EARTHSCAPE HORTICULTURAL SERVICES
Arboricultural, Horticultural and Landscape Consultants

ABN 36 082 126 027

DEVELOPMENT IMPACT ASSESSMENT REPORT

CARDINAL FREEMAN VILLAGE
137 VICTORIA STREET, ASHFIELD

STAGE 1 – VILLAGE GREEN PRECINCT

March 2010

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Member Local Government Tree Resources Association (LGTRA)

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1 INTRODUCTION

1.1.1 This report was commissioned by EPM Projects Pty Ltd on behalf of Aevum Limited to assess the health and condition of approximately seventy-three (73) trees located within or immediately adjacent to the Village Green Precinct (Stage 1) of Cardinal Freeman Village, 137 Victoria Street, Ashfield. The report has been prepared to aid in the assessment of a development application for the re-development of the facilities within the property.

1.1.2 This report follows an Arboricultural Assessment Report for the proposed Concept Plan Development prepared by Earthscape dated March 2010.

1.1.3 The purpose of this report is to assess the potential impact of the proposed development on the subject trees within the Village Green Precinct, together with recommendations for amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained where appropriate.

2 THE SITE

2.1.1 The subject property is a Retirement Village known as Lot 101 in DP 702245, Lot 4 in DP 717062, Lots 6 & 7 in DP 717644 and Lot 1 in DP 1126717, being Cardinal Freeman Retirement Village, 137 Victoria Street, Ashfield. For the purposes of this report the subject allotments will be referred to as “the Site”. The site contains a number of multi-unit residential dwellings together with other services and amenity buildings and a chapel. The total area of the site is approximately 40,851 m². The site has a moderate north-easterly gradient. The site contains established lawns and gardens, with a mixture of mature exotic and native trees, shrubs and palms. The Village Green Precinct (Stage 1) is located within the central portion of the property as shown in **Figure 1**.

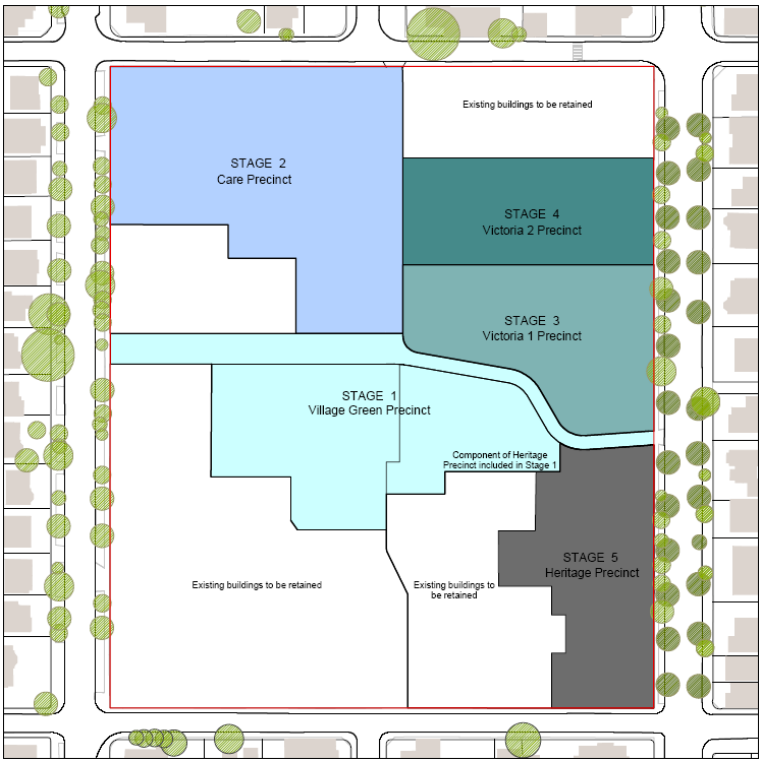


Figure 1 – Cardinal Freeman Village – Plan Showing Future Development Precincts.

2.1.2 Soils of this area are typical of the Blacktown Soil Landscape Group (as classified in the Soil Landscapes of the Sydney 1:100,000 Sheet), consisting of shallow to moderately deep (less than 1000 mm) *Red & Brown Podzolic Soils* on crests, upper slopes and well drained areas. Soils on lower slopes and areas of poor drainage consist of deep (1500-3000 mm) *Yellow Podzolic Soils and Soloth Soils* derived Wianamatta Group & Hawkesbury Shales.[1] The landscape generally consists of undulating rises with slopes ranging usually less than 5% grade.

2.1.3 The original vegetation of this area consisted of Turpentine-Ironbark Forest, most of which was cleared for residential development in the mid-twentieth century.[2]. Dominant locally-indigenous tree species formerly occurring in this area included *Syncarpia glomulifera* (Turpentine), *Eucalyptus fibrosa ssp. fibrosa* (Broad-leaved Ironbark), *Eucalyptus eugenioides* (Thin-leaved Stringybark), *Eucalyptus longifolia* (Woollybutt) and *Eucalyptus parramattensis* (Drooping Red Gum). Other species found in this association may include *Melaleuca decora* (White Feather Honey Myrtle) and *Melaleuca nodosa*. There are no remaining locally-indigenous species within the site.

3 SUBJECT TREES

3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 11th March 2008. Each tree has been provided with an identification number for reference purposes denoted on the attached Tree Location Plan (Appendix 6), based on the survey prepared by Lockley Land Title Solutions, Dwg. Ref No. 29838DT-D dated 18th February 2010. The numbers used on this plan correlate with the Tree Assessment Schedule (Appendix 4).

4 HEALTH AND CONDITION ASSESSMENT:-

4.1 Methodology

4.1.1 An assessment of each tree was made using the Visual Tree Assessment (VTA) procedure. [3] All of the trees were assessed in view from the ground. No aerial inspection or diagnostic testing has been undertaken as part of this assessment.

4.1.2 The following information was collected for each tree:-

- Tree Species (Botanical & Common Name);
- Approximate height;
- Canopy spread; measured using a metric tape and an average taken.
- Trunk Diameter measured at Breast Height (DBH) (1.4 metres from ground level);
- Live Crown Size; (measured by subtracting the total height of the tree from the lowest point of the crown and multiplying by the average crown spread to give a value in square metres).
- Health & vigour; using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators,
- Condition; using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators.
- Suitability of the tree to the site and its existing location; in consideration of damage or potential damage to services or structures, available space for future development and nuisance issues.

This information is presented in a tabulated form in **Appendix 4.**

4.2 Safe Useful Life Expectancy (SULE)

4.2.1 The remaining Safe Useful Life Expectancy [4] of the tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area in Sydney, less its estimated current age. The life expectancy of the tree has been further

modified where necessary in consideration of its current health and vigour, condition and suitability to the site. The estimated SULE of each tree is shown in **Appendix 4.**

4.2.2 The following ranges have been allocated to each tree:-

- Greater than 40 years (Long)
- Between 15 and 40 years (Medium)
- Between 5 and 15 years (Short)
- Less than 5 years (Transient)
- Dead or immediately hazardous (defective or unstable)

5 LANDSCAPE SIGNIFICANCE

5.1 Methodology for Determining Landscape Significance

5.1.1 The significance of a tree in the landscape is a combination of its amenity, environmental and heritage values. Whilst these values may be fairly subjective and difficult to assess consistently, some measure is necessary to assist in determining the retention value of each tree. To ensure in a consistent approach, the assessment criterion shown in **Appendix 1** have been used in this assessment.

5.1.2 A rating has been applied to each tree to give an understanding of the relative significance of each tree in the landscape and to assist in determining priorities for retention, in accordance with the following categories:-

1. **Significant**
2. **Very High**
3. **High**
4. **Moderate**
5. **Low**
6. **Very Low**
7. **Insignificant**

5.2 Environmental Significance

5.2.1 A Tree Preservation Order (TPO) exists within the Municipality of Ashfield, made under the Ashfield Local Environment Plan 1985 (as amended 2007). The TPO generally protects all trees with a height of five metres or greater. Some exemptions apply. The following trees are exempt (not protected) under the provisions of Ashfield Council's Tree Preservation Order:-

Tree No.	Species	Exemption
75	*Erythrina crista-galli* (Cockscomb Coral)	Environmental Weed Species
66	*Olea africana* (African Olive)	Environmental Weed Species
83, 84	*Prunus sp.* (Ornamental Peach)	Less than 5 metres in height
35, 36 & 37	*Cinnamomum camphora* (Camphor Laurel)	Environmental Weed Species (less than 10 metres in height)

5.2.2 The remainder of the trees are protected under Council's TPO.

5.2.3 All of the trees assessed are exotic or non-local native species that would be of some benefit to native wildlife (shelter, food sources etc). However, none of the trees contain cavities suitable as nesting hollows for arboreal mammals or birds or other visible signs of wildlife habitation. All of

the trees assessed have either been planted or are self-sown. There are no remaining locally indigenous species within the site.

5.2.4 None of the trees assessed are scheduled as Noxious Weeds under the meaning of *Noxious Weeds Act* (NSW) 1993. Trees T62, T69, T76 & T90 [all *Acer negundo* (Box Elder)] whilst protected under Council's TPO is considered an Environmental Weed Species in many Local Government Areas.

5.2.5 None of the trees assessed are listed as Threatened or Vulnerable Species or form part of Endangered Ecological Communities under the provisions of the *Threatened Species Conservation Act* 1995 (NSW) or the *Environmental Protection and Biodiversity Conservation Act* 1999.

5.3 Heritage Significance

5.3.1 The Chapel within the site (constructed in 1942) is listed as a Heritage Item under Schedule 7 of the Ashfield Local Environment Plan (1985) and formerly formed part of the "Convent of the Good Shepherd" (founded about 1913). 'Glentworth House' is also listed as a heritage item under the LEP. Glentworth House is a Victorian Italianate mansion thought to have been constructed between 1876 and 1900. Tree 56 & Tree 39 (both Port Jackson Figs) T39 (Small-leaf Fig) and Tree 61 (Cotton Palm) are all large mature trees in the order of 100-120 years old and were probably planted about this time. The Ashfield Heritage Study[5] prepared by Godden Mackay Pty Ltd, makes specific mention of the Fig trees within the grounds of Glentworth House. These trees are therefore considered to have some heritage significance given their association with the heritage item and the likely period of planting, being typical species of the Victorian Era.

5.3.2 Tree 91 (a Pin Oak), was probably planted in the 1930's or 40's. Trees T97, T98, T99 & T100 (Broadleaved Paperbarks) appear to be older than the majority of trees on the site (with exception of those mentioned above) and were probably planted c. 1960-70.

5.3.3 The majority of the remaining trees assessed appear to have been planted post 1970's. These trees have no known or suspected heritage significance.

