

**Arboricultural Survey to BS5837:2012**

**Welsh Dee Trust**

**Felin Puleston weir  
Felin Puleston  
Wrexham  
LL13 7RF**

**16 June 2023**

**Shaun Rowe BSc (Hons) MArborA**

---

## Table of Contents

*If this report has been released electronically the appendices referred to herein can be found in the annexed zip folder/s as .pdf files. If this report has been released in hard copy the appendices will be bound into the back of this report. Plans are annexed separately as A0, A1, A2 or A3 as appropriate.*

Introduction

Survey

BS5837:2012 Scope

Methodology

Definitions

Recommendations

Limitations

Appendices

Appendix 1: Table 1 Cascade chart for tree quality assessment

Appendix 2: Schedule of Trees

Appendix 3: Tree Constraints Plan

## Introduction

Arbtech Consulting Limited (Arbtech) received written instruction on 25 May 2023 from Welsh Dee Trust to attend Felin Puleston, Wrexham, LL13 7RE; grid reference, SJ 32544 49331 (site) to undertake an arboricultural survey a to BS5837:2012 guidance to assess trees, hedges and major shrub groups growing on and within influencing distance of the site and to produce a Schedule of Trees, Tree Constraints Plan, Arboricultural Impact Assessment, Arboricultural Method Statement and Tree Protection Plan.

I am Shaun Rowe, a Graduate Arboriculturist at Arbtech Consulting Ltd. I hold a BSc Honours degree in Arboriculture and Urban Forestry and a BTEC Level 3 Arboriculture and have professional experience in arboriculture spanning 2 years. I also hold a membership with the Arboricultural Association.

The advice below and appended is underwritten by our Professional Indemnity insurance for the business practice of Arboricultural Consultancy in the sum of one million Pounds Sterling in each and every claim.

**Table 1:** Documents referred to.

Document	Reference No.
Survey base drawing	N/A
LPA pre-app comments	N/A
British Standard 5837:2012	"BS5837"
Tree Survey Schedule	Arbtech TS 01
Tree Constraints Plan	Arbtech TCP 01

## Survey

Survey: An arboricultural survey to BS5837 of all trees within impacting distance of the site was undertaken by Shaun Rowe on 5 June 2023.

During the survey I categorised the trees using "Table 1 – Cascade chart for tree quality assessment" of the BS5837:2012 (see Appendix 1).

A total of 11No. individual trees and 5No. groups of trees were surveyed. Details for each of the trees surveyed are provided in the Schedule of Trees (see Appendix 2).

Multiple small trees and shrubs occupy the site, none of which meet the minimum diameter requirements to be considered for this survey.

**Table 2:** Documents upon which this tree survey has been based.

Document	Originator	Reference Number	Title
Survey base drawing	Survey House	N/A	File name: OS_MasterMap_Topography_Layer_871028_1112 042_OS_Mastermap

Limitations: The survey was made at ground level using visual observation only. Detailed examinations, such as climbing inspections and advanced decay detection equipment were not employed, though may form part of the survey's management recommendations. Measurements were taken using specialist tapes, laser, and GPS devices. Where this was not possible, measurements are estimated.

Scope: Pre-development tree surveys make arboricultural management recommendations based exclusively upon the individual tree or group of trees condition relative to their present context (*i.e. not in relation to the proposed development*).

Legal Status: No statutory protection check has been performed. BS5837 does not draw any distinction between trees subject to statutory protection, such as a Tree Preservation Order ("TPO"), and those trees without. This is principally because a detailed planning consent overrides any TPO protection. Consequently, we do not seek to offer any comparison between or infer any difference in the quality or importance of TPO trees and other trees.

\* For more information on the surveyed trees please see Arbtech Consulting Ltd, Tree Survey Schedule (Appendix 1), Tree Survey Report and Tree Constraints Plan.

