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E. Arborist Report

Prepared by ArborSite

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ArborSafe

Siena College
Masterplan development
Riversdale Road, Camberwell VIC
Arboricultural Impact Assessment

26 April 2021

Assessment and Report prepared by:

Andrew Clark
AQF Level 5

Ido Monk
AQF Level 5

C92252v3

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ArborSafe
TREE CONSULTANCY AND MANAGEMENT SYSTEMS

C92252

26 April 2021

Tony Grant
Business Manager
Siena College
815 Riversdale Road
Camberwell VIC 3124

Arboricultural Impact Assessment Report regarding ninety-six (96) trees located within the vicinity of the proposed Masterplan (Stages 1–4) at Siena College, 815 Riversdale Road, Camberwell

Dear Tony,

We are pleased to provide you with the following Arboricultural Impact Assessment Report for ninety-six (96) trees within the grounds of Siena College.

Complete use of this report is authorised under the conditions limiting its use as stated in Appendix A Item 7 of "*Arboricultural Reporting Assumptions and Limiting Conditions*".

Should you have any queries relating to this report, its recommendations, or the options considered please do not hesitate to contact us on 1300 272 671.

Regards,

Andy Clark
Consulting Arborist
Dip. Hort. (Arb.), AQF Level 5

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Table of Contents

1 Executive Summary 1
2 Introduction 2
3 Scope 2
4 Methodology 3
4.1 Data Collection 3
5 Observations 5
5.1 Location 5
5.2 Site Trees 6
5.3 Tree Retention Values 7
5.4 Heritage / Environment Status 8
6 Discussion 10
6.1 Proposed Construction 10
6.2 Impact of Proposed Development 14
6.3 Determining TPZ Encroachment 21
7 Tree Protection and Management Recommendations 22
7.1 Tree Removal 22
7.2 Tree Retention and Specific Protection 23
7.3 Generic Protection and Reporting Measures 31
7.4 Activities Prohibited within the TPZ 34
7.5 Protective Fencing Specification 35
7.6 Trunk and Ground Protection 36
7.7 Tree Protection Signs 37
7.8 Project Arborist 37
7.9 Project Milestones 38
7.10 Compliance Reporting 38
7.11 Offset Tree Planting 38
7.12 Additional Excavation/Trenching within TPZs 39
7.13 Plant Health Care 39
7.14 Irrigation 39
7.15 Mulching 39
8 References 40
Appendix A. Arboricultural Reporting Assumptions and Limiting Conditions 41
Appendix B. Explanation of Tree Assessment Terms 42
Appendix C. Tree Retention Values 45
Appendix D. Plant Health Care and Mulching 47
Appendix E. Tree Assessment Data 52

BOROONDARA
Received
28/4/2021

1 Executive Summary

1.1.1 The following Arboricultural Impact Assessment (Report) regarding ninety-six (96) trees located within the grounds of Siena College. The subject site was identified by Siena College (the Client) as possessing trees that may be impacted upon by four (4) stages of redevelopment proposed across the site over the coming years. The redevelopment plans have been laid out in the Siena College Masterplan document.

1.1.2 In part, the project scope was to nominate subject trees that are in direct conflict with the proposed building footprint as well as identify and reduce potential conflicts between retainable trees and site development. Accurate information on the area required for tree retention and methods/techniques suitable for tree protection during construction have been provided. It should be noted that the concept plans located within the Masterplan have been used to assess the impacts and additional impact amendments may be required once detailed designs for each stage have been completed.

1.1.3 Tree retention values have been determined based upon a modified version of the British Standard and which have been prescribed into one of the following four (4) categories, A, B, C and U. Refer to Appendix C for further detail. Generally, relevant consent authorities will consider:

- **A** retention value trees as a site constraint and may require alterations to the proposed development design and/or specific protection measures to allow retention, unless the proposed development outweighs the retention value of the tree
- **B** retention value trees as a site constraint consideration, lesser changes should be considered to retain such trees
- **C** retention value trees are not considered a site constraint
- **U** retention value trees are considered a site opportunity, as such trees are recommended for removal regardless of the proposed development.

1.1.4 Trees impacted by the proposed development:

Category	Description	Total	Removal		Retain	
			located within development footprint	irrespective of future development	with specific protection	with generic protection
A	High retention value trees	21	141, 142, 143, 144, 150		28, 94, 95, 134, 135, 136, 137, 138, 139, 140, 145, 146, 147	218, 219, 220
B	Moderate retention value trees	24	34, 48, 125, 127, 128, 130, 131, 132, 196, 201, 204, 205		30, 31, 32, 35, 36, 112	102, 106, 212, 213, 215, 216
C	Low retention value trees	47	38, 39, 41, 42, 44, 47, 84, 113, 114, 115, 116, 118, 119, 120, 121, 122, 123, 126, 129, 190, 195, 197, 198, 199, 200, 202, 203, 206, 207		29, 33	80, 85, 86, 87, 103, 104, 105, 107, 108, 110, 111, 208, 209, 210, 211, 214
U	Trees to be removed irrespective of proposed development	4		81, 109, 178, 217		

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Received
28/4/2021

2 Introduction

2.1.1 ArborSafe Australia Pty Ltd was engaged by Tony Grant on behalf of the Client to complete an Arboricultural Impact Assessment Report on ninety-six (96) trees located within the grounds of Siena College at 815 Riversdale Road, Camberwell.

2.1.2 The report has been requested to form part of the Sienna College Masterplan that involves the demolition of various existing buildings and landscaped areas and construction of new educational space buildings, a gymnasium and tennis courts (with associated underground carparking) and open landscaped areas.

2.1.3 The proposed development, as identified within the Sienna College Masterplan 2021, has been reviewed and in summary consists of four stages of development, proposed to take place over a number of years:

- Stage 1 – Veritas Centre
- Stage 2 – Latingata Morrom Gymnasium
- Stage 3 – Salamanca Place
- Stage 4 – Central Court Precinct

2.1.4 Further development detail within the individual stages can be found in Section 6 of this Report.

2.1.5 The report was intended to provide information on a subset of existing site trees, as well as neighbouring trees, and how they may be impacted upon by the proposed development. Report findings and recommendations provided are based upon guidance provided within Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

2.1.6 Observations and recommendations provided within this report are based upon information provided by the Client and an arborist site visit.

3 Scope

3.1.1 Carry out a visual examination of the nominated trees located within the vicinity of the proposed development.

3.1.2 Provide an objective appraisal of the subject trees in relation to their species, estimated age, health, structural condition, useful life expectancy (ULE) and viability within the landscape.

3.1.3 Based on the findings of this investigation, provide independent recommendations on the retention value of the trees.

3.1.4 Nominate subject trees that can be retained or require removal to facilitate the development.

3.1.5 Identify and reduce potential conflicts between subject trees and site development by providing accurate information on the area required for tree retention and methods/techniques suitable for tree protection during construction.

3.1.6 Provide information on restricted activities within the area nominated for tree protection, as well as suitable construction methods to be adopted during demolition and/or construction.

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Received
28/4/2021

4 Methodology

4.1 Data Collection

4.1.1 Ido Monk of ArborSafe Australia Pty Ltd carried out a site inspection of the subject trees on 11 March 2021.

4.1.2 Trees that are the subject of this report (Figure 3) were identified during discussions with the Client, reviewing relevant supplied development documentation.

4.1.3 Pursuant with the City of Boroondara Tree Management Guidelines 2010, all site trees above 5m in height and/or with a DBH >25cm have been included within this report. Smaller trees/shrubs within the site may have been omitted from the report based on their species, current size and/or potential future size and contribution to local amenity.

4.1.4 The subject trees were inspected from the ground using the initial component of Visual Tree Assessment (VTA) (Matthek, 1994). No foliage or soil samples were taken and no aerial, underground or internal investigations were undertaken.

4.1.5 Tree height and canopy width were estimated and have been provided to the nearest whole metre. The majority of trunk diameters at breast height (DBH) and trunk diameter at the root crown (DRB) were measured with a diameter tape and provided to the nearest centimetre, although some trees within the rear residential yards have been estimated. The estimated trees are identified within the data table.

4.1.6 TPZ encroachment has been estimated based on a review of the concept plans detailed within the Siena College Masterplan 2021, review of the data of the impacted trees and an onsite assessment.

4.1.7 Environmental and Heritage information may be sourced from State/Local Government and private sources. The source of all information has been referenced accordingly.

4.1.8 Data collected on site was analysed by Andrew Clark, collated into report format, and relevant recommendations were formulated.

4.1.9 Tree protection zones (TPZ) and structural root zones (SRZ) were calculated in accordance with the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites* (refer to Section 7.6).

4.1.10 Retention values have been determined based upon a modified version of the British Standard BS 5837–2012: *Trees in Relation to Design, Demolition and Construction* (refer to Appendix C).

4.1.11 All photographs were taken at the time of the site inspections by the author and have not been altered for brightness or contrast, nor have they been cropped.

4.1.12 Plans of the existing site and of the proposed development were provided to ArborSafe in March 2021.

4.1.13 No proposed underground service locations have been reviewed in the preparation of this report.

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Received
28/4/2021

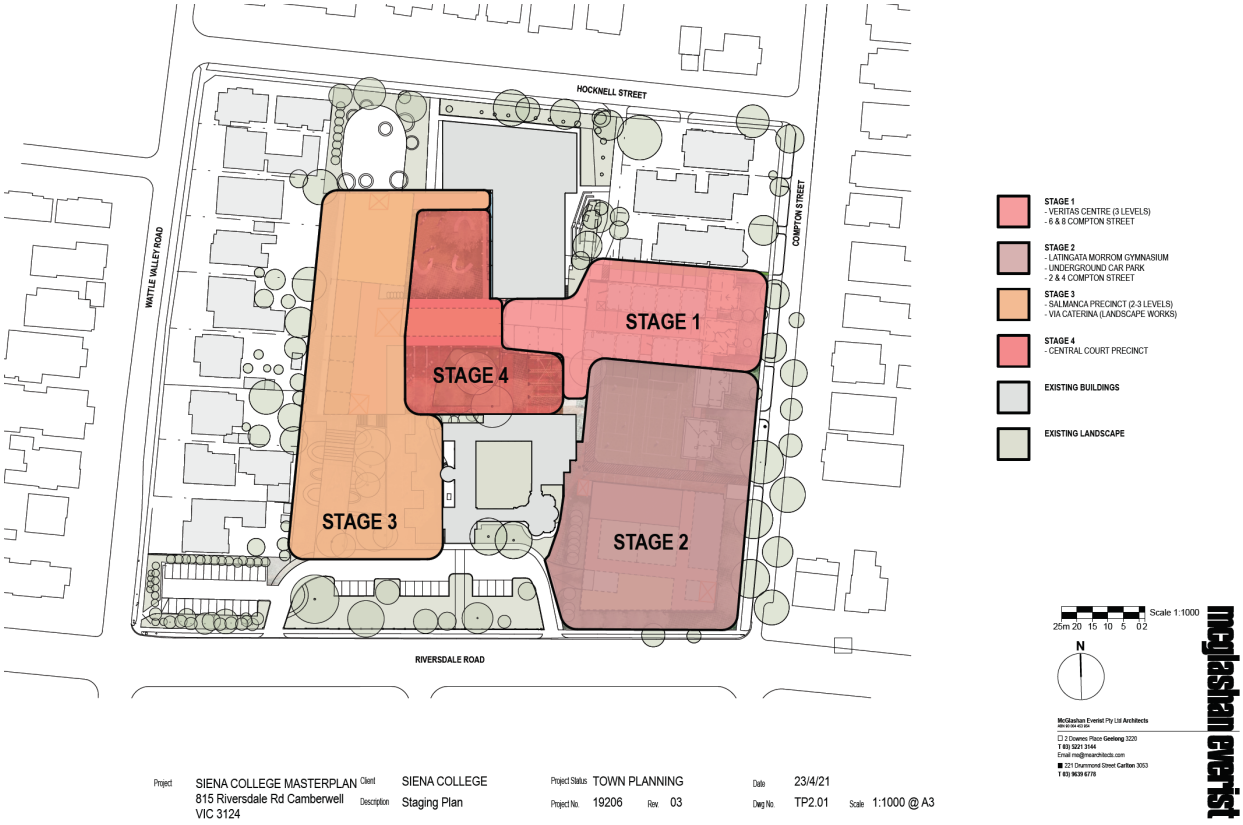

Figure 1. Excerpt from Siena College Masterplan – Staging Plan. (McGlashan Everist, 23 April 2021).

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Received
28/4/2021

5 Observations

5.1 Location

5.1.1 The various development zones/stages were all located within the grounds of Siena College (Figure 1 and 2).

5.1.2 The site was located within the City of Boroondara Local Government Area (LGA).

5.1.3 Usage surrounding the site was a mixture of school grounds, residential properties and school buildings.

5.1.4 The site possessed a largely level aspect with site soils likely to be altered from their natural horizons due to long term urban development.

Figure 2. Whole site image (location). Red lines delineate the site and area containing the subject trees that are to be impacted by the proposed development. (Google Maps, March 2021).

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Received
28/4/2021

5.2 Site Trees

5.2.1 The subject trees (Figure 3) have been numbered in line with the existing ArborSite tree numbering system. Trees can be identified on site using white tree tags which are typically located at approximately 2.0m from ground level on the southern side of the trunk.

5.2.2 The majority of subject trees form part of the existing ArborSite Tree Management System for the entire site and as such have been tagged, positioned on aerial imagery and visually assessed annually since 2014.

5.2.3 As these subject trees form a subset of a previous survey undertaken for the entire site, numbering is not sequential.

5.2.4 Trees on neighbouring residential or Council property will be un-impacted by the Masterplan development given their proximity from the proposed construction and thus do not require any specific protection over and above those considerations laid out within the generic protection measures detailed in Section 7.3 of this Report. In the event works are to be performed in closer proximity to the boundary than set-out in this report, further analysis into these impacts to trees will be required and protection guidance provided at that time.

5.2.5 The subject trees are considered to all be planted material, with no remnant specimens involved. The site trees are made up of a fairly even mixture of exotic and native species, which also have an even mix of semi-mature to mature ages.

5.2.6 There is a good spread of ULE, not being heavily weighted to either shorter term or longer-term trees which may expose the College to a break in continuity at some stage in the future.

5.2.7 The majority of site trees were of moderate size and used within the site for shade, screening or amenity purposes, with minimal influence on the greater streetscape. The most significant trees appeared to be the line of *Cupressus torulosa* (Bhutan Cypress) adjacent the Chapel/convent building, as detailed in Section 5.4.1 of this report.

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Received
28/4/2021

Figure 3. Site map showing subject trees. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix E – Tree Assessment Data. (ArborSite, March 2021).

5.3 Tree Retention Values

5.3.1 Retention values were determined based upon a modified version of the British Standard BS 5837–2012: *Trees in Relation to Design, Demolition and Construction*. This standard categorises tree retention value based upon assessment of the tree's quality (health and structure), and life expectancy. Other criteria such as its physical dimensions, age class, location and its Amenity, Heritage and Environmental significance are also considered. A breakdown of attributes required for each category can be obtained from Appendix C – Tree Retention Values.

Category	Tree numbers
A	28, 94, 95, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 150, 218, 219, 220
B	30, 31, 32, 34, 35, 36, 48, 102, 106, 112, 125, 127, 128, 130, 131, 132, 196, 201, 204, 205, 212, 213, 215, 216
C	29, 33, 38, 39, 41, 42, 44, 47, 80, 84, 85, 86, 87, 103, 104, 105, 107, 108, 110, 111, 113, 114, 115, 116, 118, 119, 120, 121, 122, 123, 126, 129, 190, 195, 197, 198, 199, 200, 202, 203, 206, 207, 208, 209, 210, 211, 214
U	81, 109, 178, 217

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Received
28/4/2021

5.4 Heritage / Environment Status

5.4.1 Heritage Status

5.4.2 Siena Convent is not included on the Victoria Heritage Register (Heritage Act 2017), although specific tree controls pertaining to the row of mature Cypress trees are included within the Boroondara Council Planning Scheme.

5.4.3 The Planning Property Report (VicPlan, 2021) for 815 Riversdale Road, Camberwell 3124 (Plan PC370879) heritage overlay lists Siena Convent (HO724) with associated tree controls, referencing the above listed document.

5.4.4 The group of mature cypress trees subject to control through association with the Siena Convent have been identified as *Cupressus torulosa* (Bhutan Cypress) in this report as opposed to 'Italian Cypress' as listed in the Boroondara Council Planning Scheme.

