



BS.3998 (2010) TREE CONDITION REPORT

Pen-y-Nant,

Church Road, Minera, Wrexham, LL11 3DA

For

Matthews of Chester Block Management Ltd

Surveyed and Compiled

By:

Consulting Arborist

Mr H Pimborough

BSc(Hons), PGCE, U.cert.F.FP, RFS.cert.Arb, MArborA

Lantra Professional Tree Inspection

QTRA (Quantified Tree Risk Assessment) Registered

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Tree Condition Report

1.0 Site Address: Pen-Y-Nant, Church Road, Minera, Wrexham, LL11 3DA

1.1 Site Grid Ref: SJ 26733 51948

2.0 Client: Miss Hâf Roberts; Matthews of Chester Block Management Ltd

2.1 Client Address: 15 Lower Bridge Street, Chester, CH1 1RS. Tel: 01244 346226

3.0 Consulting Arborist Details

Mr H Pimborough BSc (Hons), PGCE, U.cert.F.FP, RFScert.Arb, MArborA, PTI

Mancoed VM Ltd

Unit B, Reigan Industrial Estate

Factory Road, Sandycroft

Flintshire

CH5 2QJ

Tel: 01244 288088

3.1 Consulting Arborist Experience

Howard Pimborough is a graduate of the University of Wales and University of Chester, a professional member of the Arboricultural Association, QTRA registered, and qualified with Lantra Professional Tree Inspection. He has over 30 years' experience in Silviculture, Arboriculture and Environmental Management. He has provided consultancy services (BS5837 and Tree Condition Reports) for major infrastructure projects, County and Town Councils, Development and Construction Industry, Utilities Companies, and private landowners.

4.0 Site Characteristics

A 19th Century listed building converted to residential flats; surrounded by formal gardens, resident vehicular parking, a Laurel hedgerow (*Laurus ssp.*) and small areas of unmanaged woody shrubs and minor trees. On the Northern curtilage of the property there is a single large specimen Monterey Cypress (*Cupressus macrocarpa*) within falling distance of the main building and a linear group of Monterey Cypress (*Cupressus macrocarpa*) that overhang Church Road (a minor road). On the Western aspect of the site, evidence of storm damage to the Monterey Cypress group. The site location can be seen in 12.0 Site Maps (12.1 Site Location) and it's ten figure grid reference is provided. The site is within the Minera Conservation Area and is subject to the provisions of the Town and Country Planning Act (Conservation Areas) 1990 (Section 211).

4.1 Date of Survey: 9th April 2022

4.2 Weather Conditions on date of Survey: Scattered Snow and Rain Showers, changing from full to light cloud. Light conditions went from poor to good during the inspection period.

4.3 Time Limit of Survey/Re-inspection.

Initially 12 months (return late Summer - Autumn 2023) so to assess crown/foilage health and density, and to confirm the presence of fungal pathogens (if any) that cannot be observed in early spring (and or) after a period of extreme weather (whichever is sooner). The reinspection period can then be extended if there is no change to tree(s) physiological condition.

4.4 Type of Survey: Visual Tree Inspection (Tree Condition)

4.4.1 The survey undertaken is a phase 1 Visual Tree Assessment. It identifies **above ground level** major structural defects, pathogenic fungi and diseases in trees and groups of trees that might increase the risk of tree failure in whole or part.

4.4.2 Observation to exposure, site conditions, and soils (no in-depth soil investigations have been undertaken and should not be inferred) are also noted, though effects on tree stock are theoretical, due to the complex relationship between trees and their immediate environment.

4.4.3 It is important to note, in the case of certain tree fungi and diseases, their presence might not be apparent due to the season the tree has been inspected on.

4.4.4 All surveys are time limited and limited by major weather events (Trees should be reinspected after storms or extreme weather), this is primarily because the influence of abiotic factors (e.g., construction activity, drought), mammalian activity (e.g., Deer and Squirrel bark stripping), fungal pathogens, diseases and sometimes structural defects can occur after the initial inspection within a relatively short time.

4.6 Exceptions or Limits of Survey

4.6.1 Small trees and woody shrubs of less than 7.5cm dbh (diameter at breast height i.e., 1.3m) and/or have no significant level of risk to structures or persons have not been recorded.

4.7 Measurements and Identification of Surveyed Trees (Limitations or Methodology)

4.7.1 All tree diameters have been measured with an approved, serviceable dbh (diameter at breast height) tape.

4.7.2 Tree heights have been measured with a calibrated Laser clinometer. However, available distances to ensure accuracy may have been restricted due to the terrain and characteristics of the site and may influence tree height accuracy tolerances.

