

Pre-Development Tree Report

Proposed Water Treatment Works 'Five Fords' Wrexham

Ref

Barr_07DevSVY_081209

Date

16th December 2009



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1. CLIENT

Caulmert /Dwr Cymru WWA
C/O Tirlun Barr Associates,
Chartered Landscape Architects
Tan y Berllan,
Llanbedr y Cennin,
CONWY. LL32 8UY

2. SITE LOCATION

Five Fords Sludge, Wrexham.

3. DATE OF REPORT & AUTHOR

8th December 2009 by Paolo Bavaresco.

4. SITE HISTORY

As explained by Mrs Julie Barr (Landscape Architect - Tirlun Barr Associates):

- 4.1 The site is due for improvement works by Welsh Water, and proposals are in close proximity to mature trees.
- 4.2 The submission of a tree survey and report to BS5837:2005 'Trees in Relation to Construction' is required.
- 4.3 A site visit and tree survey was undertaken on 7th & 9th December 2009 by Paolo Bavaresco (Arboriculturist) on behalf of Tirlun Barr Associates.

5. AIMS AND INSTRUCTION

Mrs Julie Barr (Landscape Architect -Tirlun Barr Associates) has instructed Mr Paolo Bavaresco (Arboriculturist) to:

- 5.1 Undertake a 'Pre-Development Tree Survey' in keeping with BS5837:2005. The aim is to install a treatment works, as depicted on the plan referenced in Sc6.1. The objectives are to:
 - 5.1.1 Determine which trees are likely to be affected by the proposed development, and note their condition.
 - 5.1.2 Categorise the trees for removal or retention.
 - 5.1.3 Determine the tree root protection areas.
 - 5.1.4 Annotate the position of each tree, its crown spread and root protection area to scale on a 'Tree Constraints Plan'
 - 5.1.5 Determine the Arboricultural Implications in the context of the proposed development.
 - 5.1.6 Determine an Arboricultural Method Statement in the context of the proposed development.
 - 5.1.7 Annotate the protective fencing required for the retained trees and indicate the trees to be removed in the context of the proposed development, onto a 'Tree Protection Plan'.

6. DOCUMENTATION REFERENCES

The following documents are used as references in this report:

- 6.1 Site Location and Planning Application Boundary - Drawing No. 24800265-1000-2400 Rev A2
- 6.2 Proposed site layout - Drawing No. 24800265-1000-2402 Rev A0
- 6.3 Modifications to existing site access and road – Drawing No. 24800265-1000-2407 Rev A0
- 6.4 Tree Constraints Plan – Ref: Barr_07DevSVY_081209ConPLAN
- 6.5 Tree Protection Plan – Ref: Barr_07DevSVY_081209ProPLAN
- 6.6 Aecom Ecology Assessment Report.
- 6.7 Aecom Transport & Access Statement.

7. RESTRICTIONS & LIMITATIONS

The following restrictions and limitations are to be considered alongside the findings of the report:

- 7.1 This report is not a mandate for any recommended tree work to be undertaken, without first determining any necessary permission from the Local Planning Authority (LPA) and tree owner/s.
- 7.2 No further diagnostic tools or methods have been implemented to assist in determining actual tree strength or vitality.
- 7.3 This survey was undertaken as a ground level visual assessment.
- 7.4 This survey and report does not consider the risk of subsidence damage due to in-direct root action.
- 7.5 No assessment or advice related to specific ecological value is included. The client and contractor must determine the risk of tree work affecting protected species and the legal consequences of disturbing or injuring them. In the absence of a qualified ecological and environmental implication assessment, the Countryside Council for Wales /English Nature should be approached for advice on protected species associated with the site.
- 7.6 The contents of this report are the **copyright and intellectual property of Paolo Bavaresco**. Paper and electronic copies are permitted for the sole purposes of the client, in dealing with the project only.

8. THE TREES & PLANS

21 No. Individual trees are included in the report, **and 4 No. groups** (woodland/hedge/mixed). **14 No. trees are identified with tags** numbered 0986 – 1000. All trees noted are annotated on the tree constraints plan.

8.1 The Tree Constraints Plan

The tree root protection area for each tree is annotated as a black dashed line (so as not to confuse with the crown spread) around each tree using the tree specific measurements provided. The crown spread of each tree is already plotted, coloured red, blue, green or grey, in relation to their quality categorisation; a general crown radius is used as the trees are evenly branched and mostly typical forest form conifers.

8.2 The Tree Protection Plan

The crown spread of each retained tree is annotated as a solid line. The required tree protection fencing is annotated as a polygon and the internal area cross hatched as an exclusion zone to all, except the project

Arboriculturist and LPA tree officer. The crown spread of trees to be removed is annotated as a red dashed line.

9. ARBORICULTURAL IMPLICATIONS ASSESSMENT (AIA)

The discussion below is in the context of the final development proposal as presented:

- 9.1 The trees numbered 0986 – 0990 and 0995 – 1000** are the only trees that appear to be affected (therefore requiring protection or removal) by the proposed development outlined in Sc6.1, Sc6.2, Sc6.6 and Sc6.7. Surrounding trees 0986 – 0995, the site is very wet and marsh-like. This seems to create unfavourable conditions for some of the trees, and they appear to have passed their peak condition. However, the Oaks in particular, appear to be important to wildlife and species diversity.
- 9.2 Area 1 is the ‘Merchiel Covert’**, marked on the plans as ‘Ancient Woodland’; though the site may be ancient, the current trees and under-storey do not appear to be at all ancient. The proposed development outlined in Sc6.1 above, appears to have no effect on this area, to justify identifying tree specific RPA protection areas; the largest trees are approximately 70cm DBH, and this RPA has been assigned to the boundary of the woodland. However, a cursory inspection of the interior of the woodland, did ‘flag up’ 3 hazardous trees that may present a risk to the current site users (depending upon frequency of use of the target areas). The trees bordering the woodland to the south east and south west are the largest (upto 28m), some with the poorest form, leaning heavily with total bias to the south west and south east. Their tops are visible to the residential areas and footpaths to the south. Otherwise, the trees on site have no especial amenity value to the general public as they are located on a restricted access site, and are remote from clear viewing. However, they do appear to offer other benefits, particularly to wildlife.
- 9.3 Area 2 is a hedge** between T986 and T988. This area appears unlikely to be affected by the development proposed in Sc6.1, if the RPA are avoided. The hedge is mature and provides a screen and cover for wildlife.
- 9.4 Area 3 is a hedge** running between the south east corner of the covert to the disused railway. This area appears unlikely to be affected at all by the development proposed in Sc6.1. The hedge is mature and provides a screen and cover for wildlife.
- 9.5 Area 4 is a group of mixed species** no greater than 30cm DBH, situated on the railway embankment. Access to this area was locked, but all that could be seen was ploughed field and aggregate storage. This area appears unlikely to be affected at all by the development proposed in Sc6.1
- 9.6 T1- T6 are noted due to their poor condition and high hazard potential** – the risk of damage will be determined by considering the use and occupancy of the target area within falling distance of each tree. It is recommended that these trees be felled.
- 9.7** Tree specific justifications and recommendations for tree retention and removal are discussed in the tables.

