ARBORICULTURAL IMPACT ASSESSMENT

GOLDBOROUGH ROAD BATTERY ENERGY STORAGE SYSTEM
LAND SOUTH OF GOLDBOROUGH ROAD, HUNDLETON, PRMBROKE, NEAR SA71 5SH
P16-01-AIA JANUARY 2024

Summary table		
Site Name:	Goldborough Road BESS	
Project reference:	5438	
Site Address:	Goldborough Road, Wallaston Cross, Pembroke	
Nearest Postcode:	SA71 5SH	
Central Grid reference:	SM 92390 00660	
Local Planning Authority:	Pembrokeshire County Council	
Relevant planning policies:	Pembrokeshire County Council (PBC) - local development plan (up to 2021); policy GN.37 protection & enhancement of biodiversity **|** PBC Supplementary Planning Guidance (SPG), Biodiversity (adopted May 2021) **|** PBC SPG, Renewable Energy (adopted October 2016)	
Statutory Controls:	**Tree Preservation Order**	**Conservation Area**
	None	No
Soil Type: (Source: BGS online soils map © NERC 2023)	**Superficial/Drift**	**Bedrock**
	Freely draining slightly acid loamy soils (high ground) & freely draining slightly acid but base-rich soils (low ground)	Milford Haven Group - Argillaceous rocks and sandstone, interbedded
Proposed site plan:	Drawing No: PE-01-P02, dated: 25/102023	
Notes:	-	
Report author:	David Holmes *FdSc, MArborA*	
Checked by:	Richard Hyett *MSc, BSc (Hons), MICFor, MArborA*	
Date of issue:	30th of November 2023	

Arboricultural Association
Professional Member
PR01027

Institute of Chartered Foresters
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REPORT CONTENTS:

1. INTRODUCTION

1.1. Barton Hyett Associates Ltd have been instructed by Pembroke Green Limited to survey trees located on land at Goldborough Road, Hundleton, Pembroke, South West Wales ('the site') in accordance with the recommendations of British Standard 5837:2012 '*Trees in relation to design, demolition and construction - recommendations*'.

1.2. The scope of the instruction was to inspect trees relevant to a planning application for a Battery Energy Storage System (BESS) at the site and provide written advice on how they inform feasibility and design options. The instruction also required an assessment of the potential impact (the Arboricultural Impact Assessment) of the proposed development on the site's arboricultural resource to be undertaken.

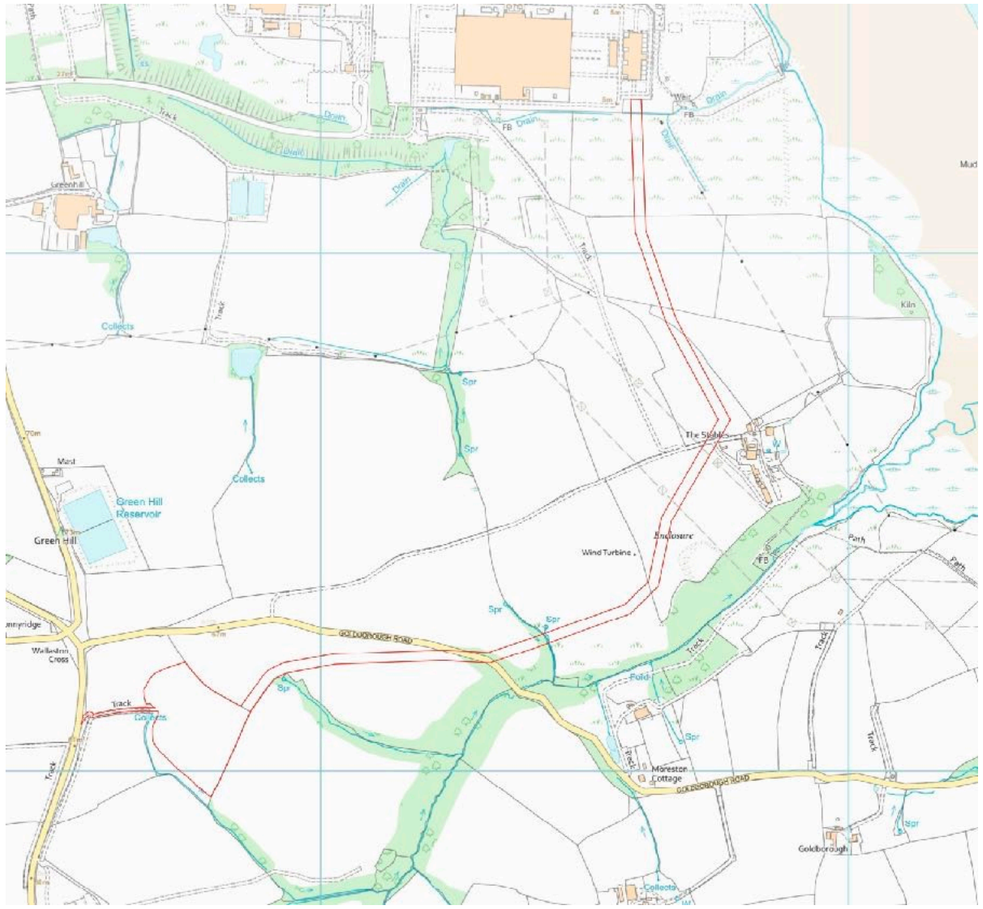

Figure 1: plan of the site with the approximate survey area & cable easement shown in red.

2. SITE DESCRIPTION

2.1. The site lies approximately 4 miles west of the town of Pembroke and is made up of agricultural land with field boundaries being defined by a mixture of hedgerows, ditches and fences.

2.2. The fields which the proposed cable route crosses are used for both grazing cattle and arable crop production. The sites approximate height above mean sea level varies from 59m on the high ground to the south and 7.7m on the low ground to the north. The site and cable easement are shown on the plan opposite (Figure 1).

2.3. Goldborough Road runs east-to-west through the approximate centre of the site with an unnamed side road branching off this, running north east toward Lambeth Farm. Access to the main site is possible from a gated entrance on an unnamed side road.

2.4. To the north of the site runs a Public Right of Way (PRoW), which is part of the Pembrokeshire Coast National Trail and Wales Coast Path.

2.5. Pembroke Power Station and sub-station are located due north of the site, just west of which is the Pembroke Oil Refinery. The surrounding area is agricultural land with occasional farms and outlying dwellings and the village of Hundleton is located approximately 2 miles east of the site.

3. TREE SURVEY FINDINGS

3.1. The survey recorded **50** arboricultural features. These are summarised in terms of quality in accordance with the recommendations of BS 5837 in Table 1 below and shown in more detail on the Tree Survey and Constraints Plan (**Section 2**) and within the Tree Survey Schedule and within the Tree Survey Schedule (**Section 4**).

Table 1: Summary of arboricultural features of each BS5837 quality category

	Total	A - High quality trees whose retention is most desirable.	B - Moderate quality trees whose retention is desirable.	C - Low quality trees which could be retained but should not significantly constrain the proposal.	U - Very poor quality trees that should be removed unless they have high conservation value.
Trees	**24**	-	16	8	-
Groups	**2**	-	1	1	-
Hedgerows	**24**	-	16	8	-
Total	**50**	**0**	**33**	**17**	**0**

4. KEY ARBORICULTURAL FEATURES

4.1. The four ash T4 - T7 have been recorded as moderate-quality features. These four trees were found to be reasonably good examples of the species with only minor defects being noted.

4.2. The moderate-quality outgrown hedge/copse feature H12 and the two low-quality features H13 and H14 are established on embankments. The former is on the sides of a gulley with the latter two being established on the opposing sides of a cutting for an unnamed minor road.

4.3. The hedgerows recorded on the site boundaries are significant landscape features. They are of moderate quality and were found to have a reasonable mix of species throughout. The predominant species are hawthorn and blackthorn which is as expected for land grazed by livestock and both types of thorn were found together or singly in all hedgerows.

