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ARBORICULTURAL DEVELOPMENT IMPACT ASSESSMENT REPORT

Greenwich Public School Greenwich Road Campus

REVISION D 4 December 2017

Prepared for GHD

Prepared by

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Executive Summary

The subject trees are all in good health and condition with no apparent structural defects with the exception of tree 17. Tree 17 has extensive decay evident within the trunk with a fungal fruiting body present indicative of active decay. The decay within this trunk places this tree at increased risk of failure posing a hazard to life and property in a high target area. This tree is recommended for removal in order to remove this hazard.

Trees 1, 2, 3, 4, 5, 7, 8, 10, 18, 21, and 22 have their Tree Protection Zones (TPZ) encroached by the proposed construction and required earthworks, including stormwater installation and trenching, by a major encroachment as defined by *AS4970-2009 Protection of Trees on Development Sites*. The excavation required for the new building is also likely to encroach within the Structural Root Zone of these trees as defined in Section 4 which will impact upon the structural stability of these trees. These trees will not be viable to be retained and are recommended for removal.

The Tree protection Zone (TPZ) of Tree 23 will be encroached by the proposed development by 15% which is slightly greater than the minor encroachment as defined by AS 4970-2009. Based on consideration of these species tolerance to root disturbance in accordance with clause 3.3.4 of AS 4970-2009, this tree will be viable to be retained under the proposed development.

Tree 9 has new works within the TPZ however this impact assessment has been made on the basis that the existing asphalt paving being retained adjacent to the tree and the new netball surface is to be installed in place of the existing surface. All stripping and removal of the existing surface is to be carried out by hand within the TPZ of this tree under the supervision of a AQFLevel 5 Site arborist.

The proposed OSD is in close proximity to trees 15 and 16. This impact assessment is made on the basis that the extent of the excavation and encroachment does not extend more than 500mm from the extent of the OSD shown on the Civil drawings. All excavation within the TPZ to be carried out under the supervision of an AQF Level 5 Site Arborist.

Trees 15 and 16 are to be retained in close proximity to the proposed OOSH demountable building. Canopy reduction pruning maybe required in order to install the proposed building. All canopy reduction pruning is to be carried out in accordance with *AS4373-2007 Pruning of Amenity Trees* under the supervision of an AQF Level 5 Site Arborist. Installation of the demountable building to be under the supervision of the site arborist.

Tree no.	Species	Recommendations	Comments
1.	Corymbia maculata	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.

Recommendations for tree retention or removal are summarised as follows:

2.	Corymbia maculata	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
3.	Eucalyptus saligna	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
4.	Casuarina spp	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
5.	Eucalyptus saligna	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
6.	Eucalyptus saligna	Retain	Retain and Protect in accordance with 7.0						
7.	Eucalyptus scoparia	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
8.	Eucalyptus microcorys	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
9.	Melaleuca quinquenervia	Retain	Retain and Protect in accordance with 7.0						
10.	Syncarpia glomulifera	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
11.	Eucalyptus pilularis	Retain	Retain and Protect in accordance with 7.0						
12.	Melaleuca quinquenervia	Retain	Retain and Protect in accordance with 7.0						
13.	Melaleuca quinquenervia	Retain	Retain and Protect in accordance with 7.0						
14.	Melaleuca quinquenervia	Retain	Retain and Protect in accordance with 7.0						
15.	Eucalyptus saligna	Retain	Retain and Protect in accordance with 7.0						
16.	Liquidambar styraciflua	Retain	Retain and Protect in accordance with 7.0						

17.	Eucalyptus saligna	Remove	Extensive decay throughout trunk. Fungal fruiting body present				
18.	Grevillea robusta	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.				
19.	Jacaranda mimosifolia	Retain	Retain and Protect in accordance with 7.0				
20.	Corymbia citriodora	Retain	Retain and Protect in accordance with 7.0				
21.	Eucalyptus pilularis	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.				
22.	Syncarpia glomulifera	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.				
23.	Corymbia maculata	Retain	Retain and Protect in accordance with 7.0				
24.	Syncarpia glomulifera	Retain	Retain and Protect in accordance with 7.0				
25.	Jacaranda mimosifolia	Retain	Retain and Protect in accordance with 7.0				
26.	Angophora costata	Retain	Retain and Protect in accordance with 7.0				

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1.0 Scope of Works

This Arboricultural Development Impact Assessment Report has been commissioned by GHD to report on trees within the site of the Greenwich Road Campus of Greenwich Public School. It has been commissioned to outline the health, condition and stability of these trees as well as their viability for retention within the context of the proposed development. The scope of this report includes all trees within areas that may be impacted by the proposed development.

On the 15th of August 2017, Glenn Bird of Birds Tree Consultancy attended site and inspected the subject trees from the ground. There was no aerial inspection carried out. A Visual Tree Assessment was undertaken in accordance with Visual Tree Assessment (VTA) guidelines (Mattheck and Breloer, 1994). Tree heights were measured using a Nikon Forestry 550 Heightmeter.