10. ARBORICULTURAL METHOD STATEMENT (AMS)

- 10.1** The majority of tree roots grow within the top 60cm of soil. Therefore, the greatest risk to future tree health and stability, is from root damage during construction. Mature trees may survive serious root damage for up to 5 years (if they do not suffer wind-throw first) before a sudden decline and death. The more obvious wounding of trunks and branches can lead to decay and decline,

and can also increase wind-throw risk. Such wounding to trees can increase risks to persons and property within falling distance, with potential mitigation/liability costs to tree owners. Dead or Dying trees may also decrease the amenity of the area and desirability of any development. **To avoid unnecessary risks and retain trees as assets into the future, the following must be considered:**

10.1.1 The Tree Root Protection Areas (RPAs) are principally to protect roots from damage during installation of foundations, landscaping, driveways and services. Only through liaison with the project Arboriculturist or Tree Officer, may construction be allowed within the RPA. This often entails the careful use of:

- Pile foundations,
- Geo-textile driveways
- Boards to reduce soil compaction by vehicles and equipment
- Moles for services
- Digging by hand rather than machine.

The RPA may be reduced by 20% in some cases, and simply not apply in others. Only a qualified and experienced Arboriculturist has the necessary expertise to determine this.

10.1.2 The structural integrity and stability of trees can be compromised by wounding to parts above and below ground. This is usually caused by inappropriate/unqualified pruning of trees to facilitate construction or plant access, or by accidental wounding by plant access or construction.

10.1.3 The effect of construction on retained trees in terms of foot traffic and machinery access can damage roots, significantly affecting tree health and stability. The following must NOT occur within the RPA of retained trees:

- Compacting of soil,
- Grade change of soil and
- Contamination of the soil.

10.1.4 Everyone engaged in the construction process has a responsibility to respect tree protection measures, and observe necessary precautions to avoid contamination.

10.2 Tree Specific Protection Measures

The following must be adhered to if unnecessary damage, instability or ill health to the retained trees is to be avoided:

10.2.1 The retained trees numbered 0986, 0987, 0990 & Area 2 must have tree protection fencing installed as a polygon **outside of the RPA** of each tree/area, as specified in Sc 10.3.1. and as annotated on the 'Tree Protection Plan'. No other trees require protection measures with respect to the proposals outlined in Sc6 above.

10.3 Site Specific Protection Measures

The following must be adhered to if the trees recommended for retention are to avoid unnecessary damage, instability or ill health:

10.3.1 Specification for fencing

Wire mesh panels of temporary fencing, minimum 2m height x 3m length, with 38mm posts with clamps to scaffolding uprights staked with strong supports into the ground, and other features essential for

robustness and stability. Erecting such panels on a bank may present stability issues and gaps; in this instance other wire/ board fencing methods may be used, as long as they adequately restrict access. The fencing must not cut corners on the RPA of each tree, though may be extended beyond the RPAs for ease of construction (**subject to conditions 10.3.2 below**). **The erection of such fencing should be supervised by the project arboriculturist and approved by the LPA tree officer, before construction commences.**

10.3.2 Specification for boarding within the RPA

The fencing by practicable necessity, should exclude the area essential for digging/installation of geo-textiles in the immediate vicinity of the proposed development. Any persons or vehicle allowed within the RPA must be run on boards to prevent any compaction of surrounding roots. Soil extracted for the development must be removed from the RPA each day, to avoid root damage from spoil heaps over a period of time. **The project Arboriculturist should be retained on site to ensure the correct positioning of RPA fencing and boarding within the RPA.**

NB: *There are a wide range of proprietary 'anti compaction' track ways on the market. It would be reasonable to accept a wide range of products provided that they provide protection from the weight / types of access proposed. It is likely that this will only take the form of pedestrian access and potentially light weight machinery. It is beyond the scope of this report to give precise details / specifications in this respect. It is reasonable to conclude that the fundamental methodology is acceptable and the details should be agreed with the Planning Department (through conditions) prior to commencement of works.*

10.3.3 On no account must fuels, oils or any materials or equipment be stored within the RPAs (or uphill of the RPA, where run-off will pass through the RPA). Storing items within the RPA may lead to compacting and contaminating of the soil (in turn affecting tree health & stability). Physical damage may occur to the trunk and branches from the movement of machinery and materials, if stored or moved through the RPA.

10.3.4 Containing and mixing of substances injurious to tree health must be **undertaken at least 10m from the nearest RPA**, including unfenced areas required to facilitate construction. This includes any fire lighting, fuels, bitumen, concrete, cement, oils, builders sand and chemicals. Special care must be taken to ensure such substances do not drain down toward a water course.

10.3.5 Installation of services in close proximity to tree roots must be undertaken with care, avoiding the RPAs. If services are required to be run through an RPA, moles and hand digging may be the only suitable approach to avoid significant damage to tree roots, **and must be undertaken in compliance with the latest National Joint Utilities Group (NJUG10) guidelines.** It should be borne in mind that a tree root of 4cm diameter has a holding capacity of 6 tonnes - severing roots of this size and larger may significantly compromise tree stability in a particular direction. Smaller roots and very fine roots also contribute to tree stability, and more significantly to tree health. **Any services requiring routing through the RPA, must be supervised by the project arboriculturist and approved by the LPA tree officer before commencing construction.**

10.3.6 Care should be taken during plant access and construction, to ensure tree trunks and branches are not wounded. A banksman must be used to ensure no unnecessary wounding. Pruning to facilitate access must only be undertaken by authorised tree specialists, and not construction staff. Such **facilitation pruning must first be authorised by the Local Planning Authority Tree Officer.**

10.4 Trees To Be Removed

The following **12 trees** are to be removed:

T3, T4, T5, T6, T988, T989, T995, T996, T997, T998, T999.

Full details are to be found in the tree specific tables. All tree work is to be undertaken by competent contractors with the necessary expertise. Guidelines for the employment of tree work contractors are attached as an appendix and must be followed to ensure the health and safety of contractors, the public and the retained trees. Tree work must be undertaken before the tree protection measures are installed.

11. SCHEDULE OF WORKS & ARBORICULTURAL SUPERVISION

The following schedule is determined by operational constraints and may be subject to change; any change must be discussed with the project arboriculturist and the LPA arboricultural officer:

11.1 Phase 1 - Pre-Development Stage

- Pre-commencement site meeting between the project arboriculturist, the client/project manager and the LPA tree officer.
- Access determined and agreed.
- Site compound and mixing/burning areas agreed.
- Access facilitation pruning agreed and undertaken.
- Demolition work identified and agreed.
- Tree work to trees directly affected by the development undertaken.
- Tree work to trees in-directly affected by development undertaken.
- Installation of tree protection measures.
- Site inspection by the project arboriculturist.

11.2 Phase 2 – Development Stage

- Site accessible to construction traffic.
- Compound sited with WC & materials.
- Undertaking of any demolition required.
- Site monitoring visits and construction staff briefing by the project arboriculturist, as required by the arboricultural method statement or planning conditions.
- Additional site monitoring visits every two weeks, as required by planning conditions.
- Ground works and installation of services, Construction.
- Completion.
- Site inspection by project arboriculturist.

