

BS 5837 Arboricultural Report

& Impact Assessment



at
Mid Kent Golf Club Ltd
Singlewell Road
Gravesend
Kent
DA11 7RB

Dated
27th March 2024



CROWN
Tree Consultancy

Branching out through England and Wales

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1. Introduction

1.1. Instruction

1.1.1. We are instructed by Steve Barrow of Mid Kent Golf Club Ltd to:

- Undertake a Tree Survey to BS 5837 at Mid Kent Golf Club and assess all trees potentially within influencing distance of proposed development within the site.
- Plot the trees on a Tree Constraints Plan and record the data in a Tree Data Schedule.
- Provide an overview of the site and any management recommendations.
- Assess the potential impact of the development proposals and provide guidance as to appropriate mitigation measures.
- Produce an Arboricultural Impact Assessment for submission to the local authority.

1.2. Purpose of this Report

1.2.1. This report is produced according to the guidance and recommendations within BS 5837: 2012 - *Trees in Relation to Design, Demolition, and Construction*. It is tailored to accompany a planning application. It assesses the impact of all proposed construction works on the tree population. Tree removal, canopy pruning, and the impact upon roots from various groundworks are all considered in detail. Best practice mitigation is specified wherever appropriate.

1.2.2. This document should not be used to inform management decisions relating to liability or risk management. Such decisions should be based on a more detailed inspection of the trees than was carried out for this report.

1.3. Survey Details

1.3.1. A visual ground-level assessment of all trees was undertaken on the 14th March 2024 by Carl Lothian. No climbed inspections or specialist decay detection were undertaken. Details of how the survey was undertaken can be found in Appendix 1.

1.3.2. The tree locations shown on the accompanying drawings are based on a measured drawing of the site supplied to Crown Tree Consultancy. This drawing had the tree positions already plotted. Where applicable, additional trees have been plotted by us according to measurements taken on-site.

1.4. Author

1.4.1. This report was compiled by Emma Hoyle FDS (Arboriculture), ED (Forestry & Arboriculture), M. Arbor. A. Details of the author's experience that qualify her to produce such a report are detailed in Appendix 4.

1.4.2. The survey was undertaken by Carl Lothian BSc (Hons) Arboriculture. Details of Carl's experience can be found in Appendix 4.

2. Site Overview



2.1. Brief Site Description

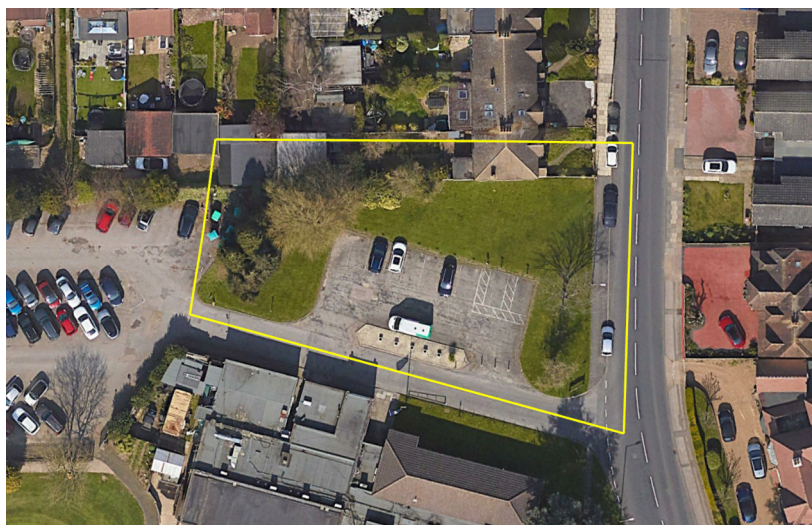
- 2.1.1. The survey area forms part of Mid Kent Golf Club. Singlewell Road runs parallel to the eastern boundary of the site and provides access to the grounds of the Golf Club.
- 2.1.2. The survey area covers a small car parking area and the surrounding soft landscaped area, in the northeastern corner of the Golf Club. The site is approximately flat with no abrupt level changes.
- 2.1.3. Within the survey area (outlined in the Google Image below), we identified Retention Category B and Retention Category C trees, including tree species such as Box Elder, Cherry, Elder, Hawthorn and Lawson Cypress.
- 2.1.4. The Tree Constraints Plan and Tree Data Schedule (see Appendix 6) should be referred to for descriptions and locations of all trees.

2.2. Coordinates

- 2.2.1. The site coordinates are 51°25'35.72"N 0°22'2.13"E, and the altitude is approximately 35m above sea level¹.

2.3. Survey Extent

- 2.3.1. The area indicated below² shows the extent of our survey. Our survey included all trees within the curtilage of the property and those adjacent to it.



¹ To access satellite imagery and street views of the site these co-ordinates may be entered into: <http://maps.google.co.uk/>

² Image taken from Google Earth and may not be current

3. Vegetation Overview (independent of proposals)

This section summarises all the recommendations within the Tree Data Schedule regardless of whether trees are to be retained, felled or pruned to facilitate the proposed development. It does not specify works that may be required to facilitate the development proposals.

3.1. Preliminary Management Recommendations

- 3.1.1. The trees were all deemed to be in an acceptable condition, and no remedial works have been recommended at this time.

3.2. Future Inspections

- 3.2.1. The table below suggests a schedule of future inspections based on the condition and location of each tree:

Inspection Frequency (years)	Tree Number
0.5	None
1	None
1.5	T2
3	T1, T3, G4, T5 and G6

- 3.2.2. The trees should be inspected sooner if there is a noticeable decline in their condition or following extreme weather events.

3.3. Statutory Protection

- 3.3.1. Before undertaking most works on trees protected by a tree preservation order³, consent needs to be formally obtained from the local authority. Where trees are in a conservation area (but not protected by a TPO), works are generally not permitted without first giving the local authority six weeks' notice of intention⁴. Unauthorised works to protected trees, or trees in a conservation area, may result in criminal prosecution and a fine. Where works are required to implement a fully approved development, no such consent or notice is required.

3.4. Felling Licences

- 3.4.1. Felling licences issued by the Forestry Commission are sometimes required before removing trees. However, these licenses are aimed toward woodland and forestry management. Felling licences are NOT required for any of the following:
- Lopping, topping or pollarding.
 - Removal of small trees (stem diameter less than 8cm) or fruit trees.
 - Works to any trees growing within domestic gardens, orchards, or the Inner London boroughs.
 - Operations involving less than five cubic meters of timber in any quarter year.
 - Thinning and understorey clearing operations.
 - Dangerous trees, nuisance trees, some diseased trees.
 - Where removal is required to enable a fully approved development.
- 3.4.2. More detailed guidance can be found at <https://www.gov.uk/government/publications/tree-felling-getting-permission>
- 3.4.3. Hence a felling license will **not** be required for any tree removal if the development receives approval.

