Arboricultural Impact Assessment

Figure 1 Tree 1 *Melaleuca quinquenervia*

Site Address: 31-33 Smith St Charlestown NSW

Clients: GPV Charlestown ATF GPV Charlestown Trust

Date: August 2022

Prepared by Ian Hills - Associate Diploma Horticulture
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1.0 Summary

Accurate Tree Assessment has been commissioned by Archadia Projects on behalf of the clients GPV Charlestown ATF GPV Charlestown Trust to provide an assessment of development impact for forty-three (43) trees located on and adjoining the property at 31-33 Smith St Charlestown NSW where it is proposed to construct a proposed healthcare development.

The trees are subject to the provisions of Lake Macquarie DCP-2014-Part-3 section 2.13 'Preservation of Trees and Vegetation'.

Conclusions

Vegetation is made up of planted native and exotic species located around the perimeter of the site.

Forty-three (43) trees have been assessed and all are proposed for removal including two (2) trees located on public land. Trees proposed for removal include sixteen (16) trees identified as undesirable species, which can be removed as exempt development.

Recommendations

That *Tree 38 Melaleuca styphelioides and 43 Aurantica rhombifolium* are public trees proposed for removal.

That the removal of one Hollow Bearing Tree (Tree 22) is supervised by a qualified ecologist and wildlife carer who are retained on-site during the works to manage any fauna that may be disturbed.

That the removal of forty-three (43) trees as detailed in the Tree Assessment Schedule at Section 6.0 of this report is approved subject to the provision of new plantings of endemic native species within the landscaping of the site.

That all tree work is carried out by a suitably qualified and insured contracting arborist, in accordance with the Safework NSW Draft Code of Practice for Tree Works and Australian Standard AS4373-2007, "Pruning of Amenity Trees".

2.0 Disclaimer

This report is to be read and considered in its entirety. The subject trees were inspected from the ground using Visual Tree Assessment methodology, no aerial investigations; underground or internal investigations were undertaken. It is the responsibility of the client to implement all recommendations contained in this report.

The assessment is made having regard for the prevailing site conditions; and does not account for the effects that extreme weather events may have on trees.

Information contained in this report reflects the condition of the trees at the time of the inspection. As trees are living organisms their condition will change over time, there is no guarantee that problems or deficiencies of the subject trees may not arise in the future. It must be accepted that living near trees involves some level of risk.

This report is for the use of the client and Lake Macquarie City Council to assist in determining the current development application. Distribution to other parties is not permitted except with the express permission of the author, Ian Hills.

3.0 Brief

Accurate Tree Assessment has been commissioned by Archadia Projects on behalf of the clients GPV Charlestown ATF GPV Charlestown Trust to provide an assessment of development impact for forty-three (43) trees located on and adjoining the property at 31-33 Smith St Charlestown NSW where it is proposed to construct a proposed healthcare development.

4.0 Method

A site inspection was carried out on 6 May 2022; the assessment of the trees was made using Visual Tree Assessment (VTA) procedure (Matheny & Clark, 1994), (Mattheck & Breloer, 2004) having regard for the provisions of AS4970-2009, 'Protection of Trees on Development Sites'.

Tree dimensions have been measured using a standard arboricultural diameter tape and Nikon Forestry Pro® laser hypsometer.

The trees subject to assessment have been allocated a number which is marked on the site plan and will be used as reference throughout this report.

4.1. Documents

The client has provided copies of the architectural plans in particular the following documents which have been used in the preparation of this assessment:

- Detail Survey Plan prepared by Daly Smith surveyors Project 35362 T01, Issue 0, dated 22 December 2021 (Appendix 12.2)
- Level 1 Site Plan prepared by Archadia, Project No. A106, Drawing DA1, Version 2.1, dated November 2022 (Appendix 12.3)
- Existing Site Trees prepared by Archadia, Project No. A106, Drawing SK51, Version 3.6, dated May 2022 (Appendix 12.4)

5.0 Site Conditions

The subject trees are protected by the provisions of Lake Macquarie DCP-2014-Part-3 section 2.13 'Preservation of Trees and Vegetation' as they meet the size criteria detailed at Point 6.iii and 6. iv. Trees appear to be planted native and exotic species and are not included in Lake Macquarie Council's online vegetation and corridors mapping.

The site is approximately 8096m² and is vegetated with a mixture of native and exotic trees and shrubs, with areas of rough lawn and hardstand making up the remainder of the landscape. The site is currently vacant.

The soil is mapped as the Gateshead Landscape (9232ga) and has the following characteristics:

- *Landscape - undulating to rolling rises on shale and sandstone parent material in the Awaba Hills. Local relief to 100 m. Slopes 5–15%. Elevation to 130 m. Predominantly cleared woodland and open-forest.*

- *Soils - moderately deep (100–200 cm), moderately well to imperfectly drained soils on conglomerate crests and sideslopes, with some shallow (<50cm), rapidly drained areas. Moderately deep to deep (100–400 cm), well to imperfectly drained soils on shale parent material.*

- *Qualities and Limitations - water erosion hazard, Mine Subsidence District, localised steep slopes and shallow soils, high run-on and seasonal water-logging on lower slopes, acid soils of low fertility*
  (NSW Environment and Heritage, 2022)

According to climate data from the weather station at Nobbys AWS, which is approximately 11 kilometres from the site, the district experiences prevailing winds from the North-west with frequent windspeeds exceeding 50km/h (Willy Weather, 2022). The subject trees are somewhat exposed by the lack of surrounding vegetation or substantial structures.

Figure 2 Site location (Sixmaps, 2022)

6.0 Tree Assessment

No.	Species (Common name)	DBH (M)	TPZ (M)	SRZ (M)	Height	Spread	Age Class	Condition	SULE	Comments	Retention value	Proposal
1	Melaleuca quinquenervia (Broad Leaved Paperbark)	0.75	9	3.09	12	8	Mature	Good	2a	Small deadwood noted, generally symmetrical	High	Removal
2	Cinnamomum camphora (Camphor Laurel)	0.5	6	2.67	7	7	Mature	Good	4a	Environmental weed, exempt species	Low	Removal
3	Grevillea robusta (Silky Oak)	0.8	9.6	3.01	22	12	Mature, Over-mature	Average	2a	Large deadwood noted, exempt species	Low	Removal
4	Grevillea robusta (Silky Oak)	0.9	10.8	3.31	24	14	Mature, Over-mature	Average	2a	Large deadwood noted, exempt species	Low	Removal
5	Cinnamomum camphora (Camphor Laurel)	0.1 x 2	2.0 ea	1.7	3	1	Juvenile	Good	4a	Environmental weed species, exempt	Low	Removal
6	Cupressus sp (Cypress)	0.3	3.6	2.25	7	3	Mature, Over-mature	Average	4a	Small deadwood noted, exempt species	Low	Removal
7	Lagunaria Patersonia (Norfolk Island Hibiscus)	0.25	3	2.13	6	4	Semi-mature	Average	2a	Small deadwood noted, exempt species	Low	Removal
8	Lophostemon confertus (Brush box)	0.035	4.2	2.37	5	5	Semi-mature	Good	1a	Appears structurally sound	High	Removal
9	Cupressus sp (Cypress)	0.2	2.4	3	4	1	Over-mature	Poor	3b	Excessive branch die-back noted, exempt species	Low	Removal
10	Lophostemon confertus (Brush box)	0.4	4.8	2 47	6	6	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
11	Cinnamomum camphora (Camphor Laurel)	0.25	3	2.13	6	2	Semi-mature	Average	4a	Small deadwood noted, exempt species	Low	Removal
12	Cinnamomum camphora (Camphor Laurel)	0.5	6	2.85	7	7	Over-mature	Average	4a	Excessive branch die-back noted, exempt species	Low	Removal
13	Lophostemon confertus (Brush box)	0.3	3.6	2.25	5	4	Semi-mature	Good	1a	Appears structurally sound	High	Removal

No.	Species (Common name)	DBH (M)	TPZ (M)	SRZ (M)	Height	Spread	Age Class	Condition	SULE	Comments	Retention value	Proposal
14	Cupressus sp (Cypress)	0.5	6	2.67	9	2	Mature	Average	4a	Small deadwood noted, exempt species	Low	Removal
15	Lophostemon confertus (Brush box)	0.3	3.6	2.25	5	5	Semi-mature	Good	1a	Appears structurally sound	High	Removal
16	Lophostemon confertus (Brush box)	0.45	5.4	2.57	6	5	Mature	Good	1a	Appears structurally sound	High	Removal
17	Rogeria amoena (Rondelitia)	0.3	3.6	2 25	3	3	Mature	Good	4a	Appears structurally sound, exempt species	Low	Removal
18	Cupressus sp (Cypress)	0.3	3.6	2.25	6	3	Over-mature	Average	4a	Excessive branch die-back noted, exempt species	Low	Removal
19	Cupressus sp (Cypress)	0.5	6	2.67	9	4	Over-mature	Average	4a	Excessive branch die-back noted, exempt species	Low	Removal
20	Lophostemon confertus (Brush box)	0.65	7.8	2.93	7	6	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
21	Cinnamomum camphora (Camphor Laurel)	0.2	2.4	2	3	3	Semi-mature	Good	4a	Appears structurally sound, exempt species	Low	Removal
22	Eucalyptus bicostata (Southern Blue Gum)	0.8	9.6	3.17	18	10	Mature, Over-mature	Fair	3a	Large deadwood noted, Excessive branch die-back noted, decay in trunk, hollow bearing	High	Removal
23	Lophostemon confertus (Brush box)	0.35	4.2	2.37	7	6	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
24	Cinnamomum camphora (Camphor Laurel)	0.6	7.2	2.85	7	7	Mature	Good	4a	Appears structurally sound, small deadwood noted, exempt species	Low	Removal
25	Angophora costata (Smooth barked apple)	0.7	8.4	3.01	14	10	Mature	Average	2a	Large deadwood noted	High	Removal
26	Eucalyptus bicostata (Southern Blue Gum)	0.7	8.4	3.01	20	14	Mature	Average	2a	Large deadwood noted, generally symmetrical	High	Removal
27	Lophostemon confertus (Brush box)	.4 x 2	6.84	2.8	10	10	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal

No.	Species (Common name)	DBH (M)	TPZ (M)	SRZ (M)	Height	Spread	Age Class	Condition	SULE	Comments	Retention value	Proposal
28	Acacia decurrens (Black wattle)	0.2	2.4	2	5	4	Semi-mature	Average	2a	Appears structurally sound, small deadwood noted	Moderate	Removal
29	Lophostemon confertus (Brush box)	0.75	9	3.09	9	10	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
30	Cinnamomum camphora (Camphor Laurel)	0.1	2	1.7	3	2	Juvenile	Good	4a	Appears structurally sound	Low	Removal
31	Lophostemon confertus (Brush box)	.5 x 2	8.52	3.03	10	10	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
32	Lophostemon confertus (Brush box)	.5	6	2.67	10	8	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
33	Cinnamomum camphora (Camphor Laurel)	1	12	3.44	9	12	Mature, Over-mature	Fair	4a	Excessive branch die-back noted, declining, exempt species	Low	Removal
34	Lophostemon confertus (Brush box)	0.6	7.2	2.67	9	9	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
35	Lophostemon confertus (Brush box)	0.6	7.2	2.67	9	10	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
36	Lophostemon confertus (Brush box)	0.6	7.2	2.67	10	7	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
37	Lophostemon confertus (Brush box)	0.6	7.2	2.67	10	7	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
38	Melaleuca styphelioides (prickly-leaved paperbark)	0.5	6	2.67	6	8	Mature	Average	2a	Appears structurally sound, Sparse canopy, street tree	Moderate	Removal
39	Lophostemon confertus (Brush box)	0.6	7.2	2.85	12	8	Mature	Good	1a	Appears structurally sound, small deadwood noted	High	Removal
40	Callistemon viminalis (Weeping bottlebrush)	0.3	3.6	2.25	7	4	Mature	Good	2a	Appears structurally sound, small deadwood noted	Moderate	Removal
41	Callistemon viminalis (Weeping bottlebrush)	0.3	3.6	2.25	6	4	Mature	Good	2a	Appears structurally sound, small deadwood noted	Moderate	Removal

No.	Species (Common name)	DBH (M)	TPZ (M)	SRZ (M)	Height	Spread	Age Class	Condition	SULE	Comments	Retention value	Proposal
42	Banksia serrata (Old man banksia)	0.3	3.6	2.25	6	5	Semi-mature	Good	1a	Appears structurally sound, small deadwood noted	Moderate	Removal
43	Auranticarpa rhombifolium (Diamond Leaf Pittosporum)	0.25	3	2.13	5	3	Mature	Good	2a	Appears structurally sound, small deadwood noted, street tree	Moderate	Removal

DBH – Trunk diameter at 1.4 metres
Vigour - P = Poor, F = Fair, Av = Average, G =Good
Age class – J = Juvenile, SM =Semi-mature M = Mature, OM= Over mature
Tree retention value Appendix 11.5

TPZ = Tree Protection Zone (calculated in accordance with AS4970)
SRZ = Structural Root Zone (calculated in accordance with AS4970)
SULE = Safe Useful Life Expectancy (Barrel, J. 1993-5) appendix 11.1

7.0 Development impact

All parts of a tree may be damaged by construction activities, and the effects of damage are often cumulative meaning that seemingly minor damage to the tree can have adverse effects that may not become apparent until well after the project has been completed.

Crown damage often occurs when machinery impacts branches of the tree resulting in a loss of foliage. As the foliage is where the tree produces the sugars required for healthy growth it therefore stands to reason that any loss of foliage will affect the trees' ability to function normally.

In addition, when branches are torn or improperly pruned the trees' ability to recover is affected and pathogens that cause wood decay or disease have an increased opportunity to penetrate the trees natural defenses.

Trunk damage is usually caused by mechanical impact, and again wounding predisposes the tree to infection by pathogens.

Root damage is the most common cause of damage to trees on development sites, and often has the most serious effects as it commonly goes un-noticed for some time. Damage can be caused by mechanical factors such as tearing during excavation, as well as factors such as chemical contamination, changes in hydrology and altering gaseous exchange rates by filling, and compaction during movement of equipment.

Australian Standard 4970, *Protection of Trees on Development Sites* was adopted in 2009 to provide Arborists and the construction industry with a guide to assist in the preservation of retained trees on all types of development sites.

To assist professionals working to protect trees the Standard proposes the following:

> "Tree Protection Zone - A specified area above and below ground level at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.
>
> *Structural Root Zone – The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres.*
>
> *This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be much larger."* (Ref. AS4970-2009)

Minor encroachment of the TPZ is sometimes unavoidable and at levels less than 10% of the total TPZ area can be tolerated if there is scope to increase the area of the TPZ contiguously about the unaffected perimeter. Where encroachment exceeds 10% further investigation will be required to determine the measures required to offset the incursion. Encroachment of the SRZ is not recommended as tree stability, health and condition will almost certainly be adversely affected.

8.0 Discussion

The impact of the proposed development on the forty-three (43) trees subject of this report is assessed against the architectural plans provided, that detail construction of new buildings, carparking, access roads and landscaping.

Vegetation is not mapped in Councils Native Vegetation and Corridors Map and appears to be planted native and exotic tree species. There are several *Lophostemon confertus* planted on the site that contribute positively to the local landscape amenity and those along the Southern and Eastern boundaries are proposed for retention.

Tree management summary

Retention value	Removal	Retention
High	20	-
Moderate	6	-
Low	17	-
Total	**43**	**0**

The Tree Assessment Schedule at Section 6.0 details the management recommendations for individual trees on and adjoining the subject site.

Sixteen (16) of the subject trees are listed as undesirable species in Appendix 10.5 of the Lake Macquarie Tree and Vegetation Preservation Guidelines and will be removed in conjunction with the proposed development.

Tree 22 *Eucalyptus bicostata* appears in declining condition and is noted to contain hollows and is therefore attributed with high environmental value, its position however conflicts with the proposed design and is not suited for retention based on increasing personal and property risk due to its declining structural condition.

Hollow bearing trees (HBT) are particularly important for arboreal fauna, including many threatened species, which specifically require such hollows for shelter and nesting. These animals are termed 'hollow-dependent' in that they require hollows as a key component of their habitat either on a daily or seasonal basis.

The occurrence of a natural range of hollow sizes, depths, volumes, and positions helps to ensure that a diversity of hollows is available to cater for the specific ecological requirements of hollow-dependent fauna. It is important therefore to maintain older mature to over mature trees, with hollows across the landscape.

The loss of tree hollows has been listed as a Key Threatening Process (Final Determination) by the NSW Scientific Committee. The removal of the HBT will require additional consideration.

A qualified ecologist should be engaged to oversee the removal of HBT. The tree is to be inspected before being dismantled so that any fauna that may be present can be identified and removed without harm. Felling of the trunk can only be conducted once the ecologist is satisfied that fauna is not present. The hollow sections should be retained for reuse either by mounting in retained trees or placement on ground level for use by terrestrial species.

It is proposed that all trees within the plan area of the proposed development will be removed to allow construction in accordance with the Proposed Site Plan (appendix 11.3). The approved removal of trees must not impact or cause harm to the trunks, roots or branches of any retained trees and is to be undertaken by a suitably qualified contracting arborist in accordance with the provisions of the Safework Australia Code of practice for Tree works

The removal of trees will be offset by the planting of new trees within the landscaping of the site, preference should be given to the use of endemic native species which will have a reduced maintenance requirement and will provide significant environmental and landscape amenity benefits.

The design includes a 5-metre-wide vegetative buffer along the Southern site boundary parallel to Frederick St. Trees 25 to 27, 29, 34-37 which are assessed with high retention value will be subject to major encroachment of the TPZ particularly the canopies which conflict with the proposed multi storey building housing the hospital. It is therefore proposed that the trees are removed in favour of the development subject to the inclusion of suitable replacement species within the landscaping of the site.

Trees 39 and 40 within the vegetation buffer on the Eastern boundary will be subject to major and unsustainable levels of encroachment caused by the proposed parking structures driveway access, the trees are assessed with moderate to high retention value and their removal will be offset by inclusion of suitable replacement species within the landscaping of the site.

Trees 38 and 43 are Council managed trees growing on the road reserve and are assessed with moderate retention value. The trees will n be subject to major and unsustainable levels of encroachment caused by the provision of utilities and access into the subject site.

The trees are therefore proposed for removal in conjunction with the proposed development of the site.

9.0 Conclusions

Vegetation is made up of planted native and exotic species located around the perimeter of the site.

Forty-three (43) trees have been assessed and all are proposed for removal including two (2) trees located on public land. Trees proposed for removal include sixteen (16) trees identified as undesirable species, which can be removed as exempt development.

10.0 Recommendations

That *Tree 38 Melaleuca styphelioides and 43 Aurantica rhombifolium* are public trees proposed for removal.

That the removal of one Hollow Bearing Tree (Tree 22) is supervised by a qualified ecologist and wildlife carer who are retained on-site during the works to manage any fauna that may be disturbed.

That the removal of forty-three (43) trees as detailed in the Tree Assessment Schedule at Section 6.0 of this report is approved subject to the provision of new plantings of endemic native species within the landscaping of the site.

That all tree work is carried out by a suitably qualified and insured contracting arborist, in accordance with the Safework NSW Draft Code of Practice for Tree Works and Australian Standard AS4373-2007, “Pruning of Amenity Trees”.

Figure 3 Trees 2 *Cinnamomum camphora* and 3,4 *Grevillea robusta* are proposed for removal

Figure 4 Trees 33 *Cinnamomum camphopra* is an exempt species in declining condition

Figure 5 Hollow bearing Trees 22 *Eucalyptus bicostata* and Tree 26 *Eucalyptus bicostata*

Figure 6 Tree 38 *Melaleuca styphelioides* is a Council managed street tree

Figure 7 **Tree 43 *Auranticarpa rhombifolium* is a Council managed street tree**

11.0 Appendices

11.1. Safe Useful Life Expectancy Categories

1: Long SULE: Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.
(a) Structurally sound trees located in positions that can accommodate future growth.
(b) Trees that could be made suitable for retention in the long term by remedial tree care.
(c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.

2: Medium SULE: Trees that appeared to be retainable at the time of assessment for 15–40 years with an acceptable level of risk.
(a) Trees that may only live between 15 and 40 more years.
(b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons.
(c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
(d) Trees that could be made suitable for retention in the medium term by remedial tree care.

3: Short SULE: Trees that appeared to be retainable at the time of assessment for 5–15 years with an acceptable level of risk.
(a) Trees that may only live between 5 and 15 more years.
(b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons.
(c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
(d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.

4: Remove: Trees that should be removed within the next 5 years.
(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions.
(b) Dangerous trees because of instability or recent loss of adjacent trees.
(c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
(d) Damaged trees that are clearly not safe to retain.
(e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting.
(f) Trees that are damaging or may cause damage to existing structures within 5 years.
(g) Trees that will become dangerous after removal of other trees for the reasons given in (a)to(f)
(h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment could be retained subject to regular review.

5: Small, young, or regularly pruned: Trees that can be reliably moved or replaced.
(a) Small trees less than 5m in height.
(b) Young trees less than 15 years old but over 5m in height.
(c) Formal hedges and trees intended for regular pruning to artificially control growth.

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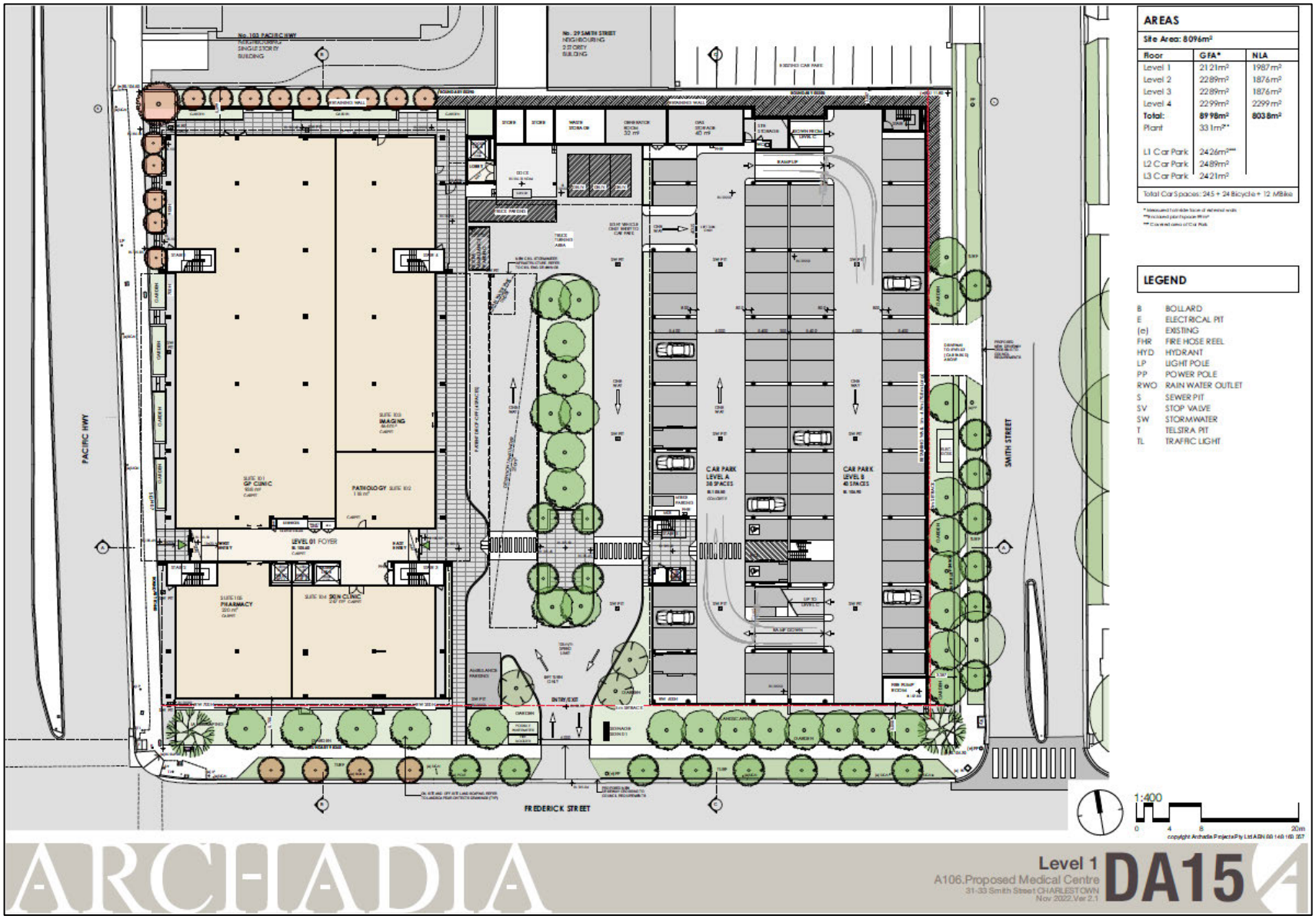
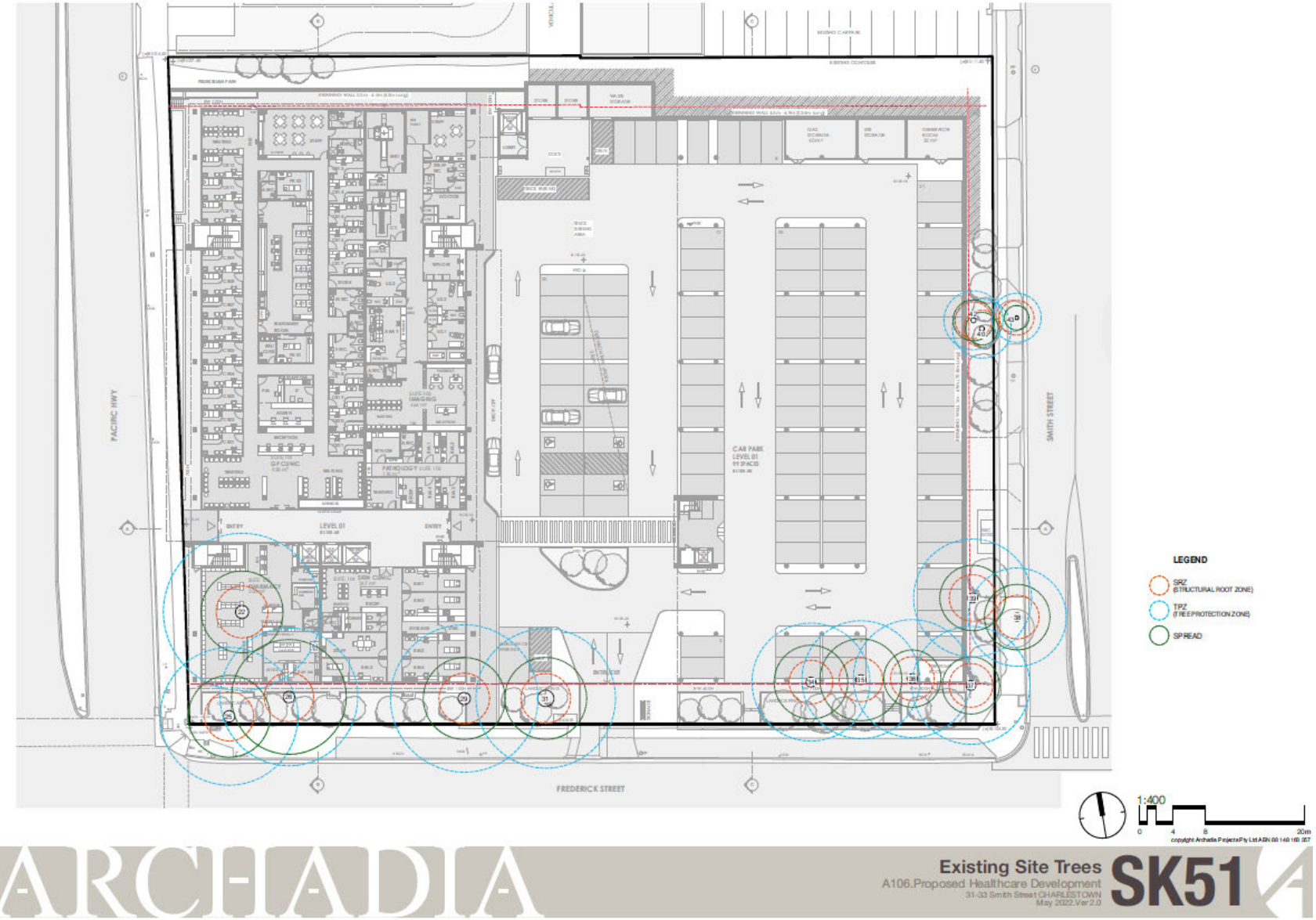
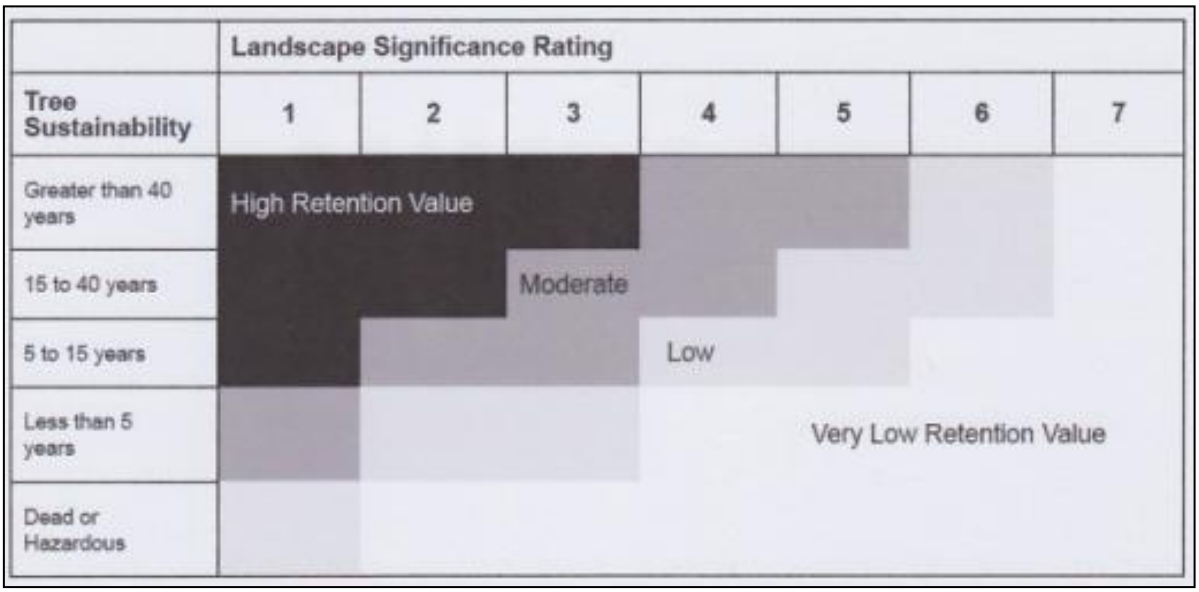
11.3 Site Plan Level 1 (extract)



11.4 Tree Plan



11.5 Calculating Tree retention Value



(Source NUFTM) Modified by A Morton from Couston and Howden (2001) Tree retention values table Footprint Green Pty Ltd Australia)

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11.7 Qualifications – Ian Hills

Associate Diploma Horticulture	Ryde TAFE 1984
AQF3 Horticulture (Arboriculture)	Ourimbah TAFE 1998
AQF5 Diploma Horticulture (Arboriculture)	Kurri Kurri TAFE 2009 (Dux) Cert No. 5934155
QTRA Registered User 2083	December 2013
QTRA Advanced User 4469	March 2018
Working with Children Check Number	WWC1780469E
National Coordinated Criminal History Check Certificate	CAD5579CB8
QTRA Advanced User 4469	March 2020