

Elan Valley Visitor Centre,
Rhayader
Tree Survey & Arboricultural Impact Assessment



For:
Dwr Cymru Welsh Water

Based on inspections
carried out
July 2024

By
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Mackley Davies Associates Ltd

Landscape Architecture . Environmental Planning . Tree Surveying

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Elan Valley Visitor Centre,
Rhayader

Tree Survey & Arboricultural Impact Assessment

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<i>Tree constraints plan – (drwg. no. 24/1055/01)</i>
<i>Tree protection plan – (drwg. no. 24/1055/02A)</i>

1 Summary:

- 1.1 The following report was prepared on the instruction of Dwr Cymru Welsh Water and concerns the area of ground adjacent to the Elan Valley Visitor Center, Elan Valley, Rhayader LD6 5HP.
- 1.2 The report is based upon the findings of a survey carried out on 16th November 2021 & 30th July 2024 to assess the existing trees in terms of health, condition, form and overall significance within the local environment, the main objective being to assess the degree of constraint they represent with regard to the proposed redevelopment of the site. The methodology used is outlined in Appendix 1, while Appendix 2 sets out definitions of the terms used and codes used in the Tree Schedule.
- 1.3 Weather conditions were warm and sunny with adequate visibility for the purposes of this investigation. All inspections were made from ground level only: only those features apparent at the time of the inspection could be considered and no liability can be accepted regarding trees or their parts that were inaccessible or obscured in part or in whole.
- 1.4 It should be noted that, although the health and safety of the trees is part of the assessment methodology used, this report is intended for planning purposes only; it should not be construed as a tree risk assessment. Faults may be identified and recorded as part of this study but unless the trees in question represent a significant hazard under the existing site conditions, management recommendations will not normally be made. It remains the tree owner's responsibility to ensure the trees are managed appropriately: the assessor can accept no liability for damage or injury sustained as a result of the failure of any tree or its parts.
- 1.5 This report remains valid for a period of 3 years from the date the survey was carried out.

2 Inspection and General Observations:

- 2.1 The survey area is as indicated on the accompanying tree constraints plan, which is based upon the topographical survey data provided by PDS Ltd (drawing number 001/R00).
- 2.2 The site consists of an area of ground around the visitor centre car park and the Elan river which consists of a tree lined access road, formal parking areas, open grassed areas with picnic benches, play areas and a fenced off pond area.
- 2.3 The trees consist of rows of mature and early-mature trees lining the access road and dividing up the existing parking bays with one late-mature sycamore (37) located on the river bank. These young trees have established in an exposed difficult environment at a height of 200m AOD and are considered to be important to the setting of the visitor centre therefore have been classified where possible as retention category 'B' trees of moderate value or category 'C' for the poorer specimens.
- 2.4 The bank-side late-mature sycamore is considered to be of high value and has been classified as a retention category 'A' tree.
- 2.5 The remaining trees and hedgerows around the site consist of alder, birch and willow which are considered to be generally of low quality category 'C' value.

3 Arboricultural Impact Assessment:

- 3.1 The proposed works are for the redevelopment of the existing visitor centre with car park and access improvements, landscape and associated drainage infrastructure works.
- 3.2 Two category 'B' trees (57 & 67) and six category 'C' trees (65, 66, 68 & G2) will require removal to accommodate the proposals.
- 3.3 The proposed works are located within the 'nominal' root protection area (RPA) of the existing sycamore (37) but the 'actual' rooting area of the tree (shown as a green hatched area) will remain unaffected by the majority of the works. This is because the tree is located approximately 2m down the steep river bank and the topography will act as a deterrent to root growth in the area at the top of the bank.
- 3.4 The category 'A' sycamore (37) will however be impacted by the proposed drainage works to accommodate the exceedance flow from rain garden 7. The full extent of this impact is not clear at this stage but it is suggested a method statement would be required to minimise any detrimental impacts on the tree.
- 3.5 The proposed cycle shelter will impact marginally (3.5% of required RPA) on the category 'B' oak (43) however it considered this could be offset into suitable ground within the retained planting area. Ground works to accommodate level changes however could further impact on the oak as it is raised 700-900mm above existing footpath and car park levels.
- 3.6 Similarly the proposed new car park bays will impact marginally on the category 'C' rowan (60) and the category 'B' birches (61-64). Although the hard paving extends into <2% of the required rooting area for these trees, it should be noted they are located on a low mound and care will be required to minimise the impact of any ground works required to accommodate the 150-300mm height difference from the existing car park surfacing.
- 3.7 The existing retaining wall adjacent the birch (36) will be retained if possible and the surfacing around the cycle parking will be installed using a 'no-dig' method of construction.
- 3.8 The impact of the Suds channel running through the RPA's of the rowan (71-73) will be minimised by hand digging or re-routing to enable these small early-mature trees to be retained.
- 3.9 Crown raising work may be required on the existing access road for numerous trees (6-20) to allow adequate access for construction purposes.
- 3.10 Trees to be retained will need to be protected by the provision of suitable temporary barriers as outlined in the tree protection plan and Appendix 2A (type 2), together with appropriate ground protection measures where required.

Trees to be removed:

BS5837:2012 Quality Category:	Total no. (Trees removed)
A – High	0no.
B – Moderate	2no.
C - Low	6no.
U - Poor	0no.
Total nos.	8no.

