



## Terrace Holiday Park: Southern Precinct Arboricultural Impact Assessment



**Terrace Holiday Park  
Brunswick Heads, NSW**

**March 2018**

**C91119**

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Ref: Reflections Holiday Parks – Terrace Holiday Park  
Arboricultural Impact Assessment – Southern Precinct (AIA–SP)

Dear Greg,

We are pleased to provide you with the following Arboricultural Impact Assessment for the Southern Precinct of Terrace Holiday Park, Brunswick Heads. Complete use of this report is authorised under the conditions limiting its use as stated in Item 7 of Appendix A – 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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## 1 Executive Summary

- 1.1.1 Anecdotal evidence indicates that Terrace Holiday Park has been operating as a Holiday Park for more than 80 years. The majority of trees within the Southern Precinct of the Holiday Park are species associated with the Endangered Ecological Community (EEC) of Coastal Callitris Pine Forest (CCPF), namely the *Callitris columellaris* (Coastal Cypress Pines). The CCPF was designated as an EEC in 2008.
- 1.1.2 While it is possible to determine the current overall state of the Coastal Cypress Pine Forest (CCPF) in the NSW North Coast Bioregion, no previous study has been undertaken which would permit an analysis of specific degradation that may have been caused by the current or recent land use within the Terrace Holiday Park.
- 1.1.3 It cannot be determined whether any degradation or decline of individual trees has occurred since the EEC was designated through current site use. It is clear however that natural attrition of older trees and the absence of any significant younger regrowth has resulted in fewer trees on site. The current overall condition of the CCPF within the Southern Precinct is considered fair.
- 1.1.4 Refining site use within the Southern Precinct camping area is likely to enhance the resilience, size and quality of the CCPF and increase the benefits to the community by spreading awareness of this EEC.
- 1.1.5 Reflections Holiday Parks adopted the use of ArborSite Arboricultural management methodology a number of years ago to undertake a tree inspection regime looking at the management of the trees onsite through an analysis of their species, age, health, structure and risk.
- 1.1.6 The current total number of semi-mature and mature trees within the Southern Precinct of the Terrace Holiday Park is 115 trees. This number includes 105 *Callitris columellaris* (Coastal Cypress Pines) which are the dominant tree within the CCPF. The majority of the 115 existing trees located within the Southern Precinct were assessed as being in good health (79) with the remainder being fair (39) or poor (3) during the most recent 2017 ArborSite assessment.
- 1.1.7 This Arboricultural Impact Assessment – Southern Precinct (AIA–SP) has been written for the Southern Precinct of the Terrace Holiday Park with the intention being to enhance, retain and protect the CCPF in the context of a working Holiday Park.
- 1.1.8 This report is divided into two sections. The first discusses the threats, impacts and mitigation strategies on the existing trees within the Southern Precinct. The second focuses on the EEC of CCPF. The mitigation strategies for both are complementary to each other and are brought together within the Recommendations Section on page 21.
- 1.1.9 Within the recommendations of this AIA–SP report, a variety of management techniques have been tabled, such as a reduction in site density, designated site dimensions and sizes, a refining of site usage, specific tree protection measures and the allocation of specific areas to regeneration and assisted regeneration. It is considered with the implementation of these recommendations the CCPF can be enhanced, made more resilient and provide educational benefits for site users for years to come.
- 1.1.10 Mapping and overlaying of the Tree Preservation Zones (TPZ) onto a site plan has been undertaken to:
- Locate CCPF trees and document the requirements for successful tree retention
  - Identify sites suitable for camping
  - Identify camping sites that may be altered with load cell installation to make them suitable for caravans or parking
  - Identify areas suitable for replanting and regeneration.

- 1.1.11 Interactive, low impact use is the preferred approach for the custodians of the CCPF asset on this site. The alternative lockout approach will not provide the quantity of benefits to the park patrons, Brunswick business community or the CCPF that low impact interactive use would.
- 1.1.12 Mulching with a native forest blend or wood chip mulch that conforms to *AS4454–2012: Composts, Soil Conditioning and Mulches* is recommended to be installed in as much of each Structural Root Zone (SRZ) and regeneration area as possible. Mulch is to be installed as per the method statement contained within this report.
- 1.1.13 Restricted activities within the TPZ of the trees have been listed and an inspection regime has been recommended for site staff to provide regular maintenance practices and ensures tourist activities are not detrimental to the existing trees onsite.
- 1.1.14 All replanting within the Southern Precinct should be with species designated as being contained within the species assemblage of CCPF (Appendix C). By underplanting the existing trees with species from the CCPF, the future viability of the forest will be enhanced, and the protection of existing trees will be improved by the indirect restriction on site use.

## 2 Introduction

- 2.1.1 ArborSafe Australia Pty Ltd was engaged by Greg Asher, Executive Manager of Operations for the Reflections Holiday Parks, to complete an Arboricultural Impact Assessment on the trees located within the Southern Precinct of the Terrace Holiday Park, Brunswick Heads.
- 2.1.2 This Arboricultural Impact Assessment – Southern Precinct (AIA–SP) focuses on the current condition of the existing trees, and their retention, protection and enhancement, in the context of its current site use as an active Holiday Park.
- 2.1.3 The tree population within the Southern Precinct consists mainly of species consistent with the Endangered Ecological Community (EEC) '**Coastal Cypress Pine Forest in the NSW North Coast Bioregion**' (CCPF), in particular the White Cypress Pine (*Callitris columellaris*).
- 2.1.4 This AIA–SP is intended to provide information on enhancing the viability of the existing site trees and reducing any impacts on the trees due to general maintenance and site usage. In particular, the AIA–SP aims to provide guidance for the care and maintenance of the existing White Cypress Pines (*Callitris columellaris*).
- 2.1.5 The recommendations within this AIA–SP align with the adopted '*Terrace Reserve Vegetation Plan of Management 2011*' (VPM).
- 2.1.6 Observations and recommendations provided within this report are based upon information provided by the client and a site visit on 9 March 2018.

### 3 Scope

- 3.1.1 Determine the impact of the current use of the Terrace Holiday Park Southern Precinct on the existing tree population.
- 3.1.2 Recommended methods to mitigate any real and/or perceived impacts to the existing tree population. The report will seek to clarify, but not limit itself to, the following points:
- Whether the recommendations will be of long-term benefit to the current tree population
  - Identify any short term negative impacts that may be associated with the recommendations, ensuring they would lead to long term gains.
- 3.1.3 Provide recommendations regarding the continuation and enhancement of the EEC – *Coastal Cypress Pine Forest* (CCPF) located within the Southern Precinct. The report will seek to clarify, but not limit itself to, the following points:
- Detail methods for enhancing the existing trees health and vitality while aiming to prevent future damage or decline within the Southern Precinct of the Terrace Holiday Park
  - Define areas suitable for assisted or natural regeneration of the EEC – *Coastal Cypress Pine Forest* (CCPF), within the Southern Precinct and methods to achieve this
  - Ensure there is a prescriptive care and maintenance program around the Cypress Pines.

### 4 Methodology

#### 4.1 Data Collection

- 4.1.1 Andrew Clark of ArborSafe Australia Pty Ltd carried out a site inspection of the subject trees on 9 March 2017.
- 4.1.2 Trees that are the subject of this report are located within the Southern Precinct of the Terrace Holiday Park as outlined in 5.1.5.
- 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 Proposed site locations and TPZ and SRZ information was received from the Client by email and via phone conversations within the two weeks preceding the report date.
- 4.1.5 Data collected was analysed by Alex Austin, Luke Dawson and Andrew Clark, collated into report format, and relevant recommendations were formulated.
- 4.1.6 The Tree Protection Zones (TPZ) have been derived from the Australian Standard AS4970–2009: *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. 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 Diameter at Breast Height (DBH) by 12. TPZ radius = DBH × 12. (Note “**Breast Height**” is nominally measured as 1.4m from ground level).

- 4.1.7 The Structural Root Zones (SRZ) have been derived from the Australian Standard AS4970–2009: *Protection of Trees on Development Sites*. The 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 =  $(D \times 50)^{0.42} \times 0.64$ .
- 4.1.8 AS4970–2009 uses the terminology TPZ and SRZ when defining tree protection areas. AS4970–2009 is now widely accepted and supersedes several other overseas standards in terminology, wording and methodology, which had previously been used in Australia. The VPM uses the term... *critical root zone...* (Section 3.4.1 pt. 5) derived from an historical USA based code. The calculations derived from AS4970–2009 are now considered appropriate for use in Australia.

## 4.2 Images and Site Photographs

- 4.2.1 All photographs were taken at the time of the site inspection by the inspecting arborist. Photographs may 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 Terrace Holiday Park is located adjacent Brunswick Heads township in northern NSW. The Holiday Park borders Simpson Creek on its eastern side and has residential properties to its west. To the south is Simpson Reserve (referred to as South Terrace Reserve in VPM), while immediately to the north are Terrace Park and Banner Park.
- 5.1.2 The site is located within the Byron Shire Council Local Government Area (LGA).
- 5.1.3 Usage within the site is typical of a NSW coastal holiday park with a mixture of short term stay cabins, permanent use cabins, powered and unpowered caravan and camping sites. The entry to the Park is at the northern end with narrow internal bitumen roads extending through the Park. There is a vehicle exit to Nana Street mid-way down the western side of the Holiday Park.
- 5.1.4 Section 2.2 of the VPM describes usage within the site as being defined by three zones, labelled Northern, Central and Southern Precincts.
- *The Northern Precinct has been cleared of most native vegetation and is at a slightly lower elevation than the Central and Southern Precincts. The area is mostly given over to short-term van sites, holiday cabins, and infrastructure such as roads, amenities blocks and the office, garage and residence. It contains some large Fig trees that may have been planted, as well as some other native and introduced trees and exotic shrubberies.*
  - *The Central Precinct is less intensively developed and retains some native trees including scattered Coastal Cypress Pines. It contains long-term residents and short-term van sites.*
  - *The Southern Precinct retains good stands of mature Coastal Cypress. It contains unpowered and powered sites, previously used for short-term caravan and tent camping. (It should be noted that site density within the Southern Precinct is proposed to be reduced along with limiting the usage to tent, camper trailers and rooftop tent camping only – no caravans).*
- 5.1.5 The VPM Site Map (see Figure 1) shows the area known as Terrace Holiday Park (blue outline) and defines the precincts, the adjacent residential, road, Park and Reserve areas.

