Innoviv Park Services
Cowes Foreshore Tourist Park
164 Church Street
Cowes VIC

5 May 2020

C91801

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5 May 2020

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Arboricultural Impact Assessment and Report regarding thirty-five (35) trees located within the vicinity of a proposed development at the Cowes Foreshore Tourist Park.

Dear Andrew,

We are pleased to provide you with the following Arboricultural Impact Assessment and Report regarding the Cowes Foreshore Tourist Park.

Complete use of this report is authorised under the conditions limiting its use as stated in Appendix A Item7 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,

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Executive Summary

1.1.1 The following Arboricultural Impact Assessment and Report regards thirty-five (35) trees located within the grounds of Cowes Foreshore Tourist Park. The subject site was identified by the client as possessing trees that may be impacted by a proposed development.

1.1.2 In part, the project scope was to nominate subject trees that can be retained, or require removal to facilitate this development, as well as identify and reduce potential conflicts between subject trees and site development. Accurate information on the area required for tree retention and methods/techniques suitable for tree protection during construction have been provided.

1.1.3 An arborist inspection of the subject trees was undertaken on 20 March 2020, where tree and site data were collected.

1.1.4 Tree retention values have been determined based upon the assessment of the trees’ health, structure, dimensions, age class, life expectancy, location and environmental amenity/significance in accordance with British Standard BS 5837–2012: Trees in Relation to Design, Demolition and Construction.

1.1.5 The Tree Protection Zone (TPZ) method has been derived from Australian Standard AS 4970–2009: Protection of Trees on Development Sites. The TPZ is defined as a specified area above and below ground and at a given distance measured radially away from the centre of the tree’s trunk and which is set aside for the protection of its roots and crown.

1.1.6 One (1) tree was of a Category A (High) Retention Value. Typically, trees in this category were of a significant size in the landscape, possess fair to good health and structure, a useful life expectancy (ULE) of more than 25 years, made significant amenity contributions to the landscape and made high environmental contributions. Category A retention value tree was numbered 125.

1.1.7 Fourteen (14) trees were of a Category B (Moderate) retention value. Trees in this category were typically of a medium size, had good to fair health and good to fair structure, and a useful life expectancy (ULE) of more than 15 years. Moderate Retention Value trees made moderate amenity contributions to the landscape, and made low to moderate environmental contributions. Category B retention value trees were numbered 1, 6, 25, 28, 37, 40, 41, 114, 118, 119, 120, 121, 124 and 127.

1.1.8 Eleven (11) trees were of Category C (Low) Retention Value. Trees in this category were typically of small–medium size, of low significance in the landscape, may have poor health and/or structure, are easily replaceable and do not warrant design consideration. Category C Retention Value trees were numbered 2, 3, 4, 27, 29, 30, 31, 34, 35, 112 and 113.

1.1.9 Nine (9) trees were of Category U (None) retention value. Trees in this category were typically of poor health and/or structure and/or of an undesirable species and were recommended for removal irrespective of site development. Category U retention value trees were numbered 5, 7, 8, 26, 32, 33, 36, 38 and 39.

1.1.10 Trees 1, 6, 28 and 37 were Category B Retention Value trees that would require removal to facilitate this development.

1.1.11 Trees 2, 3, 4, 27, 29, 34 and 35 were Category C Retention Value trees that would require removal to facilitate this development.

1.1.12 Tree 40 tree was recommended to be retained with specific protection measures during the proposed development.

1.1.13 Trees 25, 30, 31, 41, 112, 113, 114, 118, 119, 120, 121, 124, 125 and 127 were recommended to be retained with generic protection measures during the proposed development.
2 Introduction

2.1.1 ArborSafe Australia Pty Ltd was engaged by Mr Andrew Chapman on behalf of Innoviv Park Services to complete an Arboricultural Impact Assessment and Report on thirty-five (35) trees located within the Cowes Foreshore Tourist Park.

2.1.2 The site was located within the tourist park grounds (entrance area) and included existing lawn areas and gardens.

2.1.3 The report has been requested as part of a Development Application (DA) that involves the construction of a new car park and recreation area comprising of a jumping pillow and pool.

2.1.4 The report was intended to provide information on trees which may be impacted upon by the proposed development. Report findings and recommendations provided are based upon guidance provided within Australian Standard AS 4970–2009: Protection of Trees on Development Sites.

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

3 Scope

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

3.1.2 Inspect the nominated trees and their growing environment in the context of the proposed development.

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 independent recommendations on the retention value of the trees.

