

Arboricultural Impact Assessment

Shore Physical Education Centre



3rd of June 2016

ASSESSMENT & REPORT COMMISSIONED BY:

Tim Oyston
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North Sydney NSW 2059

ASSESSMENT & REPORT PREPARED BY:

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6th of June 2016

Tim Oyston
Facilities Manager
Shore School
PO Box 1221
North Sydney NSW 2059

Covering Letter

RE: Arboricultural Impact Assessment of fifty trees for the Shore Physical Education Centre.

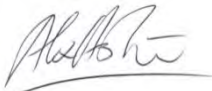
Dear Tim,

We are pleased to provide you with the following Preliminary Arboricultural Assessment associated with the proposed development of the Shore Physical Education Centre.

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,



Alex Austin
Consulting Arborist
Dip. Hort. Arb, Grad. Cert. Arb, AQF Level 8

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1 Executive Summary

1.1.1 The following Arboricultural Impact Assessment details the current condition and retention Value of fifty (50) trees [Note. Total subject tree quantity is seventy three trees (73) as the fifty tagged trees includes a number of grouped smaller trees assessed as groups. See column titled “Group” in tree schedule for these trees] all subject trees are located within the area potentially impacted by the proposed development of the Shore Physical Education Centre.

1.1.2 Of these trees:

- Three (3) trees (tree numbers 18, 33 & 93) were determined to have High Retention Values.
- Eight (8) trees (tree numbers 50, 88, 89, 109, 110, 20, 25 & 29) were determined to have Moderate Retention Values.
- Thirty three (33) trees (tree numbers 34, 36, 37, 38, 39, 40, 41, 46, 47, 48, 51, 52, 54, 91, 92, 94, 95, 96, 99, 100, 101, 104, 105, 106, 6, 7, 8, 9, 11, 12, 13, 17, & 23) were determined to have Low Retention Values
- Six (6) trees (tree numbers 35, 90, 102, 103, 111 & 112.) were found to remove retention

1.1.3 A review of the proposed plans, has indicated that thirty four (34) (forty two (42) when including individual trees within grouped assessments) of the trees assessed will require removal. These trees include;

- High Retention Value tree numbers: 93 & 18.
- Moderate Retention Value tree numbers: 88 & 89.
- Low Retention Value tree numbers: 41, 46, 47 (Group of 8), 48, 91, 92, 94, 95, 96, 99, 100, 101, 104, 105, 106, 109, 110, 6, 7, 8, 9, 11, 12, 13 & 17.
- Remove Retention Value tree numbers: 90, 102, 103, 111 & 112

1.1.4 Following the review of the proposed plans, It appears that sixteen (16) (Thirty one (31) when including individual trees within grouped assessments) trees are able to be retained and include;

- High Retention Value tree number: 33
- Moderate Retention Value tree numbers: 50, 20, 25 & 29
- Low Retention Value tree numbers 51, 52, 54, 34, 35, 36 (Group of 16), 37, 38, 39, 40 & 23

1.1.5 All trees to be retained will require tree a restriction of activities with their Tree Protection Zones (TPZ).

1.1.6 It is recommended that the future landscape design include replacement tree planting to offset the removal of site trees. Landscape design should also include improving the growing environment for all retained trees (e.g. mulching, etc.).

2 Introduction

- 2.1.1 ArborSafe Australia Pty Ltd was engaged by Tim Oyston of the Sydney Church of England Grammar School (Shore School) to provide an Arboricultural Impact Assessment in relation to fifty (50) trees (73 when including individual trees within grouped assessments).
- 2.1.2 The trees contained within the report are located within the vicinity of a proposed Physical Education Centre development at the Shore school's North Sydney Campus as well within several residential properties located on Hunter Crescent, which are also owned by the Shore school.
- 2.1.3 The scope of the proposal was outlined to ArborSafe Australia by Jordan Graham on the 2nd of May 2016.
- 2.1.4 Tree data and photographs were collected on the 11th of May by Alex Austin (The Author).
- 2.1.5 Trees likely to be impacted by the proposal have been assessed and documented within this report.
- 2.1.6 Tree data including Tree Protection Zones (TPZ) have been provided as a basis for provision of generic tree protection recommendations on trees marked for retention.

3 Scope

- 3.1.1 Carry out a visual examination of the nominated trees located within the proposed development area.
- 3.1.2 Inspect and assess the nominated trees in their growing environment in context of the proposed construction.
- 3.1.3 Provide an objective appraisal of the subject trees in relation to their species, estimated age, health, structural condition and viability within the landscape.
- 3.1.4 Based on the findings of this investigation, provide recommendations on the retention or removal of the site trees.
- 3.1.5 Identify and reduce potential conflicts between subject trees and proposed works through providing generic information on the area required for tree protection and the restricted activities within this area for each tree prior to the commencement of construction.

4 Supplied plans

- 4.1.1 Plans were supplied to ArborSafe Australia on Friday the 3rd of June 2016 and included:
- Draft Site Plan (Drawing 10), by Cox Architecture, Project 21304. 26.04.2016
 - Draft Bishops Gate Roof Plan RL- 64.50 (Drawing Number 2192) by Cox Architecture, Project 21304. 26.04.2016
 - Diagram Tree Protection Zone. (Drawing Number A-SK-001) by Cox Architecture, Project 21304. 03.06.2016
 - Diagram Tree Protection Zone Proposed. (Drawing Number A-SK-002), by Cox Architecture, Project 21304. 03.06.2016

5 Methodology

- 5.1.1 The subject trees have been numbered in line with the existing ArborPlan tree inventory system for the Shore North Sydney campus and North Sydney residential sites. Trees can be identified on site using white numbered tags located at approximately 2.0m from ground level on the southern side of each tree's trunk. As these tree numbers form a sub-set of a larger inventory undertaken for both the entire Shore campus and Shore residential sites, tree numbers are not in sequential order and range between 7 to 112.
- 5.1.2 Images used throughout this report that are produced from ArborPlan depict the trees with colour icon coding. This colour coding is related to the tree risk status in the landscape at the time of inspection and does not reflect the retention value of the subject tree.
- 5.1.3 The subject trees were inspected from ground level. No foliage or soil samples were taken. No aerial or internal investigations were undertaken.
- 5.1.4 Tree height and canopy width were estimated. Trunk Diameter at Breast Height (DBH) and Diameter at the Root Crown (DRC) were measured using a diameter tape.
- 5.1.5 Data collected on site was analysed by the author, collated into report format, and relevant recommendations were formulated.
- 5.1.6 The Tree Protection Zone (TPZ) method has been derived from the Australian Standard 4970–2009: Protection of Trees on Development Sites and is the initial means of tree protection during this development.
- 5.1.7 The Tree Protection Zone (TPZ) is defined as a specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's 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 for each tree by multiplying its Diameter at Breast Height (DBH) by 12:

$$\text{TPZ radius} = \text{DBH} \times 12$$

- 5.1.8 The Structural Root Zone (SRZ) is the area around the base of a tree required for the tree's 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.

$$\text{SRZ radius} = (\text{DRC} \times 50)^{0.42} \times 0.64$$

- 5.1.9 Retention Values have been determined based upon the assessment of the tree's health, structure, dimensions, age class, life expectancy, location and its environmental amenity and environmental significance.
- 5.1.10 All photographs were taken at the time of the site inspection by the author. Photographs have not been altered except for brightness and/or 'cropping' purposes.