³ <https://www.gov.uk/guidance/tree-preservation-orders-and-trees-in-conservation-areas>

⁴ During this time, the local authority may elect to create a tree preservation order or to inform the applicant that they have no objection to the proposed works. If the local authority does not respond within six weeks, then the intended work may be undertaken. Note: the local authority cannot refuse consent for works to trees within a conservation area; they may only create a tree preservation order if they wish to have further control over what works are undertaken.

3.5. Species Present – Additional Information

- 3.5.1. The table below contains general information about the tree *species* (rather than the actual tree *specimens*) included in the survey. Its purpose is to assist readers who are unfamiliar with the characteristics of the various species.

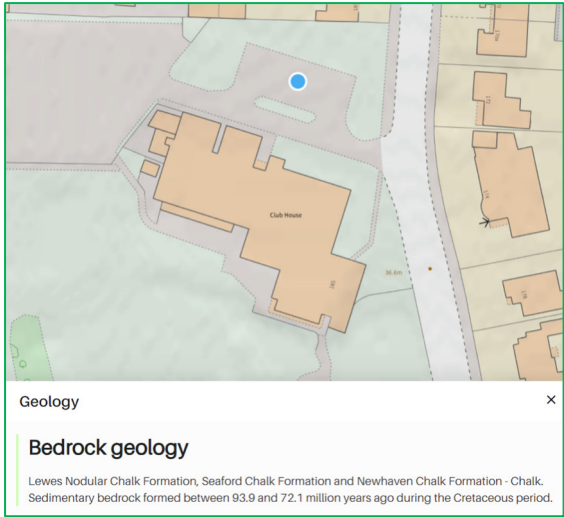
Species	Typical Height at Maturity (m)	Typical Canopy Spread at Maturity (m)	General Notes
Box Elder	16	12	Also called Ash-leaved Maple. Native across N. America. Often untidy looking with steep younger stems. Has pinnate leaves which is unusual for an Acer. Flowers in showy hanging plumes before the leaves emerge. Visit http://www.pfaf.org/user/Plant.aspx?LatinName=Acer+negundo for more info.
Cherry	8	10	Many cultivars available, bred for their abundance of spring flowers, edible cherries or ornamental bark (e.g. Tibetan Cherry). Usually white or pink flowering, often in very early spring. Usually with a single bole to around 2.5m and multi-stemmed thereafter. Most varieties have excellent autumn colour.
Elder	8	8	Deciduous tree native throughout Europe, N Africa and W Asia. Untidy, shrubby habit. Very fast growing. Covered in dense creamy flowers and deep red berries which are excellent for making wine. Visit http://www.pfaf.org/user/Plant.aspx?LatinName=Sambucus+nigra for more info.
Hawthorn	6	6	Arguably Britain's most common tree due to its abundance in field and roadside hedges. Deciduous, prickly and one of our most hardy trees, it will tolerate almost all conditions including drought, pollution and coastal winds. Also known as Mayflower because of its abundance of white flowers in May. Red 'haws' ripen from September to November and have only one pip (unlike Midland hawthorn which contains 2 pips). Visit http://www.pfaf.org/user/Plant.aspx?LatinName=Crataegus+monogyna for more info.
Lawson Cypress	40	10	Erect, narrowly conical evergreen tree native to Southwest Oregon and N. W. California. Introduced to Britain in the 1850's and now a common tree in gardens and parks. Makes an excellent dense hedge. Many varieties are available including golden and miniature varieties. Easily distinguished from Leyland cypress by the presence of small cones. Visit http://www.pfaf.org/user/Plant.aspx?LatinName=Chamaecyparis+lawsoniana for more info.

The figures quoted regarding typical height and canopy spread should be treated as approximate. Actual heights and spreads vary according to several environmental factors such as soil conditions, climate, and the presence of competing vegetation. The figures quoted are not the maximum dimensions that the species may attain.

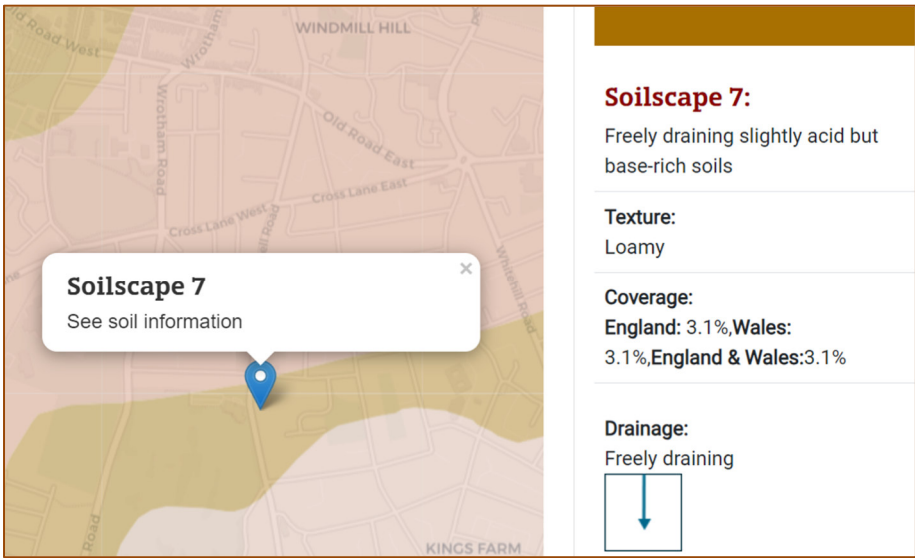
4. Local Geology and Soils

4.1. Desktop Research

4.1.1. Desktop research into local geology based on the postcode **DA11 7RB** obtained the following results:



Source:https://geologyviewer.bgs.ac.uk/?_ga=2.100849601.17774785.1660229567-1737936254.1660229567



Source <http://www.landis.org.uk/soilscales/>

4.2. Site Investigations

4.2.1. We are unaware of any specific investigations into soil properties at the site.

4.3. Conclusion and Relevance

- 4.3.1. Based on the information reproduced in Section 3.1, local soils are assumed to have a loamy texture.
- 4.3.2. Loamy soils contain a mixture of clay and sand. Soil compaction may occur due to vehicular activity on building sites, so ground protection is recommended wherever vehicles operate. Most tree species will grow well in loamy soils.
- 4.3.3. Trees of most species are less likely to root deeply in clay soils. Any new surfacing over tree roots should avoid deep excavation and have good load-spreading properties.

5. Arboricultural Impact Assessment

5.1. Overview

5.1.1. It is proposed to construct four new dwellings and associated car parking as indicated on the drawings in Appendix 6. The existing layout is indicated in black, and the footprint of the proposed layout is indicated in pink. Existing vehicular access from Singlewell Road shall be maintained.

5.1.2. The table below summarises the potential impact on trees due to various activities.

Activity	Trees Potentially Affected
Tree Removal: Retention Category A	None
Tree Removal: Retention Category B	T3 and G4
Tree Removal: Retention Category C	T1, T2, T5 and mixed shrubs
Tree Removal: Retention Category U	None
Tree Pruning	None
RPA: Building Foundations	None
RPA: Other Foundations	None
RPA: New Hard Surface	None
RPA: Replace Existing Hard Surface	None
RPA: Underground Services	None Anticipated
RPA: Change of Ground Levels	None
RPA: Soil Compaction	G6 (preventable by installing tree protection measures)

5.1.1. Other potentially damaging activities often associated with construction sites include demolition or the careless use of plant machinery, hazardous materials, or fires. All of the above potential impacts are considered in detail throughout this Section.

