HP Tree Surveys

BS3998: Tree Condition Report.

For

Mr B.E.Williams

At

Greengates, 22 Bangor Road, Overton, Wrexham LL13 0HB

Surveyed and Compiled

By:

Consulting Arborist

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Lantra Professional Tree Inspection

QTRA (Quantified Tree Risk Assessment) Registered

QTRA Registered User

LANTRA AWARDS

Arboricultural ASSOCIATION Professional Member



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Tree Condition Report

1.0 Site Address: Greengates, 22 Bangor Road, Overton, Wrexham LL13 0HB

1.1 Site Grid Ref: SJ374421

2.0 Client: Mr B.E.Williams

2.1 Client Address: Sunnymede, The Trench, Ellesmere, Shropshire, SY12 9DT

3.0 Consulting Arborist Details

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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 residential detached property adjacent to other 24hr residential properties. It was observed that some historic construction and landscaping activity has occurred within the root protection area of the inspected trees.

4.1 Soil Characteristics:

Urban disturbed soil upper horizons originated from Loamy slightly acidic, brownish subsoil with clay as dominant particle. Significantly compacted.

4.1 Date of Survey: 22nd August 2025

4.2 Weather Conditions on date of Survey: Full Sun, Light Cloud, No Wind.

4.3 Time Limit of Survey/Re-inspection: 1 years

4.4 Type of Survey: Visual Tree Inspection

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 Observations in relation 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(s) 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.

4.5 Exceptions or Limits of Survey

4.5.1 In general 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.

4.5.2 The survey identifies only trees with significant defects, which pose an imminent threat, to property and third parties or require a higher level of monitoring.

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

4.6.1 All tree diameters have been measured with an approved, serviceable dbh (diameter at breast height) tape. Where access is limited due to vegetation, an accurate estimation has been provided.

4.6.2 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.

4.6.3 Single trees of significance are **designated with the prefix 'T' and number** to help continued management of retained trees. Trees have not been tagged with an approved, numbered, aluminium forestry tree tag.

4.6.4 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 significant importance. The table Fig 4.7.5 show explanations of QTRA assessment results as included in survey data.

5.4 QTRA Analysis

- QTRA (Quantified Tree Risk Assessment) does not infer that a tree or groups of trees are free from the risk of failure in part or whole. It is an assessment of the potential to cause harm or damage if such an event takes place and an assessment of the level of harm in relation to the target.
- 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 never 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.
- In certain instances, were the QTRA system gives anomalous results, the surveyor shall use their knowledge and experience to increase the ROH (Risk of Harm) level.
- Tree risk assessment (Risk of Harm, ROH) and the suggested mitigation (Control Measures) can be viewed in section **6.0 Site Survey Data.**

Fig 5.4 Key to QTRA Quantified Tree Risk Assessment (see also 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
1/1 000 000	**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
	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.

5.1 Tree Risk Management Proposal

The client shall by agreement, 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 within budget constraints to remove trees if physiological condition deteriorates to an extent that it poses an unacceptable level of risk of harm (ROH).
- Trees that are yellow or green designated are regarded as tolerable in terms of risk of but are not to be regarded as free of potential failure.
- Trees designated as red, and amber should be removed or undertake mitigation pruning based on the tolerance of risk of the client unless it may cause harm to others.

6.0 Executive Summary: Observations and Management Conclusions

6.1 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 objects or other organisms. As self-optimising structures, trees will make as much economic use of materials as possible to ensure that any loading stresses within the tree's structure have been adapted to by the formation of reactive wood (D. Slater 2015). However, a mechanically perfect tree could be damaged or caused to fail by extreme events, such as weather, which overload specific areas (break points) or failure of the ground on which the tree grows.

6.2 No tree can ever be guaranteed to be 100% safe and even trees in good condition can suffer damage under normal conditions. Any tree can be hazardous because of decay or structural weakness, but the risk posed by that hazard is determined by its size and location in relation to the potential target. Frequent inspections can help to identify potential problems before they become acute and allow for intervention to mitigate against a risk posed by a hazard.