11.3 Phase 3 – Post Development Stage

- Removal of protective fencing
- Landscape staff briefed by project arboriculturist
- Hard and soft landscaping

11.4 Site monitoring and supervision by the project arboriculturist shall be agreed with LPA tree officer and project manager by telephone and email. Each site visit shall be recorded on the site logbook and signed. In addition, notes will be kept by the project arboriculturist and a copy forwarded to the client and the LPA.

- 11.5 The site monitoring visit** is to ensure that tree protection measures are continually adhered to, and so that any issues that may arise are dealt with appropriately and notified to the LPA and client.
- 11.6 Site supervision** is specific to tasks in close proximity to trees that require careful attention and specific techniques, to avoid damage to trees. The supervision will be required for the duration of the task, until the required objectives have been met.
- 11.7 The LPA tree officer will have free access** to the site to make recommendations as they see fit to help comply with the planning conditions.
- 11.8 Recommended tree work and any scrub clearance required** to facilitate the tree protection fencing, should be undertaken before the fencing is erected.
- 11.9 Tree protection fencing must remain in situation**, for the entire duration of the planned construction work, until completed. It must only be removed after confirmation by the LPA following the final site inspection by the project arboriculturist.
- 11.10 It is essential that contractors working in close proximity to trees, have ready access on site to the relevant documents** cross referenced in this report. This avoids any copyright infringement, ensures accurate interpretation, and maintains the usability of this report without unnecessary duplication (and associated ink and paper wastage). All reputable contractors working in close proximity to trees should have ready access to the following documents, with the relevant sections laminated for use on site:
- BS5837:2005 'Trees In Relation To Construction'
 - NJUG Guidelines for the planning, installation and maintenance of utility apparatus in close proximity to trees (Volume 4)

12. DECLARATION

The above findings, conclusions and recommendations are based on the site situation and research, as found and known about at the time of inspection.

16th December 2009

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Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
0986	English Oak (<i>Quercus robur</i>)	Mature	10m	1.5m	500cm	90cm	Fair/Poor Slightly sparse crown with much dead wood. The wet rooting area is probably causing anaerobic conditions for the roots causing physiological stress; annual extension over 5 years between 2cm and 6cm.	Fair Pronounced trunk-to-root flare typical of wetland trees, with a cavity between the buttresses on the south east side, leading into what appears to be a significant cavity. A cavity is also evident at 4m in the canopy. A well balanced crown of large boughs with good taper.	RPA: 366 square meters. As a circle this would extend from the trunk with a radius of 10.8meters, or a square of 19.14m sides. A fine shaped tree that sadly is not visible to the wider locality, reducing its amenity rating. A poor safe useful life expectancy (SULE). A potential for wildlife habitat even if it dies. The proposed development does not appear likely to infringe at all upon the RPA, or come within falling distance of the tree. Retain the tree and protect with fencing.	C2
0987	English Oak	Mature	12m	0m	8m	90cm	Good Full natural crown of good density with 5-25cm inter-nodal extension over the past 5 years.	Good Very good trunk-to-root flare into a single stem of good taper. Forks in to a wide spreading crown with good unions at 4m. Some broken branch stubs with good wound wood. Some dead wood. Cavity at the base between the buttress roots. A large burr of 50cm x 50cm at the base appears to be of low significance. A bark wound extends to 1.5m up on the south east side that is totally occluded.	RPA: 366 square meters. As a circle this would extend from the trunk with a radius of 10.8meters, or a square of 19.14m sides. A fine shaped tree that sadly is not visible to the wider locality, reducing its amenity rating. A good safe useful life expectancy (SULE). A potential for wildlife habitat even if it dies. The proposed development does not appear likely to infringe at all upon the RPA, or come within falling distance of the tree. Retain the tree and protect with fencing.	B2

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
0988	English Oak	Mature	13m	0m	5m	86cm	Fair Slightly sparse in the tips, but inter-nodal extension of between 10-20cm over 5 years. Some dead wood and some past storm damaged branches.	Good Fair trunk-to-root flare into a single stem with good taper. Evenly balanced crown with a slight lean toward the south east.	RPA: 334 square meters. As a circle this would extend from the trunk with a radius of 10.32meters, or a square of 18.29m sides. A fine tree with only a fair to poor SULE; appears to have been buried around the base, probably affecting health. Also, the sluices are in close proximity and hard standing surrounds much of the available rooting area. The proposed development appears likely to infringe upon the RPA, and come within falling distance of the tree. The tree should not be allowed to influence the development in light of its condition. Remove the tree in the interests of future safety.	C2 B2
0989	Goat Willow (<i>Salix caprea</i>)	Mature	4m	0m	5m	28cm	Poor Much dead wood and vertical epicormic shoots indicate physiological stress.	Poor Multi-stemmed from ground level. The tree has split in half at the root stock and failed to the north; only the southern half of the crown is remaining. Unidentified bracket fungi were noted.	RPA: Not applicable, the tree is not safe or worthy of retention. A poor SULE. Remove the tree in the interests of future safety.	R

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
0990	English Elm (<i>Ulmus procera</i>)	Mature	10m	2m	5m	35cm	Good A full natural crown.	Good Forks into 4 at 50cm with good unions and no significant defects. Some scars where the bark has torn from past branch failures. Good trunk-to-root flare and good taper. Biased toward the east due to suppression.	RPA: 55.42 square meters. As a circle this would extend from the trunk with a radius of 4.2meters, or a square of 7.4m sides. A reasonable tree with a fair SULE; unfortunately it is likely to succumb to Dutch Elm Disease. The proposed development does not appear likely to infringe upon the RPA, or come within falling distance of the tree. Retain the tree and protect with fencing	C2
0991	English Elm	Mature	10m	0m	5m	40cm	Fair A slightly sparse crown.	Fair A major fork has been removed at 1m, with a cavity remaining and epicormic shoots. Suppressed by adjacent Elm with no room for future optimum growth. Leans by 10 degrees with a biased crown to the north.	RPA: 72.39 square meters. As a circle this would extend from the trunk with a radius of 4.8meters, or a square of 8.5m sides. A poor tree with a poor SULE; unfortunately it is likely to succumb to Dutch Elm Disease. The proposed development does not appear likely to infringe upon the RPA, or come within falling distance of the tree. No work or protection recommended	C2

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
0992	Ash (<i>Fraxinus excelsior</i>)	Young Mature	8m	0m		45cm	Good A full natural crown, with past pruning wounds cut flush but totally occluded.	Good Good trunk-to-root flare into a single stem of good taper with an even and lightly branched crown.	RPA: 91.62 square meters. As a circle this would extend from the trunk with a radius of 5.4meters, or a square of 9.57m sides. A good SULE. The proposed development does not appear likely to infringe upon the RPA, or come within falling distance of the tree. No work or protection recommended	C2
0993	Italian Alder (<i>Alnus incana</i>)	Mature	8m			45cm	Good	Good Good trunk-to-root flare into a single stem of good taper, soon branching wide with good unions.	RPA: 91.62 square meters. As a circle this would extend from the trunk with a radius of 5.4meters, or a square of 9.57m sides. A good SULE. The proposed development does not appear likely to infringe upon the RPA, or come within falling distance of the tree. No work or protection recommended	C2
0994	Ash	Mature	15m	2m	7m	70cm	Fair Some dead wood and slightly sparse crown due to ivy colonisation.	? A single stem of good taper with good trunk-to-root flare. Adequate inspection obscured by dense ivy.	RPA: 221 square meters. As a circle this would extend from the trunk with a radius of 8.4meters, or a square of 14.88m sides. A fair SULE. The proposed development does not appear likely to infringe upon the RPA, or come within falling distance of the tree. No work or protection recommended	C2

