



THE TREE AND
WOODLAND COMPANY

Adderbury Lakes
Adderbury Parish Council
Oxfordshire

Tree Survey Report

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TWC1300-R-001

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1.0 Introduction

- 1.1 Adderbury Lakes are owned and managed by Adderbury Parish Council and is a designated Local Nature Reserve. It consists of two interconnected lakes fed by local streams and springs that connect to Sor Brook to the South. The Lakes were created in the mid nineteenth century by the owner of Adderbury House which is situated at the main entrance to Lake Walk. The lakes formed part of an ornamental garden which include lakeside paths, small stone buildings (i.e. the Boathouse on the upper lake and Summerhouse next to the lower lake) and ornamental trees and shrubs.
- 1.2 We have been instructed by Adderbury Parish Council to undertake a tree survey at Adderbury Lakes. The principal aim of the survey is to satisfy the owner's legal 'duty of care' to ensure trees are properly managed and that people and property are not exposed to unreasonable levels of risk from failure of trees.
- 1.3 In addition to assessing tree risk, the survey recorded and mapped all trees at Adderbury Lakes, which included notable mature trees and numerous tree groups. This full survey provides suitable detail to enable a consistent approach for future surveys and can assist overall tree management planning for the future.
- 1.4 We understand that there is a balance to strike between satisfying legal obligations, minimising cost of work and preserving trees in the landscape. Our approach to tree hazard management fulfils these criteria and is based on the Quantified Tree Risk Assessment (QTRA) method which has been used as the framework for carrying out the tree hazard survey.
- 1.5 All trees and groups have been plotted on a location plan (Appendix 4; Drawing No. 1300-D-001) and are listed in the Tree and Group Survey Schedules (Appendix 2 & 3; 1300-S-001 & 002).
- 1.6 Remedial action is recommended for hazard trees, to bring the risk of harm or damage within acceptable limits. The remedial tree work recommendations are indicated in the survey schedule and summarised in Table 2 (Section 3). General tree management recommendations have also been made to aid long term management objectives relating to recreation, landscape, and nature conservation (Table 3. Section 3).
- 1.7 A re-inspection programme is recommended for the trees (Section 4.0).

2.0 Survey and Methodology

- 2.1 The inspection of the trees was undertaken over two days during October/November 2020 by Richard O’Shea who holds the formal qualification FdSc Arboriculture and the LANTRA Certificate in Professional Tree Inspection. Richard is also a licensed user of the QTRA system and a professional member of the Arboricultural Association.
- 2.2 Trees are inspected for potentially hazardous parts using ‘VTA’ (Visual Tree Assessment), a system devised by Mattheck & Breloer and subsequently adopted as the industry standard.
- 2.3 The method of risk assessment used is the Quantified Tree Risk Assessment (QTRA) system which applies established and accepted risk management principles to tree safety management. QTRA provides a framework for the assessment of three components of tree-failure risk:
- The Target (i.e. people, vehicles or buildings)
 - The Probability of Failure of the hazard part
 - The Impact Potential of the hazard part if it fails
- 2.4 By evaluating the target and trees as explained above, it is possible to calculate a risk of harm index for each hazard tree which can then be compared to advisory levels of risk acceptability (see Table 1 below). This approach enables the tree surveyor and owner/manager to make an informed decision on the need to carry out remedial work on the tree to minimise the likelihood of failure and of consequent harm being caused.

Risk Thresholds	Description	Action
1/1 000	Unacceptable Risks will not ordinarily be tolerated	<ul style="list-style-type: none"> • Control the risk
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	<ul style="list-style-type: none"> • Control the risk • Review the risk
1/10 000	Tolerable (by agreement) Risks may be tolerated if <ul style="list-style-type: none"> • those exposed to the risk accept it, or • the tree has exceptional value 	<ul style="list-style-type: none"> • Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value • Review the risk
	Tolerable (where imposed on others) Risks are tolerable if ALARP	<ul style="list-style-type: none"> • Assess costs and benefits of risk control • Control the risk only where a significant benefit might be achieved at a reasonable cost • Review the risk
1/1 000 000	Broadly Acceptable Risk is already ALARP	<ul style="list-style-type: none"> • No action required currently • Review the risk