## 5.2 Adjacent sites

- 5.2.1 Terrace Park is a public park adjacent to the Northern Precinct. Terrace Park contains some play equipment, an amenities block and sound shell. Native vegetation is limited to a few scattered rainforest and Ficus species.
- 5.2.2 Simpson Reserve (Formally South Terrace Reserve) is a narrow Reserve situated between the estuary edge and the main entrance road into Brunswick Heads. Its located immediately south of Terrace Holiday Park and is not part of the commercial camping area. This area retains well-developed stands of Coastal Cypress amongst extensive areas of mowed grass, which is traversed by a hailstone gravel path with associated lighting. A large stand of mangrove trees occupies low-lying land to the east that is subject to tidal inundation.



Figure 1. The blue outline depicts the entire Terrace Holiday Park site. The Southern Precinct, as relating to this report, extends within the blue outline to the south of the red line. Source: VPM 2011



### 5.3 Environmental and Heritage Status

5.3.1 The Southern Precinct is currently listed as possessing one (1) Endangered Ecological Community, namely the ‘Coastal Cypress Pine Forest in the NSW North Coast Bioregion’ (CCPF). The species assemblage for the endangered ecological community is identified in Appendix C.

5.3.2 The site currently has no official recognised heritage listing, although the Southern Precinct could be described as ‘a place of remembrance’ for fallen ANZACS’ in some sections of the community.

### 5.4 Tree Locations

5.4.1 The locations of the existing trees situated within the Terrace Holiday Park, and adjacent associated Parks and Reserves, are captured within the ArborSite Tree Management System.

5.4.2 All trees subject to annualised ArborSite reporting are numbered, tagged and plotted on an aerial image. The trees within ArborSite are not GPS located.

### 5.5 Trees located within the Southern Precinct

5.5.1 The current total tree quantity assessed within the Southern Precinct is 115 trees, including 105 *Callitris columellaris* (Coastal Cypress Pine).

5.5.2 The majority of trees situated within the precinct, excluding the mangroves bordering Simpson Creek, are included within the ArborSite annual inspections which have been conducted annually since 2013.



Figure 2. Aerial image showing icons representing the existing trees situated within the Terrace Holiday Park Southern Precinct. ArborSite, March 2018.

5.5.3 The health of the 115 existing trees located within the Southern Precinct have been rated as good (79), fair (39) or poor (3), during the most recent 2017 ArborSafe assessment (refer to Appendix B – Explanation of Tree Assessment Terms).

5.5.4 The structure of the 115 existing trees located within the Southern Precinct has been rated as good (21), fair (87) or poor (7), during the most recent 2017 ArborSafe assessment (refer to Appendix B Explanation of Tree Assessment Terms).

## 6 Endangered Ecological Community (EEC) – Coastal Callitris Pine Forest (CCPF)

### 6.1 Condition and Impacts to the EEC

- 6.1.1 The *Coastal Cypress Pine Forest in the NSW North Coast Bioregion* (CCPF) gazettal date as an 'Endangered Ecological Community' (EEC) by the NSW Scientific Committee was in late 2008. The EEC was found to qualify under clauses 25 (reduction in geographic distribution), 26 (highly restricted) and 27 (reduction in ecological function) of the 'NSW Threatened Species Conservation Regulation 2002'.
- 6.1.2 The geographic distribution of the CCPF is estimated to have declined by more than 77% since European settlement. The main causes of the reduction has been attributed to historic land clearing for agriculture, sandmining and coastal development. There are concerns that small-scale clearing is continuing to threaten the EEC.
- 6.1.3 Fragmentation of a distinct plant community into ever smaller land sizes is a threat to the survival of an EEC as it increases the chance for foreign weed and plant infiltration, disrupting natural regeneration, and thereby diminishing the cohesion of the community until it slowly degrades away.
- 6.1.4 Inappropriate fire regimes have also been listed as a key threat to CCPF due to the dominant species, *Callitris columellaris* (Coastal Cypress Pine), intolerance of fire, as well as the seed not requiring fire to propagate.
- 6.1.5 One of the main threats to the EEC within the Southern Precinct of the Terrace Holiday Park arises from the potential for fragmentation within the site due to a lack of natural or assisted regeneration, along with the infiltration of foreign species (i.e. exotic grasses, shrubs and trees). Both of these points have been raised as key threatening issues in the original EEC determination and within the *Earth Process Ecology Services* report.

## 7 The Existing Tree Population – Southern Precinct

### 7.1 Condition and Impacts to the Existing Tree Population

- 7.1.1 Anecdotal evidence indicates that Terrace Holiday Park site has been operating as a camping area for more than 80 years. While it is possible to determine the current condition of the existing site trees, no previous study has been undertaken which would permit an analysis of the extent that degradation may have been caused by the current and/or recent land use. The current overall condition of the existing tree population of trees is considered to be fair.
- 7.1.2 The condition of a tree is the combination of its health and structure. Put simply, health relates to vitality **while structure relates to stability. Without good health a tree can't** react to structural issues and without good structure a tree wastes energy on reactive growth and/or fighting pathogen incursion caused by failures. Reduced health or structure increases the probability of failure and reduces tree life expectancy.
- 7.1.3 The majority of the existing trees were considered in fair to good health (see 5.5.3). Maintaining or improving the individual trees health as they age, increases their vitality and resilience. Competition from exotic plants (i.e. grasses and shrubs), low nutrient availability (i.e. minimal natural mulching) and chemical addition (i.e. spraying and waste water dumping) could have negative effects over time.
- 7.1.4 The majority of the existing trees were identified as having a fair structure (see 5.5.4). Defects such as soil erosion, root exposure and mechanical damage (lawnmower scalping, tent peg and guy rope damage, road and service installation) would be more associated with long term site usage. Defects such as previous failure, cavities, decay, end weight and cracks are attributed to age and exposure. These have been compounded by the lack of regeneration and the thinning of the existing tree density over time.

- 7.1.5 The age of the existing trees within the Southern Precinct was considered a significant factor in the ongoing viability of the existing tree population. There were no younger replacement trees establishing which indicates there is an age gap in the treescape. This is an issue, especially on slow growing trees such as *Callitris*, as the population is more vulnerable to biotic and abiotic pressures.
- 7.1.6 Most of the trees within the Southern Precinct were *Callitris columellaris*, the dominant species found within the EEC of CCPF, with the majority being in the later stages of maturity. The mitigation strategies outlined in 8. *Mitigation Strategies – Existing Tree Population* have been tailored to extend individual TLE and enhance the extent, quality and resilience of the EEC as a whole.

## 8 Mitigation Strategies – Existing Tree Population

### 8.1 Tree Protection Measures

- 8.1.1 The site of the Terrace Holiday Park, along with other locations around the Brunswick Heads foreshore, have been used as camping areas for over 80 years (Brunswick Heads Chamber of Commerce Website).
- 8.1.2 A review of the pressures and expectations surrounding the Southern Precinct tree population has resulted in various mitigation strategies being introduced which would enhance the health, vitality and extent of the CCPF while continuing to allow the site to be enjoyed by visitors into the future.

### 8.2 Definition of Site Location

- 8.2.1 Defining the location where camping and parking can take place is an essential component in the ongoing management of the existing tree population in the context of the working Holiday Park.
- 8.2.2 Set site locations allow protection measures to be put in place to mitigate against any potential damage while at the same time delineating areas where regeneration and planting programmes can take place. Set site locations also allow for investment in more permanent protection measures such as load cells (8.7 *Load Cells*) and permanent screw anchor points for tent guy ropes. Minimising the potential and perceived impact on the existing trees, along with creating space for regeneration to take place, were the primary consideration in the proposed site placement.
- 8.2.3 To complement the set site locations, the site density within the Southern Precinct has been reduced, from the former 38 sites, down to 30 sites. The reduced density allows for a significantly greater area to be allocated to regeneration/replanting and tree protection measures. Sites that were determined to have an unacceptable impact on CCPF were nominated for closure.
- 8.2.4 A 10m wide estuary buffer zone has been proposed along the length of the Terrace Holiday Park, including the Southern Precinct, during previous Plan of Management community consultation meetings. The buffer zone would extend from the top of estuary embankment to the edge of the proposed camp sites. The Buffer Zone would incorporate a pedestrian access path, linking Brunswick CBD with Simpson Reserve, with the remainder being designated as area where natural and assisted regeneration is to be encouraged. The path is proposed to be as low impact as possible and in a similar style as the existing path through Simpson Reserve.

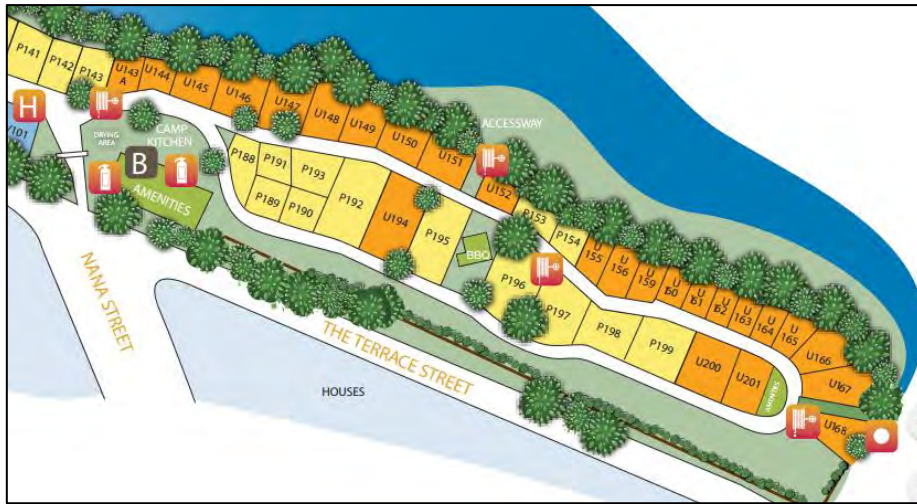


Figure 1. Site map showing the former Terrace Holiday Park camping layout.  
Source: Reflections Holiday Park, Feb 2017