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
0995	English Oak	Young Mature	8m	-	-	51cm	Fair/Poor Only 5cm annual inter-nodal extension over 5 yrs. A sparse crown previously colonised by ivy. Dead wood.	Fair/Poor A single stem with no trunk-to-root flare. 20cm Ø boughs removed at 2m on the north and south sides, with 30cm stubs remaining. Crown biased totally to the north due to suppression.	RPA: 117 square meters. As a circle this would extend from the trunk with a radius of 6.12meters, or a square of 10.84m sides A poor SULE; probable future risk to the access/ highway. The tree appears to have been buried, affecting root health. Poor past pruning and poor form compound risk of future issues. The proposed development appears likely to infringe upon the RPA, and come within falling distance of the tree. Fell to facilitate development and avoid future risk.	C1
0996	Sycamore	Young Mature	8m	-	-	43cm	Fair A slightly sparse crown previously colonised by ivy. Dead wood. Pruning to 3.5m up with 5 cm stubs remaining. Past flush cuts totally occluded.	Fair No trunk-to-root flare. A compact crown to the south. Bark wound at 30cm up on the south side.	RPA: 83.65 square meters. As a circle this would extend from the trunk with a radius of 5.16meters, or a square of 9.14m sides A poor SULE; probable future risk to the access/ highway. The tree appears to have been buried, affecting root health. Poor past pruning compounds risk of future issues. The proposed development appears likely to infringe upon the RPA, and come within falling distance of the tree. Fell to facilitate development and avoid future risk.	C1

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
0997	Sycamore	Mature	8m	-	-	55cm	Poor Colonised by ivy (since severed and now dead). Poor wound wood.	Fair Poor trunk-to-root flare. Forks in to 2 co-dominant leaders at 2.3m. Stubs from past pruning.	RPA: 136 square meters. As a circle this would extend from the trunk with a radius of 6.6meters, or a square of 11.69m sides A poor SULE; probable future risk to the access/ highway. The tree appears to have been buried, affecting root health. Poor past pruning compounds risk of future issues. The proposed development appears likely to infringe upon the RPA, and come within falling distance of the tree. Fell to facilitate development and avoid future risk.	C1
0998	Crack Willow (<i>Salix fragilis</i>)	Large Mature	15m	-	-	70cm	Fair A sparse crown, heavily suppressed by ivy.	Hazardous Forks into 3 at 1m – two divergent stems remaining, the central fork has failed in the past and is lying to the east, parallel to the highway. The fork to the west leans at 60° to the west, with what appears to be a broken top. The east fork leans at 10° to the north east, over the highway.	RPA: 221 square meters. As a circle this would extend from the trunk with a radius of 8.4meters, or a square of 14.88m sides. A poor SULE; a significant risk to the highway. The proposed development does not appear likely to infringe upon the RPA, but vehicles travelling from the east must pass directly under the tree. Fell to remove risk of damage to all highway users.	R

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
0999	English Elm	Mature	12m	-	-	42cm	Dead	Poor Likely to drop branches.	RPA: 78 square meters. As a circle this would extend from the trunk with a radius of 5.04meters, or a square of 8.9m sides A poor SULE; probable future risk to the access/ highway. Fell to remove risk of damage to highway/access users.	R
1000	Sycamore x 2	Mature	13m	-	-	64cm 51cm	Fair Only 5cm annual inter-nodal extension over 5 yrs. Deadwood. Ivy establishing in the crown.	Fair 2 separate stems located close together against the footway. The asphalt footway comes up to the trunk of the larger stem. The west trunk has extensive bark wounds with some wound wood and surface decay. Good trunk-to-root flare of both stems with good taper and unions throughout. Lightly branched.	RPA: 185 square meters. As a circle this would extend from the trunk with a radius of 7.68meters, or a square of 13.61m sides A fair SULE; probable future risk to the current highway. The proposed development does not appear likely to infringe upon the RPA. Prune to clear the footpath and highway to achieve statutory clearance. No protection measures recommended	C1 B2

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
Area 1	Mixed woodland; Sycamore (<i>Acer platanoides</i>), Wild Cherry (<i>Prunus avium</i>), Hazel (<i>Corylus avellana</i>), English Oak, English Elm, Hybrid Black Italian Poplar, Ash.	Mature	Up to 28m	-	-	Up to 70cm.	Fair Many trees appear to be in decline, possibly due to the wet area.	Fair Most of the edge trees appear in good condition, excepting those highlighted in the tables below. Some of the edge trees to the south east and south west borders lean with pronounced crown bias over neighbouring land.	RPA: As an area this would extend from the trunks of the edge trees by upto 8.4meters on the east, south east and south west sides. The west and north boundaries would have an RPA area extending from the trunks of the trees by 5.4meters. A good SULE, with a potential for wildlife habitat and screening. The proposed development does not appear likely to infringe at all upon the RPA, or come within falling distance of the trees. There are, however, significant hazard trees within falling distance of surrounding areas. These are marked on the plan and detailed in the tables below. No work or protection recommended, except where noted below.	B2
Area 2	Mixed hedge (<i>Prunus spp.</i>)	Mature	5m	0m	5m	5-25cm	Good	Good	RPA: 28 square meters. As a circle this would extend from the trunk with a radius of 3meters, or a square of 5.3m sides. A good SULE, with a potential for wildlife habitat and screening. The proposed development does not appear likely to infringe significantly upon the RPA, or come within falling distance of the trees. Protect with fencing	C2

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
Area 3	Mixed hedge; Hawthorn (<i>Crataegus monogyna</i>), Hazel, Damson.	Mature	6m	0m	5m	5-25cm	Good	Good	RPA: 28 square meters. As a circle this would extend from the trunk with a radius of 3meters, or a square of 5.3m sides. A good SULE, with a potential for wildlife habitat and screening. The proposed development does not appear likely to infringe significantly upon the RPA, or come within falling distance of the tree. No work or protection recommended	C2
Area 4	Mixed scrub as in area 3, plus occasional young Ash and Oak trees.	Young to Mature	6m	0m	5m	5-25cm	Good	Good	RPA: 28 square meters. As a circle this would extend from the trunk with a radius of 3meters, or a square of 5.3m sides. A good SULE, with a potential for wildlife habitat and screening. The proposed development does not appear likely to infringe significantly upon the RPA, or come within falling distance of the tree. No work or protection recommended	C2

