rain Tree consulting

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24 January 2022

40 BASSETT STREET

MONA VALE, NSW

DEVELOPMENT PROPOSAL

ARBORICULTURAL IMPACT ASSESSMENT REPORT

Report Ref No- 0322

Prepared for
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INTRODUCTION

This report has been commissioned by Mr. Simon Edwards C/- Gartner Trovato Architects to assess the remaining Useful Life Expectancy (ULE) and potential impacts that may occur to significant trees in relation to a new development proposal. The new development proposal consists of constructing a new residential dwelling and associated infrastructure within Lot 26 Sec E in DP 6195 known as 40 Bassett Street MONA VALE NSW.

Recommendations for retention or removal of trees is based on the trees condition, accorded ULE category, current design and potential impacts to trees under this development application.

Development incursions within tree protection zones (TPZ) and impacts to trees have been outlined within Note 2 of Appendix- A where incursions are described as Minor (<10%) & Major (>10%) TPZ occupancy having low, moderate to high level impacts within the TPZ. Where site restrictions within notional root zone radiuses exists development impacts or encroachment disturbances are based on author's experience, observations of site conditions, soil type and topography.

Each tree assessed has been accorded a temporary identification number and is referred to by number throughout this report. For additional trees not plotted on provided documentation their location has been estimated by taking offsets from existing trees and structures. The trees, their location, development impact and design requirements may be referenced within the Tree Assessment Schedule and Tree Location Plan of Appendices C & D.

Care has been taken to obtain information from reliable sources. All data has been verified as far as possible, however, I can neither guarantee nor be responsible for the accuracy of information provided by others.

METHODOLOGY

i In preparation for this report a pre design site consultation was conducted with ground level Visual Tree Assessment (VTA) conducted 23rd March 2021 by the author of this report. The principles of VTA were primarily adopted from components of Mattheck *& Breloer* 1994 '*The Body Language of Trees*' with basic risk values determined by criteria explained within the ISA TRAQ manual 2017. The inspection included assessment of the overall health and vigour of trees, tree form, structure and structural condition commencing from near the lower trunk to the upper first order branch division as best as site conditions would allow. On completion of the VTA the retention value of the tree was summarised utilizing the tree assessment Checklist provided within Appendix- B.

ii The inspection was limited to visual assessment from within the subject site where the retention value, condition and diameters of neighbouring trees was estimated. No aerial (climbing) inspections, woody tissue testing or tree root investigation was undertaken as part of this tree assessment. Tree height and canopy spread was estimated and expressed in metres with trunk diameters measured at approximately 1.4 metres above ground level, rounded off to the nearest 50mm and expressed as DBH (Diameter at Breast Height). The height of palms was taken from ground level to the top of the crown shaft only, and excludes the central apical spear projection.

iii This report acknowledges and utilizes the current Australian Standards 'Protection of Trees on Development Sites' AS 4970 – 2009 as explained within Notes of Appendix- A.

Unless specified otherwise all distances and development offsets within this report are taken from the centre of the tree.

iv Plans and/or documentation received to assist in preparation of this assessment include:

Gartner Trovato Architects project No. 2120 *specific to*:

- Site & Analysis Plan Dwg No. A.01 rev B dated 15.12.2021
- Ground Floor Plan Dwg No. A.02 rev B dated 15.12.2021
- First Floor Plan Dwg No. A.03 rev B dated 15.12.2021
- Elevations Dwg No. A.04 rev B dated 15.12.2021
- Sections Dwg No. A.05 rev B dated 15.12.2021

Sydney Surveyors

- Survey Plan ref No. 17193/1A dated 16.9.2020

1. SUMMARY OF ASSESSMENT

1.1 General tree assessment

1.1.1 Thirty eight (38) trees or groups of have been assessed under this development proposal. Of the thirty eight trees two (2) tree are located within the front Council verge, eight (8) trees are situated within neighbouring properties, two (2) trees have been identified with low retention values and eighteen (18) trees on site are non-prescribed (exempt) trees noted within Northern Beaches Council DCP tree management & protection orders.

Council verge trees: T1 & 2; the proposed new setback of the boundary stone wall will likely have a negligible effect on the trees with the increased setback allowing for greater root establishment. Tree protection fencing is recommended to be installed following the canopy dripline to mitigate tree impacts during construction.

Neighbouring trees: T3, 4, 5, 10, 11, 13, 14 & 35x3; modification of the new driveway is proposed on the existing driveway footprint and being part suspended to mitigate root zone conflicts. Detailed arborist site and root protection works are required given the part on-ground section of the driveway located within SRZ setbacks of trees 3, 4 & 5.

Low retention value trees: T7 & 16; the trees contain structural faults that are likely to become problematic in the future indicating the trees should not restrict this development application due to their short remaining safe useful life expectancies.

Exempt non-prescribed species: T8x3, 12, 17, 19x3, 21, 23, 24, 26, 27, 28, 30, 31, 32, 33, 34x2, 36, 37 & 38. Being exempt non-prescribed species, the trees are permitted to be managed (pruned, removed or relocated) without Council consent. The proposal indicates exempt trees 8x3, 12, 17, 26, 27, 28, 30, 31, 32, 33, 34x2, 36, 37 & 38 for removal to accommodate design. Where exempt species require retention further arborist advice and protection methodology is required prior to works occurring within Tree Protection Zone (TPZ) setbacks.

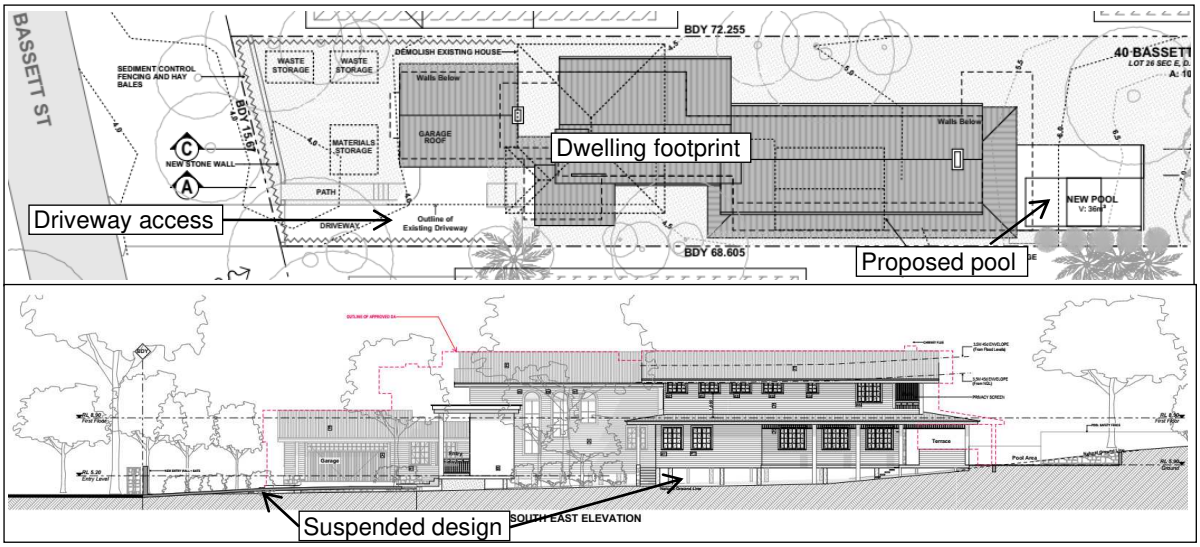
1.1.2 Remaining trees are considered viable for retention without change in existing site conditions or modification within Tree Protection Zone (TPZ) radiuses as indicated within the SRZ & TPZ distance column of Appendix- C.

