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DEVELOPMENT IMPACT ASSESSMENT REPORT

SPECTATOR PRECINCT
ROYAL RANDWICK RACECOURSE
77-97 ALISON ROAD, RANDWICK

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1 INTRODUCTION

1.1.1 This report was commissioned by AECOM on behalf of the Australian Jockey Club (AJC) to assess the health and condition of forty (40) trees located within or immediately adjacent the 'Spectator Precinct' of the Royal Randwick Racecourse (RRR). This report has been prepared to aid in the assessment of a Development Proposal under Part 3A of the *Environmental Planning and Assessment Act* (1979) for the redevelopment of the precinct.

1.1.1 The purpose of this report is to assess the potential impact of the proposed development on the subject trees, together with recommendations for amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures (Tree Management Plan – Appendix 2)) to ensure the long-term preservation of the trees to be retained where appropriate.

2 THE SITE

2.1.1 The subject property is known as the Royal Randwick Racecourse, 77-97 Alison Road, Randwick. It is the oldest and longest continually operating racecourse in the Sydney metropolitan area. The racecourse has evolved over time, focusing on racing, spectator and training facilities. The Racecourse is considered to be an important cultural landscape and forms part of Sydney's Regional Open Space System.

2.1.2 The 'Spectator Precinct' is located in the north-western portion of the property, near the main vehicular entry off Alison Road. For the purposes of this report the subject precinct will be referred to as "the Site". The site contains a number of buildings comprising the main spectator facilities, grandstands and other buildings, together with open space areas.

2.1.3 The landscape and soils of this area have been extensively disturbed and modified. Remnant soils within the site are typical of the Tuggerah Soil Landscape Group (as classified in the Soil Landscapes of the Sydney 1:100,000 Sheet), consisting of "deep (greater than 2000mm) *Podzols* on dunes and *Podzol/Humus Podzol* intergrades on swales." The landscape of the area was formerly gently undulating to rolling coastal dunefields with slope gradients of 1-10%. [1]

2.1.4 Most of the locally-indigenous vegetation has been cleared from surrounding areas for residential, recreational and institutional development. The original vegetation of this area consisted of low swamp woodland & Eastern Suburbs Banksia Scrub,[1] with dominant locally-indigenous tree species including *Angophora costata* (Sydney Red Gum), *Eucalyptus piperita* (Sydney Peppermint) and *Banksia aemula* (Wallum Banksia) on higher areas and *Eucalyptus robusta* (Swamp Mahogany) and *Melaleuca quinquenervia* (Broadleaved Paperbark) occurring in low lying areas. [2] There is no remnant locally-indigenous species within this precinct.

2.1.5 The existing plantings consist of a range of exotic and non-local native species, including single specimen and row plantings, with dominant plantings of Moreton Bay Figs, Port Jackson Figs and Brushbox. The groupings have been identified by number on Map 4 of the Royal Randwick Racecourse Development Control Plan (DCP), based on the Draft Conservation Management Plan prepared by Godden Mackay Logan (2006). These include the following:-

- Group 17 – a row of *Lophostemon confertus* (Brushbox) [T39-T45] interplanted with *Phoenix roebelenii* (Dwarf Date Palm) adjacent the car park;
- Group 47 – a row of *Lophostemon confertus* (Brushbox) [T47-T57] adjacent the main administration building (north side adjacent Alison Road) together with a single Brushbox [T46] in the centre of the car park, on the south side of the administration building (Group 25);

- Group 21 & 22 – two *Ficus macrophylla* (Moreton Bay Figs) [T84 & T85] on the south-western side of the Randwick Pavilion (transplanted to this location c.1999 and installed in raised masonry planter boxes);
- Group 32 & 33 – two *Ficus rubiginosa* (Port Jackson Figs) [T68 & T69] on the north-eastern side of the Randwick Pavilion (Betting Pavilion) (also transplanted to this location c.1999 and installed in raised masonry planter boxes);
- Group 26, 27, 28 & 30 – a former row of *Ficus rubiginosa* (Port Jackson Figs) [T61, T62 & T64]. T63, (Group 28) originally forming part of this row, has been removed since the original survey. Group 19, a single specimen *Ficus obliqua* (Small-leaf Fig) [T58], is also located in this area. This appears to be the remaining one of a former pair of trees;
- Groups 41, 42 & 45 – three (3) *Ficus rubiginosa* (Port Jackson Figs) [T77, T78 & T81] on the northern side of the temporary marquee
- Group 43 a solitary specimen of *Grevillea robusta* (Silky Oak) also on the northern side of the temporary marquee;
- Group 51 – a mixed row of *Ficus macrocarpa var hillii* (Hill's Figs) and *Platanus x hybrida* (London Plane trees) on the north-eastern side of the race track. T82 & T83 form part of this group, which continues eastward alongside Alison Road;
- Group 7 – a large specimen of *Ficus macrophylla* (Moreton Bay Fig) located in the lawn area south of the Tea House.
- Group 13 & 14 – originally a pair of *Cupressus torulosa* (Bhutan Cypress), only one now remains [T100] on the south side of the Tramway Turnstile Building;
- Group 18 – a single *Eucalyptus ficifolia* (WA Flowering Gum) [T87] adjacent the Tramway Turnstile Building (east side); and
- Group 83 – a single specimen of *Ficus rubiginosa* (Port Jackson Figs) [T102], one of an original pair of trees on the north side of the ARF building (T101 now removed).

3 SUBJECT TREES

3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 27th August 2010. Each tree has been provided with an identification number for reference purposes denoted on the attached Tree Location Plan (**Appendix 6**), based on the survey prepared by Rygate & Company Pty Ltd, Dwg. Ref No. RRC 020910_REVA_SPECTATOR PRECINCT dated 2nd September 2010. The tree identification numbers used in this report follow that of a previous arboricultural report prepared by Landscape Matrix dated December 2007. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 4**).