6.3 Tree risk assessments (Risk of Harm, ROH) and the suggested mitigation (Control Measures) can be viewed in section **7.0 Site Survey Data.**

6.4 When trees are damaged or intentionally wounded by pruning, they respond to the event by a process of creating barriers within their cell structure and eventually an adaptive wood structure that grows over the affected area of exposed main stem or branch wood. This process is known as CODIT or the compartmentalisation of decay in trees. Essentially the tree adapts cells and exudes chemicals to prevent pathogens from further weakening its structure. Each zone has varying degrees of effectiveness but the strongest is the final barrier zone where wood formations occludes (grows over) the exposed area. If a tree cannot occlude the wound (because the wound is too great in size) then it will be vulnerable to wood decay fungi and other pathogens. It is important to note resistance to decay in the form of CODIT is highly variable dependant on the species of tree. Trees will also respond to weakening of their structure by the formation of further wood at points of weakness (reactive wood) to optimise to its changed condition.

6.5 All trees on site exhibit good levels of vitality and vigour in their canopy. There was no evidence of any significant tree pathogens and no evidence of major structural defects. However, in consideration T001 Ash, showed indications of a 'lapsed pollard' but this must have been in it's early life and observations were inconclusive. When trees are pollarded and grow new canopies from adventitious buds in the bark

(that can grow to substantial branches), ultimately have weak unions due to the lack of effective wood fibre mixing found on typical branch unions.

6.6 Trees can be trespassers, and where a nuisance occurs the adjacent landowner can prune roots and branches to the line of their boundary as an 'abatement' In the particular T001 Ash, there is a case that low branches are excessively oversailing and making contact with the properties 22 and 21 Bangor Road. However, any pruning of roots and branches cannot be so excessive that it is demonstratively not in the best interest of the long-term retention of the tree, or at a poor level of arboricultural practice not in line with BS3998 Tree Work Recommendations. Basically, the tree cannot be pruned above or below ground in a way that results in it becoming a hazard.

6.7 In such cases it is best practice to actively engage with the owner of the tree, explain the issues encountered, and create an amicable and equitable solution. Common law cases can be fraught and expensive for both parties, hence the advice. Ultimately the tree owner has a duty of care to ensure their trees are regularly inspected and managed to prevent loss, damage or injury by result of failure in part or whole, or encroachment of it's growth to cause nuisance.

6.8 In the respect of T001 Ash, it is the landowner, or the adjacent landowner suffering unreasonable encroachment to inform in the Local Authority of pruning works or request removal as it lies within a Conservation Area. In this instance It is recommended to engage with the Local Authority Tree Officer to find an agreeable solution, especially over time the tree will outgrow its location (and also in the case of T002 Norway Spruce, where increasing to maximum height can lead to instability). Multiple crown reductions over a progressive management regime are know a 'retrenchment pruning'. It does control growth but not generally a hazard (if any). It must be understood that crown reductions are temporary solutions, cause opens wounds that are avenues for decay pathogens and disturb the optimised structure.

6.9 Proposed BS3998 Tree Mitigation Works

Ref.	Other Reference	Common Name	Botanical Name	Structure	Works Required	Supporting Statement
T001		Common Ash	*Fraxinus excelsior*	Tree	Full Crown reduction by 3.6m from total height and laterally by 2.5m (20% of Total canopy). Target prune direct branch contacts to structures. Crown lift secondary branches to 5, from ground level sufficient to gain clearance. Monitor condition.	Encroachment and direct contact to buildings. Tree outgrowing it's site
T002		Norway Spruce	*Picea abies*	Tree	Optional but species not known for being windfirm when reaching critical height. Removal is recommended in the long term	Continue to monitor. Removal is recommended in the long term.

All works should adhere were reasonable to the guidance as stated in 14.0 Appendices 15.0: BS 3998 Tree Work – Recommendations - Page 23 unless to remove a significant tree failure risk.