4 Existing tree schedule:

The table following overleaf provides details of the tree surveyed; notes on the terms and abbreviations used can be found at Appendix 2 following the tree schedule.

TREE SCHEDULE

ID	Species	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	Observations	Retention CATEGORY	Protection Radius (m)	RPA (m ²)
					N	E	S	W	Mean	Lowest over site Direction								
1	Birch	1	370	13	3	3.5	2	4.5	2.5	-	M	Good	Good	20-40	One of a group of three, located at site entrance	Bii	4.4	62
2	Birch	1	240	12	1.5	1.5	1.5	1.5	3	-	M	Fair	Fair	10-20	One of a group of three, located at site entrance	Cii	2.9	26
3	Birch	1	370	13	3	4	1.5	1.5	2.5	-	M	Good	Good	20-40	One of a group of three, located at site entrance	Bii	4.4	62
4	Rowan	1	110	3.5	2	2	2	2	1.5	-	EM	Good	Good	20-40		Ci	1.3	5
5	Hawthorn	2	385	4	2.5	2.5	2.5	2.5	1	-	M	Fair	Fair	10-20		Ci	4.6	67
6	Oak	1	390	10	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	4.7	69
7	Oak	1	350	10	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	4.2	55
8	Oak	1	360	10	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	4.3	59
9	Oak	1	355	10	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	4.3	57
10	Oak	1	335	10	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	4.0	51
11	Oak	1	150	5	1.5	1.5	1.5	1.5	2.5	-	EM	Fair	Fair	10-20		Cii	1.8	10
12	Oak	1	250	9	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	3.0	28
13	Oak	1	270	9	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	3.2	33
14	Oak	1	330	10	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	4.0	49
15	Oak	1	345	10	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	4.1	54
16	Oak	1	300	10	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	3.6	41
17	Oak	1	310	10	3	3	3	3	2.5	-	M	Good	Good	20-40	Avenue tree, lower branches crown raised	Bii	3.7	43
18	Oak	1	180	8	1.5	1.5	1.5	1.5	2.5	-	EM	Fair	Fair	10-20		Cii	2.2	15

ID	Species	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	Observations	Retention CATEGORY	Protection Radius (m)	RPA (m ²)
					N	E	S	W	Mean	Lowest over site + Direction								
19	Oak	1	400	12	4	4	4	4	3	1.5-W	M	Good	Good	20-40		Bii	4.8	72
20	Oak	1	320	8	3	3	3	3	2.5	-	M	Good	Good	20-40	Located on opposite side of boundary fence	Bii	3.8	46
21	Oak	1	440	12	5	5	5	5	2.5	-	M	Good	Good	20-40		Bii	5.3	88
22	Oak	1	370	8	3	3	3	3	2.5	-	M	Good	Good	20-40		Bii	4.4	62
23	Oak	1	330	8	3	3	3	3	2.5	-	M	Good	Good	20-40		Bii	4.0	49
24	Oak	1	440	8	3	3	3	3	2.5	-	M	Good	Good	20-40		Bii	5.3	88
25	Oak	1	290	8	3	3	3	3	2.5	-	M	Good	Good	20-40		Bii	3.5	38
26	Rowan	1	210	4.5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20	Sparse canopy	Cii	2.5	20
27	Rowan	1	220	4.5	2	2	2	2	2	-	EM	Fair	Fair	10-20		Cii	2.6	22
28	Oak	1	390	8	3	3	3	3	2.5	-	M	Good	Good	20-40	Slight lean to west	Bii	4.7	69
29	Oak	1	250	8	2	2	2	2	2	-	EM	Good	Good	20-40		Bii	3.0	28
30	Oak	1	490	12	3	3	3	3	2.5	-	M	Good	Good	20-40	Located on opposite side of boundary fence	Bii	5.9	109
31	Oak	1	410	10	2	2	2	2	2	-	M	Good	Good	20-40		Bii	4.9	76
32	Birch	1	190	8	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	2.3	16
33	Birch	1	210	10	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	2.5	20
34	Birch	1	255	12	2	2	2	2	2	-	EM	Good	Good	20-40		Cii	3.1	29
35	Birch	1	220	12	1	1	1	1	2	-	EM	Fair	Fair	10-20		Cii	2.6	22
36	Birch	1	310	14	4.5	2.5	2	2	2	-	M	Good	Good	20-40	Asymmetrical canopy, pruning wounds on lower stem	Bi	3.7	43
37	Sycamore	5	1,800#	16	5	5.5	5.5	5	2	-	LM	Good	Good	40+	Located 2.0m down steep river bank	Ai	15.0	707

