



Case Meallin Xavier College Masterplan development Barkers Road, Kew VIC Arboricultural Impact Assessment

22 July 2021

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Arboricultural Impact Assessment Report regarding ninety-seven (97) trees located within the vicinity of the proposed Masterplan development at Xavier College, Barkers Road, Kew

Dear Rob,

We are pleased to provide you with the following Arboricultural Impact Assessment Report for ninety-seven (97) trees within the grounds of Xavier 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

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1 Executive Summary

- 1.1.1 The following Arboricultural Impact Assessment (Report) regarding ninety-seven (97) trees located within the grounds of Xavier College. The subject site was identified by Case Meallin (the Client) as possessing trees that may be impacted upon by the proposed development outlined within the Xavier College (preliminary) Masterplan. Amendments to this document may be required based on further detailed design.
- 1.1.2 In part, the project scope was to nominate subject trees that can be retained, or require removal to facilitate the proposed development, as well as identify and reduce potential conflicts between subject trees and site development. Accurate information on the area required for tree retention and methods/techniques suitable for tree protection during proposed construction have been provided.
- 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	7			300, 301, 302, 321, 323, 494	503
B	Moderate retention value trees	52	169, 170, 171, 173, 196, 197, 203, 204, 205, 206, 207, 208, 296, 303, 304, 305, 309, 310, 311, 312, 313, 314, 315, 316, 317, 319, 322, 324, 327, 328		175, 178, 179, 180, 181, 210, 495, 496, 497, 498, 499, 502	59, 160, 163, 164, 174, 276, 277, 278, 325, 359
C	Low retention value trees	38	198, 200, 202, 298, 306, 307, 308, 318, 362, 363, 388		176, 177, 209, 500, 501	215, 216, 274, 275, 279, 280, 281, 282, 284, 289, 290, 291, 292, 293, 320, 448, 449, 450, 451, 459, 460, 461
U	Trees to be removed irrespective of proposed development	0				

2 Introduction

- 2.1.1 ArborSafe Australia Pty Ltd was engaged by Mr Rob Long on behalf of the Client to complete an Arboricultural Impact Assessment Report on ninety-seven (97) trees located within or adjacent to the Xavier College at Barkers Road, Kew.
- 2.1.2 The site was located within the north-east and north-central portion of the school grounds and includes the existing car parks, sporting facilities and surrounding areas of open space.
- 2.1.3 The proposed development, which is at the preliminary Masterplan stage and as such may be subject to minor change following completion of detailed design, has been reviewed and in summary consists of the demolition of the existing tennis club house, grandstand, maintenance building, cricket nets, senior boarding house and Chapel Oval. A new boarding house, expanded sports centre building, Year 7 and 8 building, maintenance shed (with rooftop cricket nets), academic buildings and carparking (under a revamped Chapel Oval) and associated hard and soft landscaping is proposed across a similar footprint. The proposed development will be completed in stages over a number of years.
- 2.1.4 The report was intended to provide information on site 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*.
- 2.1.5 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, including trees located within the gardens of neighbouring Vic Roads property and any trees of significance in private residences.
- 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.

4 Methodology

4.1 Data Collection

- 4.1.1 Justin Herbert of ArborSafe Australia Pty Ltd carried out a site inspection of the subject trees on 18 March 2021.
- 4.1.2 Trees that are the subject of this report (Figure 4) were identified during discussions with the Client and reviewing relevant supplied development documentation. 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.
- 4.1.3 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.
- 4.1.4 Tree height and canopy width were estimated and have been provided to the nearest whole metre. Trunk diameter at breast height (DBH) and trunk diameter at the root crown (DRB) were measured with a diameter tape and provided to the nearest centimetre. Dimension of trees on neighbouring property have been estimated due to restricted access.
- 4.1.5 TPZ encroachment has been estimated based on a review of the base tree data and the concept plans detailed within the Xavier College Masterplan.
- 4.1.6 Data collected on site was analysed against the supplied development documentation by Andrew Clark, of ArborSafe Australia Pty Ltd, following which relevant findings and recommendations were formulated and collated into report format.
- 4.1.7 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).
- 4.1.8 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).
- 4.1.9 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.
- 4.1.10 Plans of the existing site and of the proposed development were provided to ArborSafe on 17 March 2021 with additional revisions in June/July 2021.
- 4.1.11 This report is to be read in conjunction with Development Plan Drawings DP0102 Rev TP3, DP0103 Rev TP2 and DP0105 Rev TP1 (see Figure 1 and 2 and Appendix F).
- 4.1.12 No proposed underground service locations have been reviewed in the preparation of this report.

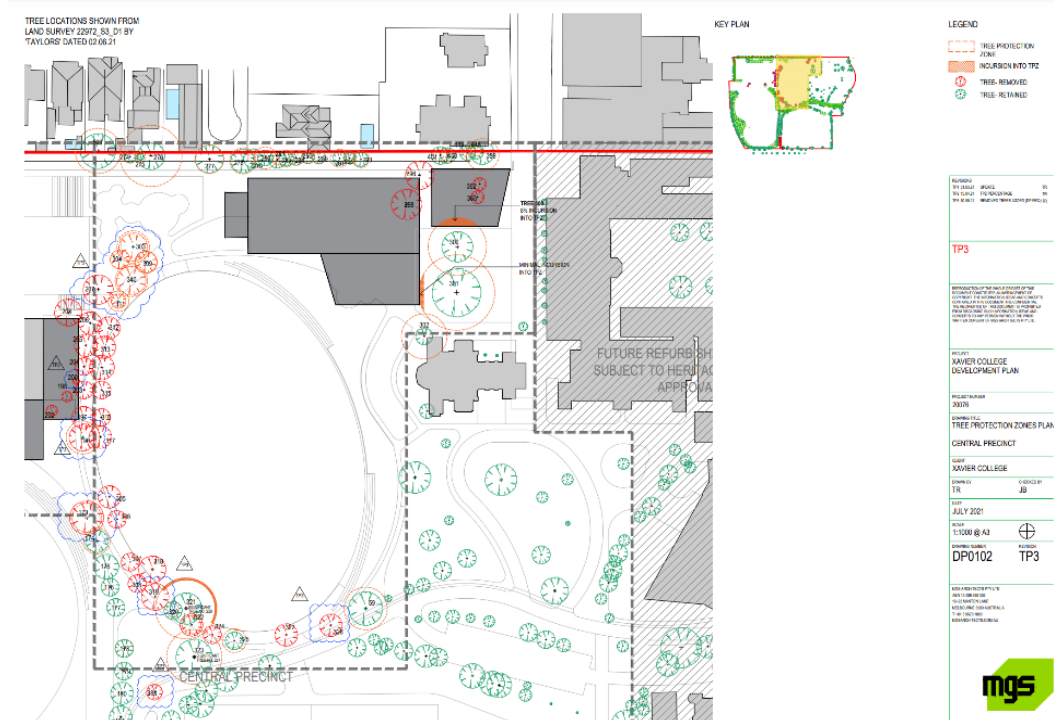


Figure 1. Excerpt from Tree Protection Zones Plan DP0102 TP3. (MGS Architects, July 2021).

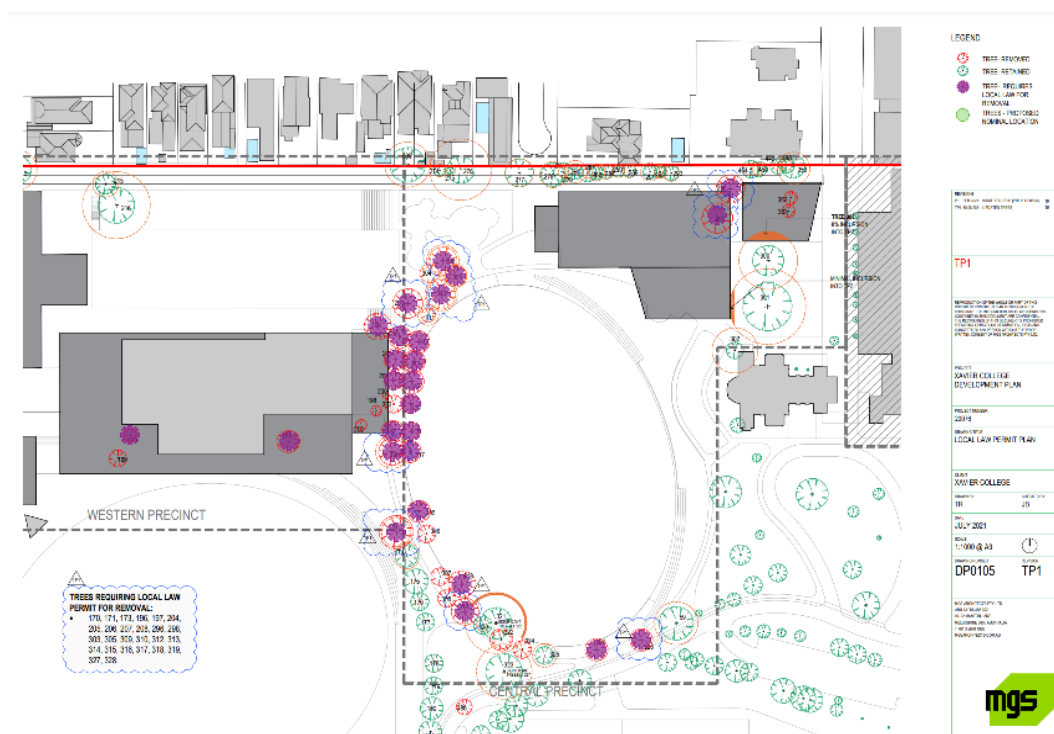


Figure 2. Excerpt from Local Law Permit Plan DP0105 TP1. (MGS Architects, July 2021).

5 Observations

5.1 Location

- 5.1.1 The site was located within the north-western corner of Xavier College in an area largely made up of existing sporting grounds and associated buildings (Figure 3).
- 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 Vic Roads offices and carparking to the west, residential properties to the north and adjacent school buildings and infrastructure to the east and south.
- 5.1.4 The site was largely flat, with a few varied levels across existing landscaping, such as raised ovals etc.
- 5.1.5 Site soils were presumed to altered following many years of development and use.



Figure 3. Whole site image (location). Red lines delineate the site and area containing the subject trees that are to be impacted by the proposed development. (NearMaps, March 2021).