6.8.1 T001 Common Ash Pruning and Location



6.8.2 T002 Norway Spruce potentially outgrowing site within a few years.

7.0 Survey Data **Date of Survey: 22nd August 2025** **Surveyor:** Mr H Pimborough BSc(Hons), PGCE, U.cert.F.FP, RFScert.Arb, MArborA, PTI

Ref.	Common	Botanical	Structure	Num. Stems	Height (m)	DBH (cm)	Crown Radius (m)	Life Stage	Safe Life Expectancy	Inspect Period	Description	Distance to main target (m)	Condition	RoH (Risk of Harm)	Tree Failure Potential	Survey Notes	Control Measures	Timescale
T001	Ash	*Fraxinus excelsior*	Tree	1	18	67	6.5	Mature	10+ Years	1 Years	Target # - dwelling.	4	Good	1/300K	Moderate	No observable pathogenic activity. Indication of girdling surface exposed primary roots on North Aspect with main tension root to South. 25% Root area restriction. Landscape ground works evident in root protection area. Shear crack at Ground level 1m vertical, Minor bark wounds not occluding, Potentially lapsed pollard Minor deadwood. Direct contact to residential buildings and over sail. Not owned by client	Full Crown reduction by 3.6m from total height and laterally by 2.5 (20% of Total canopy). Target prune direct contacts structures. Monitor condition. Consideration for removal as out growing location.	6 months or less
T002	Norway Spruce	*Picea abies*	Tree	1	16	47	4	Mature	10+ Years	2 Years	Target # - dwelling.	6	Good	1/300K	Moderate	Minor Bark Wounds, No significant observable defects. Not owned by client	Monitor Condition Removal recommended	1 Year
T003	Silver Birch	*Betula pendula*	Tree	1	21	41	9	Mature	20+ Years	2 Years	Target # - dwelling.	7	Good	1/4M	Low	Minor bark wounds vulnerable to decay not occluded. Not owned by client	No action required. Monitor condition	No Action

Ref.	Common	Botanical	Structure	Num. Stems	Height (m)	DBH (cm)	Crown Radius (m)	Life Stage	Safe Life Expectancy	Inspect Period	Description	Distance to main target (m)	Condition	RoH (Risk of Harm)	Tree Failure Potential	Survey Notes	Control Measures	Timescale
T004	Silver Birch	*Betula pendula*	Tree	1	16	39	6	Mature	20+ Years	2 Years	Target # - dwelling.	8	Good	1/4M	Low	Included main stem unions, minor bark wounds vulnerable to decay not occluded. Stub cut branches Lean to Northwest aspect. Not owned by client	No action required. Monitor condition	No Action
T005	Common Holly	*Ilex aquifolium*	Tree	10	10	20 (avg)	3	Mature	20+ Years	3 years	Target # - dwelling.	9	Good	1/4M	Low	No significant defects. Contact to overhead Low Voltage system and Communication cables. Not owned by client.	Works to be undertaken by Utilities Network	1 year

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8.0 Trees and the Law

8.1 Tree Preservation Orders and Conservation Areas

8.1.1 TPOs are administered by your 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.

8.1.2 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.

8.1.3 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.

8.1.4 To make an application to carry out works to a protected tree you will need to complete an application form and submit it to the LPA.

8.1.5 If a tree in a Conservation Area you 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 you want 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.

8.1.6 You do 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).

8.1.7 **The landowner is strongly advised to check for conservation area or TPOs in place prior to any tree mitigation works as Local Authority online data is constantly changing.**

8.1.8 Tree Preservation Order.

A preservation order is in effect and any arboricultural works will require consent from the local authority.

8.2 Felling Licences

You do not need a licence to fell trees in gardens.

8.3 Special Protected Areas (Sites of Protected Conservation Status)

There are no apparent areas of statutory protection within 50m of property.

9.0 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.

10.0 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)

[redacted]