ID	Species	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	Observations	Retention CATEGORY	Protection Radius (m)	RPA (m ²)
					N	E	S	W	Mean	Lowest over site + Direction								
38	Oak	1	260	10	3.5	1.5	3	2.5	2	-	EM	Good	Good	40+	Raised approx. 900mm above car park surface	Bi	3.1	31
39	Birch	1	315	12	3	3	3	3	2	-	EM	Good	Good	10-20	Raised approx. 900mm above car park surface	Cii	3.8	45
40	Birch	1	165	11	0.5	2.5	2	0	2	-	EM	Good	Good	10-20	Raised approx. 900mm above car park surface	Cii	2.0	12
41	Birch	1	150	10	1.5	1.5	1	0.5	2	-	EM	Good	Good	10-20	Raised approx. 900mm above car park surface	Cii	1.8	10
42	Birch	1	165	8	1.5	0.5	2.5	1	3.5	-	EM	Good	Good	10-20	Twisted stem, lean to east	Cii	2.0	12
43	Oak	1	415	10	3	3	3	3	2	-	EM	Good	Good	40+	Raised approx. 900mm above car park surface	Bi	5.0	78
44	Rowan	m/s	190#	6	1.5	1.5	1.5	1.5	1.5	-	EM	Fair	Fair	10-20	Buddleia & hawthorn understorey	Cii	2.3	16
45	Birch	1	520	14	3	3.5	4.5	4	2	-	M	Good	Good	20-40	Located in pond area	Bi	6.2	122
46	Alder	1	210	10	1.5	3	3	1	1.5	-	EM	Fair	Fair	10-20	Located in pond area	Ci	2.5	20
47	Birch	1	235	12	1.5	1.5	2.5	1	2	-	EM	Fair	Fair	10-20	Located in pond area	Ci	2.8	25
48	Birch	1	190	8	3	3	3	3	2	-	EM	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	2.3	16
49	Birch	1	290	10	3	3	3	3	2	-	M	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	3.5	38
50	Oak	1	380	10	3.5	3.5	3.5	3.5	2	-	M	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	4.6	65
51	Rowan	1	160	4	1	1	1	1	1.5	-	EM	Fair	Fair	10-20	Located in narrow grassed strip within car park	Cii	1.9	12
52	Rowan	1	75	4	1	1	1	1	1.5	-	Y	Fair	Fair	10-20	Located in narrow grassed strip within car park	Cii	0.9	3
53	Birch	1	385	10	2	2	2	2	2	-	M	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	4.6	67
54	Birch	1	200	9	2	2	2	2	2	-	EM	Fair	Fair	10-20	Located in narrow grassed strip within car park	Cii	2.4	18
55	Birch	1	290	10	2	2	2	2	2	-	M	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	3.5	38
56	Birch	1	290	10	2	2	2	2	2	-	M	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	3.5	38

ID	Species	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	Observations	Retention CATEGORY	Protection Radius (m)	RPA (m ²)
					N	E	S	W	Mean	Lowest over site + Direction								
57	Birch	1	330	11	2	2	2	2	2	-	M	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	4.0	49
58	Rowan	1	90	3	1	1	1	1	1.5	-	Y	Fair	Fair	10-20	Located in narrow grassed strip within car park	Cii	1.1	4
59	Rowan	1	130	3	1.5	1.5	1.5	1.5	1.5	-	EM	Fair	Fair	10-20	Located in narrow grassed strip within car park	Cii	1.6	8
60	Rowan	2	220	3.5	1.5	1.5	1.5	1.5	1.5	-	EM	Fair	Fair	10-20	Located in narrow grassed strip within car park	Cii	2.6	22
61	Birch	1	260	10	2	2	2	2	2	-	EM	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	3.1	31
62	Birch	1	230	10	2	2	2	2	2	-	EM	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	2.8	24
63	Birch	1	230	10	2	2	2	2	2	-	EM	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	2.8	24
64	Birch	1	240	8	2	2	2	2	2	-	EM	Good	Good	20-40	Located in narrow grassed strip within car park	Bii	2.9	26
65	Hawthorn	1	180	3.5	1.5	1.5	1.5	1.5	1	-	EM	Fair	Fair	10-20	Located adjacent to visitor centre building	Ci	2.2	15
66	Rowan	1	200	3.5	1.5	3.5	2	1.5	1.5	-	EM	Fair	Fair	10-20	Lean to east	Ci	2.4	18
67	Birch	1	420	10	3.5	5	2.5	3	3	2.5-E	M	Good	Good	20-40		Bi	5.0	80
68	Birch	1	195	10	1	1	1	1	3	-	EM	Fair	Fair	10-20		Ci	2.3	17
69	Rowan	1	135	5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	1.6	8
70	Rowan	1	160	5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	1.9	12
71	Rowan	1	255	5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	3.1	29
72	Rowan	1	150	5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	1.8	10
73	Rowan	1	170	5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	2.0	13
74	Rowan	1	130	5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	1.6	8
75	Rowan	1	240	5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	2.9	26

ID	Species	Stem No.	Trunk Diam (mm)	Height (m.)	Crown Spread (metres)				Clearance (metres)		Life stage	Health & Vigour	Structural Condition	Remaining useful life	Observations	Retention CATEGORY	Protection Radius (m)	RPA (m ²)
					N	E	S	W	Mean	Lowest over site + Direction								
76	Rowan	1	140	5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	1.7	9
77	Rowan	1	150	5	1.5	1.5	1.5	1.5	2	-	EM	Fair	Fair	10-20		Cii	1.8	10
78	Oak	1	440	8	5	5.5	6	3.5	3	1.5-S	M	Good	Good	20-40		Bii	5.3	88
79	Rowan	1	110	4	1	1	1	1	2	-	EM	Fair	Fair	10-20		Cii	1.3	5
80	Rowan	1	115	4	1	1	1	1	2	-	EM	Fair	Fair	10-20		Cii	1.4	6
81	Rowan	1	140	4	1	1	1	1	2	-	EM	Fair	Fair	10-20		Cii	1.7	9
G1	Rowan, hawthorn	1	<180	3	1.5 x 1.5m				1	-	EM	Fair	Fair	10-20	Small group of trees	Cii	2.2	-
G2	Rowan	1	<120	3	1.5 x 1.5m				1.5	-	EM	Fair	Fair	10-20	Group of three trees	Cii	1.4	-
G3	White willow	m/s	<100	3	0.5 x 0.5m				0.5	-	Y	Fair	Fair	10-20	Narrow strip	Cii	1.2	-
G4	Rowan	1	<180	3	1 x 1m				1	-	EM	Fair	Fair	10-20	Row of widely spaced trees located to west of play area	Cii	2.2	-