## Site description

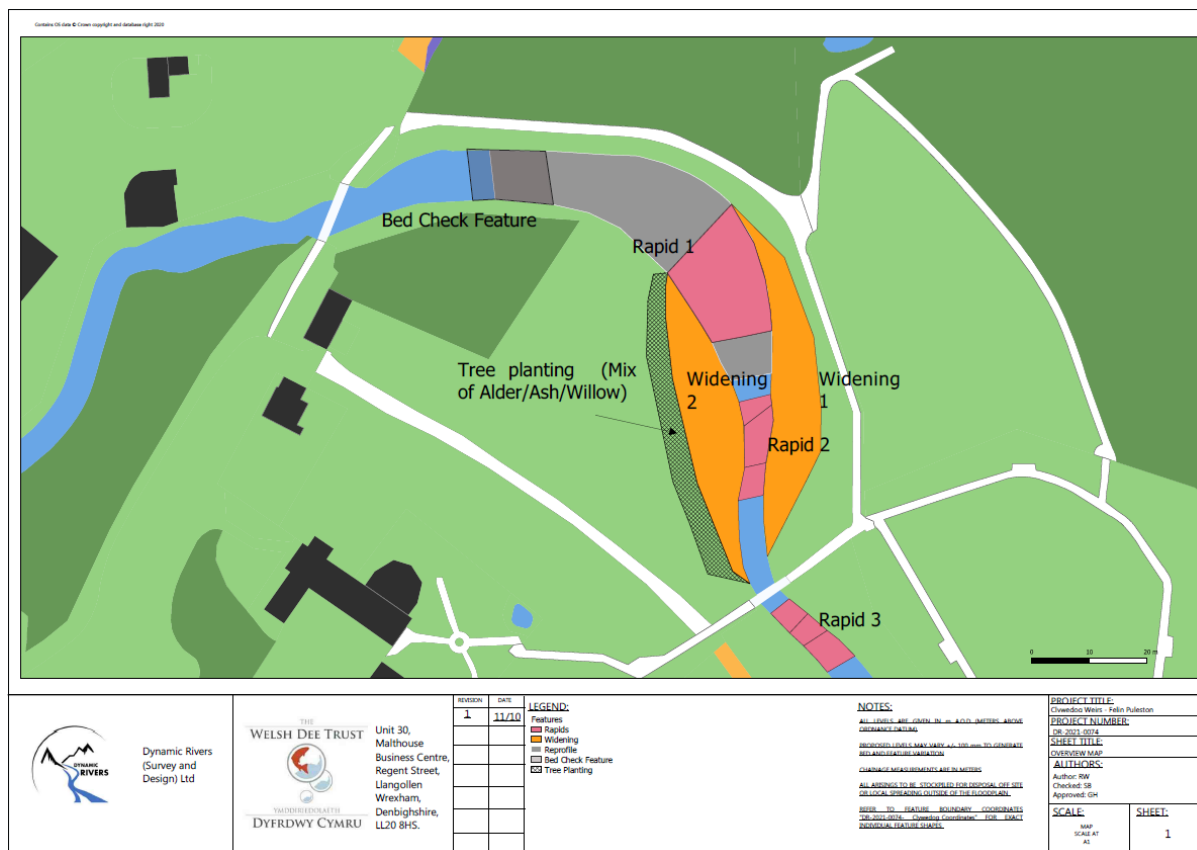
**Figure 1:** OS Map showing site location (Bing Maps)



**Figure 2:** Aerial Image of site with approximate red line boundary (Google Earth)

## Proposed scheme

Widening and reprofiling of a section of the River Clywedog.



**Figure 3:** Clywedog Weirs - Felin Puleston Design Drawing, DR-2021-0074 Dynamic Rivers (Survey and Design Ltd.)

It is likely that arboricultural impacts can be addressed with arboricultural methodology or minor amendments to the proposal.

---

*This content is for educational and informative purposes; parts of it are reproduced with the kind permission of BSI Global.*

## BS5837:2012 Scope

This standard recognises that there can be problems for development close to existing trees which are to be retained, and of planting trees close to existing structures. This standard sets out to assist those concerned with trees, in relation to construction, to form balanced judgements. It does not set out to put arguments for or against development, or for the removal or retention of trees. Where development, including demolition, is to occur, the standard provides guidance on how to decide which trees are appropriate for retention, on the means of protecting these trees during development, including demolition and construction work, and on the means of incorporating trees into the developed landscape.

## Methodology

The methodology used to assess the trees was the British Standard 5837:2012 'Trees in Relation to Construction' tree survey method. The aim of the survey is to establish which trees are moderate and good quality; suitable for retention and justifying protection. And which trees are low or poor quality; either undesirable or unsuitable to retain and protect.

