

“GROWING MY WAY”

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EXCELLENCE in ALL ASPECTS OF TREE MANAGEMENT

FULL INSURANCE PROTECTION

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ARBORICULTURAL MANAGEMENT ASSESSMENT for Demolition of Ivanhoe Park Pre School

July 2021

Client: Northern Beaches Council

Prepared By Jason M Paxton AQF Level 5 Diploma of Arboriculture AHC50516

with supervision by “Growing My Way” Tree Consultants

Site Address, Ivanhoe Park Sydney Road Manly NSW 2095.



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1. Executive summary.

Northern Beaches Council has secured the services of *Growing My Way Tree Consultants (GMW)* to prepare an Arboriculture Management Assessment, for the management of the trees potentially to be impacted by demolition and removal of the Pre School building located within Ivanhoe Park Manly.

Twenty (20) trees are discussed, Eighteen (18) trees are located within Ivanhoe Park, Two (2) tree are located on the Eastern (E) verge of the access road to the Bowling Club and the Oval.

The Northern Beaches Council (NBC) (Previously Manly Council) *from herein* (NBC) is the local government authority.

Ivanhoe Park Manly is located within the (NBC) designated *Landscape Heritage Conservation Area*. The subject site is zoned RE1 Public Recreation. No discussed trees are known to be listed on any “*significant tree register*”. The park has a Landscape Heritage Listing.

I, Jason M Paxton, as a qualified Practising & Consulting Arborist, have prepared this document based on “*Visual Tree Assessment*” (VTA) undertaken on July 13th 2021 by Kyle A Hill and Jason M Paxton. Jason M Paxton is the author of this document. Kyle A Hill as the appointed Project Arborist has overseen & edited the evolution of this Draft Document.

The sole consent authority is the (NBC) in consultation with other parties, e.g., ‘Friends of the Gardens’.

The report discusses the necessity (relative to the proposed Demolition) & specified strategy for management of Twenty (20) trees identified & discussed.

The aim of this report is:

- i. *Provide valid reasons to support the proposed development relative to tree management.*
- ii. *Provide an achievable Tree Management Strategy for all discussed to be retained trees.*

Kyle Hill and Jason Paxton of Growing My Way Tree Consultants visited the site, Ivanhoe park Manly to consider and develop a Tree Management Plan to minimize the impact to the discussed trees during the Demolition of the Ivanhoe Park Pre School.

3. Method.

The site at Ivanhoe Park Manly was visited to collect data on July 13th, 2021 to assess the site and collect data.

- Tree diameters were taken off the Survey Plan
- The height and canopy spread were estimated.
- All tree data contained within this report is based on data obtained at the time of site inspection.

- The Australian Standard AS 4970 – 2009 *Protection of trees on development sites*, has been used as the benchmark for the preparation of this report.
- The trees were assessed using a basic Visual Tree Assessment (VTA¹) The subject trees were inspected visually from ground level only.
- The identification of genus and species is based on features, visible from a ground level during inspection only, and has not been compared to herbarium specimens.
- The aspect was taken off the survey plan.
- No root analysis, soil testing, 'Resistograph®' drilling, or aerial canopy inspection was undertaken during the assessment of the trees.

Information Provided				
NBC, Ivanhoe Park Botanic Gardens, Manly. Final Masterplan. Sheets 1-3				
Urban Forestry Australia, Arboricultural Asset Assessment. Ivanhoe Park Sep 2018				
Plan name	Plan number	Drawn by	Date	Revision
Survey Plan Detail	17827 1/5	R.N.	13/09/2018	2
Survey Plan Detail	17827 2/5	R.N.	13/09/2018	2
Survey Plan Detail	17827 3/5	R.N.	13/09/2018	2
Survey Plan Detail	17827 4/5	R.N.	13/09/2018	2
Survey Plan Detail	17827 5/5	R.N.	13/09/2018	2
C.M.S Surveyors Pty Limited.				
PO Box 463 Dee Why NSW 2099.				

5. Observations.

The Pre School is located in the centre of Ivanhoe Park to the West of the Bowling greens. The Eastern entrance to the park is located at the end of the small bitumen access Road orientated East (E) to West (W) between the Bowling Greens and the Grandstand. At this point, there are Three (3) brick piers, a Single Wrought Iron gate to the South (S), and a Double Wrought Iron gate to the North (N).

From the gates a concrete path heads North (N) for 15m towards the Pre School, tree #419 is located within the grassed area above the sandstone retaining wall to the South (S) of the path, it then divides staying left uphill for 20m until the next intersection of paths. The path to the Right then gently slopes uphill towards the Pre School for 50m. Along the Northern (N) side of the path is a planting of 10 trees. To the South (S) of this path are Three (3) significant trees, T #347, T #349 & T #405.

¹ VTA is a method commonly used worldwide to access trees, as described by Claus Mattheck in *The body language of trees – A handbook for failure and analysis* (1994). Pages 144-145. The Stationary Office. London.

Located within the direct vicinity of the Pre School are three Significant Trees, T #269, T #350, and T#1. Tree #1 is located to the East (E) of the Pre School Building with the canopy spreading over the existing roof. Tree #269 is located adjacent to the existing building on the Western side (W). Tree #350 is located to the North(N) of the building within the Pre School playground area.

The Entrance to the park off Raglan Street is a steep driveway heading South towards the Bowling greens. Tree #3 is located on the grass verge to the East (E) of the road below the double chain wire gates. Tree #2 is located on the grass verge at the intersection of the entrance road and the ring road around the oval.

5.1 Tree Schedule Table.

#	Identification	Height (m)	Crown (m)	Age	Comments
419	<i>Eucalyptus botryoides</i> (Bangalay Gum)	13	18	M	Install Temporary Fencing, Pruning.
405	<i>Lophostemon confertus</i> (Brush Box)	17	15	M	Install Tree Protection Fencing, Mulch.
362	<i>Harpullia pendula</i> (Tulipwood)	12	8	M	Install Tree Protection Fencing, Mulch.
361	<i>Hymenosporum flavum</i> (Native Frangipani)	14	4	SM	Install Tree Protection Fencing, Mulch.
360	<i>Polyscias elegans</i> (Celerywood)	8	6	EM	Install Tree Protection Fencing, Mulch.
359	<i>Alectryon tomentosus</i> (Hairy Birds Eye)	6	8	EM	Install Tree Protection Fencing, Mulch.
358	<i>Brachychiton acerifolius</i> (Illawarra Flame Tree)	8	4	SM	Install Tree Protection Fencing, Mulch.
357	<i>Syzygium luehmannii</i> (Riberry)	5	4	SM	Install Tree Protection Fencing, Mulch.
356	<i>Tristaniaopsis laurina</i> (Water Gum)	4	4	SM	Install Tree Protection Fencing, Mulch.
355	<i>Polyscias elegans</i> (Celerywood)	7	7	SM	Install Tree Protection Fencing, Mulch.
353	<i>Melaleuca quinquenervia</i> (Broad Leaved Paperbark)	10	7	SM	Install Tree Protection Fencing, Mulch.
352	<i>Melaleuca salicina</i> (White Bottlebrush)	9	7	SM	Install Tree Protection Fencing, Mulch.
Y=Young, SM=Semi-Mature, EM=Early-Mature, M=Mature, LM=Late-Mature					

Growing My Way Tree Consultants

#	Identification	Height (m)	Crown (m)	Age	Comments
349	<i>Araucaria cunninghamii</i> (Hoop Pine)	22	16	M	Install Tree Protection Fencing, Mulch.
347	<i>Ficus rubiginosa</i> (Port Jackson Fig)	14	22	LM	Install Tree Protection Fencing, Minor Pruning, Mulch.
342	<i>Livistona australis</i> (Cabbage Tree Palm)	13	6	EM	Install Tree Protection Fencing.
269	<i>Araucaria cunninghamii</i> (Hoop Pine)	27	18	M	Install Tree Protection Fencing, Trunk Protection. Minor Pruning,
350	<i>Agonis flexuosa</i> (Willow Myrtle)	9	16	LM	Install Tree Protection Fencing.
1	<i>Ficus rubiginosa</i> (Port Jackson Fig)	Est. 18	Est. 20	M	Install Tree Protection Fencing, Trunk & Branch Protection, Mulch.
2	<i>Araucaria heterophylla</i> (Norfolk Island Pine)	Est. 25	Est. 16	LM	Install Tree Protection Fencing, Minor Pruning.
3	<i>Cinnamomum camphora</i> (Camphor Laurel)	Est. 15	Est. 10	M	Install Tree Protection Fencing, Minor Pruning.
Y=Young, SM=Semi-Mature, EM=Early-Mature, M=Mature, LM=Late-Mature					

6. Discussion.

For the demolition process to have minimal to no impact on the trees within the park will require consideration of multiple requirements. This will include restricted access to the public within the construction area while still allowing movement and thoroughfare within the park, (**Traffic Control Plan**). The construction of a tree root-friendly access road suitable for Plant and Equipment. Within the access road to the site implement protection against compaction to the soil and root systems (**Load Bearing Surface**). Protection of trees from mechanical or other associated damage. Trunk and Branch Protection for Trees #269 & #1. Retention of existing perimeter fencing. All these factors and requirements should be considered in the implementation of the tendering process.