5.2. Tree Removal

5.2.1. All trees to be removed are indicated on the Impact Assessment Plan and are listed below:

5.2.2. **Retention Category A:** Our survey did not identify any Retention Category A trees.

5.2.3. **Retention Category B:** It is proposed to remove T3 and G4. These trees are located within the footprint of the proposed new surface, or are so close to it that their retention is not possible. They are set back in excess of 38m from the public highway and are not considered to have a particularly high amenity value. Their removal shall not have a major impact on local visual amenity. Replacement tree planting is proposed to mitigate their loss.

5.2.4. **Retention Category C:** It is proposed to remove T1, T2, T5 and mixed shrubs. These are relatively small trees (maximum height 7m) and none are considered to have a high amenity value. T1 and T2 at the front of the site are deemed to have a limited life expectancy due to their current condition (see further details in the Tree Data Schedule in Appendix 6). Their removal shall not have a major impact on the visual amenity of the locality. Furthermore, there is opportunity to implement replacement planting at the front of the site.

5.2.5. **Retention Category U:** Our survey did not identify any Retention Category U trees.

5.2.6. Details specific to each tree can also be found in the Tree Data Schedule.

5.3. Mitigation Planting

- 5.3.1. Mid Kent Golf Club offers ample opportunity to plant new trees to mitigate those to be removed to facilitate the proposed development. The application site also offers opportunity to plant small trees, hedges and shrubs to mitigate the loss of T1, T2, T3, G4 and T5.

5.4. Impact on Tree Canopies

- 5.4.1. The retained tree canopies of G6 are sufficiently far from proposed building works such that they should not be impacted by construction activity, so long as tree protection measures are installed. Consequently, no pruning works are required to enable the proposal.

5.5. Impact on Tree Roots

Building Foundations:

- 5.5.1. No new building foundations are proposed within the Root Protection Areas of retained trees. Consequently, no restrictions on foundation design or implementation are considered necessary from an arboricultural perspective.

New Surfaces:

- 5.5.2. No significant hard surfaces are proposed within the Root Protection Areas of G6. If any pedestrian paving is to be installed as part of proposed landscaping works, excavation should be undertaken using hand tools only to a maximum depth of 100mm. Any new surfaces over RPAs should be permeable.

Underground Services:

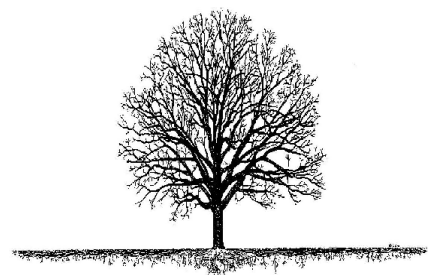
- 5.5.3. There is ample opportunity for service and drainage provision without the need to pass through the Root Protection Areas of any retained trees. The exact position of services should be agreed, and installation engineers should be made aware of the need to keep trenches outside of RPAs.

Changes in Ground Levels:

- 5.5.4. We are not aware of any ground levels changes that re proposed over Root Protection Areas.

Soil Compaction:

- 5.5.5. The majority of tree roots lie within the upper soil horizons. This is because the availability of oxygen decreases with depth, and roots need to breathe to stay alive. In addition, nutrients are more readily available in the form of organic matter close to the soil surface.
- 5.5.6. Healthy soils contain about 25% air space between solid particles. Increased loading of the soil caused by construction activity causes air to be squeezed out as the soil becomes compacted, preventing roots from breathing. Even an increase in pedestrian activity may cause some soil compaction.
- 5.5.7. It is important therefore that ground compaction and soil disturbance over Root Protection Areas should be avoided during the construction phase. This may be done by installing protective fencing and ground protection measures.



5.6. Demolition Activities

- 5.6.1. No demolition is proposed close to trees.

5.7. Waste and Materials Storage

- 5.7.1. All hazardous materials (including cement and petrochemical products) will need to be controlled according to COSHH regulations in order to ensure there is no detrimental impact on tree health. Provision shall need to be made to ensure that cement spillage avoids all Root Protection Areas.
- 5.7.2. Areas designated for the storage of building materials and waste products will need to be approved by the local authority. Root Protection Areas should be avoided. Where this is not possible, suitable ground protection measures will need to be installed.

5.8. Cabins and Site Facilities

- 5.8.1. Consideration should be given to the location of any site welfare facilities in terms of potential impact on trees. Where it is proposed to install cabins or site facilities in Root Protection Areas, the project arborist should be consulted and approval obtained from the local authority.
- 5.8.2. There is limited room for the siting of cabins and storage of materials / spoil during the construction phase so the logistics of the development shall need to be well organised to ensure that there is adequate space outside of the Tree Protection Zones for construction activity.

5.9. Boundary Treatments

- 5.9.1. We are not aware of any changes proposed to the existing boundary features that might impact upon trees.

5.10. Impact of Retained Trees on the Development

- 5.10.1. The retained trees (G6) are at a sufficient distance from the proposed buildings and shall have ample room for future growth.
- 5.10.2. The foundations and any new surfaces should be designed to accommodate all potential impacts due to future tree rooting activity. These include potential vegetation related subsidence, vegetation related heave, and lifting of surfaces / light structures due to direct root pressure.

5.11. Summary

- 5.11.1. To enable the development, it is proposed to remove Retention Category B trees T3 and G4 and Retention Category C trees T1, T2 and T5. None of the trees to be removed are considered to have a high amenity value.
- 5.11.2. Replacement tree planting is proposed to mitigate tree removal and to ensure tree cover is maintained throughout the site.
- 5.11.3. No pruning works are required to enable the proposal.
- 5.11.4. No new building foundations are proposed within Root Protection Areas.
- 5.11.5. Any new pedestrian surfacing within RPAs shall be installed sympathetically and with minimal excavation.

5.12. Arboricultural Method Statement

- 5.12.1. BS 5837 recommends that a detailed methodology is agreed in the form of an Arboricultural Method Statement, which shall ensure that trees are well protected during the construction phase. This should detail all tree protection measures and limitations on construction activity. All of the issues raised within this Impact Assessment should be covered by the Method Statement.

6. Photographs

Refer also to the Tree Constraints Plan for photo locations.

Photo 1.



Photo 2.



Photo 3.



Photo 4.



Photo 5.



Photo 6.



Photo 7.



Photo 8.



Photo 9.



Photo 10.



Appendix 1: BS 5837: 2012 – Guidance Notes

This Standard prescribes the principles to be applied to achieve a satisfactory juxtaposition of trees and structures. It sets out to assist those concerned with trees in relation to design, demolition and construction to form balanced judgements.

It acknowledges the positive contribution trees may offer to a site, as well as the negative aspects of retaining inappropriate trees. It addresses the negative impacts that construction activity may have upon trees and offers mitigation strategies to minimise these impacts.