Estimated tree diameter

Details of the Terms & Abbreviations used are provided in Appendices

APPENDIX 1: Methodology

- The report has been framed as an 'Arboricultural Constraints Report', as defined in BS5837:2012 - *Trees in relation to design, demolition & construction-Recommendations*. Its purpose is to set out and to quantify the degree of constraint offered by existing tree cover with regard to any development or alteration in land-use that may be proposed and is intended to be used to inform feasibility studies and design options. As such it reflects the conditions *as they existed at the time of our inspections*: no account has been taken of any specific development proposals, although it has been assumed that certain unspecified alterations in site usage patterns are likely to occur, which are likely to result in an increase in site occupancy levels. Additional arboricultural input may be required at subsequent stages of design, planning and implementation in relation to the assessment & management of possible arboricultural impacts.
- The survey parameters are as set out in BS5837:2012 and based on the findings each tree or group is allocated to one of four 'Retention Categories' (see Appendix 2, p2). The factors taken into account in categorising the trees include their overall arboricultural quality, their general health and structural stability, their likely useful life-expectancy, their significance to the local landscape and general public amenity value, the degree to which they provide wildlife habitat and enhance local biodiversity and any other social or cultural values that they may embody.
- Also integral to the methodology of BS5837 is the calculation of **Root Protection Areas (RPAs)** for each of the trees in question. The 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 is treated as a priority.*"
- It should be noted that in most cases the plan accompanying this report will show the *nominal* RPAs of the trees, indicated as circles centred upon the tree of a radius such that they enclose an area equal to the relevant RPA. In practice the distribution of roots around a tree will frequently prove to be uneven due to the presence of a variety of constraining influences. These may be physical barriers such as existing foundations etc, or the existence of localised soil conditions inhospitable to root growth, such as waterlogging or soil compaction. Conversely, soil conditions may be particularly *conducive* to root development in one quarter and this might also lead to an asymmetric distribution of roots around the tree. However in most cases the nominal circular areas as indicated will provide a reasonable guide as to where special measures will be required to protect tree roots and preserve good soil condition.
- The RPAs of the trees will provide the basis for defining **Construction Exclusion Zones (CEZs)**, these being areas around all of those trees intended to be retained where access should be prevented throughout the entire process of site preparation and construction. In certain cases the CEZ will exceed the size of the RPA in order to accommodate the aerial parts of wide-spreading trees.
- Access within the CEZ should be prevented through the erection of barriers, constructed in accordance with BS5837:2012. Where access within an RPA is unavoidable, appropriate ground protection should be installed. Outline details of the design of suitable barriers and ground protection are given in Appendices A & B. These protection measures should be put in place prior to any site clearance or construction work commencing on the site and they should remain *in situ* until all works have been completed. Some activities within the CEZs may be acceptable but should not be put in hand until appropriate arboricultural advice has been sought.

APPENDIX 2: Terms & Definitions (including codes & abbreviations used in Tree Schedule)

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.
- **DIAMETER** (in centimetres), 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**, estimated and expressed in metres.
- The **CROWN SPREAD** is expressed in terms of the crown radii estimated at the four cardinal points (or as otherwise specified) and given in metres.
- **CLEARANCES** are indicated as an estimate of the *mean, overall* height of the canopy above ground level with an additional figure for the height above ground of the *lowest significant branch* within the site, together with the direction of its growth.

LIFE STAGE is defined as follows:

- P** recently Planted; sapling: A tree that is still establishing and which would be relatively easy to replace or even transplant. Likely to be vulnerable to damage from (e.g.) strimmers, mowing equipment, drought, vandals, etc. (Easily replaced thus a negligible constraint).
- Y** Young, establishing trees. Should be growing fast, usually primarily increasing in height more than spread, but as yet making limited impact upon the landscape.
- EM** Early-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 & 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 & fissure. In the middle half of their safe, useful life-expectancies.
- LM** Late-Mature: In full maturity. Still retaining some vigour but growth slowing.
- O** Old: Fully mature with vigour declining. Likely to possess features that could be regarded as potential faults, such as large, ponderous branches, old wounds etc. etc., but also likely to be of high amenity value.
- A** Ancient: Old trees can survive for very many years with healthy growth continuing although the tree may be of low vigour. Crown size usually becomes reduced, either through natural branch-loss or through management (e.g. pollarding). Decay is usually present. Such trees may embody certain hazards but they are also likely to be of considerable conservation value (i.e. “Veteran” trees).