5.4 Amenity Value

5.4.1 Criteria for the assessment of amenity values are incorporated into Appendix 1. The amenity value of a tree is a measure of its live crown size, visual appearance (form, habit, crown density), visibility and position in the landscape and contribution to the visual character of an area. Generally the larger and more prominently located the tree, and the better its form and habit, the higher its amenity value.

6 TREE PROTECTION ZONES

6.1.1 Tree Protection Zones and Minimum Set-back Distances to construction for each tree are shown in **Appendix 4**. These have been determined using the methodology shown in **Appendix 3**.

7 PROPOSED DEVELOPMENT

7.1.1 The proposed development includes the demolition of the existing buildings within the Village Green Precinct and construction of new buildings and aged care facilities within the Precinct.

8 IMPACT ASSESSMENT

8.1.1 The intention of this assessment is to determine the incursions to the root zones and canopies created by the proposed development and evaluate the likely impact of the proposed works on the subject trees. Details shown on the following plans were used in this assessment:-

Title	Author	Dwg No.	Date
Landscape Plan	Jane Irwin Landscape Architects	L01 Rev B	05/03/2010

8.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 5**. The following criteria have been examined as part of this assessment:-

- Relative Level (R.L.) at base of tree;
- Optimum Tree Protection Zone (TPZ);
- Critical Root Zone (CRZ);
- Incursions to the TPZ, CRZ and tree canopy, including estimated cut & fill and offset from the tree;
- Assessment of the likely impact of the works;
- Recommendations for retention or removal.

8.1.3 The proposed development will necessitate the removal of thirty-five (35) trees of low and very low retention value. These include T54a (Western Red Cedar), T54b (Pittosporum), T55 (Port Jackson Pine), T57, T58 & T92 (Canary Island Palm), T35, T36, T37 & T60 (Camphor Laurel), T62, T76 & T90 (Box Elder), T63 (Tree Fern), T66 (African Olive), T54c, T67, T153 & T154 (Jacarandas), T70 &T81a (Willow Bottlebrush), T81 (Broad-leaved Paperbark), T75 (Cockscomb Coral), T78 (Melaleuca), T84, T93, T94, T95 & T96 (all *Prunus sp*.), T86 (Silky Oak), T87 (Claret Ash), T88b & 156a (Honey Locust), T157a (Alexandra Palm) and T157 (Chinese Hawthorn). None of these trees are considered significant or worthy of special measures to ensure their preservation. It should be noted that seven (7) of these trees (T35, T36, T37, T66, T75, T83 and T84) are exempt from Council's Tree Preservation Order.

8.1.4 The proposed development will necessitate the removal of a further eleven (11) trees of moderate retention value. These include T85, T89 & T152 (Broad-leaved Paperbarks), T79 & T88 (Jacaranda), T82 & T156 (Honey Locust), T80 (Kaffir Plum), T83 (Chinese Elm) & T68 (Cook's Pine). These trees are not considered significant, but are in good health and condition and make a fair contribution to the amenity of the site and surrounding properties. T42 (Small-leaf Fig) is also proposed to be removed. This tree is considered to have some heritage significance, but due to its declining health and relatively poor structure this tree is proposed to be removed.

8.1.5 The proposed development will also necessitate the removal of one (1) tree of high retention value (T91, a Pin Oak). This tree is in good health and condition and. The subject tree has no known or suspected heritage or ecological significance but makes a positive contribution to the amenity of the site. There are no feasible alternatives to retain this tree given its central position within the site.

8.1.6 The top of the batter for the proposed Croquet Field is located in close proximity to T61 (a Cotton Palm). There is already a relatively steep embankment on the same side of the tree. Excavations within the CRZ may result in some root loss, resulting in an adverse impact on this tree. In should be noted that there is already a relatively steep bank adjacent this tree. In order to minimise any adverse impact, all excavations within the TPZ should be undertaken in accordance with Section 12.6.

8.1.7 A proposed new footpath is located on the south side of T64 (Jacaranda) and T65 (Broad-leaved Paperbark). Excavations and compaction associated with the new pavement sub-grade may result in some root loss and damage, resulting in some adverse impact on these trees. In order to minimise any adverse impact, all excavations within the TPZ should be undertaken in accordance with Section 12.6

8.1.8 A proposed retaining wall associated with a new set of stairs is located in close proximity to T69 (a Box Elder). Excavations for the wall footings at this proximity may necessitate severance of woody roots, resulting in an adverse impact on this tree. In order to minimise any adverse impact, all excavations within the TPZ should be undertaken in accordance with Section 12.6

8.1.9 The proposed new roadway (in the approximate alignment of the existing road) is located within the TPZ's of Trees T39 & T56 (Port Jackson Figs) and T97, T98, T99 & T100 (Broad leaved Paperbarks). Demolition of the existing road and kerb and excavations and compaction for the pavement sub-grade and kerb for the new road may result in some disturbance within the root zones of these trees. In order to minimise any adverse impact, excavations for the pavement sub-grade should be undertaken in accordance with Section 12.6 and demolition of the new pavement and kerb should be undertaken in accordance with Section 12.5.

8.1.10 No other trees will be adversely affected by the proposed Stage 1 development.

9 REPLACEMENT PLANTING

9.1.1 The Landscape Plan prepared by Jane Irwin Landscape Architects indicates approximately eighteen (18) new trees to be planted within the Village Green Precinct. These will provide some compensation for loss of amenity resulting from the removal of trees to accommodate the proposed development.

10 CONCLUSIONS:-

10.1.1 A total of seventy-three (73) trees stand within or immediately adjacent the Village Green Precinct (Stage 1). These are a mix of non-local native and exotic species in fair to good health and condition. Most of the trees within the site are relatively recent plantings, planted post-1970. T56 & T39 (both Port Jackson Figs), T42 (Small-leaf Fig) and Tree 61 (Cotton Palm) are all large mature trees in the order of 100-120 years old and were probably planted in association with the construction of Glentworth House in the 1880's.

10.1.2 The proposed development will necessitate the removal of thirty-five (35) trees of low and very low retention value. These include T35, T36, T37, T54a, T54b, T54c, T55, T57, T58, T60, T62, T63, T66, T67, T70, T75, T76, T78, T81, T81a, T84, T86, T87, T88b, T90, T92, T93, T94, T95, T96, T153, T154, T156a, T157 and T157a. None of these trees are considered significant or worthy of special measures to ensure their preservation. It should be noted that seven (7) of these trees (T35, T36, T37, T66, T75, T83 and T84) are exempt from Council's Tree Preservation Order.

10.1.3 The proposed development will necessitate the removal of a further eleven (11) trees of moderate retention value. These include T68, T79, T80, T82, T83, T85, T88, T89, T152 & T156. These trees are not considered significant, but are in good health and condition and make a fair contribution to the amenity of the site and surrounding properties. T42 (Small-leaf Fig) is also proposed to be removed. This tree is considered to have some heritage significance, but due to its declining health and relatively poor structure this tree is proposed to be removed.

10.1.4 The proposed development will also necessitate the removal of one (1) tree of high retention value (T91, a Pin Oak). This tree is in good health and condition and. The subject tree has no known or suspected heritage or ecological significance but makes a positive contribution to the amenity of the site. There are no feasible alternatives to retain this tree given its central position within the site.

10.1.5 Excavations for the batter associated with the Croquet Field may result in an adverse impact on T61. However, there is already a steep embankment on this side of the tree. Providing any required excavations on the western side of the tree are undertaken as recommended, the proposed works should not result in any adverse impact on this tree.

10.1.6 Excations and compaction associated with the new road pavement may result in an adverse impact on trees T97 & T98. In order to avoid any adverse impact, consideration should be given to relocating this roadway outside the Tree Protection Zones.

10.1.7 Excavations and compaction associated with a new pathway may result in some root loss and damage to T64 and T65, resulting in some adverse impact on these trees. Any adverse impact can be minimised by undertaking the sub-grade preparation as recommended.

10.1.8 Excavation for the footings a new retaining wall to the east of T69 is likely to necessitate severance of woody roots, resulting in an adverse impact on this tree. Any adverse impact can be minimised by undertaking the excavations for the footings as recommended

10.1.9 Demolition of the existing road and kerb and excavations and compaction for the pavement sub-grade and kerb for the new road may result in some disturbance within the root zones of Trees T39 & T56 (Port Jackson Figs) and T97, T98, T99 & T100 (Broad leaved Paperbarks). In order to minimise any adverse impact, excavations for the pavement sub-grade and demolition of the existing pavement should be undertaken as recommended.

10.1.10 No other trees will be adversely affected by the proposed Stage 1 development.

11 RECOMMENDATIONS:-

1. The following Tree Protection Measures (Appendix 2) should be implemented to ensure the long term survival of all trees within the site to be retained as part of the development

2. In order to minimise adverse impact on T61, all excavations within the TPZ should be undertaken in accordance with Section 12.6 and disturbance to the root zone kept to a minimum.

3. In order to minimise any adverse impact on T64 & T65, all excavations within the TPZ for the proposed pathway sub-grade to the south should be undertaken in accordance with Section 12.6

4. In order to minimise any adverse impact on T69, all excavations for the proposed retaining wall footings within the TPZ should be undertaken in accordance with Section 12.6.

5. In order to avoid any adverse impact on Trees T39,T56, T97, T98, T99 & T100 demolition of the existing pavement and kerb should be undertaken in accordance with Section 12.5 and excavations for the sub-grade of the new road pavement and kerb should be undertaken in accordance with Section 12.6

6. Any canopy pruning of T71, T72, T98 & T99required to clear the building or temporary scaffolding should undertaken in accordance with Section 12.10

Andrew Morton
EARTHSCAPE HORTICULTURAL SERVICES
10th March 2010

REFERENCES:-

1.1.1

[1] GA Chapman & CL Murphy (1989)
Soil Landscapes of the Sydney 1:100,000 Sheet
Soil Conservation Service of NSW. Sydney

[2] Benson, Doug & Howell, Jocelyn (1990)
Taken for Granted: the Bushland of Sydney and its Suburbs.
Kangaroo Press & The Royal Botanic Gardens, Sydney, NSW

[3] Mattheck, Dr. Claus & Breloer, Helge (1994) – Sixth Edition (2001)
The Body Language of Trees – A Handbook for Failure Analysis
The Stationery Office, London, England

[4] Barrell, Jeremy (1996)
Pre-development Tree Assessment
Proceedings of the International Conference on Trees and Building Sites (Chicago)
International Society of arboriculture, Illinois, USA

[5] Godden Mackay Pty Ltd (1991/92)
Ashfield Heritage Study
(Ref No. 277 'Glentworth House' & No.278 'Chapel of the Convent of the Good Shepherd')
Ashfield Council, Ashfield NSW

APPENDIX 1
CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

The level of landscape significance has been determined using the following key criteria as a guide:

1. SIGNIFICANT

- The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance; or
- The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item; or
- The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event; or
- The subject tree is scheduled as a Threatened Species as defined under the *Threatened Species Conservation Act* 1995 (NSW) or the *Environmental Protection and Biodiversity Conservation Act* 1999; or
- The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species; or
- The subject tree is a Remnant Tree, being a tree in existence prior to development of the area; or
- The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent in the landscape, exhibits very good form and habit typical of the species and makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity; or
- The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
- The species, cultivated variety or form is rare in cultivation within the region.