1.1.3 Within Appendix- C; development impacts, Tree Protection Zone (TPZ) incursions and design requirements for the trees assessed have been discussed.

1.2 The development proposal

1.2.1 The development proposal consists of demolition of existing site features to construct a new two storey suspended residential dwelling. Additions include a new vehicle garage, swimming pool and associated infrastructure within Tree Protection Zone (TPZ) setbacks. Minor excavation is required for the rear yard swimming pool with part on ground and suspended driveway access to minimise neighbouring tree conflicts as indicated within Figure 1.

Figure 1, showing proposed construction footprint



1.3 Tree removal to accommodate design

1.3.1 Five (5) prescribed (LGA protected) trees require removal with an additional tree T14 partly located on the boundary recommended for removal to accommodate the design proposal. The five trees affected by the building envelope are identified as trees 7, 9, 15, 16 & 18 with additional T14 likely receiving minor canopy conflict due to proposed roofline encroachment.

The removal of non-prescribed exempt trees 8x3, 12, 17, 26, 27, 28, 30, 31, 32, 33, 34x2, 36, 37 & 38 are required for dwelling design purposes or to make space for new landscape plantings.

The identified development impacts and design requirements have been detailed within Appendix- C and summarized within the following sections.

1.4 Discussion of development impacts – *prescribed trees*

Trees receiving high level impacts by the design proposal

1.4.1 Four (4) trees T9, 15, 16 & 18 fall within the building footprint or receive high level root zone or canopy impacts by roofline encroachment requiring removal by the design proposal.

1.4.2 Tree 14 being partly located on the boundary is recommended for removal. Given one sided canopy extension a moderate level (<25%) canopy conflict is likely by the proposed SE roofline extension. The estimated 4.5m low bowing one-sided canopy extension within the site indicates reduction pruning to mitigate nuisance and roofline conflicts will likely alter tree form and canopy balance.

Low retention value; tree removal

1.4.3 Tree 7 has been identified as structurally defective and not viable to retain for lengthy periods. The tree contains centralized lower trunk (cut stump end) decay and is recommended for removal due to the trees low safe useful life expectancy.

Trees which receive negligible impacts or Minor TPZ occupancy by design

1.4.4 Trees 1, 2, 6, 10, 11, 13, 20, 22 & 29 receive negligible to low level Minor (<10%) TPZ occupancy and impacts by the design proposal. To ensure the trees remain viable the trees are recommended to be managed and protected in accordance with Section 2.3 *General tree protection requirements* or as additionally detailed within this report and/or Specific recommendations outlined within Section 2.2.

1.4.5 Amended design reduces TPZ encroachment to T25 receiving a Moderate level (15-20%) occupancy by the proposal. Given the one-sided TPZ occupancy the tree is recommended to be protected in accordance with Section 2.3 *General tree protection requirements*.

Driveway impact discussions - neighbouring trees

1.4.6 Prior to works further engineer or civil driveway design plans are recommended to be reviewed and endorsed by an appointed project arborist. The proposal identifies part new on ground driveway on top of the existing driveway footprint before being suspended above ground level. The suspended section is consistent with tree sensitive design with on ground construction likely to encounter significant and critical tree roots adjacent T3. Based on the driveway proposal the management of neighbouring trees is recommended to consist of the following guidelines:

a) Clearer more detailed driveway construction plans are recommended to be provided for arborist review prior to obtaining a Construction Certificate (CC). The on-ground driveway design should be consistent with tree sensitive construction techniques such that no below grade (ground level) excavation or compaction occurs adjacent trees 3, 4 & 5.

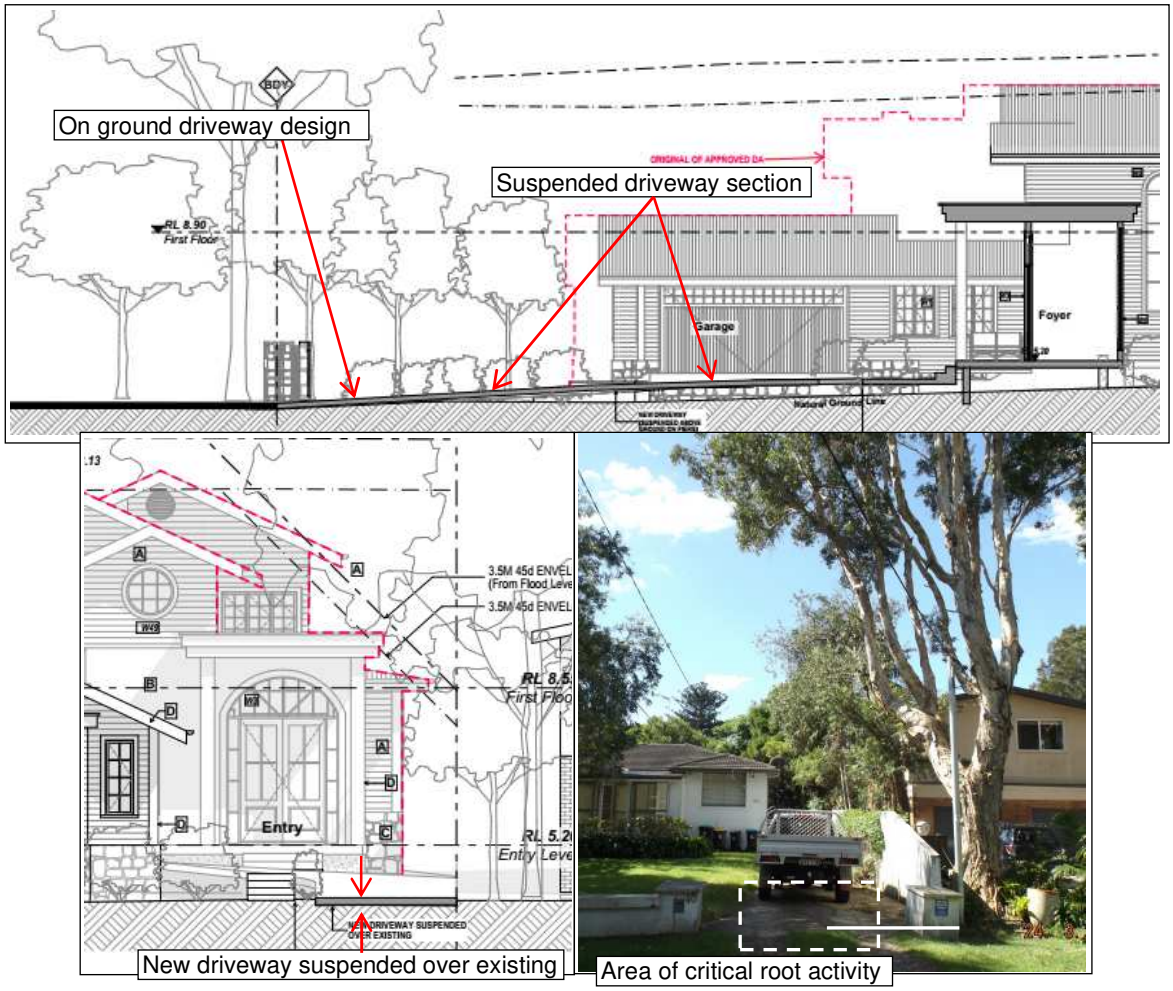
b) Prior to construction the existing driveway is recommended to be removed manually (by hand) under the supervision of an appointed site arborist. The site arborist shall detail all encountered tree roots and provide specific root protection advice. This may include appropriate driveway construction methodology such that the retention of critical roots within the Structural Root Zone (SRZ), being *the area required for tree stability* (AS4970); are retained and not damaged by works.