The Standard suggests a three stage approach to ensure best practice is followed when developing close to trees:

A1.1 Stage 1: Survey Details and Notes

A ground level visual survey was undertaken. No climbed inspections or specialist decay detection were undertaken. Only trees with a stem diameter over 75mm, which lie within the site boundary or relatively close to it, were included.

Where applicable, trees with significant defects have been highlighted and appropriate remedial works have been recommended. However, this report should not be seen as a substitute for a full *Safety Survey* or *Management Plan* which are specifically designed to minimise risk and liability associated with responsibility for trees.

Wherever practicable dimensions were obtained using diameter tapes, logger's tapes, distometers and clinometers. Where obstacles prevent accurate measurement, dimensions are estimated. Trees on privately owned third party are surveyed from the best available vantage point and observations relating to the condition of these trees should be treated accordingly. All height measurements should be regarded as approximate.

Data is recorded for each tree and is presented in a Tree Data Schedule. Each tree is allocated a **Retention Category** according to its size, amenity value, condition and safe useful life expectancy. The categories are allocated independently of development proposals. Our interpretation of the Retention Categories is explained below:

A1.1.1 Retention Categories

A Category: Trees of high quality and amenity value. Usually, mature trees with a significant life expectancy which would enhance any development. Retention of these trees is strongly encouraged.

B Category: Trees of moderate quality and amenity value. Usually these are maturing trees or younger trees with exceptional form. Retention of these trees is desirable though the removal of occasional specimens may be acceptable.

C Category: Trees of low quality or small specimens with a relatively low amenity value. These trees are not considered to be a material planning constraint and their removal will generally be seen as acceptable in order to facilitate development.

U Category: Trees of such low quality that their removal is recommended regardless of development proposals.

Occasionally trees are borderline and do not fall neatly into one of the categories A, B or C. In such cases we apply a superscript (+/-) such that:

C⁺ Indicates borderline C/B, though Category C is deemed to be most appropriate.

B⁻ Indicates borderline C/B, though Category B is deemed to be most appropriate.

The British Standard suggests that each of the A, B and C categories may be further subdivided (A1, A2, A3, B1, B2, B3 etc) such that subcategory 1 denotes mainly arboricultural values, subcategory 2 denotes mainly landscape values and subcategory 3 denotes mainly cultural values (including conservation). Multiple subcategories may be used.

Our experience suggests that these subdivisions lack clarity and can be confusing. Within this report subcategories are **not** denoted. Where appropriate, the use of phrases such as 'Part of a formal group', or 'Has a high ecological value', or 'Offers good screening to the site' are incorporated into the observation section of the Tree Data Schedule. We believe this conveys all relevant landscape and cultural information without any confusion.

Tree Constraints Plan (TCP). This indicates the position, crown spread, Retention Category and Root Protection Area of each tree. It is used to inform where development may proceed without causing damage to trees.

Root Protection Area (RPA). This is the area around each tree likely to contain the majority of roots. It should ideally remain undisturbed to avoid a detrimental impact on tree health. For single stemmed trees It is calculated according to the formula “radius of RPA” = “12 x stem diameter”. Where a tree has more than one stem, the equivalent-single-stem diameter is usually recorded. This is calculated by adding the squares of the stems and then finding the square root of this total. The radius of the Root Protection Area is then calculated by multiplying the equivalent-stem-diameter by 12.

Shade Constraints. The previous Standard (BS 5837 2005) suggested that shade constraints should be indicated on the TCP. These are denoted as a circle-segment drawn northwest to due east with a radius equal to the height of the tree. These do not represent the actual shade pattern which varies through the seasons. Rather, they indicate the area most shaded by the tree throughout the course of the year. Ideally habitable room windows should be located outside of these shade constraints. Where we consider it appropriate, we will include shade constraints information on our Impact Assessment Plan or Proposed Layout Plan.

A1.2 Stage 2: Arboricultural Impact Assessment

After the initial survey and the production of the Tree Constraints Plan, arborists and designers are encouraged to work together to establish a design proposal with minimal impact on the high quality trees. An assessment should be made of all possible impacts including the impact that the trees may have upon the proposal. The arborist may recommend mitigation strategies to minimise these impacts and help achieve a more harmonious juxtaposition between buildings and trees.

A1.3 Stage 3: Arboricultural Method Statement

This type of report specifies the measures necessary to protect trees against damage from construction activity. The Method Statement should be written in a manner that it may be conditioned and enforced by the local authority upon granting of planning permission. The site manager should be familiar with all aspects of the Method Statement and should ensure that all persons working on the site are aware of those aspects which appertain to their work. This includes service installation engineers and operators of plant machinery.

Appendix 2: Survey Methodology

Ground level visual surveys are carried out using the *Visual Tree Assessment* technique described by Mattheck and Broeler (1994) and endorsed by the Arboricultural Association (LANTRA Professional Tree Inspection course, 2007).

Structural condition is assessed by inspecting the stem and scaffold branches from all angles looking for weak branch junctions or symptoms of decay. Particular attention is paid to the stem-base. Cavities are explored using a metal probe in order to assess the extent of any decay. If this is not possible further inspection is recommended in the form of a climbed inspection or using specialist decay detection equipment.

The physiological condition is assessed by inspecting the stem, branches and foliage for symptoms of disease. The overall vigour of the tree is also taken into account.

Where significant defects are observed, recommendations are made according to a scale of priority in order to reduce the likelihood of structural failure. The position of the tree and its potential targets are taken into account.

Measurements are obtained using a diameter tape, clinometer, distometer and loggers tape. Where this is not practical measurements are estimated.

Some trees are surveyed as groups, though this is usually avoided close to areas likely to be developed.

Finally, a *Retention Category* is allocated as described in Appendix 1.1.1.

Appendix 3: Glossary of Tree Data

This section explains the terms used in the **Tree Data Schedule** (see Section 3 and Appendix 6).