The tree survey includes all trees included in the land survey red line boundary plan, as well as any that may have been missed, and it should categorize trees or groups of trees, including woodlands for their quality and value within the existing context, in a transparent, understandable, and systematic way. Where the arboriculturist has deemed it appropriate, the trees have been tagged with small metal or plastic tags, placed as high as is convenient on the stem of each tree.

Whilst master plan proposals for the development of the site might be available, the trees have been surveyed without taking these into consideration. All detailed design work on site layout should take into consideration the results of the tree survey (and the TCP).

Trees forming groups and areas of woodland (including orchards, wood pasture and historic parkland) are identified and considered as groups where the arboriculturist has determined that this is appropriate, particularly where they contain a variety of species and age classes that could aid long-term management. It is often expedient to assess the quality and value of such groups of trees as a whole, rather than as individuals. However, an assessment of individuals within any group has been undertaken if they are open-grown or if there is a need to differentiate between them.

The quality and value of each tree or group of trees has been recorded by allocating it to one of the four categories: **A**, **B**, **C**, or **U** (highest to lowest quality respectively). The categories are differentiated on the tree survey plan by colour, or by suffixing the category adjacent to the tree identification number on the TCP.



The survey schedule lists all the trees or groups of trees. The following information is also provided:

- a) reference number (to be recorded on the tree survey plan);
- b) species (common or scientific names);
- c) height in meters (m);
- d) stem diameter in millimetres (mm) at 1.5m above adjacent ground level or immediately above the root flare for multi-stemmed trees;
- e) branch spread in meters taken at the four cardinal compass points;
- f) height of crown clearance above adjacent ground level in meters (m);
- g) age class (newly planted, young, semi-mature, early mature, mature, over mature);
- h) physiological condition (e.g. good, fair, poor, decline and dead);
- i) structural condition (e.g. good, fair, poor or not visible);
- j) comment about the tree, its location and preliminary management recommendations, including further investigation of suspected defects that require more detailed assessment and potential for wildlife habitat;
- k) The retention category referring to the quality and useful contribution in years; **U** = <10yrs; **A** = >40yrs; **B** = >20yrs; **C** = >10yrs. The retention subcategory referring to the type of amenity; 1 = Arboricultural; 2 = Landscape; 3 = Cultural including conservation (see Appendix 1 Cascade chart for tree quality assessment).



---

## Definitions

### Arboriculturist

An arboriculturist (or arboricultural consultant) is a person who has, through relevant education, training, and experience, gained recognized qualifications and expertise in the field of trees in relation to construction.

### Tree Survey

A tree survey should be undertaken by an arboriculturist and should record information about the trees on a site independently of and prior to any specific design for development. As a subsequent task, and with reference to a design or potential design, the results of the survey should be included in the preparation of a tree constraints plan, which should be used to assist with site layout design.

### Tree Constraints Plan

A TCP is plan, typically delivered as an AutoCAD drawing (.DWG file format), prepared by an arboriculturist for the purposes of layout design showing the root protection area and representing the effect that the mature height and spread of retained trees will have on layouts through shade, dominance, etc.

### Root Protection Area

An RPA is a 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 m<sup>2</sup>.

### Construction Exclusion Zone (also termed Tree Protection Zone)

A construction exclusion or tree protection zone is an area based on the RPA (in m<sup>2</sup>), identified by an arboriculturist, to be protected during 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.

### Arboricultural Impact Assessment (AIA)

This is a study, undertaken by an arboriculturist, 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.

### Tree Protection Plan (TPP)

A TPP is plan, typically delivered as an AutoCAD drawing (.DWG file format), prepared by an arboriculturist showing the finalized layout proposals, tree retention and tree and landscape protection measures detailed within the arboricultural method statement, which can be shown graphically.

### Arboricultural Method Statement (AMS)

This is a methodology for the implementation of any aspect of development that has the potential to result in loss of or damage to a tree. The AMS is likely to include details of an on-site tree protection monitoring regime.

