

EARTHSCAPE HORTICULTURAL SERVICES

Arboricultural, Horticultural and Landscape Consultants

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ARBORICULTURAL IMPACT ASSESSMENT REPORT

PROPOSED AMENITIES BUILDING

MIDDLE HEAD OVAL 1110 MIDDLE HEAD ROAD, MOSMAN

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Prepared for: Mosman Council

c/- Archer Office

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1 INTRODUCTION

- 1.1.1 This report was commissioned by Archer Office on behalf of Mosman Council to assess the health and condition of twelve (12) trees located immediately adjacent to Middle Head Oval, 1110 Middle Head Road, Mosman. The report has been prepared to aid in the assessment of a Development Application (DA) for the demolition of the existing amenities building on the southwestern side of the oval and construction of a new amenities building in a similar position, together with associated landscape works.
- 1.1.2 The purpose of this report is to assess the potential impact of the proposed development on the subject trees, together with recommendations for amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures (Tree Protection Plan and Specification) to ensure the long-term preservation of the trees to be retained where appropriate.
- 1.1.3 This report has been prepared in accordance with Mosman Council's guidelines for preparation of Arborists Reports as outlined in Section 2.2 & 2.3 of Mosman Council's *Open Space and Infrastructure Development Control Plan 2012* [MOSIDCP] and Sections 2.3.2-2.3.5 of the Australian Standard for *Protection of Trees on Development Sites* (AS 4970:2009).
- 1.1.4 Section 71 of the Sydney Harbour Federation Trust Act 2001 covers 'excluded State Law' this states that certain state laws do not apply to the Trust or to the property (including Trust Land) covering, but not exclusive of, matters of town planning, powers and functions of local Councils, standards applicable to the design, or manner of construction, of a building, structure or facility and the protection of the environment or of the natural and cultural heritage. Although for completeness and if there is a lack of Commonwealth guidance, NSW laws or standards in these matters have been assessed and reviewed as required.

2 THE SITE

- 2.1.1 The Middle Head Oval and its immediate environs forms part of Lot 203 in DP 1022020, located at 1110 Middle Head Road, Mosman. For the purposes of this report, the oval and its immediate environs will be referred to as 'the site'. The site adjoins Headland Park. The site is zoned Infrastructure [SP2] under the *Mosman Local Environmental Plan 2012* (MLEP).
- 2.1.2 The site contains an existing playing field (Middle Head Oval), together with an amenities building on the south-western side of the oval incorporating public amenities. Open spectator seating (bleachers) is located to the east of the amenities building. The area around the amenities building and bleachers is comprised of open lawn areas, with no trees or other vegetation. The south side of the oval (between the oval and Middle Head Road) has a steep, heavily vegetated embankment. The embankment contains a number of mature and semi-mature trees. These include a variety of locally-indigenous and non-local native species.
- 2.1.3 The landscape and soils of this area have been extensively disturbed and modified for urban development, particularly during the construction of the playing field in c. 1951. The original soils of this area are typical of the Lambert Soil Landscape Group (as classified in the *Soil Landscapes of the Sydney 1:100,000 Sheet*). Soil materials consist of "shallow (less than 500 mm) discontinuous *Earthy Sands* and *Yellow Earths* on crests and inside of benches and shallow (less than 200 mm) *Siliceous Sands* and *Lithosols* on leading edges; shallow to moderately deep (< 1500mm) *Leached Sands, Grey Earths* and *Gleyed Podzolic Soils* occur in poorly drained areas and localised *Yellow Podzolic Soils* are associated with shale lenses." Soil materials are derived Hawkesbury Sandstone and are often associated with rock outcrop.

2.1.4 The original vegetation of this area consisted of low open woodland and heath typical of Hawkesbury Sandstone areas.² The dominant locally-indigenous tree species occurring in this area include *Eucalyptus haemastoma* (Scribbly Gum), *Angophora costata* (Sydney Red Gum) and *Corymbia gummifera* (Red Bloodwood). Other species found in this vegetation community may include *Eucalyptus botryoides* (Bangalay), *Banksia serrata* (Old Man Banksia), *Banksia ericifolia* (Heath Banksia), *Leptospermum laevigatum* (Coastal Tea-tree), *Banksia integrifolia* (Coast Banksia), *Allocasuarina distylla* (Scrub She-oak) and *Angophora hispida* (Dwarf Apple).

3 SUBJECT TREES

3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 26th March 2024. Each tree has been provided with an identification number for reference purposes denoted on the attached Tree Location Plan (**Appendix 5**), based on the survey prepared by Total Surveying Solutions, Dwg. Ref No. 240162-1 [D] dated March 2024. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 3**). Tree No.s T1, T2, T3, T6, T7, T8, T9, T11 & T12 were not shown on the original survey and have been plotted on the drawing in their approximate positions by taking offsets from existing features.

4 HEALTH AND CONDITION ASSESSMENT

4.1 Methodology

- 4.1.1 An assessment of each tree was made using the Visual Tree Assessment (VTA) procedure.³ All of the trees were assessed in view from the ground. No aerial inspection or diagnostic testing has been undertaken as part of this assessment.
- 4.1.2 The following information was collected for each tree:-
 - Tree Species (Botanical & Common Name);
 - Approximate height;
 - Canopy spread (measured using laser distance measurer in four directions and an average taken);
 - Trunk diameter (measured with a diameter tape at 1.4 metres from ground level);
 - **Live Crown Size** (measured by subtracting the total height of the tree from the lowest point of the crown and multiplying by the average crown spread to give a value in square metres);
 - **Maturity Class -** the Maturity Class for each tree has been divided into the following categories:-
 - OM Over-mature greater than 80% of the life expectancy for the species;
 - M Mature 50-80% of the life expectancy for the species;
 - SM Semi-mature 20-50% of the life expectancy for the species;
 - I Immature less than 20% of the life expectancy for the species.
 - **Health & vigour** (using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators).
 - **Condition** (using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators); and
 - **Suitability** of the tree to the site and its existing location (in consideration of damage or potential damage to services or structures, available space for future development and nuisance issues).
- 4.1.3 This information is presented in a tabulated form in **Appendix 3**.