Table 1. Risk of Harm Advisory Thresholds – Informing Management Decisions

- 2.5 The 'Target Range' for the survey area was based on our assessment of occupancy of pedestrians within proximity of trees and Target Range 3 was mainly used to inform our survey. Although a Target Range is selected for each path/area/property, it may vary depending on the defective part of tree and its actual location in relation to the target.
- 2.6 For a full description of the QTRA methodology and criteria used please refer to Appendix 1.
- 2.7 All the recorded trees and groups have been given an identification reference T1-T67 and G1-G20 which are detailed in the survey schedules (Appendix 2 & 3) and shown on the location plan (Appendix 4). For further clarification on site, numbered metal tags have been affixed to trees with corresponding numbers. Groups have not been tagged but they should be straightforward to identify from the map and schedule information. If there is any doubt please clarify with us prior to the work.

3.0 Findings and Conclusions

3.1 A total of 67 individual trees (T1-T67) and 20 groups (G1-G20) have been recorded and mapped. The individual trees consist of notable mature landscape trees which include Oriental Plane, Beech, Ash, Sycamore, Alder, Cedar of Lebanon, Yew and Douglas Fir. Many of these trees date from the late nineteenth to early twentieth century, the oldest tree being an Oriental Plane (T22) which is estimated to be around 180-200 years old. Some of the other individual trees recorded are trees that require remedial work and are not necessarily notable mature trees. The tree groups make-up the remaining tree population which include mixed native and ornamental tree species along with broadleaved and evergreen understorey.

Hazard Tree Works

3.2 All hazard tree work recommendations are listed in the Survey Schedules (Appendix 2 & 3) which detail the work required and the priority for implementing it. Where further detailed inspection has been recommended to assess a specific defect (i.e. Aerial inspection, decay detection equipment) or due to survey restrictions (i.e. ivy, epicormic growth) a provisional QTRA risk of harm has been calculated. The QTRA risk of harm will need to be re-evaluated following the conclusions of the detailed inspection. Table 2. below provides a quick reference summary of the recommended hazard tree works required.

Table 2: Hazard tree work summary

Work item	Work Priority		
	High	Medium	Low
Remove/reduce defective branches and deadwood	-	G7	T9, T19, T28, T44
Fell/monolith	-	T67	T46
Crown reduction	-	T43, G12	-
Ivy removal	-	-	T33
Detailed decay detention test (Picus Tomograph, Resistograph)	-	T22	-

3.3 In summary there are 0 high priority works, 5 medium priority works and 6 low priority work recommendations.

3.4 The following information highlights the proposed timescale for carrying out the recommended remedial works.

Work priority

Urgent Carry out work as soon as possible and prevent access to area

High Carry out work within 3 months of the date of this report

Medium Carry out work within 1 year of the date of this report

Low Carry out work within 2-3 years of the date of this report

- 3.5 High priority works are for trees that present an Unacceptable Risk of Harm (RoH) of 1/10K or greater (Refer to Advisory Risk Thresholds) and must be carried out to reduce the RoH to a more Tolerable or Broadly Acceptable level.
- 3.6 Medium priority works are within the higher end of the Tolerable region of the Advisory Risk Thresholds i.e. 1/40K to 1/100K and should be carried to out to reduce the RoH to a lower Tolerable or Broadly Acceptable level.
- 3.7 Low priority works are due to their calculated risk of harm being at the lower end of the Tolerable region of the Advisory Risk Thresholds i.e. 1/300K – 1/1M and considered As Low As Reasonably Practicable (ALARP), or being Broadly Acceptable i.e. > 1/1M. Some of the work is considered to be relatively straightforward and at a low monetary cost (i.e. selective branch removal, deadwood removal, ivy severance) but some of the work will be more costly and challenging (i.e. felling, crown reduction). The decision to carry out the low priority work will be based on budget resource and consideration of the benefits of the risk control by the owner/manager. The arboriculturalist can assist in relation to specific works recommendations where requested.

General Management Works

- 3.8 In addition to the remedial tree hazard work we provide recommendations for general tree management which include works to individual trees and groups. The work for individual trees includes improving tree form or maintenance pruning, and work recommendations for groups include removal of self-sown regeneration, thinning and pruning to manage poor quality trees, and to improve canopy structure and biodiversity. Table 3. provides a quick reference summary of the recommended management works.