4.7.3 Single trees of significance are **designated with the prefix 'T'** have been tagged with an approved numbered tree tag for ease of identification and to help continued management of retained trees.

4.7.4 Trees growing in close proximity to each other provide a sheltering effect and optimise their structure accordingly, suggested tree risk mitigation must therefore be in consideration of the entire group i.e. If one tree is felled due to defects, a consideration to remove all must be made. Trees considered as 'groups' are **designated with the prefix 'G.'**

5.0 Quantified Tree Risk Assessment (QTRA) Methodology and Analysis

5.1 Using a comprehensive range of values, Quantified Tree Risk Assessment (QTRA) enables the tree assessor to identify and analyse the risk from tree failure in three key stages. 1) to consider land-use in terms of vulnerability to impact and likelihood of occupation, 2) to consider the consequences of an impact, taking account of the size of the tree or branch concerned, and 3) to estimate the probability that the tree or branch will fail onto the land-use in question. Estimating the values of these components, the assessor can use the QTRA calculator application to calculate an annual Risk of Harm from a particular tree or tree group(s).

5.2 A Risk of Harm in the Tolerable Region but 1/10,000 or greater will not usually be tolerable where it is imposed on others, such as the public, and if retained, will require a more detailed consideration of ALARP (as low as reasonably possible). In exceptional circumstances a tree owner might choose to retain a Risk of Harm that is 1/10,000 or greater. Such a decision might be based on the agreement of those who are exposed to the risk, or perhaps that the tree(s) is of great importance. The table Fig 4.7.5 show explanations of QTRA assessment results as included in survey data.

QUANTIFIED TREE RISK ASSESSMENT - RISK DECISION INFORMING FRAMEWORK

Risk Thresholds	Description	Action
1/1 000	Unacceptable Risks will not ordinarily be tolerated	• Control the risk • Periodically review the risk
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	• Control the risk • Periodically review the risk
1/10 000	Tolerable (by agreement) Risks may be tolerated if • those exposed to the risk accept it, or • the tree has exceptional value	• Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value • Periodically review the risk
	Tolerable (where imposed on others) Risks are generally tolerable	• Assess costs and benefits of risk control • Control the risk only where a significant benefit might be achieved at a reasonable cost • Periodically review the risk
1/1 000 000	Broadly Acceptable	• No action currently required • Periodically review the risk

Costs and Benefits of Risk Control.

Risk control measures bring benefits in terms of reducing or eliminating a risk, but those benefits come at a cost that should, in broad terms, be balanced against the benefits of risk control. For guidance on considering costs and benefits, please refer to the Quantified Tree Risk Assessment Practice Note, available at to <http://www.qtra.co.uk/cms/index.php?section=25> (due to be updated October 2013).

Based on the tree owner/manager accepting the principles set out in the Quantified Tree Risk Assessment Practice Note and or any other specific instructions, the risk assessor will take account of the cost/benefit balance when providing management recommendations.

5.4 QTRA Analysis

- The risk assessment cannot take into account weather events of an extreme nature but relates to typical mean windspeeds and conditions experienced in the UK.
- No tree can ever be guaranteed to be 100% safe and even trees in good condition can suffer damage beyond normal conditions or fail because defects cannot be observed, for instance root condition below ground level.
- Tree risk assessment and the suggested mitigation can be viewed in section **6.0 Site Survey Data**.

5.1 Tree Risk Management Proposal

The client shall where 'reasonably practicable' minimise risk to adjacent properties and site users by: -

- Short Term – Continue monitoring of tree condition and stability using the data provided and make contingency to be proactive to tree hazards when they occur within reason, or to mitigate existing ones.
- Medium to Long Term – Create a management plan to remove dead/declining trees in poor physiological condition and consider suitable replacements to maintain tree stock levels.