HEALTH & VIGOUR: Essentially a snapshot of the general health of the tree based upon its general appearance, its 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
- Bad** Severe decline; widespread dieback and/or severe stress; life-threatening disease.
- 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. 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
- Bad** Defects liable to cause significant failure in the short term, or to lead to a major or total collapse in the foreseeable future
- Severe** Tree that has already suffered or is at imminent risk of a major collapse.

APPENDIX 2: Terms & Definitions (including codes & abbreviations used in Tree Schedule)

REMAINING USEFUL LIFE EXPECTANCY: 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)

V - less than 10 years	S - 10+ years
M - 20+ years	L - 40+ years

RETENTION CATEGORY: Trees are classed as category **U, A, B** or **C**, based on criteria given in BS5837:2012; summary definitions as follow (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:

(i) **arboricultural** qualities (ii) **landscape** qualities and (iii) **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.*

U **UNSUITABLE (red)** 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.

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 which it might be desirable to preserve.

It may also include trees that should be removed irrespective of *any* development proposals.)

A **HIGH QUALITY (green)** 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.

(i) *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.)*

(ii) *Trees, groups or woodlands of particular visual importance as landscape features.*

(iii) *Trees, groups or woodlands of particular significance by virtue of their conservation, historical, commemorative or other value (e.g. veteran trees or wood pasture.)*

B **MODERATE QUALITY (blue)**: Trees or groups of some importance with a likely useful life-expectancy in excess of 20 years. Their retention would be highly desirable; selective removal of certain individuals may be acceptable, but only after full consideration of all alternative courses of action.

(i) *Fair quality but not exceptional; good specimens showing some impairment (e.g. remediable defects, minor storm damage or poor past management.)*

(ii) *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).*

(iii) *Trees, groups or woodlands with clearly identifiable conservation or other cultural benefits.*

C **MINOR VALUE (grey)**: Trees or groups of rather low quality, although potentially capable of retention for at least approx. 10 years. *Also small trees below 15cm diam.* Potentially retainable, but not of sufficient value to be regarded as a significant planning constraint.

(i) *Unremarkable trees of very limited merit or of significantly impaired condition.*

(ii) *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.*

(iii) *Trees with extremely limited conservation or other cultural benefit.*

ROOT PROTECTION AREA (RPA): *This is the area in square metres formed by a circle of radius (the Protection Radius) twelve times the actual or notional stem diameter of the tree (see 'Diameter', above). The RPA represents the minimum area deemed to contain sufficient roots & soil to maintain the tree's viability. It is the basis whereby the layout of the Construction Exclusion Zone (CEZ) is determined, which should encompass an area equal to the RPA, although its form may be adapted in the light of arboricultural considerations and pre-existing physical constraints. The CEZ should be protected by sturdy temporary fencing (see BS5837:2012) throughout the entire process of site preparation and construction.*

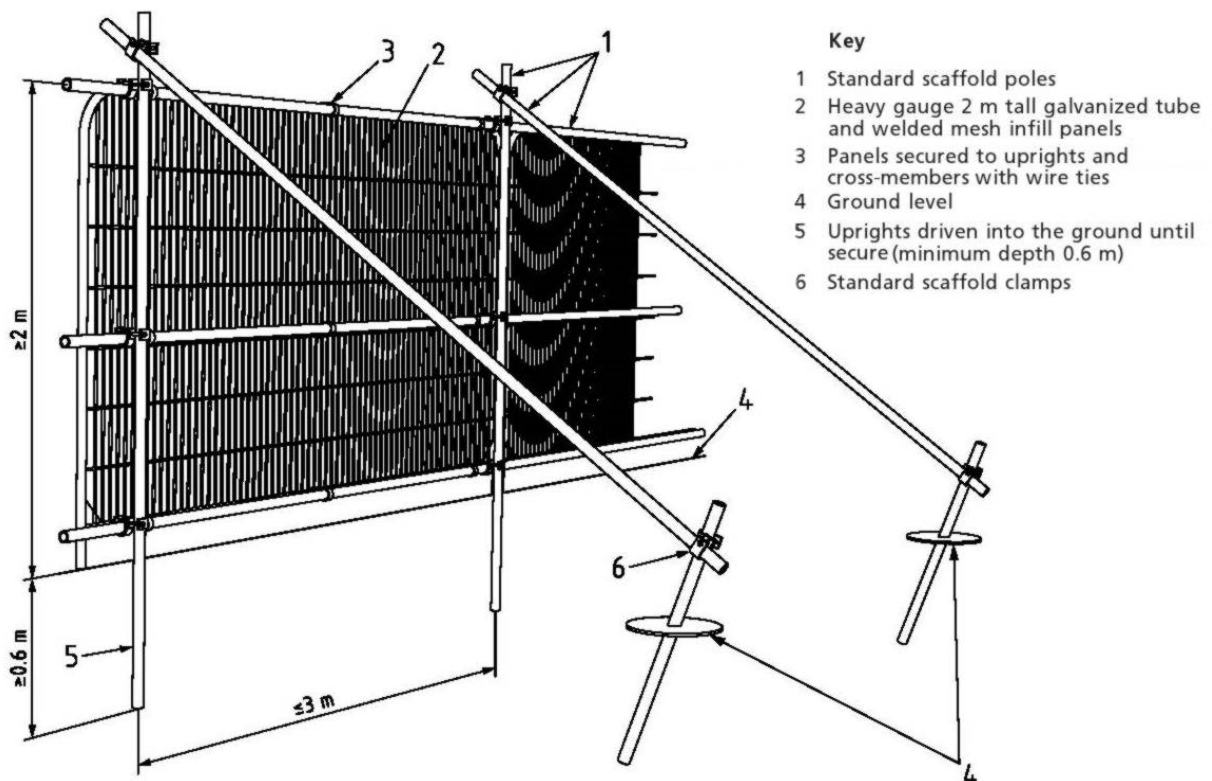
APPENDIX 3: The Protection of Trees on Demolition & Construction Sites:

A **CONSTRUCTION EXCLUSION ZONE** should be established around all trees intended for retention, based upon the Root Protection Areas (RPAs) of those trees. These zones should be adequately protected by appropriately designed **Protective Barriers & Ground Protection** throughout the all demolition & construction processes.

A: PROTECTIVE BARRIERS

- Vertical barriers should be erected and ground protection installed **before any materials or machinery are brought onto the site and before any demolition, development or stripping of soil commences**. Areas of new or retained structure planting should be similarly protected, based on the extent of the soft landscaping as shown on the approved drawings. The project arboriculturist should confirm that barriers and ground protection have been erected and set out correctly prior to the commencement of other operations, and that they are fit for purpose
- Where required, pre-development tree work may be undertaken before the installation of tree protection, with the agreement of the project arboriculturist and the local planning authority.
- **Once erected, barriers and ground protection should be regarded as sacrosanct**, and should not be removed or altered without prior recommendation by the project arboriculturist and approval of the local planning authority.
- Barriers should be fit for the purpose of excluding construction activity and appropriate to the degree and proximity of work taking place around the retained tree(s). On all sites, special attention should be paid to ensuring that barriers remain rigid and complete.
- In most cases, barriers should consist of a scaffold framework in accordance with the illustration below, comprising a vertical and horizontal framework, well braced to resist impacts, with vertical poles spaced at a maximum interval of 3m. Onto this, weldmesh panels should be securely fixed.

Default specification for protective barrier (Type 1)



- Where driven vertical poles are impractical due to the likelihood of causing damage to tree roots or to underground services, above-ground stabilizing systems may be specified.
- Alternative specifications may be acceptable but should be specified in conjunction with the project arboriculturist but they must always ensure an adequate degree of protection for the conditions likely to obtain on site. Weldmesh panels on rubber or concrete feet (Type 2 barrier) may be sufficient where protection is only required from pedestrians, cars, vans and manually operated plant, but in such cases the panels should be securely joined together using a minimum of two anti-tamper couplers, installed so that they can only be removed from inside the fence. The panels should be supported on the inner side by stabilizer struts. Timber post and sheep net fencing 1.1m high (Type 3 barriers) may be used in instances where deemed acceptable in low risk areas.

B: GROUND PROTECTION

- Where construction working space or temporary construction access is justified within the RPA, this should be facilitated by a set-back in the alignment of the tree protection barrier. In such areas, suitable existing hard surfacing that is not proposed for re-use as part of the finished design should be retained to act as temporary ground protection during construction, rather than being removed during demolition. The suitability of such surfacing for this purpose should be evaluated by the project arboriculturist and an engineer as appropriate
- However, where the set-back of the tree protection barrier would expose unmade ground to construction damage, new temporary ground protection should be installed as part of the implementation of physical tree protection measures prior to work starting on site. Such temporary ground protection should be capable of supporting any traffic entering or using the site without being distorted or causing compaction of underlying soil.
- The ground protection might comprise one of the following:
 - a) *for pedestrian movements only, a single thickness of scaffold boards placed either on top of a driven scaffold frame, so as to form a suspended walkway, or on top of a compression-resistant layer (e.g. 100 mm depth of woodchip), laid onto a geotextile membrane;*
 - b) *for pedestrian-operated plant up to a gross weight of 2 t, proprietary, inter-linked ground protection boards placed on top of a compression-resistant layer (e.g. 150 mm depth of woodchip), laid onto a geotextile membrane;*
 - c) *for wheeled or tracked construction traffic exceeding 2 t gross weight, an alternative system (e.g. proprietary systems or pre-cast reinforced concrete slabs) to an engineering specification designed in conjunction with arboricultural advice, to accommodate the likely loading to which it will be subjected.*
- In all cases, the objective should be to avoid compaction of the soil, which can arise from the single passage of a heavy vehicle, especially in wet conditions, so that tree root functions remain unimpaired.

C: ADDITIONAL PRECAUTIONS OUTSIDE THE EXCLUSION ZONE:

- Once the exclusion zone has been protected by barriers and/or ground protection, construction work can commence. All weather notices should be erected on the barrier with words such as:

Construction exclusion zone – NO ACCESS

In addition the following should be addressed or avoided.