5. PROPOSED DEVELOPMENT

5.1. The development proposal is for a Battery Energy Storage System (BESS) with access to the west of the site, security perimeter fencing with CCTV, internal access roads and parking. The proposed site layout is shown on the proposed site plan, drawing No: PE-01-P02, dated: 25/102023 (as amended and submitted).

6. IMPACT ASSESSMENT

6.1. The impact assessment considers the effects of any tree loss required to implement the proposed development as well as any reasonably foreseeable potentially damaging activities proposed in the vicinity of retained trees. This is undertaken with reference to BS5837:2012 and considering the nature of the proposed development. Actual and potential impacts can include tree removal to facilitate the development, soil compaction in close proximity to trees, and direct impact damage to the canopy and roots of retained trees from construction activities. A summary of anticipated impacts resulting from the proposed development is provided below.

Trees to be removed

6.2. One low quality tree and the sections from nine moderate-quality hedgerows are proposed to be removed. The site and cable easement layout and the areas of impacts are shown on the Tree Retention and Removal Plan (TRR) in **Section 3.**

6.3. Nine sections from the moderate-quality hedgerows are proposed to be removed from H2 - H10 in order to facilitate the cable installation/easement. At present, it is not possible to show the exact amount of impact as detailed access design is not available and it is likely that utilising existing gateways or gaps in the hedgerows would limit the impact. The loss can be offset by mitigation planting, be it to re-instate the removed sections or by selecting other locations to create new or enhance existing hedgerows (see TN6 - TN8 on the TRR at **Section 3**).

6.4. The individual ash T3 is located between the hedgerows H5 and H6 and the cable easement shows that this tree would need to be removed. Low-quality arboricultural features should not ordinarily constrain development and the loss of T3 can be off-set by the provision of mitigation planting. These removals are shown on the Tree Retention and Removal Plan in **Section 3**.

Impacts on retained trees

6.5. The use of a Cellular Confinement System (CCS) is not proposed for the access track from the unnamed side road providing that the existing surface be retained with a new wearing surface added to this. The track is routed parallel and closely alongside the hedgerows H22 and H23. The close proximity of the track is acceptable since this is no more significant than the previous agricultural use of the land (see TN1 on the TRR at **Section 3**).

6.6. It will be possible to avoid the RPA of G1, once the cable route has been subject to detailed design (see TN3 on the TRR at Section 3). To install the cable under Goldborough Road (where T5, H13 and H14 are recorded) and the gulley to the north-east of the road (where T4 and H12 are recorded), Horizontal Directional Drilling (HDD) will be utilised. There is sufficient space in the adjacent field for launch and receiver pits to be excavated and it will be possible to avoid the RPA of adjacent arboricultural features (see TN4 and TN5 on the TRR in **Section 3**).

Conclusion

6.7. The proposal is feasible from an arboricultural perspective, and if carefully implemented according to an approved Arboricultural Method Statement there would be no or only a low potential negative impact on the retained trees. A combined draft Tree Retention and Removal and Tree Protection Plan are included in **Section 3**.

7. TREE PROTECTION MEASURES

7.1. Temporary tree protection fencing is not proposed for this site. The proposed security / acoustic fence which is to be erected around the periphery of the site, will act as an effective tree protection barrier if erected before any construction works commence on site. This will mitigate the need to install BS5837:2012 fencing along the outer perimeters of those trees close to the development area (see TN2 on the TRR at **Section 3**).

8. HEADS OF TERMS FOR AN ARBORICULTURAL METHOD STATEMENT (AMS)

8.1. BS5837:2012 (Figure 1) recommends that detailed/technical design of tree protection and arboricultural methodologies should be resolved and finalised following the approval of the feasibility of a scheme by the Local Planning Authority.

8.2. Annex B and Table B.1 of BS5837:2012, an informative, advises that Arboricultural Method Statement (AMS) Heads of Terms are a sufficient level of information in order to deliver tree-related information into the

planning system. The table also advises that a detailed AMS might reasonably be required as a planning condition.

8.3. A brief summary of the principles of tree protection on development sites is included in **Section 7**.

8.4. A draft, 'Heads of Terms' for an AMS is set out below:

- Project arboriculturist – schedule of monitoring and supervision to be agreed upon with the applicant and LPA (if required)
- Pre-commencement site meeting - to be attended by the project arboriculturist, client, site manager and other relevant parties. Project arboriculturist to ensure that all parties have copies of the tree protection plan and this report
- Tree (T3) and sectional hedgerow removals (H2 - H10) - as illustrated by TN6 - TN8 on the Tree Retention and Removal Plan (TRR)
- Site groundworks to upgrade the surface of the track to the north of H22
- Main construction phase
- Final groundworks including hedgerow replacement planting

9. CONCLUSIONS AND RECOMMENDATIONS

9.1. Subject to the implementation of the advice contained within this report the proposed development is acceptable from an arboricultural perspective. The loss of trees can be readily mitigated and the retained trees can be adequately protected during construction activities to sustain their health and longevity.

9.2. Potentially, nine sections from nine separate moderate-quality hedgerows H2 - H10 and one low-quality ash T3 would need to be removed in order to permit the cable easement although with detailed design the impact may be lessened by using existing gateways or gaps.

9.3. An AMS and finalised Tree Protection Plan will need to be produced. Where the feasibility of a scheme has been agreed upon by the Local Planning Authority, this detail can be agreed upon and submitted later as part of a pre-commencement planning condition (by agreement with the applicant).

David Holmes *FdSc, MArborA*
Arboriculturist

SELECT IMAGES FROM THE TREE SURVEY

LAND SOUTH OF GOLDBOROUGH ROAD, HUNDLETON, PEMBROKE

PROJECT NO: 5438

SURVEYOR: DAVID HOLMES

Barton Hyett
Arboricultural Consultants

IMAGE 1: View looking west at the established unmetalled track running to the north of hedgerow H22.

IMAGE 2: View looking south along the hedgerow H19.

IMAGE 3: View looking east toward the group of ash G1 with the hedgerow H16.

IMAGE 4: View looking east toward Lambeth Farm with the access track flanked by hedgerows H9 & H10.

IMAGE 5: View looking north from just south of the PRoW - Pembroke Power Station seen in the distance.

IMAGE 6: View looking north showing the Out of Scope (OOS) brambles and the thicket H1.

SECTION 1

KEY

Category A Tree - High quality
(Retention highly desirable)

Category A - Hedgerow, Group, Woodland - High quality
(Retention highly desirable)

Category B Tree - Moderate quality
(Retention desirable)

Category B - Hedgerow, Group, Woodland - Moderate quality
(Retention desirable)

Category C Tree - Low quality
(May be retained but should not constrain development)

Category C - Hedgerow, Group, Woodland - Low quality
(May be retained but should not constrain development)

Category U Tree - Very low quality
(Mostly unsuitable for retention)

Category U - Hedgerow, Group, Woodland - Very low quality
(Mostly unsuitable for retention)

Root Protection Area (RPA) - Layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and soil volume to maintain the tree's viability

Shrub mass/offsite tree/out of scope (OOS)

* Tree/Group/Hedgerow not on topographical survey. Location given is an estimate

Ancient Tree / Woodland or Veteran Trees

Ancient tree/woodland or Veteran tree: Important trees that require special consideration

Ancient tree/woodland or Veteran tree buffer: As per published standing advice from Natural England and the Forestry Commission

Tree Ref	Species	Height (m)	LifeStage	RPA Radius (m)	RPA (m2)
T1	Willow (Goat)	8	SM	5	80
T2	Ash (Common)	8	SM	5	80
T3	Ash (Common)	12	EM	6.8	147
T4	Ash (Common)	15	M	8.4	222
T5	Ash (Common)	10	M	10.2	327
T6	Ash (Common)	14	M	11	393
T7	Ash (Common)	15	EM	7.8	191
T8	Ash (Common)	8	SM	7.3	168

Group Ref	Species	Height Range (m)	LifeStage	RPA Radius (m)	RPA (m2)
G1	Ash; blackthorn	2 - 12	EM	6	113
G2	Ash; goat willow	6 - 7	SM	2.4	18

