

Arborist's Report

Incorporating
Tree Management Strategy
and
Arboricultural Assessment

Royal Randwick Racecourse Hotel
Alison Road
Randwick

Prepared for

Australian Turf Club Ltd
77 -79 Alison Road
Randwick
NSW 2031

by

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Declaration

I, Tony Lydon BSc, Consulting Arborist, declare that;

This report has been prepared in accordance with all relevant requirements of Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

This report contains or refers to all available information that is relevant to the environmental assessment of the development, and

The information contained in this statement is neither false nor misleading.

Summary

This report concludes that two of the three Fig trees affected by the proposed construction of the Royal Randwick Hotel will be retained.

The largest of the retained trees (T41) will be minimally affected by the proposed development but will be managed and monitored according to a proposed Tree Management Plan during the course of all works.

The second retained tree (T42) is located in close proximity to both proposed construction and excavation and will require detailed supervision during all phases of site works. This tree will also require canopy pruning, which will be carried out under the supervision of the Site Arborist and be in accordance with the guidelines of AS 4373 (Australian Standard for Pruning of Amenity Trees).

A third Fig tree (T45) will be removed along with a less significant Silky Oak tree (T43). Replacement plantings of identical species or species with similar mature size will mitigate any long term environmental impacts that may arise from the loss of these two trees.

Site operations and arboricultural aspects of the development will be managed through implementation of a site specific Tree Management Plan.

1. Introduction

This report has been commissioned by John O'Neill, Development Manager, on behalf of The Australian Turf Club.

The report is intended to form part of an Environmental Impact Statement required for Development Application SSD 5002-2011 for the Royal Randwick Racecourse Hotel at Royal Randwick Racecourse, Randwick.

2. Scope of the Report

2.1 Director General's Requirements

The Director General's Environmental Assessment Requirements for development at the site, include at Item Number 6 'Plans and Documents', the inclusion of a Tree Management Strategy and Arboricultural Assessment.

This report fulfills the requirement for both a Tree Management Strategy and Arboricultural Assessment for the Royal Randwick Racecourse Hotel development.

The report also fulfills all pertinent requirements (ie those relevant to the area of this report) as set out in clause 6 (content) and Clause 7 (form) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000. For ease of reference the full text of Clause 6 and Clause 7 has been appended to this report. (Appendix Two)

2.2 General Scope

This report incorporates an assessment of four trees, which have been identified from field assessments and site plans as likely to be impacted by the proposed development.

Information contained in this the report incorporates a preliminary tree assessment as described under Table One 'Indicative Stages in Development and the Tree Management Process' of AS 4970 - The Australian Standard for Protection of Trees on Development Sites.

The report also contains information requested by the site managers including a discussion of available options for tree retention / transplanting and a review of the arboricultural implications of the proposed development.

As Appendix One to this report, a methodology for tree monitoring and certification is offered, as per section five of AS 4970. The methodology (Tree Protection Plan) has been written so that, if appropriate, it may be adopted by the consent authority as part of any future development consent.

The Tree Protection Plan sets out all measures necessary to mitigate any adverse arboricultural impacts of the proposed development.

2.3 Relevant Plans and Documents

The development proposed is described in the following plans by Tonkin Zulaikha Greer Architects and Aspect Landscape Architects. I have reviewed these plans as the basis for my opinion on the impacts of the development.

A - 003 Site Plan.
A -1000 Level B1 Plan
A -1001 Ground Level Plan.
A -1002 Level 1 Plan.
A -1003 Level 2 Plan.
A -1004 Level 3 Plan.
A -1009 Level 8 Roof Plan.
A - 2000 Elevations.
A - 2001 Elevations.
A - 4000 Schematic Detail Section.
A - 4001 Schematic Detail Section.

All the above plans are marked Preliminary - For Co-ordination, and are dated 24/4/12

Planting Plan, Drawing No.12017 - LA01 revision C dated 17.05.12 by Aspect Studios Pty Ltd has been used in identifying the location of the nominated trees and assessing likely impacts of the proposed development. Tree numbers used in this report (ie T41, T42, T43, and T45) are derived from this plan.

3. Method of Assessment

Advice contained in this report is based on observations relating to standard development site assessment criteria applied by TLC Tree Solutions, including a combination of the following:

3.1 Current tree health

Assessments of health are based on qualities such as; foliage cover, extension growth, flower quality and abundance, fruiting bodies, leaf colour, presence of epicormic shoots, observed pests, and diseases. Health encompasses an assessment of tree vigour, whilst making allowance for season and stage of growth.