4 HEALTH AND CONDITION ASSESSMENT

4.1 Methodology

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

4.1.2 The following information was collected for each tree:-

- Tree Species (Botanical & Common Name);
- Approximate height;
- Canopy spread; measured in four cardinal directions using a metric tape and an average taken.
- Trunk Diameter measured at 1.4 metres from ground level;
- Live Crown Size; (measured by subtracting the total height of the tree from the lowest point of the crown and multiplying by the average crown spread to give a value in square metres).
- Health & vigour; using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators,

- Condition; using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators.
- Suitability of the tree to the site and its existing location; in consideration of damage or potential damage to services or structures, available space for future development and nuisance issues.

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

4.2 Safe Useful Life Expectancy (SULE)

4.2.1 The remaining Safe Useful Life Expectancy [4] of the tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area in Sydney, less its estimated current age. The life expectancy of the tree has been further modified where necessary in consideration of its current health and vigour, condition and suitability to the site. The estimated SULE of each tree is shown in **Appendix 4.**

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

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

5 LANDSCAPE SIGNIFICANCE

5.1 Methodology for Determining Landscape Significance

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

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

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

5.2 Environmental Significance

5.2.1 A Tree Preservation Order (TPO) applies to all land within the City of Randwick, made under Clause 28 of the Randwick Local Environment Plan 1998 by resolution of Council of 26th July 2005. The TPO generally protects all trees of a height of six (6) metres or greater or with a canopy spread of four (4) metres or greater, or trunk circumference of 1000 mm (320 mm in diameter) or greater. The TPO also protects all palms, tree ferns, cycads and any tree situated on public land or in bushland, regardless of their size. Some exemptions apply, however, all of the trees assessed within this Precinct are protected under Council's TPO.

5.2.2 All of the trees within this precinct are exotic or non-local native species that would be of some benefit to native wildlife. However, none of the trees contain cavities suitable as nesting hollows

for arboreal mammals or birds or other visible signs of wildlife habitation. There are no remnant locally-indigenous species within this precinct.

5.2.3 None of the trees assessed are scheduled as Noxious Weeds under the meaning of *Noxious Weeds Act* (NSW) 1993.

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

5.3 Heritage Significance

5.3.1 The site has been associated with horse racing since 1833. The Australian Jockey Club (AJC) was established in 1842, and has the responsibility of care, control and management of the Royal Randwick Racecourse. The site has had successive overlays of landscaping and tree planting since this time, including important specimen trees, informal groupings, row plantings and avenues across the site. The Royal Randwick Racecourse contains one of the largest collections of Fig plantings in the Randwick LGA, many dating back to the mid to late 1800's and are considered important cultural plantings of local and regional significance. The Members' Stand (Official Stand), constructed c. 1910, is listed as a Heritage Item of Local Significance under Schedule 3 of the Randwick Local Environment Plan (LEP), 1998 (December 2008). However, none of the trees within the site are specifically listed on the LEP.

5.3.2 Map 4 of the Royal Randwick Racecourse DCP, based on the Draft Conservation Management Plan prepared by Godden Mackay Logan (2006) also indicates the relative heritage significance of cultural plantings within the site.

5.3.3 A Significant Tree Register (STR) exists within the City of Randwick, adopted by Council in August 2007. All trees listed on the register are protected Tree Preservation Order, regardless of their species or dimensions. Trees T84 & T85, two (2) *Ficus macrophylla* (Moreton Bay Figs) and T68 & T69, two (2) *Ficus rubiginosa* (Port Jackson Figs), T61, T62, T64, T77, T78 & T81 six (6) *Ficus rubiginosa* (Port Jackson Figs), T58, a *Ficus obliqua* (Small-leaf Fig), T91 & T102 *Ficus macrophylla* (Moreton Bay Fig) are all listed on Council's Register of Significant Trees Volume 3 (Significant Trees under the control and management of other Government Authorities, Institutional, religious and Non-government Organisations).[5]

Plate 1 – Royal Randwick Racecourse c.1863 – note semi-mature trees on the rear right hand side of the stands. Ref: State Library of NSW

5.3.4 The specimen and row plantings of various Fig species around the main lawn and open space areas north-west of the stands (including all those listed above) are thought to have been planted in the mid to late 1800's, being typical of the late Victorian era. Photos of the Racecourse from the 1860's show a group of semi-mature trees in this general area which appear to be Figs (refer Plate 1). These trees are all considered of 'Exceptional Significance' under the Royal Randwick Racecourse DCP. These trees are of variable health and condition, most having been previously pollarded (severely lopped) at 5-6 metres from ground level. The crowns are now completely restored, though this type of pruning creates wounds that inevitably lead to decay and formation of branching defects. Four of the trees T68, T69, T84 & T85 were transplanted in c.1999 to either side of the Randwick Pavilion (Betting Pavillion) and are sited in raised masonry planters. With exception of T84, which has a large basal cavity and exhibits signs of decline, the remaining three trees display good health and vigour.

5.3.5 The alternate row planting of *Ficus macrocarpa var. hillii* (Hill's Fig) and *Platanus x hybrida* (London Plane Trees) along the north-eastern side of the race track, near Alison Road (of which T82 & T83 form a part) are thought to have been planted in the early Inter-war Period (1915-1940) being fairly typical of this area. These trees are also considered of 'Exceptional Significance' under the Royal Randwick Racecourse DCP. This row has also been previously pollarded, but T82 & T83 exhibit good health and vigour with no significant branching defects.

5.3.6 The individual specimens [T46 & T70] and row plantings [T47-T57 and T39-T45] of *Lophostemon confertus* (Brushbox) are fairly typical of the Federation Period and were probably planted c. 1900-1920. These trees are considered of 'High Significance' under the Royal Randwick Racecourse DCP. These trees exhibit varying degrees of dieback throughout the crowns, probably related to latent drought stress, but most are generally in fair health and condition. Many of the group north of the administration building have either trunk or primary limbs in contact with the masonry boundary fence and have adaptive growth at the contact points.

5.3.7 The remaining miscellaneous plantings [T86, T87, T100 & T105] are not considered significant under the Royal Randwick Racecourse DCP.