2.0 Site Analysis

2.1 Site

The subject site is the Greenwich Road Campus of Greenwich Public School. The subject trees are located within or adjacent to the boundaries of this site. The site is proposed for development involving the construction of new school buildings. Refer to GHD construction drawings for greater details of the proposed development.

2.2 Topography

The site is relatively flat. The area in the vicinity of all trees is flat. Refer to survey for greater detail of levels.

2.3 Identification

Trees are as identified in the attached inspection forms in Appendix A and shown in Tree location Plan A01 in Appendix B.

2.4 Soils

Soil material and horizons were not tested for this report.

3.0 Existing Trees

The following trees were inspected from the ground and the following items identified. Please refer also to the attached inspection data in appendix A.

3.1 Tree 1.

1. Corymbia maculata

This mature tree is approximately 18m tall with a canopy spread of 14m. It has a single trunk with a diameter at breast height (DBH) of 470mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.2 Tree 2. Corymbia maculata

This mature tree is approximately 22m tall with a canopy spread of 12m. It has a single trunk with a DBH of 540mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.3 Tree 3. Eucalyptus saligna

This mature tree is approximately 13m tall with a canopy spread of 11m. It has a single trunk with a DBH of 445mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.4 Tree 4. Casuarina spp

This mature tree is approximately 17m tall with a canopy spread of 7m. It has a single trunk with a DBH of 400mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.5 Tree 5. Eucalyptus saligna

This mature tree is approximately 18m tall with a canopy spread of 14m. It has a single trunk with a DBH of 545mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.6 Tree 6. Eucalyptus saligna

This mature tree is approximately 13m tall with a canopy spread of 6m. It has a single trunk with a DBH of 270mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.7 Tree 7. Eucalyptus scoparia

This mature tree is approximately 18m tall with a canopy spread of 18m. It has a single trunk with a DBH of 815mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.8 Tree 8. Eucalyptus microcorys

This mature tree is approximately 25m tall with a canopy spread of 14m. It has a single trunk with a DBH of 700mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.9 Tree 9. Melaleuca quinquenervia

This mature tree is approximately 16m tall with a canopy spread of 12m. It has a single trunk with a DBH of 710mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.10 Tree 10. Syncarpia glomulifera

This mature tree is approximately 13m tall with a canopy spread of 8m. It has a single trunk with a DBH of 310mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.11 Tree 11. Eucalyptus pilularis

This mature tree is approximately 20m tall with a canopy spread of 14m. It has a single trunk with a DBH of 670mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.12 Tree 12. Melaleuca quinquenervia

This mature tree is approximately 13m tall with a canopy spread of 7m. It has a single trunk with a DBH of 510mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.13 Tree 13. Melaleuca quinquenervia

This mature tree is approximately 12m tall with a canopy spread of 7m. It has a single trunk with a DBH of 250mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.14 Tree 14. Melaleuca quinquenervia

This mature tree is approximately 12m tall with a canopy spread of 8m. It has a single trunk with a DBH of 350mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.15 Tree 15. Eucalyptus saligna

This mature tree is approximately 26m tall with a canopy spread of 14m. It has a single trunk with a DBH of 700mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.16 Tree 16. Liquidambar styraciflua

This mature tree is approximately 10m tall with a canopy spread of 9m. It has a single trunk with a DBH of 320mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.17 Tree 17. Eucalyptus saligna

This mature tree is approximately 24m tall with a canopy spread of 14m. It has a single trunk with a DBH of 820mm. This tree has extensive decay evident within the trunk with a fungal fruiting body present indicative of active decay. The decay within this trunk places this tree at increased risk of failure posing a hazard to life and property in a high target area. This tree is recommended for removal in order to remove this hazard.



Figure 1- - Decay with fungal fruiting body in Tree 17

3.18 Tree 18. Grevillea robusta

This mature tree is approximately 17m tall with a canopy spread of 8m. It has a single trunk with a DBH of 490mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.19 Tree 19. Jacaranda mimosifolia

This mature tree is approximately 17m tall with a canopy spread of 8m. It has a single trunk with a DBH of 410mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.20 Tree 20. Corymbia citriodora

This mature tree is approximately 22m tall with a canopy spread of 16m. It has a single trunk with a DBH of 840mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.21 Tree 21. *Eucalyptus pilularis*

This mature tree is approximately 21m tall with a canopy spread of 12m. It has a single trunk with a DBH of 480mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.22 Tree 22. Syncarpia glomulifera

This mature tree is approximately 12m tall with a canopy spread of 6m. It has a single trunk with a DBH of 400mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.23 Tree 23. Corymbia maculata

This mature tree is approximately 19m tall with a canopy spread of 8m. It has a single trunk with a DBH of 405mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.24 Tree 24. Syncarpia glomulifera

This mature tree is approximately 13m tall with a canopy spread of 6m. It has a single trunk with a DBH of 305mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.25 Tree 25. Jacaranda mimosifolia

This mature tree is approximately 9m tall with a canopy spread of 8m. It has a single trunk with a DBH of 275mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

3.26 Tree 26. Angophora costata

This mature tree is approximately 8m tall with a canopy spread of 7m. It has a single trunk with a DBH of 265mm. This tree is in good health and condition with minimal deadwood and epicormic growth.