6.1. Tree Protection fencing.

The Tree Protection Fencing (**TPF**), will be required to protect and isolate the trees along the Access Road, and then isolate and protect the trees directly adjacent to the Pre School.

Tree Protection Fencing in most instances for this project will also work as Construction Site Isolation Fencing (**CSIF**). The **TPF** and the **CSIF** will be recommended to start at the Eastern (E) entrance to Ivanhoe Park at the Iron gates noted in the Observations. The fencing will have a locked construction gate at the existing site of the Park entrance, the fencing will be located on either side of the (**Access Road/Load Bearing Surface**) leading to the Pre School (as discussed in Observations). The section of fencing is designed for the isolation of the site and the isolation and Protection of Trees # 419, 405 362-355, 353, 352, 349, 347 & 342.

For the Protection of Trees 269, 350 & 1, **TPF/CSIF** will continue from the access road/loadbearing surface at the Southeast (SE) corner of the existing building, the fence will continue along the Southern (S) side of the building on the edge of the concrete path below the stone wall to the South West (SW) corner of the building, then returning North (N) along the existing drain towards Tree #269 and along towards the North East (NE) corner of the building to then incorporate the existing black steel fencing.

All the existing black steel fencing will be left in place as **TPF** and **CSIF**. The access for machinery will only be between the existing black steel fencing at the existing entrance gate to the Pre School and the **TPF/CSIF** to the South of the existing building.

Tree #350 located within the playground of the Pre School has an existing deck around the base, this will be required to remain as root protection until final demolition of the building has finished. The deck **MUST** be removed by hand/persons with no access to machinery or the use of machinery.

Tree #1 will be isolated between the existing black steel fencing located to the East (E) of the building and **TPF** adjacent to the Eastern (E) wall of the existing building. The Eastern (E) wall of the existing building will also protect the tree during the demolition process. The preferred option for the demolition process would be to leave the removal of the existing Eastern (E) wall till the final demolition stage. This will be determined, if possible, from engineering requirements.

Trees 2 & 3, will require **TPF** along the curb of the existing road within the spread of the canopy for the protection of the trees from entering trucks during the demolition

process. Erection of the fencing along the gutter of the existing road will isolate the trees from impact from trucks and machinery. The current road will serve as an existing Load Bearing Surface for the noted trees.

All Tree Protection Fencing must comply with AS 4970 – 2009 Protection of trees on development sites, detailed within Section 4. AS 4687–2007 Temporary fencing and hoardings.

6.2. Trunk and Branch Protection.

Trees #269 and #1 will require trunk and/or branch protection.

Tree #269, due to the close proximity of the building will require trunk protection from existing ground level to a height of 3m above the existing building roof height. To achieve the installation some minor pruning will be required.

Tree #1, due to the close proximity of the building will require trunk and branch protection from the impact of demolition rubble and machinery damage during the demolition process.

Trunk protection will be required for the First Order branches located to the West (W). Above this point, the 1st Order branches on the Western aspect of the tree directly over the building will require branch protection to a minimum height of 3m above the existing building roof height for the duration of the demolition process.

The trunk and Branch protection will be constructed from pine fence palings/board or similar with a 1cm thick foam/polystyrene/carpet backing or similar, boards will be joined with steel/webbing strapping or similar **screwed** to the boards (**NOT NAILED**), this will reduce damage to cambium tissue from the impact of hammering in nails.

All Tree Trunk and Branch Protection must comply with AS 4970 – 2009 Protection of trees on development sites, detailed within Section 4, 4.5.2 & 4.5.3.

6.3. Access Road, Load Bearing Surface Construction.

It has been discussed for access to the site, the entry and exit will be off Raglan Street Manly continuing down the access road to the oval towards and grandstand, then turning Right into the slip road to the Eastern (E) entrance gates to Ivanhoe Park. The Access road will then continue from this point West (W) along the existing path for 15m towards the Pre School, the path then divides Left/Right. The access road will continue uphill following the existing path to the left for Approximately 20m. At this point, the path divides and the road will continue to the Right for Approximately 50m to the entrance of the Pre School. (see PLAN in Appendix 2).

The existing concrete pathways will be retained as they are an existing Load Bearing Surface (LBS). Following the path as described above the access road will require construction from the Eastern (E) entrance gates to the Pre School.

The construction of the road will require an underlay of geotextile fabric, The base will consist of large diameter **sandstone** aggregate 80-100mm or consistent with engineering specifications. This will allow for drainage, aeration and minimise compaction issues. The

Aggregate for the road **MUST NOT** be from a crushed “**Concrete or Lime Based Products**” as the leaching of Lime based products will cause Ph and associated tree health issues.

Above the aggregate surface will require a surface of Track Mats, Wooden Sleepers, or similar (as engineered). The construction of the access road will require specification from a suitably qualified Engineer as these specifications are outside the field of expertise of the Author.

6.4 Root Protection.

Trees 352 – 362, 1, 269, 347 and 349, will require a 10cm layer of arborist mulch within the TPZ, individual trees may require the addition of geotextile fabric around the basal flare and exposed roots of the tree.

Trees 352 – 362 will require a 10cm layer of Arborist Mulch between the existing concrete path and the trees including around the base of the trees.

Tree 1 will require a 10cm layer of Arborist Mulch within the Tree Protection Fencing, additionally, the base of the tree, buttress, or exposed, is to be covered in a geotextile fabric.

Tree 269 will require a 10cm layer of Arborist Mulch within the Tree Protection Fencing, additionally, the base of the tree, buttress, or exposed area to be covered in a geotextile fabric.

Trees 347 and 349 will require any exposed roots to be covered in a geotextile fabric. A 10cm layer of Arborist Mulch within the dripline of the trees, except where the area will be covered by the Load Bearing Surface.

6.5 Pruning Specifications.

Trees #2, 3, 269, 419, and 347 may require minimal pruning for truck access. The Requirement of pruning will be dependent on the specifications of truck size during the tendering process. If a clearance height of 4.5m is required, the specifications for the individual trees are listed below.

Tree #2, may require minor pruning on the lower 2nd Order branches to the West (W) over the access road to the required height.

Tree #3, may require minor pruning of the lower 3rd Order branches over the road towards the North (N) to the required height.

Tree #269, will require minor pruning of small branches on the trunk up to a height of 6m above ground level to enable the installation of trunk protection.

Tree #419, may require pruning of the lowest 2nd order branch to the North (N) over the path, or complete removal of the lowest 1st Order branch to the North (N) over the path dependant on the required height.

Tree #347, may require pruning of a 2nd Order branch over the proposed access road for the required clearance, removal of this branch would be recommended regardless of the construction due to its decline and evidence of fungal fruiting bodies.

All pruning specifications will have a final determination once the tender has been accepted and **Vehicle and Plant** dimensions are concluded. (See Appendix 3, 3.1 for Images).

All Pruning must comply with AS 4373-2007 Pruning of amenity trees. A minimum suitably qualified AQF Level 3 Arborist is required for any pruning within the site.

6.6 Removal of Infrastructure.

For the purposes of creating the Load Bearing Surface/Access Road for the demolition process, Removal and Replacement of some infrastructure will be required.

There are three (3) Ausgrid owned and maintained light poles located within the proposed Load Bearing Surface/Access Road. For the purposes of the demolition, the three poles will be required to have the **Power Isolated, and the Poles Removed**, Then reinstalled if required upon removal of the Load Bearing Surface/Access Road, before the finalization of the project.

The Pole numbers are, **MA12853, MA12855, MA12856.**

The Removal and replacement (if required) of the centre pier located between the two steel gates at the Eastern (E) to the park. This will be required to increase the width of the entrance as the existing gates are not wide enough for use by trucks.

6.7 Traffic Control.

A Traffic/Pedestrian control plan will be required. This may also be required for trucks entering and exiting to and from Raglan Street.

For trucks entering the site along the existing road between the Bowling Club and the Oval, then the road between the Bowling Greens and the Grandstand up to the Eastern entrance to the Park, and within the park for pedestrian and thoroughfare usage.

The Traffic Control and Pedestrian management will need to be designed and implement by a suitably qualified person with the appropriate Accreditation.

7. Recommendations.

For the management of all trees, the Tree Protection Fencing & Construction Site Isolation Fencing must be erected before commencement of any construction, excavation, or demolition. Additionally, Trees #2 & 3 are to have temporary tree protection fencing installed before any trucks or machinery entering the site.

As with the guidelines of The Australian Standard AS 4970 – 2009 *Protection of trees on development sites*, an offset greater than 10% can be achieved by extending the TPZ (see Appendix 1, Site and Tree Protection Plan). It is specified that temporary fencing panels or similar in accordance with AS 4687–2007 *Temporary fencing and hoardings*. The tree protection fencing is to be erected in accordance with the specifications in the Tree Protection Plan (Appendix 4), AS 4970 – 2009 *Protection of trees on development sites*.

Within the TPZ, a 10cm layer of Arborist Mulch is to be applied and maintained for the duration of the project over the ground within the Tree Protection Area. This Mulch Product can be sourced from a local Arborist Company. At this time, the Greater Sydney

Region has experienced above-average rainfalls, as a consequence soil moisture levels are good. If periods of rainfall decrease, the Tree Protection Area should be irrigated weekly or as required to compensate for soil moisture loss. Water is the number one limiting factor for tree growth and health.