6.0 Executive Summary

- Trees are self-optimising mechanical structures that grow in and react to their environment. They are living organisms that live and die and are capable of being wounded or infected by pathogenic organisms. As self-optimising structures, trees will make as much economic use of materials as possible to ensure that any stresses are uniformly spread over the entire surface area. This means that even a mechanically perfect tree could be damaged or caused to fail by extreme events, such as weather, that overload specific areas (break points) or failure of the ground on which the tree grows. Basically, a tree that appears to be perfectly healthy can fail under extreme weather events or have defects hidden below ground level that cannot be inspected, decay fungi can be hidden from view, deep within the main stem or obscured by coverings of Ivy (*Hedera helix*).
- Specimen T014 (*Cupressus macrocarpa*) is dead, and from resonance sounding there is advancing decay from the basal area of the tree extending upwards on the North aspect of the main stem. Its removal is recommended with some urgency. Ownership, however, was inconclusive; the client may wish to confirm whether it is within the curtilage of the property boundary.
- T012 and T009 Monterey Cypress have existing storm damage and require immediate attention to clear hung-up branches within the tree crowns, and to mitigate the existing storm damage wounds by target pruning.
- Due to structural weaknesses in the form of included branch unions, and changes to exposure due to storm damage. A recommendation of a limited crown reduction with reference to BS3998 Tree Work Guidance, as specified in **8.0 Survey Observations and Recommendations** is advised to Monterey Cypress T004 – T012, and to T002 Monterey Cypress to a lesser degree.
- Group G018, an unmanaged area of young to semi mature trees with Ash (*Fraxinous excelsior*) as the dominant species. The Ash trees are infected with the fungal pathogen *Hymenoscyphus fraxineus* (Ash Dieback) is present and is at class 2 to 3 stage. As young Ash trees, *Hymenoscyphus fraxineus* has a more pronounced impact on their long-term viability, and as the fungus causes crown deterioration and minor dead wood, their removal in the medium term may be required.
- All tree work must be approved by the local Authority as the location is in a Conservation Area as per The Town and Country Planning Act (1990).
- Tree condition on site should be reinspected in 12 months (return late Summer - Autumn 2023) so to assess crown/foilage health and density, the response to mitigation pruning and the presence of fungal pathogens that cannot be observed in early spring (and or) after a period of extreme weather (whichever is sooner). The inspection period can then be extended if there is no change of physiological condition of the trees.
- The residents of the location have expressed concern of the safety of the trees on site. Their opinions though noted have had no influence on this report.

6.0 Survey Data

Ref.	Other Reference	Common	Botanical	Structure	Num. Stems	Height (m)	DBH (cm)	Crown Radius (m)	Life Stage	Life Expectancy	Inspect Period	Description	Survey Notes	Condition	Risk of Harm	Control Measures	Distance to main target (m)
G016		Laurel x20	<i>Laurus sp. x20</i>	Group	20	6	20	3	Mature	10+ Years	1 Year	Target # - car park.	Not significant	Good	1/1M	No action required.	1
G017		Goat Willow Elder Wild Cherry x2	<i>Salix caprea</i> <i>Sambucus nigra</i> <i>Prunus avium</i> x2	Group	3	5	10	4	Semi Mature	10+ Years	1 Year	Target # - car park.	Other/None (specify)	Good	1/1M	No action required.	3
G018		Norway Spruce Common Ash x10 Common Holly x2 Sycamore x2 Hazel x4 Leyland Cypress	<i>Picea abies</i> <i>Fraxinus excelsior</i> x10 <i>Ilex aquifolium</i> x2 <i>Acer pseudoplatanus</i> x2 <i>Corylus avellana</i> x4 <i>Cupressocyparis leylandii</i> X	Group	20	10	20	3	Semi Mature	<10 years	1 Year	Target # - road.	Ash Dieback Class 2, windthrow trees.	Poor	1/40K	Fell dead, infected trees and clear windthrow.	1
T001	0153	English Yew	<i>Taxus baccata</i>	Tree	1	10	79	6	Mature	30+ Years	1 Year	Target # - dwelling.	Crown Spread: N6 S4 E6 W5. Bark wounds partially occluded, Stub branch South Aspect, minor deadwood, dieback tertiary branches	Good	1/30K	Crown reduce by 0.5m, crown clean	8

Ref.	Other Reference	Common	Botanical	Structure	Num. Stems	Height (m)	DBH (cm)	Crown Radius (m)	Life Stage	Life Expectancy	Inspect Period	Description	Survey Notes	Condition	Risk of Harm	Control Measures	Distance to main target (m)
T002	152	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	23.5	134	9	Mature	20+ Years	1 Year	Target # - dwelling. Target # - road.	Crown Spread: N9 S7 W6 E8. Root affecting structure low wall, raised ground restricted root pattern, large wound 30cm x 20cm South aspect partially occluded, shear crack large primary union, phototropic/ geotropic direction change, low over highway 4m. Included primary union, minor deadwood less than 25mm in diameter. Bark wounds on branches and main stem less than 15cm not occluding., strong reactive wood response on primary unions. Minor ivy on primary stem. 1m from road and 0.5m from low wall, root system causing minor structural damage.	Fair	1/5K	Crown clean but retain natural bracing, Crown reduce by 3m over successive growth periods. Crown lift to 5.2 m for highway clearance.	10
T003	Not tagged	Silver Birch	<i>Betula pendula</i>	Tree	4	5	9	1	Young	20+ Years	1 Year	Roadside tree.	Minimal risk	Good	1/1M	No action required.	1
T004	0150	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	21	80	8	Mature	20+ Years	1 Year	Target # - building Target # - car park. Target # - road.	Crown Spread: N9 S5 W8 E4. Codominant tree, leaning towards South, included secondary branch union, minor deadwood below 25mm in diameter, basal shear crack South aspect 3m from ground level, minor ivy	Fair	1/30K	Crown reduce by 3m Crown lift to 5.2 m for highway clearance.	12