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

3.1.6 Review the proposed development in the context of the Bass Coast Shire Planning Scheme (2020).

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

3.1.8 Provide information on restricted activities within the area nominated for tree protection, as well as suitable construction methods to be adopted during construction.
4 Methodology

4.1 Data Collection

4.1.1 Ido Monk of ArborSafe Australia Pty Ltd carried out a site inspection of the subject trees on 20 March 2020.

4.1.2 Trees that are the subject of this report were identified during discussions with the client and a review of the Tree Removal Site Plan supplied by Green Hill Design.

4.1.3 The subject trees were inspected from ground level. No foliage or soil samples were taken. No aerial or internal investigations were undertaken.

4.1.4 Tree height and canopy width were estimated and have been provided to the nearest whole metre. Trunk diameter at breast height (DBH) was measured with a diameter tape and provided to the nearest centimetre.

4.1.5 In this report, the term ‘Native’ relates to a species originating within Australia as a whole but not necessarily the subject area, ‘Indigenous’ relates to a species originating within Australia as a whole and the subject area is within its natural range, ‘Exotic’ relates to a species originating from outside Australia.

4.1.6 Data collected on site was analysed against the supplied development documentation by Nick Arnold of ArborSafe Australia Pty Ltd, following which relevant recommendations were formulated and collated into report format.

4.2 Images and Site Photographs

4.2.1 All photographs were taken at the time of the site inspection by Ido Monk. Photographs have been altered for brightness and/or cropped only. Other images used within this report have been sourced from ArborSite or via the internet. The source of all images has been referenced accordingly.

5 Observations

5.1 Site Details

5.1.1 The site was located within the grounds of Cowes Foreshore Tourist Park (Figure 1). Specifically, the area designated in this report was located to the south of the site adjacent to the Church Street entrance and central park driveway running north, Kedah Road.

5.1.2 The site was located within the Bass Coast Shire Council Local Government Area (LGA).

5.1.3 Usage surrounding the site was a mixture of administration buildings, camping areas and cabins, open lawn areas and asphalt driveways.

5.1.4 Site soils are likely to be disturbed given the sites urban setting and altered from their natural soil profiles.
5.2 Heritage Status

5.2.1 The Bass Coast Planning Scheme – Local Provision (Heritage Overlay, 2020) was not found to show any associated heritage items, overlays within the subject site (Figure 2).
5.3 Proposed Construction

5.3.1 Plans of the existing site (Figure 3) and of the proposed development were provided to ArborSafe in March 2020 and include:


5.3.2 The proposed development has been reviewed and in summary consists of the creation of additional asphalted parking space and a recreation area consisting of an enclosed jumping pillow/swimming pool area to the south and west of the existing reception building.

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

5.4 The Subject Trees

5.4.1 Thirty-five (35) trees were inspected and are the subject of this report. Complete attributes for each tree can be found in Appendix C – Tree Assessment Data of this report.

5.4.2 The project scope has been used in conjunction with the Bass Coast Shire Planning Scheme to identify subject trees within the site that require inclusion into the report.

5.4.3 Pursuant with the Bass Coast Shire Planning Scheme – Clause 52.17 Native Vegetation, all significant site trees within the proposed development area have been included within the scope of this report. Small trees/shrubs within the site may have been omitted from the report based on their species, current size and/or potential future size and contribution to local amenity.
5.4.4 The subject trees were considered to have all been planted within the site as opposed to being remnant specimens. This assumption is based on the trees’ current size (larger Eucalyptus trees are native to Western Australia i.e.: *E. gomphocephala*), age class (majority are Semi-mature, taken in context of duration of site use as a camping area), species type (area is technically within some tree species growth range however they would not typically be associated with the immediate area) and location within the site (the majority are strategically placed within site).

5.4.5 Subject trees form part of the existing ArborSite Tree Management System for the entire Cowes Foreshore Tourist Park and as such have been tagged, positioned on aerial imagery and visually assessed annually since 2018.

5.4.6 For continuity’s sake the subject trees have been numbered in line with the existing ArborSite tree numbering system. Trees can be identified on site using tree tags which are typically located at approximately 2.0m from ground level on the south side of the trunk. Trees located on neighbouring properties have not been tagged.

5.4.7 As these subject trees form part of a previous survey undertaken for the entire site, trees are numbered between Tree 1 and Tree 127 and are shown in Figure 4.