4.2 Safe Useful Life Expectancy (SULE)

- 4.2.1 The remaining Safe Useful Life Expectancy⁴ of the tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area, less its estimated current age. The life expectancy of the tree has been further modified where necessary in consideration of its current health and vigour, condition and suitability to the site. The estimated SULE of each tree is shown in **Appendix 3.**
- 4.2.2 The following ranges have been allocated to each tree:-
 - Greater than 40 years (Long)
 - Between 15 and 40 years (Medium)
 - Between 5 and 15 years (Short)
 - Less than 5 years (Transient)
 - Dead or immediately hazardous (defective or unstable)
- 4.2.1 SULE ratings are intended to provide a general overview of the long-term sustainability of the trees within the site in consideration of these factors. The allocated ranges are not intended to be absolute. This information is useful in guiding future planning by highlighting the probable lifespan of individual trees, for which a clear pattern may emerge. This information may be helpful in forecasting likely tree senescence and planning for replacement planting to ensure continuity in tree canopy across the site. It should be noted that SULEs *may* be extended or reduced depending on the way trees are managed. Intervention and remedial works may extend the SULE of some trees.

5 LANDSCAPE SIGNIFICANCE

5.1 Methodology for Determining Landscape Significance

- 5.1.1 The significance of a tree in the landscape is a combination of its environmental, heritage and amenity values. Whilst these values may be fairly subjective and difficult to assess consistently, some measure is necessary to assist in determining the retention value of each tree. To ensure a consistent approach, the assessment criteria shown in **Appendix 1** have been used in this assessment.
- 5.1.2 A rating has been applied to each tree to give an understanding of the relative significance of each tree in the landscape and to assist in determining priorities for retention, in accordance with the following categories:-
 - 1. Significant
 - 2. Very High
 - 3. High
 - 4. Moderate
 - 5. Low
 - 6. Very Low
 - 7. Insignificant

5.2 Environmental Significance

5.2.1 Tree Management Controls

Prescribed Trees within the Municipality of Mosman are protected under Section 4.10 of the *Mosman Open Space and Infrastructure Development Control Plan 2012* (MOSIDCP) [as amended August 2020], made pursuant to Chapter 2, Part 2.3 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021* (Biodiversity SEPP). The MOSIDCP generally protects all trees with a height of five (5) metres or greater and with a trunk circumference exceeding 450 mm (i.e. 140 mm diameter). Tree ferns greater than two (2) metres in height are

also protected. Trees located within a property listed as a Heritage Item or located with a Heritage Conservation Area are protected where they are greater than two (2) metres in height. Some exemptions apply. The following trees are exempt (not protected) under the provisions of the MOSIDCP 2012:-

Tree No.	Species	Exemption
Т3	Banksia integrifolia (Coast Banksia)	Dead tree, of no habitat value

The remainder of the trees are protected under Council's Tree Management Controls.

5.2.2 Wildlife Habitat

Eucalyptus botryoides (Bangalay) [T10] and Banksia integrifolia (Coast Banksia) [T3] are all locally-indigenous species, representative of the original vegetation of the area and would be of benefit to native wildlife. However, none of the subject trees contain any cavities that would be suitable as nesting hollows for arboreal mammals or birds. There were no other visible signs of wildlife habitation. Note that T3 is completely dead and has no habitat value.

The site is located within a defined 'Habitat Link' as indicated on Council's *Biodiversity Corridor* and *Habitat Link Map* forming part of MOSIDCP. The landscape design for these areas is required to incorporate some locally-indigenous species (refer also **Section 11**).

5.2.3 Noxious Plants & Environmental Weeds

None of the subject trees are scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within NSW under the provisions of the *Biosecurity Act 2015*.

5.2.4 Threatened Species & Ecological Communities

None of the subject trees are listed as Threatened or Vulnerable Species or form part of Endangered Ecological Communities (EECs) under the provisions of the *Biodiversity Conservation Act 2016* (NSW) or the *Environment Protection and Biodiversity Conservation Act 1999*.

5.2.5 Biodiversity, Bushfire & Riparian Lands

The NSW Office of Environment and Heritage (OEH) *Biodiversity Values Map and Threshold Tool* (refer https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap), indicates that there is no vegetation on or near the site that is subject to the Biodiversity Offset Scheme (BOS).

The site does *not* contain any 'Natural Watercourses' as indicated on Council's *Natural Resources Watercourse Map* forming part of the MLEP 2012.

The site is classified as Bushfire Prone Land as indicated on Council's Bush Fire Prone Land Map.

The site is located within a 'Designated Bush Fire Prone Area' as defined by the NSW Rural Fire Service (RFS). The site is located within a 'Designated 10/50 Vegetation Clearing Entitlement Area' as defined by the NSW RFS. However, the 10/50 exemption to clear vegetation is *not* applicable to this parcel of land as it is located within 100 metres of the coastline or estuaries of NSW.

5.3 Heritage Significance

5.3.1 Heritage Items

The subject property is listed as an item of Environmental Heritage [Item 137] under Schedule 5, Part 1 of the *Mosman Local Environmental Plan 2012* (MLEP). Prior to the development of the playing field in c. 1951, the area was used for defence purposes.

5.3.2 Heritage Conservation Area

The site is *not* located within a Heritage Conservation Area (HCA) under Schedule 5, Part 2 of the MLEP 2012.

5.3.3 Significant Tree Register

None of the subject trees are listed on Mosman Council's *Urban Forest Management Register* (November 2021).