3.2 Tree structure and likely future condition

Observations of tree condition relate to mechanical qualities and a visual assessment of factors influencing wood strength. These include previous pruning/injury, physical form, and external indications of likely internal structure such as wood fractures, cavities, or decay pockets. Extensive, large, or abnormal deadwood may adversely affect a tree's condition rating.

Observations of tree form (habit) such as lean, past windthrow, twist, or bow, may influence an assessment of tree structure where they predispose a tree to future risk of failure.

3.3 Tolerance to development impacts

Trees have been assessed in respect of likely tolerance to potential development impacts. Assessments are based on on-site observations of prevailing soil conditions and the physical characteristics of each tree. Soil conditions may include; general soil properties, influence of existing or past structures, site topography, impacts of likely root competition, and location of

likely water sources. Allowance has also been made for apparent root morphology, tree age, tree species, opportunity for ongoing canopy management, and the species' anticipated tolerance to root loss.

3.4 Possible future hazard potential

Hazard potential is based on a determination of the likelihood of failure, the nature of current and possible future targets, and any associated risk of injury to either people or property.

3.5 General amenity value

Assessments of amenity may incorporate aspects of each tree's observed features such as; canopy size, site screening, provision of shade, contribution to streetscape, habitat, or influence as a windbreak. Comments are provided where I believe they will be of assistance in the planning / decision-making process.

Unless otherwise stated, all assessments are based on a visual inspection from ground level.

TLC Tree Solutions' assessment methodology incorporates all pertinent principles of AS 4970 - 2009 The Australian Standard for Protection of Trees on Development Sites.

4. Observations

The following notes provide information regarding the terms used in the Summary Table of Trees Assessed (Section 5).

4.1 Tree Name

Common and scientific names are given. Identification is based on a field assessment. Confirmation or identification of specific species or cultivars may be undertaken if required.

4.2 Dimensions

DBH - Diameter at Breast Height. Trunk diameter measurement at 1.4m from ground level. This measurement provides a guide to tree size and may also be used to assist in determining required root area protection zones for retained trees. Where multiple trunks occur, then either the size of the largest trunk(s) is indicated or the description 'Multi' trunked is given.

Canopy Spread - The indicative spread of the canopy as a radius in metres. This measurement allows likely conflict with proposed building lines to be recognised. Since few trees are symmetrical, canopy radius may be most usefully measured at the canopy's widest point to indicate maximum tree spread. Asymmetrical canopy measurements are suffixed with an 'A' and the maximum and minimum spread provided.

Height - An estimate of tree height is provided to allow (along with spread) an appreciation of existing canopy size. In many cases height also provides an indication of likely tree age (allowing for the species and growing conditions).

4.3 Tree Health / Condition

The criteria used for an assessment of both Health (Vigour) and Condition (Structure) have been described in sections 3.1 and 3.2. Categories used in the tabulated data are Good, Fair, and Poor.

4.4 Ranked Class

A ranking system has been applied to identify, on a comparative basis, those trees that the author advises are most suitable or valued for retention based on individual tree's characteristics. The ranking system has been applied to all trees equally, and is applied irrespective of any specific or likely future development of the site.

Comparative values assigned to each tree range from 1 to 5 as follows.

1 = High

Assigned to trees most highly valued for retention on a comparative basis. Trees are of good condition and form, likely to be tolerant of the impacts of redevelopment if retained within an appropriate Tree Protection Zone, and generally are of mature size or otherwise prominent within the landscape.

It is recommended that, where possible, future development impacts are moderated for the benefit of these trees.

2 = Medium

Assigned to trees less valued for retention on a comparative basis. Trees are generally observed to be in good condition, or can be safely managed to improve their condition through arboricultural intervention or remedial pruning. Trees are mainly of mature size or located in a position that allows room for future healthy growth to mature size and are likely to be tolerant of development impacts if retained within an appropriate Tree Protection Zone.

Whilst of lower relative rank in comparison to those trees designated as Rank 1 it is recommended that, where possible, future development impacts are moderated for the benefit of these trees.

