BS5837

Arboricultural Survey, Implication Assessment and Tree Protection

The Knoll, High House Road, St Bees, Cumbria

Client: Mr I. Wrigley

10 February 2023

Surveyor	Author	Checked
B Knipe	B Knipe	A Whitworth

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Contents

Appendices

1. Summary

1.1 Lowther Forestry Group Ltd has been commissioned by Mr I. Wrigley to produce an Arboricultural Survey and Arboricultural Implication Assessment (AIA) following guidance of BS 5837: 2012 *Trees in Relation to Design, Demolition and Construction - Recommendations*. The report is to aid planning application for the construction of three new residential dwellings on the site of a former dwelling on land next to High House Road, St Bees, Cumbria.

1.2 The report aims to give a balanced judgement of the trees, their protection prior to the development phase and future management.

1.3 The site measures approximately 0.3 ha and is currently vacant following the demolition of the previous house. The land slopes down from High House Road and includes overgrown garden shrubs, self-set trees and a prominent copper beech around its boundary.

1.4 The proposed development is to construct three new detached dwellings along with associated parking spaces and a shared driveway. One dwelling is proposed on the site of the former house near the top of the site, with the other two on a lower level and further away from the road. Access into the site will be directly off High House Road.

1.5 The survey identified and recorded 5 trees, 5 groups and 1 woodland prior to the design or development of the site.

1.6 To facilitate the design, three Category C groups are proposed to be removed in their entirety, and one Category C group partially removed. In total this is approximately 17 single and multi-stemmed understorey trees and shrubs, and a pair of mature conifers. All tree works should conform to BS 3998: 2010 *Recommendations for Tree Works*.

1.7 Arboricultural Method Statements (AMS) are included to avoid potential root damage to Category A tree T1 (copper beech) during the construction and landscaping phases. These are to be followed to ensure roots belonging to T1 are not present on ground, which is proposed to be developed upon, and to protect from removal of historic hard surfaces and laying of a new driveway surface.

1.8 Root Protection Areas (RPA) can be seen in Drawing D01, Tree Constraints Plan (F476-08-D01). Survey details relating to individual trees can be seen in Appendix 1, Tree Survey Data Table.

1.9 Tree protection fences are recommended to avoid tree damage during the development and to protect soft ground for tree planting. The proposed development can be seen on Drawing D02, Arboricultural Implication Assessment (F476-08-D02-REV A). Tree protection fences and AMS areas can be seen on Drawing D03, Tree Protection Plan (F476-08-D03).

2. Introduction

2.1 Lowther Forestry Group Ltd has been commissioned by Mr I. Wrigley to produce an Arboricultural Survey and Arboricultural Implication Assessment (AIA) following guidance of BS 5837: 2012 *Trees in Relation to Design, Demolition and Construction - Recommendations*. The report is to aid a planning application for the construction of three new residential dwellings on the site of a former dwelling on land next to High House Road, St Bees, Cumbria.

3. The Brief and Requirements

3.1 A plan to a scale and level of accuracy appropriate to the proposal that shows the position, crown spread and root protection area (RPA) of every retained tree on site.

3.2 A schedule of tree works for all the retained trees in 3.1 above, specifying pruning and other remedial or preventative work; whether for physiological, hazard abatement, aesthetic, or operational reasons. All works shall be carried out in accordance with BS 3998: 2010 *Recommendations for Tree Work*.

3.3 Identify tree removal or pruning that would be required for the proposed development to take place.

4. The Report

4.1 The report aims to give a balanced judgement of the trees, their protection prior to the development phase and future management.

4.2 The report will clearly identify the tree locations, their crown spread, and the extent of the root protection area (RPA) required at all stages of development.

5. Scope and Report Limitations

5.1 This is not a tree safety survey and therefore does not evaluate trees with regards to their likelihood to cause death or bodily injury to any person or damage to property. Any clear and identifiable hazards are highlighted with recommendations. There may, however, be hidden defects or defects which are not identified due to weather conditions or foliage for which Lowther Forestry Group Ltd cannot be held responsible. The survey produces a picture of those trees surveyed as on the date when the survey was undertaken. It is quite possible for hazards to have developed since that time.

5.2 This report confines itself to the silvicultural and arboricultural aspects of the trees and does not address any ecological or engineering aspects or anything in relation to soils for which other specialists' advice may be sought.

6. Documents Provided

6.1 A topographical plan of the site was provided prior to the survey (*5568-01D Existing Site Plan)* and the development plan was provided to assess tree impact *(5568-02H Proposed Site Plan).*

7. The Site

7.1 The site is The Knoll, High House Road, St Bees, Cumbria, CA27 0BY.

7.2 The site is located beside High House Road and measures approximately 0.3 ha with the general topography of the site sloping down away from the road towards a third-party woodland. The vacant plot consists of an unmanaged open area surrounded by mostly overgrown garden shrubs and small trees.

7.3 The site formally had a large, detached dwelling located near to the road which has since been demolished. The foundations of this building and surrounding hard surfaces are still visible in the site.

7.4 The principle tree in the survey area is a large copper beech (*Fagus sylvatica* 'Purpurea') which is close to the boundary and overhangs the site along with a third-party driveway. Historically vehicle access into The Knoll was via a shared driveway which entered the site beside the copper beech. This access point is now redundant; however, the extent of the previous hard driveway surfaces can still be seen under and near to the crown of this tree.

7.5 Land-use surrounding the survey area includes High House Road, adjacent residential dwellings with large gardens, and a third-party woodland.

8. Legal Restrictions

8.1 Trees in any location may be protected by legislation. Where development is proposed, additional legal protection may be appropriate and can be enforced by the local authority. Attention is drawn to legal controls and liabilities under common law for consideration at the earliest stages of potential site development.