Ref.	Other Reference	Common	Botanical	Structure	Num. Stems	Height (m)	DBH (cm)	Crown Radius (m)	Life Stage	Life Expectancy	Inspect Period	Description	Survey Notes	Condition	Risk of Harm	Control Measures	Distance to main target (m)
T005	0149	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	23	113	8	Mature	20+ Years	1 Year	Target # - building Target # - car park. Target # - road.	Crown Spread: N8 S8 W8 E8 Included main stem/primary branch unions primary branch contacts, minor deadwood less than 25mm in diameter	Fair	1/40K	Crown reduce by 3m. Or crown thin. Crown lift to 5.2 m for highway clearance.	4
T006	0146	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	24	100	9	Mature	20+ Years	1 Year	Target # - car park. Target # - road.	Crown Spread: N9 S9 W9 E9, Shear Crack main stem, helical torsion, deadwood less than 25mm in diameter, lean to North, Low clearance over road	Fair	1/40K	Crown reduce by 3m Crown lift to 5.2 m for highway clearance.	2
T007	0147	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	25	83	9	Mature	20+ Years	1 Year	Target # - car park. Target # - road.	Low branches (5.2) obstruct vehicle access. Included union main stem, deadwood less than 25mm in diameter	Fair	1/40K	Crown reduce by 3m. Crown lift to 5.2 m for highway clearance.	3
T008	0146	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	25	48	8	Mature	20+ Years	1 Year	Target # - car park. Target # - road.	Crown Spread: N8 S2 W3 E3, asymmetrical crown due to suppression Dead wood less than 25mm in diameter, main stem wound South aspect localised minor decay, Leaning to North	Fair	1/40K	Crown reduce by 3m. Crown lift to 5.2 m for highway clearance.	2

Ref.	Other Reference	Common	Botanical	Structure	Num. Stems	Height (m)	DBH (cm)	Crown Radius (m)	Life Stage	Life Expectancy	Inspect Period	Description	Survey Notes	Condition	Risk of Harm	Control Measures	Distance to main target (m)
T009	0145	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	27	100	9	Mature	20+ Years	1 Year	Target # - car park. Target # - road.	Crown Spread: N9 S9 W4 E6. Included union main stem primary branches, deadwood less than 25mm in diameter, shear cracks main stem. Movement in primary to North not stable union Low branches (5.2) obstruct vehicle access. Failed branch hung up South aspect.	Fair	1/3K	Crown reduce by 3m. Crown lift to 5.2 m for highway clearance.	3
T010	0140	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	26	72	8	Mature	20+ Years	1 Year	Target # - car park. Target # - road.	Crown Spread: N4, S8, E3 W4 Bark wounds to main stem North aspect localised decay. Leaning to South, asymmetrical to south, Deadwood less than 45mm	Fair	1/40K	Crown reduce by 3m, Crown lift to 5.2 m for highway clearance.	3
T011	0144	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	10	70	9	Mature	10+ Years	1 Year	Target # - car park. Target # - road.	Crown Spread: N9 S0 E3 W3 Suppressed by 0143, Asymmetrical to North, leaning towards target Road, Low branches (5.2) obstruct vehicle access. Bark wounds partially occluded, deadwood over 25mm in diameter	Fair	1/40K	Crown lift to 5.2 m for highway clearance.	2
T012	0143	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	25	88	8	Mature	20+ Years	1 Year	Target # - car park. Target # - road.	Crown Spread: N8, S8 E4 W4, upper primary branch tear failure, branches hung up at height over car park, deadwood 25mm in diameter, secondary branch tear lower crown South aspect	Fair	1/3K	Crown clean. Crown reduce by 3m	3

Ref.	Other Reference	Common	Botanical	Structure	Num. Stems	Height (m)	DBH (cm)	Crown Radius (m)	Life Stage	Life Expectancy	Inspect Period	Description	Survey Notes	Condition	Risk of Harm	Control Measures	Distance to main target (m)
T013	0142	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	23	88	9	Mature	20+ Years	1 Year	Target # - car park. Target # - road.	Crown Spread: N9 S8 E6 W4, Low branches (5.2) obstruct vehicle access. Deadwood greater than 25mm, included union main stem	Fair	1/40K	Crown reduce by 3m	2
T014	0141	Monterey Cypress	<i>Cupressus macrocarpa</i>	Tree	1	25	100	7	Dead	Dead	6 Months	Target # - car park. Target # - road.	Dead tree over target, deadwood greater than 25mm over target, ivy cover minor	Dead	1/400	Fell tree.	1

