SimplyArb LTD

TREE CONSULTANTS

TREE SUSTAINABILITY THROUGH
COMMUNICATION * PLANNING * PROJECT MANAGEMENT

Halswell School, 1 School Rd, Halswell, Christchurch 8025

Author: Craig Taylor Date: June 2021

QTRA Quantified Tree Risk Assessment
Craig Taylor, Accredited QTRA User: License #5836

ISA TREE RISK ASSESSMENT QUALIFIED

NZARB
New Zealand Arboricultural Association Inc.

Table of Content

1.0 Introduction

1.1 This arboricultural report was commissioned by Stuart Cameron, Principal, Halswell School, as to the feasibility of installing an Astro Turf play area in the vicinity of several mature trees at Halswell School, 1 School Road, Halswell, Christchurch, (Halswell School) (images 1 and 2).

1.2 The trees are identified as 11x Quercus robur – English Oak (English Oak). 10 of the English Oak trees are growing as a single stand with the remaining English Oak tree located northwest of the stand and which will *not* be impacted by the proposed work (image 2).

1.3 The English Oaks have been attributed a unique ID number for ease of identification for this report (image 2).

Images 1: Overview of Halswell School and the trees with which this report relates.

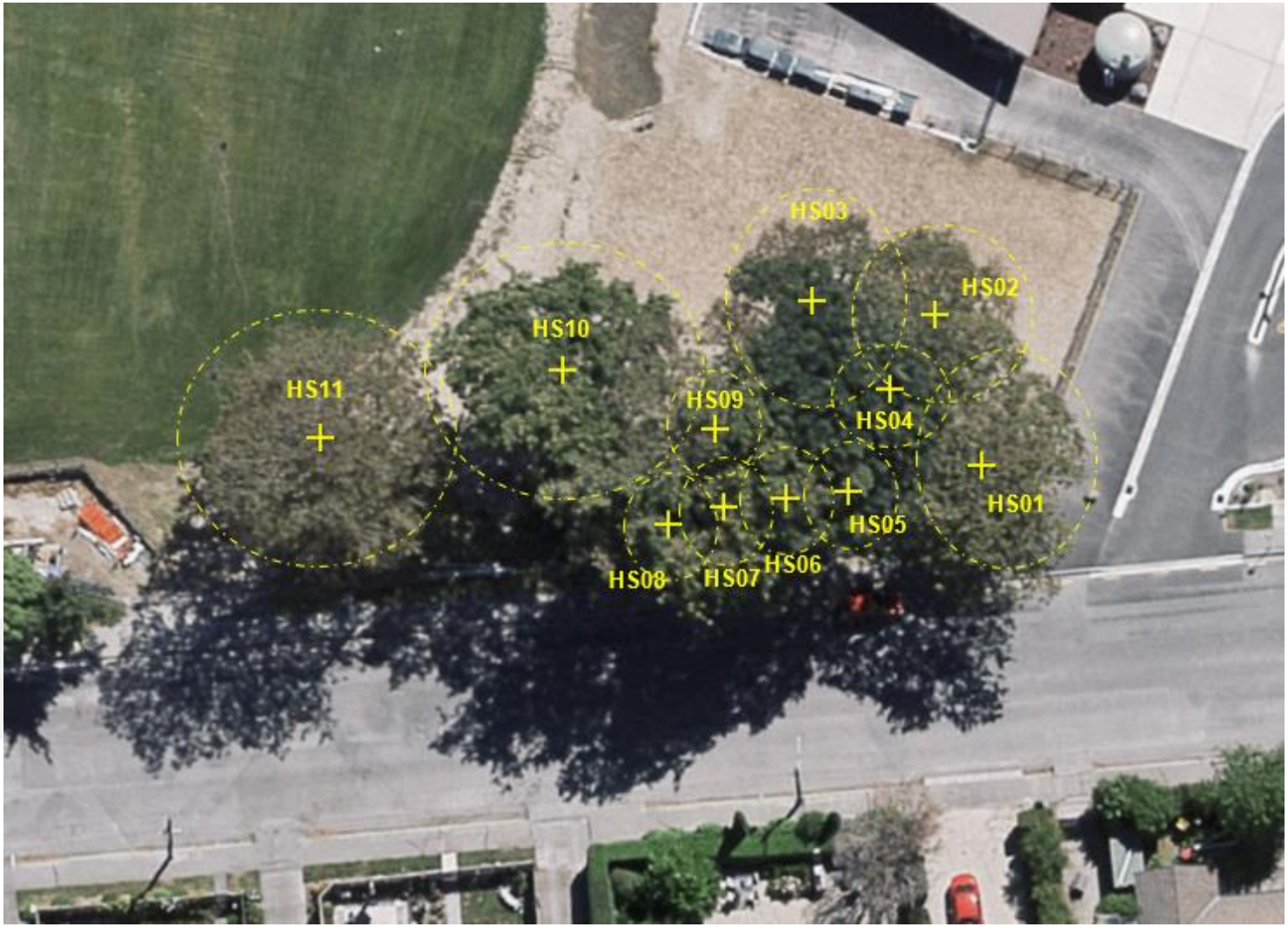

Image 2: Halswell School Plotted Trees

Image 3: 11x English Oak trees at Halswell School, Halswell, Christchurch.

2.0 Brief Outline of the Proposed Works

2.1 The brief was to look at the proposal, look at the alignment, assess the trees, explore all options and form an opinion to help the board of trustees make an informed decision on the proposal.

2.2 Due to limited playing areas at Halswell School and the increase in student role numbers it is proposed to install an Astro Turf play area at Halswell School.

Image 4: The proposed location of the Astro Turf play area at Halswell School in relation to the stand of Oak trees.

2.3 There are 11x English Oak trees located on the southern front boundary of Halswell School. 10 of which are in the vicinity of the proposed Astro Turf play area.

N.B. Tree HS11 (image 2) is identified in the initial outline of this report but will not be impacted by the proposal so will no longer be identified specifically within the body of this report and this report will relate to trees HS01-HS10 only.

2.4 The trees were assessed for health and structure based on the Christchurch City Council (CCC) Health and Structure Assessment methodology (Appendix 1).

2.5 This report will address the short and long-term viability of the trees.

2.6 The trees were inspected on the 10th June 2021 on a fine overcast day.

3.0 Considerations