5.4 Amenity Value

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

6 RETENTION VALUES

6.1.1 The Retention Values shown in **Appendix 4** and **Appendix 6** have been determined on the basis of the estimated longevity of the trees and their landscape significance rating, in accordance with **Table One**. Together with guidelines contained in **Section 7** (Tree Protection Zones) this information should be used to determine the most appropriate position of building footprints and other infrastructure within the site, with due consideration to other site constraints, to minimise the impact on trees considered worthy of preservation.

TABLE 1 – TREE RETENTION VALUES – ASSESSMENT METHODOLOGY

	Landscape Significance Rating						
Estimated Life Expectancy	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Long - Greater than 40 Years	High Retention Value						
Medium- 15 to 40 Years			Moderate Retention Value				
Short - 5 to 15 years				Low Ret. Value			
Transient - Less than 5 Years				Very Low Retention Value			
Dead or Potentially Hazardous							

7 TREE PROTECTION ZONES

7.1.1 In order to provide adequate protection for trees nominated as suitable for preservation, Tree Protection Zones (TPZ) are required to provide adequate setbacks from buildings and other infrastructure to minimise adverse impact. The Tree Protection Zone is a radial distance measured from the centre of the trunk of the tree as specified in **Appendix 5**. The intention of the Tree Protection Zone is to minimise incursions to the root system and canopy to ensure the long-term health and stability of each tree to be retained. Incursions to the root zone may occur due to excavation, changes in ground levels, (either lowering or raising the grade), trenching or other forms or soil disturbance such as ripping, grading or inverting the soil profile. Tree Protection Zones for each tree are shown in **Appendix 5**. These have been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).[6]

7.2 Structural Root Zone (SRZ)

7.2.1 The Structural Root Zone (SRZ) provides the bulk of mechanical support and anchorage for a tree. Incursions within the SRZ are not recommended as they are likely to result in the severance of woody roots which may lead to the destabilisation and/or demise of the tree. The SRZ for each tree has been shown in **Appendix 5**. These have been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).

7.3 Acceptable Incursions to the Tree Protection Zone.

7.3.1 Where encroachment to the TPZ is unavoidable, an incursion to the TPZ of not exceeding 10% of the area of the TPZ and outside the SRZ may be acceptable. Examples of acceptable incursions are shown in **Appendix 3**. Greater incursions to the TPZ may result in an adverse impact on the tree. Where incursions greater than 10% of the TPZ are unavoidable, exploratory excavation using non-destructive methods may be required to evaluate the extent of the root system affected and determine whether or not the tree can remain viable.

7.4 Legal Protection

7.4.1 Notwithstanding the above recommendations, Council may require a greater setback from certain types of structures to ensure the on-going legal protection of the tree (i.e. its legal status under Council's Tree Preservation Order). In Randwick City LGA, a tree located within two (2) metres of a dwelling or approved building is not protected under the Tree Preservation Order (TPO). The measurement is taken from the closes point of the trunk of the tree to the closest vertical alignment of the building. As such, if a tree is considered worthy of preservation, Council is unlikely to approve the construction of a building or structure within two (2) metres of a tree, regardless of whether this can be undertaken without having an adverse impact on its health or longevity.

8 PROPOSED DEVELOPMENT

8.1.1 The proposed development includes the demolition of the Tea House & Betting Pavilion, construction of a new Parade Ring and redevelopment of the open space and pedestrian areas surrounding the main spectator facilities.

9 IMPACT ASSESSMENT

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

Title	Author	Dwg No.	Date
Landscape Concept Plan – Spectator Precinct	AECOM	10503376/ L001 Issue C	22/09/2010
Landscape Design Report – Spectator Precinct	AECOM		September 2010

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

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

9.1.3 The proposed development will necessitate the removal of a one (1) tree of moderate retention value (T86, a Bullbay Magnolia). This tree is not considered significant, but is in good health and condition and makes a fair contribution to the amenity of the site. This tree is a relatively small specimen and could be replaced in the short term with new tree planting elsewhere within the site. Alternatively, it would be feasible to transplant this tree elsewhere within the site.

9.1.4 Demolition of existing paved areas and pathways are located within the TPZ's of tree No.s T58 (Small-leaf Fig), T61, T62, T64, T77 & T78 (Port Jackson Figs) (nominated as 'Exceptional Significance' under the Royal Randwick Racecourse DCP) and T70 (Brushbox). The proposed demolition work should not result in any adverse impact on these trees provided that the work is carried out in accordance with Section 14.18. Proposed new pavements within the TPZ's of these trees will necessitate some excavation and compaction within their root zones, but the proposed works are largely within the footprint of existing pavements. As such, the new pavement works should not result in any adverse impact on these trees provided that all excavations are undertaken in accordance with Section 14.19. In the case of T58, it is recommended that the proposed pavement be relocated outside the Structural Root Zone, no closer than the footprint of the existing paved area, to avoid severance and damage to woody roots.

9.1.5 Existing paved areas located within the TPZ's of tree No.s T68 & T69 (Port Jackson Figs) and T84 & T85 (Moreton Bay Figs) are proposed to be demolished and replaced with new garden and paved areas. These trees are nominated as 'Exceptional Significance' under the Royal Randwick Racecourse DCP. As these trees have been previously transplanted into raised masonry planter boxes, demolition of the pavements outside the perimeter line of the planter boxes will not result in any adverse impact on these trees. However, proposed new pavements and gardens surrounding these trees currently indicate the reduction in ground levels within the SRZ (within the area of the

planter box). Given the limited remaining root volume following initial transplanting, lowering of the ground level within the planter box will result in a significant adverse impact on these trees. In order to avoid any adverse impact on T68, T69, T84 & T85, the existing ground levels within the area of the raised planter boxes must be kept at existing levels. The existing area occupied by the planters should be maintained as a landscaped or garden area without any new pavement. It is understood that this issue will be resolved during the detailed design stage by adjusting the levels and areas surrounding the trees accordingly to mitigate any adverse impact on them.