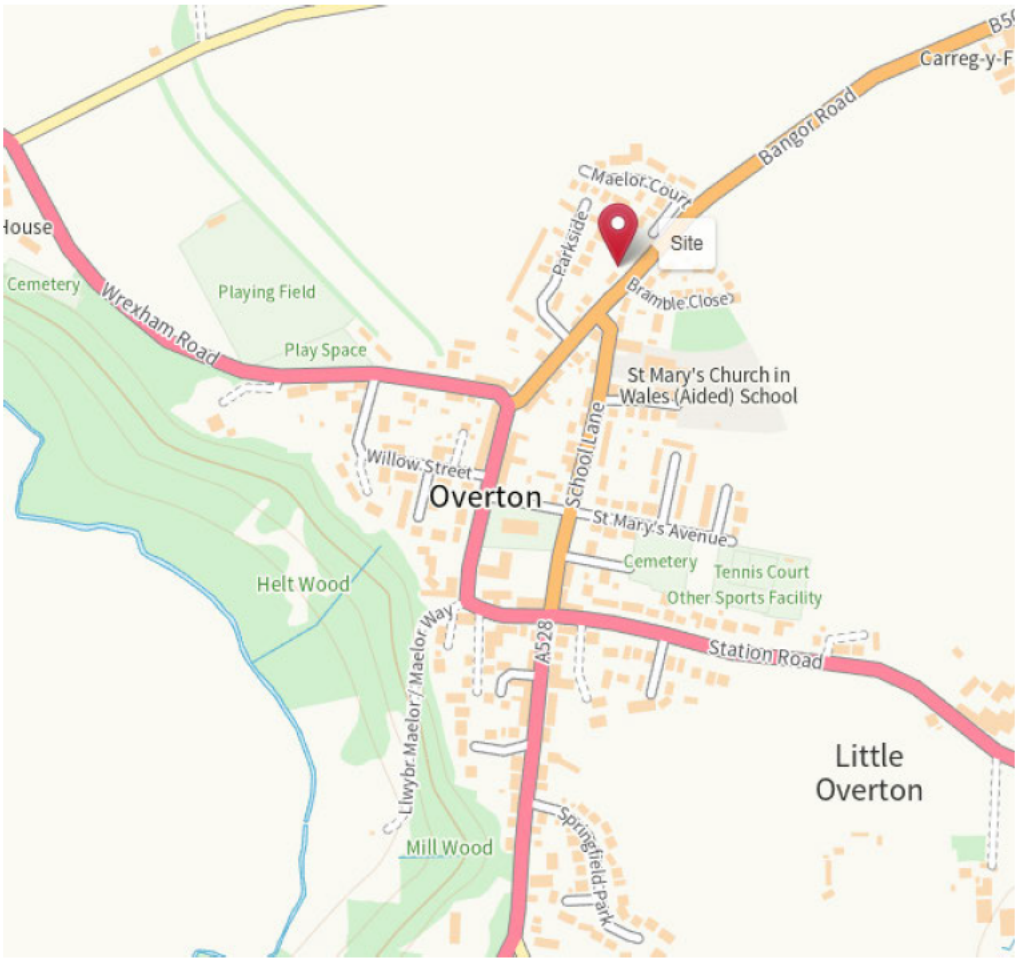
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Date: 7.09.2025