3 = Low

These trees are considered worthy of retention if convenient within the context of the redevelopment / landscape design process. They will add value in the short to medium-term, or until suitable replacement trees have been established, but are not considered of sufficient significance to warrant extensive efforts for their retention.

If these trees are retained, normal protection measures including Tree Protection Zones should be applied in accordance with arboricultural guidelines.

4 = Removal Recommended

The effort required to retain Rank 4 trees may not be considered justified by the site managers in the context of likely development impacts or future site usage. More suitable, healthier, and longer lived trees, or trees conferring greater amenity can be retained or introduced as part of an integrated landscape plan.

Despite poor form and structure, or terminal decline, Rank 4 trees may be retained at the preference of interested parties for features such as site screening or habitat. In such a case, a management plan may need to be provided to allow for their future safe retention.

5 = Unsuitable for Retention.

Rank five trees may be near or already dead or absent from the surveyed area. If present these trees are weed species, likely to be considered immediately hazardous, or otherwise unsuitable for retention.

4.5 Indicative Tree Preservation Zone

The Tree Protection Zones (TPZ) indicated are the optimum set-back distances for safe long-term tree retention and are the closest distances recommended that any development impacts be allowed without further specific assessment and onsite arboricultural supervision.

Where specific works are to be undertaken within the nominated TPZ distances, any detailed engineering design and proposed implementation may require further site assessment. Such assessment may indicate opportunities for canopy management, the location of significant roots via root mapping, and an assessment of the relevant characteristics of the existing soil profile.

Indicative TPZs include an assessment of both Structural Root Zones (SRZs - as described in AS4970) and canopy spread (ie dripline area).

5. Summary Table of Trees Assessed (see section four for definition of terms)

Tree No.	Name	Dimensions			Health	Condition	Rank 1=High 5=Low	Nominal TPZ Radius (m)	Notes
		Canopy Radius (m)	DBH (cm)	Height (m)					
47	<i>Ficus rubiginosa</i> Port Jackson Fig	12 max 12 min	190	18	Good	Good	1	14	The largest of the three Fig Trees assessed and the tree furthest from the proposed Hotel. Located in a raised garden bed. Dense canopy rises from two leaders (trunks) which separate around 2m in height. Epicormic shoots suggest previous episodes of physiological stress. Has been previously lopped at around 6 meters in height, but structural self-optimisation of regrowth appears good. Canopy observations include crossing limbs and minor deadwood. No evidence of included (defective) limbs. Some aerial roots.
42	<i>Ficus rubiginosa</i> Port Jackson Fig	14 max 10 min	170	16	Good	Fair	1	14	Asymmetrical canopy with greatest extent to the East. Canopy defects include potential inclusions and compressed branch junctions, some torn limbs and minor deadwood. Has been previously lopped at between 6 and 8 meters in height. Bitumen and surface water drain installed at base.
43	<i>Grevillea robusta</i> Silky Oak	4	40	15	Good	Fair	3	4	Planted in lawn area with minor girdling root and basal mower damage. Buttress root developing in response to trunk lean towards the North.

Tree No.	Name	Dimensions			Health	Condition	Rank 1=High 5=Low	Nominal TPZ Radius (m)	Notes
		Canopy Radius (m)	DBH (cm)	Height (m)					
45	<i>Ficus rubiginosa</i> Port Jackson Fig	12 max 8 min	120	16	Good	Good	1	14	Single trunk to 2.5m then forms two leaders. Northern leader further divides into two major and two minor trunks. A third limb to the South was pruned many years ago and has not yet occluded, although the tree generally shows a good cambium response to relatively recent pruning of lower limbs over the Oaks Marquee. Significant lopping was carried out at a juvenile growth stage with the tree's canopy reforming at around 9m in height. Branch structure is well optimised with some grafting but no significant inclusions noted. Past pruning has been of variable standard with residual stubs evident. Soil around the tree is highly disturbed with a bitumen area and raised roadway at the edge of the dripline, as well as paving in the adjacent marquee area.

6. Observations on Proposed Construction Impacts

6.1 Building Footprint

The proposed construction will require the removal of trees T43 and T45. These trees are located within the nominated building footprint and cannot be retained insitu. Options for tree retention through transplanting have been considered by the project team and are discussed in section 7.2 of this report.