9.1.6 Proposed new pathways are located within the TPZ/SRZ of T91 (Moreton Bay Fig). This tree is nominated as 'Exceptional Significance' under the Royal Randwick Racecourse DCP. Excavation and compaction associated with the pathway on the western side of the tree may necessitate the severance of woody roots, leading to a significant adverse impact. In order to avoid any adverse impact, consideration should be given to adjusting the alignment and/or width of the pathway/pavement to avoid any encroachment into root zone. Alternatively consideration should be given to placement of the pavement and any kerb or edge restraint above grade to avoid excavations within the TPZ (refer Figure 1). Consideration should also be given to a permeable type pavement surface to maximise water infiltration to the underlying root zone. Drainage works, including pits and pipelines, should be placed outside the recommended Minimum Setback Distance (refer Appendix 5) where possible.

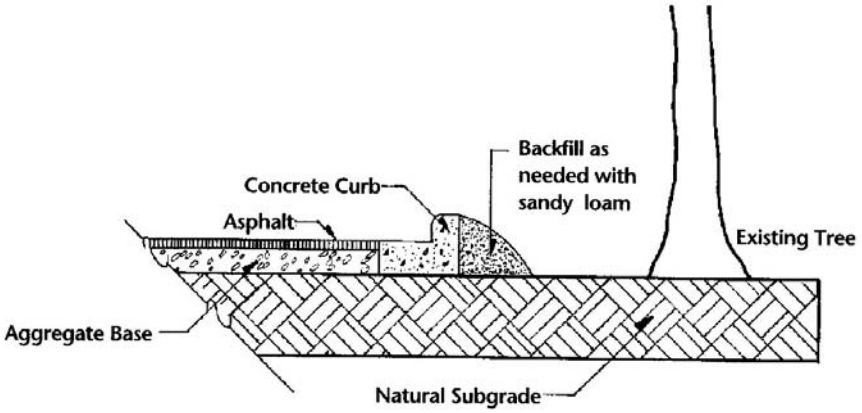


Figure 1 – Suggested method of pavement construction within TPZ's of T91.

9.1.7 It is understood that this issue will be resolved during the detailed design stage by adjusting the levels and areas surrounding the tree accordingly to mitigate any adverse impact

9.1.8 A proposed new amenities block is also located within the TPZ of T91 (Moreton Bay Fig). Excavations and compaction associated with building foundations and underground services may result in an adverse impact on this tree. In order to avoid adverse impact, consideration should be given to relocating the amenities block further south, outside the TPZ (15 metres radius).

9.1.9 No other trees will be adversely affected by the proposed development.

10 REPLACEMENT PLANTING

10.1.1 Where compromises to tree retention are proposed, consideration should be given to replanting new trees within the allotment in accordance with The Royal Randwick Racecourse Development Control Plan (DCP). Replacement trees should be sympathetic with the heritage context of the existing landscape, containing species typical of the late Victorian to Interwar periods.

10.1.2 Section 2.3.5 of the Royal Randwick Racecourse Development Control Plan (DCP) [May 2007] recognises the importance of the cultural heritage landscape and calls for the enhancement of the

landscape qualities of the site, especially gardens and major trees both within the site and in the context of the broader landscape setting. In particular landscape components identified as exceptional or high significance should be conserved and managed. Removal of items of exceptional or high significance should be undertaken only where absolutely necessary based on their remaining SULE (RRR DCP Section 3.3.b).

11 CONCLUSIONS:-

11.1.1 A total of forty (40) trees stand within and adjacent the precinct. These are a mix of non-local native and exotic species in fair to good health and condition. The dominant species in this precinct are row and specimen plantings of Port Jackson Figs, Moreton Bay Figs and Brushbox.

11.1.2 Many of the trees within the site are important cultural plantings. In particular the specimen plantings of Port Jackson Figs and Moreton Bay Figs within the lawn and open space areas north-west of the stands are considered of exceptional significance under the RRR DCP and are listed on Randwick Council's Significant Tree Register. These trees are in the order of 150 years old being typical of Victoria era public plantings. The majority of these trees have been previously pollarded, however, most are in fair to good health and condition with varying SULEs. The alternate row planting of Hills Figs and London Planes on the north-east side of the race track, probably planted in the Interwar period, are also considered of Exceptional Significance under the RRR DCP.

11.1.3 The Brushbox row and specimen plantings located mostly in the vicinity of the administration building and car park were probably planted in the Federation period c. 1900-1920 being fairly typical of this period. These trees are listed considered of High Significance under the RRR DCP, but are not listed on Council's Significant Tree Register. These trees are in variable health and condition, most exhibiting some degree of dieback probably due to latent drought stress.

11.1.4 Miscellaneous plantings of other species have also been planted within the precinct, but these have no special ecological or heritage significance. They are not considered significant under the RRR DCP and are not listed on Council's STR

11.1.5 The proposed development will necessitate the removal of a one (1) tree of moderate retention value (T86). Alternatively, it would be feasible to transplant this tree elsewhere within the site. This tree is not considered significant, but is in good health and condition and makes a fair contribution to the amenity of the site and surrounding properties.

11.1.6 Demolition of existing paved areas and pathways are located within the TPZ's of tree No.s T58 (Small-leaf Fig), T61, T62, T64, T77 & T78 (Port Jackson Figs) should not result in any adverse impact on these trees provided that the work is carried out in accordance with Section 14.18. Proposed new pavements within the TPZ's of these trees will necessitate some excavation and compaction within their root zones. However, the new pavement works should not result in any adverse impact on these trees provided that all excavations are undertaken in accordance with Section 14.19.

11.1.7 Proposed new pavements and gardens surrounding tree No.s T68, T69, T84 & T85 currently indicate a reduction in ground levels within the area of the existing raised planter boxes, which would result in a significant adverse impact on these trees. However, it is understood that this issue will be resolved during the detailed design stage by adjusting the surrounding levels as required to ensure that the existing levels within the planter box areas are maintained.

11.1.8 Proposed new pathways are located within the TPZ/SRZ of T91. Excavation and compaction associated with the pathway may result in a significant adverse impact on this tree. However, it is understood that this issue will be resolved during the detailed design stage by adjusting the surrounding levels as required to ensure that the existing ground levels within the TPZ of this tree are maintained.