5.2 Site Trees

- 5.2.1 Subject trees form part of the existing ArborPlan Tree Management System for the entire Xavier College site and as such have been tagged, positioned on aerial imagery and visually assessed annually since 2009.
- 5.2.2 Trees can be identified on site using white tree tags which are typically located at approximately 2m from ground level on the southern side of the trunk. Trees located on neighbouring properties have not been tagged. As the subject trees form a subset of a previous survey undertaken for the entire site, numbering is not consecutive.
- 5.2.3 The site trees are considered to all be planted material, with no remnant specimen's or species endemic to the area observed. The site trees are made up of a fairly even mixture of exotic and Australian native species, which are predominantly semi-mature in age.
- 5.2.4 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. The majority of site trees were of moderate size and considered useful within the site for shade, screening or amenity purposes, with minimal influence on the outside streetscape.
- 5.2.5 Three (3) trees are considered of site significance due to age, size and location within the site These are trees 300 and 301, both *Platanus x acerifolia* (London Plane) and 302 *Cupressus torulosa* (Bhutan Cypress).
- 5.2.6 Trees 300 and 301 are significant examples of their species and offer considerable amenity to the local landscape while tree 302 is a significant example of *Cupressus torulosa* (Bhutan Cypress) and is one of a pair that flank the Xavier Chapel. The trees have become iconic with regard to local landscape when considered in context of the historic Chapel.



Figure 4. 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. (ArborPlan, July 2021).



Figure 5. View to south of Trees 300 and 301 *Platanus x acerifolia* in their growing environment. (Justin Herbert, March 2021).



Figure 6. View to north of Tree 302 *Cupressus torulosa* in its growing environment. (Justin Herbert, 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	300, 301, 302, 321, 323, 494, 503
B	59, 160, 163, 164, 169, 170, 171, 173, 174, 175, 178, 179, 180, 181, 196, 197, 203, 204, 205, 206, 207, 208, 210, 276, 277, 278, 296, 303, 304, 305, 309, 310, 311, 312, 313, 314, 315, 316, 317, 319, 322, 324, 325, 327, 328, 359, 495, 496, 497, 498, 499, 502
C	176, 177, 198, 200, 202, 209, 215, 216, 274, 275, 279, 280, 281, 282, 284, 289, 290, 291, 292, 293, 298, 306, 307, 308, 318, 320, 362, 363, 388, 448, 449, 450, 451, 459, 460, 461, 500, 501
U	

5.4 Heritage / Environment Status

5.4.1 Heritage Status

- 5.4.2 The South Wing, West Wing and Great Hall at Xavier College are of significance as a group of three substantially intact, commandingly designed educational buildings of the nineteenth century that, apart from their architectural distinction, have become a Kew landmark (Heritage Victoria, 2021).
- 5.4.3 Two trees within the proposed development site were identified as significant in the Lovell Chen Conservation Management Plan 2021; these are the two plane trees west of the Senior Boarding House (Trees 300 and 301).

5.4.4 Botanical and Environmental Status

- 5.4.5 The site trees were considered common species in the local area and as such hold limited botanical significance.
- 5.4.6 Two (2) trees within the subject site were listed within the City of Boroondara Significant Tree Study (2019). ArborSafe Tree number 321 is listed as Tree 228 and ArborSafe Tree number 323 is listed as Tree 227 within this study (John Patrick Landscape Architects, 2019).

6 Discussion

6.1 Impact of Development

- 6.1.1 The trees affected by direct conflict with the proposed construction footprint would require removal under the current design. To retain any of these trees a redesign or relocation of the major components of the proposed development would be required. Refer to Appendix E for full detail.
- 6.1.2 Development impacts which affect trees, but not necessarily to the point of requiring immediate removal, are through significant root damage due to major TPZ encroachment. This can largely be placed into three (3) categories – soil compaction, level changes or direct root severance.

- 6.1.3 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.
- 6.1.4 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.
- 6.1.5 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.
- 6.1.6 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.
- 6.1.7 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).
- 6.1.8 Due to the preliminary nature of the plans it is hard to ascertain the eventual impacts to some of the site trees, however if consideration is given to the basic information provided above during detailed design, along with gathering additional individual targeted tree information where required, then positive outcomes for the majority of the listed retained trees should be achieved.

6.2 Determining TPZ Encroachment

- 6.2.1 **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.
- 6.2.2 **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.
- 6.2.3 **No encroachment.** Trees with no encroachment may be retained with generic or no protection requirements throughout the construction stage.

6.2.4 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).

7 Tree Protection and Management Recommendations

7.1 Tree Removal

7.1.1 Forty-one (41) trees would require removal as follows, based on the supplied design proposal. These 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	0		30	169 170 171 173 196 197 203 204 205 206 207 208 296 303 304 305 309 310 311 312 313 314 315 316 317 319 322 324 327 328	11	198 200 202 298 306 307 308 318 362 363 388	0	

7.2 Tree Retention

7.2.1 Fifty-six (56) 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	6	300, 301, 302, 321, 323, 494	12	175, 178, 179, 180, 181, 210, 495, 496, 497, 498, 499, 502	5	176, 177, 209, 500, 501
Retain with generic protection requirements	1	503	10	59, 160, 163, 164, 174, 276, 277, 278, 325, 359	22	215, 216, 274, 275, 279, 280, 281, 282, 284, 289, 290, 291, 292, 293, 320, 448, 449, 450, 451, 459, 460, 461

7.3 Site Survey

- 7.3.1 A site survey should be completed using a registered surveyor. Tree numbers contained within this report and located on the individual tree tags onsite should be used in the survey.
- 7.3.2 The TPZ and Retention Value (Category A, B and C) of all retainable trees should be displayed accurately on the site survey and subsequent plans for the development using the distances and tree numbers contained in this report.

7.4 Underground Services

- 7.4.1 An investigation as to the location, condition and size of underground services should be undertaken and plotted on drawings. Any utility that needs replacement or upgrading which is located within the TPZ of a tree appropriate for retention should be identified at the design stage.

7.5 Specific Protection Measures

7.6 Demolition

- 7.6.1 Trees 300, 301 and 302 require added care and TPZ protection during demolition works of the grandstand and senior boarding structures. The trees TPZ are to be fenced off where possible. Any heavy machinery will operate from outside the TPZ, unless ground protection is installed, or it operates from a pre-existing concrete foundation hardstand within the TPZ area. The demolition is to commence at the outer extent of the TPZ and move inwards to minimise root damage to the trees.

7.7 Exploratory Root Investigation / Arborist Supervision

- 7.7.1 Based upon the indicative location of various proposed buildings identified in Figure 2, exploratory root investigation may be required to determine the size and location of tree roots during the detailed design stage. The detailed design stage should allow for consultation from the Project Arborist. The Project Arborist should be used to provide feedback and guidance as to the requirement and specifications on required root mapping
- 7.7.2 Trees 209, 210, 494, 495, 496, 497, 498, 499, 500, 501 and 502 will be situated within close proximity to the proposed construction footprint of the Boarding House.
- 7.7.3 Trees 300, 301 and 302 will be situated within close proximity to the demolition of the senior boarding house and the construction footprint of the Year 7 & 8 building and learning and teaching building.
- 7.7.4 Tree 321 will be situated within close proximity to the proposed excavation footprint of the Chapel Oval underground carpark.
- 7.7.5 Tree 323 is situated adjacent to a main access road which is to be upgraded/reconfigured. Arborist supervision will be required where any roading reconfiguration (including bitumen scraping/removal) is proposed within the TPZ of this tree.
- 7.7.6 Where the proposed encroachment is more than 10% into any individual trees TPZ, root mapping is recommended at the limit of encroachment to ascertain the extent of impact and future viability of the tree.
- 7.7.7 Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage and under the supervision of the Project Arborist.

7.7.8 Excavation techniques include:

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

7.7.9 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/development and ultimately the future viability of the tree.

7.7.10 This work should be undertaken prior to construction work commencing to allow for detailed management plans to be formulated. If tree species and locations exhibit similar traits, one or two points can be root mapped and the results extrapolated to other areas at the direction of the Project Arborist.

7.7.11 Significant roots (>40mm diameter) should be measured, recorded (diameter, depth and distance from trunk), photographed and collated into a root map report to be placed on file.

7.7.12 Minor roots (<40mm diameter) are to be pruned with a sharp, sterile handsaw or secateurs and, at the direction of the Project Arborist,



Figure 7. Site map showing tree requiring specific protection measures. (ArborPlan, July 2021).

7.8 Proposed Pruning

- 7.8.1 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.
- 7.8.2 Any pruning must be completed in accordance with the Australian Standard AS 4373–2007: *Pruning of Amenity Trees* (Standards Australia, 2007) and undertaken by a suitably qualified arborist (minimum AQF 3 arborist).
- 7.8.3 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.

7.9 Generic Protection and Reporting Measures

- 7.9.1 All retained trees require generic protection measure (Figure 8). Refer to Section 7.5–7.8 for further detail.



Figure 8. Site map showing tree requiring generic protection measures. (ArborPlan, July 2021).

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

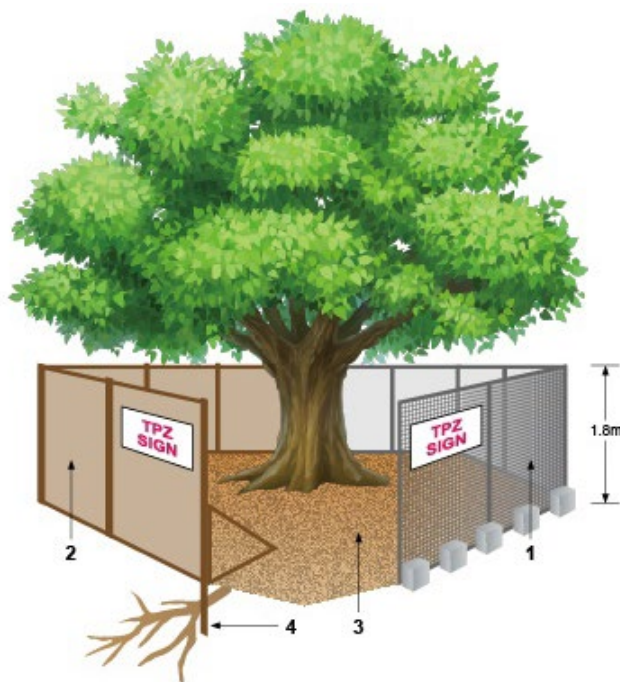
- Activities restricted within the TPZ
- Protective fencing
- Trunk and ground protection
- Tree protection signage
- Involvement from the project arborist
- Project milestones
- Compliance reporting

7.10 Activities Restricted 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

7.11 Protective Fencing Specification

- 7.11.1 Protective fencing (Figure 9) 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).
- 7.11.2 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.
- 7.11.3 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.
- 7.11.4 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.
- 7.11.5 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.
- 7.11.6 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.