5.4.5 A subsequent Assessment of Heritage Impacts, undertaken by Lovell Chen in 2021 (Refer to Appendix G of Sienna College Masterplan), acknowledges the Cypress avenue as a '*contributory element within a significant place'* and states the potential loss of four (4) trees would weaken the visual aspect of the avenue. The report also states that sufficient trees would remain to show the original purpose and placement of the planting. The report prepared by Openworks as part of the Masterplan submission includes further planting to strengthen and maintain the avenue into the future.

Heritage Listing	Listing Title	Listing Number	Tree Controls Apply?	Included in Victorian Heritage Register	Gazette Page
Boroondara Planning Scheme – 2019 (Heritage Overlay)	Siena Convent	HO724	Yes – mature Italian cypress	No	P60 of 98

Boroondara Council Planning Scheme 2019

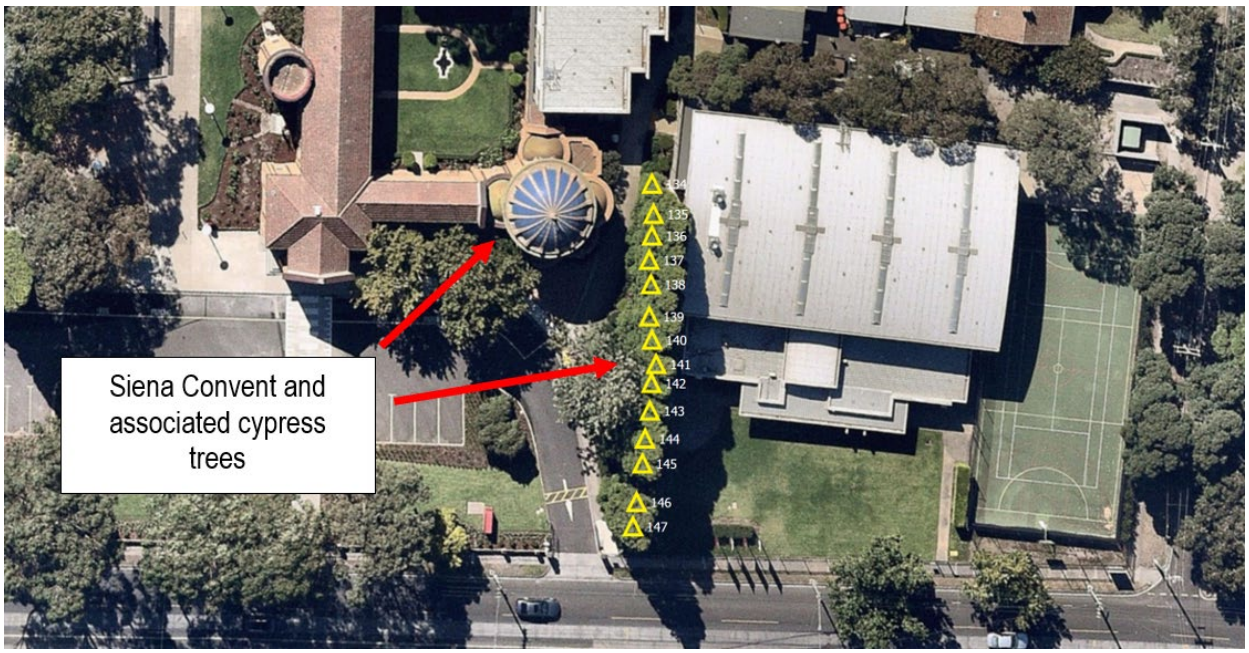

Figure 4. Site map showing subject (heritage) trees. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix E – Tree Assessment Data. (ArborSite, March 2021).

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Received
28/4/2021

5.4.6 Botanical and Environmental Status

5.4.7 No trees within the subject site were listed within the City of Boroondara Significant Tree Study (2019) (see Figure 5).

5.4.8 No site-specific vegetation overlays pertaining to rainforests, bioregional conservation status or ecological vegetation class where listed/specified during a search of the subject site (VicPlan, February 2021).

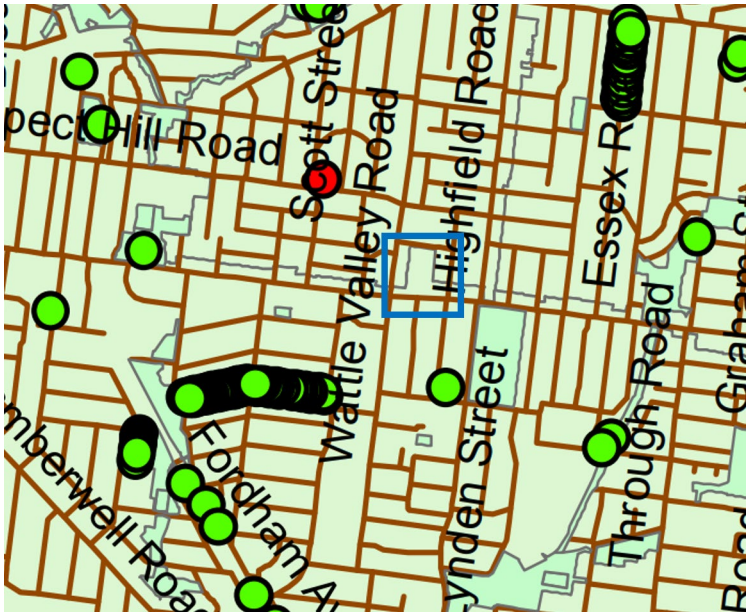

Figure 5. Excerpt from Significant Tree Study – indicative subject area within blue square (City of Boroondara, 2019).

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Received
28/4/2021

6 Discussion

6.1 Proposed Construction

6.1.1 Stage 1 – Veritas Centre

6.1.2 The proposed development at this stage has been reviewed and in summary consists of:

- Demolition of some existing buildings and infrastructure.
- Installation of temporary car parking in the area to the west of Nos. 2 and 4 Compton Street, north of the existing Latingata Morrom Gymnasium and east of the existing College Hall.
- A 3-level building connected to the existing 3-level classroom block will provide contemporary STEAM learning spaces, including maker spaces with links to outdoor areas and car parking.
- The building steps back from the east at the higher levels so as to be recessive in the streetscape. Materiality complements the existing neighbourhood character.
- Improved landscaping to the northern boundary and east facing Compton St frontage areas retaining the essential fabric of existing houses on the site and integrating them into the campus.
- A 2.4m high acoustic fence and 3m dense landscaping along the boundary with 10 Compton Street. Setbacks are in accordance with planning requirements for residential development, as shown in sections TP3.02 and TP3.03 of the Masterplan.
- Associated landscaping works once building is completed.

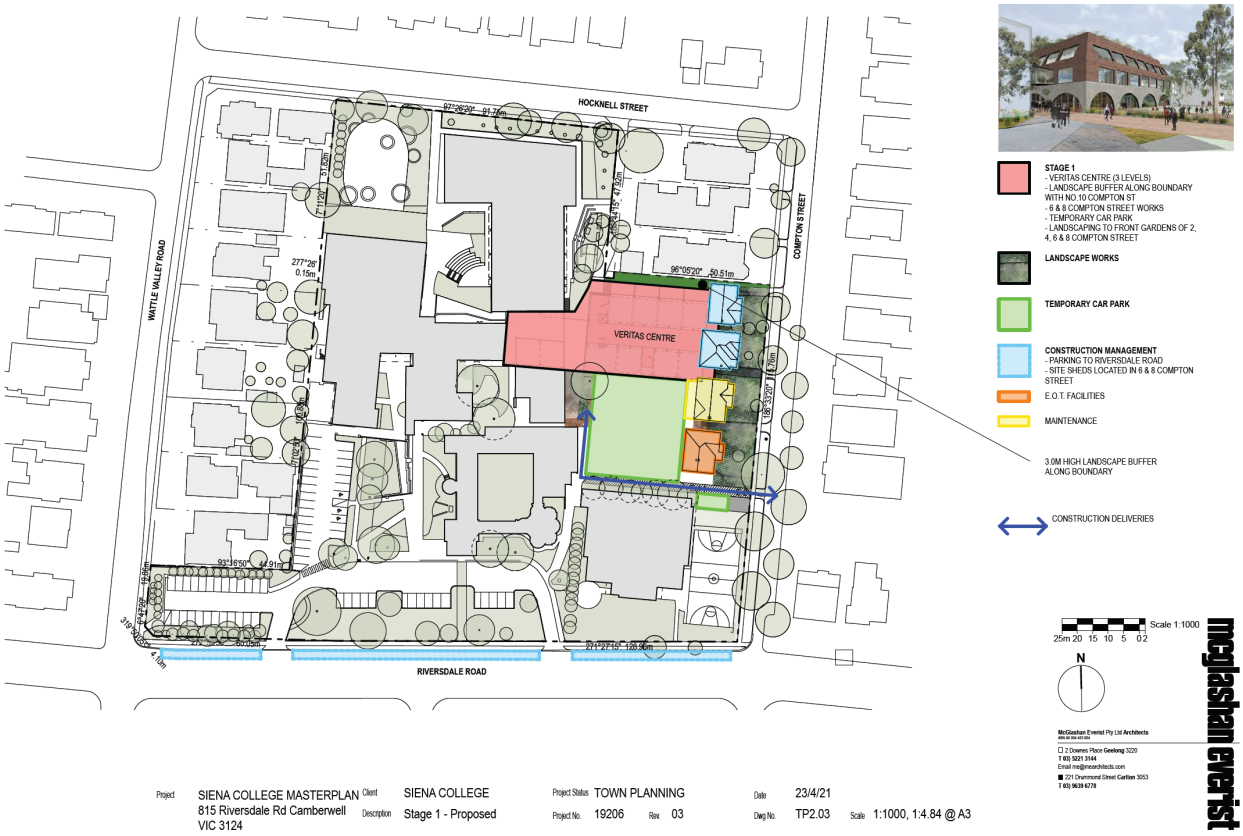

Figure 6. Proposed Stage 1 works. (McGlashan Everist, 23 April 2021).

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Received
28/4/2021

6.1.3 Stage 2 – Latingata Morrom Gymnasium and Underground Car Park

6.1.4 The proposed development at this stage has been reviewed and in summary consists of:

- Demolition of some existing buildings and infrastructure.
- The construction of a 2-level Gymnasium building (Latingata Morrom) comprising internal sports courts and facilities.
- The construction of two new full sized outdoor courts to the north of the new Gymnasium.
- An underground car park beneath both the Gymnasium and outdoor court area.

Figure 7. Proposed Stage 2 works. (McGlashan Everist, 23 April 2021).

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Received
28/4/2021

6.1.5 Stage 3 – Salamanca Place

6.1.6 The proposed development at this stage has been reviewed and in summary consists of:

- Demolition of some existing buildings and infrastructure.
- A new student learning centre and performing arts building on the western edge of the campus, named the Salamanca Precinct, which connects to the rest of the College through the proposed Central Court building. This improves accessibility throughout the campus on consistent, legible floor levels.
- A new entrance plaza, Via Caterina, from Riversdale Road and connects to the bottom level of the Salamanca Precinct building.
- A new landscape buffer along the western boundary to provide some screening from the properties along Wattle Valley Road.

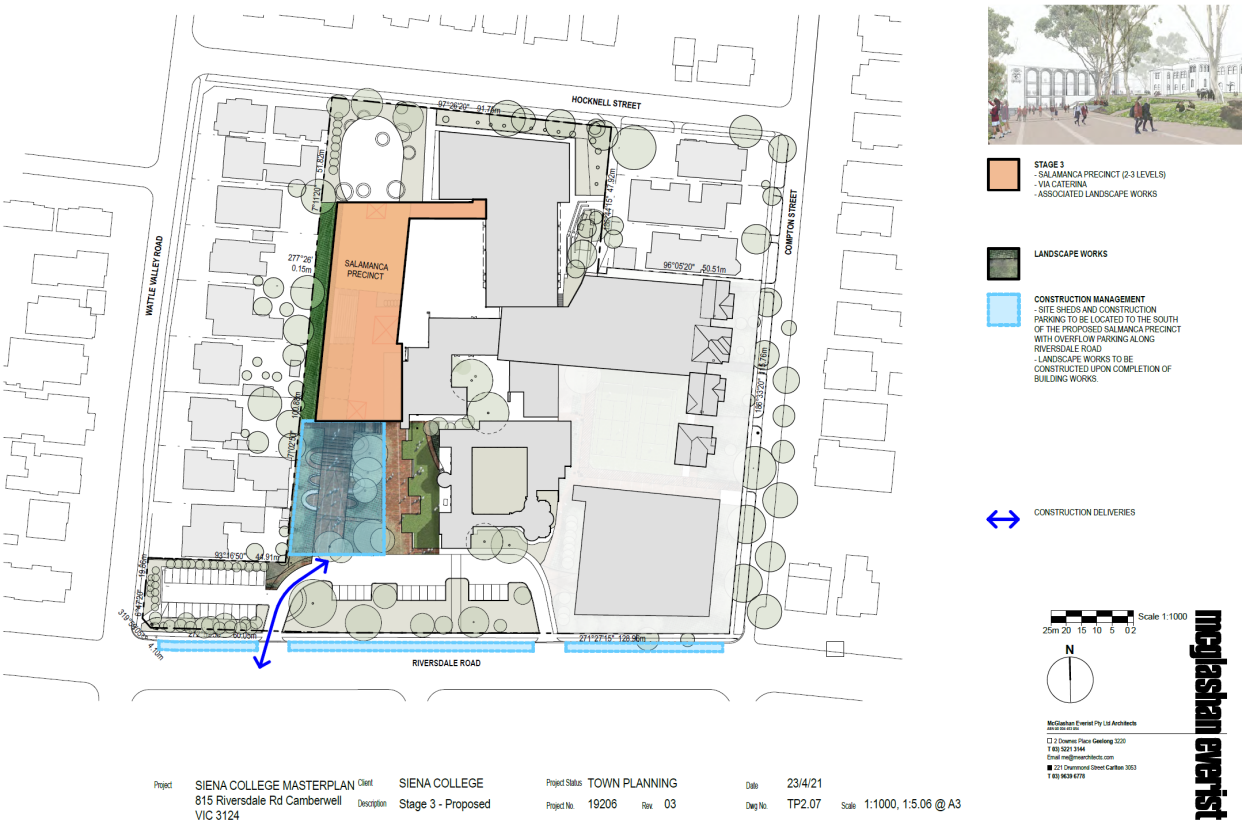

Figure 8. Proposed stage 3 works. (McGlashan Everist, 23 April 2021).

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Received
28/4/2021

6.1.7 Stage 4 – Central Court Precinct

6.1.8 The proposed development at this stage has been reviewed and in summary consists of:

- Demolition of some existing infrastructure.
- A newly landscaped central courtyard to provide a centralised outdoor space for student and College gatherings consisting of both passive and active outdoor spaces along with a centralised and connective element for each of the north, south, east and west parts of the College campus.

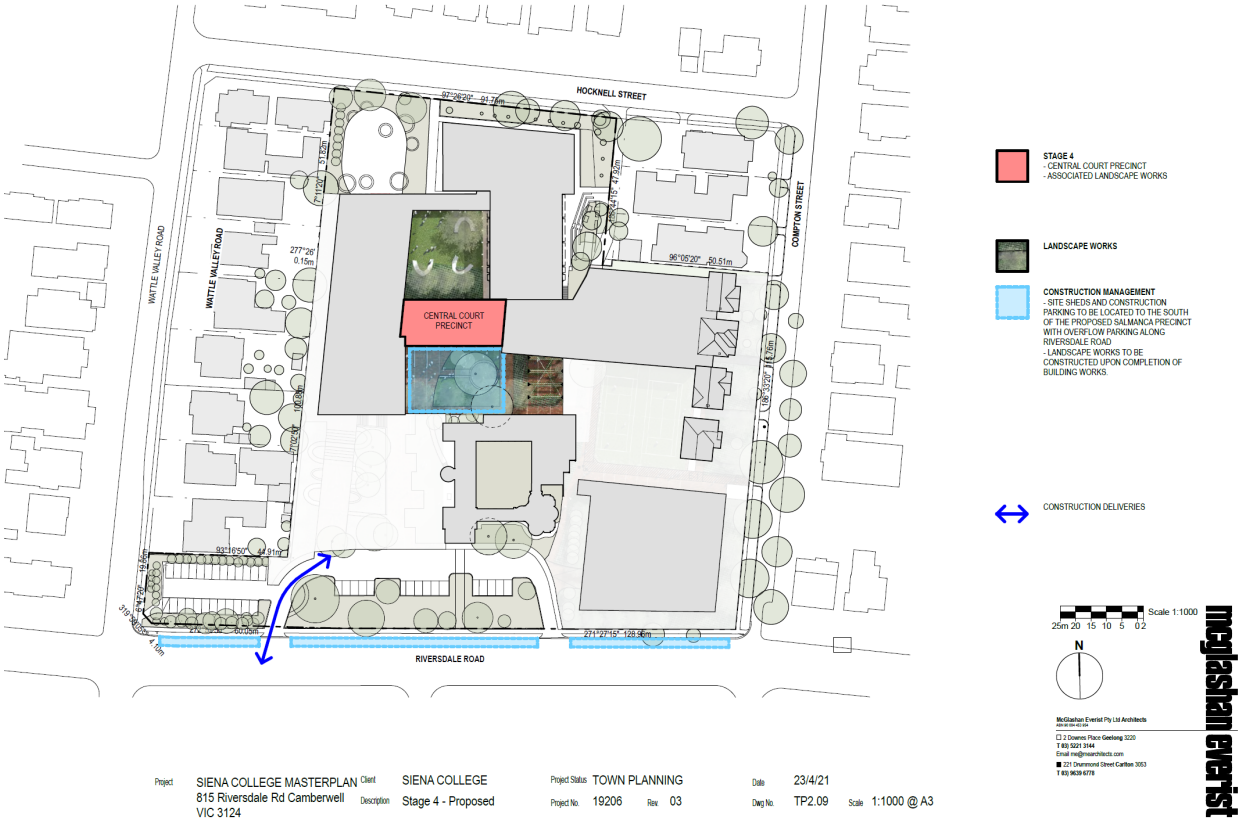

Figure 9. Proposed stage 4 works. (McGlashan Everist, 23 April 2021).