Tree T41 is unaffected by the building footprint or proposed excavation and has been nominated for retention. A “new secure fence line” (assumed to consist of metal fencing and gates) is indicated on the plans close to the canopy area, and is unlikely to affect tree retention if constructed under arboricultural supervision as part of the proposed Tree Protection Plan.

Although the building footprint encroaches on the dripline area of T42 the development has been designed to allow the retention of this tree. Encroachments take the form of a vehicle ramp, raised planter beds, soil improvement for plantings outside raised beds and possible batter slope for basement excavation.

None of these encroachments are likely to adversely impact the tree's long term health or condition if all mitigating measures detailed in the proposed Tree Management Plan are adopted and carried out.

6.2 Soil Level Changes

6.2.1 Raised soil levels

Level changes are indicated in the architectural plans which will have an impact on T42. The existing ground level at the tree is shown as 31.30 (Dwg No.T11_10211) and the adjacent road way at 31.12. Proposed finished levels of the vehicle exit ramp (drawing A 1001) fall from 33.2 above the basement area to 31.90 at the new access road. These levels suggest a difference of between 1.9m and 0.6m in height between the existing ground levels and the finished levels.

Whilst engineering detail has not yet been provided, multiple options exist for such construction to be carried out with minimal damage to the retained tree. Such options include piered or cantilevered concrete slab construction and/or placement of porous fill in conjunction with wall construction on piered footings.

The main criteria for successful raising of soil levels around trees is to ensure that existing roots are not killed or damaged by significant changes in patterns of air and water movement within the soil.

Storm water plans have not been provided for arboricultural review but since ground levels are to be raised, any necessary pipework can be installed without cutting existing roots. Porous surfaces including earth swales and porous paving may be used to ensure that excess water is not all immediately removed in a way that dramatically alters the existing soil moisture and infiltration rates around retained trees.

6.2.2 Excavation for basement levels or footings

Basement levels indicate that excavation will be required close to the nominated TPZ for T42. Where excavation occurs existing tree roots will be removed. The degree to which such root loss impacts on the future health and condition of the tree will depend on the root volume affected relative to the tree's total available root volume. In this case, although root loss or

disturbance is likely to occur on more than one side of the tree, total loss is likely to occur within less than 10% of the TPZ area and will be outside the SRZ (Structural Root Zone). AS 4970 considers this a “minor encroachment”, and assuming arboricultural supervision in accordance with the proposed Tree Management Plan, such root loss will be within the tree’s anticipated tolerance.

Implementation of the proposed Tree Management Plan will also ensure that injury to retained roots, through either mechanical action or desiccation, will be avoided. The manner in which excavation is carried out will be specified and engineering options such as sheet piling, screw piles and shoring of batter slopes, reviewed as part of the detailed design process.

6.3 Canopy Pruning

Pruning of lower limbs from T42 over the exit ramp and planter bed are likely to be both required for vehicle access and desirable from a landscape perspective. The subjective ‘balance’ of the tree and its contribution to the landscape around the hotel entrance will be enhanced by such branch reduction or removal. A Pruning Schedule will be provided once engineering details and access requirements have been determined.

6.4 Site Management Plan

The Director General’s requirements include assessments of traffic and waste management but do not include a separate Site Management Plan. Preparation of such a plan allows all adverse impacts arising from general construction activities to be anticipated and monitored before any conflict arises with tree protection requirements. It considers plant and vehicle access, delivery and storage of waste or site materials, access to services and facilities, and locations for site sheds.

Preparation of a Site Management Plan has been included in the recommended sequence for implementation of the proposed Tree Management Plan at Appendix One to this report.

6.5 Other Potential Impacts

Other potential construction or associated impacts, such as stormwater layout and design, engineering detail, provision of underground services, landscaping detail, and provision for temporary structures such as scaffolding or piling rigs will be considered as necessary through the detailed design process and supervised under the conditions of the proposed Tree Management Plan

7.2 Transplanting options considered for additional tree retention.

As part of the Tree Management Strategy applied to the development consideration was given to the option of Transplanting each of the trees now nominated for removal. The following assessments were made;

7.2.1 Silky Oak (T43)

T43 is considered unsuitable for transplanting because of its low species tolerance, risk of transplant failure, and low perceived amenity relative to likely transplant costs.