6 Site Observations

6.1 Site Map

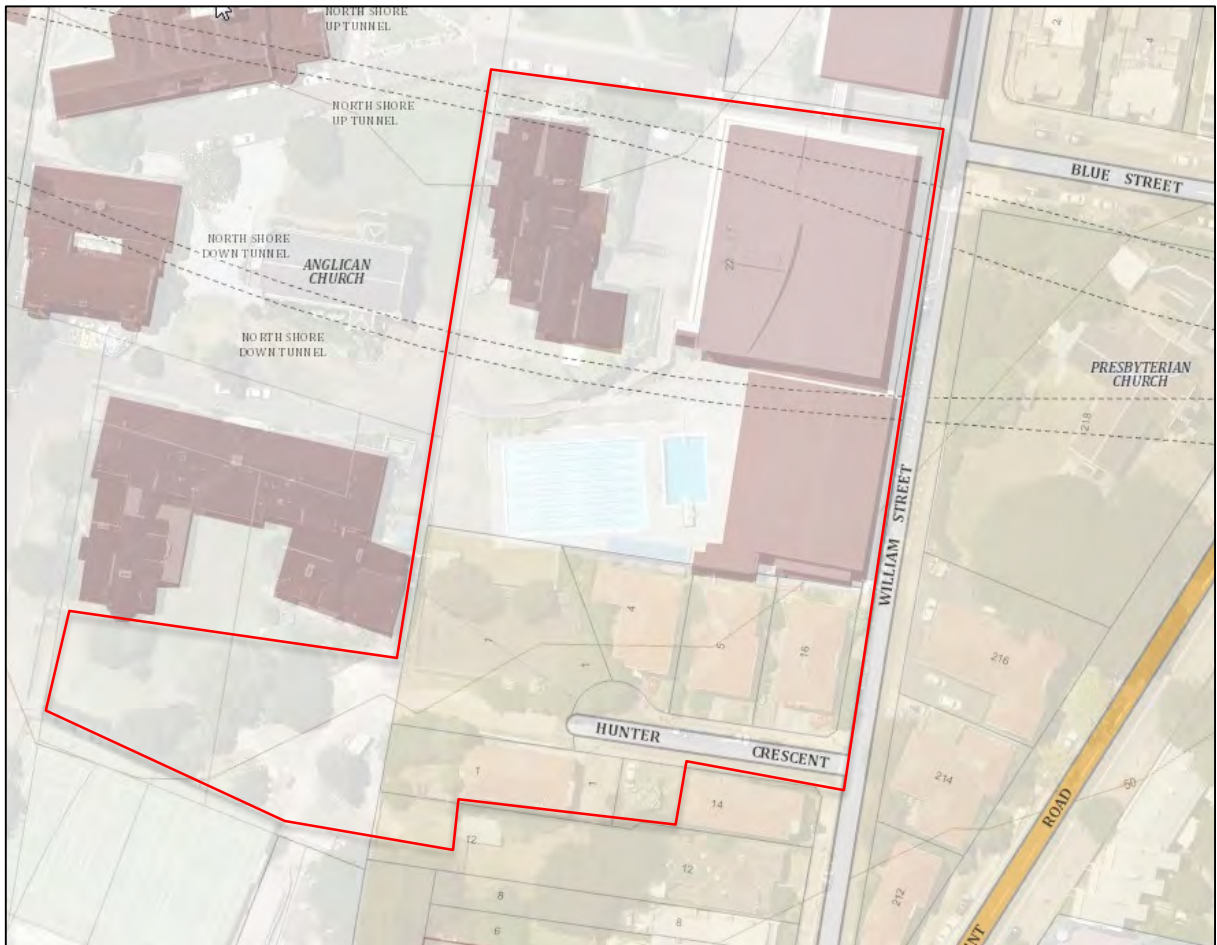


Fig. 1: Location of the site that is subject to the report is bordered by the red lines. Source: Six Maps 2016

6.2 2 Site Sections

6.2.1 The site has been broken into two sections in line with the ArborPlan tree inventory system. These sections are titled the Shore North Sydney Campus and the Shore North Sydney Residences.

6.3 Shore North Sydney Campus

6.3.1 The Shore North Sydney campus is located on Blue Street, North Sydney, NSW, 2060.

6.3.2 The section of the site likely to be impacted by the proposal covers the south eastern corner of the campus.

6.3.3 A mix of outdoor recreational lawn areas, new and old multistorey buildings, garden beds, retaining walls, footpaths, access roads and a swimming pool are found within the area.

6.3.4 The area has a south facing aspect with varying angles of slope with certain sections containing exposed sandstone cliffs.

6.4 Shore North Sydney Residences.

- 6.4.1 The Shore North Sydney residences are located on either side of Hunter Crescent, North Sydney, NSW, 2060.
- 6.4.2 The residences on the northern side and western end of Hunter Crescent share boundaries with the Shore North Sydney school campus.
- 6.4.3 All the residences are comprised of double story buildings containing apartments.
- 6.4.4 Brick garages and out buildings are also located within the grounds.
- 6.4.5 The grounds mainly narrow garden beds and lawn areas.

7 Subject Trees

7.1 Tree Location

- 7.1.1 Fifty (50) trees (73 trees when groups are broken down) were identified within the proposed development area.
- 7.1.2 Site trees that are subjects of this report form a sub-set of a larger tree inventory for the School which are under management within the ArborPlan system. This larger inventory of trees have all been previously tagged, positioned on aerial imagery and visually assessed annually since 2014 by ArborSafe Australia's AQF Level 5 arborists.
- 7.1.3 Nearby site trees have been omitted from this report on the basis they were located outside the nominated development area and are unlikely to be affected during the construction stage. No trees on neighbouring properties are to be affected by the proposed development.
- 7.1.4 Tree 33 appears to be located on the council verge. Ownership of this tree is unclear and must be confirmed.
- 7.1.5 Subject trees were of varying age, size and species. Complete documentation regarding observations made during this visual tree assessment (VTA) can be found in Appendix C - Tree Assessment Data.
- 7.1.6 Images within the report produced from ArborPlan depict the trees with colour coding that is related to the risk status in the landscape, not the retention value of the trees.



Fig. 2: Indicative location of site trees (triangular icons) and tree tag numbers of trees likely to be affected by the proposed development on the Shore North Sydney Campus. Source ArborPlan, 2016



Fig. 3: Indicative location of site trees (triangular icons) and tree tag numbers of trees likely to be affected by the proposed development on the Shore North Sydney Residences site. Source ArborPlan, 2016

7.2 Amenity Value

7.2.1 The Amenity value of individual trees within the group ranged from Low to High based on the trees' size, visibility from surrounding area and amount of shade and screening provided.

7.3 Environmental Value

7.3.1 The trees can be described as planted and self-sewn Australian native trees which are common in cultivation and covered under the Local Tree Preservation Order.

7.3.2 No significant nests or active habitat hollows were observed during the inspection, however, given the size and number of trees within this group, moderate habitat potential was considered appropriate.

7.3.3 Certain trees within the site are self-sown weed species.

7.3.4 Collectively the group of trees were considered to have Low Environmental Value.

7.4 Heritage Value

7.4.1 The state planning viewer identifies the Shore North Sydney Campus as a general Heritage item. The Shore North Sydney Campus is listed under the Local Environment Plan (Listing number I0782). The statement of significance makes no mention of the grounds or trees.

7.4.2 The state planning viewer identifies Hunter Cres as having no Heritage significance.

7.4.3 Due to the age and size of the trees on the subject sites, and the absence of any detail within the statement of significance, the subject trees are determined to have no Heritage significance.