Table 3: General management work summary

Work item	Work Priority		
	High	Medium	Low
Trees	-	-	T10, T11, T12, T13, T25, T41, T42, T50, T51, T60, T61, T64
Groups	G2, G4, G7	G1, G3, G8, G13, G14, G16, G19	G5, G10, G17

Work priority

- 3.9 The following information highlights the proposed timescale for carrying out the general management work recommendations. The works have been broadly prioritised to assist in forward planning, but these may be altered to meet budgets, volunteer resource and other management objectives.

High Carry out work within 1-2 years.

Medium Carry out work within 3-4 years

Low Carry out work in 5+ years

- 3.10 To assist in budgeting and resource management, we have included an estimate of days to complete the work. For the tree surgery operations; the estimate is based on a two-person team. For the smaller ground-based works; the estimate is based on a two-person landscape contractor team or a larger group of volunteers. The number of days required for the works is likely to be variable depending on whether landscape contractors or volunteers can carry out the work, but the estimate will hopefully provide a general guide to assist planning.
- 3.11 For detail of the work specifications for each Tree and Group and priority timescales refer to the schedules at Appendix 2 and 3.
- 3.12 All tree surgery works should be carried out in accordance with the British Standard 3998: 2010, 'Tree Work – Recommendations' or current recognised best practice in the industry.
- 3.13 All recommended hazard related works should be carried out within the timescales identified in the report. A written record should be kept of the survey work done and implementation of the recommended works.
- 3.14 We recommend that we are contacted by the tree/landscape contractor or the volunteer group to discuss any of the more complex works, and a site meeting can be arranged to go through the work specifications in more detail.

4.0 Re-inspection Programme

- 4.1 Trees should be subject to regular inspection but on a timescale that is reasonable and proportionate to the actual risk they pose. Based on our evaluation of the tree stock, potential targets and levels of usage, the following recommendations are made for the future inspection programme. To carry out a ground level inspection of all trees adjacent the surveyed routes every 2-3 years from the date of this report.
- 4.2 The recommended remedial works resulting from all inspections should be carried out within the timescales specified. A written record should be kept of the survey work done and implementation of the recommended works, including the outcome of aerial inspections and detailed decay detection tests.
- 4.3 In addition to the above, a systematic check should be carried out on priority access routes/areas following severe weather i.e. high winds, heavy rain or snow falls. A basic visual check can be undertaken by an member of the Parish Council and any defects reported to the Parish Council Clerk/Chairman. Defects likely to be encountered include broken and hanging branches, cracks, split forks, and unstable trees or parts of trees. Once reported, a qualified tree surgeon should be contacted to action any necessary work and/or further advice sought from a qualified arboriculturalist.
- 4.4 Where it is deemed suitable it would be beneficial to alternate winter and summer surveys as this will enable better assessment of structural condition and presence of annual fungal fruiting bodies during the autumn/winter months, and better assessment of physiological condition in the summer months. The arboriculturalist can provide further guidance where required.
- 4.5 It is recommended that a short follow up survey in conducted in the late spring/early summer 2021 to gain better access to groups G9 and G17 and to view the canopy health of trees.
- 4.6 Tree pests and diseases are part of a balanced ecosystem and dead, dying, and diseased wood is a natural process providing an important contribution to habitat biodiversity. However, in recent years there have been an increasing number of new and serious pests and diseases affecting tree populations across the UK, and regular monitoring is essential to check for their presence. Chalara dieback of Ash, Acute/Chronic Oak Decline, *Dothistroma* needle blight, Horse Chestnut Bleeding Canker and *Phytophthora kernoviae* and *ramorum*, are now widely established. Ash trees with symptoms of Chalara Ash dieback have been observed during the survey which include branch dieback, diamond-shaped lesions, and necrosis of stalks with desiccation of leaflets.
- 4.7 These diseases can kill or weaken trees quite rapidly, and it is important that the current re-inspection programme continues to provide regular monitoring of pests and diseases to inform tree management decisions over the coming years. If members of the public or volunteers notice any rapid or irregular changes in tree health, such as unseasonal defoliation or leaf/needle discolouration it is recommended that it is reported to a qualified arboriculturist to provide management guidance.
- 4.8 The Forestry Commission website gives very useful information on symptoms of tree diseases and control measures, as well as Biosecurity guidelines (see www.forestry.gov.uk/biosecurity). It is essential that the correct procedures and control measures are followed if any significant diseases are found.