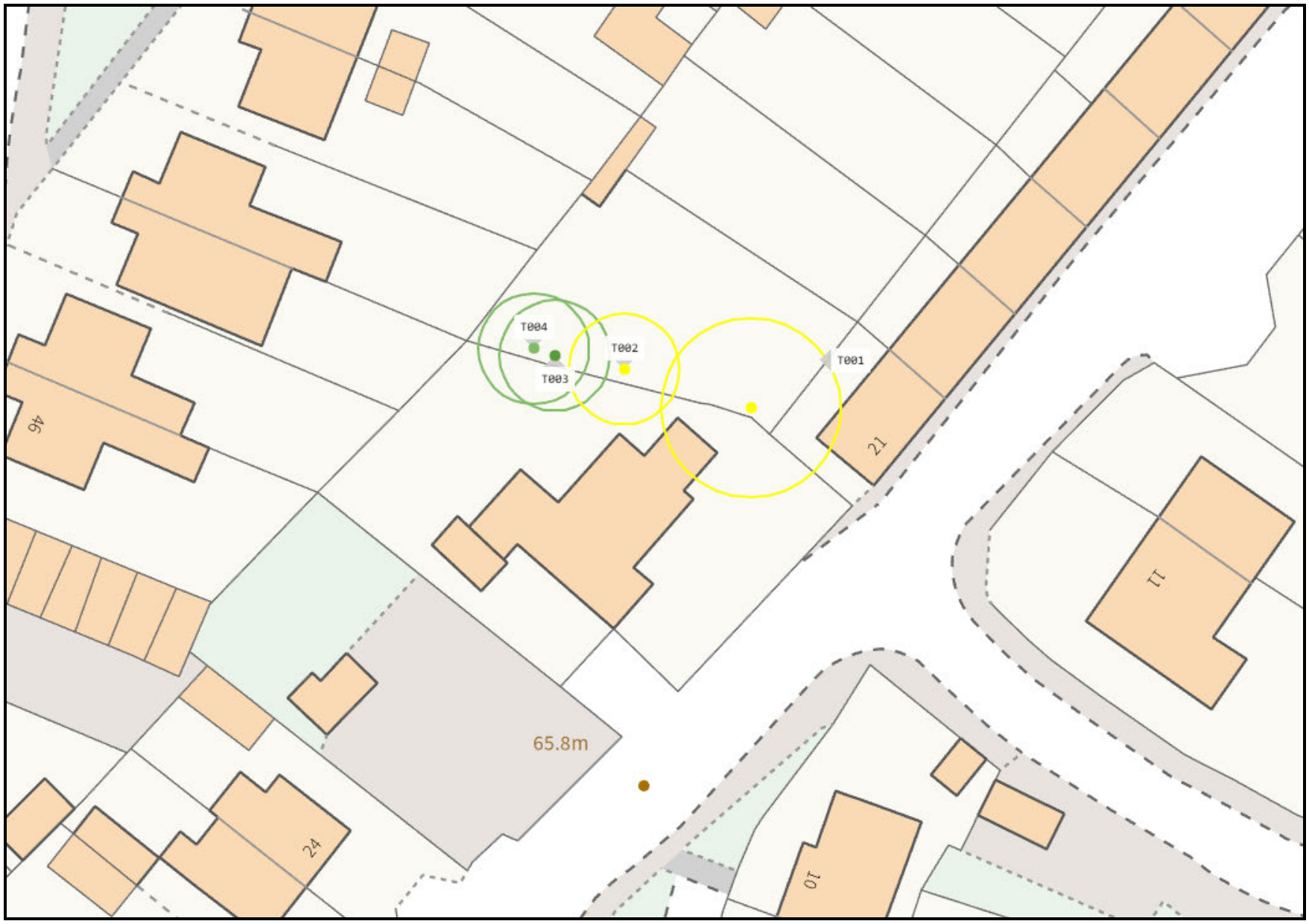
Recommended Reinspection Date: 07.9.2026

11.0 Site and Location Maps

11.1 Site Location Map (Grid Ref:) SJ374421



11.2 Site Map: Tree Locations (approximate GPS accuracy to 3m)



12.0 Glossary of Survey Terms

12.1 Tree Number

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

12.2 Tag Number

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

12.3 Species

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

12.4 Height (m)

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

12.5 DBH (cm or mm BS5837)

Diameter at Breast Height (1.5m) in centimetres.

12.6 Crown Spread Radius (m)

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

12.7 Age Class

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

12.8 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	
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

12.9. ROH (risk of Harm)

From QTRA (Quantified Tree Risk Assessment) the potential to cause harm, death or damage based on a tree physiological issues and the impact of failure.

12.10 Tree Failure Potential

An advisory when trees are outside of falling distance of a significant target hazard and QTRA identifies as low risk, but where potential for tree failure in part or whole remains.

13.0 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

CODIT (Compartmentalization of Decay in Trees)

According to CODIT, when a tree is wounded cells undergo changes to form "walls" around the wound, slowing or preventing the spread of disease and decay to the rest of the tree.

- Wall 1. The first wall is formed by plugging up normally conductive vascular tissue above and below the wound. This tissue runs up and down the length of the stem, so plugging it slows the vertical spread of decay. Tissues are plugged in various ways, such as with tylosis, polyphenolic deposits, anti-fungal substances and (in conifers) by the closure of the bordered pits linking vessel cells. This wall is the weakest.

- Wall 2. The second wall is formed by the thick-walled, lignin-rich cells of the latewood growth ring interior and exterior to the wound, thus slowing the radial spread of decay. This wall is the second weakest and is continuous except where intersected by ray cells (see next section).

- Wall 3. The third wall is formed by ray cells, which are groups of radiating cells oriented perpendicularly to the stem axis, dividing the stem into segments not entirely unlike the slices of a pie. These groups of cells are not continuous and vary in length, height, and thickness, forming a maze-like barrier to tangential spread of

decay. After wounding, some ray cells are also altered chemically, becoming toxic to some microorganisms. This is the strongest wall at the time of wounding, prior to the growth of the fourth wall.