7.2.2 Port Jackson Fig (T45)

I assessed the transplant suitability of T45 during my initial site inspection. In my view the species, age, condition (structure) likely root morphology, and site constraints relating to this tree mean that its retention through transplanting would be practicable. Although specialist and heavy machinery would be required, the tree could be moved to an adjacent location and its immediate physiological needs met through implementation of a Transplant Methodology, prior to the commencement of general construction at the site.

However, whilst transplanting can be useful in certain circumstances to mitigate tree loss, in this case the size, cost, and complexity of the task mean that the potential transplant operation is not considered justified in light of biophysical and economic considerations and constraints.

Whilst any replacement tree is likely to have a smaller canopy and diminished environmental function compared to the removed tree, a transplanting operation also cannot be guaranteed to provide a thriving and low maintenance, specimen with an equally long predicted safe useful life expectancy. If the function of the transplant option was to ensure a continued specific amenity or site screening, or to maintain an ecological niche, or even to provide a required “instant landscape” then the balance of considerations might change.

In this case the financial consideration, which would reduce resources available to look after multiple other retained or planted trees, as well as the opportunity to provide a younger, more vigorous and longer-lived specimen, swing the balance in favour of tree removal and replacement.

8. Application of Principles of Ecologically Sustainable Development to Arboricultural Matters.

Clause 7 Sub-clause 4 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (see Appendix Two) sets out the principles of Ecologically Sustainable Development. The following sections, 8.1 to 8.4 discuss these principles with reference to arboricultural aspects of the proposed development.

8.1 Precautionary Principle

The Loss of one of the three significant trees at the site does not in itself constitute serious or irreversible environmental damage. A replacement tree will be provided along with other additional or supplementary plantings as part of the proposed new landscape. Within a tree-centric timeframe there will be no net loss of canopy cover because new plantings are located in areas where they can grow to their full potential.

8.2 Inter-generational Equity

New plantings ensure that the health, diversity and productivity of the arboricultural environment are maintained for the benefit of future generations. In fact, staging replacement plantings so that arboricultural elements of older landscapes do not all become overmature and senesce at the same time is a key component of both diversity and ensuring that each successive generation benefits from the foresight and investment of the previous.

8.3 Conservation of biological diversity and integrity

Conservation of biological diversity has been considered in the species selection for replacement plantings. Ecological integrity is maintained since the existing trees, to a large extent, form their own habitats as “island” specimens rather than comprise a natural forest type or ecosystem.

8.4 Improved Valuation, Pricing and incentive Mechanisms

The environmental services such as wind speed reduction, removal of particulate matter from the air, CO2 sequestration, shade, and water detention provided by the removed tree will be reduced until the replacement tree has matured.

Since the landholder provides these services free to the rest of the community their temporary withdrawal cannot easily be reversed through incentive mechanisms.

In the context of the broader site, the value of such services, and their temporary reduction, is less significant than building activities, transport, and energy use at the site and is not currently quantified.

9. Recommendations and Full Description of Measures Proposed to Mitigate Adverse Affects of the Development.

This report recommends that the proposed development be approved subject to the implementation of the arboricultural specifications and Tree Management Plan set out in Appendix One.

The Tree Management Plan contains a full description of the measures proposed to mitigate adverse affects of the development from an arboricultural perspective.

If any part of this report is not clear to the reader, or if further information is required, please contact the arborist by email or phone at the office of TLC Tree Solutions.

Yours faithfully,



Tony Lydon BSc (Hons)

Consulting Arborist
Founding and Life Member of Arboriculture Australia (International Society of Arboriculture Australia Chapter)
Life Member International Society of Arboriculture

Appendix One - Proposed Tree Management Plan

Preface

This Tree Management Plan sets out the tree protection measures required to protect trees during proposed construction work for the Royal Randwick Hotel, Alison Road, Randwick.

These measures are designed to mitigate, as far as possible, any adverse impacts of the proposed development..

The plan details stages of construction requiring expert assistance, such as possible root pruning during excavation, and explains the reasons why such measures have been recommended.

It also provides a mechanism for any other advice necessary for ongoing tree care, or to mitigate any other possible impacts as they become apparent.

Details of proposed compliance certification required in relation to any retained trees or tree management procedures are included.

This specification is designed to be specifically referred to and implemented during all stages of construction. Once adopted it will form part of the Development Consent conditions and is therefore legally enforceable.

1. Chronology and Implementation

- 1.1 The tree protection measures described in this plan must be implemented **PRIOR** to commencement of any further site works. "Site works" includes the formally approved excavation as well as any informal commencement. The following highlighted tasks are identified in their proposed sequence.