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8.0 Survey Observations and Recommendations

8.1 The specimens of Monterey Cypress (*Cupressus macrocarpa*) are a prominent feature of the location, and many show good vitality in their overall foliage with minimal or no visible decline. There is one specimen T014 (*Cupressus macrocarpa*) that is dead, and from resonance sounding there is advancing decay from the basal area of the tree extending upwards on the North aspect of the main stem. There was no visible, apparent cause for its decline though several fungal pathogens are known to defoliate and cause *Cupressus ssp.* morbidity notably *Armillaria ssp* (Honey Fungus) and *Phytophthora lateralis* (though no real indicators were observed of this pathogen), the former being the most common. This substantial tree should be removed due to its condition and proximity to Church Road and it's potential to cause harm from failure in part or whole. It should be noted that as part of a larger group it had been a sheltering tree to trees T006-T013, removal though strongly recommended has some implications to this row of trees as the result of changes of exposure. In consideration, T 014 has been declining for some time so there is a considered mitigation in the increased risk.



Fig 8.1.1 T013 Dead Monterey Cypress (*Cupressus macrocarpa*)

8.2 'Changes to exposure of trees/stands as a consequence of surrounding damage may change the magnitude of the applied force. Openings in the canopy allow the penetration of strong winds, and generate turbulence (Gardiner 1995), leading to increased crown damage, rocking of trees, and fatiguing of the root/soil interface. (Gardinier et al 2021)'

8.3 Trees respond to tension and compression from loading by the force of gravity on their structure and from prevailing weather, by the formation of reaction wood, loading stress therefore is compensated by the formation of specialised wood structures, (D Slater et al 2013). When trees grow near each other, their need to produce this additional reactive wood to remain upright and intact, from the pressures of environmental loading, gravitational

force on their structure (causing tension and compression) within the wood fibres, is reduced. Removal, therefore, of sheltering trees can lead to whole or part tree failure as a result, as adaptation to site conditions is not optimised.

8.4 Monterey Cypress (*Cupressus macrocarpa*) trees T006 -T012 would normally be surveyed and inspected as a 'group' (and therefore managed uniformly) for the reasons stated in 8.2 and 8.3, however it was expedient to inspect individually. Macrocarpa are generally known for some resilience to exposure and commonly found planted in exposed coastal regions, their tolerance to salt air and wind firm root system means statistically they rarely fail as a whole tree (unless there is some influence of changes to tree condition from abiotic or biotic factors). However, they have a tendency towards failure at branch/mainstem unions especially at zones of included union (the point where branch/stem or branch/branch bifurcation occurs, the tree's bark becomes embedded in the union between branch and trunk or between codominant stems, potentially causing an area of weakened structural strength.) (Slater et al 2013) Included bark unions have always been known to be of increased risk areas of part tree failure. Failures at the included unions have occurred on the specimens within T006-T012 from environmental loading i.e., wind pressure.

8.5 On T012 Monterey Cypress has a significant and extensive failure at the point of an included branch union, leaving a weakened primary limb and exposure to pathogenic decay. The size of the wound is so significant that occlusion of wound wood is unlikely to form sufficiently, and the loss of structural strength means further upper crown failures are likely, especially under loading from high winds. A substantial part of the failed area is 'hung up' at height on existing intact branches. It's removal and mitigation of the damaged section (s) of the tree by a full crown reduction is recommended and should be undertaken with some urgency. This is also the case for T009 Monterey Cypress, though the level of damage is of a lesser degree, crown reduction on this particular specimen is considered in paragraph 8.6.



Fig 8.5.1 Storm Damage on T012 Monterey Cypress (*Cupressus macrocarpa*)

