Tree Risk Management Appraisal

of Horse Chestnut Tree T3 and Sycamore in Group G1 in Consideration of Outcome of Aerial Inspection at

St Mary's Church Graveyard, Longridge Road, Chipping, Lancashire, PR3 2QD

Prepared by:

Bowland Tree Consultancy Ltd

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TREE RISK MANAGEMENT APPRAISAL
ST MARY'S CHURCH GRAVEYARD, CHIPPING

Project Details

Project No.: BTC1675

Site: St Mary's Church Graveyard, Chipping, PR3 2QD

Survey Type: Aerial Inspections of Two Trees

Tree(s) Considered: One Horse Chestnut and one Sycamore

Client: St Mary's Church

Survey Date: 6 March 2019

Surveyor: Elizabeth Thompson BSc(Hons) TechArborA

Climber: Tony Shaw

Report Prepared by: Elizabeth Thompson BSc(Hons) TechArborA & Phill Harris MSc BSc(Hons) HND MArborA CEnv MICFor

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Date of Issue: 27 March 2019

QTRA METHODOLOGY OVERVIEW AND APPLICATION IN MANAGEMENT DECISIONS

The QTRA methodology utilised quantifies the three components of tree failure risk, which are:

i. *Target* (i.e. something having potential to be harmed and/or damaged by the mechanical failure of trees);
ii. *Impact Potential*; and
iii. *Probability of Failure* (within the coming year).

The product of the three component values is the annualised 'Risk of Harm', which is a combined measure of the likelihood and the consequence of tree failure considered in terms of the loss within the coming year, and is expressed as a probability. In applying the 'Tolerability of Risk Framework' (ToR) the QTRA methodology divides the 'Risk of Harm' into three threshold values, being;

1. *Unacceptable* (i.e. >1/1,000), which is unacceptable and will not ordinarily be tolerated;
2. *Tolerable* (i.e. between 1/1,000,000 and 1/1,000, where the Risk of Harm will be tolerable if it is As Low As Reasonably Practicable (ALARP); but a Risk of Harm 1/10,000 or greater will not ordinarily be Tolerable where it is imposed on others, such as the public. In the Tolerable range management decisions are informed by consideration of the benefits and costs of risk control, including benefits provided by trees that would be lost to risk control measures; and
3. *Broadly Acceptable* (<1/1,000,000), which is already ALARP.

The QTRA advisory thresholds, (see Table 1, below) are proposed as a reasonable approach to balancing safety from falling trees with the costs of risk reduction. This approach takes account of the principles of ALARP and ToR, but does not dictate how these principles should be applied. While the thresholds can be the foundation of a robust policy for tree risk management, tree managers should make decisions based on their own situation, values and resources.

Table 1: QTRA Advisory Risk Thresholds:

Threshold	Description	Action
Risk of harm of 1/1,000 or greater	**Unacceptable** - Risks will not ordinarily be tolerated	▪ Control the risk
Risk of harm between 1/1,000 and 1/10,000	**Unacceptable** (where imposed on others) - Risks will not ordinarily be tolerated	▪ Control the risk ▪ Review the risk
	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 ▪ Review the risk
Risk of harm between 1/10,000 and 1/1,000,000	**Tolerable** (where imposed on others) - Risks are tolerable if ALARP	▪ Assess costs and benefits of risk control ▪ Control the risk only where a significant benefit might be achieved at reasonable cost ▪ Review the risk
Risk of harm less than 1/1,000,000	**Broadly Acceptable** - Risk is already ALARP	▪ No action currently required ▪ Review the risk

As detailed in the Table a Risk of Harm less than 1/1,000,000 is Broadly Acceptable and already ALARP (i.e. 'as low as reasonably practicable'). A Risk of Harm 1/1,000 or greater is unacceptable and will not ordinarily be tolerated. Between these two thresholds, the Risk of Harm is in the Tolerable region of the ToR Framework and will be tolerable if it is ALARP, but a Risk of Harm 1/10,000 or greater will not ordinarily be Tolerable where it is imposed on others, such as the public. Here, management decisions are informed by consideration of the benefits and costs of risk control, including benefits provided by trees that would be lost to risk control measures.

In respect of the above the assessor (i.e. Bowland Tree Consultancy Ltd) may consider the costs of risk control when providing options for management if specifically asked to do so, but the tree owner/manager, who owns the risk and therefore exercises control over the costs, must consider the balance and make the final management decision(s).