Reason - To establish priorities for site management and to prevent accidental but avoidable damage to the retained trees, whilst providing clear sequential guidelines to promote efficient workplace planning.

- 1.2 **Preparation of a Site Management Plan** - This plan must be prepared by the principle building contractor in association with the Site Arborist prior to commencement of any site works. It details the location and extent of all potential site impacts, especially those not considered in other forms or documents. The Site Management Plan explains and details the location of site sheds, storage facilities, delivery areas, waste areas, vehicle access requirements, plant access requirements, and any other potential impact on trees or conflict with the integrity of the nominated Tree Protection Zones at every stage of the project.

Reason - The Site Management Plan seeks to remove conflict between tree protection requirements and common site activities which might not otherwise be considered until it is "too late".

- 1.3 **Initial Tree Pruning** - pruning to mitigate the possible impacts of excessive branch loss may be carried out prior to any other site works or when convenient within the context of the Site Management Plan. Such work shall be detailed in a written Pruning Method Statement by the Site Arborist before commencement.

Reason - Excessive or inexpert pruning may adversely affect the health and stability of the retained trees.

- 1.4 **Tree Protection Fencing** - must be erected and be certified by the Site Arborist before commencement of any further site works. Fencing should be designed and set out to protect both the canopy and basal root area of retained trees. See further details in Section 4 of this plan.

Reason - Fencing acts as a physical and visual reminder of sensitive areas.

- 1.5 **Marking Out** - The location of any proposed excavation adjacent to retained trees must be set out and methods of excavation considered in consultation with the Site Arborist.

Reason - Unsupervised excavation within any nominated Tree Protection Zone is prohibited.

- 1.6 **Excavation** - works outside any nominated Tree Protection Zone (TPZ) (See Section 3) may proceed once tree protection fencing has been certified.

Reason - To minimise potential damage to the trunk / basal roots of the retained tree.

- 1.7 **Root Pruning** - Any roots of 50mm size or greater found outside the TPZ must be retained until assessed or their pruning / removal authorised by the Site Arborist.

Reason - Larger roots, if encountered, may require further assessment or competent pruning.

- 1.8 **Landscaping Works** - Proposed new tree planting as well as any works within existing Tree Protection Zones shall be carried out under the supervisor or guidance of the Site Arborist.

Reason - Poor planting techniques or commonly specified landscape actions such as deep ripping may damage existing trees or reduce the anticipated benefits from such works.

- 1.9 **Removal of Tree Protection Fencing** - Tree protection fencing must not be removed, moved or modified unless specifically authorised by the Site Arborist.

Reason - Tree Protection Fencing is not effective in safeguarding trees or tree roots if it can be altered without consent.

2. Arboricultural Reporting Procedures - Appointment of Site Arborist

- 2.1 The Site Arborist shall be appointed to monitor and advise in regard to all issues affecting tree health for all phases of construction. This will include supervision of tree protection measures for the duration of construction and provision of compliance certification on completion of works.

Reason - Experience has shown that implementation of tree protection measures requires specialist attention.

- 2.2 Notification of any nominated successor to the approved Site Arborist must be provided in writing, to the Principal Certifying Authority and to Council if not the PCA with relevant details, including the date of transfer of responsibility.

Reason - To ensure continuity of advice throughout the project period and to clarify a legally binding chain of responsibility in the event of future tree decline or failure.

- 2.3 The Site Arborist is to carry out independent inspections as required, or on a bi-monthly basis, during the construction period to monitor ongoing tree health. Reports will be provided, as necessary, following each inspection to the Principle Certifying Authority and Site Manager in relation to all ongoing tree management issues.

Reason - To promote effective communication and allow timely remedial action to be taken if required.

3. Establishment of Tree Protection Measures / TPZ.

- 3.1 A Tree Protection Zone (TPZ) is nominated to include all areas within the TPZ fencing. Minimum radial distances for TPZs are 14m for both T77 and T78

Any amendments or alterations to TPZ areas, for example due to site access or construction requirements or in response to actual root growth encountered within the site will only occur following further site assessment and at the discretion of the Site Arborist.

Reason - Nomination of this area ensures that both the Site Managers and Principle Certifying Authority understand the physical extent within which compliance requirements must be met.