8.6 Unnecessary wounding of trees by the removal of large areas of the live crown, because of 'perceived risk' by lay people, is all too common. Crown reductions lead to multiple exposed wounds (and therefore to avenues for decay pathogens to enter the tree at pruning points), reduced photosynthetic area leading to tree stress and the distribution of the dampening effect of wind loading to the main stem and root systems via the tertiary and secondary branch structure. However, trees T006 -T012 (*Cupressus macrocarpa*) will experience change of exposure from the loss of T013 and the essential crown reduction of T012. It is deemed necessary due to the disturbance to the optimisation of all trees in the group, that crown reduction is an acceptable strategy to mitigate further failures. This should follow the guidance of BS3998 Tree Work Guidance and should ideally be phased over multiple growing periods. The optimal whole tree crown reduction is approximately 2 - 3.5m from crown height and less than 1-1.5m from the tertiary branches (retaining leaf bearing branches) to the side of the trees. Crown cleaning, if undertaken should retain internal 'natural bracing' i.e., branch to branch or branch to stem contacts, which supports weakened branch unions. Dead wood may be removed only if it is not a natural brace or has safety implications. Consideration to apply the same management methodology to T005 and 6, though exposure change is less significant, is recommended, due the existing included unions with the crown architecture. T011 Monterey Cypress is a suppressed specimen, with asymmetry of the crown radius to the North (overhanging the road). It will not require crown height reduction, but a limited lateral crown reduction is recommended.

8.7 All Monterey Cypress (*Cupressus macrocarpa*) are very low over the Church Road (below a recommended clearance of 5.8m above a highway) and the low branches may cause damage to vehicles from impacts, and as a result the trees themselves may suffer significant wounding that would be hard to mitigate from pruning. Crown lifting over the road is recommended but should not be excessive or undertaken at the same time as crown reduction due to potential loss of photosynthetic area.



Fig 8.7.1 Low Canopy Height over Church Road

8.8. T002 Monterey Cypress (*Cupressus macrocarpa*) was highlighted by the QTRA (Quantified Tree Risk Assessment) methodology as being of a higher Risk of harm than T006 -12, this is primarily because of the value of hazard target i.e., the main building of high occupancy. It does have the same structural weaknesses as all the other *Macrocarpa* on site, in the form of included branch unions and additionally has significant stress loading to trifurcated primary main stem unions, and a large wound partially occluded on the South aspect primary union. The tree has responded by the formation of significant reaction wood at the primary zones of stress. Its crown canopy colour density is very good and vigorous, and the tree is certainly active in its structural optimisation, which is causing the low wall to fail. **Under normal conditions** it is highly unlikely to experience whole tree failure (as with all the trees on site), as there is no observable or apparent pathogenic infection, and though its rooting pattern is restricted, the tree is somewhat sheltered by the building itself. More likely is the potential for failures at included unions and only under environmental loading. However, the UK is experiencing ever more regular storm conditions, and therefore the impact of storms on trees is becoming more unpredictable. Mitigation in the form of approved tree risk management cannot give any guarantees of protection. In terms of the site exposure to high wind loads we can refer to Quine and Gardiner (2007) 'The stochastic nature of storm occurrence means that the degree of wind damage can vary significantly from year to year. A succession of quiet winters (or decades) can be followed by a sequence of winters (or decades) with very damaging storms. The occurrence of a particularly severe storm in one year does not modify the chance of the same intensity of storm occurring in the following year.'

The client has the option to accept the risk of failure or mitigate; this should follow the guidance of BS3998 Tree Work Guidance and should ideally be phased over multiple growing periods. The optimal whole tree crown reduction is approximately 3 -3.75m from total crown height and less than 2m from the tertiary branches (retaining leaf bearing branches) from the sides of the canopy. Crown cleaning if undertaken should retain internal 'natural bracing' i.e., branch to branch or branch to stem contacts, which supports weakened branch unions. Dead wood may be removed only if it is not a natural brace or has safety implications. As highlighted previously, no tree is entirely risk free when subject to unpredictable conditions beyond its mechanically optimised structure. The recommendation of crown reduction will have a moderate effect on the stress load to the primary main stem unions, but will not entirely remove the risk of damage to the property any failure of the tree in part or whole.



Fig 8.8.1 T002 Monterey Cypress (*Cupressus macrocarpa*)

8.9 T001 English Yew (*Taxus baccata*) has early indications of dieback on the tertiary branches and minor bark wounds. As a species, it is very resilient. Some minor formative pruning to the tertiary branches to remove the very low risk dieback, to see if the pruning response will increase crown foliage density could be undertaken. Better still, alleviation of ground compaction in the form of a mulching the root area may improve this minor condition.

8.10 Group G018 is an unmanaged area of young to semi mature trees with Ash (*Fraxinus excelsior*) as the dominant species. The pathogen *Hymenoscyphus fraxineus* (Ash Dieback) is present and is at class 2 to 3 stage. As young Ash trees *Hymenoscyphus fraxineus* has a more pronounced impact on their long-term viability, and as the fungus causes crown deterioration and minor dead wood, their removal in the medium term may be required. There are examples of dead and windthrown minor trees within the group. Overall, it is of minimal risk, but has visual impact. The client may wish to consider clearing the area and replanting. A consideration to maintain as a small wildlife area. in juxtaposition to the formal gardens at Pen y Nant is recommended, but optional.