It is additionally specified that no building materials of any description be stored, or any construction or other activities conducted within the TPZ without WRITTEN APPROVAL and or SUPERVISION by the suitably qualified (AQF Level 5) appointed site Project Arborist.

The appointed project must be onsite to supervise the construction of the Load Bearing Surface within the locality of trees 252 - 362, 347, and 349 for potential impact to the root system.

Prior to any construction.

1	Engage a suitably qualified project arborist with a minimum AQF 5 Diploma in Arboriculture to oversee and implement the tree protection plan.
2	Construction of tree protection fencing (see tree protection plan. (Appendix 2)
3	Mulch TPZ with a minimum of 10cm thick arborist mulch or similar.
4	Install the irrigation system within TPZ. And maintain adequate moisture levels.
5	All plans provided should have a copy of the tree protection plan (drawing). There should be a note to <u>check for the tree protection plan.</u> (drawing) on each plan provided.
6	Install Load Bearing/Sharing device as shown on a tree protection plan. (Appendix 4)
7	Install sediment fencing and contamination absorption control.

Tree removal or Pruning

8	No access within TPZ for machinery or persons
9	Temporary access within TPZ only with written authorization from project arborist before work.
10	A spill kit must be on site.
11	All tree pruning or removal must be carried out by a suitably qualified arborist with a minimum AQF Certificate 3 in Arboriculture.

During demolition.

12	All work must be supervised by the project arborist within 1m of TPZ.
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13	No access within TPZ for machinery.
14	Temporary access within TPZ only with written authorization from the project arborist.
15	A spill kit must be on site.

Critical checkpoints.

All work to be supervised by the project arborist	
16	After construction of TPZ fencing. (check for compliance)
17	After installation of Load-bearing/sharing surfaces. (check for compliance)
18	TPZ fencing is not to be moved for any reason.
19	If temporary access is required into TPZ.
20	Before and during any excavation within the TPZ.
21	Before cutting any roots larger than 2cm in diameter.
22	Inspection and auditing by the project arborist every three months and at critical stages. The monitoring process must be recorded and included in the certification at the time of practical completion of the work. The critical stages will include, excavation, footings, and slabs, the installation of above or below ground services, erection and removal of scaffolding, ANY work required within the TPZ, and completion of works. As defined in. (AS 4970-2009 Protection of trees on development sites, section 5.4.3 page 21).
Note: Tree Protection Zone (TPZ) is defined in a Glossary of terms	

During construction work.

The project arborist must supervise all work	
23	Before and during any excavation within the TPZ.
24	All excavation within the TPZ is to be performed by hand digging only.
25	Any work within the TPZ.
26	Removal or moving of Tree Protection Fencing. (for any reason)
27	No storage of any materials within the TPZ.

During landscaping work.

28	Check landscape plan for compliance with Tree Protection Plan
29	All work is to be supervised by the project arborist within the TPZ. As described (AS 4970-2009 Protection of trees on development sites section 5.4.4 page 21).

Practical completion.

30	At the time of practical completion will be when all construction and landscaping works are complete. At this time, all tree protection measures can be removed, and the project arborist will access the tree condition and provide certification.
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	As described in (AS 4970-2009 Protection of trees on development sites, section 5.5.2 page 21).
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Post construction.

31	The completion of any further building or landscaping work post construction period will not damage or injure trees.
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Final certification.

32	The project arborist at this time will access the trees and make any recommendations or requirements for remedial works that may be necessary to comply with (AS 4970-2009 Protection of trees on development sites section 5.5.2 page 21).
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If you have any questions relating to this report or implementation of recommendations, please contact Kyle Hill on 0412-221-962.

Regards,



Jason M Paxton (AQF Level 5 Practicing and Consulting Arborist).



Kyle A Hill (AQF Level 5 & AQF Level 8 Practicing & Consulting Arborist).

Appendix 1: Aerial Image of Site.

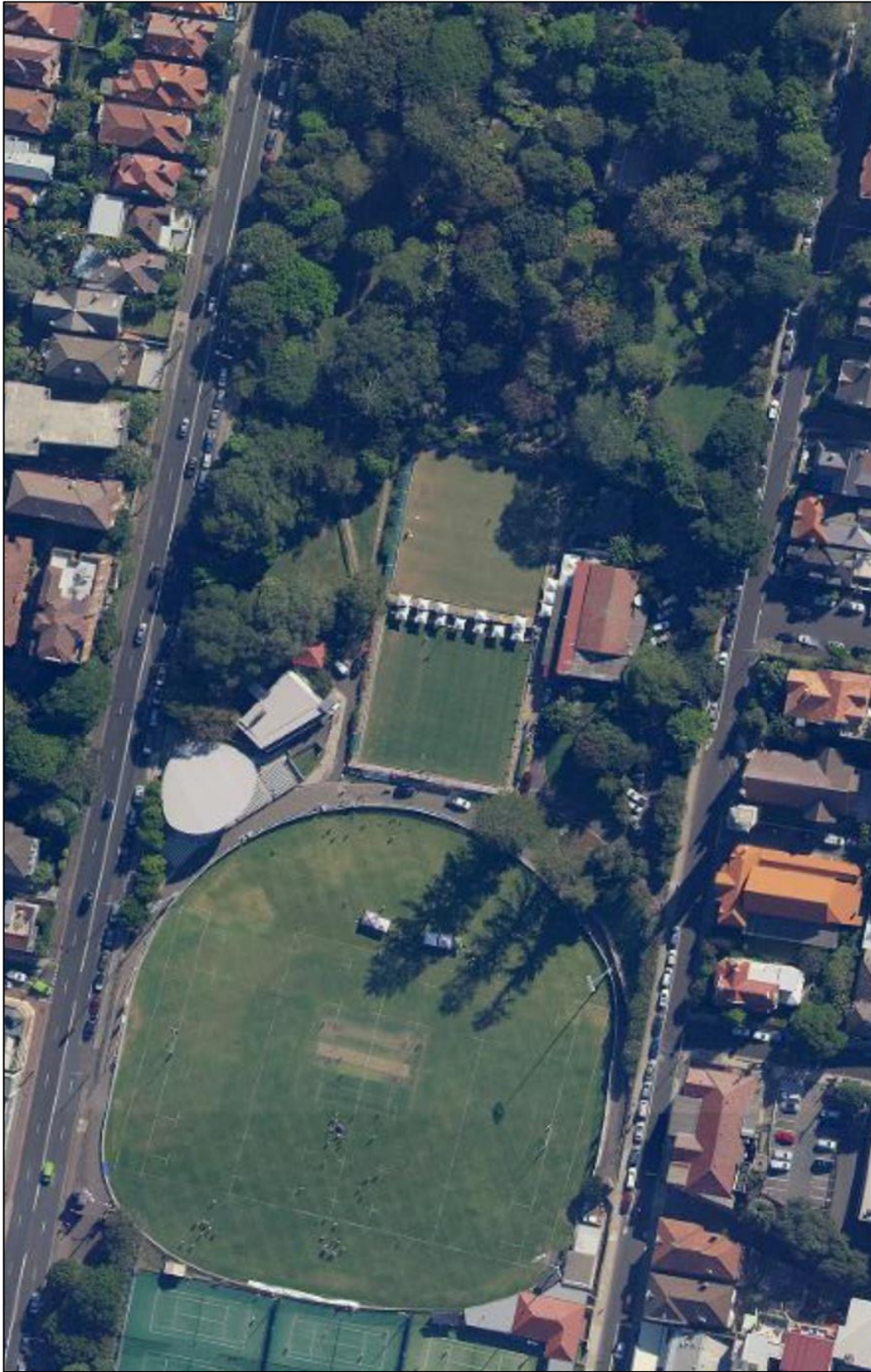


Image 1, [SIX Maps \(nsw.gov.au\)](https://www.sixmaps.com.au)