11.1.9 A proposed new amenities block located within the TPZ of T91 may result in an adverse impact on this tree. In order to avoid adverse impact, consideration should be given to relocating the amenities block further south, outside the TPZ (15 metres radius).

11.1.10 No other trees will be adversely affected by the proposed development.

12 RECOMMENDATIONS:-

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

2. The proposed pavement on the south-western side of T58 should be relocated outside the Structural Root Zone, no closer than the footprint of the existing paved area, to avoid severance and damage to woody roots

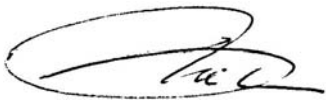
3. Demolition of existing paved areas and pathways located within the TPZ's of tree No.s T58, T61, T62, T64, T77 & T78 should be undertaken in accordance with Section 14.18.

4. Excavations for new pavement sub-grade within the TPZ's of tree No.s T58, T61, T62, T64, T77 & T78 should be undertaken in accordance with Section 14.19.

5. In order to avoid any adverse impact on trees T68, T69, T84 & T85, the existing ground levels within the raised planter box areas surrounding each tree should be retained as existing. The existing area occupied by the planters should be maintained as a landscaped or garden area without any new pavement.

6. In order to avoid any adverse impact on T91, consideration should be given to altering the alignment or width of the proposed pathway on the western side of this tree or alternatively installing a permeable pavement above existing ground levels to minimise the incursion to the root zone. Consideration should also be given to relocating the proposed amenities block outside the TPZ

7. In order to avoid any adverse impact on T91, consideration should be given to relocating the proposed amenities block outside the TPZ of this tree (15 metres radius).



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23rd September 2010

REFERENCES:-

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

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

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

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

[5] Ruting, Noel (August 2007)
Register of Significant Trees (Randwick City Council LGA) - Volume 3 of 4 – Significant Trees under the control and management of other Government Authorities, Institutional, Religious and Non-government Organisations.
Landarc Pty Ltd, Sydney NSW

[6] Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

13 APPENDIX ONE - CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

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

1. SIGNIFICANT

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

2. VERY HIGH

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

3. HIGH

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

4. MODERATE

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

5. LOW

- The subject tree has a small live crown size of less than 40m² and can be replaced within the short term with new tree planting; or
- The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% Crown Cover (sparse); and
- The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area.

6. VERY LOW

- The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.
- The subject tree is scheduled as exempt (not protected) under the provisions of the local Council's Tree Preservation Order due to its species, nuisance or position relative to buildings or other structures.

7. INSIGNIFICANT

- The tree is a declared Noxious Weed under the *Noxious Weeds Act* (NSW) 1993; or
- The tree is completely dead and has no visible habitat value.

14 APPENDIX TWO - TREE MANAGEMENT PLAN (TREE PROTECTION SPECIFICATIONS)

14.1 Site Arborist

14.1.1 A qualified consulting arborist ('Site Arborist') should be appointed to undertake regular inspections of the site to ensure compliance with the specified tree protection measures and monitor tree health.

14.1.2 The Site Arborist should have the following minimum qualifications:-

- 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 [Australian Qualification Framework (AQF) Level 5];

14.2 Site Management Plan

14.2.1 Prior to commencement of any work on site, the Traffic Management Plan and Site Management Plan should be submitted to the Site Arborist for review and comment in order to resolve any potential issues or conflicts between tree protection and site management & vehicle movements.

HOLD POINT – The Site Management Plan and Traffic Management Plan shall be submitted to the Site Arborist prior to commencement of any work on site.

14.3 Site Inspections

14.3.1 Inspections should be conducted by the Site Arborist in accordance with the following key milestones:-

- Prior to any work commencing on-site (including demolition, earthworks or site clearing) and following installation of tree protection fences or other specified tree protection devices (e.g. Trunk Protection, Ground Protection etc);
- During removal of pavements or demolition of any structure within the Tree Protection Zone of any tree to be retained & protected;
- During any excavation within the nominated Tree Protection Zone of any tree required to be retained & protected;
- At monthly intervals during the construction phase;
- Following completion of the building works and prior to commencement of any landscape works;
- During any landscape works within Tree Protection Zones; and
- At the completion of landscape works.

14.3.2 The Project Manager or Construction Manager shall be responsible to notify the Site Arborist prior to any works within the Tree Protection Zone with a minimum of 24 hours notice.

14.4 Certification/Reporting

14.4.1 Following each inspection the Site Arborist shall prepare a Statement of Compliance, certifying whether or not the works have been completed in compliance with this Plan and the conditions of development consent relating to tree protection. The Compliance Statements should contain photographic evidence where required to demonstrate that the work has been carried out as specified. The Compliance Statements shall be submitted to the Planning NSW at the end of each month.

14.4.2 If conditions have been breached, remedial action shall be recommended to minimise any adverse impact on the subject trees.

14.5 Induction

14.5.1 All contractors, sub-contractors or other persons required to carry out work within Tree Protection Zones should be inducted prior to the commencement of that work. The induction should highlight the following requirements:-

- The requirement to protect trees within the site;
- The specific trees that are to be protected;
- The type of actions that could lead to potential damage (refer **Section 14.9**);
- Maintenance of any protective devices (fencing, trunk protection, ground protection etc) during the proposed works;
- Penalties imposed by Council for breach of Development Consent or breach of Council's Tree Preservation Order; and
- Contact details for the Site Arborist.

14.6 Tree Protection Zones

14.6.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk of the tree as specified in **Appendix 4**. These have been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).[7]

14.6.2 The intention of the TPZ is to ensure protection of the root system and canopy from the potential damage from construction works and ensure the long-term health and stability of each tree to be retained. Incursions to the root zone may occur due to excavations, changes in ground levels, (either lowering or raising the grade), trenching or other forms or soil disturbance such as ripping, grading or inverting the soil profile. Such works may cause damage or loss of part of the root system, leading to an adverse impact on the tree.