5.0 Report Limitations

- 5.1 Trees are dynamic living organisms, whose health and condition can be subject to rapid change, depending on a number of external and internal factors. The conclusions and recommendations contained in this report relate to the trees at the time of inspection. It should be noted that any tree, irrespective of its health or condition, can be subject to a major failure given sufficiently severe weather conditions.
- 5.2 This inspection procedure is of a preliminary nature and from ground level only, using binoculars, a sounding mallet, and a metal probe where necessary. No invasive tests were undertaken, and no trees were climbed. If further investigation is considered necessary (e.g. use of decay detection technology, aerial inspection), this is highlighted in the hazard tree survey schedule.
- 5.3 Actionable defects may have gone undetected where trees are heavily ivy-clad, with dense epicormic growth, surrounded by impenetrable vegetation, or inaccessible due to adjacent features.
- 5.4 The scope of this survey is limited to trees within the area on drawing 1300-D-001. Any trees outside this area are not included within the scope of this report.
- 5.5 This survey is based on the Quantified Tree Risk Assessment system, and the aim is to bring the risk of harm posed by hazardous trees **within acceptable limits** in accordance with the Health and Safety Executive guidance on risks imposed on the public 'in the wider interest' (HSE 1996). Complete eradication of risk is therefore not the goal, as this would involve total removal of the mature tree population. This approach is in line with the legally established concept of the landowner's duty to take **reasonable** action to bring the risk of harm to within acceptable limits. See tables in Appendix 1 which illustrate the QTRA risk thresholds that are used to inform management decisions.

6.0 Statutory Obligations

Tree Preservation Orders [TPO's], Conversation Areas [CAs] and Felling Licences.

- 6.1 Works to trees which are covered by Tree Preservation Orders [TPOs] or are within a Conservation Area [CA] require permission or consent from the Local Planning Authority [LPA]. Consent for felling imminently dangerous trees is not required under the above legislations, however, before carrying out any works, it is strongly advised to explain the intended works to the Local Planning Authority (LPA) and to ascertain if any trees are protected. The removal of deadwood is exempt from 'The Town and Country Planning (Tree Preservation) Regulations 2012', but notice must be given to the LPA at least five working days prior to the date on which the works are to commence.
- 6.2 Adderbury Lakes is within Adderbury Conservation Area and any trees with a stem diameter of 75mm or more measured at 1.5m above ground level will be protected and permission will be required by the LPA prior to undertaking tree work. The LPA should be contacted to confirm whether there are any trees subject to a Tree Preservation Order.
- 6.3 The Forestry Authority should also be informed if more than 5 cubic metres of timber in any one calendar quarter is being felled. A felling license will normally be required in this situation.

Wildlife & Countryside Act 1981/Countryside and Rights of Way Act 2000

- 6.4 Trees are a potential habitat for nesting birds and roosting bats and it is a criminal offence under normal circumstances to disturb or destroy - whether intentional or unintentional - the nesting or roost sites of bats. They are afforded protection under the 'Wildlife & Countryside Act 1981' and the 'Conservation of Species and Habitats Regulations 2010'. Therefore, avoid carrying out significant tree works during the bird nesting season [March 1st to July 31st] and ensure that trees are professionally surveyed for signs of bat roosts and/or bat activity before starting any tree work.

APPENDIX 1

The QTRA System, Survey Criteria and Glossary of Terms

QTRA Survey Methodology

The Quantified Tree Risk Assessment system (QTRA) provides a framework for the assessment of three components of tree-failure risk:

- Target Value
- Probability of Failure of hazardous trees
- Impact Potential of hazardous trees