c) The severing of tree roots at or >30mm(Ø) is not recommended within SRZ setbacks. Pad footings to help support on ground driveway construction may be required to ensure the retention and protection of critical roots, refer Figure 2 p8.

d) A pier footing plan is recommended to be provided for review of the suspended driveway section where cantilevering the driveway towards neighbouring trees is recommended.

e) Within Tree Protection Zone (TPZ) setbacks all approved excavations or site grading (levelling or ground preparation works) are to be supervised and certified by an appointed site arborist.

Figure 2, showing proposed driveway construction area



Neighbouring tree swimming pool impact discussions

1.4.7 Palm trees having adventitious roots systems are more tolerable to development disturbances. As shown within NE Elevation Plan impacts by excavation at the boundary for the proposed boundary retaining wall is considered at a Moderate (15-20%) TPZ incursion and impact by design.

The minimising of impacts should be conducted by undertaking arboricultural root pruning in accordance with AS4970 – 2009 Section 4.5.4 *Root protection during works within the TPZ*, such that tree roots are not damaged or ripped beyond the point of excavation by site machinery.

All roots are to be clean cut with sharp disinfected horticultural tools with the exposed soil face protected immediately after pruning occurs.

It is likely the adjacent hedge along the boundary may also be subjected to root pruning requirements where *the effects or root pruning are not always predictable* (AS4373-2007).

2. CONCLUSIONS & RECOMMENDATIONS

2.1 Tree Removal

2.1.1 Based on the design proposal and with the consent of Council five (5) trees on site and one (1) tree located on the boundary require or are recommended for removal to accommodate the design proposal. The five trees on site are identified as trees: 7, 9, 15, 16 & 18.

Tree 14 being partly located on the boundary is recommended for removal due to likely nuisance and canopy conflicts with roofline extension.

2.1.2 Non-prescribed trees and in specific trees 8x3, 12, 17, 26, 27, 28, 30, 31, 32, 33, 34x2, 36, 37 & 38 require removal for design purposes. Being non prescribed trees all exempt trees within the site are permitted to be managed (pruned, removed or relocated) without Council consent.

2.2 Recommended tree management & protection principles

2.2.1 In addition to the recommendations provided within this report and Australian Standard AS4970 – 2009 Protection of Trees on Development Sites the following summary and/or additional recommendations are provided as a guide for tree protection during works:

Specific recommendations

a) Tree 22 & 25: Tree Protection Fencing (TPF) is recommended to be installed following the extent of the canopy dripline encompassing the boundary screen tree group. The fenced area is to be considered a tree protection area (TPA) where no access is permitted without arborist advice.

b) Tree 29: A fenced tree protection area (TPA) is to be constructed at a 4m radial setback. Minor adjustment should only occur for swimming pool construction activities where no over excavation beyond the swimming pool footprint is recommended. Where excavation within the 5.4m TPZ is required, works are to be conducted manually for the first 0.5m (500mm) under the supervision of an appointed site arborist.

Neighbouring trees

c) Driveway impacts: Prior to works detailed engineered or civil design plans are to be reviewed and endorsed by an appointed site arborist. In specific root protection requires to be detailed adjacent T3 ensuring critical roots within the Structural Root Zone (SRZ) are not damaged or disrupted by the new driveway proposal. A pier footing plan should be provided with cantilevering of the slab towards neighbouring trees recommended.

d) Swimming pool / boundary wall cut: excavation to accommodate the boundary wall is to be conducted manually for the first 0.5m (500mm) under the supervision of an appointed site arborist. All encountered roots are to be managed in accordance with AS4970 – 2009 Section 4.5.4 *Root protection during works within the TPZ* and/or Section 2.3 e) of this report.

2.3 General tree protection requirements

a) Prior to demolition works Tree Protection Fencing (TPF) and/or zones as identified within Figure 3 p11 are recommended to be located under the guidance of an appointed site arborist. Unless specified otherwise the location of tree protection fencing is to be positioned to allow for adequate work access and/or be located at the extremity of the Tree Protection Zone (TPZ) radius, see SRZ & TPZ distance column Appendix- C.

Where design & construction access may be restricted by fencing timber beam trunk protection is recommended to be installed, with ground protection mats provided to protect underlying tree roots within tree protection zones or areas.