Appendix 2: Survey Plan with Trees numbered, LBS & TPF Plan

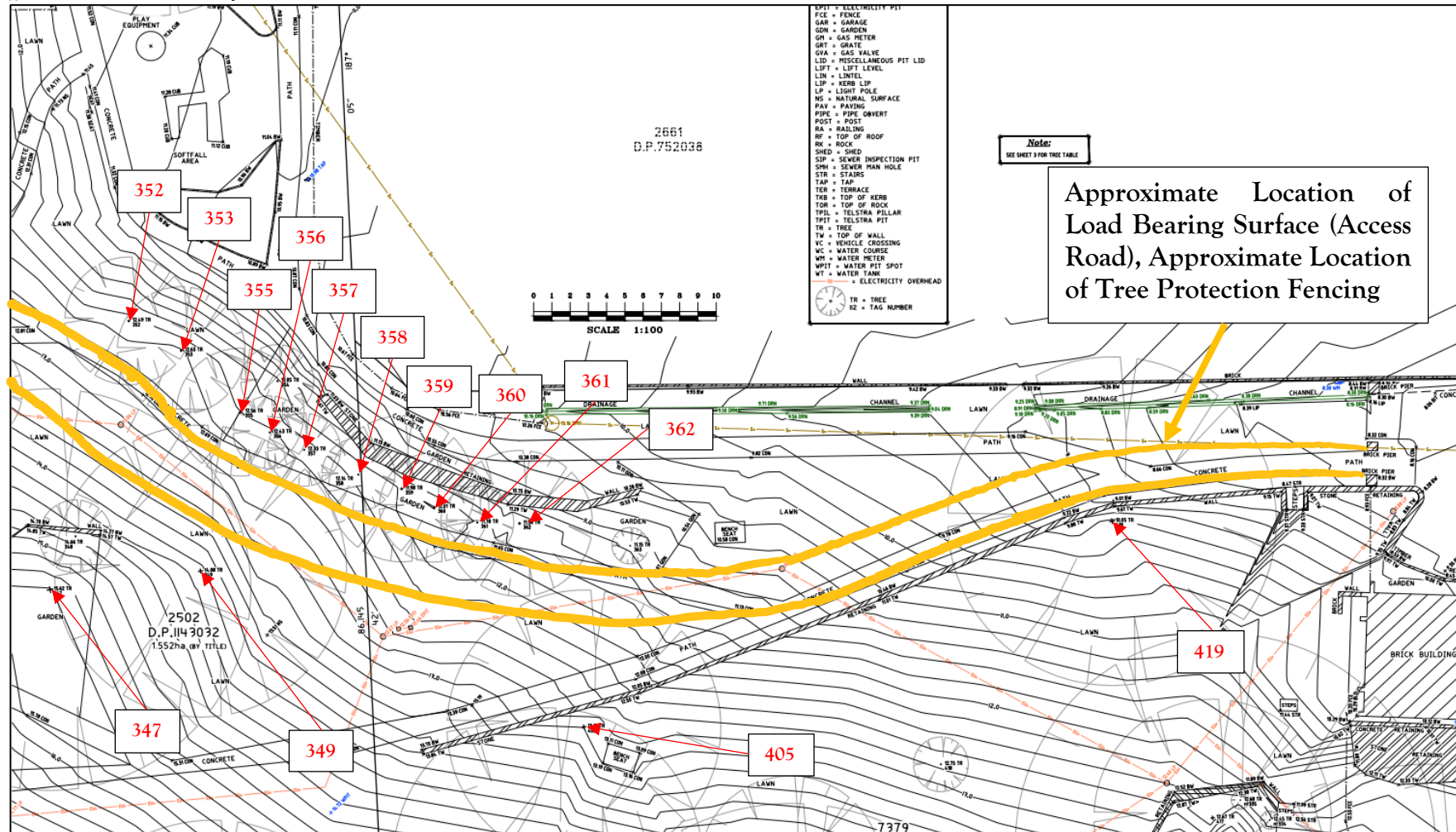


Image 1, Extract from 17827 detail Survey, sheet 5/5. C.M.S. Surveyors Pty Limited.

Ivanhoe Park Manly, NSW 2095.
Arboricultural Management Assessment

Appendix 3: Photographs.

All Images by the Author.

3.1 Pruning Specifications.



Image 2, Tree 2.



Image 3, Tree 3.

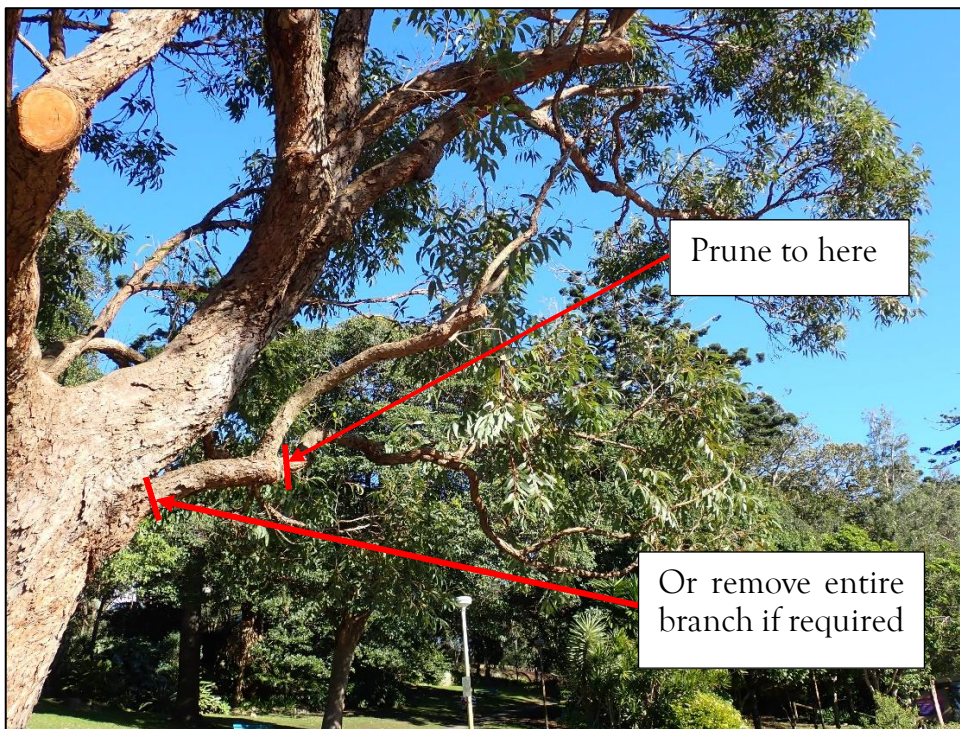


Image 4, Tree 419.



Image 5, Tree 347.

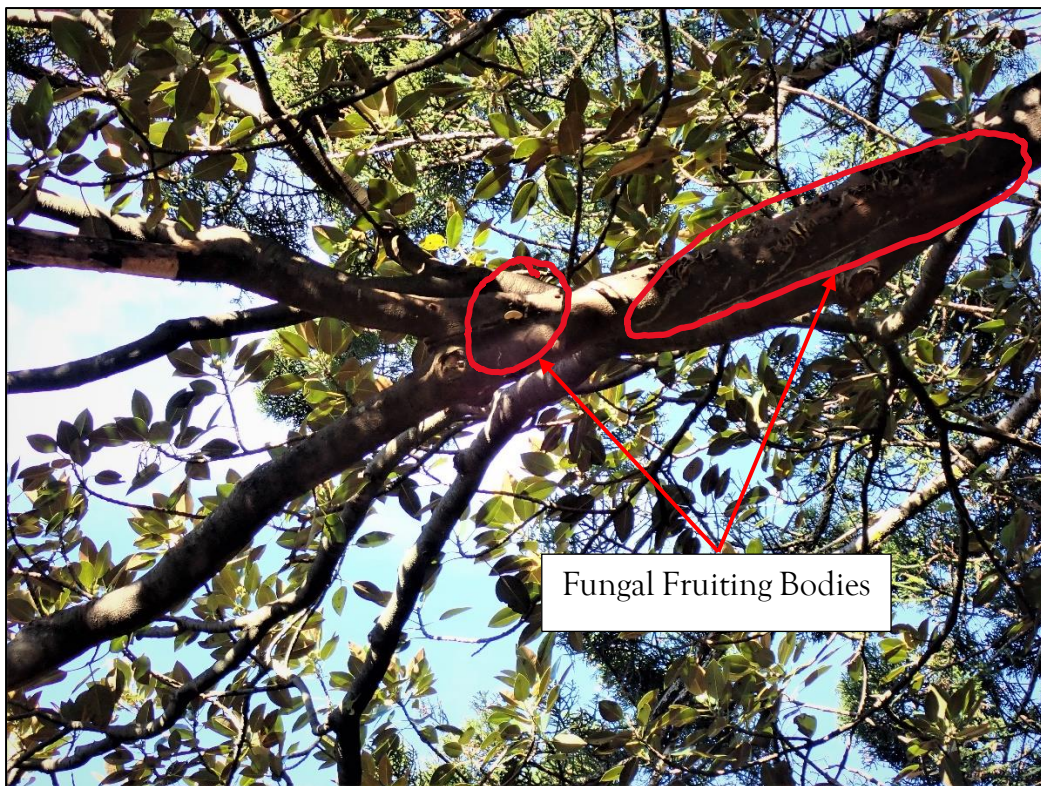
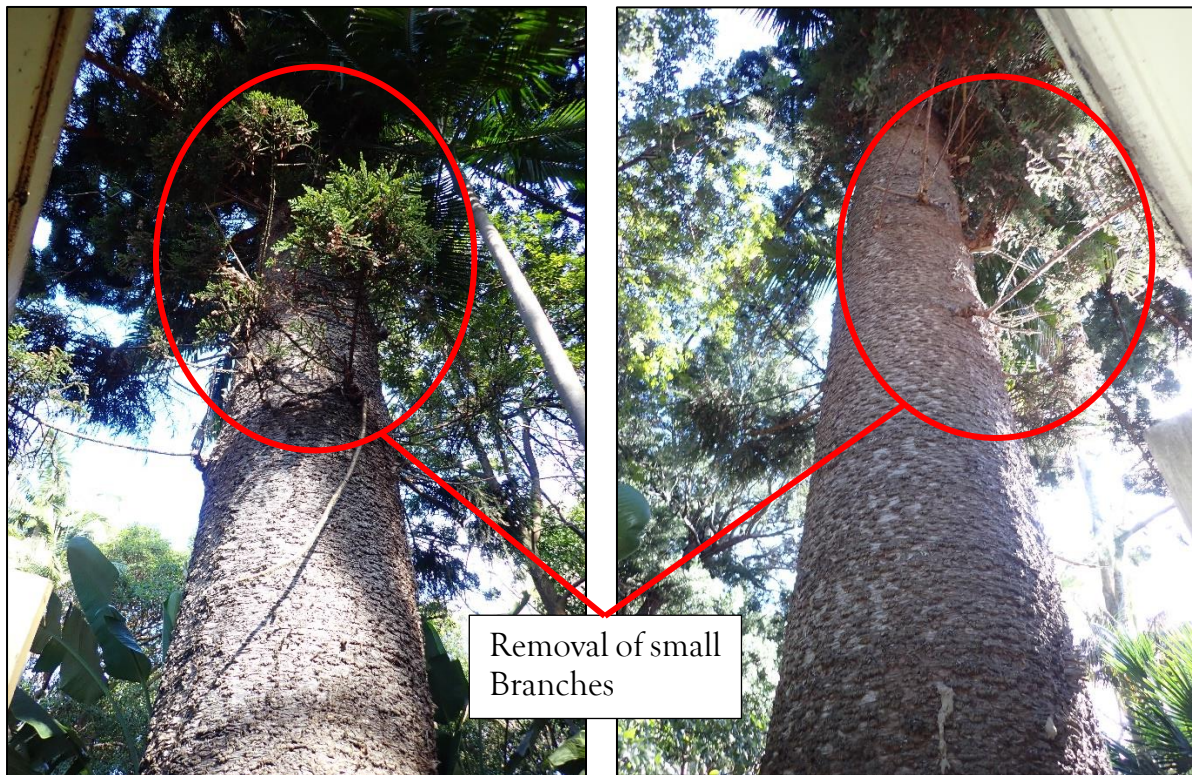