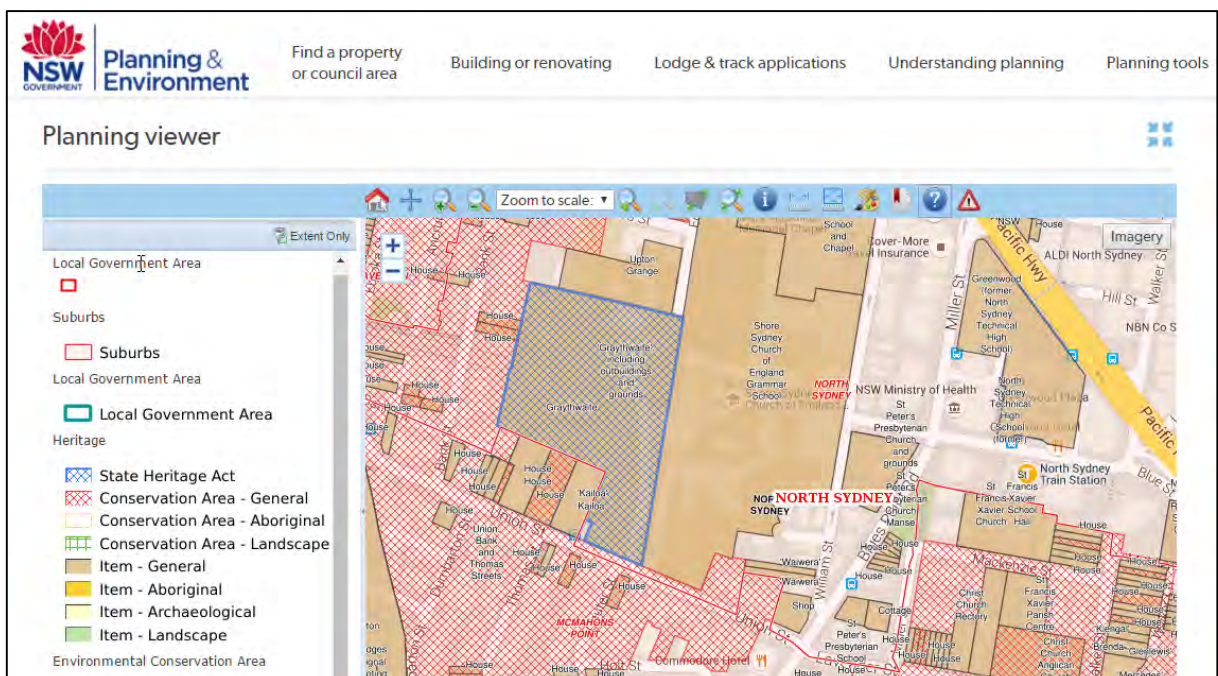


Fig. 4: Depicts the identifiable Heritage items located in the vicinity of the proposed development. : State Planning Agency, Planning Viewer 2016.

7.5 High Retention Value Trees

- 7.5.1 Three (3) trees were identified as having High retention values. Trees of High Retention Value (Tree numbers 18, 33 & 93) were typically of a large size, have good/fair health and structure, had a Useful Life Expectancy (ULE) of more than 25 years, made moderate/high amenity contributions to the landscape.
- 7.5.2 For complete attributes and comments relating to all High Retention Value trees, refer to Appendix C - Tree Assessment Data, where High Retention Value trees are identified in Green.
- 7.5.3 Tree 33 – Queensland Box (*Lophostemon confertus*) has a High Retention Value. The tree is located on the foot path on William Street and is likely to be owned by council. The tree is significant in the local landscape given its size and age. The TPZ required for the successful retention of this tree is a 6.4m radius measured from the trunk.
- 7.5.4 Tree 93 – Spotted Gum (*Corymbia maculata*) has a High Retention Value. The tree is situated in a prominent lawn area on the southern portion of the site. The tree is significant in the local landscape given its size and age. The TPZ required for the successful retention of this tree is a 5.6m radius measured from the trunk.



Fig. 5: Depicts Tree 33 in its growing environment.
Source: Austin 11/05/2016



Fig. 6: Depicts Tree 93 in its growing environment.
Source: Austin 11/05/2016

- 7.5.5 Tree 18 – Cypress (*Cupressus sp.*) has a High Retention Value. The tree is situated in a raised garden bed at the north western corner of the Shore North Sydney residential site. The tree is significant in the local landscape given its size and age. The TPZ required for the successful retention of this tree is a 9.1m radius measured from the trunk.



Fig. 7: Depicts Tree 18 in its growing environment. Source: Austin 11/05/2016

7.6 Moderate Retention Value Trees

7.6.1 Eight (8) trees were considered to have Moderate Retention Values. These trees were of a Moderate size, had good/fair health and structure, had a Useful Life Expectancy (ULE) of more than 15 years and made moderate amenity contributions to the landscape.

7.6.2 The following trees were considered to have Moderate Retention Value: 50, 88, 89, 109, 110, 20, 25 & 29.

7.6.3 Photos of Moderate Retention Value trees are provided below. For complete attributes and comments relating to all Moderate Retention Value trees, refer to Appendix C - Tree Assessment Data, where Moderate Retention Value trees are identified in blue.

7.6.4 Trees 88 - Monterey Cypress (*Hesperocyparis macrocarpa*) and 89 Leyland Cypress (*Cupressocyparis leylandii*) were determined to be of Moderate Retention Value. These mature cypress trees were of medium size growing in the south west portion of the Shore North Sydney Campus site. The TPZs required for the successful retention of these trees are currently: 6.4m and 6.5m respectively.



Fig. 8: Depicts Tree 88 in its growing environment. Source: Austin 11/05/2016



Fig. 9: Depicts Tree 89 in its growing environment. Source: Austin 11/05/2016

7.6.5 Trees 20 and 29 - Bhutan Cypress's (*Cupressus torulosa*) were determined to be of Moderate Retention Value. These mature cypress trees were of medium size growing in the south west portion of the Shore North Sydney residential site. The TPZs required for the successful retention of these trees are currently: 4.9m and 4.4m respectively.



Fig. 10: Depicts Tree 20 in its growing environment.
Source: Austin 11/05/2016



Fig. 11: Depicts Tree 29 in its growing environment.
Source: Austin 11/05/2016

- 7.6.6 Tree 25 – Saucer Magnolia (*Magnolia x soulangeana*) has a Moderate Retention Value. This mature Magnolia tree was growing in the south west portion of the Shore North Sydney Residential site The TPZ required for the successful retention of this tree is currently 3.7m.
- 7.6.7 Tree 50 – Frangipani (*Plumeria acuminata*) has a Moderate Retention Value. This mature Frangipani tree was growing in the middle of the Shore North Sydney Campus. The TPZ required for the successful retention of this tree is currently 3.4m.



Fig. 12: Depicts Tree 50 in its growing environment. Source: Austin 11/05/2016

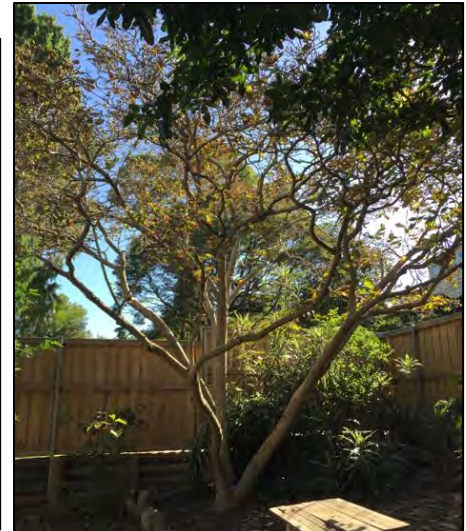


Fig. 13: Depicts Tree 25 in its growing environment. Source: Austin 11/05/2016

- 7.6.8 Trees 109 and 110 - Chinese Weeping Cypress's (*Cupressus funebris*) were determined to be of Moderate Retention Value. These mature cypress trees were of medium size growing in the southern portion of the Shore North Sydney Campus site. The TPZs required for the successful retention of these trees are currently: 3.8m and 7.2m respectively.