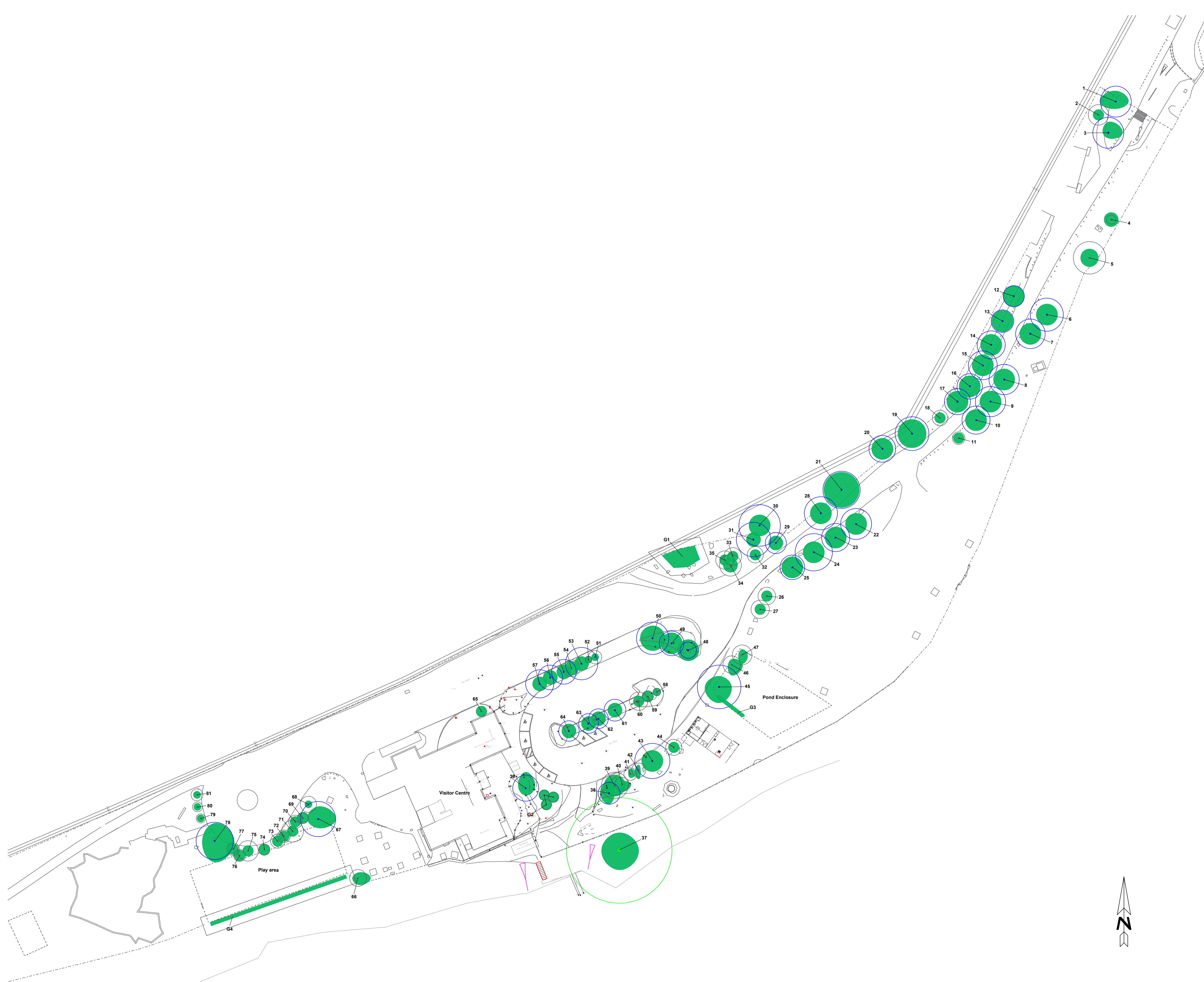
- Care should be taken when planning site operations to ensure that wide or tall loads, or plant with booms, jibs and counterweights (including drilling and piling rigs) can operate without coming into contact with retained trees. Such contact can result in serious damage to them and might make their safe retention impossible. Consequently, any transit or traverse of plant in close proximity to trees should be conducted under the supervision of a banksman to ensure that adequate clearance from trees is maintained at all times. In some circumstances it may be impossible to maintain adequate clearance thus necessitating access facilitation pruning. Local Planning Authority consent for such pruning may be required.
- Material which will contaminate the soil, e.g. concrete mixings, diesel oil and vehicle washings, should not be discharged within 10 m of the tree stem.
- Fires should be avoided on sites if at all possible. Where they are unavoidable they must not be lit in a position where heat could affect the trunk, branches or foliage of any tree. The size of the fire and the wind direction should be taken into account, and fires must be attended at all times.
- Notice boards, telephone cables or other services should not be attached to any part of the tree.
- It is essential that allowance should be made for the slope of the ground so that damaging materials such as concrete washings, mortar or diesel oil cannot run towards trees..