4.0 Safe Useful Life Expectancy (SULE)

4.1 Safe Useful Life Expectancy

Safe Useful Life Expectancy (SULE) Ratings have been assessed for each of the subject trees. These assessments are in accordance with the categories provided by Jeremey Barrell (Proceedings of International Conference on Trees and Building Sites Chicago 1996). Refer to Appendix C.

Tree no.	Species	SULE Rating	Category
1.	Corymbia maculata	2A	Medium
2.	Corymbia maculata	2A	Medium
3.	Eucalyptus saligna	1A	Long
4.	Casuarina spp	2A	Medium
5.	Eucalyptus saligna	2A	Medium
6.	Eucalyptus saligna	2A	Medium
7.	Eucalyptus scoparia	2A	Medium
8.	Eucalyptus microcorys	2A	Medium

9.	Melaleuca quinquenervia	2A	Medium
10.	Syncarpia glomulifera	2A	Medium
11.	Eucalyptus pilularis	2A	Medium
12.	Melaleuca quinquenervia	2A	Medium
13.	Melaleuca quinquenervia	2A	Medium
14.	Melaleuca quinquenervia	2A	Medium
15.	Eucalyptus saligna	2A	Medium
16.	Liquidambar styraciflua	2A	Medium
17.	Eucalyptus saligna	4C	Remove
18.	Grevillea robusta	2A	Medium
19.	Jacaranda mimosifolia	2A	Medium
20.	Corymbia citriodora	2A	Medium
21.	Eucalyptus pilularis	2A	Medium
22.	Syncarpia glomulifera	2A	Medium
23.	Corymbia maculata	2A	Medium
24.	Syncarpia glomulifera	2A	Medium
25.	Jacaranda mimosifolia	2A	Medium
26.	Angophora costata	2A	Medium

5.0 Impact of Development

5.1 Tree Protection Zone

Tree Protection Zones (TPZs) have been defined for the subject trees in order to define the encroachment of the proposed development in accordance with *AS4970-2009*. The TPZs required have been taken as a circular area with a radius 12 x the diameter at breast height of the tree. This requirement is in line with Australian Standard AS 4970-2009 Protection of Trees on Development Sites. This standard defines a maximum of 10% encroachment to be minimal encroachment. Any encroachment over 10% requires the site arborist to give consideration as to the viability of the tree due to the proposed development.

Tree no.	Species	TPZ Radius (m)	Encroachment (%)	SRZ (m)			
1.	Corymbia maculata	5.64	50	2.651583			
2.	Corymbia maculata	6.48	50	2.814499			
3.	Eucalyptus saligna	5.34	50	2.534797			
4.	Casuarina spp	4.8	20	2.452617			
5.	Eucalyptus saligna	6.54	30	2.707397			
6.	Eucalyptus saligna	3.24	0	1.96768			
7.	Eucalyptus scoparia	9.78	40	3.121372			
8.	Eucalyptus microcorys	8.4	56	2.965333			
9.	Melaleuca quinquenervia	8.52	10	2.932737			
10.	Syncarpia glomulifera	3.72	2.129394				
11.	Eucalyptus pilularis	8.04	4	2.882883			
12.	Melaleuca quinquenervia	6.12	10	2.68897			
13.	Melaleuca quinquenervia	3	1.96768				
14.	Melaleuca quinquenervia	4.2	0	2.204228			
15.	Eucalyptus saligna	8.4	10	2.981447			
16.	Liquidambar styraciflua	3.84	0	2.154738			
17.	Eucalyptus saligna	9.84	0	3.13639			
18.	Grevillea robusta	5.88	100	2.554776			
19.	Jacaranda mimosifolia	4.92	0	2.344215			
20.	Corymbia citriodora	10.08	0	3.166134			
21.	Eucalyptus pilularis	5.76	20	2.554776			
22.	Syncarpia glomulifera	4.8	0	2.344215			
23.	Corymbia maculata	4.86	15	2.298858			

24.	Syncarpia glomulifera	3.66	0	2.077415
25.	Jacaranda mimosifolia	3.3	0	1.752124
26.	Angophora costata	3.18	0	1.995898

5.2 Development Impact

5.2.1. Tree 1 Corymbia maculata

The Tree Protection Zone (TPZ) of this tree in accordance with *AS* 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 50% which is significantly greater than the minor encroachment as defined by AS 4970-2009. This tree will not be viable to be retained under the proposed development.

5.2.2. Tree 2 Corymbia maculata

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 50% which is significantly greater than the minor encroachment as defined by AS 4970-2009. This tree will not be viable to be retained under the proposed development.

5.2.3. Tree 3 *Eucalyptus saligna*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 50% which is significantly greater than the minor encroachment as defined by AS 4970-2009. This tree will not be viable to be retained under the proposed development.

5.2.4. Tree 4 Casuarina spp

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 20% which is significantly greater than the minor encroachment as defined by AS 4970-2009. This tree will not be viable to be retained under the proposed development.

5.2.5. Tree 5 Eucalyptus saligna

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 30% which is significantly greater than the minor encroachment as defined by AS 4970-2009. This tree will not be viable to be retained under the proposed development.