8.2 Correspondence with Copeland Borough Council (10 Jan. 23) confirmed that there are no Tree Preservation Orders in the survey area. The site is within a Conservation Area therefore trees on site above the size threshold of 75 mm stem diameter taken at 1.5 m are protected by law.

8.3 Substantial penalties and/or prison sentences can be incurred for contravention of legislation relating to protected species. Lowther Forestry Group Ltd has not been requested to make any checks for protected species on this site.

8.4 Further legal considerations can be found in Appendix 4.

9. Proposed Development

9.1 The proposed development is to construct three new detached dwellings along with associated parking spaces and a shared driveway. One dwelling is proposed on the site of the former house near the top of the site, with the other two on a lower level and further away from the road. Access into the site is proposed to be directly from High House Road, with a widened entrance apron and all three properties sharing a central driveway.

9.2 The development is proposed to take place on split levels due to the sloping topography of the site, with the access drive on an even slope throughout. The proposed development includes the building up of ground levels near the bottom of the site to enable the construction of two detached dwellings.

9.3 The location of the proposed construction can be seen in Drawing D02, Arboricultural Implication Assessment (F476-08-D02-REV A).

10. Survey

10.1 The survey was carried out in accordance with BS 5837: 2012 *Trees in Relation to Design, Demolition and Construction - Recommendations*. A glossary of arboricultural terms used in this report can be found in Appendix 2.

10.2 The surveyor was Ben Knipe, Contracts Supervisor, Lowther Forestry Group Ltd. Surveyor qualifications can be found in Appendix 3.

10.3 The trees have been categorised in accordance with the cascade chart in Table 1 of BS 5837: 2012 *Trees in Relation to Design, Demolition and Construction - Recommendations*, page 9. The survey methodology can be seen in Appendix 5, Survey Methodology.

10.4 The survey identified and recorded 5 trees, 5 groups and 1 woodland prior to the design or development of the site. The trees have been divided into the following four categories and are as follows:

- Category A = 1 tree
- Category B = 1 tree, 1 woodland
- Category C = 3 trees, 5 groups
- Category U = 0 trees

10.5 Table 1, Tree Quality Assessment Table shows the trees on site categorised following guidance from BS 5837: 2012 *Trees in Relation to Design, Demolition and Construction - Recommendations*.

Table 1. Tree Quality Assessment Table

Category	1: Mainly arboricultural values	2: Mainly landscape values	3: Mainly cultural values including conservation
A	T1	T1	--
B	T5	W1	--
C	T2, T3	T4, G1, G2, G3, G4, G5	--
U	--		

A, B, C and U indicate the contribution in years the tree will potentially live for. 40+ years = **A**, 20 to 40 years = **B**, 10 to 20 years = **C**, less than 10 years = **U**

10.6 The Category A trees are those of high quality and value, with an estimated remaining life expectancy of at least 40 years. Tree T1 is a late-mature copper beech which is the largest and principle tree on site. This has a fully developed crown which is shaped by the prevailing wind so that it extends greatest into the site and is of a lower height than a sheltered tree of the same age and species. This tree has good crown vitality and a wide stem with signs of historic limb removal. The original driveway into this site entered close to the stem of T1 and passed under its crown.

10.7 The Category B trees are those are of moderate quality and value with an estimated remaining life expectancy of at least 20 years. Tree T5 is a mature English yew in a third-party garden with a relatively narrow crown for its stem diameter, which may be due in part to suppression and past pruning. Woodland W1 is on third-party land and includes a mix of mature broadleaves species which are in normal condition for their age, species, and planting location. One tree in W1 overhangs the site boundary and is located close to T2.

10.8 The Category C trees are those trees of low quality and value with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm. Three trees and all five groups are in this category due to competition, suppressed form and reduced vitality. These are unlikely to contribute to the site in the long term and in some cases, their removal will benefit adjacent trees of higher quality.

10.9 Category U trees are unsuitable for retention and cannot realistically be retained as living trees for longer than 10 years. None of the trees on site have been placed in this category.

11. Arboricultural Implication Assessment

11.1 Any arboricultural recommendations for the trees aim to promote health, growth, and retention of suitable specimens within the development.

11.2 Recommendations may also aim to reduce the potential risk of harm to users of the site, by identifying significant defects within the trees.

11.3 Table 2 (below) Arboricultural Implication Assessment Table identifies trees to be removed to facilitate the development, and trees to be retained and managed within the proposed development.

Table 2. Arboricultural Implication Assessment

Arboricultural Implication Assessment Table					
		Category A	Category B	Category C	Category U
Recommendations to Facilitate Development	Fell			G1, G4, G5	
	Partial removal			G3	
	No action	T1	T5, W1	T2, T3, T4 G2	

11.4 To facilitate the proposed development, three Category C groups are recommended to be removed in their entirety and one Category C group partially removed. This will make space for the construction of a new dwelling (G1), remove conflict between the finished development and future growth (G4) and create space for landscaping, the erection of a boundary fence, and maintaining the external stone walls (G3, G5).

11.5 There is approximately 17 single and multi-stemmed trees and shrubs within the four Category C groups which are therefore proposed to be removed. Species include sycamore, hawthorn, holly, rowan, rhododendron, and a New Zealand privet. Group 4 is a pair of mature Lawson's cypress which are close to the eastern site boundary and overhang a third-party garden.

11.6 Should the plans or methods change, then revised works will need to be approved by Copeland Borough Council and the supervising arboriculturist consulted. Details of tree works can be seen in Appendix 1, Tree Survey Data Table.