A2.1 General Observations

Numbering System:	Each item of vegetation has its own unique number prefixed by a letter such that T1=Tree 1, G2=Group 2, H3=Hedge 3 and W4=Woodland 4, S5=Shrub 5.
Age Categories:	
Young	Usually less than 10 years old.
Semi-Mature	Significant future growth to be expected, both in height and crown spread (typically below 30% of life expectancy).
Early-Mature	Full height almost attained. Significant growth may be expected in terms of crown spread (typically 30-60% of life expectancy).
Mature	Full height attained. Crown spread will increase but growth increments will be slight (typically 60% or more of life expectancy).
Veteran	A level of maturity whereby significant management may be required in order to keep the tree in a safe condition.
Over Mature	As for veteran except management is not considered worthwhile.
Species:	Common names and Latin names are given.
Height:	Measured from ground level to the top of the crown.
Stem Diameter:	Taken at 1.5m above ground level where possible. On multi-stemmed trees this measurement may be taken at ground level, though usually an indication of the number of stems and average diameter is given, e.g. 3 x 30cm.
Crown Height:	Measured from ground level to the height at which the main crown begins. Where the crown is unbalanced it is measured on the side deemed to be most relevant. This is usually the side facing the area of anticipated development.
Tree Diagram:	This scaled drawing is computer generated based on measurements taken for stem diameter, crown height and spread, and overall height. It is designed to help the reader rapidly assess the data. It is not an accurate representation of the form of the tree.
Crown Spread:	Measured N, E, S & W, taken from the centre of the stem and usually rounded up to the nearest metre.
Observations:	If a tree's position is considered to be relevant it will be commented upon (e.g. overhanging a children's play area). Tree form and pruning history are also recorded along with an account of any significant defects. Defects and descriptive terms are dealt with in more detail at the end of this section.
Recommendations:	Usually based on any defects observed and intended to ensure that the tree is in an acceptable condition.
Priority Scale:	Depending upon the threat posed by the tree, and the likelihood of failure, recommendations should be carried out according to the following priority scale:
Urgent	To be carried out as soon as possible.
Very High	To be carried out within 1 month.
High	To be carried out within 3 months.
Moderate	To be carried out within 1 year.
Low	To be carried out within 3 years.
Inspection Frequency:	An interval of 6 months, 1 year, 1.5 years or 3 years is allocated before the next inspection is due. Wherever practical, consideration should be given to seasonal changes so that deciduous trees are not always surveyed in winter when they have no leaves, or in summer when leaves may obscure branches within the upper crown.
Vigour:	An indication of growth rate and the tree's ability to cope with stresses:
High	Having above average vigour.
Moderate	Having average vigour.
Low	Having below average vigour.
Very Low	Tree is struggling to survive and may be dying.
Physiological Condition:	
Good	Healthy and with no symptoms of significant disease.
Fair	Disease present or vigour is impaired.
Poor	Significant disease present or vigour is extremely low.
Very Poor	Tree is dying.
Structural Condition:	
Good	Having no significant structural defects.
Fair	Some defects observed though no high priority works are required.
Poor	Significant defects found. Tree requires monitoring or remedial works.
Very Poor	Major defects which will usually require significant remedial works or tree removal.
Amenity Value:	
Very High	Exceptional specimen, observable by a large number of people.
High	Attractive specimen, observable by a significant number of people.
Moderate	One of the above factors is not applicable.
Low	Unattractive specimen or largely hidden from view.
Life Expectancy:	The estimated number of years before the tree may require removal. Classified as (<10), (10 – 20), (20 – 40), or (40+).
Retention Category:	These are explained in detail in Appendix 1.

A2.2 Evaluation of Defects

Cavities, wounds, deadwood etc are all evaluated as follows:

Major	Such that structural integrity is, or will become, compromised and the tree is, or will inevitably become, hazardous.
Significant	A defect that may over time become a major defect, though not necessarily so. This will depend on the vigour of the tree and its ability to deal with decay etc.
Minor	A defect that is unlikely to develop into a major defect.

Appendix 4: Author & Surveyor's Qualifications

Qualifications & Experience of Emma Hoyle FDS (Arboriculture), ED (Forestry & Arboriculture), M. Arbor. A.

Emma is a qualified Arboricultural Consultant educated to Level 5 in Arboriculture at Askham Bryan College, is a professional member of the Arboricultural Association and is a LANTRA accredited *Professional Tree Inspector*. She has worked for Crown Consultants since 2015 and has since written numerous reports relating to all aspects of arboriculture including; planning and development, vegetation related subsidence, tree preservation orders and tree risk assessment. Emma regularly attends seminars and events in order to keep abreast with current knowledge and best practise in Arboriculture.

Prior to becoming an arboricultural consultant, Emma worked for two reputable tree surgery firms from 2008 and became an NPTC Qualified tree surgeon after completing a Level 3 Extended Diploma in Forestry and Arboriculture at Askham Bryan College. Emma also has experience in other areas of arboriculture such as forest clearance, tree planting, tree maintenance and landscaping.

Qualifications & Experience of Carl Lothian – BSc (Hons) (Arboriculture).

Carl began his career undertaking a Level 3 extended diploma in arboriculture and forestry at Merrist Wood College in 2015. Upon completion of his diploma, Carl worked with several tree surgery firms completing a range of arboricultural works. In 2018 Carl began his BSc (Hons) in arboriculture and urban forestry, graduating with a first-class degree and attaining the Institute of Chartered Foresters student of the year award.

After graduating, Carl worked as a TreeRadar technician where he carried out tree root and decay surveys with specialist ground-penetrating radar equipment. During this time Carl was fortunate enough to work at prestigious sites, such as the Palace of Westminster and the National Maritime Museum.

Whilst working at Crown, Carl has undertaken a range of tree surveys and written reports relating to development, safety, subsidence, and decay detection. Carl is a professional member of the Consulting Arborist Society and an associate member of the Institute of Chartered Foresters.

Appendix 5: Further Information

Building Near Trees – General

National Joint Utilities Group publication # 10 (1995), *Guidelines for the Planning, Installation and Maintenance of Utility Services in Proximity to Trees*. Downloadable at www.njug.demon.co.uk/pdf/NJUG%20Publication10.pdf

NHBC Standards Chapter 4.2., *Trees and Buildings*.

Horticulture LINK project 212. (University of Cambridge, 2004), *Controlling Water Use of Trees to Alleviate Subsidence Risk*.

Tree Planting and aftercare

See www.trees.org.uk/leaflets.php# for downloadable leaflets on selecting a garden tree, planting, aftercare and veteran tree management.

British Standards

BS 5837: 2012. *Trees in Relation to Design, Demolition and Construction – Recommendations*.

Bs 3998: 2010. *Recommendations for Tree Work*.

BS 3936: 1992. *Nursery Stock. Part 1: Specification for Trees and Shrubs*.

BS 3936: 1992. *Nursery Stock. Part 10: Specification for Groundcover Plants*.

BS 4043: 1989. *Transplanting Root-balled Trees*.

BS 8004: 1986. *Foundations*.

BS 8103: 1995. *Structural design of Low-Rise Buildings*.

BS 8206: 1992. *Lighting for Buildings*.

BS 8545:2014. *Trees: From nursery to independence in the landscape – Recommendations*

BS 3882: 2015. *Topsoil*.

BS 4428: 1989. *General Landscaping Operations (excluding hard surfaces)*.

Permission to do Works to Protected Trees / Tree Law

Forestry Commission (Edinburgh, 2003), *Tree Felling – Getting Permission*. Country Services Division - Forestry Commission. Downloadable at [www.forestry.gov.uk/website/pdf.nsf/pdf/wgsfell.pdf/\\$FILE/wgsfell.pdf](http://www.forestry.gov.uk/website/pdf.nsf/pdf/wgsfell.pdf/$FILE/wgsfell.pdf)

Transport and the Regions (Department of the Environment, 2000), *Tree Preservation Orders, A Guide to the Law and Good Practice*. Downloadable at www.communities.gov.uk/publications/planningandbuilding/tposguide

C. Mynors, *The Law of Trees, Forests and Hedgerows* (Sweet and Maxwell, London, 2002)

Communities and Local Government website with numerous downloadable documents, from: <http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/>

Lighting Levels

P.J. Littlefair, B.R.E. 209: *Site layout planning for daylight and sunlight A guide to good practice*. B.R.E. Bookshop, London.