3.1 The following considerations were made whilst carrying out the assessment and subsequent report:

- The land (and use of) with which the trees are currently located i.e. grassed play area etc;
- The land (and use of) with which the trees will be located if the proposed work goes ahead i.e. Astro Turf play area etc;
- Public access around the trees i.e. local events and sports days etc;
- Probability or likelihood of failure of the trees (or any part of) into the area frequented by users;
- Probability or likelihood of failure of the trees (or any part of) into School Rd;
- The characteristics of the trees; and
- Any health and safety considerations.

4.0 Tree Assessment Methodology

4.1 Trees are assessed using the internationally recognised Visual Tree Assessment (VTA) methodology (*Mattheck.C & Breloer.H. 1994).*

4.2 The trees were assessed against the CCC Health and Structure Assessment criteria and attributed a rating of 1-5 with very good (1) to very poor (5) for health and very good (1) to very poor (5) for structure.

Limitations

4.3 The assessment was carried out from ground level using binoculars only.

4.4 A compaction probe was used to determine any levels of soil compaction.

4.5 Exploratory investigative works in the form of exploratory digging was carried out to determine root spread, depth and size etc.

4.6 Health and structure assessment relates to the tree on the day of inspection only.

4.7 No other form of inspection technic was deemed necessary based on the VTA carried out.

5.0 Tree Details

Tree ID:	HS01-HS10
Tree species:	10x Quercus robur – English Oak
Date of plantings:	Circa. 1925
Height:	15.0-19.0m
Canopy spread: (east – west)	45.0m (measured as a single canopy)
Diameter at breast height:	0.4-0.9m
Health:	3
Structure:	4
Overall:	4
Life expectancy:	15-25+ years (if the current status quo is maintained).

Image 5

Comments: The trees were assessed as a single entity and are all classed as having the same health and structure.
Trees are multi stemmed from 3m+ (species characteristic).
Trees have high canopies.
Trees have weighted elongated limbs due to growing as a single canopy and where there has been limited space from neighbouring trees and have adopted a phototropic (growing towards light) growth.
Tree canopies HS01/HS02/HS03/HS04/HS10 asymmetrically weighted north/northeast.
Tree canopies HS05/HS06/HS07/HS08 asymmetrically weighted south/southeast toward School Rd.
Pockets of decay evident on all trees from lower lateral branch removals through natural branch failures or pruning.
Minimal epicormic growth or wound occlusion evident.
Trees appear to be in senescence with minimal incremental branch tip growth evident.

