



Arboricultural Impact Assessment



54 Smith Street, Manly
DA2020/1728
19/02/2021

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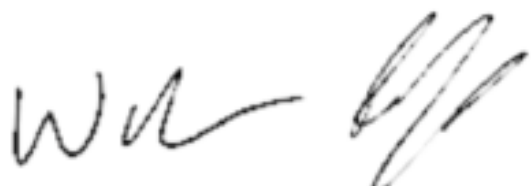
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DISCLAIMER

The provision of this report is for use by the property owner (*Mr. Ron Delezio*) and project designer (*Rapid Plans*) for a proposed development at 54 Smith Street, Manly to assess the potential impact on two trees inside and within 5 metres of the property boundaries. The author of this report is *Temporal Tree Management Pty Ltd*. This report is not designed for any other purpose. The author accepts no responsibility for the use of this report for purposes other than as an Arboricultural Impact Assessment or if used by any other person / party.

All observations, recommendations and advice expressed within this report are based on *the Australian Standard for the Protection of Trees on Development Sites (AS 4970 2009)*, the professional experience of the author, information gathered during the site assessments and information provided by the clients. Trees are dynamically growing organisms that change over time. No guarantee is implied with respect to future tree condition or safety beyond the advice and recommendations within the report.



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19 February 2021



1. Summary

The purpose of this report is to provide an Arboricultural Impact Assessment (AIA) for the trees located inside and within 5 metres of the property boundaries at 54 Smith Street, Manly. A minor renovation of the eastern portion of this property has been proposed under DA2020/1728. Additional information regarding the impact on the trees within and adjacent to this site has been requested by the Northern Beaches Council (08/02/2021). Two trees were included in this assessment, which aims to satisfy the Council's request.

An assessment of the trees was undertaken by William Dunlop of *Temporal Tree Management Pty Ltd* on 18/02/2021. The trees were located, identified and their retention value assessed using the TreeAZ model (10.10 NZ) (Barrell Tree Consultancy 2012). Tree protection measures are drawn from and relating to the *Australian Standard for the Protection of Trees on Development Sites* (AS 4970 2009).

The trees were observed to differ in size, species and condition. Tree 1, which is positioned within the north-eastern boundary corner of the subject site was determined to be of Low retention value in the Preliminary Assessment due to its poor structural condition and conflict with surrounding infrastructure. Tree 2, which is a street tree positioned outside the western property boundary, was determined to be of High retention value.

Tree 1 will require removal to facilitate the development within the eastern portion of the subject site. The proposed landscaping works will be within the SRZ of this tree. Due to its Z2 and Z10 Low retention status, this tree should not obstruct the development within this portion of the subject site. As such, its removal is considered an appropriate management strategy for it. This tree must be replaced with a specimen of the same species within the same position as part of this development.

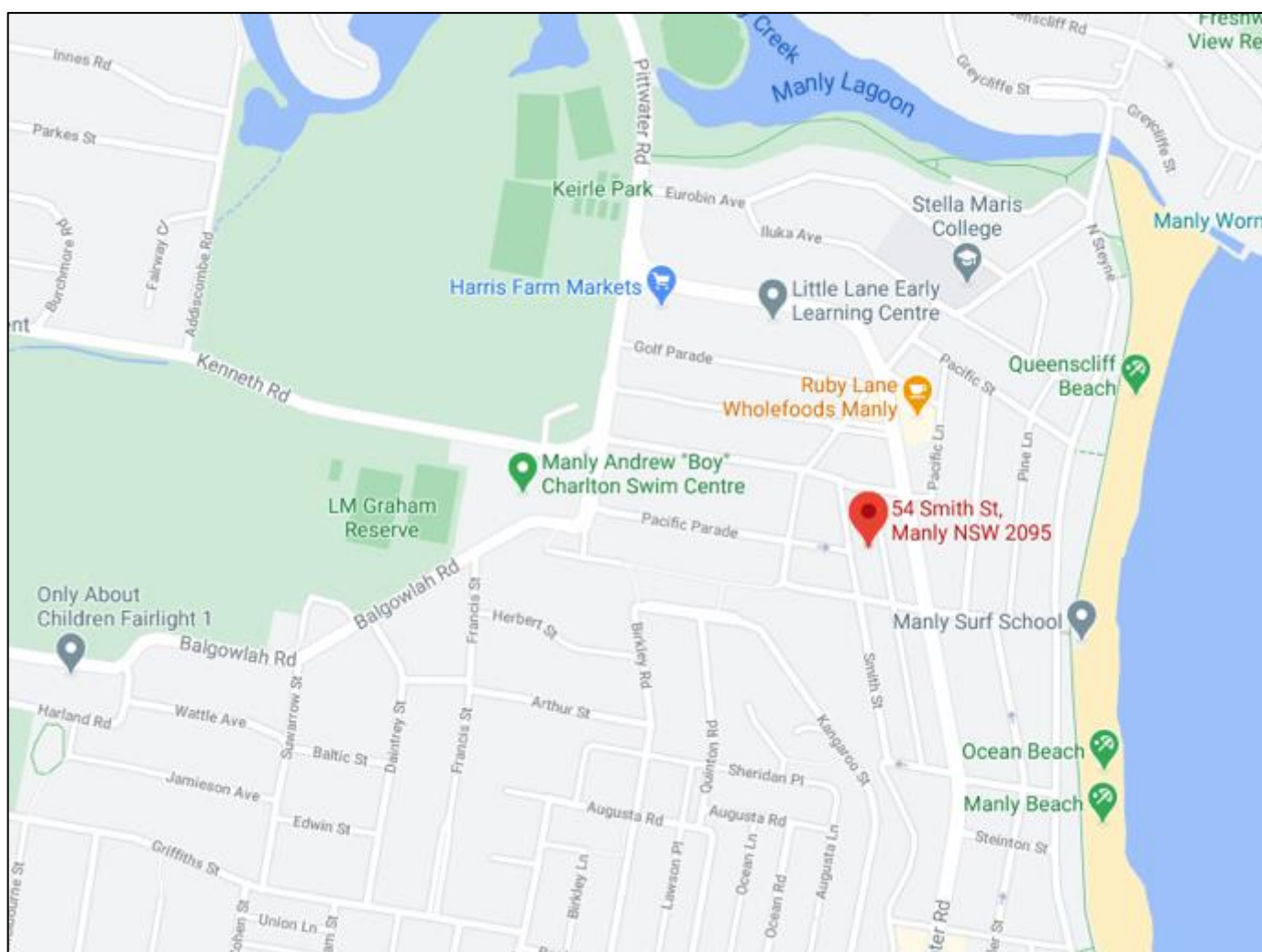
Tree 2 does not require removal to facilitate the proposed development. To ensure this specimen is not indirectly impacted during site access, stem protection measures compliant with Section 4.5.2 of *AS 4970 (2009)* must be installed on this tree prior to the commencement of works due to its A4 High retention value.



2. Location

2.1. Site Location

The subject site for this Arboricultural Impact Assessment is 54 Smith Street, Manly (Map 1). The land use surrounding this subject site is primarily residential. The subject site is positioned within close proximity of Kierle Park and Manly Beach. The ecological significance of trees included in this assessment in contributing to the local amenity and ecological connectivity within this urban area will be an important consideration of this report.



Map 1. Site location is 54 Smith Street, Manly. Image sourced from Google (2021).



2.2. Relevant Policy Context

The subject site forms part of an R1 General Residential zone within the Northern Beaches local government area (Planning NSW 2021). The environmental policy regulations relevant to the trees (woody vegetation taller than 3 metres) within the subject site are drawn from Part 3 of the NSW State Environmental Planning Policy (SEPP) (Vegetation in Non-rural Areas). The policy controls governing the management of trees within and adjacent to the subject site are outlined in Part 3.3.2 'Preservation of Trees and Bushland Vegetation' of the Manly Development Control Plan (2013), which the Northern Beaches Council has applied to this area (Northern Beaches Council 2019). This policy control draws from *the Australian Standard for the Protection of Trees on Development Sites* (AS4970 2009) and *the Australian Standard for Pruning Amenity Trees* (AS4373 2007). This property is also within the Pittwater Road Heritage Conservation Area, which affords the trees and landscape features within and adjacent to the subject site an additional level of protection (Planning NSW 2021).

2.3. Tree Locations

There are a small number of trees positioned within and adjacent to the property boundaries of the subject site. Woody vegetation was classed as a tree if it was measured to be taller than 3 metres, as specified in Part 3.3.2 'Preservation of Trees and Bushland Vegetation' of the Manly Development Control Plan (2013). Only trees positioned inside and within 5 metres of the subject site property boundaries site were included in this assessment.

Two trees were determined to be suitable for inclusion (Map 2). Tree 1 is a small Small-leaved Lilly Pilly (*Syzygium luehmannii*) positioned inside the north-eastern boundary corner of the subject site while Tree 2 is street tree positioned outside the western boundary within a footpath planting.





Map 2. Location of two tree located inside and within 5 metres of the property boundaries of the subject site (annotated in red). Image sourced from SixMaps 2021.

3. Site Development Plans

Development plans for this property are currently at the final design and resubmission stage. The findings of this Preliminary Assessment will contribute to the planning and final design for the development. The findings of the Tree Protection Plan will ensure the high retention trees that are positioned within close proximity of proposed works as identified in the Preliminary Assessment are suitably protected during the construction process.

The planned development works for the subject site involve a minor renovation of the existing dwelling (Figure 1). The proposed renovation will alter the height of the eastern portion of the dwelling within its existing envelope. Landscape alteration and grade changes are also proposed within the eastern portion of the subject site to allow for wheelchair access to the dwelling from Smith Lane (Figure 2).



Tree 1, which is positioned inside the north-eastern boundary corner of the subject site, is likely to be directly impacted by the landscaping works within this portion of the property. While not positioned within close proximity of the proposed works areas, Tree 2 may also be indirectly impacted by the development through compaction, contamination or physical damage associated with site access.

It is therefore important that the retention value of Trees 1 and 2 be determined and for an effective Tree Protection Plan to be established.

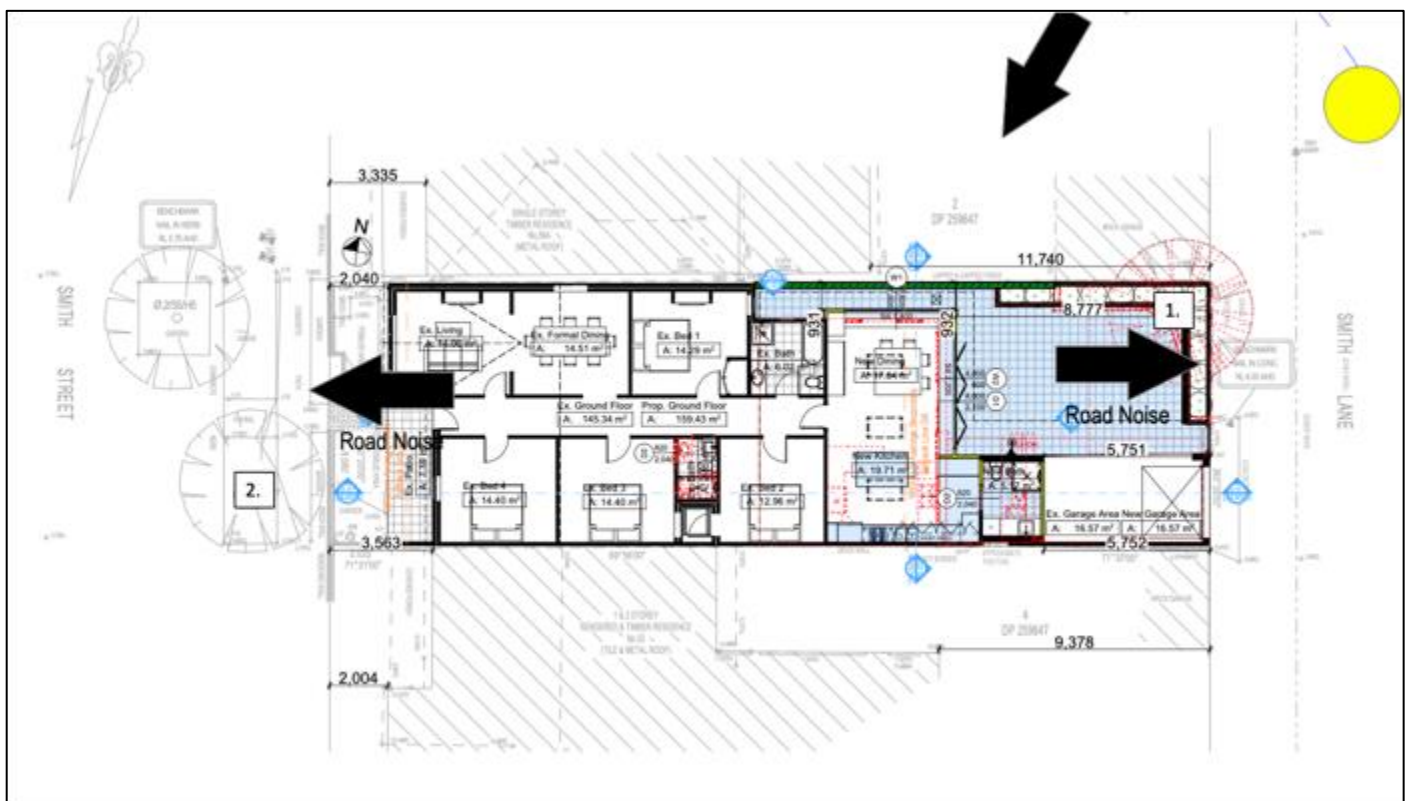


Figure 2. Position of the planned development works in relation to Trees 1 and 2 at 54 Smith Street, Manly. Site Plan (DA1003) drawn by *Rapid Plans* (04/02/2021) annotated by William Dunlop of *Temporal Tree Management Pty Ltd* (19/02/2021).





Figure 2. Rear patio area within eastern portion of subject site is proposed for redesign to improve wheel chair access to the dwelling.



4. Preliminary Assessment

4.1 Assessment Methodology

After being located and numbered a visual assessment was carried out for each tree. Visual assessments of trees' health and structure were underpinned by the Visual Tree Assessment method established by Mattheck and Breloar (1994) and the Visual Vitality Index method established by Johnston et al. (2012). The data collected for each individual was used in simple characterisation models for age, origin, health, structure, life expectancy and retention value. Simple characterisations were used to ensure outcomes remained clear and consistent. The format for data collection included:

Ø Tree Number: Determined in Map 2.

Ø Botanical Name: Vegetation was identified and described using botanical names.

Ø Common Name: Only one common name was used.

Ø Age: Juvenile, Semi – mature, Mature or Over Mature. Judgement on these four categories was determined by professional knowledge and research on the species present.

Ø Origin: Exotic, Native or Indigenous.

Ø Diameter at Breast Height (DBH): An important tree measurement used in arboriculture. DBH was described in mm and used to determine the Tree Protection Zone for each tree. This information is included in Appendix A.

Ø Diameter at Root Flare (DRF): An important tree measurement used in arboriculture. DRF was described in mm and used to determine the Structural Root Zone for each tree. This information is included in Appendix A.

Ø Height: Estimated in metres using professional experience. This information is included in Appendix A.

Ø Canopy Width: Estimated in metres from north– south x east – west. This information is included in Appendix A.



- Ø Health: Dead, Poor, Fair, Good or Excellent. Professional experience along with the visual vitality index established by Johnston et al. (2012) was used to underpin these categories (Appendix B).
- Ø Structure: Failed, Very Poor, Poor, Fair, Good or Excellent. Professional experience along with VTA method established by Mattheck and Breloar (1994) was used to underpin these categories.
- Ø Useful Life Expectancy (ULE): Long (greater than 40 years), Medium (40 years – 15 years), Short (15 – 5 years) or Remove (less than 5 years). These categories were established by Barrell Tree Consultancy (2010) and provide an important estimate of a tree's remaining safe life span based on species knowledge and an individual's structure and health.
- Ø Retention Value: Retention value was split into two categories as defined by the TreeAZ method; A or Z (Barrell Tree Consultancy 2012). Category A stipulates that a tree should be retained, and efforts made in the design planning and construction to ensure its survival. Category Z determines that a tree's retention is not a priority and it need not constrain design, planning or construction. Categories were determined using the tree assessment data and TreeAZ model criteria (Figure 3) (Barrell Tree Consultancy 2012).
- Ø Tree Protection Zone (TPZ): This measure provides the principle means of protecting trees on construction sites. A TPZ radius (R_{TPZ}) may be calculated using the equation from the Australian Standard for the Protection of Trees on Development Sites (AS 4970 2009):

$$R_{(TPZ)} = DBH \times 12.$$

As stipulated in AS 4970 (2009), the radial TPZ measure for palms was determined from the following equation:

$$R_{(TPZ)} = \text{Canopy radius} + 1 \text{ metre}.$$

A TPZ was established for trees determined to be suitable for retention. Once a TPZ is established all construction activity should be excluded from within its borders. Encroachments may occur under further arboricultural assessment and advice.



Ø Structural Root Zone (SRZ): This measure provides an indication of the portion of a tree's root plate that is considered fundamentally important for the maintenance of structural integrity. An SRZ radius (R_{SRZ}) may be calculated using the equation from the *Australian Standard for the Protection of Trees on Development Sites* (AS 4970 2009):

$$R_{(SRZ)} = (DRF \times 50)^{0.42} \times 0.64$$

Ø Comments: Any additional information explaining an individual's health, structure, ULE or retention value categorization. This information is included in Appendix A.



TreeAZ: Detailed guidance on its use Australia and New Zealand (Version 10.10-ANZ)

4 DETAILED EXPLANATION OF SUBCATEGORY ALLOCATION

Photographic examples and further explanations for each of the following subcategories are set out below (click on the underlined hyperlink to go directly to each sub category).

- [Z1 Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc](#)
- [Z2 Too close to a building, i.e. exempt from legal protection because of proximity, etc](#)
- [Z3 Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc](#)
- [Z4 Dead, dying, diseased or declining](#)
- [Z5 Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc](#)
- [Z6 Instability, i.e. poor anchorage, increased exposure, etc](#)
- [Z7 Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc](#)
- [Z8 Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc](#)
- [Z9 Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc](#)
- [Z10 Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc](#)
- [Z11 Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc](#)
- [Z12 Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc](#)

- [A1 No significant defects and could be retained with minimal remedial care](#)
- [A2 Minor defects that could be addressed by remedial care and/or work to adjacent trees](#)
- [A3 Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years](#)
- [A4 Trees that may be worthy of legal protection for ecological reasons \(Advisory requiring specialist assessment\)](#)

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Figure 3. TreeAZ model 10.10.NZ criteria as used by Barrell Tree Consultancy (2012). (Access via <http://www.treeaz.com/downloads/Document-06-311210.pdf> 2017).



4.2. Tree Data

Table 1. Summarised tree data for two trees assessed at 54 Smith Street, Manly. Trees determined to be of High retention value (A1-4) are annotated in Blue while trees of Low retention value are annotated in Red (Z1-12).

Tree#	Botanical Name	Health	Structure	ULE	Retention	TPZ(m)	SRZ(m)
1	<i>Syzygium luehmannii</i>	Fair	Poor	Short	Z2, Z10	N/A	N/A
2	<i>Grevillea robusta</i>	Fair	Poor	Medium	A4	3.72	2.2

5. Summary and Recommendations

The two trees included in this assessment were of different species, condition and ownership. The retention value determined for them was correspondingly variable.

Tree 1 is a mature Small-leaved Lilly Pilly (*Syzygium luehmannii*) specimen positioned within the north-eastern boundary of the subject site. This tree's size, species and position suggest that it has been planted within the last 15 years. Its canopy has been lopped in the past at 1 metre, which has resulted in the development of a poorly structured epicormic canopy. The canopy becomes codominant from an included union at the previous lopping point. The northern stem is impacting the neighbour's garage while the eastern stem is impacting and causing displacement of the boundary wall. A short ULE estimate was determined for this tree due to its poor canopy structure and its conflicting growth with the adjacent infrastructure. This tree was therefore determined to be of Z2 and Z10 Low retention value within this landscape.

Tree 2 is a mature Silky Oak (*Grevillea robusta*) specimen, which is positioned 3.9 metres outside the western property of the subject site within a footpath planting. This street tree's canopy has been severely pruned to facilitate the overhead powerlines. This poor structure underpinned the shortened ULE estimate for this tree. Despite this, its public ownership within a heritage conservation area renders this tree of A4 High retention value within this landscape.

Planning and resources are required to ensure the protection of Tree 2 as part of the proposed development within the subject site.



6. Tree Protection Plan

6.1. Pre – Construction Vegetation Management

The removal of Tree 1 is required to facilitate the proposed development within the subject site. The removal of the paved area and retaining wall within the SRZ of this tree will be required to undertake the proposed landscape works within the eastern portion of the subject site (Figure 4). It is likely that the removal of the retaining wall, pavers and the subsequent grade changes will have a negative impact on this tree's health (Matheny and Clark 1994). These changes may also impact the structural integrity of this tree's root plate (Day et al. 2008).

This tree is considered suitable for removal due to its Z2 and Z10 Low retention value. Its stem growth is impacting the neighbour's garage and causing displacement of the boundary wall (Figure 5). Its smaller size and poor structure suggest that it can be easily replaced with suitable replenishment of the local canopy coverage within a short time frame (less than 15 years) (Figure 6).

It is therefore the recommendation of this report that Tree 1 be removed to facilitate the proposed development. Tree 1 must be replaced within the same location with a specimen of the same species to mitigate impact on the heritage conservation area.

The position of the replacement specimen must be altered slightly to better avoid conflict with the surrounding infrastructure. The canopy of the replacement specimen must be formatively pruned by a suitably qualified arborist (minimum AQF Level 3) at 3 years and 7 years after planting to ensure that it develops a good structural form that will more suitably fit within its confined location. The replacement specimen must be of the same species (*Syzygium luehmannii*), in a 100 Litre container, between 1 and 2 metres in height and grown under conditions compliant with *the Australian Standard for Tree Stock for Landscape Use (AS 2303 2015)*.





Figure 4. Proposed landscape works will be within the SRZ of Tree 1.



Figure 5. Stem growth of Tree 1 conflicting with surrounding infrastructure.



Figure 6. Poor stem structure of Tree 1 due to having been lopped at 1 metre in past.

6.2. Tree Protection Measures

All tree protection measures have been established in accordance with the *Australian Standard for the Protection of Trees on Construction Sites* (AS4970 2009). Tree protection zones (TPZs) and structural root zones (SRZs) have been calculated for all trees in section 3.2. These zones are aimed at preventing soil compaction, contamination and physical damage to trees above and below ground (Matheny and Clark 1994). As such all construction activity is excluded from designated TPZ areas. The TPZ and SRZ measurements are provided as a radial measurement that determines the circular areas of above and below ground exclusion (Figure 7).

The calculation of the radial measurement for the TPZ areas of palm specimens differs due to differences in their root plate morphology. The radial measurement for palm specimens was calculated by adding 1 metre to an individual's canopy width as specified in *Australian Standard for the Protection of Trees on Development Sites* (AS4970 2009). Due to the morphology of palm species' root mass structures, an SRZ calculation is non-applicable.

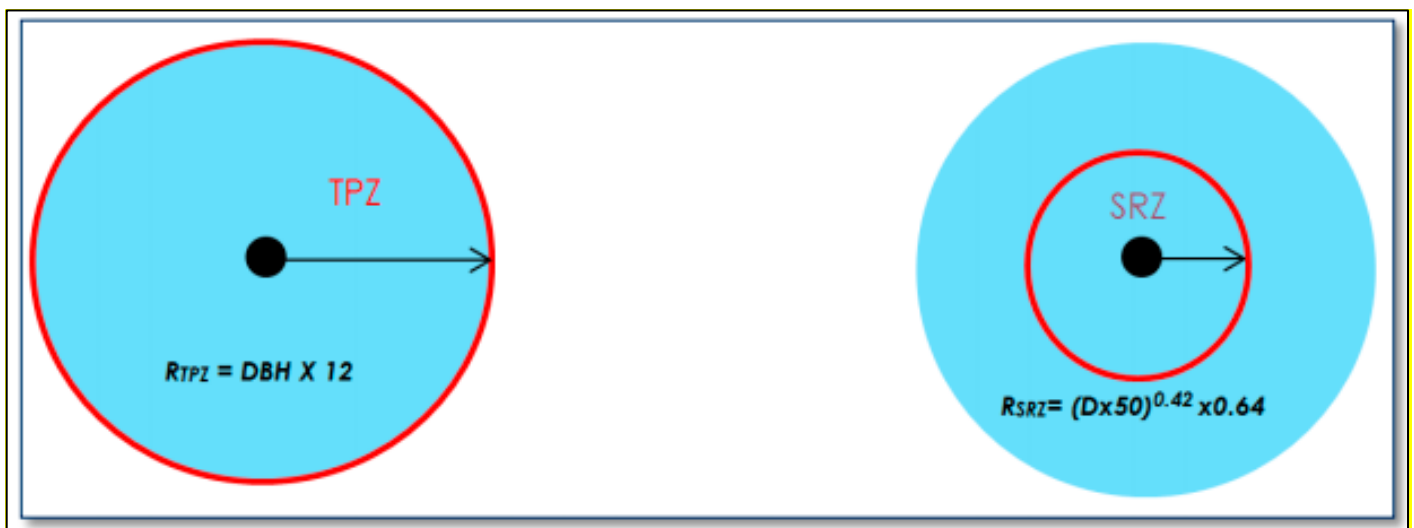


Figure 7. TPZ and SRZ radial measurement equations.



6.3. Tree Protection Zones

The tree protection zone is an above and below – ground area that excludes any construction activity and is the principal means of protecting trees on construction sites (Matheny and Clark 1994). The area contained within the TPZ is fundamentally important in trees' long – term survival (Matheny and Clark 1994).

The area established by the radial measurement should be enclosed by 1.8 metre steel fencing that is securely fixed to the ground as stated in section 4.3 of the *Australian Standard for the Protection of Trees on Development Sites* (AS4970 2009) (Figure 8). Signage stating the purpose of these exclusion zones should be fixed to the fencing so that it is visible from all points within the site.

The structural root zone is the predicted area in which roots that ensure a trees' stability are located (Day et al. 2009). The SRZ is typically located within the TPZ. Under no circumstances should construction activity occur within the SRZ without the presence and consultation of the project arborist.

Encroachments of construction activity may only occur with the consultation and permission of the project arborist. As defined in section 5 of the *Australian Standard for the Protection of Trees on Development Sites* (AS4970 2009) encroachments of less than 10% of the total TPZ area may occur without the site presence of the project arborist providing there is an equal compensation of area elsewhere within the TPZ. Major encroachments of more the 20% require added consultation from the project arborist. Suitability for major encroachments are site specific and depend on the vitality of the tree and extent of the encroachment. A root mapping report may be required to determine if the tree will be able to sustain the level of encroachment. The presence of the project arborist during all such construction activity is required. An equal amount of compensated area should also be added to the TPZ elsewhere.



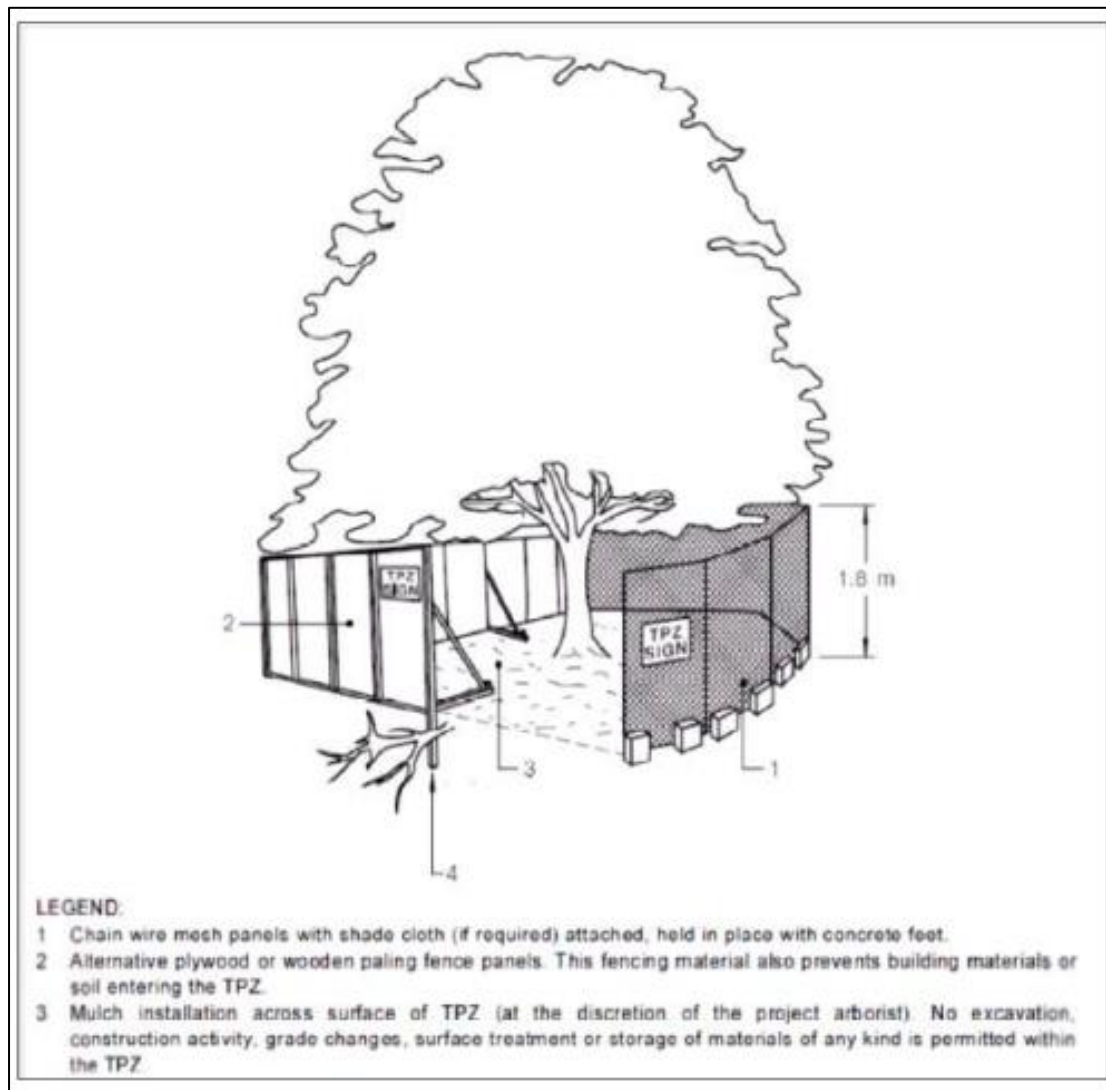


Figure 8. Steel fencing should be erected around the perimeter of TPZs in accordance with AS4970.



6.4 Site Specific Protection Measures

A fenced TPZ will not be suitable for Tree 2 due to its position within the footpath planting pit on the eastern side of Smith Street. The footpath will be retained and unaffected by the development, which will suitably protect the tree's root plate from compaction and contamination. There will therefore not be any need for a fenced exclusion zone to protect the root plate of this tree.

Stem protection measures compliant with Section 4.5.2 of *AS 4970 (2009)* must be installed on Tree 2 prior to the commencement of works for the approved development (Figure 9). Hessian or carpet underlay padding must first be wrapped around the tree's stem and fixed in place using duct tape. Timber batons must then be spaced no more than 200mm around the stem and fixed to one another using steel strapping. Timber batons must not be fixed directly to the tree's stem (Figure 10). Stem protection measures may be installed using the aforementioned specifications by the project builder. Stem protection measures must remain in place for the duration of the development and until the final arboricultural certification is given at the stage of practical completion.

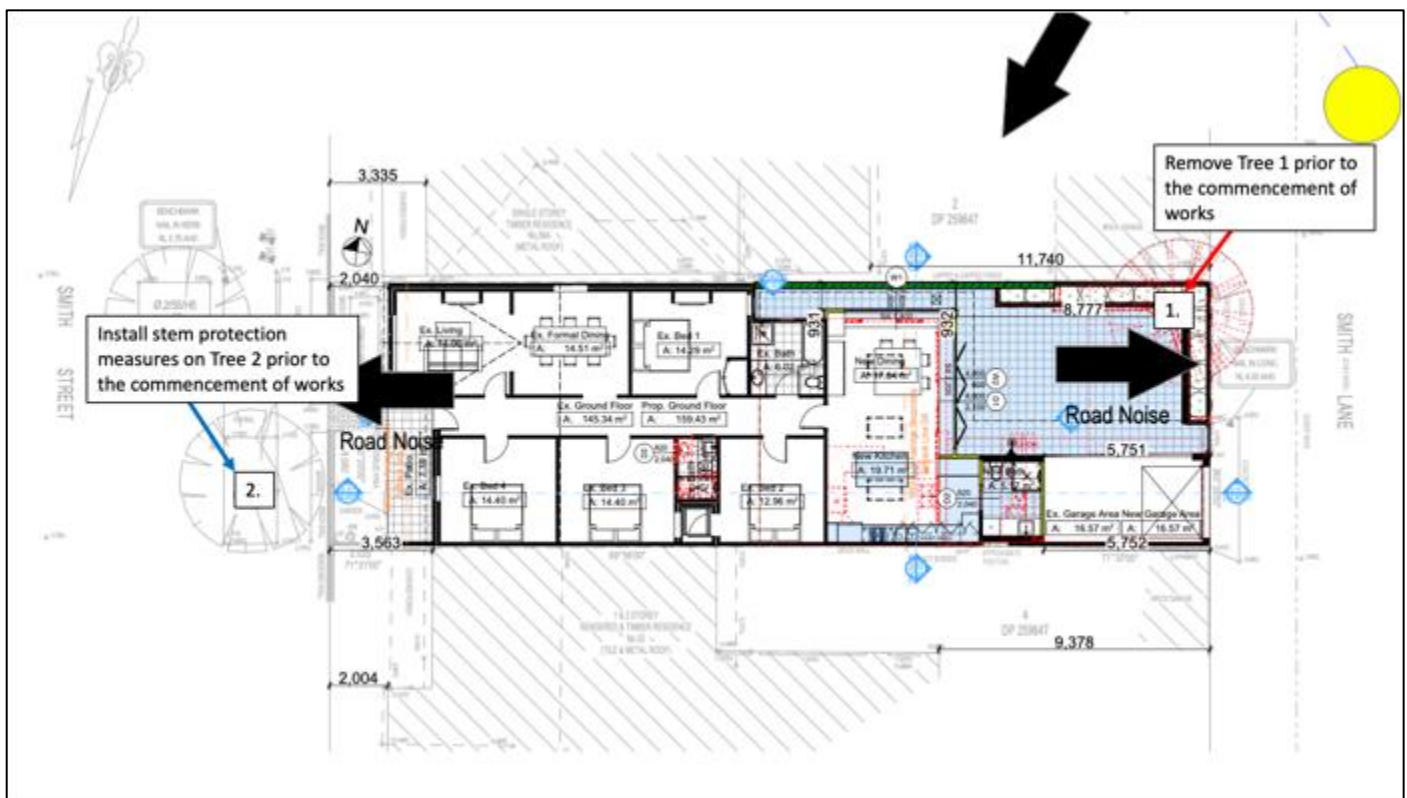


Figure 9. Required tree protection measures for the proposed works within 54 Smith Street, Manly. Site Plan (DA1003) drawn by *Rapid Plans* (04/02/2021) annotated by William Dunlop of *Temporal Tree Management Pty Ltd* (19/02/2021).





Figure 10. Example of properly installed stem protections measures.



6.5. Certifications

To ensure that the protection of retained vegetation is carried out to meet the objectives of the Arboricultural Impact Assessment and the development approval, the following monitoring and certification process will be undertaken by the Project Arborist at the following hold points in line with *AS 4970 (2009)*.

- Site establishment – Removal of only Tree 1 only to facilitate the development. Tree 2 must be retained with the installation of stem protection measures compliant with Section 4.5.2 of *AS 4970 (2009)* prior to the commencement of works. The Project Arborist must certify that these tree protection measures have been suitably installed prior to the commencement of works.
- Practical completion – Successful implementation of the Tree Protection Plan for the duration of the development. In line with *AS4970 (2009)*, this certification should determine if the Tree Protection Plan measures were adequately followed and whether the relevant trees were successfully protected. This certification must be given by the Project Arborist at the stage of practical completion prior to the Occupancy Certificate being issued.



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Appendix A: Tree Data

Tree N^o: 1.

Botanical Name: *Syzygium luehmannii*

Common Name: Small-leaved Lilly Pilly

Age: Mature

Origin: Native

DBH: 240 mm

DGL: 260 mm

Height: 6 metres

Width: 5 metres x 4 metres

Health: Fair

Structure: Poor

ULE: Short

Retention Value: Z2, Z10

TPZ: N/A.

SRZ: N/A.

Comments: This Small-leaved Lilly Pilly is positioned within the south-eastern boundary corner of the subject site. This tree has been previously lopped to a height of 1 metre, which has resulted in the development of a poorly structured epicormic canopy. Its stems become codominant from the previous lopping point. The northern stem is impacting the neighbouring garage while the eastern stem is impacting and has caused displacement of the boundary wall. Due to its poor structure and very confined growing space this tree was determined to be of Low retention value.



Tree N^o: 2.

Botanical Name: *Grevillea robusta*

Common Name: Silky Oak

Age: Mature

Origin: Native

DBH: 310 mm

DGL: 380 mm

Height: 10 metres

Width: 7 metres x 5 metres

Health: Fair

Structure: Poor

ULE: Medium

Retention Value: A4

TPZ: 3.72 metres

SRZ: 2.2 metres

Comments: This Silky Oak is a street tree positioned within 5 metres of the western property boundary of the subject site. This tree's canopy has been severely pruned to maintain clearance from the Low Voltage power lines. This pruning has impacted the tree's estimated ULE. Nonetheless, this tree was determined to be of High retention value due to its public ownership.



Appendix B: Vitality using Visual Vitality Index (Johnstone et al. 2012).

VVI = 3/3 (Upper crown exposed) + 5/5 (Good crown size) + 8/9 (Good crown density) + 4/5 (Very little deadwood) + 2/3 (Moderate epicormic growth) + 5/5 (Crown in tact).
=26/30.