Hedge Ref	Species	Avg. Height (m)	Life Stage	RPA Radius (m)	RPA (m2)
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H2	Hawthorn; blackthorn; dogrose	3	EM	1.5	7
H3	Hawthorn; blackthorn; goat willow; dogrose	6	EM	1.7	9
H4	Hawthorn; blackthorn; hazel; dogrose	5.5	EM	1.3	5
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H6	Hawthorn; blackthorn; sycamore; goat willow; dogrose	3	SM	1	3
H7	Hawthorn; blackthorn; field elm; dogrose	2.5	SM	1	3
H8	Blackthorn; field elm; dogrose	2.5	SM	1	3
H9	Hawthorn; blackthorn; sycamore; dogrose	2.5	SM	1	3
H10	Hawthorn; blackthorn; field elm; dogrose	2.5	SM	1	3
H11	Hawthorn; blackthorn; elder; dogrose	2	SM	1	3
H12	Blackthorn; hawthorn; hazel; elder; goat willow	4.5	SM	1.8	10
H13	Blackthorn; hawthorn; hazel; sycamore; goat willow	4.5	SM	2	13
H14	Blackthorn; hawthorn; hazel; goat willow	3	SM	1.3	5
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H24	Blackthorn; elder	2.5	SM	1	3

Label	Description
OOS1	Pile of debris (timber) with establishing brambles & saplings
OOS2	Pile of debris (timber) with establishing brambles & saplings
OOS3	Dogrose & brambles - maintained as a hedge by flail; approx 1.5m in height & 1m in width
OOS4	Brambles - maintained as a hedge by flail; approx 1.5m in height & 1m in width
OOS5	Young ash & oak saplings (x6) on embankment adjacent to access track
OOS6	Cluster of brambles
OOS7	Cluster of brambles
OOS8	Cluster of brambles
OOS9	Brambles growing against boundary fence

INDEX MAP

Note: The original of this drawing was produced in colour – a monochrome copy should not be relied upon. This drawing should be interpreted with reference to the accompanying tree schedule and written advice

N
GRID NORTH

0 25 50 100 Meters

PROJECT TITLE

Goldborough Road (5438)

DRAWING TITLE

Tree Survey plan

SCALE			DRAWING NUMBER	
Scale: 1:1,250 @ A1			**BHA_5438_01**	
DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
TB	**DH**	**-**	**1 of 3**	**29/11/2023**

COORDINATE SYSTEM / DATUM

British National Grid / Newlyn Datum (AOD)

CLIENT

Pembroke Green Limited

Barton Hyett Associates
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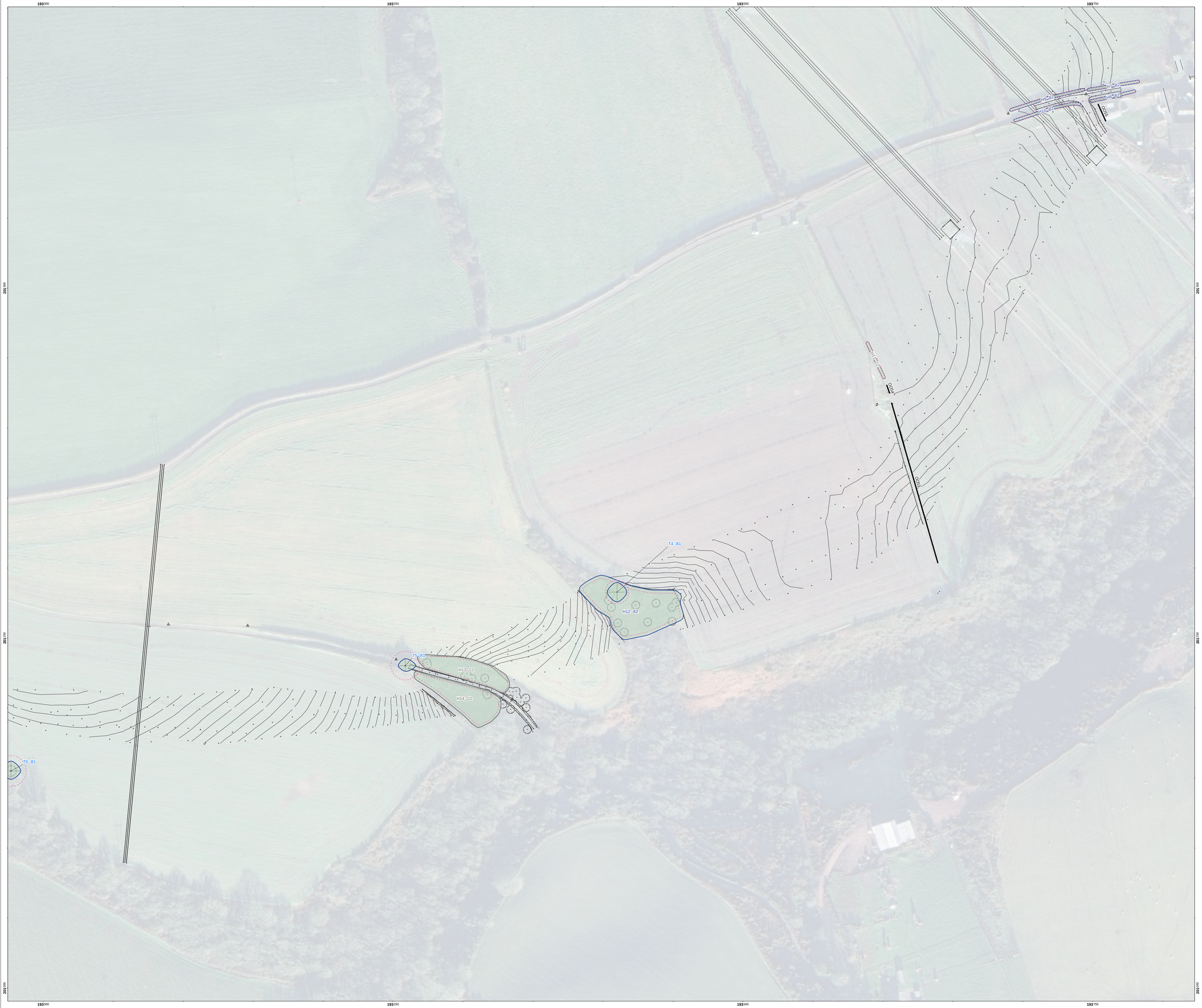
Address: Office SE, Deer Park Business Centre,
Eckington, Pershore, Worcestershire, WR10 3DN