5.3.4 General

The 1943 Aerial Photograph of Sydney (SIX Maps) indicates that site had been largely cleared of vegetation for defence purposes, with some native vegetation remaining around the foreshore.

Based on analysis of Historical Imagery of the site (NSW Spatial Services), by 1955, the oval had been constructed in much the same location as the present day. The amenities building and spectator seating were constructed between 1982 and 1986. The band of vegetation around the southern side of the oval (on the embankment) appears to have been established c.1980-2000. T10 is visible as a semi- mature specimen in 1965, and may have been planted in association with the development of the playing field. The tree is not extant in 1943 and therefore is not a remnant tree. None of the trees have any known or suspected heritage significance.

5.4 Amenity Value

- 5.4.1 Criteria for the assessment of amenity values are incorporated into **Appendix 1**. The amenity value of a tree is a measure of its live crown size, visual appearance (form, habit, crown density), visibility and position in the landscape and contribution to the visual character of an area. Generally the larger and more prominently located the tree, and the better its form and habit, the higher its amenity value.
- 5.4.2 The site is located within a Scenic Protection Area as indicated on Council's *Scenic Protection Map* forming part of the MLEP 2012.

6 TREE RETENTION VALUES

6.1.1 The Retention Values shown in **Appendix 3** and **Appendix 5** have been determined on the basis of the estimated longevity of the trees and their landscape significance rating, in accordance with **Table 1**. Together with guidelines contained in **Section 7** (Tree Protection Zones) this information should be used to determine the most appropriate position of building footprints and other infrastructure within the site, with due consideration to other site constraints, to minimise the impact on trees considered worthy of preservation.

TABLE 1 – TREE RETENTION VALUES – ASSESSMENT METHODOLOGY

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

6.1.2 The following table describes the implications of the retention values on site layout and design.

TABLE 2 – TREE RETENTION PRIORITES.

RETENTION VALUE	RECOMMENDED ACTION
"High"	These trees considered worthy of preservation; as such careful consideration should be given to their retention as a priority. Proposed site design and placement of buildings and infrastructure should consider the recommended setbacks as discussed in the following section to avoid any adverse impact on these trees (refer also Appendix 2 for examples of acceptable encroachments) In addition to Tree Protection Zones, the extent of the canopy (canopy drip-line) should also be considered, particularly in relation to multi-storey developments. Significant canopy pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
"Moderate"	The retention of these trees is desirable, but not essential. These trees should be retained as part of any proposed development if possible. However, these trees are considered less critical for retention. If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replenishment Policy to compensate for loss of amenity (refer also Section 11).
"Low"	These trees are not considered to worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE. These trees should not be considered as a constraint to the future development of the site.
"Very Low"	These trees are considered potentially hazardous or very poor specimens, or may be environmental or noxious weeds. The removal of these trees is therefore recommended regardless of the implications of any proposed development.

7 TREE PROTECTION ZONES

- 7.1.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk of the tree as specified in **Appendix 4**. These have been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).⁵
- 7.1.2 The intention of the TPZ is to ensure protection of the root system and canopy from the potential damage from construction works and ensure the long-term health and stability of each tree to be retained. Incursions to the root zone may occur due to excavations, changes in ground levels, (either lowering or raising the grade), trenching or other forms or soil disturbance such as ripping, grading or inverting the soil profile. Such works may cause damage or loss of part of the root system, leading to an adverse impact on the tree.

7.2 Structural Root Zone (SRZ)

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

7.3 Acceptable Encroachments to the Tree Protection Zone.

- 7.3.1 Where encroachment to the TPZ is unavoidable, an incursion to the TPZ of not exceeding 10% of the area of the TPZ and outside the SRZ may be acceptable. Examples of acceptable incursions are shown in **Appendix 2**. Greater incursions to the TPZ may result in an adverse impact on the tree.
- 7.3.2 Where incursions greater than 10% of the TPZ are unavoidable, exploratory excavation using non-destructive methods may be required to evaluate the extent of the root system affected and determine whether or not the tree can remain viable

7.4 Acceptable Encroachments to the Canopy

- 7.4.1 The removal of a small portion of the crown (foliage and branches) is generally tolerable provided that the extent of pruning required is less than 10% of the total foliage volume of the tree and the removal of branches does not create large wounds or disfigure the natural form and habit of the tree. All pruning cuts must be undertaken in accordance with AS 4373:2007. This generally involves reduction of the affected branches back to the nearest branch collar at the junction with the parent branch, rather than at an intermediate point. The latter is referred to as "lopping" and is no longer an acceptable arboricultural practice. Generally speaking, the minimum pruning as required to accommodate any proposed works is desirable. Extensive pruning can result in a detrimental impact on tree health and may lead to exposure of remaining branches to wind forces that they were previously sheltered from, leading to a greater risk of branch failure.
- 7.4.2 Clearance to between the building line and canopy should take into account any projecting structures, such as balconies, awnings and the roofline and any requirement for temporary scaffolding to be erected during construction (typically 1-1.5 metres wide). High structures should preferably be located outside the canopy dripline (as shown indicatively on the attached plans) in order to avoid or minimise canopy pruning.

8 PROPOSED DEVELOPMENT

8.1.1 The proposed development includes the demolition of the existing amenities building and construction of a new amenities building and shelter over existing tiered seating in a similar position within the site.