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6.2 Impact of Proposed Development

6.2.1 Stage 1

6.2.2 Review of the proposed design has been undertaken in the context of tree retention and removal across the area.

6.2.3 Forty-seven (47) trees are situated within the stage one work area. These trees are numbered 80, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 118, 119, 120, 121, 122, 123, 125, 178, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216 and 217

6.2.4 The main impact on the trees comes from direct conflict with the footprint of the proposed Veritas building and temporary car parking area, with potential secondary impacts from associated landscaping works.

6.2.5 Trees on neighbouring residential or Council property will be un-impacted by the Masterplan development given their proximity from the proposed construction and thus do not require any specific protection over and above those considerations laid out within the generic protection measures detailed in Section 7.3 of this Report. In the event works are to be performed in closer proximity to the boundary than set-out in this report, further analysis into these impacts to trees will be required and protection guidance provided at that time.

Figure 10. Proposed Stage 1 demolition works. (McGlashan Everist, 23 April 2021).

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Received
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Figure 11. Site map showing subject trees – Stage 1. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix E – Tree Assessment Data. (ArborSite, March 2021).

6.2.6 Stage 2

6.2.7 Review of the proposed design has been undertaken in the context of tree retention and removal across the area.

6.2.8 Twenty-five (25) trees are situated within the stage one work area. These trees are numbered 126, 127, 128, 129, 130, 131, 132, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 150, 218, 219 and 220.

6.2.9 The main impact on the trees comes from direct conflict with the footprint of the proposed Gymnasium building, underground car park and outdoor court area, with potential secondary impacts from associated landscaping works.

6.2.10 The existing building and infrastructure would likely have constrained the adjacent tree's root projection, making demolition and future building within the same footprint less impactful than it may otherwise have been.

6.2.11 Trees on neighbouring residential or Council property will be un-impacted by the Masterplan development given their proximity from the proposed construction and thus do not require any specific protection over and above those considerations laid out within the generic protection measures detailed in Section 7.3 of this Report. In the event works are to be performed in closer proximity to the boundary than set-out in this report, further analysis into these impacts to trees will be required and protection guidance provided at that time.

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Figure 12. Proposed Stage 2 demolition works. (McGlashan Everist, 23 April 2021).

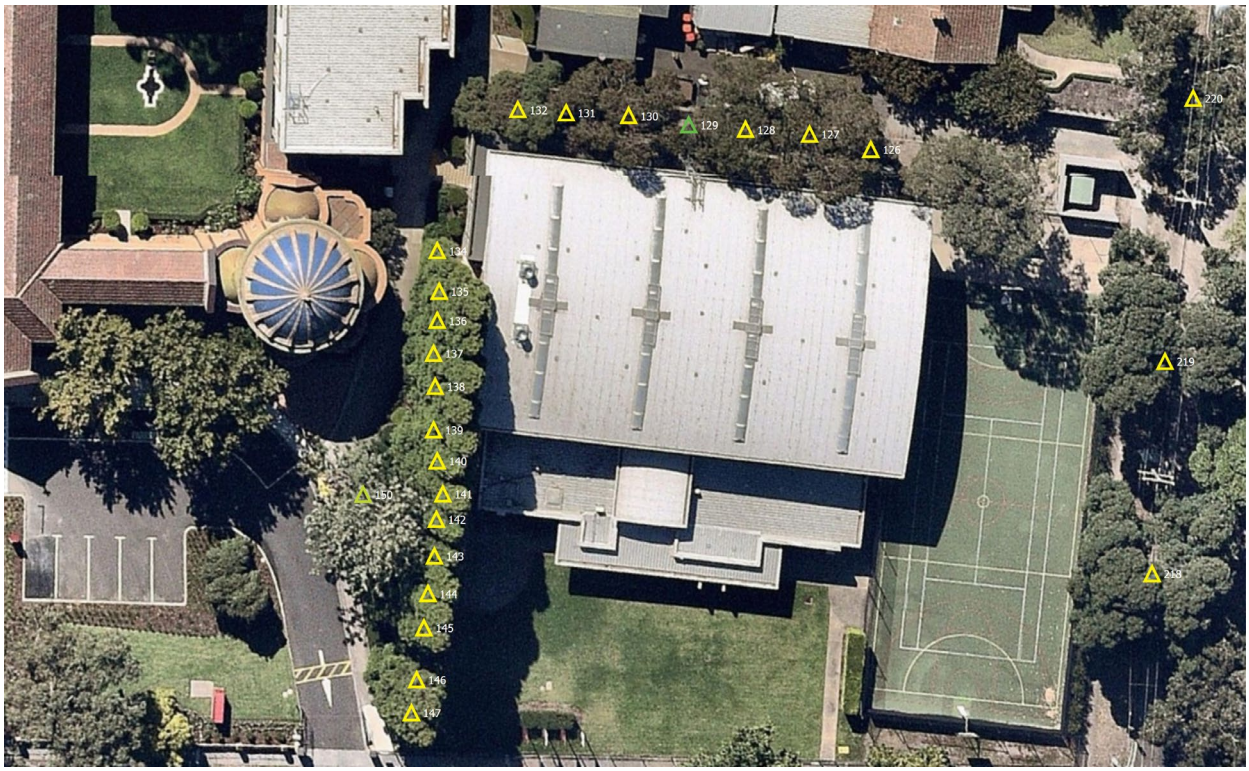

Figure 13. Site map showing subject trees – Stage 2. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix E – Tree Assessment Data. (ArborSite, March 2021).

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28/4/2021

6.2.12 Stage 3

6.2.13 Review of the proposed design has been undertaken in the context of tree retention and removal across the site.

6.2.14 Twenty-two (22) trees are situated within the stage three work area. These trees are numbered 28, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 41, 42, 44, 47, 48, 81, 84, 85, 86, 87 and 190

6.2.15 The main impact on the trees comes from direct conflict with the footprint of the proposed Salamanca building, with potential secondary impacts from associated landscaping works and use as a temporary car parking and site management area.

6.2.16 Trees on neighbouring residential or Council property will be un-impacted by the Masterplan development given their proximity from the proposed construction and thus do not require any specific protection over and above those considerations laid out within the generic protection measures detailed in Section 7.3 of this Report. In the event works are to be performed in closer proximity to the boundary than set-out in this report, further analysis into these impacts to trees will be required and protection guidance provided at that time.

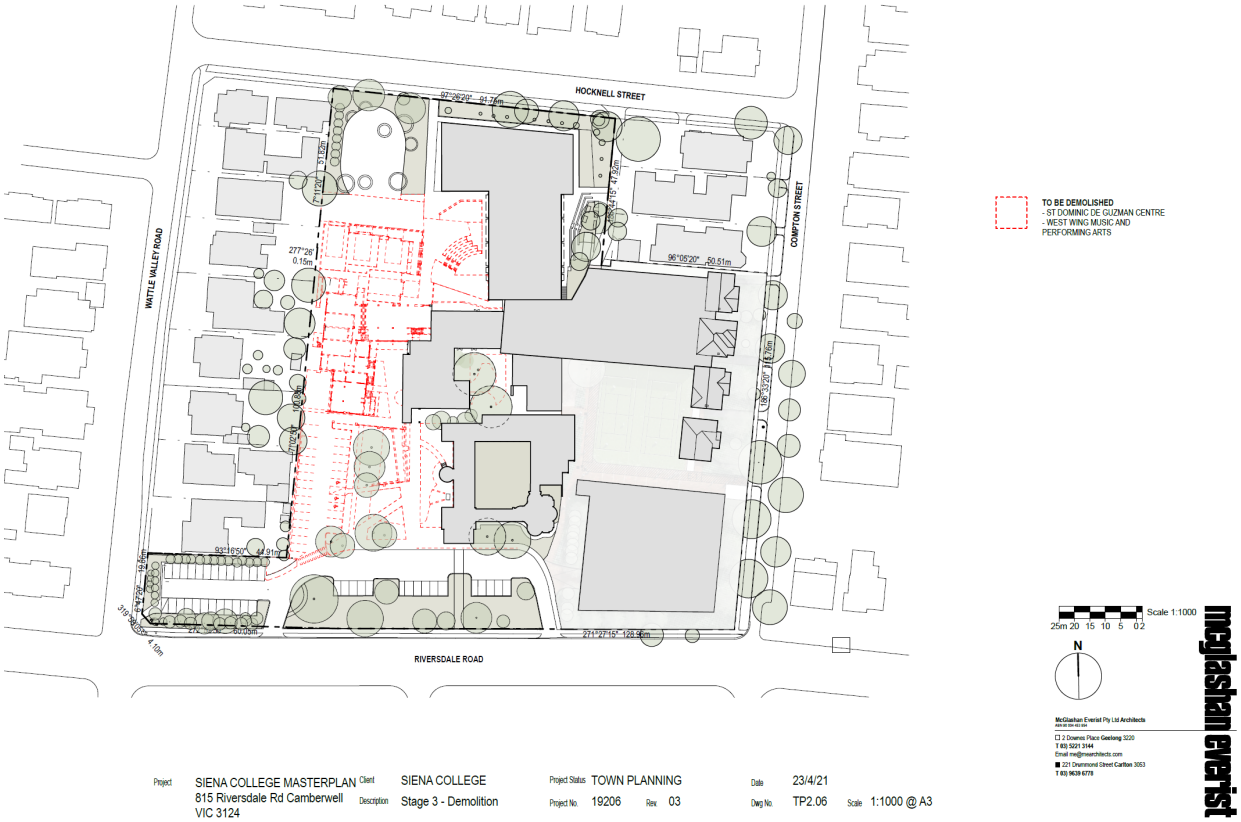

Figure 14. Proposed Stage 3 demolition works. (McGlashan Everist, 23 April 2021).

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Received
28/4/2021

Figure 15. Site map showing subject trees – Stage 3. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix E – Tree Assessment Data. (ArborSite, March 2021).

6.2.17 Stage 4

6.2.18 Review of the proposed design has been undertaken in the context of tree retention and removal across the area.

6.2.19 Two (2) trees are situated within the Stage 4 work area. These trees are numbered 94 and 95

6.2.20 The main impact on the trees comes from proposed hard landscaping works.

6.2.21 Trees on neighbouring residential or Council property will be un-impacted by the Masterplan development given their proximity from the proposed construction and thus do not require any specific protection over and above those considerations laid out within the generic protection measures detailed in Section 7.3 of this Report. In the event works are to be performed in closer proximity to the boundary than set-out in this report, further analysis into these impacts to trees will be required and protection guidance provided at that time.

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Received
28/4/2021

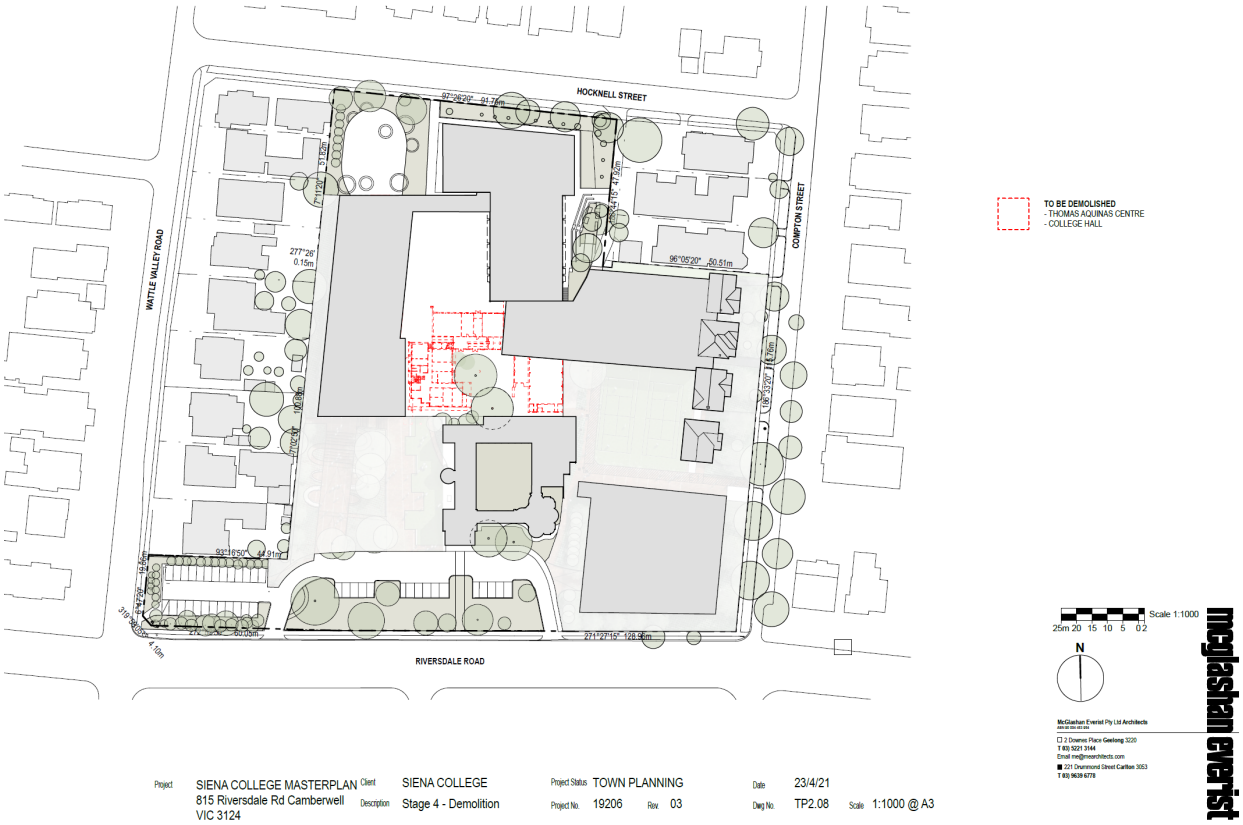

Figure 16. Proposed Stage 4 demolition works. (McGlashan Everist, 23 April 2021).

Figure 17. Site map showing subject trees – Stage 4. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix E – Tree Assessment Data. (ArborSite, March 2021).

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Received
28/4/2021

6.2.22 Typical Development Impacts

6.2.23 Any trees affected by direct conflict with the proposed construction footprint require removal. To retain any of these trees a redesign or realignment of the major components of the development would be required. Refer to Appendix E for full detail.

6.2.24 Other main development impacts which affect trees, but not necessarily to the point of requiring immediate removal, is through significant root damage due to major TPZ encroachment. These can largely be placed into three (3) categories – soil compaction, level changes or direct root severance.

6.2.25 Negative tree impacts can manifest as either a reduction in health and/or vigour due to root loss (absorption and/or transport roots) resulting in a reduction in water and nutrient absorption capability or on tree stability if larger roots are impacted. Ultimately, the outcome for the trees depends on a number of variable factors including species, age, current health, TPZ encroachment percentage, soil type, topography, previous site use and the proposed design and construction methodology.

6.2.26 Compacted soils, especially artificially compacted soils such as those found under driveways or building platforms, have a higher bulk density down to a deeper level of subsoil. Bulk density is the term used for describing the weight of soil per unit volume. The broad engineering thinking is that the higher the density the more stable the road surface due to less soil movement in expansion, contraction, or compression. A higher bulk density is produced by compacting the soil to reduce available pore space between the soil particles.

6.2.27 The effect of compacted soils on plants is somewhat influenced by the soil type but generally a reduction in available pore space reduces the available area for oxygen and water within the soil. A reduction in available soil water and oxygen inhibits root activity within the soil, as they are essential for root elongation and growth, and the lack of these properties is considered a major limiting factor.