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
T1	Alder (<i>Alnus glutinosa</i>)	Large Mature	10m	0m	4m	70cm	Good A full natural crown	Good Good trunk-to-root flare into a single stem of good taper with an even and lightly branched crown.	RPA: 221 square meters. As a circle this would extend from the trunk with a radius of 8.4meters, or a square of 14.88m sides. A good SULE, with a potential for wildlife habitat and screening. More prominent to footpath and properties to the south. The proposed development does not appear likely to infringe significantly upon the RPA, or come within falling distance of the tree. No work or protection recommended	B2
T2	English Oak	Mature	13m	2m	5m	80cm	Good A full natural crown. Ivy colonising	Good Good trunk-to-root flare into a single stem of good taper with an evenly branched crown.	RPA: 289 square meters. As a circle this would extend from the trunk with a radius of 9.6meters, or a square of 17m sides. A good SULE, with a potential for wildlife habitat and screening. More prominent to footpath and properties to the south. The proposed development does not appear likely to infringe significantly upon the RPA, or come within falling distance of the tree. No work or protection recommended	B2
T3	Ash	Large Mature	Extensively decayed at the base. O f no significance to the proposals, but likely to fail outside of the woodland boundary. Fell							R
T4	Ash	Large Mature	Extensively decayed at the base. O f no significance to the proposals, but likely to fail outside of the woodland boundary. Fell							R

Tree No.	Species	Age Class	Height Of Tree	Height Of Crown	Crown Radius (cm)	DBH (cm)	Physiological Condition	Structural Condition	Safe Useful Life expectancy, Root Protection Area, & Recommendations	BS 5837 Grading
T5	English Elm	Mature	Extensively decayed at the base. O f no significance to the proposals, but likely to fail outside of the woodland boundary. Fell							R
T6	Wych Elm (<i>Ulmus glabra</i>)	Young Mature	A dead tree that is implicated by the proposals. Fell in the interests of safety to the drive, and to facilitate development.							R
See Section 9 & 10 for important considerations and recommendations.										

TREE QUALITY ASSESSMENT CASCADE CHART - BS5837: 2005

Appendix 1

Trees For Removal				
Category and Definition	Criteria			Identification on Plan
Category R Those in such a condition that any <u>existing value would be lost within 10 years</u> , and which should in the current context, be removed for sound arboricultural reasons.	- Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse. Includes those that will be exposed following removal of other category R trees, because their sudden exposure increases risk of failure. - Trees that are dead or are showing signs of irreversible, immediate decline. - Trees infected with pathogens that threaten the health or safety of other trees nearby. - Very low value trees restricting the growth of specimens of better quality. <u>NOTE:</u> Habitat re-instatement or protection may be appropriate for species such as bats. E.g. installation of bat boxes, or leaving as a safe structure of no arboricultural value, but very good for invertebrates, owls, woodpeckers etc.			DARK RED
Trees To Be Considered For Retention				
Category and Definition	1. Mainly Arboricultural Values	2. Mainly Landscape values	3. Mainly Cultural Values inc Conservation	Identification on Plan
Category A Those of high quality and value: in such a condition as to be able to make a <u>substantial contribution</u> for a min. of 40 years	Good examples for the species (maybe rare or unusual), or essential components of groups, or of formal or semi-formal arboricultural features.	Trees, groups or woodlands which provide a definite screening or softening effect to the locality (views into or out of the site), or those of particular visual importance.	Trees, groups or woodlands of significant conservation, historical etc value.	LIGHT GREEN
Category B Those of moderate quality and value: those in such a condition as to make a <u>significant contribution</u> for a minimum of 20 years.	Trees downgraded from A because of impaired, but remediable, condition.	Trees present in numbers that form part of distinct landscape features, that are collectively of more value than they would be as individuals, but are not essential parts of more formal arboricultural features (eg avenues). Or trees internal to a site, with little visual impact on the wider locality.	Trees with clearly identifiable conservation or other cultural benefits	MID BLUE
Category C Those of low quality and value: Currently in <u>adequate condition to remain</u> until new planting could be established for a minimum of 10 years. Also young trees with a stem diameter below 15cm.	Trees not qualifying as category A or B.	Trees that are only of value because of their contribution to a group, or trees offering only low or temporary screening benefit.	Trees with very limited or low conservation or cultural benefits.	GREY
NOTE: Whilst Category C trees will usually not be retained where they would impose a significant constraint on development, trees less than 150mm could be relocated on site.				

BIBLIOGRAPHY

The findings and recommendations within this report are derived from the principles, practices and information explained in some or all of the following publications:

- The Body Language of Trees
Mattheck C. & Breloer H.
- A New Tree Biology
Shigo A.L.
- Modern Arboriculture
Shigo A.L.
- Hazards From Trees - A General Guide: Forestry Commission Practice Guide
Lonsdale D.
- Diagnosis of Ill Health in Trees
Strouts R.G. & Winter T.G.
- Principles of Tree Hazard Assessment and Management
Lonsdale D.
- Tree Mechanics
Mattheck C.
- BS 5837:2005; Trees in Relation to Construction
British Standards Institute
- BS 3998:1989; Recommendations for Tree Work
British Standards Institute
- SIM 01/2007/05: Management of the Risk from Falling Trees
Health & Safety Executive
- Veteran Trees - A Guide to Risk & Responsibility
English Nature
- G55/1 Engineering Recommendations: Safe Tree Working in Relation to Overhead Lines - July 2001.
Electricity Association
- Towards Reasonable Tree Risk Decision- Making?
The Arboricultural Journal (2). 143 – 161
- Alan Mitchell's Trees Of Britain
Mitchell A.
- NJUG Guidelines for the planning, installation and maintenance of utility apparatus in close proximity to trees (Volume 4)
National Joint Utilities Group

RECOMMENDATIONS FOR EMPLOYING TREE WORK CONTRACTORS

The risks involved with routine tree work requires time served supervision, study and training to ensure safety to operatives, the public and property. In addition, ill considered or heavy pruning operations can drastically reduce the safe, useful life expectancy of individual trees and the dynamics of a group. To reduce these risks, appropriate site supervision is recommended. A credible Arboricultural supervisor would normally be expected to have a minimum of 3 yrs practical experience, and would be qualified to national academic/vocational standards specific to Arboriculture*.

Certificates of competence to operate chainsaws are only awards for basic competence in the interests of chainsaw safety. There is currently no industry or insurance requirement for qualified* arboricultural supervision (technicians) on site. In some cases, this has been a key factor in serious accidents, and irreparable damage to trees:

<http://www.hse.gov.uk/agriculture/pdf/arbnews0107.pdf> .