12. Tree Protection Arboricultural Recommendations

12.1 A pre-commencement meeting attended by the supervising arboriculturist, and site manager is recommended before any works are undertaken. A copy of the Arboricultural Method Statement and drawings should be retained on site.

12.2 Soft ground where tree planting is to take place and in RPA of retained trees should be protected from compaction and contamination at all stages of the development. Otherwise, soil remediation may have to take place to make the ground suitable for tree establishment. Furthermore, compacted ground inhibits water infiltration causing increased run-off and waterlogging. A permeable driveway surface is recommended if suitable, to aid water infiltration and gas exchange to benefit root growth of retained trees.

12.3 The RPA of each tree and group and the location of the proposed development can be seen on Drawing D02, Proposed Development Plan (F476-08-D02-REV A). The RPA radius is the minimum distance the Construction Exclusion Zone (CEZ) and any protective barriers can be from the centre of the individual tree.

12.5 CEZ fencing in the form of Heras panels are recommended to be installed prior to development to protect soft ground for planting and protect all retained trees from possible damage during the construction phase. The location of these fences can be seen on Drawing D02, Proposed Development Plan (F476-08-D02-REV A). Construction activities which also include the storage of materials are to be excluded from within this fenced area.

12.6 There is a small amount of overlap (27m^2) between the RPA of T1 and the corner of the proposed southwest dwelling. This equates to 6.5% of the total RPA for T1. Fine roots belonging to T1 may be present in this soft ground therefore careful excavation is recommended in this area to expose any roots and to cleanly cut them back to the edge of the development. Method Statement 1 in Appendix 7 details the working method for this part of the development.

12.7 Upon development completion, the route of the finished driveway is proposed to cross part of the RPA belonging to T1. Much of this overlap has been historically used as a driveway and presently consists of hard, level surfaces. To avoid potential damage to tree roots belonging to T1 it is recommended to construct the lower properties first and to access these plots by skirting around and avoiding the RPA of T1. The level footprint of the previous dwelling could be used at this stage for materials storage and site cabins. The new driveway surface must be installed without compaction of soft ground within the RPA of T1. If existing surfaces are removed, cellular confinement systems (i.e., geocells) are to be used where the driveway crosses the RPA of T1.

12.8 Ideally redundant hard surfaces within the RPA of T1 will also be carefully removed to benefit water and gas exchange for tree roots, and to allow final landscaping of the area. Method Statement 2 in Appendix 8 details the working method for this part of the development.

12.9 To help maintain the long-term value of tree T1 and to alleviate any potential disturbance caused by development, it is recommended to leave a wide arc of soft ground around the stem and to cover this with a 100 mm deep layer of bark mulch. Turf in the RPA of T1 will

compete for water and nutrients, therefore bark mulch around the stem and extending outwards will help reduce water stress and maintain vitality.

12.10 Once the construction phase is largely complete, the tree protection fences can be adjusted to enable final landscaping activities to take place. However, the RPA of all retained trees must still be protected from damage resulting from materials storage, chemical spillages, excavation, and compaction of soft ground. Site activities should make use of hard standings where possible.

12.11 Careful working procedures are required at all stages to ensure that trees are suitably protected. The general recommendations in Method Statement 3 (Appendix 9) should be followed to avoid damage to all retained trees in and adjacent to the site.

13. Species Selection Recommendations

13.1 Because of site topography and location, tree selection can consider native and non-native tree species which are tolerant of periodic waterlogging of the ground, especially towards the lower sections. These same species can also be suitable for SuDS schemes and may help to alleviate surface water flood issues.

13.2 Tree selection can use native species but should also plant non-native varieties where space allows, to make the site more tolerant of changing weather patterns and potential tree diseases. Non-native planting should be careful to select trees from a variety of genus types which are well suited to the site, so that once established, they will be healthy and robust against causes of stress.

13.3 In addition to native species traditionally used on waterlogged sites, alternative species which are moderately tolerant of drought and waterlogging, taken from Tree Species Selection for Green Infrastructure - Trees and Design Action Group (tdag.org.uk) include:

Species name (common name)
Alnus cordata (Italian alder)
Alnus x spaethii (Spaeth alder)
Gleditsia triacanthos (Honey locust)
Liquidambar styraciflua (Sweet gum / Liquidambar)

13.4 All trees on the list above are winter hardy for the site (H6 and H7), can tolerate exposed locations, are suitable to a range of soil conditions, and are suitable for SuDS schemes. Cultivars of these tree species can be further selected for traits such as colour and form, for example *Liquidambar styraciflua* 'Corky' which has a narrowly pyramidal form.