Fig. 14: Depicts Trees 110 (left) and 109 (right) in their growing environment. Source: Austin 11/05/2016

7.7 Low Retention Value Trees

- 7.7.1 Thirty three (33) trees were found to have Low Retention Values. Trees in this category includes trees that may be of low significance in the landscape, may have poor health and/or structure, may be undesirable weed species, are inappropriately located or are easily replaceable which results in no need for design consideration.
- 7.7.2 Trees within the site considered to have attained a Low Retention Value are: 34, 36, 37, 38, 39, 40, 41, 46, 47, 48, 51, 52, 54, 91, 92, 94, 95, 96, 99, 100, 101, 104, 105, 106, 6, 7, 8, 9, 11, 12, 13, 17, & 23.
- 7.7.3 Examples of Low Retention Value trees and their specific attributes are provided below. For characteristics of all trees refer to Appendix C - Tree Assessment Data, where Low Retention Value trees are identified in grey.
- 7.7.4 Tree 54 – Magnolia (*Magnolia x soulangeana*) is of Low Retention Value. This mature Magnolia is of small size with fair health and structure. This tree is being browsed by possums. The TPZ required for the successful retention of this tree is currently 1.9m.
- 7.7.5 Tree 47 – A group of 8 Tree ferns (*Cyathea cooperii*) are of Low Retention Value. The tree ferns are easily replaceable. . The TPZ required for the successful retention of each tree fern tree is currently 1.5m.



Fig. 15: Depicts Tree 54 in its growing environment.
Source: Austin 11/05/2016



Fig. 16: Depicts Tree 47 (A group of 8 tree ferns) in their growing environment. Source: Austin 11/05/2016

- 7.7.6 Tree 34 – Chinese Tallow (*Sapium sebiferum*) tree is of Low Retention Value. This semi mature tree is of small size with fair health and structure. This tree has a short Tree life expectancy of 5-10 years. The TPZ required for the successful retention of this tree is currently 1.7m.
- 7.7.7 Tree 95 – Pittosporum (*Pittosporum undulatum*) is of Low Retention Value. This mature tree is of moderate size with fair health and structure. This tree is located immediately onto of a rock shelf which reduces its life expectancy and retention value. The TPZ required for the successful retention of this tree is currently 5.4m



Fig. 17: Depicts Tree 34 in its growing environment. Source: Austin 11/05/2016



Fig. 18: Depicts Tree 95 in its growing environment. Source: Austin 11/05/2016

7.7.8 Tree 36 – A group of 16 Leyland Cypress (*Cupressocyparis leylandii*) are of Low Retention Value. These semi mature trees are of small size with poor structure are planted under powerlines, are pushing against a retaining wall which results in a short life expectancy of 5-10 years. The TPZ required for the successful retention of these trees is currently 2.2m each. .



Fig. 19: Depicts Trees 36 in their growing environment pushing against the wall. Source: Austin 11/05/2016



Fig. 20: Depicts Trees 36 in their growing environment growing under powerlines. Source: Austin 11/05/2016

7.7.9 Tree 104 – Kentia Palm (*Howea forsteriana*) tree is of Low Retention Value. This mature palm is of medium size with good health and structure. This palm is easily transplantable or replaceable. The TPZ required for the successful retention of this tree is currently 1.7m.



Fig. 21: Depicts Tree 104 in its growing environment. Source: Austin 11/05/2016

7.8 Tree removal irrespective of development

- 7.8.1 Six (6) trees were found to have significant health or structural issues, may be damaging existing infrastructure assets due to their location, or may be self-sown weed species in inappropriate locations that resulted in the trees possessing a Remove (or Nil) Retention Value. These trees should be removed irrespective of any future development on the site.
- 7.8.2 Trees with a Remove Retention Value are: Trees 35, 90, 102, 103, 111 & 112.
- 7.8.3 For complete attributes and comments relating to all Remove Retention Value trees, refer to Appendix C - Tree Assessment Data, where Remove Retention Value trees are identified in red.

8 Proposed design

8.1.1 The proposed design includes an expansion of the Bishops gate carpark and an expansion of the gymnasium.



Fig. 22: Depicts the proposed development area. Source: Site Plan (Drawing 10), by Cox Architecture, Project 21304. 26.04.2016.

9 Impacts to Site trees

9.1 Site Plan with TPZ and SRZ's plotted.

9.1.1 In order to determine the impact of the proposal, site trees have been plotted on the proposed plan with their TPZ and SRZ offsets.



Fig. 23: Depicts the trees able to be retainable surrounded by blue boxes. All other trees will require removal if the proposal is to commence.

Source: Diagram Tree Protection Zone Proposed. Note. Outer red circle is the TPZ and inner green circle is the SRZ of each tree. (Drawing Number A-SK-002), by Cox Architecture, Project 21304. 03.06.2016

9.2 **Trees requiring removal**

9.2.1 Following a review of the proposed plans in relation to the impacts to site trees, it has been determined that that thirty four (34) (forty two (42) when separating groups) of the trees assessed will require removal. This is due to either the tree being within the foot print of the proposed development or the encroachment to the TPZ or SRZ is determined to be severe and as a result, tree retention is not possible.

9.2.2 Trees requiring removal include;

- High Retention Value Tree numbers: 93 & 18.
- Moderate Retention Value Tree numbers: 88 & 89.
- Low Retention Value Tree numbers: 41, 46, 47 (Group of 8), 48, 91, 92, 94, 95, 96, 99, 100, 101,104, 105, 106,109, 110, 6, 7, 8, 9, 11, 12, 13 & 17.
- Remove Retention Value Tree numbers: 90, 102, 103, 111 & 112

9.3 **Retainable Trees**

9.3.1 Following the review of the proposed plans, It appears that sixteen (16) (Thirty one (31) when including individual trees within grouped assessments) trees are able to be retained.

9.3.2 Trees listed for retention must not have works occur within their TPZ's without arborist approval.

9.3.3 Trees listed for retention include;

- High Retention Value Tree number: 33
- Moderate Retention Value Tree numbers: 50, 20, 25 & 29
- Low Retention Value Tree numbers 51, 52, 54, 34, 35, 36 (Group of 16), 37, 38, 39, 40 & 23

9.4 Development in close proximity to retained trees

9.4.1 Tree numbers 50 – 54 appear to be away from the proposed works as no works are evident on the western side of Robson House. No Protection fence should be required. .