British Standards Institution. Code of practice for day lighting. *British Standard BS 8206: Part 2 (1992)*.

Chartered Institution of Building Services Engineers. *Applications manual: Window Design* (London, 1987).

NBA Tectonics. A study of passive solar housing estate layout. *ETSU Report S-1126*. Harwell, Energy Technology Support Unit (1988).

I.P. Duncan; D. Hawkes, *Passive solar design in non-domestic buildings. ETSU Report S-1110*. Harwell, Energy Technology.

P. J. Littlefair, *Measuring Daylight, BRE Information Paper 23/93 f3.50*. (Advises on measuring daylight under the real sky or an artificial sky, allowing for the changing nature of sky light).

High Hedges

Communities and Local Government website with numerous downloadable documents, from: <http://www.communities.gov.uk/planningandbuilding/planning/treeshighhedges/>

Tree Specific Websites

www.crowntrees.co.uk	Crown Consultants site containing useful information
www.trees.org.uk	Arboricultural Association
www.rfs.co.uk	Royal Forestry Society of England, Wales and N. Ireland
www.treehelp.info	The Tree Advice Trust
www.woodland-trust.org.uk	The Woodland Trust
www.treecouncil.org.uk	The Tree Council

Appendix 6: Tree Data Schedule and Drawings

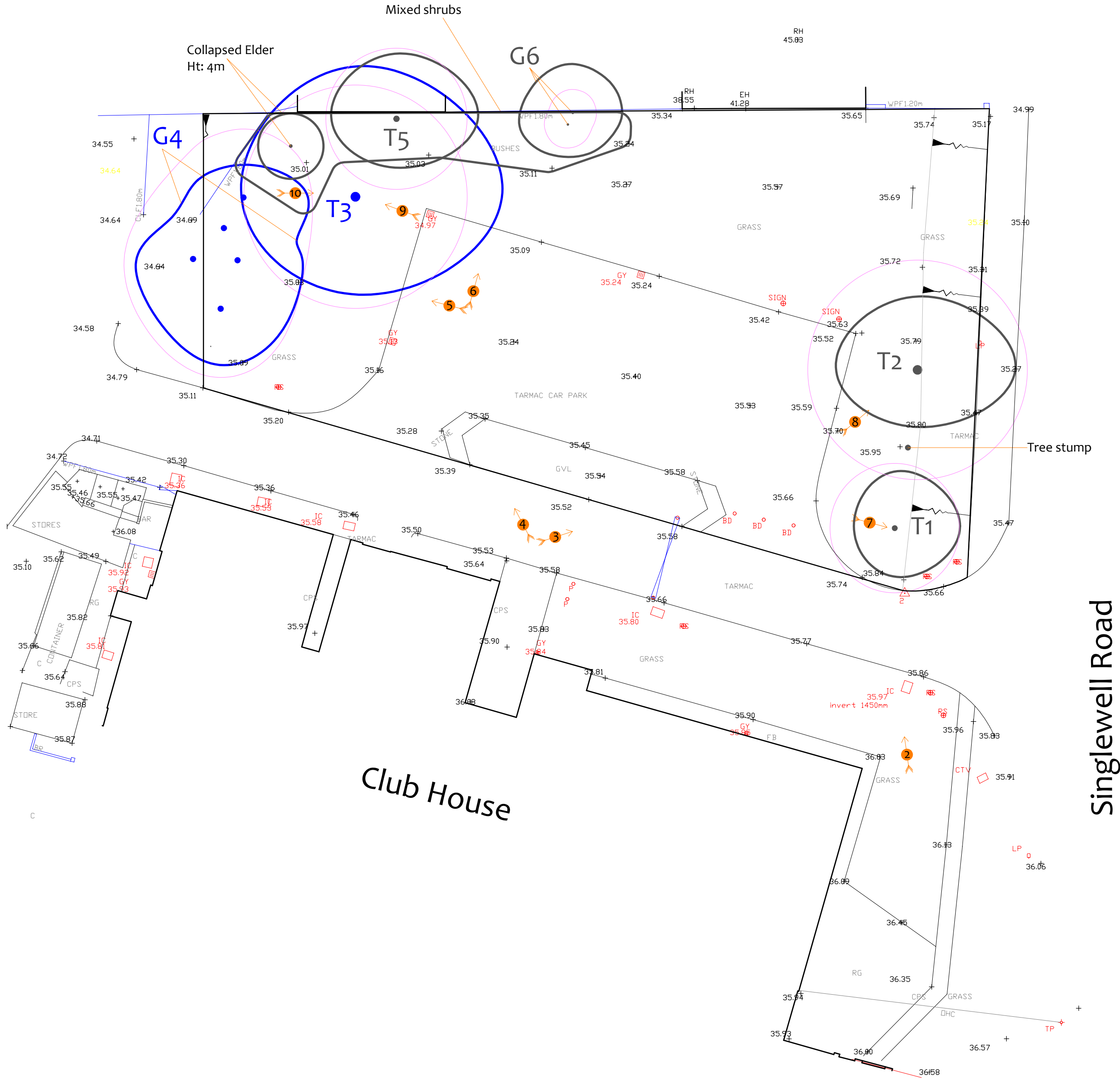
The Tree Data Schedule and any drawings accompanying this report follow this page. They are also provided as separate documents for ease of printing and screen viewing.