KEY

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- Category A - Hedgerow, Group, Woodland - High quality (Retention highly desirable)
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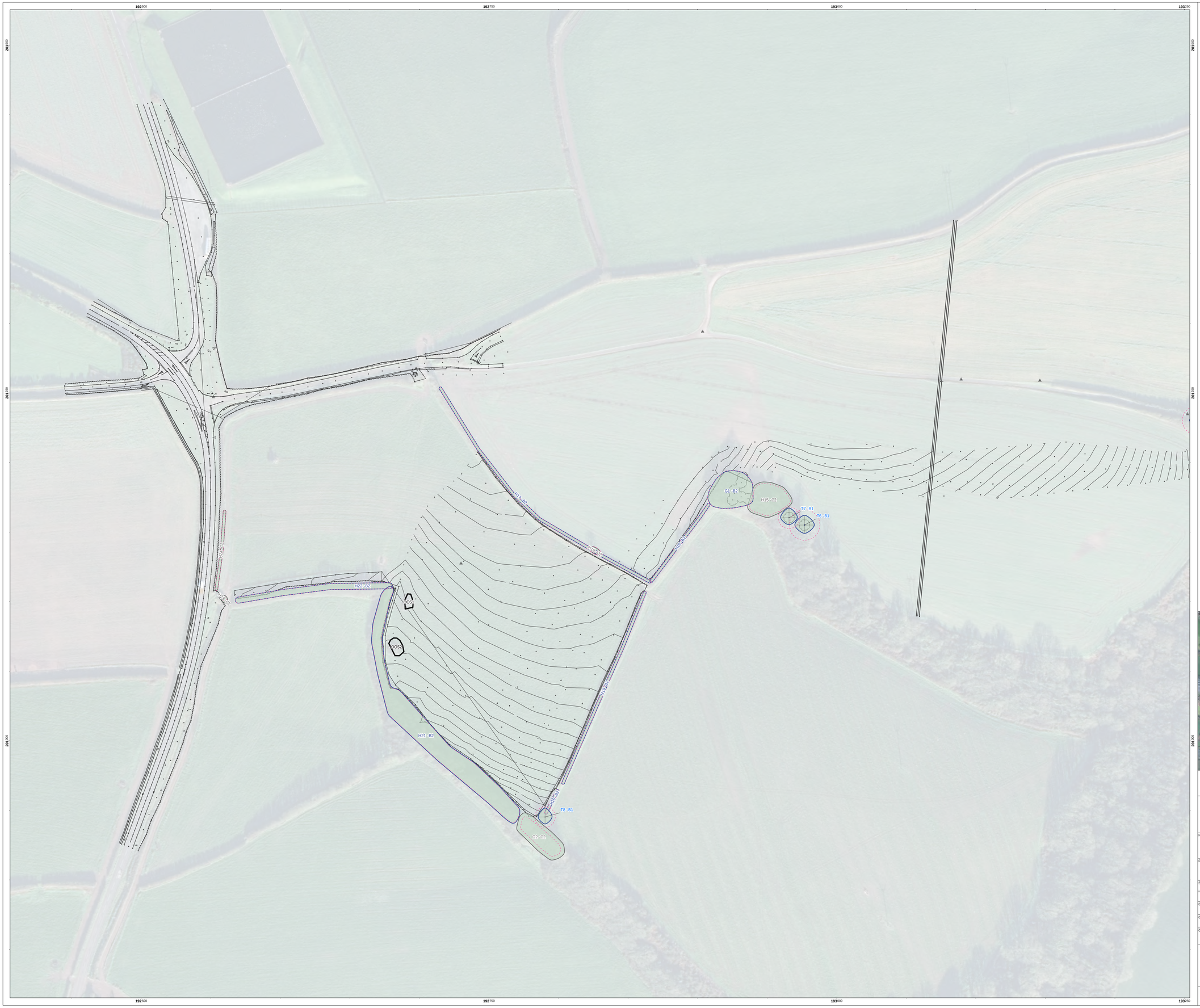

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OOS5	Young ash & oak saplings (x6) on embankment adjacent to access track
OOS6	Cluster of brambles
OOS7	Cluster of brambles
OOS8	Cluster of brambles
OOS9	Brambles growing against boundary fence

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N
GRID NORTH

0 25 50 100 Meters

PROJECT TITLE

Goldborough Road (5438)

DRAWING TITLE

Tree Survey plan

SCALE				DRAWING NUMBER	
Scale: 1:1,250 @ A1				**BHA_5438_01**	
DRAWN BY	APPROVED BY	REVISION	SHEET	DATE	
TB	**DH**	**-**	**3 of 3**	**29/11/2023**	

COORDINATE SYSTEM / DATUM

British National Grid / Newlyn Datum (AOD)

CLIENT

Pembroke Green Limited

Barton Hyett Associates
Arboricultural Consultants

Tel: 01386 576161
Address: Office 5E, Deer Park Business Centre,
Eckington, Pershore, Worcestershire, WR10 3DN

KEY

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Tree Ref	Species	Height (m)	LifeStage	RPA Radius (m)	RPA (m2)
T1	Willow (Goat)	8	SM	5	80
T2	Ash (Common)	8	SM	5	80
T3	Ash (Common)	12	EM	6.8	147
T4	Ash (Common)	15	M	8.4	222
T5	Ash (Common)	10	M	10.2	327
T6	Ash (Common)	14	M	11	393
T7	Ash (Common)	15	EM	7.8	191
T8	Ash (Common)	8	SM	7.3	168

Group Ref	Species	Height Range (m)	LifeStage	RPA Radius (m)	RPA (m2)
G1	Ash; blackthorn	2 - 12	EM	6	113
G2	Ash; goat willow	6 - 7	SM	2.4	18

Hedge Ref	Species	Avg. Height (m)	Life Stage	RPA Radius (m)	RPA (m2)
H1	Blackthorn	3	SM	1	3
H2	Hawthorn; blackthorn; dogrose	3	EM	1.5	7
H3	Hawthorn; blackthorn; goat willow; dogrose	6	EM	1.7	9
H4	Hawthorn; blackthorn; hazel; dogrose	5.5	EM	1.3	5
H5	Hawthorn; blackthorn; dogrose	3	SM	1	3
H6	Hawthorn; blackthorn; sycamore; goat willow; dogrose	3	SM	1	3
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H9	Hawthorn; blackthorn; sycamore; dogrose	2.5	SM	1	3
H10	Hawthorn; blackthorn; field elm; dogrose	2.5	SM	1	3
H11	Hawthorn; blackthorn; elder; dogrose	2	SM	1	3
H12	Blackthorn; hawthorn; hazel; elder; goat willow	4.5	SM	1.8	10
H13	Blackthorn; hawthorn; hazel; sycamore; goat willow	4.5	SM	2	13
H14	Blackthorn; hawthorn; hazel; goat willow	3	SM	1.3	5
H15	Blackthorn; hawthorn; goat willow	4.5	SM	1.3	5
H16	Hawthorn; blackthorn; goat willow	2.5	SM	1	3
H17	Blackthorn; goat willow; gorse; elder; dogrose	2.5	SM	1	3
H18	Goat willow	5	SM	1.8	10
H19	Blackthorn; hawthorn; gorse; goat willow	2.5	SM	1	3
H20	Blackthorn	2.5	SM	1	3
H21	Goat willow; hawthorn; blackthorn	6	EM	2.2	15
H22	Hawthorn; blackthorn; goat willow; dogrose	6	EM	2.2	15
H23	Blackthorn; dogrose; goat willow	3	SM	1	3
H24	Blackthorn; elder	2.5	SM	1	3

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0 25 50 100 Meters

PROJECT TITLE

Goldborough Road (5438)

DRAWING TITLE

Tree Retention plan

SCALE	DRAWING NUMBER
Scale: 1:1,250 @ A1	BHA_5438_01

DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
TB	DH	-	1 of 3	29/11/2023

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Scale: 1:1,250 @ A1	BHA_5438_01

DRAWN BY	APPROVED BY	REVISION	SHEET	DATE
TB	DH	-	2 of 3	29/11/2023

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BS5837:2012 TREE SURVEY SCHEDULE

PROJECT NO: 5438

LAND SOUTH OF GOLDBOROUGH ROAD, HUNDLETON, PEMBROKE

SURVEYOR: DAVID HOLMES

CLIENT: PEMBROKE GREEN LIMITED

SURVEY DATE: 03/10/2023

Barton Hyett Arboricultural Consultants

INDIVIDUAL TREES

Ref	Species	On/off site	Top Height (m)	No. of Stems	Est diam?	Calc. / Actual Stem Dia. (mm)	Crown radii (m) N-E-S-W	Avg. low crown height (m)	1st branch ht (m)	1st branch dir.	Life Stage	Special importance	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)	RPA m²
T1	Willow (Goat)	On	8.0	2	Yes	420	1.0-3.0-6.0-4.0	1.5	0.0	None	SM	None	Not recorded on topo; twin stemmed; adjacent to PRoW access gate on embankment; stem to north has failed with debris hung up in hedge	Good	Fair	20+	C1	5.0	80.0
T2	Ash (Common)	On	8.0	2	Yes	420	3.0-3.5-3.0-3.5	0.0	0.0	None	SM	None	Not recorded on topo; established within hedgerow	Good	Fair	20+	B1	5.0	80.0
T3	Ash (Common)	On	12.0	2	Yes	570	3.0-6.0-6.0-4.0	2.0	0.0	None	EM	None	Twin stemmed tree which had been three stemmed - stem to north west has failed leaving an asymmetric crown shape	Good	Fair	20+	C1	6.8	147.0
T4	Ash (Common)	On	15.0	1	Yes	700	7.0-7.0-7.0-7.0	3.0	0.0	None	M	None	Not recorded on topo; established to northern embankment of gulley; sheltered location; typical for age & species	Good	Fair	20+	B1	8.4	222.0
T5	Ash (Common)	On	10.0	2	Yes	850	5.0-7.5-4.0-5.0	1.5	0.0	None	M	None	Not recorded on topo; heavily swathed in ivy; appears to be 2x mature stems which have been pollarded @3 - 4m with semi mature re-gen forming a new crown; water shoots triggered throughout upper crown	Good	Fair	20+	B1	10.2	327.0
T6	Ash (Common)	On	14.0	2	-	920	7.0-7.0-6.0-7.0	6.0	0.0	None	M	None	Recent limb reduction to north; heavily swathed in ivy; minor twiggy deadwood to upper crown	Good	Fair	20+	B1	11.0	383.0
T7	Ash (Common)	On	15.0	1	Yes	650	7.0-6.0-5.0-6.0	2.5	2.5	E	EM	None	Within thicket; heavily swathed in ivy; minor twiggy deadwood throughout crown	Good	Fair	20+	B1	7.8	191.0