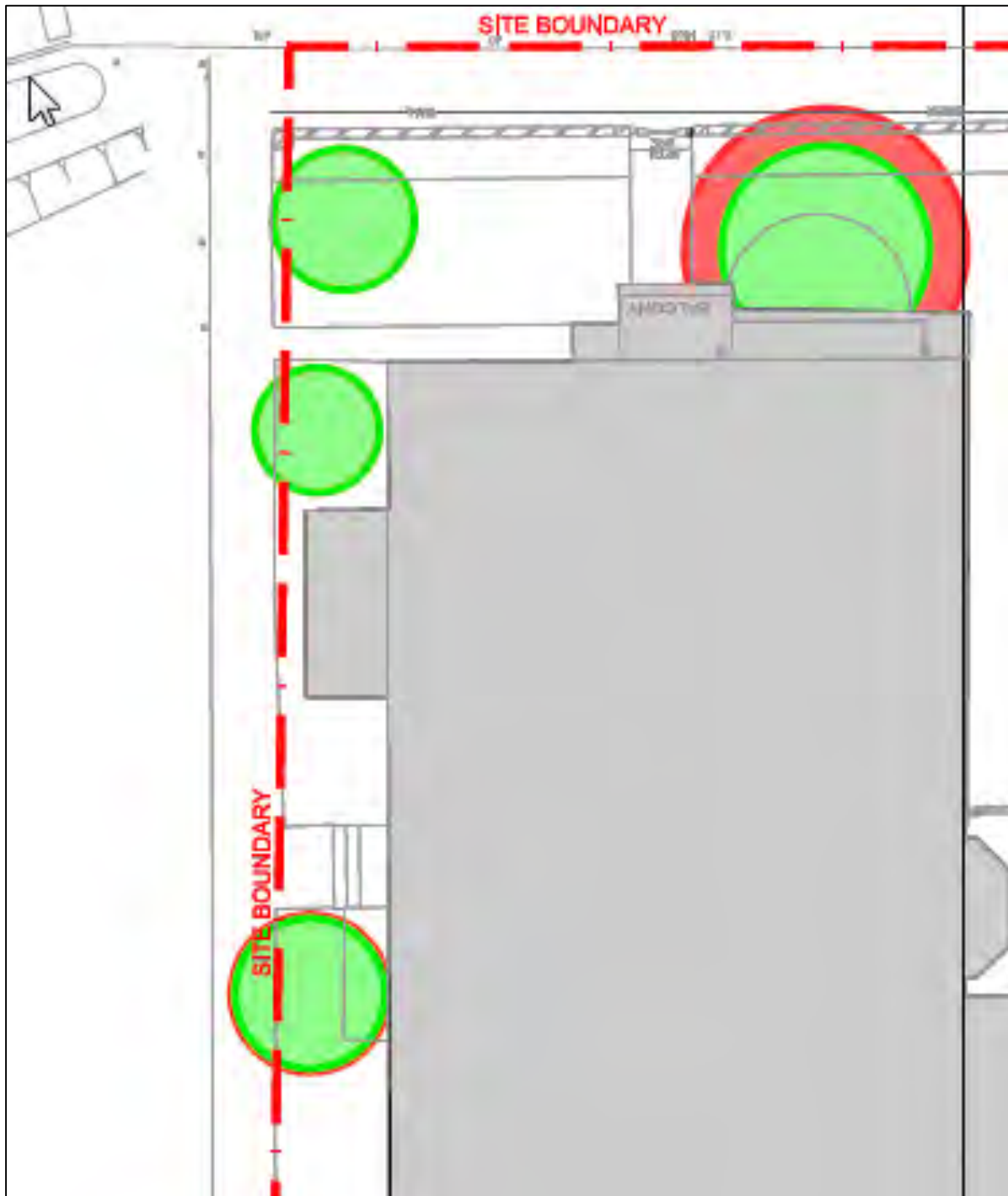


Fig. 24: Depicts tree numbers 50, 51, 52 & 54 which are able to be retained. Source: Diagram Tree Protection Zone Proposed. (Drawing Number A-SK-002), by Cox Architecture, Project 21304. 03.06.2016

9.4.2 The existing rear fence of 1-4/1 Hunter Crescent serves as an adequate tree protection fence for trees 20, 23, 25 & 29. If no changes to the adjacent Shore driveway or garden bed occur, protection of the root zone will not be required.

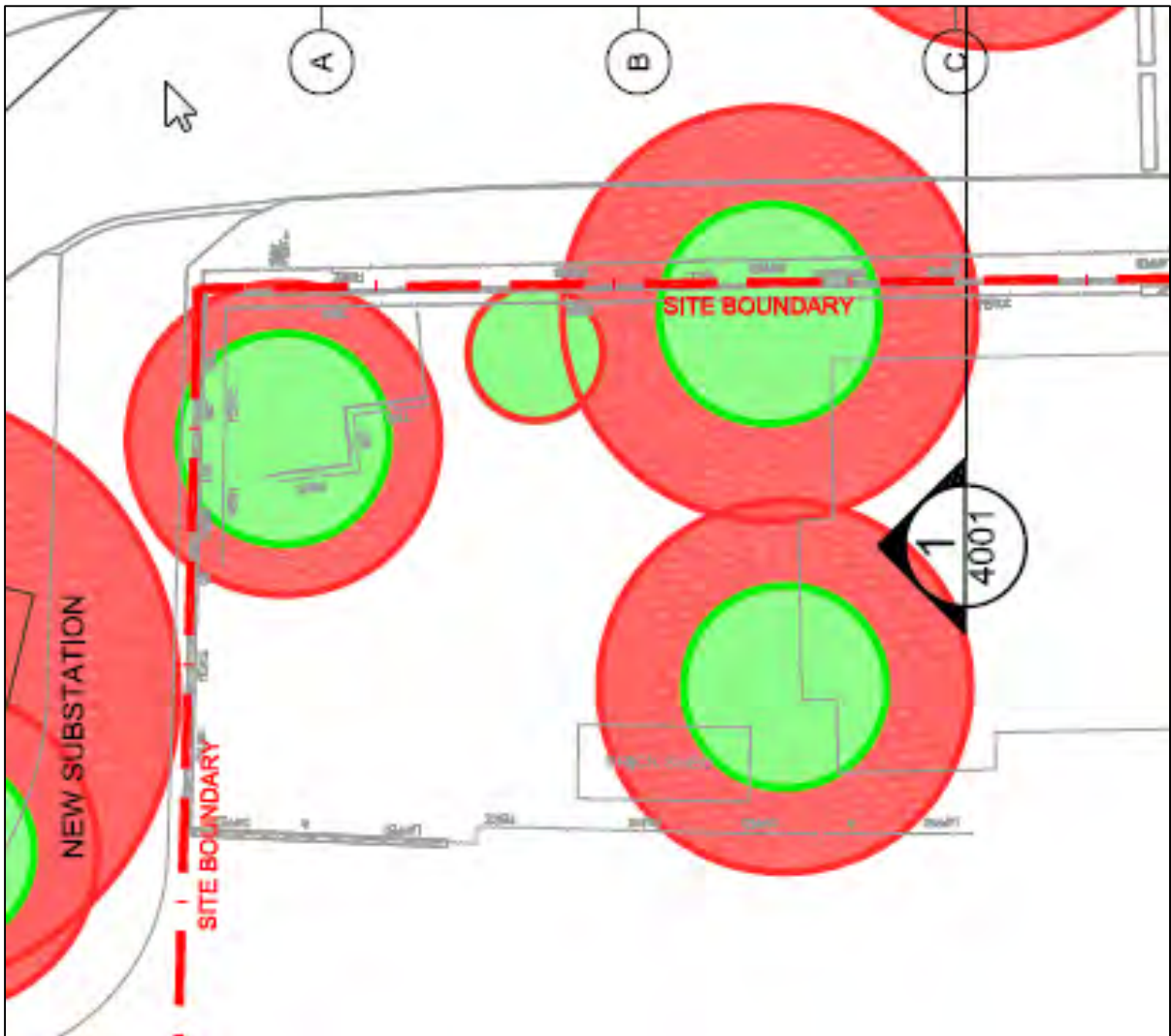


Fig. 25: Depicts tree numbers 20, 23, 25 & 29 which able to be retained. Source: Diagram Tree Protection Zone Proposed. (Drawing Number A-SK-002), by Cox Architecture, Project 21304. 03.06.2016

- 9.4.3 The William street frontage (Outside the Library) does not appear to have any works occurring.
- 9.4.4 The existing garden bed and retaining walls adequately protect trees 34 – 40 from works outside the bed and walls.
- 9.4.5 Tree 33 is located in the foot path and will require trunk protection. Ground protection and Arborist supervision will be required if works to existing pavement or services occurs.



Fig. 26: Depicts tree numbers 33, 34, 35, 36, 37, 38, 39 & 40 which are able to be retained. Source: Diagram Tree Protection Zone Proposed. (Drawing Number A-SK-002), by Cox Architecture, Project 21304. 03.06.2016

10 Tree Management through Construction

10.1 Project Arborist

- 10.1.1 An official “Project Arborist” should be commissioned to oversee the tree protection, any works within the TPZ and to complete regular monitoring compliance certification.
- 10.1.2 The Project Arborist should 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.
- 10.1.3 Inspections should 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.

10.2 Tree Protection Tree 33

- 10.2.1 Tree 33 will require trunk protection as outlined in Figure 27 below.