9.0 Trees and the Law

9.1 Tree Preservation Orders and Conservation Areas

9.1.1 TPOs are administered by the local Council in its role as the Local Planning Authority (LPA) and are made to protect trees that provide a significant amenity benefit to the area.

9.1.2 All species of tree can be protected (but not hedges, bushes or shrubs), and a TPO can protect anything from a single tree to all trees within a defined area or woodland – but no species is automatically protected by a TPO.

9.1.3 A TPO makes it a criminal offence to cut down, top, lop, uproot, wilfully damage, or wilfully destroy a tree protected by that order, or to cause or permit such actions, without the authority's permission. Anyone found guilty of such an offence is liable to prosecution, and an unlimited fine can be imposed for destroying or removing a protected tree without consent from the LPA.

9.1.4 To make an application to conduct works to a protected tree the client will need to complete an application form and submit it to the LPA.

9.1.5 If a tree is in a Conservation Area the client must give six weeks prior written notice to the LPA (by letter, email or on the LPA's form) of any proposed work, describing what the client wants to do. This gives the LPA an opportunity to consider protecting the tree with a TPO. Normal TPO procedures apply if the tree is already protected by a TPO.

9.1.6 The client does not need to give notice if the tree is less than 7.5 centimetres in diameter, measured 1.5 metres above the ground (or 10 centimetres if thinning to help the growth of other trees).

9.1.7 The landowner is strongly advised to check for conservation area or TPOs in place prior to any tree mitigation works and consult with the local authority.

9.2 Felling Licences

9.2.1 A felling licence is required by law if you plan to fell more than 5m³ of timber in one calendar quarter. If you are selling the wood – for logs, for example – then you can only fell 2m³ in a calendar quarter. This applies to trees in hedges as well as woodlands. Everyone involved in the felling of trees, the owner, agent and timber merchant or contractor must ensure that a licence has been issued before any felling is carried out, unless they are certain that one of the exemptions apply, such as felling a dangerous tree where there is an imminent risk of serious harm and urgent work is needed to remove the risk.

9.3 Special Protected Areas and Protected Species

The site is just outside of the Clwydian Range and Dee Valley ANOB. The presence of protected species (Bats) using the trees as summer day roosts or wild birds as nesting sites cannot be discounted.

10.0 Disclaimer.

Please note that the recommendations, comments, and observations have been made on a stated date, factors may not be observed, such as below surface ground conditions due to reasons beyond the control of the surveyor when the inspection occurred. The surveyor accepts no liability to any events arising from the advice given, or any features not observed, in this report or the client's failure to act or not to on those recommendations.

11.0 Report Submission to Client

This report and survey is based on unbiased and fair representation of the tree or trees and their condition on the site as described. All recommendations are given, are based on the knowledge, training and the experience of the surveyor identified, and is submitted in good faith.

Signed (electronically)

H Pimborough

Mr H Pimborough BSc (Hons), PGCE, U.cert.F.FP, RFScert.Arb, MArborA, PTI

Consulting Arborist

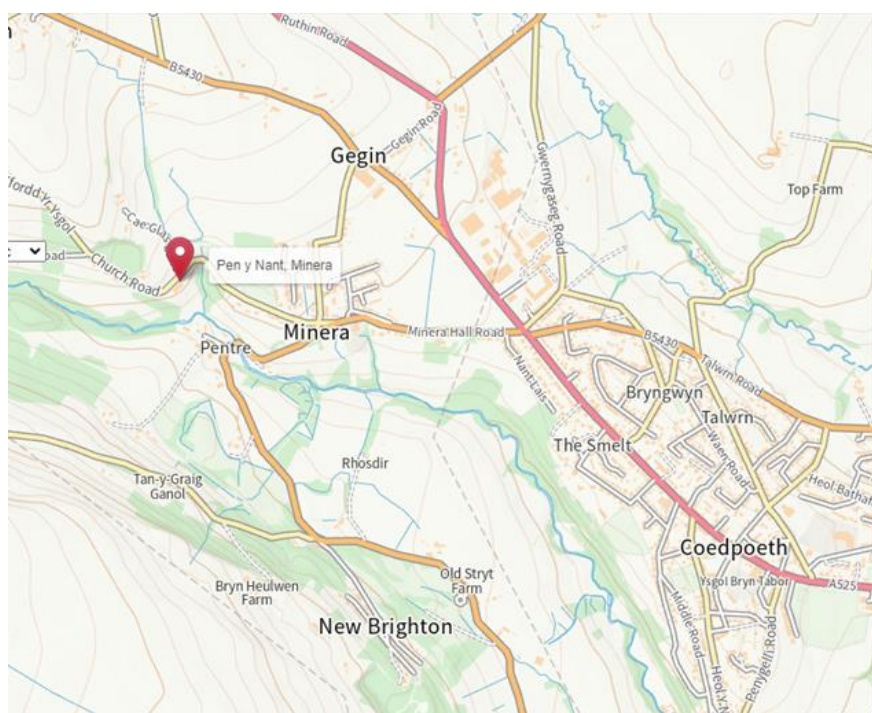
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Date: 05.04.2022