5.2.6. Tree 6 *Eucalyptus saligna*

The Tree Protection Zone (TPZ) of this tree in accordance with *AS* 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

5.2.7. Tree 7 Eucalyptus scoparia

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed stormwater drainage and associated trenching by 40% which is significantly greater than the minor encroachment as defined by AS 4970-2009. This tree will not be viable to be retained under the proposed development.

5.2.8. Tree 8 Eucalyptus microcorys

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 56% which is greater than the minor encroachment as defined by AS 4970-2009. The excavation required for the new building will encroach within the Structural Root Zone of this tree as defined in Section 4 which will impact upon the structural stability of this tree. This tree will not be viable to be retained under the proposed development.

5.2.9. Tree 9 Melaleuca quinquenervia

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 10% which is equal to the defined minor encroachment as defined by AS4970-2009. This tree will be viable to be retained under the proposed development. This impact assessment is made on the basis of the existing asphalt paving being retained adjacent to the tree and the new netball surface is to be installed in place of the existing surface. All stripping and removal of the existing surface is to be carried out by hand within the TPZ of this tree under the supervision of an AQFLevel 5 Site arborist.

5.2.10. Tree 10 Syncarpia glomulifera

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be totally encroached by the proposed development. This tree will not be viable to be retained under the proposed development.

5.2.11. Tree 11 Eucalyptus pilularis

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed stormwater installation and associated trenching by 4% which is less than the minor encroachment as defined by AS 4970-2009. This tree will be viable to be retained under the proposed development. This impact assessment is made on the basis that the extent of the excavation and encroachment does not extend more than 500mm from the extent of the OSD shown on the

Civil drawings. All excavation within the TPZ to be carried out under the supervision of an AQF Level 5 Site Arborist.

5.2.12. Tree 12 Melaleuca quinquenervia

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed stormwater installation and associated trenching by 10% which is equal to the minor encroachment as defined by AS 4970-2009. This tree will be viable to be retained under the proposed development. This impact assessment is made on the basis that the extent of the excavation and encroachment does not extend more than 500mm from the extent of the OSD shown on the Civil drawings. All excavation within the TPZ to be carried out under the supervision of an AQF Level 5 Site Arborist.

5.2.13. Tree 13 Melaleuca quinquenervia

The Tree Protection Zone (TPZ) of this tree in accordance with *AS* 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

5.2.14. Tree 14 Melaleuca quinquenervia

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

5.2.15. Tree 15 *Eucalyptus saligna*

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed stormwater installation and associated trenching by 10% which is equal to the minor encroachment as defined by AS 4970-2009. This tree will be viable to be retained under the proposed development.

5.2.16. Tree 16 Liquidambar styraciflua

The Tree Protection Zone (TPZ) of this tree in accordance with *AS* 4970-2009 *Protection of Trees on Development Sites* will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

5.2.17. Tree 17 Eucalyptus saligna

This tree is recommended for removal.

5.2.18. Tree 18 Grevillea robusta

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be totally encroached by the proposed excavation for the OSD. This tree will be viable to be retained under the proposed development.

5.2.19. Tree 19 Jacaranda mimosifolia

Based on the proposed construction methods for the relocated OOSH using pier footings, The Tree Protection Zone (TPZ) of this tree in accordance with *AS 4970-2009 Protection of Trees on Development Sites* will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

5.2.20. Tree 20 Corymbia citriodora

Based on the proposed construction methods for the relocated OOSH using pier footings, The Tree Protection Zone (TPZ) of this tree in accordance with *AS 4970-2009 Protection of Trees on Development Sites* will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

5.2.21. Tree 21 Eucalyptus pilularis

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed stormwater drainage and associated trenching by 20% which is greater than the minor encroachment as defined by AS 4970-2009. This tree will not be viable to be retained under the proposed development.

5.2.22. Tree 22 Syncarpia glomulifera

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

5.2.23. Tree 23 Corymbia maculata

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will be encroached by the proposed development by 15% which is slightly greater than the minor encroachment as defined by AS 4970-2009. Based on consideration of this species tolerance to root disturbance in accordance with clause 3.3.4 of AS 4970-2009, this tree will be viable to be retained under the proposed development.

5.2.24. Tree 24 Syncarpia glomulifera

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

5.2.25. Tree 25 Jacaranda mimosifolia

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

5.2.26. Tree 26 Angophora costata The Tree Protection Zone (TPZ) of

The Tree Protection Zone (TPZ) of this tree in accordance with AS 4970-2009 Protection of Trees on Development Sites will not be further encroached by the proposed development. This tree will be viable to be retained under the proposed development.

The subject trees are all in good health and condition with no apparent structural defects with the exception of tree 17. Tree 17 has extensive decay evident within the trunk with a fungal fruiting body present indicative of active decay. The decay within this trunk places this tree at increased risk of failure posing a hazard to life and property in a high target area. This tree is recommended for removal in order to remove this hazard.