Image 7, Tree 347.



Images 8 & 9, Tree 269.

3.2 Access Road location.

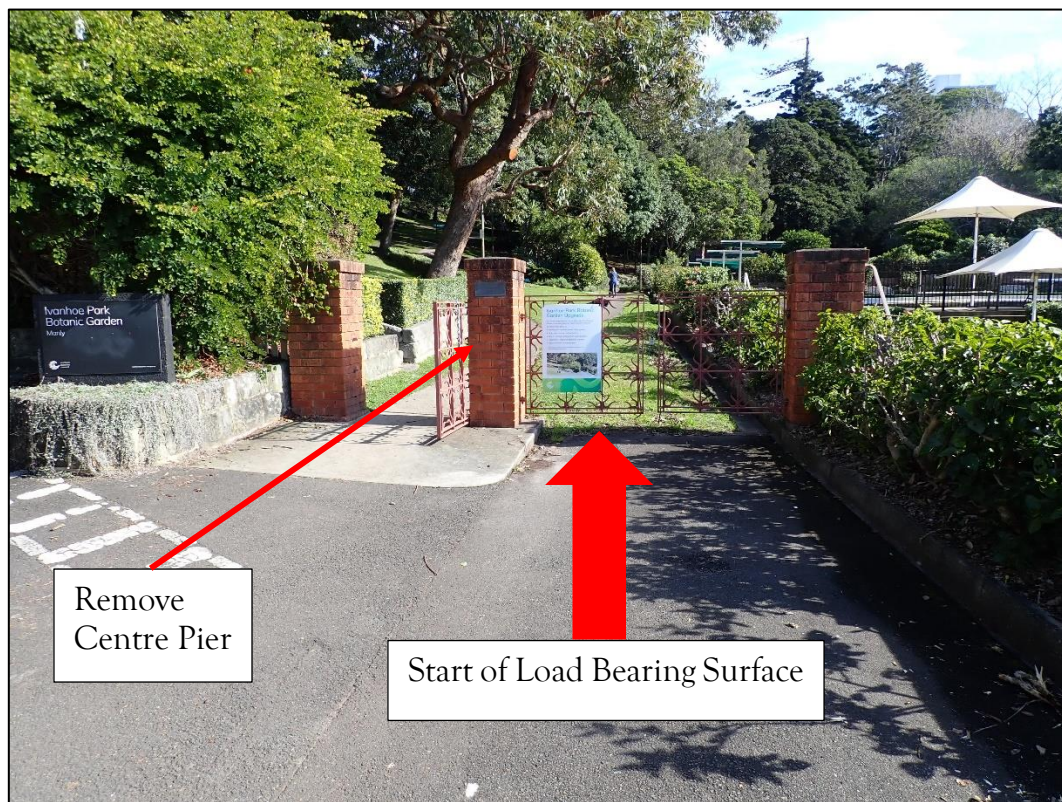


Image 9, Start of Load Bearing Surface (LBS).



Image 10, Continuation of Load Bearing Surface (LBS).



Image 11, Continuation of Load Bearing Surface (LBS).



Image 12, Continuation of Load Bearing Surface (LBS).

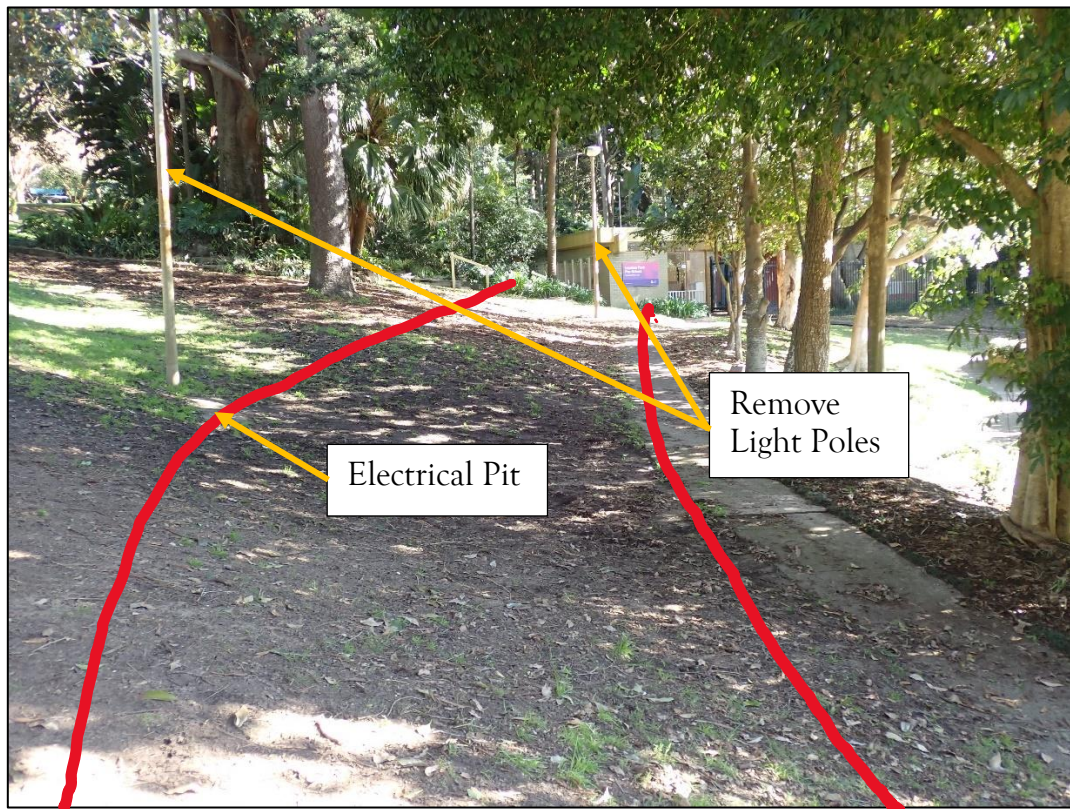


Image 13, Continuation of Load Bearing Surface (LBS).



Image 14, Continuation of Load Bearing Surface (LBS).

3.3 Individual Tree Images.

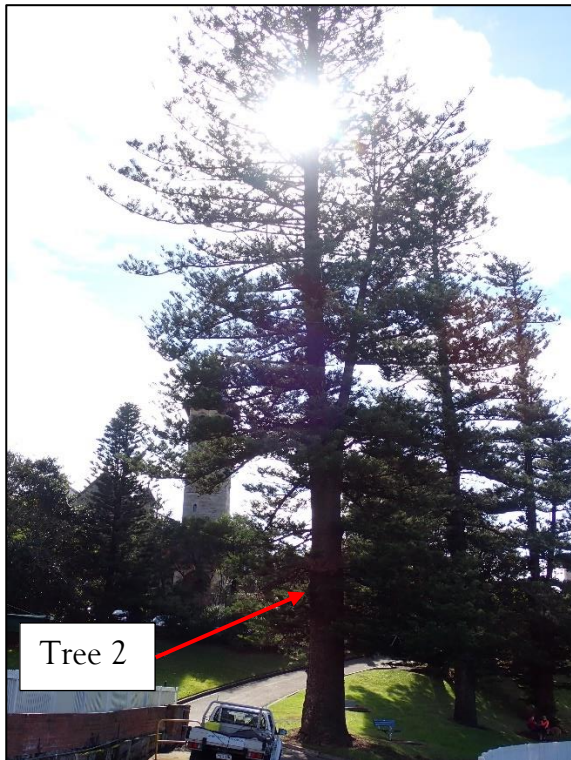


Image 15, Tree 2.