2. VERY HIGH

- The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site; or
- The subject tree is listed on Council's Significant Tree Register; or
- The tree is a locally-indigenous species, representative of the original vegetation of the area and forms part of the assemblage of species of an Endangered Ecological Community;
- The subject tree has a very large live crown size exceeding 200m²; a crown density exceeding 70% Crown Cover (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area.
- The species, cultivated variety or form is uncommon in cultivation (few examples in cultivation within the region)

3. HIGH

- The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence; or
- The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value;
- The subject tree has a large live crown size exceeding 100m²; and
- The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (eg crown distortion/suppression) with a crown density of at least 70% Crown Cover (normal); and
- The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area.

4. MODERATE

- The subject tree has a medium live crown size exceeding 40m²; and
- The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% Crown Cover (thinning to normal); and
- The tree makes a fair contribution to the visual character and amenity of the area; and
- The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms.
- The tree has no known or suspected historical association

5. LOW

- The subject tree has a small live crown size of less than 40m² and can be replaced within the short term with new tree planting; or
- The subject tree is not visible from surrounding properties (visibility obscured) and makes little contribution the amenity and visual character of the area.

6. VERY LOW

- The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species; or
- The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% Crown Cover (sparse) or has a negative impact on visual amenity; or
- The subject tree is scheduled as exempt (not protected) under the provisions of the local Council's Tree Preservation Order due to its species, nuisance or position relative to buildings or other structures.

7. INSIGNIFICANT

- The tree is a declared Noxious Weed under the *Noxious Weeds Act* (NSW) 1993

APPENDIX 2
12 TREE PROTECTION MEASURES

12.1 Tree Protection Zones

12.1.1 The Tree Protection Zones are recommended for all trees within the site to be retained shall be equivalent to the Tree Protection Zone as specified in Appendix 5. This is a radial distance measured from the centre of the trunk of the subject tree.

12.1.2 The following activities should be avoided within specified Tree Protection Zones:-

- Excavations and trenching (with exception of the approved foundations and underground services);
- Ripping or cultivation of soil;
- Mechanical removal of vegetation;
- Soil disturbance or movement of natural rock;
- Soil level changes including the placement of fill material (excluding any suspended floor or slab);
- Movement and storage of plant, equipment & vehicles;
- Erection of site sheds;
- Affixing of signage or hoardings to trees;
- Storage of building materials, waste and waste receptacles;
- Disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids;
- Other physical damage to the trunk or root system; and
- Any other activity likely to cause damage to the tree.

12.2 Tree Protection Fencing

12.2.1 All trees within the site to be retained shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence beneath the canopy to the full extent of the Tree Protection Zone (excluding the footprint of the proposed works and areas within adjoining properties). As a minimum the fence should consist temporary chain wire panels 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement. The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate.

12.2.2 Appropriate signage shall be installed on the fencing to prevent unauthorised movement of plant and equipment or entry to the Tree Protection Zone.

12.2.3 A 50mm layer of woodchip mulch shall be installed to the full extent of the Tree Protection Zone of all trees to be retained. Mulch shall be installed and spread by hand to avoid soil disturbance and compaction within the root zone.

12.3 Trunk Protection

12.3.1 Where provision of tree protection fencing is in impractical due to its proximity to the proposed building envelope, trunk protection shall be erected around the tree to avoid accidental damage. As a minimum, the trunk protection shall consist of two metre lengths of hardwood timbers (100 x 50mm) spaced at 100-150mm centres secured together with 2mm galvanised wire. These shall be strapped around the trunk (not fixed in any way) to avoid mechanical injury or damage. Trunk protection should be installed prior to any site works and maintained in good condition for the duration of the construction period.

12.4 Tree Damage

12.4.1 In the event of any tree becoming damaged for any reason during the construction period a consulting arborist shall be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

12.5 Demolition Works within Tree Protection Zones

12.5.1 Demolition of pathways and paved areas within the Tree Protection Zone of trees to be retained shall be undertaken under the supervision of the Site Arborist. The pavement surface and sub-base shall be stripped-off in layers of no greater than 50mm thick using a small rubber tracked excavator or alternative approved method to avoid damage to underlying roots and minimise soil disturbance. The machine shall work within the footprint of the existing pathway to avoid compaction of the adjacent soil. The final layer of sub-base material shall be

removed using hand tools were required to avoid compaction of the underlying soil profile and damage to woody roots.

12.5.2 Following removal of the pavement surface and sub-base, clean, friable topsoil shall be used to fill in the excavated area and bring flush with surrounding levels. Soil shall only be imported and spread when the underlying soil conditions are dry to avoid compaction of the soil profile.

12.5.3 Demolition of low masonry walls within the Tree Protection Zone of trees to be retained shall be undertaken under the supervision of the Site Arborist. The walls shall be demolished using equipment on the street side of the wall. Care shall be taken to avoid the root systems, trunks and lower branches of trees in the vicinity of the existing walls.

12.6 Excavations within Tree Protection Zones

12.6.1 Excavations within the Tree Protection Zone of any tree to be retained shall be avoided wherever possible.

12.6.2 Excavations for foundations and pavement sub-grade within the Tree Protection Zone of any tree to be retained shall be undertaken by hand or using an Air-spade® device to locate and expose roots along the perimeter of the foundation or pavement prior to any mechanical excavation. All care shall be undertaken to preserve root systems intact and undamaged. Any roots less than 50mm in diameter shall be cleanly severed with clean sharp pruning implements at the face of the excavation. The root zone in the vicinity of the excavation shall be kept moist following excavation for the duration of construction to minimise stress on the tree.

12.6.3 Where large woody roots (greater than 50mm diameter) are encountered during excavations, further advice from a qualified arborist shall be sought prior to severance. Where necessary, (to avoid severing large woody roots) consideration should be given to the installation of an elevated structure (e.g. pier and beam footing, suspended slab or floor on piers, cantilevered slab, etc) in preference to structures requiring a deep edge beam or continuous perimeter strip footing. The beam section of any pier and beam footing should be placed **above** grade to avoid excavation within the CRZ.

12.6.4 For masonry walls or fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (eg steel or timber pickets, lattice etc) fixed to pillars.

12.6.5 For paved areas, consideration should be given to raising the proposed pavement level and using a porous fill material in preference to excavation.

12.7 Underground Services

12.7.1 All proposed stormwater lines and other underground services should be located as far away as practicable, or suspended beneath the floor of the building where possible, to avoid excavation within the Tree Protection Zone of trees to be retained.

12.7.2 For underground services, where the incursion to the Root Zone is less than 20% of the total TPZ (i.e. beyond the Minimum Setback Distance), a chain trenching device may be used. A backhoe or skid steer loader is unacceptable due to the potential for excessive compaction and root damage. Where large woody roots (greater than 50mm in diameter) are encountered during excavation or trenching, these shall be retained intact wherever possible (eg by sub-surface boring beneath roots or re-routing the service etc).

12.7.3 Excavations required for underground services within the Critical Root Zone of any tree to be retained should only be undertaken by sub-surface boring. The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root zone depth as specified. This will depend on the soil conditions at the site. Where this is not practical and root pruning is the only alternative, proposed root pruning should be assessed by the arborist to determine continued health and stability of the subject tree.

12.7.4 If trees show signs of stress or deterioration, remedial action shall be taken to improve the health and vigour of the subject tree (s) in accordance with best practice arboricultural principles

12.8 Pavements

12.8.1 Pavements should be avoided within the Tree Protection Zone of trees to be retained where possible. Proposed paved areas within the Tree Protection Zone of trees to be retained should be placed above grade to minimise excavations within the root zone and avoid root severance and damage. Pavement sub-base material should be as per Section 12.8.

12.9 Fill Material

12.9.1 Placement of fill material within the Tree Protection Zone of trees to be retained should be avoided where possible. Where placement of fill cannot be avoided, the material should be a coarse, gap-graded material such as 20 – 50mm crushed basalt (Blue Metal) or equivalent to provide some aeration to the root zone. Note that Roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose. The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil. A permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade. No fill material should be placed in direct contact with the trunk.

12.10 Canopy & Root Pruning

12.10.1 All pruning work required shall be carried out in accordance with Australian Standard No 4373-2007 – Pruning of Amenity Trees. Written approval from Council may be required under the Tree Preservation Order prior to undertaking this work. All pruning work shall be carried out by a qualified and experienced arborist or tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).

12.10.2 Care shall be taken when operating cranes, drilling rigs and similar equipment near trees to avoid damage to tree canopies (foliage and branches). Under no circumstances shall branches be torn-off by construction equipment. Where there is potential conflict between tree canopy and construction activities, the advice of the Site Arborist must be sought.

12.10.3 Where root pruning is required, roots shall be severed with clean, sharp pruning implements and retained in a moist condition during the construction phase using Hessian material or mulch where practical. Severed roots shall be treated with a suitable root growth hormone containing the active constituents Indol-3-yl-Butric Acid (IBA) and 1-Naphthylacetic Acid (NAA) to stimulate rapid regeneration of the root system.

12.11 Tree Removal

12.11.1 The approval of Ashfield Council shall be obtained prior to the removal or pruning of any tree protected under the Tree Preservation Order.

12.11.2 Tree removal work shall be carried out by an experienced tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). Care shall be taken to avoid damage to other trees during the felling operation.

12.11.3 Stumps shall be grubbed-out where required using a mechanical stump grinder without damage to the root system of other trees. Where trees to be removed are in close proximity to trees to be retained, consideration should be given to cutting the stump close to ground level and retaining the root crown intact. Stumps within the Tree Protection Zone of other trees to be retained should **not** be removed using excavation equipment or similar.

APPENDIX 3
13 METHODOLOGY FOR DETERMINING TREE PROTECTION ZONES

13.1.1 In order to provide adequate protection for trees nominated as suitable for preservation, Tree Protection Zones (TPZ) are required to provide adequate setbacks from buildings and other infrastructure to minimise adverse impact. The Tree Protection Zone is a radial distance measured from the centre of the trunk of the tree as specified in Appendix 5 (refer also Figure 4). The intention of the Tree Protection Zone is to minimise incursions to the root system and canopy to ensure the long-term health and stability of each tree to be retained. Incursions to the root zone may occur due to changes in ground levels, (either lowering or raising the grade), trenching or other forms or soil disturbance such as ripping, grading or inverting the soil profile.