6.2.28 A similar reduction in root activity, due to a reduction in pore space, can occur following significant soil level changes across the TPZ, although this generally occurs over a longer time frame than if the roots were directly severed. Root severance has the same effect, reduction in root function and capability, but on an instantaneous time scale where there is no time for the tree to adjust.

6.2.29 The assumption of allowable encroachment and minimal long-term health or structural impacts to the trees rely on a combination of the following being used - root sensitive construction methods being adhered to within the TPZ, minimal excavation within the TPZ to limit root severance (i.e. construction placed outside the TPZ where possible), fill rather than excavation utilised to affect level changes where possible (i.e. to minimise root severance and allow the trees root system time to adjust), no construction occurring within the SRZ, compensatory area being available around the unimpacted aspects of the trees and the enhancement of the existing TPZ area (i.e. mulched, soil conditioning and irrigation when required).

BOROONDARA
Received
28/4/2021

6.3 Determining TPZ Encroachment

6.3.1 **Major encroachment**. As per the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*, a major encroachment into the TPZ of any tree is considered to occur when it is beyond 10% of the total TPZ area. Trees with major encroachment may require removal or, in certain instances, be retained with specific protection requirements throughout the construction stage.

6.3.2 **Minor encroachment**. Under the aforementioned standard, a minor encroachment is determined as being less than 10% of the total TPZ area. Trees with minor encroachment may be retained with specific, generic or no protection requirements throughout the construction stage.

6.3.3 **No encroachment**. Trees with no encroachment may be retained with generic or no protection requirements throughout the construction stage.

6.3.4 For the purposes of this report, trees to be removed or retained have been identified as those:

- Requiring removal due to a level of encroachment into their TPZ that would likely result in a detrimental impact upon their future health and/or stability
- Retainable and requiring specific protection requirements throughout construction (i.e. generic requirements plus arborist supervision and careful construction methods within their TPZ)
- Retainable and requiring generic tree protection measures only (i.e. protective fencing and restriction of activities within the TPZ).

BOROONDARA
Received
28/4/2021

7 Tree Protection and Management Recommendations

7.1 Tree Removal

7.1.1 Stage 1

7.1.2 Twenty-seven (27) of the forty-seven (47) total existing trees in this area would require removal based on the supplied design proposal. The following trees would require removal to allow the proposed development:

Recommendation	Category A High retention value		Category B Moderate retention value		Category C Low Retention value		Category U No retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Remove for development			5	125, 196, 201, 204, 205	19	113, 114, 115, 116, 118, 119, 120, 121, 122, 123, 195, 197, 198, 199, 200, 202, 203, 206, 207	3	109, 178, 217

7.1.3 Stage 2

7.1.4 Twelve (12) of the twenty-five (25) total existing trees in this area would require removal based on the supplied design proposal. The following trees would require removal to allow the proposed development:

Recommendation	Category A High retention value		Category B Moderate retention value		Category C Low Retention value		Category U No retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Remove for development	5	141, 142, 143, 144, 150	5	127, 128, 130, 131, 132	2	126, 129		

7.1.5 Stage 3

7.1.6 Eleven (11) of the twenty-two (22) total existing trees in this area would require removal based on the supplied design proposal. The following trees would require removal to allow the proposed development:

Recommendation	Category A High retention value		Category B Moderate retention value		Category C Low Retention value		Category U No retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Remove for development			2	34, 48	8	38, 39, 41, 42, 44, 47, 84, 190	1	81

7.1.7 Stage 4

7.1.8 No trees would require removal in Stage 4.

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Received
28/4/2021

7.2 Tree Retention and Specific Protection

7.2.1 Stage 1 – Tree Retention

7.2.2 Twenty (20) trees were recommended for retention and require generic, and in certain cases additional specific, protection measures during construction to ensure they remain viable following the completion of works.

Recommendation (Refer Section 7.5–7.9)	Category A High retention value		Category B Moderate retention value		Category C Low Retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Retain with specific protection requirements			1	112		
Retain with generic protection requirements			6	102, 106, 212, 213, 215, 216	13	80, 103, 104, 105, 107, 108, 110, 111, 208, 209, 210, 211, 214

7.2.3 Stage 1 – Specific Protection Measures

7.2.4 Tree 112 will be situated within close proximity to the proposed construction footprint and associated landscaping works of the Veritas Centre. To ensure the future viability of the tree the following action, over and above the generic protection, is proposed:

- Detail design ensures minimal encroachment within the TPZ by either service installation, building foundations or hard landscaping.
- If major encroachment is deemed necessary to facilitate development, root mapping along the proposed line of encroachment is recommended to ascertain the level of impact. The root mapping should be undertaken at set intervals, designated by the project Arborist, to allow detailed management plans to be formulated prior to construction work commencing.

Figure 18. Site map showing Tree 112, which requires specific protection measures for Stage 1 works. (ArborSite, March 2021).

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Received
28/4/2021

Figure 19. An image showing Tree 112 in its current growing environment. (ArborSafe, March 2021).

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Received
28/4/2021

7.2.5 Stage 2 – Tree Retention

7.2.6 Thirteen (13) trees were recommended for retention and require generic, and in certain cases additional specific, protection measures during construction to ensure they remain viable following the completion of works.

Recommendation (Refer Section 7.5–7.9)	Category A High retention value		Category B Moderate retention value		Category C Low Retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Retain with specific protection requirements	10	134, 135, 136, 137, 138, 139, 140, 145, 146, 147				
Retain with generic protection requirements	3	218, 219, 220				

7.2.7 Stage 2 – Specific Protection Measures

7.2.8 Trees 134, 135, 136, 137, 138, 139, 140, 145, 146 and 147 will be situated within close proximity to the proposed construction footprint and excavation of the Gymnasium/underground car park and underground car park entrance ramp. To ensure the future viability of the trees the following action, over and above the generic protection, is proposed:

- Where the proposed excavation for the underground carpark or the carpark entrance ramp encroaches more than 10% into the trees TPZ, root mapping is recommended to ascertain the extent of impact. The root mapping should be at set intervals, designated by the project Arborist, to ascertain the extent of root encroachment into the area of proposed excavation. This work should be undertaken prior to construction work commencing to allow for detailed management plans to be formulated.

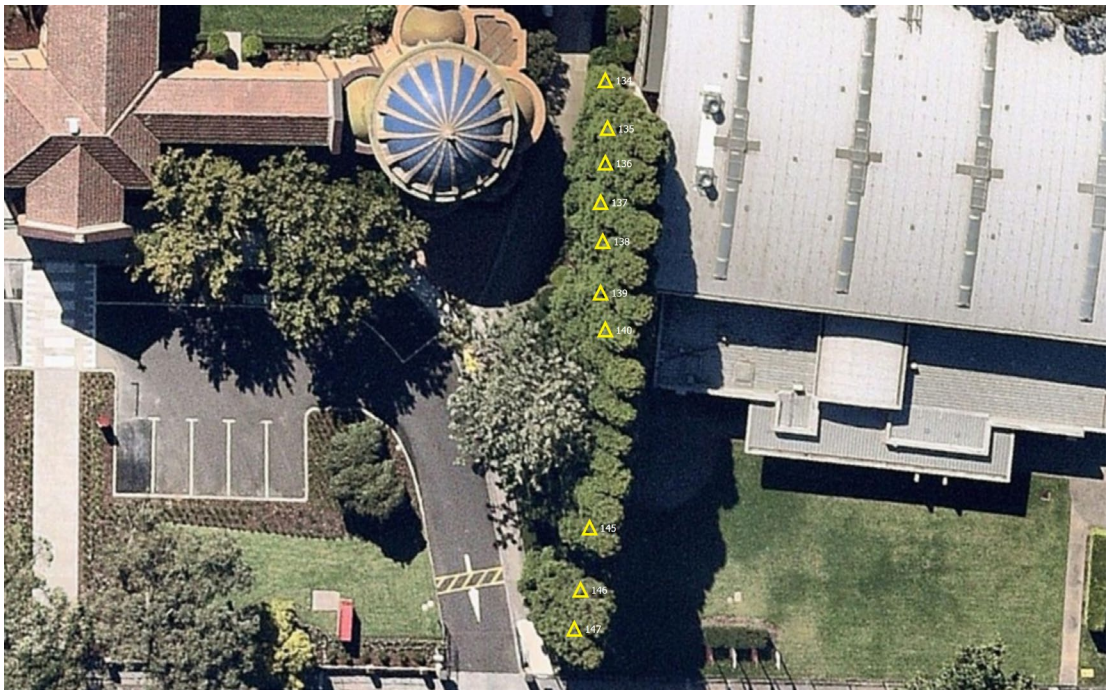

Figure 20. Site map showing trees requiring specific protection measures for Stage 2 works. (ArborSite, March 2021).

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Received
28/4/2021

Figure 21. An image showing the avenue of *Cupressus torulosa* (Bhutan Cypress) in their current growing environment. (ArborSafe, March 2021).

BOROONDARA
Received
28/4/2021

7.2.9 Stage 3 – Tree Retention

7.2.10 Eleven (11) trees were recommended for retention and require generic, and in certain cases additional specific, protection measures during construction to ensure they remain viable following the completion of works.

Recommendation (Refer Section 7.5–7.9)	Category A High retention value		Category B Moderate retention value		Category C Low Retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Retain with specific protection requirements			5	30, 31, 32, 35, 36	2	29, 33
Retain with generic protection requirements	1	28			3	85, 86, 87

7.2.11 Stage 3 – Specific Protection Measures

7.2.12 Trees 29, 30, 31, 32, 33, 35 and 36 will be situated within the proposed landscaping upgrade area for the Stage 3 Salamanca Precinct works, and prior to that the temporary car park and access and site shed zone. It is likely works will be undertaken within the TPZ of these trees. To ensure the future viability of the trees the following actions, over and above the generic protection, is proposed:

- All trees have trunk protection installed and all affected TPZ have ground protection installed. If site sheds are located within TPZs these can act as protection measures as long as the shed feet have ground protection installed under them.

Figure 22. Site map showing trees requiring specific protection measures for Stage 3 works. (ArborSite, March 2021).

BOROONDARA
Received
28/4/2021

Figure 23. An image, looking north, of Trees 30, 31 and 32 in their current growing environment. (ArborSafe, March 2021).

BOROONDARA
Received
28/4/2021

7.2.13 Stage 4 – Tree Retention

7.2.14 Two (2) trees were recommended for retention and require generic, and additional specific, protection measures during construction to ensure they remain viable following the completion of works.

Recommendation (Refer Section 7.5–7.9)	Category A High retention value		Category B Moderate retention value		Category C Low Retention value	
	Qty	Tree numbers	Qty	Tree numbers	Qty	Tree numbers
Retain with specific protection requirements	2	94, 95				
Retain with generic protection requirements						

7.2.15 Stage 4 – Specific Protection Measures

7.2.16 Trees 94 and 95 will be situated within the middle of the proposed landscaping upgrade works for the central courtyard. To ensure the future viability of the trees the following action, over and above the generic protection, is proposed:

- Detail design ensures minimal encroachment within the TPZ by either service installation, hard landscaping excavation works or level changes.

Figure 24. Site map showing tree requiring specific protection measures for Stage 4 works. (ArborSite, March 2021).

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Received
28/4/2021

Figure 25. An image showing Trees 94 and 95 in their current growing environment. (ArborSafe, March 2021).

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28/4/2021

7.2.17 Excavation Works

7.2.18 Excavation within TPZ is to be carried out only under Arborist supervision. No excavation should occur within the SRZ of these trees. It was recommended that the proposed excavation commence at the outer extent of the TPZ and move inwards to minimise root damage to the trees.

7.2.19 Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:

- Excavation using a high-pressure water jet and vacuum truck
- Excavation using an Air Spade with vacuum truck
- Excavation by hand.

7.2.20 Machine excavation is prohibited within the TPZs of retained trees unless undertaken at the direct consent of the project arborist.

7.2.21 Roots discovered are to be treated with care and minor roots (<40mm diameter) pruned with a sharp, sterile handsaw or secateurs. All significant roots (>40mm diameter) are to be recorded, photographed and reported to the project arborist.

7.2.22 Other proposed surfacing within the TPZ is to be installed above the existing grade and be of a permeable nature to allow the passage of air and moisture. If the surfacing is to be load bearing, then it is suggested that a geogrid/web or similar is incorporated to ensure the rooting area below does not become compacted.

7.2.23 Pruning Works

7.2.24 It is anticipated that minor pruning only will be required, of no greater than 10% of any retained trees total canopy area, to facilitate development. This pruning would likely be for minor crown lifting to facilitate access, and/or reduction pruning away from built structures.

7.2.25 All pruning is recommended to be completed in accordance with the Australian Standard AS 4373–2007: *Pruning of Amenity Trees* and undertaken by a suitably qualified arborist (minimum AQF 3 arborist).

7.2.26 Reduction pruning should focus on the removal of smaller diameter branches where feasible and remove no greater than 10% of the total crown. Branches no greater than 50mm diameter are to be removed unless specifically approved by the project arborist.

7.2.27 Irrespective of the proposed development it was recommended that Trees 94 and 216 are pruned as per the specifications provided within Appendix E – Tree Assessment Data.

7.3 Generic Protection and Reporting Measures

7.3.1 All retained trees require generic protection measure (Figure 26–29). Refer to Section 7.3–7.7 for further detail.

BOROONDARA
Received
28/4/2021

Figure 26. Site map showing trees requiring generic protection measures for Stage 1 works. (ArborSite, March 2021).

Figure 27. Site map showing trees requiring generic protection measures for Stage 2 works. (ArborSite, March 2021).

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Received
28/4/2021

Figure 28. Site map showing trees requiring generic protection measures for Stage 3 works. (ArborSite, March 2021).

Figure 29. Site map showing trees requiring generic protection measures for Stage 4 works. (ArborSite, March 2021).

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Received
28/4/2021

7.3.2 All trees to be retained require protection during the construction stage. Tree protection measures include a range of:

- Activities restricted within the TPZ
- Protective fencing
- Trunk and ground protection
- Tree protection signage
- Involvement from the project arborist
- Project milestones
- Compliance reporting

7.4 Activities Prohibited within the TPZ

- Machine excavation including trenching
- Storage
- Preparation of chemicals, including cement products
- Parking of vehicles and plant
- Refuelling
- Dumping of waste
- Wash down and cleaning of equipment
- Placement of fill
- Lighting of fires
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the tree

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Received
28/4/2021

7.5 Protective Fencing Specification

7.5.1 Protective fencing (Figure 30) is to be installed as far as practicable from the trunk of any retained trees. Fencing should be erected as per the image below before any machinery or materials are brought to site and before commencement of works (including demolition).

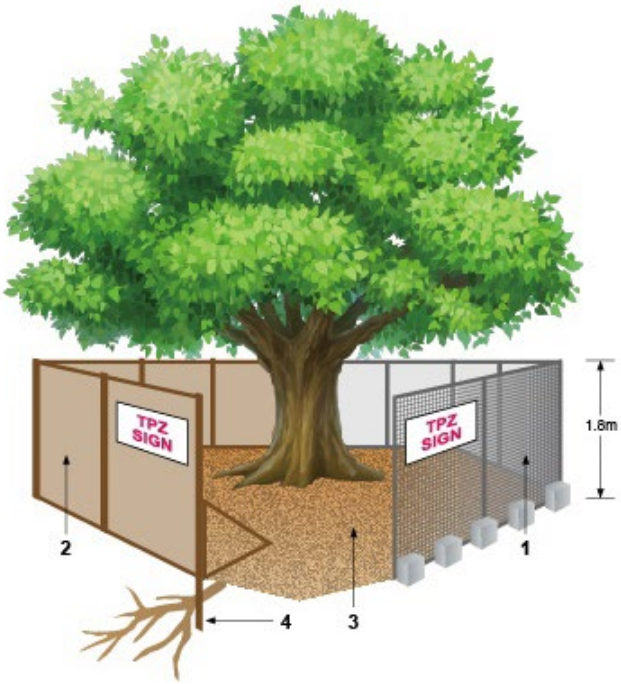
7.5.2 In some areas of the site (i.e. protection of trees on neighbouring properties) existing boundary fencing may be used as an alternative to protective fencing.

7.5.3 Once erected, protective fencing must not be removed or altered without approval from the project arborist. The TPZ fencing should be secured to restrict access.

7.5.4 TPZ fencing is to be a minimum of 1.8m high and mesh or wire between posts must be highly visible. Fence posts and supports should have a diameter greater than 20mm and should ideally be freestanding, otherwise be located clear of the roots. See image below.