APPENDIX 3: The Protection of Trees on Demolition & Construction Sites:

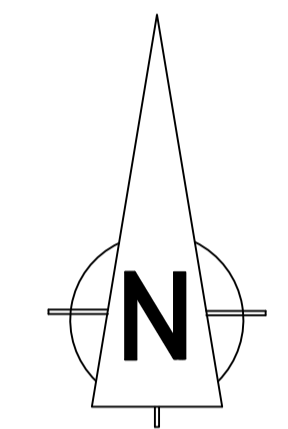
D: **ROADS, DRIVEWAYS AND PATHS NEAR TREES** **(including outline notes on 3-dimensional 'Cellular Confinement' load-support systems)**

1. The overriding principles to be adhered to in the design of hard surfaces near trees are:
(i) the preservation of the character of the soil in a form no more compacted or otherwise disturbed, disrupted or contaminated than it is at present; (ii) to maintain gaseous exchange between the upper layers of soil and the atmosphere; (iii) to ensure adequate (but not excessive) water supply to the soil; and (iv) the avoidance of damage to retained trees as a result of root severance, crushing or abrasion.
2. Tree roots are concentrated in the upper metre of the soil, with the great majority 300-600 mm below the soil surface. Beyond 3 or 4 metres from the trunk most of the roots are small in diameter and not readily apparent as originating from trees. They are nevertheless vital to the tree's well-being, as well as being very easily damaged by even rather shallow soil disturbance, such as may be required in establishing a path or driveway.
3. Wherever possible paths etc should be routed well outside the Root Protection Area (RPA), when problems should not arise. Note, however, that the position of a path or road on a layout plan may indicate the surface only: *Allowance must be made for any kerbing, and the footing into which kerbs will be set, when considering possible conflicts between trees and nearby paths, roadways etc.*
4. Where there is no alternative other than for such a route to impinge upon the RPA of a tree, the possibility of damage can be significantly reduced through the use of No-Dig techniques, where an adequately load-bearing sub-base and hard-wearing surface is established over existing roots without them being disturbed. A variety of techniques are available including three-dimensional cellular confinement systems¹. Alternatively, piles, pads or elevated beams can be used to support surfaces to bridge over the RPA or, following exploratory investigations to determine location, to provide support within the RPA while allowing the retention of roots greater than 25 mm in diameter. The design of all such systems should be specified in liaison with the project arboriculturist.
5. Temporary haul roads must be similarly designed and specified, taking into account the extra loading that is likely to be imposed by construction traffic. Where proposed *permanent* new surfaces will be used for construction access, it is essential that this extra loading and wear is taken into account during the design process. A temporary sacrificial wearing surface may be required for the duration of construction activity.
6. Wherever possible, new surfaces should permit the percolation of moisture into the soil and allow free gaseous exchange. Suitable permeable wearing course include washed gravel (either loose or in laid gravel-retention grids, but note that self-binding gravels and 'hoggin' is NOT suitable) or paving slabs or block pavers with built-in infiltration spaces. These must be laid dry-jointed, bedded onto a free-draining sub-base such as sharp sand or coarse, no-fines aggregate. Porous asphalt and resin-bonded gravels will provide good porosity initially but will eventually become blocked by fines and should be laid following the principles used for impermeable surfaces (see below).
7. New permanent impermeable hard surfacing should not exceed 20% of any existing un-surfaced ground within the RPA. The hard surface should be resistant to or tolerant of deformation by tree roots, and should be set back from the stem of the tree and its above-ground root buttressing by a minimum of 500 mm to allow for growth and movement. Resulting gaps may be filled using appropriate inert granular material.
8. Prior to and during installation, the soil structure in the area beneath the proposed new surfacing must be protected from compaction, using temporary ground protection where necessary (see appendix 2B). During installation the new surface should be "rolled out", using machinery working forward from the surface as it is constructed.
9. If it proves necessary, existing surface vegetation should be killed using an appropriate herbicide that will not leach into the soil and will not affect tree roots. All herbicides must be applied strictly in accordance with the manufacturer's instructions.
10. The soil should not be skimmed to reduce ground levels. However loose organic matter and/or turf should be removed carefully, using hand tools. If the surface needs to be levelled or raised, this should be achieved using a suitable granular fill material (e.g. no-fines gravel, washed aggregate etc.)

¹ Suppliers of suitable proprietary products include Geosynthetics ('CellWeb') and Terram ('Geocell') and Greenfix ('Geoweb')



- KEY**
- Trees are indicated by symbols below, colour coded to indicate their 'Retention Categories'.
- ★ Category U (defective, negligible or redundant trees)
 - Category A (high retention value)
 - Category B (moderate retention value)
 - ▲ Category C (low retention value)
 - APPROXIMATE crown spread of individual trees
- The nominal ROOT PROTECTION AREA (RPA) of each tree is indicated by a solid line using the colour coding above



All dimensions must be checked on site and not scaled from this drawing.

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CLIENT
 Dwr Cymru Welsh Water








DRAWING TITLE
 Tree Constraints Plan

SCALE	1:500 @ A1	Job No.	24/1055/01
DATE	August 2024	REVISION No.	A

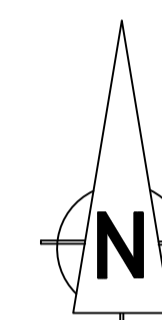


KEY

Trees are indicated by symbols below, colour coded to indicate their 'Nominal' retention categories.

-  Trees to be removed
-  Category A (to be retained)
-  Category B (to be retained)
-  Category C (to be retained)
-  Existing canopy
-  Line of protective fence (temporary barrier)
-  Area of 'No-dig' construction

The nominal ROOT PROTECTION AREA (RPA) of each tree is indicated by a radial solid line using the colour coding above.
 The actual ROOT PROTECTION AREA (RPA) of each tree is indicated by a hatched area using the colour coding above.



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DRAWING TITLE

Tree Protection Plan

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