![Site map showing subject trees. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. The red line indicates the proposed development area within the main site. (ArborSite, March 2020).](image-url)
6 Tree Retention Values

6.1 Determining Tree Retention Values

6.1.1 Tree Retention Value has been determined based on a combination of tree attributes. Tree retention value is based on a modified version of the British Standard BS 5837–2012: Trees in Relation to Design, Demolition and Construction. Attributes considered when determining the retention value include tree health, structure and form, life expectancy, suitability of the tree in the context of local landscape. Arboricultural, Cultural, Environmental and Heritage significance are all also considered within the subcategories identified.

6.1.2 Collectively tree attributes are reviewed and used to categorise tree value in a development context. Additional information explaining Tree Retention Value can be found in Appendix B – Explanation of Tree Assessment Terms.

6.2 Category A Trees (High Retention Value)

6.2.1 One (1) tree, numbered 125, was determined to be Category A (High) Retention Value tree and is shown in Figure 5. Typically trees in this category are of high quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years. The tree may make significant amenity contributions to the landscape and may make high environmental contributions. In some cases, trees within this category may not meet the above criteria, however possess significant heritage or ecological value. Trees of this retention value warrant design consideration and amendment to ensure their viable retention.

Figure 5. Aerial image showing location of High Retention Value Tree. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. (ArborSite, March 2020).
6.2.2 Tree 125 (Figure 6) was identified as a mature *Corymbia maculate* (Spotted Gum) and was observed to be in good health with good structure and provided significant amenity and landscape value. The tree had an estimated useful life expectancy of 25–50 years.

6.2.3 The tree protection zone (TPZ) for Tree 125 was 7.4m which is measured at a radial distance from the centre of the trunk.

![Figure 6. View of Tree 125 in its growing environment, Cowes Foreshore Tourist Park. (Ido Monk, 20 March 2020).](image-url)
6.3  Category B Trees (Moderate Retention Value)

6.3.1 Fourteen (14) trees were considered to have a Category B (Moderate) Retention Value and are shown in Figure 7. Typically trees in this category were of moderate quality with an estimated remaining life expectancy of 15–25 years and prominence of size dimensions that cannot be readily replaced within 10 years. They may make moderate amenity contributions to the landscape and make low/moderate environmental contributions. Trees with this retention value warrant minor design consideration in an attempt to allow for their retention.

6.3.2 Category B retention value trees were numbered 1, 6, 25, 28, 37, 40, 41, 114, 118, 119, 120, 121, 124 and 127.

Figure 7. Aerial image showing location of Moderate Retention Value Trees. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. (ArborSite, March 2020).
6.3.3 Tree 1 (Figure 8) was identified as a semi mature *Eucalyptus botryoides* (Southern Mahogany) that was observed to have been in good health with fair structure and provided significant amenity and landscape value. The tree had an estimated useful life expectancy of 15–25 years (see Figure 8).

6.3.4 The TPZ for Tree 1 was 6.1m which is measured at a radial distance from the centre of the trunk.

![Figure 8. View of Tree 1 in its growing environment, Cowes Foreshore Tourist Park. (Ido Monk, 20 March 2020).](image)

6.3.5 Tree 25 was identified as a semi mature *Eucalyptus globulus* (Southern Blue Gum) that was observed to have been in fair health with fair structure and provided significant amenity and landscape value. The tree had an estimated useful life expectancy of 10–15 years.

6.3.6 The TPZ for Tree 25 was 7.6m which is measured at a radial distance from the centre of the trunk.

6.3.7 Tree 28 was identified as a semi-mature *Fraxinus angustifolia* ssp. *oxycarpa* ‘Raywood’ (Claret Ash). The tree was observed to have been in good health with fair structure and provided significant amenity and landscape value. The tree had an estimated useful life expectancy of 15–25 years.

6.3.8 The TPZ for Tree 28 was 3.7m which is measured at a radial distance from the centre of the trunk.
6.3.9 Tree 41 (Figure 9) was identified as a semi-mature *Corymbia maculata* (Spotted Gum) that was observed to be in good health with fair structure and provided significant amenity and landscape value. The tree had an estimated useful life expectancy of 15–25 years.

6.3.10 The TPZ for Tree 41 was 7.0m which is measured at a radial distance from the centre of the trunk.

Figure 9. View of Tree 41 in its growing environment, Cowes Foreshore Tourist Park. (Ido Monk, 20 March 2020).
6.3.11 Tree 127 (Figure 10) was identified as a mature *Corymbia maculata* (Spotted Gum) that was observed to be in good health with poor structure (requiring the inspection of branch support hardware) and provided significant amenity and landscape value. The tree had an estimated useful life expectancy of 10–15 years.