SUMMARY OF AERIAL INSPECTION FINDINGS

Further to the initial tree risk management survey, carried out by Phill Harris on 13 November 2018, and resultant of the subsequent report issued on 23 November, aerial inspections were carried out to two trees at the site under consideration on 6 March 2019.

The trees in question are post-mature Horse Chestnut T3 and an early-mature Sycamore in group G1. The aerial inspections were undertaken as the initial ground based survey identified that both evidently had defects to their primary branches in the form of cavities (please refer to previous report of November 2018 for specific details regarding identified defects).

The aerial inspections were undertaken by climbing arboriculturist Tony Shaw, under the guidance of consulting arboriculturist Liz Thompson, and the cavities on both trees were inspected by Mr Shaw to investigate the extent of the decay. In turn, the findings of the aerial inspections were utilised by Phill Harris and Liz Thompson to reconsider the structural condition of the parts of the trees that were inspected, and to subsequently re-evaluate the trees' QTRA calculations.

The aerial inspection of Horse Chestnut tree T3 showed that, due to past pruning events, the structural stability of the western primary branch has evidently been significantly compromised by a large cavity of approximately 350mm diameter and 600mm depth, with associated extensive decay, and a resultant relatively high probability of failure (see QTRA calculation in appended TSS).

In turn, the tree's recalculated QTRA risk threshold now falls within the 'unacceptable (where imposed on others)' range of between 1/1,000 and 1/10,000 (see Table 1, previous page for more detail in this respect). As such, it is essential that risk management works are carried out to the tree in question in order to reduce the risk that it presents to at least a 'tolerable' level.

Subsequently, the cheapest short-term option for reducing the risk that the tree presents to a tolerable level would be to prune it to remove the defective branch. However, there are various associated long-term considerations that need to be considered with regard to this option, being:

1. that the size of the result pruning wound would be significant enough to potentially result in a new cavity, with the formation of associated decay, forming at the pruning point, thereby resulting in the development of a new and potentially more significant structural defect to the stem;
2. that such major pruning works are projected to substantially reduced the tree's mass damping abilities (i.e. its ability to effectively redistribute wind loads down through its branches, stem and roots, thereby placing increased stresses and resultant strains on its stem and structural roots);
3. that if the pruning and retention option is selected then it will be essential to have the tree re-inspected on a regular basis (e.g. every 12 months) which, in turn, has associated cost implications; and
4. that the tree is approaching the end of its safe useful life and, as such, its removal will subsequently likely be necessary within the coming decade or so irrespective of the necessary risk management pruning.

The second option, which would be much costlier in the short-term, but would abate all future risk presented by the tree and, in turn, all costs associated with its retention (e.g. cyclical inspections, further pruning, etc.), is to remove the tree completely.

In consideration of the above it is therefore important that the stakeholders consider the options presented, along with the associated risks and costs, and make a definitive decision regarding the management of Horse Chestnut tree T3.

The aerial inspection of the Sycamore tree in group G1 indicated that it has six cavities to its primary branches, but that the cavities are relatively shallow and the associated decay is evidently restricted. As such, although the defects are projected to have affected the overall structural stability of the branches in question, they are not currently considered significant enough to have increased the probability of branch failure to a sufficiently high level to have a major impact on the tree's overall risk of harm calculation. In this respect, the tree's recalculated QTRA risk threshold remains within the 'tolerable' range of between 1/10,000 and 1/1,000,000 (see Table 1, previous page for more detail in this respect).

Nonetheless, in consideration of the ages and sizes of the trees as a whole, and the associated targets (e.g. persons attending church, parked vehicles, etc.) it is strongly advised that all the retained trees, other than Horse Chestnut tree T3, which is discussed above, be re-inspected on a cyclical programme of roughly every

18 months, so that they can be alternately viewed whilst both in and out of leaf in order to monitor both their structural and physiological condition and, consequently, for the site owners and occupiers to meet their duty of care. In turn, it is recommended that the next cyclical inspection be carried out during spring/summer 2020.