9 IMPACT ASSESSMENT

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

Title	Author	Dwg No. [Rev.]	Date
Site Plan	Archer Office	1903 A050 [-]	03/2024
Ground Floor Plan	Archer Office	1903 A101 [-]	03/2024
Landscape Design Report	Studio Rewild & Emily Simpson Landscape Architecture	L01 [B]	28/03/2024

- 9.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 4**. The following criteria have been examined as part of this assessment:-
 - Existing Relative Levels (R.L.);
 - Tree Protection Zone (TPZ);
 - Structural Root Zone (SRZ);

- Footprint and envelope of the proposed development and temporary structures (scaffolding, hoardings etc);
- Incursions to the TPZ & SRZ, including estimated cut & fill beyond the building footprint;
- Incursions to the tree canopy from the building envelope and temporary structures; and
- Assessment of the likely impact of the works on existing trees.
- 9.1.3 The proposed development will not result in the removal or adverse impact on any of the subject trees.

10 RECOMMENDED TREE PROTECTION MEASURES

10.1 Tree Protection Plan

10.1.1 The following Tree Protection Measures should be read in accordance with the Tree Protection Plan (**Appendix 6**). The Tree Protection Plan (TPP) indicates the position of tree protection devices and other recommended measures to ensure the protection of trees within the site to be retained as part of the proposed development.

10.2 Prohibited Activities

- 10.2.1 The following activities should be avoided within specified Tree Protection Zones (refer **Appendix 4 & 6** for extent of the TPZ for each tree):-
 - Excavations and trenching (with exception of the approved remediation works, underground services, building foundations or pavement sub-grade);
 - Soil disturbance, surface grading, compaction, tyning, ripping or cultivation of soil;
 - Mechanical removal of vegetation, including extraction of tree stumps;
 - Soil level changes including the placement of fill material (excluding imported validated fill for remediation works or placement of fill for approved works)
 - Movement and storage of plant, equipment & vehicles (except within defined temporary haul roads, where ground protection has been installed, or within the footprint of existing floor slabs or paved areas);
 - Erection of site sheds (except where approved by the site arborist);
 - Affixing of signage, barricades or hoardings to trees;
 - Storage of building materials, waste and waste receptacles;
 - Stockpiling of spoil or fill;
 - Stockpiling of bulk materials, such as soil, sand, gravel, roadbase or the like;
 - Stockpiling of demolition waste;
 - Disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids;
 - Other physical damage to the trunk or root system; and
 - Any other activity likely to cause damage to the tree.

10.3 Tree Damage

- 10.3.1 Care shall be taken when operating cranes, drilling rigs and similar equipment near trees to avoid damage to tree canopies (foliage and branches). Under no circumstances shall branches be torn-off by construction equipment. Where there is potential conflict between tree canopy and construction activities, the advice of the Site Arborist must be sought.
- 10.3.2 In the event of any tree becoming damaged for any reason during the construction period a consulting arborist [Australian Qualification Framework Level 5] shall be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

10.4 Tree Protection Fencing

10.4.1 Trees [T1, T2 & T12] shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence in the positions as indicated on the Tree Protection Plan (Appendix 6). As a minimum, the fence shall consist of temporary chain wire panels of 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement using corner braces where required. The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate. Existing site boundary fences may form part of the enclosure.

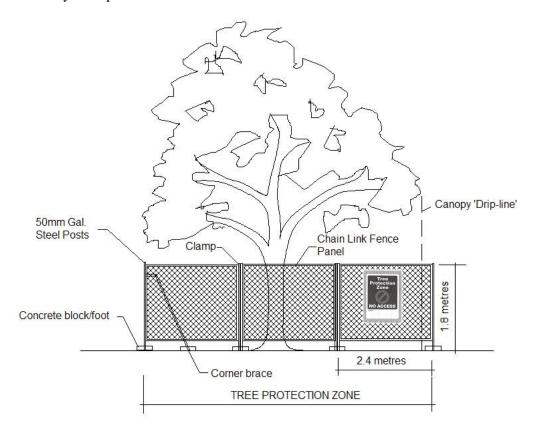


Figure 1 – Detail of Tree Protection Fence

10.5 Tree Protection Signs

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



Figure 2 – Detail of Tree Protection Sign

10.6 Ground Protection

10.6.1 Construction haul routes shall be confined to existing paved areas wherever possible. Where this is not feasible and construction haul routes or access for plant and equipment must traverse soft landscape areas within TPZs of [any tree nominated for retention], 20mm thick marine ply sheets or truck mats (such as Envirex Versadeck® access mats) (refer Figure 4 shall be placed over the top of the ground surface to minimise compaction and disturbance of the underlying soil profile and root zone.



Figure 4 – Showing typical detail for truck mats.

10.6.2 Ground protection shall be installed prior to any site works and maintained in good condition for the duration of the construction period. On completion of the works, ground protection shall be removed without damage or disturbance to the underlying soil profile.

10.7 Demolition Works within Tree Protection Zones

10.7.1 Existing Turfgrass

No mechanical soil cultivation (using ripping tynes, rotary hoes or the like) is permitted within Tree Protection Zones (TPZs). Where existing turfgrass is proposed to be removed (demolished) within the TPZs of Trees [any tree nominated for retention], the turfgrass shall be first treated with a non-selective herbicide with the active constituent Glyphosate (Round-up ® or equivalent) at the manufacturers recommended rate and allowed to dehisce. Once the turfgrass in the effected area is completely dead, any high grass may be slashed/mown close to ground level.

Any residual vegetation (dead grass etc) may then be carefully scraped-off the surface using a small rubber tracked excavator with a broad sand bucket (i.e. without tynes/teeth), taking care to remove the minimum topsoil necessary (no more than 20mm deep) (refer to **Figure 5**). An observer shall be used to ensure that no woody surface roots of any trees are damaged during this process.



Figure 5 – Showing method for removal of residual surface vegetation from Tree Protection Zones following herbicide treatment and slashing.

10.7.2 Paved Areas

Demolition of paved areas within the Tree Protection Zones (TPZs) of trees [any tree nominated for retention] shall be undertaken under the supervision of a qualified Arborist [Australian Qualification Framework (AQF) Level 5].