Activities prevented within the TPZ include; machine excavation including trenching, storage & work preparation, wash down areas, soil level change, utility services and physical damage to trees.

b) In accordance with AS4970 - 2009 (1.4.4) a Project or Site Arborist is to be engaged to monitor, supervise excavation within TPZ setbacks, advise and provide certification of protection works conducted. The project arborist is recommended to hold a minimum Australian Qualification Framework (AQF) Level 4 certification and be competent in methodology of protecting trees on development sites.

c) The project arborist is to provide final certification outlining tree protection measures with photographic evidence of ongoing works retained for certification purposes (AS4970 S/5.5.2 *Final certification*).

d) The project arborist is to be familiar with protection measures specific to Australian Standard AS4970 'Protection of Trees on Development Sites' – 2009 requirements with any modification in Tree Protection Fencing (TPF) or Zones (Z) to be compliant with AS4970 Section 4.5 *Other Tree Protection Measures.*

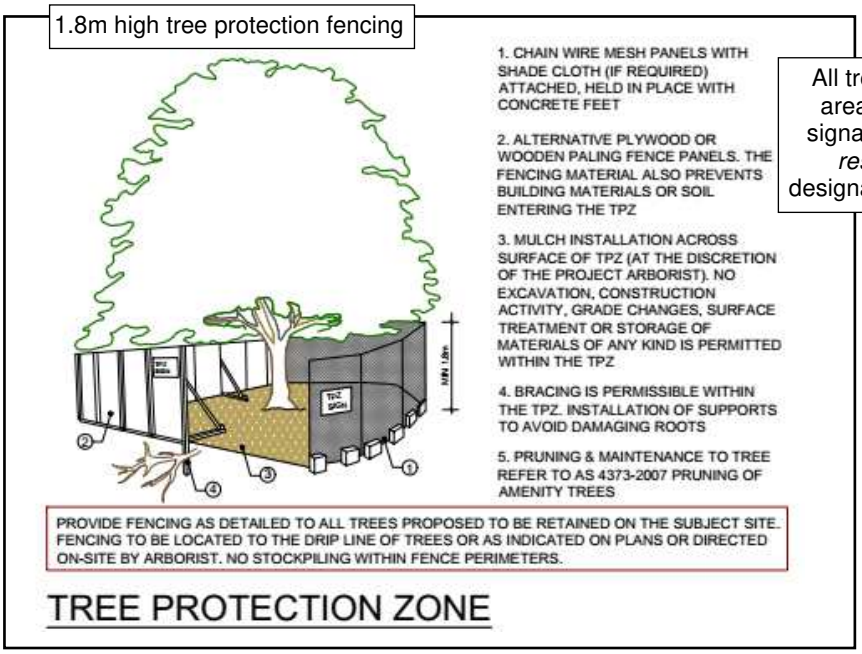
e) Unless specified otherwise during approved excavation within TPZ setbacks excavation is to be conducted manually (by hand) under the supervision of an appointed project arborist.

Where approved by the arborist the pruning of roots at or <30mm(Ø) is to be conducted in accordance with AS4970 – 2009 Section 4.5.4 *Root protection during works within the TPZ*, such that tree roots are not damaged or ripped beyond the point of excavation by site machinery. Where larger roots have been encountered they are to be referred to an independent Level 5 arborist for further advice.

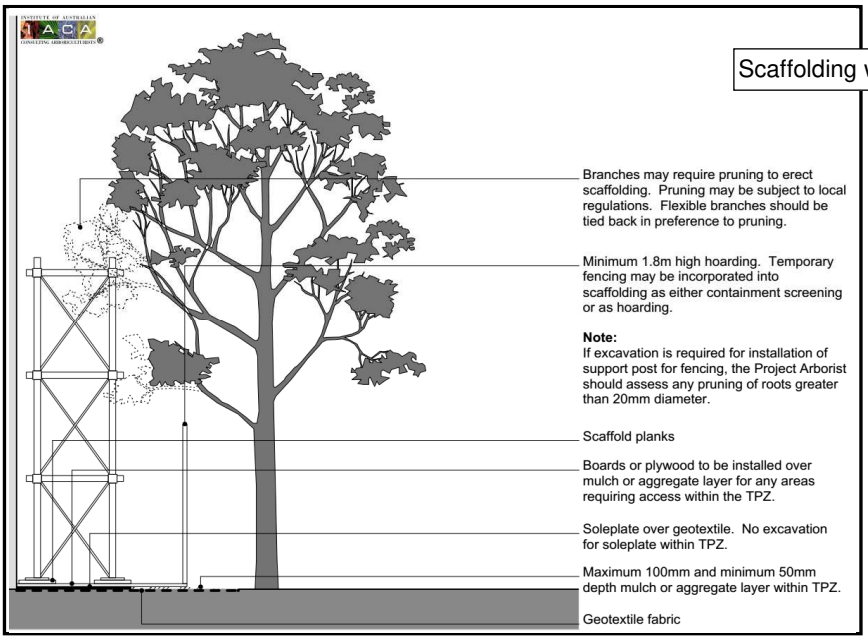
For deep excavations exposed roots at the excavated cut face are to be protected with jute mesh, geotextile fabric or similar being secured in place to avoid drying of roots and the exposed soil profile.

Figure 3: Tree protection fencing, ground and trunk protection detail

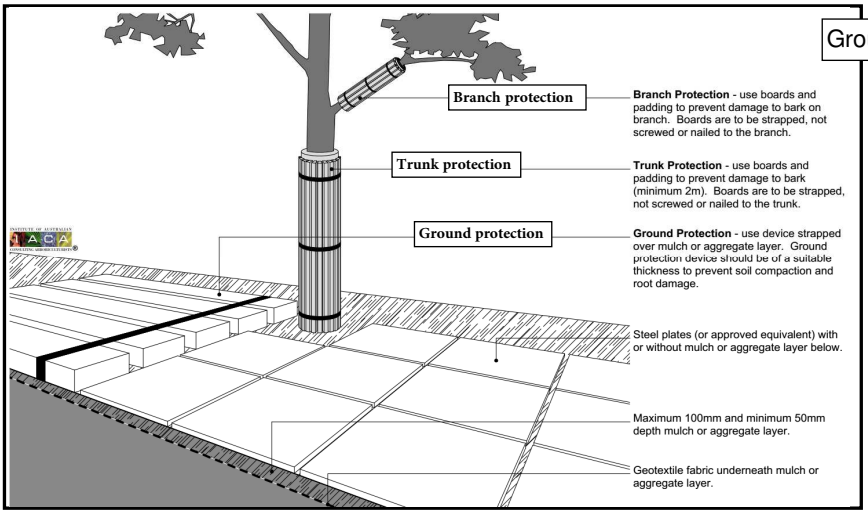
1.8m high tree protection fencing



All tree protection fencing or areas requires appropriate signage clearly stating *a TPZ restriction zone* being a designated Tree Protection Area



Scaffolding within the Tree Protection Zone



Ground, trunk & branch protection

f) *Canopy pruning / tree removal:* where required tree removal and canopy reductions are to be approved by the Local Government Authority.

Works are to be conducted by a suitably qualified AQF Level 3 certified arborist in accordance with AS4373 Pruning Standards, and specifically be conducted in accordance with Safe Work Australia – Guide to managing risks of tree trimming and removal works 2016 (www.swa.gov.au).

g) *Additional inground services* which may include landscape works, sewer, stormwater, water and electrical services, final design and impact to trees shall be reviewed and endorsed by the project arborist prior to their installment. Where landscaping (excavation) is required within the SRZ further advice from an appointed project arborist is recommended.

h) *Tree sensitive construction measures* such as pier and beam bridging over critical roots, suspended slabs, cantilevered building sections, screw piles and contiguous piling can minimise the impact of encroachment (AS4970).