---

## Recommendations

With the benefit of making an assessment of your planning proposals, we make the following recommendation to ensure that there are no irrevocable issues to the proposed retained trees and so that no conditions relating to arboriculture are attached to any planning consent secured; obtain an arboricultural report to include:

- a) An arboricultural impact assessment (AIA).
- b) An arboricultural method statement (AMS).
- c) A tree protection plan drawing (TPP).

## Limitations

Trees were inspected from using visual observation from ground level only. Trees were not climbed or inspected below ground level. Inaccessible trees will have best estimates made about the location, physical dimensions, and characteristics. Trees have been grouped where BS5837 guides us that it is expedient to do so. Trees have been excluded from the survey if they are found by us to be sufficiently far away from the proposed developable area or if they are outside of the red line boundary plan showing the expectations of our client for the extent of the survey. BS5837 does not draw any distinction between trees subject to statutory protection, such as a Tree Preservation Order (“TPO”), and those trees without. This is principally because a detailed planning consent overrides any TPO protection. Consequently, we do not seek to offer any comparison between or infer any difference in the quality or importance of TPO trees and other trees.

---

## Appendices

The following documents were released to the Client as appendices to this report:

- Survey Schedule (.PDF)
- Tree Constraints Plan drawing (.DWG & .PDF)

If you require clarification of information contained herein, please do not hesitate to contact us via 01244 661170.

Yours Sincerely,



Shaun Rowe BSc (Hons) MArborA

Graduate Arboriculturist

07842 413 921

shaunrowe@arbtech.co.uk

## Appendix 1: Table 1 Cascade chart for tree quality assessment

---

**BS5837:2012 Trees in relation to design, demolition and construction – Recommendations**
**Table 1 Cascade chart for tree quality assessment**

Category and definition	Criteria (including subcategories when appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
<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 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> <i>NOTE Category U trees can have existing or potential conservation value which might be desirable to preserve; see 4.5.7.</i>			Dark red
	<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>  <b>Trees of high quality</b> 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 dominate 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).	Light green
<b>Category B</b>  <b>Trees of moderate quality</b> 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 remedial defects, including unsympathetic management and storm damage), such that they are unlikely to be suitable for retention of 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.	Mid blue
<b>Category C</b>  <b>Trees of low quality</b> with an estimated remaining expectancy of at least 10 years, or young trees with a stem diameter below 150mm.	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 value.	Trees with no material conservation or other cultural value.	Grey

## Appendix 2: Schedule of Trees

---

## BS5837:2012 Tree Survey

## Arbtech Consulting Ltd.

Client: Welsh Dee Trust  
 Project: Felin Puleston Weir  
 Survey Date: 05/06/2023  
 Surveyor: Shaun Rowe



Chester Road  
 Chester  
 Cheshire  
 CH4 0DH  
 Phone: 01244661170  
 Mobile: N/A

Tree and Tag No Species		Hght (m)	Stems		Crown		Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations		Cat ERC	
			No	Ø (mm)	Spread (m)	Clear (m)					Survey Comment			
G01											Estimated Measurements			
Various		10	1	180	N	2	1	SM	A: 14.7	Good	C: Good		C.2	
See comments for details					E	2	1		R: 2.16		S: Good	Group primarily consists of bankside alder trees with few willow, hazel, sycamore and hawthorn within. Tall and slender forms due to competitive growth for light. Basal areas obscured with thick undergrowth. Low level deadwood in lower crowns due to shaded conditions.	10+ yrs	
					S	2	1				B: Not visible			
					W	2	1							
G02											Estimated Measurements			
Crack Willow		8	1	100	N	2	0	SM	A: 4.5	Good	C: Good		C.2	
Salix fragilis					E	2	0		R: 1.19		S: Good	Typical trees within riparian habitat growing on bank of weir. No significant notable features.	10+ yrs	
					S	2	0				B: Not visible			
					W	2	0							
G03											Estimated Measurements			
Various		10	1	450	N	4	0	EM	A: 91.6	Good	C: Good		B.1.2	
See comments for details					E	4	0		R: 5.39		S: Good	Sweet Chestnut, common lime, hawthorn, sycamore. Group set back from weir. Basal areas not visible due to thick undergrowth of brambles. Good landscape value as group situated directly adjacent to public right of way.	20+ yrs	
					S	4	0				B: Not visible			
					W	4	0							
G04											Estimated Measurements			
Various		6	1	100	N	1	0	Y	A: 4.5	Fair	C: Poor		C.2	
See comments for details					E	1	0		R: 1.19		S: Good	Field maple, sycamore, ash. Multiple young ash trees displaying severe ash dieback. Poor future potential for ash trees within group. Other species have good future potential.	10+ yrs	
					S	1	0				B: Not visible			
					W	1	0							
Age Classifications:		N	Newly planted	EM	Early Mature		Condition:		C	Crown	Stems:		Ø	Diameter
		Y	Young	M	Mature				S	Stem			(Eq)	Equivalent stem diameter using BS5837:2012 definition
		SM	Semi-mature	OM	Over Mature				B	Basal area	ERC:		Estimated Remaining Contributio	