Site:	St Mary's Church Graveyard, Longridge Road, Chipping, Lancashire, PR3 2QD
Client:	St Mary's Church
Brief:	March 2019: Climbing arboriculturist to carry out aerial inspection of cavities to primary branches of group G1 Sycamore and T3 Horse Chestnut in order to appraise potential effects on structural stability, and report findings to tree consultant, who is then to reconsider risk assessment

Surveyors:	Phill Harris & Liz Thompson
Survey Date:	6 March 2019
Viewing Conditions:	Heavy clouds, light wind & showers
Job Reference:	BTC1675

No.	Species	Age	Height (m)	Stem Diam. (mm)	Crown Spread (m)	Vital-ity	Comments	Management Recommendations	Risk Assessment Description (Part/Target)	Target	Size	P.O.F	Reduced Mass %	Risk Index	Work Priority
T3	Common Horse Chestnut	PM	23	1300	13	G	▪ Several rapid adaptive growth increment strips extending up length of stem to east. ▪ Number of dense areas of adventitious growth to stem, evidently resultant of past pruning events. ▪ Stem bifurcates at a height of approximately 4m. ▪ Largest primary branch bifurcates at a height of approximately 8m, and has a rapid adaptive growth increment strip extending below union down to ground level. ▪ Western primary branch evident previously extensively pruned with resultant pruning wounds and associated cavities to approximately 350mm diameter – wounds and cavities not inspected in details, but one is evidently resultant of a previously failed branch. ▪ Due to its age, form and structure, tree is considered to have a relatively short remaining life expectancy. ▪ *Climbing arboriculturist carried out aerial inspection of cavities to western primary branch, under guidance of tree consultant Liz Thompson, on 6 March 2019 – see report for more information in this respect.*	▪ *Options:* *a. Prune tree to remove defective branch and, in turn, reduce risk to a tolerable level; or* *b. Remove tree and, in turn, reduce risk to a tolerable level.* *Note: see report for more information with regard to the implications of the management options detailed above.*	*P: Upper primary branch ≤450mm diameter.* *T: Neighbouring properties to west.*	*3*	*P*	*2*	*N/A*	*3K*	*H*
G1	3no. Sycamore, 2no. Beech	EM-M	≤ 23	≤ 900	≤ 14	G	▪ Moderately spaced group, with trees located close to boundary to neighbouring properties, access road to church and associated properties, and Longridge Road. ▪ Dense ivy up stem and branches of Sycamore that is located at road frontage. ▪ Sycamore internal to graveyard evidently has several large decay cavities up to 400mm diameter to primary branches. ▪ *Climbing arboriculturist carried out aerial inspection of branch cavities to pertinent Sycamore, under guidance of tree consultant Liz Thompson, on 6 March 2019 – see report for more information in this respect.*	▪	*P: Sycamore branches with cavities ≤300mm diameter.* *T: Pedestrians using neighbouring Longridge Road.*	*2*	*2*	*4*	*N/A*	*100 K*	*N/A*