Appendix 1 Tree Data Table

Tree Data Table - Arboricultural Survey *BS 5837: 2012* - F476-08

Client: Mr I. Wrigley | **Location: St Bees** | **Surveyor: Ben Knipe**

Site: The Knoll | **Survey Date: 21.12.22** | **Weather: Overcast**

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Tree ID	Botanical Name	Common Name	Ht (M)	1st Branch (m)	Crown clearance	Crown Spreads N	E	S	W	Diameter @ 1.5m (mm)	No of stems	Age class	Condition Physiological	Structural	SULE	BS5837 Categorization	Hazards	Comments and Defects	Preliminary Arboricultural Recommendations	Recommendations to Facilitate Development	Root Protection Area m²	Root Protection Radius
T1	*Fagus sylvatica 'Purpurea'*	Copper beech	17	6 N	2	10	11	6	6	960	1	LM	G	F	20	A 1, 2	N	This is the principle tree on site. The crown has good vitality. The crown is 'flagged' by the strong prevailing wind and extends furthest into the site. Historic removal of low limbs has taken place with occluded and occluding wounds up to 4 m. Four scaffold limbs are present from 6 m which generally follow the cardinal points. The edge of the original driveway passed is 1 m from the southeast side of the stem. A low stone retaining wall ends 2 m from the stem.	No action	No action	416.98	11.52
T2	*Betula pendula*	Silver birch	12	2 S	1	3	3	5	4	270	1	M	G	F	10	C 1	N	The dense crown is showing normal vitality.	No action	No action	32.98	3.24
T3	*Prunus serrulata*	Japanese cherry	12	1.5 S	2	2	1	9	5	480	1	M	F	F	10	C 1	N	A suppressed tree resulting in an unbalanced crown. Vitality is reduced. Dense ivy is up to the middle crown.	No action	No action	104.24	5.76
T4	*Prunus serrulata*	Japanese cherry	9	1 W	3	4	4	4	4	#250	1	M	F	F	10	C 2		Third party tree. DBH is estimated at 1 m due to low crown break. A moderately healthy and partly suppressed tree. A distinct difference in growth rates can be seen between the rootstock and grafted tree. The crown overhangs the site boundary by 2 m.	No action	No action	28.28	3.00
T5	*Taxus baccata*	English yew	11	4 S	4	5	5	5	5	820	1	M	F	F	20	B 1	N	Third party tree. A moderately healthy tree with a high and partly suppressed crown. This is multi-stemmed above 3 m.	No action	No action	304.23	9.84
G1	*Ilex aquifolium* *Sorbus aucuparia*	Holly Rowan	4	0.5	0	2	2	2	2	150	>5	SM	F	F	10	C 2	N	A short group of small trees along the boundary, on either side of tree T1. These have generally poor form. The holly are multi-stemmed. A single rowan is present.	No action	Fell	10.18	1.80
G2	*Sambucus nigra* *Populus canescens*	Elder Grey poplar	9	2 W	1	3	3	3	3	220	>20	SM	F	F	10	C 2	N	A group of five trees along the boundary.	No action	No action	21.90	2.64

G3	*Acer pseudoplatanus* *Ilex aquifolium* *Crataegus monogyna* *Rhododendron*	Sycamore Holly Hawthorn Rhododendron	10	0.5	0	4	4	4	4	250	>10	M	F	F	10	C 2	N	A group of trees and understorey shrubs along the boundary line. Trees have poor form.	No action	Remove a section approximately 9 m long. This will remove approximately 3 trees.	28.28	3.00
G4	*Chamaecyparis lawsoniana*	Lawson's Cypress	11	2 W	1.5	3	3	3	3	520	4	M	F	F	10	C 2	N	A pair of trees forming a joint canopy. The north-western tree is dominant in the pair. These are multi-stemmed above 1.3 m.	No action	Fell	122.34	6.24
G5	*Ilex aquifolium* *Rhododendron* *Griselinia littoralis*	Holly Rhododendron Papauma (New Zealand privet)	7	0.5	1	3	3	3	3	170	#30	M	F	F	10	C 2	N	A group of approximately 10 multi-stemmed and single-stemmed trees and shrubs around the boundary. Trees have generally poor form.	No action	Fell	13.08	2.04
W1	*Larix sp.* *Betula pendula* *Acer platanoides*	Larch Silver birch Maple	16	5 S	3	6	6	6	6	#300	>20	M	F	F	20	B 2		A third-party woodland up to the boundary fence. Trees are well spaced and generally open grown. The nearest tree is 3 m from the fence with its crown overhanging by 4 m next to T4.	No action	No action	40.72	3.60

Key				
Tree ID:-	Number given to the individual tree or group.			
Crown Spreads:-	Distance in meters from the stem of the tree to the edge of the canopy in the four cardinal directions.			
1st Branch:-	First significant branch height and direction of growth i.e., North, South, East or West.			
Crown Clearance:	Height above ground level to the canopy			
Diameter:-	Diameter of the trunk at 1.5 m above adjacent ground level. (mm)			
No of Stems:-	No of stems per tree below 1.5 m above adjacent ground levels.			
Hazards:-	Y = Hazards are present, N = No hazards present. (Visual, ground level assessment)			
Physiological / Structural Condition:-	G = Good, F = Fair, P = Poor, D = Dead			
SULE = Safe Useful Life Expectancy (years).	40+ = **A**, 20 to 40 = **B**, 10 - 20 = **C,** less than 10 years = **U**			
BS5837 categorization:-	1 = Arboricultural values	2 = Landscape values	3 = Conservation and cultural values	1, 2 or 3 plus the SULE = BS5837 category
Age Class:-	Y = Young, recently planted with no viable seed production. EM = Early Mature, apical dominance with growth to normal crown dimensions for species and height. M = Mature, normal life expectancy with normal crown size for species and type and maximum seed production. LM = Late-Mature, in natural decline. V = Veteran and A = Ancient, both (A and V) are as defined by Natural England.			
Tree number followed by #	Tree, Group or Woodland with no access therefore dimensions are approximate.			

Appendix 2 Glossary of Arboricultural Terms

Term	Description
Tree Number	Reference number, or tag number
Botanical Name	Scientific name
Common Name	Common Name
Height	Height in metres
Crown Clearance	Height in metres of crown clearance above adjacent ground level (to inform on ground clearance, crown stem ratio and shading.
Crown Spread	Distance from stem to crown edge in meters. Usually specified as a single average distance or as four separate measurements for north, south, east, and west.
Stem Diameter (DBH)	(Diameter at breast height) Stem diameter in millimetres at 1.3 m above adjacent ground level (on sloping ground to be taken on the upslope side of the tree base) or immediately above the root flare for multi-stemmed trees.
Physiological Condition	e.g., good, fair, poor, dead
Structural Condition	e.g., collapsing, the presence of any decay and physical defect.
SULE	Safe Useful Life Expectancy
BS5837 grading	A to C or U category grading
Hazards	Defects present on a tree
Bat Potential	The potential for the tree to be used by bats
Recommendations	Preliminary management recommendations, including further investigation of suspected defects that require more detailed assessment and potential for wildlife habitat.
RPA	Root Protection Area
CEZ	Construction Exclusion Zone
EDC	Eden District Council