Image 16, Tree 3.



Image 17, Tree 419.



Image 18, Tree 405.



Image 19, Trees 361 & 362.

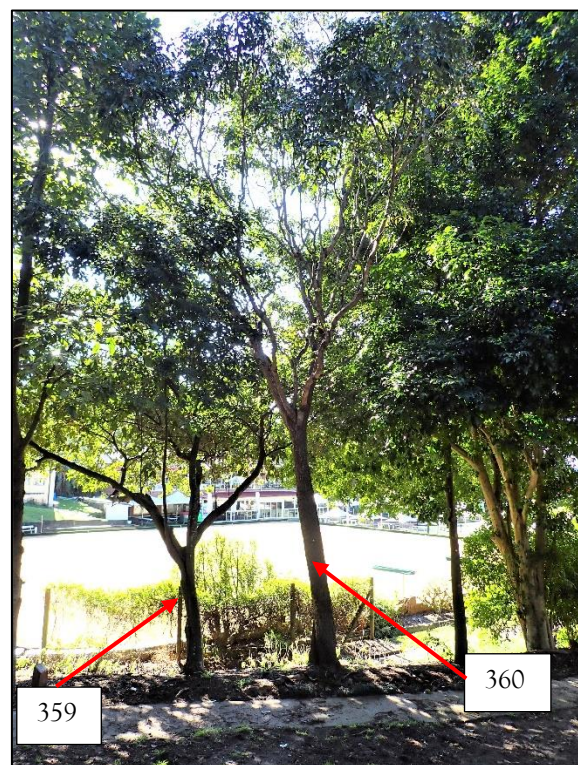


Image 20, Trees 359 & 360.



Image 21, Tree 358.

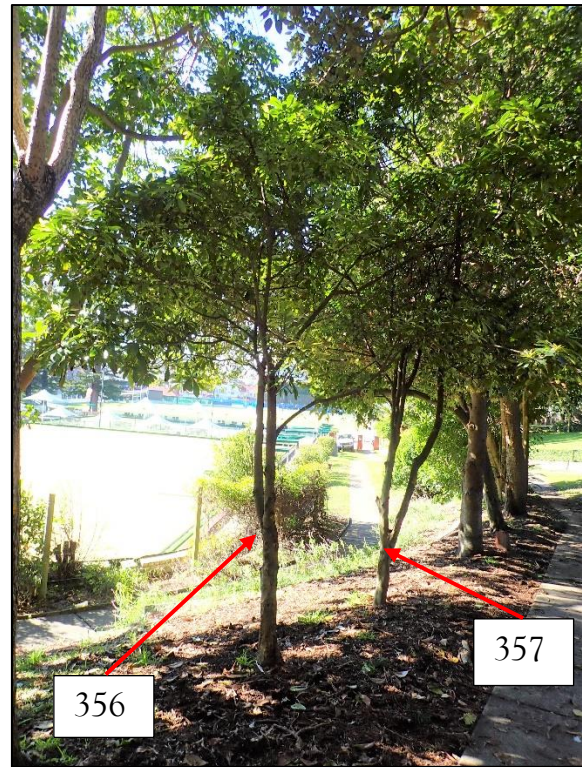


Image 22, Trees 356 & 357.



Image 23, Tree 355.

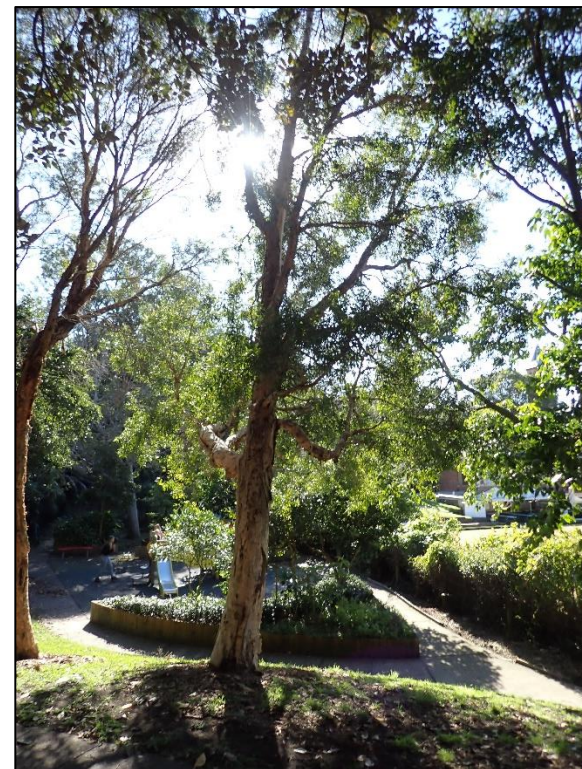


Image 24, Tree 353.



Image 25, Trees 352 & 353.

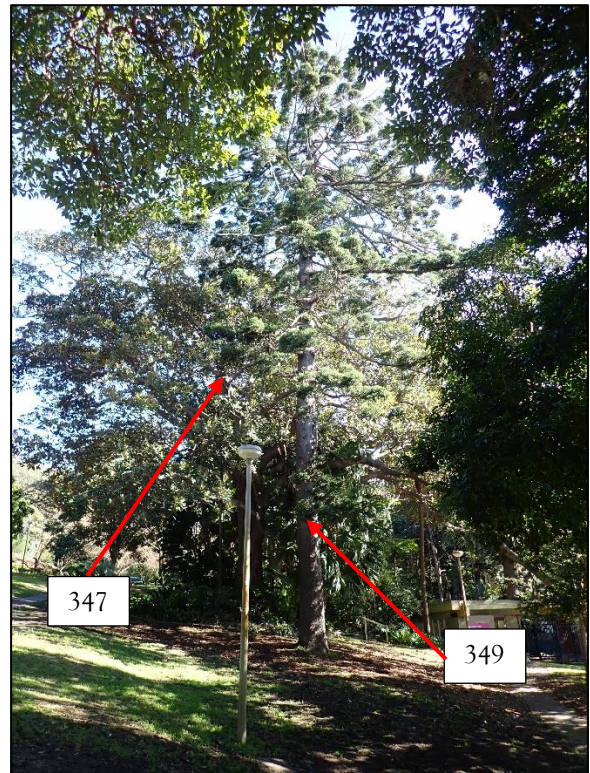


Image 26, Tree 353.



Image 27, Tree 342.



Image 28, Tree 269.

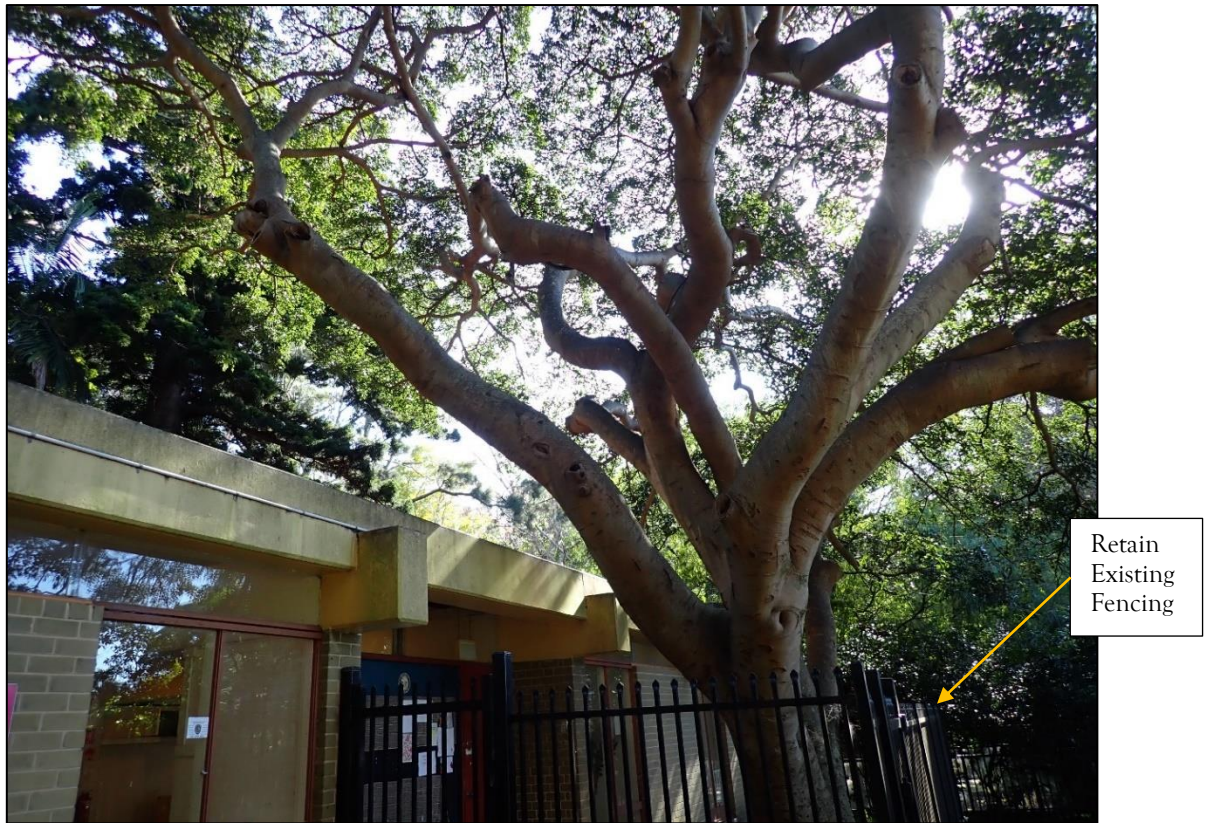


Image 29, Tree 1.



