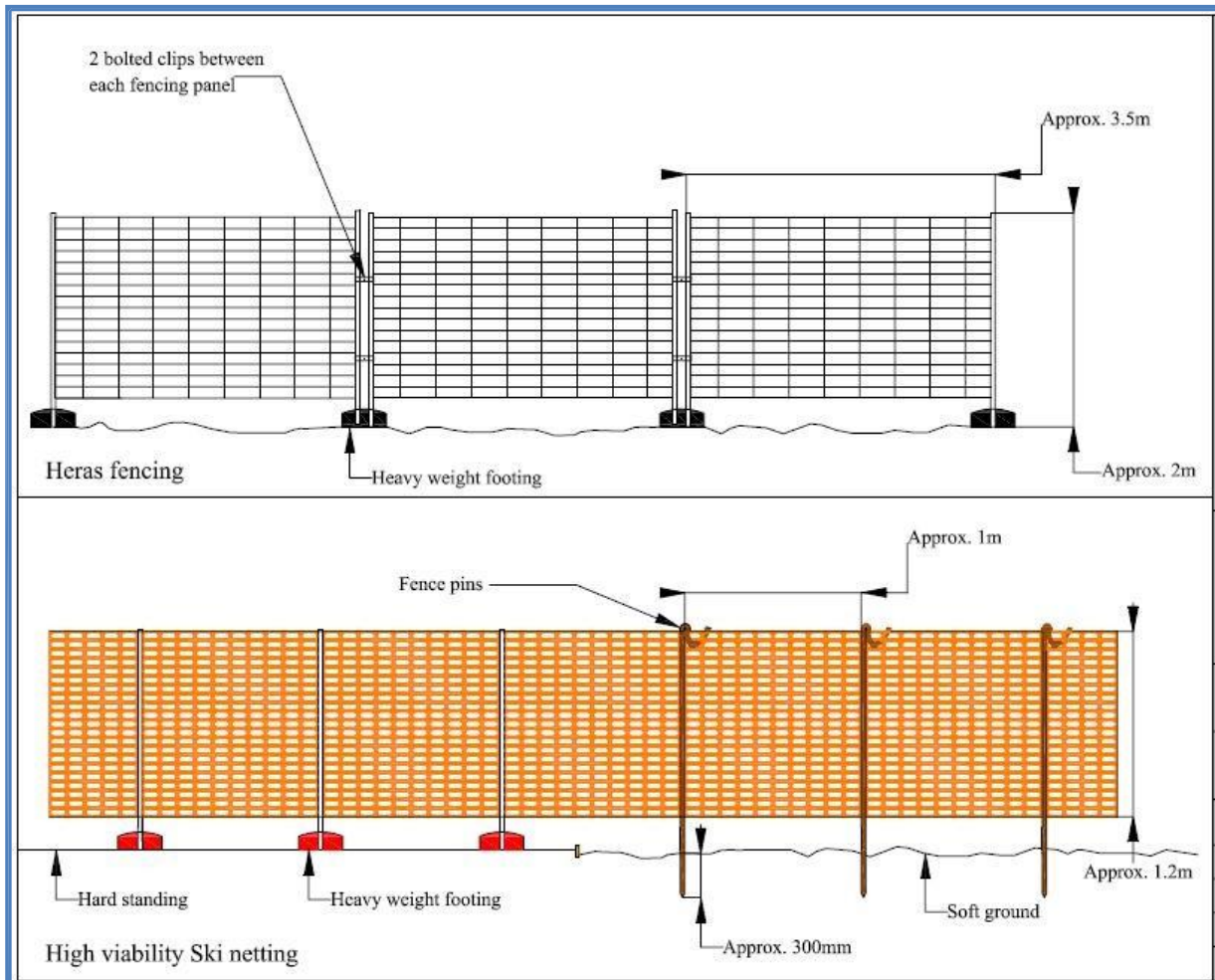
**BS5837: 2012 - Figure 2 – Tree Protective Barrier**





BS5837: 2012 - Figure 3 – Examples of Above Ground Stabilisation Systems





### Examples of specification fencing that may be appropriate for areas of low-intensity activity

#### No-dig Construction and Special Engineering Measures

No-dig construction methods and special engineering measures will be employed to enable the construction of roads and other built features within the RPAs of trees without damaging tree roots. Installation of built features using no-dig and special engineering measures will meet the following performance criteria:

- Ensure that tree roots are not damaged.
  - *For the roots of the trees to remain undamaged there must be no excavation, soil stripping or site grading within the rooting areas – in other words NO DIGGING.*
- Ensure that soil is not compacted.
- Ensure that no spilled toxic materials seep into the soil.
- Ensure that sufficient rain water reaches tree roots.
- Ensure that gaseous exchange can take place within the soil around tree roots.
- All operations will be supervised and signed off by the Arboricultural Consultant.

## **Appendix E**

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### **Tree Survey Method and Limitations**

## Tree Survey Method and Limitations

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### Tree Survey Method

1. The tree survey was conducted from ground level aided by the Visual Tree Assessment method (Mattheck and Breloer, 1994) and in accordance with BS5837: 2012.
2. All trees on the site with a stem diameter of over 75 mm (measured at 1.5 m above ground) were included in the survey.
3. Offsite trees within influencing distance of the site (typically those located within a distance of up to 12 times their stem diameter away from the site) were included in the survey.
4. Data collected included:
  - a designated tree number
  - type of feature (trees, group, woodland, hedge)
  - number of trees in group
  - tree species
  - height (metres)
  - number of stems
  - stem diameter (in centimetres, as measured at 1.5 m above ground)
  - crown clearance (height of periphery of crown spread above ground level in metres)
  - height of lowest branch (metres),
  - branch spread (to N, S, E and W)
  - age class
  - physiological condition
  - useful life expectancy
  - structural condition
  - BS5837 retention category (A, B, C or U)
  - site notes (where this has a bearing on the present or future health or structural condition of the tree)
  - preliminary management recommendations.
5. All measurements were made in metric using measuring devices where applicable. Estimated stem diameters (e.g., due to lack of access or dense undergrowth) were recorded as such and are shown in the Tree Schedule in bold (see the key at the end of the Tree Schedule table at Appendix A for an explanation of the measurements and codes presented therein).
6. While the appraisals of the surveyed trees are not tree risk assessments, they nonetheless take into account observed structural defects in drawing conclusions about the trees' retentive worth.

## Survey Limitations

1. The survey was a preliminary assessment from ground level and observations were made solely from visual inspection for the purposes of an assessment relevant to planning and development. Only binoculars, trowel, mallet and fine manual metal probe were used to aid tree assessment, where necessary. No invasive or other detailed internal decay detection devices were used in assessing trunk condition.
2. The conclusions relate to conditions found at the time of survey. Any significant alteration to the site that may affect the trees that are present or have a bearing on the planning implications (including level changes, hydrological changes, extreme climatic events or other site works) will require a re-assessment of the trees and the site.
3. This survey is not a tree safety inspection. It is carried out in order to inform the planning process. Where clear and obvious hazards have been observed, these have been addressed in the recommendations (see Appendix A - Tree Schedule). A full assessment of the levels of risk posed by trees would need to consider site use together with tree hazards.