4. Conduct of Tree Protection Zones

- 4.1 Tree Protection Zone fencing will consist of posts set into the ground or supported by a freestanding base which itself is secured against sideways movement. Mesh or wire between posts must be durable, highly visible and at least one metre high. "Cyclone" type mesh 1.8m high may be preferred by Council.

Reason - To prevent accidental encroachment or damage to trunk / soil / root structures close to the base of trees.

- 4.2 Unauthorised removal or disruption of the tree protection fencing is to be considered a breach of the conditions of development consent.

Reason - To ensure that both site workers and the Principle Certifying Authority are informed of the serious nature of unauthorised removal of a Tree Protection Fence.

- 4.3 Prohibited within the fenced portion of the TPZ are; unauthorised access including access for vehicles or pedestrian traffic, storage or stockpiling of materials including delivered materials, excavation, leveling, soil removal, or work of any kind unless specifically approved or supervised by the Site Arborist, incursion of pollutants, solvents, excess water or other material harmful to the protected trees such as silt, concrete, paint or mortar mix

Reason - To ensure that the most significant causes of tree damage and future decline or hazard formation are prevented.

- 4.4 TPZ fences are to remain in place until the end of construction when their removal is to be approved by the Site Arborist. Access for landscaping or other works may be approved prior to the completion of all other site works.

Reason - To ensure that any works required are carried out as anticipated by the Site Arborist and that all tree protection measures are properly applied.

- 4.5 The Tree Protection Fence is to display clear signs indicating the reason for the fence and action to be taken if access is desired.

An example of such a sign follows below;



Reason - Site workers need to be made aware of the protection measures in place and the reasons those measures are required.

- 4.6 The TPZ fence may only be modified with the specific approval of the Site Arborist.

Reason - Moving a fence, for example to facilitate site access or removal / delivery of bulky materials may lead to unintended damage to retained trees.

5. Action Regarding Roots to be Pruned

- 5.1 Any roots that need to be pruned along the edge of TPZ areas must be cut cleanly with a sharp tool in accordance with standard arboricultural guidelines. In any areas where existing tree roots greater than 50mm in diameter are encountered such pruning must only be carried out under the direction or supervision of the Site Arborist.

Reason - Poor root pruning or other root damage can cause long-term tree decline due to incremental decay many years after project completion.

- 5.2 Any pruned roots, and the soil around them are to be protected from drying out - especially if adjacent to a cut face or soil batter. Use of either underlay/hessian or a temporary construction such as a form-ply shuttering to provide soil and root protection is recommended and may need to be installed at the direction of the Site Arborist.

Reason - Exposed soil may dry out quickly close to a cut face and additional measures to provide moist soil conditions and to protect existing roots may be required.

6. Works within Tree Protection Zone

- 6.1 Specifications for any construction works within a Tree Protection Zone shall be approved by the Site Arborist prior to commencement of any such works.

Reason - Engineering details must adequately consider likely impacts on the protected tree and must include practicable solutions to tree and root protection issues.

- 6.2 No excavation for any service pipes, pits, culverts or similar shall be carried out within a nominated Tree Protection Zone. (Unless directly authorised or supervised by the Site Arborist).

Reason - Unauthorised excavation may impact on roots within a retained tree's Root Zone, leading to reduced health or decreased structural integrity.

- 6.3 Any necessary pruning works specified by the Site Arborist for the retained trees shall be considered to have all necessary approvals as part of the Development Application. Such works may include pruning to remove deadwood, reduce overhanging limbs, improve tree health (Type G pruning), or reshape the trees canopy. All pruning work must be carried out within the guidelines of AS4373 -The Australian Standard for Pruning of Amenity Trees, by appropriately qualified arborists.

Reason - Crown-raising or canopy reshaping may be desired to achieve suitable clearance from building or landscape works.

- 6.4 Work on any tree shall be carried out by qualified tree workers in accordance with any OHS conditions required by the Site Managers.

Reason - To ensure worker safety and compliance with current OHS legislation.

7. Additional Treatments within Tree Protection Zone

- 7.1 A temporary irrigation system may need to be installed as directed by the Site Arborist. Generally watering should occur on a weekly cycle of deep soaking followed by a period of allowing the soil profile to drain. The watering regime should be adjusted according to the Site Arborist's recommendations throughout the construction period and as part of site reporting conditions.