Trees 1, 2, 3, 4, 5, 7, 8, 10, 18, 21, and 22 have their Tree Protection Zones (TPZ) encroached by the proposed construction and required earthworks, including stormwater installation and trenching, by a major encroachment as defined by *AS4970-2009 Protection of Trees on Development Sites.* The excavation required for the new building is also likely to encroach within the Structural Root Zone of these trees as defined in Section 4 which will impact upon the structural stability of these trees. These trees will not be viable to be retained and are recommended for removal.

The Tree protection Zone (TPZ) of Tree 23 will be encroached by the proposed development by 15% which is slightly greater than the minor encroachment as defined by AS 4970-2009. Based on consideration of these species tolerance to root disturbance in accordance with clause 3.3.4 of AS 4970-2009, this tree will be viable to be retained under the proposed development.

Tree 9 has new works within the TPZ however this impact assessment has been made on the basis that the existing asphalt paving being retained adjacent to the tree and the new netball surface is to be installed in place of the existing surface. All stripping and removal of the existing surface is to be carried out by hand within the TPZ of this tree under the supervision of a AQFLevel 5 Site arborist.

The proposed OSD is in close proximity to trees 15 and 16. This impact assessment is made on the basis that the extent of the excavation and encroachment does not extend more than 500mm from the extent of the OSD shown on the Civil drawings. All excavation within the TPZ to be carried out under the supervision of an AQF Level 5 Site Arborist.

Trees 15 and 16 are to be retained in close proximity to the proposed OOSH demountable building. Canopy reduction pruning maybe required in order to install the proposed building. All canopy reduction pruning is to be carried out in accordance with *AS4373-2007 Pruning of Amenity Trees* under the supervision of an AQF Level 5 Site Arborist. Installation of the demountable building to be under the supervision of the site arborist.

Recommendations for tree retention or removal are summarised as follows:

Tree no.	Species	Recommendations	Comments
1.	Corymbia maculata	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.

2.	Corymbia maculata	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
3.	Eucalyptus saligna	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
4.	Casuarina spp	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
5.	Eucalyptus saligna	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
6.	Eucalyptus saligna	Retain	Retain and Protect in accordance with 7.0						
7.	Eucalyptus scoparia	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
8.	Eucalyptus microcorys	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
9.	Melaleuca quinquenervia	Retain	Retain and Protect in accordance with 7.0						
10.	Syncarpia glomulifera	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.						
11.	Eucalyptus pilularis	Retain	Retain and Protect in accordance with 7.0						
12.	Melaleuca quinquenervia	Retain	Retain and Protect in accordance with 7.0						
13.	Melaleuca quinquenervia	Retain	Retain and Protect in accordance with 7.0						
14.	Melaleuca quinquenervia	Retain	Retain and Protect in accordance with 7.0						
15.	Eucalyptus saligna	Retain	Retain and Protect in accordance with 7.0						
16.	Liquidambar styraciflua	Retain	Retain and Protect in accordance with 7.0						

17.	Eucalyptus saligna	Remove	Extensive decay throughout trunk. Fungal fruiting body present				
18.	Grevillea robusta	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.				
19.	Jacaranda mimosifolia	Retain	Retain and Protect in accordance with 7.0				
20.	Corymbia citriodora	Retain	Retain and Protect in accordance with 7.0				
21.	Eucalyptus pilularis	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.				
22.	Syncarpia glomulifera	Remove	Not viable to be retained due to the encroachment of the TPZ by the proposed development.				
23.	Corymbia maculata	Retain	Retain and Protect in accordance with 7.0				
24.	Syncarpia glomulifera	Retain	Retain and Protect in accordance with 7.0				
25.	Jacaranda mimosifolia	Retain	Retain and Protect in accordance with 7.0				
26.	Angophora costata	Retain	Retain and Protect in accordance with 7.0				

7.0 **Pre-Construction Tree Protection Measures**

7.1 General

All tree protection works shall be carried out before excavation, grading and site works commence. Tree protection works shall be inspected and approved by a Consulting Arborist meeting AQF Level 5 prior to construction works commencing.

Storage of materials, mixing of materials, vehicle parking, disposal of liquids, machinery repairs and refueling, site office and sheds, and the lighting of fires, stockpiling of soil, rubble or any debris shall not be carried out within the TPZ of existing trees. No backfilling shall occur within the TPZ of existing trees. Trees shall not be removed or lopped unless specific instruction is given in writing by the Superintendent.

7.2 Identification

All trees to be protected shall be clearly identified and all TPZs surveyed.

7.3 **Protective Fence**

Fencing is to be erected around existing trees to be retained. In addition to this protective fencing within the site, Protective Fencing is to be installed to the full extent of the TPZs within the site. This fencing is to be erected prior to any materials being brought on site or before any site, civil works or construction works commence. The fence shall enclose a sufficient area so as to prevent damage to the TPZ as defined on Appendix D Tree Protection Plan and as defined in 5.1 above. Fence to comprise 1800mm high chain wire mesh fixed to 50mm diameter Galvanised steel posts. Panels should be securely fixed top and bottom to avoid separation. No storage of building materials, tools, paint, fuel or contaminants and the like shall occur within the fenced area.