7.5.5 Tree protection fencing must remain intact throughout all proposed construction works and must only be dismantled after their conclusion. The temporary dismantling of tree protection fencing must only be done with the authorisation of a consulting arborist and/or the responsible authority.

7.5.6 The subject trees themselves must also not to be used as a billboard to support advertising material. Affixing nails or screws into the trunks of trees to display signs of any type is not a recommended practice in the successful retention of trees.



Legend:
1. Chain wire mesh panels with shade cloth attached (if required), held in place with concrete feet
2. Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ
3. Mulch installation across surface of TPZ (at discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage materials of any kind are permitted within the TPZ
4. Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

Figure 30. Depicts standard fencing techniques. (AS 4970–2009).

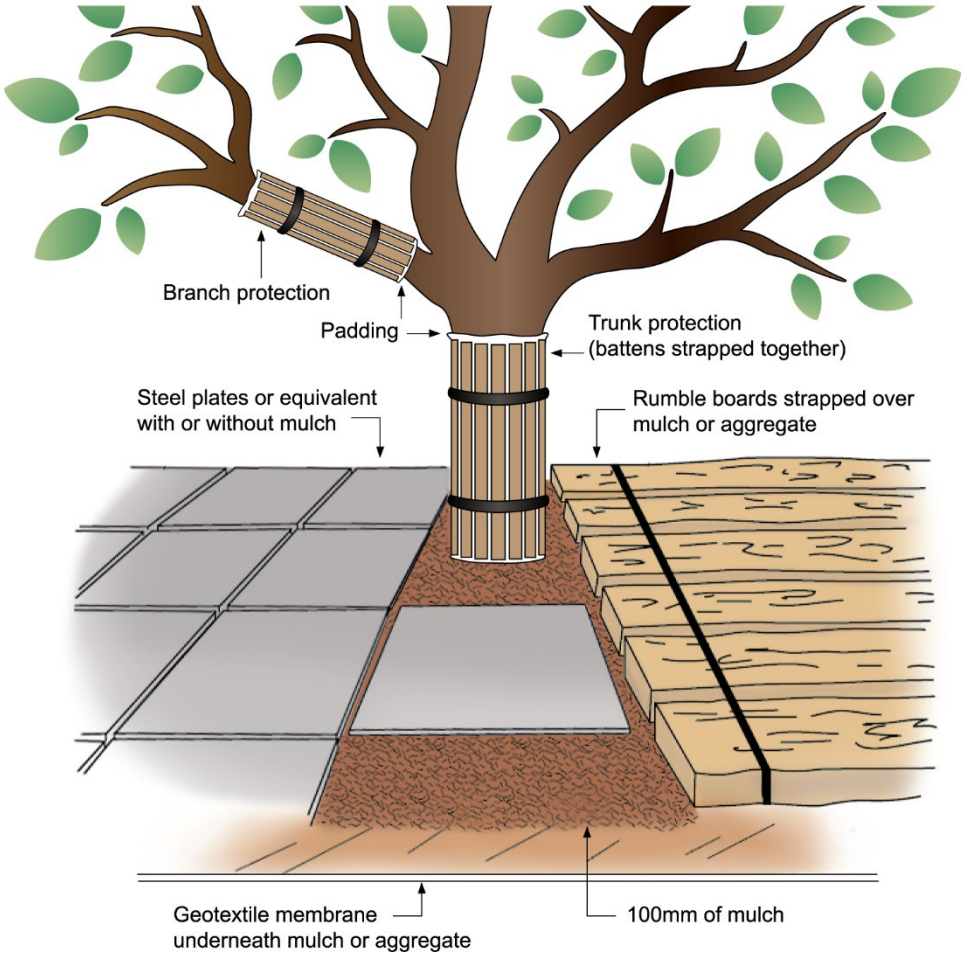
BOROONDARA
Received
28/4/2021

7.6 Trunk and Ground Protection

7.6.1 Given that proposed works are often within the TPZs of retained trees, standard protective fencing may not always be a viable method of protection. In these areas trunk protection and ground protection should be installed prior to the commencement of works and remain in place until after construction works have been completed.

7.6.2 Where construction access into the TPZ of retained trees cannot be avoided, the root zone of each tree must be protected using either steel plates or rumble board strapped over mulch/aggregate until such a time as permanent above ground surfacing (cellular confinement system or similar) is to be installed.

7.6.3 Trunk and ground protection (Figure 31) should be undertaken in line with the Australian Standard AS 4790–2009: *Protection of Trees on Development Sites* as per the image below:



Notes:

1. For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

Figure 31. Depicts trunk and ground protection techniques. (AS 4970–2009).

BOROONDARA
Received
28/4/2021

7.7 Tree Protection Signs

7.7.1 Signs identifying the TPZ (Figure 32) should be placed at 10m intervals around the edge of the TPZ and should be visible from within the development site.

Figure 32. Depicts standard fencing techniques. (AS 4970–2009).

7.8 Project Arborist

7.8.1 An official "Project Arborist" must be commissioned to oversee the tree protection, any works within the TPZ's and complete regular monitoring compliance certification.

7.8.2 The project arborist must have minimum five (5) years industry experience in the field of arboriculture, horticulture with relevant demonstrated experience in tree management on construction sites, and Diploma level qualifications in arboriculture – AQF Level 5.

7.8.3 Inspections are to be conducted by the project arborist at several key points during the construction in order to ensure that protection measures are being adhered to during construction stages and decline in tree health or additional remediation measures can be identified.

BOROONDARA
Received
28/4/2021

7.9 Project Milestones

7.9.1 The following visits and milestones were recommended as to when on-site tree inspection by the project arborist is required:

Item	Purpose of Visit	Timing of Visit(s)	Prerequisites
1	Pre-start induction	Following sign off from Item 1. Contractor to provide a minimum of five days advance notice for this visit.	Prior to commencement of works. All parties involved in the project to attend.
2	Supervision of works in TPZ's including all regrading and excavations	Whenever there is work planned to be performed within the TPZ's. Contractor to provide a minimum of five days advance notice for such visits.	
3	Regular site inspections	Minimum frequency monthly for the duration of the project.	The checklist must be completed by the Project Arborist at each site inspection and signed by both parties.
4	Final sign off	Following completion of works.	Practical completion of works and prior to tree protection removal.

7.10 Compliance Reporting

7.10.1 Following each inspection, the project arborist shall prepare a report detailing the condition of the trees. These reports should certify whether or not the works have been completed in compliance with the consent relating to tree protection.

7.10.2 These reports should contain photographic evidence where required to demonstrate that the work has been carried out as specified.

7.10.3 Matters to be monitored and included in these reports should include tree condition, tree protection measures and impact of site works which may arise from changes to the approved plans.

7.10.4 The reports and Compliance Statements shall be submitted to the Project Manager (as well as the Clients' nominated representative) following each inspection.

7.10.5 The reports and any Non-Compliance Statements shall be submitted to the Project Manager (as well as the Clients' nominated representative) if tree protection conditions have been breached. Reports should contain clear remedial action specifications to minimise any adverse impact on any subject tree.

7.11 Offset Tree Planting

7.11.1 Offset planting should reflect the number of trees removed and the initial loss of amenity and biomass. New trees should be of long-term potential and sourced from a reputable supplier.

7.11.2 Replacement tree species must suit their location on the site in terms of their potential physical size and their tolerance(s) to the surrounding environmental conditions. To avoid unethical or unprofessional tree selection and/or their placement within the landscape, replacement tree species must be selected in consultation with a consulting arborist, who can also assist in implementing successful tree establishment techniques.

7.11.3 Replacement tree species must have the genetic potential to reach a mature size potential of those trees removed to facilitate the development. As a guide, potential height will be a minimum of 10m (or more) and produce a spreading canopy so as they may provide amenity value to the property and contribute to the tree canopy of the surrounding area in the future.

BOROONDARA
Received
28/4/2021

7.12 Additional Excavation/Trenching within TPZs

7.12.1 In the event additional excavation is required within the TPZs of retained trees identified within this report, or any other site trees, arborist involvement will be required to ensure works are undertaken in accordance with the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites.*

7.12.2 Where excavation or trenching is required to facilitate installation of underground services within the TPZs of any site trees arborist supervision is required. Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:

1. Excavation by hand
2. Excavation using a high-pressure water jet and vacuum truck
3. Excavation using an Air Spade with vacuum truck.

7.12.3 Machine excavation should be prohibited within the TPZs of retained trees unless undertaken at the direct consent from the project arborist and/or the responsible authority.

7.13 Plant Health Care

7.13.1 When managing a tree affected by development incursions within its TPZ, plant tonic and growth stimulant drenching should be undertaken. Plant tonic and growth stimulant drenching is the process of adding diluted products directly to the root area of a tree to promote and assist trees to cope with loss of roots during the development process. They also assist trees to provide better resistance to sap sucking insects and fungal attack/disease and improve the establishment of beneficial microbial populations and nutrient uptake. See Appendix D – Plant Health Care and Mulching

7.14 Irrigation

7.14.1 Regular checks are required to ensure retained trees are receiving the correct amount of water. The majority of a tree's fine water absorbing roots are located in the top 10–30cm of soil. To undertake a basic soil moisture test, dig a small hole to a depth of 40cm at the dripline of the tree. If the soil is moist at this depth, water is not needed. Slow irrigation that provides an even coverage and targets the absorbing roots is the key to successful irrigation and encourages a deeper tree root system. Irrigation near the trunk is unnecessary as for most trees there are generally fewer water absorbing roots in this area. Irrigating the soil from half-way between the trunk and the dripline as well as beyond the dripline will provide water where it will most effectively be used. Preferably, water your trees during the cooler evening and early morning period when temperatures are lower, humidity is higher, and the air is calmer thereby reducing water evaporation from the soil surface. Irrigation in the middle of the day is not harmful to most trees however it is less efficient.

7.15 Mulching

7.15.1 Mulching regulates soil moisture and temperature levels, suppresses weeds, minimises soil compaction and reduces run off during periods of heavy rain. Acquiring wood chip mulch from programmed tree works (and by purchasing it from local tree contractors) would be a proactive way to improve the growing conditions around trees that ultimately will result in improved tree health and vitality.

7.15.2 Mulch should aim to cover an area at least as large as a tree's crown projection (and preferably larger) for it to be effective. It should also be laid at a uniform thickness of 75–100mm. Mulch should also be placed over damp to wet soil and never over dry soil. Application during the cooler months of the year is ideal. In areas where grass exists where you wish to mulch, spray the grass first with a non-selective herbicide and allow it to wilt and die before placement. This practice will negate grass growing up through the mulch over time.

BOROONDARA
Received
28/4/2021

7.15.3 Mulching within the canopy areas of trees not only improves long term tree health but also acts to reduce tree risk by reducing targets that pass and/or congregate under their canopies. This in turn will minimise the likelihood of injury in the event of a branch failure.

8 References

- Matthek, C. a. B. H., 1994. The Body Language of Trees: A Handbook for Failure Analysis. H. M. Stationery Office: University of Michigan.
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- Standards Australia, 2009. AS4970–2009: Protection of Trees on Development Sites, Sydney: Standards Australia.
- The British Standards Institution, 2012. BS5837–2012: Trees in relation to design, demolition and construction, London: BSI Standards Limited.
- Urban, J., 2008. Up By Roots - Healthy Soils and Trees in the Built Environment. Champaign (Illinois): International Society of Arboriculture.

Plans of the existing site and of the proposed development were provided to ArborSafe in May 2021 and include:

- Sienna College 2021 Master Plan, April 2021

BOROONDARA
Received
28/4/2021

Appendix A. Arboricultural Reporting Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. Any titles and ownership of any property are assumed to be good. No responsibility is assumed for matters legal in character.
2. It is assumed that any property/project is not in violation of any applicable codes, ordinances, statutes or other government regulations.
3. Care has been taken to obtain all information from reliable sources. All data has been verified in so far as possible, however, the consultant can neither guarantee nor be responsible for the accuracy of the information provided by others.
4. The consultant shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.
5. Loss or alteration of any part of this report invalidates the entire report.
6. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by anyone but the person to whom it is addressed, without the prior written consent of the consultant.
7. Neither all nor any part of the contents of this report, nor any copy thereof, shall be used for any purpose by anyone but the person to whom it is addressed, without the written consent of the consultant. Nor shall it be conveyed by anyone, including the Client, to the public through advertising, public relations, news, sales or other media, without the written consent of the consultant.
8. This report and any values expressed herein represent the opinion of the consultant and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
9. Sketches, diagrams, graphs and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise.
10. Information contained in this report covers only those items that were examined and reflect the condition of those items at the time of inspection.
11. Inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee expressed or implied that the problems or deficiencies of the plants or property in question may not arise in the future.

BOROONDARA
Received
28/4/2021

Appendix B. Explanation of Tree Assessment Terms

Tree number: Refers to the individual identification number assigned within the ArborSafe software to each assessed tree on the site and the number which appears of the tree's tag.

Tree location: Refers to the easting and northing coordinates assigned to the location of the tree as obtained from the geo-referenced aerial image within the ArborSafe software.

Tree species: Provides the botanic name (genus, species, sub-species, variety and cultivar where applicable) in accordance with the International Code of Botanical Nomenclature (ICBN), and the accepted common name.

Trees in group: The number of trees encompassing a collective assessment of more than one tree. Typically grouped trees have similar attributes that can be encompassed within one data record.

Height: The estimated range in metres attributed to the tree from its base to the highest point of the canopy. Where required height will be estimated to the nearest metre.

Diameter at Breast Height (DBH): Refers to the tree's estimated trunk diameter measured 1.4m from ground level for a single trunked tree. These estimates increase in 50mm increments. Where required DBH will be measured to give an accurate measurement for single trunked trees, trees with multiple trunks, significant root buttressing, bifurcating close to ground level or trunk defects and will be measured as per the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites*.

Tree Protection Zone (TPZ): A specified area above and below ground and at a given distance measured radially away from the centre of the tree's trunk and which is set aside for the protection of its roots and crown. It is the area required to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development. The radius of the TPZ is calculated by multiplying its DBH by 12. TPZ radius = DBH × 12. (Note "Breast Height" is nominally measured as 1.4m from ground level).TPZ is a theoretical calculation and can be influenced by existing physical constraints such as buildings, drainage channels, retaining walls, etc. (Standards Australia, 2009).

Structural Root Zone (SRZ): The area close to the base of a tree required for the tree's anchorage and stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. SRZ radius = $(D \times 50)^{0.42 \times 0.64}$ (Standards Australia, 2009).

Canopy spread: The estimated range in metres attributed to the spread of the tree's canopy on its widest axis. Where required crown spread will be estimated to the nearest metre.

Origin: Refers to the origin of the species and its type.

Category	Description
Locally Endemic	Occurs naturally in the local area and is native to a given region or ecosystem.
Australian Native	Occurs naturally within Australia and its territories but may not be endemic to the local area.
Exotic Evergreen	Occurs naturally outside of Australia and its territories and typically retains its leaves throughout the year.
Exotic Deciduous	Occurs naturally outside of Australia and its territories and typically loses its leaves at least once a year.

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Received
28/4/2021

Health: Refers to the health and vigour of the tree.

Category	Description
Excellent	Canopy full with even foliage density throughout, leaves are entire and are of an excellent size and colour for the species with no visible pathogen damage. Excellent growth indicators, e.g. seasonal extension growth. Exceptional specimen.
Good	Canopy full with minor variations in foliage density throughout, leaves are entire and are of good size and colour for the species with minimal or no visible pathogen damage. Good growth indicators, none or minimal deadwood.
Fair	Canopy with moderate variations in foliage density throughout, leaves not entire with reduced size and/or atypical in colour, moderate pathogen damage. Reduced growth indicators, visible amounts of deadwood, may contain epicormic growth.
Poor	Canopy density significantly reduced throughout, leaves are not entire, are significantly reduced in size and/or are discoloured, significant pathogen damage. Significant amounts of deadwood and/or epicormic growth, noticeable dieback of branch tips, possibly extensive.
Dead	No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches.

Age: Refers to the life cycle of the tree.

Category	Description
Young	Newly planted small tree not fully established may be capable of being transplanted or easily replaced.
Juvenile	Tree is small in terms of its potential physical size and has not reached its full reproductive ability.
Semi-mature	Tree in active growth phase of life cycle and has not yet attained an expected maximum physical size for its species and/or its location.
Mature	Tree has reached an expected maximum physical size for the species and/or location and is showing a reduction in the rate of seasonal extension growth.
Senescent	Tree is approaching the end of its life cycle and is exhibiting a reduction in vigour often evidenced by natural deterioration in health and structure.

Structure: Refers to the structure of the tree from roots to crown.