13.1.2 A commonly used delineation for the Tree Protection Zone is the drip-line (extent of the crown spread projected to the ground plane). However, this may not provide adequate protection for trees that have prominent leans or distorted, imbalanced or narrow crowns. A more appropriate guideline is the trunk diameter.[6]

13.1.3 The TPZ has been determined from Table 3, based on guidelines prepared by the British Standards Institute (1991) using the following parameters:-

- The trunk diameter;
- The sensitivity/tolerance of the species to construction impacts;
- The level of maturity;
- The health, vigour and structural integrity of the tree (refer to Section 4); and
- The trees root and crown formation.

13.2 Trunk Diameter

13.2.1 The trunk diameter of each tree was measured at 1.4 metres from ground level using a metric diameter tape. For the purpose of calculating the tree protection zone, the diameter of twin-trunked trees has been added then multiplied by 75%. For multi-trunked trees, the diameter of each trunk has been added then multiplied by 60%. This gives a more realistic measurement for an equivalent sized single-trunked tree.

13.3 Construction Tolerance

13.3.1 The Construction Tolerance of each tree has been divided into the following categories:-

- **G** **Good –** good tolerance to construction impacts
- **M** **Moderate –** moderate tolerance to construction impacts
- **P** **Poor –** poor tolerance to construction impacts

13.3.2 As there is very little documentary record of the construction tolerance of species under Australian conditions, the trees have been categorized according to our field observation and experience. The above classifications are also used as criteria to determine appropriate setback distances to trenching (together with Maturity Class).

13.4 Maturity Class.

13.4.1 The Maturity Classification of each tree has been divided into the following categories:-

- **OM** **Overmature –** greater than 80% of the life expectancy for the species
- **M** **Mature –** 50-80% of the life expectancy for the species
- **SM** **Semi-mature –** 20-50% of the life expectancy for the species
- **I** **Immature –** less than 20% of the life expectancy for the species

13.5 Root and Crown Formation

13.5.1 The distribution of the canopy and branches of each tree was recorded in the field from visual observation and is shown in **Appendix 4**. This is also reflected in the tree location plans in **Appendix 6**. Based on the information available, it has been assumed that the soil conditions are fairly uniform and therefore a uniform radial root system has also been assumed. Existing incursions (due to existing underground services, adjacent structures or grade differences) to the root zone were also noted in the field. Where appropriate the Tree Protection Zones take account of existing incursions and canopy distribution.

TABLE THREE – GUIDELINES FOR OPTIMUM TREE PROTECTION ZONES

Species Tolerance	Tree Maturity Class	Distance from Trunk (m) per Unit Trunk Diameter (cm)
Good	Young	0.06
	Mature	0.09
	Overmature	0.12
Moderate	Young	0.09
	Mature	0.12
	Overmature	0.15
Poor	Young	0.12
	Mature	0.15
	Overmature	0.18

KEY (Maturity Class)
Young (<20% Life Expectancy)
Mature (20-80% Life Expectancy)
Overmature (>80% Life Expectancy)

Modified from the British Standards Institute (1991)
Guidelines are for trees of average to excellent vigour

REF:- Harris, R.W., Clark, J.R. & Matheny, NP (1999)
Arboriculture - Integrated Management of Landscape Trees, Shrubs & Vines (Third Edition)
Prentice Hall, New Jersey, USA

13.6 Minimum Set-back Distance.

13.6.1 Where construction work within the TPZ is unavoidable, the proposed incursion should be limited to a radial offset equivalent to no greater than 20% of the TPZ, on one side only (refer to **Figure 4**). It is generally accepted that healthy, vigorous trees can withstand incursions of this amount without any significant adverse impact on their health and long-term preservation. Incursions of greater amounts are likely to result in an adverse impact and significant incursions may lead to the demise or destabilization of the tree. Minimum Setback Distances to construction have been specified in **Appendix 5**.

13.7 Critical Root Zone.

13.7.1 The diameter of the root plate, which provides the bulk of mechanical support and anchorage for a tree, is related to the distance from the trunk at which rapid taper of tree roots ceases. [7] This has been defined as the tree's "Critical Root Zone". Based on field studies of root plate sizes of windthrown (overturned) trees, it has been established that there is a relationship between the Critical Root Zone (Root Plate Diameter) and the trunk diameter.[11] The Critical Root Zone for each tree has been shown in **Appendix 5**. Incursions within the Critical Root Zone are not recommended as they are likely to result in the severance of woody roots which may lead to the destabilisation and/or demise of the tree.

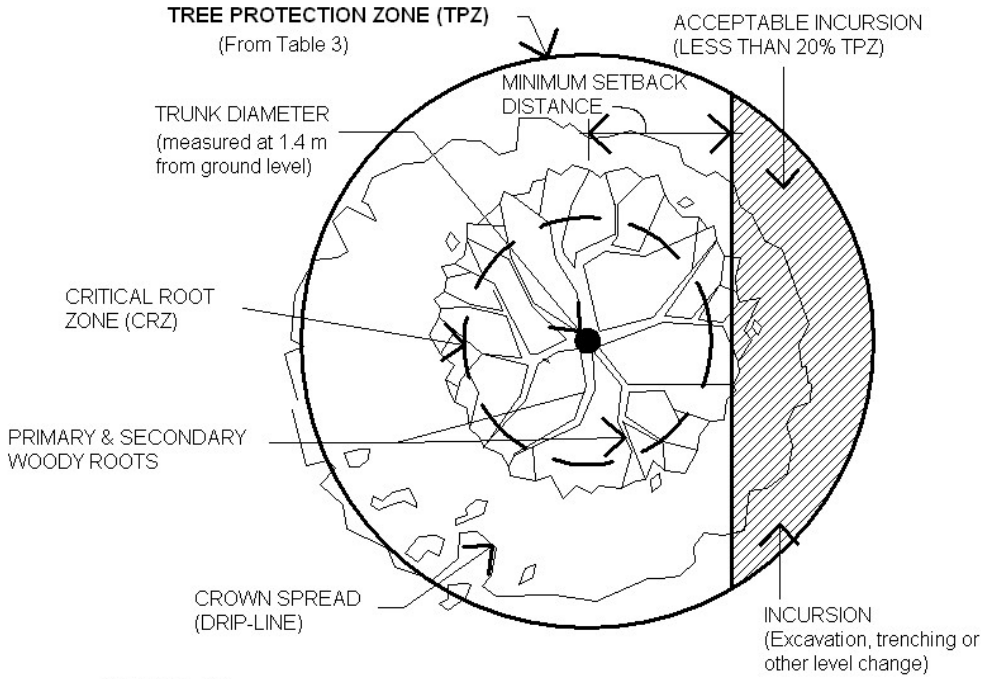


FIGURE 4

METHODOLOGY TO CALCULATE MINIMUM SETBACK DISTANCE

13.8 Acceptable Incursions to the Root Zone.

13.8.1 Incursions within the TPZ and CRZ may be acceptable only where special construction methods are adopted to avoid any adverse impact on the trees root system. Fully elevated construction methods incorporating suspended flooring, isolated piers or pier and beam type footing construction are generally acceptable within the TPZ / CRZ, provided all excavations are undertaken by hand and roots are adequately protected.

REFERENCES

1.1.1

[6] Harris, R.W., Clark, J.R. & Matheny, N.P. (2004)
Arboriculture – Integrated Management of Landscape Trees, Shrubs and Vines (4th Edition)
Prentice Hall, New Jersey, USA

[7] Culter, David F. (1995)
Interactions between Tree Roots and Buildings
Proceedings of and International Workshop on Trees and Buildings
International Society of Arboriculture, Illinois, USA