Reason - Imposition of a new drainage and moisture regime on the root system of trees may cause significant stress. This stress may be reduced during a transition phase by provision of additional soil moisture.

- 7.2 Following consideration of existing or future garden surfaces a 75 - 100 mm layer of composted leaf mulch shall be applied where appropriate within tree protection zones.

Reason - Appropriate application of leaf mulch assists in stabilising soil moisture and surface temperature conditions and is also favourable to trees in the longer term. Among other advantages it provides enhanced conditions for beneficial soil organisms, reduces compaction of surface soil layers and acts as a slow release source of nutrients.

- 7.3 Whilst no additional treatments are currently proposed, any application of additional root or soil treatments such as wetting agents, root hormones, or nutrients is to be carried out only as directed by the Site Arborist.

Reason - Additional measures to maintain the health of retained trees may be required, unapproved measures may lead to increased stress.

If any part of the **Arboricultural Specification** is not clear to the reader or if any conflict arises between conditions outlined in this specification and the proposed completion of any other site works, including approved works, then **immediate clarification** or additional advice must be sought from the **Site Arborist**

Appendix Two -

Transcript of clause 6 and Clause 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000

http://www.austlii.edu.au/au/legis/nsw/consol_reg/epaar2000480/sch2.html

6 Form of environmental impact statement

An environmental impact statement must contain the following information:

- (a) the name, address and professional qualifications of the person by whom the statement is prepared,
- (b) the name and address of the responsible person,
- (c) the address of the land:
 - (i) in respect of which the [development application](#) is to be made, or
 - (ii) on which the [activity](#) or [infrastructure](#) to which the statement relates is to be carried out,
- (d) a description of the development, [activity](#) or [infrastructure](#) to which the statement relates,
- (e) an assessment by the person by whom the statement is prepared of the environmental impact of the development, [activity](#) or [infrastructure](#) to which the statement relates, dealing with the matters referred to in this Schedule,
- (f) a declaration by the person by whom the statement is prepared to the effect that:
 - (i) the statement has been prepared in accordance with this Schedule, and
 - (ii) the statement contains all available information that is relevant to the environmental assessment of the development, [activity](#) or [infrastructure](#) to which the statement relates, and
 - (iii) that the information contained in the statement is neither false nor misleading.

7 Content of environmental impact statement

- (1) An environmental impact statement must also include each of the following:
 - (a) a summary of the environmental impact statement,
 - (b) a statement of the objectives of the development, [activity](#) or [infrastructure](#),
 - (c) an analysis of any feasible alternatives to the carrying out of the development, [activity](#) or [infrastructure](#), having regard to its objectives, including the consequences of not carrying out the development, [activity](#) or [infrastructure](#),
 - (d) an analysis of the development, [activity](#) or [infrastructure](#), including:
 - (i) a full description of the development, [activity](#) or [infrastructure](#), and
 - (ii) a general description of the environment likely to be affected by the development, [activity](#) or [infrastructure](#), together with a detailed description of those aspects of the environment that are likely to be significantly affected, and
 - (iii) the likely impact on the environment of the development, [activity](#) or [infrastructure](#), and
 - (iv) a full description of the measures proposed to mitigate any adverse effects of the development, [activity](#) or [infrastructure](#) on the environment, and
 - (v) a list of any [approvals](#) that must be obtained under any other Act or law before the development, [activity](#) or [infrastructure](#) may lawfully be carried out,
 - (e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv),
 - (f) the reasons justifying the carrying out of the development, [activity](#) or [infrastructure](#) in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).
- (2) Subclause (1) is subject to the [environmental assessment requirements](#) that relate to the environmental impact statement.
- (3) Subclause (1) does not apply if:
 - (a) the Director-General has waived (under [clause](#) 3 (9)) the need for an [application](#) for [environmental assessment requirements](#) in relation to an environmental impact statement in respect of State significant development, and

(b) the conditions of that waiver specify that the environmental impact statement must instead comply with requirements set out or referred to in those conditions.

(4) The principles of ecologically sustainable development are as follows:

(a) the "precautionary principle", namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the [application](#) of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options,

(b) "inter-generational equity", namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

(c) "conservation of biological diversity and ecological integrity", namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

(d) "improved valuation, pricing and incentive mechanisms", namely, that environmental factors should be included in the valuation of assets and services, such as:

(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.