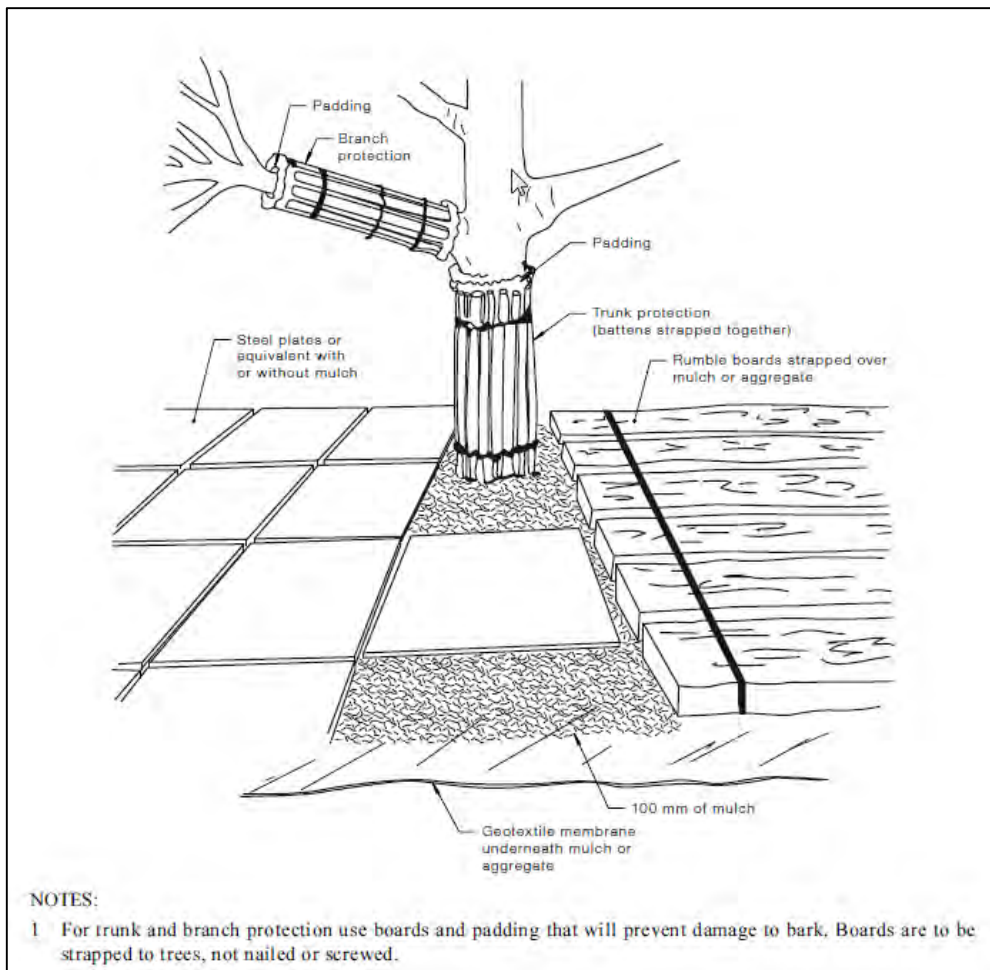


Fig. 27: Trunk Protection Requirements for tree 33. Source: Australian Standard 4970:2009.

10.3 **Incorporate TPZ of retained trees dimensions onto all Site Plans**

10.3.1 The TPZ of trees to be retained should be displayed accurately on the site survey and all subsequent plans for the development using the distances and tree numbers contained in this report.

10.4 **Activities restricted within the TPZ**

1. Machine excavation including trenching
2. Excavation for silt fencing
3. Cultivation
4. Storage
5. Preparation of chemicals, including cement products
6. Parking of vehicles and plant
7. Refuelling
8. Dumping of waste
9. Wash down and cleaning of equipment
10. Placement of fill
11. Lighting of fires
12. Soil level changes
13. Temporary or permanent installation of utilities and signs
14. Physical damage to the tree

10.5 **Installing Underground Services within TPZ**

10.5.1 All services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling or manual excavation. The directional drilling should be at least 600mm deep or as directed by the Project Arborist.

10.6 **Project Milestones**

The following actions or project milestones are recommended as when on-site tree inspection should be required:

- 10.6.1 Following the installation of the TPZ fencing
- 10.6.2 At least once every three (3) months during the construction phase.
- 10.6.3 During any earthworks within the TPZ of trees marked for retention.
- 10.6.4 At the completion of building works and prior to commencement of landscape works.
- 10.6.5 At practical completion of the project.

10.7 Compliance Reporting

- 10.7.1 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.
- 10.7.2 These reports should contain photographic evidence where required to demonstrate that the work has been carried out as specified.
- 10.7.3 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.
- 10.7.4 The reports and Compliance Statements shall be submitted to the Project Manager (as well as Shore's nominated representative) following each inspection.
- 10.7.5 The reports and any Non-Compliance Statements shall be submitted to the Project Manager (as well as Shore's nominated representative) if tree protection conditions have been breached. Reports should contain clear remedial action specification to minimise any adverse impact on the subject tree.

11 References

- Standards Australia, 2009, *AS:4970-2009 Protection of Trees on Development Sites*, Standards Australia, G.P.O. Box 476, Sydney, New South Wales, 2001.

12 Appendices

12.1 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.

12.2 Appendix B – Explanation of Tree Assessment Terms

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

Age: Refers to the life cycle of the tree.

Category	Description
Young	Tree is small in terms of its potential physical size and has not reached its full reproductive ability, may have been recently planted.
Semi-mature	Tree in active growth phase of life cycle and 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.

Diameter at breast height (DBH): Refers to the diameter of the tree’s trunk measured 1.4m from ground level for a single trunked tree. Trees with multiple trunks, significant root buttressing, forking close to ground level or trunk defects will be measured as per AS 4970-2009 *Protection of Trees on Development Sites* - Appendix A.

Height & Canopy Width: Refers to the height and canopy width of the tree and is expressed in meters.

Health: Summarises 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.

Structure: Summarises the structure of the tree from root 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 becomes potentially hazardous 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 to the tree's location and environment which may influence the ULE value.

Category:
0-5 Years
5-10 Years
10-20 Years
20-30 Years
30-50 Years
>50 Years

Retention Value: Refers to a combination of tree attributes including health, structure and form and also considers suitability of the tree in the context of the landscape.

Category	Description
High	Tree displays good or better health and structure characteristics, is ideally suited to its location, provides a significant level of amenity and has the potential to become a long term component of the landscape. Design modifications will be required to ensure the successful retention of the tree.
Moderate	Tree displays fair or better health and structure characteristics, is well suited to its location, provides a moderate level of amenity and has the potential to become a medium to long term component of the landscape. Reasonable efforts should be made to ensure the successful retention of the tree.
Low	Tree displays poor health and structure characteristics and/or is a young and easily replaceable specimen and/or is inappropriate for its location and/or provides a low level of amenity. Design modifications will not be required.
None	A dead tree and/or a tree with severe structural defects that cannot be corrected through modern arboricultural practices and/or a recognised weed species.