Category	Description
Good	Sound branch attachments with no visible structural defects, e.g. included bark or acute angled unions. No visible wounds to the trunk and/or root plate. No fungal pathogens present.
Fair	Minor structural defects present, e.g. apical leaders sharing common union(s). Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present.
Poor	Moderate structural defects present, including bifurcations with included bark with union failure likely within 0–5 years. Wounding evident with cavities and/or decay present. Damage to structural roots.
Hazardous	Significant structural defects with failure imminent (3–6 months). Defects may include active splits and/or partial branch or root plate failures. Tree requires immediate arboricultural works to alleviate the associated risk.

BOROONDARA
Received
28/4/2021

Useful Life Expectancy (ULE): Useful life expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or presents a greater risk and/or more hazards to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes within the tree's location and environment which may influence the ULE value.

Category
0 Years
<5 Years
5–10 Years
10–15 Years
15–25 Years
25–50 Years
>50 Years

Defects: Visual observations made of the presenting defects of the tree and its growing environment that are, or have the capacity to impact upon, the health, structural condition and/or the useful life expectancy of the tree. Defects may include adverse physical traits or conditions, signs of structural weaknesses, plant disease and/or pest damage, tree impacts to assets or soil related issues.

Tree Significance: Includes environmental, social or historical reasons why the tree is significant to the site. The tree may also be rare under cultivation or have a rare or localised natural distribution.

Arborist Actions: A list of arboricultural and/or plant health care works that are aimed at maintaining or improving the tree's health, structural condition or form. Actions may also directly or indirectly reduce the risk potential of the tree such as via the removal of a particular branch or the moving of infrastructure from under its canopy.

BOROONDARA
Received
28/4/2021

Appendix C. Tree Retention Values

Based upon a modified version of the British Standard BS 5837–2012: *Trees in relation to design, demolition and construction* – recommendations.

Category and definition	Criteria (including sub-categories where appropriate)		
Category U			
Trees in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than 5 years.	• Trees that have a severe structural defect that are not remediable such that their failure is expected within 12 months. • Trees that will become unviable after removal of other Category U trees (e.g. where for whatever reason the loss of companion shelter cannot be mitigated by pruning). • Trees that are dead or are showing signs of significant, immediate and irreversible overall decline. • Trees infected with pathogens of significance to the health and or safety of other trees nearby • Low quality trees suppressing adjacent trees of better quality. • Noxious weeds or species categorised as weeds within the local area. **Note:** Category U trees can have existing or potential conservation value* which might make it desirable to preserve.		
	1. Arboricultural Qualities	**2. Landscape qualities**	**3. Cultural and environmental values**
Category A			
Trees of High Quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years.	Trees that are particularly good examples of their species, especially if rare or unusual (in the wild or under cultivation); or those that are important components of groups or avenues.	Trees or groups of significant visual importance as arboricultural and/or landscape features. (e.g. feature and landmark trees).	Trees, groups or plant communities of significant conservation, historical, commemorative or other value (e.g. remnant trees, aboriginal scar trees, critically endangered plant communities, trees listed specifically within a Heritage statement of significance).
Category B			
Trees of Moderate Quality with an estimated remaining life expectancy of 15–25 years and of dimensions and prominence that cannot be readily replaced within 10 years.	Trees that might be included within Category A but are downgraded because of diminished condition such that they are unlikely to be suitable for retention beyond 25 years.	Trees that are visible from surrounding properties and/or the street but make little visual contribution to the wider locality.	Trees with conservation or other cultural value (trees within conservation areas or landscapes described within a statement of significance, locally indigenous species).
Category C			
Trees of Low Quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable.	Trees of very limited value or such impaired condition that they do not qualify in higher categories.	Trees offering low or only temporary/transient landscape benefits.	Trees with no material conservation or other cultural value.

*Where trees would otherwise be categorised as U, B or C but have significant identifiable conservation, heritage or landscape value even though only for the short term, they may be upgraded, although they might be suitable for retention only.

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Received
28/4/2021

Tree Quality

		Health**			
		Excellent/ Good	Fair	Poor	Dead
Structure	Good	A	B	C	U
	Fair	B	B	C	U
	Poor	C	C	U	U
	Hazard*	U	U	U	U

* Structural hazard that cannot be remediated through mitigation works to enable safe retention.

** Trees of short term reduced health that can be remediated via basic, low cost plant health care works (e.g. mulching, irrigation etc.) may be designated in a higher health rating to ensure correct retention value nomination.

Category A	Typically trees in this category are of high quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years. The tree may make significant amenity contributions to the landscape and may make high environmental contributions. In some cases, trees within this category may not meet the above criteria, however possess significant heritage or ecological value. Trees of this retention value warrant design consideration and amendment to ensure their viable retention.
Category B	Typically trees in this category are of moderate quality with an estimated remaining life expectancy of 15–25 years and prominence of size dimensions that cannot be readily replaced within 10 years. They may make moderate amenity contributions to the landscape and make low/moderate environmental contributions. Trees with this retention value warrant lesser design consideration in an attempt to allow for their retention.
Category C	Trees in this category are of low quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable, may have poor health and/or structure, are easily replaceable, or are of undesirable species and do not warrant design consideration.
Category U	Trees in this category are found to be in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than five years. These trees may be dead and/or of a species recognised as a weed that resulted in them being unretainable.

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Received
28/4/2021

Appendix D. Plant Health Care and Mulching

Guide to plant health tonics and root growth stimulants

Considering the varying sizes of trees in common urban landscapes, it is suggested that an application volume of combined water and product solution of 80–150L for small to medium sized trees (5-10m height), 150–250L for medium to large sized trees (10-20m height) and 250–400L for large to very large sized trees (+20m height). Note: a lesser volume of total mixed product could be used if a more concentrated mix is drenched and water irrigation used to further drench the area and therefore dilute the stronger mix application.

The following product recommendations have been based on previous successful works undertaken by ArborSafe. The information provided is to be used as a general guide only, depending on your tree species, health or location. We recommend you always refer to the manufacturers label before applying any product. You may need to further consult with ArborSafe or your Project Arborist to develop a more specific program for your tree needs.

- **Soil Conditioner** concentrate such as Kelpro, Seasol or similar 600–800mL/100L of water. A concentration of beneficial nutrients stimulating plant growth and root establishment, ideal for trees under stress.
- **Nitrogen Boost** concentrate such as Nitrosol liquid plant food or similar 300mL/100L of water. A general-purpose fertilizer that contains a nitrogen boost (the most abundantly used element for tree growth). NB: Care must be taken when applying general fertilizer, particularly where plants can be affected Phosphorus toxicity.
- **Root Biostimulant** concentrate such as Auxinone or similar 400mL/100L of water. A scientific blend of hormone root growth stimulants and vitamins assisting in the regeneration of roots.
- **Microbial Formulation** concentrate such as Noculate Liquid or similar 500mL/100L of water. Generally containing strains of beneficial soil microorganisms, humic acid, kelp, essential amino acids, vitamins, biotin, folic acid and natural sugars designed to enhance the establishment of beneficial microbial populations.
- **Carbohydrate Energy Source** such as Molasses 500-800mL/100L of water. Molasses is the by-product of sugar refining. It contains all the nutrients from the raw sugarcane plant and is a carbohydrate energy source that feeds soil microorganisms and increases microbial activity.
- **Surfactant/Wetting Agent** (optional) such as Dispatch (Liquid) 200–300ml/100L of water. Improves the infiltration and penetration of applied water and irrigation.

We recommend you always refer to the manufacturers label before applying any product using the above as a guide only.

Guide to mulching and maintenance for established trees

Whether a tree is a newly planted young tree, or a well-established mature tree, the area around its base is a key factor in its long-term retention and viability. Maintaining a soil environment that is conducive to tree root development is vital for trees of all ages. This guide provides information on appropriate maintenance practices around the base of trees including mulching and the restriction of activities that may cause harm to tree roots or trunks.

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Received
28/4/2021

1. Why mulch?

Mulching is a plant health care action which can be undertaken to improve plant and soil health (Figure 33), as well as overall landscape aesthetics. Placing an organic (or sometimes inorganic) material on the soil surface reduces the level of direct sunlight contact. Mulching should not be confused with composting which involves incorporating organic matter such as composts or manures into the soil profile. All plants in their natural ecologies (except for some arid and coastal ecologies) are naturally mulched by the falling of leaves, bark, flowers and other organic material.

This action is of great importance in successful cultivation of plants as it:

- assists in the regulation of soil moisture and temperature levels
- helps to suppress weeds
- minimises soil compaction
- reduces run-off during periods of heavy rain
- adds organic matter to the soil, and
- improves overall structure, nutrition and water holding composition.

Mulch is best comprised of organic materials such as wood chips, leaf litter, straw or hay as these will degrade over time. Long-term mulching improves soil health and structure as it encourages the activities of earthworms, microflora and beneficial fungi. Inorganic materials such as stones and gravel can be moderately effective as mulch but will not provide the ongoing improvements to soil health.

Figure 33. An excellent example of how to mulch a young tree. (Lachlan Andrews, September 2015).

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28/4/2021

2. How to mulch

- Apply mulch to damp soil, as placing over dry soil makes it difficult to rehydrate. Applying during the cooler months of the year is an ideal time.
- If mulching on top of a pre-existing grass area, grass or weeds must first be hand weeded and/or sprayed with a non-selective herbicide and left to wilt and die before applying mulch.
- Mulch should be applied at a uniform thickness of 75–100mm and re-applied approximately every 12 months. Do not place mulch up against the trunk of a tree as the damp mulch can cause bark to decay.
- Apply over a wide area, at least as large as a tree's crown projection (preferably larger), within and outside the current root mass to encourage lateral root development and expansion.
- Wood chip mulch (such as that generated from wood chippers) is considered an ideal mulch for landscape use as it contains a wide variety of materials that are of different sizes (such as bark, foliage and timber), is relatively cheap to purchase, and can be obtained in large quantities. Stockpiling of mulch after tree contractors have conducted works at a site is a way of generating 'free' mulch and ensuring that plant material from tree pruning and/or removals is recycled on site, not imported from external suppliers, saving costs and making the site more self-sustaining.
- The use of mulch made from pine bark or red gum chips are discouraged as they seldom degrade and therefore do not add nutrition to the soil profile. The uniform particle size and resin content can provide an impervious layer to water as well as retarding gaseous exchange.
- Mulching within the canopy areas of larger trees (Figure 34) can not only improve long-term tree health but can also act to reduce tree risk by decreasing the number of targets that pass and/or congregate under their canopies. This in turn will minimise the likelihood of injury in the event of a branch failure.
- When using wood chip mulch, ensure that if it has been made from live plant material that is stored and allowed to compost for between 3 and 6 months prior to use. Never apply fresh, 'green' mulch around trees as this can induce what is called the nitrogen drawdown, which can result in the removal of nitrogen from the soil resulting in plants with nutrient deficiencies.

For further information refer to the Australian Standard AS 4454–2012: *Composts, Soil Conditioners and Mulches*.

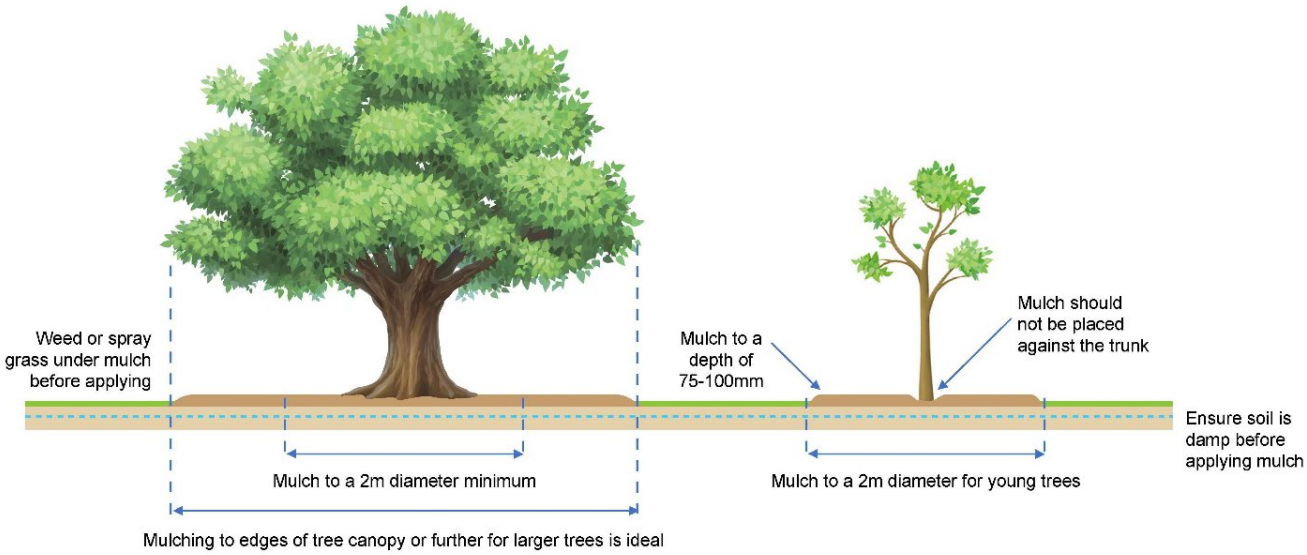

Figure 34. Mulching established and young trees (ArborSafe Australia, 2020).

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Received
28/4/2021

3. Root and trunk damage

The function of tree roots is primarily to provide water and nutrient uptake for the tree, provide stability through structural roots that anchor it to the ground and as a means of food and nutrient storage. Damage to tree roots can lead to a reduction to any or all of these functions.

Damage to tree roots (Figure 35 and Figure 36) and the lower portion of a tree's trunk is a common and often unnecessary occurrence that can lead to the entry of decay fungi into a tree's structural framework. Once present, decay may develop in larger structural roots and/or the base of the trunk, which can result in a reduction in tree health and in severe cases even compromise stability.

Works such as trenching and excavation are often the cause of root damage to trees. Refer to ArborSafe's Guide – Tree protection during construction or the Australian Standard AS 4970–2009: *Protection of Trees on Development Sites* for things to consider when performing construction activities near trees.

Everyday activities such as grass cutting via mowing or brush cutters can result in serious root damage or wounding to the lower trunk. Young trees with their trunks damaged by machinery often need replacing, while damage to the trunks and/or surface roots of established trees is not only detrimental to tree health but can also result in costly repairs to machinery.

Another advantage to mulching around the trunk and root crown is that it limits damage to both parts from mowing equipment. This in turn reduces mechanical damage and compaction.

Figure 35. An example of damage to tree roots caused via mowing. (Luke Dawson, June 2017).

Figure 36. Image showing wound caused to upper portion of surface root by mower. (Luke Dawson, June 2017).

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Received
28/4/2021

4. How to avoid root and trunk damage

The following points serve to highlight ways to avoid damage to tree roots and trunks caused via grass cutting activities:

- Mulching around young and established trees negates the need for brush cutter and/or lawn mower use around the base of a tree. Mulching therefore not only creates a barrier between tree roots and trunk that are susceptible to damage, it improves soil condition, minimises soil compaction and decreases the total area required for mowing.
- Where mulching is not feasible, raising the cutting height of mowers and maintaining grass at a greater height can avoid unnecessary 'scalping' of roots and damage to mowers/blades.
- Where surface roots are located away from the trunk and in a location where neither the application of mulch nor the raising of mower height is inappropriate, it may be possible to raise the soil grade directly around the root/s to minimise damage. It is important that the application of new material does not result in significant changes to the soil profile that may inadvertently damage roots. Material applied should be permeable and allow the development of turf which will protect the roots. Coarse sand or a planting mix with a high sand to organic matter ratio (e.g. 80/20 mix) spread at a depth of 75–100mm could suitably protect the surface root from damage, while allowing turf to redevelop within the area.
- ArborSafe is able to answer any questions regarding the material, depth and method of application to be used to ensure the tree/s remain viable for the long-term.