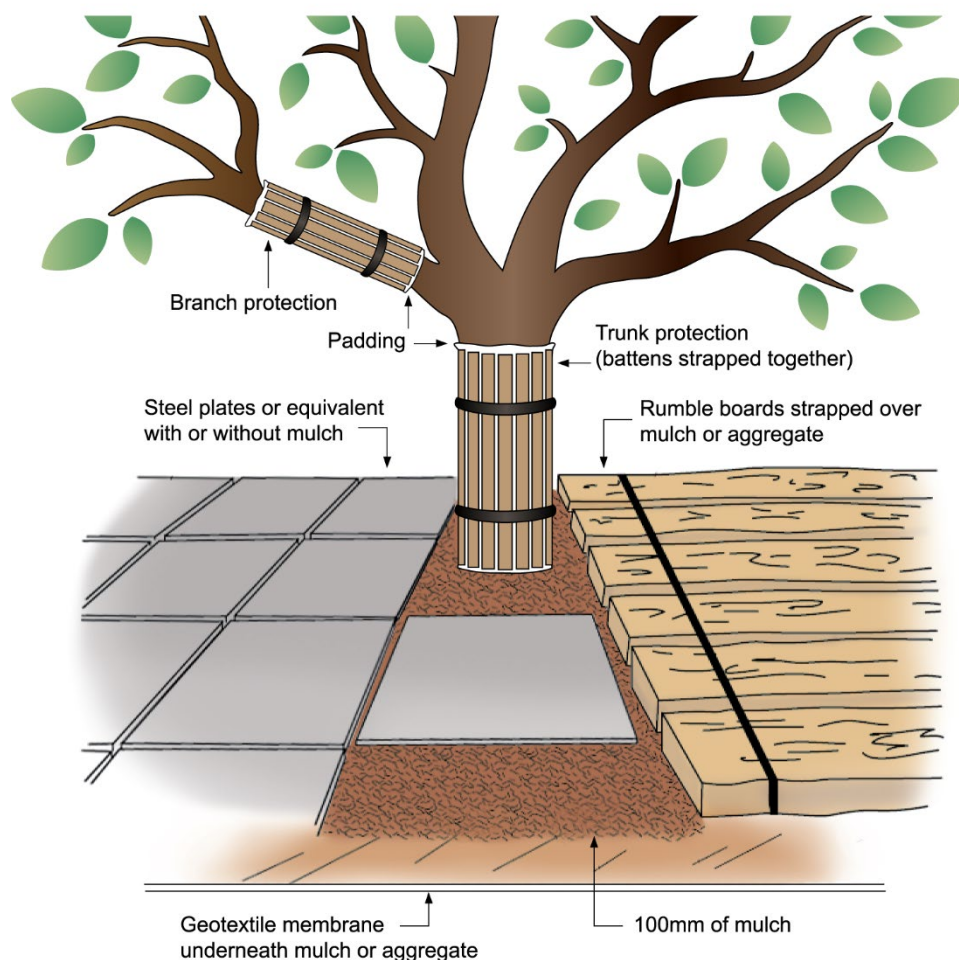
Legend:

- 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 9. Depicts standard fencing techniques. (AS 4970–2009).

7.12 Trunk and Ground Protection

- 7.12.1 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.
- 7.12.2 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.
- 7.12.3 Trunk and ground protection (Figure 10) 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 10. Depicts trunk and ground protection techniques. (AS 4790–2009).

7.13 Tree Protection Signs

- 7.13.1 Signs identifying the TPZ (Figure 11) should be placed at 10m intervals around the edge of the TPZ and should be visible from within the development site.



Figure 11. Depicts standard fencing techniques. (AS 4970–2009).

7.14 Project Arborist

- 7.14.1 An official “Project Arborist” must be commissioned to oversee the tree protection, any works within the TPZ’s and complete regular monitoring compliance certification.
- 7.14.2 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.
- 7.14.3 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.

7.15 Project Milestones

7.15.1 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.

7.16 Compliance Reporting

- 7.16.1 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.
- 7.16.2 These reports should contain photographic evidence where required to demonstrate that the work has been carried out as specified.
- 7.16.3 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.
- 7.16.4 The reports and Compliance Statements shall be submitted to the Project Manager (as well as the Clients' nominated representative) following each inspection.
- 7.16.5 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.

7.17 Offset Tree Planting

- 7.17.1 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.
- 7.17.2 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.
- 7.17.3 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.

7.18 Additional Excavation/Trenching within TPZs

- 7.18.1 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*.
- 7.18.2 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.
- 7.18.3 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.

7.19 Plant Health Care

- 7.19.1 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

7.20 Irrigation

- 7.20.1 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.

7.21 Mulching

- 7.21.1 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.
- 7.21.2 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.

- 7.21.3 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

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Plans of the existing site and of the proposed development were provided to ArborSafe on 17 March 2021 and include:

- Xavier College Masterplan, Issue P1, MGSD Architects, February 2021
- Xavier College Development – DP0102-105 TP2, July 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.

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 on 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. $TPZ\ radius = DBH \times 12$. (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.
Victorian Native	Occurs naturally within Victoria but is not indigenous.
Australian Native	Occurs naturally within Australia and its territories but is not a Victorian native or indigenous.
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.

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.

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.

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.	<ul style="list-style-type: none">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 nearbyLow quality trees suppressing adjacent trees of better quality.Noxious weeds or species categorised as weeds within the local area. <p>Note: Category U trees can have existing or potential conservation value* which might make it desirable to preserve.</p>		
	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.

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.

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 Nocate 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.

1. Why mulch?

Mulching is a plant health care action which can be undertaken to improve plant and soil health (Figure 12), 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 12. An excellent example of how to mulch a young tree. (Lachlan Andrews, September 2015).

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 13) 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*.

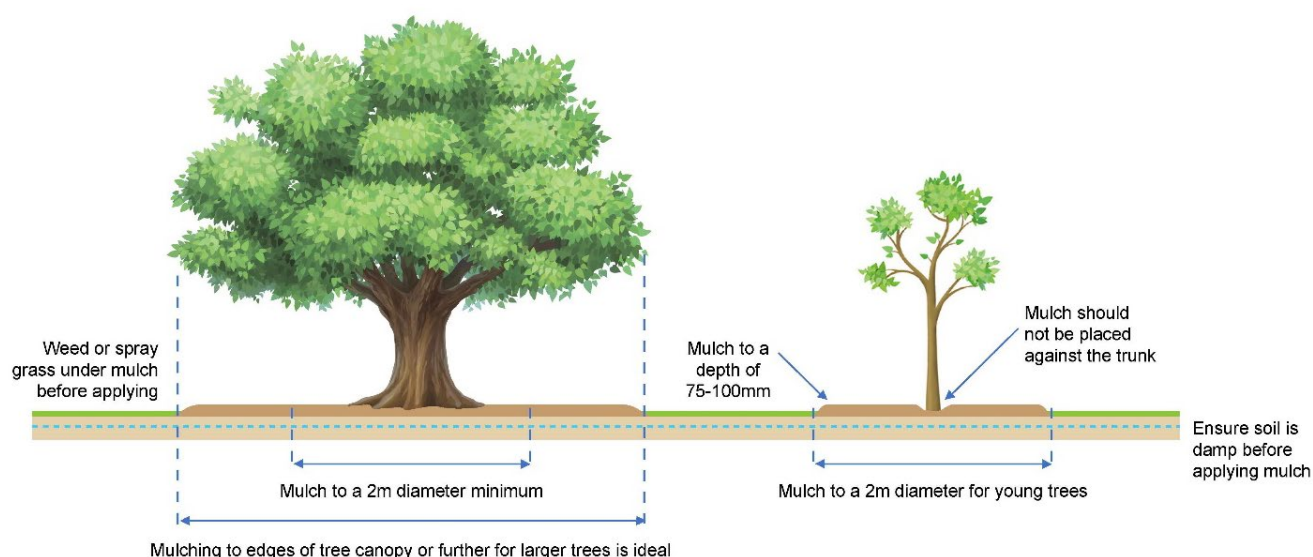


Figure 13. Mulching established and young trees (ArborSafe Australia, 2020).

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 14 and Figure 15) 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 14. An example of damage to tree roots caused via mowing. (Luke Dawson, June 2017).



Figure 15. Image showing wound caused to upper portion of surface root by mower. (Luke Dawson, June 2017).

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.