For the purposes of this survey

- 'Target value': Target Value is normally based on the level of occupancy within the target area of a hazard tree (number of vehicles or pedestrians per hour averaged over a 24 hour period, i.e. total annual number of vehicles or pedestrians divided by total number of hours in the year; or monetary value of property) and ranges from Target 1 (Very High) to Target 6 (Very Low).
- To determine appropriate 'Target Ranges' for public highways the traffic data is sourced from the Department for Transport (DfT), which provides a basis for our understanding of the number of vehicles travelling along the surveyed routes. Where no data is available an estimation of the average daily traffic flow is based on our general understanding of the surrounding network and figures obtained from the DtF.
- Pedestrian usage of rights of way and public thorough fares are based on information supplied by the client in regards of visitor numbers and/or our experience of surveying similar pedestrian routes.
- Property value estimates are based on our general understanding of property value prices. When evaluating the exposure of property, the assessment considers the cost of repair or replacement that might result from failure of the tree.
- 'Probability of failure' (PoF) is worked out by evaluation of the hazard tree or part of the tree against a benchmark of either a non-compromised tree at PoF Range 7 ($>1/1M$), or a tree or branch that is certain to fail at PoF Range 1 ($1/1 - >1/10$) within the coming year. The assessor decides if the tree under assessment is 10, 100, 1000 etc. times more likely to fail than a non compromised tree or if it is 10, 100, 1000 etc times less likely to fail than a substantially compromised tree. Experienced and qualified Arboriculturalist need to make this decision.
- 'Impact potential' is based on the size and weight of the hazard tree or part of the tree. Since there is a direct relationship between stem diameter, mass and weight, the diameter of hazard trees or parts of them is used to categorise levels of impact potential. Other factors (e.g. level of decay and its effect on stem weight, or height from which a branch falls) can affect impact force. These are given significance only where they are considered particularly important in a given situation.

By evaluating the target and the trees as explained above, it is possible to calculate a risk of harm index for each hazard tree, and therefore make an informed decision on the need to carry out remedial work on the tree to minimise the likelihood of failure and of consequent harm being caused.

The table below provides advisory thresholds for the calculated risk of harm to inform tree management decisions.

Risk Thresholds	Description	Action
1/1 000	Unacceptable Risks will not ordinarily be tolerated	<ul style="list-style-type: none"> Control the risk
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	<ul style="list-style-type: none"> Control the risk Review the risk
1/10 000	Tolerable (by agreement) Risks may be tolerated if <ul style="list-style-type: none"> those exposed to the risk accept it, or the tree has exceptional value 	<ul style="list-style-type: none"> Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value Review the risk
	Tolerable (where imposed on others) Risks are tolerable if ALARP	<ul style="list-style-type: none"> Assess costs and benefits of risk control Control the risk only where a significant benefit might be achieved at a reasonable cost Review the risk
1/1 000 000	Broadly Acceptable Risk is already ALARP	<ul style="list-style-type: none"> No action required currently Review the risk

Risk of Harm Advisory Thresholds – Informing Management Decisions

A probability of death or serious injury of 1/10,000 per annum is used as the limit of acceptable risk to the public at large, based on the Health and Safety Executive guidance (HSE 2001). Using the 1/10,000 limit, all risks with a probability (or Risk of Harm) exceeding 1/10,000 (e.g. 1/5,000) are therefore unacceptable and require remedial action to reduce the risk to below the 1/10,000 level.

If the Risk of Harm is less than 1/1 Million then it is considered broadly acceptable and no action is necessary until the next recommended inspection date. If the Risk of Harm is between 1/10,000 and 1/1Million, there should be further evaluation of the risk to be reduced and the benefits and cost of implementing risk reduction. Where trees are within the upper part of the Tolerable Region (e.g. 1/50,000 - 1/100,000) and the Risk of Harm is likely to increase before the next inspection date it may be proportionate to carry out remedial work to reduce the risk of harm to lower more broadly acceptable levels.

Survey Criteria

These notes refer to the survey schedule headings in Appendix 2.

Tree Number The reference/tag number given to the tree.

Species The species of tree in English.

Age Class The age class of the tree, defined as Young (Y), Early-mature (EM), Middle-Mature (MM), Mature (M), Over-mature (OM).

DBH The measurement of stem diameter (mm).

Cond'n Condition of the above trees;

G = Good

F = Fair

P = Poor

D = Dead

Comments Comments on the significant defective part or parts of the tree.

Recommendations

Remedial work required on tree to bring the risk of harm within acceptable levels.

Target (range) The target range is from 1 – 6, reflecting the value of the target from 1 (very high) to 6 (very low).