### Potential Site Locations

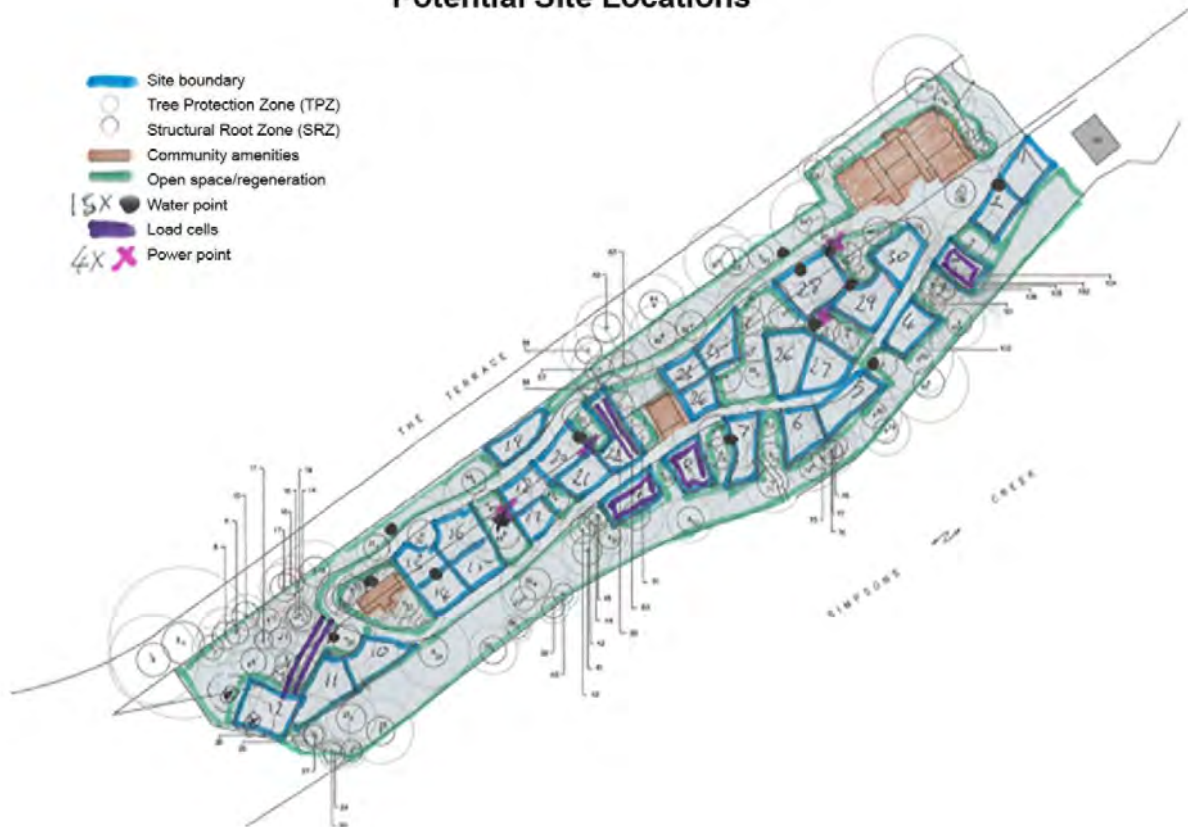


Figure 4. Site sketch showing potential site locations, regeneration/open areas, load cell installation sites, water and power points, tree positions with TPZ and SRZ. Source: ArborSafe 2018

### 8.3 Definition of Site Size

- 8.3.1 The *Local Government (Manufactured Home Estates, Caravan Parks, Camping Grounds and Moveable Dwellings) Regulation 2005 part 3 division 3, Subdivision 1 – Land and site requirements* state that the minimum size for a short-term dwelling/caravan camp site is 65sqm. A camp site must have an area of at least 40sqm if an off-site car space is provided or 50sqm if the car space is incorporated.
- 8.3.2 The proposed camp site sizes within the Southern Precinct would have at least 50sqm of usable space. Usable space means open ground excluding any area inside a tree SRZ, unless it has been protected with load cells.
- 8.3.3 Site dimensions are to be available at the time of booking and placed on the website to allow clients to request sites based on individual camping equipment, e.g. average footprint of 4-person dome tent is 6m x 2.5m, average camper trailer is 6m x 3m plus annex of 3m x 3m, additional tarpaulins can be any size, and are frequently oversize.
- 8.3.4 The site dimensions are to be emphasized at the time of booking to stop encroachment into protected regeneration areas. If information is easily accessible, and patrons are aware prior to visiting, then encroachment issues can be resolved fairly and easily.



Figure 5. The photo shows encroachment from an awning into a protected regeneration area due to lack of space and inappropriate site booking. Source: Clark, March 2018

## 8.4 Definition of Site Usage

- 8.4.1 Southern Precinct site usage has been altered to restrict occupancy to tents, rooftop tents and camper trailers only. All caravan usage within the Southern Precinct has been halted.
- 8.4.2 Soil compaction is considered to have been of minimal impact within the Southern Precinct due to its sand-based soils. Soil erosion and root displacement around the trees SRZ by heavy vehicles turning and parking and minor wounding from vehicle impacts would be the main issues. The elimination of caravan usage in the precinct will do much to mitigate these observed issues.

## 8.5 Site usage Inspections

- 8.5.1 Site usage inspections in the Southern Precinct would be essential to the protection, enhancement and continuation of the existing tree population. Inspections should range from daily informal walkarounds to check patrons are adhering to site requirements, through to annual arboricultural inspections to ensure that the risk associated with interactions between people and trees is managed accordingly.
- 8.5.2 The informal inspections should focus on the following issues, with rectification occurring immediately:
1. Material storage
  2. Parking of vehicles (other than on designated areas)
  3. Refuelling
  4. Lighting of fires
  5. Physical damage to the tree i.e. tent ropes, branch breakages, tent pegs in SRZ
  6. Excavation for stormwater drainage
  7. Dumping of caravan waste water.
- 8.5.3 Annual Arboricultural inspections would be undertaken by a qualified professional (AQF 5) and focus on general health, structural stability and risk.

## 8.6 Tree Protection Zones (TPZ) and Structural Root Zones (SRZ)

- 8.6.1 It is noted that TPZ or SRZ encroachment in the context of *AS 4970–2009 Protection of Trees on Development Sites* is largely considered to be excavation or significant soil disturbance and differs in the severity of potential damage in the context of an active Holiday Park. *AS 4970–2009* still provides a useful tool in designating widely-accepted tree protection zones. *AS4970–2009* would apply to the full extent if any future excavation for road or service upgrades within the existing tree population were planned.
- 8.6.2 *AS 4970–2009* states that 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. Major TPZ encroachments (>10%) are permissible if sensitive methods are applied that recognize the protection of the tree as the primary objective. Examples of sensitive measures in the context of a camp ground could include the use of load cells and permanently located tent anchor points.
- 8.6.3 Any incursion within the SRZ of existing trees ought to be discouraged. The SRZ should be protected with the installation of mulch or the use of load cells, considered a minimum requirement for any proposed encroachments. Mulch or load cells will minimise any potential impact to the soil and root systems caused by TPZ/SRZ encroachments.
- 8.6.4 The TPZ and SRZ for each tree situated within the Terrace Holiday Park Southern Precinct has been calculated and is shown on the proposed site location diagram Figure 4 and within the individual tree data as Appendix F.

## 8.7 Load Cells

- 8.7.1 Load spreading products are generally plastic structures filled with coarse grade sand which rest on the top of the existing soil level and rising approximately 100–200mm above the existing soil grade. The composition of the resulting structure spreads the load over the underlying soil thereby minimising soil disturbance or root depression while providing a level surface for camping. The infill of coarse grade sand permits water and gaseous exchange to and from the existing root structure situated in the underlying soil and is considered suitable for use within a tree TPZ or SRZ.
- 8.7.2 It is considered that installing a platform of load spreading cells (i.e. TerraCell® or TERRAM Geocell) would mitigate the negative impacts of vehicles parking within the TPZs or SRZ or of potential mechanical damage caused by camping within the SRZ.
- 8.7.3 If parking is proposed within the TPZ or SRZ, ground protection measures are to be put in place to minimise impacts to the tree roots. Products such as **'TERRAM Geocell'** can be installed to cover enough space to accommodate the designated parking area.
- 8.7.4 Areas proposed for camping within the CCPF do not require any form of ground protection if vehicle parking is excluded from the TPZ and camping from the SRZ.
- 8.7.5 It is anticipated that the existing trees would display a positive response following the installation of load spreading products due to the minimisation of soil disturbance within the trees TPZ and SRZ.



Figure 6. The photo shows site 22 (refer to Fig. 4) as an example of where load cells (between red lines) could be utilised to allow access and use of site when SRZ encroachment is unavoidable. The long narrow site could be designated for camper trailer use with awning out to the left. Source: Clark, March 2018

## 8.8 Permanent Anchors

- 8.8.1 The installation of permanent screw anchors should be instigated at obvious key locations around the sites. These anchor points will negate the need for hammering in new pegs, each causing potential root damage every time there is an occupancy changeover.
- 8.8.2 There are a variety of screw anchor designs on the market which could be sensitively installed with minimal root disturbance. Any minor root disturbance will be compensated by the long-term benefits of reduced peg use over time.

## 8.9 Drainage/Soil Levels

- 8.9.1 Changes to natural soil levels, other than additions of coarse sand to fill minor depressions, should not be undertaken.
- 8.9.2 Unrestricted stormwater drainage from designated sites is to be achieved by maintaining stormwater drains, identifying natural topographical water channels/flows and being sensitive to not blocking these natural channels with the installation of flow restrictive mulch/regeneration areas.

# 9 Mitigation Strategies – Endangered Ecological Community (EEC) of Coastal Callitris Pine Forest (CCPF)

## 9.1 Limit Weed Incursion

- 9.1.1 All exotic trees and shrubs not aligning with the CCPF should be systematically removed from the Southern Precinct over time and replaced with CCPF associated species. This includes the removal of the *Murraya paniculate* hedges and various shrubs.
- 9.1.2 All weeding should be undertaken by hand.
- 9.1.3 Any chemical use must not impact the regeneration of CCPF.