6.3.12 The TPZ for Tree 127 was 10m which is measured at a radial distance from the centre of the trunk.

Figure 10. View of Tree 127 in its growing environment, Cowes Foreshore Tourist Park. (Ido Monk, 20 March 2020).
6.4 Category C Trees (Low Retention Value)

6.4.1 Eleven (11) trees were identified as being Category C (Low) Retention Value trees and are shown in Figure 11. Trees in this category were of low quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable, may have poor health and/or structure or are of an undesirable species and do not warrant design consideration.

6.4.2 Category C retention value trees were numbered 2, 3, 4, 27, 29, 30, 31, 34, 35, 112 and 113.

Figure 11. Aerial image showing location of Low Retention Value Trees. Note that icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. (ArborSite, March 2020).
6.4.3 Tree 112 (Figure 12) was identified as a juvenile *Lophostemon confertus* (Queensland Box) that was observed to be in good health with fair structure and provided significant amenity and landscape value. The tree had an estimated useful life expectancy of 15–25 years.

6.4.4 The TPZ for Tree 112 was 2.0m which is measured at a radial distance from the centre of the trunk.

6.4.5 Tree 113 (Figure 12) was identified as a juvenile *Ulmus glabra ‘Lutescens’* (Golden Scotch Elm) that was observed to be in good health with fair structure and provided moderate level amenity and landscape value. The tree had an estimated useful life expectancy of 15–25 years.

6.4.6 The TPZ for Tree 113 was 2.0m which is measured at a radial distance from the centre of the trunk.

![Figure 12. View of Trees 112 and 113 in their growing environment, Cowes Foreshore Tourist Park. (Ido Monk, 20 March 2020).](image-url)
6.5 Category U Trees (Unsuitable for Retention)

6.5.1 Nine (9) trees were found to be in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than five years. These trees may be dead and/or of a species recognised as a weed that resulted in them being unretainable. These trees should be removed irrespective of any future development on the site and are shown in Figure 13.

6.5.2 Category U Trees were numbered 5, 7, 8, 26, 32, 33, 36, 38 and 39.

![Aerial image showing location of Remove Retention Value Trees (Nil/No Retention Value). Note icon colour indicates trees current risk rating (not Retention Value). Tree attributes are to be obtained from Appendix C – Tree Assessment Data. (ArborSite, March 2020).](image)

6.5.3 Tree 39 was identified as a semi-mature *Eucalyptus viminalis* ssp. *viminalis* (Manna Gum) that was observed to be in fair health with poor structure. The poor structure related to multiple compounding defects such as significant borer damage, decay, previous failures, cavity, wounds, dieback and weak included unions. The tree had an estimated useful life expectancy of less than 5 years and a Likely chance of branch or stem failure within the next 12 months, under the ArborSafe Tree Risk Assessment Matrix.

6.5.4 Tree 38 was identified as a semi-mature *Pittosporum tenuifolium* (Kohuhu) that was observed to be in fair health with poor structure and offered little discernible amenity or landscape value. The tree had an estimated useful life expectancy of less than 5 years.
7 Discussion

7.1 Tree Protection Zones

7.1.1 The TPZ is defined as a specified area above and below ground and at a given distance measured radially away from the centre of the tree’s trunk and which is set aside for the protection of its roots and crown. It is the area required to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development. The radius of the TPZ is calculated by multiplying its trunk DBH by 12.

TPZ radius = DBH × 12 with DBH being nominally measured 1.4m from ground level.

7.1.2 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. SRZ radius = (D × 50)^0.42 × 0.64.

7.1.3 The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) methods have been derived from the Australian Standard AS 4970–2009: Protection of Trees on Development Sites.

7.2 Retention Value

7.2.1 Retention values are determined based upon a revised version of the British Standard BS 5837–2012: Trees in Relation to Design, Demolition and Construction (The British Standards Institution, 2012) and as such is to be viewed as a tool to aid in the categorisation of the subject trees. The standard categorises tree retention value based upon assessment of the tree’s quality (health and structure), and life expectancy. Other criteria such as its physical dimensions, age class, location and its Amenity, Heritage and Environmental significance are also considered. A breakdown of attributes required for each category can be obtained from Appendix B – Explanation of Tree Assessment Terms.