Where Bushfire BAL construction conflicts exist with tree management advice the appointed project arborist shall be consulted to advise on appropriate design outcomes.

i) To ensure tree(s) are appropriately protected the development site superintendent is recommended to be familiar with all tree protection and ongoing certification requirements.

The superintendent is responsible for informing all subcontractors of the responsibilities and requirements of tree protection prior to their engagement.

j) *Hold points*: specific to no works are to commence without arborist advice, inspections & certifications:

1) Prior to construction arboricultural certification is required ensuring that all trees have been adequately protected in accordance with this report.
2) No works (including landscaping) shall occur within the SRZ of any tree without prior arborist advice and certification. Where excavation may be required prior exploratory tree root investigation are to identify the location, distribution and impact to underlying tree roots.
3) No excavation shall occur within the TPZ without prior project arborist notification and/or site supervision.
4) No access or work activity is permitted within fenced or designated tree protection areas (TPA's) without arborist advice.

Table 1, certification requirements & hold points

1	Pre-construction	Prior to works arborist to review & provide additional tree management advice certifying driveway construction methodology adjacent neighbouring trees.
		Prior to works install tree protection fencing & zones as specified within this report or as directed by the site arborist.
2	During construction	Project arborist to supervise & certify approved works within tree protection areas with all civil work plans to be reviewed and endorsed by the arborist prior to instalment.
3	Post construction	Prior to handover project arborist to provide final inspection & certification of tree health & vitality

k) Should there be any uncertainty with tree protection requirements the site superintendent shall contact the appointed project arborist for advice prior to works occurring within tree protection zones (TPZ).

Should you require further liaisons in this matter please contact me direct on 0419 250 248

Yours sincerely

Mark A Kokot

AQF Level 5 consulting arborist

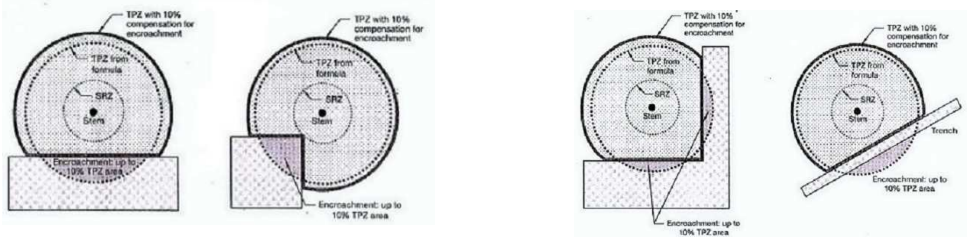
Diploma of Hort/Arboriculture (AQF5), Associate Diploma Parks Management (AQF4)
Certified Arborist / Tree Surgeon (AQF3), ISA Tree Risk Assessment Qualified 6/2024
Member: ISA, Arboriculture Australia & IACA, Working With Children No: WWC0144637E

APPENDICES

APPENDIX- A: Terminology & references

Acceptable Risk: Exposure to or reject risk of varying degrees. The acceptable risk is defined as '*The person who accepts some degree of risk in return for a benefit being exposed to some risk of varying degree.* **Age classes:** (I) Immature refers to a well established but juvenile tree. (ESM) refers to an early semi mature tree not of juvenile appearance. (SM) Semi-mature refers to a tree at growth stages advancing into maturity and full size. (LSM) Late Semi-Mature, refers to a tree between semi-mature and close to mature. (EM) refers to a tree at the first stages of maturity. (M) Mature refers to a full size tree with some capacity for future growth. **Health:** Refers to a trees vigor exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion and the degree of dieback. **Condition:** Refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. Trunk and major branches), including structural defects such as cavities, crooked trunks or week trunk / branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition. **Decay:** (*N*) – an area of wood that is undergoing decomposition. (*V*) – decomposition of an area of wood by fungi or bacteria. **Decline:** Is the response of a tree to a reduction of energy levels resulting from stress. Recovery from decline is difficult and slow; is usually irreversible. **Defect:** A identifiable fault in a tree. **Epicormic Shoots**: Shoots that arise from latent or adventitious buds that occur on stems and branches and on suckers produced from the base of the tree. A symptom / result of stress related factors. **Footprint:** The area occupied by site structures, including the dwelling driveways and hard surfaces. **Included Bark**: (Inclusion) a genetic weak fault, pattern of development at branch junctions where the bark is turned inwards rather than pushed out, can pose a potential hazard. **Order of branches:** First order being those that are the first to extend from the main trunk or codominant limbs, second order branches extend from the first order and third order branches extend from the second order. **Probability:** The likelihood of some event happening. **Risk:** Is the probability of something adverse happening. **Suppression:** Restrained growth pattern from competition of other trees or structures. **Wound:** Damage inflicted upon a tree through injury to its living cells, may continue to develop further weakening of the structure compromising structural integrity.
NOTE 1: This report acknowledges the current **Australian Standards 'Protection of Trees on Development Sites'** AS 4970 – 2009 with reference to the Tree Protection Zone (TPZ): being a combination of the root and crown area requiring protection. The TPZ takes into consideration the Structural Root Zone (SRZ): The area required for tree stability. Determined by AS4970 - 2009 Figure 1, Table of determining the SRZ, section 3.3.5 of the standards. The standard states where a greater than 10% encroachment occurs the arborist is to take into consideration the schedule of determining impacts as set within AS4970 s. 3.3.4. Encroachments are referred to within this report as major or minor encroachments (AS4970 s. 3.3.2 & 3.3.3). Below is the terminology used for estimated percentage of development incursion used within this report. To retain specific trees and ensure their viability development must take into consideration protection of the TPZ radius.

NOTE 2: The extent of inclusion within the TPZ radius has been categorised as follows:
No impact (0%) incursion, Low to negligible impact (<10%) of minor consequence, 10 - <15% incursion of moderate to low impact, 15 - <20% Medium to moderate level of impact and incursion where the project arborist is to demonstrate the tree/s remain viable by tree sensitive construction techniques, 20 - <25% incursion of Medium to high level of impact, 25 – <35% of High level impact to significant >35% incursion where moderate to high level impacts may require design changes or further information to manage tree vitality. **WBF** = located within the building footprint where design necessitates tree removal.
Showing acceptable incursion within the TPZ (AS4970)



SELECTED REFERENCES:
Barrell J. 1993, 'Preplanning Tree Surveys: Safe useful Life expectancy (SULE) is the Natural Progression", Arboricultural Journal 17: 1, February 1993, pp. 33-46.
International Society of Arboriculture (ISA) 2013, Tree Risk Assessment Manual, Martin Graphics, Champaign Illinois U.S.
Mattheck, C. & Breloer, H.(1994) *The Body Language of Trees.* Research for Amenity Trees No.4 the Stationary Office, London.
Matheny N. & Clark J. 1998, Trees & Development *'A Technical Guide to Preservation of Trees During Land Development'* International Society of Arboriculture, Champaign USA.
ProSafe: TPZ encroachment calculator https://proofsafe.com.au/tpz_incursion_calculator.htmlStandards Australia 2009, *Australian Standards 4970 Protection of Trees on Development Sites* - Standards Australia, Sydney, Australia.
Standards Australia 2007, *Australian Standards 4373 Pruning of Amenity Trees* - Standards Australia, Sydney, Australia.
Northern Beaches Council DCP https://www.northernbeaches.nsw.gov.au/planning-and-development/building-and-renovations/planning-controls

APPENDIX- B: Tree Retention Value *Check list* ©rainTree consulting

VTA i) Landscape Significance (LS): The significance of a tree in the landscape is a combination of its amenity, environmental and heritage values.