Appendix E. Tree Assessment Data

Tree no.	Botanical Name	Common Name	Easting	Northing	Origin	Trees in group	DBH Total (cm)	DRS (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	TLE (Yrs.)	Defects	Significance	Action of development (irrespective)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
59	<i>Eucalyptus sideroxylon</i>	Red Ironbark	326794.77	5813175.7	Australian native	1	71	77	8.5	228.05	3.0	10-15	10-15	Good	Fair	Semi-Mature	10-15	Co-dominant stems; Damaging infrastructure; Mechanical damage to root(s); Soil compaction; Soil grade changes; Soil problems;	Amenity value/shade; Attractive landscape feature;	Monitor;	26-03-2020 : Justin Herbert : Tree assessed. 09-05-2016 : Justin Herbert : 2016 May Tree re-assessed. SRZ has been treated with permeable paving, west side of TPZ with concrete. Tree health is good to very good. Weight reduction pruning has been carried out. Monitor for reaction to change via overall canopy health.	B	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
160	<i>Schinus areira</i>	Peppercorn	326514.57	5813220.24	Exotic	1	40	72	4.8	72.25	2.9	5-10	5-10	Fair	Fair	Semi-Mature	25-50	Soil grade changes;				B	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
163	<i>Eucalyptus sideroxylon</i>	Red Ironbark	326524.6	5813226.07	Australian native	1	57	65	6.8	146.98	2.8	10-15	5-10	Good	Fair	Semi-Mature	10-15	Epicormic growth; Soil compaction;	Amenity value/shade; Attractive landscape feature;			B	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
164	<i>Corymbia maculata</i>	Spotted Gum	326525.37	5813233.91	Australian native	1	53	68	6.4	127.08	2.8	10-15	10-15	Good	Fair	Semi-Mature	10-15	Deadwood/stubs > 60mm; Previous failure(s); Resin exudation/kino; Soil compaction; Weak union(s); Wound(s);	Amenity value/shade; Attractive landscape feature;			B	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
169	<i>Ulmus parvifolia</i>	Chinese Elm	326585.38	5813267.79	Exotic	1	34	55	4.1	52.30	2.6	5-10	5-10	Good	Fair	Semi-Mature	15-25	Abnormal lean; Poor pruning; Previous failure(s); Soil compaction; Wound(s);	Amenity value/shade; Attractive landscape feature;		Within Sports expansion footprint	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
170	<i>Ulmus parvifolia</i>	Chinese Elm	326591.27	5813276.18	Exotic	2	38	52	4.6	65.33	2.5	5-10	5-10	Good	Fair	Semi-Mature	25-50	Crack(s)/split(s); Deadwood/stubs > 30mm; Mechanical damage; Previous failure(s); Resin exudation/kino; Soil compaction; Wound(s);	Amenity value/shade; Attractive landscape feature;		Within Sports expansion footprint	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
171	<i>Ulmus parvifolia</i>	Chinese Elm	326653.06	5813268.09	Exotic	1	49	58	5.9	108.62	2.6	5-10	10-15	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Epicormic growth; Previous failure(s); Soil compaction; Soil problems;	Amenity value/shade; Attractive landscape feature;		Within Sports expansion footprint	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
173	<i>Ulmus parvifolia</i>	Chinese Elm	326688.97	5813225.61	Exotic	1	48	73	5.8	104.23	2.9	5-10	5-10	Good	Fair	Semi-Mature	25-50	Soil compaction;	Amenity value/shade; Attractive landscape feature;			B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
174	<i>Ulmus parvifolia</i>	Chinese Elm	326691.91	5813215.04	Exotic	1	43	60	5.2	83.65	2.7	5-10	5-10	Good	Fair	Semi-Mature	25-50	Epicormic growth; Soil compaction;	Amenity value/shade; Attractive landscape feature;			B	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
175	<i>Ulmus parvifolia</i>	Chinese Elm	326695.28	5813205.19		1	40	44	4.8	72.38	2.3	5-10	5-10	Good	Good	Semi-Mature	25-50	Deadwood/stubs < 30mm; Epicormic growth; Soil compaction;	Amenity value/shade; Attractive landscape feature;		31-05-2021 : Justin Herbert : Tree assessed.	B	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).
176	<i>Ulmus parvifolia</i>	Chinese Elm	326695.54	5813197.15		1	25	28	3.0	28.27	1.9	5-10	5-10	Good	Good	Semi-Mature	25-50	Previous failure(s); Soil compaction; Wound(s);	Amenity value/shade; Attractive landscape feature;		31-05-2021 : Justin Herbert : Tree assessed.	C	3	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).
177	<i>Ulmus parvifolia</i>	Chinese Elm	326696.83	5813187.99		1	25	28	3.0	28.27	1.9	<5	5-10	Good	Good	Semi-Mature	25-50	Crossing/rubbing branches; Soil compaction;	Amenity value/shade; Attractive landscape feature;	Formative pruning; Mulching;	31-05-2021 : Justin Herbert : Tree assessed. 02-05-2017 : Justin Herbert : 2017 May Tree reassessed. Remove crossing branch mid canopy.	C	3	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).
178	<i>Corymbia citridora</i>	Lemon-scented Gum	326697.86	5813172.51		1	30	33	3.6	40.72	2.1	5-10	<5	Good	Good	Semi-Mature	25-50	Deadwood/stubs < 30mm; Hanger(s); Soil compaction;	Amenity value/shade;	Mulching; Remove hanging limb(s);	31-05-2021 : Justin Herbert : Tree assessed. 26-03-2020 : Justin Herbert : Tree assessed. Small diameter hanging branch mid crown. 19-03-2019 : Ido Monk : Tree assessed.	B	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).
179	<i>Corymbia citridora</i>	Lemon-scented Gum	326696.81	5813164.58		1	40	44	4.8	72.38	2.3	10-15	5-10	Good	Good	Semi-Mature	25-50	Included bark; Mechanical damage to root(s); Previous failure(s); Soil compaction;	Amenity value/shade;	Mulching;	01-06-2021 : Ido Monk : Tree assessed.	B	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).
180	<i>Corymbia citridora</i>	Lemon-scented Gum	326695.37	5813154.67		1	40	44	4.8	72.38	2.3	10-15	5-10	Good	Poor	Semi-Mature	15-25	Co-dominant stems; Deadwood/stubs > 30mm; Included bark; Mechanical damage to root(s); Soil compaction; Weak union(s);	Amenity value/shade;	Branch support hardware; Mulching; Remove deadwood/stubs > 30mm;	01-06-2021 : Ido Monk : Tree assessed. 26-03-2020 : Justin Herbert : Tree assessed. 19-03-2019 : Ido Monk : Tree assessed. Synthetic bracing installed. ArborSafe recommends that the installed cable/bracing system be checked by the installer within the installer's timeframe recommendations and documentation be supplied to the site manager on it being rated for the loads placed upon it, in good condition, free from wear and tear and is currently fit for purpose.	B	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).
181	<i>Corymbia citridora</i>	Lemon-scented Gum	326693.82	5813145.91		1	45	50	5.4	91.61	2.5	10-15	5-10	Good	Fair	Semi-Mature	25-50	Co-dominant stems; Deadwood/stubs > 30mm; Included bark; Mechanical damage to root(s); Soil compaction;	Amenity value/shade;	End weight reduction; Mulching; Remove deadwood/stubs > 30mm;	01-06-2021 : Ido Monk : Tree assessed. 02-05-2017 : Justin Herbert : 2017 May Tree reassessed. Suppress the north apical leader by ~10%.	B	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).
196	<i>Corymbia maculata</i>	Spotted Gum	326691.95	5813258.21	Australian native	1	55	76	6.6	136.85	2.9	10-15	10-15	Good	Fair	Semi-Mature	15-25	Deadwood/stubs < 30mm; Poor pruning;	Amenity value/shade; Attractive landscape feature;	Mulching;	Care required during grand stand demolition works. Possibly requires Root mapping during detaile design if over 10% TPZ encroachment. Ensure no service line encroachment.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
197	<i>Corymbia maculata</i>	Spotted Gum	326692.74	5813266.94	Australian native	1	58	74	7.0	152.18	2.9	10-15	5-10	Fair	Good	Semi-Mature	25-50	Deadwood/stubs < 30mm; Exposed root(s); Previous failure(s); Soil compaction;	Amenity value/shade; Attractive landscape feature;		Within footprint of sitting stair	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
198	<i>Tristaniopsis laurina</i>	Kanooka	326688.45	5813274.18	Australian native	1	13	17	2.0	12.57	1.6	5-10	<5	Good	Fair	Young	10-15				Within footprint of sitting stair	C	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
200	<i>Callistemon viminalis</i>	Weeping Bottlebrush	326693.32	5813280.14	Australian native	1	15	18	2.0	12.57	1.6	<5	<5	Good	Fair	Semi-Mature	5-10	Soil compaction; Wound(s);	Amenity value/shade;		Within footprint of sitting stair	C	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
202	<i>Tristaniopsis laurina</i>	Kanooka	326681.29	5813269.67	Australian native	2	17	20	2.0	13.07	1.7	5-10	<5	Good	Fair	Semi-Mature	10-15				Within footprint of sitting stair	C	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
203	<i>Corymbia maculata</i>	Spotted Gum	326695.76	5813276.21	Australian native	1	44	68	5.3	87.58	2.8	10-15	5-10	Fair	Good	Semi-Mature	25-50	Damaging infrastructure; Exposed root(s); Mechanical damage to root(s); Soil compaction;	Amenity value/shade; Attractive landscape feature;		Within footprint of sitting stair	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
204	<i>Corymbia citridora</i>	Lemon-scented Gum	326696.15	5813288.77	Australian native	1	47	70	5.6	99.93	2.8	10-15	5-10	Good	Fair	Semi-Mature	25-50	Exposed root(s); Mechanical damage to root(s); Previous failure(s); Soil compaction; Wound(s);	Amenity value/shade; Attractive landscape feature;		Within footprint of sitting stair	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
205	<i>Corymbia citridora</i>	Lemon-scented Gum	326698.13	5813294.58	Australian native	1	48	66	5.8	104.23	2.8	5-10	5-10	Good	Good	Semi-Mature	25-50	Deadwood/stubs < 30mm; Exposed root(s); Mechanical damage to root(s); Poor pruning; Soil compaction;	Amenity value/shade; Attractive landscape feature;		Within footprint of sitting stair	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
206	<i>Corymbia maculata</i>	Spotted Gum	326700.17	5813302.95	Australian native	1	52	70	6.2	122.33	2.8	10-15	5-10	Good	Fair	Semi-Mature	25-50	Deadwood/stubs < 30mm; Exposed root(s); Soil compaction;	Amenity value/shade; Attractive landscape feature;		Within footprint of sitting stair	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
207	<i>Corymbia citridora</i>	Lemon-scented Gum	326704.74	5813315.01	Australian native	1	58	79	7.0	152.18	3.0	10-15	5-10	Good	Fair	Semi-Mature	25-50	Co-dominant stems; Included bark; Soil compaction;	Amenity value/shade; Attractive landscape feature;	End weight reduction; Mulching;	27-03-2020 : Justin Herbert : Tree assessed. 23-04-2018 : Ido Monk : Tree Assessed. Reduce west subdominant stem by ~15%, focusing on reducing overall length/dominance to appropriate pruning targets.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
208	<i>Ulmus parvifolia</i>	Chinese Elm	326692.41	5813308.18	Exotic	1	53	77	6.4	127.08	3.0	5-10	10-15	Good	Fair	Semi-Mature	25-50	Epicormic growth; Soil compaction;	Amenity value/shade; Attractive landscape feature;			B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.