7.4 Mulching

Install mulch to the extent of all tree protection fencing. Use a leaf mulch conforming to AS 4454 which is free of deleterious and extraneous matter such as soil, weeds, sticks and stones and consisting of a minimum of 90% recycled content compliant with AS 4454 (1999) and AS 4419 (1998). All trees marked as to be removed on the proposed development are to be chipped and reused for this purpose. Place mulch evenly and to a depth of 100mm.

8.0 Site Management Issues

8.1 Soil Compaction

Plant and pedestrian traffic during the construction period will cause significant soil compaction. This will be exacerbated by increased water expected on these soils as result of adjacent construction and weather. Compaction of the soil within the TPZ will reduce the voids between soil peds or particles therefore will reduce the gaseous exchange capacity of the root system which will slow critical metabolic processes such as respiration which produces Adenosine Triphosphate (ATP) which provides energy for the photosynthesis, which in turn provides photosynthates such as glucose. These photosynthates provide the carbohydrates required for tree extension growth, girth expansion, reproduction and pest and disease resistance. No pedestrian or plant access is permissible to the TPZ.

8.2 Site Access

Sufficient access is required to enable efficient construction. It is essential to delineate access zones or corridors which will provide suitable access without damaging the existing trees to be retained or causing compaction to the root zone.

8.3 Excavation within Tree Protection Area

No excavation is to be carried out within the TPZs of retained trees without the permission and supervision of the site arborist (AQF5)

8.4 Possible Contamination / Storage of Materials

The construction site will require the use of many chemicals and materials that are possible contaminants which if not managed will pose a risk to the existing trees. These possible contaminants include fuels, herbicides, solvents and the like. A site specific Environmental Management Plan shall be provided and this specific risk identified and addressed.

9.0 Tree Protection Measures During Construction

9.1 Maintenance of Pre-Construction Tree Protection Measures

The Pre-Construction Tree Protection Measures identified in 5.0 above are to be maintained in good and serviceable condition throughout the construction period.

9.2 Possible Contaminants

Do not store or otherwise place bulk materials and harmful materials under or near trees. Do not place spoil from excavations within the TPZs. Prevent wind-blown materials such as cement from harming trees. All possible contaminants are to be stored in a designated and appropriate area with secure chemical spill measures such as a bund in place.

9.3 Physical Damage

Prevent damage to tree. Do not attach stays, guys and the like to trees. No personnel, plant, machinery or materials are to be allowed within the tree protection fencing.

9.4 Compaction

No filling or compaction shall occur over tree roots zones within tree protection fenced areas. Where construction occurs close to or the TPZ of trees to be retained it shall be necessary to install protection to avoid compaction of the ground surface. This protection is to be planks supported clear of the ground fixed to scaffolding.

9.5 Trenching

No Trenching should be necessary within the TPZs or within tree protection fencing. No further trenching is to be carried out without the approval of the Superintendent. Should any further trenching be required within the TPZs identified, this work is to be carried out by hand and under the supervision of a qualified Arborist.

9.6 Watering

Contractor is to ensure that soil moisture levels are adequately maintained. Apply water at an appropriate rate suitable for the species during periods of little or no rainfall.

9.7 Site Sheds / Amenities/ Storage

Site sheds, site amenities, ablutions and site storage shall be in the area clear of all TPZ. Chemicals and potential contaminants are to be stored appropriately and this storage area is to be enclosed by a chemical spill bund to prevent the potential run off of contaminants in the event of a spillage or accident.

10.0 Environmental / Heritage/ Legislative Considerations

None of the subject trees are identified as threatened species or elements of endangered ecological communities within the Threatened Species Conservation Act 1995.

11.0 Compensatory Planting

This report makes the recommendation for the removal of 1 tree due to structural defects and 13 that will require removal as consequence of encroachment by the proposed development. We recommend that compensatory planting be carried out as part of the proposed landscape works ancillary to the development works. Replacement tree species should be selected from local indigenous tree species and planted as directed in locations determined by the Landscape Architect.

12.0 References

Mattheck, C. Breloer, K. 1993, The Body Language of Trees: A Handbook for Failure Analysis, 12th Impression 2010 The Stationery Office. AS4970-2009 Protection of Trees on Development Sites : Standards Australia

13.0 Disclaimer

This Appraisal has been prepared for the exclusive use of the Client and Birds Tree Consultancy.

Birds Tree Consultancy accepts no responsibility for its use by other persons. The Client acknowledges that this Appraisal, and any opinions, advice or recommendations expressed or given in it, are based on the information supplied by the Client and on the data inspections, measurements and analysis carried out or obtained Birds Tree Consultancy and referred to in the Appraisal. The Client should rely on the Appraisal, and on its contents, only to that extent.

Every effort has been made in this report to include, assess and address all defects, structural weaknesses, instabilities and the like of the subject trees. All inspections were made from ground level using only visual means and no intrusive or destructive means of inspection were used. For many structural defects such as decay and inclusions, internal inspection is required by means of resistograph or similar. No such investigation has been made in this case. Trees are living organisms and are subject to failure through a variety of causes not able to be identified by means of this inspection and report.