7.2.2 Under the Bass Coast Planning Scheme, section 52.17 Native trees, subsection 1 - A permit is required to remove, destroy or lop native vegetation, including dead native vegetation. Sub-section 7 – Table of Exemptions states the requirement to obtain a permit does not apply to ‘Native vegetation that is to be removed, destroyed or lopped that was either planted or grown as a result of direct seeding’. All subject trees contained within this report are assumed to have been planted and as such would fall within the exemption parameters.

7.3 Major and Minor TPZ Encroachment

7.3.1 As per the Australian Standard AS 4970–2009: Protection of Trees on Development Sites, a major encroachment into the TPZ of any tree is considered to occur when it is beyond 10% of the total TPZ area. A minor encroachment is determined as being less than 10% of the total TPZ area.

7.3.2 The proposed development will significantly impact twenty (20) subject trees and which will require removal as they are located within the development footprint or have major encroachment into their TPZs.

7.3.3 The remaining trees are proposed to incur minor or no encroachment into their TPZ and may be retained with specific, generic or no protection requirements throughout the construction stage.
7.4  Impact of Proposed Development

7.4.1  A review of the proposed development (as per the supplied documents listed in Section 5.4) has been undertaken in the context of tree retention and removal in relation to the subject trees. The proposal includes the construction of additional car parking and recreation space consisting of a jumping pillow and pool area.

7.4.2  The development will affect three (3) site trees through encroachment via excavation into their TPZs, i.e. Trees 1, 26 and 40.

7.5  TPZ Encroachment

7.5.1  Tree 1 has a proposed major encroachment into its TPZ. This encroachment is estimated to be greater than 20% of its TPZ area. Loss of tree health and potential effects of tree stability have therefore deemed this tree unviable for future retention. This tree requires removal to facilitate construction of the proposed design.

7.5.2  Tree 26 is a Category U tree and has been recommended for removal irrespective of future development.

7.5.3  Tree 40 has a proposed minor encroachment into its TPZ. The area of encroachment is estimated to be less than 10% of its TPZ area. This tree can be retained with little or no effect on tree health or stability, providing sensitive construction measures are adhered to during construction.

7.6  Proposed Pruning

7.6.1  It is anticipated that minor pruning only will be required (of no greater than 10% of a tree’s total crown mass) to selected trees to be retained during construction.

7.7  Additional Excavation/Trenching within TPZs

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

7.7.2  Excavation/trenching within the TPZ of retained trees should be undertaken using sensitive construction methods such as manual excavation, hydro-vac or air spade.
8 Recommendations

8.1 Tree Removal

8.1.1 Eleven (11) subject trees will require removal to facilitate this development, i.e. Trees 1, 2, 3, 4, 6, 27, 28, 29, 34, 35 and 37.

8.1.2 Nine (9) trees were considered unsuitable for retention (Category U) and as such were recommended for removal irrespective of future development on the site, i.e. Trees 5, 7, 8, 26, 32, 33, 36, 38 and 39.

8.1.3 Of the twenty (20) trees recommended for removal seven (7) trees were exotic species (Trees 7, 8, 26, 27, 28, 29 and 38), five (5) trees were native species originating from Western Australia (Trees 2, 3, 34, 36 and 37) and eight (8) trees were indigenous species whose natural growth range extended to the subject area (Trees 1, 4, 5, 6, 32, 33, 35 and 39).

8.1.4 Tree Replacement

8.1.5 It is recommended that trees requiring removal be replaced (on a one-to-one basis) elsewhere on site with Australian native tree species of comparable form and stature upon maturation.

8.1.6 Newly planted trees will likely require maintenance and after planting care for a period of 2–3 years to ensure successful establishment. Mitigation plantings failing during this establishment period are to be removed and replaced (like for like). Refer to Section 8.12 of this report for further guidance.

8.2 Tree Retention

8.2.1 One (1) tree, numbered 40 was recommended for retention and requires specific protection measures during construction to ensure it remains viable following the completion of works. The TPZ of Tree 40 should be extended to both the north and west (in a manner contiguous with the existing TPZ) to offset any proposed encroachment (<10% of total TPZ). In addition, arborist supervision of intended excavations within the TPZ (>10% of total TPZ) will require arborist supervision.

8.2.2 Fourteen (14) trees are recommended to be retained with generic protection measures, i.e. Trees 25, 30, 31, 41, 112, 113, 114, 118, 119, 120, 121, 124, 125 and 127.