BS5837:2012 TREE SURVEY SCHEDULE

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SURVEY DATE: 03/10/2023

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T8	Ash (Common)	On	8.0	6	Yes	610	6.5-5.0-5.0-5.0	0.0	0.0	None	SM	None	Not recorded on topo; heavily swathed in ivy; appears to be an early mature coppice stool to east of hedge with semi mature re-gen forming a new crown	Good	Fair	20+	B1	7.3	168.0

GROUPS OF TREES

Ref	Species	On/off site	Height range (m)	No. of trees	Est diam?	Max stem diam (mm)	Av. Crown radius (m)	Avg. low crown height (m)	Life Stage	Special importance	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)
G1	Ash; blackthorn	On	2 - 12	8	Yes	500.0	6.0	0.0	EM	None	Copse of 8x multi stemmed ash with thorn occurring as understory; occasional young ash establishing within understory	Good	Fair	20+	B2	6.0
G2	Ash; goat willow	On	6 - 7	5	Yes	200.0	5.0	0.0	SM	None	Multi stemmed trees; 4x ash & 1x willow; ditch runs through feature	Good	Fair	20+	C2	2.4

HEDGEROWS

Ref	Species	On/off site	Av. Height (m)	Av. width (m)	Av. Stem diam (mm)	Avg. low crown height (m)	Life Stage	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)
H1	Blackthorn	On	3.0	3.5	80	0.0	SM	Not plotted on topo; outgrown thicket of blackthorn	Good	Fair	20+	C2	1.0
H2	Hawthorn; blackthorn; dogrose	On	3.0	2.5	120	0.0	EM	Sides maintained by flail for clearance; sample recorded where feature abuts survey area	Good	Fair	20+	B2	1.5
H3	Hawthorn; blackthorn; goat willow; dogrose	On	6.0	4	140	0.0	EM	Sides maintained by flail for clearance; sample recorded where feature abuts survey area	Good	Fair	20+	B2	1.7
H4	Hawthorn; blackthorn; hazel; dogrose	On	5.5	3.5	100	0.0	EM	Sides maintained by flail for clearance	Good	Fair	20+	B2	1.3
H5	Hawthorn; blackthorn; dogrose	On	3.0	2	80	0.0	SM	Maintained by flail	Good	Fair	20+	B2	1.0

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Ref	Species	On/off site	Av. Height (m)	Av. width (m)	Av. Stem diam (mm)	Avg. low crown height (m)	Life Stage	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)
H6	Hawthorn; blackthorn; sycamore; goat willow; dogrose	On	3.0	2	80	0.0	SM	Maintained by flail; predominantly thorn; sample recorded where feature abuts survey area	Good	Fair	20+	B2	1.0
H7	Hawthorn; blackthorn; field elm; dogrose	On	2.5	2	80	0.0	SM	Maintained by flail; sample recorded where feature abuts survey area	Good	Fair	20+	B2	1.0
H8	Blackthorn; field elm; dogrose	On	2.5	2	80	0.0	SM	Maintained by flail	Good	Fair	20+	B2	1.0
H9	Hawthorn; blackthorn; sycamore; dogrose	On	2.5	2	80	0.0	SM	Maintained by flail; becoming colonised by brambles	Good	Fair	20+	B2	1.0
H10	Hawthorn; blackthorn; field elm; dogrose	On	2.5	2	80	0.0	SM	Maintained by flail	Good	Fair	20+	B2	1.0
H11	Hawthorn; blackthorn; elder; dogrose	On	2.0	2	80	0.0	SM	Maintained by flail; predominantly thorn with established elder; plot becoming colonised by brambles; sample recorded where feature abuts survey area	Good	Fair	20+	C2	1.0
H12	Blackthorn; hawthorn; hazel; elder; goat willow	On	4.5	8	150	0.0	SM	Thicket established to opposing embankments where levels change between fields	Good	Fair	20+	B2	1.8
H13	Blackthorn; hawthorn; hazel; sycamore; goat willow	On	4.5	6	170	0.0	SM	Outgrown thicket of predominantly blackthorn; established on embankment where levels change between fields & access track	Good	Fair	20+	C2	2.0
H14	Blackthorn; hawthorn; hazel; goat willow	On	3.0	6	100	0.0	SM	Outgrown thicket of predominantly blackthorn; established on embankment where levels change between fields & access track	Good	Fair	20+	C2	1.3
H15	Blackthorn; hawthorn; goat willow	On	4.5	5	100	0.0	SM	Outgrown thicket of blackthorn; occasional young hawthorn establishing; willow occurs to north east corner of feature	Good	Fair	20+	C2	1.3
H16	Hawthorn; blackthorn; goat willow	On	2.5	2	80	0.0	SM	Maintained by flail; predominantly blackthorn with occasional hawthorn; willow located to north of feature; becoming colonised by ferns	Good	Fair	20+	B2	1.0
H17	Blackthorn; goat willow; gorse; elder; dogrose	On	2.5	2	80	0.0	SM	Maintained by flail; predominantly blackthorn with occasional willow & gorse; becoming colonised by ferns; single decayed elder to approx centre of feature	Good	Fair	20+	B2	1.0
H18	Goat willow	On	5.0	3	150	0.0	SM	Sides maintained by flail for clearance; outgrown stems within maintained hedge	Good	Fair	20+	C2	1.8
H19	Blackthorn; hawthorn; gorse; goat willow	On	2.5	2	80	0.0	SM	Maintained by flail; predominantly blackthorn with occasional hawthorn; willow & gorse to north of feature; masonry wall/gatepost terminates the far north of hedge	Good	Fair	20+	B2	1.0

BS5837:2012 TREE SURVEY SCHEDULE

PROJECT NO: 5438

LAND SOUTH OF GOLDBOROUGH ROAD, HUNDLETON, PEMBROKE

SURVEYOR: DAVID HOLMES

CLIENT: PEMBROKE GREEN LIMITED

SURVEY DATE: 03/10/2023

Ref	Species	On/off site	Av. Height (m)	Av. width (m)	Av. Stem diam (mm)	Avg. low crown height (m)	Life Stage	General Observations	Health & vitality	Structural condition	Estimated Remaining Contribution (Years)	BS5837 Category	RPA Radius (m)
H20	Blackthorn	On	2.5	2	80	0.0	SM	Maintained by flail; orphan section of hedge	Good	Fair	20+	B2	1.0
H21	Goat willow; hawthorn; blackthorn	On	6.0	5	180	0.0	EM	Sides maintained by flail for clearance; outgrown hedge - predominantly willow with thorn occurring as understory; to north of feature a ditch runs alongside to the east - where features turns to south east the ditch runs within the hedge	Good	Fair	20+	B2	2.2
H22	Hawthorn; blackthorn; goat willow; dogrose	On	6.0	4.5	180	0.0	EM	Sides maintained by flail for clearance; predominantly thorn with established willow to east of plot; established unmetalled track to north of feature	Good	Fair	20+	B2	2.2
H23	Blackthorn; dogrose; goat willow	On	3.0	3.5	80	0.0	SM	Maintained by flail; orphan section of hedge	Good	Fair	20+	C2	1.0
H24	Blackthorn; elder	On	2.5	2	80	0.0	SM	Maintained by flail; predominantly thorn with established elder; plot becoming colonised by ivy & brambles; sample recorded where feature abuts survey area	Good	Fair	20+	C2	1.0

- The tree survey was carried out with reference to the methodology set out in BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'.
- Trees were surveyed individually or as groups where it was considered that they had grown together to form cohesive arboricultural features either aerodynamically (trees that provide companion shelter), visually (e.g. avenues or screens) or culturally (including for biodiversity). However, where it was considered that there was an arboricultural need to differentiate between attributes trees within groups and / or woodlands were also surveyed as individuals.
- The full tree survey findings are recorded in the following tree survey schedule.
- Within the tree survey schedule, each surveyed TREE (T), GROUP (G), HEDGEROW (H), WOODLAND (W) or SHRUB MASS on or adjacent to the site is given a reference number which refers to its position on the tree survey and constraints plan.
- TREE SPECIES are listed by common name.