Values may be subjective however, offer a visual understanding of the relative importance of the tree to the environment. The Landscape Significance of a tree is described in seven categories to assist in determining the retention value of trees.

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

ii) Visual Tree Assessment (VTA)

0	If appropriate to VTA - **exempt* trees from Local Government Authority (LGA) Tree Management or Preservation Orders (TPO)	2E	Trees location likely to be affected by infrastructure restricting root growth potential, or tree has potential to cause infrastructure damage &/or risk mitigation or rectification works may compromise tree anchorage. Tree(s) may be contained within a vault have restricted anchoring root potential
0A	Noxious or invasive species located within heritage conservation area		
1	Trees that are dead, significantly declining >75% volume or obviously hazardous	3	This rating incorporates trees that may require further investigation of defects such as cavities or symptoms indicating internal decay to an extent that cannot be quantified under visual examination. Further inspections may be in the way of arborist climbing inspection within the canopy, root crown investigation and/or drill penetrating or Picus Sonic Tomograph ultrasound testing procedures to determine percentage of internal decay.
2	Trees that are structurally damaged. Have poor structure or weak & detrimental large stem inclusions capable or failure opposed to 2B. Tree also may be affected by extensive borer damage, fungal pathogens (wood rot) or viruses. Some symptoms may be reversible, remediated or controlled give appropriate management.		
2A	Tree damage specific to basal and/or root plate damage, very shallow soils or steep topography resulting in poor anchorage where condition may become problematic in near future / may include trees with included bark splits to ground level	4	Trees which appear specifically environmentally stressed by drought, poor soil or site conditions. Symptoms may be reversible given appropriate management
2B	Defect specific to stem inclusions development (weak branch attachments) where the condition may not be immediately detrimental however, require annual to biannual monitoring with control to prevent stem failure by installing slings, cable or bracing. Tree may also contain multi stems or codominant twin stems	5	Trees that would benefit from crown maintenance pruning as identified within the Australian Standards AS 4373 – 2007 Pruning of Amenity Trees
		5A	Trees that require little or no maintenance at time of inspection other than close monitoring
2C	Tree may contain minor wounds, pest or minor pathogen activity, altered from storm damaged to an extent that is not considered immediately detrimental - may also display average form. Likely to require close annual monitoring or minor corrective pruning	6	Trees may be typical for species type, of good form and visual condition for age class May have suppressed one sided canopies or are low risk trees
2D	Trees significantly altered by recent storm or over pruning events which may reduce retention values due to average form- or tree extensively pruned for power line clearance	7	VTA restricted by canopy or plant material vine or ivy covering tree parts, or site conditions which do not allow access- fences to neighbouring sites

iii) Retention Value (RV): Determined by [1] tree fee of visual defects and viable for retention, [2] viable for retention with minor faults which may reduce ULE, [3] trees which should not restrict development applications containing faults that are likely to become problematic in the short term, [4] trees to be considered for removal due to average condition.

1	High retention	2	Medium retention	3	Low retention	4	Consider removal

iv) U.L.E. categories Useful Life Expectancy (after *Barrell* 1996, modified by the author). A trees U.L.E. category is the life expectancy of the tree modified first by its age, health, condition, safety and location. U.L.E. assessments are not static but may be modified as dictated by changes in trees health and environment.

1. Long U.L.E. - Appear retainable at the time of assessment for over 40 years with an acceptable degree of risk assuming reasonable maintenance.
2. Medium U.L.E. - Appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk assuming reasonable maintenance.
3. Short U.L.E. - Trees appear to be retainable at the time of assessment for 5 to15 years with an acceptable degree of risk assuming reasonable maintenance.
4. Very short - Removal- Trees which should be scheduled for removal within the very short term or as specified within this report.
5. Small, young or regularly pruned – Trees under 5m in height that can be easily moved or replaced, includes screen plantings or hedge lines.

APPENDIX- C: Tree Assessment Schedule

	Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification		Trees with low retention values: senescence, developing defects or being *exempt trees from the LGA Tree Preservation Order (TPO)

Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Vigour	Condition	Signifi-cance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
1 CV	*Callistemon viminalis* Bottle Brush	5 x 6	250, 200	2.4m / 5.4	EM	Good	Fair	4/3	2D	2	2	Pruned for power line clearance modifying form
Design & impact summary	*Retain; Existing retaining wall has likely acted as a root barrier indicating a likely negligible root zone conflict with proposed new increased wall setback providing additional root space within the TPZ. Requires tree protection fencing located at the extremity of canopy drip line.*											
2 CV	*Callistemon viminalis* Bottle Brush	6 x 6	300, 350	2.7 / 7.8	M	Good	Fair	4/3	2D	2	3	Past lopped at 1.2m = multi stems with decay stub end sections evident
Design & impact summary	*Retain; Existing retaining wall has likely acted as a root barrier indicating a likely negligible root zone conflict with proposed new increased wall setback providing additional root space within the TPZ. Requires tree protection fencing located at the extremity of canopy drip line.*											
3 NT	*Melaleuca quinquenervia* Paperbark	16 x 9	750	3 / 9	M	Good	Fair / Good	3	2C	2	2	Canopy lift / under pruned to 7m resulting in exposed narrow form
Design & impact summary	*Protect with detailed root management during driveway renovation. Existing driveway displays displacement from tree root interference indicating structural roots are likely to be encountered during driveway demolition. It is highly likely the on-ground section of the driveway will required to be constructed utilizing tree root sensitive techniques retaining large and critical roots within the SRZ. Excluding the existing driveway footprint TPZ occupancy beyond the driveway by path and stone wall construction is likely to have negligible impact to minor (<10%) new TPZ occupancy. Prior to works engineer plans of driveway construction require to be reviewed and endorsed by an appointed site arborist.*											
4 NT	*Callistemon viminalis* Bottle Brush	5 x 3	250	2 / 3	SM	Good	Fair	4	2D	2	2	Past topped at 5m reducing canopy overhang, modifying natural form and reducing landscape significance
Design & impact summary	*Protect with detailed root management during driveway renovation. As in T3 above driveway design requires to be constructed utilizing tree root sensitive techniques within the SRZ where the part suspended section as shown within Section A reduces root zone conflicts with existing and proposed renovated driveway located within the TPZ.*											
5 NT	*Callistemon viminalis* Bottle Brush	7 x 4	250	2 / 3	SM	Good	Fair / Good	4	6	1	2	Suppressed canopy form + slight lean N
Design & impact summary	*As in T4 above, protect with detailed root management during driveway renovation. Suspended driveway section shown within Section A reducing root zone conflicts with existing and proposed renovated driveway located within the TPZ.*											
6x3	*Syzygium australe* Bush Cherry	av 6 x 3	av 200	1.6 / 2.4	ESM	Good	Fair	4/3	2D	2	2	Three trees, NW side reduction pruned reducing natural form
Design & impact summary	*Retain & protect with tree protection fencing. Negligible (0%) building line footprint impact with trees to be managed in accordance with Section 2.3 General tree protection requirements. Activities to be excluded from within the TPZ include waste storage areas.*											

	Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification		Trees with low retention values: senescence, developing defects or being *exempt trees from the LGA Tree Preservation Order (TPO)

Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Vigour	Condition	Signifi-cance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
7	*Agonis flexuosa* Willow Myrtle	9 x 10	1200at base	3.6m / 14.4	OM	Good	Fair / Poor	4/3	2D	3	3	Centre stem past topped / lopped with decaying centre surrounded by multi epicormic stems = Structurally defective tree of low retention value
Design & impact summary		*Remove: Structurally defective tree of low retention value. New works of proposed front stone wall, pathway, garage footprint & driveway addition having at or near 15.3% TPZ disturbance of moderate (15-20%) impact or new TPZ occupancy beyond the existing driveway footprint.*										
*8x3	*Datura metel* Devils Trumpet	av 4 x 4	av 400at base	2.3 / 4.8	M	Fair / Good	Fair / Good	3	O/2B	2	3	Three trees, Exempt tree species, multi stemmed at base, <5m in height
Design & impact summary		*Exempt trees, remove to accommodate design.*										
9	*Banksia integrifolia* Costal Banksia	10 x 7	350	2.3 / 4.2	ESM	Good	Fair / Poor	3	2	3	3	Moderate bowing lean N, twin stems at 1.6m, NW stem with defined stem inclusion development at junction capable of splitting apart in age = structurally defective tree of low retention value
Design & impact summary		*Remove; Structurally defective tree with garage located at or near 0.5m from tree and well within the SRZ. TPZ occupancy by the garage footprint at 30.8% indicates a high (25-35%) level of TPZ impact by design.*										
10 NT	*Howea forsteriana* Kentia Palm	8 x 5	200	- / 3.5	M	Good	Good	4/3	6/7	1	1	Palm with no significant visual faults
Design & impact summary		*Protect; likely negligible TPZ impact by suspended driveway over existing driveway footprint. Requires arborist supervision and/or root management by appointed site arborist during initial demolition & driveway construction stage.*										
11 NT	*Howea forsteriana* Kentia Palm	5 x 4	150	- / 3	M	Good	Good	4/3	6/7	1	1	Palm with no significant visual faults
Design & impact summary		*Protect; likely negligible TPZ impact by suspended driveway over existing driveway footprint. Requires arborist supervision and/or root management by appointed site arborist during initial demolition & driveway construction stage.*										
*12	*Melaleuca linearifolia* Melaleuca	4 x 3	200	1.8 / 2.4	EM	Fair	Fair?	4	7/2D	2	3	Exempt tree species <5m in height, lopped W side with vine covered canopy
Design & impact summary		*Exempt tree, remove to accommodate design.*										
13 NT	*Leptospermun petersonii* Lemon Scented Tea Tree	5 x 2	150	1.6 / 2	M	Fair / Poor	Fair?	4	7/2D	2	3	Reduction pruned / lopped E side with vine covered canopy
Design & impact summary		*Protect; likely negligible TPZ impact by suspended driveway and building floor plan over the existing driveway footprint. May require arborist supervision and/or root management during initial demolition & construction within the TPZ*										

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Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Vigour	Condition	Signifi-cance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
14 NT	*Melaleuca bracteata* Tea tree	9 x 5	350	2.3m / 4.2	M	Good	Fair / Good?	4/3	7/2C	2	3	Suppressed canopy form biomass W, 2.5m up x 4.5m within site, past lopped SE stem with vine covered canopy S
Design & impact summary		*Likely moderate level of canopy impact where tree removal should be considered. Given that the dwelling is suspended above ground level and over existing hard surfaces root zone conflicts are likely to be manageable, however, the one-sided bowing canopy extension at near 4.5m within the site requires reduction pruning to accommodate roofline extension. Reduction pruning should be conducted in accordance with Australian Standards AS 4373 Pruning of Amenity Trees 2007 with extent of pruning likely to alter tree form.*										
15	*Syzygium australe* Bush Cherry	9 x 2.5	250	2 / 3	ESM	Good	Good	4/3	6	1	2	Suppressed canopy form due to tree location
Design & impact summary		*Remove: located within footprint of roofline design*										
16	*Callistemon viminalis* Bottle Brush	6 x 5	250	2 / 3	SM	Good	Fair / Poor	4	2	4	4	Structurally defective tree large open wound & cavity at base E side = low retention value
Design & impact summary		*Remove: located within building stair access and footprint of roofline design*										
*17	*Jacaranda mimosifolia* Jacaranda	8 x 7	250	2 / 3	ESM	Good	Good	4	0/2C	2	2	Exempt tree species, suppressed canopy form due to location with past lopped stem E side
Design & impact summary		*Exempt tree, remove to accommodate design.*										
18	*Callistemon viminalis* Bottle Brush	6 x 5	250x3	2.8 / 9	LM	Fair / Good	Fair / Good	4	2C	2	2	Appears past lopped at 3.5m resulting in multi stems at junctions, vine covered canopy with suppressed canopy form
Design & impact summary		*Remove: located within footprint of building design*										
*19x3	*Archontophoenix cunninghamiana* Bangalow Palm	av 4 x 3	av 200	- / 2.5	ESM	Good	Good	4	0/6	1	1/5	Exempt palm species, 1x Dracaena behind clump
Design & impact summary		*Exempt palm species, manage in accordance with design requirement.*										
20	*Syzygium australe* Bush Cherry	6 x 3	250at base	1.8 / 3	ESM	Good	Good	3	6	2B	2	Twin stems at near ground level with minor stem inclusion development
Design & impact summary		*Retain with tree protection fencing at extremity of canopy dripline. Negligible to minor (<10%) TPZ occupancy by landscape (stair access) being suspended above ground level*										