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Id. No.	Species	Height	Spread	DBH (mm)	Live Crown Size (m²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Life Expectancy	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
34	***Lophostemon confertus*** (Brushbox)	11	8	420 + 240	72	M	Appears stable with sound branching structure. Basal sprout.	No Evidence	Good	No Evidence	Medium 15-40 Years	4	**moderate**	On-site
35	***Cinnamomum camphora*** (Camphor Laurel)	7	6	200x5	36	M	Stability suspect with poor branching structure. Predominantly epicormic sprouts arising from original stump. Large basal cavity with decay.	Previously cut to ground level	Fair	No Evidence	Short 5-15 Years	6	**very low**	On-site
36	***Cinnamomum camphora*** (Camphor Laurel)	7	6	200x4	36	M	Stability suspect with poor branching structure. Predominantly epicormic sprouts arising from original stump. Large basal cavity with decay.	Previously cut to ground level	Fair	No Evidence	Short 5-15 Years	6	**very low**	On-site
37	***Cinnamomum camphora*** (Camphor Laurel)	7	6	150 + 220	36	M	Stability suspect with poor branching structure. Predominantly epicormic sprouts arising from original stump.	Previously cut to ground level	Fair	No Evidence	Short 5-15 Years	6	**very low**	On-site
38	***Casuarina cunninghamiana*** (River Oak)	9	4	220	28	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**moderate**	On-site
39	***Ficus rubiginosa*** (Port Jackson Fig)	18	25	1100 + 550 + 650 + 500 + 1000	375	M	Appears stable with fair branching structure.	Selectively thinned & deadwooded	Fair with thinning crown	No Evidence	Short 5-15 Years	1	**high**	On-site
41	***Citharexylum spinosum*** (Fiddlewood)	11	9	280x4	81	M	Appears stable with fair branching structure. Exhibits a large basal cavity.	No Evidence	Very Good	No Evidence	Short 5-15 Years	3	**moderate**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Id. No.	Species	Height	Spread	DBH (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Life Expectancy	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
42	***Ficus obliqua*** (Small-leaf Fig)	13	15	500x2	135	OM	Appears stable with fair branching structure. Exhibits a low bark inclusion at 0.5 & 1.5 metres. Multiple moderate wounds due to sunscald on primary limbs & previous pruning. Exhibits moderate dieback with 20% deadwood.	Selectively pruned & deadwooded	Fair with thinning crown	Moderate vine infestation (Wisteria)	Transient (less than 5 years)	1	**moderate**	On-site
54	***Taxodium distichum*** (Swamp Cypress)	15	9	800	117	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	**high**	On-site
54a	***Thuja plicata*** (Western Red Cedar)	7	4	280	16	M	Appears stable with fair branching structure. Exhibits a prominent lean to the NE. Moderate bark inclusion at 1 metre. Some dieback in lower crown with 10% deadwood.	Crown lifted to 3 metres	Fair with thinning crown	No Evidence	Short 5-15 Years	4	**low**	On-site
54b	***Pittosporum undulatum*** (Native Daphne)	9	6	200	42	SM	Appears stable with sound branching structure.	Crown lifted to 2 metres	Very Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
54c	***Jacaranda mimosifolia*** (Jacaranda)	8	7	180	42	SM	Appears stable with fair branching structure. Exhibits some basal epicormic sprouts. Prominent lean to the SW. Upper crown suppressed due to overshadowing.	No Evidence	Fair	No Evidence	Medium 15-40 Years	5	**low**	On-site
55	***Callitris rhomboidea*** (Port Jackson Pine)	9	4	200x2	30	M	Appears stable with fair branching structure. Exhibits a moderate bark inclusion at 0.5 metres. Located close to existing building	Crown lifted to 1.5 metres	Good	No Evidence	Short 5-15 Years	4	**low**	On-site
56	***Ficus rubiginosa*** (Port Jackson Fig)	18	25	2000	400	M	Appears stable with sound branching structure. Exhibits multiple moderate bark inclusions at ground level. Moderate wound due to previous branch loss.	No Evidence	Good	No Evidence	Medium 15-40 Years	1	**high**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Id. No.	Species	Height	Spread	DBH (mm)	Live Crown Size (m²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Life Expectancy	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
57	***Phoenix canariensis*** (Canary Island Palm)	5.5	5	600	17.5	SM	Appears stable with sound branching structure. Insufficient space for future growth.	No Evidence	Good	No Evidence	Short 5-15 Years	5	**low**	On-site
58	***Phoenix canariensis*** (Canary Island Palm)	7	8	600	40	SM	Appears stable with sound branching structure. Insufficient space for future growth.	No Evidence	Very Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
59	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	11	7	350	63	SM	Appears stable with sound branching structure. Crown suppressed on south side due to crowding	No Evidence	Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site
60	***Cinnamomum camphora*** (Camphor Laurel)	16	12	450x2 + 350	156	M	Appears stable with fair branching structure. Crown suppressed on east side due to crowding. Multiple low bark inclusions at 1.2 metres.	No Evidence	Good	No Evidence	Long - more than 40 years	6	**low**	On-site
61	***Washingtonia filifera*** (Cotton Palm)	15	5	380	15	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	2	**high**	On-site
62	***Acer negundo*** (Box Elder)	12	14	350	147	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	6	**low**	On-site
63	***Cyathea cooperi*** (Tree fern)	7	4	180	8	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Short 5-15 Years	5	**low**	On-site
64	***Jacaranda mimosifolia*** (Jacaranda)	11	10	340	95	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	4	**high**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Id. No.	Species	Height	Spread	DBH (mm)	Live Crown Size (m²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Life Expectancy	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
65	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	14	8	650	80	M	Appears stable with fair branching structure. Exhibits multiple low bark inclusions at 2 metres	No Evidence	Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site
66	***Olea africana*** (African Olive)	8	7	330	45.5	M	Appears stable with sound branching structure. Root plate lifting & displacing spoon drain	Lower limbs selectively pruned	Very Good	No Evidence	Medium 15-40 Years	6	**low**	On-site
67	***Jacaranda mimosifolia*** (Jacaranda)	6	6	220	24	I	Appears stable with sound branching structure. Exhibits a very prominent lean to the north. Upper crown suppressed due to overshadowing	No Evidence	Good	No Evidence	Short 5-15 Years	5	**low**	On-site
68	***Araucaria columnaris*** (Cook's Pine)	14	5	380	62.5	M	Appears stable with sound branching structure.	Crown lifted to 2 metres	Very Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site
69	***Acer negundo*** (Box Elder)	12	13	320 + 360	136.5	M	Appears stable with sound branching structure.	Lower limbs selectively pruned	Good	No Evidence	Medium 15-40 Years	6	**low**	On-site
70	***Callistemon salignus*** (Willow Bottlebrush)	5.5	4	140	10	SM	Appears stable with fair branching structure. Exhibits minor dieback with 5% deadwood. Upper crown suppressed due to overshadowing	No Evidence	Fair with slight thinning crown	No Evidence	Short 5-15 Years	5	**low**	On-site
71	***Eucalyptus microcorys*** (Tallowwood)	14	7	400	77	M	Appears stable with fair branching structure. Exhibits moderate bark inclusion at 4 metres	No Evidence	Very Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site
72	***Eucalyptus microcorys*** (Tallowwood)	15	11	430	132	M	Appears stable with sound branching structure. Exhibits one extended primary lateral limb to west. Suppressed on south side due to crowding.	No Evidence	Very Good	No Evidence	Long - more than 40 years	3	**high**	On-site
73	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	7	5	180	27.5	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
74	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	6	6	180	27	SM	Appears stable with fair branching structure. Exhibits a low bark inclusion at 1 metre.	No Evidence	Fair	No Evidence	Medium 15-40 Years	5	**low**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Id. No.	Species	Height	Spread	DBH (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Life Expectancy	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
75	***Erythrina crista-galli*** (Cockscomb Coral)	4.5	5	230	12.5	SM	Appears stable with fair branching structure.	Lower limbs selectively pruned	Fair	No Evidence	Short 5-15 Years	6	**very low**	On-site
76	***Acer negundo*** (Box Elder)	7	7	220	38.5	I	Appears stable with sound branching structure. Crown suppressed on south side due to crowding	No Evidence	Good	No Evidence	Long - more than 40 years	6	**low**	On-site
77	***Jacaranda mimosifolia*** (Jacaranda)	6	4	130 + 80	12	I	Appears stable with sound branching structure. Upper crown suppressed due to overshadowing. Insufficient space for future growth.	No Evidence	Good	No Evidence	Short 5-15 Years	5	**low**	On-site
78	***Melaleuca bracteata*** (Melaleuca)	8	3	150	12	SM	Appears stable with sound branching structure.	No Evidence	Fair with thinning crown	No Evidence	Short 5-15 Years	5	**low**	On-site
79	***Jacaranda mimosifolia*** (Jacaranda)	7	4	140	16	I	Appears stable with sound branching structure.	Lower limbs selectively pruned	Good	No Evidence	Long - more than 40 years	5	**moderate**	On-site
80	***Harpephyllum caffrum*** (Kaffir Plum)	7	8	320	40	SM	Appears stable with fair branching structure. Exhibits multiple moderate bark inclusions at 1.2 metres.	No Evidence	Good	No Evidence	Medium 15-40 Years	4	**moderate**	On-site
81	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	5.5	4	250	14	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
81a	***Callistemon salignus*** (Willow Bottlebrush)	7	3	120x2	18	SM	Appears stable with fair branching structure. Exhibits a moderate bark inclusion at ground level. Crown suppressed on SW side due to crowding.	No Evidence	Fair	Moderate English Ivy infestation	Short 5-15 Years	5	**low**	On-site
82	***Gleditsia triacanthos*** (Honey Locust)	5	6	150	18	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**moderate**	On-site
83	***Ulmus parvifolia*** (Chinese Elm)	7	7	150	42	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**moderate**	On-site
84	***Prunus sp.*** (Ornamental Peach)	4	7	150 + 120 + 80	17.5	M	Appears stable with fair branching structure. Exhibits a low bark inclusion at 0.5 metres.	No Evidence	Fair with slight thinning crown	No Evidence	Short 5-15 Years	6	**low**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Id. No.	Species	Height	Spread	DBH (mm)	Live Crown Size (m²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Life Expectancy	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
85	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	11	7	420	56	M	Appears stable with fair branching structure. Exhibits a moderate bark inclusion at 1.3 metres	No Evidence	Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site
86	***Grevillea robusta*** (Silky Oak)	7	4	160	28	I	Appears stable with sound branching structure. Located close to existing building - insufficient space for future growth.	No Evidence	Good	No Evidence	Short 5-15 Years	5	**low**	On-site
87	***Fraxinus* 'Raywood'** (Claret Ash)	8	7	260	45.5	M	Appears stable with sound branching structure. Exhibits moderate dieback with 15% deadwood.	No Evidence	Fair with thinning crown	Suspected Ash white Fly infestation	Short 5-15 Years	4	**low**	On-site
88	***Jacaranda mimosifolia*** (Jacaranda)	8	9	300	36	M	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site
88b	***Gleditsia triacanthos*** (Honey Locust)	7	7	180	35	I	Appears stable with sound branching structure.	Crown lifted to 1.5metres	Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
89	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	9	5	350	37.5	M	Appears stable with sound branching structure. Located in narrow traffic island - uplifting & displacing kerb	No Evidence	Very Good	No Evidence	Medium 15-40 Years	4	**moderate**	On-site
90	***Acer negundo*** (Box Elder)	7	8	280	44	M	Appears stable with sound branching structure.	No Evidence	Fair	No Evidence	Medium 15-40 Years	6	**low**	On-site
91	***Quercus palustris*** (Pin Oak)	16	16	700	224	M	Appears stable with sound branching structure. Exhibits a large primary lateral lim to south	Lower limbs selectively pruned	Very Good	Moderate Climbing Cactus infestation	Medium 15-40 Years	2	**high**	On-site
92	***Phoenix canariensis*** (Canary Island Palm)	6	3	600	12	SM	Appears stable with sound branching structure.Insufficient space for future growth.	Crown lifted to 2 metres	Good	No Evidence	Short 5-15 Years	5	**low**	On-site
93	***Prunus sp.*** (Ornamental Peach)	4.5	6	230	18	M	Appears stable with sound branching structure. Crown supressed on NW side due to overshadowing.	No Evidence	Good	Low borer infestation	Short 5-15 Years	6	**low**	On-site
94	***Prunus cerasifera* 'Nigra'** (Ornamental Plum)	5	5	160	20	M	Appears stable with fair branching structure. Exhibits multiple small wounds due to borer damage.	No Evidence	Good	Low borer infestation	Short 5-15 Years	5	**low**	On-site
95	***Prunus cerasifera* 'Nigra'** (Ornamental Plum)	4	4	150	12	M	Appears stable with fair branching structure. Exhibits multiple small wounds due to borer damage.	No Evidence	Good	Low borer infestation	Short 5-15 Years	6	**low**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Id. No.	Species	Height	Spread	DBH (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Life Expectancy	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
96	***Prunus cerasifera* 'Nigra'** (Ornamental Plum)	5	5	160	20	M	Appears stable with fair branching structure. Exhibits multiple small wounds due to borer damage.	No Evidence	Good	Low borer infestation	Short 5-15 Years	5	**low**	On-site
97	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	11	11	550	88	M	Appears stable with fair branching structure. Exhibits a moderate bark inclusion at 1.8 metres. Small wound at 2 metres with evidence of decay (superficial)	Lower limbs selectively pruned	Good	No Evidence	Long - more than 40 years	3	**high**	On-site
98	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	14	12	900	144	M	Appears stable with fair branching structure. Exhibits multiple co-dominant primary limbs from 1.8 metres	Lower limbs selectively pruned	Good	No Evidence	Long - more than 40 years	3	**high**	On-site
99	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	14	12	800	132	M	Appears stable with fair branching structure. Exhibits a multiple low bark inclusions at 2 metres.	Lower limbs selectively pruned	Good	No Evidence	Long - more than 40 years	3	**high**	On-site
100	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	13	11	820	88	M	Appears stable with fair branching structure. Exhibits a multiple low bark inclusions at 1.5 metres.	Lower limbs selectively pruned	Good	No Evidence	Long - more than 40 years	3	**high**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Id. No.	Species	Height	Spread	DBH (mm)	Live Crown Size (m²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Life Expectancy	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
152	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	8	7	430	45.5	M	Appears stable with fair branching structure. Exhibits moderate bark inclusions at 1.2 metres	No Evidence	Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site
153	***Jacaranda mimosifolia*** (Jacaranda)	7	6	200	12	I	Appears stable with sound branching structure. Crown suppressed on east side due to crowding. Close to existing road & path.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
154	***Jacaranda mimosifolia*** (Jacaranda)	7	6	220	12	I	Appears stable with sound branching structure. Crown suppressed on west side due to crowding. Close to existing road & path.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
155	***Archontophoenix alexandrae*** (Alexandra Palm)	8	4	230	12	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	**moderate**	On-site
155a	***Archontophoenix alexandrae*** (Alexandra Palm)	5	3	170	6	I	Appears stable with sound branching structure.	No Evidence	Fair	No Evidence	Medium 15-40 Years	5	**low**	On-site
155b	***Archontophoenix alexandrae*** (Alexandra Palm)	6	3	230	6	I	Appears stable with sound branching structure.	No Evidence	Fair	No Evidence	Medium 15-40 Years	5	**low**	On-site
156	***Gleditsia triacanthos*** (Honey Locust)	7	8	230	40	SM	Appears stable with sound branching structure. Close to existing path & wall.	No Evidence	Good	No Evidence	Medium 15-40 Years	4	**moderate**	On-site
156a	***Gleditsia triacanthos*** (Honey Locust)	4	6	130	18	I	Appears stable with fair branching structure. Crown suppressed on SW side due to overshadowing.	Crown lifted to 1.5 metres	Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
157	***Photinia x fraseri* 'Robusta'** (Chinese Hawthorn)	5	5	250	17.5	M	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
157a	***Archontophoenix alexandrae*** (Alexandra Palm)	7	4	200 + 160	20	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	**low**	On-site
159	***Gleditsia triacanthos*** (Honey Locust)	5	5	120	15	SM	Appears stable with sound branching structure.	Crown lifted to 2 metres	Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site
160	***Gleditsia triacanthos*** (Honey Locust)	8	9	200	54	SM	Appears stable with sound branching structure.	Crown lifted to 2 metres	Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site