BOROONDARA
Received
28/4/2021

Appendix E. Tree Assessment Data

Tree no.	Stage	*Botanical Name*	Common Name	Origin	Trees in group	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	ULE (Yrs.)	Defects	Significance	Action (irrespective of development)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
28	S3	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	44	51	**5.3**	87.58	**2.5**	10-15	5-10	Good	Fair	Mature	15-25	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Previous failure(s);Soil compaction;	Amenity value/shade;	Irrigation;	Root friendly design & work methods required during hard landscaping works within TPZ.	A	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
29	S3	*Tilia cordata*	Small-leaved Lime	Exotic	1	57	64	**6.9**	148.02	**2.7**	10-15	5-10	Fair	Fair	Semi-Mature	15-25	Co-dominant stems;Deadwood/stubs < 30mm;Decay;Dieback;Included bark;Previous failure(s);Soil compaction;Soil grade changes;Wound(s);	Attractive landscape feature;Amenity value/shade;	Irrigation;Mulching;	Root friendly design & work methods required during hard landscaping works within TPZ.	C	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
30	S3	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	60	74	**7.2**	162.86	**2.9**	15-20	10-15	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Previous failure(s);Soil compaction;Soil grade changes;	Attractive landscape feature;Amenity value/shade;	Mulching;Shape from infrastructure;	Root friendly design & work methods required during hard landscaping works within TPZ.	B	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
31	S3	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	Native	1	86	108	**10.3**	334.59	**3.4**	10-15	10-15	Good	Fair	Mature	15-25	Deadwood/stubs > 60mm;Epicormic growth;Excessive end weight;Mechanical damage to root(s);Poor pruning;Soil compaction;Weak union(s);Wound(s);	Amenity value/shade;Attractive landscape feature;	End weight reduction;Remove deadwood/stubs > 30mm;Remove tables/seating from fall zone;	Root friendly design & work methods required during hard landscaping works within TPZ.	B	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
32	S3	*Eucalyptus nicholii*	Narrow-leaved Black Peppermint	Native	1	54	60	**6.5**	131.92	**2.7**	5-10	10-15	Fair	Fair	Mature	10-15	Deadwood/stubs > 30mm;Dieback;Epicormic growth;Mechanical damage to root(s);Resin exudation/kino;Soil compaction;Soil grade changes;Suppressed;Wound(s);	Amenity value/shade;Attractive landscape feature;	Remove deadwood/stubs > 30mm;Remove tables/seating from fall zone;	Root friendly design & work methods required during hard landscaping works within TPZ.	B	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
33	S3	*Cinnamomum camphora*	Camphor Laurel	Exotic	1	43	47	**5.2**	83.65	**2.4**	5-10	5-10	Poor	Poor	Semi-Mature	5-10	Deadwood/stubs > 30mm;Dieback;Epicormic growth;Excessive thinning;Pests/insects;Poor pruning;Previous failure(s);Wound(s);	Amenity value/shade;	Mulching;Pest & disease control;Remove deadwood/stubs > 30mm;Remove selective branches;	Tree excessively grazed by Possums, <15% viable foliage. Root friendly design & work methods required during hard landscaping works within TPZ.	C	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
34	S3	*Cedrus atlantica f. glauca*	Blue Atlas Cedar	Exotic	1	42	47	**5.0**	79.80	**2.4**	10-15	5-10	Fair	Good	Mature	15-25	Dieback;Pests/insects;Previous failure(s);Soil compaction;Soil grade changes;Wound(s);	Amenity value/shade;	Irrigation;Mulching;Plant health care;	Upper crown being grazed by Possums. Root friendly design & work methods required during hard landscaping works within TPZ.	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
35	S3	*Eucalyptus saligna*	Sydney Blue Gum	Native	1	64	75	**7.7**	185.30	**2.9**	15-20	5-10	Good	Fair	Mature	15-25	Canker(s);Deadwood/stubs > 60mm;Epicormic growth;Hanger(s);Mechanical damage to root(s);Previous failure(s);Soil compaction;Wound(s);	Active nesting by fauna;Amenity value/shade;Attractive landscape feature;	Mulching;Remove deadwood/stubs > 30mm;Remove hanging limb(s);	Root friendly design & work methods required during hard landscaping works within TPZ.	B	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
36	S3	*Corymbia maculata*	Spotted Gum	Native	1	79	96	**9.5**	282.34	**3.3**	20-30	15-20	Good	Fair	Mature	25-50	Deadwood/stubs > 30mm;Exposed root(s);Previous failure(s);Soil compaction;Wound(s);	Dominant landscape feature;Amenity value/shade;Attractive landscape feature;	Mulching;Remove deadwood/stubs > 30mm;Remove selective branches;	Root friendly design & work methods required during hard landscaping works within TPZ.	B	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
38	S3	*Corymbia maculata*	Spotted Gum	Native	1	21	24	**2.5**	19.95	**1.8**	5-10	<5	Good	Poor	Semi-Mature	10-15	Bird browsing damage;Epicormic growth;Previous failure(s);Soil compaction;Wound(s);	Amenity value/shade;Significant habitat - nests/hollows;	Consider removing;Mulching;Remove selective branches;	Multiple wounded branches mid crown, tree of limited long-term viability.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
39	S3	*Corymbia maculata*	Spotted Gum	Native	1	16	20	**2.0**	12.57	**1.7**	5-10	<5	Good	Poor	Semi-Mature	5-10	Epicormic growth;Pests/insects;Previous failure(s);Soil compaction;	Amenity value/shade;	Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
41	S3	*Corymbia maculata*	Spotted Gum	Native	1	20	27	**2.4**	18.10	**1.9**	5-10	<5	Good	Poor	Semi-Mature	10-15	Deadwood/stubs < 30mm;Dieback;Epicormic growth;Previous failure(s);Soil compaction;	Amenity value/shade;	Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
42	S3	*Corymbia maculata*	Spotted Gum	Native	1	25	30	**3.0**	28.27	**2.0**	5-10	<5	Good	Poor	Semi-Mature	5-10	Epicormic growth;Previous failure(s);Resin exudation/kino;Soil compaction;Wound(s);	Amenity value/shade;	Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
44	S3	*Corymbia maculata*	Spotted Gum	Native	1	29	34	**3.5**	38.05	**2.1**	5-10	<5	Good	Poor	Semi-Mature	5-10	Deadwood/stubs > 30mm;Epicormic growth;Previous failure(s);Soil compaction;	Amenity value/shade;	Mulching;Remove deadwood/stubs > 30mm;Remove selective branches;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
47	S3	*Quercus robur (possible hybrid)*	Hybrid English Oak	Exotic	1	40	56	**4.8**	72.38	**2.6**	5-10	5-10	Fair	Fair	Semi-Mature	10-15	Deadwood/stubs > 60mm;Dieback;Epicormic growth;Fungal fruiting body(s);Mechanical damage;Mechanical damage to root(s);Poor pruning;Previous failure(s);Soil compaction;Soil grade changes;Wound(s);	Amenity value/shade;	Irrigation;Mulching;Remove deadwood/stubs > 30mm;	No indication of root plate instability. Tree remains in reduced health.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
48	S3	*Pyrus ussuriensis*	Manchurian Pear	Exotic	1	23	26	**2.8**	23.93	**1.9**	5-10	5-10	Good	Fair	Semi-Mature	15-25	Soil compaction;Suckers;	Amenity value/shade;Attractive landscape feature;	Mulching;Trim suckers;		B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
80	S1	*Callistemon viminalis*	Weeping Bottlebrush	Native	1	23	30	**2.7**	23.16	**2.0**	5-10	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Soil compaction;	Amenity value/shade;			C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
81	S3	*Ligustrum lucidum 'Variegata'*	Variegated Glossy Privet	Exotic	1	25	32	**3.0**	27.73	**2.1**	5-10	5-10	Fair	Poor	Mature	<5	Abnormal lean;Epicormic growth;Excessive end weight;Soil compaction;Undesirable species;		Removal;	Recognised weed species.	U		Remove tree irrespective of future development.
84	S3	*Ulmus parvifolia*	Chinese Elm	Exotic	1	27	36	**3.2**	32.98	**2.2**	5-10	5-10	Fair	Poor	Semi-Mature	10-15	Epicormic growth;Poor pruning;Previous failure(s);Soil compaction;Uncharacteristic form;	Amenity value/shade;Attractive landscape feature;	Mulching;Remove all deadwood/stubs;Shape from infrastructure;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
85	S3	*Acer palmatum ssp. palmatum*	Japanese Maple	Exotic	1	19	24	**2.3**	16.33	**1.8**	<5	<5	Fair	Good	Semi-Mature	15-25	Dieback;	Amenity value/shade;Attractive landscape feature;	Irrigation;Mulching;		C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
86	S3	*Thuja occidentalis*	White Cedar	Exotic	1	18	36	**2.1**	14.34	**2.2**	5-10	<5	Fair	Fair	Semi-Mature	10-15	Co-dominant stems;Soil compaction;	Amenity value/shade;	Mulching;		C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
87	S3	*Syringa vulgaris*	Common Lilac	Exotic	1	12	25	**2.0**	12.57	**1.8**	<5	5-10	Fair	Fair	Mature	10-15	Co-dominant stems;Decay;Dieback;Epicormic growth;Poor pruning;Soil compaction;Suckers;	Amenity value/shade;Attractive landscape feature;	Irrigation;Mulching;		C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
94	S4	*Corymbia citriodora*	Lemon-scented Gum	Native	1	72	87	**8.6**	234.52	**3.1**	20-30	10-15	Good	Fair	Mature	15-25	Deadwood/stubs > 30mm;Previous failure(s);Soil compaction;Weak union(s);Wound(s);	Dominant landscape feature;Amenity value/shade;Attractive landscape feature;	End weight reduction;Remove deadwood/stubs > 30mm;	Root friendly design & work methods required during hard landscaping works within TPZ. Good reaction growth surrounding previous failure wound. Tree health remains good, yet branch failures remain possible. Reduce overall weight of the wounded south facing scaffold branch by ~10-15%, all pruning should be terminally focused rather than lateral.	A	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
95	S4	*Corymbia citriodora*	Lemon-scented Gum	Native	1	61	79	**7.3**	168.33	**3.0**	15-20	10-15	Good	Fair	Mature	15-25	Deadwood/stubs > 30mm;Poor pruning;Previous failure(s);Resin exudation/kino;Soil compaction;Wound(s);	Amenity value/shade;Attractive landscape feature;	Mulching;Remove deadwood/stubs > 30mm;	Root friendly design & work methods required during hard landscaping works within TPZ.	A	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
102	S1	*Corymbia maculata*	Spotted Gum	Native	1	30	39	**3.6**	40.72	**2.2**	5-10	<5	Fair	Good	Semi-Mature	15-25	Resin exudation/kino;Soil compaction;Soil grade changes;Wound(s);	Amenity value/shade;	Mulching;		B	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
103	S1	*Callistemon viminalis*	Weeping Bottlebrush	Native	1	16	27	**2.0**	12.57	**1.9**	5-10	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Soil compaction;	Amenity value/shade;	Mulching;		C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
104	S1	*Callistemon viminalis*	Weeping Bottlebrush	Native	1	19	22	**2.3**	16.33	**1.8**	5-10	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Soil compaction;	Amenity value/shade;	Mulching;		C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).

BOROONDARA
Received
28/4/2021

Tree no.	Stage	*Botanical Name*	Common Name	Origin	Trees in group	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	ULE (Yrs.)	Defects	Significance	Action (irrespective of development)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
105	S1	*Callistemon viminalis*	Weeping Bottlebrush	Native	1	12	21	**2.0**	12.57	**1.7**	5-10	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Soil compaction;	Amenity value/shade;	Mulching;	Development dimensions estimated due to restricted access.	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
106	S1	*Corymbia maculata*	Spotted Gum	Native	1	38	53	**4.6**	65.33	**2.5**	5-10	5-10	Good	Good	Semi-Mature	15-25	Soil compaction;	Amenity value/shade;	Mulching;	Development dimensions estimated due to restricted access.	B	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
107	S1	*Corymbia maculata*	Spotted Gum	Native	1	23	27	**2.8**	23.93	**1.9**	5-10	5-10	Good	Fair	Semi-Mature	5-10	Deadwood/stubs < 30mm;Mechanical damage to root(s);Soil compaction;Soil grade changes;Suppressed;	Amenity value/shade;	Mulching;		C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
108	S1	*Callistemon viminalis*	Weeping Bottlebrush	Native	1	13	18	**2.0**	12.57	**1.6**	5-10	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Soil compaction;	Amenity value/shade;	Mulching;	Development dimensions estimated due to restricted access.	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
109	S1	*Corymbia maculata*	Spotted Gum	Native	1	39	54	**4.7**	68.81	**2.6**	5-10	5-10	Good	Poor	Semi-Mature	0	Major root damage/severance;Mechanical damage to root(s);Soil compaction;Soil grade changes;Soil problems;		Removal;	Tree appears to remain outwardly viable although longterm stability is uncertain given previous significant root damage within SRZ.	U		Remove tree irrespective of future development.
110	S1	*Callistemon viminalis*	Weeping Bottlebrush	Native	1	16	22	**2.0**	12.57	**1.8**	5-10	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Soil compaction;	Amenity value/shade;	Mulching;		C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
111	S1	*Callistemon viminalis*	Weeping Bottlebrush	Native	1	20	28	**2.4**	18.50	**1.9**	5-10	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Soil compaction;Soil grade changes;	Amenity value/shade;	Mulching;		C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
112	S1	*Quercus palustris*	Pin Oak	Exotic	1	67	85	**8.0**	203.08	**3.1**	10-15	10-15	Good	Fair	Semi-Mature	25-50	Deadwood/stubs > 30mm;Dieback;Excessive end weight;Hanger(s);Included bark;Previous failure(s);Soil compaction;Weak union(s);	Amenity value/shade;	End weight reduction;Remove deadwood/stubs > 30mm;Remove hanging limb(s);Remove tables/seating from fall zone;	Concept design places this tree close to multiple potential impacts during stage 1. Root friendly design & work methods required during development works within TPZ.	B	1	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
113	S1	*Jacaranda mimosifolia*	Jacaranda	Exotic	1	16	19	**2.0**	12.57	**1.6**	<5	<5	Good	Fair	Juvenile	25-50	Epicormic growth;Soil compaction;	Amenity value/shade;Attractive landscape feature;	Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
114	S1	*Prunus persica*	Peach	Exotic	1	17	19	**2.0**	13.07	**1.6**	<5	5-10	Good	Fair	Semi-Mature	10-15	Epicormic growth;Poor pruning;Soil compaction;	Amenity value/shade;	Irrigation;Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
115	S1	*Ficus carica*	Common Fig	Exotic	1	14	22	**2.0**	12.57	**1.8**	<5	5-10	Fair	Fair	Semi-Mature	15-25	Epicormic growth;Poor pruning;	Amenity value/shade;	Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
116	S1	*Pittosporum undulatum*	Sweet Pittosporum	Native	1	34	41	**4.1**	52.30	**2.3**	5-10	5-10	Fair	Fair	Mature	10-15	Dieback;Epicormic growth;Poor pruning;Soil compaction;		Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
118	S1	*Prunus armeniaca*	Apricot	Exotic	1	37	26	**4.4**	61.93	**1.9**	5-10	5-10	Fair	Fair	Semi-Mature	10-15	Dieback;Poor pruning;Soil compaction;Suckers;	Amenity value/shade;	Mulching;Remove deadwood/stubs > 60mm;Trim suckers;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
119	S1	*Acer palmatum ssp. palmatum*	Japanese Maple	Exotic	1	33	48	**3.9**	47.95	**2.4**	5-10	5-10	Poor	Poor	Mature	<5	Cavity(s);Deadwood/stubs > 30mm;Decay;Dieback;Soil compaction;Weak union(s);		Removal;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
120	S1	*Acca sellowiana*	Feijoa	Exotic	1	25	32	**3.0**	28.27	**2.1**	<5	5-10	Good	Fair	Mature	15-25	Co-dominant stems;Soil compaction;	Amenity value/shade;	Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
121	S1	*Diospyros kaki*	Persimmon	Exotic	1	13	18	**2.0**	12.57	**1.6**	<5	5-10	Fair	Fair	Semi-Mature	15-25	Disease pathogens;Epicormic growth;Poor pruning;Resin exudation/kino;Soil compaction;	Amenity value/shade;	Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
122	S1	*Juglans regia*	Common Walnut	Exotic	1	23	36	**2.8**	24.66	**2.2**	5-10	5-10	Fair	Fair	Semi-Mature	15-25	Deadwood/stubs < 30mm;Dieback;Poor pruning;Soil compaction;Wound(s);	Amenity value/shade;	Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
123	S1	*Malus cvr.*	Apple	Exotic	1	35	39	**4.2**	55.42	**2.2**	5-10	5-10	Fair	Fair	Mature	10-15	Cavity(s);Decay;Epicormic growth;Poor pruning;Soil compaction;Wound(s);	Amenity value/shade;	Formative pruning;Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
125	S1	*Corymbia ficifolia*	West. Aust. Red Flowering Gum	Native	1	53	64	**6.4**	127.08	**2.7**	10-15	5-10	Fair	Fair	Semi-Mature	15-25	Dieback;Epicormic growth;Parasitic plant/mistletoe;Resin exudation/kino;Soil compaction;Soil grade changes;	Amenity value/shade;	Mulching;Remove all deadwood/stubs;Remove selective branches;	Within temporary carpark footprint (and stage 2 development)	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
126	S2	*Corymbia ficifolia*	West. Aust. Red Flowering Gum	Native	1	41	44	**4.9**	76.05	**2.3**	10-15	5-10	Fair	Fair	Semi-Mature	5-10	Co-dominant stems;Deadwood/stubs > 60mm;Dieback;Epicormic growth;Excessive thinning;Previous failure(s);Soil compaction;	Amenity value/shade;	Irrigation;Mulching;Remove deadwood/stubs > 30mm;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
127	S2	*Corymbia ficifolia*	West. Aust. Red Flowering Gum	Native	1	62	71	**7.4**	173.90	**2.9**	10-15	5-10	Fair	Fair	Semi-Mature	10-15	Cavity(s);Co-dominant stems;Deadwood/stubs > 30mm;Decay;Dieback;Epicormic growth;Poor pruning;Previous failure(s);Resin exudation/kino;Soil compaction;Wound(s);	Amenity value/shade;	End weight reduction;Mulching;Remove deadwood/stubs > 30mm;		B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
128	S2	*Corymbia ficifolia*	West. Aust. Red Flowering Gum	Native	1	51	58	**6.1**	117.67	**2.6**	10-15	5-10	Fair	Fair	Semi-Mature	10-15	Co-dominant stems;Deadwood/stubs > 30mm;Dieback;Epicormic growth;Previous failure(s);Soil compaction;	Amenity value/shade;	Mulching;Remove deadwood/stubs > 30mm;		B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
129	S2	*Corymbia ficifolia*	West. Aust. Red Flowering Gum	Native	1	11	13	**2.0**	12.57	**1.5**	<5	<5	Fair	Fair	Semi-Mature	5-10	Dieback;Soil compaction;Suppressed;	Amenity value/shade;	Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
130	S2	*Corymbia ficifolia*	West. Aust. Red Flowering Gum	Native	1	67	64	**8.0**	203.08	**2.7**	10-15	5-10	Fair	Fair	Semi-Mature	10-15	Co-dominant stems;Deadwood/stubs > 60mm;Decay;Dieback;Soil compaction;	Amenity value/shade;	Mulching;Remove deadwood/stubs > 30mm;Remove selective branches;		B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
131	S2	*Corymbia ficifolia*	West. Aust. Red Flowering Gum	Native	1	31	36	**3.7**	43.47	**2.2**	5-10	5-10	Good	Fair	Semi-Mature	10-15	Dieback;Included bark;Soil compaction;	Amenity value/shade;	Mulching;Remove selective branches;Shape from infrastructure;		B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
132	S2	*Corymbia ficifolia*	West. Aust. Red Flowering Gum	Native	1	31	36	**3.7**	43.47	**2.2**	5-10	5-10	Fair	Fair	Semi-Mature	10-15	Dieback;Poor pruning;Soil compaction;	Amenity value/shade;	End weight reduction;Mulching;Shape from infrastructure;		B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
134	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	53	55	**6.4**	127.08	**2.6**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Dieback;Included bark;Soil compaction;	Amenity value/shade;	Mulching;Weed control;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
135	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	38	44	**4.6**	65.33	**2.3**	10-15	<5	Good	Fair	Mature	25-50	Dieback;Included bark;Soil compaction;	Amenity value/shade;	Mulching;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
136	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	42	49	**5.0**	79.80	**2.5**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Soil compaction;	Amenity value/shade;	Mulching;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
137	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	40	46	**4.8**	72.38	**2.4**	10-15	<5	Good	Fair	Mature	25-50	Deadwood/stubs < 30mm;Soil compaction;	Amenity value/shade;	Mulching;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).