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Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Vigour	Condition	Signifi-cance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
*21	*Viburnum odoratissimum* Sweet Viburnum	4 x 3	150at base	1.5 / 2	ESM	Fair	Fair / Poor	4	0/2	3	4	Exempt tree species height class <5m. Declining lower branch scaffolds to ground level = low retention value
Design & impact summary		*Exempt tree species, manage in accordance with design requirement.*										
22	*Viburnum odoratissimum* Sweet Viburnum	7 x 5	500	2.6 / 6	M	Good	Fair / Good	4/3	2B	2	2	Multi stemmed at base with minor stem inclusion development throughout, canopy extending 3m E
Design & impact summary		*Retain with tree protection fencing at extremity of canopy dripline. Negligible to minor (<10%) impact & TPZ occupancy by footings for suspended building design suspended well above ground level. Given that no works are proposed within the SRZ tree requires to be managed in accordance with Section 2.3 General tree protection requirements.*										
*23	*Lagerstromia indica* Crepe Myrtle	3 x 3	450	2.5 / 5.4	M	Fair / Good	Fair	4	0/2D	2	2	Exempt tree species. Multi stemmed at base, past lopped at 2.2m modifying form
Design & impact summary		*Exempt palm species, manage in accordance with design requirement.*										
*24	*Schinus areira* Peppercorn	4.5 x 4	250at base	1.8 / 3	ESM	Fair	Fair / Poor	5	0/2C	2	3	Exempt tree species <5m tall, slight ;lean NW from potential past root plate failure, vine covered canopy
Design & impact summary		*Exempt palm species, manage in accordance with design requirement.*										
25	*Callistemon viminalis* Bottle Brush	9 x 9	300x3	2.7 / 7.2	M	Good	Fair	4/3	2D	2	3	Broad form canopy, past topped at 4m with decaying stub end sections evident,
Design & impact summary		*Can be considered for retention. New TPZ occupancy of Moderate (15-20%) encroachment, at or near 18.3% indicating tree can be retained in accordance with Section 2.3 General tree protection requirements*										
*26	*Prunus sp* Ornamental Prune	5 x 5	200	1.8 / 2.4	M	Fair / Good	Fair / Good	4	0	2	3	Exempt tree species with suppressed canopy form
Design & impact summary		*Exempt species, remove to accommodate landscape design.*										
*27	*Bauhinia sp* Bauhinia	2.5 x 3	100	1.5 / 2	ESM	Good	Poor	5	0/2	3	4	Exempt tree species <5m tall, structurally defective tree with lower trunk damage
Design & impact summary		*Exempt species, remove to accommodate landscape design.*										
*28	*Callistemon viminalis* Bottle Brush	2.5 x 3	100	1.5 / 2	ESM	Good	Fair / Good	5	0/6	1	1/5	Exempt tree species height class <5m tall
Design & impact summary		*Exempt species, remove to accommodate landscape design.*										

	Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification		Trees with low retention values: senescence, developing defects or being *exempt trees from the LGA Tree Preservation Order (TPO)

Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Vigour	Condition	Signifi-cance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
29	*Callistemon viminalis* Bottle Brush	7 x 8	450	2.5m / 5.4	SM	Good	Fair / Good	4/3	2B	2	2	Minor stem inclusion development at 1.2m
Design & impact summary		*Retain. Proposed swimming pool occupancy at or near 5.5% of the TPZ indicating a negligible or minor (<10%) TPZ incursion & impact by design. Protect with tree protection fencing to the extent of the canopy dripline (4m) towards pool footprint allowing for construction access for pool works. Tree requires additional management (root pruning within the TPZ) during excavation and protection as specified within Section 2.3 General tree protection requirements, with no over excavation beyond the line of the pool footprint towards the tree recommended.*										
*30	*Archontophoenix cunninghamiana* Bangalow Palm	2.5 x 3	100	- / 2.5	ESM	Good	Good	5	0	1	1/5	Exempt palm species
Design & impact summary		*Exempt tree, remove to accommodate design.*										
*31	*Melaleuca bracteata* Tea tree	4 x 2	100	1.5 / 2	I	Good	Good	4	0/6	1	1	Exempt tree species height class <5m tall
Design & impact summary		*Exempt tree, remove to accommodate design.*										
*32	*Morus sp* Mulberry	4 x 4	250	2 / 3	ESM	Fair	Good	4	0/4	2	2	Exempt tree species, slightly environmentally stressed with decline in canopy evident
Design & impact summary		*Exempt tree, remove to accommodate design.*										
*33	*Archontophoenix cunninghamiana* Bangalow Palm	3 x 2	100	- / 2	I	Good	Good	5	0/6	1	1/5	Exempt palm species
Design & impact summary		*Exempt tree, remove to accommodate design.*										
*34x2	*Jacaranda mimosifolia* Jacaranda	5 x 3	150	1.5 / 2	I	Good	Fair / Good	4	0/2C	2	2	Exempt tree species, minor lower trunk to ground level wounds evident
Design & impact summary		*Exempt tree, remove to accommodate landscape design.*										
35x3 NT	*Archontophoenix cunninghamiana* Bangalow Palm	5 x 4	150	- / 3	ESM	Good	Good	4	7/6	1	1/5	Palms with no decline in vigour evident
Design & impact summary		*Protect; likely Moderate level (15-20%) TPZ incursion at or near 19% TPZ occupancy & impact by design with excavation cut to boundary within TPZ, at or near 1.3m from palms. Given adventitious root system palms may likely withstand correct root management (clean cutting) to boundary with adjacent hedge line potentially affected by excavation. Appropriate management should consist of hand excavation and clean cutting of the root system with soil profile and root protection immediately provided after treatment. All root pruning activities to be conducted by an appointed site arborist certifying root management techniques, where AS4373 -2007 states – the effects of root pruning are not always predictable.*										

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Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Vigour	Condition	Signifi-cance	VTA	RV	U. L.E.	Comments CV = Council verge tree NT= Neighbouring tree
*36	*Lagerstromia indica* Crepe Myrtle	3 x 3	250, 200	2.4m / 5.4	SM	Good	Fair / Good	5	0/2D	2	2	Exempt tree species, past lopped at 2m
Design & impact summary		*Exempt tree, remove to accommodate swimming pool design.*										
*37	*Brachychiton acerifolius* Illawarra Flame Tree	9 x 5	300	2.1 / 3.6	ESM	Good	Good	4	0/6	1	1	Exempt tree species with no significant visual faults
Design & impact summary		*Exempt tree, remove to accommodate swimming pool design.*										
*38	*Lagerstromia indica* Crepe Myrtle	3 x 3	300, 250	2.6 / 6.6	SM	Good	Fair / Good	5	0/2D	2	2	Exempt tree species past lopped at 2m
Design & impact summary		*Exempt tree, remove to accommodate swimming pool design.*										

APPENDIX- D: Tree Location Plan