APPENDIX 4 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Id. No.	Species	Height	Spread	DBH (mm)	Live Crown Size (m^2)	Maturity Class	Condition	Previous Pruning	Health		Remaining Life Expectancy	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
161	***Jacaranda mimosifolia*** (Jacaranda)	10	8	290	64	SM	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	4	**moderate**	On-site

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Id. No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Critical Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
34	***Lophostemon confertus*** (Brushbox)	M	5.9	2.6	4.0	Proposed pump station offset 4.9 metres south. Excavations for building foundations within TPZ. Existing sandstone retianing wall offset 0.9 metres NW to be maintained intact.	Extent of incursion to the root zone is less than 10% of the TPZ, which is considered within acceptable limits.	Retain in accordance with recommended Tree Protection Measures. Install tree protection fence in accordance with Section 12.2. Undertake excavations for new pump station in accordance with Section 12.6.
35	***Cinnamomum camphora*** (Camphor Laurel)	M	3.4	2.1	2.3	Proposed pump station offset 0.6 metres south. Excavations for building foundations within TPZ.	May result in an adverse impact	Remove Tree
36	***Cinnamomum camphora*** (Camphor Laurel)	M	3.4	2.1	2.3	Proposed pump station offset 1.7 metres north. Excavations for building foundations within TPZ.	May result in an adverse impact	Remove Tree
37	***Cinnamomum camphora*** (Camphor Laurel)	M	3.4	2.1	2.3	No proposed works within TPZ	No adverse impact. Proposed to be removed (Environmental Weed Species)	Remove Tree
38	***Casuarina cunninghamiana*** (River Oak)	M	3.3	1.85	2.2	No proposed works within TPZ	No adverse impact.	To be retained - no special protection measures required.
39	***Ficus rubiginosa*** (Port Jackson Fig)	M	12.5	4.15	8.5	Existing retaining wall (to north) maintained intact. Existing roadway & kerb offset 3.4 metres south to be demolished. New roadway & kerb offset 4.6 metres south (within footprint of existing road). Excavations & compaction for new roadway within TPZ.	Unlikely to result in any adverse impact	Retain in accordance with recommended Tree Protection Measures. Install tree protection fence in accordance with Section 12.2. Undertake excavations for new pavement sub-grade & kerb foundations in accordance with Section 12.6. Demolish existing road & kerb in accordance with Section 12.5.
41	***Citharexylum spinosum*** (Fiddlewood)	M	6.7	2.75	4.6	Existing retaining wall (to north) maintained intact. Existing roadway & kerb offset 8 metres south to be demolished. New roadway & kerb offset 6 metres south (minor incursion to TPZ).	No adverse impact	Retain in accordance with recommended Tree Protection Measures. Install tree protection fence in accordance with Section 12.2.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Id. No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Critical Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
42	***Ficus obliqua*** (Small-leaf Fig)	M	9.0	3	6.1	Existing roadway & kerb offset 5 metres north & path 3.8 metres north to be demolished. New roadway & kerb offset 3.7 metres north (mostly within footprint of existing road & path). New parking bay offset 4 metres NW. Excavations & compaction for new road pavement & kerb within TPZ	Excavations & compaction for pavement sub-grade & kerb may result in some root damage and severance resulting in some adverse impact. Proposed to be removed & replaced - declining specimen.	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
54	***Taxodium distichum*** (Swamp Cypress)	M	6.0	3.1	4.1	No proposed works within TPZ	No adverse impact.	Retain in accordance with recommended Tree Protection Measures.
54a	***Thuja plicata*** (Western Red Cedar)	M	3.4	2.1	2.3	Located within footprint of proposed pedestrian path/ramp	Proposed works will necessitate removal.	Remove tree
54b	***Pittosporum undulatum*** (Native Daphne)	M	3.0	1.65	2.0	Located immediately adjacent footprint of proposed pedestrian path/ramp	Proposed works will necessitate removal.	Remove tree
54c	***Jacaranda mimosifolia*** (Jacaranda)	M	2.7	1.65	1.8	Proposed pedestrian path/ramp offset 2 metres south. Located within new landscape area.	No adverse impact. Proposed to be removed to accommodate new landscape and planting.	Remove tree
55	***Callitris rhomboidea*** (Port Jackson Pine)	M	3.6	2.1	2.4	Located close to existing building to be demolished.	Proposed works will necessitate removal.	Remove tree
56	***Ficus rubiginosa*** (Port Jackson Fig)	M	15.0	4.15	10.2	Proposed new parking bay offset 5.8 metres SE, new roadway offset 8.7 metres NE & pathway/ramp offset 8.8 metres south. Excavations and compaction for pavement sub-grade & kerb within TPZ. New batter 11.3 metres west. (total incursion to TPZ approx 24%, but most of this is located within the footprint of existing pavements)	Total incursion to root zone is marginally above acceptable limits, but given nature of structures should not result in any adverse impact.	Retain in accordance with recommended Tree Protection Measures. Install tree protection fence in accordance with Section 12.2. Undertake excavations for new pavement sub-grade & kerb foundations in accordance with Section 12.6. Demolish existing road & kerb & path in accordance with Section 12.5.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Id. No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Critical Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
57	***Phoenix canariensis*** (Canary Island Palm)	G	4.8	2.75	3.3	No proposed works within TPZ. Located within new landscape area.	No adverse impact. Proposed to be removed to accommodate new landscape and planting.	Remove tree
58	***Phoenix canariensis*** (Canary Island Palm)	G	4.8	2.75	3.3	Top of batter for Croquet Field offset 3.3 metres west. Excavations for batter within TPZ.	Extent of incursion to root zone is less than 20% of the TPZ, which is within acceptable limits. No adverse impact. Proposed to be removed to accommodate new landscape and planting.	Remove tree
59	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	4.2	2.25	2.9	Existing parking bay offset 3.2 metres NE to be demolished within TPZ. New Pathway offset 4.4 metres north (within footprint of existing pavement). Batter for Croquet Field offset 3.5 metres west.	Extent of incursion to root zone is less than 20% of the TPZ, which is within acceptable limits. No adverse impact.	Retain in accordance with recommended Tree Protection Measures.Undertake excavations for batter in accordance with Section 12.6.
60	***Cinnamomum camphora*** (Camphor Laurel)	M	9.0	3	6.1	Top of batter for Croquet Field offset 2.6 metres NW. Excavations for batter within CRZ.	Will necessitate severance of woody roots, leading to a significant adverse impact. Proposed to be removed.	Remove tree
61	***Washingtonia filifera*** (Cotton Palm)	G	3.4	2.4	2.3	Top of batter for Croquet Field offset 0.6 metres NW. Excavations for batter within CRZ (within area of steep embankment).	May result in some adverse impact	Retain in accordance with recommended Tree Protection Measures.Undertake excavations for batter in accordance with Section 12.6.
62	***Acer negundo*** (Box Elder)	M	5.3	2.25	3.6	Located within footprint of proposed deck surrounding proposed exercise area.	Proposed works will necessitate removal.	Remove tree
63	***Cyathea cooperi*** (Tree fern)	G	2.7	1.6	1.8	Located within footprint of proposed Croquet Field.	Proposed works will necessitate removal.	Remove tree
64	***Jacaranda mimosifolia*** (Jacaranda)	M	5.1	2.25	3.5	Proposed low kerb offset 1.9 metres north (within steep embankment). New path offset 2.3 metres east at RL46.15 & 2.5 metres south at RL 46.625 (close to existing grade). New retaining wall offset 5 metres south	Excavation & compaction for sub-grade of new pathways may result in some root damage leading to some adverse impact.	Retain in accordance with recommended Tree Protection Measures. Undertake excavations for pavement sub-grade & kerb in accordance with Section 12.6.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Id. No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Critical Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
65	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	7.8	2.8	5.3	New path offset 1.7 metres south & 4.7 metres west, new low kerb offset 4.1 metres north. Excavations & compaction for pavement sub-grade within TPZ.	Excavation & compaction for sub-grade of new pathways may result in some root damage leading to some adverse impact.	Retain in accordance with recommended Tree Protection Measures.Undertake excavations for pavement sub-grade & kerb in accordance with Section 12.6.
66	***Olea africana*** (African Olive)	M	4.0	2.25	2.7	Located within footprint of proposed building/patio area	Proposed works will necessitate removal.	Remove tree
67	***Jacaranda mimosifolia*** (Jacaranda)	M	3.3	1.85	2.2	Located within footprint of proposed pathway	Proposed works will necessitate removal.	Remove tree
68	***Araucaria columnaris*** (Cook's Pine)	M	5.7	2.4	3.9	Located in close proximity to new building.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
69	***Acer negundo*** (Box Elder)	M	7.7	2.65	5.2	Proposed new retaining wall & stairs offset 2.6 metres east. Excavations for wall footings within CRZ.	May result in severance and damage to woody roots, resulting in an adverse impact.	Retain in accordance with recommended Tree Protection Measures. Undertake excavations for wall foundations in accordance with Section 12.6.
70	***Callistemon salignus*** (Willow Bottlebrush)	M	2.1	1.3	1.4	No proposed works within TPZ	No adverse impact. Proposed to be removed to accommodate new landscape and planting.	Remove tree
71	***Eucalyptus microcorys*** (Tallowwood)	P	6.0	2.4	4.1	No proposed works within TPZ. Proposed building offset 6.6 metres east.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures.
72	***Eucalyptus microcorys*** (Tallowwood)	P	6.5	2.5	4.4	No proposed works within TPZ. Proposed building offset 6.9 metres east.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures.
73	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	2.7	1.6	1.8	No proposed works within TPZ	No adverse impact.	Retain in accordance with recommended Tree Protection Measures.
74	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	2.7	1.6	1.8	No proposed works within TPZ	No adverse impact.	Retain in accordance with recommended Tree Protection Measures.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Id. No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Critical Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
75	***Erythrina crista-galli*** (Cockscomb Coral)	M	3.5	1.85	2.3	No proposed works within TPZ. Canopy close to building envelope.	Significant pruning required to clear building & Temp scaffolding. Proposed works will necessiate removal	Remove tree
76	***Acer negundo*** (Box Elder)	M	3.3	1.85	2.2	No proposed works within TPZ. Canopy close to building envelope.	Significant pruning required to clear building & Temp scaffolding. Proposed works will necessiate removal	Remove tree
77	***Jacaranda mimosifolia*** (Jacaranda)	M	2.4	1.3	1.6	No proposed works within TPZ	No adverse impact.	Retain in accordance with recommended Tree Protection Measures.
78	***Melaleuca bracteata*** (Melaleuca)	M	2.3	1.3	1.5	No proposed works within TPZ	No adverse impact. To be removed (close to proposed new building)	Remove tree
79	***Jacaranda mimosifolia*** (Jacaranda)	M	2.1	1.3	1.4	No proposed works within TPZ	No adverse impact. To be removed (close to proposed new building)	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
80	***Harpephyllum caffrum*** (Kaffir Plum)	M	4.8	2.2	3.3	No proposed works within TPZ	No adverse impact. To be removed (close to proposed new building)	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
81	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	3.8	1.85	2.6	Located within footprint of proposed paved area (forecourt)	Proposed works will necessitate removal.	Remove tree
81a	***Callistemon salignus*** (Willow Bottlebrush)	M	2.2	1.65	1.5	Located close to footprint of proposed paved area (forecourt) & stairway	Proposed works will necessitate removal.	Remove tree
82	***Gleditsia triacanthos*** (Honey Locust)	M	2.3	1.3	1.5	Located within footprint of proposed pathway/stairs	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
83	***Ulmus parvifolia*** (Chinese Elm)	M	3.5	1.3	2.4	Located within footprint of proposed pathway	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
84	***Prunus sp.*** (Ornamental Peach)	M	3.2	1.6	2.1	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Id. No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Critical Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
85	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	5.0	2.5	3.4	Located within footprint of proposed building.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
86	***Grevillea robusta*** (Silky Oak)	M	2.4	1.4	1.6	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree
87	***Fraxinus*** **'Raywood'** (Claret Ash)	M	3.9	1.9	2.7	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree
88	***Jacaranda mimosifolia*** (Jacaranda)	M	4.5	2.1	3.1	Located within footprint of proposed roadway.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
88b	***Gleditsia triacanthos*** (Honey Locust)	M	3.5	1.65	2.4	Located within footprint of proposed roadway.	Proposed works will necessitate removal.	Remove tree
89	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	4.2	2.25	2.9	Located within footprint of proposed roadway.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
90	***Acer negundo*** (Box Elder)	M	4.2	2.1	2.9	Located within footprint of proposed roadway.	Proposed works will necessitate removal.	Remove tree
91	***Quercus palustris*** (Pin Oak)	M	8.4	1.6	5.7	Located within footprint of proposed building.	Proposed works will necessitate removal.	Proposed works will necessitate removal (High Retention Value).
92	***Phoenix canariensis*** (Canary Island Palm)	G	4.8	2.75	3.3	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree
93	***Prunus sp.*** (Ornamental Peach)	M	3.5	1.85	2.3	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree
94	***Prunus cerasifera*** **'Nigra'** (Ornamental Plum)	M	2.4	1.3	1.6	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree
95	***Prunus cerasifera*** **'Nigra'** (Ornamental Plum)	M	2.3	1.3	1.5	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