5.2 Further Observations

5.2.1 The trees are located within a grassed area on the southern boundary of Halswell School bordering School Rd.

5.2.2 Trees HS05/HS06/HS07/08 overhang and are weighted towards School Rd by approx. 3-5m (image 6).

Image 6

5.2.3 The trees have grown as a single canopy having been planted around the same time with tree removals through natural tree decline/death evident leaving areas of open canopies on the north/northeast face.

5.3 Soil and Ground Compaction Test

5.3.1 A compaction test was carried out to determine any levels of ground compaction around trees HS01-HS10 using a penetrometer compaction tester. The results showed low/moderate levels of soil and ground compaction.

5.3.2 Soil excavation showed fibrous root mass within the area which is to be expected where the root plate flares out from the base of the tree. No larger buttress roots were encountered during the exploratory work but, in my opinion, and based on the age of the trees, the location of the trees in a grassed area where there are low levels of soil compaction, the roots will be diving deeper beyond the points of the exploratory dig.

5.4 Historical Information - General

5.4.1 The school is dated 1864 and the trees appear on historical aerial imagery circa. 1925 (source: https://apps.canterburymaps.govt.nz/CanterburyHistoricAerialImagery/) and appear to have been planted to offer protection to the school from southerly winds (images 7 and 8).

5.4.2 The school has changed significantly over that period with the original building located further away but with the increase in size of Halswell and surrounding areas which has led to an increase in role numbers leading to the expansion of Halswell School.

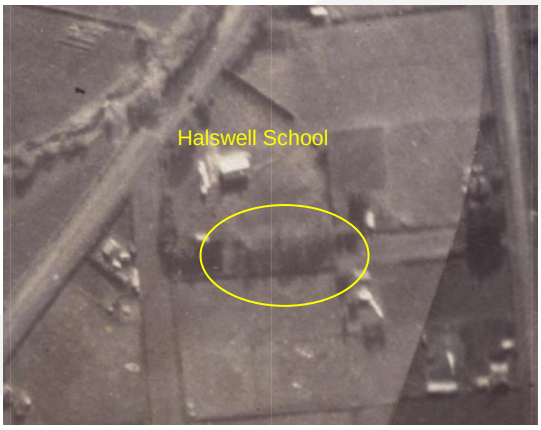

Image 7: Circa.1925

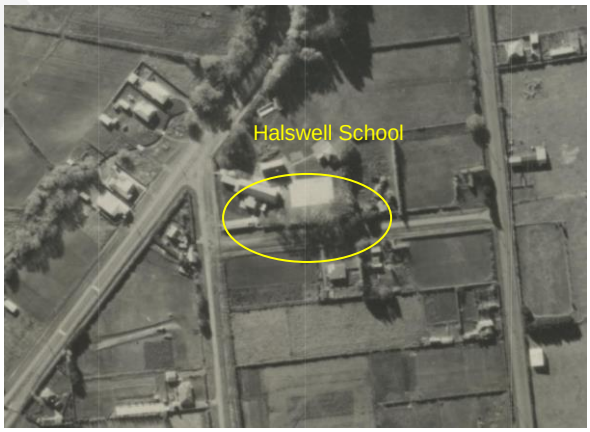

Image 8: Circa.1955

6.0 Options and Considerations

6.1 The proposed Astro Turf play area alignment will be between trees HS01 and HS04 (image 9 and 10).

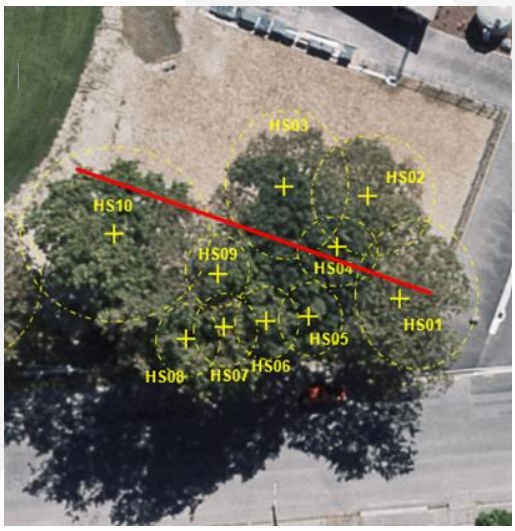

Image 9:

Image 10:

6.2 In consideration of the proposal it has been identified and considered that currently pedestrian movement below the trees is during lunch/play time and is limited to a certain number of students per day. The introduction of the Astro Turf play area will not only increase pedestrian numbers exponentially but could potentially increase the duration period during school times as the area becomes more user friendly. This has been a major consideration for the options discussion.