Concrete pavements shall be demolished by breaking the slab into manageable sections (using a rock hammer or similar) and asphalt pavements shall be removed by breaking the topcoat into manageable pieces. The broken sections shall be carefully lifted and folded over the remaining paved surface to minimise disturbance and compaction of the underlying soil profile (refer to **Figure 6**). Special care shall be taken where underlying woody roots have lifted or displaced the pavement. Any plant or equipment used in demolition work shall operate within the footprint of existing paved areas and avoid traversing soft landscape areas. Where this is unavoidable, suitable ground protection shall first be installed in accordance with **Section 10.6**.



Figure 6 – Showing method for removal of concrete pavement, by carefully lifting sections and folding over the remaining paved surface.

The pavement sub-base within the TPZ shall be gradually removed (where required) in layers of no greater than 50mm thick using a small rubber tracked excavator or alternative approved method to avoid excessive disturbance and compaction of the underlying soil profile and damage to underlying roots and minimise. The machine shall work within the footprint of the existing path footprint to avoid compaction of the underlying soil. The final layer of sub-base material shall be removed using hand tools were required to avoid compaction of the underlying soil profile and avoid damage to any underlying woody roots.

10.7.3 Structures & Retaining Walls

Demolition of existing walls, kerbs and other structures within the TPZ of trees [any tree nominated for retention] shall be undertaken under the supervision of a qualified Arborist [AQF level 5]. The structures shall be demolished using equipment on stationed outside the TPZ where possible or within the footprint of existing hardstand areas.

Care shall be taken to avoid the root systems, trunks and lower branches of trees in the vicinity of the structures during demolition works, with special attention required during demolition of the footings and other sub-surface members to avoid damage to woody roots. An observer ('spotter') shall be employed to assist the plant operator in order to detect and avoid damage to underlying woody roots during demolition. Trunk and/or branch protection shall be installed where there is a potential risk of damage to trees in proximity or overhead of the work.

10.8 Excavations within Tree Protection Zones

10.8.1 Prior to any mechanical excavations for building foundations or pavement sub-grade within the TPZs of Trees [any tree nominated for retention] exploratory excavation using non-destructive techniques shall be taken along the perimeter of the structure or pavement within the TPZ. Non-destructive excavation techniques may include the use of hand-held implements, air pressure (using an Air-spade® device) or water pressure (hydro-excavation in combination with a vacuum extraction unit). The exploratory excavation shall be undertaken along the perimeter of the foundation or pavement (within the TPZ) to the depth of the foundation or to a maximum of

800mm from surface levels, to locate and expose any woody roots prior to any mechanical excavation.

10.8.2 All care shall be undertaken to preserve woody roots intact and undamaged during exploratory excavation. Any roots encountered of less than 40mm in diameter may be cleanly severed with clean sharp pruning implements at the face of the excavation. The root zone in the vicinity of the excavation shall be kept moist following excavation for the duration of construction to minimise moisture stress on the tree. Where large woody roots (greater than 40mm diameter) are encountered during exploratory excavations, further advice from a qualified arborist shall be sought prior to severance.

10.9 Alternative Construction Methods

- 10.9.1 Where necessary, (to avoid severing large woody roots) consideration should be given to the installation of an elevated structure (e.g. pier and beam footing, suspended slab or floor supported on piers, cantilevered slab, up-turned edge beam etc) in preference to structures requiring a deep edge beam or continuous perimeter strip footing. The beam section of any pier and beam footing should be placed **above** grade to avoid excavation within the SRZ. Pier footings intersecting large woody roots should be slightly offset where necessary to avoid root severance.
- 10.9.2 For masonry walls or fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars. For retaining walls, consideration should be given to eliminating continuous strip footings and substituting with pier and beam footings, pier footings (using a post and caisson type wall) or mass wall such as gabions or mass stone that can be placed without a structural footing.
- 10.9.3 For paved areas, consideration should be given to raising the proposed pavement level and using a porous fill material in preference to excavation where large woody roots are found within the subbase.

10.10 Underground Services

- 10.10.1 All proposed stormwater lines and other underground services should be located outside TPZs of trees proposed to be retained wherever possible or installed by alternative measures. Alternative measures include suspending pipelines beneath the floor of a building or structure (to avoid excavation with the TPZ), non-destructive excavation methods or Horizontal Directional Drilling (HDD). Where the installation of service lines within TPZs is unavoidable, the pipelines or conduits should be installed as follows.
- 10.10.2 Trenching for underground services and stormwater pipes within the TPZs of Trees [any tree nominated for retention], shall be undertaken using non-destructive excavation in accordance with Section 10.8. Where large woody roots are encountered during excavation or trenching (root diameter greater than 40mm), these shall be retained intact wherever possible (e.g. by tunnelling beneath roots and inserting the pipeline or conduit beneath or re-routing the service etc). Where this is not practical and root pruning is the only alternative, proposed root pruning should be assessed by a qualified arborist [AQF 5] to evaluate the potential impact on the health and stability of the subject tree.
- 10.10.3 Installation of underground services and stormwater pipes within the SRZs of Trees [any tree nominated for retention], shall only be undertaken by Horizontal Directional Drilling (HDD) (also referred to as sub-surface boring or Micro-tunnelling for large diameter pipes). The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root zone depth as specified. At this site a minimum depth of 1 metre to the invert level of the pipe is specified.

10.11 Root Pruning

- 10.11.1 Where root pruning of [any tree nominated for retention] is required to facilitate construction, roots shall be severed with clean, sharp pruning implements and retained in a moist condition during the construction phase using Hessian material or mulch where practical. Severed roots shall be treated with a suitable root growth hormone containing the active constituents Indol-3-yl-Butric Acid (IBA) and 1-Naphthylacetic Acid (NAA) to stimulate rapid regeneration of the root system.
- 10.11.2 Any required root pruning shall be carried out in accordance with Australian Standard 4373-2007 *Pruning of Amenity Trees* by a qualified and experienced arborist or tree surgeon [Australian Qualification Framework Level 3] in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). No roots of greater than 40mm in diameter should be removed or pruned without further advice from a Consulting Arborist [Australian Qualification Framework Level 5].