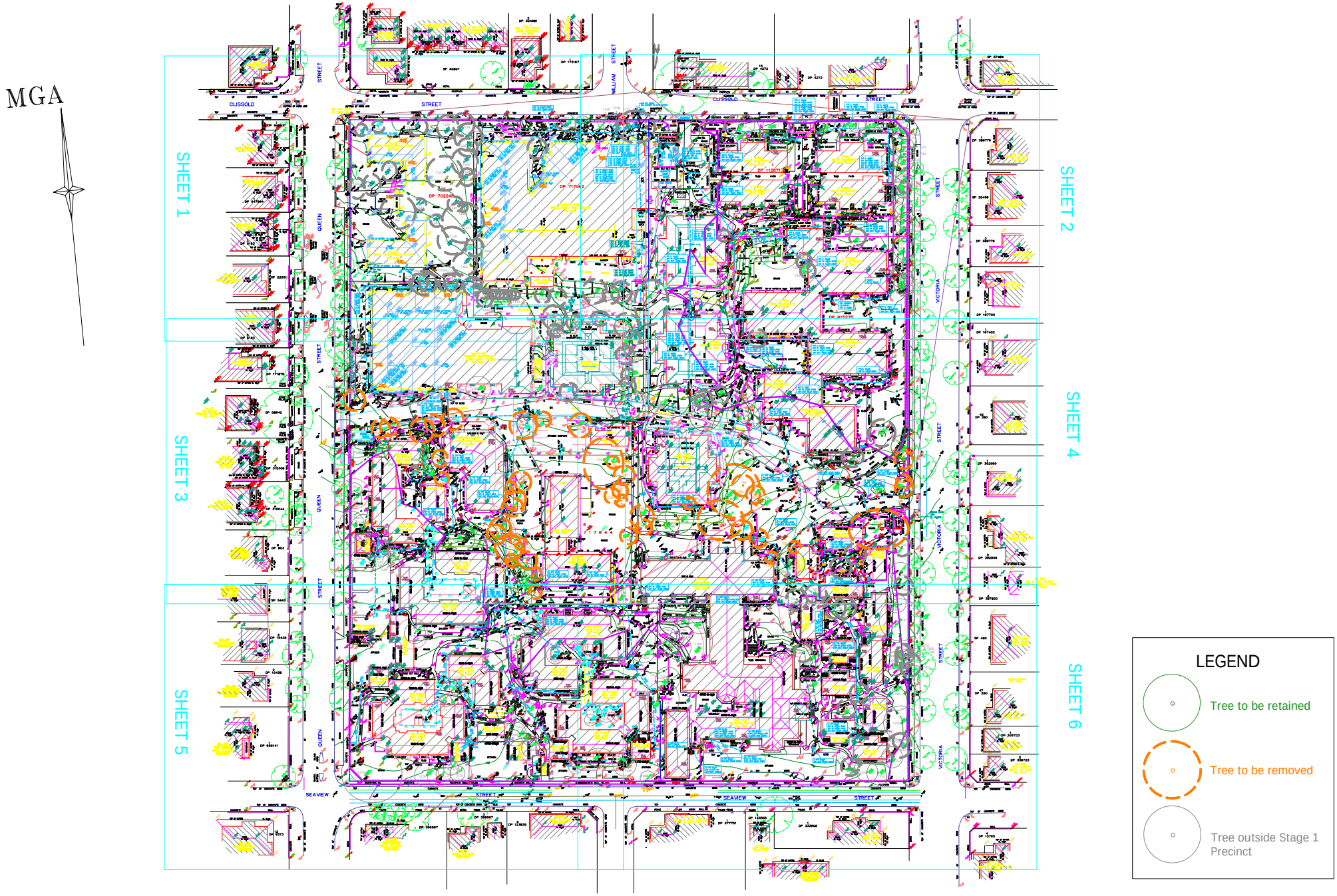
Id. No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Critical Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
96	***Prunus cerasifera* 'Nigra'** (Ornamental Plum)	M	2.4	1.3	1.6	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree
97	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	6.6	2.7	4.5	Proposed new roadway offset 2.3 metres south (within footprint of existing roadway). Excavation & compaction for pavement sub-grade & kerbs within TPZ.	Unlikely to result in any adverse impact	Retain in accordance with recommended Tree Protection Measures. Demolish existing roadway and kerb in accordance with Section 12.5. Undertake excavations for pavement sub-grade & kerb in accordance with Section 12.6.
98	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	7.0	3.2	4.8	Proposed new roadway offset 2.3 metres south (within footprint of existing roadway). Excavation & compaction for pavement sub-grade & kerbs within TPZ.	Unlikely to result in any adverse impact	Retain in accordance with recommended Tree Protection Measures. Demolish existing roadway and kerb in accordance with Section 12.5. Undertake excavations for pavement sub-grade & kerb in accordance with Section 12.6.
99	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	7.0	3.1	4.8	Proposed new roadway offset 2.1 metres south (within footprint of existing roadway). Excavation & compaction for pavement sub-grade & kerbs within TPZ.	Unlikely to result in any adverse impact. Minor canopy pruning may be required to clear temporary scaffolding.	Retain in accordance with recommended Tree Protection Measures. Demolish existing roadway and kerb in accordance with Section 12.5. Install Tree protection fence in accordance with Section 12.2. Undertake canopy pruning in accordance with Section 12.10.
100	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	7.0	3.15	4.8	Proposed basement offset 5.4 metres NW. Excavations for basement within TPZ.	Extent of incursion to root zone is less than 20% of the TPZ, which is considered within acceptable limits - no adverse impact. Minor canopy pruning may be required to clear temporary scaffolding.	Retain in accordance with recommended Tree Protection Measures. Demolish existing roadway and kerb in accordance with Section 12.5. Install Tree protection fence in accordance with Section 12.2. Undertake canopy pruning in accordance with Section 12.10.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Id. No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Critical Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
152	***Melaleuca quinquenervia*** (Broad-leaved Paperbark)	M	5.2	2.5	3.5	Located within proposed footpath	Proposed works will necessitate removal	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
153	***Jacaranda mimosifolia*** (Jacaranda)	M	3.0	1.6	2.0	Located within footprint of proposed roadway.	Proposed works will necessitate removal	Remove tree
154	***Jacaranda mimosifolia*** (Jacaranda)	M	3.3	1.6	2.2	Located within footprint of proposed footpath	Proposed works will necessitate removal	Remove tree
155	***Archontophoenix alexandrae*** (Alexandra Palm)	M	3.5	1.85	2.3	No proposed works within TPZ	No adverse impact	To be retained - no special protection measures required.
155a	***Archontophoenix alexandrae*** (Alexandra Palm)	G	2.0	1.65	1.4	No proposed works within TPZ	No adverse impact	To be retained - no special protection measures required.
155b	***Archontophoenix alexandrae*** (Alexandra Palm)	G	2.8	1.85	1.9	No proposed works within TPZ	No adverse impact	To be retained - no special protection measures required.
156	***Gleditsia triacanthos*** (Honey Locust)	M	3.5	1.85	2.3	Proposed retaining walls offset 1 metre north, east & SW. Excavations for wall foundations within CRZ.	Proposed works will necessitate removal	Undertake replacement planting elsewhere within the site order to compensate for loss of amenity.
156a	***Gleditsia triacanthos*** (Honey Locust)	M	3.0	1.3	2.0	Located within footprint of proposed roadway.	Proposed works will necessitate removal	Remove tree
157	***Photinia x fraseri* 'Robusta'** (Chinese Hawthorn)	M	3.8	1.85	2.6	Located within footprint of proposed driveway ramp	Proposed works will necessitate removal	Remove tree
157a	***Archontophoenix alexandrae*** (Alexandra Palm)	G	3.4	19.8	2.3	Located in close proximity to proposed driveway ramp	Proposed works will necessitate removal	Remove tree
159	***Gleditsia triacanthos*** (Honey Locust)	M	2.5	1.6	1.7	No proposed works within TPZ	No adverse impact	To be retained - no special protection measures required.
160	***Gleditsia triacanthos*** (Honey Locust)	M	4.5	1.6	3.1	No proposed works within TPZ	No adverse impact	To be retained - no special protection measures required.