Size (range) This figure is the probability of the hazard part causing harm on impact, and is based on the hazard part's size. It is expressed as a range from 1 (very high) to 4 (very low).

Probability of failure

The probability of failure of the hazard part is assessed by (Range) deciding if it is 10, 100, 1000 etc. times more likely to fail than a non-compromised tree or if it is 10, 100, 1000 etc times less likely to fail than a substantially compromised tree. The probability of failure is expressed as a range from 1 (very high) to 7 (very low).

Risk Index (Risk of Harm)

This is the risk or possibility of significant harm being caused by the hazard tree (or part of it). It is expressed as a probability fraction and calculated as:

Risk of Harm probability = Target value x Size of part x Probability of failure

Work Priority Our recommendation for the priority to implement the work is as follows:

Urgent Complete work as soon as possible and prevent access to target area.

High Complete work within 3 months of the date of this report

Medium Complete work within 1 year of the date of this report

Low Complete work within 2-3 years of the date of this report (prior to the next survey).

Glossary of Terms

Remove deadwood and defective limbs

- Remove or reduce specific deadwood and defective branches/stems detailed in the works recommendation. They should be removed using natural target pruning and the final cut should not exceed one-third of the parent stem or branch, unless specified. Where individual deadwood branches are not specified, deadwood above 50mm diameter and 1 metre in length should be reduced to stabilise.

Fell

- Fell to ground level. Fell the tree from the base or dismantle in sections according to site restrictions.

Monolith

- Reduce the tree to its main stem, removing all branches. The retention of the main stem can provide ecological benefits for a variety of habitat types. A natural fracture technique called a coronet cut can be used at the cut surfaces to mimic jagged edges characteristically seen on broken stems/ branches following storm damage.

Crown reduction

- Reduce the overall crown, or part of it specified in the work recommendations, by the specified % with reference to tree height/branch spread. A reduction should alleviate biomechanical stress by reducing leverage and/or the sail area. The main framework and shape of the crown should be retained and sufficient proportion of foliage to maintain tree vitality.

Crown lifting

- Prune to achieve a desired vertical clearance from above ground level. The removal of secondary branches should be preferred to the removal of primary branches to avoid the creation of seats of decay in the main stem.

Pollarding

- Initial pollarding should be carried out while a tree is establishing 50-200mm stem diameter at 2-3m height and a regular pollard cycle programmed. This involves the removal of the tree canopy back to the main stem or primary branches to create a suitable framework. Pollarding can be carried out to established maiden trees which can include the removal of the entire canopy in one operation or phased over several years. Species suitability and tree condition will be assessed in detail prior to
- Re-pollarding shall be defined as the removal of all new growth from the pollard head just above the previous pollard point. Where pollard heads have poor live tissue connection, the pruning cut should create a new pollard point immediately below into sound wood.

Aerial Inspection

- Trees that have potentially significant defects which cannot be adequately assessed from either ground level or visual means, e.g. extent of decay cavities or presence of a wood decay fungus, are recommended for an aerial inspection. A re-assessment of potential risk and a QTRA calculation can then be completed based on the results of the tests.

Sever Ivy

- Cut all Ivy stems on the tree trunk, to ensure the Ivy in the crown is killed and will gradually fall off. Alternatively remove ivy to a specific point i.e. stem or branch union.

Picus Tomograph

- The Picus® Sonic Tomography system uses low frequency sound waves to measure the density of the wood inside the tree. The data produced from twelve separate sensors is converted into a colour image showing the condition of the wood across the cross-section of the tree at the selected measurement height.

Resistograph

- The Resistograph® decay detection drill tests the strength of the wood by measuring its resistance to drilling, plotting the data as a trace onto a waxed paper or computer-generated graph.

Decompaction

- Tree root remediation work such as radial mulching, soil aeration and decompaction using a terravent or airspade techniques to loosen and aerate the soil within the rooting environment. The process improves soil drainage and soil aeration, reduce root impedance, and promotes soil fertility and tree health.

APPENDIX 2
Tree Survey Schedule
TWC1300-S-001

APPENDIX 3
Group Survey Schedule
TWC1300-S-002

APPENDIX 4
Tree Location Plan
TWC1300-D-001



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