Appendix A - Tree Inspection Data

Birds Tree Consultancy Consulting Arborist · Project Management · Horticultural Consultancy · Landscape Management

15-Aug-17 Inspection Data Greenwich Public School Greenwich Road Campus

									Trunk																		- 0		
					TPZ	S	SRZ		(single, twin.				Crown						Overall					Pest		Life	Env. & Landcape		
Tree			Spread(m		Radius	Dia at 🛛 F	Radius		multiple	Trunk	Form/Cro	Branching	Distributi		Branching	g Pruning			Health &	Canopy		Deadwoo	Epicormic	Infestatio		expectanc	significanc	Retention	
no.	Species	Height (m))	DBH (mm)	(m)	base (m)	Maturity	@)	lean	wn shape	Habit	on	Stability	Structure	History	Defects	Damage	Vigour	Density	Foliage	d	Growth	n	Disease	у	е	Value	Notes/Comments
1	Corymbia	18	2 14	470	5.64	590	2 65	Mature	Single	NII	Normal	Normal	Balanced	Stable	Stable	No	Nil	Nil	Good	Normal	Normal	<5%	<5%	No evidence	No evidence	15-40v	High	High	
	Corymbia	10	5 14	470	5.04	550	2.03	Wature	Jiligie	INIL	Normai	Normai	Dalanceu	Stable	Stable	No		INII	0000	Normai	Normai	<578	<578	No	No	13-40y	Tingit	Tilgii	
2	maculata	22	2 12	540	6.48	680	2.81	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	15-40y	High	High	
-	Eucalyptus	12	11	445	5 2/	530	2 5 2	Mature	Single	NII	Normal	Normal	Balanced	Stable	Stable	No	Nil	Nil	Good	Normal	Normal	~5%	~5%	No	No	40/4	High	High	
3	Saligita	15	, 11	445	5 5.54	550	2.33	wature	Siligie	INIL	Normai	Normai	Balanceu	Stable	Stable	No	INII	INII	GUUU	Normai	Normai	<3%	<5%	No	No	40y+	півц	nigii	
4	Casuarina spp	17	7 7	400	4.8	490	2.45	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	15-40y	High	High	
	Eucalyptus	10	14	EAE	6 6 6 4	620	2 71	Maturo	Singlo	NII	Normal	Normal	Palancod	Stable	Stable	No	Nil	NU	Good	Normal	Normal	~E9/	<e%< td=""><td>No</td><td>No</td><td>15 404</td><td>High</td><td>High</td><td></td></e%<>	No	No	15 404	High	High	
	Eucalyptus	10	5 14	545	0.54	020	2.71	Iviature	Siligie	INIL	Normai	Normai	Balanceu	Stable	Stable	No	INII	INII	GUUU	Normai	Normai	<3%	<5%	No	No	13-40y	півц	nigii	
e	saligna	13	6	270	3.24	290	1.97	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	15-40y	High	High	
-	Eucalyptus	10	10	015	0.70	970	2 1 2	Matura	Cingle	NU	Normal	Normal	Delenced	Stable	Stable	No	NII	NU	Cood	Normal	Normal	< F 0/	< F 0/	No	No	15 404	Uiah	Lliab	
	Eucalyptus	10	o 10	610	9.78	870	5.12	wature	Single	INIL	Normai	Normai	Dalanceu	SLADIE	Stable	No	INII	INII	GOOU	Normai	Normai	<3%	<5%	No	No	15-40y	nigii	nigii	
8	microcorys	25	5 14	700	8.4	770	2.97	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	
	Melaleuca	10	12	710	9.53	75.0	2.02	Matura	Cingle	NU	Normal	Normal	Delenced	Stable	Stable	No	NII	NU	Cood	Normal	Normal	< F 0/	< F 0/	No	No	40.41	Uiah	Lliab	
5	Syncarpia	10	5 12	/10	0 8.52	750	2.95	wature	Single	INIL	Normai	Normai	Dalaliceu	SLADIE	Stable	No	INII	INII	GOOU	Normai	Normai	<3%	<5%	No	No	40y+	півц	півіі	
10) glomulifera	13	8 8	310	3.72	350	2.13	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	
11	Eucalyptus	20	14	670	8.04	720	2 00	Maturo	Singlo	NII	Normal	Normal	Palancod	Stable	Stable	No	Nil	NU	Good	Normal	Normal	~E9/	<e%< td=""><td>No</td><td>No</td><td>40.4</td><td>High</td><td>High</td><td></td></e%<>	No	No	40.4	High	High	
	Melaleuca	20	14	670	8.04	720	2.00	wature	Single	INIL	Normai	Normai	Balanceu	SLADIE	Stable	No	INII	INII	GOOU	Normai	Normai	<3%	<5%	No	No	40y+	nigii	підн	
12	quinquenervia	13	8 7	510	6.12	610	2.69	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	
13	Melaleuca	12		250		200	1.07	Matura	Cingle	NU	Normal	Normal	Delenced	Stable	Stable	No	NII	NU	Cood	Normal	Normal	< F 0/	< F 0/	No	No	40.41	Uiah	Lliab	
13	Melaleuca	12	/	250) 3	290	1.97	wature	Single	INIL	Normai	Normai	Balanceu	SLADIE	Stable	No	INII	INII	GOOU	Normai	Normai	<3%	<5%	No	No	40y+	nigii	nigii	
14	quinquenervia	12	8	350	4.2	380	2.20	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	
10	Eucalyptus	26	. 14	700	0 4	790	2.00	Matura	Cingle	NU	Normal	Normal	Delenced	Stable	Stable	No	NII	NU	Cood	Normal	Normal	< F 0/	< F 0/	No	No	40.41	Uiah	Lliab	
15	Liquidambar	26	0 14	/00	8.4	780	2.98	iviature	Single	NIL	Normai	Normai	Balanced	Stable	Stable	No	NII	INII	Good	Normai	Normai	<5%	<5%	No	No	40y+	High	High	
16	styraciflua	10	9	320	3.84	360	2.15	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	
	F															Na	Fuidence								Ne				Extensive decay throughout
17	saligna	24	14	820	9.84	880	3.14	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	of decav	Wound	Good	Normal	Normal	<5%	<5%	evidence	evidence	40v+	High	Low	body present
	Grevillea															No	,							No	No	- /	0	-	, .
18	8 robusta	17	8	490	5.88	540	2.55	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	
19) mimosifolia	17	8	410	4.92	440	2.34	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40v+	High	High	
	Corymbia								Ŭ							No								No	No	,		0	
20) citriodora	22	16	840	10.08	900	3.17	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	
21	Eucalyptus	21	12	480	5.76	540	2.55	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	NO evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	NO evidence	NO evidence	40v+	High	High	
	Syncarpia															No								No	No	- /	0	5	
22	glomulifera	12	2 6	400	4.8	440	2.34	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	
23	maculata	19	8	405	4.86	420	2.30	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40v+	High	High	
	Syncarpia															No		1						No	No	-,			
24	glomulifera	13	6	305	3.66	330	2.08	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	
25	Jacaranda imimosifolia	q	8	275	33	220	1.75	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	NO evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	NO evidence	40v+	High	High	
	Angophora			275	5.5	220	2.75		2							No			2000			570	5,0	No	No				
26	costata	8	3 7	265	3.18	300	2.00	Mature	Single	NIL	Normal	Normal	Balanced	Stable	Stable	evidence	Nil	Nil	Good	Normal	Normal	<5%	<5%	evidence	evidence	40y+	High	High	