11 REPLACEMENT PLANTING

- 11.1.1 In accordance with the Section 4.9, Part 4 of the MOSIDCP and Council's *Urban Forest Management Policy* where trees are approved for removal as part of the development, new trees must be planted within the site to compensate for loss of amenity and ensure no net loss of canopy cover. Selection and placement of new trees should consider minimising bushfire risk, maintaining scenic views and minimising risk of damage to buildings and other structures. Sites located within defined Biodiversity Corridors and Habitat Links must incorporate some locally indigenous species.
- 11.1.2 Replacement trees should preferably include some locally indigenous species. These will be most appropriate to the site conditions and be most valuable in terms of preserving the landscape character and wildlife habitat of the area. The following species are appropriate to the site conditions and could be considered for replacement planting:-

Locally-indigenous species:-

- Eucalyptus haemastoma (Scribbly Gum),
- Angophora costata (Sydney Red Gum)
- Corymbia gummifera (Red Bloodwood)
- Eucalyptus sieberi (Silvertop Ash)
- Eucalyptus capitellata (Brown Stringybark)
- Corymbia eximia (Yellow Bloodwood),
- Banksia serrata (Old Man Banksia).
- 11.1.3 The Landscape Design Report prepared by Studio Rewild and Emily Simson Landscape Architecture indicates a number of new locally-indigenous trees to be planted within the site as part of the new landscape works. These include several Sydney Red Gums and Coast Banksias. These species are considered appropriate to the site conditions and will result in a net increase in amenity and canopy cover within the site.

Andrew Morton

EARTHSCAPE HORTICULTURAL SERVICES

1st May 2024

REFERENCES

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

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

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

Pre-development Tree Assessment

Proceedings of the International Conference on Trees and Building Sites (Chicago) International Society of arboriculture, Illinois, USA

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

⁴ Barrell, Jeremy (1996)

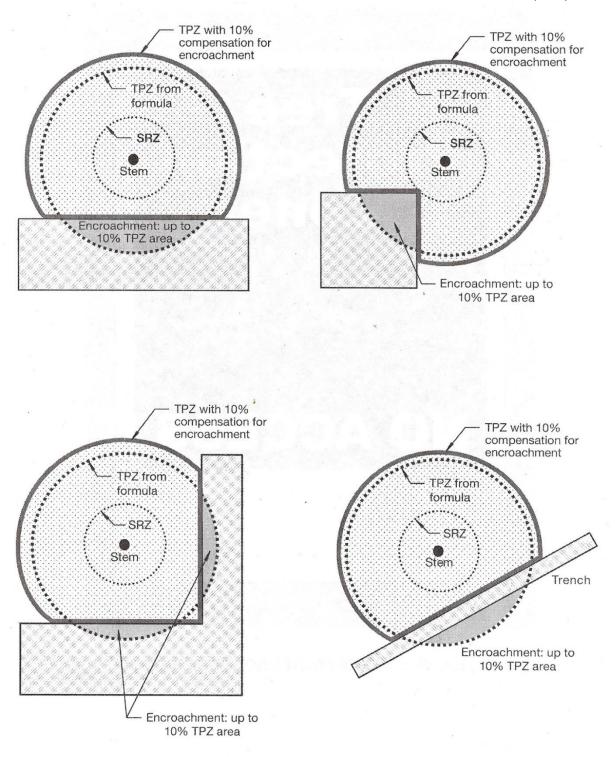
APPENDIX 1 - CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE		
	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened or Vulnerable Species as defined under the provisions of the <i>Biodiversity Conservation Act 2016</i> (NSW) or the <i>Environment Protection and Biodiversity Conservation Act 1999</i> .	The subject tree has a very large live crown size exceeding 300m² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species		
1. SIGNIFICANT	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity		
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.		
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m ² ; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area		
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m²; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area		
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is	The subject tree is a non-local native or exotic species that is protected under the provisions of the local or state planning controls	The subject tree has a medium live crown size exceeding 40m²; the tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and		
	sympathetic to the original era of planting.	(Development Control Plan etc).	The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.		
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of the local or state planning controls (DCP etc) due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m² and can be replaced within the short term (5-10 years) with new tree planting		
6. VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).		
7. INSIGNIFICA NT	The tree is completely dead and has no known heritage value (or any habitat value)	The tree is scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within NSW or within the relevant Local Government Area under the provisions of the <i>Biosecurity Act 2015</i>	The tree is completely dead and represents a potential hazard.		

Ref:- Morton, A (2006) Determining the Retention Value of Trees on Development Sites

TreeNet - Proceedings of the 7th National Street Tree Symposium 2006 Government of South Australia Department for Transport, Energy and Infrastructure

APPENDIX 2 – ACCEPTABLE INCURSIONS TO THE TREE PROTECTION ZONE (TPZ)



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

REF:- Council of Standards Australia (August 2009)