Image 29, Tree 350.

3.4 Root Protection Images.



Image 30, Tree 269.



Image 31, Tree 1.



Image 32, Exposed roots from Tree 347 or 349, North (N) side of the tree.

Appendix 4: Tree protection.

Tree protection zone. The Australian Standard® AS 4970 – 2009 *Protection of trees on development sites* describes “The tree protection zone (TPZ) is the principal means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance so that the tree remains viable.”

To determine the TPZ for the tree, the diameter at breast height (DBH) is multiplied by 12 ($TPZ = DBH \times 12$), this is expressed as the radius from the centre of the trunk measured above the buttress at ground level. A TPZ will not be less than 2m and should not be greater than 15m, except where canopy protection is required.

Structural root zone.

The Australian Standard® AS 4970 – 2009 *Protection of trees on development sites* describes “The SRZ is the area required for tree stability. A larger area is required to maintain a viable tree.

The SRZ only needs to be calculated when major encroachment into a TPZ is proposed.

There are many factors that affect the size of the SRZ (e.g. tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rocks and footings. An indicative SRZ radius can be determined from the trunk diameter measured immediately above the root buttress using the following formula or Figure 1. Root investigation may provide more information on the extent of these roots.

SRZ radius = $(D \times 50)^{0.42} \times 0.64$ where D = trunk diameter, in m, measured above the root buttress NOTE: The SRZ for trees with trunk diameters less than 0.15 m will be 1.5 m."

Encroachments within the TPZ.

It is possible that construction activities can encroach into the TPZ, however, The Australian Standard® AS 4970 – 2009 *Protection of trees on development sites* says "If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ (see Clause 3.3.5), the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods".



Image 1: Good tree protection fencing as per AS 4970 – 2009. Image Paxton



Image 2: Poor tree protection fencing not complying with AS 4970-2009. Image Paxton



Image 3: Good tree protection fencing as per AS 4970 – 2009. Image Paxton.

TREE PROTECTION ZONE

NO ACCESS

WITHOUT APPROVAL FROM THE SITE ARBORIST

JASON PAXTON
ARBORTECH TREE & GARDEN CARE 048963281

Image 4: Tree protection Sign as per AS 4970 – 2009. Image Paxton.

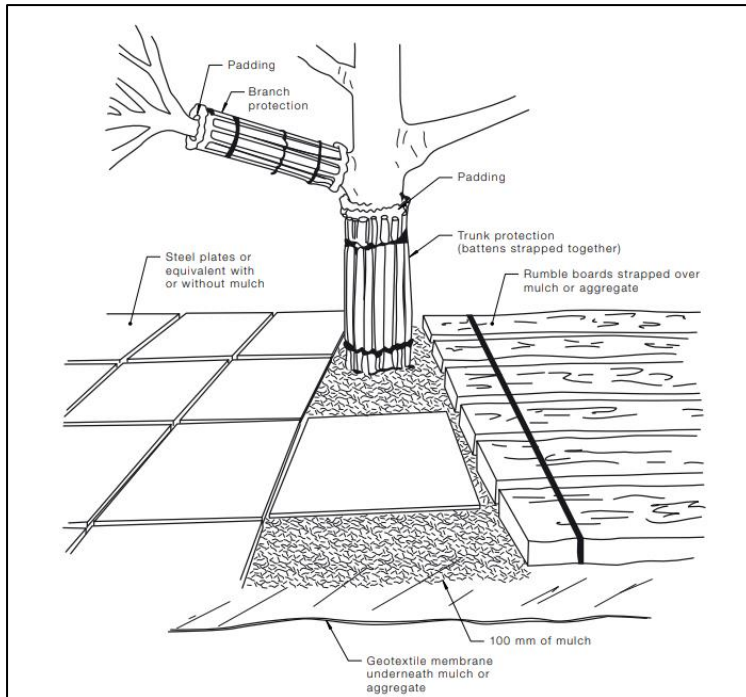


Image 5: Extract from AS 4970-2009 Page 17, 4.5.3

Table 1, Activities restricted within the TPZ.

ACTIVITIES RESTRICTED WITHIN THE TPZ	
All machine excavation including trenching	Excavation for silt fencing
Cultivation of the soil	Preparation of chemicals
Storage of any description	Preparation of cement products
Parking of vehicles and plant	Refuelling
Dumping of waste	Wash down & cleaning equipment
Placement or storage of fill	Lighting of fires
Soil level changes	Physical damage to the tree
Temporary or permanent installation of utilities and signs	
Mechanical removal of vegetation	Affixing signage or hoarding to trees
Movement of pedestrian or vehicular traffic	Anything that may harm the trees

Appendix 5: Land and Heritage Zoning.

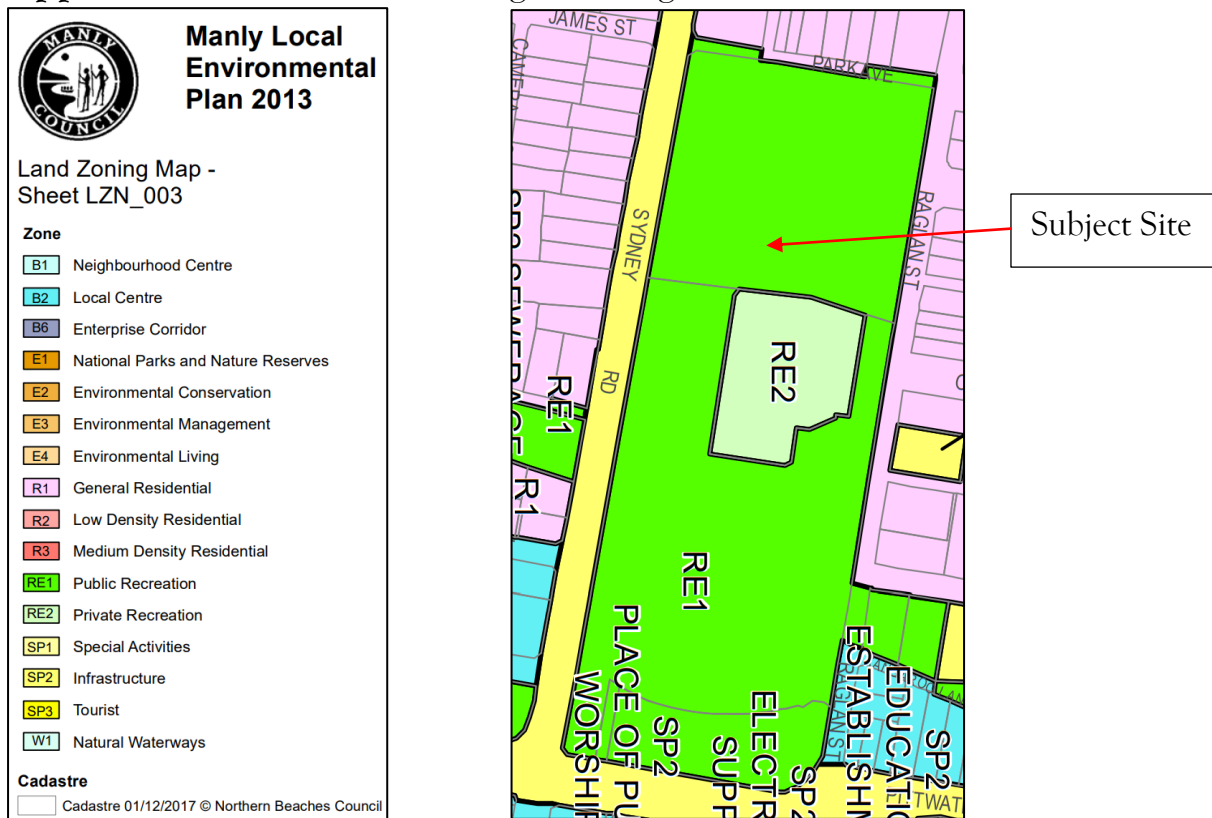


Image 11, Land Zoning Map Sheet LZN_003. (NBC Website tools).