APPENDIX 5 - IMPACT ASSESSMENT SCHEDULE

Id. No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Critical Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
161	***Jacaranda mimosifolia*** (Jacaranda)	M	4.4	2.1	3.0	No proposed works within TPZ	No adverse impact	To be retained - no special protection measures required.



APPENDIX 6 TREE LOCATION PLAN
STAGE 1 - VILLAGE GREEN PRECINCT
CARDINAL FREEMAN VILLAGE
137 Victoria Street, ASHFIELD

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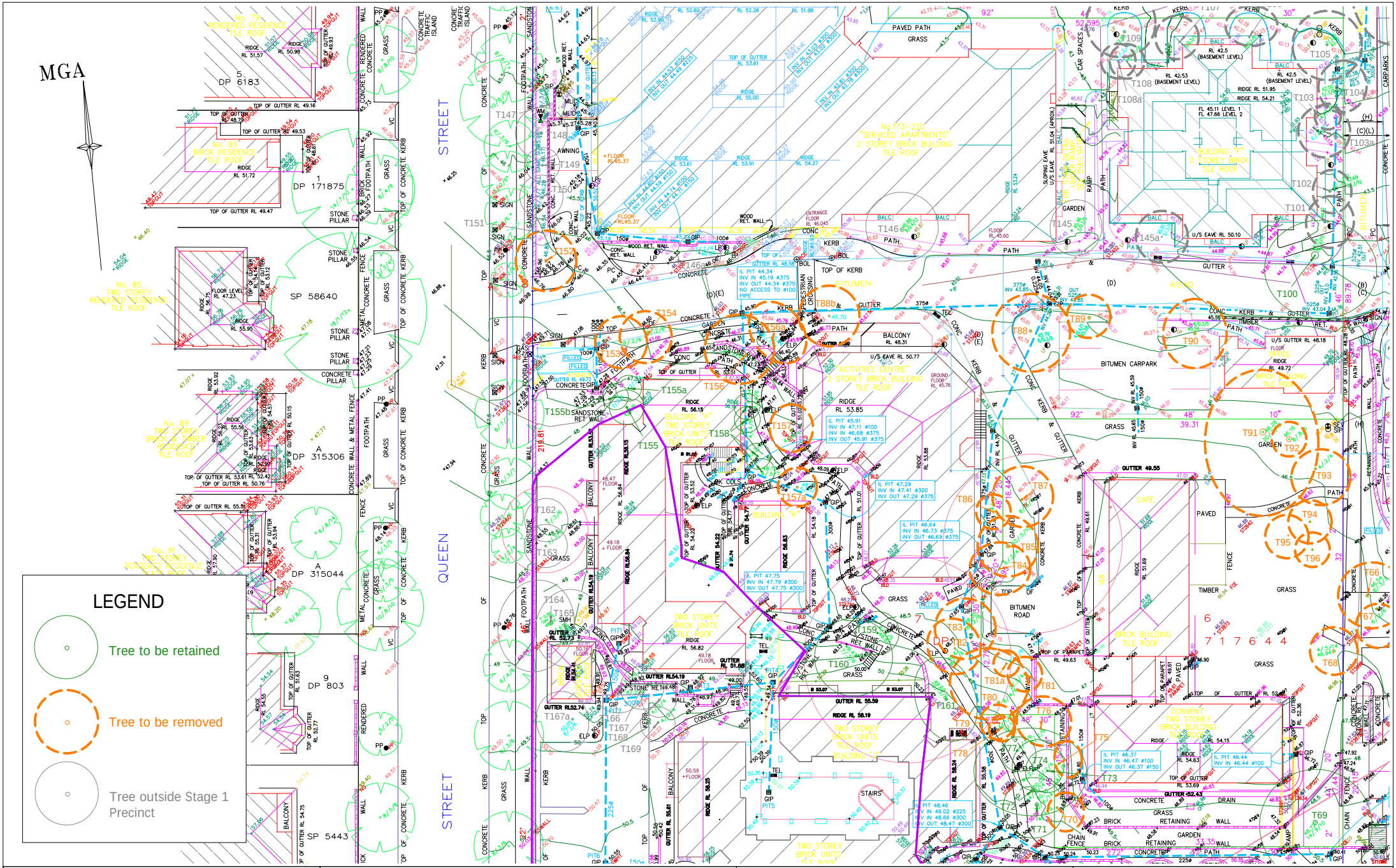
Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 29838DT-D
Dated 18/02/2010

DWG No. TLP 4270 KEY PLAN

DATE: 10/03/2010



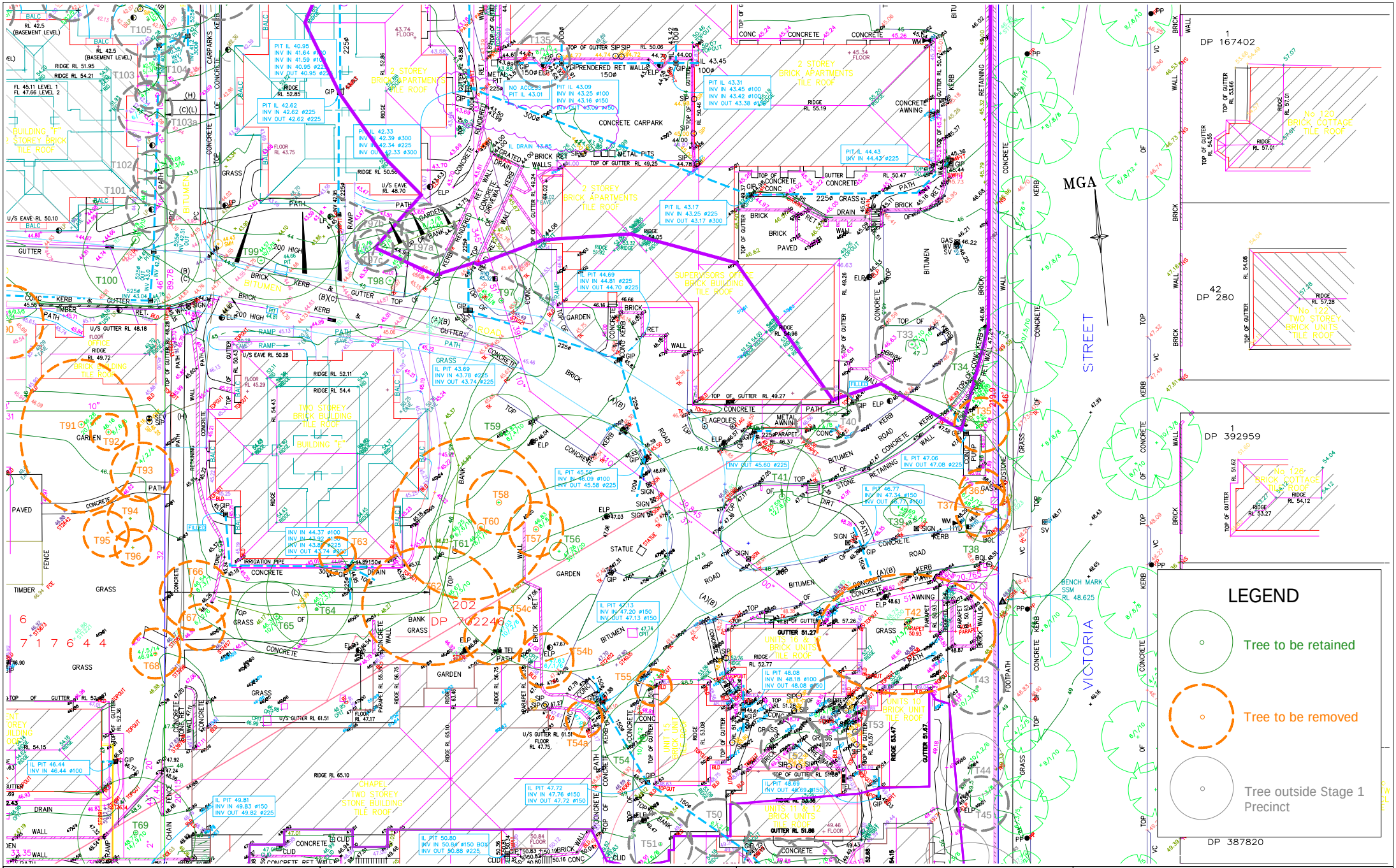
APPENDIX 6 TREE LOCATION PLAN
STAGE 1 - VILLAGE GREEN PRECINCT
CARDINAL FREEMAN VILLAGE
137 Victoria Street, ASHFIELD

Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Lockley Land Title Solutions
Dwg Ref No. 29838DT-D
Dated 18/02/2010

DWG No. TLP 4270 SHEET 3

DATE: 10/03/2010



APPENDIX 6 TREE LOCATION PLAN

STAGE 1 - VILLAGE GREEN PRECINCT

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