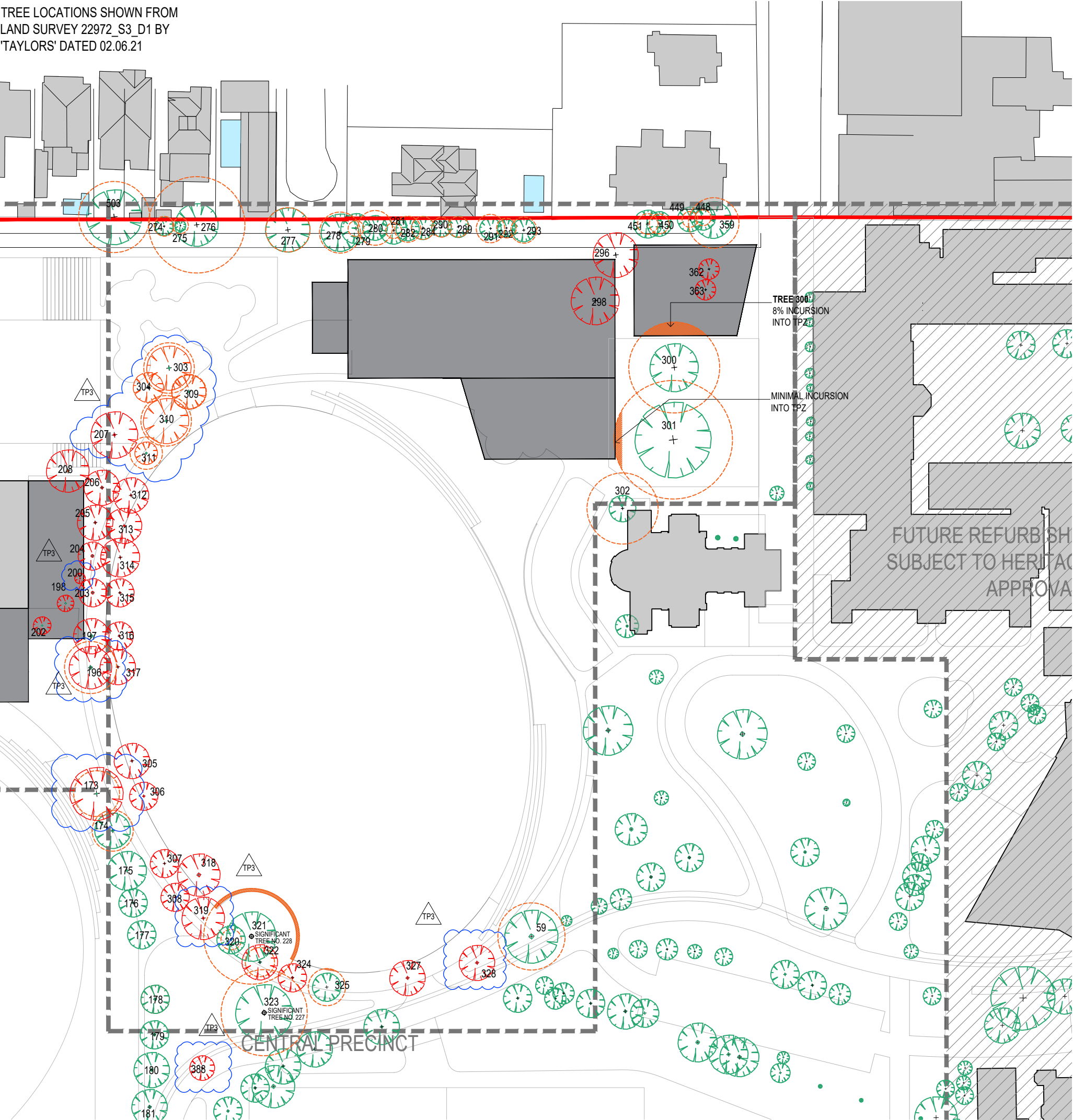
Tree no.	Botanical Name	Common Name	Easting	Northing	Origin	Trees in group	DBH Total (cm)	DRS (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	TLE (Yrs.)	Defects	Significance	Action of development (irrespective)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
209	<i>Syzygium floribundum</i>	Weeping Lilly Pilly	326557.94	5813386.55	Australian native	1	37	29	4.5	62.38	2.0	5-10	<5	Good	Good	Semi-Mature	10-15	Previous failure(s); Soil compaction; Soil grade changes; Suppressed; Wound(s);	Amenity value/shade;		Care required during hard landscaping works within TPZ.	C	12	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).
210	<i>Syzygium floribundum</i>	Weeping Lilly Pilly	326562.81	5813386.11	Australian native	1	67	75	8.0	203.08	2.9	10-15	10-15	Good	Fair	Mature	15-25	Co-dominant stems; Epicormic growth; Hanger(s); Included bark; Previous failure(s);	Amenity value/shade; Attractive landscape feature;		Care required during hard landscaping works within TPZ.	B	12	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).
215	<i>Syzygium floribundum</i>	Weeping Lilly Pilly	326593.86	5813377.71	Australian native	1	42	80	5.1	81.52	3.0	10-15	5-10	Fair	Fair	Semi-Mature	10-15	Co-dominant stems; Deadwood/stubs > 30mm; Dieback; Poor pruning; Soil grade changes; Wound(s);	Amenity value/shade; Attractive landscape feature;			C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
216	<i>Populus alba</i>	White Poplar	326598.27	5813368.99	Exotic	1	111	105	13.3	557.57	3.4	10-15	10-15	Fair	Fair	Mature	10-15	Deadwood/stubs > 30mm; Decay; Dieback; Epicormic growth; Mechanical damage to root(s); Resin exudation/kino; Soil compaction; Soil grade changes; Soil problems;	Amenity value/shade; Attractive landscape feature;			C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
274	<i>Ulmus x hollandica</i>	Dutch Elm	326724.65	5813365.67	Exotic	1	21	25	2.5	19.95	1.8	5-10	<5	Fair	Fair	Young	5-10	Dieback; Epicormic growth; Inappropriate location; Previous failure(s); Soil compaction; Wound(s);	Amenity value/shade;		Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
275	<i>Ulmus x hollandica</i>	Dutch Elm	326728.59	5813364.65	Exotic	1	10	13	2.0	12.57	1.5	<5	<5	Fair	Fair	Young	5-10	Dieback; Epicormic growth; Inappropriate location; Pests/insects; Soil compaction; Wound(s);	Amenity value/shade;		Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
276	<i>Ulmus x hollandica</i>	Dutch Elm	326732.98	5813364.25	Exotic	1	102	117	12.2	470.67	3.5	15-20	15-20	Fair	Fair	Mature	15-25	Cavity(s); Deadwood/stubs < 30mm; Decay; Dieback; Epicormic growth; Pests/insects; Soil compaction;	Amenity value/shade; Attractive landscape feature;		Situated along northern perimeter, between residential blocks and existing carpark.	B	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
277	<i>Ulmus parvifolia</i>	Chinese Elm	326755.58	5813360.2	Exotic	1	47	66	5.6	99.93	2.8	5-10	10-15	Good	Good	Semi-Mature	25-50	Mechanical damage to root(s); Previous failure(s); Soil compaction; Soil grade changes;	Amenity value/shade; Attractive landscape feature;		Situated along northern perimeter, between residential blocks and existing carpark.	B	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
278	<i>Ulmus parvifolia</i>	Chinese Elm	326768.69	5813359.19	Exotic	1	43	65	5.2	83.65	2.8	5-10	10-15	Good	Fair	Semi-Mature	25-50	Epicormic growth; Exposed root(s); Mechanical damage to root(s); Previous failure(s); Soil compaction; Wound(s);	Amenity value/shade; Attractive landscape feature;		Situated along northern perimeter, between residential blocks and existing carpark.	B	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
279	<i>Callistemon 'Kings Park Special'</i>	Kings Park Special Bottlebrush	326773.41	5813358.47	Australian native	1	12	15	2.0	12.57	1.5	<5	<5	Good	Good	Young	<5	Inappropriate location; Suppressed;			Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
280	<i>Acer negundo</i>	Box Elder Maple	326777.67	5813358.76	Exotic	1	37	45	4.4	61.93	2.4	5-10	5-10	Poor	Fair	Semi-Mature	<5	Dieback; Epicormic growth; Mechanical damage to root(s); Previous failure(s); Wound(s);			Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
281	<i>Callistemon 'Kings Park Special'</i>	Kings Park Special Bottlebrush	326782.09	5813358.47	Australian native	1	12	16	2.0	12.57	1.5	<5	<5	Good	Fair	Semi-Mature	10-15				Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
282	<i>Callistemon 'Kings Park Special'</i>	Kings Park Special Bottlebrush	326786.2	5813357.45	Australian native	1	28	30	3.3	34.61	2.0	<5	<5	Good	Fair	Semi-Mature	10-15	Co-dominant stems; Previous failure(s); Wound(s);			Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
284	<i>Callistemon 'Kings Park Special'</i>	Kings Park Special Bottlebrush	326792.73	5813356.5	Australian native	1	24	32	2.9	26.06	2.1	<5	<5	Good	Poor	Semi-Mature	5-10	Crack(s)/split(s); Previous failure(s); Weak union(s); Wound(s);			Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
289	<i>Callistemon 'Kings Park Special'</i>	Kings Park Special Bottlebrush	326798.66	5813355.64	Australian native	1	22	27	2.6	21.90	1.9	<5	<5	Fair	Fair	Semi-Mature	5-10	Deadwood/stubs > 30mm; Dieback; Poor pruning; Previous failure(s); Wound(s);			Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
290	<i>Callistemon 'Kings Park Special'</i>	Kings Park Special Bottlebrush	326795.54	5813356.41	Australian native	1	21	25	2.5	19.95	1.8	<5	<5	Good	Fair	Semi-Mature	10-15	Previous failure(s);			Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
291	<i>Prunus cerasifera 'Nigra'</i>	Purple-leaved Cherry Plum	326806.45	5813355.56	Exotic	1	30	35	3.6	40.72	2.1	<5	5-10	Fair	Fair	Mature	10-15	Co-dominant stems; Deadwood/stubs > 30mm; Dieback; Disease pathogens; Epicormic growth; Pests/insects; Poor pruning;			Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
292	<i>Callistemon 'Kings Park Special'</i>	Kings Park Special Bottlebrush	326811.63	5813354.98	Australian native	1	21	29	2.5	19.95	2.0	<5	<5	Good	Fair	Semi-Mature	10-15	Co-dominant stems; Poor pruning; Previous failure(s); Weak union(s); Wound(s);			Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
293	<i>Callistemon 'Kings Park Special'</i>	Kings Park Special Bottlebrush	326816.35	5813353.96	Australian native	1	28	32	3.3	34.43	2.1	<5	<5	Good	Fair	Semi-Mature	10-15	Co-dominant stems; Epicormic growth; Poor pruning; Previous failure(s); Wound(s);			Situated along northern perimeter, between residential blocks and existing carpark.	C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
296	<i>Quercus robur</i>	English Oak	326836.14	5813345.24	Exotic	1	62	78	7.4	173.90	3.0	5-10	10-15	Good	Good	Mature	15-25	Deadwood/stubs > 30mm; Epicormic growth; Soil compaction; Soil problems; Wound(s);	Amenity value/shade; Attractive landscape feature;		Within footprint of Year 7 & 8 building.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
298	<i>Hesperocyparis macrocarpa 'Horizontalis Aurea'</i>	Golden Monterey Cypress	326830.97	5813334.63	Exotic	1	120	128	14.4	649.36	3.7	10-15	10-15	Fair	Poor	Mature	<5	Co-dominant stems; Deadwood/stubs > 60mm; Included bark; Weak union(s);			Within footprint of Year 7 & 8 building. Multiple basal unions of inferior attachment.	C	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
300	<i>Platanus x acerifolia</i>	London Plane	326846.7	5813312.8	Exotic	1	96	110	11.5	416.92	3.4	20-30	15-20	Good	Good	Mature	>50	Deadwood/stubs < 30mm; Epicormic growth; Exposed root(s); Mechanical damage to root(s); Soil compaction;	Significant due to age/size; Dominant landscape feature; Amenity value/shade; Attractive landscape feature; Heritage listed; Outstanding example of species;		Care required during demolition of existing senior building. Possibly requires Root mapping during detail design if over 10% TPZ encroachment. Ensure no service line encroachment. Historical tree that is large in stature and makes a significant contribution to the quality of the surrounding landscape.	A	12	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).
301	<i>Platanus x acerifolia</i>	London Plane	326844.67	5813296.27	Exotic	1	133	155	15.0	706.86	4.0	20-30	15-20	Good	Good	Mature	>50	Deadwood/stubs < 30mm; Dieback; Epicormic growth; Mechanical damage to root(s); Parasitic plant/mistletoe; Soil compaction;	Significant due to age/size; Dominant landscape feature; Amenity value/shade; Attractive landscape feature; Heritage listed; Outstanding example of species;		Care required during demolition of existing senior building. Possibly requires Root mapping during detail design if over 10% TPZ encroachment. Ensure no service line encroachment. Historical tree that is large in stature and makes a significant contribution to the quality of the surrounding landscape.	A	12	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).
302	<i>Cupressus torulosa</i>	Bhutan Cypress	326830.08	5813281.64	Exotic	1	75	97	9.0	254.47	3.3	15-20	<5	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Disease pathogens; Poor pruning; Soil compaction;	Dominant landscape feature; Amenity value/shade; Attractive landscape feature;			A	12	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).
303	<i>Corymbia citriodora</i>	Lemon-scented Gum	326721.79	5813331.87	Australian native	1	53	71	6.4	127.08	2.9	10-15	5-10	Fair	Good	Semi-Mature	25-50	Mechanical damage to root(s); Soil compaction; Wound(s);	Amenity value/shade; Attractive landscape feature;			B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
304	<i>Corymbia citriodora</i>	Lemon-scented Gum	326716.16	5813326.64	Australian native	1	35	40	4.2	55.42	2.3	10-15	5-10	Good	Good	Semi-mature	25-50	Deadwood/stubs < 30mm; Soil compaction;	Amenity value/shade; Attractive landscape feature;			B	2	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
305	<i>Corymbia citriodora</i>	Lemon-scented Gum	326701.85	5813232.45	Australian native	1	44	67	5.3	87.58	2.8	10-15	5-10	Good	Fair	Semi-Mature	25-50	Included bark; Mechanical damage to root(s); Soil compaction; Soil grade changes;	Amenity value/shade;		Possibly requires Root mapping during detailed design if Chapel Oval carpark excavation is over 10% TPZ encroachment. Dynamic bracing restraint previously installed in upper crown.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.