- Wall 4. The fourth wall, known as the barrier zone, is created by new growth of specialised woody tissue on the exterior of the tree, isolating tissue present at the time of infection from subsequent growth. This is the strongest wall, and often the only one which can completely halt the spread of infection by closing the wound with new wood. When only the fourth wall remains intact, the result is something most people have seen walking through the woods or in a park: a living tree with a completely rotted-out interior. In such cases, all the tissue present at the time of injury has become infected, but new healthy tissue has been allowed to continue to grow outside of the fourth wall.

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

Appendices 14.0: BS 3998 Tree Work - Recommendations

14.1 General Guidance in Tree Management for the Client referenced from BS3998 Tree Work – Recommendations (2010) specific to the Survey Findings.

14.1.1 It is recommended that appointed Tree Surgeons should be suitably qualified and with an understanding of the long-term effects of various arboricultural pruning practices i.e., crown reduction, crown lifting etc. and the approved method of natural target pruning to minimise potential decay and avenues for pathogenic fungi. Lopping and topping is not desirable, and is strongly discouraged, as it causes extensive aerial decay and cambium dieback, preventing occlusion of bark wounds.

14.2 Minimizing Undesirable Effects of Pruning

14.2.1 The effects of pruning are influenced by many factors, of which some are related to the tree, and others to its environment or to the tools and techniques used. Potentially adverse effects include the development of disease, dieback, decay, or future structural problems.

14.2.2 The timing and extent of pruning (especially regarding the number and size of wounds should be determined by both the management objectives, and an assessment of the likely effects on the tree and its surroundings. The assessment should take account of species tolerances, the tree's age, and condition and any implications for the safety of other trees.

14.3 Species and cultivars

14.3.1 The degree of pruning should be controlled according to the ability of the species to react defensively against wounding. Members of the family Rosaceae, Eucalyptus and other species with high susceptibility to the silver-leaf fungus (Chondrostereum purpureum) should be pruned only when their starch reserves are high, following good growing conditions during summer. Except where the probability of structural failure would otherwise be unacceptably high, the following guidance should be observed when pruning species that are relatively susceptible to wound-induced decay.

• Wherever practicable, pruning should be restricted to healthy, small-diameter parts of the tree, as this will minimize the size of the resultant wounds and provide the greatest opportunity for these to be occluded.

• Species which generally have particularly weak defences against the development of decay, should be pruned as sparingly as possible and without exposing heartwood or ripewood. E.g., Birch, Beech, Horse Chestnut.

14.3.2 The shade-tolerance of the species being pruned and of any neighbouring trees should be considered, so that the tree(s) do not become excessively overshadowed by other foliage or by buildings as a result of being subjected to crown reduction (e.g., Beech (Fagus sylvatica) is more shade-tolerant than Ash (Fraxinus excelsior). Conversely, pruning should be avoided if, by the removal of shading foliage, it would expose extensive areas of thin bark (including the bark of a neighbouring tree) to a high probability of sunscorch.

14.3.4 When there is a need to prune species which tend to a proliferation of very dense growth of weakly attached shoots from around each wound, the resulting branches should be managed by cyclic cutting at appropriate intervals, or selectively pruned while time is allowed for a stronger branch structure to develop. Selective pruning of densely growing new branches is, for example, often advisable in species of Salix, Populus and Tilia.

The capacity of the species or cultivar to retain viable shoots or dormant buds on increasingly old stems and branches, and/or to produce adventitious buds, should be considered when deciding where and how much to prune so that the tree is more likely to develop new branches near all the pruning cuts.

14.4 Environmental and seasonal factors

Wherever feasible, pruning should be avoided at times when the disease- and decay-resistance of the tree is likely to be impaired by physiological stress induced by previous tree work, construction damage, or seasonal or weather-related factors, e.g., during or soon after a drought or when starch reserves have been depleted by spring flushing and flowering.

14.5 Age-related factors

Age is used as a loose term to reflect physiological condition and stage of tree development; allowances should be considered for the likely influence of the age of the tree on the outcome of pruning work.
• Very extensive wound-induced decay can develop in older trees of species that contain a large proportion of ripewood or non-durable heartwood.
• In species that are highly susceptible to particular canker diseases, older trees can be especially vulnerable to infection by the pathogens concerned. A tree could, however, survive such infection if its stem is too large to be easily girdled by the cankers.
• Mature and old trees generally have a reduced capacity to tolerate the potentially adverse effects of wounding, especially about the development of physiological dysfunction and decay.
• The older the stem or branch, the less capacity it generally has to produce new shoots from dormant or adventitious buds after pruning. The decline in this capacity varies greatly according to species.