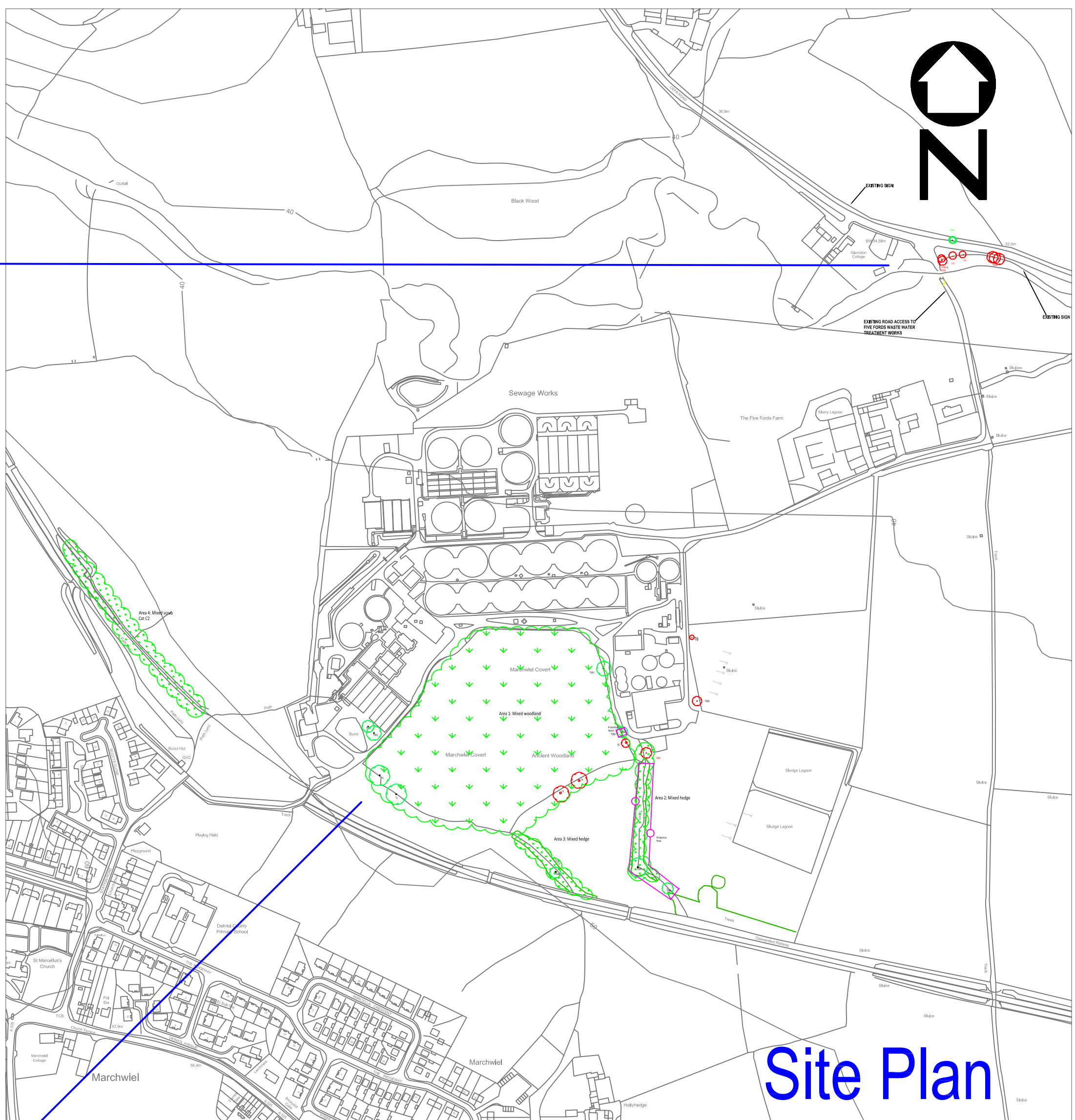
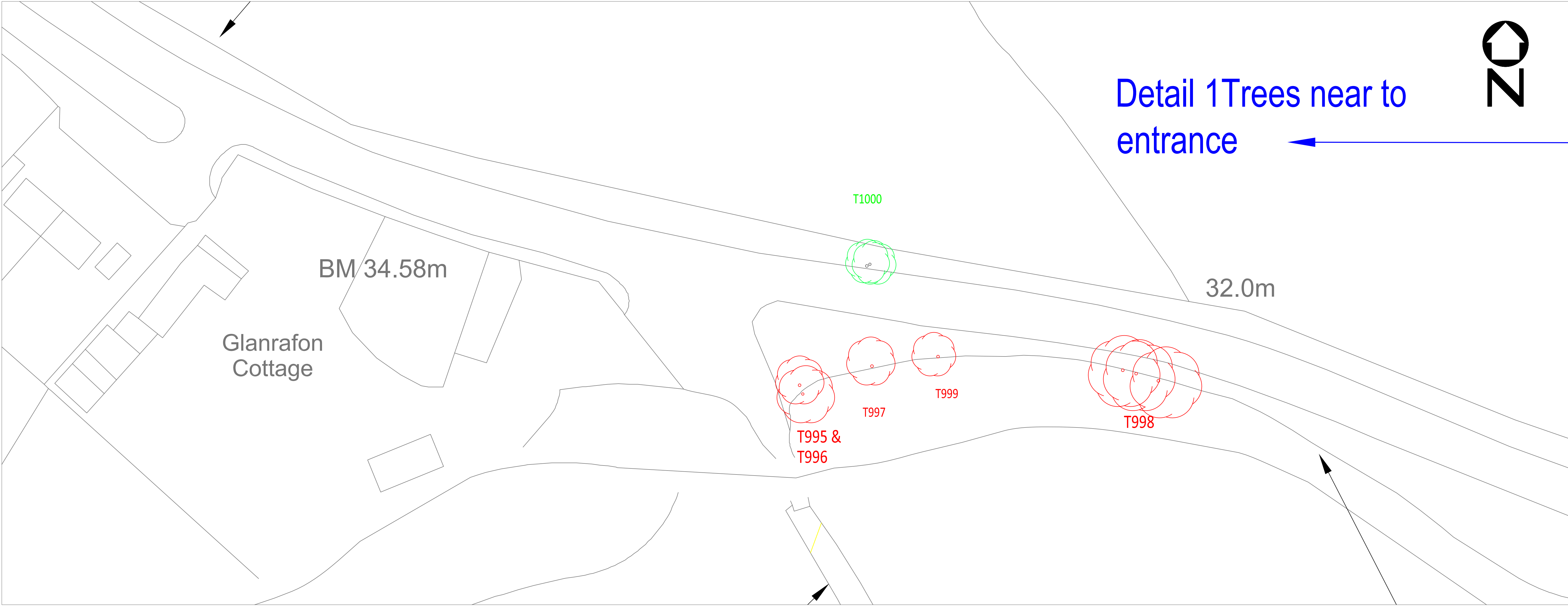
http://www.fentons.co.uk/article_hse_warns_householders_about_unqualified_tree_surgeons_328.asp

As trees are usually at the centre of complex ecosystems, ill-considered tree work can have an adverse affect on local wildlife, flora and fauna. In addition, it can radically reduce the amenity value of an area, reducing the desirability and value of property. For these reasons, it is recommended that contractors should be chosen based on the following guidelines:

- **All tree work to be undertaken to the latest British Standard 3998** (except where the latest published research suggests otherwise), in accordance with safety guidelines set out by **AFAG (Arboricultural & Forestry Advisory Group)** in 300, 400, 600 and 800 series leaflets:
<http://www.hse.gov.uk/pubns/forindex.htm>
<http://www.hse.gov.uk/pubns/afag805.pdf>
- **All works to be carried out by operatives competent to use a chainsaw** with the appropriate awards for basic chainsaw use. Large dismantling operations require additional expertise that is currently insufficiently qualified.
- ***It is recommended** that operatives work under the direct supervision of a qualified arboricultural technician, with at least three years relevant practical experience **PLUS** one of the following formal qualifications *specific to arboricultural good practice*:
 - National Certificate in Arboriculture (Various awarding bodies)
 - Higher National Certificate in Arboriculture (Various awarding bodies)
 - National Diploma in Arboriculture (Various awarding bodies)
 - Arboricultural Technicians Certificate (Arboricultural Association)
 - Certificate in Arboriculture (Royal Forestry Society)
 - Certified Arborist (International Society of Arboriculture)
 - Higher National Diploma in Arboriculture (Various awarding bodies)
 - BSc Honours degree in Arboriculture (Various awarding bodies)
 - Professional Diploma in Arboriculture (Royal Forestry Society)
- **Climbing spikes are NOT acceptable for climbing retained trees. They are only to be used on trees to be dismantled** or during an emergency/aerial rescue. In exceptional circumstances, spikes may be required on trees that do not offer suitably strong branches to climb via more acceptable roped access methods. Ask contractors for a guarantee that staff will not use them on retained trees.