Tree no.	Botanical Name	Common Name	Easting	Northing	Origin	Trees in group	DBH Total (cm)	DRS (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	TLE (Yrs.)	Defects	Significance	Action of development (irrespective)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
306	<i>Corymbia citriodora</i>	Lemon-scented Gum	326702.16	5813223.15	Australian native	1	34	52	4.1	52.30	2.5	10-15	5-10	Fair	Fair	Semi-Mature	10-15	Co-dominant stems; Included bark; Mechanical damage to root(s); Previous failure(s); Resin exudation/kino; Soil grade changes; Wound(s);	Amenity value/shade;		Possibly requires Root mapping during detailed design if Chapel Oval carpark excavation is over 10% TPZ encroachment. Dynamic bracing restraint previously installed in upper crown in conjunction with reduction pruning.	C	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
307	<i>Corymbia citriodora</i>	Lemon-scented Gum	326704.14	5813206.41	Australian native	1	24	31	2.9	26.06	2.0	5-10	5-10	Good	Good	Semi-Mature	25-50	Dieback; Mechanical damage to root(s); Soil compaction; Soil grade changes;		Mulching;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed. 24-04-2018 : Ido Monk : Tree assessed. 02-05-2017 : Justin Herbert : 2017 May Tree reassessed. 25-05-2016 : Justin Herbert : 2016 May Tree re-assessed.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
308	<i>Corymbia citriodora</i>	Lemon-scented Gum	326705.89	5813197.04	Australian native	1	23	31	2.8	23.93	2.0	5-10	5-10	Good	Fair	Juvenile	10-15	Co-dominant stems; Mechanical damage; Mechanical damage to root(s); Soil compaction; Soil grade changes; Wound(s);	Amenity value/shade;	Branch support hardware; Formative pruning;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed. Dynamic bracing restraint installed in upper crown, reduction pruning remains valid for long-term defect suppression. ArborSafe recommends that the installed cable/bracing system be checked by the installer within the installer's timeframe recommendations and documentation be supplied to the site manager on it being rated for the loads placed upon it, in good condition, free from wear and tear and is currently fit for purpose. 24-04-2018 : Ido Monk : Tree assessed. Formative pruning may be effective in improving structure if implemented in near future. Reduce subdominant stem by ~20%, focusing on reducing overall length/dominance of stem to appropriate pruning targets.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
309	<i>Corymbia citriodora</i>	Lemon-scented Gum	326727.43	5813324.29	Australian native	1	37	59	4.4	61.93	2.7	10-15	5-10	Good	Good	Semi-Mature	25-50	Mechanical damage to root(s);	Amenity value/shade; Attractive landscape feature;			B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
310	<i>Corymbia citriodora</i>	Lemon-scented Gum	326720.42	5813315.86	Australian native	1	53	70	6.4	127.08	2.8	10-15	10-15	Good	Fair	Semi-Mature	15-25	Previous failure(s); Resin exudation/kino; Wound(s);	Amenity value/shade; Attractive landscape feature;			B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
311	<i>Corymbia citriodora</i>	Lemon-scented Gum	326713.88	5813308.74	Australian native	1	34	53	4.1	52.30	2.5	5-10	<5	Good	Fair	Semi-Mature	15-25	Included bark; Previous failure(s); Soil compaction;	Amenity value/shade; Attractive landscape feature;			B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
312	<i>Corymbia citriodora</i>	Lemon-scented Gum	326707.78	5813297.72	Australian native	1	47	66	5.6	99.93	2.8	10-15	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems; Included bark; Resin exudation/kino; Weak union(s); Wound(s);	Amenity value/shade;		Possibly requires Root mapping during detailed design if Chapel Oval carpark excavation or sitting stairway development is over 10% TPZ encroachment. Dynamic bracing restraint previously installed in upper crown in conjunction with reduction pruning.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
313	<i>Corymbia citriodora</i>	Lemon-scented Gum	326704.13	5813283.77	Australian native	1	53	75	6.4	127.08	2.9	10-15	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems; Included bark; Previous failure(s); Resin exudation/kino; Soil compaction; Wound(s);	Amenity value/shade; Attractive landscape feature;		Possibly requires Root mapping during detailed design if Chapel Oval carpark excavation or sitting stairway development is over 10% TPZ encroachment.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
314	<i>Corymbia citriodora</i>	Lemon-scented Gum	326702.61	5813274.18	Australian native	1	42	65	5.0	79.80	2.8	5-10	5-10	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Previous failure(s);	Amenity value/shade;		Possibly requires Root mapping during detailed design if Chapel Oval carpark excavation or sitting stairway development is over 10% TPZ encroachment.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
315	<i>Corymbia citriodora</i>	Lemon-scented Gum	326701.39	5813264.59	Australian native	1	41	60	4.9	76.05	2.7	10-15	5-10	Fair	Good	Semi-Mature	15-25		Amenity value/shade; Attractive landscape feature;		Possibly requires Root mapping during detailed design if Chapel Oval carpark excavation is over 10% TPZ encroachment.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
316	<i>Corymbia citriodora</i>	Lemon-scented Gum	326700.78	5813257.47	Australian native	1	39	58	4.7	68.81	2.6	10-15	5-10	Good	Fair	Semi-Mature	25-50	Exposed root(s); Mechanical damage to root(s); Previous failure(s); Soil compaction;	Amenity value/shade; Attractive landscape feature;		Possibly requires Root mapping during detailed design if Chapel Oval carpark excavation is over 10% TPZ encroachment.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
317	<i>Corymbia citriodora</i>	Lemon-scented Gum	326699.56	5813251.36	Australian native	1	37	55	4.4	61.93	2.6	10-15	5-10	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Included bark; Mechanical damage to root(s); Soil compaction;	Amenity value/shade; Attractive landscape feature;	Branch support hardware; Mulching;	Possibly requires Root mapping during detailed design if Chapel Oval carpark excavation is over 10% TPZ encroachment. Dynamic bracing restraint previously installed in upper crown in conjunction with reduction pruning.	B	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
318	<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	326713.1	5813202.8	Australian native	1	71	75	8.5	228.46	2.9	10-15	5-10	Good	Poor	Mature	5-10	Borers/termites; Co-dominant stems; Dieback; Included bark; Mechanical damage to root(s); Soil compaction; Weak union(s); Wound(s);	Attractive landscape feature; Amenitiy value/shade;	Mulching;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed. Wood Borer, likely to be Longicorn species remains active in lower primary structure. Mulching may aid in promoting general tree health and therefore natural pest defence.	C	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
319	<i>Corymbia citriodora</i>	Lemon-scented Gum	326713.2	5813191.96	Australian native	1	36	47	4.3	58.63	2.4	10-15	5-10	Good	Good	Semi-Mature	25-50	Hangar(s); Mechanical damage to root(s); Previous failure(s); Resin exudation/kino; Soil compaction; Soil grade changes;	Amenity value/shade;	Remove hanging limb(s);	23-03-2021 : Luke Dawson : Tree assessed. Hangar at 4m over footpath. 22-01-2009 : ArborSafe Australia : Good form and excellent future potential.	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
320	<i>Corymbia citriodora</i>	Lemon-scented Gum	326719.14	5813184.4	Australian native	1	22	27	2.6	21.90	1.9	5-10	<5	Good	Fair	Semi-Mature	10-15	Inappropriate location; Mechanical damage to root(s); Soil compaction; Soil grade changes; Suppressed;		Mulching;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed. 22-01-2009 : ArborSafe Australia : Limited potential given location under Tree 321.	C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
321	<i>Eucalyptus camaldulensis</i>	River Red Gum	326724.92	5813184.11	Australian native	1	101	94	12.1	461.48	3.2	15-20	15-20	Good	Fair	Mature	25-50	Cavity(s); Deadwood/stubs > 30mm; Decay; Included bark; Poor pruning; Previous failure(s); Soil compaction; Soil problems; Weak union(s); Wound(s);	Amenity value/shade; Attractive landscape feature; Particularly old/venerable; Significant habitat - nests/hollows;	Irrigation; Mulching; Plant health care; Understorey planting;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed. Treat soil below crown projection with seaweed solution, wetting agent and liquid Blood and Bone (or similar) prior to mulching. 18-11-2015 : Justin Herbert : 18 November 2015. DBH is 1020mm on this date.	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).
322	<i>Corymbia citriodora</i>	Lemon-scented Gum	326725.69	5813178.59	Australian native	1	31	38	3.7	43.47	2.2	10-15	5-10	Good	Good	Semi-Mature	25-50	Deadwood/stubs < 30mm; Mechanical damage; Mechanical damage to root(s); Soil compaction; Soil grade changes; Suppressed; Wound(s);	Amenity value/shade;	Mulching;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed.	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
323	<i>Eucalyptus camaldulensis</i>	River Red Gum	326724.15	5813164.74		1	105	120	12.6	498.76	3.6	15-20	15-20	Good	Fair	Mature	25-50	Cavity(s);Deadwood/stubs < 30mm;Decay;Previous failure(s);Soil compaction;Soil problems;Wound(s);	Heritage listed;Amenity value/shade;Attractive landscape feature;Particularly old/venerable;Significant habitat - nests/hollows;	Mulching;Other action;Remove infrastructure from fall zone;Understorey planting;	01-06-2021 : Ido Monk : Tree assessed. Previous remains valid for both risk reduction and tree retention, tree maintaining good state of health. 31-05-2021 : Justin Herbert : Tree assessed. Listed on the City of Boroondara Significant Tree Register. ID 227. 24-04-2018 : Ido Monk : Tree assessed. Risk will remain elevated whilst area is used for carparking. Tree responding moderately to wounding. Reduction in asphalt and conversion to mulch will aid in improving tree health. 07-04-2014 : Justin Herbert : 2014 Remove as much asphalt as is practical, mulch and underplant to improve tree health and remove stationary targets from beneath canopy.	A		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).