Reference G = Group H = Hedge	Age & Species	Height (m)	Crown Ht (m)	Diameter (cm)	Crown Spread (m) N W E S	Scaled Tree Diagram (m)	Notes	Recommendations (Independent of any development proposals)		Vigour	Amenity Value
								Priority	Inspect Freq (yrs)	Physiological Condition	Life Expectancy (yrs)
										Structural Condition	Retention Category
T1	Semi-Mature Hawthorn Crataegus monogyna.	6	2	33	3.5 2.5 4 3		Form: Multi-stemmed at 2m with a slightly unbalanced crown. History: Multiple pruning wounds due to crown reduction. Defects: Significant pruning wounds with early decay at crown break.	No action required.		Moderate Good Fair	Moderate 10-20 C
							n/a	3			
T2	Early-Mature Cherry Prunus sp.	7	2.5	56	4.5 5 6 3.5		Form: Multi-stemmed at 2m with a slightly unbalanced crown. History: Occasional pruning wounds due to crown lifting. Defects: Minor to significant deadwood throughout crown. Significant pruning wound to scaffold branch 2.3m above ground level (western side). Included bark unions at stem and branch junctions. Other: Encroaching street light.	No action required.		Low Poor Fair	Moderate 10-20 C
							n/a	1.5			
T3	Early-Mature Box Elder Acer negundo.	11	2	57	8 7 9 6		Form: Multi-stemmed at 3m with a slightly unbalanced crown and slightly leaning. History: Occasional pruning wounds due to crown lifting. Defects: Significant pruning wound 3.5m above ground level with decay pocket forming (branch overhangs parking space.) Significant deadwood and dead branch stubs (low occupancy area). Significant wound to branch c. 4m above ground level with decay (low occupancy area).	No action required.		Moderate Fair Fair	Moderate 40+ B -
							n/a	3			
G4	Semi-Mature Lawson Cypress Chamaecyparis lawsoniana.	av 9	av 0	av 35	av 2 3.5 4 3.5 each		Form: Group of close growing specimens. History: No evidence of significant pruning. Defects: No significant defects observed. Other: Vegetation prevented detailed inspection. Ivy prevented detailed inspection.	No action required.		Moderate Good Good	Moderate 40+ B -
							n/a	3			
T5	Early-Mature Elder Sambucus nigra.	5.5	2	36	4 4 5 3		Form: Multi-stemmed at 0.5m with an unbalanced crown. History: No evidence of significant pruning. Defects: No significant defects observed. Other: Recorded stem diameter is equivalent for 4 stems (11cm, 12cm, 20cm, 25cm). Vegetation prevented detailed inspection.	No action required.		Moderate Good Good	Low 40+ C
							n/a	3			
G6	Semi-Mature Elder Sambucus nigra.	av 5	av 0.5	av 12	av 3 3 3 2 each		Form: Two close growing specimens. History: No evidence of significant pruning. Defects: No significant defects observed. Other: Vegetation prevented detailed inspection.	No action required.		Moderate Good Good	Low 40+ C
							n/a	3			

Tree Data Schedule

Reference C = Group U = Hedge	Age & Species	Height (m)	Crown Hit (m)	Diameter (cm)	Crown Spread (m)	S	N	E	Scaled Tree Diagram (m)	Notes	Recommendations (dependent of any development proposals)		Vigour	Amenity Value	
											Priority	Inspect Free (yrs)		Physiological Condition	Life Expectancy (yrs)
T1	Semi-Mature Hawthorn <i>Crataegus monogyna</i>	6	2	33	3.5	4				Forms: Multi-stemmed at 2m with a slightly unbalanced crown. Multiple pruning wounds due to crown reduction. Defects: Significant pruning wounds with early decay at crown break.	No action required.		Moderate	Moderate	
T2	Early-Mature Cherry <i>Prunus</i> sp.	7	2.5	56	5	6				Forms: Multi-stemmed at 2m with a slightly unbalanced crown. Occasional pruning wounds due to crown lifting. Defects: Minor to significant deadwood throughout crown. Significant pruning wound to scaffold branch 2.3m above ground level (western side). Included bark unions at stem and branch junctions. Encroaching street light.	No action required.		Low	Moderate	10-20
T3	Early-Mature Box Elder <i>Acer negundo</i>	11	2	57	7	8				Forms: Multi-stemmed at 3m with a slightly unbalanced crown and slightly leaning. Occasional pruning wounds due to crown lifting. Defects: Significant pruning wound 5.5m above ground level with decay pocket forming (branch overhangs parking space.) Significant deadwood and dead branch stubs (low occupancy area). Significant wound to branch c. 4m above ground level with decay (low occupancy area).	No action required.		Moderate	Moderate	40+
G4	Semi-Mature Lawson Cypress <i>Chamaecyparis lawsoniana</i>	av 9	av 0	av 35	av 2	av 3.5				Forms: Group of close growing specimens. No evidence of significant pruning. No significant defects observed. Vegetation prevented detailed inspection. Ivy prevented detailed inspection.	No action required.		Moderate	Moderate	40+
T5	Early-Mature Elder <i>Sambucus nigra</i>	5.5	2	36	4	5				Forms: Multi-stemmed at 0.5m with an unbalanced crown. No evidence of significant pruning. No significant defects observed. Recorded stem diameter is equivalent for 4 stems (11cm, 12cm, 20cm, 25cm). Vegetation prevented detailed inspection.	No action required.		Moderate	Good	40+
G6	Semi-Mature Elder <i>Sambucus nigra</i>	av 5	av 0.5	av 12	av 3	av 3				Forms: Two close growing specimens. No evidence of significant pruning. No significant defects observed. Vegetation prevented detailed inspection.	No action required.		Moderate	Good	40+

Photographs 1-6



Drawing No:
CCL 11819 / TCP Rev: 1

Title:
Tree Constraints Plan
(Existing Layout)

Site:
Mid Kent Golf Club, DA11 7RB

CROWN
Arborticultural Consultants
01423 316660

Tree Retention Categories
Stems & canopies shown

- Category A tree
- Category B tree
- Category C tree
- Category U tree

Trees of high quality with an estimated life expectancy of 40+ years. Usually large trees with significant presence or smaller trees with excellent form. Retention of these trees is highly desirable.

Trees of moderate quality with a life expectancy of 20+ years. Usually mature trees, or younger trees with good form. Retention of these trees is desirable though less than Category A trees.

Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.

Trees unsuitable for retention due to their very poor condition.

Tree Constraints Plan
Status: Final

BS 5837 Root Protection Area (radius = 1xstem diameter)

Root Protection Area needing amendment due to site conditions, e.g. presence of existing road or building.

Root Protection Area having been amended to account for site conditions

T1 = Tree No 1 G2 = Group No 2 H3 = Hedge No 3

Photo 1

MN = Measured North:

Canopy spreads are sometimes measured to an approximate N defined by site features. Often more accurate, especially where rows of trees are not aligned N-S or E-W.

Tree Ref.	Species	Height (m)	Root Protection Area		
			Radius (m)	m ²	Square (m)
T1	Hawthorn	6	4.0	49	7.0
T2	Cherry	7	6.7	142	11.9
T3	Box Elder	11	6.8	147	12.1
G4	Cypress	9	4.2	55	7.4
T5	Elder	5.5	4.3	59	7.7
G6	Elder	5	1.4	7	2.6

Excerpts from the
Arboricultural
Impact Assessment

Overview

It is proposed to construct four new dwellings and associated car parking as indicated on the drawings in Appendix 6. The existing layout is indicated in black, and the footprint of the proposed layout is indicated in pink. Existing vehicular access from Singlewell Road shall be maintained.

The table below summarises the potential impact on trees due to various activities.

Activity	Trees Potentially Affected
Tree Removal: Retention Category A	None
Tree Removal: Retention Category B	T3 and G4
Tree Removal: Retention Category C	T1, T2, T5 and mixed shrubs
Tree Removal: Retention Category U	None
Tree Pruning	None
RPA: Building Foundations	None
RPA: Other Foundations	None
RPA: New Hard Surface	None
RPA: Replace Existing Hard Surface	None
RPA: Underground Services	None Anticipated
RPA: Change of Ground Levels	None
RPA: Soil Compaction	G6 (preventable by installing tree protection measures)

Other potentially damaging activities often associated with construction sites include demolition or the careless use of plant machinery, hazardous materials, or fires. All of the above potential impacts are considered in detail throughout this Section.