6.3 Further consideration is the probability or likelihood of failure of the tree (or any part of) into the area frequented by users onto School Rd where pedestrian and vehicle access is high at peak times of the day.

6.4 Options

6.4.1 Maintain the status quo and either (i) do not proceed with the proposal with installing the Astro Turf play area in the vicinity of the trees or (ii) relocate the Astro Turf play area away from the trees to another area.

6.4.2 Remove trees HS02/HS03/HS04 and retain the remaining trees.

<u>Option explored in closer detail.</u>

Discussion – The Oak trees have grown as a single entity and should be treated as such with being planted around the same time. The removal of trees amongst the stand ***will*** impact on the neighbouring trees that have been retained. Trees that have grown as a stand and as a single entity have grown offering protection and shelter to neighbouring trees and have moved dynamically as a single entity during weather events. The removal of trees HS02/HS03/HS04 will expose trees HS01/HS05/HS06/HS07/HS08/HS09/HS10 to wind forces they are unaccustomed to and a domino effect of failures will more than likely occur over the coming years.

Recommendation – This option is ***not*** recommended due to the reasons outlined and that, in my opinion, failures will more than likely occur on the remaining trees HS01/HS05/HS06/HS07/HS08/HS09/HS10 and that section 6.2 and 6.3 of this report has been considered in collaboration with the recommendation.

6.4.3 Remove trees HS01/HS02/HS03/HS04 and retain the remaining trees.

Option explored in closer detail.

Discussion - These trees have grown as a single entity and should be treated as such. The removal of trees amongst the stand ***will*** impact on the neighbouring trees. Trees that have grown as a stand and a single entity have grown offering protection and shelter to neighbouring trees and have moved dynamically as a single entity during weather and the removal of trees HS01/HS02/HS03/HS04 will expose trees HS05/HS06/HS07/HS08/HS09/HS10 to wind forces they are unaccustomed to and a domino effect of failures will more than likely occur over the years.

Recommendation – This option is ***not*** recommended due to the reasons outlined and that, in my opinion, failures will more than likely occur on the remaining trees HS05/HS06/HS07/HS08/HS09/HS10 and that section 6.2 and 6.3 of this report has been considered in collaboration with the recommendation.

6.4.4 Remove all the trees.

Option explored in closer detail.

Remove all the trees – Removal of all the trees to accommodate the Astro Turf play area would be the safest option though this option could be contentious in the community.

From an arboricultural perspective the trees currently have a life span of another 15-25+ years and with regular maintenance and inspections these trees will be a viable asset to the school during this period.

Recommendation - This option is ***not*** recommended and retain all the trees.

6.4.5 Remove trees HS02/HS03/HS04 or remove trees HS01/HS02/HS03/HS04 and reduce the canopies back on the remaining trees.

Remove trees.

Reduce canopies back.

<u>Option explored in closer detail.</u>

Discussion – Pollarding or canopy reductions can be an effective way of managing the canopies of trees and reducing the forces that are being exerted from wind loading, snow loading etc. and can be an effective way of retaining trees that would otherwise be earmarked for removal.

However, these Oak trees are in senescence i.e. that they are no longer putting on incremental yearly growth on the outer canopy (this is also evident in the lack of epicormic growth and the lack of occlusion around some of the wounds as the trees are unable to respond or adapt to the damage due to their age etc.) but are producing leaves, producing and dropping acorns and dropping the leaves annually.

Pollarding or reducing the canopies back will lessen the risk from failures but the likelihood is that these trees would not respond favourably to the reduction work. This would, in my opinion, lead to a decline in their health as they are unable to respond to the work carried as the productive leaves which are essential for the trees to produce energy and sustain life (through the photosynthesis process) will have been drastically reduced due to the canopy reduction work and could increase the health and safety risk longer-term to pedestrians on School Rd and within the school grounds if not managed appropriately.

In my opinion, if pollarding or canopy reduction work is carried out the trees will continue on for several years living off the energy reserves they have stored but will ultimately go into a steady decline to the point of the trees becoming a health and safety concern.

The environment changes from an opened grassed area where water is ample to an Astro Turf play area where the soils will become compacted will also exacerbate the decline further on the remaining trees.

Recommendation

Removing trees HS02/HS03/HS04 or removing trees HS01/HS02/HS03/HS04 and reduce the canopies back on the remaining trees is ***not*** the recommended option for the reasons outlined.