14.7 Structural Root Zone (SRZ)

14.7.1 The Structural Root Zone (SRZ) provides the bulk of mechanical support and anchorage for a tree. This is also a radial distance measured from the centre of the trunk as specified in **Appendix 4**. The SRZ has been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites). Incursions within the SRZ are not recommended as they are likely to result in the severance of woody roots which may compromise the stability of the tree or lead to its decline and demise.

14.8 Acceptable Incursions to the Tree Protection Zone.

14.8.1 Where encroachment to the TPZ is unavoidable, an incursion to the TPZ of not exceeding 10% of the area of the TPZ and outside the SRZ may be acceptable. Examples of acceptable incursions are shown in **Appendix 3**. Greater incursions to the TPZ may result in an adverse impact on the tree.

14.8.2 Where incursions greater than 10% of the TPZ are unavoidable, exploratory excavation using non-destructive methods may be required to evaluate the extent of the root system affected and determine whether or not the tree can remain viable (refer **Section 14.19**).

14.9 Prohibited Activities

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

- Excavations and trenching (with exception of the approved foundations and approved underground services);
- Ripping or cultivation of soil;
- Mechanical removal of vegetation;
- Soil disturbance or movement of natural rock;

- Soil level changes including the placement of fill material (excluding that associated with the approved works);
- Stockpiling of spoil;
- Stockpiling of bulk materials such as soil, gravel, sand or similar materials;
- Storage or stockpiling of building materials, demolition waste, other waste and waste receptacles;
- Disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids;
- Movement and storage of plant, equipment & vehicles;
- Erection of site sheds;
- Affixing of signage or hoardings to trees;
- Other physical damage to the trunk or root system; and
- Any other activity likely to cause damage to the tree.

14.9.2 In some instances, proposed building footprints, roadways, services and other infrastructure may overlap with the recommended Tree Protection Zones. Details of the potential issues and recommendations are shown in the attached Impact Assessment Schedule (**Appendix 4**). In these cases, special provisions must be made for the protection of those trees, as per the recommendations column.

14.10 Tree Protection Fencing

14.10.1 All trees within the site to be retained shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence beneath the canopy in the positions indicated on the Tree Protection Plan (**Appendix 7**). The fence shall consist temporary chain wire panels 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement (refer to **Figure 1**). The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate.

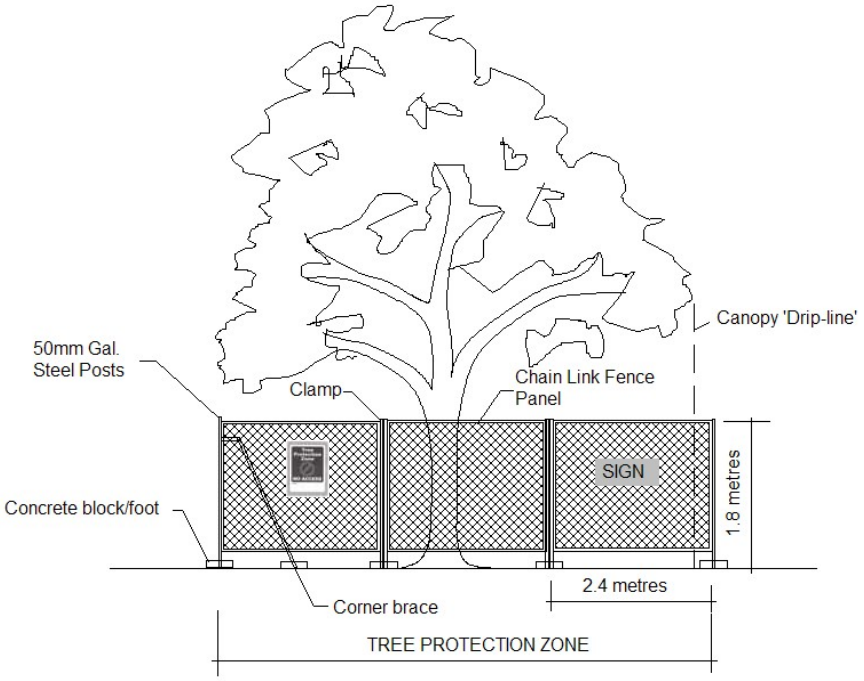

Figure 1 – Detail of Tree Protection Fence

14.11 Signage

14.11.1 Signs shall be installed on the Tree Protection Fence to prevent unauthorised movement of plant and equipment or entry to the Tree Protection Zone. The signs shall be securely attached to the fence using cable ties or equivalent. Signs shall be placed at minimum 10 metre intervals. The wording and layout of the sign shall comply with AS 4970-2009 as shown in Figure 2.

Figure 2 – Detail of Tree Protection Sign

14.12 Ground Protection

14.12.1 A 100mm layer of woodchip mulch shall be installed within designated areas of the Tree Protection Zone of nominated trees as indicated on the Tree Protection Plan (**Appendix 7**) to minimise compaction of the underlying soil profile. A Geotextile fabric, such as Geotex® 'ST' Series manufactured by Synthetic Industries or an equivalent product, shall be installed beneath the mulch layer to minimise compaction to the underlying soil profile and limit migration of mulch into the underlying soil profile. Mulch shall be installed and spread by hand to avoid soil disturbance and compaction within the root zone. Ground protection should be installed prior to any site works and maintained in good condition for the duration of the construction period. On completion of the works, ground protection should be removed without damage or disturbance to the underlying soil profile.

14.13 Trunk Protection

14.13.1 Where provision of tree protection fencing is in impractical due to its proximity to the proposed building footprint, trunk protection shall be erected around nominated trees to avoid accidental damage (**Appendix 7**). The trunk protection shall consist of two (2) metre lengths of softwood timbers (90 x 45mm in section) spaced at 100-150mm centres around the trunk and secured together with 2mm galvanised wire or galvanised hoop strap as shown in Figure 3. Recycled timber (such as demolition waste) may be suitable for this purpose, subject to the approval of the Site Arborist. The timbers shall be wrapped around the trunk, but not fixed to the tree to avoid mechanical injury or damage to the trunk. Trunk protection should be installed prior to any site works and maintained in good condition for the duration of the construction period.