Appendix 3 Surveyor Qualifications

LOWTHER FORESTRY GROUP LTD

PROFESSIONAL CURRICULUM VITAE

Name	Ben Knipe
Position in Company	Contracts Supervisor
Professional Qualifications	MSc, Arboriculture and Urban Forestry BA (Hons) Environmental Management degree Professional Tree Safety Inspection qualification QTRA, Quantified Tree Risk Assessment IOSH Managing Safely
Professional Experience	
2015-Present	Lowther Forestry Group Ltd
2012-2015	National Trust, Woodland Ranger, Central & East Lakes
2007-2012	Area Ranger, National Trust, Windermere & Troutbeck
2011-2012	Head Warden, National Trust, Lyme Park
2003-2007	Warden, South Peak Estate
2000-2003	National Trust Warden (Staffs) & Patrol Ranger (Macclesfield Forest) Peak District National Park
Other Qualifications & Training Courses	Applied Tree Biology – Arboricultural Association (AA)
	AA Surveying and Categorising Trees for BS:5837
	AA Introduction to Soils
	Pesticides- PA1, PA6
	C.A.T. Locator & Genny
	Off-road Driving (NPTC)
	Manual Handling Level 2 for Managers
	CSCS for Managers and SSSTS
	Peak District National Park Ranger Training

Appendix 4 Legal Restrictions

Trees in any location may be protected by legislation. Where development is proposed, additional legal protection may be appropriate and can be enforced by the local authority. Attention is drawn to legal controls and liabilities under common law for consideration at the earliest stages of potential site development.

The Town and Country Planning Act 1990 requires that, except in certain circumstances, “no work shall be carried out which will affect trees over a certain size which are situated in Conservation Areas”. Six weeks’ notice of intent must be given to the local authority before the work is carried out. This provides an opportunity for the local authority to make a Tree Preservation Order (TPO) under this Act to protect the trees.

Tree Preservation Orders allow for trees to be protected either as individuals, groups, areas, or woodlands. The orders have the effect of preventing the cutting down, topping, lopping, uprooting, wilful damage, or wilful destruction of trees, except in certain circumstances, other than with consent of the local authority.

Even when no specific legal protection exists, it may be necessary to obtain a felling licence. These apply if the volume of timber exceeds specified amounts; site clearance, even of small areas, before detailed planning permission has been granted could exceed the felling licence quota. The Forestry Commission, under the Forestry Act 1967, administers felling licences.

Before carrying out any arboricultural or forestry operations, consideration should be given to the following legislation for protected species of flora and fauna: The Wildlife and Countryside Act 1981 (as amended), the Conservation (Natural Habitats & c.) Regulations 1994 (as amended), and the Countryside Rights of Way Act 2000 protected species of flora and fauna. This will prevent any harm or damage to protected species.

Substantial penalties and or prison sentences can be incurred for contravention of legislation relating to protected species.

Lowther Forestry Group Ltd has not been requested to make any checks for protected species on this site.

Appendix 5 Survey Methodology

The survey was carried out in accordance with BS 5837: 2012 *Trees in Relation to Design, Demolition and Construction - Recommendations*. A glossary of arboricultural terms used in this report can be found in Appendix 2.

All recommendations of tree works should be carried out to BS 3998: 2010 *Recommendations for Tree Work*.

Tree categorisation is the method by which a value is placed on an individual tree using the method described in BS5837: 2012. The method considers the Safe Useful Life Expectancy (SULE). This is measured in numbers of years. Trees of greater than 40 years = A, The Category A trees are of high quality with an estimated remaining life expectancy of 40 years. A minimum of 20 years = B, The category B trees are of moderate quality and value with an estimated remaining life expectancy of at least 20 years. A minimum of 10 years = C, The category C trees are 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.

Once this is established a trees contextual attributes are determined and come under the following three headings.

- Mainly Arboricultural values.
- Mainly Landscape values.
- Mainly cultural values, including conservation.

Category U trees are those in such a condition that any existing value would be lost within 10 years, and which should, in the current context, be removed for reasons of sound arboricultural management.

A single tree can come under one or more of these headings and can therefore be found twice in the quality assessment table. This does not give the tree a higher value than one with a single value in the same table.