12.3 Appendix C - Tree Assessment Data

ArborPlan Tree Data

Customer Sydney Church of England Grammar School - North Sydney

No	Botanical Name	Common Name	Canopy	DBH mm	DRC mm	Height	Location	Group	Condition	Structure	Age	TLE	Defects	Significance	Arborist comments	TPZ m	SRZ m	Retention Value	Impact	Retain or Remove
33	<i>Lophostemon confertus</i>	Queensland Box	10-15	530	680	15-20		1	Good	Fair	Mature	25-50	Parasitic plant/Mistletoe;Dieback;Dead wood in canopy;Damaging infrastructure;Co-dominant stems;Wound(s);Epicormic growth	Amenity value/shade;Attractive landscape feature	Possible council tree. Monitor paving for trip hazards	6.4	2.9	High	No Impact identified	Retain
34	<i>Sapindus sebiferum</i>	Chinese Tallow Tree	<5	130	150	<5		1	Fair	Fair	Semi-Mature	5-10	Dieback;Dead wood in canopy;Suppressed	Amenity value/shade	Apply broad spectrum slow release fertilizer annually and seasoal as per labelled direction quarterly	1.6	1.5	Low	No Impact identified	Retain
35	<i>Sapindus sebiferum</i>	Chinese Tallow Tree	<5	140	180	<5		1	Poor	Poor	Semi-Mature	<5	Suppressed;Dieback;Dead wood in canopy;Epicormic growth;Excessive thinning	Amenity value/shade	Tree in severe decline	1.7	1.7	Remove	No Impact identified	Retain
36	<i>Cupressocyparis leylandii</i>	Leyland Cypress	<5	180	240	5-10		16	Good	Poor	Semi-Mature	5-10	Wound(s);Abnormal lean	Attractive landscape feature;Amenity value/shade	16 trees in hedge planting. 8 of which are pushing against wall and located beneath powerlines. Short ULE for group. Removal and replacement is recommended.	2.2	1.9	Low	No Impact identified	Retain
37	<i>Elaeocarpus obuvatus</i>	Mountain Quandong	5-10	140, 100	220	5-10		1	Fair	Fair	Semi-Mature	15-25	Suppressed;Dieback;Poor pruning;Wound(s);Epicormic growth			2.2	1.8	Low	No Impact identified	Retain
38	<i>Elaeocarpus obuvatus</i>	Mountain Quandong	5-10	130, 120	220	5-10		1	Good	Fair	Semi-Mature	15-25	Suppressed;Dieback;Poor pruning;Wound(s);Epicormic growth			2.2	1.8	Low	No Impact identified	Retain
39	<i>Elaeocarpus obuvatus</i>	Mountain Quandong	5-10	160	190	5-10		1	Fair	Fair	Semi-Mature	15-25	Suppressed;Dieback;Poor pruning;Wound(s);Epicormic growth			1.9	1.7	Low	No Impact identified	Retain
40	<i>Elaeocarpus obuvatus</i>	Mountain Quandong	<5	110	150	<5		1	Fair	Fair	Semi-Mature	<5	Suppressed;Dieback;Poor pruning;Wound(s);Epicormic growth			1.5	1.5	Low	No Impact identified	Retain
41	<i>Gordonia axillaris</i>	Gordonia	5-10	10, 170, 1	390	5-10		1	Good	Fair	Mature	15-25	Epicormic growth;Wound(s)	Amenity value/shade		3.1	2.3	Low	Within proposed landscape upgrade	Remove
46	<i>Archontophoenix alexandrae</i>	Alexandra Palm	<5	220	340	5-10		1	Good	Good	Mature	25-50		Amenity value/shade		2.6	2.2	Low	SRZ within proposed footprint	Remove
47	<i>Cyathea cooperii</i>	Rough Tree Fern	<5	120	150	<5		8	Good	Good	Mature	15-25		Amenity value/shade		1.5	1.5	Low	SRZ within proposed footprint	Remove
48	Hedge	Hedge	15-20	0		5-10		1	Good	Fair	Mature	15-25		Amenity value/shade	Ivy on rock - not tagged. Trim back close to rock and remove weeds			Low	SRZ within proposed footprint	Remove
50	<i>Plumeria acuminata</i>	Frangipani	5-10	10, 130, 1	500	5-10		1	Fair	Fair	Mature	15-25	Poor pruning;Co-dominant stems;Wound(s)	Amenity value/shade	Remove poorly pruned stubs DRC 50? cm Cant measure due to plants	3.4	2.5	Moderate	No Impact identified	Retain
51	<i>Ceratopetalum gummiferum</i>	NSW Christmas Bush	<5	110	200	<5		1	Good	Good	Mature	15-25		Amenity value/shade		1.7	1.7	Low	No Impact identified	Retain
52	<i>Magnolia grandiflora 'Little Gem'</i>	Dwarf Bull Bay	<5	100	130	<5		1	Good	Good	Semi-Mature	>50		Amenity value/shade		1.5	1.5	Low	No Impact identified	Retain
54	<i>Magnolia x soulangeana</i>	Saucer Magnolia	5-10	10, 110, 7	230	<5		1	Fair	Fair	Mature	10-15	Co-dominant stems;Pests/Insects;Wound(s)	Amenity value/shade	Tree being browsed by possums. Epicormic regrowth.	1.9	1.8	Low	No Impact identified	Retain
88	<i>Hesperocyparis macrocarpa</i>	Monterey Cypress	5-10	530	650	10-15		1	Good	Good	Mature	25-50	Co-dominant stems;Wound(s)	Amenity value/shade		6.4	2.8	Moderate	No Impact identified	Remove
89	<i>Cupressocyparis leylandii</i>	Leyland Cypress	5-10	360, 400	650	10-15		1	Good	Fair	Mature	25-50	Included bark;Weak unions;Co-dominant stems	Amenity value/shade	Major basal union is included. Install lazy restraint system at 8m height. Monitor basal union for cracks or splits after strong winds or storm events.	6.5	2.8	Moderate	SRZ within proposed footprint	Remove
90	<i>Melia azedarach</i>	White Cedar	5-10	180	200	5-10		1	Good	Fair	Semi-Mature	5-10	Inappropriate location	Amenity value/shade	Self sown	2.2	1.7	Remove	SRZ within proposed footprint	Remove
91	<i>Pittosporum undulatum</i>	Sweet Pittosporum	5-10	180, 180	400	5-10		1	Fair	Fair	Mature	10-15	Dieback;Wound(s);Co-dominant stems	Amenity value/shade		3.1	2.3	Low	SRZ within proposed footprint	Remove
92	<i>Pittosporum undulatum</i>	Sweet Pittosporum	5-10	10, 150, 2	400	5-10		1	Fair	Fair	Mature	10-15	Dieback;Wound(s);Co-dominant stems;Epicormic growth	Amenity value/shade		3.6	2.3	Low	SRZ within proposed footprint	Remove
93	<i>Corymbia maculata</i>	Spotted Gum	10-15	470	600	15-20		1	Good	Good	Mature	>50	Soil compaction;Dieback	Attractive landscape feature;Amenity value/shade	Mulch to 3m around trunk to improve growing conditions.	5.6	2.7	High	SRZ within proposed footprint	Remove
94	<i>Alectryon tomentosus</i>	Rambutan	5-10	300	420	10-15		1	Good	Fair	Semi-Mature	10-15	Parasitic plant/Mistletoe;Wound(s)	Amenity value/shade	Sever vine at base	3.6	2.3	Low	SRZ within proposed footprint	Remove
95	<i>Pittosporum undulatum</i>	Sweet Pittosporum	10-15	450	600	10-15		1	Fair	Fair	Mature	5-10	Dieback;Wound(s);Co-dominant stems;Epicormic growth;Soil problems;Previous failures	Amenity value/shade	No roots below cliff Monitor for root plate movement after heavy rains or serious wind events	5.4	2.7	Low	SRZ within proposed footprint	Remove
96	<i>Alectryon tomentosus</i>	Rambutan	5-10	180	250	<5		1	Good	Fair	Semi-Mature	10-15	Parasitic plant/Mistletoe;Wound(s);Suppressed;Soil problems;Abnormal lean	Amenity value/shade	Monitor for root plate movement after heavy rains or serious wind events	2.2	1.9	Low	SRZ within proposed footprint	Remove
99	<i>Howea forsteriana</i>	Kentia Palm	<5	110	150	5-10		1	Good	Good	Mature	25-50		Amenity value/shade		1.5	1.5	Low	SRZ within proposed footprint	Remove
100	<i>Archontophoenix alexandrae</i>	Alexandra Palm	<5	250	400	5-10		1	Good	Good	Mature	25-50		Amenity value/shade		3	2.3	Low	SRZ within proposed footprint	Remove
101	<i>Alectryon tomentosus</i>	Rambutan	5-10	100, 90, 8	300	5-10		1	Good	Fair	Semi-Mature	10-15	Co-dominant stems;Included bark;Wound(s)	Amenity value/shade		2	2	Low	SRZ within proposed footprint	Remove
102	<i>Jacaranda mimosifolia</i>	Jacaranda	5-10	80, 90, 60	40	5-10		1	Fair	Poor	Semi-Mature	<5	Suppressed;Decay;Weak unions;Poor pruning;Wound(s);Co-dominant stems		Growing from cut stump.	2.3	2.3	Remove	SRZ within proposed footprint	Remove
103	Group of Trees	Group of Trees	<5	10, 100, 1	250	<5		2	Fair	Fair	Semi-Mature	10-15	Undesirable species;Inappropriate location;Suppressed		Group of 2 self sown weed species inc privet. olive.	2.2	1.9	Remove	SRZ within proposed footprint	Remove
104	<i>Howea forsteriana</i>	Kentia Palm	<5	160	200	5-10		1	Fair	Good	Mature	15-25	Dead wood in canopy	Amenity value/shade		1.5	1.5	Low	SRZ within proposed footprint	Remove
105	<i>Howea forsteriana</i>	Kentia Palm	<5	160	200	5-10		1	Good	Good	Mature	25-50		Amenity value/shade		1.5	1.5	Low	SRZ within proposed footprint	Remove
106	<i>Liriodendron tulipifera</i>	Tulip Tree	<5	160, 190	420	5-10		1	Good	Fair	Semi-Mature	>50	Co-dominant stems;Included bark;Weak unions	Amenity value/shade;Attractive landscape feature	Remove 2 smaller basal stems leaving primary trunk only.	3	2.3	Low	SRZ within proposed footprint	Remove
109	<i>Cupressus funebris</i>	Chinese Weeping Cypress	5-10	320	390	10-15		1	Fair	Fair	Mature	25-50	Soil compaction;Root damage	Amenity value/shade	Quarterly treatments with Seasoal recommended. Monitor growth response to treatments. Jul 07 2014 - Recent works within root zone -Monitor tree health	3.8	2.3	Moderate	SRZ within proposed footprint	Remove
110	<i>Cupressus funebris</i>	Chinese Weeping Cypress	10-15	330, 490	720	15-20		1	Good	Fair	Mature	25-50	Soil compaction;Root damage;Co-dominant stems;Included bark;Poor pruning;Wound(s);Dieback	Attractive landscape feature;Amenity value/shade	Recent works within root zone- Monitor tree health Basal union has included bark. Install lazy cable restrain cable tsystem at 10m height. Monitor basal union for cracks or splits after strong winds or storm events. Quarterly treatments with Seasoal recommended.	7.2	2.9	Moderate	SRZ within proposed footprint	Remove
111	<i>Olea africana</i>	African Olive	5-10	400	400	5-10		1	Good	Fair	Mature	5-10	Co-dominant stems;Undesirable species;Inappropriate location;Damaging infrastructure;Dead wood in canopy;Soil problems	Amenity value/shade	Self sown - damaging retaining wall	4.8	2.3	Remove	SRZ within proposed footprint	Remove
112	<i>Cinnamomum camphora</i>	Camphor Laurel	5-10	180, 180	450	5-10		1	Good	Fair	Mature	5-10	Co-dominant stems;Undesirable species;Inappropriate location;Damaging infrastructure;Dead wood in canopy;Soil problems	Amenity value/shade	Self sown - damaging wall	3.1	2.4	Remove	SRZ within proposed footprint	Remove
Total of 37 Trees for Site shorenorthsydney																				