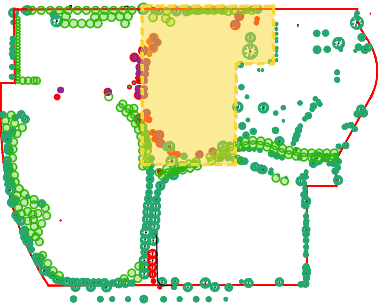
Tree no.	Botanical Name	Common Name	Easting	Northing	Origin	Trees in group	DBH Total (cm)	DRS (cm)	Radial TPZ (m)	TPZ area (m2)	Radial SRZ (m)	Tree Height (m)	Canopy (m)	Health	Structure	Age	TLE (Yrs.)	Defects	Significance	Action of development (irrespective)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
324	<i>Corymbia citriodora</i>	Lemon-scented Gum	326733.45	5813174.23	Australian native	1	34	46	4.1	52.30	2.4	10-15	5-10	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Included bark; Mechanical damage to root(s); Soil compaction; Soil grade changes; Weak union(s);	Amenity value/shade;	Branch support hardware; End weight reduction; Mulching;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed. Dynamic bracing restraint installed in upper crown. ArborSafe recommends that the installed cable/bracing system be checked by the installer within the installer's timeframe recommendations and documentation be supplied to the site manager on it being rated for the loads placed upon it, in good condition, free from wear and tear and is currently fit for purpose. Pruning remains valid in conjunction with bracing, aiming to suppress defect over time. 24-04-2018 : Ido Monk : Tree Assessed. Reduce subdominant stem to the west and 3x lowest scaffold branches by ~15-20%, focusing on reducing overall length/dominance to appropriate pruning targets.	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
325	<i>Corymbia citriodora</i>	Lemon-scented Gum	326741.74	5813170.49	Australian native	1	39	49	4.7	68.81	2.5	10-15	<5	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Included bark; Mechanical damage to root(s); Soil compaction; Soil grade changes; Weak union(s);	Amenity value/shade;	Branch support hardware; End weight reduction; Mulching;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed. Dynamic bracing restraint installed in upper crown. ArborSafe recommends that the installed cable/bracing system be checked by the installer within the installer's timeframe recommendations and documentation be supplied to the site manager on it being rated for the loads placed upon it, in good condition, free from wear and tear and is currently fit for purpose. Pruning remains valid in conjunction with bracing to aid in suppression of defect over time. 24-04-2018 : Ido Monk : Tree Assessed. Reduce subdominant southern stem by ~25%, focusing on reducing overall length/dominance to appropriate pruning targets.	B	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
327	<i>Corymbia citriodora</i>	Lemon-scented Gum	326761.23	5813170.36	Australian native	1	49	65	5.9	108.62	2.8	10-15	5-10	Good	Fair	Semi-Mature	10-15	Co-dominant stems; Damaging infrastructure; Included bark; Mechanical damage to root(s); Resin exudation/kino; Soil compaction; Soil grade changes;	Amenity value/shade;	Branch support hardware; Consider removing; End weight reduction;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed. Dynamic bracing restraints (x3) installed in upper crown. ArborSafe recommends that the installed cable/bracing system be checked by the installer within the installer's timeframe recommendations and documentation be supplied to the site manager on it being rated for the loads placed upon it, in good condition, free from wear and tear and is currently fit for purpose. Reduction pruning remains valid in conjunction with bracing restraints. Tree unlikely to remain viable without suppression of defective unions. 24-04-2018 : Ido Monk : Tree assessed. Tree may not remain viable without remedial pruning. Reduce all stems/branches with included bark unions by ~15-20%, focusing on reducing overall length/height to appropriate pruning targets.	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
328	<i>Corymbia citriodora</i>	Lemon-scented Gum	326780.84	5813171.86	Australian native	1	44	53	5.3	87.58	2.5	5-10	5-10	Good	Fair	Semi-Mature	15-25	Damaging infrastructure; Mechanical damage to root(s); Soil compaction; Soil grade changes; Soil problems; Wound(s);	Amenity value/shade;	Monitor;	26-03-2020 : Justin Herbert : Tree assessed. 20-03-2019 : Ido Monk : Tree assessed. 09-05-2016 : Justin Herbert : 2016 SRZ has been treated with permeable paving, east and west side of TPZ with concrete. Monitor for any changes to the health of the tree.	B	1	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
359	<i>Ulmus procera</i>	English Elm	326863.42	5813348.51	Exotic	1	53	72	6.4	127.08	2.9	10-15	5-10	Fair	Good	Semi-Mature	15-25	Epicormic growth; Resin exudation/kino; Soil compaction;	Amenity value/shade; Attractive landscape feature;			B	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
362	<i>Lagerstroemia indica</i>	Crepe Myrtle	326860.96	5813338.7	Exotic	1	19	22	2.3	16.33	1.8	<5	<5	Fair	Fair	Semi-Mature	10-15	Co-dominant stems; Dieback; Epicormic growth; Soil compaction;	Amenity value/shade; Attractive landscape feature;		Within footprint of Learning & Teaching building.	C	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
363	<i>Acer palmatum ssp. palmatum</i>	Japanese Maple	326860.07	5813333.47	Exotic	1	9	11	2.0	12.57	1.5	<5	<5	Fair	Good	Semi-Mature	15-25	Dieback; Soil compaction;	Amenity value/shade; Attractive landscape feature;		Within footprint of Learning & Teaching building.	C	12	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
388	<i>Ulmus parvifolia</i>	Chinese Elm	326707.2	5813152.25	Exotic	1	25	30	3.0	28.27	2.0	5-10	5-10	Fair	Good	Semi-mature	15-25	Co-dominant stems; Previous failures; Soil compaction;				C	3	Remove - tree located within proposed development footprint or has major encroachment into its TPZ.
448	<i>Ulmus minor "Variegata"</i>	Variegated Field Elm	326860.98	5813349.36	Exotic	1	11	14	2.0	12.57	1.5	<5	<5	Good	Good	Young	10-15	Inappropriate location; Suppressed;				C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
449	<i>Ulmus minor "Variegata"</i>	Variegated Field Elm	326857.63	5813349.38	Exotic	1	11	13	2.0	12.57	1.5	<5	<5	Good	Good	Young	>50	Soil compaction;				C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
450	<i>Ulmus minor "Variegata"</i>	Variegated Field Elm	326849.41	5813350.4	Exotic	1	21	26	2.5	19.95	1.9	5-10	<5	Good	Good	Semi-Mature	>50	Soil compaction;	Amenity value/shade; Attractive landscape feature;			C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
451	<i>Ulmus minor "Variegata"</i>	Variegated Field Elm	326845.0	5813350.69	Exotic	1	22	25	2.6	21.90	1.8	5-10	<5	Good	Good	Semi-Mature	>50	Soil compaction;	Amenity value/shade; Attractive landscape feature;			C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
459	<i>Melaleuca styphelioides</i>	Prickly-leaved Paperbark	326512.72	5813215.85	Australian native	1	21	28	2.6	20.45	1.9	<5	<5	Poor	Fair	Semi-Mature	<5	Co-dominant stems; Dieback; Suppressed;				C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
460	<i>Schinus areira</i>	Peppercorn	326508.73	5813218.2	Exotic	1	23	27	2.8	24.66	1.9	<5	<5	Good	Poor	Juvenile	5-10	Dieback; Epicormic growth; Soil grade changes; Suppressed;				C	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
461	<i>Schinus areira</i>	Peppercorn	326509.43	5813224.76	Exotic	1	17	21	2.0	13.07	1.7	<5	<5	Good	Poor	Juvenile	5-10	Dieback; Epicormic growth; Soil grade changes; Suppressed;				C	1	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).
494	<i>Ulmus minor "Variegata"</i>	Variegated Field Elm	326529.23	5813301.97	Exotic	1	75	95	9.0	254.47	3.2	15-20	10-15	Good	Fair	Mature	25-50		Amenity value/shade; Attractive landscape feature;		Tree situated within adjacent Vic Roads property. Measurements an estimate only, no access. It is considered the existing tennis court foundation would have limited extent root expansion into the proposed development area. Possibly requires Root mapping during detailed design to ensure this is correct assumption prior to construction of the Boarding House.	A	12	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).
495	<i>Quercus sp.</i>	Oak	326531.36	5813314.76	Exotic	1	30	40	3.6	40.72	2.3	<5	5-10	Good	Fair	Semi-Mature	15-25				Tree situated within adjacent Vic Roads property. Measurements an estimate only, no access. It is considered the existing tennis court foundation would have limited extent root expansion into the proposed development area. Possibly requires Root mapping during detailed design to ensure this is correct assumption prior to construction of the Boarding House.	B	12	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).
496	<i>Eucalyptus camaldulensis</i>	River Red Gum	326533.95	5813327.84	Australian native	1	60	80	7.2	162.86	3.0	10-15	5-10	Fair	Poor	Semi-Mature	10-15		Amenity value/shade; Attractive landscape feature;		Tree situated within adjacent Vic Roads property. Measurements an estimate only, no access. It is considered the existing tennis court foundation would have limited extent root expansion into the proposed development area. Possibly requires Root mapping during detailed design to ensure this is correct assumption prior to construction of the Boarding House.	B	12	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).