Figure 7. The red arrow indicates a planting of exotic *Murraya paniculata* not a species associated with CCPF recommended for removal. Source: Clark March 2018



## 9.2 Fertilising

- 9.2.1 The addition of Artificial Fertiliser is not considered appropriate for the Callitris trees within the Terrace Holiday Park. The trees naturally grow on low fertile soils in the local area (refer to 9.4.4) and the addition of Artificial Fertiliser can greatly increase certain macro-nutrients (i.e. Nitrogen, Potassium, Phosphorus). This may disrupt the use and uptake of micronutrients, the function of healthy soil micro-organisms, rapidly alter soil Ph and potentially leach unused elements into adjacent water sources. (VPM pg22).

## 9.3 Educational Signage

- 9.3.1 The significance and vulnerability of CCPF would be unknown by the majority of site visitors. Minor activities can have a detrimental impact upon individual trees. Informative and educational signage is likely to increase the respect and understanding of the importance of CCPF by site users.
- 9.3.2 Educational signage should be used to identify the CCPF ecological significance and the vulnerability of the forest to individual actions.
- 9.3.3 Example wording may include; The Cypress Pine trees within Terrace Reserve form part of an endangered **ecological community named 'Coastal Cypress Pine Forest in the NSW North Coast Bioregion'** (CCPF). The forest is in a vulnerable condition and in order to preserve the viability of the forest, please park in designated locations only, refrain from discharging waste water in the area and do not damage the trees in any way'

## 9.4 Mulching

- 9.4.1 Mulching is an activity undertaken by arborists, horticulturalists and home gardeners alike as a means of improving plant and soil health and overall landscape aesthetics. Mulching is the act of placing an organic (or sometimes inorganic) material on top of the soil surface to reduce the level of direct sunlight contacting it.
- 9.4.2 Mulching is of great importance in the successful cultivation of plants to regulate soil moisture and temperature levels and also to suppress weeds, minimise soil compaction (both human and vehicular) and reduce run-off during periods of heavy rain. It should be noted that the majority of plants in their natural environments are mulched by falling of leaves, bark, flowers and other organic material. Natural mulching slowly releases essential elements (nutrients) back to the plant through the recycling of the fallen tree debris by soil micro-organisms. **This 'natural mulching' can be observed around the denser stands of trees** situated in Simpson Reserve and to a smaller degree around lesser utilised sites within the Southern Precinct.
- 9.4.3 Mulches are best comprised of organic materials such as wood chip and leaf litter as they will degrade over time. As they degrade they add organic matter to the soil, thereby improving its overall structure and water holding composition, while releasing essential elements back into the soil. Long term mulching improves soil health and structure as it encourages the activities of earthworms, microflora and beneficial fungi. Inorganic materials such as stones and gravel can be moderately effective as mulch but will not provide the ongoing improvements to soil health.



Figure 8 and Figure 92. Partial natural mulching around trees situated at the south western corner, around Trees 2–8 of Terrace Holiday Park along with an example of natural mulching around Callitris trees in Simpsons Reserve. Source: Clark November 2017

- 9.4.4 It has been stated that the CCPF situated in the local area is growing in ‘...elevated areas of raised Pleistocene sands, which are generally of relatively low fertility’. Soil fertility refers to a soils ability to hold nutrients and make them available to the plant. This nutrient availability is measured by the Cation Exchange Capacity (CEC) of a soil. The poor fertility of sandy soils relates to its larger particle size, which gives it a lower CEC compared with clay and highly organic soils. Due to this larger particle size, sandy soils also have a free draining structure which is more prone to nutrient leaching and water loss.
- 9.4.5 The pros and cons of adding mulch around the SRZ of the individual trees situated in the Southern Precinct has been reviewed. The potential increase in nutrient availability within the existing soil is likely to be beneficial to the existing CCPF trees. A review of the other benefits that mulch provides (regulating soil moisture and temperature, increased activity in the soil biosphere, weed suppression, minimising soil compaction) results in the addition of mulch being considered advantageous.
- 9.4.6 Site-use such as grass moving, blowing and raking has reduced the natural mulch layers and consequently, this is likely to have impacted the natural mulching sequence. Natural mulch onsite should be retained whenever possible.
- 9.4.7 An ‘artificial’ mulch layer should be seen to be a beneficial source of organic matter that will ‘kick start’ the microbial organisms and the natural mulching system. Without any natural mulch layer replenishing nutrients, the soil may be less fertile than soils would naturally be in a pristine CCPF.
- 9.4.8 Mulches can be organic (bark, straw, forest blend, wood chips) or inorganic (scoria, sand, rocks, river stones). Organic mulches are considered most appropriate for the reasons described in 9.4.1. Organic mulch promotes a multitude of differing beneficial fungi and creates a biosphere of microbial competition where singular pathogenic fungi find it hard to establish. Furthermore, microbial relationships are formed by the tree and fungi that provide increased absorption by roots and removing the mulch can break this relationship resulting in a detrimental impact on tree health.
- 9.4.9 A native forest blend or wood chip mulch is considered most appropriate for the trees within the Southern Precinct due to the varying degrees of particle sizes within the mulch. This will both ensure a slow breakdown of product and mulch which will not blow or wash away during storm events.

- 9.4.10 The mulch composition and supply should adhere to *AS4454–2012 Composts, Soil Conditioning and Mulches* to ensure they are fit for purpose and free of pathogens and weed seeds.
- 9.4.11 A course grade sand (an inorganic mulch) is recommended for areas where depressions in the natural soil grade have been created by vehicle or storm wear or where structural roots have been exposed. The sand will allow free drainage to the underlying soil profile, so no perched water tables are created, while providing support and protection.
- 9.4.12 Mulch generated from works onsite can be used if allowed to compost in a pile for between 3 and 6 months. Application of **fresh, 'green' mulch around trees** is to be avoided as this can induce a nitrogen drawdown, which can result in the mulch drawing nitrogen from the soil resulting in plants with nutrient deficiencies.
- 9.4.13 The planning of mulched areas should take into consideration the aspect and drainage of a site to allow natural water run-off and not create a potential pooling of water behind the mulched area in times of heavy inundation.
- 9.4.14 Mulch must be installed using the methodology provided in Appendix D.

## 9.5 Coastal Cypress Pine Forest Regeneration/Replanting

- 9.5.1 All replanting within the Southern Precinct should be with species designated as being relevant to the CCPF (Appendix C). A number of methods can be utilised to allocate planting/regeneration locations within the Southern Precinct.
- 9.5.2 New/additional areas for planting can be found in small pockets of land and mulched areas in and around the existing camping areas situated within the Southern Precinct along with the newly formed buffer zone (see Figure 4).
- 9.5.3 By defining individual camping sites, potential planting and regeneration locations will become apparent in the unused open areas and the larger of the mulched, interlocking TPZ zones with species relevant to the CCPF. (see Figure 4).
- 9.5.4 Through underplanting the existing trees with species from the CCPF, the future viability of the CCPF will be enhanced. The protection of existing trees will also be improved by the indirect restriction on site use.
- 9.5.5 Care with underplanting in these areas would be required so existing tree roots are not damaged. Hand excavation and manual planting are recommended.



Figure 10 and Figure 11. Potential planting/regeneration areas within the southern zone. Left: The western Right: area in the south western corner around Trees 2–8. Source: Clark March 2018

## 9.6 Simpson Reserve

- 9.6.1 Simpson Reserve, identified as South Terrace Reserve in the VPM, is situated immediately south of the Terrace Holiday Park Southern Precinct. The arboricultural management of the Reserve is outside the scope of this report, however it contains a significant remnant community of CCPF and has multiple areas where regeneration and assisted replanting could be undertaken to compliment the work undertaken within the Terrace Holiday Park. Simple methods such as natural regeneration, assisted regeneration and the management of weeds and regrowth would all provide for the long-term enhancement of the CCPF.



Figure 12. Depicts the location of CCPF within Simpson Reserve with a Blue line. This area appears to be suitable and appropriate for regeneration. Site use should be restricted to activities that will regenerate the EEC. Source: VPM 2011

## 10 Ecological Considerations

- 10.1.1 The Earth Process Ecological Report (EPER), prepared by Dr Robert Kooyman (dated 3 August 2017) provided a good overview of the state of the CCPF in northern NSW. The report covered a number of points, however the main one relevant to this AIA–SP was in relation to the continuation and enhancement of the EEC of CCPF within the Southern Precinct of the Terrace Holiday Park. The report provided insight into the pressures affecting the EEC as a whole, along with potential threats within the Southern Precinct, such as lack of regeneration, mechanical damage, compaction, drainage, weed invasion and fragmentation.
- 10.1.2 The EPER expanded on positive management options such as: **minimise camping around trees, don't modify drainage or soil levels, protect roots from machinery damage, restrict weed species – including grasses, remove dangerous trees, encourage and protect regeneration.** In 3.5.5 of the report, exemplary example areas were **identified such as** *'The southern end of Terrace Reserve Holiday Park has naturally regenerating Coastal Cypress ... should be protected from camping incursion'* (this area is located in Simpson Reserve and immediately south of the Terrace Holiday Park boundary) to show what could be achieved.

- 10.1.3 The three (3) recommended options put forward within the EPER err heavily on the opinion that the area needs to be locked up to regenerate or the CCPF would deteriorate under the current usage. There is no middle way or compromise suggested. The EPER options for managing the CCPF provided were:
1. Complete halt to camping activity in Southern Precinct along with the removal of all infrastructure
  2. Complete halt to camping activity in Southern Precinct to allow regeneration while retaining infrastructure in situ
  3. Maintain status quo and trees, and therefore the EEC of CCPF, are destined to deteriorate.
- 10.1.4 A compromise between the options put forward in the EPER has been proposed within this AIA–SP report. An attempt has been made to cover the main impacts and concerns expressed within the EPER and recommended actions which show how the coexistence and enhancement, of the EEC of CCPF and the retention of the Southern Precinct as an active camping area can be achieved into the future.
- 10.1.5 The untouched factors in this Report is the impact on the wider Brunswick community if the area was removed as an active camping area in the cost to the business community, lost educational opportunities and the restricted access of a well-loved resource. It is considered unreasonable to lock up areas where current use has been in place for over 80 years, far longer than an EEC classification, especially when easily achievable EEC enhancement and regeneration work has not been acted upon in adjacent Reserves over successive management regimes.
- 10.1.6 In the Southern Precinct of the Terrace Holiday Park there is a chance to show how good management of a well-used and loved resource can benefit all – ecology, patrons, environmental educational outcomes and local business.