Reinspection Date: 16.06.2022

12.0 Site Maps

12.1 Site Location: Site Grid Ref: SJ 26733 51948



12.2 Survey Map: Pen y Nant, Minera



14.0 Glossary of Survey Terms

14.1 Tree Number

Refers to the tree as identified on site and referenced within the site plan

14.2 Tag Number

Each tree has been identified with a circular metal tag; these are placed approximately 1.8 m from ground level

14.3 Species

Common and vernacular name of the tree – Vernacular- Latin names displayed in small italics.

14.4 Height (m)

Height (in metres) of the tree from base to the tips of the crown to expected tolerances.

14.5 DBH (cm or mm BS5837)

Diameter at Breast Height (1.5m) in centimetres.

14.6 Crown Spread Radius (m)

The average crown radius (in metres) from the four cardinal points

14.7 Age Class

The appearance of at what stage of life the tree may be in (Young, Semi-Mature, Early Mature, Mature, Over Mature, Veteran).

14.8 Condition

Overall physiological condition in relation to tree structure, vigour, and vitality, including the effects of abiotic factors and pest and diseases.

Denoted by the attached key

Tree Condition	
Excellent	Tree in excellent condition with good vitality and no defects present
Good	Tree in displaying good vigour, vitality, only very minor defects
Fair	Tree showing signs of stress, minor -moderate defects present
Poor	Tree showing signs of major die back, major defects – intervention needed
Dead	Tree no longer alive
None	No target

15.0 Glossary of Arboricultural Terms

Abiotic

Non-living. Abiotic factors may include weather, mechanical damage from human activity, pollution etc

Apical dominance

the phenomenon whereby the main, central stem of the plant is dominant over (i.e., grows more strongly than) other side stems; on a branch the main stem of the branch is further dominant over its own side twigs.

Biotic

Pertaining to living organisms

Branch

Stem arising from a larger stem. A subdominant stem. Pith in true branches has no connection to the parent stem.

Bark

A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem.

Cambium

Thin layer(s) of meristematic cells that give rise (outward) to the phloem and (inward) to the xylem, increasing stem and root diameter.

Canker

Localized diseased area on stems, roots, and branches. Often shrunken and discoloured.
canopy: collective branches and foliage of a tree or group of trees

Crown/Canopy

The main foliage bearing section of the tree, these terms are interchangeable.

Crown lifting

The removal of limbs and small branches to a specified height above ground level.

Crown thinning

The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure.

Crown reduction/shaping

A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape.

Crown reduction/thinning

Reduction of the canopy volume by thinning to remove dominant branches whilst preserving, as far as possible the natural tree shape.

Deadwood

Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard.

Dieback

The death of parts of a woody plant, starting at shoot-tips or root-tips.

Disease

A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms.

Included bark

Bark that becomes embedded in a union between branch and trunk or between codominant stems. Can cause an area of weakened structural strength.

Lever arm

A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch.

Lignin

The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification.

Lions tailing

A term applied to a branch of a tree that has few if any side-branches except at its end and is thus liable to snap due to end loading.

Occluding tissues

A general term for the roll of wood, cambium and bark that forms around a wound on a woody plant (cf. wound wood).

Occlusion/Occlude

The process whereby a wound is progressively closed by the formation of new wood and bark around it.

Pathogen

A micro-organism which causes disease in another organism.

Reactive Growth/Reaction Wood

Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth).

Stem/s

The main supporting structure/s, from ground level up to the first major division into branches.

Stress

In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition, or extremes of temperature.

Stress

In mechanics, the application of a force to an object.

Taper

In stems and branches, the degree of change in girth along a given length.

Union

Branch union point where a branch originates from the trunk or another branch or fork.

Graft union Junction between root stock and scion wood. Often evident by a thickening of the trunk.

Wind exposure

The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity.

Wind pressure

The force exerted by a wind on a particular object.

Windthrow

The blowing over of a tree at its roots.

Wound wood

Wood with atypical anatomical features, formed in the vicinity of a wound.