The **DIMENSIONS** taken are:

- STEM-No. Indicates the number of main stems (i.e. whether the trunk divides at or below 1.5m; (Used in the calculation of RPA.) "m-s" = Multi-stemmed.
- STEM DIAMETER (measured in millimetres), obtained from the girth measured at approx. 1.5m. For trees with 2 to 5 sub-stems a notional figure is derived from the sum of their cross-sectional areas. For multi-stemmed trees, the notional diameter may be estimated on the basis of the average stem size x the number of stems. (A notional diameter may be estimated where measurement is not possible.)
- HEIGHT (measured in metres), recorded to the nearest half metre for dimensions up to 10m and to the nearest whole metre for dimensions over 10m.
- The CROWN SPREAD, taken at the four cardinal points to derive an accurate representation of the tree crown, recorded up to the nearest half metre for dimensions up to 10m and to up the nearest whole metre for dimensions over 10m.
- CROWN CLEARANCES are expressed both as existing height above ground level of first significant branch along with its direction of growth (e.g. 2.5m-N), and also in terms of the overall crown e.g. the average height of the crown above ground level. Measurements are recorded to the nearest half metre for dimensions up to 10m and to the nearest whole metre for dimensions over 10m.
- ESTIMATES. Where any measurement has had to be estimated, due to inaccessibility for example, this is indicated by a "#" suffix to the measurement as shown in the tree survey schedule.

LIFE STAGE is defined as follows:

Y Young: Normally stake dependent, establishing trees. Should be growing fast, usually primarily increasing in height more than spread but as yet making limited impact upon the landscape.

SM Semi-mature: Established young trees, normally of good vigour and still increasing in height but beginning to spread laterally. Beginning to make an impact upon the local landscape and environment. Semi-Mature (still capable of being transplanted without preparation, up to 30cm girth and not yet sexually mature).

EM Early-mature: Not yet having reached 75% of expected mature size. Established young trees, normally of good vigour and still increasing in height but beginning to spread laterally. Beginning to make an impact upon the local landscape and environment.

M Mature: Well-established trees, still growing with some vigour but tending to fill out and increase spread. Bark may be beginning to crack and fissure. In the middle half of their safe, useful life expectancies.

LM Late-Mature: In full maturity but possibly beyond mature and in a state of natural decline). Still retaining some vigour but any growth is slowing.

A Ancient: A tree that has passed beyond maturity and is old/aged compared with other trees of the same species. Typically having a very wide trunk and a small canopy.

PHYSIOLOGICAL CONDITION (HEALTH & VITALITY):

Essentially a snapshot of the general health of the tree based upon its general appearance, it's apparent vigour and the presence or absence of symptoms associated with poor health, physiological stress etc. (Fungal infections may be recorded here but decay giving rise to structural weakness would be recorded under 'Structural Condition' – see next parameter):

Good: No significant health issues.
Fair: Indications of slight stress or minor disease (e.g. the presence of minor dieback/deadwood or of epicormic shoot growth).
Poor: Significant stress or disease noted; larger areas of dieback than above.
Dead: (or Moribund).

STRUCTURAL CONDITION:

Defects affecting the structural stability of the tree including decay, significant dead wood, root-plate instability or significant damage to structural roots, weak forks (e.g. those where bark is included between the members) etc. Classified as:

Good: No obvious structural defects: basically sound.
Fair: Minor, potential or incipient defects.
Poor: Significant defect(s) likely to lead to actual failure in the medium to long-term.
Dead: (or Moribund).

ESTIMATED REMAINING CONTRIBUTION:

An estimate of the length of time in years that a tree might be expected to continue to make a useful contribution to the locality at an acceptable level of risk (based on an assumption of continued routine maintenance):

- Less than 10 years
- 10+ years
- 20+ years
- 40+ years

SPECIAL IMPORTANCE:

Trees that are particularly notable as high value trees such as ancient trees/woodland or veteran trees. Such trees may be regarded as the principal arboricultural features of a site and pose a significant constraint to potential development.

An *ancient* tree is one that has passed beyond maturity and is very old compared with other trees of the same species. Very few trees reach the ancient life-stage.

Veteran trees are often very old but not necessarily so; they may be regarded as 'survivors' that have developed some of the characteristic features of an ancient tree but have not necessarily lived as long. All ancient trees are veterans but not all veteran trees are ancient.

An ancient woodland is an area that has been wooded continuously since at least 1600 AD. It includes ancient semi-natural woodland (ASNW), plantations on ancient woodland sites (PAWS) and ancient replanted woodland (ARW)

QUALITY CATEGORY:

Trees are classed as category U, A, B or C, based on criteria given in BS5837:2012; summary definitions as follows (see BS5837 for further details). Categories A, B and C are further characterised by the use of sub-categories, which attempt to identify what aspect of the tree is the main source of its perceived value, These are:

(1) arboricultural qualities
(2) landscape qualities, and
(3) cultural, historic or ecological/conservation qualities.

Examples of these qualities for each of the three categories are given below, although these are indicative only.

Note: This is NOT a health and safety classification; the classification does not take into account any requirement for remedial tree care or ongoing maintenance apart from that which may affect the trees' general suitability for retention.

CATEGORY A: HIGH QUALITY:

Trees or groups whose retention should be given a particularly high priority within the design process. Normally with an expected useful life expectancy of at least 40 years.

A1: Notably fine specimens; rare or unusual specimens; essential component trees within groups, semi-formal or formal plantings (e.g. dominant trees within an avenue etc.).
A2: Trees, groups or woodlands of particular visual importance as landscape features.
A3: Trees, groups or woodlands of particular significance by virtue of their conservation, historical, commemorative or other value (e.g. veteran trees or wood pasture.)

CATEGORY B: MODERATE QUALITY:

Trees or groups of some importance with a likely useful life expectancy in excess of 20 years. Their retention would be desirable; selective removal of certain individuals may be acceptable but only after full consideration of all alternative courses of action.

B1: Fair quality but not exceptional; good specimens showing some impairment (e.g. remediable defects, minor storm damage or poor past management.)
B2: Acceptable trees situated such as to have little visual impact within the wider locality. Also numbers of trees, perhaps in groups or woodlands, whose value as landscape features is greater collectively than would warrant as individuals (such that the selective removal of an individual would not impact greatly upon the trees' overall, collective value).
B3: Trees, groups or woodlands with clearly identifiable conservation or other cultural benefits.

CATEGORY C: LOW QUALITY:

Trees or groups of rather low quality, although potentially capable of retention for at least approx. 10 years. Also small trees with stems below 15cm diameter.

Potentially retainable, but not of sufficient value to be regarded as a significant planning constraint.

C1: Unremarkable trees of very limited merit or of significantly impaired condition.
C2: Trees offering only low or short-term landscape benefits; also secondary specimens within groups or woodlands whose loss would not significantly diminish their landscape value.
C3: Trees with extremely limited conservation or other cultural benefit.

CATEGORY U:

Trees likely to prove to be unsuitable for retention for longer than 10 years should any significant increase in site usage arise as a result of development.