## 11 Recommendations

### 11.1 Inspections

- 11.1.1 Frequent informal and structured annualised arboricultural inspections are to be continued/adopted.

### 11.2 Designated Site Use

- 11.2.1 The reduction in the number of available sites and the defining of designated camping and parking areas within those sites, utilising the methodologies described within the report, is to be adopted.
- 11.2.2 The effective sqm size of any site is not to be less than 50sqm. Effective size means excluding all area taken up by any tree's SRZ, unless it has been protected with the use of load cells.
- 11.2.3 The installation of a 10m buffer zone along the top of the estuary embankment to increase the regeneration area and allow for a pedestrian track to join Simpson Reserve with the main Brunswick CBD as outlined in 8.2.4 of this report. Consulting level Arborist (AQF5) involvement during the design and construction phases of the track would be recommended as a minimum requirement in managing tree protection.
- 11.2.4 The use of load cells is to be utilised when camping encroaches into a trees SRZ or when a designated car parking space encroaches into a trees TPZ.

### 11.3 Regeneration/Replanting/Assisted Regeneration

- 11.3.1 The staggered removal of all existing trees of a species not consistent with the CCPF is recommended from within the Southern Precinct.
- 11.3.2 A local nursery is to be engaged to propagate endemic Callitris Pine seedlings for planting onsite.
- 11.3.3 Only species consistent with the CCPF are to be planted or allowed to regenerate within the Southern Precinct.

- 11.3.4 Encourage regeneration in the overlapping mulched TPZ areas and the estuary buffer zone.
- 11.3.5 Minimise weed species in the regeneration areas by hand weeding.
- 11.3.6 Simpson Reserve currently provides the best opportunity for regeneration of the CCPF ecological community on a large scale as it does not need to compete with camping/tourism. The engagement of a bush regenerator to enhance the CCPF in Simpson Reserve is recommended.

#### **11.4 Erosion/SRZ Protection**

- 11.4.1 Washed coarse grade river sand should be utilised to fill any depressions within sites or where structural roots have been exposed.

#### **11.5 Mulching**

- 11.5.1 Install a native forest blend or wood chip mulch that conforms to *AS4454–2012 Composts, Soil Conditioning and Mulches* in as much of each SRZ as practicable (considering existing site constraints such as roads, paths, buildings, drainage channels).
- 11.5.2 Mulch is to be installed as per the method statement provided in Appendix D.

#### **11.6 Educational Signage**

- 11.6.1 Install educational signage relating to tree care and the CCPF at prominent locations within the Southern Precinct.

#### **11.7 Review of AIA–SP**

The contents within the AIS–SP should be reviewed every three years to ensure recommendations and baseline data remain current.

## **12 References**

- Standards Australia, 2007, *AS4373–2007 Pruning of Amenity Trees*, Standards Australia, GPO Box 476, Sydney, NSW
- Standards Australia, 2009, *AS4970–2009 Protection of Trees on Development Sites*, Standards Australia, GPO Box 476, Sydney, NSW
- Standards Australia, 2012, *AS4454–2012 Composts, Soil Conditioning and Mulches*, Standards Australia, GPO Box 476, Sydney, NSW
- Terrace Holiday Park, 2011, *Vegetation Management Plan*, Idyll Spaces Environmental Consultants, 21 Titans Close, Bonville, NSW
- Brunswick Heads Chamber of Commerce website – Brunswick Heads/Simple Pleasures.  
<http://www.brunswickheads.org.au/>
- Earth Process Ecological Service Report, Dr Robert Kooyman, 3 August 2017
- Vegetation Management Plan for Terrace Reserve Holiday Park, by Idyll Spaces Environmental Consultants, dated 2011
- Existing and Proposed Sketches, by Byrns Lardner Environmental and King Landscapes & Tree Solutions

## 13 Appendices

### 13.1 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.

### 13.2 Appendix B – Explanation of Tree Assessment Terms

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

**Age: Refers to the life cycle of the tree**

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

**Health: Summarises the health and vigour of the tree**

Category	Description
Excellent	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.
Good	Canopy full, with minor variations in foliage density throughout, leaves are entire and are of good size and colour for the species with minimal or no visible pathogen damage. Good growth indicators.
Fair	Canopy with moderate variations in foliage density throughout, leaves not entire with reduced size and/or atypical in colour, moderate pathogen damage. Reduced growth indicators, visible amounts of deadwood/dieback, and epicormic growth.
Poor	Canopy density significantly reduced throughout, leaves are not entire, are significantly reduced in size and/or are discoloured, significant pathogen damage. Significant amounts of deadwood and/or epicormic growth, noticeable dieback of branch tips, possibly extensive.
Dead	No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches.

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

Category	Description
Good	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.
Fair	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.
Poor	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.
Hazardous	Serious structural defects with failure determined to be imminent (<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.



### 13.3 Appendix C – Species Assemblage for Coastal Cypress Pine Forest

Scientific Name	Common Name	Scientific Name	Common Name
<b>Trees</b>		<i>Notelaea longifolia</i>	Large Mock-olive
<i>Araucaria cunninghamii</i>	Hoop Pine	<i>Oxylobium robustum</i>	Tree Shaggy Pea
<i>Callitris columellaris</i>	Coastal Cypress Pine	<i>Persoonia stradbrokeensis</i>	Geebung
<i>Corymbia intermedia</i>	Pink Bloodwood	<i>Zieria smithii</i>	Sandfly Zieria
<i>Eucalyptus pilularis</i>	Blackbutt	<b>Graminoids (grasses and similar)</b>	
<i>Eucalyptus resinifera</i> subsp. <i>resinifera</i>	Red Mahogany	<i>Abildgaardia vaginata</i>	
<i>Eucalyptus signata</i>	Scribbly Gum	<i>Aristida</i> spp.	Wiregrass
<i>Euroschinus falcatus</i> var. <i>falcata</i>	Ribbonwood	<i>Baloskion tetraphyllum</i> subsp. <i>meiostachyum</i>	Plume Rush
<i>Halfordia kendack</i>	Saffron Heart	<i>Bulbostylis barbata</i>	
<b>Shrubs &amp; Small Trees</b>		<i>Cymbopogon refractus</i>	Barbed Wire Grass
<i>Acacia disparrima</i> subsp. <i>disparrima</i>	Salwood	<i>Cyperus stradbrokeensis</i>	
<i>Acacia ulicifolia</i>	Prickly Moses	<i>Dianella caerulea</i>	Blue Flax-lily
<i>Acronychia imperforata</i>	Logan Apple	<i>Eragrostis brownii</i>	Brown's Lovegrass
<i>Acrotriche aggregata</i>	Red Cluster Heath	<i>Imperata cylindrica</i> var. <i>major</i>	Blady Grass
<i>Allocasuarina littoralis</i>	Black She-oak	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
<i>Alyxia ruscifolia</i>	Prickly Alyxia	<i>Paspalidium distans</i>	
<i>Astroloma humifusum</i>	Native Cranberry	<b>Herbs &amp; Ferns</b>	
<i>Austromyrtus dulcis</i>	Midgen Berry	<i>Acianthus caudatus</i>	Mayfly Orchid
<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coast Banksia	<i>Acianthus exsertus</i>	Mosquito Orchid
<i>Banksia serrata</i>	Old-man Banksia	<i>Chiloglottis</i> spp.	Orchid
<i>Cyclophyllum longipetalum</i>	Coast Canthium	<i>Commelina cyanea</i>	Native Wandering Jew
<i>Leptospermum polygalifolium</i> subsp. <i>polygalifolium</i>	Tantoon	<i>Platycerium bifurcatum</i>	Elkhorn
<i>Leucopogon ericoides</i>	Pink Beard-heath	<i>Pomax umbellata</i>	
<i>Leucopogon leptospermoides</i>		<i>Pteridium esculentum</i>	Common Bracken
<i>Leucopogon margarodes</i>		<i>Pterostylis nutans</i>	Nodding Greenhood
<i>Monotoca elliptica</i>	Tree Broom-heath	<i>Pterostylis pedunculata</i>	Maroonhood
		<i>Hoya australis</i>	Natve Hoya

Source: Department of Environment and Climate Change, (2009) Coastal Cypress Pine Forest in the NSW North Coast Bioregion

### 13.4 Appendix D – Mulching Method Statement

The following points serve to highlight the important steps in ensuring mulching is effective and has lasting benefits for plant and soil health:

- Washed coarse grade river sand should be utilised to fill any depressions within the natural soil level within sites or if structural roots have been exposed or soil depressions lower than the existing soil grade are observed prior to organic mulch installation over the area.
- If mulching on top of a pre-existing grass area, the grass or weeds must first be hand weeded before the mulch is placed over the area. Care must be taken in not damaging roots while removing the grass. This practice will negate grass growing up through the mulch over time.
- Mulch used must be a native forest blend or wood chip mulch that conforms to *AS 4454–2012: Compost, Soil conditioners and Mulches*.
- The Tree Protection Zone (TPZ – contained with Appendix F of the Tree Management Strategy) should be considered when mulching and where possible, the majority of the SRZ should be mulched.
- Mulch should be applied at a uniform thickness of 75–100mm and re-applied when necessary (approximately every 12–18 months).
- Mulch should not be piled against the trunk of a tree, but rather tapered down to the soil level next to the trunk.
- **Mulch is not to be stockpiled within any trees' TPZ, unless it is to be spread within 24** hours of the delivery. Delivery trucks are not to encroach within a trees TPZ.
- The mulch is to be spread by hand within a trees TPZ. The mulch can be delivered from a stockpile to the TPZ if appropriate mechanised machinery is utilised (i.e. small rubber tracked machine, trailers behind small vehicles). Ensure minimal soil disturbance by turning on the bitumen road and going in straight lines in and out to deliver the mulch.
- To minimise the risk of trunk damage, dump product at the extremities of the designated mulch area and hand spread into the centre trunk. If a large area is to be spread and to minimise root impacts start mulching at the outside of the area and drive over the spread mulch to keep delivering mulch to the centre.

### 13.5 Appendix E – Site Checklist

The following induction has been created to ensure site staff are aware of and have minimal impact upon the *Coastal Cypress Pine Forest (CCPF)* located at Terrace Holiday Park. The checklist focuses on the protection of CCPF by providing guidance on and restricting activities that have the potential to impact upon the health of the trees.