Tree and Tag No Species	Hght (m)	Stems		Crown		Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations			Cat ERC	
		No	Ø (mm)	Spread (m)	Clear (m)					Survey Comment				
G05											Estimated Measurements			
Various <i>See comments for details</i>	16	1	550	N	4	2	EM	A: 136.9 R: 6.6	Good	C: Good S: Good B: Good	Large woodland bordering east of site. Woodland contains trees of Varying age, size and condition. Species include common beech, common ash, Norway maple, sycamore, hawthorn, field maple, swedish whitebeam, sweet Chestnut. High landscape value for local area, borders high traffic public right of way. Few mature ash displaying early symptoms of ash dieback.			B.1.2.3 20+ yrs
T01											Estimated Measurements			
Crack Willow <i>Salix fragilis</i>	8	2	283 (Eq)	N	3	2	SM	A: 36.2 R: 3.39	Good	C: Good S: Good B: Not visible	Typical bankside willow. Twin stemmed from base, base obscured with bramble growth.			C.2 10+ yrs
T02											Estimated Measurements			
Sycamore <i>Acer pseudoplatanus</i>	8	1	400	N	4	2	SM	A: 72.4 R: 4.8	Good	C: Good S: Fair B: Fair	Occluding longitudinal wound on eastern aspect of lower stem circa 90cmx5cm. Localized area of internal stem decay which has not progressed further up the stem. Minor suppression of crown to east from adjacent more dominant tree. Minor western stem lean, typical for bankside tree. Low level deadwood within crown.			B.2 20+ yrs
T03											Estimated Measurements			
Common Lime <i>Tilia europaea</i>	14	1	570	N	6.5	1	EM	A: 147 R: 6.84	Good	C: Good S: Good B: Good	Dominant tree within general area. Typical form for lime, multiple included unions at circa 3m where tree forks into multiple leading stems. Low level deadwood within shaded area of lower crown. Multiple structural surface roots visible to west.			B.1.2 20+ yrs
T04											Estimated Measurements			
Common Alder <i>Alnus glutinosa</i>	8	7	529 (Eq)	N	4	1	SM	A: 126.7 R: 6.35	Good	C: Good S: Good B: Not visible	Typical tree within riparian habitat. Multistemmed from base, basal area obscured with thick undergrowth. Minor suppression to east from more dominant tree. Low level deadwood within crown.			C.2 10+ yrs
Age Classifications:	N Y SM	Newly planted Young Semi-mature	EM M OM	Early Mature Mature Over Mature			Condition:	C S B	Crown Stem Basal area		Stems:  ERC:	Ø (Eq) Estimated Remaining Contributio	Diameter Equivalent stem diameter using BS5837:2012 definition	