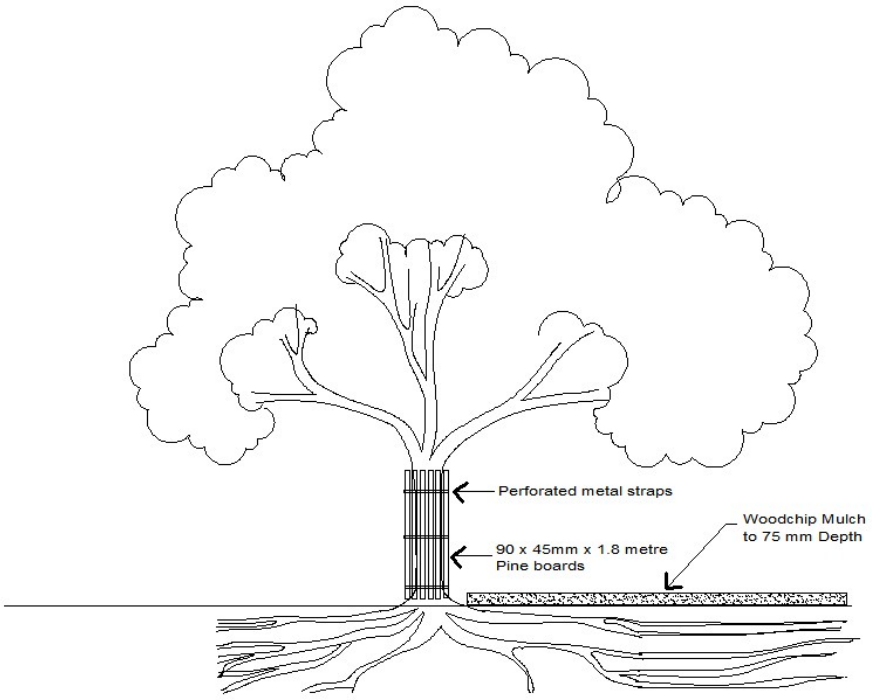

Figure 3 – Detail of Tree Protection Fence

HOLD POINT – The Site Arborist shall inspect Tree Protection Fences, Trunk Protection, Ground Protection and any other specified tree protection devices following their installation and prior to commencement of any other work on site.

14.14 Site Establishment

14.14.1 Where site sheds are required as part of the project, these should be located on existing hardstand areas where possible. Subject to approval of the Site Arborist, site sheds may be located within Tree Protection Zones, provided that they can be installed and removed without disturbance to the ground levels and without damage or pruning of the foliage and branches. Where all-weather surfaces are required beneath or around the site sheds, ground protection shall be installed as per **Section 14.12**. Gravel, roadbase or crushed concrete is *not* suitable for this purpose.

14.14.2 Where temporary services are required, these shall be installed above ground within TPZ's. Where in-ground utilities are required, these shall be installed outside designated Tree Protection Zones. If trenching is required within Tree Protection Zones, the prior approval of the Site Arborist must be sought.

14.14.3 Compounds for storage of equipment and materials shall be located outside designated Tree Protection Zones. No storage or stockpiling of materials is permitted within Tree Protection Zones.

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

14.15 Site Clearing & Tree Removal

14.15.1 Trees to be removed as part of the proposal are nominated in the attached schedule (**Appendix 5**) and indicated on the Tree Protection Plan (**Appendix 7**) with a dashed line. All trees within the Site are protected under Council's Tree Preservation Order. The approval of the Randwick City Council shall be obtained prior to the removal or pruning of any tree protected under the Tree Preservation Order.

14.16 Temporary Construction/Demolition Haul Roads

14.16.1 Temporary construction haul roads shall be limited to the existing site roadways and pathways to avoid soil disturbance and compaction within Tree Protection Zones, as shown on the Tree Protection Plan (**Appendix 7**). If deviation from the designated haul routes and site access points is required for any reason, the approval of the Site Arborist must be obtained.

14.16.2 Where haul roads transect Tree Protection Zones and there is no existing paved surface, temporary ground protection shall be installed. Ground protection shall consist of temporary rumble boards (steel or plywood sheets) underlain by sand or no-fines aggregate (e.g. blue metal) underlain by a suitable geotextile material. The existing topsoil and ground vegetation layer shall be retained intact and undisturbed. Upon completion of demolition and construction works, the rumble boards underlying sub-base material and geotextile material shall be removed without disturbance of the underlying soil profile.

14.17 Tree Pruning

14.17.1 All pruning works shall be carried out in accordance with Australian Standard No 4373-2007 – Pruning of Amenity Trees. All pruning work shall be carried out by a qualified and experienced arborist or tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998) under the supervision of the Site Arborist.

14.17.2 Where pruning of any tree is required due to unforeseen circumstances, including site access or to facilitate materials handling or construction processes, prior approval for pruning works shall be obtained from Randwick City Council.

14.18 Demolition Works

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

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

14.18.3 Demolition of the existing retaining walls or other structures, concrete slabs or footings within the Tree Protection Zone of trees to be retained shall be undertaken under the supervision of the Site Arborist. Equipment used in demolition works within Tree Protection Zones shall work only within areas that suitable ground protection has been installed in accordance with **Section 14.12**. Light weight equipment such as small rubber tracked excavators and small 2-3 tonne tipper trucks should be used for demolition works within TPZ's to minimise compaction and ground disturbance.

14.18.4 Care shall be taken during demolition works to avoid damage to the root systems, trunks and lower branches of trees in the vicinity of existing buildings, particularly when using cranes, excavators drilling rigs and the like near or beneath the canopy.

HOLD POINT – Following demolition and prior to excavation of stuctural footings or pavements, the Site Arborist shall inspect the site and verify whether any damage to trees has occurred during demolition works.