The checklist should be completed monthly to ensure routine activities are not impacting the CCPF.

1. Camping and caravans must be located in designated zones and not in unspecified areas.
2. Vehicles must be parked outside of Tree Protection Zones (TPZs) or on areas protected by load cells
3. Site users must not be dumping waste water within the Southern Precinct area.
4. Leaf litter and debris falling from the Cypress trees should be retained under the canopies.
5. No fires can occur in the Southern Precinct.
6. Camping ropes should not be tied to tree trunks.
7. No construction or trenching is to occur within TPZ unless authorised by an Arborist or are activities that are in line with conditions of consent associated with a development application.
8. Soil level changes should not occur unless they are to fill slight depressions with the addition of coarse washed river sand.
9. New plantings and regeneration areas must be maintained and kept free from competition with weeds and monitored for encroachment or damage.
10. Mower blade heights are to be set not to contact tree roots.
11. Brush cutters are not to contact tree trunks or roots.
12. Refuelling is not to occur within TPZs.
13. No fertilizer is to be used within the TPZ of CCPF trees.

Checklist Completion Date:	
Checklist Completed by:	
Routine Activities are in line with the points listed above	
Specific Issues Identified:	
Are Remedial Actions required:	

### 13.6 Appendix F – Callitris Pine Data with TPZ

No	Canopy	Diameter	Height	Condition	Structure	Age	TLE	Defects	Action	Current Risk	Radial TPZ (m)
2	5–10	350	15–20	Fair	Fair	Mature	15–25	Dead wood in canopy; Suppressed; Wound(s); Soil compaction; Root damage; Previous failures	Remove deadwood/stubs	Medium	4.2
3	5–10	450	15–20	Fair	Good	Mature	15–25	Dead wood in canopy; Co-dominant stems; Suppressed; Root damage	Remove deadwood/stubs	Medium	5.4
4	5–10	350	15–20	Fair	Good	Mature	15–25	Dead wood in canopy; Dieback; Previous failures; Wound(s); Root damage	Remove deadwood/stubs	Medium	4.2
6	<5	250	10–15	Fair	Good	Mature	15–25	Dieback; Dead wood in canopy; Root damage	Remove deadwood/stubs	Medium	3.0
8	<5	250	10–15	Good	Fair	Semi-Mature	15–25	Wound(s); Suppressed; Dieback; Previous failures; Poor pruning; Root damage	Mulching	Low	3.0
11	5–10	550	15–20	Good	Fair	Mature	15–25	Dead wood in canopy; Root damage; Damaging infrastructure; Dieback; Mechanical damage; Wound(s); Suppressed	Remove deadwood/stubs	Medium	6.6
13	5–10	400	10–15	Good	Fair	Mature	10–15	Mechanical damage; Decay; Wound(s); Previous failures	Remove deadwood/stubs	Low	4.8
17	5–10	500	10–15	Good	Fair	Mature	15–25	Wound(s); Suppressed		Low	6.0
20	10–15	550	15–20	Good	Good	Mature	15–25	Dead wood in canopy; Wound(s); Previous failures; Root damage	Remove deadwood/stubs	Low	6.6
21	10–15	500	15–20	Fair	Fair	Mature	15–25	Dead wood in canopy; Wound(s); Previous failures; Root damage; Hanger(s); Soil compaction	Remove deadwood/stubs; Remove hanging limb	Medium	6.0
23	5–10	500	15–20	Good	Good	Mature	15–25	Root damage; Dead wood in canopy; Soil compaction; Previous failures; Wound(s)	Remove deadwood/stubs	Medium	6.0
25	5–10	550	15–20	Good	Fair	Mature	15–25	Co-dominant stems; Dead wood in canopy; Soil compaction; Wound(s)	Remove deadwood/stubs; Remove selective branches	Medium	6.6
27	5–10	550	15–20	Good	Fair	Mature	15–25	Root damage; Mechanical damage; Dead wood in canopy; Soil compaction; Previous failures; Wound(s)	Remove deadwood/stubs	Medium	6.6
29	5–10	500	15–20	Good	Fair	Mature	15–25	Previous failures; Root damage; Wound(s); Co-dominant stems; Dead wood in canopy	Remove deadwood/stubs; Formative pruning; Remove selective branches	Medium	6.0
30	5–10	450	15–20	Good	Fair	Mature	15–25	Wound(s); Dead wood in canopy	Remove deadwood/stubs; Remove selective branches	Medium	5.4
31	10–15	600	15–20	Good	Good	Mature	15–25	Root damage; Wound(s); Suppressed; Dead wood in canopy; Previous failures	Remove deadwood/stubs; Other action	Medium	7.2
32	10–15	500	15–20	Fair	Fair	Mature	15–25	Root damage; Mechanical damage; Poor pruning; Wound(s); Soil compaction		Low	6.0

No	Canopy	Diameter	Height	Condition	Structure	Age	TLE	Defects	Action	Current Risk	Radial TPZ (m)
35	10-15	450	15-20	Good	Fair	Mature	15-25	Root damage; Dieback; Previous failures; Wound(s)		Low	5.4
36	10-15	800	10-15	Poor	Fair	Senescent	5-10	Wound(s); Dieback; Excessive thinning; Dead wood in canopy; Soil compaction; Previous failures; Poor pruning	Remove deadwood/stubs; Monitor	Medium	9.6
37	5-10	500	10-15	Fair	Fair	Mature	15-25	Root damage; Dead wood in canopy; Soil compaction	Remove deadwood/stubs	Medium	6.0
38	5-10	550	10-15	Fair	Fair	Mature	10-15	Dieback; Root damage; Mechanical damage; Hanger(s); Wound(s); Previous failures	Monitor; Remove selective branches; Remove hanging limb	Medium	6.6
39	5-10	500	10-15	Fair	Fair	Mature	10-15	Wound(s); Mechanical damage; Root damage; Dead wood in canopy; Dieback; Previous failures; Poor pruning	Monitor; Remove deadwood/stubs	Medium	6.0
40	5-10	650	10-15	Fair	Fair	Mature	10-15	Mechanical damage; Dead wood in canopy; Dieback; Wound(s); Decay; Soil compaction; Poor pruning	Monitor; Remove deadwood/stubs; Other action	Medium	7.8
41	10-15	700	15-20	Good	Fair	Mature	10-15	Dead wood in canopy; Previous failures; Soil compaction; Co-dominant stems; Included bark	Remove deadwood/stubs; Remove selective branches; Formative pruning	Medium	8.4
42	10-15	500	15-20	Good	Fair	Mature	15-25	Dead wood in canopy; Dieback; Wound(s); Previous failures	Remove deadwood/stubs; Mulching; Aerial inspection	High	6.0
43	10-15	500	15-20	Fair	Poor	Mature	5-10	Co-dominant stems; Cavity(s); Decay; Wound(s); Previous failures	Removal	High	6.0
44	10-15	500	15-20	Fair	Poor	Mature	5-10	Crack(s)/Split(s); Poor pruning; Previous failures; Wound(s)	Removal	High	6.0
45	10-15	500	15-20	Good	Good	Mature	15-25	Wound(s); Dead wood in canopy	Remove deadwood/stubs	Low	6.0
46	10-15	550	15-20	Fair	Fair	Mature	15-25	Wound(s); Previous failures; Dieback; Dead wood in canopy	Remove deadwood/stubs	Medium	6.6
47	5-10	550	15-20	Good	Good	Mature	15-25	Wound(s); Dieback; Previous failures; Soil compaction		Low	6.6
48	5-10	550	15-20	Good	Fair	Mature	10-15	Wound(s); Dead wood in canopy; Co-dominant stems; Hanger(s); Previous failures; Soil compaction	Remove deadwood/stubs; Remove hanging limb	Medium	6.6
49	5-10	500	15-20	Fair	Fair	Mature	10-15	Dieback; Wound(s); Dead wood in canopy	Remove deadwood/stubs	Medium	6.0
50	5-10	550	15-20	Good	Good	Mature	15-25	Wound(s); Excessive end weight; Dead wood in canopy; Cavity(s); Previous failures	Remove deadwood/stubs; End weight reduction	Medium	6.6
51	10-15	650	15-20	Fair	Fair	Mature	15-25	Bracket fungi; Wound(s); Dead wood in canopy; Parasitic plant/Mistletoe; Co-dominant stems; Soil compaction; Previous failures	Remove deadwood/stubs; Monitor; Remove selective branches	Medium	7.8
52	10-15	550	15-20	Fair	Fair	Mature	15-25	Root damage; Damaging infrastructure; Cavity(s); Mechanical damage; Dead wood in canopy; Wound(s)	Remove deadwood/stubs	Medium	6.6
53	10-15	500	15-20	Good	Fair	Mature	15-25	Excessive end weight; Wound(s); Dead wood in canopy; Crack(s)/Split(s)	Remove deadwood/stubs; Remove selective branches	High	6.0
54	10-15	500	15-20	Fair	Good	Mature	15-25	Root damage; Dead wood in canopy	Remove deadwood/stubs	Medium	6.0