E.g. dead or moribund trees; those at risk of collapse or in terminal decline; trees that will be left unstable by other essential works such as the removal of nearby category U trees; trees infected by pathogens that could materially affect other trees; low quality trees that are suppressing better specimens.

(Category U trees may have conservation values that it might be desirable to preserve. This category may also include trees that should be removed irrespective of any development proposals.)

ROOT PROTECTION AREA (RPA):

These are normally represented as a circle centred on the base of each tree stem with a radius of 12 times stem diameter, measured at 1.5m above ground level. The shape of the RPA may be altered where site conditions dictate that there are sound reasons to do so.

VETERAN OR ANCIENT TREE BUFFER (VTB/ATB)

In line with the Standing Advice produced by the Forestry Commission and Natural England this is a buffer zone (in metres) around an ancient or veteran tree that should be at least 15 times larger than the diameter of the tree. The buffer zone should be 5m from the edge of the tree's canopy if that area is larger than 15 times the tree's stem diameter.

ANCIENT WOODLAND BUFFER (FOR ASNW, PAWS OR ARW)

In line with the Standing Advice produced by the Forestry Commission and Natural England this is a buffer zone of at least 15 metres to avoid root damage. Where assessment shows other impacts are likely to extend beyond this distance, a larger buffer zone may be required.

THE IMPORTANCE OF TREES

Wider benefits:

There is a growing body of evidence that trees bring a wide range of benefits to the places people live.

Some *Economic* benefits of trees include:

- Trees can increase property values
- As trees grow larger, the lift they give to property values grows proportionately
- They can improve the environmental performance of buildings by reducing heating and cooling costs, thereby cutting bills
- Mature landscapes with trees can be worth more as development sites
- Trees create a positive perception of a place for potential property buyers
- Urban trees improve the health of local populations, reducing healthcare costs

Some *Social* benefits of trees include:

- Trees help create a sense of place and local identity
- They benefit communities by increasing pride in the local area
- They can create focal points and landmarks
- They have a positive impact on people's physical and mental health
- They can have a positive impact on crime reduction

Some *Environmental* benefits of trees include:

- Urban trees reduce the 'urban heat island effect' of localised temperature extremes
- They provide shade, making streets and buildings cooler in summer
- They help remove dust and particulates from the air
- They help to reduce traffic noise by absorbing and deflecting sound
- They help to reduce wind speeds
- By providing food and shelter for wildlife they help increase biodiversity
- They can reduce the effects of flash flooding by slowing the rate at which rainfall reaches the ground
- They can help remediate contaminated soil

On new development sites:

Trees bring many benefits to new development. Where retained successfully they can form important and sustainable elements of green infrastructure, contribute to urban cooling and reduce energy demands in buildings. Their importance is acknowledged in relation to adaptation to the effects of climate change. Other benefits brought by trees include:

- increasing property values;
- visual amenity
- softening, complementing and adding maturity to built form
- displaying seasonal change
- increasing wildlife opportunities in built-up areas
- contributing to screening and shade
- reducing wind speed and turbulence

NATIONAL PLANNING POLICY

Paragraph 6.4.26 of the Planning Policy Wales - Edition 11 (PPW) states in relation to Ancient Woodland:

'Ancient woodland and semi-natural woodlands and individual ancient, veteran and heritage trees are irreplaceable natural resources, and have significant landscape, biodiversity and cultural value. Such trees and woodlands should be afforded protection from development which would result in their loss or deterioration unless there are significant and clearly defined public benefits; this protection should prevent potentially damaging operations and their unnecessary loss. In the case of a site recorded on the Ancient Woodland Inventory, authorities should consider the advice of NRW. Planning authorities should also have regard to the Ancient Tree Inventory'.

The PPW goes on to state:

'The protection and planting of trees and hedgerows should be delivered, where appropriate, through locally specific strategies and policies'.

STATUTORY CONTROLS

Statutory tree protection

Works to trees which are covered by Tree Preservation Orders (TPOs) or are within a Conservation Area (CA) require permission or consent from the Local Planning Authority. Where information is available on

any Statutory designations such as this they are identified within the summary table in Section 1 and on the Tree Survey and Constraints Plan at Section 2.

Notwithstanding specific exceptions and in general terms, a TPO prevents the cutting down, uprooting, topping, lopping, wilful damage or wilful destruction of protected trees or woodlands without the prior written consent of the LPA.

Penalties for contravention of a TPO tend to reflect the extent of damage caused but can, in the event of a tree being destroyed, result in a fine of up to £20,000 if convicted in a Magistrates' Court, or an unlimited fine is the matter is determined by the Crown Court.

Similarly, and again notwithstanding specific exceptions, it is an offence to carry out any works to a tree in a Conservation Area with a trunk diameter greater than 75mm diameter at 1.5 height without having first provided the LPA with 6 weeks written notification of intent to carry out the works.

On many non-residential sites (excluding specific exemptions) there is also a statutory restriction relating to tree felling that relates to quantities of timber that can be removed within set time periods. In basic terms, it is an offence to remove more than 5 cubic metres of timber in any one calendar quarter without having first obtained a felling licence from the Forestry Commission.

Any proposed tree works that are planned to be carried out on site must be carried out in accordance with the statutory controls outlined. Therefore, we recommend that a further check is made with the LPA before any tree works are carried out.

Statutory Wildlife Protection

Although preliminary visual checks from ground level of likely wildlife habitats are made at the time of surveying, detailed ecological assessments of wildlife habitats are not made by the arboriculturist and fall outside of the scope for this report.

Trees which contain holes, splits, cracks and cavities could potentially provide a habitat for protected species such as bats in addition to birds and small mammals. It is advised that in some instances specialist ecological advice may be required. This may result in tree works being carried out following a detailed climbing inspection to the tree to ensure that protected species or their nests/roosts are not disturbed. If any are found, the site manager, site owner or consulting arboriculturist should be informed and appropriate action taken as recommended by the appointed Ecologist or the relevant Statutory Nature Conservation Organisation (SNCO): Natural England, Scottish Natural Heritage or Natural Resources Wales.

It is advised that tree/hedgerow works are carried out with the understanding that birds will generally nest in trees, hedges and shrubs between March and August. This time period only provides an indication of likely nesting times and as such diligence is required when undertaking tree works at all times.

Irrespective of the time of year and other than any actions approved under General Licence, it is an offence to intentionally kill, injure or take any wild bird or to intentionally take, damage or destroy the nest or eggs of any wild bird. Ideally, tree operations should be avoided during the likely bird nesting period. However, any tree works should always only be carried out following a preliminary visual check of the vegetation.

For information, the Wildlife and Countryside Act 1981 (as amended), The Countryside and Rights of Way Act 2000 (as amended) and the Conservation of Habitat and Species Regulations 2010, form the basis of the statutory legislation for flora and fauna in England and Wales. A different legislative framework applies in Scotland and Northern Ireland.
Any proposed tree works that are planned to be carried out on site must be carried out in accordance with any relevant statutory controls, outlined above.

DESIGN GUIDANCE

Approach

The approach adopts the guidelines set out in the British Standard BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations. The process is broken down to coordinate with the key elements within both the RIBA Plan of Work (2013) and British Standard 5837:2012 as set out in the table below:

Information Stage	RIBA Stage	BS5837:2012
Stage A – Tree Survey	2: Concept	4: Feasibility
Stage B – Arboricultural Impact Assessment	3: Developed design	5: Proposals
Stage C – Arboricultural Method Statement	4: Technical design	6: Technical Design
Stage D – Arboricultural Site Supervision	5: Construction	7: Demolition and construction

A hierarchical approach is adopted in order to achieve optimum use of the site and location of built structures. This is set out below:

Avoid

The starting point of Site layout design should be to avoid the RPA of retained trees and provide suitable clearance from above ground constraints [tree canopies]. Where possible building lines should be at least 2m outside the RPA to provide working space for construction. However, protection measures can be taken if such clearance is not achievable.

Mitigate

Where intrusion within the RPA is unavoidable then its impact on the tree can be mitigated by specialist measures:

Foundations that avoid trenching e.g. screw piles, suspended floor slabs or casting at ground level for lightweight structures such as bin and cycle stores.

Limited use may be made for parking, drives or hard surfaces within the root protection areas, subject to advice from a qualified arboriculturist. Cellular confinement systems that enable hard surfaces to be built above existing soil levels are acceptable methods subject to site-specific soil conditions.

Service runs that cannot be routed outside the RPA(s) can be installed by, for example, thrust boring, directional drilling, air excavation or hand digging. These operations often require supervision by the project arboriculturist.

Compensate

Replacement planting can ensure the continuity of tree cover where tree removal is unavoidable or desirable. Off-site provision may be considered in some circumstances but this will require negotiation with the local planning authority.

Considerations:

For proposed residential developments, consideration must be given to numerous factors future tree growth and orientation.

Tree constraints

Root Protection Areas:

With reference to BS5837:2012, a root protection area (RPA) is defined as "a layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure should be treated as a priority". "**The default position [when considering design layout in relation to RPAs] should be that structures are located outside the RPAs of trees to be retained**".

BS5837:2012 states (4.6.2) that, "where pre-existing site conditions or other factors indicate that rooting has occurred asymmetrically, a polygon of equivalent area should be produced." The BS goes on to state that, "modifications to the shape of the RPA should reflect a soundly based arboricultural assessment of likely root distribution," and that any deviation from the original circular plot should take into account:

- Morphology and disposition of roots;
- topography and drainage;
- soil type and structure;
- the likely tolerance of the tree to root damage/disturbance.

Additional buffer zones beyond the RPA:

The following text is taken from the Standing Advice produced by the Forestry Commission and Natural England as included in the National Planning Policy Guidance:

'A buffer zone's purpose is to protect ancient woodland and individual ancient or veteran trees. The size and type of buffer zone should vary depending on the scale, type and impact of the development'.

Ancient woodland buffer:

'For ancient woodlands, you should have a buffer zone of at least 15 metres to avoid root damage. Where assessment shows other impacts are likely to extend beyond this distance, you're likely to need a larger buffer zone. For example, the effect of air pollution from development that results in a significant increase in traffic'.

Ancient and veteran tree buffer:

'A buffer zone around an ancient or veteran tree should be at least 15 times larger than the diameter of the tree. The buffer zone should be 5m from the edge of the tree's canopy if that area is larger than 15 times the tree's diameter'.

Above ground:

Above ground constraints posed by trees describe the capacity for trees to have an overbearing or dominating effect on new developments; usually post occupancy. Typical above ground constraints include a number or combination of inconveniences including shading, branch spread, movement of trees during strong winds and so on. If not adequately considered, above ground constraints can lead to repeated requests to fell or heavily prune retained and protected trees.

Shade:

Adverse shading and blocked views from windows raise concerns for incoming residents, which may lead to pressure to fell or remove trees in the future. Wherever possible it is advisable to arrange fenestration away from tree canopies to lessen the conflict, or increase window size to accommodate ambient light.
Conversely, appropriate designed development can use existing or new trees to create necessary and welcome shade and screening.
As part of the adopted approach the above considerations and constraints are assessed cumulatively in order to provide clear and site-specific advice on the areas of a site most suitable for the location of development.

Dependent on the site and nature of the proposed development, the Tree Survey and Constraints Plans may show the following:

Recommended Developable area - an advisory area defined in order to minimise arboricultural impacts using standard approaches to construction. Restricting proposed development to this area will limit the risk of harm to retained trees and of the Local Planning Authority objecting to the proposed development. It may be possible to propose development outside of this area but specific 'low impact' construction techniques may be needed recommended.

Recommended Buffer to development - similar to the Recommend Developable Area but defined as a line marking a suitable buffer to retained trees. More commonly used on large sites or sites where the presence of trees is localised.

Tree Opportunities

Depending on the scale of developments existing trees can often provide opportunities to enhance the existing arboricultural resource of a site by bringing it into good management or by putting in place remedial measures e.g. soil amelioration.

Appropriately designed new tree planting is extremely important in maintaining healthy and sustainable tree populations. For the reasons highlighted, new trees can bring many benefits to new developments. It is critical to the establishment of new tree planting that the locations, species and specification of new trees is appropriate. Subsequently the sourcing of high-quality stock, suitable planting and the provision of post planting maintenance are essential to allow new trees to establish and to allow them to mature.

HOW TREE DAMAGE CAN OCCUR

Above the ground

Damage can occur as a result of knocks and scuffs, breakages of branches and/or tree trunks. This is often but not always associated with machine operations, groundworks excavations, tele handlers, high sided vehicles and crane use. Other forms of above ground damage include fixings to trunk and unauthorised cutting back of branches. Wounds will harm a tree's health and shorten its life by letting in disease-causing organisms.

Below the ground

It is often not appreciated that the majority of most tree roots are generally located within the top 600mm of the ground. On this basis it needs to be understood that damage to roots can occur in three ways:

- Root severance can occur as a result of, for example, soil stripping during site clearance or excavations.
- Root dieback and death can result from compaction of the soil. Compaction can occur as a result of vehicle weight, weight of stored materials or increased pedestrian access. Compaction crushes out soil pore space and prevents tree respiration from occurring (respiration requires gas exchange between the ground and the atmosphere). Compacted soil is denser and therefore inhibits/prevents any further new root growth.
- Pollution of the soil with chemicals such as oil or cement washings can destroy the soil environment, making it inhospitable for the tree cause causing it stress.

The effects of these impacts can be disfiguring to a tree's appearance and also weaken a tree making it more liable to attack by pest and diseases. In addition, root damage or death results in corresponding decline above the ground with dieback occurring within the tree crown.

The effects of damage to trees generally take some time to become fully apparent. In many cases, damaged trees decline slowly after the completion of a new development, until they eventually need to be removed due to ill health.

Tree protection barriers and load distributing 'no-dig' paths are specified in order to prevent soil compaction from taking place.

GENERAL SITE RULES FOR TREE PROTECTION

Do not independently carry out any activity that is at odds with the site scheme of tree protection. This is contained within an approved Arboricultural Method Statement (AMS) and accompanying Tree Protection Plan.

In simple terms: do not carry out any work within any Construction Exclusion Zone (CEZ) without prior liaison with the Project Arboriculturist and written authorisation from the Local Planning Authority.

Within the CEZ:

- No mixing of cement
- No soil/turf stripping, raising/lowering of ground levels (unless advised), deposit or excavation of soil or rubble
- No excavations for services or installation of services
- No storage of materials, machinery fuel, chemicals or other materials of any other description
- No parking/use of tracked or wheeled machinery
- No siting of temporary structures including hard standing areas, portaloos, site huts
- No lighting of fires or disposal of liquids
- Fires on site should be avoided if possible. Where they are unavoidable, they must not be lit in a position where heat could damage foliage or branches. Fires must be a minimum of 20m from the trunk of any retained tree or the centre line of any hedgerow to be retained
- No signs, cables, fixtures or fittings of any other description shall be attached to any part of a retained tree

CONSTRUCTION EXCLUSION ZONE SIGN

CONSTRUCTION EXCLUSION ZONE - NO ENTRY

TREE PROTECTION FENCING

THIS FENCE MUST BE MAINTAINED IN ACCORDANCE WITH THE APPROVED TREE PROTECTION PLANS AND ARBORICULTURAL METHOD STATEMENT FOR THIS DEVELOPMENT.

TREES ENCLOSED BY THIS FENCE ARE PROTECTED BY PLANNING CONDITIONS AND/OR ARE THE SUBJECTS OF A TREE PRESERVATION ORDER.
CONTRAVENTION CAN RESULT IN BREACH OF PLANNING CONDITIONS AND/OR CRIMINAL PROSECUTION.
(TOWN AND COUNTRY PLANNING ACT 1990)

FOR ALL ENQUIRIES REGARDING TREES AT THIS DEVELOPMENT
PLEASE CALL 01386 576161 OR EMAIL ENQUIRIES@BARTON-HYETT.CO.UK

Barton Hyett Associates
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