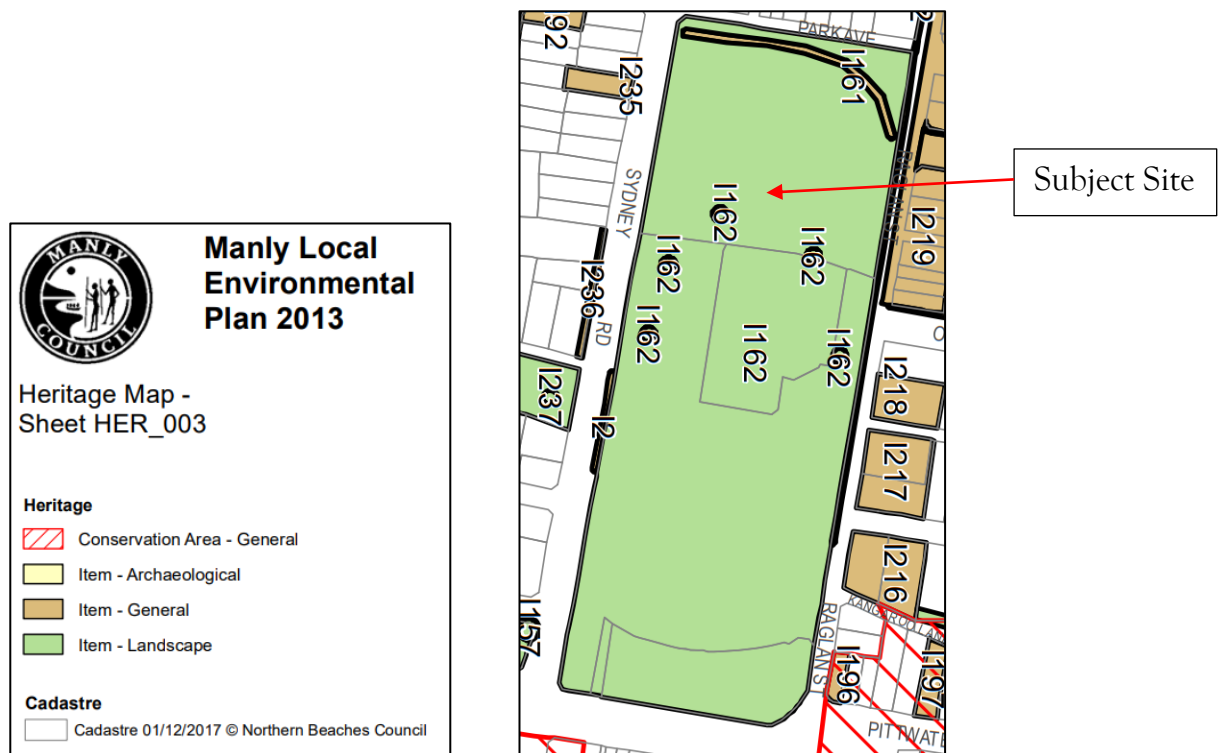


Image 12, Heritage Zoning Map Sheet HER_003. (NBC Website tools).

Appendix 6: Limitations on the use of the report.

This report is to be utilised in its entirety only. Any written or verbal submission, report, or presentation that includes statements taken from the findings, discussions, conclusions, or recommendations made in this report, may only be used where the whole of the original report (or a copy) is referenced in, & directly attached to that submission, report, or presentation.

Appendix 7: Assumptions.

Care has been taken to obtain information from reliable resources. All data has been verified insofar as possible; however, Growing My Way Tree Services, can neither guarantee nor be responsible for the accuracy of information provided by others.

Unless stated otherwise:

Information contained in this report covers only the trees that were examined & reflects the condition of the trees at the time of inspection.

The inspection was limited to visual examination of the subject trees without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

Appendix 8: Glossary.

Glossary of common Arboreal terms

Age:	I	<i>Immature</i> refers to a well-established but juvenile tree
	SM	<i>Semi-mature</i> refers to a tree at growth stages between immaturity & full size
	M	<i>Mature</i> refers to a full-sized tree with some capacity for further growth
	LM	<i>Late Mature</i> refers to a full-sized tree with little capacity for growth that is not yet about to enter decline
	OM	<i>Over-mature</i> refers to a tree about to enter decline or already declining
	LS	<i>Live Stag</i> refers to a tree in a significant state of decline. This is the last life stage of a tree prior to death

Hth & Vig Health & Vigour

Health refers to the tree's form & growth habit, as modified by its environment (aspect, suppression by other trees, soils) & the state of the scaffold (ie. trunk & major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health & it is possible for a tree to be healthy but in poor condition/vigour. **Classes are:**

Excellent (E), V. Good (VG), Good (G), Fair (F), Declining (D), Poor (P), Very Poor (VP)

Vigour refers to the tree's growth rate/condition as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion & the degree of dieback. **Classes are:**

Excellent (E), V. Good (VG), Good (G), Fair (F), Declining (D), Poor (P), Very Poor (VP)

Useful Life Expectancy (ULE) refers to any individual tree specimen's potential life expectancy (viability) based on VTA assessment, three groups are described,

Short = Less than Five years

Medium = Five–Fifteen years

Long = more than Fifteen years

Significant diameter roots are defined as those being greater than 0.05m/50mm in diameter.

Diameter at Breast Height (DBH) refers to the tree trunk diameter at breast height (1.4 metres above ground level)

Structural Root Zone (SRZ) refers to a radial offset that relates to tree stability. This zone is presumed to be the main location of the tree's structural support roots. It is calculated using the formula $SRZ\ radius = (D \times 50)^{0.42} \times 0.64$.

Primary Root Zone (PRZ) refers to a radial offset of ten (10) times the trunk DBH measured from the centre of the trunk. This zone often contains a significant amount of (but by no means all of a tree's) fine, non-woody roots required for uptake of nutrients, oxygen & water.

Tree Protection Zone (TPZ) is ideally a "No Go Zone" surrounding a tree to aid in its ability to cope with disturbances associated with construction works. **TPZ = DBH x 12**. Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree's decline in health or death & the possibly damage to the structural stability of the tree from root damage.

To limit damage to the tree, protection within a specified distance of the tree's trunk must be maintained throughout the proposed development works. No excavation, stockpiling of building materials, or the use of machinery is permitted within the TPZ.

A TPZ is required for each tree or group of trees within five metres (unless otherwise specified) of building envelopes.

Stem/bark inclusion refers to a genetic fault in the tree's structure. This fault is located at the point where the stems/branches meet. In the case of an inclusion, this point of attachment is potentially weak due to bark obstructing healthy tissue from joining together to strengthen the joint.

Decay refers to the breakdown of tissues within the tree. There are numerous types of decay that affect different types of tissues, spread at different rates & have a different effect on both the tree's health & structural integrity.

Point of Attachment refers to the point at which a stem/branch etc joins.

Deadwood refers to any whole limb that no longer contains living tissues (eg live leaves &/or bark). Some deadwood is common in a number of tree species.

Dieback refers to the death of growth tips/shoots & partial limbs. Dieback is often an indicator of stress & tree health.

One dimensional crown refers to branching habits & leaves that extend/grow in One direction only. There are many causes for this growth habit such as competition & pruning.

Crown Foliage Density of Potential (CFDP) refers to the density of a tree's crown to the expected density of a healthy specimen of the same species. CFDP is measured as a percentage.

Epicormic growth/shoots refer to growth/shoots that are/have sprouted from axillary buds within the bark. Epicormic growth/shoots are a survival mechanism that often indicates the presence of current or past stress even such as fire, pruning, drought, etc.

Over Head Powerlines (OHP) Overhead electricity wiring.

LVOHP Low Voltage Overhead Powerlines

HVOHP High Voltage Overhead Powerlines

ABC Aerial Bundled Cable

Arborist Mulch, Mulch product produced by Arborists containing wood and leaf chip.

References:

- AS 4970-2009 Protection of trees on development sites.
- AS 4373-2007 Pruning of amenity trees.
- AS 4687–2007 Temporary fencing and hoardings.
- AS 2303-2015 Tree stock for landscape use.
- <http://maps.six.nsw.gov.au/>
- State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 under the Environmental Planning and Assessment Act 1979.
- https://proofsafe.com.au/tpz_incursion_calculator.html
- https://www.treetec.net.au/tpz_srz_dbh_calculator/
- Mattheck C, Bethge K, Webber K 2015. The Body Language of trees, Encyclopedia of Visual Tree Assessment. Karlsruhe Institute of Technology – Campus North. PO Box 3640, D-76021 Karlsruhe, Germany.
- [View - NSW legislation](#)
- D.J. Boland, M.I.H. Brooker, G.M. Chippendale, N. Hall, B.P.M. Hyland, R.D. Johnston, D.A. Kleinig, M.W. McDonald, and J.D. Turner 2006. Forest Trees of Australia Fifth Edition. CSIRO PUBLISHING 150 Oxford Street (PO Box 1139) Collingwood VIC 3066 Australia.
- Francesco Ferrini, Cecil C Konijnendijk van den Bosch, and Alessio Fini, Routledge Handbook of Urban Forestry. First Published 2017 by Routledge. 2 Park Square, Milton Park, Abingdon, Oxfordshire OX14 4RN. 52 Vanderbilt Avenue, New York 10017.

- Allan Fairley & Phillip Moore 1989. Native Plants of The Sydney District an Identification Guide. First published by Kangaroo Press Pty Ltd. 3 Whitehall Rd (PO Box75) Kenthurst 2156. Typeset by G.T. typesetters P/L. Printed in Hong Kong through Book builders Ltd.
- NBC Landscape Referral Response, 24/06/2021.
- [Tree Guide | Northern Beaches Council \(nsw.gov.au\)](#)
- [Manly Local Environmental Plan 2013 - NSW Legislation](#)
- [Manly DCP \(nsw.gov.au\)](#)