- **Any further defects encountered** whilst work is being carried out must be made known to the site supervisor, whom should formally report to the client and/or management.
- **Contractors must take all reasonable precautions** to avoid injury to themselves, surrounding vegetation, property features and the public. They should present evidence of a Health & Safety Policy, Risk Assessments, public & products liability insurance and work within relevant HSE Regulations.
- **Friction damage to retained trees** from rope wear must be minimised; in thin barked trees (such as Pines, Planes and Beech), climbers should use friction saving devices for their final aerial anchor point.
- **Rigging ropes used for the removal of heavy branches** should not be run directly over branches or trunks of trees to be retained. Failure to observe this may cause severe bark damage and reduce a tree's safe, useful life expectancy.

We can be retained as project managers / auditors of chosen contractors, to ensure on site safety and quality, on behalf of the client.



Title: Tree Protection Plan

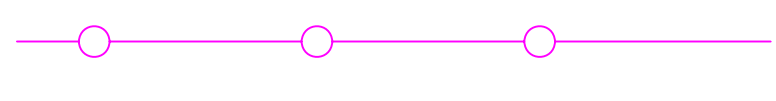
Site: Five Fords Water Treatment Works Wrexham

Ref: Barr_07DevSvy_081209ProPlan

**Tree layer by: Jeremy Lawton/ Paolo Bavaresco.
Drawn on architects supplied original.**

Date: 16th December 2009

Key:

Protective fencing shown as 

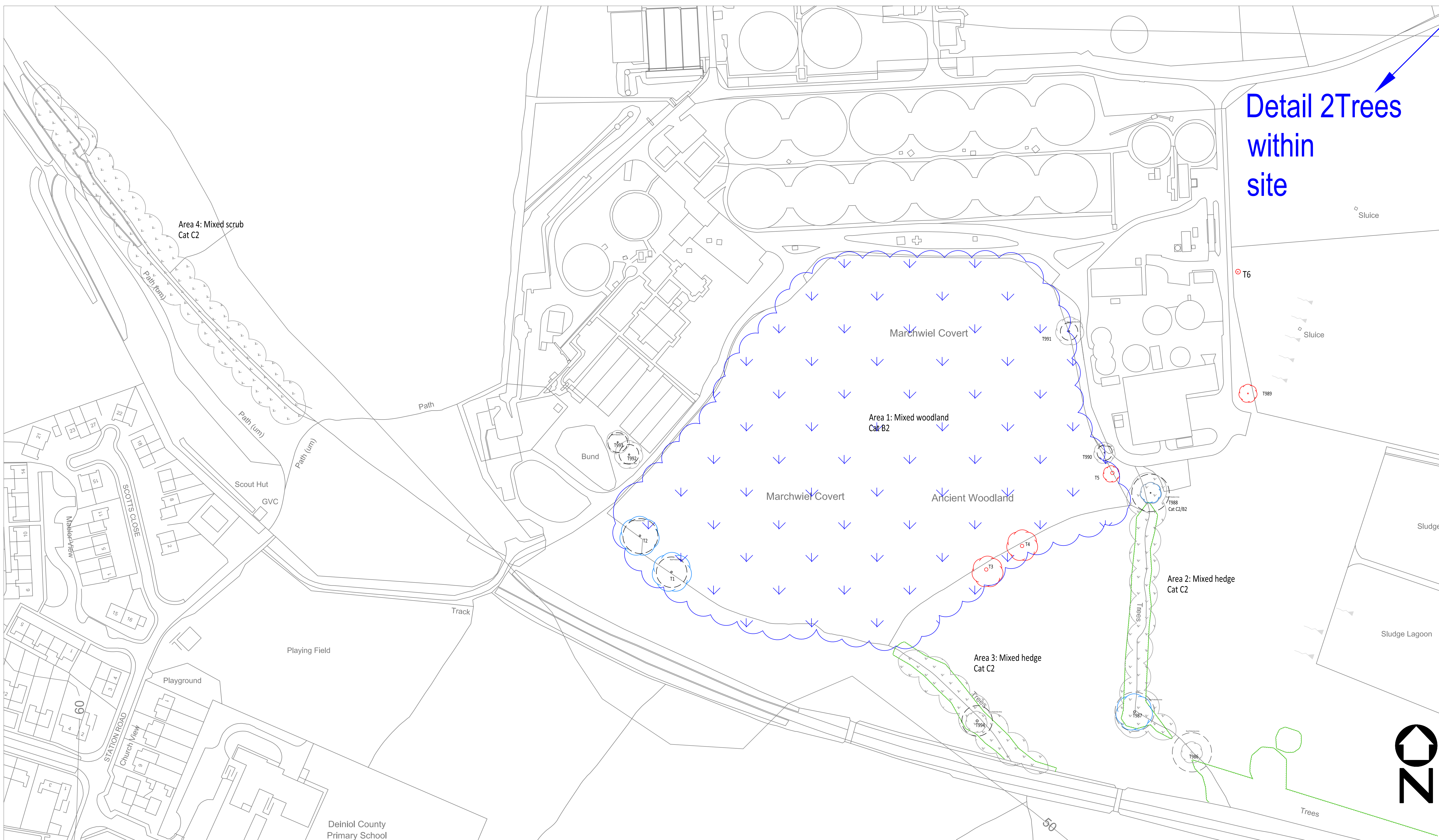
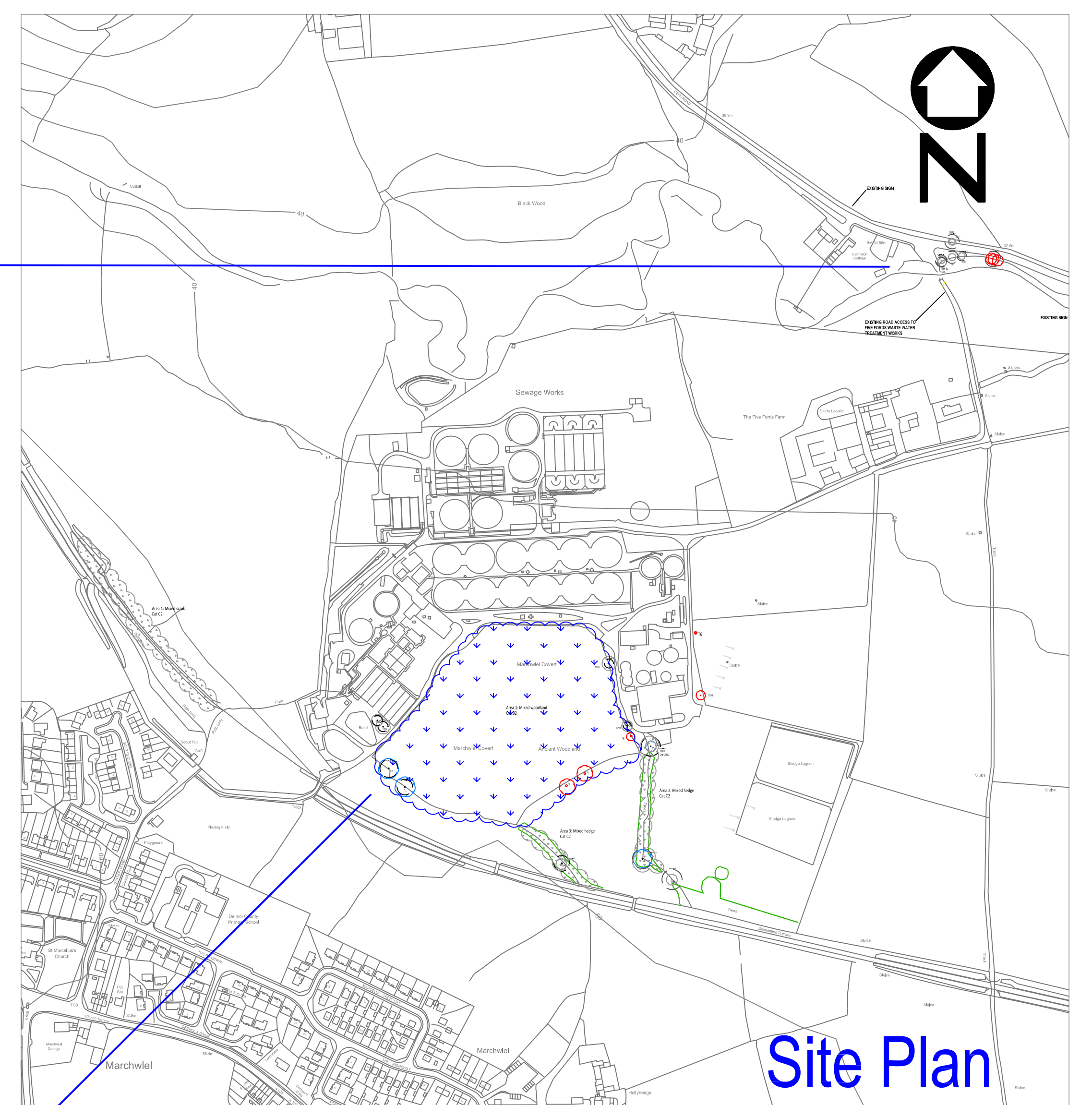
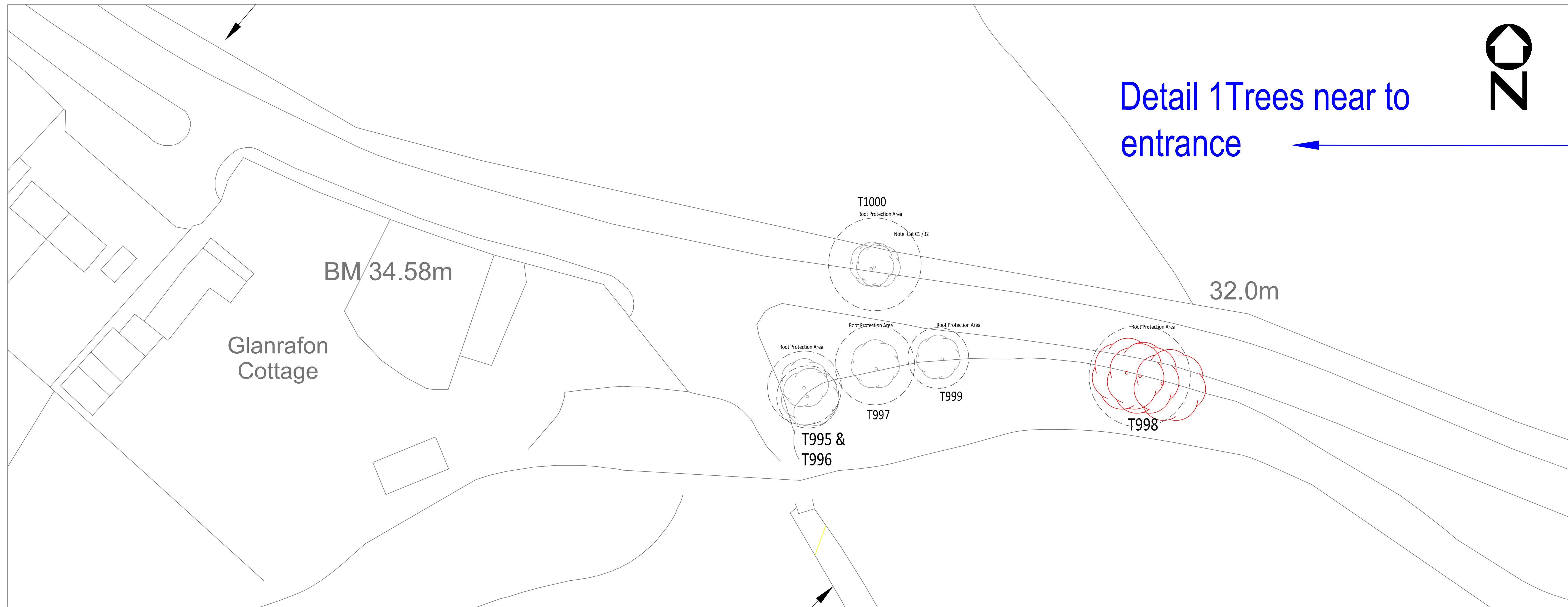
Trees outlined Red : for removal

Trees and groups outlined Green: for retention

**Note: plan only shows position of trees
inspected for this report.**



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Title: Tree Constraints Plan

Site: Five Fords Water Treatment Works Wrexham

Ref: Barr_07DevSvy_081209ConPlan

Tree layer by: Jeremy Lawton/ Paolo Bavaresco.
Drawn on architects supplied original.

Date: 16th December 2009

Key:

BS 58375:2005 retention category

Trees outlined Red :Category R (removals)

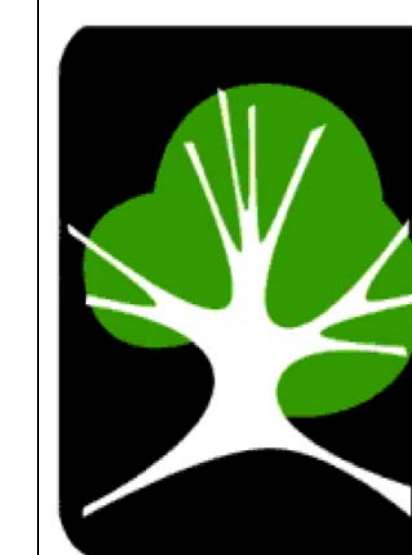
Trees outlined Light Green: Category A (high quality and value)

Trees outlined Mid Blue:Category B (moderate quality and value)

Trees shaded Grey:Category C (low quality and value)

Root Protection Area: Shown as black dashed line- plotted nominally from centre of trunk.

Note:plan only shows position of trees inspected for this report.



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