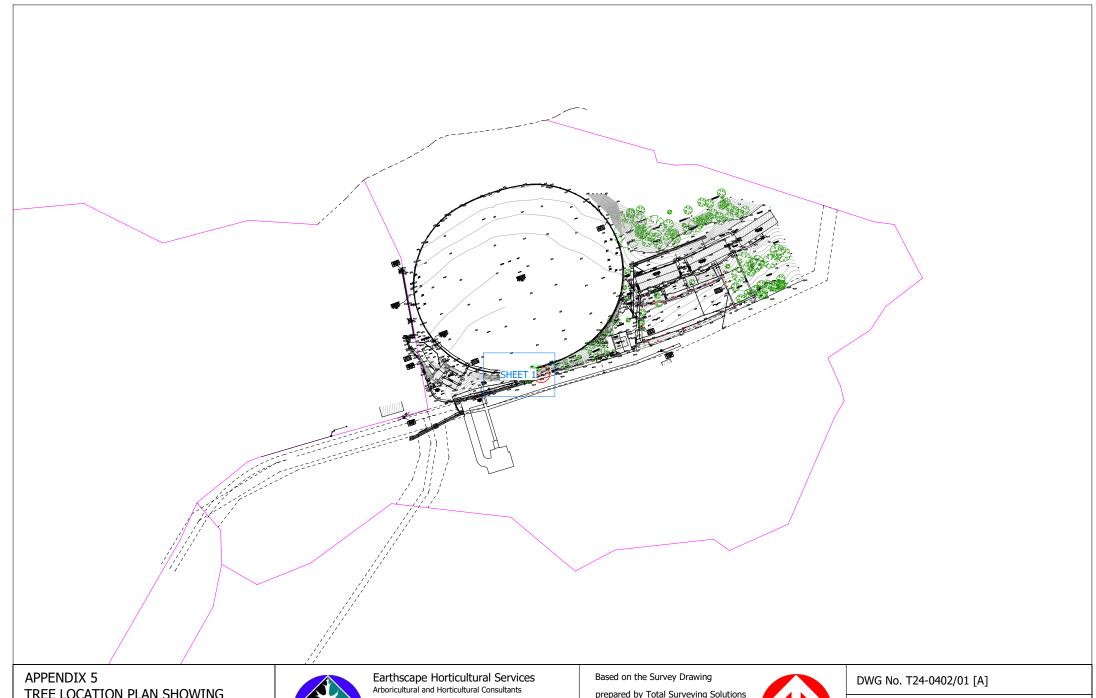
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

			APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE												
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Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm) at 1.4 metres	Live Crown Size (m²)	Maturity Class	Condition	Previous Pruning	Vigour Pest & Disease		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location	
1	Casuarina glauca (Swamp Oak)	9	3	96	27	I	Appears stable with fair branching structure. Exhibits multiple moderate partially occluded wounds on lower trunk. Crown suppressed east side due crowding.	No evidence	Very Good	No Evidence	Medium 15-40 Years	5	Low	On-site	
2	Casuarina glauca (Swamp Oak)	8	3	137	21	I	Appears stable with fair branching structure. Crown suppressed east & west side due crowding.	Crown lifted to 1.5 metres.	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site	
3	Banksia integrifolia (Coast Banksia)	5	1.5	111	0	I	Stability suspect with poor branching structure. Exhibits a prominent lean to the north. Completely dead - no habitat value.	No evidence	Dead	No Evidence	Nil	7	Very Low	On-site	
4	Casuarina glauca (Swamp Oak)	9	3	90 + 120	21	I	Appears stable with fair branching structure. Crown suppressed south side due crowding.	Crown lifted to 1.5 metres.	Good	No Evidence	Medium 15-40 Years	5	Low	On-site	
5	Casuarina glauca (Swamp Oak)	9	5	261	40	SM	Appears stable with sound branching structure. Exhibits a prominent lean to the west. Exhibits twin leaders at 1.5 metres.	No evidence	Good	No Evidence	Long - more than 40 years	5	Moderate	On-site	
6	Casuarina glauca (Swamp Oak)	9	4	170 + 200	28	SM	Appears stable with poor branching structure. Exhibits a severe bark inclusion at junction of co-dominant PLs at GL.	Crown lifted to 2 metres.	Good	No Evidence	Medium 15-40 Years	5	Low	On-site	
7	Casuarina glauca (Swamp Oak)	5	2	90	8	I	Appears stable with poor branching structure. Upper crown suppressed and distorted due to overshadowing.	No evidence	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	5	Low	On-site	
8	Acacia parramattensis (Sydney Green Wattle)	7	2.5	80 + 100	7.5	ı	Appears stable with fair branching structure. Exhibits a prominent lean to the north-east. Obtuse bend in trunk at 0.5 metres.	No evidence	Good	No Evidence	Short 5-15 Years	5	Low	On-site	
9	Acacia parramattensis (Sydney Green Wattle)	7	3	80	9	I	Appears stable with fair branching structure. Crown suppressed south side due to overshadowing. Prominent lean to the north-west. Some interior crown dieback with 15% deadwood.	No evidence	Good	No Evidence	Short 5-15 Years	5	Low	On-site	

			APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE												
tion				meter metres	s z z z z z z z z z z z z z z z z z z z			Health		Safe ife (SULE)	ating	Value			
Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm) at 1.4 metre	Live Crown Size (m²)	Maturity Class	Condition	Previous Pruning	Vigour	Pest & Disease	Remaining Sa Useful Life Expectancy (SI	Landscape Significance Rating	Retention Va	Location	
10	Eucalyptus botryoides (Bangalay)	8	11	401	55		Appears stable with sound branching structure. Broad rounded crown with extended lateral branching habit.	Crown lifted to 5 metres - south side over roadway + selectively pruned.	Good	High foliar insect infestation (brown lace lerp).	Long - more than 40 years	3	High	On-site	
11	Grevillea robusta (Silky Oak)	5	4	120	20	ı	Appears stable with sound branching structure. Prominent lean to the south-east. Crown suppressed north side due to overshadowing	No evidence	Good	No Evidence	Short 5-15 Years	5	Low	On-site	
12	Acacia parramattensis (Sydney Green Wattle)	7	6	232	42	SM	Appears stable with sound branching structure. Crown suppressed east side due to crowding.	No evidence	Good	No Evidence	Short 5-15 Years	4	Low	On-site	

			APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE												
Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation						
1	Casuarina glauca (Swamp Oak)	М	2.0	1.8	1.4	12.6	No proposed works within the TPZ	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fence in accordance with Section 10.4.						
2	Casuarina glauca (Swamp Oak)	М	2.0	1.6	1.4	12.6	No proposed works within the TPZ	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fence in accordance with Section 10.4.						
3	Banksia integrifolia (Coast Banksia)	М	N/A	N/A	N/A	N/A	No proposed works within the TPZ	No adverse impact.	To be retained - no special tree protection measures required.						
4	Casuarina glauca (Swamp Oak)	М	2.0	1.6	1.4	12.6	No proposed works within the TPZ	No adverse impact.	To be retained - no special tree protection measures required.						
5	Casuarina glauca (Swamp Oak)	М	3.1	1.9	2.1	30.8	No proposed works within the TPZ	No adverse impact.	To be retained - no special tree protection measures required.						
6	Casuarina glauca (Swamp Oak)	М	3.0	2.0	2.0	28.3	No proposed works within the TPZ	No adverse impact.	To be retained - no special tree protection measures required.						
7	Casuarina glauca (Swamp Oak)	М	1.5	1.3	1.0	7.1	No proposed works within the TPZ	No adverse impact.	To be retained - no special tree protection measures required.						
8	Acacia parramattensis (Sydney Green Wattle)	М	2.0	1.4	1.4	12.6	No proposed works within the TPZ	No adverse impact.	To be retained - no special tree protection measures required.						
9	Acacia parramattensis (Sydney Green Wattle)	М	2.0	1.3	1.4	12.6	No proposed works within the TPZ	No adverse impact.	To be retained - no special tree protection measures required.						

			APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE												
Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation						
10	Eucalyptus botryoides (Bangalay)	Р	6.5	2.3	4.4	132.7	No proposed works within the TPZ	No adverse impact.	To be retained - no special tree protection measures required.						
11	Grevillea robusta (Silky Oak)	М	2.2	1.5	1.5	15.2	No proposed works within the TPZ	No adverse impact.	To be retained - no special tree protection measures required.						
12	Acacia parramattensis (Sydney Green Wattle)	M	3.0	1.7	2.0	28.3	No proposed works within the TPZ	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fence in accordance with Section 10.4.						



TREE LOCATION PLAN SHOWING TREE RETENTION VALUES

Middle Head Oval 1110 Middle Head Road, MOSMAN, NSW



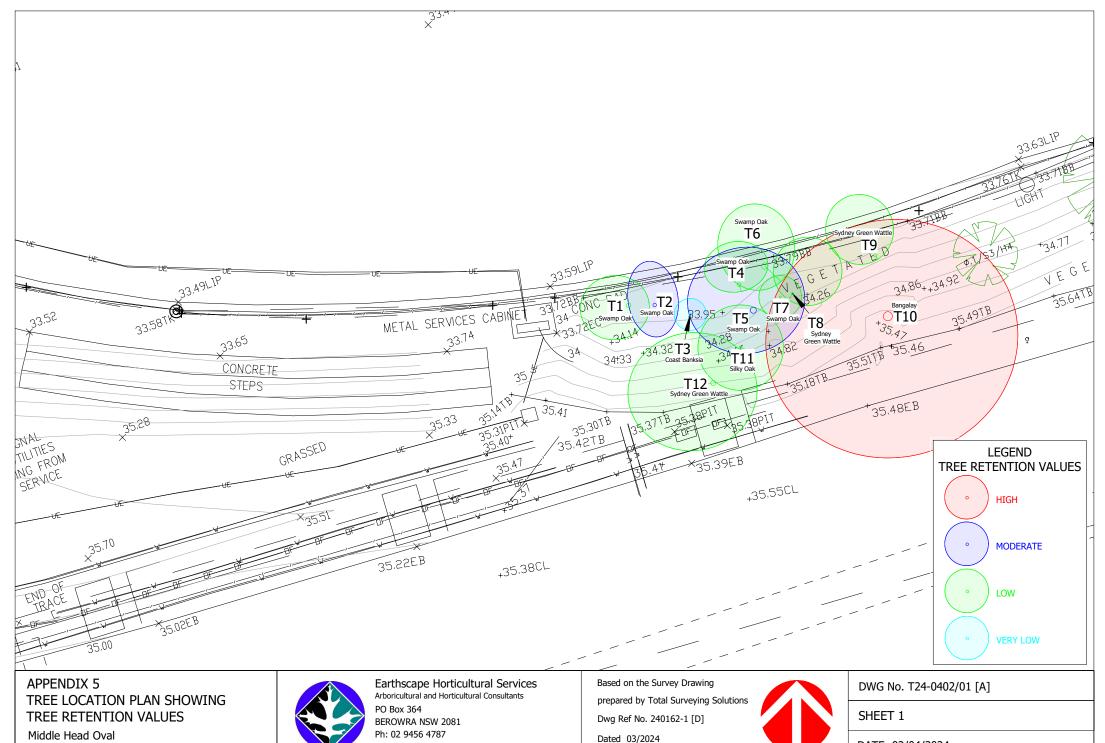
PO Box 364 BEROWRA NSW 2081

Ph: 02 9456 4787 Fax: 02 9456 5757 e: earthscape@iinet.net.au prepared by Total Surveying Solutions Dwg Ref No. 240162-1 [D] Dated 03/2024



KEY PLAN

DATE: 02/04/2024



1110 Middle Head Road, MOSMAN, NSW

Fax: 02 9456 5757 e: earthscape@iinet.net.au



DATE: 02/04/2024



TREE PROTECTION PLAN

Middle Head Oval 1110 Middle Head Road, MOSMAN, NSW



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