BOROONDARA
Received
28/4/2021

Tree no.	Stage	*Botanical Name*	Common Name	Origin	Trees in group	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	ULE (Yrs.)	Defects	Significance	Action (irrespective of development)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
138	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	43	48	**5.2**	83.65	**2.4**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Soil compaction;	Amenity value/shade;	Mulching;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
139	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	40	45	**4.8**	72.38	**2.4**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Poor pruning;Soil compaction;	Amenity value/shade;	Mulching;Remove all deadwood/stubs;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
140	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	41	47	**4.9**	76.05	**2.4**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Poor pruning;Soil compaction;	Amenity value/shade;	Mulching;Remove all deadwood/stubs;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
141	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	36	43	**4.3**	58.63	**2.3**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Soil compaction;	Amenity value/shade;	Mulching;		A	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
142	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	30	36	**3.6**	40.72	**2.2**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Soil compaction;Wound(s);	Amenity value/shade;	Mulching;		A	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
143	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	42	47	**5.0**	79.80	**2.4**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Soil compaction;Wound(s);	Amenity value/shade;	Mulching;		A	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
144	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	46	51	**5.5**	95.73	**2.5**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs > 30mm;Soil compaction;	Amenity value/shade;	Mulching;		A	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
145	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	42	49	**5.0**	79.80	**2.5**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Soil compaction;	Amenity value/shade;	Mulching;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
146	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	41	48	**4.9**	76.05	**2.4**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Soil compaction;	Amenity value/shade;	Mulching;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
147	S2	*Cupressus torulosa*	Bhutan Cypress	Exotic	1	46	52	**5.5**	95.73	**2.5**	10-15	<5	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Included bark;Soil compaction;	Amenity value/shade;	Mulching;		A	2	Retain tree with specific protection requirements (i.e. Generic measures plus supervision of works within the TPZ and/or use of root sensitive construction techniques).
150	S2	*Grevillea robusta*	Silky Oak	Native	1	54	68	**6.5**	131.92	**2.8**	10-15	5-10	Good	Good	Semi-Mature	25-50	Dieback;Mechanical damage to root(s);Previous failure(s);Soil compaction;Soil grade changes;Wound(s);	Amenity value/shade;	Mulching;		A	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
178	S1	*Grevillea robusta*	Silky Oak	Native	1	21	23	**2.5**	19.95	**1.8**	<5	5-10	Dead	Poor	Juvenile	0	Epicormic growth;Inappropriate location;Poor pruning;		Removal;	Dead tree.	U		Remove tree irrespective of future development.
190	S3	*Pyrus ussuriensis*	Manchurian Pear	Exotic	1	8	10	**2.0**	12.57	**1.5**	<5	<5	Fair	Good	Juvenile	15-25	Soil compaction;	Amenity value/shade;Attractive landscape feature;	Irrigation;Mulching;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
195	S1	*Acer palmatum ssp. palmatum*	Japanese Maple	Exotic	1	7	9	**2.0**	12.57	**1.5**	<5	<5	Fair	Fair	Semi-Mature	10-15	Crossing/rubbing branches;Deadwood/stubs < 30mm;Dieback;Wound(s);	Amenity value/shade;	Mulching;Shape from infrastructure;		C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
196	S1	*Syzygium australe*	Brush Cherry	Native	1	32	42	**3.8**	46.32	**2.3**	5-10	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Epicormic growth;Exposed root(s);Mechanical damage to root(s);Poor pruning;Wound(s);	Amenity value/shade;	Mulching;Remove selective branches;Shape from infrastructure;	Development dimensions estimated due to restricted access. Tree previously pruned incorrectly (Lopped).	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
197	S1	*Eucalyptus sp.*	Eucalypt	Native	1	4	5	**2.0**	12.57	**1.5**	<5	<5	Good	Fair	Juvenile	10-15	Deadwood/stubs < 30mm;Poor pruning;Suppressed;		Mulching;	Development dimensions estimated due to restricted access.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
198	S1	*Leptospermum sp.*	Tea Tree	Native	1	180	250	**15.0**	706.86	**4.9**	<5	5-10	Fair	Fair	Senescent	5-10	Co-dominant stems;Deadwood/stubs < 30mm;Dieback;Epicormic growth;Poor pruning;		Mulching;Shape from infrastructure;	Development dimensions estimated due to restricted access.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
199	S1	*Prunus cerasifera*	Cherry Plum	Exotic	1	33	43	**4.0**	49.27	**2.3**	5-10	<5	Fair	Fair	Senescent	5-10	Co-dominant stems;Deadwood/stubs > 60mm;Decay;Dieback;Epicormic growth;Included bark;Wound(s);		Shape from infrastructure;	Development dimensions estimated due to restricted access. Tree reaching the end of its lifespan as a cultivated specimen.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
200	S1	*Pittosporum undulatum*	Sweet Pittosporum	Native	1	25	38	**3.0**	28.27	**2.2**	5-10	5-10	Good	Fair	Mature	10-15	Co-dominant stems;Deadwood/stubs < 30mm;Suppressed;Undesirable species;	Amenity value/shade;	Remove selective branches;	Development dimensions estimated due to restricted access. Tree species of proven weed potential.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
201	S1	*Syzygium smithii*	Lilly Pilly	Native	1	52	75	**6.2**	122.33	**2.9**	10-15	5-10	Good	Fair	Mature	25-50	Co-dominant stems;Deadwood/stubs < 30mm;Exposed root(s);Mechanical damage to root(s);	Amenity value/shade;Attractive landscape feature;	Shape from infrastructure;	Development dimensions estimated due to restricted access.	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
202	S1	*Callistemon viminalis*	Weeping Bottlebrush	Native	1	13	19	**2.0**	12.57	**1.6**	<5	<5	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Included bark;Suppressed;Wound(s);	Amenity value/shade;	End weight reduction;Mulching;	Development dimensions estimated due to restricted access.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
203	S1	*Callistemon viminalis*	Weeping Bottlebrush	Native	1	22	29	**2.6**	21.90	**2.0**	5-10	<5	Good	Fair	Semi-Mature	15-25	Deadwood/stubs < 30mm;Suppressed;	Amenity value/shade;	Mulching;	Development dimensions estimated due to restricted access.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
204	S1	*Corymbia citriodora*	Lemon-scented Gum	Native	1	33	43	**4.0**	49.27	**2.3**	15-20	5-10	Fair	Good	Semi-Mature	15-25	Canker(s);Deadwood/stubs < 30mm;Pests/insects;	Amenity value/shade;Attractive landscape feature;	Mulching;	Development dimensions estimated due to restricted access. Outer crown presents with areas of cankering (wounds), causal agent unclear, currently having only minor impact on structure.	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
205	S1	*Syzygium australe*	Brush Cherry	Native	1	67	75	**8.0**	203.08	**2.9**	10-15	5-10	Good	Fair	Mature	25-50	Co-dominant stems;Crossing/rubbing branches;Damaging infrastructure;Deadwood/stubs < 30mm;	Amenity value/shade;Attractive landscape feature;	Mulching;	Development dimensions estimated due to restricted access. Roots beginning to lift paving.	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
206	S1	*Pittosporum tenuifolium 'James Stirling'*	James Stirling Pittosporum	Exotic	4	7	9	**2.0**	12.57	**1.5**	<5	<5	Good	Fair	Semi-Mature	15-25	Co-dominant stems;Epicormic growth;	Amenity value/shade;	Formative pruning;	Development dimensions estimated due to restricted access. Tree has been previously hedge pruned.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
207	S1	*Prunus cerasifera 'Nigra'*	Purple-leaved Cherry Plum	Exotic	1	18	25	**2.2**	14.66	**1.8**	5-10	<5	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Epicormic growth;Inappropriate location;Included bark;Poor pruning;	Amenity value/shade;	Shape from infrastructure;	Tree growing in close proximity to two residential dwellings	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
208	S1	*Ligustrum lucidum*	Chinese Privet	Exotic	1	12	18	**2.0**	12.57	**1.6**	<5	<5	Good	Fair	Semi-Mature	<5	Deadwood/stubs < 30mm;Undesirable species;	Weed species;	Consider removing;	Recognised weed species offering limited amenity, consider replacing with more desirable species. If retained care required during landscaping works	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
209	S1	*Melaleuca armillaris*	Bracelet Honey Myrtle	Native	1	14	20	**2.0**	12.57	**1.7**	<5	<5	Fair	Fair	Semi-Mature	10-15	Deadwood/stubs < 30mm;Epicormic growth;	Screen value;		Care required during landscaping works	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
210	S1	*Cotoneaster sp.*	Cotoneaster	Exotic	1	6	10	**2.0**	12.57	**1.5**	<5	<5	Good	Fair	Semi-Mature	10-15	Co-dominant stems;	Amenity value/shade;Screen value;		Development dimensions estimated due to restricted access. Care required during landscaping works	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
211	S1	*Prunus cerasifera*	Cherry Plum	Exotic	1	32	45	**3.8**	46.32	**2.4**	5-10	5-10	Good	Fair	Mature	5-10	Co-dominant stems;Crossing/rubbing branches;Included bark;	Amenity value/shade;Screen value;	Remove selective branches;Shape from infrastructure;	Development dimensions estimated due to restricted access. Uplift to give a 1m clearance from touching either dwelling.	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
212	S1	*Lagerstroemia indica*	Crepe Myrtle	Exotic	1	24	25	**2.9**	26.06	**1.8**	<5	5-10	Good	Fair	Mature	25-50	Deadwood/stubs < 30mm;Epicormic growth;Poor pruning;Suppressed;	Amenity value/shade;Attractive landscape feature;	Mulching;	Care required during landscaping works. Large example of the species, adapting well to past unfavourable pruning.	B	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
213	S1	*Betula pendula*	Silver Birch	Exotic	1	36	51	**4.3**	58.63	**2.5**	5-10	5-10	Good	Fair	Semi-Mature	15-25	Deadwood/stubs < 30mm;Epicormic growth;Poor pruning;	Amenity value/shade;	Mulching;	Care required during landscaping works	B	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).

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TREE CONSULTANCY AND MANAGEMENT SYSTEMS

Tree no.	Stage	*Botanical Name*	Common Name	Origin	Trees in group	DBH Total (cm)	DRB (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	ULE (Yrs.)	Defects	Significance	Action (irrespective of development)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
214	S1	*Prunus serrulata*	Japanese Flowering Cherry	Exotic	1	21	32	**2.6**	20.86	**2.1**	<5	<5	Good	Fair	Semi-Mature	15-25	Deadwood/stubs < 30mm;Decay;Epicormic growth;Fungal fruiting body(s);Previous failure(s);Wound(s);	Attractive landscape feature;	Irrigation;Mulching;	Care required during landscaping works	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
215	S1	*Malus x purpurea 'Eleyi'*	Purple Crab Apple	Exotic	1	25	34	**3.1**	29.41	**2.1**	<5	5-10	Good	Fair	Semi-Mature	15-25	Co-dominant stems;Deadwood/stubs < 30mm;Epicormic growth;	Amenity value/shade;Attractive landscape feature;	Irrigation;Mulching;Remove epicormic growth;	Care required during landscaping works	B	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
216	S1	*Acer palmatum ssp. palmatum*	Japanese Maple	Exotic	1	21	33	**2.5**	19.95	**2.1**	<5	5-10	Fair	Fair	Mature	15-25	Co-dominant stems;Crossing/rubbing branches;Dieback;Epicormic growth;Included bark;Weak union(s);	Amenity value/shade;Screen value;		Care required during landscaping works. Minor crownlift required to provide 1m clearance to adjacent residential buildings and rooftops.	B	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
217	S1	*Catalpa bignonioides*	Indian Bean Tree	Exotic	1	13	19	**2.0**	12.57	**1.6**	<5	<5	Good	Poor	Juvenile	<5	Epicormic growth;Poor pruning;Previous failure(s);Weak union(s);Wound(s);		Removal - poor specimen;	Failures within primary structure have left tree of compromised structure, remove and replace.	U		Remove tree irrespective of future development.
218	S2	*Corymbia ficifolia (hybrid)*	West Aust. Red Flowering Gum	Native	1	73	86	**8.8**	241.08	**3.1**	10-15	10-15	Good	Fair	Mature	15-25	Epicormic growth;Exposed root(s);Mechanical damage to root(s);Poor pruning;Resin exudation/kino;Soil compaction;Wound(s);	Amenity value/shade;Attractive landscape feature;		Council tree not tagged. Although heavily pruned by line clearance, tree contributes well to the amenity of the street.	A	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
219	S2	*Corymbia ficifolia (hybrid)*	West Aust. Red Flowering Gum	Native	1	77	97	**9.2**	268.22	**3.3**	10-15	10-15	Good	Fair	Mature	15-25	Deadwood/stubs < 30mm;Epicormic growth;Exposed root(s);Included bark;Mechanical damage to root(s);Poor pruning;Resin exudation/kino;Soil compaction;Wound(s);	Amenity value/shade;Attractive landscape feature;		Council tree not tagged. Although heavily pruned by line clearance, tree contributes well to the amenity of the street.	A	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
220	S2	*Corymbia ficifolia*	West. Aust. Red Flowering Gum	Native	1	75	103	**9.0**	254.47	**3.4**	10-15	10-15	Good	Fair	Mature	15-25	Cavity(s);Decay;Epicormic growth;Exposed root(s);Mechanical damage to root(s);Poor pruning;Resin exudation/kino;Soil compaction;Wound(s);	Amenity value/shade;Attractive landscape feature;		Council tree not tagged. Form and habit is open as a result of electric line clearance works. Branch failure remains possible due to this.	A	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).

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