Tree no.	Botanical Name	Common Name	Easting	Northing	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	TLE (Yrs.)	Defects	Significance	Action of development (irrespective)	Arborist comments	Tree Quality Score	Tree Retention value subcategory	Recommendation
497	<i>Eucalyptus camaldulensis</i>	River Red Gum	326533.19	5813332.05	Australian native	1	60	90	7.2	162.86	3.2	10-15	5-10	Fair	Fair	Semi-Mature	15-25		Amenity value/shade; Attractive landscape feature;		Tree situated within adjacent Vic Roads property. Measurements an estimate only, no access. It is considered the existing tennis court foundation would have limited extent root expansion into the proposed development area. Possibly requires Root mapping during detailed design to ensure this is correct assumption prior to construction of the Boarding House.	B	12	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).
498	<i>Eucalyptus camaldulensis</i>	River Red Gum	326534.56	5813338.3	Australian native	1	75	100	9.0	254.47	3.3	10-15	5-10	Fair	Fair	Semi-Mature	15-25		Amenity value/shade; Attractive landscape feature;		Tree situated within adjacent Vic Roads property. Measurements an estimate only, no access. It is considered the existing tennis court foundation would have limited extent root expansion into the proposed development area. Possibly requires Root mapping during detailed design to ensure this is correct assumption prior to construction of the Boarding House.	B	12	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).
499	<i>Eucalyptus camaldulensis</i>	River Red Gum	326535.63	5813345.42	Australian native	1	65	90	7.8	191.13	3.2	10-15	5-10	Fair	Fair	Semi-Mature	15-25		Amenity value/shade; Attractive landscape feature;		Tree situated within adjacent Vic Roads property. Measurements an estimate only, no access. It is considered the existing tennis court foundation would have limited extent root expansion into the proposed development area. Possibly requires Root mapping during detailed design to ensure this is correct assumption prior to construction of the Boarding House.	B	12	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).
500	<i>Liquidambar styraciflua</i>	Sweet Gum	326536.85	5813351.67	Exotic	1	35	55	4.2	55.42	2.6	5-10	5-10	Fair	Fair	Semi-Mature	10-15				Tree situated within adjacent Vic Roads property. Measurements an estimate only, no access. It is considered the existing tennis court foundation would have limited extent root expansion into the proposed development area. Possibly requires Root mapping during detailed design to ensure this is correct assumption prior to construction of the Boarding House.	C	12	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).
501	<i>Callistemon salignus</i>	Willow Bottlebrush	326540.96	5813374.92	Australian native	1	35	55	4.2	55.42	2.6	5-10	5-10	Fair	Poor	Semi-Mature	5-10				Tree situated within adjacent Vic Roads property. Measurements an estimate only, no access. It is considered the existing carpark foundation would have limited extent root expansion into the proposed development area. Possibly requires Root mapping during detailed design to ensure this is correct assumption prior to construction of the Boarding House.	C	12	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).
502	<i>Ulmus parvifolia</i>	Chinese Elm	326542.33	5813389.02	Exotic	1	57	75	6.8	147.03	2.9	5-10	10-15	Good	Fair	Semi-Mature	15-25				Tree situated within adjacent Vic Roads property. Measurements an estimate only, no access. It is considered the existing carpark foundation would have limited extent root expansion into the proposed development area. Possibly requires Root mapping during detailed design to ensure this is correct assumption prior to construction of the Boarding House.	B	12	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).
503	<i>Eucalyptus sp.</i>	Eucalypt	326715.6	5813370.85	Australian native	1	75	95	9.0	254.47	3.2	10-15	10-15	Good	Good	Semi-Mature	25-50				18-03-2021 : Justin Herbert : Measurements an estimate only, no access. Situated within adjacent residential backyard.	A	12	Retain tree with generic protection requirements (i.e. protective fencing and restriction of activities within the TPZ).

TREE LOCATIONS SHOWN FROM
LAND SURVEY 22972_S3_D1 BY
'TAYLORS' DATED 02.06.21



KEY PLAN



LEGEND

- TREE PROTECTION ZONE
- INCURSION INTO TPZ
- TREE- REMOVED
- TREE- RETAINED

REVISIONS		
TP1 31.03.21	UPDATE	TR
TP2 15.04.21	TPZ PERCENTAGE	TR
TP3 30.06.21	REMOVED TREES ADDED (DP REQ)	TR

TP3

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PROJECT
XAVIER COLLEGE
DEVELOPMENT PLAN

PROJECT NUMBER
20076

DRAWING TITLE
TREE PROTECTION ZONES PLAN

CENTRAL PRECINCT

CLIENT
XAVIER COLLEGE

DRAWN BY
TR

CHECKED BY
JB

DATE
JULY 2021

SCALE
1:1000 @ A3



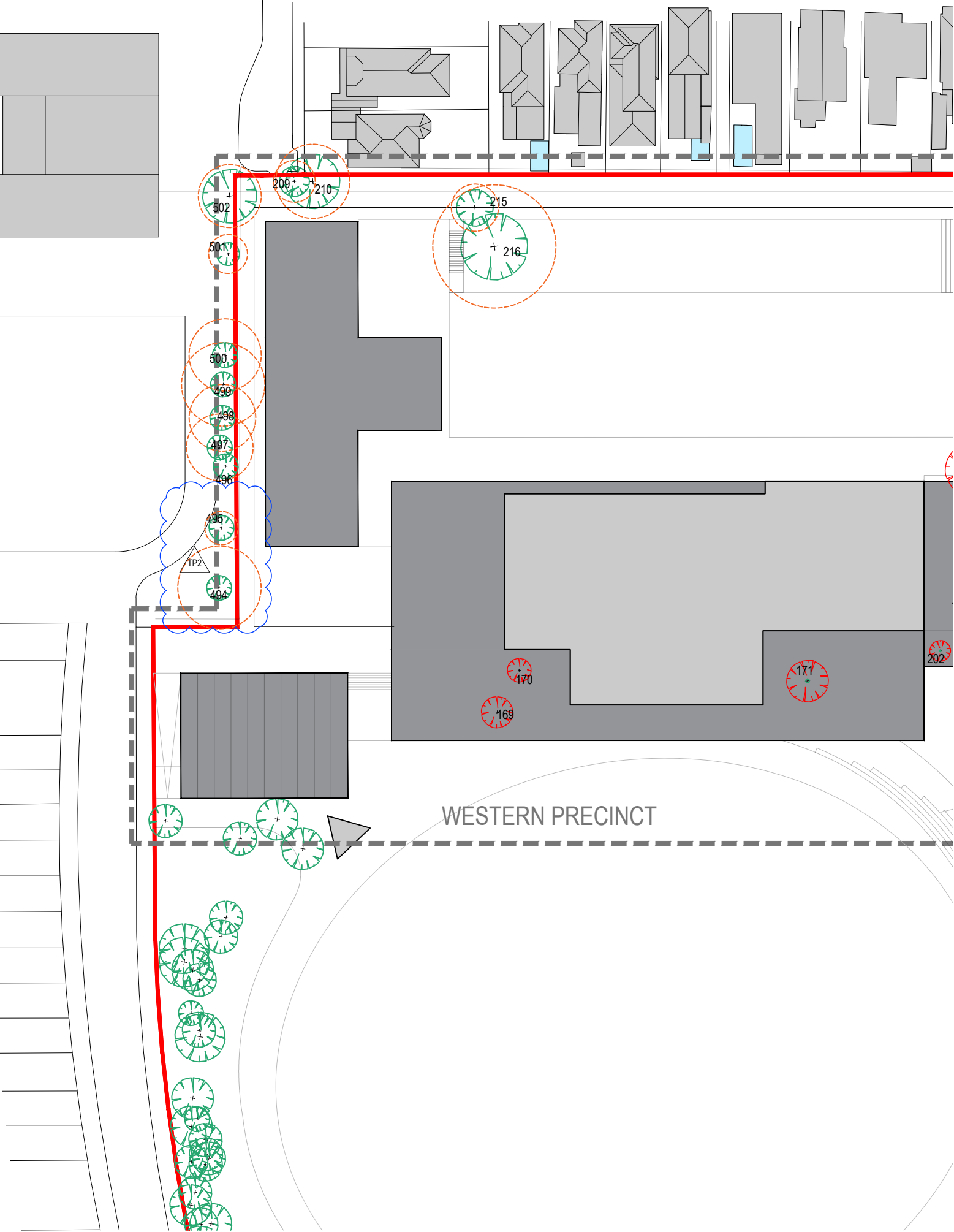
DRAWING NUMBER
DP0102

REVISION
TP3

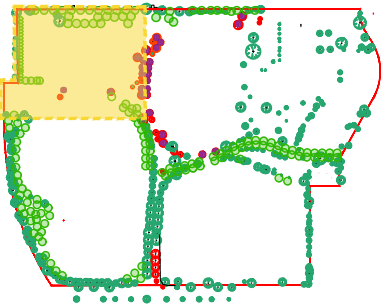
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TREE LOCATIONS SHOWN FROM
LAND SURVEY 22972_S3_D1 BY
'TAYLORS' DATED 02.06.21



KEY PLAN



LEGEND

- TREE PROTECTION ZONE
- INCURSION INTO TPZ
- TREE- REMOVED
- TREE- RETAINED

REVISIONS		
TP1 31.03.21	UPDATE	TR
TP2 30.06.2021	TPZ's TREE NUMBERS	TR

TP2

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PROJECT
XAVIER COLLEGE
DEVELOPMENT PLAN

PROJECT NUMBER
20076

DRAWING TITLE
TREE PROTECTION ZONES PLAN

WESTERN PRECINCT

CLIENT
XAVIER COLLEGE

DRAWN BY	CHECKED BY
TR	JB

DATE
JULY 2021


SCALE
1:1000 @ A3



DRAWING NUMBER	REVISION
DP0103	TP2

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