No	Canopy	Diameter	Height	Condition	Structure	Age	TLE	Defects	Action	Current Risk	Radial TPZ (m)
55	10–15	550	15–20	Good	Fair	Mature	15–25	Wound(s); Previous failures; Dead wood in canopy; Root damage; Co-dominant stems	Remove deadwood/stubs	Medium	6.6
56	5–10	500	15–20	Good	Good	Mature	15–25	Dieback; Root damage	Mulching	Low	6.0
57	10–15	550	15–20	Good	Fair	Mature	15–25	Dead wood in canopy; Previous failures; Wound(s); Root damage	Remove deadwood/stubs	Medium	6.6
58	5–10	500	15–20	Fair	Fair	Mature	15–25	Hanger(s); Dieback; Root damage; Pests/Insects; Decay; Wound(s); Previous failures; Dead wood in canopy	Remove deadwood/stubs; Remove hanging limb	Medium	6.0
59	10–15	800	15–20	Good	Fair	Mature	15–25	Co-dominant stems; Wound(s); Previous failures; Poor pruning		Medium	9.6
60	10–15	600	15–20	Good	Fair	Mature	15–25	Wound(s); Dieback		Medium	7.2
61	10–15	650	15–20	Good	Fair	Mature	10–15	Dieback; Wound(s); Co-dominant stems; Included bark; Previous failures	Monitor	Medium	7.8
62	10–15	750	15–20	Good	Fair	Mature	10–15	Co-dominant stems; Excessive end weight; Crack(s)/Split(s); Previous failures; Wound(s)	Remove selective branches; Aerial inspection; Monitor	High	9.0
64	<5	200	10–15	Good	Fair	Semi-Mature	>50	Suppressed	Other action	Low	2.4
65	5–10	350	10–15	Good	Fair	Semi-Mature	25–50	Root damage; Co-dominant stems	Remove selective branches	Low	4.2
66	<5	100	10–15	Fair	Good	Juvenile	25–50	Suppressed; Wound(s)		Very Low	2.0
67	<5	150	5–10	Good	Fair	Juvenile	15–25	Crack(s)/Split(s); Inappropriate location; Root damage; Wound(s); Suppressed	Monitor; Consider removing	Medium	2.0
68	5–10	450	15–20	Good	Fair	Mature	15–25	Root damage; Dead wood in canopy	Remove deadwood/stubs; Remove selective branches	Low	5.4
69	<5	300	15–20	Good	Fair	Semi-Mature	15–25	Root damage		Low	3.6
71	<5	200	10–15	Good	Good	Semi-Mature	25–50	Suppressed		Very Low	2.4
72	<5	200	10–15	Good	Fair	Semi-Mature	25–50	Suppressed; Mechanical damage; Previous failures		Low	2.4
73	<5	200	10–15	Good	Good	Semi-Mature	25–50	Suppressed		Very Low	2.4
74	5–10	200	5–10	Fair	Fair	Semi-Mature	10–15	Wound(s); Suppressed		Low	2.4

No	Canopy	Diameter	Height	Condition	Structure	Age	TLE	Defects	Action	Current Risk	Radial TPZ (m)
75	<5	200	10–15	Good	Good	Semi-Mature	25–50	Wound(s); Bracket fungi; Suppressed		Low	2.4
76	10–15	500	15–20	Good	Fair	Mature	15–25	Co-dominant stems; Wound(s); Previous failures; Dieback; Crack(s)/Split(s)	Remove selective branches	Medium	6.0
77	10–15	550	15–20	Good	Fair	Mature	15–25	Wound(s); Dead wood in canopy	Remove deadwood/stubs; Other action	Medium	6.6
78	10–15	500	15–20	Good	Fair	Mature	10–15	Dieback; Co-dominant stems; Cavity(s); Wound(s); Decay; Soil compaction; Previous failures	Monitor	Medium	6.0
79	10–15	600	15–20	Good	Fair	Mature	10–15	Co-dominant stems; Dead wood in canopy; Wound(s); Previous failures	Remove deadwood/stubs	Medium	7.2
80	5–10	450	15–20	Good	Fair	Mature	15–25	Wound(s); Dieback; Previous failures		Low	5.4
81	10–15	600	15–20	Good	Fair	Mature	15–25	Wound(s); Root damage; Dead wood in canopy	Remove deadwood/stubs	Low	7.2
82	<5	250	10–15	Fair	Fair	Semi-Mature	25–50	Wound(s); Suppressed	Remove selective branches	Low	3.0
83	<5	250	10–15	Fair	Fair	Semi-Mature	5–10	Suppressed; Mechanical damage; Dead wood in canopy; Dieback; Decay; Wound(s)	Monitor; Remove deadwood/stubs; Consider removing	Medium	3.0
84	5–10	450	10–15	Good	Fair	Semi-Mature	25–50	Co-dominant stems; Dead wood in canopy; Previous failures	Remove deadwood/stubs	Medium	5.4
85	<5	300	10–15	Fair	Fair	Semi-Mature	15–25	Dead wood in canopy; Hanger(s); Previous failures; Suppressed; Wound(s)	Remove deadwood/stubs; Remove hanging limb	Medium	3.6
86	<5	250	10–15	Fair	Fair	Semi-Mature	25–50	Suppressed; Dead wood in canopy; Previous failures	Remove deadwood/stubs	Medium	3.0
87	5–10	300	10–15	Fair	Fair	Semi-Mature	15–25	Dieback; Wound(s); Previous failures; Soil compaction		Low	3.6
88	<5	150	10–15	Fair	Fair	Juvenile	15–25	Suppressed		Low	2.0
89	<5	200	10–15	Fair	Good	Semi-Mature	25–50	Dieback; Suppressed		Low	2.4
90	<5	250	10–15	Good	Fair	Semi-Mature	15–25	Suppressed; Previous failures		Medium	3.0
91	5–10	300	15–20	Good	Fair	Semi-Mature	25–50	Suppressed; Dieback		Low	3.6
92	5–10	150	5–10	Fair	Fair	Juvenile	5–10	Wound(s); Mechanical damage; Suppressed	Consider removing	Low	2.0

No	Canopy	Diameter	Height	Condition	Structure	Age	TLE	Defects	Action	Current Risk	Radial TPZ (m)
93	5-10	300	10-15	Good	Fair	Semi-Mature	25-50	Dieback; Previous failures; Suppressed		Low	3.6
96	5-10	400	10-15	Fair	Poor	Semi-Mature	10-15	Dieback; Previous failures; Co-dominant stems; Included bark	Monitor	Medium	4.8
98	10-15	500	15-20	Good	Fair	Mature	15-25	Wound(s); Co-dominant stems; Dieback	Formative pruning; Remove selective branches	Medium	6.0
99	10-15	550	15-20	Good	Fair	Mature	15-25	Wound(s); Previous failures; Dead wood in canopy; Soil compaction	Remove deadwood/stubs	Medium	6.6
100	10-15	500	15-20	Good	Fair	Mature	15-25	Crack(s)/Split(s); Wound(s); Dead wood in canopy	Remove selective branches; Remove deadwood/stubs	Medium	6.0
101	<5	100	10-15	Fair	Good	Juvenile	25-50	Wound(s); Suppressed		Low	2.0
102	<5	150	10-15	Good	Fair	Juvenile	25-50	Suppressed; Wound(s)		Low	2.0
104	5-10	450	10-15	Good	Fair	Mature	15-25	Wound(s); Suppressed		Low	5.4
105	10-15	650	15-20	Fair	Fair	Mature	10-15	Wound(s); Dead wood in canopy; Root damage; Poor pruning	Remove deadwood/stubs	Medium	7.8
106	10-15	650	15-20	Good	Fair	Mature	15-25	Root damage; Previous failures; Wound(s); Soil compaction; Poor pruning		Medium	7.8
107	10-15	500	15-20	Fair	Fair	Mature	5-10	Root damage; Decay; Co-dominant stems; Dead wood in canopy; Cavity(s); Soil compaction; Poor pruning; Wound(s)	Monitor; Remove deadwood/stubs	Medium	6.0
108	5-10	450	5-10	Fair	Poor	Mature	<5	Root damage; Decay; Wound(s); Crack(s)/Split(s); Dead wood in canopy; Excessive thinning; Soil compaction	Removal	Medium	5.4
109	10-15	500	10-15	Fair	Fair	Mature	5-10	Cavity(s); Dead wood in canopy; Soil compaction; Wound(s); Decay	Monitor; Formative pruning; End weight reduction; Remove selective branches	Medium	6.0
110	5-10	500	10-15	Good	Fair	Semi-Mature	15-25	Co-dominant stems; Dead wood in canopy	Remove deadwood/stubs; Monitor	Medium	6.0
111	<5	300	10-15	Good	Fair	Semi-Mature	25-50	Dead wood in canopy	Remove deadwood/stubs	Medium	3.6
112	5-10	350	15-20	Good	Fair	Semi-Mature	15-25	Dieback; Dead wood in canopy; Wound(s)	Remove deadwood/stubs	Medium	4.2
113	5-10	200	10-15	Good	Fair	Semi-Mature	15-25	Dieback; Suppressed		Low	2.4
114	5-10	350	10-15	Good	Fair	Semi-Mature	25-50	Suppressed		Low	4.2
116	10-15	500	10-15	Good	Poor	Mature	10-15	Excessive end weight; Crack(s)/Split(s); Weak unions; Wound(s); Decay; Dieback; Co-dominant stems	Remove selective branches	High	6.0



No	Canopy	Diameter	Height	Condition	Structure	Age	TLE	Defects	Action	Current Risk	Radial TPZ (m)
117	5-10	450	10-15	Poor	Fair	Mature	5-10	Dead wood in canopy; Root damage; Dieback; Excessive thinning	Remove deadwood/stubs; Monitor	Medium	5.4
118	10-15	650	15-20	Good	Fair	Mature	15-25	Root damage; Co-dominant stems; Dead wood in canopy; Soil compaction	Remove deadwood/stubs	Medium	7.8
119	10-15	650	15-20	Fair	Fair	Mature	15-25	Parasitic plant/Mistletoe; Dead wood in canopy; Co-dominant stems	Remove deadwood/stubs	Medium	7.8
120	10-15	550	10-15	Fair	Fair	Mature	15-25	Co-dominant stems; Dead wood in canopy; Previous failures	Remove deadwood/stubs	Medium	6.6
121	10-15	700	15-20	Good	Fair	Mature	10-15	Previous failures; Wound(s); Hanger(s); Dead wood in canopy; Included bark; Co-dominant stems	Formative pruning; Remove hanging limb; End weight reduction; Remove deadwood/stubs; Remove selective branches	Medium	8.4
122	5-10	450	15-20	Good	Fair	Mature	15-25	Wound(s); Dead wood in canopy	Remove deadwood/stubs; Remove selective branches	Medium	5.4
123	<5	350	15-20	Good	Fair	Mature	15-25	Wound(s); Cavity(s); Previous failures; Dead wood in canopy	Consider removing; Monitor	Medium	4.2
124	<5	350	15-20	Good	Fair	Mature	15-25	Wound(s); Dead wood in canopy; Suppressed; Soil compaction	Remove deadwood/stubs	Medium	4.2
125	10-15	450	15-20	Good	Fair	Mature	15-25	Wound(s); Dead wood in canopy; Soil compaction	Remove deadwood/stubs	Medium	5.4
126	<5	350	15-20	Good	Fair	Mature	15-25	Wound(s); Suppressed		Low	4.2
127	5-10	350	10-15	Good	Fair	Mature	15-25	Included bark; Co-dominant stems	Formative pruning; Remove selective branches	Medium	4.2
128	5-10	300	10-15	Good	Fair	Semi-Mature	10-15	Soil compaction; Suppressed		Low	3.6
129	10-15	650	10-15	Good	Fair	Mature	10-15	Wound(s); Root damage; Previous failures; Dead wood in canopy; Co-dominant stems; Included bark	Remove deadwood/stubs; Branch support hardware	Medium	7.8
131	10-15	550	10-15	Good	Fair	Mature	15-25	Co-dominant stems; Previous failures; Wound(s)	Remove selective branches	Medium	6.6
136	10-15	600	10-15	Fair	Good	Mature	15-25	Wound(s); Soil compaction; Poor pruning; Dead wood in canopy	Maintain statutory clearances; Remove deadwood/stubs	Medium	7.2
137	10-15	550	10-15	Good	Good	Mature	25-50	Root damage; Wound(s); Dead wood in canopy; Soil compaction	Remove deadwood/stubs	Medium	6.6
140	5-10	450	10-15	Fair	Fair	Mature	5-10	Wound(s); Decay; Dead wood in canopy	Remove deadwood/stubs; Monitor; Consider removing	Medium	5.4
141	5-10	550	10-15	Good	Fair	Mature	15-25	Hanger(s); Poor pruning; Wound(s); Dead wood in canopy; Previous failures	Remove hanging limb; Remove deadwood/stubs	Medium	6.6
142	5-10	550	10-15	Good	Fair	Mature	15-25	Co-dominant stems; Wound(s); Root damage; Damaging infrastructure	Shape from infrastructure; Monitor	Medium	6.6

