Arboricultural Impact Assessment

Alterations & Additions at

18-20 Sturdee Lane, Lovett Bay

Client: F Loader
Date: September 2021
Author: Alexis Anderson
Qualifications: -Diploma Horticulture (Arboriculture) –AQF Level 5.
-Bachelor of Applied Science (CM)
Membership: -Arboriculture Australia-Member No.2268
-International Society of Arboriculture –Professional Member
A.B.N: 989 613 015 96
Contact: 0431 286 080 info@bluegumarborist.com.au

1 Table of Contents

2 Summary

This Arboricultural Impact Assessment (AIA) is based on six (6) trees located at 18-20 Sturdee Lane, Lovett Bay (subject site).

The assessed trees consist of locally indigenous natives and one planted exotic. The proposed works include demolition of the south-eastern corner of the existing dwelling and construction of a new building section in the same footprint.

Refer to the Tree Protection Plan (Attachment C) for tree locations. Refer to the Tree Assessment Table (Attachment A) for the species and a detailed description of the assessed trees.

All of the assessed trees are able to be retained. All works are to be undertaken downslope of the existing retaining wall which is likely to have acted as a barrier to root spread. No impacts from the proposed works are expected. Recommendations have been made regarding tree protection measures to limit the potential for incidental impacts on retained trees.

3 Introduction

3.1 Background

This Arboricultural Impact Assessment (AIA) was prepared for Fiona Loader in relation to the existing trees and a proposed alterations and additions at 18-20 Sturdee Lane, Lovett Bay (subject site).

The purpose of this AIA is to assess the likely impacts of the proposed works on the existing site trees and make recommendations regarding construction methods and tree protection measures to limit adverse impacts on trees recommended for retention.

This AIA has been prepared in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites.*

3.2 Subject Site/Proposed Works

The subject site is a steeply sloping site with a northerly aspect. For the purpose of this development application, the subject site refers to the south-eastern corner of the main dwelling and the surrounding landscape.

The proposed works include re-construction of the SE corner of the existing dwelling within the existing footprint and construction of a new retaining wall.

3.3 Subject Trees

All trees with a potential Tree Protection Zone overlap of the construction area have been assessed. The tree population of the site is made up of locally indigenous natives and one planted exotic.

Part of the site is occupied by species assemblage typical of Pittwater Spotted Gum Forest a critically endangered ecological community.

All of the assessed trees are protected under Part 3 of SEPP *Vegetation in Non-Rural Areas*, 2017 (Northern Beaches Council).

Refer to the Tree Protection Plan (Attachment C) for tree locations and numbers. A detailed description of the subject trees is included in the Tree Assessment Table (Attachment A).

Photo A: Existing retaining wall downslope of Trees 104, 105, 107

Photo B: Trees 113 and 114 located upslope to the east of the site.

4 Methodology

4.1 Site Inspection

Site inspection and tree assessment was undertaken on the 16th of July, 2021. The trees were assessed from ground level using a Tree Assessment Table, which is included as Attachment A. The definitions and explanations of terms used are outlined in the Tree Table Definitions page which is included at Attachment B.

The tree assessment was undertaken for the purpose of pre-development planning. Detailed tree risk assessment was not requested or included in the scope of works.

4.2 Plan Review

The set of plans provided by James de Soyres & Associates (dated 27/08/2021) were reviewed as part of this assessment.

4.3 Tree Protection Zones

Tree assessments in accordance with the Australian Standard 4970-2009, *Protection of trees on development sites*, require calculation of a Tree Protection Zone (TPZ) and Structural Root Zone (SRZ). The following is a brief explanation of these terms:

Tree Protection Zone -TPZ: This is the area that should be isolated from construction disturbance so that the tree remains viable. Some disturbance within the TPZ may be possible following arboricultural assessment.

Structural Root Zone -SRZ: This is the area or undisturbed soil and roots required to maintain tree stability. Excavation within the SRZ can lead to whole tree failure.

Refer to the Tree Assessment Table (Attachment A) for the Tree Protection Zones of the assessed trees.

4.4 Retention Values

Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

- **HIGH Retention Value**: These trees are worthy of retention and design consideration should be made where possible to allow their retention.
- **MEDIUM Retention Value**: These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, stormwater pipes, garden retaining walls, driveway levels).
- **LOW Retention Value**: These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

The method of determining and defining retention values used in this report has been derived from the ©Retention Index developed by Tree Wise Men® Australia Pty Ltd.

4.5 Consideration for Tree Retention and Removal

Where demolition of existing structures, excavation or fill is proposed within the Tree Protection Zone (TPZ), arboricultural assessment and sensitive construction methods will be required. Where works are proposed outside of the TPZ, no sensitive construction methods are required.

Tree removal recommendations have been based on tree Retention Values and construction offsets. Trees may generally be recommended for removal in the following circumstances:

- Trees located within construction footprints.
- Trees with construction proposed within SRZ where root loss cannot be avoided through sensitive design.
- Trees with a TPZ loss of more than 25%, may be recommended for removal providing tree sensitive design cannot be implemented to avoid significant root and canopy loss.
- Trees with low Retention Values may be recommended for removal irrespective of proposed development.

5 Potential Impacts of Proposed Works

5.1 Trees to be removed

No trees are proposed to be removed as part of this project.

5.2 Potential Impacts of Proposal on Retained Trees

Tree Number	Retention Value	Works proposed within the Tree Protection Zone (TPZ)
104	Medium	The proposed new retaining wall and building is within the theoretical TPZ and Structural Root Zone spread. The existing retaining wall is however likely to have restricted the spread of roots downslope. The new retaining wall is proposed downslope of the existing wall, beyond the likely spread of roots. The existing stone wall shall be retained. No new excavation upslope of the existing wall is proposed. The new retaining wall toe footing will be on the downslope side of the wall. No impact is expected.
105	Medium	
107	Medium	
113	High	Construction work is proposed within the footprint of the existing building. The existing retaining walls that restrict root spread into the construction area will be retained. No impact is expected.
114	Medium	
115	High	

Incidental Impacts: There is the potential for incidental/accidental damage to the trunk, canopy and shallow roots of all retained trees throughout the construction process. Trees are commonly impacted on construction sites in the following ways.

- Stripping of topsoil and removal of organic material form the soil surface.
- Compaction of the topsoil and damage to surface roots through use of heavy machinery and frequent foot traffic.
- Soil contamination through washing out barrows and disposal or spillage of chemical materials.
- Root loss due to unforeseen excavation for plumbing upgrades and landscape construction.
- Bark/trunk and branch injuries from accidental contact with machinery.

These impacts can be easily avoided through communication with building contractors and basic tree protection measures.

6 Recommendations

6.1 Site Establishment –Prior to Demolition/Construction

Appointment of a Project Arborist: An Arborist with an AQF Level 5 qualification in Arboriculture and experience in tree protection within construction sites should be engaged prior to the commencement of work on the site. The Project Arborist should be present at the following times:

- Following installation of trunk battening.
- During any excavation to the south of the existing stone retaining wall.
- At project completion to verify tree protection and retention.

Trunk Protection (Trees 104, 105, 107): Trunk protection is recommended for Trees 104, 105, 107 as an alternative to fencing due to the steep topography.
Trunk protection is aimed at preventing accidental injury to the bark and cambium that often occurs on construction sites during transport of materials and movement of machinery. Refer to Figure A below for detail of adequate trunk protection.

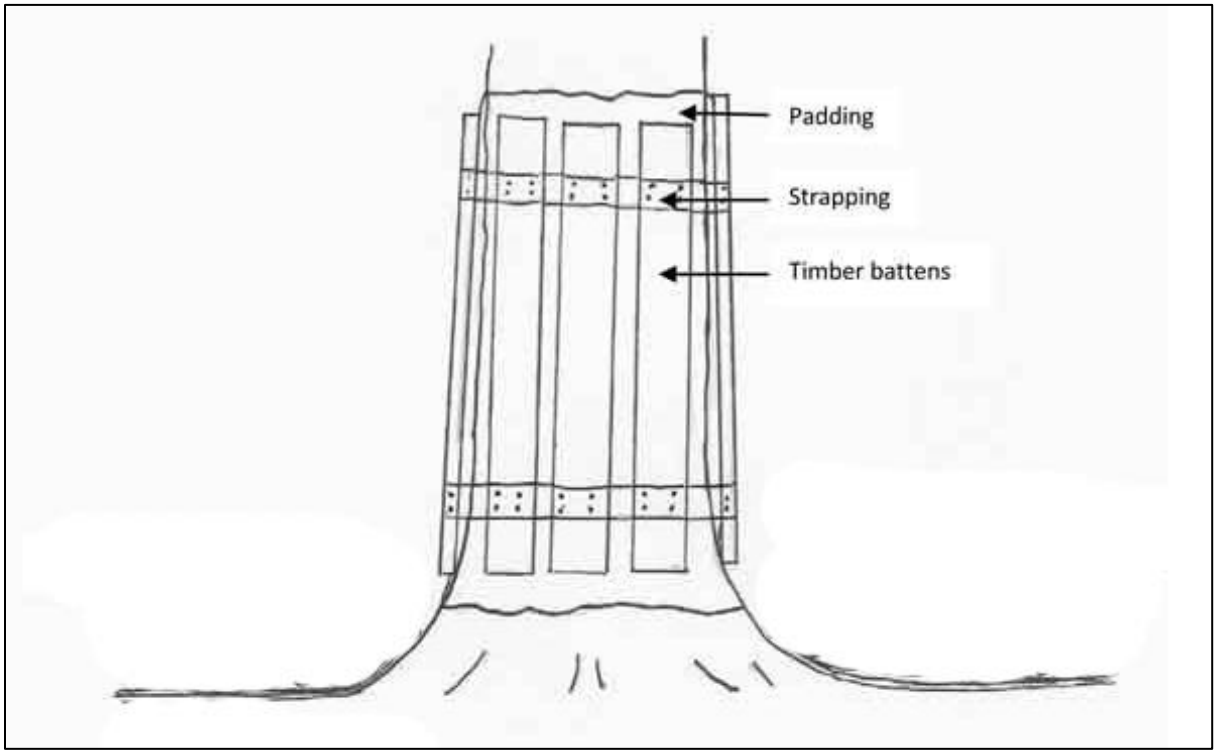

Figure A: Detail of adequate trunk protection

6.2 During Construction

Retaining Wall Construction: The new retaining wall at the rear of the building is to be built further down slope than the existing retaining wall. The toe footing is to be on the downslope side of the wall. There is to be no new excavation upslope and the existing stone wall is to remain.

Tree Protection Zones: Refer to the Tree Assessment Table (Attachment A) for the spread of TPZ's of trees nominated for retention. The existing retaining walls have limited the TPZ spreads. The following should be prohibited within the Tree Protection Zones:

- Stripping of topsoil or organic surface material.
- Storage of material, vehicles and machinery.
- Disposal of solid, liquid or chemical waste.
- Any excavation, fill or other construction activity other than that discussed in this report.

If the existing groundcover is stripped within a Tree Protection Zone, it should be replaced with leaf and woodchip mulch to a depth of 80-100mm.

7 Statement of Impartiality

- This report prepared by Bluegum Tree Care & Consultancy (BTCC) reflects the impartial and expert opinion of Alexis Anderson.
- BTCC is acting independently of and not as the advocate for the owners of the subject trees.
- BTCC does not undertake tree pruning and removal works and will not have any involvement with pruning or removing trees which are the subject of this report.

8 Limitations

- The findings of this report are based upon and limited to visual examination of trees from ground level without any climbing, internal testing or exploratory excavation.
- The tree assessment was undertaken for the purpose of pre-development planning. Detailed tree risk assessment was not requested or included in the scope of works.
- This report reflects the health and structure of trees at the time of inspection. Bluegum cannot guarantee that a tree will be healthy and safe under all circumstances or for a specified period of time. There is no guarantee that problems or defects with assessed trees, will not arise in the future. Liability will not be accepted for damage to person or property as a result of failure of assessed trees.

Tree No.	Common Name/ Genus Species	DBH (cm)	Height (m)	Canopy Spread Radius (m)	Age Class	Health / Vitality	Structural Condition	Tree Protection Zone (m)	Structural Root Zone (m)	Estimated Life Expectancy (ELE)	Landscape and Environmental Significance	Retention Value	Comments	Works Proposed Within the Tree Protection Zone	Proposed Action.
104	Spotted Gum, *Corymbia maculata*	17	7	3	EM	F	G	2.0	1.6	Long (30+ yrs)	3	Medium	Supressed by larger trees. Root spread downslope is restricted by the existing stone retaining wall.	New retaining wall construction is proposed downslope beyond the likely spread of roots. The existing stone wall shall be retained. No excavation or battering into the slope is proposed.	Retain.
105	Sweet Pittosporum, *Pittosporum undulatum*	25	8	3	M	G	G	3.0	1.8	Long (30+ yrs)	3	Medium	Root spread downslope is restricted by the existing stone retaining wall.	New retaining wall construction is proposed downslope beyond the likely spread of roots. The existing stone wall shall be retained. No excavation or battering into the slope is proposed.	Retain.
107	Magnolia, *Magnolia grandiflora*	21	7	4	M	G	G	2.5	1.7	Long (30+ yrs)	3	Medium	Root spread downslope is restricted by the existing stone retaining wall.	New retaining wall construction is proposed downslope beyond the likely spread of roots. The existing stone wall shall be retained. No excavation or battering into the slope is proposed.	Retain.
113	Spotted Gum, *Corymbia maculata*	53	14	6	M	G	G	6.4	2.5	Long (30+ yrs)	2	High	Located on the neighbours property.	Construction work is proposed within the footprint of the existing building. The existing retaining walls that restrict root spread into the construction area will be retained.	Retain.
114	Forest She Oak, *Allocasuarina torulosa*	41	8	6	M	G	G	4.9	2.3	Medium (10-30 yrs)	3	Medium	Located on the neighbours property.	Construction work is proposed within the footprint of the existing building. The existing retaining walls that restrict root spread into the construction area will be retained.	Retain.
115	Spotted Gum, *Corymbia maculata*	49	16	6	M	F	G	5.9	2.5	Long (30+ yrs)	2	High	Located on the neighbours property.	Construction work is proposed within the footprint of the existing building. The existing retaining walls that restrict root spread into the construction area will be retained.	Retain.

Attachment B: TREE ASSESSMENT DEFINITIONS

Height. Tree height is estimated from ground level. This assessment is made independently of data plotted on survey plan. These measurements have not been confirmed with clinometer or other surveying instrument.

Diameter at Breast Height (DBH). Trunk diameter is measured at 1.4 metres above ground level. A diameter tape is used which calculates the diameter from a measurement of the circumfrence. DBH is primarily used for the calculation of the TPZ and SRZ.
If a tree has more than 4 trunks, the diameter of the four largest trunks is recorded. For irregular trunk formations the DBH is calculated as outlined in Appendix A of AS4970-2009 -*Protection of Trees on Development Sites*.

Canopy Spread Radius. Average canopy spread radius is estimated from the centre of trunk to the outer edge of canopy. Refer to Comments column for detail of heavily skewed canopy spread.

Age Class - This is an estimation of the tree's current age class based on size, growth habit, local environmental conditions and comparison with surrounding trees.

- **Immature (IM)**: This is a juvenile specimen that is likely to have germinated within the previous 5 years.
- **Early Mature (EM)**: This is a tree that is established within its growing environment, though has not reached an age of reproductive maturity or the natural growth habit of a mature individual.
- **Mature (M)**: This is a tree has reached both reproductive maturity and a physical form and shape typical for the species. Trees can have a Mature Age Class for the majority of their life span.
- **Late-Mature (LM)**: There trees show early signs of senescence with symptoms such as reduced canopy density and an accumulation of dead branches.
- **Over-mature (OM)**: These trees show symptoms of irreversible decline such as canopy dieback with dead branches concentrated in the upper canopy.

Health/Vitality - Good (G), Fair (F) or Poor (P). This is primarily based on the extent of vigorous new foliage growth at branch tips and the colour, size and density of foliage generally. The percentage of live branches to dead branches is considered. The location of any dead branches is also considered. The presence of any pest or disease is considered as part of this assessment. Health can vary with climatic conditions.

Structural Condition - **Good (G), Fair (F) or Poor (P).** This is an assessment of tree structure and stability. Root anchorage, trunk lean, structural defects, canopy skew and any hazardous features are considered. Dead branches can be considered as part of Structural Condition if they are of a size and location that could cause injury or property damage.

Tree Protection Zone (TPZ). This is a radial distance of (12X) the DBH measured from centre of trunk. TPZ is rounded to the nearest 0.1 metre. A TPZ should not be less than 2m or greater than 15m. The TPZ for palms and other monocots should not be less than 1m outside of the crown projection. Existing constraints to root spread can vary the TPZ. For a tree to remain viable, construction activity should be excluded or undertaken with care within the TPZ. Disturbance within up to 10% of the TPZ area is considered to be a minor encroachment. Disturbance to more than 10% of the TPZ area is considered a major encroachment. Major encroachment into the TPZ is possible depending on the type of disturbance, and species tolerance to disturbance. Exploratory excavation may be required to quantify the presence of roots at the alignment of proposed ground disturbance.
This is based upon the Australian Standard AS 4970, 2009, *Protection of trees on development sites* and the Matheney & Clarke "*Guidelines for adequate tree preservation zones for healthy, structurally stable trees*".

Structural Root Zone (SRZ). This is a radial distance based on the following formula- **SRZ =(D x 50) $^{0.42}$ x 0.64** (for trees less than 150mm Diameter, a minimum SRZ of 1.5 metres). SRZ measurements are rounded to the nearest 0.1m. .
The Structural Root Zone is the area of soil and roots required to maintain tree stability. Excavation within the SRZ can result in whole tree failure. Fully elevated construction is possible within SRZ with specific rootzone assessment. Existing constraints to root spread can vary the SRZ. This method of determining SRZ is outlined at Section **3.3.5** of Australian Standard AS 4970, 2009, *Protection of trees on development sites.*

Estimated Remaining Life Expectancy: This gives a length of time that the Arborist believes a particular tree can be retained from the time of assessment with an acceptable level of risk based on the information available at the time of the inspection. This system of rating does not take into consideration the likely impacts of any proposed development. Ratings are **Long** (retainable for 30 years or more with an acceptable level of risk), **Medium** (retainable for 10-30 years), **Short** (retainable for 0-10 years) and **Removal** (tree requiring removal due to risk/hazard or absolute unsuitability).

Landscape & Environmental Significance*. This is an assessment of the impact of the tree on the surrounding landscape amenity and natural environment. Rarity, habitat value, physical prominence, historical and cultural significance of the tree are considered in this rating system. The Landscape & Environmental Value ratings used in this report are:

1. Very High Value: This is an outstanding specimen that holds irreplaceable environmental, landscape or cultural value.

2. High Value: An excellent specimen that holds environmental, landscape or cultural value that is present in other site trees or that could be replaced.

3. Moderate Value: Can be a good to fair specimen with environmental, landscape or cultural value that is common within other trees in the locality.

4. Low Value: Removal would not result in any loss of site amenity or environmental value. Can include undesirable or weed species or trees growing in unsuitable locations.

5. Very Low Value : Dead or hazardous with no other environmental or cultural value. Could also include weed species. These trees should be removed or pruned in a way to make safe irrespective of any development.

***Note**: The concept of using a five (5) point scale to assess tree significance was derived from the Tree Wise Men® Australia Pty Ltd ©Significance Rating Scale.

Retention Value*. Retention values are derived from a combination of Estimated Life Expectancy rating and Landscape and Environmental Significance ratings.

<table>
<tr><td rowspan="6">Landscape & Environmental Significance</td><td></td><td colspan="4">Estimated Life Expectancy</td></tr>
<tr><td></td><td>Long</td><td>Medium</td><td>Short</td><td>Removal</td></tr>
<tr><td>Very High (1)</td><td colspan="2" rowspan="2">HIGH</td><td rowspan="2">MEDIUM</td><td rowspan="2"></td></tr>
<tr><td>High (2)</td></tr>
<tr><td>Medium (3)</td><td colspan="2">MEDIUM</td><td rowspan="3" colspan="2">LOW</td></tr>
<tr><td>Low (4)</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>Very Low (5)</td></tr>
</table>

HIGH Retention Value: These trees are worthy of retention and major design consideration should be made where feasible to allow this.

MEDIUM Retention Value: These trees are worthy of retention and minor design consideration should be made to retain these trees wherever possible (e.g. placement of ancillary structures, garden retaining walls, driveway levels).

LOW Retention Value: These trees should not be considered to be a constraint to design layout. Some of these trees should be removed irrespective of any proposed development.

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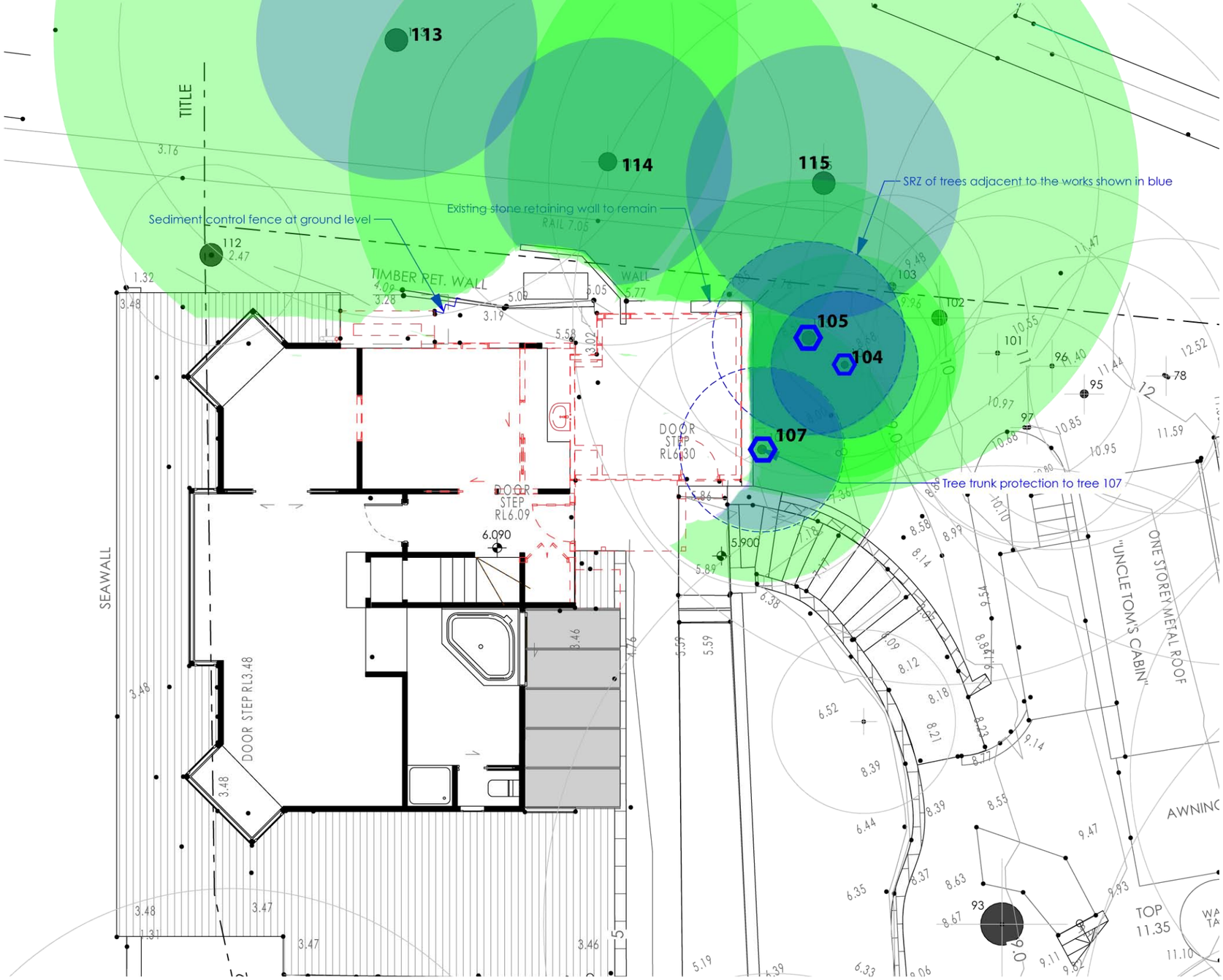

Tree Protection Plan

18-20 Sturdee Lane, Lovett Bay

LEGEND			
Trunk Protection	⬡	Tree Protection Zone	●
		Structural Root Zone	●

-This plan was prepared with the Demolition & Sediment Control Plan, DA-02 A, James de Soyres + Associates as a base.

-This plan is to be read in conjunction with the Arboricultural Impact Assessment (AIA) report prepared for this site, September 2021.

-The type of trunk protection should be determined with co-ordination between the Site Foreman and Project Arborist.