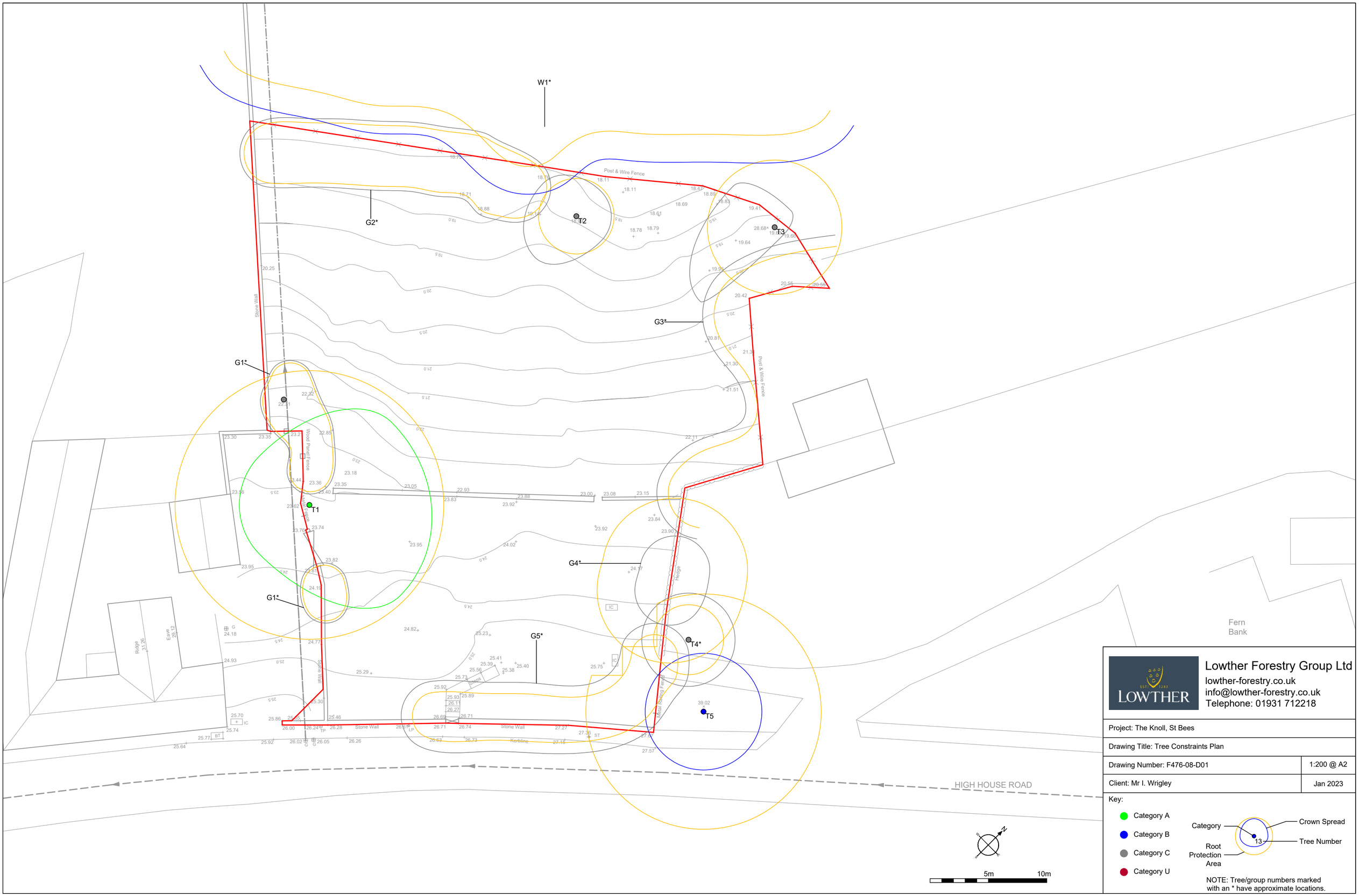
The trees have been categorised in accordance with the cascade chart in Table 1 of BS 5837: 2012 *Trees in Relation to Design, Demolition and Construction - Recommendations*, page 9.

All trees were tagged except for trees on neighbouring properties which were inaccessible. The tree tags correspond with the tree numbering in the Tree Survey Data Table in Appendix 1.

Where access to the tree trunk is restricted, the diameter is approximate. This is highlighted in by a hash mark (#) in the tree data table.

All measuring equipment is regularly checked and calibrated to ensure accuracy.

Appendix 6 Survey Area and Drawings



LOWTHER	Lowther Forestry Group Ltd lowther-forestry.co.uk info@lowther-forestry.co.uk Telephone: 01931 712218
Project: The Knoll, St Bees	
Drawing Title: Tree Constraints Plan	
Drawing Number: F476-08-D01	1:200 @ A2
Client: Mr I. Wrigley	Jan 2023

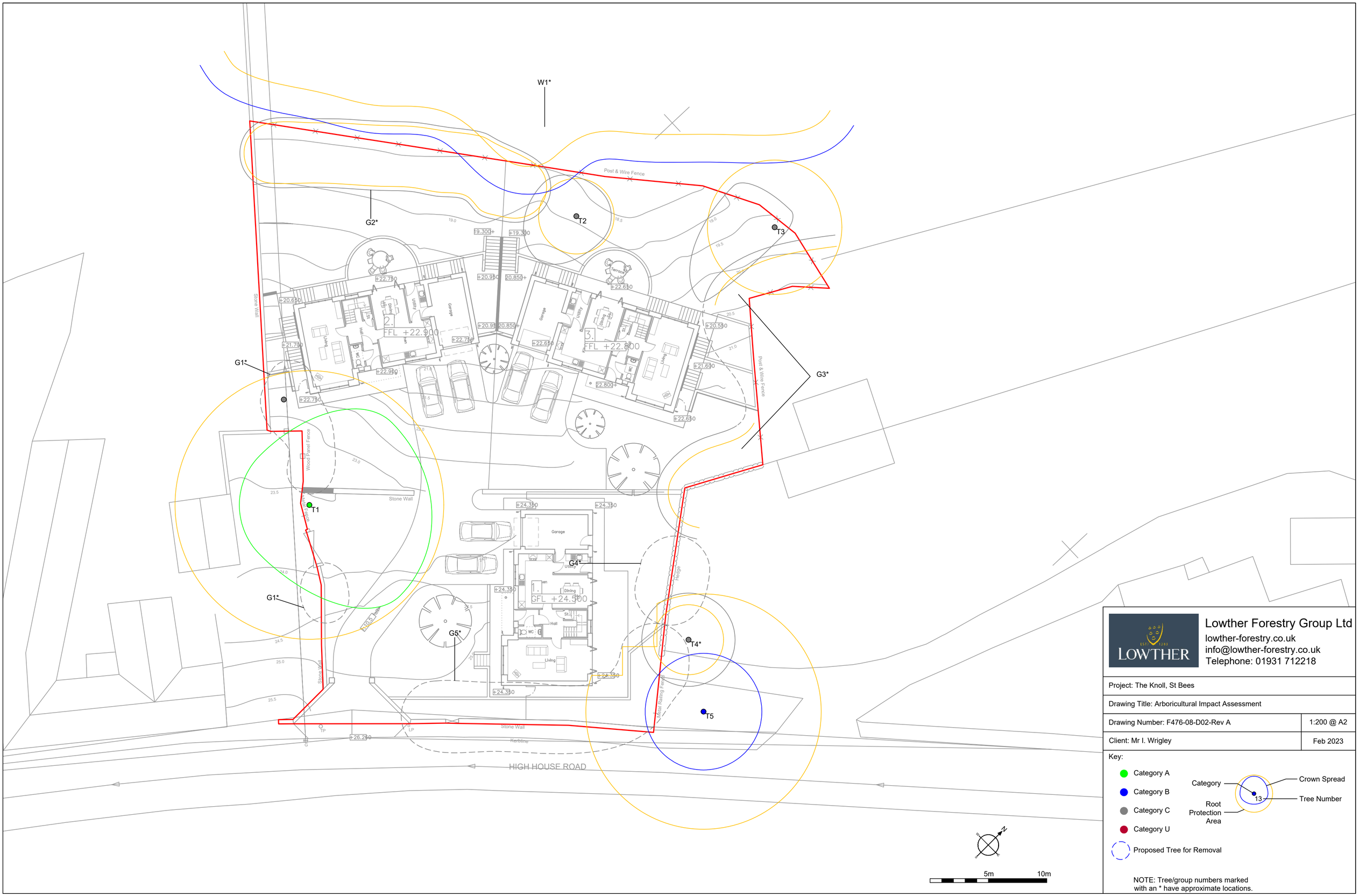
Key:

- Category A
- Category B
- Category C
- Category U

Category — 13 — Crown Spread / Tree Number

Root Protection Area

NOTE: Tree/group numbers marked with an * have approximate locations.



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Project: The Knoll, St Bees	
Drawing Title: Arboricultural Impact Assessment	
Drawing Number: F476-08-D02-Rev A	1:200 @ A2
Client: Mr I. Wrigley	Feb 2023

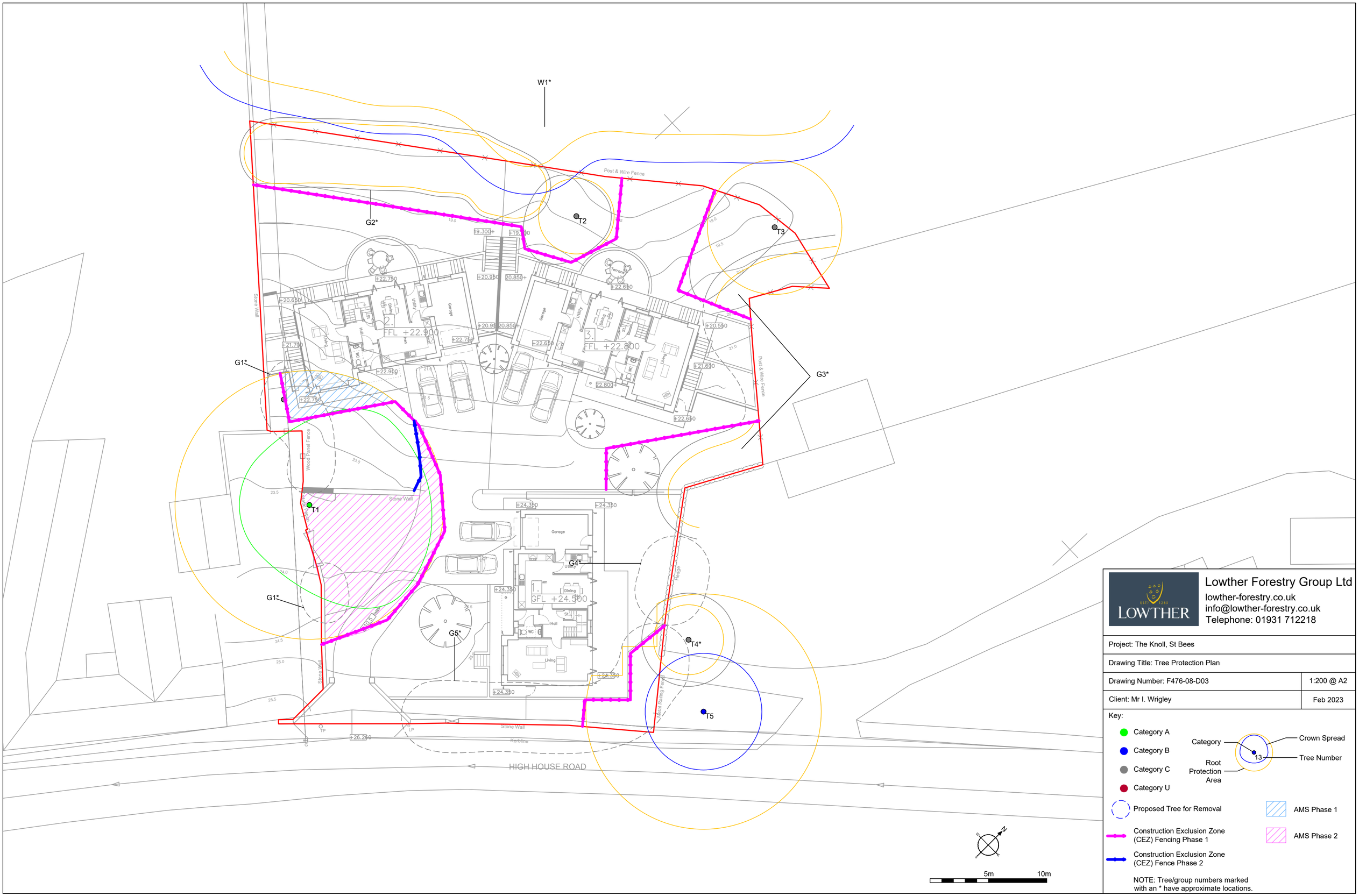
Key:

- Category A
- Category B
- Category C
- Category U
- Proposed Tree for Removal

Category — Crown Spread
13 — Tree Number
Root Protection Area

5m 10m

NOTE: Tree/group numbers marked with an * have approximate locations.



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Project: The Knoll, St Bees

Drawing Title: Tree Protection Plan

Drawing Number: F476-08-D03 | 1:200 @ A2

Client: Mr I. Wrigley | Feb 2023

Key:

- Category A
- Category B
- Category C
- Category U
- Proposed Tree for Removal
- Construction Exclusion Zone (CEZ) Fencing Phase 1
- Construction Exclusion Zone (CEZ) Fence Phase 2

Category — Crown Spread
13 — Tree Number
Root Protection Area

- AMS Phase 1
- AMS Phase 2

NOTE: Tree/group numbers marked with an * have approximate locations.

Appendix 7 Arboricultural Method Statement 1 – Working Procedures to Protect T1 During Changes in Ground Levels and/or Excavation

7.1 There is overlap between the RPA for tree T1 and the siting of a dwelling. This overlap measures 27m^2 and is 6.5% of the total RPA for T1. It is possible that fine roots belonging to T1 will be in this area, therefore careful investigation and pruning of small diameter roots is advised prior to development to avoid potential damage. To achieve this, the following recommendations taken from NJUG 10 (National Joint Utility Group 1995) and edited for this development should be followed:

- Prior to pruning, accurately mark out the extent of the foundations including a suitable workspace.
- Clear ground vegetation and carefully strip off the uppermost vegetation layer (grasses etc).
- Using hand digging or air-excavation equipment (for example air-spade) carefully excavate along the edge of the foundations where they cross the RPA, exposing any tree roots along this line. Almost all woody roots will be in the upper 600mm of soil.
- Prune any exposed roots using a sharp tool to make a clean cut (e.g., secateurs or loppers) back to the development line.
- Roots over 25 mm diameter are not to be cut unless agreed by the supervising arboriculturalist, however it is unlikely that woody roots of T1 will extend into this area.
- Carry out the operation in a methodical way which limits the exposure and drying of live roots.
- Do not excavate with machinery as excavators can rip and drag roots, causing damage.
- Do not mix or store cement-based products, or other chemicals, in or near the RPA due to the risk of soil contamination and subsequent root damage.

Appendix 8 Arboricultural Method Statement 2 – Working Procedures to Protect T1 During Hard Surface Removal & Driveway Construction

8.1 The removal of redundant hard surfaces within the RPA of T1 may be necessary for development and will increase the area of permeable ground around T1 for roots to develop. The installation of a new driveway is also proposed across part of T1's RPA where redundant surfaces are present. With suitable planning and careful working procedures, physical damage roots belonging to T1 can be avoided during removal of hard surfaces. To achieve this the following recommendations should be followed:

- Adjust Construction Exclusion Zone (CEZ) fences as necessary to enable the hard surface removal to take place whilst excluding other works.
- Site heavy plant and machinery outside of the RPA area. Lightweight plant and machinery can be used on existing hard surfaces areas within the RPA, but not on unprotected soft ground.
- Remove hard surfaces in such a way as to avoid ground compaction and excavation of soft ground.
- Work methodically away from the tree utilising existing hard surfaces where possible for access and temporary materials storage.
- Do not store materials within the RPA of T1 during the removal process.
- Lay a Terram type membrane on the exposed soil surface to avoid drying of the soil, prior to laying of turf and/or bark mulch in areas to be landscapes.
- If tree roots are encountered the supervising arboriculturist should be consulted.
- If tree roots belonging to T1 are encountered in the zone proposed for the new driveway, ground protection e.g., cellular confinement systems may be required.
- Reinstate the CEZ fence upon completion to exclude construction activities on exposed soft ground within the RPA.
- Turf and/or bark mulch is to be deposited in the RPA by way of extending booms of machines located outside the RPA. Pedestrian routes across soft ground should also be protected during the landscape phase.

Appendix 9 Arboricultural Method Statement 3 – Working Procedures to Protect Retained Trees During the Construction Phase

9.1 With suitable planning and careful working procedures, physical damage to retained trees can be avoided. To achieve this the following recommendations should be followed:

- Exclude construction activities within RPA areas at risk of tree damage and ground compaction, and from areas identified for tree planting, as indicated in drawing F476-08-D02-REV A.
- Use pedestrian routes that ideally avoid RPAs. Lay down ground protection for high use pedestrian routes which pass over soft ground in RPAs.
- Site the works compound away from retained trees and outside of RPAs, ideally on a hard standing.
- Store building or waste materials outside of the RPAs and mix cement-based products away from the RPAs, ideally on hard surfaces.
- Clearly sign the Construction Exclusion Zone fences so they are not adjusted.
- Maintain CEZ fences throughout the construction phase and where necessary the landscaping phase as well, to avoid ground compaction and tree damage.
- At the end of development, CEZ fences can be adjusted to provide access to the final landscaping phases, provided that ground compaction, excavation and contamination of the ground does not take place in the RPAs.
- It is recommended to communicate this information and the importance of tree protection during site inductions.