HEADINGS & ABBREVIATIONS

NO. TREE/GROUP REFERENCE NUMBER. REFER TO PLAN OR NUMBERED TAGS WHERE APPLICABLE
SPECIES: COMMON NAME
AGE: Y = YOUNG, SM = SEMI MATURE, EM = EARLY MATURE, M = MATURE, PM = POST MATURE
HEIGHT: APPROXIMATELY 80% OF TREES ARE MEASURED USING AN ELECTRONIC CLINOMETER AND THE REMAINDER ESTIMATED AGAINST THE MEASURED TREES
DIAMETER: STEM DIAMETER MEASURED OR ESTIMATED AT A HEIGHT OF APPROXIMATELY 1.3 METRES
CROWN SPREAD: MEASURED OR ESTIMATED DIAMETER OF CROWN(S) AT THE WIDEST POINT
VITALITY: A MEASURE OF PHYSIOLOGICAL CONDITION WHEREBY D = DEAD, MD = MORIBUND, P = POOR, M = MODERATE, G = GOOD
MANAGEMENT: SUFFIXES: (M) = FOR GENERAL ARBORICULTURAL OR SILVICULTURAL MANAGEMENT; (S) = TO REMOVE OR REDUCE THE RISK OF DIRECT DAMAGE TO A FIXED STRUCTURE BY MEANS OF CIRCUMFERENTIAL ROOT, STEM OR BRANCH GROWTH
TARGET RANGE: HIGHEST VALUE TARGET THAT THE MOST SIGNIFICANT PART LIKELY TO FAIL COULD STRIKE. RANGES 1-6. 1 = HIGH, 6 = LOW VALUE/OCCUPANCY
RISK ASSESSMENT DESCRIPTION: DESCRIPTION OF PART IDENTIFIED AS MOST LIKELY TO FAIL AND ASSOICATED TARGET, ASSESSED IN ACCORDNACE WITH QTRA SYSTEM
SIZE RANGE: SIZE CATEGORY OF MOST SIGNIFICANT PART CONSIDERED LIKELY TO FAIL. - RANGES 1-4 WHEREBY 1 = LARGE, 4 = SMALL, P = PROPERTY
P.O.F: PROBABILITY OF FAILURE WITHIN 12 MONTHS. RANGES 1-7. 1 = HIGH, 7 = LOW
REDUCED MASS %: WHERE THE MASS OF A TREE OR BRANCH IS REDUCED BY DEGRADATION THE RISK INDEX IS MULTIPLIED TO REFLECT THE PERCENTAGE OF MASS REDUCTION
RISK INDEX: E.G. RISK INDEX 20 = RISK OF SIGNIFICANT HARM 1 IN 20,000. AN ADDITIONAL FIGURE, IN BRACKETS, MAY BE SUFFIXED 'T' REPRESENTING THE RATE OF MULTIPLE OCCUPATION OVER THE YEAR, E.G. 10(10T) REPRESENTS A RISK OF HARM 1/10,000 TO 10 OCCUPANTS OR AN EQUIVALENT MONETARY VALUE. SEE QTRA PRACTICE NOTE FOR MORE INFORMATION REGARDING COLOURS USED TO SIGNIFY RISK INDEX
WORK PRIORITY: H (HIGH) = TREE WORKS TO BE GIVEN IMMEDIATE CONSIDERATION. M (MODERATE) = TREE WORKS TO BE CARRIED OUT WITHIN 12 MONTHS OF SURVEY (TIMING MAY BE SPECIFIED IN MANAGEMENT RECOMMENDATIONS). L (LOW) = TREE WORKS THAT ARE NOT CONSIDERED ESSENTIAL FOR RISK MANAGEMENT PURPOSES, BUT ARE RECOMMENDED IN ACCORDANCE WITH PRUDENT ARBORICULTURAL MANAGEMENT (TO BE REVIEWED IN 12 MONTHS, OR SPECIFIED TIME, IF APPLICABLE). N/A = NO WORKS RECOMMENDED

DISCLAIMER

Survey Limitations: Unless otherwise stated all trees are viewed from ground level using non-invasive techniques. The disclosure of hidden crown and stem defects, in particular where they may be above a reachable height or where trees are ivy clad or in areas of ground vegetation, cannot therefore be expected. All obvious defects, however, are reported. Where the QTRA Risk Index is calculated as Tolerable or Broadly Acceptable, but the tree(s) have not been adequately inspected (e.g. due to the presence of ivy and/or ground vegetation which impeded the inspection), then it is essential to follow the recommendations made in the Management Recommendations column and to have the applicable tree(s) re-inspected as recommended.

Detailed tree safety appraisals are only carried out under specific written instructions. Comments upon evident tree safety relate to the condition of said tree at the time of the survey only. The level of detail of the survey is as per the brief detailed on the Tree Survey Schedule and as per the specifics set out in the associated fee estimate for the project.

Unless otherwise stated all trees should be re-inspected annually in order to appraise their on-going mechanical integrity and physiological condition. It should, however, be recognised that tree condition is subject to change, for example due to the effects of disease, decay, high winds, development works, etc. Changes in land use or site conditions (e.g. development that increases access frequency) and the occurrence of severe weather incidents are also significant considerations with regards tree structural integrity and trees should therefore be re-assessed in the context of such changes and/or incidents and inspected at intervals relative to identified and varying site conditions and associated risks.

Where trees are located wholly or partially on neighbouring private third-party land then said land is not accessed and our inspection is therefore restricted to what can reasonably be seen from within the site. Any subsequent comments and judgments made in respect of such trees are based on these restrictions and are our preliminary opinion only. Recommendations for works to neighbouring third-party trees are only made where a potentially unacceptable risk to persons and/or property has been identified during our survey. Where significant structural defects of third-party trees are identified and associated management works are considered essential to negate any risk of harm and/or damage then we will first attempt to inform the site occupier of the issues and, if not possible, then inform the relevant Council. Where a more detailed assessment is considered necessary then appropriate recommendations are set out in the Tree Survey Schedule.

The potential influence of trees upon existing or proposed buildings or other structures, resulting from the effects of their roots abstracting water from shrinkable load-bearing soils, is not considered herein.

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