Customer Sydney Church of England Grammar School - North Sydney Residential

No	Botanical Name	Common Name	Canopy	DBH mm	Height	Location	Group	Condition	Structure	Age	TLE	Defects	Significance	Arborist comments	TPZ m	SRZ m	Retention Value	Impact	Retain or Remove	
6	<i>Alectryon tomentosus</i>	Rambutan	<5	160, 130	230	<5	1-4/16 William St	1	Good	Fair	Mature	15-25	Poor pruning;Epicormic growth	Amenity value/shade		2.5	1.8	Low	SRZ within proposed footprint	Remove
7	<i>Alectryon tomentosus</i>	Rambutan	<5	220	290	<5	1-4/16 William St	1	Good	Fair	Mature	15-25	Poor pruning;Epicormic growth	Amenity value/shade		2.6	2.0	Low	SRZ within proposed footprint	Remove
8	<i>Plumeria acuminata</i>	Frangipani	<5	230	300	<5	1-4/16 William St	1	Good	Good	Mature	15-25	Co-dominant stems;Wound(s)	Amenity value/shade		2.8	2	Low	SRZ within proposed footprint	Remove
9	<i>Plumeria acuminata</i>	Frangipani	<5	140, 140	260	<5	1-4/16 William St	1	Good	Good	Mature	15-25	Co-dominant stems;Wound(s)	Amenity value/shade		2.4	1.9	Low	SRZ within proposed footprint	Remove
11	<i>Pittosporum tenuifolium 'James Stirling'</i>	James Stirling Pittosporum	<5	120, 60	150	<5	1-4/5 Hunter Cres	1	Fair	Fair	Mature	<5	Dieback;Wound(s)			1.7	1.5	Low	SRZ within proposed footprint	Remove
12	<i>Pittosporum tenuifolium 'James Stirling'</i>	James Stirling Pittosporum	<5	180	250	5-10	1-4/5 Hunter Cres	1	Fair	Fair	Mature	<5	Parasitic plant/Mistletoe;Dieback;Wound(s)		Monitor tree health and for deadwood build up. Sever vine at base.	2.2	1.9	Low	SRZ within proposed footprint	Remove
13	<i>Pittosporum tenuifolium 'James Stirling'</i>	James Stirling Pittosporum	5-10	240	300	5-10	1-4/5 Hunter Cres	1	Fair	Fair	Mature	<5	Damaging infrastructure;Dieback;Wound(s)			2.9	2	Low	SRZ within proposed footprint	Remove
17	<i>Prunus serrulata</i>	Japanese Flowering Cherry	<5	180	300	<5	1-4/4 Hunter Cres	1	Fair	Good	Semi-Mature	15-25	Co-dominant stems;Wound(s);Poor pruning	Amenity value/shade		2.2	2	Low	SRZ within proposed footprint	Remove
18	<i>Cupressus sp.</i>	Cypress	15-20	760	920	15-20	1-4/4 Hunter Cres	1	Good	Fair	Mature	15-25	Co-dominant stems;Excessive end weight;Dead wood in canopy	Attractive landscape feature;Amenity value/shade	Reduce length of long low lateral to the north back to small upright. Clear branches from court fence. Monitor major unions for cracks or splits after strong winds or storm events.	9.1	3.2	High	SRZ within proposed footprint	Remove
20	<i>Cupressus torulosa</i>	Bhutan Cypress	5-10	410	520	15-20	1-4/1 Hunter Cres	1	Good	Good	Mature	15-25	Soil compaction	Amenity value/shade;Attractive landscape feature		4.9	2.6	Moderate	No Impact identified	Retain
23	<i>Alectryon tomentosus</i>	Rambutan	<5	110	170	<5	1-4/1 Hunter Cres	1	Good	Good	Semi-Mature	25-50		Amenity value/shade		1.6	1.6	Low	No Impact identified	Retain
25	<i>Magnolia x soulangeana</i>	Saucer Magnolia	5-10	10, 170, 1	490	5-10	1-4/1 Hunter Cres	1	Good	Good	Mature	15-25	Co-dominant stems	Attractive landscape feature;Amenity value/shade		3.7	2.5	Moderate	No Impact identified	Retain
29	<i>Cupressus torulosa</i>	Bhutan Cypress	5-10	370	450	15-20	1-4/1 Hunter Cres	1	Good	Good	Mature	15-25	Co-dominant stems;Dieback	Attractive landscape feature;Amenity value/shade		4.4	2.4	Moderate	No Impact identified	Retain
Total of 13 Trees for Site shorenorthsydneyresidential																				