Tree Removal

All trees to be removed are indicated on the Impact Assessment Plan and are listed below:

Retention Category A: Our survey did not identify any Retention Category A trees.

Retention Category B: It is proposed to remove T3 and G4. These trees are located within the footprint of the proposed new surface, or are so close to it that their retention is not possible. They are set back in excess of 38m from the public highway and are not considered to have a particularly high amenity value. Their removal shall not have a major impact on local visual amenity. Replacement tree planting is proposed to mitigate their loss.

Retention Category C: It is proposed to remove T1, T2, T5 and mixed shrubs. These are relatively small trees (maximum height 7m) and none are considered to have a high amenity value. T1 and T2 at the front of the site are deemed to have a limited life expectancy due to their current condition (see further details in the Tree Data Schedule in Appendix 6). Their removal shall not have a major impact on the visual amenity of the locality. Furthermore, there is opportunity to implement replacement planting at the front of the site.

Retention Category U: Our survey did not identify any Retention Category U trees.

Details specific to each tree can also be found in the Tree Data Schedule.

Mitigation Planting

Mid Kent Golf Club offers ample opportunity to plant new trees to mitigate those to be removed to facilitate the proposed development. The application site also offers opportunity to plant small trees, hedges and shrubs to mitigate the loss of T1, T2, T3, T4, G4 and T5.

Impact on Tree Canopies

The retained tree canopies of G6 are sufficiently far from proposed building works such that they should not be impacted by construction activity, so long as tree protection measures are installed. Consequently, no pruning works are required to enable the proposal.

Impact on Tree Roots

Building Foundations:

No new building foundations are proposed within the Root Protection Areas of retained trees. Consequently, no restrictions on foundation design or implementation are considered necessary from an arboricultural perspective.

New Surfaces:

No significant hard surfaces are proposed within the Root Protection Areas of G6. If any pedestrian paving is to be installed as part of proposed landscaping works, excavation should be undertaken using hand tools only to a maximum depth of 100mm. Any new surfaces over RPAs should be permeable.

Underground Services:

There is ample opportunity for service and drainage provision without the need to pass through the Root Protection Areas of any retained trees. The exact position of services should be agreed, and installation engineers should be made aware of the need to keep trenches outside of RPAs.

Changes in Ground Levels:

We are not aware of any ground levels changes that re proposed over Root Protection Areas.

Impact of Retained Trees on the Development

The retained trees (G6) are at a sufficient distance from the proposed buildings and shall have ample room for future growth.

The foundations and any new surfaces should be designed to accommodate all potential impacts due to future tree rooting activity. These include potential vegetation related subsidence, vegetation related heave, and lifting of surfaces / light structures due to direct root pressure.

Summary

To enable the development, it is proposed to remove Retention Category B trees T3 and G4 and Retention Category C trees T1, T2 and T5. None of the trees to be removed are considered to have a high amenity value. Replacement tree planting is proposed to mitigate tree removal and to ensure tree cover is maintained throughout the site.

No pruning works are required to enable the proposal.

No new building foundations are proposed within Root Protection Areas.

Any new pedestrian surfacing within RPAs shall be installed sympathetically and with minimal excavation.

See Section 5
for a more
detailed assessment

X T3, G4, T5 and mixed shrubs require removal to facilitate the proposed car park. None of these trees are deemed to have a high amenity value, and replacement tree planting is proposed.

Tree roots unlikely to be in abundance beneath existing building foundations. Consequently, their roots are likely to proliferate within the site.

G6 may be retained, and should be protected during all construction works.

Proposed Layout (Pink)

X T1 and T2 require removal due to their proximity from the proposed dwellings. These trees are deemed to have a limited life expectancy and are not considered to have a high amenity value. Replacement tree planting is proposed.

X Trees to be removed to facilitate the proposed development.

Reference	Age & Species	Height (m)	Crown Spread (m)	Crown Spread (m)	Notes	Recommendations	Vigour	Physiological Condition	Amenity Value	Life Expectancy (yrs)	Retention Category
T1	Semi-Mature Hawthorn	6	2	33	Form: Multi-stemmed at 2m with a slightly unbalanced crown. History: Multiple pruning wounds due to crown reduction. Defects: Significant pruning wounds with early decay at crown break.	No action required.	Moderate	Good	Moderate	10-20	C
T2	Early-Mature Cherry	7	2.5	56	Form: Multi-stemmed at 2m with a slightly unbalanced crown. History: Occasional pruning wounds due to crown lifting. Defects: Minor to significant deadwood throughout crown. Significant pruning wound to scaffold branch 2.3m above ground level (western side). Included bark unions at stem and branch junctions. Encroaching street light.	No action required.	Low	Poor	Moderate	10-20	C
T3	Early-Mature Box Elder	11	2	57	Form: Multi-stemmed at 3m with a slightly unbalanced crown and slightly leaning. History: Occasional pruning wounds due to crown lifting. Defects: Significant pruning wound 3.5m above ground level with decay pocket forming (branch overhangs parking area). Significant deadwood and dead branch stubs (low occupancy area). Significant wound to branch c. 4m above ground level with decay (low occupancy area).	No action required.	Moderate	Fair	Moderate	40+	B -
G4	Semi-Mature Lawson Cypress	av 9	av 0	av 35	Form: Group of close growing specimens. History: No evidence of significant pruning. Defects: No significant defects observed. Other: Vegetation prevented detailed inspection.	No action required.	Moderate	Good	Moderate	40+	B -
T5	Early-Mature Elder	5.5	2	36	Form: Multi-stemmed at 0.3m with an unbalanced crown. History: No evidence of significant pruning. Defects: No significant defects observed. Other: Recorded stem diameter is equivalent for 4 stems (110cm, 112cm, 200cm, 250cm). Vegetation prevented detailed inspection.	No action required.	Moderate	Good	Low	40+	C

Drawing No:	CCL 11819 / IAP Rev 1
Title:	Impact Assessment Plan
Site:	Mid Kent Golf Club, DA11 7RB
Scale:	0 10m 1:2500
Paper Size:	A1



Tree Retention Categories
Category A tree
Category B tree
Category C tree
Category U tree

Trees of high quality with an estimated life expectancy of 40+ years. Usually large trees with significant presence or smaller trees with excellent form. Retention of these trees is highly desirable.
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Unremarkable trees of low quality and merit. Individual specimens are not considered to be a material planning consideration.
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Impact Assessment Plan

Status: Final - for submission

BS 5837 Root Protection Area (radius = 1xstem diameter)
Root Protection Area needing amendment due to site conditions, e.g. presence of existing road or building.
Root Protection Area having been amended to account for site conditions
T1 = Tree No 1 G2 = Group No 2 H3 = Hedge No 3

X Tree to be removed to facilitate the proposal
X Tree to be removed due to its low quality
Proposed pruning

MN = Measured North:
Canopy spreads are sometimes measured to an approximate N defined by site features. Often more accurate, especially where rows of trees are not aligned N-S or E-W.

Tree Ref.	Species	Height (m)	Radius (m)	m ²	Square (m)
T1	Hawthorn	6	4.0	49	7.0
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