8.2.3 Excavation within the TPZ of any retained subject tree is to be carried out only under arborist supervision. No excavation should occur within the SRZ of any tree. It is recommended that the proposed excavation commence at the outer extent of the TPZ and move inwards to minimise root damage to retained trees.

8.2.4 Works within the TPZ should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:

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

8.2.5 Machine excavation should be prohibited within the TPZs of retained trees unless undertaken at the direct consent from the project arborist.

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

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

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

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

8.4 **Protection and Reporting Measures During Construction**

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

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

8.5 **Activities Prohibited within the TPZ**

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

8.6.1 Protective fencing is to be installed around all retained trees for the extent of its TPZ (or as much as is practicable). Fencing should be erected as per Figure 14 before any machinery or materials are brought to site and before commencement of works (including demolition).

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

8.6.3 Once erected, protective fencing must not be removed or altered without approval from the project arborist and be secured to restrict access.

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

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

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

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

Figure 14. Depicts standard fencing techniques. (AS 4970–2009).
8.7 Trunk and Ground Protection

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

8.7.2 Where construction access into the TPZ of retained trees cannot be avoided, the root zone of each tree must be protected using either steel plates or rumble boards strapped over mulch/aggregate until such a time as permanent above ground surfacing (cellular confinement system or similar) is installed as shown in Figure 15.

8.7.3 Trunk and ground protection should be undertaken in accordance with the Australian Standard AS 4790–2009: Protection of Trees on Development Sites as per the image below:

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

Figure 15. Depicts trunk and ground protection techniques. (AS 4970–2009).
8.8  **Tree Protection Signs**

8.8.1  Signs identifying the TPZ should be placed at 10m intervals around the edge of the TPZ and should be visible from within the development site. An example is shown below in Figure 16.

![Tree Protection Zone Sign](image)

**Figure 16.** Depicts standard fencing techniques. (AS 4970–2009).

8.9  **Project Arborist**

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

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

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

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

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

8.11 Compliance Reporting

8.11.1 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.

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

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

8.11.4 The reports and Compliance Statements shall be submitted to the project manager (as well as the clients’ nominated representative) following each inspection.

8.11.5 Reports and any Non-Compliance Statements shall be submitted to the project manager (as well as the clients’ nominated representative) if tree protection conditions have been breached. Reports should contain clear remedial action specifications to minimise any adverse impact on any affected subject tree.

8.12 Offset Tree Planting

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

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

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

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

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

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

9 References

10.1 **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.
10.2 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.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young</td>
<td>Newly planted tree not fully established may be capable of being transplanted or easily replaced.</td>
</tr>
<tr>
<td>Juvenile</td>
<td>Tree is small in terms of its potential physical size and has not reached its full reproductive ability.</td>
</tr>
<tr>
<td>Semi-mature</td>
<td>Tree in active growth phase of life cycle and has not yet attained an expected maximum physical size for its species and/or its location.</td>
</tr>
<tr>
<td>Mature</td>
<td>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.</td>
</tr>
<tr>
<td>Senescent</td>
<td>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.</td>
</tr>
</tbody>
</table>

Health: Summarises the health and vigour of the tree.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>Canopy full with dense foliage coverage 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.</td>
</tr>
<tr>
<td>Good</td>
<td>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.</td>
</tr>
<tr>
<td>Fair</td>
<td>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/dieback, and epicormic growth.</td>
</tr>
<tr>
<td>Poor</td>
<td>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.</td>
</tr>
<tr>
<td>Dead</td>
<td>No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches.</td>
</tr>
</tbody>
</table>
Table 1. ArborSafe Structure Descriptors

**Structure:** Summarises the structure of the tree from roots to crown.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>Good form and branching habit. Minor structural defects that are insignificant and typical or common within the species. e.g. included bark, co-dominant stems. No fungal pathogens present. No visible wounds to the trunk and/or root plate.</td>
</tr>
<tr>
<td>Fair</td>
<td>Moderate structural defects present that impact longevity e.g. apical leaders sharing common union(s). Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present. A fair representation of the species.</td>
</tr>
<tr>
<td>Poor</td>
<td>Significant structural defects present that have a significant impact on longevity and result in a poor representation of the species e.g. Branch/stems with included bark with failure likely within 0–5 years. Wounding evident with cavities and/or decay present. Damage to structural roots.</td>
</tr>
<tr>
<td>Hazardous</td>
<td>Serious structural defects with failure determined to be imminent (&lt;12 months). Defects may include active splits and/or partial branch or root plate failures. Tree requires immediate arboricultural works to alleviate the associated risk.</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Category:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–5 Years</td>
</tr>
<tr>
<td>5–10 Years</td>
</tr>
<tr>
<td>10–20 Years</td>
</tr>
<tr>
<td>20–30 Years</td>
</tr>
<tr>
<td>30–50 Years</td>
</tr>
<tr>
<td>&gt;50 Years</td>
</tr>
</tbody>
</table>
### Tree Retention Value: (based upon BS 5837–2012: Trees in relation to design, demolition and construction – recommendations)