If, due to site constraints or management objectives, there is a need to prune a tree so as to manage the size or shape of its crown, this should be started when it is young so as to reduce the need for pruning in later life

14.6 General Pruning Guidance (Crown Reductions and other pruning)

14.6.1 In order to ensure that the potentially adverse effects of pruning are avoided as far as possible cross-sectional area of the cuts individually and in total should be minimized as follows: -
• Each final cut should be kept as small as possible, e.g., by cutting at an optimum angle (natural target pruning).
• In order to select a branch for removal, **the diameter of the final cut should generally not exceed one-third of that of the parent stem or branch.** If the tree is old or declining, the maximum diameter of individual cuts should be even smaller, to allow for the relatively small proportion of sapwood and the slow rate of wound occlusion.

The number and size of cuts should generally be limited so that their total cross-sectional area does not exceed one-third of that of the stem, when measured at 1.5 m above ground level.

14.6.2 Retrenchment pruning

Retrenchment pruning is a phased form of crown reduction, which is intended to emulate the natural process whereby the crown of a declining tree retains its overall biomechanical integrity by becoming smaller

through the progressive shedding of small branches and the development of the lower crown (retrenchment). This natural loss of branches of poor vitality improves the ratio between dynamic (biologically active) and static (inactive) mass, thus helping the tree as a whole to retain good physiological function. This natural process is not, however, always sufficient to prevent trees from falling apart or from posing unacceptable risks to fixed targets (e.g., roads, pavements etc.).

14.7 Climbing plants (Common Ivy (Hedera helix))

14.7.1 The control of plants climbing on or over trees should not be a routine aspect of crown maintenance. They may, however, be removed or cut back if this is considered necessary in the light of any of the following circumstances: -
a) the plant is hindering the visual inspection of a tree that could be posing a risk to people or property by virtue of site usage and the suspected presence of weak or decaying structures.
b) the plant is growing high into the crown of a tree increasing resistance to the wind.
c) the plant is significantly weighing down a branch or a leaning tree.
d) the tree is otherwise likely to be smothered (e.g., by Clematis, Russian vine or, occasionally, ivy), especially if it is old and therefore unlikely to outgrow the climbing plant.
e) retention of the plant would be incompatible with the management objectives where trees are being managed in formal situations.
f) there is potential for dead stems of the plant to become a hazard.

14.7.2 Any form of control of climbing plants should be undertaken with care to avoid undue damage to the tree (e.g., sunscorch) and/or the wildlife that might use the habitat. If a climbing plant is to be controlled, this should be done by removing it if necessary or otherwise by periodically cutting selected stems, so as to cause them to die back.

14.8 Standing dead trees

Where standing dead trees are retained for conservation and habitat, their height should be reduced if this is required for mitigation of present or future risks. A recommended maximum height of 4.5m for Habitat monoliths should be observed and condition monitored as any live tree.

14.9 Fallen trees

Trees that have been partially uprooted may be managed so that they continue to grow. This may be achieved by means of pruning and/or artificial support. NOTE Root plates left exposed are of benefit to local habitat even if the tree dies.

When determining options for management of fallen trees, the following factors, should be taken into account:
a) safety of people or property during the work and thereafter.
b) available space, access to the site and land use.
c) soil conditions.
d) client's wishes and expectations (including cost); e) amenity or other value (e.g., wildlife value) of the tree.

Management of fallen trees should be undertaken by appropriately trained workers, because such work can be particularly hazardous.

14.10 Wildlife, Habitat and Plant health

14.10.1 Where there is evidence that bats, birds, or other protected species are present, the statutory nature conservation organization needs to be consulted before starting any work.
Arborists have a legal duty to ensure protected species, habitats and other landscape features are not damaged by their operations.
Where there is extensive ground flora, mulching of the ground layer through wood chip is not recommended.

14.11 Biosecurity

In sites where active tree pathogens are present e.g., Phytophthoras, Ash Dieback etc, arborists should maintain strict biosecurity in respect of industry guidelines, to prevent further spread of pathogens to other parts of the site and general area.