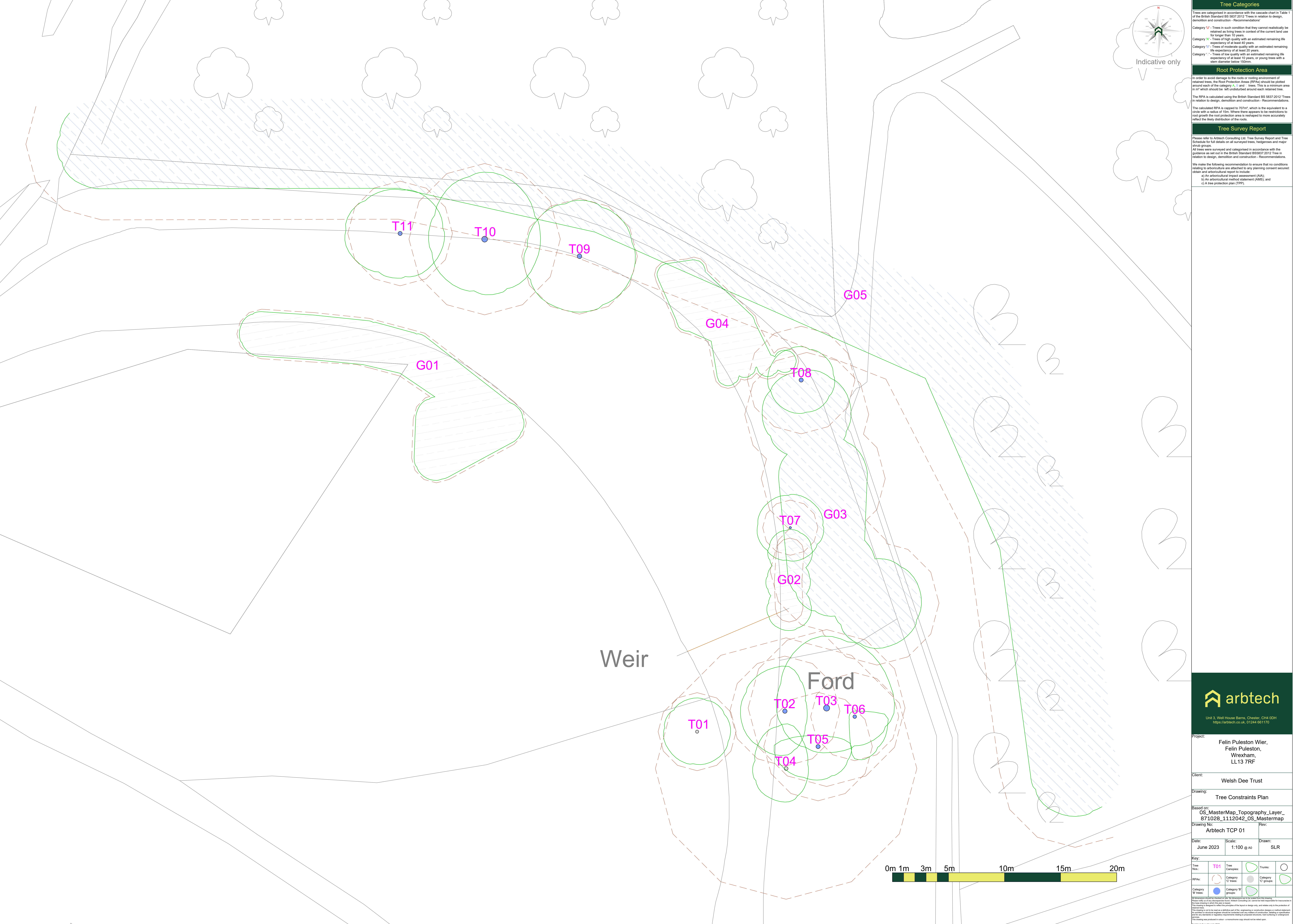
Tree and Tag No Species	Hght (m)	Stems		Crown		Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations			Cat ERC
		No	Ø (mm)	Spread (m)	Clear (m)					Survey Comment			
T05												Estimated Measurements	
Common Lime <i>Tilia europaea</i>	10	3	394 (Eq)	N	1	4	SM	A: 70.3 R: 4.73	Good	C: Good S: Good B: Good	Multistemmed from base. Suppression of crown to north from more dominant lime. No significant notable features.		B.2 20+ yrs
T06												Estimated Measurements	
Common Oak <i>Quercus robur</i>	8	1	320	N	0.5	0	SM	A: 46.3 R: 3.83	Good	C: Good S: Good B: Good	Heavily suppressed crown to north and west due to more dominant adjacent lime. Deadwood within inner crown typical of species. Longitudinal wound on first order limb to south, occluding with minor internal decay of limb.		B.2 20+ yrs
T07												Estimated Measurements	
Common Alder <i>Alnus glutinosa</i>	8	1	200	N	3	0	SM	A: 18.1 R: 2.4	Good	C: Good S: Not visible B: Not visible	Surveyed from public right of way to east. Typical tree within riparian habitat.		B.2 20+ yrs
T08												Estimated Measurements	
Common Hawthorn <i>Crataegus monogyna</i>	5	2	391 (Eq)	N	3	0	M	A: 69 R: 4.68	Good	C: Good S: Not visible B: Not visible	Good landscape value, directly adjacent to public right of way. Stems obscured by ivy growth from base into lower crown.		B.2 20+ yrs
T09												Estimated Measurements	
Sycamore <i>Acer pseudoplatanus</i>	12	1	420	N	5	5	EM	A: 79.8 R: 5.03	Good	C: Good S: Not visible B: Not visible	Tree growing on bank of weir. Potential undermining of stem but not visible due to dense basal growth. Dense ivy on stem into crown from base. Good landscape value.		B.1.2 20+ yrs
Age Classifications:	N Y SM	Newly planted Young Semi-mature	EM M OM	Early Mature Mature Over Mature	Condition:		C S B	Crown Stem Basal area	Stems:	Ø (Eq)	Diameter Equivalent stem diameter using BS5837:2012 definition	ERC:	Estimated Remaining Contributio