14.19 Excavations within Tree Protection Zones

14.19.1 Prior to excavations for foundations of new structures or buildings within Tree Protection Zones, exploratory excavation shall be undertaken by hand or using an Air-spade® device to locate and expose roots along the perimeter of the foundation prior to any mechanical excavation taking place (refer **Appendix 5**). All care shall be undertaken to preserve root systems intact and undamaged. Any roots less than 50mm in diameter shall be cleanly severed with clean sharp pruning implements at the face of the excavation. The root zone in the vicinity of the excavation shall be kept moist following excavation for the duration of construction to minimise stress on the tree.

14.19.2 Where large woody roots (greater than 50mm diameter) are encountered during excavations, further advice from the Site Arborist shall be sought prior to severance.

HOLD POINT – Following any exploratory excavation and prior to any mechanical excavations for the building footings, the Site Arborist shall inspect and undertake any required root pruning or provide further advise on methods to protect tree roots during construction.

14.20 Underground Services

14.20.1 All proposed stormwater lines and other underground services should be located as far away as practicable from trees to be retained to avoid excavation or trenching within the Tree Protection Zones.

14.20.2 Where the incursion to the Tree Protection Zone is less than 10% of the total TPZ (refer Appendix 2), a chain trenching device may be used for open trenching works. A backhoe or skid steer loader is unacceptable due to the potential for excessive compaction and root damage. Where large woody roots (greater than 50mm in diameter) are encountered during excavation or trenching, these shall be retained intact. If necessary, the service line should be re-routed or conduits inserted beneath woody roots to avoid root severance.

14.20.3 Excavations required for underground services within the Structural Root Zone of any tree to be retained should only be undertaken by sub-surface boring. The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root plate (minimum 1.5 metres below ground surface level). Where this is not practical and open trenching is the only alternative, proposed root pruning should be assessed by the arborist to determine continued health and stability of the subject tree.

14.21 Root Pruning

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

14.21.2 Where root pruning is required, roots shall be severed with clean, sharp pruning implements and retained in a moist condition during the construction phase using Hessian material or mulch where practical. Severed roots shall be treated with a suitable root growth hormone containing the active

constituents Indol-3-yl-Butric Acid (IBA) and 1-Naphthylacetic Acid (NAA) to stimulate rapid regeneration of the root system.

14.22 Tree Damage & Remedial Action

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

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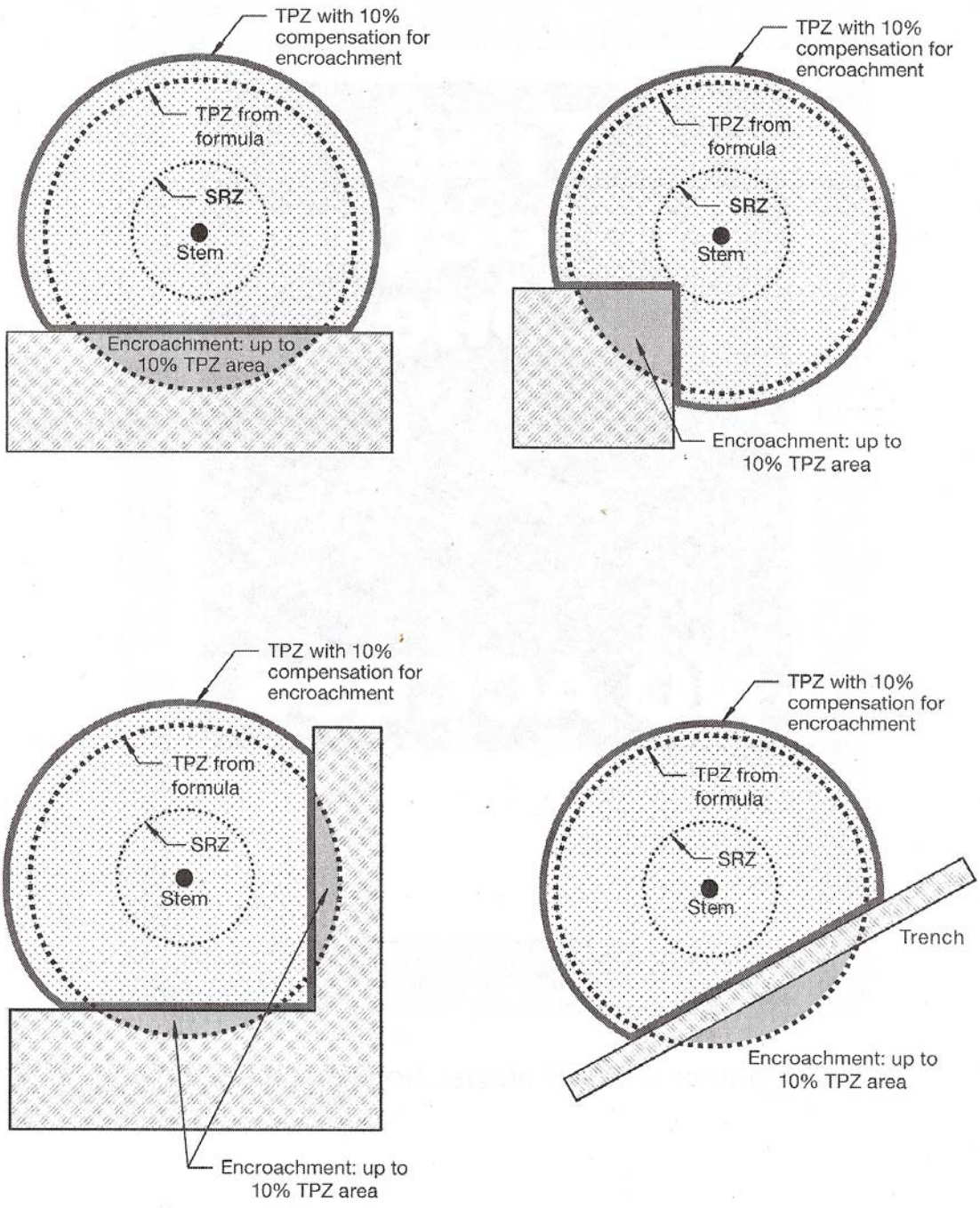
23rd September 2010

APPENDIX 3 – ACCEPTABLE INCURSIONS TO THE TREE PROTECTION ZONE (TPZ)



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

[7] Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney