Arborcultural Impact Assessment Report

Broadwater Public School

Client

ADCO

Northern Tree Care
ABN 73 674 526 681
6 Abalone Place, Ballina. NSW 2478

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Contents

1. Introduction

1.1 This report has been prepared on request from ADCO. The Broadwater Public School was extensively damaged in the 2020 floods. ADCO is carrying out the construction of the new school buildings. There are a number of trees growing on the school grounds that may potentially be affected by the new building.

2. Scope

2.1 This report is an Arboricultural Impact Assessment Report. The report describes the trees. The retention value of the trees is assessed. Where it is considered appropriate recommendations for the management of the trees are made. Where trees are retained in the new development recommendations for their protection construction are made.

2.2 Northern Tree Care provided a Preliminary Tree Report in 2022. This report uses some of the information gathered for the previous report. The potential and likely effect of the construction of the new buildings and infrastructure on the trees is assessed in this report.

3. Method

3.1 The trees were assessed visually from the ground. The diameter at breast height (DBH) was measured at 1.4 m above the ground. The height of the trees was measured using a hypsometer or estimated where the view of the trees was partially obstructed. The conventions and methods recommended in the Australian Standard AS 4970-2009 Protection of trees on development sites was used to assess the tree.

3.2 The health and condition of the trees was assessed using the Visual Tree Assessment method (Mattheck & Breloer 2003). This is a method of assessing trees using the body language or shape and features of the tree to indicate their condition. These tree shapes or body language are a reliable indicator of the underlying condition of that part of the tree. The trees were identified using the signs and features present at the time of inspection.

3.3 The trees were inspected by Peter Gray of Northern Tree Care on 2nd June 2023. This report is compiled from information gathered during the inspection and from plans and documents supplied by ADCO. The plans and documents include:

- *Detail Survey Plan.* Beveridge Williams. 18/01/2023.
- *Masterplan.* Pedavoli Architects. 19/05/2023

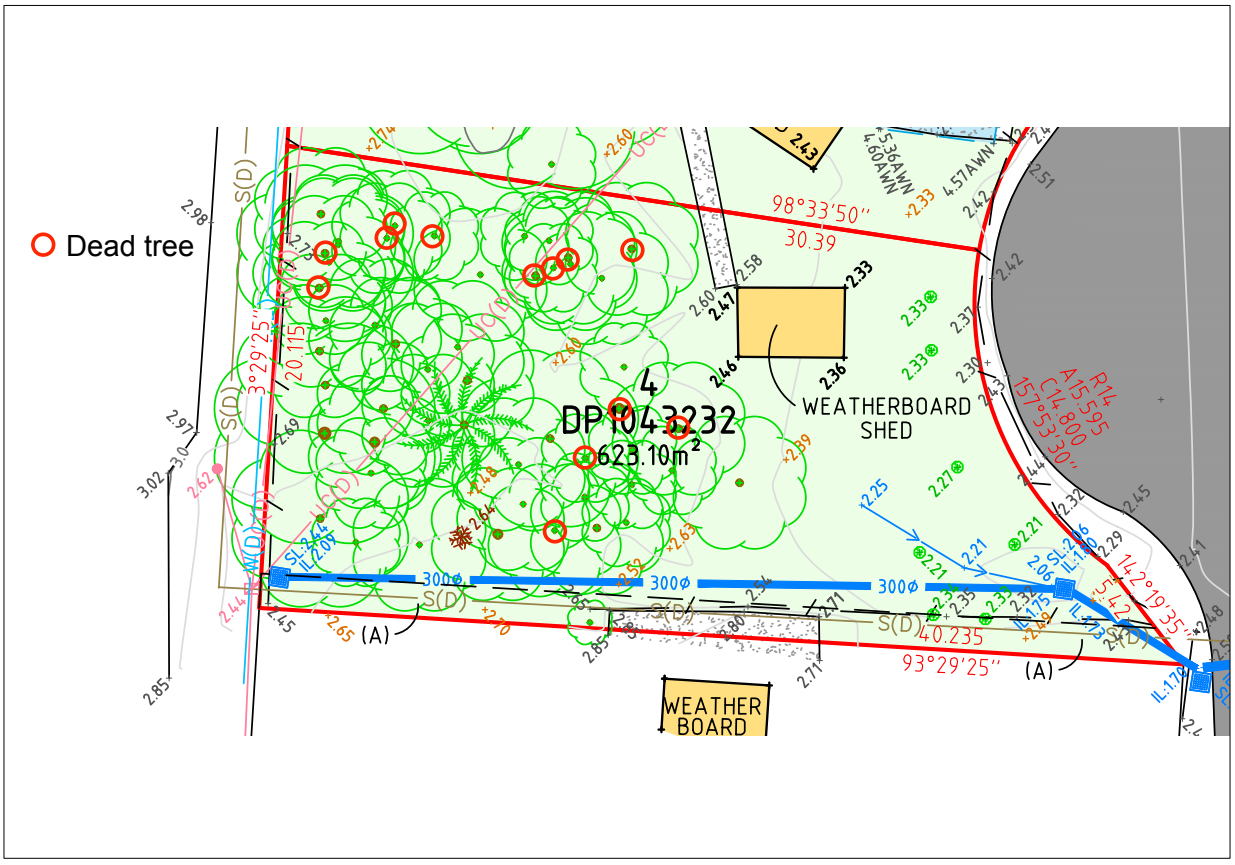
4. Observations

4.1 The property subject of this report is described as 9 Byrnes Street, Broadwater, Lot 4 & 5 in DP 1043232 and Lot 501 in DP 755624. The land is zoned RU1 Primary Production. The land is bounded by the Pacific Highway to the west, private residences to the north and south and farmland to the east. The land is flat and the soil is sandy loam.

4.2 The trees growing on the school grounds have all been planted. Some of the trees are planted in groups or rows. .Where the trees are in groups or rows that were planted at the same time tree trees have been described as a group (see Attachment 2. Site Plan).

4.3 It is planned to construct some of the buildings near the group of trees G 4. This group of trees has now been individually described. The trees are described in detail in Table 1. Tree Data.

4.4 The group of trees # 22 has thirteen dead trees in the group. The trees in the group that are dead are shown in Figure 1 below. There are also two trees that are planned to be removed to allow installation of a services trench.



4.4 Table 1. Tree Data

Tree #	Name	Age	Health	Height m	DBH mm	Crown m	TPZ m	Retain
1	Tallowwood *Eucalyptus microcorys*	Mature	Good	20-25	850	15	10.2	Yes
2a	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2b	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2c	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2d	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2e	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2f	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2g	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2h	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2i	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2j	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
2k	Alexander Palm *Archontoephoenix alexandrae*	Mature	Good	10-15	250	3	2.5	Yes
3a	Bottlebrush x 2 *Callistemon viminalis*	Nature	Good	5-10	500	6	6.0	No
3b	Bottlebrush x 2 *Callistemon viminalis*	Nature	Good	5-10	500	6	6.0	No
4a	Swamp Mahogany *Eucalyptus robusta*	Mature	Poor	10-15	710	6	8.5	No
4b	Swamp Mahogany *Eucalyptus robusta*	Mature	Fair	10-15	480	5	5.8	No
4c	Forest Red Gum *Eucalyptus tereticornis*	Mature	Good	15-20	820	8	9.8	Yes
4d	Forest Red Gum *Eucalyptus tereticornis*	Mature	Good	15-20	510	6	6.1	Yes
4e	Flooded Gum *Eucalyptus grandis*	Mature	Good	15-20	560	7	6.7	Yes

4.4 Table 1. Tree Data

Tree #	Name	Age	Health	Height m	DBH mm	Crown m	TPZ m	Retain
5	Weeping Fig *Ficus microcarpa* var. *hillii*	Mature	Good	20-25	1,170	20	14.0	Yes
6	Coastal Pine *Callitris columellaris*	Mature	Good	5-10	410	5	4.9	Yes
7	Flooded Gum *Eucalyptus grandis*	Mature	Good	10-15	880	9	10.6	Yes
8	Brushbox *Lophostemon confertus*	Mature	Good	5-10	320	5	3.8	Yes
9	Forest Red Gum *Eucalyptus tereticornis*	Mature	Good	10-15	540	8	6.5	Yes
10	Poplar *Populus* sp.	Mature	Good	5-10	550	9	6.6	Yes
11	Hoop Pine *Araucaria cunninghamii*	Mature	Good	10-15	430	8	5.2	Yes
12a	Cocos Palm *Syagrus romanzofiana*	Mature	Good	5-10	350	4	3.0	Yes
12b	Cocos Palm *Syagrus romanzofiana*	Mature	Good	5-10	350	4	3.0	Yes
13	Hoop Pine *Araucaria cunninghamii*	Mature	Good	10-15	1,000	14	12.0	Yes
14a	Bangalow Palm *Archontoephoenix alexandrae*	Mature	Good	5-10	200	3	2.5	No
14b	Bangalow Palm *Archontoephoenix alexandrae*	Mature	Good	5-10	200	3	2.5	No
15	Exotic species	Mature	Good	5-10	330	5	4.0	No
16	Camphor Laurel *Cinnamomum camphora*	Mature	Good	15-20	1,600	15	15.0	No
17	Camphor Laurel *Cinnamomum camphora*	Mature	Good	15-20	1,600	15	15.0	Yes
18	Group of rainforest trees x 62	Mature	Good	15-20	<700			Yes
18a	She Oak *Casuarina glauca*	Mature	Good	15-20	400	8	4.8	No
18b	Dead tree							No
19a	Camphor Laurel *Cinnamomum camphora*	Mature	Fair	15-20	1,500	12	15.0	Yes
19b	Camphor Laurel *Cinnamomum camphora*	Mature	Fair	15-20	1,500	12	15.0	Yes

Table 1. Tree Data continued

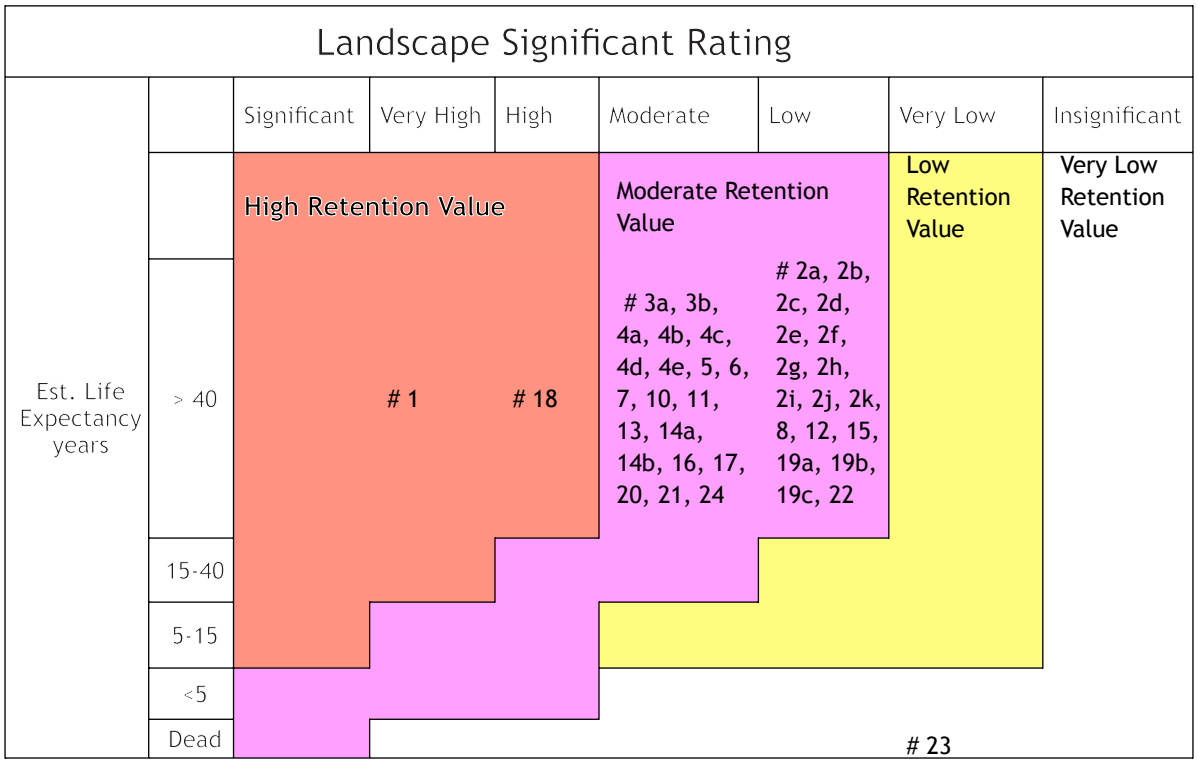
Tree #	Name	Age	Health	Height m	DBH mm	Crown m	TPZ m	Retain
19c	Camphor Laurel *Cinnamomum camphora*	Mature	Fair	15-20	1,500	12	15.0	Yes
20	Weeping Paperbark *Melaleuca leucadendra*	Mature	Good	10-15	600	8	7.2	Yes
21	Weeping Paperbark *Melaleuca leucadendra*	Mature	Good	10-15	600	8	7.2	Yes
22	Group of Rainforest trees	Mature	Poor	5-10	<250	4		Yes
23	Brown Kurrajong *Commersonia bartramia*	Dead	Dead	5-10	620	6		No
24	Firewheel *Stenocarpus sinuatus*	Mature	Good	5-10	290	5	3.5	No
25	Paperbark *Melaleuca quinquenervia*	Mature	Good	5-10	240	4	2.9	Yes

5. Tree Significance

5.1 When considering the retention value of trees, two major issues were considered. They are the significance of the tree and its estimated life expectancy.

5.2 When assigning a value to the significance of the tree, a number of factors should be considered (Moreton 2003). The significant outcomes have been determined in **Attachment 4. Significance of Trees in the Landscape**.

6. Tree Retention Values



Ref: Modified from Couston, Howden (2001) Tree Retention Values Table. Footprint Green Pty Ltd, Sydney Australia.

6.1 Where trees have a high retention value they should be retained if possible. Where the development is considered to be more important than the trees they may be removed (Barrell 2006).

7. Discussion

7.1 The existing school buildings will be demolished and new building will be constructed. The new buildings will be constructed in an area that is currently used as a sports field. A total of 10 trees will be removed to allow construction of the new buildings and also a new sports field. Of the 10 trees to be removed seven are assessed as being of moderate retention value. They include tree # 3 and 14 which are actually two trees growing close together as shown on the plans. One of the trees to be removed is dead and one of the trees is of low retention value.

7.2 Three of the trees planned to be retained have encroachment into their Tree Protection Zones. The Australian Standard *AS 4970 -2009 Protection of trees on development sites* describes the Tree Protection Zone (TPZ) as an area around the tree that should be protected during construction. The Standard allows for encroachment into a TPZ in certain circumstances. Where the encroachment is less than 10% it is considered to be a minor encroachment and is allowed. Where it is greater than 10% it is considered to be a major encroachment and is allowed where the Project Arborists can show that the tree will remain viable. The Standard lists a number of consideration that must be taken into account when determining whether a major encouragement is allowable.

7.3 There are two trees that have an encroachment into their TPZ. These are trees # 5 and 13. The encroachment into tree # 5 is calculated to be 3%. The encroachment in to tree # 13 is calculated to be 1%. The encroachment into trees # 5 and 13 are minor encroachments and are allowed according to the Standard.

7.4 An underground power line is proposed to be installed from the power pole in the road through the group of trees # 18. This will require two trees, # 18a and 18b to be removed. Tree # 8b is dead.

7.5 The group of trees # 22 have 13 trees that are dead. There are a further 2 trees that will be required to be removed to allow construction of a services trench.

8. Recommendations

8.1 It is recommended that the new school buildings and related infrastructure should be constructed as planned. The trees required to be removed to allow construction of the new building trees # 3a, 3b, 4a, 4b, 14a, 14b, , 15, 16, 18a, 18b, 23 and 24. There are 15 trees in Group 22 that also should be removed. Thirteen of these trees are dead and another two trees should be removed to allow construction of a services trench. The other trees growing on the school grounds should be retained and protected during construction.

8.2 The specifications for the protection of retained trees during construction are given in 9. Tree Protection.

9. Tree Protection

9.1 The trees retained on the site should be protected during construction in accordance with the recommendations of the Australian Standard AS 4970-2009 Protection of trees on development sites. The Standard sets out a Tree Protection Zone that is calculated to be an area around the tree with a radius of 12 x diameter at breast height (DBH). The TPZ has a minimum of 2 m and maximum of 15 m. The TPZ should be protected during construction as effectively as is practicable.

9.2 The Standard lists activities that are prohibited in the TPZ. They are:

a. Machine excavation
b. excavation for silt trenching
c. cultivation
d. storage
e. preparation of chemicals, including preparation of cement products
f. parking of vehicles and plant
g. refuelling
h. dumping of waste
i. wash down and cleaning of equipment
j. placement of fill
k. lighting of fires
l. soil level changes
m. temporary or permanent installation of utilities and signs and
n. physical damage to the tree.

9.3 The proposed construction of the development is planned to be undertaken within the TPZ of some trees. In order to ensure that the trees remain viable it is important to protect them during construction as much as is practicable. Any of the activities detailed above should not be undertaken in the TPZ of the tree unless absolutely necessary. A 1.8 m wire panel fence should be erected around the trees. An example of a suitable fence is shown in Figure 2. The location of the fence is shown in Figure 3.

9.4 The protective fencing must be installed before commencement of works and not removed before the building works are completed.

Figure 2. Example of a suitable protective fence

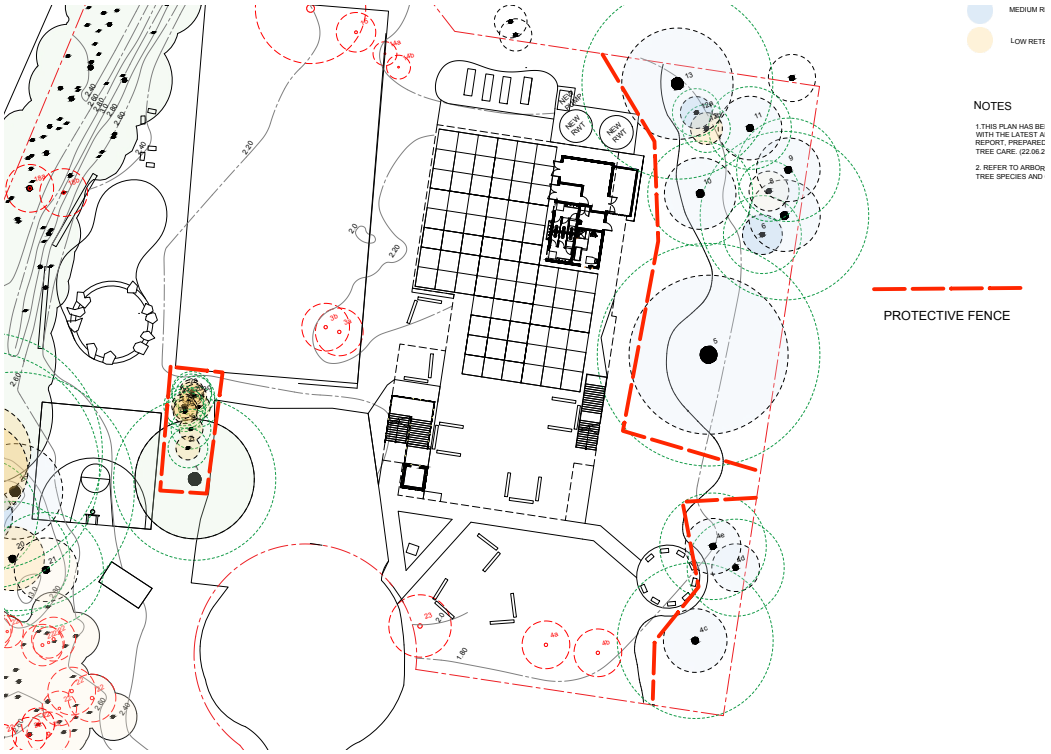


Figure 3. Location of protective fence

10. References

Barrell J. 2006. *Workshop Manual Trees on Construction Sites*. Barrell Tree Consultancy. Brisbane.

Brooker M. Kleinig D. 1999. *Field Guide to Eucalypts*. Bloomings Books. Hawthorn.

Harden G. MacDonald W. Williams J. 2009. *Rainforest Trees and Shrubs*. Gwen Harden Publishing. Nambucca Heads.

Mattheck C. Breloer H. 2003. *The Body Language of Trees*. TSO. London.

Moreton A. 2003. *Criteria for Assessment of Landscape Significance.* 7th National Street Tree Symposium 2006.

Standards Australia. 2009. *AS 4970 Protection of Trees on Development Sites*. Australian Standards. Sydney.

11. About The Author

11.1 This report was compiled by Peter Gray of Northern Tree Care. The author is an arborist who has been providing Arboricultural Reports for Local Government, State Government and private clients for over 20 years. His qualifications include:

Graduate Certificate of Arboriculture (AQF 8)

Diploma of Arboriculture (AQF 5)

Diploma of Horticulture (Arboriculture)

Quantified Tree Risk Assessment (QTRA)

Tree Risk Assessment Qualification (ISA)

VALID Tree Risk-Benefit Validator.

11.2 Peter Gray is an AQF level 8 Consulting Arborist general member No. 2344 with Arboriculture Australia. He is a trained and registered practitioner of Quantified Tree Risk Assessment (QTRA) Registered User number 980. In 2020 he was appointed as a director to the board of Arboriculture Australia.

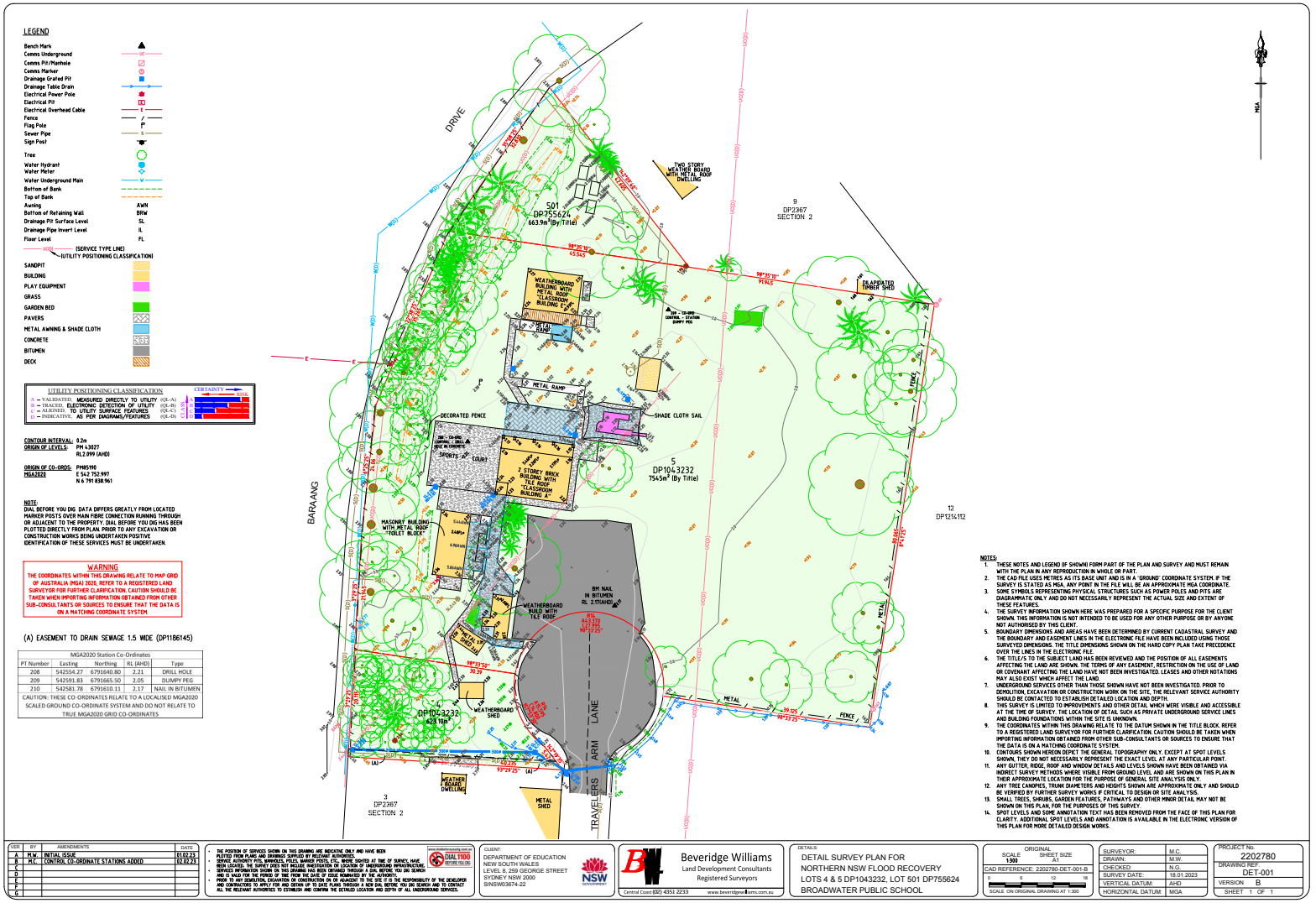
11.3 I declare that I have compiled this report impartially using best professional judgement. I have no financial interest in the outcome of the report.

Signed Peter Gray, Northern Tree Care

13 September 2023

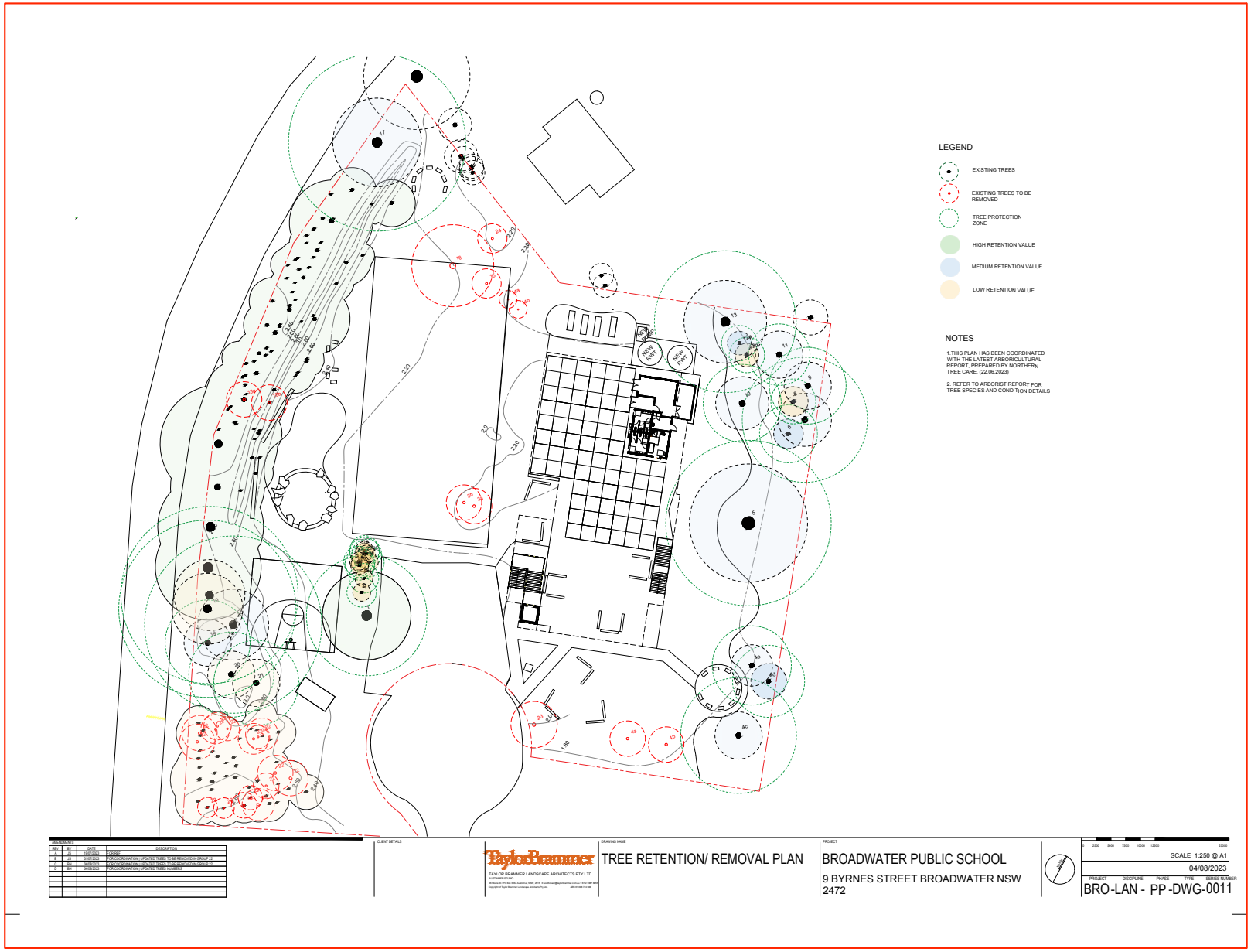
12. Attachment 1 Location

13. Attachment 2 Aerial Photo



NORTHERN TREE CARE

14. Attachment 3 Survey



NORTHERN TREE CARE

15.
Attachment 4
New Buildings

16. Attachment 5. Significance of Trees

Tree #	Name	Condition	Vigour	Protected	Environmental value	Amenity value	Significance
1	Tallowwood *Eucalyptus microcorys*	Good	Good	No	High	High	Very High
2a	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2b	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2c	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2d	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2e	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2f	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2g	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2h	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2i	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2j	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low
2k	Alexander Palm *Archontoephoenix alexandrae*	Good	Good	No	Low	Medium	Low

Tree #	Name	Condition	Vigour	Protected	Environmental value	Amenity value	Significance
3a	Bottlebrush *Callistemon viminalis*	Good	Good	No	Medium	Medium	Moderate
3b	Bottlebrush *Callistemon viminalis*	Good	Good	No	Medium	Medium	Moderate
4a	Swamp Mahogany *Eucalyptus robusta*	Poor	Fair	No	High	Low	Moderate
4b	Swamp Mahogany *Eucalyptus robusta*	Fair	Fair	No	High	Low	Moderate
4c	Forest Red Gum *Eucalyptus tereticornis*	Good	Good	No	High	Medium	Moderate
4d	Forest Red Gum *Eucalyptus tereticornis*	Good	Good	No	High	Medium	Moderate
4e	Flooded Gum *Eucalyptus grandis*	Good	Good	No	Medium	Medium	Moderate
5	Weeping Fig *Ficus microcarpa* var. *hillii*	Good	Good	No	Medium	Medium	Moderate
6	Coastal Pine *Callitris columellaris*	Good	Good	No	High	Low	Moderate
7	Flooded Gum *Eucalyptus grandis*	Good	Good	No	Medium	Low	Moderate
8	Brushbox *Lophostemon confertus*	Poor	Good	No	Medium	Low	Low
9	Forest Red Gum *Eucalyptus tereticornis*	Good	Good	No	High	Medium	Moderate
10	Poplar *Populus* sp.	Good	Good	No	Low	Medium	Moderate
11	Hoop Pine *Araucaria cunninghamii*	Good	Good	No	Medium	Medium	Moderate
12a	Cocos Palm x 2 *Syagrus romanzofiana*	Good	Good	No	Low	Low	Low
12b	Cocos Palm x 2 *Syagrus romanzofiana*	Good	Good	No	Low	Low	Low
13	Hoop Pine *Araucaria cunninghamii*	Good	Good	No	Medium	Medium	Moderate

Significance of Trees Continued

Tree #	Name	Condition	Vigour	Protected	Environmental value	Amenity value	Significance
14a	Bangalow Palm *Archontoephoenix alexandrae*	Good	Good	No	Medium	Low	Moderate
14b	Bangalow Palm *Archontoephoenix alexandrae*	Good	Good	No	Medium	Low	Moderate
15	Exotic species	Good	Good	No	Low	Low	Low
16	Camphor Laurel *Cinnamomum camphora*	Good	Good	No	Low	Medium	Moderate
17	Camphor Laurel *Cinnamomum camphora*	Good	Good	No	Low	High	Moderate
18	Group of rainforest trees x 62	Good	Good	No	Medium	High	High
18a	She Oak *Casuarina glauca*	Good	Good	No	Medium	Medium	Moderate
18b	Dead tree						Very Low
19a	Camphor Laurel *Cinnamomum camphora*	Fair	Good	No	Low	High	Low
19b	Camphor Laurel *Cinnamomum camphora*	Fair	Good	No	Low	High	Low
19c	Camphor Laurel *Cinnamomum camphora*	Fair	Good	No	Low	High	Low
20	Weeping Paperbark *Melaleuca leucadendra*	Good	Good	No	Medium	Medium	Moderate
21	Weeping Paperbark *Melaleuca leucadendra*	Good	Good	No	Medium	Medium	Moderate
22	Group of Rainforest trees	Poor	Poor	No	Medium	Medium	Low
23	Brown Kurrajong *Commersonia bartramia*	Dead		No	Low	Low	Very Low
24	Firewheel *Stenocarpus sinuatus*	Good	Good	No	Medium	Low	Moderate
25	Paperbark *Melaleuca quinquenervia*	Good	Fair	No	Medium	Low	Moderate

17. Attachment 6. Photos

Photo 1. Tree # 1
Tallowood

Photo 2. Tree # 3
Bottlebrush

Photo 3. Tree # 4
Gum trees

Photo 4. Tree # 5
Weeping Fig

Photos Continued

Photo 5. Trees # 6 - 13

Photo 6. Tree # 14
Bangalow Palms

Photo 7. Tree # 15
Exotic species

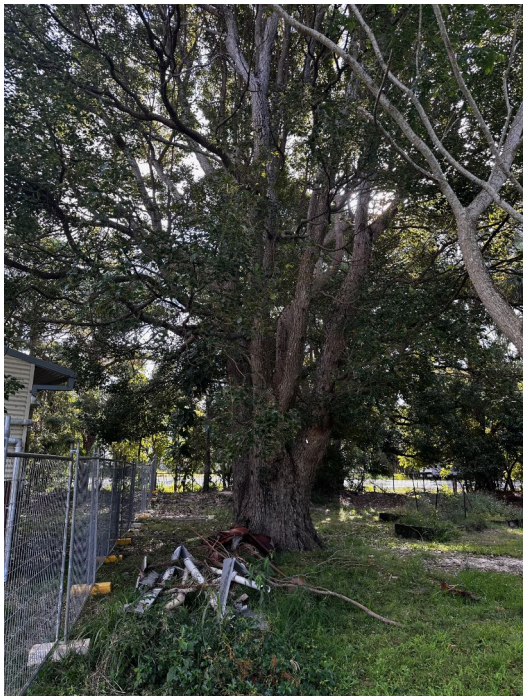


Photo 8. Tree # 16
Camphor Laurel

Exotic species

Photos Continued

Photo # 9. Tree # 24
Firewheel

Photo 10. Tree # 16
Camphor Laurel

Photo 11. Tree # 18
Group of 62 trees

Photo 12. Tree # 22
Group of trees. Many have died.