## Appendix 3: Tree Constraints Plan

---





### Tree Categories

Trees are categorised in accordance with the cascade chart in Table 1 of the British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'

Category 'U' - Trees in such condition that they cannot realistically be retained as living trees in context of the current land use for longer than 10 years.

Category 'V' - Trees of high quality with an estimated remaining life expectancy of at least 40 years.

Category 'W' - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.

Category 'X' - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 100mm.

### Root Protection Area

In order to avoid damage to the roots or rooting environment of retained trees, the Root Protection Area (RPA) should be plotted around each of the category 'U' and 'V' trees. This is a minimum area in m<sup>2</sup> which should be left undisturbed around each retained tree.

The RPA is calculated using the British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'.

The calculated RPA is capped to 707m<sup>2</sup>, which is the equivalent to a circle with a radius of 15m. Where there appears to be restrictions to root growth the root protection area is reshaped to more accurately reflect the likely distribution of the roots.


### Tree Survey Report

Please refer to Arbtech Consulting Ltd. Tree Survey Report and Tree Schedule for full details on all surveyed trees, hedgerows and major shrub groups.

All trees were surveyed and categorised in accordance with the guidance as set out in the British Standard BS5837:2012 'Trees in relation to design, demolition and construction - Recommendations'.

We make the following recommendation to ensure that no conditions relating to arboriculture are attached to any planning consent issued:

- a) An arboricultural impact assessment (AIA);
- b) An arboricultural method statement (AMS); and
- c) A tree protection plan (TPP).



Unit 3, Well House Barns, Chester, CH4 0DH  
<https://arbtech.co.uk> 01244 661170

Project:

Felin Puleston Wier,  
Felin Puleston,  
Wrexham,  
LL13 7RF

Client:

Welsh Dee Trust

Drawing:

Tree Constraints Plan

Based on:

OS\_MasterMap\_Topography\_Layer\_871028\_1112042\_OS\_Masternmap

Drawing No:

Arbtech TCP 01

Date:

June 2023

Scale:

1:100 @ A0

Drawn:

SLR

Key:

Tree No:	T01	Tree Category:	Category 'U' trees	Trunks:	○
RPA:		Category 'V' trees:	Category 'W' groups:		

Arbtech Consulting Ltd. 2018

Document number	Editor	Signature	Position	Issue number	Date
Arbtech TSR 01	Shaun Rowe		Graduate Arboriculturist	01	16/06/23

### Limitations

Arbtech Consulting Ltd has prepared this report for the sole use of the above-named Client/Agent in accordance with our terms of business, under which our services were performed. No other warranty, expressed or implied, is made as to the professional advice included in this report or any other services provided by us. This report may not be relied upon by any other party without the prior and express written agreement of Arbtech Consulting Ltd. The assessments made assume that the sites and facilities will continue to be used for their current purpose without significant change. The conclusions and recommendations contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested. Information obtained from third parties has not been independently verified by Arbtech Consulting Ltd.

### Copyright

© This Report is the copyright of Arbtech Consulting Ltd. Any unauthorised reproduction or usage by any person other than the addressee is strictly prohibited.