Appendix B Tree Location Plans

Tree Protection Plans





Project: Greenwich Public School K -1 Client: GHD DWG: A01 REV D Plan: Tree Location Plan Date: 4 Dec 2017 Scale : Not to Scale

Tree to be Retained and Protected

Tree not viable to be retained due to proposed development

Tree to be Removed

Tree Protection Zone (TPZ) in accordance with AS4970-2009

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Tree to be Retained and Protected

Tree not viable to be retained due to proposed development

Tree to be Removed

Tree Protection Zone (TPZ) in accordance with AS4970-2009

Birds Tree Consultancy

Project: Greenwich Public School K -1 Client: GHD DWG: A02 REV D Plan: Tree Protection Plan Date: 4 Dec 2017 Scale : Not to Scale

Appendix C – Safe Useful Life Expectancy

SOLE OATEOONIEO AND OOD-OATEOONIEO

	1	2	3	4	5
	Long SULE:	Medium SULE:	Short SULE:	Remove:	Small, Young or regularly clipped:
	Trees that appeared to be retainable at the time of assessment for more than 40 years with and acceptable level of risk	Trees that appeared to be retainable at the time of assessment for 15 to 40 years with and acceptable level of risk	Trees that appeared to be retainable at the time of assessment for 5 to 15 years with and acceptable level of risk	Trees that should be removed within the next 5 years	Trees that can be reliably transplanted or replaced
A	Structurally sound trees located in positions that can accommodate future growth	Trees that may only live for between 15 and 40 more years	Trees that may only live for between 5 and 15 more years	Dead, dying, supressed or declining trees through disease or inhospitable conditions	Small trees less than 5 metres in height
В	Trees that could be made suitable for retention in the long term by remedial Care	Trees that may live for more than 40 years, but would need to be removed for safety or nuisance reasons	Trees that may live for more than 15 years, but would need to be removed for safety or nuisance reasons	Dangerous trees through instability or recent losss of adjacent trees	Young trees less than 15 years old but over 5 metres in height
o i	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention	Trees that may live for more than 40 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting	Trees that may live for more than 15 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting	Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form	Trees that have been regularly pruned to arteficially control growth
D		Trees that could be made suitable for retention in the medium term by remedial Care	Trees that require substantial remedial care and are only suitable for retention in the short term	Damaged trees that are clearly not safe to retain	
E STATE				Trees that may live for more than 5 years, but should be removed to prevent interference with more suitable individuals or to provide space for new planting	
F				Trees that may cause damage to existing structures within 5 years	
G				Trees that will become dangerous after removal of other trees for reasons given in 1A- 1F	

Ref: Barrell, Jeremy (1996)

Pre-development Tree Assessment Proceedings of the International Conference on Trees and Building Sites (Chicago)