<table>
<thead>
<tr>
<th>Category and Definition</th>
<th>Criteria (including sub-categories where appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category U</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Trees in such a condition that they cannot realistically be retained as viable trees in the context of the current land use for longer than 5 years. | • Trees that have a severe structural defect that are not remediable such that their failure is expected within 12 months.  
  • Trees that will become unviable after removal of other Category U trees (e.g. where for whatever reason the loss of companion shelter cannot be mitigated by pruning).  
  • Trees that are dead or are showing signs of significant, immediate and irreversible overall decline.  
  • Trees infected with pathogens of significance to the health and or safety of other trees nearby.  
  • Low quality trees suppressing adjacent trees of better quality.  
  • Noxious weeds or species categorised as weeds within the local area.  

**Note:** Category U trees can have existing or potential conservation value* which might make it desirable to preserve. |

| **Category A**          |                                                       |
| Trees of High Quality with an estimated remaining life expectancy of at least 25 years and of dimensions and prominence that it cannot be readily replaced in <20 years. | Trees that are particularly good examples of their species, especially if rare or unusual (in the wild or under cultivation); or those that are important components of groups or avenues.  
  Trees or groups of significant visual importance as arboricultural and/or landscape features. (e.g. feature and landmark trees).  
  Trees, groups or plant communities of significant conservation, historical, commemorative or other value (e.g. remnant trees, aboriginal scar trees, critically endangered plant communities, trees listed specifically within a Heritage statement of significance). |

| **Category B**          |                                                       |
| Trees of Moderate Quality with an estimated remaining life expectancy of 15–25 years and of dimensions and prominence that cannot be readily replaced within 10 years. | Trees that might be included within Category A but are downgraded because of diminished condition such that they are unlikely to be suitable for retention beyond 25 years.  
  Trees that are visible from surrounding properties and/or the street but make little visual contribution to the wider locality.  
  Trees with conservation or other cultural value (trees within conservation areas or landscapes described within a statement of significance, locally indigenous species). |

| **Category C**          |                                                       |
| Trees of Low Quality with an estimated remaining life expectancy of 5–15 years, or young trees that are easily replaceable. | Trees of very limited value or such impaired condition that they do not qualify in higher categories.  
  Trees offering low or only temporary/transient landscape benefits.  
  Trees with no material conservation or other cultural value. |

*Where trees would otherwise be categorised as U, B or C but have significant identifiable conservation, heritage or landscape value even though only for the short term, they may be upgraded, although they might be suitable for retention only.*
Table 2. Tree Quality

<table>
<thead>
<tr>
<th>Structure</th>
<th>Health**</th>
<th>Excellent/Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Dead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>C</td>
<td>C</td>
<td>U</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>Hazard*</td>
<td>U</td>
<td>U</td>
<td>U</td>
<td>U</td>
<td></td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Tree Code</th>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Height (m)</th>
<th>Diameter (cm)</th>
<th>Crown Spread (cm)</th>
<th>Status</th>
<th>Action</th>
<th>Arborist Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>E3</td>
<td>Eucalyptus globulus</td>
<td>Tuart 1</td>
<td>7.8</td>
<td>28</td>
<td>22.0</td>
<td>Mature</td>
<td>Retain</td>
<td>- 19-03-2020 : idoasafe : Tree assessed. Tree continues to decline, insufficient remaining crown for tree to recover. C 2 Indigenous</td>
</tr>
<tr>
<td>E4</td>
<td>Eucalyptus globulus</td>
<td>Tuart 1</td>
<td>7.8</td>
<td>28</td>
<td>22.0</td>
<td>Mature</td>
<td>Retain</td>
<td>- 19-03-2020 : idoasafe : Tree assessed. Tree continues to decline, insufficient remaining crown for tree to recover. C 2 Indigenous</td>
</tr>
<tr>
<td>E5</td>
<td>Eucalyptus globulus</td>
<td>Tuart 1</td>
<td>7.8</td>
<td>28</td>
<td>22.0</td>
<td>Mature</td>
<td>Retain</td>
<td>- 19-03-2020 : idoasafe : Tree assessed. Tree continues to decline, insufficient remaining crown for tree to recover. C 2 Indigenous</td>
</tr>
</tbody>
</table>