No	Canopy	Diameter	Height	Condition	Structure	Age	TLE	Defects	Action	Current Risk	Radial TPZ (m)
143	5-10	550	10-15	Good	Good	Mature	15-25	Root damage; Parasitic plant/Mistletoe; Damaging infrastructure; Dead wood in canopy; Previous failures; Wound(s)	Remove deadwood/stubs; Other action	Medium	6.6
144	<5	350	10-15	Fair	Fair	Semi-Mature	10-15	Root damage; Dead wood in canopy; Wound(s)	Remove deadwood/stubs	Medium	4.2
145	5-10	600	15-20	Good	Good	Mature	25-50	Wound(s); Root damage		Medium	7.2
146	5-10	600	10-15	Good	Fair	Mature	15-25	Decay; Root damage; Bracket fungi; Soil compaction; Wound(s); Poor pruning	Further reporting/testing; Monitor	High	7.2
147	10-15	800	10-15	Fair	Fair	Mature	15-25	Dead wood in canopy; Co-dominant stems; Wound(s); Poor pruning; Previous failures; Hanger(s)	Remove deadwood/stubs; Remove hanging limb	Medium	9.6
149	5-10	650	10-15	Fair	Fair	Mature	15-25	Previous failures; Dieback; Wound(s); Poor pruning	Crown uplift	Medium	7.8
150	5-10	600	10-15	Good	Fair	Mature	15-25	Root damage; Damaging infrastructure; Dead wood in canopy; Soil grade changes; Previous failures	Remove deadwood/stubs	Medium	7.2
151	5-10	550	10-15	Good	Fair	Mature	15-25	Wound(s); Root damage; Dieback; Soil compaction		Medium	6.6
153	10-15	500	10-15	Good	Fair	Mature	15-25	Root damage; Excessive end weight; Soil compaction; Dead wood in canopy	Remove deadwood/stubs; End weight reduction	Medium	6.0
155	10-15	850	15-20	Good	Poor	Mature	10-15	Wound(s); Dead wood in canopy; Decay; Cavity(s); Previous failures	Remove deadwood/stubs; Monitor	Medium	10.2
160	5-10	450	15-20	Good	Fair	Mature	15-25	Suppressed; Poor pruning; Hanger(s); Dead wood in canopy	Remove deadwood/stubs; Remove hanging limb	Medium	5.4
173	5-10	500	15-20	Good	Fair	Mature	15-25	Root damage; Dead wood in canopy; Co-dominant stems; Previous failures; Soil compaction	Remove deadwood/stubs	Medium	6
174	5-10	550	15-20	Good	Fair	Mature	15-25	Root damage; Damaging infrastructure; Excessive end weight; Previous failures; Dead wood in canopy; Soil compaction	Remove deadwood/stubs; End weight reduction	Medium	7
175	10-15	900	10-15	Good	Fair	Mature	15-25	Weak unions; Damaging infrastructure; Poor pruning; Dead wood in canopy; Soil compaction; Co-dominant stems; Included bark	Remove deadwood/stubs; Branch support hardware	Medium	11
183	10-15	650	10-15	Fair	Fair	Mature	15-25	Root damage; Wound(s); Co-dominant stems; Dieback; Soil problems; Poor pruning; Dead wood in canopy	Remove deadwood/stubs	Medium	8
184	10-15	950	15-20	Fair	Hazard	Mature	0	Wound(s); Excessive end weight; Crack(s)/Split(s); Weak unions; Dead wood in canopy; Poor pruning; Soil grade changes; Co-dominant stems; Soil compaction	Removal	Urgent	11

No	Canopy	Diameter	Height	Condition	Structure	Age	TLE	Defects	Action	Current Risk	Radial TPZ (m)
192	<5	300	5–10	Poor	Poor	Semi-Mature	<5	Dead wood in canopy; Dieback; Suppressed	Removal	Medium	4
194	10–15	700	10–15	Good	Fair	Mature	15–25	Root damage; Cavity(s); Co-dominant stems; Mechanical damage; Wound(s); Dead wood in canopy; Soil compaction; Poor pruning	Remove deadwood/stubs	Medium	8
195	10–15	700	10–15	Good	Fair	Mature	15–25	Dead wood in canopy; Co-dominant stems; Damaging infrastructure; Soil compaction; Poor pruning; Root damage	Remove deadwood/stubs	Medium	8
196	10–15	750	10–15	Good	Fair	Mature	15–25	Co-dominant stems; Dead wood in canopy; Hanger(s); Parasitic plant/Mistletoe; Soil grade changes; Soil compaction; Poor pruning	Other action; Remove deadwood/stubs; Branch support hardware; End weight reduction; Remove hanging limb	Medium	9
200	5–10	500	10–15	Good	Fair	Mature	10–15	Soil grade changes; Included bark; Soil problems; Poor pruning; Co-dominant stems; Dead wood in canopy	Remove selective branches; Remove deadwood/stubs; Shape from infrastructure; Monitor	Medium	6
201	5–10	700	10–15	Good	Fair	Mature	10–15	Wound(s); Bleeding/sap flow; Included bark; Soil compaction; Co-dominant stems	Formative pruning; End weight reduction; Remove selective branches	Medium	8
207	10–15	550	10–15	Good	Fair	Mature	15–25	Co-dominant stems; Root damage; Included bark; Damaging infrastructure; Wound(s); Soil compaction	Monitor; Shape from infrastructure; Remove selective branches	Medium	7
208	10–15	600	10–15	Fair	Fair	Mature	15–25	Dead wood in canopy; Co-dominant stems; Root damage; Cavity(s); Poor pruning; Previous failures	Remove deadwood/stubs	Medium	7
211	10–15	500	15–20	Good	Fair	Mature	15–25	Root damage; Dead wood in canopy; Co-dominant stems; Soil compaction	Remove deadwood/stubs; Monitor	Medium	6
216	10–15	600	10–15	Good	Fair	Mature	15–25	Root damage; Co-dominant stems; Dead wood in canopy; Previous failures	Remove deadwood/stubs	Medium	7
226	10–15	650	10–15	Good	Poor	Mature	15–25	Decay; Wound(s); Parasitic plant/Mistletoe; Soil compaction; Co-dominant stems; Included bark	Remove selective branches; Branch support hardware	Medium	8
229	10–15	750	15–20	Good	Fair	Mature	15–25	Root damage; Wound(s); Dieback; Hanger(s); Soil compaction	Remove hanging limb	Medium	9
231	10–15	650	10–15	Good	Fair	Mature	15–25	Excessive end weight; Wound(s); Co-dominant stems; Soil compaction; Previous failures	Remove selective branches	High	8
232	10–15	650	10–15	Fair	Poor	Mature	<5	Decay; Hanger(s); Dead wood in canopy; Cavity(s); Co-dominant stems; Previous failures	Removal	High	8
233	5–10	350	10–15	Good	Fair	Mature	15–25	Dead wood in canopy; Dieback; Soil compaction; Wound(s); Co-dominant stems	Remove deadwood/stubs	Medium	4
234	5–10	500	10–15	Good	Poor	Mature	<5	Soil compaction; Decay; Cavity(s); Wound(s)	Removal	High	6

No	Canopy	Diameter	Height	Condition	Structure	Age	TLE	Defects	Action	Current Risk	Radial TPZ (m)
238	5-10	600	10-15	Fair	Poor	Mature	<5	Cavity(s); Co-dominant stems; Previous failures; Dead wood in canopy; Poor pruning; Wound(s); Decay	Removal	High	7
240	5-10	450	10-15	Good	Fair	Mature	15-25	Abnormal lean; Suppressed; Dead wood in canopy; Wound(s)		Medium	5
244	10-15	650	10-15	Fair	Fair	Mature	10-15	Dead wood in canopy; Soil compaction; Root damage; Decay; Wound(s); Cavity(s)	Mulching; Monitor; Remove deadwood/stubs	Medium	8
260	5-10	500	10-15	Good	Fair	Mature	15-25	Co-dominant stems; Wound(s); Root damage; Previous failures	Crown uplift	Medium	6
280	5-10	800	10-15	Good	Fair	Senescent	5-10	Root damage; Co-dominant stems; Wound(s); Hanger(s)	Remove hanging limb; Monitor; Mulching; Other action	Medium	10
281	5-10	550	10-15	Fair	Fair	Mature	10-15	Decay; Crack(s)/Split(s); Co-dominant stems; Cavity(s); Dead wood in canopy; Soil compaction; Root damage	Monitor; Remove deadwood/stubs	Medium	7

## 13.7 Appendix G – Potential Site Locations DWG CAD file