7.0 Recommendation

7.1 Based on the following considerations and sections 6.2 and 6.3 of this report:

- Where pedestrian access beneath the trees will increase exponentially and where the trees could become compromised through tree removals or reduction works creating a higher level of health and safety concerns for both school users and pedestrians and vehicles on School Rd.
- That the trees have grown as a single entity and should be treated as such and that the removal of trees HS02/HS03/HS04 or the removal of trees HS01/HS02/HS03/HS04 will expose the remaining trees to unaccustomed wind loading, snow loading etc that will more than likely create a domino effect of failures.
- Where, in the opinion of the author, if the trees HS02/HS03/HS04 or trees HS01/HS02/HS03/HS04 are removed, and the remaining trees are pollarded or canopy reduced, that this will create further issues whereby the remaining trees will ***not*** respond favorably to the works carried out.
- Where environmental changes from an open grassed area to an Astro Turf play area where pedestrianisation will increase creating compaction related issues to the soils will further exacerbate the decline of any remaining trees.

7.2 It is the recommendation of the author that 6.4.1 Maintain the status quo and either (i) do not proceed with the proposal with installing the Astro Turf play area in the vicinity of the trees or (ii) relocate the Astro Turf play area away from the trees to another area is the only viable option.

Craig Taylor
Consultant Arborist

Appendix 1
Christchurch City Council Tree Health and Structure Assessment

Description	Non-existent	Very Good	Good	Fair	Poor	Very Poor
Assessment of **Tree Health**	Asset is no longer present or cannot be found	No more than approximately 5% foliage density loss, discolouration or disease, below ideal leaf size or shoot growth, dieback, dead wood or other disorders.	Approximately 6-10% foliage density loss, discolouration or disease, below ideal leaf size or shoot growth, dieback, dead wood or other disorders.	Approximately 11-30% foliage density loss, discolouration or disease, below ideal leaf size or shoot growth, dieback, dead wood or other disorders.	Approximately 31-70% foliage density loss, discolouration or disease, below ideal leaf size or shoot growth, dieback dead wood or other disorders.	Tree dead or state of severe decline. More than approximately 70% foliage density loss, discolouration or disease, below ideal leaf size or shoot growth, dieback, dead wood or other disorders.
Assessment of **Tree Structure**		No structural defects or abnormalities (including roots and trunk taper).	Defects (including roots and trunk taper) do not affect structural integrity or continued well-being of tree.	Defects (including roots and trunk taper) present, but can be rectified in order to maintain the structural integrity and continued well-being of tree.	Tree maintenance may improve the framework or the continued well-being of tree. Defects (including roots and trunk taper) result in loss of structural integrity, may be mitigated but unlikely to be rectified.	Tree dead or state of severe decline. Total loss of structural integrity of tree. Tree maintenance cannot improve the framework or the continued well-being of tree. Defects (including roots and trunk taper) result in loss of structural integrity, and cannot be mitigated or rectified
Condition Rating	**0**	**1**	**2**	**3**	**4**	**5**

The single overall condition score for a tree is worst of the health and structure grades (ie the highest number).

Health

Tree health assesses both vigour and vitality.

Vigour is described as growth efficiency. Trees with higher growth efficiency are more likely to effectively resist strain from, and respond to, biotic and abiotic factors.

Vitality is described as the tree's ability to grow and survive in the position that it occupies.

When assessing a tree's health, the following are assessed:

- leaf colour;
- leaf necrosis;
- shoot growth;
- fruit or flower set (e.g. lack of nitrogen can lead to poor fruit set, excess or insufficient water during the summer, root constrictions caused by hardpan or compacted soil, sunburn or borer insects on the trunk or branches, and pests such as soil nematodes, root rot, bacterial canker, brown rot of twigs, powdery mildew, and spider mites can cause fruit to drop);
- live crown ratio;
- foliage density;
- leaf size;
- wound wood;
- absence/presence of lichens on small diameter branching;
- dieback;
- sun scorch;
- pests and diseases.

Stands of trees are to be averaged and not individually assessed.

Structure

This is an assessment of the structural integrity of a tree's branches, trunk and roots. It considers defects such as cavities, cracks, presence of decay, bleeding/sap flow, wounding and previous failure (e.g. storm damage, mower damage), ground cracking, root plate slumping or heaving, girdling roots, included unions (e.g. branch bark ridges that are included (concave) are considerably weaker than those with a prominent ridge line (convex), trunk taper, excessive end weight, dead branches, loose/cracked bark, organised or disorganised burrs (e.g. poplars).

Stands of trees are to be averaged and not individually assessed.

Mitigation means cable bracing, propping, pruning.

Rectification means removing the defect.