*Note: The table above provides a summary of tree assessment data, including tree codes, botanical names, common names, heights, diameters, crown spreads, statuses, actions, and Arborist Comments. Each tree is evaluated based on its structural integrity and environmental impact.*
<table>
<thead>
<tr>
<th>Tree No.</th>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Trees in group</th>
<th>DBH</th>
<th>Total (cm)</th>
<th>DRB (cm)</th>
<th>Total TPZ (m)</th>
<th>TPZ area (m²)</th>
<th>Radial SRZ (m)</th>
<th>Tree Height (m)</th>
<th>Canopy (m)</th>
<th>Health</th>
<th>Structure</th>
<th>Age</th>
<th>TLE (Yrs.)</th>
<th>Defects</th>
<th>Significance</th>
<th>Arborist comments</th>
<th>Tree Quality</th>
<th>Tree Retention</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>121</td>
<td>Corymbia maculata</td>
<td>Spotted Gum</td>
<td>1</td>
<td>65</td>
<td>68</td>
<td>7.4</td>
<td>133.60</td>
<td>2.8</td>
<td>16.20</td>
<td>10-15</td>
<td>Good</td>
<td>Fair</td>
<td>16-20</td>
<td>Corymbium intermedia (Boothwood)/ Spotted Gum (Eucalyptus)</td>
<td>- 19/10/2020</td>
<td>Arborist - Tree assessed.</td>
<td>B</td>
<td>1</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td>124</td>
<td>Corymbia maculata</td>
<td>Spotted Gum</td>
<td>1</td>
<td>62</td>
<td>79</td>
<td>10.0</td>
<td>311.65</td>
<td>2.9</td>
<td>15.20</td>
<td>10-15</td>
<td>Good</td>
<td>Fair</td>
<td>15-20</td>
<td>Bird browsing damage; Cavity(s); Deadwood/stubs &gt; 60mm; Dieback; Poor pruning; Resin exudation/Kino; Weak union(s); Wound(s); Amenity value/shade; Attractive landscape feature; Branch support hardware</td>
<td>08-11-2018</td>
<td>Remove the two branches with wounding at attachment on south stem.</td>
<td>B</td>
<td>1</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>Corymbia maculata</td>
<td>Spotted Gum</td>
<td>1</td>
<td>83</td>
<td>75</td>
<td>8.8</td>
<td>241.08</td>
<td>3.3</td>
<td>15-20</td>
<td>10-15</td>
<td>Good</td>
<td>Poor</td>
<td>Mature</td>
<td>Bird browsing damage; Co-dominant stems; Crack(s)/Split(s); Deadwood/stubs &lt; 30mm; Dieback; Previous failure(s); Amenity value/shade; Attractive landscape feature; Branch support hardware</td>
<td>- 19/10/2020</td>
<td>Arborist - Tree assessed.</td>
<td>A</td>
<td>1</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
<tr>
<td>127</td>
<td>Corymbia maculata</td>
<td>Spotted Gum</td>
<td>1</td>
<td>73</td>
<td>101</td>
<td>7.0</td>
<td>152.18</td>
<td>3.0</td>
<td>16.20</td>
<td>10-15</td>
<td>Good</td>
<td>Poor</td>
<td>Mature</td>
<td>Bird browsing damage; Co-dominant stems; Crack(s)/Split(s); Deadwood/stubs &lt; 30mm; Dieback; Excessive end weight; Included bark; Pests/Insects; Previous failure(s); Resin exudation/Kino; Weak union(s); Wound(s); Branch support hardware</td>
<td>19-03-2020</td>
<td>Arborist - Tree assessed. Dynamic bracing system installed, rating of brace does not appear adequate for stem diameters. Ensure contractor provides certification of installation detailing rating, correct installation and inspection schedule. Reduction pruning not completed, reduce northern stem by ~20%. Remove lowest south facing scaffold branch.</td>
<td>B</td>
<td>1</td>
<td>Native</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>